Amador County
Local Hazard Mitigation Plan Update
May 2020

FOSTER MORRISON
CONSULTING

Executive Summary

This LHMP Update serves to update the 2014 Federal Emergency Management Agency (FEMA) approved Amador County LHMP. The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. Amador County, five incorporated communities, and ten special districts prepared this Local Hazard Mitigation Plan (LHMP) Update to the FEMA approved 2014 Amador County LHMP, in order to make the County and its residents less vulnerable to future hazard events.

This LHMP Update demonstrates the community's 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 FEMA Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Program (PDM), and the Flood Mitigation Assistance Program (FMA).

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. The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards.

LHMP 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 hazard mitigation planning process and identifies relevant hazards and vulnerabilities and strategies the County will use to decrease vulnerability and increase resiliency and sustainability in the community.

This is a multi-jurisdictional plan with the following seeking approval of the plan by FEMA:

- Amador County*
- City of Amador City*
- City of Ione*
- City of Jackson*
- City of Plymouth*
- City of Sutter Creek*
- Amador Water Agency*
- Amador Fire Safe Council*
- Lockwood Fire Protection District*
- Jackson Valley Irrigation District
- Pine Grove Community Services District

- River Pines Public Utility District
  * Participated in 2014 Amador County LHMP

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. The County and all participating 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 County 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 by all participating jurisdictions or the Amador County Planning Area. Once approved by Cal OES and FEMA, this LHMP Update will be adopted and implemented by the County and all participating jurisdictions over the next five years.

Risk Assessment

The HMPC conducted a risk assessment that identified and profiled hazards that pose a risk to the County and participating jurisdictions, assessed the vulnerability of the Planning Area to these hazards, and examined the existing capabilities to mitigate them.

The Amador County Planning Area is vulnerable to numerous hazards that are identified, profiled, and analyzed in this Plan. Floods, earthquakes, drought, levee failures, landslides, wildfires, and other severe weather events are among the hazards that can have a significant impact on the County. Table ES-2 details the hazards identified for this Amador County LHMP Update.

Table ES-2 Amador County Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude / Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect/Pests	Extensive	Highly Likely	Limited	Medium	Low
Aquatic Invasive Species	Significant	Highly Likely	Limited	Low	Low
Avalanche	Limited	Likely	Negligible	Low/ Medium	Medium
Climate Change	Extensive	Likely	Limited	Medium	–
Dam Failure	Limited	Unlikely	Critical	High	Medium
Drought & Water shortage	Extensive	Likely/Occasional	Limited	Medium	High
Earthquake (large damaging/small)	Significant	Unlikely/Likely	Catastrophic	High	Low
Floods: 1%/0.2% annual chance	Significant	Occasional/ Unlikely	Critical	High	Medium
Floods: Localized Stormwater	Extensive	Highly Likely	Critical	Medium	Medium
Landslide, Mudslide, Debris Flow	Significant	Highly Likely	Critical	Medium	Medium
Levee Failure	Limited	Occasional	Limited	Low	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely/ Occasional	Limited	Medium	Low
Severe Weather: Winter Storms and Freeze	Significant	Highly Likely	Limited	Medium	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High	High

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, the participating jurisdictions and the HMPC developed a mitigation strategy for reducing the County's and all participating jurisdictions' risk and vulnerability to hazards. The resulting Mitigation Strategy for the Amador County Planning Area is comprised of LHMP goals and objectives and a mitigation action plan which includes a series of mitigation action projects and implementation measures. Based on the risk assessment, the HMPC identified goals and objectives for reducing the Amador County Planning Area's vulnerability to hazards. The goals and objectives of this multi-hazard mitigation plan are:

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 risk and vulnerability to dam failure
- 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.

Actions to support these goals are shown on Table ES-3.

Table ES-3 Amador County Planning Area Mitigation Actions

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 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	Amador County	2014 Action	X	X	X	Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Amador County and all jurisdictions	2014 Action	X	X	X	Public Information
Action 3. Evaluate All Major and Minor Structures Along Evacuation Routes within Amador County Right of Way	Amador County and all jurisdictions	New Action	X	X		Emergency Services
Action 4. Evaluate All Roadways Used as Evacuation Routes within Amador County Right of Way	Amador County and all jurisdictions	New Action	X	X		Emergency Services
Action 5. Harden and Enhance Cell service: Additional Cell/Repeater Towers/Mobile Repeaters, Generator Backup, Etc.	Amador County and all jurisdictions	New Action	X	X		Emergency Services
Action 6. Amador County Evacuation planning for all Hazards; Include Establishment of Sheltering in Place and Refuge areas.	Amador County and all jurisdictions	New Action	X	X		Emergency Services
Action 7. Reverse 911 Enhancements	Amador County and all jurisdictions	New Action	X	X		Prevention Emergency Services
Action 8. Enhance Agency Communications	Amador County and all jurisdictions	New Action	X	X		Prevention Emergency Services
Action 9. PRC 4290 Compliant Street and Address Signage for Rural Areas	Amador County and all jurisdictions	2014 Action	X	X		Prevention Emergency Services
Action 10. Fixed Generators to Essential County Facilities	Amador County and all jurisdictions	New Action	X	X		Prevention Emergency Services Property Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 11. Implement modern GIS capabilities in Amador County	Amador County and all jurisdictions	2014 Action	X	X		Prevention Emergency Services Property Protection
Avalanche Actions						
Action 12. Annual Review of Kirkwood Ski Area Avalanche Mitigation Program	Amador County	2014 Action	X	X		Prevention Property Protection
Agricultural Hazard Actions						
Action 13. Invasive Insect Pests	Amador County and all jurisdictions	2014 Action	X	X		Prevention Property Protection Natural Resource Protection
Action 14. Invasive Weed Pests	Amador County and all jurisdictions	2014 Action	X	X		Prevention Property Protection Natural Resource Protection
Climate Change Actions						
Action 15. Energy Action Plan	Amador County and all jurisdictions	New Action	X	X		Prevention
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	Amador County and all jurisdictions	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 17. Review and Amend Flood Ordinance as Appropriate	Amador County	2014 Actions	X	X	X	Prevention Property Protection
Action 18. Evaluate All Areas With Localized Flooding Along Amador County Maintained Roadways	Amador County and all jurisdictions	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 19. Monitor Shakeridge Road (upcountry) for Landslide or Road Movement	Amador County and all jurisdictions	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 20. Evaluate Each Roadways That is Subject to Local Land Movement and Minimize Debris Removal within Amador County Right of Way	Amador County and all jurisdictions	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Earthquake Actions						
Action 21. Identify Un-Reinforced Masonry (URM) and other seismically vulnerable buildings in the County	Amador County and all jurisdictions	2014 Action	X	X		Property Protection Structural Projects
Wildfire and Drought and Water Shortage Actions						
Action 22. Evaluate Evacuation Routes for Wildfire That Serve Critical Infrastructure	Amador County and all jurisdictions					Prevention Emergency Services
Action 23. Community Ingress/Egress – Phase I: Fire Safe Programs and Public Education Activities*	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Prevention Public Information Property Protection Natural Resource Protection
Action 24. Community Ingress/Egress – Phase II: Brush Clearing and Fuels Reduction*	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Prevention Public Information Property Protection Natural Resource Protection
Action 25. Construction of Mitchell Mine Fuelbreak*	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Property Protection Natural Resource Protection
Action 26. Outreach and Public Information Immobile Citizen Evacuation*	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Public Information Emergency Services Property Protection Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 27. Development of Firewise Communities in Amador County*	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Public Education Prevention Property Protection Natural Resource Protection
Action 28. Pine Acres Vegetation Management Program (2526 Acres)	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Public Education Prevention Property Protection Natural Resource Protection
Action 29. Shake Fiddletown Vegetation Management Program (2526 Acres)	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Public Education Prevention Property Protection Natural Resource Protection
City of Amador City Actions						
Localized Flood Actions						
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	City of Amador City	2014 Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	City of Amador City and all Jurisdictions	New Action	X	X	X	Public Information
Action 3. Wastewater Plant Emergency Power	City of Amador City	2014 Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 4. Midtown Sewer Crossing	City of Amador City	2014 Action	X	X	X	Property Protection Structural Project Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 5. Vegetation Management	City of Amador City	2014 Action	X	X		Prevention Property Protection Natural Resource Protection
Action 6. Landslide and Slope Failure Mitigation	City of Amador City	New Action	X	X		Prevention Property Protection Natural Resource Protection
City of Ione Actions						
Multi-Hazard Actions						
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	City of Ione	2014 Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	City of Ione and all Jurisdictions	New Action	X	X	X	Public Information
Action 3. Harden and Enhance Cell Service: Additional Call/repeater towers/mobile repeaters generator back up	City of Ione	New Action	X	X		Emergency Services
Action 4. Shelter Upgrades to Evalyn Bishop Hall (E.B. Hall)	City of Ione	2014 Action	X	X		Prevention Emergency Services
Action 5. Backup generators	City of Ione	New Action	X	X		Property Protection Emergency Services
Flood, Localized Flood, and Levee Failure Actions						
Action 6. Flood Ordinance Review and Update	City of Ione	New Action	X	X	X	Prevention
Action 7. Develop and Implement Storm Water Master Plan	City of Ione	New Action	X	X	X	Prevention Property Protection Structural Projects Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 8. Develop Watershed Based Flood Reduction Programs	City of Ione and all Jurisdictions	New Action	X	X	X	Prevention Property Protection Structural Projects Natural Resource Protection
Action 9. Stream Maintenance and Debris/Sediment Removal	City of Ione	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 10. Replace Five Mile Bridge	City of Ione and all Jurisdictions	New Action	X	X	X	Property Protection Structural Projects
Action 11. Pursue certification of the Levee along Sutter Creek					X	Property Protection Structural Projects
Wildfire Actions						
Action 12. Ordinance Review – Wildland Urban	City of Ione	New Action	X	X		Prevention
City of Jackson Actions						
Multi-Hazard Species Actions						
Action 1.Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	City of Plymouth	2014 Action	X	X		Prevention
Action 2.Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	City of Plymouth and all jurisdictions	New Action	X	X	X	Prevention Public Information
Action 3.Station 131 generator	City of Plymouth	New Action	X	X		Prevention Property Protection Emergency Services
Dam Failure, Flood, Localized Flood Actions						
Action 4.Buena Vista Flood Mitigation Project	City of Plymouth	2014 Action	X	X	X	Property Protection Structural Projects Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 5.Busi Parking Lot Slope Drainage	City of Plymouth	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 6.Annual Creek Cleaning	City of Plymouth	2014 Action	X	X	X	Property Protection Natural Resource Protection
Wildfire Actions						
Action 7.Starks Lane Bridge	City of Plymouth	New Action	X	X		Property Protection Structural Projects Natural Resource Protection
Action 8.Defensible Space	City of Plymouth	New Action	X	X		Property Protection Natural Resource Protection
Action 9.Picardo Bridge	City of Plymouth	New Action	X	X		Property Protection Structural Projects Natural Resource Protection
City of Plymouth Actions						
Multi-Hazard Actions						
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	City of Plymouth	2014 Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	City of Plymouth and all Jurisdictions	New Action	X	X	X	Prevention Public Information
Action 3. Secure City Hall as Critical Infrastructure with Commercial Generator	City of Plymouth	2014 Action	X	X		Prevention Property Protection Emergency Services

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 4. Indian Creek Stream Restoration & Culvert Improvement in Flood Hazard Zone	City of Plymouth	2014 Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 5. Maintain and Enhance Water Canal by Converting Earthen Arroyo Ditch to Fixed Pipeline or Gunite Lined Canal	City of Plymouth	2014 Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 6. Develop a Community Wildfire Prevention Plan	City of Plymouth	2014 Action	X	X		Prevention Public Information Property Protection Structural Projects Natural Resource Protection
City of Sutter Creek Actions						
Multi-Hazard Actions						
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	City of Sutter Creek	2014 Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	City of Sutter Creek and all Jurisdictions	New Action	X	X	X	Prevention Public Information
Action 3. Development of Walking Paths, Native Tree Protection & Native Tree Species Planting	City of Sutter Creek	New Action	X	X	X	Natural Resource Protection
Action 4. Installation of Generator at City Hall and Community Center	City of Sutter Creek	New Action	X	X		Property Protection
Action 5. Upgrade Ditches and Culverts	City of Sutter Creek	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 6. Develop a Stormwater Management Plan	City of Sutter Creek	New Action	X	X	X	Prevention Property Protection Structural Projects Natural Resource Protection
Floods and Localized Flood Actions						
Action 7. Sutter Creek City Hall Flooding	City of Sutter Creek	2014 Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 8. Sutter Creek Bank Stabilization	City of Sutter Creek	2014 Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Wildfire Actions						
Action 9. Perimeter Wildfire Protection Fuel Break	City of Sutter Creek and all Jurisdictions	New Action	X	X		Property Protection Natural Resource Protection
Amador Water Agency Actions						
Multi-Hazard Actions						
Action 1. AWP Standby Generators	Amador Water Agency and all Jurisdictions	New Action	X	X		Property Protection
Ag Hazards and Aquatic Invasive Species Actions						
Action 2. Amador and Ione Water Systems Taste and Odor Mitigation	Amador Water Agency and all Jurisdictions	New Action	X	X		Prevention
Climate Change Actions						
Action 3. Lower Bear Reservoir Expansion Study	Amador Water Agency and all Jurisdictions	New Action	X	X	X	Structural Projects
Drought and Water Shortage and Wildfire Actions						
Action 4. Replacement of Two Hypalon Lined and Covered Tanks with New Tanks	Amador Water Agency and all Jurisdictions	New Action	X	X		Property Protection Structural Projects

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 5. Mt. Crossman Main Area Tank for Upper CAWP System	Amador Water Agency and all Jurisdictions	New Action	X	X		Property Protection Structural Projects
Action 6. Upgrade Fire Pumps	Amador Water Agency and all Jurisdictions	2014 Action	X	X		Property Protection Structural Projects
Flood and Localized Flood Actions						
Action 7.Mace Meadows Pump Station Flooding	Amador Water Agency and all Jurisdictions	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 8.Eggiman Lane Flooding	Amador Water Agency and all Jurisdictions	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Amador Fire Safe Council Actions						
Multi-Hazard Actions						
Action 1. Community Ingress/Egress – Phase I: Fire Safe Programs and Public Education Activities*	Amador County and all Jurisdictions	New Action	X	X		Prevention Public Information Property Protection Natural Resource Protection
Action 2. Community Ingress/Egress – Phase II: Brush Clearing and Fuels Reduction*	Amador County and all Jurisdictions	New Action	X	X		Prevention Public Information Property Protection Natural Resource Protection
Action 3. Construction of Mitchell Mine Fuelbreak*	Amador County and all Jurisdictions	New Action	X	X		Property Protection Natural Resource Protection
Action 4. Outreach and Public Information Immobile Citizen Evacuation*	Amador County and all Jurisdictions	New Action	X	X		Public Information Emergency Services Property Protection Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 5. Development of Fire Wise Communities in Amador County*	Amador County and all Jurisdictions	New Action	X	X		Public Education Prevention Property Protection Natural Resource Protection
Action 6. Establish Fire Breaks on three parallel ridges (Antelope, Doakes and Panther)*	Amador County and all Jurisdictions	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 7. Amador Soil Health and Agricultural Resiliency Program*	Amador County and all Jurisdictions	New Action	X	X		Prevention Property Protection Natural Resource Protection
Lockwood Fire Protection District Actions						
Multi-Hazard Actions						
Action 1. Emergency Action Plan and Post-Disaster Recovery Plan	LFPD, Amador County	New Action	X	X		Prevention Emergency Services
Action 2. COW – Celltower on Wheels	LFPD, Amador County	2014 Action	X	X		Emergency Services
Action 3. Undergrounding of Overhead Power Lines	LFPD, Amador County	New Action	X	X		Property Protection Structural Projects Natural Resource Protection
Flood: Localized Flooding and Heavy Rains and Storms						
Action 4. Water Hazards: Dam Failure Study; Dry Creek Ford crossing on Hale Road	LFPD, Amador County	New Action	X	X	X	Property Protection Natural Resource Protection
Wildfire Actions						
Action 5. Water Tanks Installation and GIS tank location recording	LFPD, Amador County	2014 Action	X	X		Property Protection Structural Projects
Action 6. Public Education, Defensible Space, Firewise Communities	LFPD, Amador County	New Action	X	X		Prevention Public Information

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 7. Remodel/renovation Stations 151, 152	LFPD, Amador County	2014 Action	X	X		Property Protection Structural Projects Emergency Services
Jackson Valley Irrigation District						
Ag Hazards Actions						
Action 1. Outreach to Farmers regarding Agricultural Hazards in the Area	JVID, Amador County	New Action	X	X		Public Information
Aquatic Invasive Species Actions						
Action 2. Lake Amador Aquatic Invasive Species Monitoring	JVID and all Jurisdictions	New Action	X	X		Prevention Property Protection
Climate Change Actions						
Action 3. Long Term Water Solutions Analysis Due to Climate Change	JVID and all Jurisdictions	New Action	X	X		Prevention
Dam Failure Actions						
Action 4. Jackson Creek Dam Immediate Inundation Area Public Outreach – Dam Failure	JVID, Amador County	New Action	X	X	X	Public Information Property Protection
Action 5. Jackson Creek Dam Spillway Apron Extension Project	JVID, Amador County	New Action	X	X	X	Property Protection Structural Projects
Drought and Water Shortage and Wildfire Actions						
Action 6. JVID Water Meter Maintenance Program	JVID	New Action	X	X		Prevention
Action 7. JVID Water Procurement and Additional Water Storage Study	JVID and all Jurisdictions	New Action	X	X		Prevention Structural Projects
Action 8. Lake Amador Spillway Rubber Dam Project	JVID, Amador County	New Action	X	X	X	Prevention Structural Projects
Earthquake Actions						
Action 9. Jackson Creek Dam Seismic Evaluation and Liquefaction Study	JVID, Amador County	New Action	X	X		Prevention Structural Projects
Flood Actions						

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 10. Lake Amador Drive Box Culvert Expansion Project	JVID, Amador County	New Action	X	X	X	Property Protection Structural Projects
Levee Failure Actions						
Action 11. Jackson Creek Levee Maintenance Project	JVID, Amador County	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Severe Weather Actions						
Action 12. JVID Office Backup Generator	JVID	New Action	X	X		Prevention Property Protection
Action 13. JVID Freeze Protection Project	JVID	New Action	X	X		Prevention Property Protection
Wildfire Actions						
Action 14. JVID Fire Hydrant Expansion Project	JVID, and all Jurisdictions	New Action	X	X		Prevention Property Protection Structural Projects Natural Resource Protection
Pine Grove CSD Actions						
Multi-Hazard Actions						
Action 1. Hydrant Project - Install water lines and add 16 fire hydrants to the area above Lupe Road in Pine Grove. There are 64 homes in this area that are on wells and there are no fire hydrants available.	PGCSD	New Action	X	X		Property Protection Structural Projects Natural Resource Protection
Severe Weather Actions						
Action 2. Warming/Cooling Center/Generator	PGCSD	New Action	X	X		Prevention
River Pines PUD Actions						
Multi-Hazard Actions						
Action 1. Wildfire Prevention and Public Education	RPPUD	New Action	X	X		Prevention Public Information

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 2. Stormwater Drainage	RPPUD	New Action	X	X	X	Prevention Property Protection Structural
Action 3. Backup Generators	RPPUD	New Action	X	X		Structural
Action 4. Rebuild Culvert/Road at Consumnes River Access Point	RPPUD	New Action	X	X	X	Property Protection Structural

* These actions are both County and Fire Safe Council joint actions.

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Annexes

Appendices

Appendix D: Adoption Resolution

Appendix E: Threatened and Endangered Species

Appendix F: Critical Facilities

Appendix G: Wildfire History

Abbreviations and Acronyms

Acronym	Definition
AB	Assembly Bill
ACS	American Community Survey
ACPHD	Amador County Public Health Department
AFSC	Amador Fire Safe Council
APG	Adaptation Planning Guide
APN	Assessor Parcel Numbers
AQI	Air Quality Index
AWA	Amador Water Agency
AWS	Amador Water System
BAM	Best Available Map
BCEGS	Building Code Effectiveness Grading Schedule
BLM	Bureau of Land Management
CAC	Community Assistance Contact
CAWP	Central Amador Water Project
CBC	California Building Code
Cal DWR	California Department of Water Resources
Cal OES	California Office of Emergency Services
CAS	Climate Adaptation Strategy
CAV	Community Assistance Visit
CCSM3	Community Climate System Model Version 3
CDAA	California Disaster Assistance Act
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Health
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CGS	California Geological Survey
CNNDB	California Natural Diversity Database
CNPS	California Native Plant Society
CNRA	California Natural Resource Agency
CRCB	Coast Range Central Valley
CRS	Community Rating System
CRV	Contents Replacement Values
CUPA	Certified Unified Program Agency

Acronym	Definition
CVP	Central Valley Project
DAC	Disadvantaged Community Status
DFIRM	Digital Flood Insurance Rate Map
DFPZ	Defensible Fuel Profile Zone
DMA	Disaster Mitigation Act
DSOD	Division of Safety of Dams
EBMUD	East Bay Municipal Utility District
EF	Enhanced Fujita
EOP	Emergency Operations Plan
F	Fujita
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FGA	Future Growth Area
FHSZ	Fire Hazard Severity Zones
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance
FMMP	Farmland Mapping and Monitoring Program
FRA	Federal Responsibility Area
FRAP	Fire and Resource Assessment Program
GFDL	Geophysical Fluid Dynamics Laboratory
GHG	Greenhouse Gas
GIS	Geographic Information Systems
HMGP	Hazard Mitigation Grant Program
HMPC	Hazard Mitigation Planning Committee
IBC	International Building Code
ICC	Increased Cost of Compliance
IPCC	Intergovernmental Panel on Climate Change
IRC	International Residential Code
IRWM	Integrated Regional Water Management
JVID	Jackson Valley Irrigation District
LAFCO	Local Agency Formation Commission
LFPD	Lockwood Fire Protection District
LOMA	Letter of Map Amendment
LOMR	Letter of Map Revision
LHMP	Local Hazard Mitigation Plan
LRA	Local Responsibility Area

Acronym	Definition
MAF	Million Acre-Feet
MERS	Middle East Respiratory Syndrome
MHDP	Multi-Hazards Demonstration Project
MHI	Median Household Income
MMI	Modified Mercalli Intensity
MPH	Miles Per Hour
MSL	Mean Sea Level
NCDC	National Climactic Data Center
NDMC	National Drought Mitigation Center
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NIDIS	National Integrated Drought Information System
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NWS	National Weather Service
OES	Amador County Office of Emergency Services
OHP	Office of Historic Preservation
PA	Public Assistance
PD	Planned Development
PDM	Pre-Disaster Mitigation
PGCSD	Pine Grove Community Services District
PG&E	Pacific Gas and Electric
PM	Particulate Matter
PNAS	Proceedings of the National Academy of Sciences
PSPS	Public Safety Power Shutoff
RCP	Representative Concentration Pathways
RL	Repetitive Loss
RPPUD	River Pines Public Utility District
SAC-SJ	Sacramento-San Joaquin
SB	Senate Bill
SBA	Small Business Administration
SDAC	Severely Disadvantaged Community
SFHA	Special Flood Hazard Area
SGMA	Sustainable Groundwater Management Act
SH	State Highway
SOI	Sphere of Influence
SPA	Special Plan Area

Acronym	Definition
SPI	Sierra Pacific Industries
SR	State Route
SRA	State Responsibility Area
SRL	Severe Repetitive Loss
SUP	Special Use Permit
SWP	State Water Project
TC	Town Center
TCP	Traditional Cultural Properties
UBC	Uniform Building Code
UCERF	Uniform California Earthquake Rupture Forecast
UHI	Urban Heat Island
UMRWA	Upper Mokelumne River Watershed Authority
URM	Unreinforced masonry
USACE	US Army Corps of Engineers
USDA	US Department of Agriculture
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
WHO	World Health Organization
WRCC	Western Regional Climate Center
WUI	Wildland Urban Interface

Chapter 1 Introduction

1.1 Purpose

Amador County, five incorporated communities, and six special districts prepared this Local Hazard Mitigation Plan (LHMP) Update to the Federal Emergency Management Agency (FEMA) approved 2014 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. This LHMP Update demonstrates the community's 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 FEMA Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Program (PDM), and the Flood Mitigation Assistance Program (FMA).

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 additional expenses incurred by 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 reduced or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of $6 in avoided future losses in addition to saving lives and preventing injuries (National Institute of Building Science Multi-Hazard Mitigation Council 2017 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 2020 LHMP Update 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*
- Amador Fire Safe Council*
- Lockwood Fire Protection District*
- Jackson Valley Irrigation District
- Pine Grove Community Services District
- River Pines Public Utility District

* Participated in 2014 Amador County LHMP

All plan participants from the 2014 Amador County Plan are participating in this LHMP Update.

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.) While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). This planning effort also follows FEMA's 2013 Plan Preparation Guidance. Because the Amador County Planning Area is subject to many kinds of hazards, access to FEMA grant 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 critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. The Amador County Planning Area has been affected by hazards in the past and is thus committed to reducing future impacts from hazard events and maintaining eligibility for mitigation-related federal funding.

1.3 Community 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 1-1. Multiple entities own land in Amador County. A land ownership map can be seen on Figure 1-2 and is detailed in Table 1-1.

Figure 1-1 Amador County

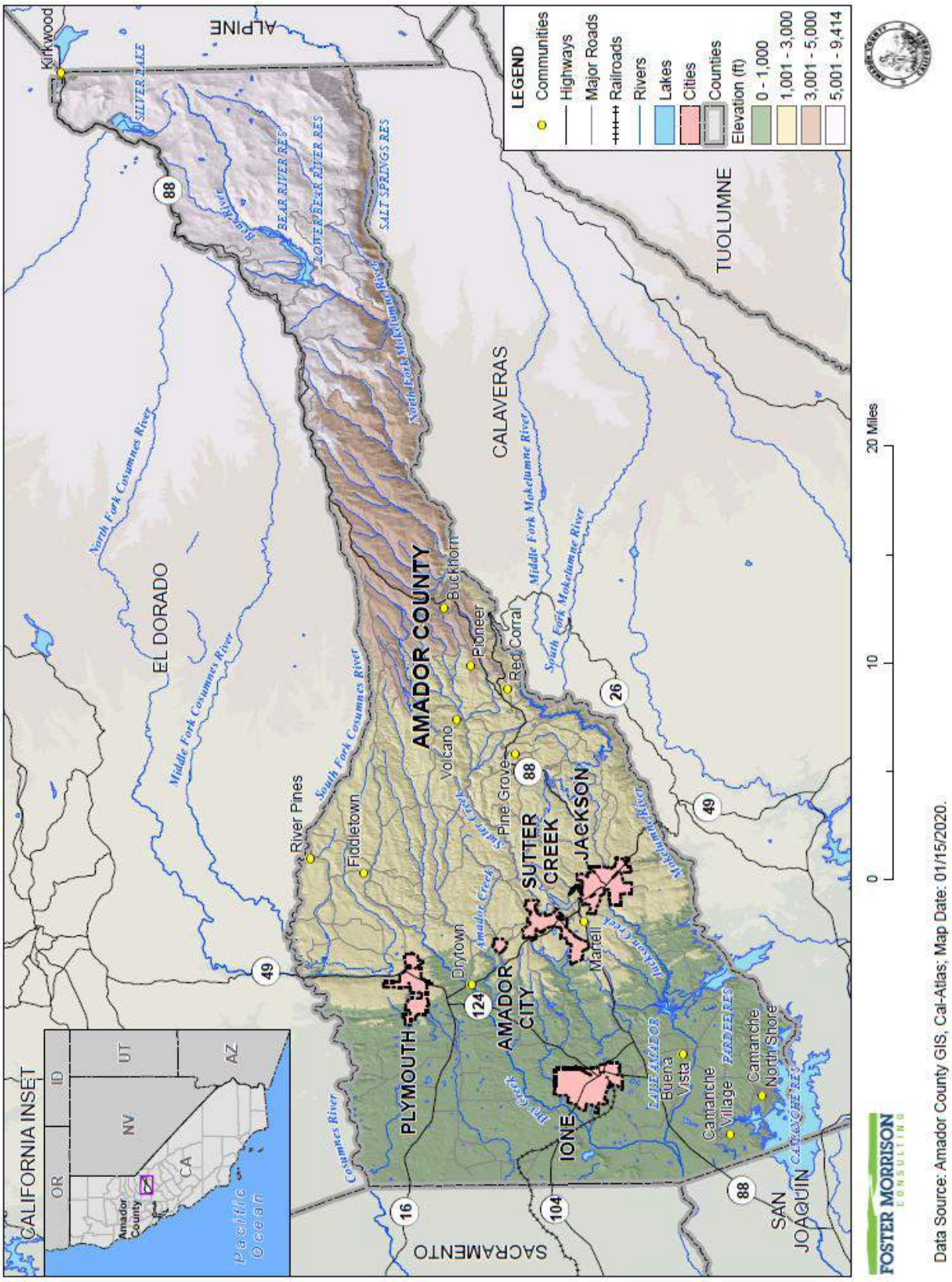


Figure 1-2 Amador County – Land Ownership

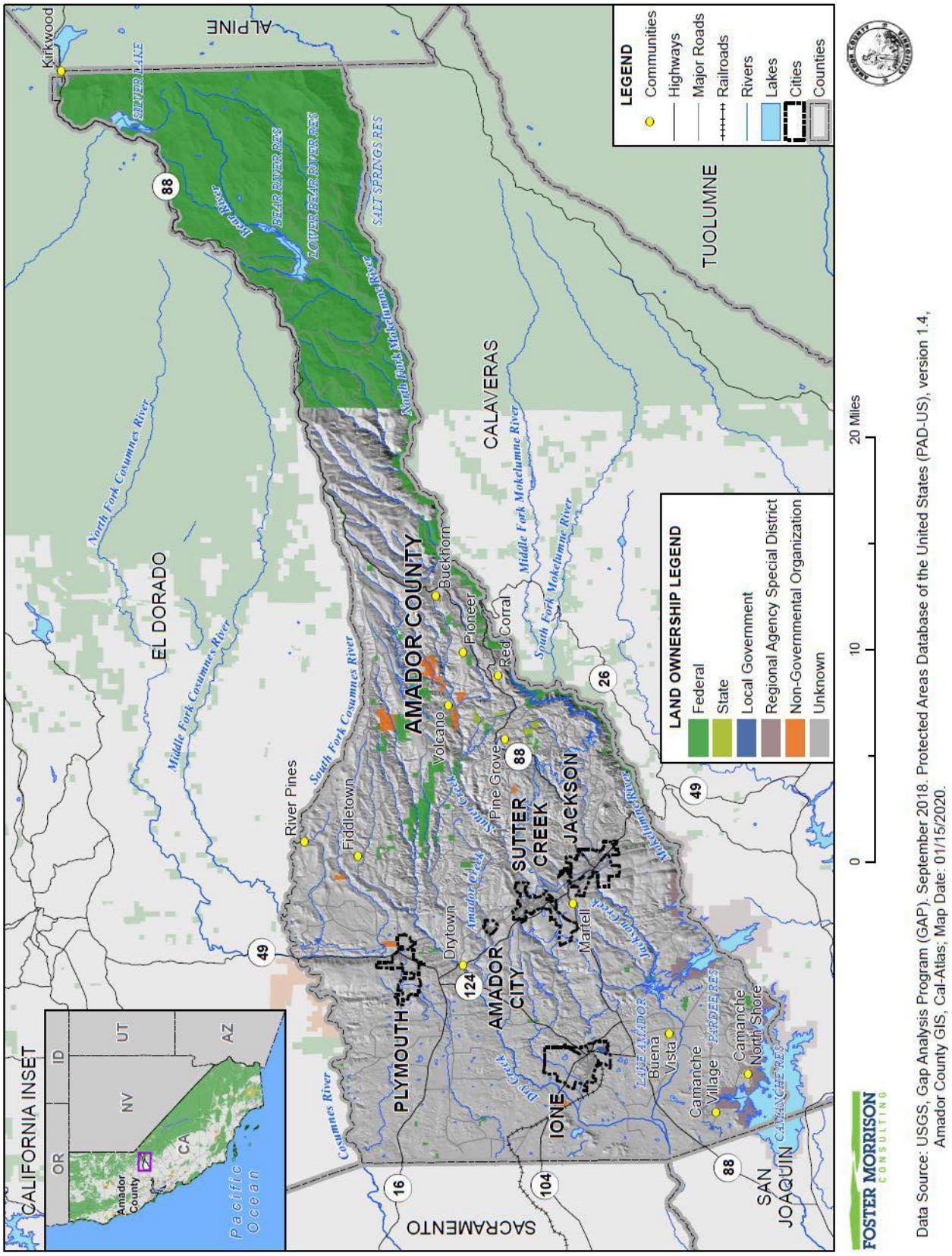


Table 1-1 Amador County Planning Area – Land Ownership

Land Ownership	Total Acres	% of Total Acres
Federal	222,374.34	43.49%
Irrigation/Utility District	8,696.48	1.70%
Local Government	115.46	0.02%
Non-Governmental Organization	1,790.48	0.35%
State	599.30	0.12%
Unknown	1.91	0.00%
Grand Total	**233,577.97**	**45.69%**
Non-Designated Land Ownership (Countywide)	**277,698.30**	**54.31%**
Countywide Total	**511,276.27**	**100.00%**

Source: USGS

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 9000 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 2019 estimates for population of the County and its jurisdictions are shown in Table 1-2.

Table 1-2 Amador County Population by Jurisdiction, 2019

Jurisdiction	Total Population
City of Amador City	188
City of Ione	7,991
City of Jackson	4,770
City of Plymouth	1,012
City of Sutter Creek	2,559

Jurisdiction	Total Population
Unincorporated County	21,774
Total	**38,294**

Source: California Department of Finance, 2019 E-1 Report

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

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

Statistic	Number
Populations	
Population under 5	1,431
Population over 65	7,865
Median Age	48.2
Racial Makeup	
White	87.0%
Black or African American	2.5%
American Indian or Alaska Native	1.8%
Asian	1.1%
Native Hawaiian or Pacific Islander	0.2%
Some Other Race	3.8%
Two or more races	3.6%
Income	
Median income	$74,151
Mean Income	$91,557
Poverty rate	
All families	5.2%
All people	10.6%
Unemployment Rate (December 2019)	3.7%

Source: 2010 US Census, 2017 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 County. These are shown in Table 1-4.

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

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	378	2.8%

Industry	Estimated Employment	Percent
Construction	947	7.0%
Manufacturing	667	5.0%
Wholesale trade	142	1.1%
Retail trade	1,656	12.3%
Transportation and warehousing, and utilities	703	5.2%
Information	257	1.9%
Finance and insurance, and real estate and rental and leasing	496	3.7%
Professional, scientific, and management, and administrative and waste management services	1,112	8.3%
Educational services, and health care and social assistance	2,649	19.7%
Arts, entertainment, and recreation, and accommodation and food services	2,105	15.7%
Other services, except public administration	787	5.9%
Public administration	1,545	11.5%

Source: US Census Bureau American Community Survey 2017 Estimates

Major employers in the County are shown in Table 1-5.

Table 1-5 Major Employers in Amador County

Employer Name	Location	Industry
Amador County Sheriff	Jackson	Government Offices-County
American Legion Post No 108	Sutter Creek	Ambulance Service
Ampine	Sutter Creek	Plywood & Veneers-Manufacturers
Argonaut Care Home	Jackson	Nursing & Convalescent Homes
Beth Sogaard Catering	Plymouth	Caterers
Borjon Vineyard & Labor Svc	Plymouth	Farm Management Service
Forestry Fire Protection Ca Dept	Pine Grove	City Government-General Offices
Ione Elementary School	Ione	Schools
Jackson Casino & Resort	Jackson	Casinos
Jackson Rancheria Casino Resrt	Jackson	Casinos
Kit Carson Nursing & Rehab	Jackson	Hospitals
Lake Camanche Marina & Grill	Ione	Marinas
Lowe's Home Improvement	Jackson	Home Centers
Mariah Resources Incorporated	Jackson	Labor Contractors
Mule Creek State Prison	Ione	Government Offices-State
Pioneer Elementary School	Pioneer	Schools
Plymouth Elementary School	Plymouth	Schools
Raley's	Jackson	Grocers-Retail
Save Mart	Jackson	Grocers-Retail

Employer Name	Location	Industry
Sierra Pacific Industries	Martell	Lumber-Manufacturers
Sutter Amador Hospital	Jackson	Hospitals
United Home Care	Jackson	Home Health Service
Volcano Public Telephones	Pine Grove	Radio/Tv Broadcasting/Comm Equip (mfrs)
Volcano Vision-Kirkwood Repair	Pine Grove	Television-Cable & CATV
Walmart	Jackson	Department Stores

Source: Economic Development Department

The County has a wide and varied tax base. Tax base information is tracked and maintained by the Amador County Assessor's Office. Table 1-6 shows the tax base for the County as well as for the incorporated jurisdictions.

Table 1-6 Unincorporated Amador County – Distribution of Value by Property Use*

Property Use	2018 Value ($)	Percent of Current Roll
Agricultural	$417,341,135	11.5%
Commercial	$264,279,914	7.3%
Industrial	$34,952,682	1.0%
Miscellaneous	$38,153,738	1.1%
Residential	$2,864,724,131	79.0%
Unknown	$6,385,312	0.2%
Total	$3,625,836,912	**100.0%**

Source: Amador County 12/31/2018 Assessor's Office data

*includes land and structure values

1.4 Plan Organization

This Amador County LHMP Update is a multi-jurisdictional plan that geographically covers the entire area within Amador County's jurisdictional boundaries (i.e., the Planning Area). The Amador County Local Hazard Mitigation Plan update is organized as follows:

Base Plan

- Chapter 1: Introduction
- Chapter 2: What's New
- 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: Amador Fire Safe Council
- Annex H: Lockwood Fire Protection District
- Annex I: Jackson Valley Irrigation District
- Annex J: Pine Grove Community Services District
- Annex K: River Pines Public Utility 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: Wildfire History

The **Base Plan** provides the overall framework for this multi-jurisdictional LHMP. It is the umbrella document that includes the planning process, methodologies, and procedural 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 six 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

Requirements §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 2014 Amador County Local Hazard Mitigation Plan (LHMP) contained descriptions of their planning processes, the risk assessments of identified hazards for the Amador County Planning Area and mitigation strategies for reducing the risk and vulnerability from these hazards. Since approval of this plan by FEMA, progress has been made by the County, the five incorporated communities, and six special Districts, most of which were participating jurisdictions to the 2014 LHMP, on implementation of the 2014 mitigation strategies. As part of this LHMP Update, a thorough review and update of the 2014 County LHMP was conducted to ensure that this Update reflects current community conditions and priorities in order to realign the updated mitigation strategy for the next five-year planning period. This section of this LHMP Update includes the following:

- **What's New in the Plan Update**. Section 2.1 provides an overview of the approach to updating the Plan 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 as well as information on current and future development trends affecting community vulnerability and related issues. The actual updated data, discussions, and associated analyses are contained in their respected sections within this LHMP Update.
- **Summary of Significant Changes to Current Conditions and Hazard Mitigation Program Priorities**. Section 2.2 provides a summary of significant changes in current conditions, changes in vulnerability, and any resulting modifications to the community's mitigation program priorities.
- **2014 Mitigation Strategy Status and Successes**. Section 0 provides a description of the status of mitigation actions from the 2014 LHMP and also indicates whether a project is no longer relevant or is recommended for inclusion in the updated 2020 mitigation strategy. This section also highlights key mitigation success stories of the County and other participating jurisdictions since the 2014 LHMP.

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

2.1 What's New in the Plan Update

This LHMP Update involved a comprehensive review and update of each section of the 2014 Plan and includes an assessment of the success of the participating communities in evaluating, monitoring, and

implementing the mitigation strategy outlined in the 2014 LHMP. Only the information and data still valid from the 2014 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;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to inventories; and
- Incorporate new action recommendations or changes in action prioritization.

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

As part of its comprehensive review and update of each section of the Plan, Amador County and 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 is identified below in this section and is also sourced in context within Chapter 4, Risk Assessment. Specific data used is sourced throughout this LHMP Update. This new data and associated analysis provided valuable input for the development of the updated mitigation strategy presented in Chapter 5 of this LHMP Update.

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

- All hazards from the 2015 Plan Update were identified and investigated for the 2020 Plan Update, with the exception of fog, subsidence, and volcanoes.
- Climate change has been addressed as a stand-alone hazard as well as within the hazard profiles of each identified hazard to assist the County in considering climate change issues when identifying future mitigation actions for the Planning Area.
- The NCDC Storm Events and FEMA/Cal OES disaster declaration tables were updated.
- New dam data provided by Cal OES and California Department of Water Division of Safety of Dams was used for the dam inventory and analysis. This data included an updated hazard classification for identified dams and updated inundation mapping. Values at risk to dam inundation was analyzed. Critical facilities and populations at risk to dams were tabulated.
- An updated GIS analysis was performed for earthquake, including two Hazus earthquake runs to show risk and provide potential loss estimates to the County from earthquake.
- An updated GIS analysis was performed for the flooding hazard for the 1% and /0.2% annual chance floods, including values at risk, critical facilities at risk, population at risk, future development, and general community impacts.

- An updated GIS analysis was performed for landslides, including values at risk, critical facilities at risk, population at risk, future development, and general community impacts.
- An updated GIS analysis was performed for the wildfire hazard, including values at risk, critical facilities at risk, population at risk, historic, cultural, and natural locations at risk, and general community impacts.
- An entire rework of the risk assessment for each identified hazard to reflect new information and to reflect the updated FEMA plan review tool. This included reworking the hazard profile and adding sections on location, extent, and new hazard event occurrences; redoing the entire vulnerability analysis to add additional items and updating the vulnerability assessment based on more recent hazard data as well as using the most current parcel and assessor data for the existing built environment to develop loss estimates.
- To better meet the revised FEMA plan review tool, a more extensive analysis of the extents of each community to identified hazards was conducted and included in this LHMP Update.
- Utilizing updated critical facility GIS mapping for the Planning Area, an analysis was conducted to provide an updated inventory of critical facilities by jurisdiction and those that fall within mapped hazard areas.
- An enhanced vulnerability assessment was conducted, which added a GIS analysis of updated future development areas in the Planning Area and specific to each of the mapped hazards.
- A greater study of County and jurisdictional mitigation capabilities was added.
- Incorporation and analysis of the updated California Department of Finance population data was utilized for this LHMP Update.
- Environmental justice concerns were addressed in portions of this Plan Update.
- Also, as required by current FEMA planning guidance, an analysis of ongoing and continued compliance with the NFIP was included in this LHMP Update.

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 vulnerability, and any resulting modifications to the community's mitigation program priorities since the 2014 LHMP:

2020 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Agricultural Hazards: Severe Weather/Insects-Pests			X

- Recent 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.
- Water table seems to be dropping which can impact the Agricultural industry.

2020 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Aquatic Invasive Species	X		

- While the quagga mussel has not been found yet in Amador County, data shows that it is getting closer with many more lakes in California affected.
- No Hydrilla occurrences detected since 2014.

2020 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 changed.

2020 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Climate Change			X

- Climate change was not addressed in the last plan, but since 2014, the effects of climate change are becoming more apparent in the Amador County Planning Area and all of California.
- NWS data indicates temperatures are increasing resulting in more extreme heat days.
- Snowpack levels have been occurring at higher elevations in recent years.
- Data also suggests that changing climate conditions influence the severity of multiple hazards, such as heat, flooding, wildfire, drought, and others, identified in the Planning Area.

2020 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Dam Failure		X	

- Risk increases over years due to aging dam infrastructure.
- However, more dams are now required to do inundation mapping and develop EAPs which helps mitigate the risk.
- More people moving within Dam inundation areas will increase the County's vulnerability.

2020 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.
- State drought mandates, including conservations measures, to protect water supply throughout California have been implemented and some continue within the Planning Area.
- Recent drought conditions have contributed 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.
- Although drought impacts were significant from 2014 through 2016, the winter storms of 2017 provided some relief from the most recent drought. As the 2017 storms were very short lived, there was limited recharge to groundwater systems. Drought conditions have continued to improve with more seasonal rain occurring in 2018, 2019, and 2020.

2020 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.

2020 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Flood: 1%/0.2% events		X	

- New 2016 DFIRMs were available for this update.
- 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.
- 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.

2020 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 work to mitigate this hazard.
- Outdated drainage systems also contribute to a greater vulnerability to localized, stormwater flooding.
- 2017-2019 storms, including significant, greater intensity rains, 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.
- Recent drought conditions in some areas have hardened soils and predisposed areas to worse flooding.
- Recent changes in vegetation cause by past drought conditions as well as large fires also contribute to more runoff, especially in post-fire burn scar areas.

2020 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Landslides, Mudslides, and Debris Flows			X

- With the most recent drought, 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.
- With heavy rains in recent years contributing to saturated and barren soils, the landslide potential increased in the Planning Area, especially in post fire areas.
- An increase in timber harvesting activities including salvage logging, creates additional areas susceptible to erosion and other slope failures.

2020 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Levee Failure		X	

- The levees in Ione have not changed much since the 2014 LHMP
- Similar to other hazards, increased development in areas protected by levees could result in an increase in vulnerability.

2020 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Pandemic			X

- The Pandemic is a new hazard to this 2020 LHMP Update; thus, there is no real change in vulnerability.
- However, COVID-19 is proving to be a significant public health and economic issue as of the submittal of this LHMP.

2020 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Extreme Heat			X

- The HMPC noted that there has been an increase in severe heat days in recent years.
- Climate change issues will continue to increase heat related impacts.
- The heat, combined with drought conditions, has increased the potential for wildfires.
- Extreme heat, combined with high winds, also contributes to the wildfire hazard, including the potential for a PSPS.
- The increase in elderly/vulnerable populations increases the population at risk to this hazard.

2020 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. Although during the first few years following 2014, the County experienced drought conditions, the rains of 2017-2019 have been significant, causing flooding and other adverse impacts to the County. 2020 rainy season was more mild.
- Post fire conditions resulted in a more vulnerable Planning Area during periods of heavy rain and storms.
- Climate change brings renewed concern moving forward for heavy and more intense rains, storms, and associated issues to the County.

2020 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Freeze and Winter Storms		X	

- Similar to other weather hazards, the overall vulnerability of the Planning Area changes from year to year depending on the season.
- Freeze and winter storms does affect vulnerable populations, and is also an agricultural issue in the Planning Area.

2020 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.

- High winds, combined with extreme heat, also contributes to the wildfire hazard, including the potential for a PSPS

2020 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Wildfire			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 heavy rains, 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 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 2014 LHMP Mitigation Strategy Successes and Status

Amador County and participating jurisdictions have been successful in implementing actions identified in the 2014 Amador County LHMP Mitigation Strategies, thus, working diligently towards meeting their 2014 goals and objectives of:

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

- Minimize economic and resource impact
- Minimize impact to both existing and future development
- Prevent and reduce agricultural losses
- Minimize risk and vulnerability of the community to wildfire
- Minimize risk and vulnerability of the community to flood

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

- Update and maintain list of critical facilities: Essential Services, At-Risk Populations, Hazardous Materials Facilities

Goal #3: Improve community 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

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

- Improve community capability to mitigate hazards and reduce losses
- Increase the capacity to respond, countywide
- Improve interagency (local, state, federal) emergency coordination, communication, and operational capacity to ensure effective community preparedness, response, and recovery
- Enhance the use of shared resources/Develop a strong mutual aid support system
- Make better use of technology
- 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
- Consider environmental requirements (National Environmental Policy Act (NEPA)/ California Environmental Quality Act (CEQA)) in the early stages of project planning and implementation

Where possible, Amador County and participating jurisdictions used existing plans and programs to implement the 2014 mitigation strategies.

2.3.1. Success Stories

The County and participating jurisdictions have seen the successful implementation of projects from previous mitigation plans. A few success stories are highlighted below.

- CAL FIRE credited the Pine Acres Fuel Break with stopping the 2015 Butte Fire from ravaging Amador County during the first day of the fire. This fuel break was funded by the Amador Fire Safe Council (AFSC) and constructed by the CAL FIRE Youth Authority Camp crew and local contractors. The grant for this project came from the California Fire Safe Council via funding from the USDA Forest Service. Work began in 2012 and was completed in 2016. This fuel break began at the rim of the Mokelumne Canyon and extended to Hwy. 88. A subsequent grant was secured by AFSC from CAL FIRE to extend the fuel break for more than 10 miles to Ridge Road/Surrey Junction.

Figure 2-1 Aerial Photograph Taken Before the Butte Fire. Red Arrows Point to Treatment Areas that Performed Successfully in and around Quail Drive and Clinton Bar Road on September 11th

Source: Amador-EL Dorado Unit of CAL FIRE

- Another success story is the Amador Fuel Reduction Collaborative. This is an informal group of "doers" – organizations that can actually get fuels reduction work done on the ground. The core group of participants in the Collaborative include the Amador Fire Safe Council, CAL FIRE, US Forest Service, Sierra Pacific Industries, PG&E, Bureau of Land Management, Amador Resource Conservation District and County Fire Districts. The Collaborative has been in existence for two decades. Its primary purpose has been to coordinate on fuel reduction activities throughout the county and across land ownerships. Over the past two years the Collaborative has mapped all existing and needed fuel reduction projects in the County, resulting in a comprehensive visual strategic plan. All the organizations within the collaborative are aggressively implementing the projects they incorporated into the strategic plan.

2.3.2. 2014 Mitigation Strategy Update

The 2014 Amador County LHMP mitigation strategy contained 53 separate mitigation actions for the County and participating jurisdictions. Of the 53 actions, 4 have been completed, 31 are ongoing, and 18 have not been started. 28 2014 Amador County actions have been identified for inclusion in this LHMP Update. Table 2-1 provides a status summary of the mitigation action projects from the 2014 Amador County LHMP. Following the table is a description of the status of each project.

Table 2-1 Amador County's 2014 LHMP Update: Mitigation Action Status Summary

Mitigation Action	Complete	Ongoing	Not Started	Project in Plan Update
Amador County Actions				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	X			Y
Review and Amend Flood Ordinance, as Appropriate			X	Y
Identify Un-Reinforced Masonry Buildings in the County			X	Y
Hale Road Bridge			X	N
Reinstating and Maintaining GIS Capabilities in Amador County		X		Y
Develop and Conduct a Multi-Hazard Seasonal Public Awareness Program Providing Citizens and Business with Accurate Information Describing Risk and Vulnerability to Natural Hazards, Implemented on an Annual Basis		X		Y
PRC 4290 Compliant Street and Address Signage for Rural Areas		X		Y
GIS Based Mapping of Pertinent Information That Can Be Used by All Agencies in The Development of Pre-Planning and During Emergency Incidents		X		Y
Primary Defensible Fuel Profile Zones (DFPZ)*		X		N
Defensible Space*		X		N
Maintenance of Primary Defensible Fuel Profile Zones*		X		N
Maintenance of Existing Fuel Modification Projects*		X		N
Senior Assistance*		X		N
Secondary Defensible Fuel Profile Zones (DFPZ)*		X		N
Maintenance of Secondary Defensible Fuel Profile Zones*		X		N
Continue Weed Control along State Highways		X		N
Continued Maintenance of Invasive Species Monitoring through Insect and Noxious Weed Programs		X		Y
Amador City				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan		X		Y
Fleehart, Water Street, and Gods Hill Road Drainage	X			N
Wastewater Plant Emergency Power			X	Y
Midtown Sewer Crossing			X	Y
City of Ione				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan			X	Y
Evelyn Bishop Hall Emergency Evacuation Center Upgrade Project			X	Y
Sutter Creek Bank Stabilization and Maintenance			X	N

Mitigation Action	Complete	Ongoing	Not Started	Project in Plan Update
City of Jackson				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan			X	Y
Mattley Street Slope Stabilization			X	N
Buena Vista Flood Mitigation Project		X		Y
Vegetation Abatement for Flood Control		X		Y
City of Plymouth				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	X	X		Y
Replace Temporary Bridge at Wastewater Treatment Plant Spray Field.			X	N
Maintain and Enhance Water Canal by Converting Earthen Arroyo Ditch to A Fixed Pipeline or Gunite-Lined Canal.			X	Y
Indian Creek Stream Restoration and Culvert Improvement in Flood Hazard Zone			X	Y
Plymouth Storm Drain System			X	Y
Develop A Community Wildfire Prevention Plan		X		Y
City of Sutter Creek				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan		X		Y
Sutter Creek City Hall Flooding		X		Y
Sutter Creek Bank Stabilization			X	Y
Sulphur Elimination in Storm Drain			X	N
China Gulch Drainage			X	N
Amador Water Agency				
Gravity Supply Line	X			N
System Interties			X	N
Upgrade Fire Pumps		X		Y
Amador Fire Safe Council				
Implement Wildfire Fuel Reduction Projects Identified in CWPPs		X		N
Primary Defensible Fuel Profile Zones (DFPZ)		X		N
Defensible Space		X		N
Maintenance of Primary Defensible Fuel Profile Zones		X		N
Maintenance of Existing Fuel Modification Projects		X		N
Senior Assistance		X		N
Secondary Defensible Fuel Profile Zones (DFPZ)		X		N
Maintenance of Secondary Defensible Fuel Profile Zones		X		N

Mitigation Action	Complete	Ongoing	Not Started	Project in Plan Update
Lockwood Fire Protection District				
COW - Celltower On Wheels		X		Y
Retrofit & Repairs Station 151 and 152		X		Y
Emergency Water Tanks		X		Y

* These actions are listed for both the County and the Amador Fire Safe Council Annex

Amador County Actions

Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The 2014 LHMP was incorporated by reference into the Safety Element upon adoption of the complete General Plan Update in 2016. Had there been residential or commercial development proposals in floodplains, high- or very-high fire hazard severity zones, excessive topography, or other hazards areas, those projects would have been required to mitigate the associated risks and impacts. Absent development proposals in constrained areas, it is not possible to determine if risks were reduced or avoided.

Review and Amend Flood Ordinance, as Appropriate

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was not completed due to staffing levels. It is important to mention, however, that the most recent FIRMs for Amador County were prepared in 2016 and staff reviews projects for compliance with the Flood Damage Prevention Ordinance during routine plan checks. This project is being carried forward into the Plan Update.

Identify Un-Reinforced Masonry Buildings in the County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was not started. It was noted that there are very few of these in the unincorporated County. This project will be carried forward in this Plan Update.

Hale Road Bridge

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was not started. The County would like to remove from the list and evaluate all major and minor structures along evacuation routes within Amador County Right of Way for adequate egress and ingress.

Reinstating and Maintaining GIS Capabilities in Amador County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): In 2019, the Planning Department purchased GIS software in order to analyze spatial data and prepare maps for project review and internal use. This would not be considered the full reinstatement or maintenance of GIS capabilities as they existed prior to a reduction in staff in 2012. Again, the absence of major development projects within the unincorporated area since 2014 limits the ability to determine risk reduction or avoidance. This project is being carried forward in this Plan Update.

Develop and Conduct a Multi-Hazard Seasonal Public Awareness Program Providing Citizens and Business with Accurate Information Describing Risk and Vulnerability to Natural Hazards, Implemented on an Annual Basis

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is ongoing. Amador County Sherriff's Dept, CAL FIRE and the Amador Fire Safe Council annually presents a Wildfire Safety Town Hall Meeting to educate the public on: Wildland Fire Risk, Defensible Space and Evacuation Procedures. It is being carried forward in this Plan Update.

PRC 4290 Compliant Street and Address Signage for Rural Areas

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This action has not been started, but will be carried forward in this Plan Update.

GIS Based Mapping of Pertinent Information That Can Be Used by All Agencies in The Development of Pre-Planning and During Emergency Incidents

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project has not been implemented due to a lack of funding for GIS personnel.

Primary Defensible Fuel Profile Zones (DFPZ)*

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This is a joint action with the County and the Amador Fire Safe Council. See the action status for this action in the AFSC section below.

Defensible Space*

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This is a joint action with the County and the Amador Fire Safe Council. See the action status for this action in the AFSC section below.

Maintenance of Primary Defensible Fuel Profile Zones*

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This is a joint action with the County and the Amador Fire Safe Council. See the action status for this action in the AFSC section below.

Maintenance of Existing Fuel Modification Projects*

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This is a joint action with the County and the Amador Fire Safe Council. See the action status for this action in the AFSC section below.

Senior Assistance*

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This is a joint action with the County and the Amador Fire Safe Council. See the action status for this action in the AFSC section below.

Secondary Defensible Fuel Profile Zones (DFPZ)*

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This is a joint action with the County and the Amador Fire Safe Council. See the action status for this action in the AFSC section below.

Maintenance of Secondary Defensible Fuel Profile Zones*

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This is a joint action with the County and the Amador Fire Safe Council. See the action status for this action in the AFSC section below.

Continue Weed Control along State Highways

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This is taken care of by Cal Trans. It is not being carried forward into this Plan Update.

Continued Maintenance of Invasive Species Monitoring through Insect and Noxious Weed Programs

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is ongoing and will be carried forward into the Plan Update.

Amador City

Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was not completed for the 2014 LHMP Update and will be carried forward in this 2020 Update.

Fleehart, Water Street, and Gods Hill Road Drainage

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The City was able to repair the landslide area on God's Hill Road using FEMA PA funds. The other two areas were not repaired by the City as they were determined to be on private property. This project will not be carried forward in the Plan Update in its original form, but will be included as part of a general landslide project.

Wastewater Plant Emergency Power

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was not started due to lack of funding. This project will be carried forward in the Plan Update.

Midtown Sewer Crossing

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was not started due to lack of funding. This project will be carried forward in the Plan Update.

City of Ione

Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project not started due to staff change over and a lack of funds. Project is included in this Plan Update.

Evelyn Bishop Hall Emergency Evacuation Center Upgrade Project

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project not started due to staff change over and a lack of funds. This project is being carried forward in this Plan Update.

Sutter Creek Bank Stabilization and Maintenance

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project not started due to staff change over and a lack of funds. Under California law, property owners along non-navigable streams own to the center of the stream bed. Stream banks are therefore private property. This will not carry forward in this Plan Update.

City of Jackson

Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): No funds were previously allocated to the update of the Safety Element of the General Plan. The City has been awarded State Planning Grant funds to complete an update of the General Plan. This work will include integration of the LHMP into the Safety Element. The General Plan Update is anticipated to be completed by June 2022. This project will be carried forward in this Plan Update.

Mattley Street Slope Stabilization

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The City Engineer has reviewed a variety of options to complete the stabilization project. The project is currently in the design phase with the work expected to be completed by November of this year. This project will not be carried forward in this Plan Update.

Buena Vista Flood Mitigation Project

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): A portion of the drainage project was completed in 2019 by the Environmental Protection Agency. Additional work is required to remedy the continued flood risk in the vicinity. This project will be carried forward in this Plan Update.

Vegetation Abatement for Flood Control

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is ongoing. The City has annually performed vegetation abatement for flood control however the City's Department of Fish and Wildlife Streambed Alteration Agreement expired in November 2019. The City is in the process of obtaining a new 12-year permit to continue to perform annual vegetation removal from the creeks and drainages. Silt removal around culverts and bridge abutments will also be added to the permit. This project will be carried forward in this Plan Update. It is now titled Annual Creek Cleaning.

City of Plymouth

Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This was done in the current General Plan in Section 9.7. This is ongoing, since each General Plan Update will require integration of the LHMP. This will be carried forward in this Plan Update.

Replace Temporary Bridge at Wastewater Treatment Plant Spray Field.

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project has not been implemented. Lack of funds. This will not be carried forward in this Plan Update.

Maintain and Enhance Water Canal by Converting Earthen Arroyo Ditch to A Fixed Pipeline or Gunite-Lined Canal.

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project has not been implemented. Project has not been implemented. The Plymouth Arroyo Ditch sustained significant damage from the Sand Fire (2014) and subsequently from severe winter flooding. The City has obtained CDAA and FEMA grant funding to do repairs. However, the City has had to file an appeal to reinstate our funding with Cal OES and FEMA. The City does not anticipate construction repairs to begin before 2020. This will be carried forward in this Plan Update.

Indian Creek Stream Restoration and Culvert Improvement in Flood Hazard Zone

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project has not been implemented. Lack of funds. This will be carried forward in this Plan Update.

Plymouth Storm Drain System

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project has not been implemented. Lack of funds. This will be carried forward in this Plan Update.

Develop A Community Wildfire Prevention Plan

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Ongoing. Annual Weed Abatement Program is in place (MC 8.01). All undeveloped parcels, vacant buildings and excessive growth properties are inspected annually, and code enforced until cleared by owner or City Public Works. Emergency Organization and Functions determined (MC 8.07). Code Red community notification system is in place, messages can be sent out in office or from mobile sources. Defensive space materials are shared with the general public. On

September 11, 2019, a trailer driving through Plymouth on HWY 49 sparked several roadside fires, including fires on Weed Abatement Program properties. Loss was minimal. One uninhabitable structure suffered minor fire damage. Weed Abatement Program minimized roadside fuels. This will be carried forward in this Plan Update.

City of Sutter Creek

Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This action is ongoing and is carried forward in this Plan Update.

Sutter Creek City Hall Flooding

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Some of this was completed. Lack of funding prevented a full cleanup. This will be carried forward in the Plan Update.

Sutter Creek Bank Stabilization

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This was not started due to a lack of funding. This will be carried forward in the Plan Update.

Sulphur Elimination in Storm Drain

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This will never occur and should be eliminated. This will not be carried forward in the Plan Update.

China Gulch Drainage

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This really is not an issue. This will not be carried forward in the Plan Update

Amador Water Agency

Gravity Supply Line

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was completed and will not be carried forward in the Plan Update.

System Interties

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Due to lack of funds and other priorities, this project was not started and will not be carried forward in this Plan Update.

Upgrade Fire Pumps

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is ongoing and will be carried forward in the Plan Update.

Amador Fire Safe Council

Implement Wildfire Fuel Reduction Projects Identified in CWPPs

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The best example of loss avoidance was the Butte Fire in September 2015. While the adjacent Calaveras County suffered high residential and infrastructure losses, Amador County only lost one home. The fire started in Amador County just below the Pine Acres Fuel Reduction project. This project protected 600+ homes in Pine Acres and allowed first responders to make a stand along the Mokelumne River canyon top. Additional fuel reductions further east, also along the river, allowed for staging in the early days of the fire. This project will not be carried forward in this Plan Update.

Primary Defensible Fuel Profile Zones (DFPZ)

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Many of the early fuel reduction projects were completed in the years 2001-2016, and a few of the early projects were treated as a Phase 2 follow up. This project will not be carried forward in this Plan Update.

Defensible Space

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): During the time of the previous LHMP, the Amador Fire Safe Council had an aggressive senior defensible space project. Viewed as "one home at a time", several hundred home defense zones were treated. Additionally, one very large subdivision, Sherwood Forest, and one moderate sized subdivision, Emigrant Way, became certified Firewise Communities. Each year, numerous small burn piles escape, and these scattered home defense zones have aided first responders. This project will not be carried forward in this Plan Update.

Maintenance of Primary Defensible Fuel Profile Zones

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Between 2014 and 2016, the only maintenance project funded and completed was Pine Acres Phase 2. This maintenance helped prevent losses during the 2015 Butte Fire. This project will not be carried forward in this Plan Update.

Maintenance of Existing Fuel Modification Projects

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Between 2014 and 2016, the only maintenance project funded and completed was Pine Acres Phase 2. No existing fuel modification projects were completed. This maintenance helped prevent losses during the 2015 Butte Fire. This project will not be carried forward in this Plan Update.

Senior Assistance

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): All of the defensible space funds were directed towards low-income senior and disabled residents. This was especially significant during the 2015 Butte Fire as many of the treated defensible space project areas were within the potential area of the fire. This project will not be carried forward in this Plan Update.

Secondary Defensible Fuel Profile Zones (DFPZ)

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Grant funding was directed to the primary defense zones. This project will not be carried forward in this Plan Update.

Maintenance of Secondary Defensible Fuel Profile Zones

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Maintenance funds are rarely given, with focus on the Primary Zones first. This project will not be carried forward in this Plan Update.

Lockwood Fire Protection District

COW – Celltower On Wheels

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is ongoing. It is being carried forward in this Plan Update.

Retrofit & Repairs Station 151 and 152

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): 151: In 2016, a travel trailer was purchased and installed at 151, providing the much-needed facilities. The trailer was used briefly and then, due to a change in management, the trailer was sold. Current remodeling at 151 includes installation of 3 new double-paned windows, removal of rollup doors, installation of a new accessible front door, and a generator capable of running the well to keep the tanks filled. 152: remodeling of the kitchen with donated used cabinets and range. Wi-Fi installed. STILL NEEDED/ONGOING: 151 – sleeping quarters, shower; 152 – a second man door and a generator. It is being carried forward in this Plan Update.

Emergency Water Tanks

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is ongoing. It is being carried forward in this Plan Update.

Chapter 3 Planning Process

Requirements §201.6(b), §201.6(c)(1), §201.7(c)(1), and §201.7(c)(1)(ii), (iii) and (iv): 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, five incorporated communities, and six special districts, in conjunction with a planning committee, prepared this Local Hazard Mitigation Plan (LHMP) Update to the Federal Emergency Management Agency (FEMA)-approved 2014 Amador County LHMP.

Amador County, Office of Emergency Services (OES), recognized the importance and need of the update process for their 2014 LHMP and initiated the development of this 2020 LHMP Update. Utilizing grant funds, which served as the primary funding source for this Plan, the County contracted with Foster Morrison Consulting, Ltd. (Foster Morrison) to facilitate and develop the LHMP Update. 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 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's (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, five incorporated communities, and six special districts made a commitment to this 2020 LHMP Update, as participating jurisdictions. These 12 participating jurisdictions include:

- Amador County*
- City of Amador City*
- City of Ione*
- City of Jackson*
- City of Plymouth*
- City of Sutter Creek*
- Amador County Fire Safe Council*
- Amador Water Agency*
- Jackson Valley Irrigation District
- Lockwood Fire Protection District*
- River Pines Public Utility District
- Pine Grove Community Services District

* Participated in 2014 Amador County LHMP

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 the risk differs across the Amador County Planning Area;
- Identify potential mitigation actions; and
- Formally adopt the plan.

For the Amador County Planning Area's participating jurisdictions, "participation" means the following:

- Providing facilities and printed materials for meetings;
- 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 Plan process and content;
- Identifying mitigation actions for the Plan;
- Reviewing and providing comments on Plan drafts; including annexes
- Coordinating, and participating in the public input process; and
- Coordinating the formal adoption of the Plan by the governing boards.

The County and all jurisdictions with annexes to this LHMP Update seeking FEMA approval met all of these participation requirements. In most cases one or more representatives from each jurisdiction attended the HMPC meetings described in Table 3-3 and also brought together a local planning team to help collect data, identify mitigation actions and implementation strategies, and review and provide data on Plan drafts, as detailed in Table 3-1. Other jurisdictions and public and private stakeholders supported the planning process through representation on the HMPC, providing data and input for the risk assessment and

mitigation strategy; and reviewing and providing input on Plan drafts prior to finalization and submittal to Cal OES and FEMA.

As described, specific individuals representing Amador County, the five incorporated communities, and the six special districts participating in this LHMP Update were actively involved throughout this planning 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 to 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 2020 LHMP Update.

3.2 The 10-Step Planning Process

Foster Morrison established the planning process for updating the 2014 Amador County LHMP using the DMA planning requirements and FEMA's associated guidance. 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 Community Rating System (CRS) and FMA programs. Thus, 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 Amador County Local Hazard Mitigation Plan Update

DMA Process	Modified DMA/CRS Process
1) Organize Resources	
201.6(c)(1)/201.7(c)(1)	1) Organize the Planning Effort
201.6(b)(1)/201.7(c)(1)(i)	2) Involve the Public
201.6(b)(2) and (3)/ 201.7(c)(1)(ii), (iii) and (iv)	3) Coordinate with Other Departments and Agencies
2) Assess Risks	
201.6(c)(2)(i)/201.7(c)(2)(i)	4) Identify the Hazards
201.6(c)(2)(ii)/201.7(c)(2)(ii)	5) Assess the Risks
3) Develop the Mitigation Plan	
201.6(c)(3)(i)/201.7(c)(3)(i)	6) Set Goals

DMA Process	Modified DMA/CRS Process
201.6(c)(3)(ii)/201.7(c)(3)(ii)	7) Review Possible Activities
201.6(c)(3)(iii)/201.7(c)(3)(iii)	8) Draft an Action Plan
4) Implement the Plan and Monitor Progress	
201.6(c)(5)/201.7(c)(5)	9) Adopt the Plan
201.6(c)(4)/201.7(c)(4)	10) Implement, Evaluate, and Revise the Plan

This LHMP Update involved a comprehensive review and update of each section of the 2014 Amador County LHMP and includes an assessment of the success of the participating communities in evaluating, monitoring and implementing the mitigation strategy outlined in the initial plan, as previously described in more detail in Chapter 2 and Chapter 4.

The process followed to update the 2014 LHMP is detailed in the above table and the sections that follow and is in conformance with the latest DMA planning guidance. As part of this LHMP Update, all sections of the Plan were reviewed and updated to reflect new data, processes, participating jurisdictions, and resulting mitigation strategies. Only the information and data still valid from the 2014 LHMP was carried forward as applicable into this LHMP Update.

3.2.1. Phase 1: Organize Resources

Planning Step 1: Organize the Planning Effort

With Amador County's, five incorporated communities', and six special district's commitment to participate in the DMA planning process, Foster Morrison worked with Amador County OES, Emergency Services Coordinator as overall project lead, to establish the framework and organization for development of this LHMP Update. A conference call was held with County OES to discuss the organizational and process aspects of this LHMP Update.

The initial kick-off meeting was held on September 25, 2019. Invitations to the kickoff meeting were extended to key County departments, cities, special districts, and tribes as well as to other federal, state, and local stakeholders that might have an interest in participating in the 2020 LHMP Update. Representatives from the County, cities, districts, and key community stakeholders participated in this LHMP project with additional invitations extended as appropriate throughout the plan development process. The list of invitees is included in Appendix A.

The HMPC was established as a result of the initial meeting, as well as through interest generated through the initial planning and public meetings and outreach conducted for this project as detailed later in this chapter. The HMPC, comprising key county, city, special district, and other government and stakeholder representatives and the public, developed this Plan with leadership from the County OES and facilitation by Foster Morrison. Each participating jurisdiction seeking FEMA approval of the Plan had representation on the HMPC. Table 3-2 gives information on who participated on the HMPC.

Table 3-2 Amador County Hazard Mitigation Planning Committee

Name	Agency/Title
Aaron Watkins	Amador County Fire Protection District
Amy Gedney	City of Sutter Creek, City Manager
Andrea Petretti	Amador Water Agency
Candi Bingham	River Pines Public Utility District, General Manager
Carmel Mitchell	Cal Fire
Carrie Bassett	Amador County Agricultural Department
Cathleen Johnson	City of Plymouth, Public Works
Cathy Koos	Lockwood Fire Protection District
Chuck Beatty	Amador County Planning
Cindy Engel	Amador County Transportation Commission, GIS Coordinator
Dave Seawell	Harrahs
Debbie Calcote	Amador Red Cross
Debbie Mackey	City of Jackson, City Manager
Derek selman	Amador County Public Works
Diana Evensen	Amador County Public Health
Elsy Votino	Cal OES
Eric Mayberry	Amador County Agricultural Commissioner
Eric Mikkelson	Amador County Animal Control
Gene Mancebo	Amador Water Agency, General Manager
Holly Sandman	Amador County Public Health
James Foley	Amador County Health and Human Services
Jan Hewitt	Lockwood Fire Protection District
Jason Navarre	Amador County Sheriff OES, Sergeant
Jeanine Foster	Foster Morrison, Project Manager
Jeff Brown	Amador County Supervisor
Jeff White	Amador County IT
Jenna Peckham	Cal Fire
Jim O'Connell	City of Sutter Creek, Police Department
John Gedner	Amador County Transportation Commission
John Silva	Amador County Sheriff OES, Sergeant
Jon Hanken	City of Ione, City Manager
Ken Mackey	City of Ione Fire
Kenneth Hansen	Harrahs
Kevin Darrow	City of Sutter Creek, City Clerk
Linda Nafus	Amador Water Agency
Lori Arnberg	Pine Grove Community Services District, General Manager

Name	Agency/Title
Lucas Carthew	Amador Water Agency
Lurali Moore	ARC of Amador & Calaveras
Maggie Amarant	Amador Transit
Mark Hopkins	Amador County Public Works
Matt Hill	Cal Fire Amador-Eldorado Unit
Michael Hooper	City of Jackson, Inspector/Code Enforcement
Mike Israel	Amador County Environmental Health
Nell Raymond	River Pines Public Utility District
Pat Minyard	Amador County Fire Safe Council
Patrick Henry	River Pines Public Utility District
R. Hopson	US Forest Service
Rayda Ward	Sutter Health
Rick Ferriera	Amador Water Agency, Operations Manager
Rita Kerr	Amador County Public Health/Health Officer
Rob Withrow	Cal Fire
Rocky Raymond	River Pines Public Utility District
Roseanne Chamberlain	LAFCO Agency
Ryan Hamre	Amador Fire
Sami Nell	Cal DWR Office of Floodplain Management
Sandy Swafford	Sutter Health
Scott Meyer	Amador County Environmental Health
Sharon Nickerson	Amador Transit
Stacy Rhoades	City of Ione, Council Member
Steve Fredrick	Jackson Valley Irrigation District, General Manager
Susan Bragstadt	City of Amador City, Vice Mayor
Susan Peters	City of Sutter Creek, Planner
Todd Barr	Amador County Chief Building Official
Walt White	Amador Fire Protection District
Yvonne Kimball	City of Jackson, City Manager

A complete list of participating HMPC representatives for each participating jurisdiction is included in Appendix A. The above list of HMPC members also includes several other government and stakeholder representatives that were invited to participate and contributed to the planning process. This list includes all HMPC members that attended one or more HMPC meetings detailed in Table 3-3, and others who provided input to the LHMP Update. In addition to providing representation on the HMPC, participating jurisdictions formulated their own internal planning teams to collect and provide requested data and to conduct timely reviews of the draft documents as further detailed in each annex to this LHMP and as detailed in the list of HMPC representatives for Amador County. The internal planning teams from all

participating jurisdictions were called upon to collect and provide requested data and to conduct timely reviews of the draft documents. Note that the above list of HMPC members also includes several other government and stakeholder representatives that contributed to the planning process. Specific participants from these other agencies are identified above and documented in Appendix A.

Meetings

The planning process officially began with an internal project planning meeting held in August 2019 followed by an HMPC kick-off meeting held in Amador on September 25, 2019. 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 LHMP Update. Using FEMA guidance, these worksheets were designed to capture information on past hazard events, identify hazards of concern to the County, Cities, and Districts, quantify values at risk to identified hazards, inventory existing capabilities, and to identify possible mitigation actions. A copy of the worksheets for this project are included in Appendix A. Amador County and all participating jurisdictions seeking FEMA approval of this LHMP completed and returned the worksheets to Foster Morrison for incorporation into this LHMP.

During the planning process, the HMPC communicated through face-to-face meetings, emails, telephone conversations, Dropbox websites, and through a County developed webpage dedicated to the LHMP development process. This later website was developed to provide information to the HMPC, the public, and all other stakeholders on the LHMP Update process. Draft documents were also posted on these websites so that the HMPC members and the public could easily access and review them. The LHMP website can be accessed at:

- Amador County – https://www.amadorgov.org/departments/office-of-emergency-services/local-hazard-mitigation-plan

The HMPC met formally five times during the planning period (August 2019 – May 2020) which adequately covers the four phases of DMA and the 10-Step CRS planning process. The formal meetings held and topics discussed are described in Table 3-3. Agendas and sign-in sheets for each of the meetings are included in Appendix A.

Table 3-3 HMPC Meetings

Meeting Type	Meeting Topic	Meeting Date(s)	Meeting Location(s)
HMPC #1 Kick-off Meeting	1) Introduction to DMA and the planning process 2) Overview of current LHMP; 3) Organize Resources: the role of the HMPC, planning for public involvement, coordinating with other agencies/stakeholders 4) Introduction to Hazard Identification	9/25/2019	Amador County Health Department
HMPC #2	1) Risk assessment overview and work session - Assess the Hazard - Assess the Problem	1/28/2020	Amador County Health Department

Meeting Type	Meeting Topic	Meeting Date(s)	Meeting Location(s)
HMPC #3	1) Review of risk assessment summary 2) Review and update of mitigation goals 3) Intro to Mitigation Action Strategy - Set Goals - Review possible activities	2/19 /2020	CAC Conference Room
HMPC #4*	1) Review of mitigation alternatives 2) Review and update of mitigation actions from the 2014 plan 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	2/20 /2020	CAC Conference Room
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) Draft an Action Plan 4) Plan maintenance and Implementation Procedures	5/7/2020	Zoom Meeting

Planning Step 2: Involve the Public

Public stakeholders are defined as any stakeholders not attached to the local governments considered as participating jurisdictions to this LHMP Update. Up-front coordination discussions with the Amador County OES and the HMPC 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. Information provided to the public included an overview of the mitigation status and successes resulting from implementation of the 2014 plan as well as information on the processes, new risk assessment data, and proposed mitigation strategies for this LHMP Update. At the planning team kick-off meetings, the HMPC discussed additional strategies for public involvement and agreed to an approach using established public information mechanisms and resources within the community.

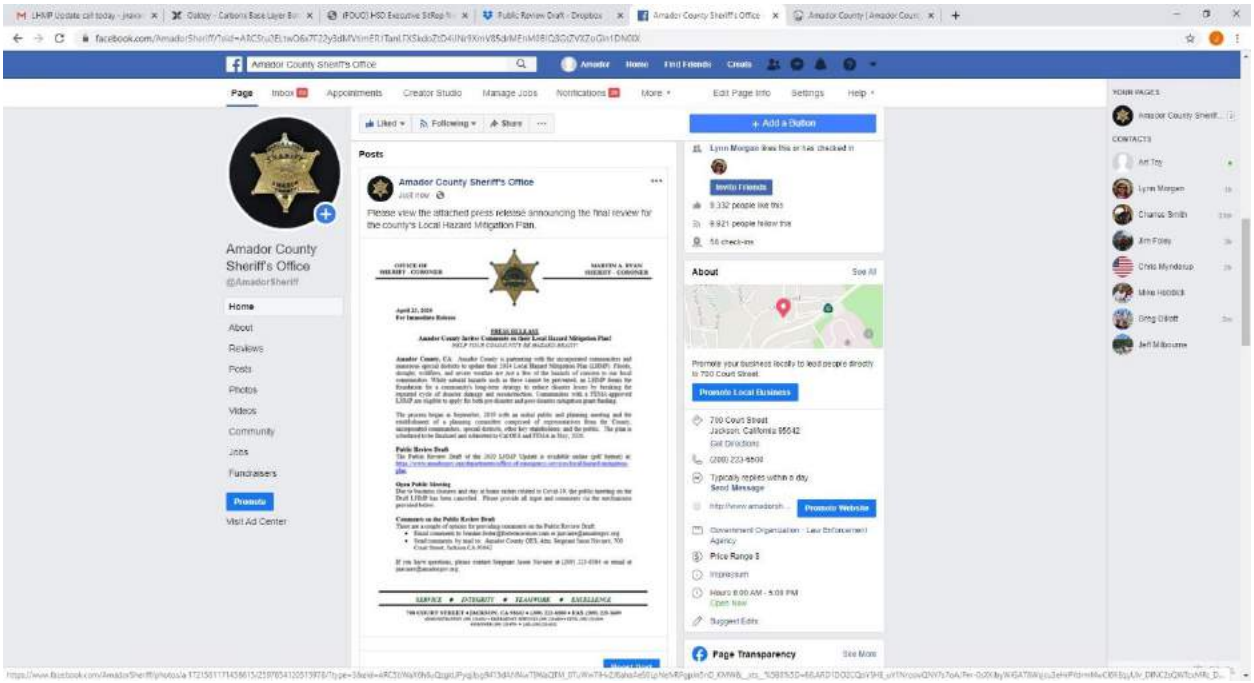
Early Public Meeting

Public outreach for this LHMP Update began at the beginning of the plan development process with a press release issued in addition to other local outreach methods, including social media posts, and as advertised on the Amador County LHMP webpage. This early public meeting was held to inform the public of the purpose of the DMA and the hazard mitigation planning process for the Amador County Planning Area and to invite the public to an early public meeting to kick-off the LHMP Update project on September 25, 2020 at the Amador County Health Department.

Final Public Meeting

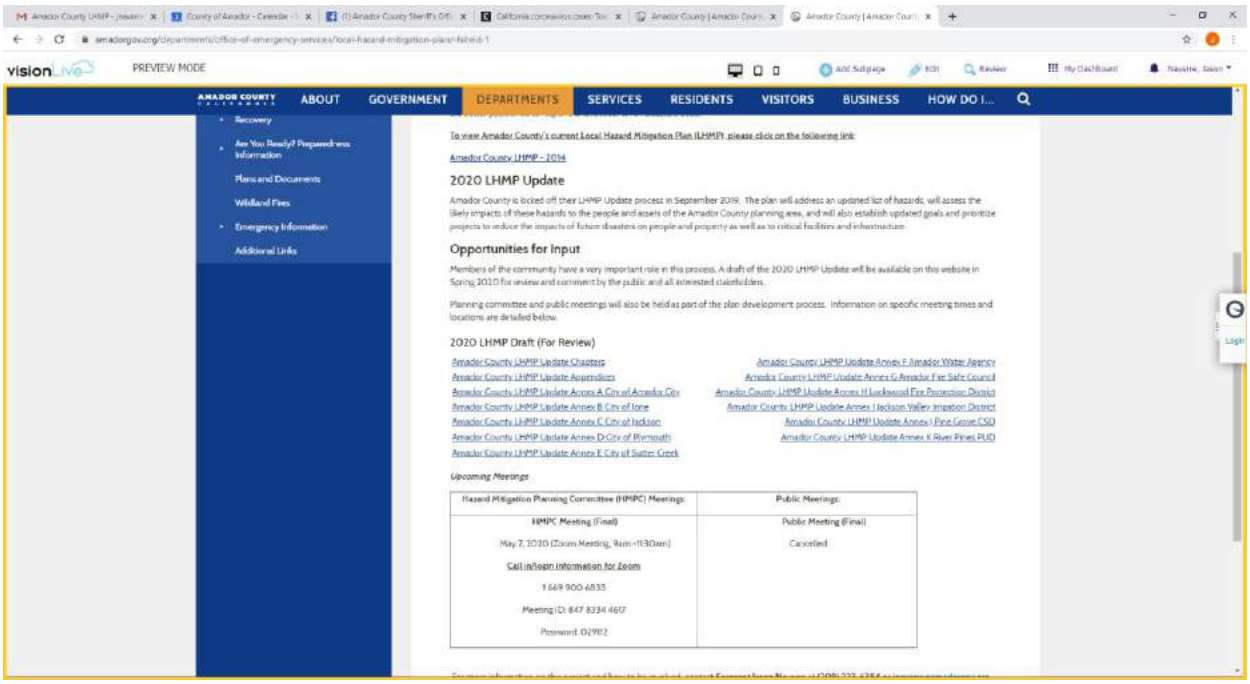
The first draft of the Plan was provided to the HMPC in March 2020, with a public review draft provided in April 2020. A public meeting was scheduled for May 6, 2020 to present the draft LHMP Update and to collect public comments on the LHMP prior to finalization and submittal to Cal OES/FEMA, but was canceled due to COVID-19. The public outreach on the Public Review Draft was advertised in a variety of ways to maximize outreach efforts to the public at large and included a press release, the press release printed in a local newspaper, placement on the County website, and through the County Facebook page (as shown on Figure 3-1) inviting the public to provide input on the Public Review Draft. The press release and associated outreach advertising the final public indicated that the public meeting had been canceled due to Covid-19, and also provided a link to the Draft LHMP Update on the County website and how to provide comments on the draft Plan (as shown on Figure 3-2).

Figure 3-1 Public Outreach on Facebook



Source: Amador County

Figure 3-2 Public Outreach on Amador County Website



Source: Amador County

Documentation to support the final public meeting can be found in Appendix A. In addition to 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 with an interest in the Amador County Planning Area. The majority of these people reside in Amador County 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 Amador County, the five incorporated communities, and the six special districts. 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 Meeting	1) Intro to DMA and mitigation planning 2) 2019 LHMP Update Process	9/25/2019	Amador County Health Department
Final Public Meeting	1)Presentation of Draft LHMP and solicitation of public and stakeholder comments	5/7/2020	Cancelled

No public comments were received on the draft Plan. All press releases, newspaper advertisements and articles, website postings, and public outreach efforts are on file with the Amador 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. The

public outreach activities described here were conducted with participation from and on behalf of all jurisdictions participating in this LHMP Update.

Planning Step 3: Coordinate with Other Departments and Agencies

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

- Amador Transit
- American Red Cross
- ARC of Amador and Calaveras
- Bureau of Land Management
- Bureau of Reclamation
- California Department of Transportation
- California Department of Water Resources
- Cal FIRE
- California Office of Emergency Services
- California State Fire Marshall
- Cal Trans
- California Department of Fish and Game
- California Department of Water Resources
- East Bay Municipal Utility District
- FEMA Region IX
- National Weather Service/NOAA
- Pacific Gas & Electric
- Sierra Nevada Conservancy
- Sutter Health
- United States Corps of Engineers
- United Stated Department of Agriculture
- United States Forest Service

Coordination with key agencies, organizations, and advisory groups throughout the planning process allowed the HMPC to review common problems, development policies, and mitigation strategies as well as to review any conflicts or inconsistencies with regional mitigation policies, plans, programs, and regulations. Coordination involved contacting these agencies through a variety of mechanisms and informing them on how to participate in the LHMP Update process and if they had any expertise or assistance they could lend to the planning process, risk assessment, or specific mitigation strategies. These groups and agencies were solicited asking for their assistance and input, telling them how to become involved in the LHMP Update process, and inviting them to HMPC meetings.

In addition, 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 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 Water Resources
- California Division of Mines and Geology
- California Geological Survey
- California Invasive Plant Council
- California Natural Resources Agency
- FEMA Region IX
- Library of Congress
- National Drought Mitigation Center
- 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 Farm Service Agency
- United States Forest Service
- United States Geological Survey
- United States Occupational Health and Safety Agency
- 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, these groups were invited to attend the public meetings and to review and comment on the LHMP Update 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 uses 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 plan establishes a credible and comprehensive plan that ties into and supports other community programs. The development of this Plan

incorporated information from the following existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities and other jurisdictions.

- CAL OES plans and data
- California Department of Finance demographic documents
- California Department of Water Resources plans and information
- California Geological Survey Plans
- CAL FIRE Fire Plans and data
- Climate Adaptation Plans
- Emergency Operations Plans
- FEMA mitigation planning documents
- Flood Insurance Studies
- General Plans – County and Cities
- National Weather Service documents
- Stormwater Master Plans
- US Department of Agriculture Reports
- US Department of Interior Plans
- US Fish and Wildlife reports
- USGS Reports

Specific source documents are referenced at the beginning of each section of Chapter 4 and 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 risk assessment and hazard vulnerability sections of the Plan. Where the data from the existing studies and reports is used in this LHMP Update, the source document is referenced throughout this Plan document. The data was also used in determining the capability of the community in being able to implement certain mitigation strategies. Appendix B, References, provides a detailed list of references used in the preparation of this LHMP Update.

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 on the Planning Area. Starting with the 2014 LHMP, natural hazards of concern were added, deleted, and modified for this LHMP Update. Data collection worksheets and jurisdictional annexes were developed and used in this effort to aid in determining hazards and vulnerabilities and where the risk varies across the 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 the Planning Area's current capabilities to mitigate risk from and vulnerability to hazards. By collecting information about existing government 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.

Also addressed in this risk assessment is an assessment of each jurisdictions' floodplain management program and participation in the National Flood Insurance Program (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 to participate in this program.

A more detailed description of the risk assessment process, methodologies, and results are included in Chapter 4 Risk Assessment.

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 strategy is included 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 Plan was developed. This complete draft was provided for HMPC review and comment via a Dropbox web link. Other agencies were invited to comment on this draft as well. HMPC and agency 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 the CAL OES and FEMA Region IX to review and approve, contingent upon final adoption by the governing boards of each participating jurisdiction.

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 this LHMP Update, the 2020 LHMP Update 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, most of the HMPC's efforts have been directed at researching data, coordinating input from participating entities, and developing appropriate mitigation actions. 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 Amador County and is addressed further in Chapter 7.

Implementation and Maintenance Process: 2014

The 2014 Amador County, California LHMP Update included a process for plan maintenance and implementation of the mitigation strategy as well as formal updates to the Plan document. The 2014 process called for annual reviews of the existing LHMP with updates made to reflect new policies, changed conditions, mitigation priorities, and the implementation of mitigation strategies. In addition, the 2014 process called for a formal LHMP Update as required by DMA regulations every 5 years. Although these 2014 maintenance requirements were not systematically followed, this 2020 LHMP Update, once complete, will meet the DMA formal update requirements.

While systematic annual reviews of the 2014 LHMP were not carried out, the 2014 LHMP was integrated into other planning mechanisms in the County. Table 3-5 lists the planning mechanism the 2014 LHMP was integrate have similar tables that show how the 2014 LHMP was specifically integrated into their local community planning mechanisms.

Table 3-5 Incorporation of Amador County 2014 LHMP into Other Planning Mechanisms

Planning Mechanism 2014 LHMP Was Incorporated or Implemented Through	Details
General Plan Safety Element 2016	LHMP was incorporated by reference
2018 Zoning Ordinance Amendment	Utilizing information from the 2014 LHMP, requires findings that developments of 5 or more lots/units in high and very-high fire hazard severity areas have adequate fire protection

The LHMP implementation and maintenance process as set forth in the 2014 LHMP have been updated for this LHMP Update. The revised implementation and maintenance process for this Amador County 2020 LHMP Update is set forth in Chapter 7 of this Plan document. A strategy for continued public involvement for this LHMP Update process is also included in Chapter 7.

Chapter 4 Risk Assessment

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

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 to 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 hazards that threaten the Planning Area and describes why some hazards have been omitted from further consideration.
- **Section 4.2: Hazard Profiles** discusses the threat and impacts to the Planning Area and describes previous occurrences of hazard events and the likelihood of future occurrences.
- **Section 4.3: Vulnerability Assessment** assesses the Planning Areas' exposure to natural hazards; considering assets at risk, critical facilities, future development trends, and, where possible, estimates potential hazard losses.
- **Section 4.4: Capability Assessment** inventories existing local mitigation activities and policies, regulations, plans, and projects that pertain to mitigation and can affect net vulnerability.

This risk assessment covers the entire geographical extent of Amador County (i.e., the Amador County Planning Area). 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 2014 risk assessment. Information from the 2014 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 also detailed in this risk assessment portion of the Plan.

4.1 Hazard Identification

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:

- 2014 Amador County Hazard Mitigation Plan
- 2018 State of California Multi-Hazard Mitigation Plan
- Amador County 2016 General Plan
- FEMA Disaster Declaration Database
- HMPC input
- National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC) Storm Events Database

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 (Cal DWR), the NOAA NCDC database, 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 2018 California State Hazard Mitigation Plan was consulted to evaluate the applicability of new hazards of concern to the State to the Amador 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 2014 plan were profiled in this LHMP Update, with fog, subsidence, and volcano dropped from Plan consideration. New hazards include climate change and pandemic. Water shortage was also added to the drought hazard.

Table 4-1 Amador County Hazard Identification and Comparison from 2014 LHMP

2020 Hazards	2014 Hazards	Comment
Agricultural Hazards: Severe Weather/Insect - Pests	Invasive Species: Insect/Pests	Name was changed to align with California State Plan
Aquatic Invasive Species	Marine Invasive Species	Name was changed to align with California State Plan
Avalanche	Avalanche	Similar analysis was performed. Additional updated data was added to both the hazard profile and the vulnerability assessment.
Climate Change	–	New Hazard
Dam Failure	Dam Failure	Additional analysis was performed. New data from Cal OES and Cal DWR was analyzed. Dams were reclassified due to changes in how California Division of Safety of Dams classifies them in 2020. Vulnerability was updated with more recent values and figures from the County Assessor's Office.
Drought & Water shortage	Drought	Water shortage was added to this hazard.
Earthquake (large damaging/small)	Earthquake	An updated Hazus analysis of earthquake was performed and included in the vulnerability section.
Floods: 1%/0.2% annual chance	Floods: 100/500 year	An updated DFIRM was added and analyzed. Additional impacts were discussed. Vulnerability was updated with more recent values and figures from the County Assessor's Office
Floods: Localized Stormwater	Floods: Localized Stormwater	Additional locations in the County were identified. Additional information was added to the profile and vulnerability sections.
Landslide, Mudslide, Debris Flow	Landslide, Mudslide, Debris Flow	Vulnerability was updated with more recent values and figures from the County Assessor's Office
Levee Failure	Levee Failure	Additional research was done on locations and status of levees. Similar analysis was performed.
Pandemic	–	New hazard
Severe Weather: Extreme Heat	Severe Weather: Extreme Heat	Similar analysis was performed.
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Severe Weather: Heavy rain, thunderstorm, hail, and lightning	Similar analysis was performed.
Severe Weather: High Winds and Tornadoes	Severe Weather: Tornado; Severe Weather: Winds	These hazards were combined into a single hazard.
Severe Weather: Winter Storms and Freeze	Severe Weather: Winter Storms and Freeze	Similar analysis was performed.
Wildfire	Wildfire	Additional impacts were added. Greater discussion of wildfires effects on landslide, debris flow, and flooding. Tree mortality was added. Vulnerability was updated with more recent values and figures from the County Assessor's Office

2020 Hazards	2014 Hazards	Comment
–	Severe Weather: Fog	This hazard was dropped from consideration due to the fact that fog events have become rarer and that there are limited mitigation efforts that can be put forward.
–	Subsidence	This hazard was dropped from consideration due to the lack of subsidence areas in the County. Subsidence will be discussed in the drought and water shortage section of this Plan Update.
–	Volcanoes	This hazard was dropped from the Plan due to the low chance of volcano eruption.

Certain 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
Tsunami	The County is not on the coast.
Air Pollution	The County did consider this a hazard for this Plan, it is dealt with in other planning mechanisms in the County.
Coastal Flooding, Erosion, and Sea Level Rise	The County is not on the coast.
Energy Shortage and Energy Resilience	The County did consider this a hazard, it is dealt with in other planning mechanisms in the County.
Epidemic/Pandemic/Vector Borne Disease Hazards	The County did consider this a hazard, it is dealt with in other planning mechanisms in the County.
Natural Gas Pipeline Hazards	The County did not consider this a hazard due to the low number of gas pipelines traversing the County.
Oil Spills	The County did not consider this a hazard, as there are few pipelines or oil wells in the County.
Radiological Accidents	There are no areas in the County at risk to this hazard.
Subsidence	There are few areas of the County where subsidence is a risk. In addition, most subsidence is related to drought and water shortage, and will be discussed in that hazard profile and vulnerability.
Volcano	The County is a fair distance away from volcano areas, and the chances of volcanic activity affecting the County are very low. This was eliminated as a hazard based on the last two County LHMPs.
Cyber Threats	The County did consider this a hazard, but it is dealt with in other planning mechanisms in the County.
Airline Crashes	There have been few past occurrences in the County of airplane crashes. This is not a hazard to be included in the LHP
Civil Disturbance	The County did consider this a hazard, but it is dealt with in other planning mechanisms in the County.
Well Stimulation and Hydraulic Fracking	This is not occurring in the County.

Table 4-3 was completed by the County and HMPC to identify, profile, and rate the significance of identified hazards. Only the more significant (or priority) hazards have a more detailed hazard profile and are analyzed further in Section 4.3 Vulnerability Assessment. Those hazards that occur infrequently or have little or no impact on the 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, crop, and economic damage. The ability of a community 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 by the HMPC to prioritize those hazards of greatest significance to the Planning Area, enabling the County to focus resources where they are most needed. Table 4-47 in Section 4.2.19 Natural Hazards Summary provides an overview of these hazards.

Table 4-3 Amador County Hazard Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect/Pests	Extensive	Highly Likely	Limited	Medium	Low
Aquatic Invasive Species	Significant	Unlikely	Limited	Low	Low
Avalanche	Limited	Likely	Negligible	Low/ Medium	Medium
Climate Change	Extensive	Likely	Limited	Medium	–
Dam Failure	Limited	Unlikely	Critical	High	Medium
Drought & Water shortage	Extensive	Likely/Occasional	Limited	Medium	High
Earthquake (large damaging/small)	Significant	Unlikely/Likely	Catastrophic	High	Low
Floods: 1%/0.2% annual chance	Significant	Occasional/ Unlikely	Critical	High	Medium
Floods: Localized Stormwater	Extensive	Highly Likely	Critical	Medium	Medium
Landslide, Mudslide, Debris Flow	Significant	Highly Likely	Critical	Medium	Medium
Levee Failure	Limited	Occasional	Limited	Low	Medium
Pandemic	Extensive	Likely	Critical	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely/ Occasional	Limited	Medium	Low
Severe Weather: Winter Storms and Freeze	Significant	Highly Likely	Limited	Medium	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High	High

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 the HMPC 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. These programs are discussed in Section 4.2.4.

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 FEMA and Cal OES and compiled in chronological order in Table 4-4. A review of state declared disasters indicates that Amador County received 18 state declarations between 1950 and 2019. Of the 18 state declarations: 14 were associated with severe winter storms, heavy rains, or flooding; 2 were for drought; 1 were from economic disasters, and 1 was for wildfire. A review of federal disasters shows 18 federal disaster declarations. Of these 18 federal declarations: 15 were associated with severe winter storms, heavy rains, or flooding; 1 for drought, 1 for wildfire, 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 State and Federal Disaster Declarations, 1950-2020

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
2020	Covid-19	Pandemic	Pandemic	DR-4482	3/4/2020	1/20/2020
2019	California Severe Winter Storms, Flooding, Landslides, And Mudslides	Flood	Storms	DR-4434	–	5/17/2019

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
2017	California Severe Winter Storms, Flooding, Mudslides	Flood	Storms	DR-4308	–	4/1/2017
2017	California Severe Winter Storms, Flooding, Mudslides	Flood	Storms	DR-4301	–	2/14/2017
2015	Butte Fire	Fire	Fire	FM-5111	–	9/10/2015
2014	California Drought	Drought	Drought	GP 2014-13	1/17/2014	–
2006	2006 June Storms	Flood	Storms	DR 1646	–	6/5/2006
2005/2006	2005/06 Winter Storms	Flood	Storms	DR-1628	–	2/3/2006
2005	Hurricane Katrina Evacuations	Economic	Hurricane	EM-3248 2005	–	9/13/2005
2001	Energy Emergency	Economic	Greed	GP 2001	1/1/2001	–
1998	1998 El Nino Floods	Flood	Storms	DR-1203	Proclaimed	2/19/1998
1997	1997 January Floods	Flood	Storms	DR-1155	1/2/97-1/31/97	1/4/1997
1995	California Severe Winter Storms, Flooding, Landslides, Mud Flows	Flood	Storms	DR-1046	Proclaimed	3/12/1995
1995	1995 Severe Winter Storms	Flood	Storms	DR-1044	1/6/95-3/14/95	1/13/1995
1986	1986 Storms	Flood	Storms	DR-758	2/18-86-3/12/86	2/18/1986
1982	Heavy Rain and Flooding	Flood	Storms	DC-82-03	4/1/1982	–
1980	April Storms	Flood	Storms	–	4/1/1980	–
1977	1977 Drought	Drought	Drought	EM-3023	–	1/20/1977
1976	1976 Drought	Drought	Drought	–	2/9/76 2/13/76 2/24/76 3/26/76 7/6/76	–
1969	Severe Storms and Flooding	Flood	Flood	DR 253	1/27/1970 - 3/2/1970	1/26/1969
1964	1964 Late Winter Storms	Flood	Storms	DR-183	–	12/24/1964

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
1963	1963 Floods and Rains	Flood	Storms	DR-145	2/7/63, 2/26/63, 2/29/63, & 4/22/63	2/25/63
1963	1963 Floods	Flood	Storms	–	2/14/1964	–
1961	1961 Widespread Fires	Fire	Fire	–	9/8/61	–
1959	1959 Heavy Rains	Flood	Storms	–	9/7/1959	–
1958	1958 April Storms and Floods	Flood	Storms	DR-52	4/5/1958	4/4/1958
1958	1958 February Storms and Floods	Flood	Storms	CDO 58-03	2/26/1958	–
1955	1955 Floods	Flood	Flood	DR-47	12/22/1955	12/23/1955
1950	1950 Floods	Flood	Flood	OCD 50-01	11/21/1950	–

Source: Cal OES, FEMA

Table 4-5 Amador County – State and Federal Disaster Declarations Summary 1950-2020

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Drought	1	1977	2	1976, 2014
Economic	1	2005	1	2001
Fire	1	2015	1	1961
Flood (including heavy rains and storms)	15	1955, 1958, 1963, 1964, 1969, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1959, 1963 (twice), 1969, 1980, 1982, 1986, 1995, 1997, 1998
Pandemic	1	2020	1	2020
Totals	**19**	–	**19**	**–**

Source: Cal OES, FEMA

Disasters since 2014

As detailed above, there have been five federal disaster declarations and two state disaster declarations since the 2014 plan:

- 2014 Drought (state)
- 2015 Fire (federal)
- 2017 Flood (two federal)
- 2019 Flood (federal)
- 2020 Pandemic (state and federal)

EOC Activations since 2014

The EOC has been activated three times since 2014: once in 2015 for the Butte Fire, once in 2018 for the Irish Fire, and once in March 2020 for the Covid-19 event.

4.2 Hazard Profiles

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.

The hazards identified in Section 4.1 Hazard Identification, are profiled individually in this section. These profiles set the stage for Section 4.3 Vulnerability Assessment, where the vulnerability is quantified for each of the priority hazards.

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. Where known, this includes information on the hazard location, extent, 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. The extent or location of the hazard within or near the Amador County Planning Area is also included here. Hazard research, historical incident worksheets and other input from the HMPC were used to capture information on past occurrences.
- **Frequency/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 (if applicable). The possible ramifications of climate change on the hazard are discussed.

Section 4.2.19 Natural Hazards Summary provides an initial assessment of the profiles and assigns a level of significance or priority to each hazard. Those hazards determined to be of high or medium significance were characterized as priority hazards that required further evaluation in Section 4.3 Vulnerability Assessment. Those hazards that occur infrequently or have little or no impact on the Planning

Area were determined to be of low significance and are 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, crop, and economic damage. The ability of a community 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 by the HMPC to prioritize those hazards of greatest significance to the Planning Area, enabling the County to focus resources where they are most needed.

The following sections provide profiles of the natural hazards that the HMPC identified in Section 4.1 Hazard Identification. The severe weather hazards are discussed first because it is the secondary hazards generated or exacerbated by severe weather (e.g., flood and wildfire) that can result in the most significant losses. The other hazards follow alphabetically.

Data Sources

In general, information provided by HMPC members 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.

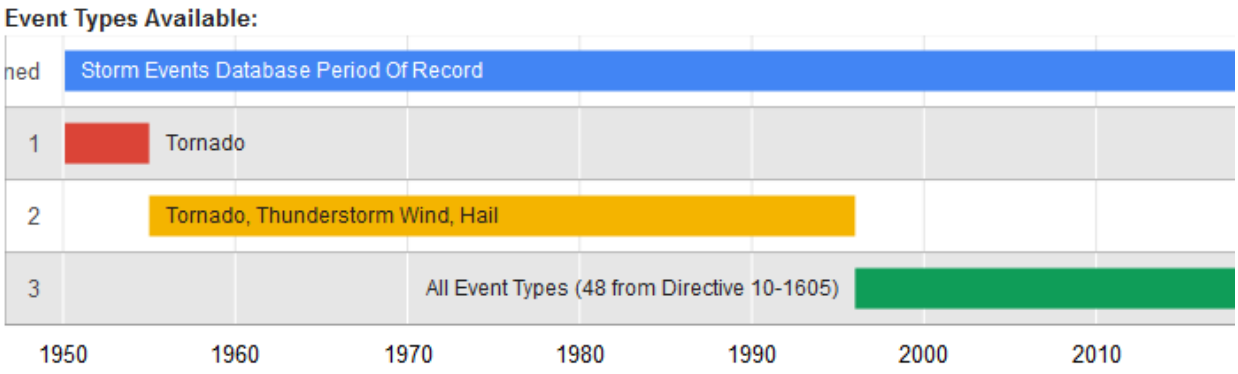
- 2018 State of California Multi-Hazard Mitigation Plan
- CAL FIRE Wildfire History Database
- Cal-Adapt
- Cal-Adapt – Precipitation: Decadal Averages Map
- Cal-Adapt – Temperature: Decadal Averages Map
- California Climate Adaptation Strategy
- California Department of Public Health
- California Department of Water Resources Best Available Maps
- California Department of Water Resources Division of Safety of Dams
- California Department of Water Resources Groundwater Information Center
- California Division of Mines and Geology
- California Invasive Plant Council
- California Natural Resource Agency
- California Office of Emergency Services
- California's Drought of 2007-2009, An Overview. State of California Natural Resources Agency, California Department of Water Resources."
- Climate Change and Health Profile Report – Amador County
- Climate Change Impacts in the United States
- Amador County Agricultural Commissioner Crop Reports
- Amador County Digital Flood Insurance Rate Map
- Amador County Flood Insurance Study
- Amador County Emergency Operations Plan
- Amador County 2016 General Plan
- Amador County General Plan Background Report
- Amador County 2014-2019 Housing Element
- Enhanced Fujita Scale. National Oceanic and Atmospheric Administration Storm Prediction Center.

- Federal Emergency Management Agency – Disaster Declaration Database
- Federal Emergency Management Agency – Wind Zones in the United States
- Federal Emergency Management Agency: Building Performance Assessment: Oklahoma and Kansas Tornadoes
- Federal Emergency Management Agency: Multi-Hazard Identification and Risk Assessment.
- Galloway, Jr Dr. Gerald E. Levees in History: The Levee Challenge. Water Policy Collaborative, University of Maryland, Visiting Scholar, USACE, IWR.
- Intergovernmental Panel on Climate Change
- Multi-Hazard Identification and Risk Assessment, FEMA 1997
- National Aeronautics and Space Administration
- National Climate Assessment
- National Climatic Data Center Storm Events Database.
- National Drought Mitigation Center
- National Flood Insurance Program
- National Integrated Drought Information System
- National Levee Database
- 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 HeatRisk
- Public Policy Institute of California. If drought continues: Environment and poor rural communities most likely to suffer. [press release].
- Science Magazine
- Sierra Avalanche Center
- State of California Department of Conservation Farmland Mapping and Monitoring Program
- Underwood, E. Models predict longer, deeper US droughts. Science, 347(6223) 707 DOI: 10.1126/science.347.6223.707. 2015.
- United State Geologic Survey. Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977.
- US Army Corps of Engineers
- US Bureau of Reclamation
- US Department of Agriculture
- US Department of Agriculture – Farm Service Agency Secretarial Disasters Declarations
- US Drought Monitor
- US Fish and Wildlife Service
- US Geological Survey – Biological Resource Division
- US Geological Survey Open File Report 2015-3009
- US Geological Survey Publication 2014-3120
- US Natural Resource Conservation Service
- USA Today
- Vaisala National Lightning Detection Network
- Western Regional Climate Center

4.2.1. Severe Weather: General

Severe weather is generally any destructive weather event, but usually occurs throughout the Amador County Planning Area as localized storms that bring heavy rain and strong winds. The NCDC has been tracking severe weather since 1950. Their Storm Events Database contains data on the following events shown on Figure 4-1.

Figure 4-1 NCDC Storm Events Database Period of Record



Event Types Available:
Add more info about event types here. Link to collections page/tab when referencing data collection source.

1. Tornado: From 1950 through 1954, only tornado events were recorded.

2. Tornado, Thunderstorm Wind and Hail: From 1955 through 1992, only tornado, thunderstorm wind and hail events were keyed from the paper publications into digital data. From 1993 to 1995, only tornado, thunderstorm wind and hail events have been extracted from the Unformatted Text Files.

3. All Event Types (48 from Directive 10-1605): From 1996 to present, 48 event types are recorded as defined in NWS Directive 10-1605.

Source: NCDC

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 672 severe weather events that occurred in Amador County between January 1, 1950, and May 31, 2019. Table 4-6 summarizes these events.

*Table 4-6 NCDC Severe Weather Events for Amador County 1950-5/31/2019**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Avalanche	4	2	0	3	0	$0	$0
Blizzard	1	0	0	0	0	$0	$0
Cold/Wind Chill	23	0	0	0	0	$0	$0
Debris Flows	1	0	0	0	0	$100,000	$0

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Dense Fog	16	9	9	44	19	$3,210,000	$0
Dense Smoke	2	0	0	0	0	$0	$0
Drought	70	0	0	0	0	$0	$1,500,000,000
Excessive Heat	7	6	2	1	0	$0	$0
Extreme Cold/Wind Chill	3	0	0	0	0	$0	$0
Flash Flood	3	0	0	0	0	$0	$0
Flood	34	3	0	0	0	$4,400,000	$7,800,000
Frost/Freeze	15	0	0	0	0	$700,000	$25,000,000
Funnel Cloud	2	0	0	0	0	$0	$0
Hail	2	0	0	0	0	$0	$0
Heat	65	2	3	18	3	$0	$0
Heavy Rain	5	0	0	0	0	$0	$0
Heavy Snow	104	1	3	2	1	$1,125,000	$0
High Wind	58	1	0	5	0	$16,103,000	$48,000
Strong Wind	38	2	1	4	3	$5,275,500	$0
Thunderstorm Wind	1	0	0	0	0	$0	$0
Wildfire	22	3	0	32	21	$525,000	$0
Winter Storm	155	1	1	3	1	$190,000	$0
Winter Weather	41	1	3	0	0	$0	$0
Total	**672**	**31**	**22**	**112**	**48**	**$31,628,500**	**$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 summarize severe weather events that occurred in Amador County. Only a few of the events actually resulted in state and federal 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 state and federal disaster declarations have been a result of severe weather. For this plan, severe weather is discussed in the following subsections:

- Extreme Heat
- Heavy Rains and Storms
- High Winds and Tornadoes
- Winter Storm and Freeze

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 cities and towns); and eastern Amador County, which is generally above 2,000 feet above msl, 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 east Amador County.

4.2.2. Severe Weather: Extreme Heat

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. Extreme heat can also affect the agricultural industry. Extreme heat as it affects agriculture in Amador County is discussed further in the agricultural hazards discussion in Section 4.2.6.

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, chronic invalids, those on certain medications or drugs, and persons with weight and alcohol problems are particularly susceptible to heat reactions.

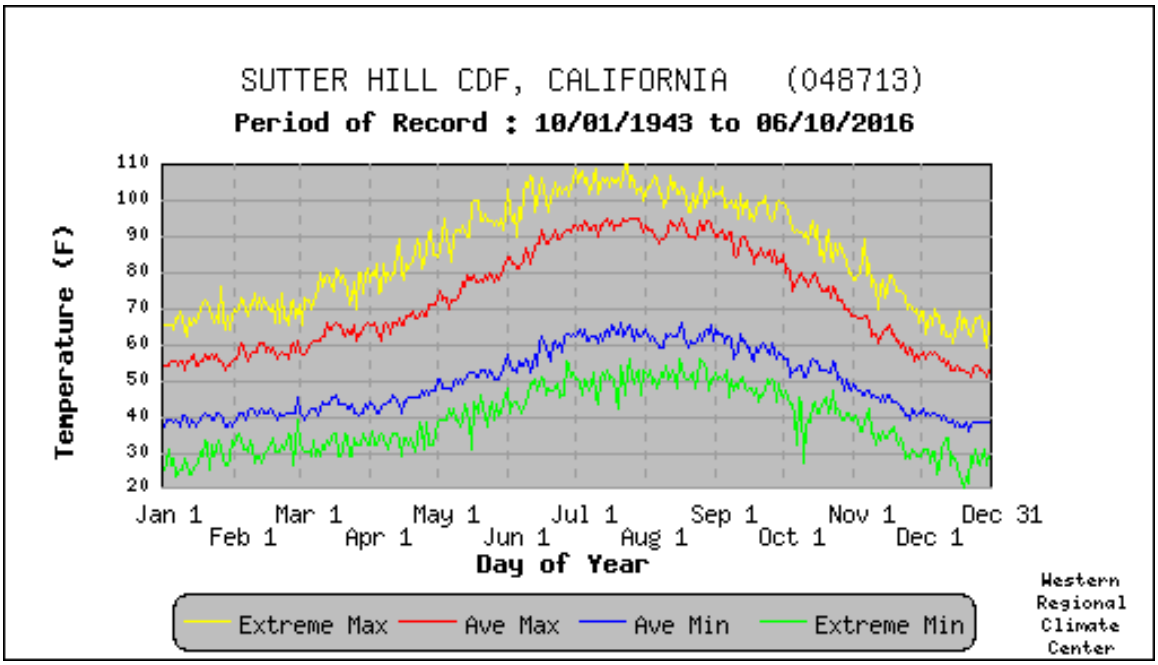
Location and Extent

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 Western Regional Climate Center (WRCC) maintains data on weather normal and extremes in the western United States. Information from the two representative weather stations introduced in Section 4.2.1 is summarized below.

Western Amador County— Sutter Hill Ranger Station Weather Station, Period of Record 1943 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 23, 2006. In a typical year, maximum temperatures exceed 90°F on 69.3 days. Figure 4-2 shows the average daily high temperatures and extremes for the western portion of the County. Table 4-7 shows the record high temperatures by month for the western County.

Figure 4-2 Western Amador County—Daily Temperature Averages and Extremes



Source: Western Regional Climate Center, www.wrcc.dri.edu/

Table 4-7 Western Amador County – Record High Temperatures

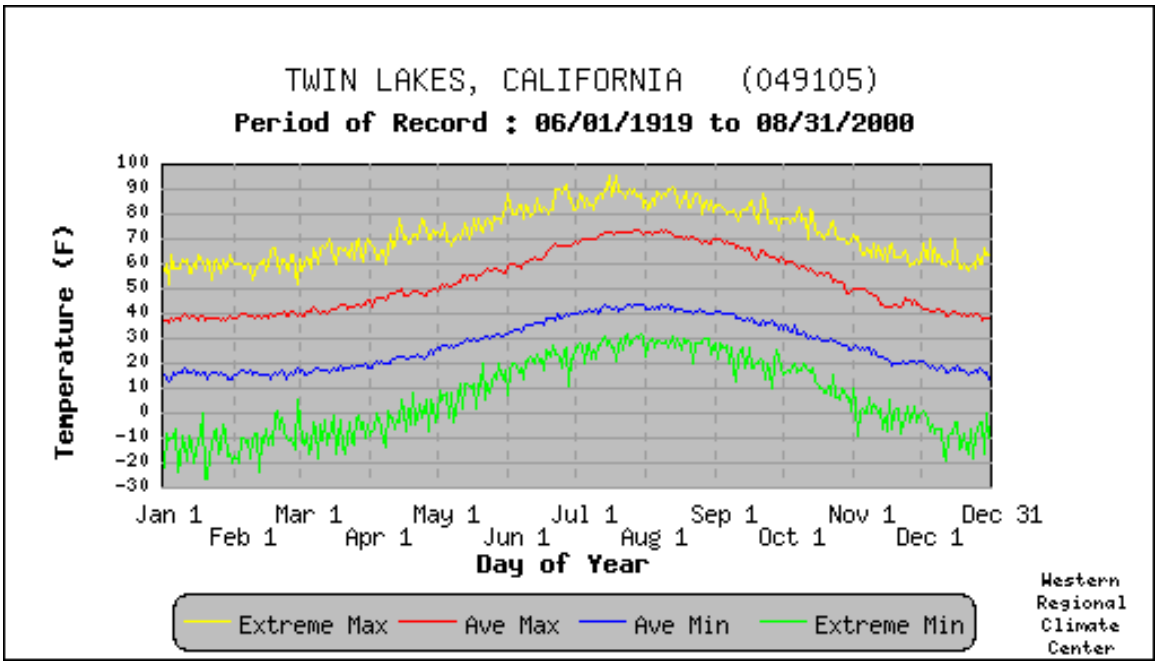
Month	Record High	Date	Month	Record High	Date
January	68°	1/17/2007	July	110°	7/14/2006
February	73°	2/4/2009	August	107°	8/9/1998
March	81°	3/30/2004	September	104°	9/2/1998
April	92°	4/28/2004	October	99°	10/2/2001
May	100°	5/17/2008	November	89°	11/27/2010
June	106°	6/16/2012	December	70°	12/26/2000

Source: Western Regional Climate Center

Eastern Amador County—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 4-3 shows the average daily high temperatures and extremes for the eastern portion of the County. Table 4-8 shows the record high temperatures by month for the eastern County.

Figure 4-3 Eastern Amador County—Daily Temperature Averages and Extremes



Source: Western Regional Climate Center, www.wrcc.dri.edu/

Table 4-8 Eastern Amador County – Record High Temperatures

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

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 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 National Weather Service (NWS) has in place a system or scale 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 4-9.

Table 4-9 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.

NCDC Events

The NCDC data shows only seven extreme heat incidents for Amador County since 1993. Specific impacts for these events in Amador were not reported in the database. These events are shown in Table 4-10.

*Table 4-10 NCDC Extreme Heat Events in Amador County 1993 to 5/31/2019**

Event	Date	Deaths	Injuries	Property Damage	Crop Damage
Excessive Heat	5/8/2007	0	0	$0	$0
Excessive Heat	7/5/2007	0	0	$0	$0
Excessive Heat	7/5/2007	0	0	$0	$0
Excessive Heat	6/18/2017	4	0	$0	$0
Excessive Heat	6/18/2017	1	0	$0	$0
Excessive Heat	6/18/2017	1	0	$0	$0
Excessive Heat	8/1/2017	0	1	$0	$0

Event	Date	Deaths	Injuries	Property Damage	Crop Damage
Total		**6**	**1**	**$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 Agricultural Declarations for Amador County for extreme heat events, which are discussed in more detail in the past occurrences of Section 4.2.6. Members of the HMPC recalled 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.

The HMPC noted that extreme heat is a yearly event, but could not recall any other specific incidents 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.

Climate Change and Extreme Heat

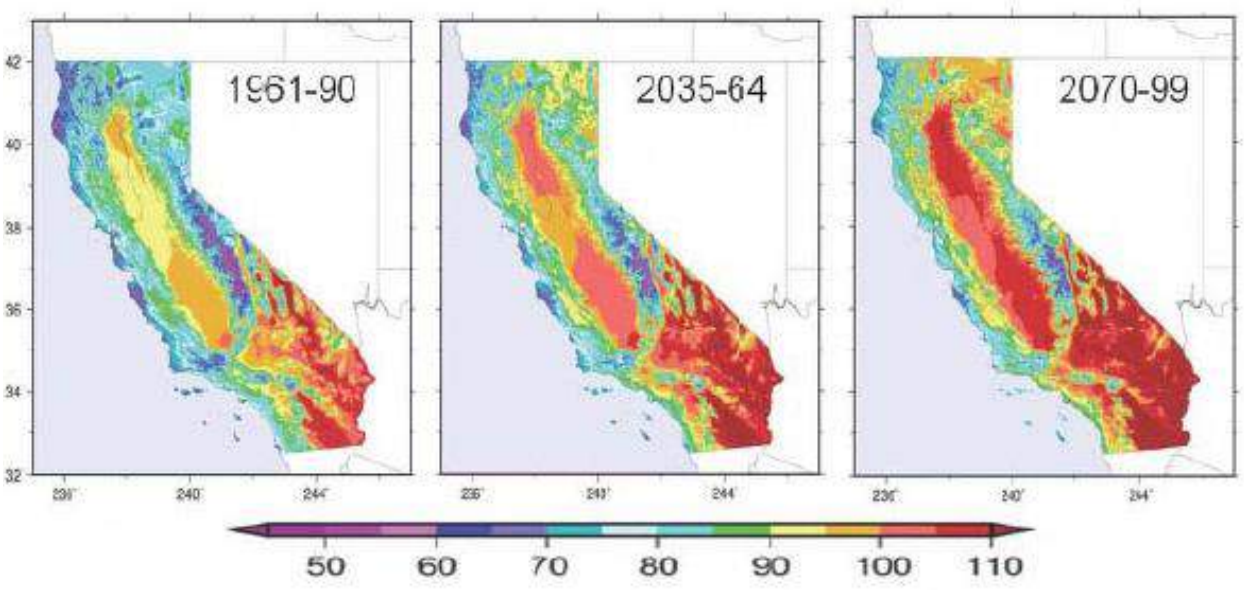
Climate change and its effect on flood near the City has been discussed by three sources:

- California Climate Adaptation Strategy (CAS) – 2014
- Climate Change and Health Profile Report – Amador County
- Cal-Adapt

Climate Adaptation Strategy

The California Climate Adaptation Strategy (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 4-4.

Figure 4-4 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 CAS report and the 2018 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 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.

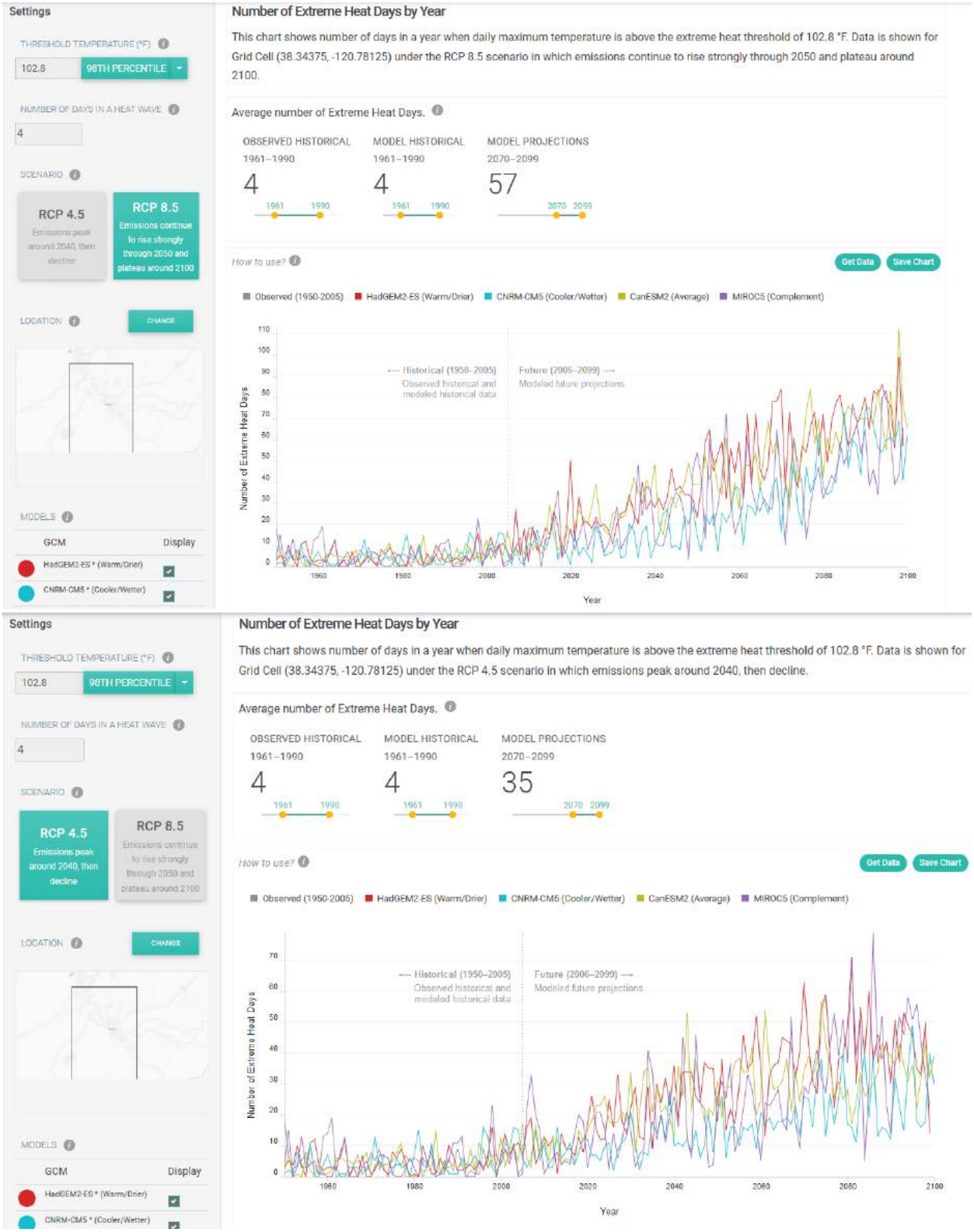
Cal-Adapt

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 (using the quad that contains the City of Jackson) are shown in Figure 4-5. It shows the following:

- The upper chart shows number of days in a year when daily maximum temperature is above the extreme heat threshold of 90.0°F. Data is shown for Amador County under the RCP 8.5 scenario in which emissions continue to rise strongly through 2050 and plateau around 2100.
- The lower chart shows number of days in a year when daily maximum temperature is above the extreme heat threshold of 90.0 °F. Data is shown for Amador County under the RCP 4.5 scenario in which emissions peak around 2040, then decline.

Figure 4-5 Amador County – Future Temperature Estimates in Low and High Emission Scenarios



Source: Cal-Adapt – Number of Extreme Heat Days by Year

4.2.3. Severe Weather: Heavy Rains and Storms

Hazard/Problem Description

Storms in the Amador County Planning Area occur throughout the County 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.

According to the HMPC, short-term, heavy storms can cause both widespread flooding as well as extensive localized drainage issues. With the increased growth of the area, the lack of adequate drainage systems has become an increasingly important issue. 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

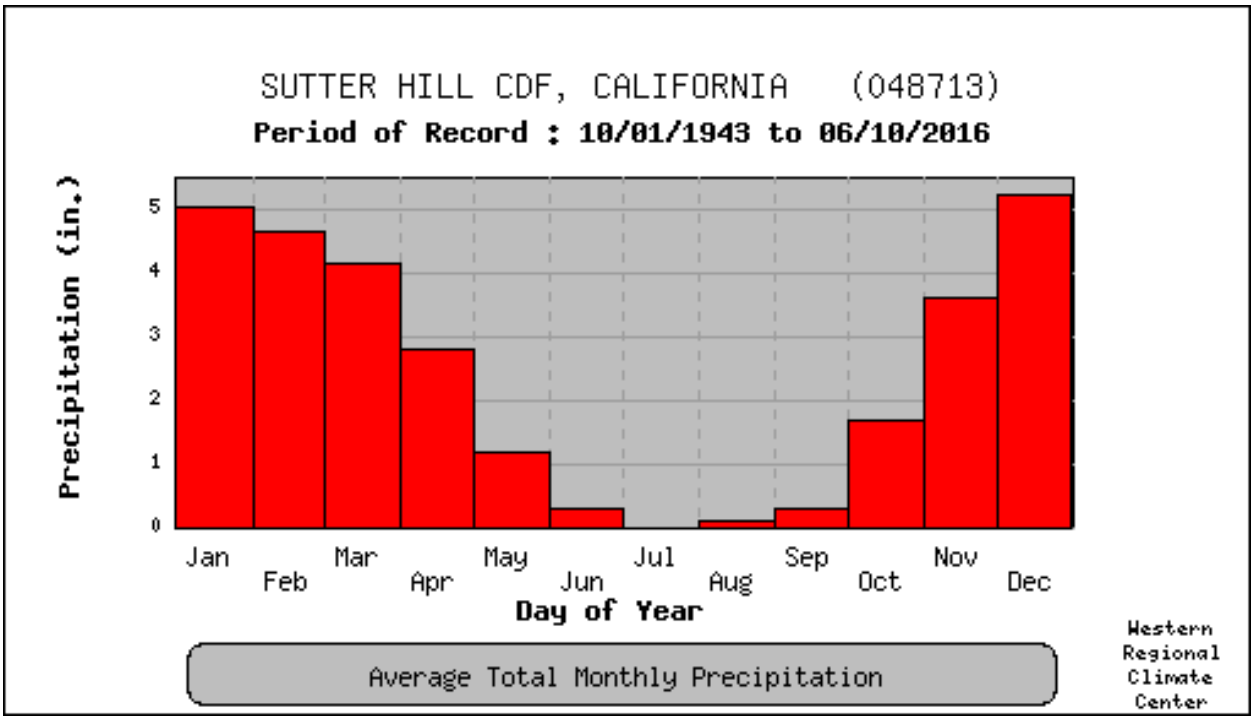
Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the County. All portions of the County are at risk to heavy rains. Most of these rains occur during the winter months, as discussed below.

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. Information from the WRCC weather stations in eastern and western Amador County previously discussed in Section 4.2.1 is summarized below.

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

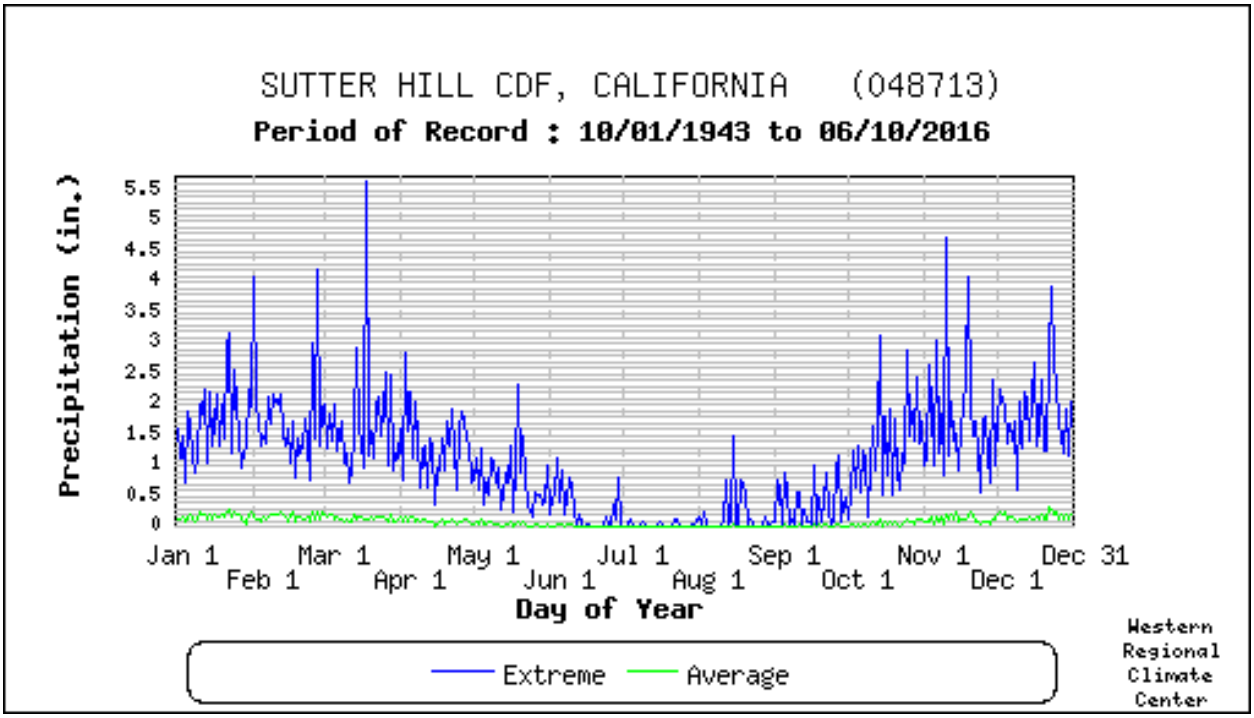
According to the WRCC, average annual precipitation in western Amador County is 26.55 inches per year. The highest recorded annual precipitation is 46.19 inches in 1950; the highest recorded precipitation for a 24-hour period is 5.62 inches on March 18, 2012. The lowest recorded annual precipitation was 10.17 inches in 1976. Average monthly precipitation for western Amador County is shown in Figure 4-6. Daily average and extreme precipitations are shown in Figure 4-7.

Figure 4-6 Western Amador County—Monthly Average Total Precipitation



Source: Western Regional Climate Center, www.wrcc.dri.edu/

Figure 4-7 Western Amador County—Daily Average and Extreme Precipitation

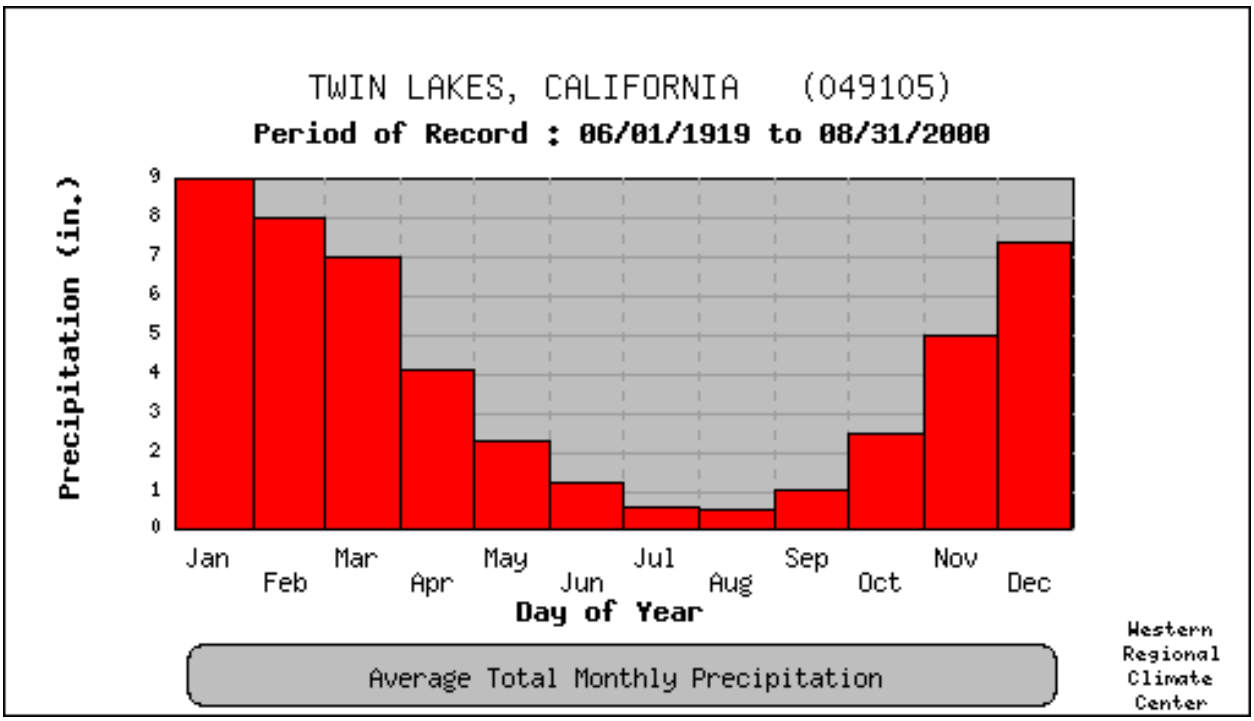


Source: Western Regional Climate Center, www.wrcc.dri.edu/

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

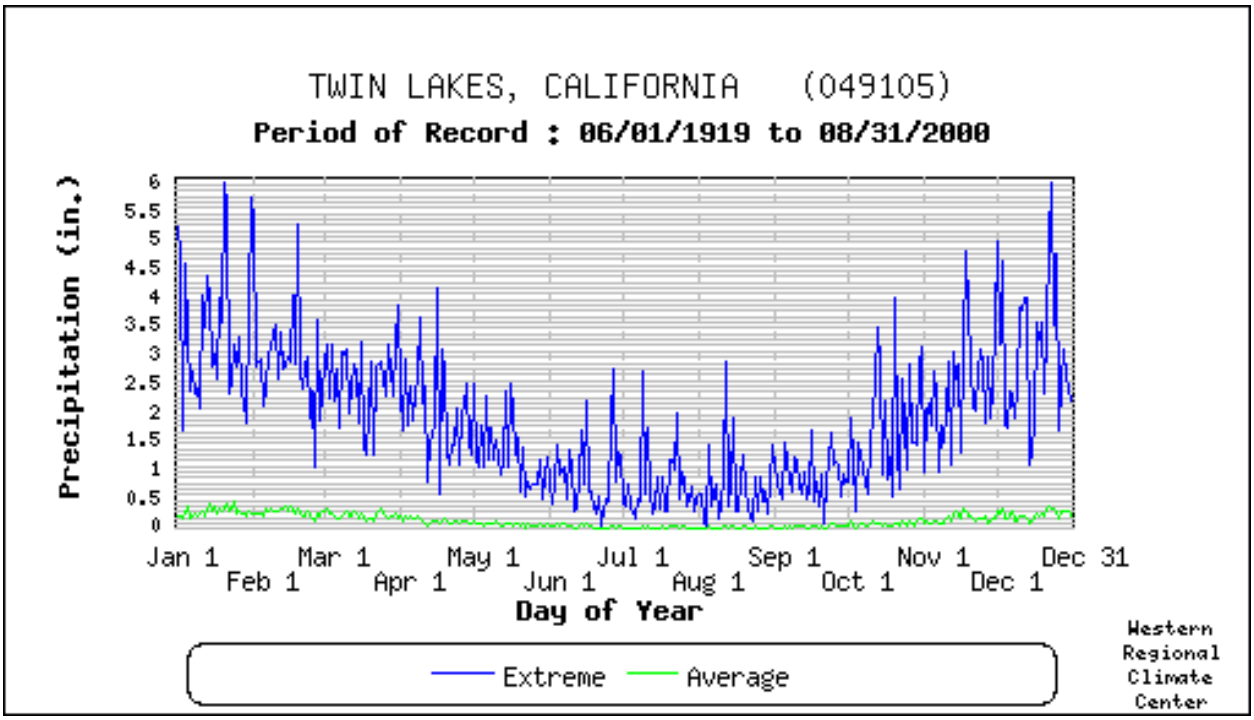
According to the WRCC, average annual precipitation in eastern Amador County is 47.05 inches per year. The highest recorded annual precipitation is 85.21 inches in 1983; the highest recorded precipitation for a 24-hour period is 9.35 inches on December 13, 1919. The lowest recorded annual precipitation was 10.17 inches in 1976. Average monthly precipitation for eastern Amador County is shown in Figure 4-8. Daily average and extreme precipitations are shown in Figure 4-9.

Figure 4-8 Eastern Amador County—Monthly Average Total Precipitation



Source: Western Regional Climate Center, www.wrcc.dri.edu/

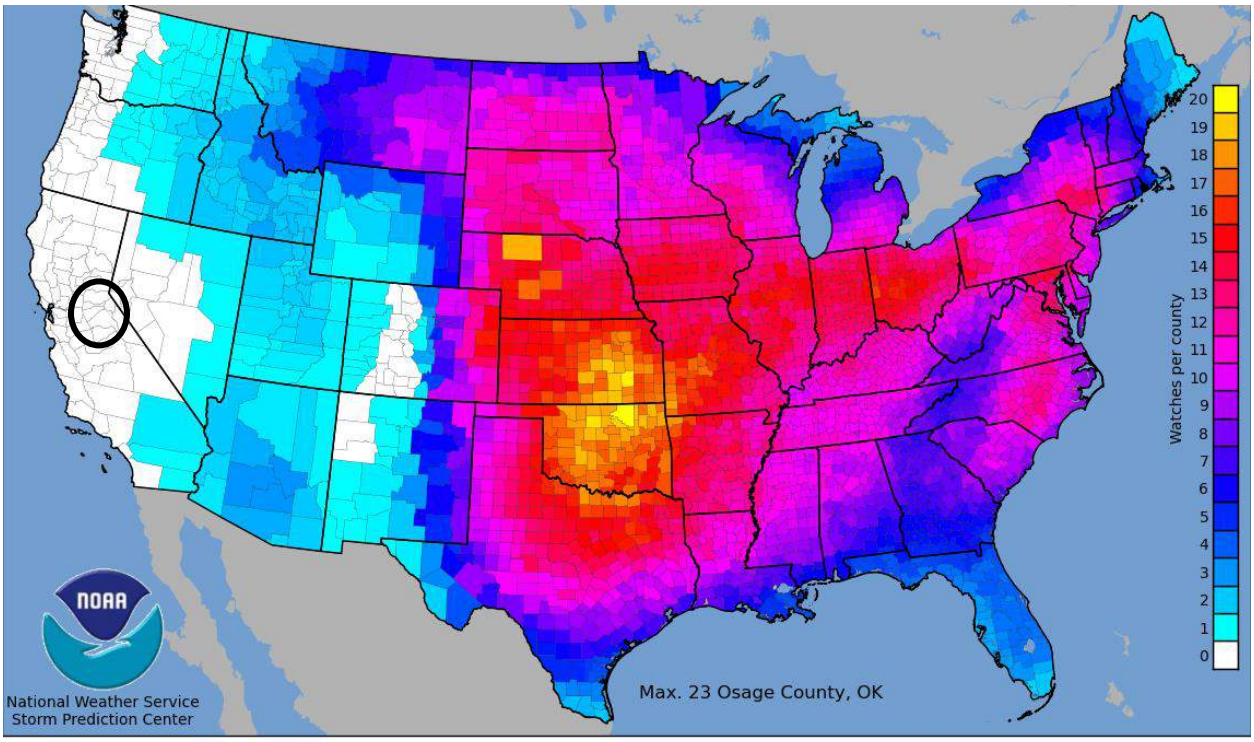
Figure 4-9 Eastern Amador County—Daily Average and Extreme Precipitation



Source: Western Regional Climate Center, www.wrcc.dri.edu/

The NOAA Storm Prediction Center tracks thunderstorm watches on a county basis. Figure 4-10 shows thunderstorm watches in Amador County and the United States for a 20-year period between 1993 and 2012, the most recent map available.

Figure 4-10 Amador County – Average Thunderstorm Watches per Year (1993 to 2012)



Source: NOAA Storm Prediction Center, map retrieved 11/25/2019

Hail

Hail can occur throughout the Amador County Planning Area during storm events, though it is rare. 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 4-11 indicates the hailstone measurements utilized by the National Weather Service.

Table 4-11 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

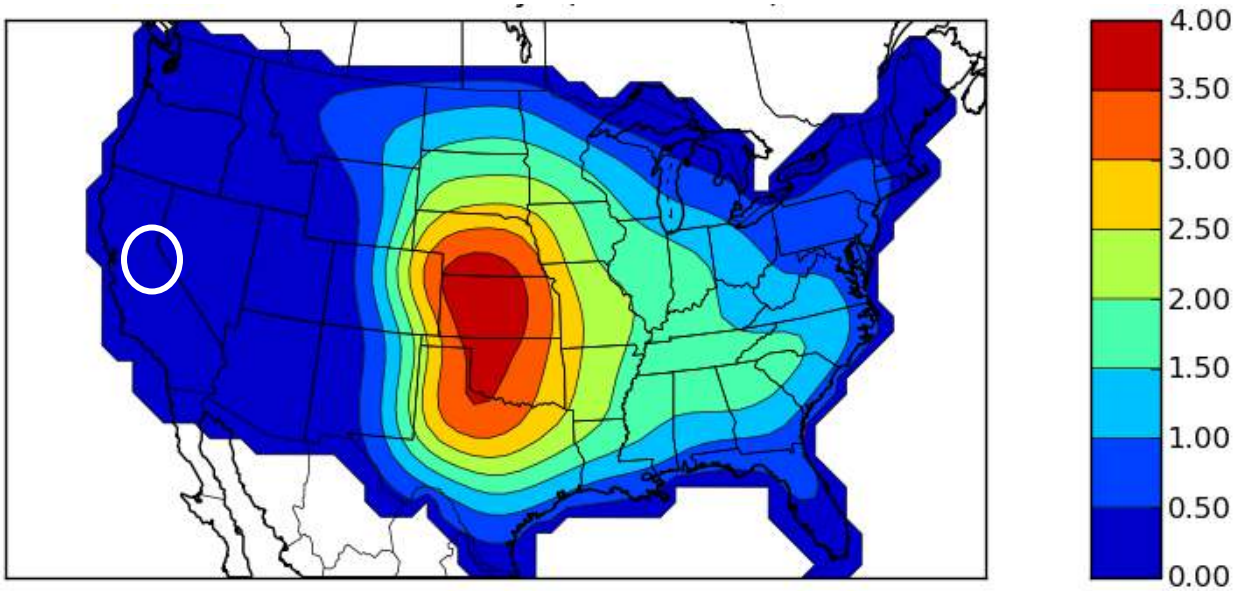
Average Diameter	Corresponding Household Object
1.5 inch	Ping-pong ball
1.75 inch	Golf-Ball
2.0 inch	Hen Egg
2.5 inch	Tennis Ball
2.75 inch	Baseball
3.00 inch	Teacup
4.00 inch	Grapefruit
4.5 inch	Softball

Source: National Weather Service

Location and Extent

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 the County and 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 4-11 shows the average days each year where hail of greater than 1" in diameter occurred during a 20-year period from 1990 to 2009. The most recent map available.

Figure 4-11 Amador County – Average Hail Days per Year (1990 to 2009)



Source: National Weather Service, map retrieved 11/25/2019

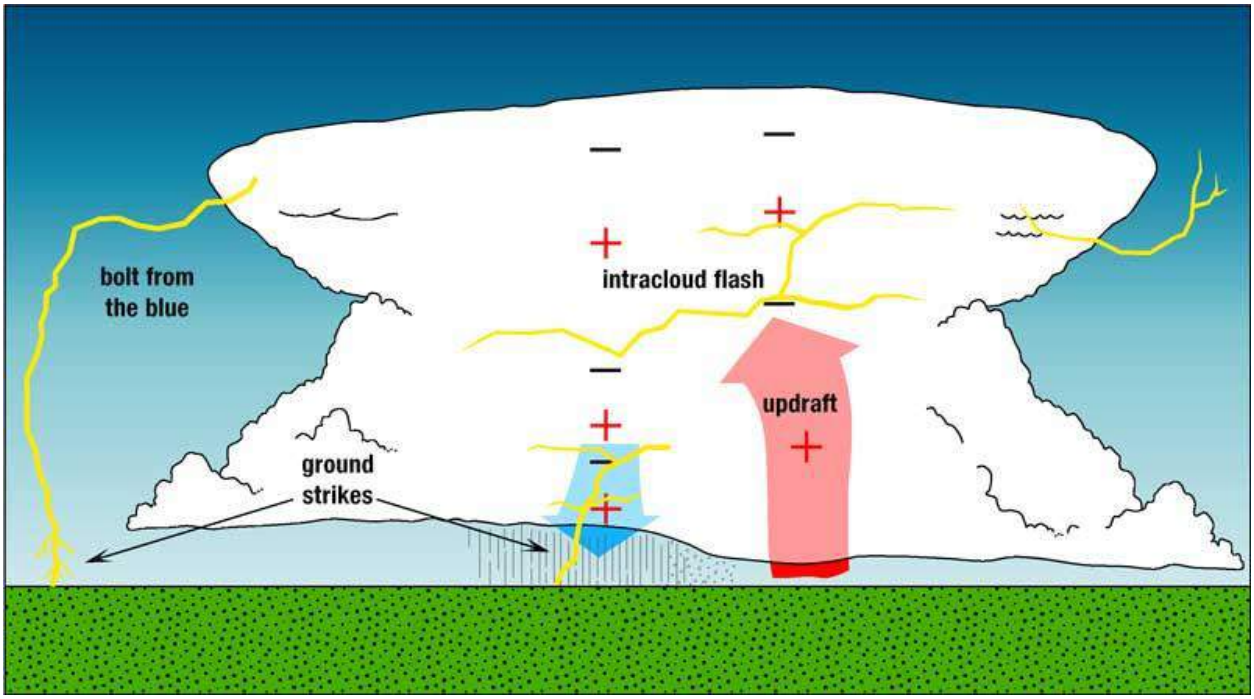
Lightning

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 4-12). 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 4-12 Cloud to Ground Lightning



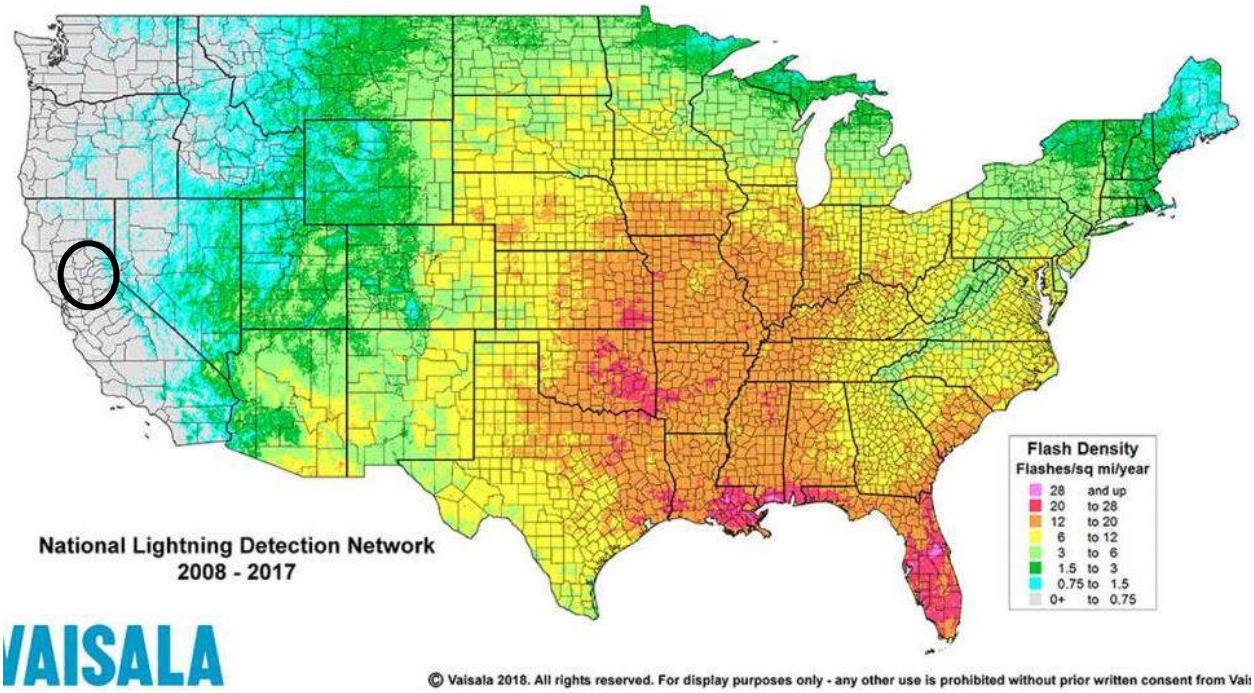
Source: National Weather Service

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 4.2.17.

Location and Extent

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 rare in 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. Vaisala maintains the National Lightning Detection Network. It tracks cloud to ground lightning incidences in the United States. Figure 4-13 shows lightning incidences in the County and the rest of the United States from 2008 to 2017, the most recent map date available.

Figure 4-13 Amador County – Lightning Incidence Map 2008 to 2017



Source: Vaisala National Lightning Detection Network, map retrieved 11/25/2019

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 resulted in a state or federal disaster declaration are shown in Table 4-12.

Table 4-12 Amador County – Disaster Declarations from Heavy Rain and Storms 1950-2020

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	15	1955, 1958, 1963, 1964, 1969, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1959, 1963 (twice), 1969, 1980, 1982, 1986, 1995, 1997, 1998

Source: FEMA, Cal OES

NCDC Events

The NCDC data recorded 48 hail, heavy rain, and winter weather incidents for Amador County since 1950. Winter weather events tend to be rain in the lower elevations of the County, while snow can fall in the upper elevations. For that reason, winter weather is captured here as well as in the winter storms past occurrences in Section 4.2.5. No incidents of lightning were found in the NCDC database for the County. A summary of these events is shown in Table 4-13 Additional events of heavy rain and storms are also discussed in the NCDC table in the flood profile in Section 4.2.13.

Table 4-13 NCDC Severe Weather Events in Amador County 1950-5/31/2019

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	5	0	0	0	0	$0	$0
Winter Weather	41	1	3	0	0	$0	$0
Total	**48**	**1**	**3**	**0**	**0**	**$ 0**	**$ 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 4.2.6. 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.

Likelihood of Future Occurrence

Highly Likely – Based on NCDC data and HMPC input, 48 heavy rain and storm incidents over a 70-year period (1950-2019) equates to a severe storm event every 1.46 years. As noted, this database likely does not capture all heavy rain, hail, lightning, and winter weather events. Severe weather is a well-documented seasonal occurrence that will continue to occur often in the Amador County Planning Area.

Climate Change and Heavy Rains and Storms

Climate change and its effect on flood near the City has been discussed by three sources:

- California Climate Adaptation Strategy (CAS) – 2014
- Cal-Adapt

CAS

According to the 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.

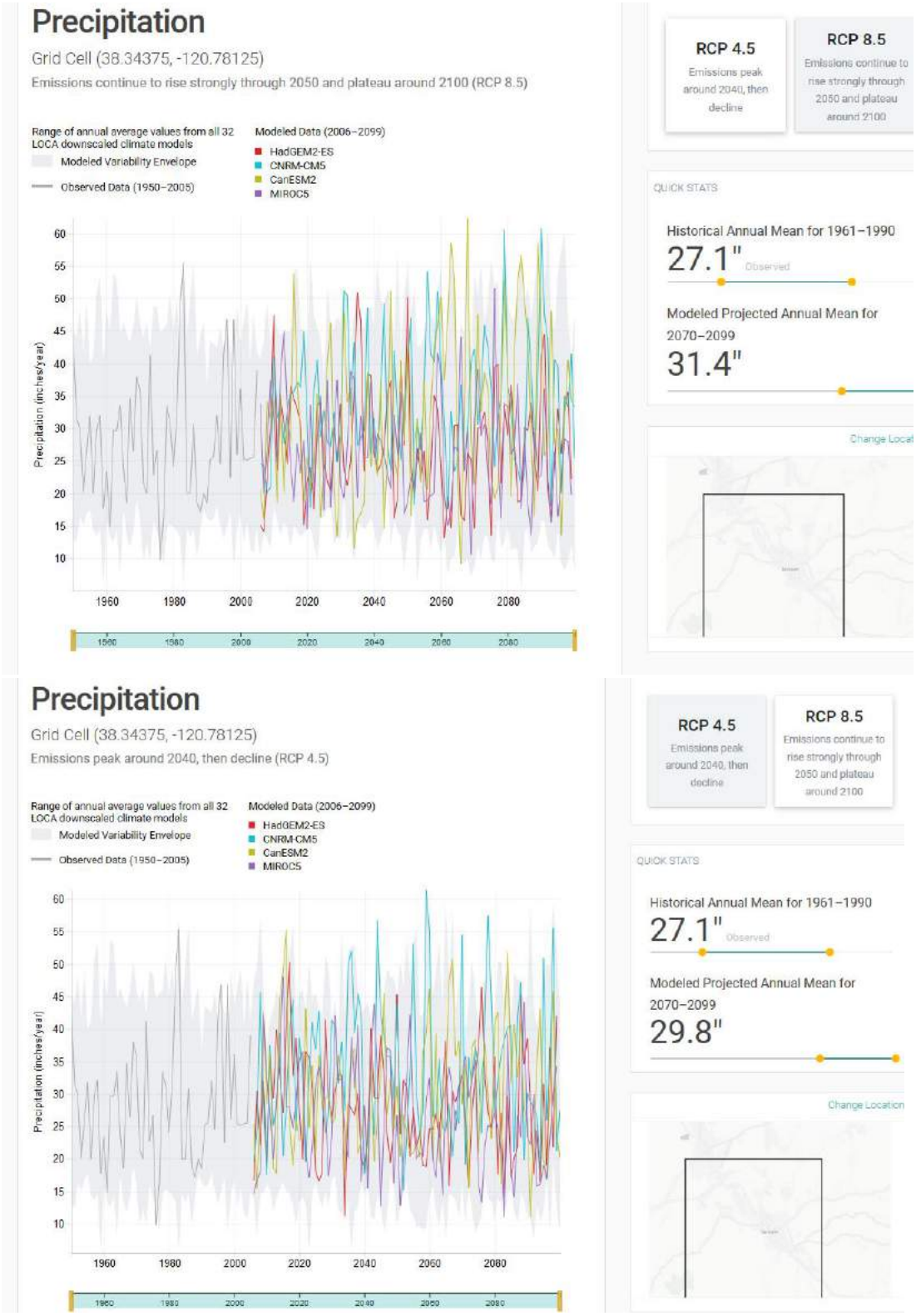
Cal Adapt

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.

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 precipitation estimates from Cal-Adapt for the Amador County Planning (using the quad that contains the City of Jackson) are shown in Figure 4-14.. It shows the following:

- The upper chart shows annual averages of observed and projected precipitation values for the selected area on map under the RCP 8.5 scenario in which emissions continue to rise strongly through 2050 and plateau around 2100. 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 4.5 scenario in which emissions peak around 2040, then decline. 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 4-14 Amador County– Future Precipitation Estimates: High and Low Emission Scenarios



Source: Cal-Adapt – Precipitation: Decadal Averages Map

4.2.4. Severe Weather: High Winds and Tornadoes

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 snowstorms. 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 Amador County 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 4-15 shows the Beaufort wind scale.

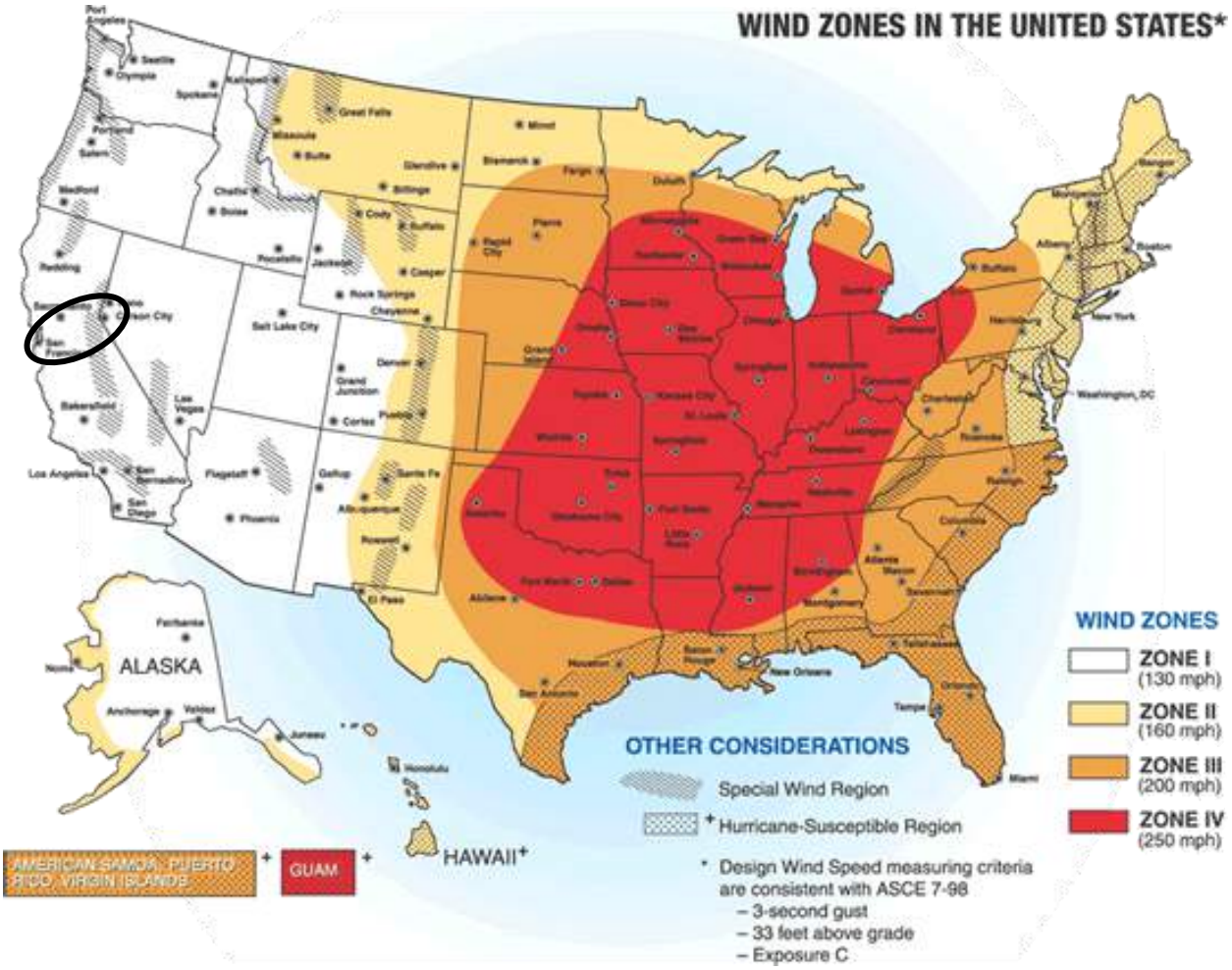
Figure 4-15 Beaufort Wind Scale

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 4-16 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 4.2.17.

Figure 4-16 Wind Zones in the United States

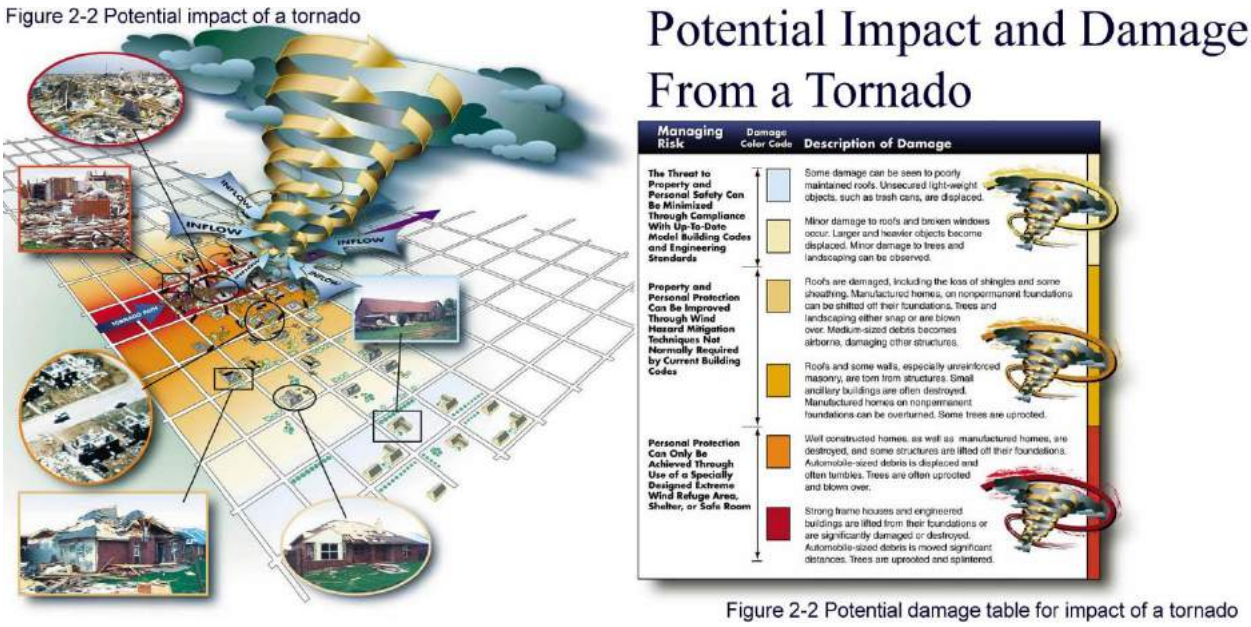


Source: FEMA

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, primarily during the rainy 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 4-17 illustrates the potential impact and damage from a tornado.

Figure 4-17 Potential Impact and Damage from a Tornado



Source: FEMA: Building Performance Assessment: Oklahoma and Kansas Tornadoes

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.

Location and Extent

Tornadoes, while rare, can occur at locations in the lower elevations County. 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 4-14 shows the wind speeds associated with the original Fujita scale ratings and the damage that could result at different levels of intensity. Table 4-15 shows the wind speeds associated with the Enhanced Fujita Scale ratings.

Table 4-14 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.

Fujita (F) Scale	Fujita Scale Wind Estimate (mph)	Typical Damage
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.
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 4-15 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.

NCDC Events

The NCDC data recorded 99 high wind and tornado incidents (funnel clouds) for Amador County since 1955. A summary of these events is shown in Table 4-16.

*Table 4-16 NCDC High Wind and Tornado Events in Amador County 1955-5/31/2019**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Funnel Cloud	2	0	0	0	0	$0	$0
High Wind	58	1	0	5	0	$16,103,000	$48,000
Strong Wind	38	2	1	4	3	$5,275,500	$0
Thunderstorm Wind	1	0	0	0	0	$0	$0
Total	**99**	**3**	**1**	**9**	**3**	**$21,378,500**	**$48,000**

Source: NCDC

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

HMPC Events

The HMPC noted that winds have affected the agricultural industry in the past. Those events are discussed in the Past Occurrences in Section 4.2.6. HMPC members also noted that the 2004 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.

Likelihood of Future Occurrence

Highly Likely/Occasional – Based on NCDC data and HMPC input, 99 wind and tornado incidents over a 65-year period (1955-2019) 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 and High Winds

According to the 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.

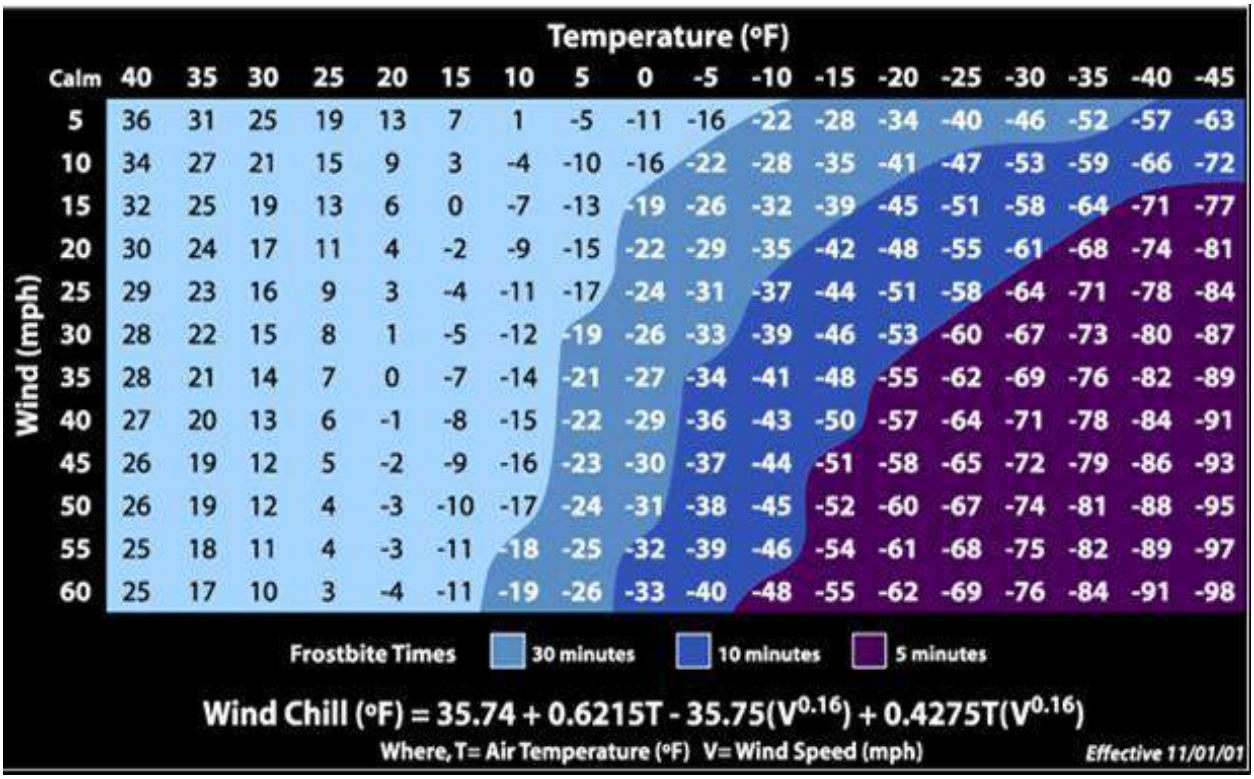
4.2.5. Severe Weather: Winter Storm and Freeze

Hazard/Problem Description

According to the NWS and the WRCC, extreme cold often accompanies a winter storm 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 4.2.4 Agricultural Hazards.

In 2001, the NWS implemented an updated Wind Chill Temperature index (shown in Figure 4-18), 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.

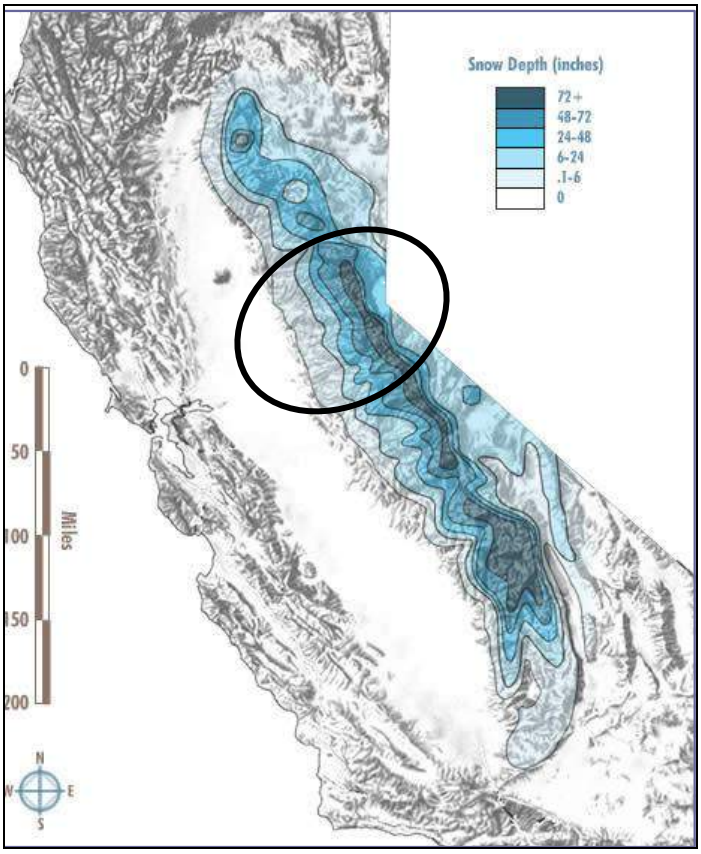
Figure 4-18 Wind Chill Temperature Chart



Source: National Weather Service

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 4-19 shows the average maximum measured snow depth in the Sierra Nevada for the month of March (the month of greatest average snow depths).

Figure 4-19 Average Maximum Snow Depths of Sierra Nevada Mountains in March



Source: http://www.sierranevadaphotos.com/geography/snow_depth.asp

The western portion of the Amador County Planning Area does experience rare snowfall on a seasonal basis; however, the and eastern portions of the County receive an abundance of snow, mostly between the months of November through March. Winter snowstorms in this part of the County, including strong winds and blizzard conditions, can result in localized power and phone outages and closures of streets, highways, schools, businesses, and nonessential government operations. During periods of heavy snow there is also an increase in the number and severity of traffic accidents. People can become isolated in their homes and vehicles and are unable to receive essential services. Snow removal costs can impact budgets significantly. Heavy snowfall during winter can lead to flooding or landslides during the spring if the area snowpack melts too quickly and can also create numerous challenges for emergency responders.

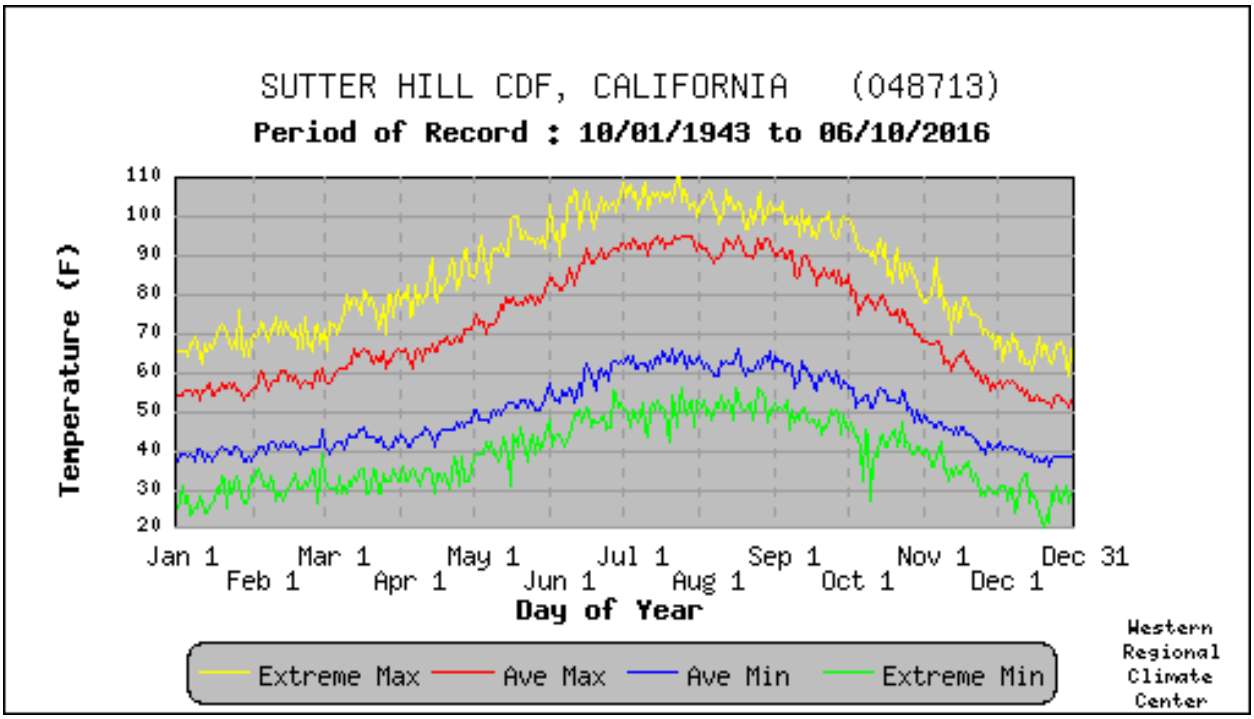
Information on cold and winter storms from the two WRCC coop stations for the western and eastern County is shown below.

Western Amador County— Sutter Hill Ranger Station Weather Station, 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 4-17 shows the record low temperatures by month for western Amador County. Average daily temperatures for western Amador County are shown in Figure 4-20.

Figure 4-20 Western Amador County— Daily Temperature Averages and Extremes



Source: Western Regional Climate Center

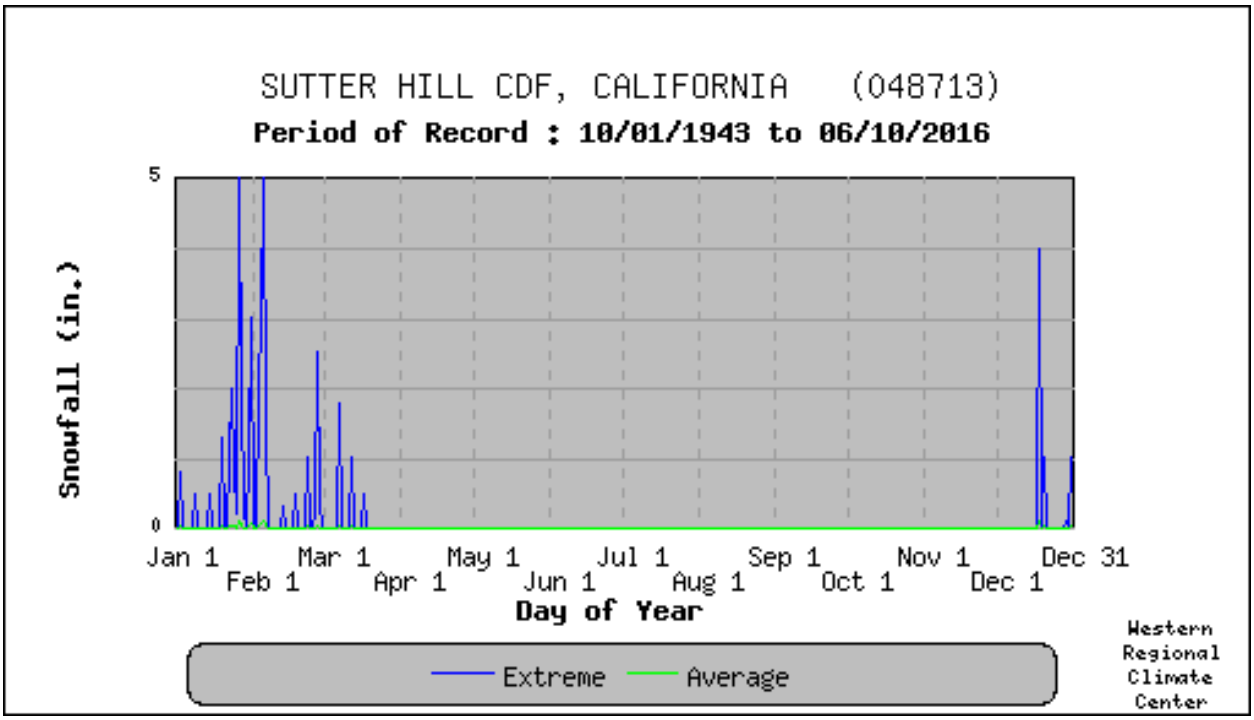
Table 4-17 Western Amador County – Record Low Temperatures 1943 to 2016

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

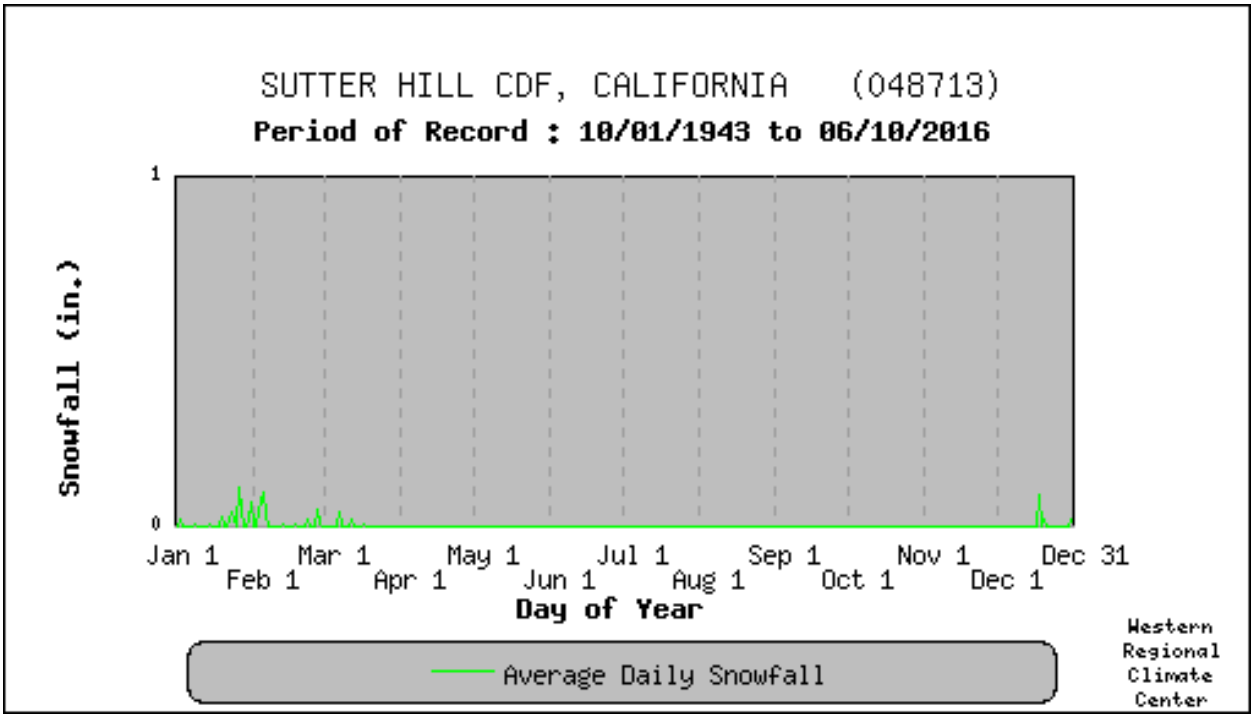
According to the WRCC, average snowfall on the western side of the County is 1.42 inches, as shown in Figure 4-21. The highest annual snowfall fell in 1967, when 9.0 inches fell. Highest monthly snowfall accumulation came in February of 1948, when 6.5 inches fell. Average snow depths in January through March are minimal. This can be seen in Figure 4-22.

Figure 4-21 Western Amador County—Snowfall Averages and Extremes



Source: Western Regional Climate Center

Figure 4-22 Western Amador County—Snow Depth Averages and Extremes

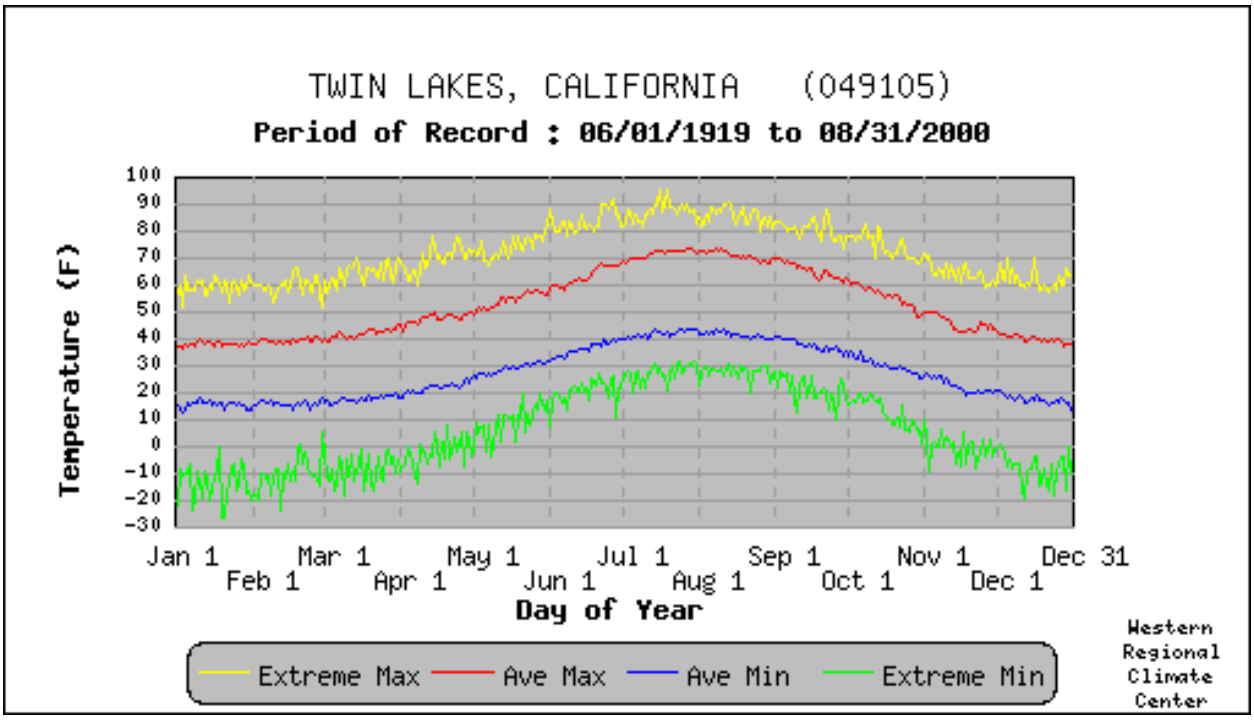


Source: Western Regional Climate Center

Eastern Amador County—Twin Lakes Weather Station, 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 4-18 shows the record low temperatures by month for eastern Amador County. Average daily temperatures for eastern Amador County are shown in Figure 4-23.

Figure 4-23 Eastern Amador County— Daily Temperature Averages and Extremes



Source: Western Regional Climate Center

Table 4-18 Eastern Amador County – Record Low Temperatures 1919 to 2000

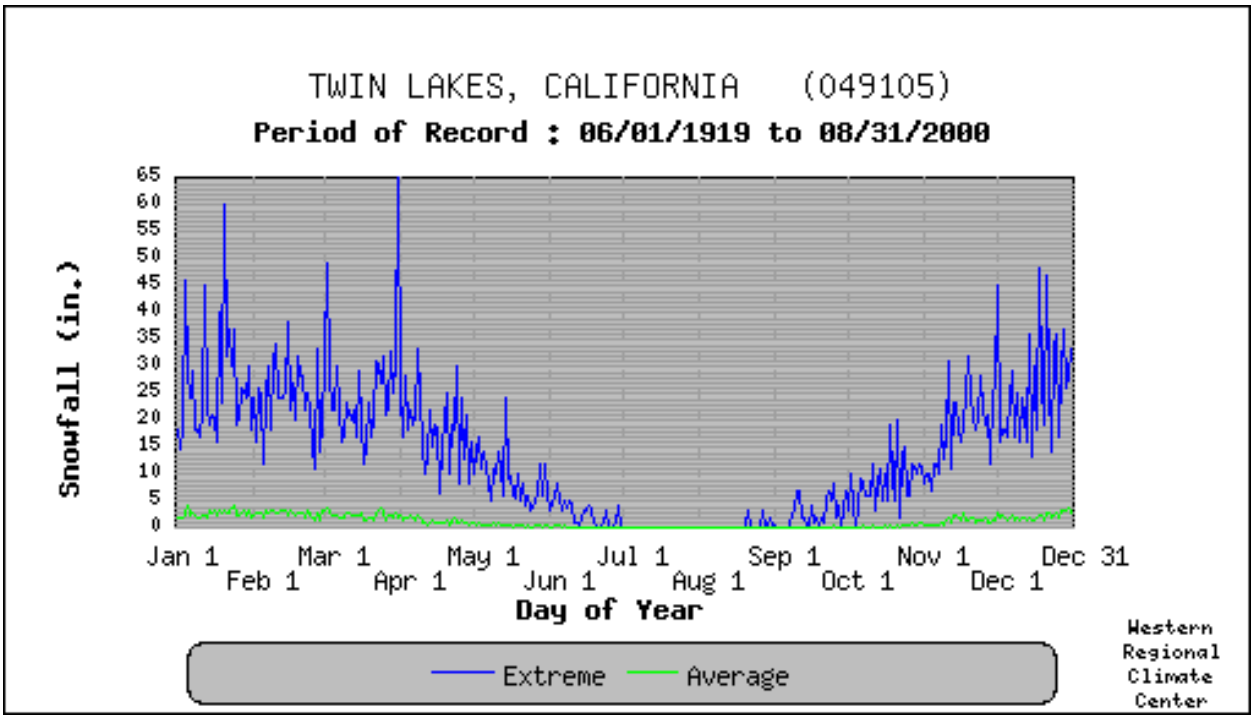
Month	Record Low	Date	Month	Record Low	Date
January	-26°	1/19/1937	July	19°	7/1/1997
February	-24°	2/12/1949	August	20°	8/22/1947
March	-18°	3/9/1935	September	7°	9/25/1934
April	-14°	4/8/1929	October	1°	10/31/1935
May	-4°	5/8/1933	November	-9°	11/3/1935
June	7°	6/1/1929	December	-19°	12/12/1932

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 4-21. The highest annual snowfall fell in 1982, when 693.4 inches fell. Highest monthly snowfall

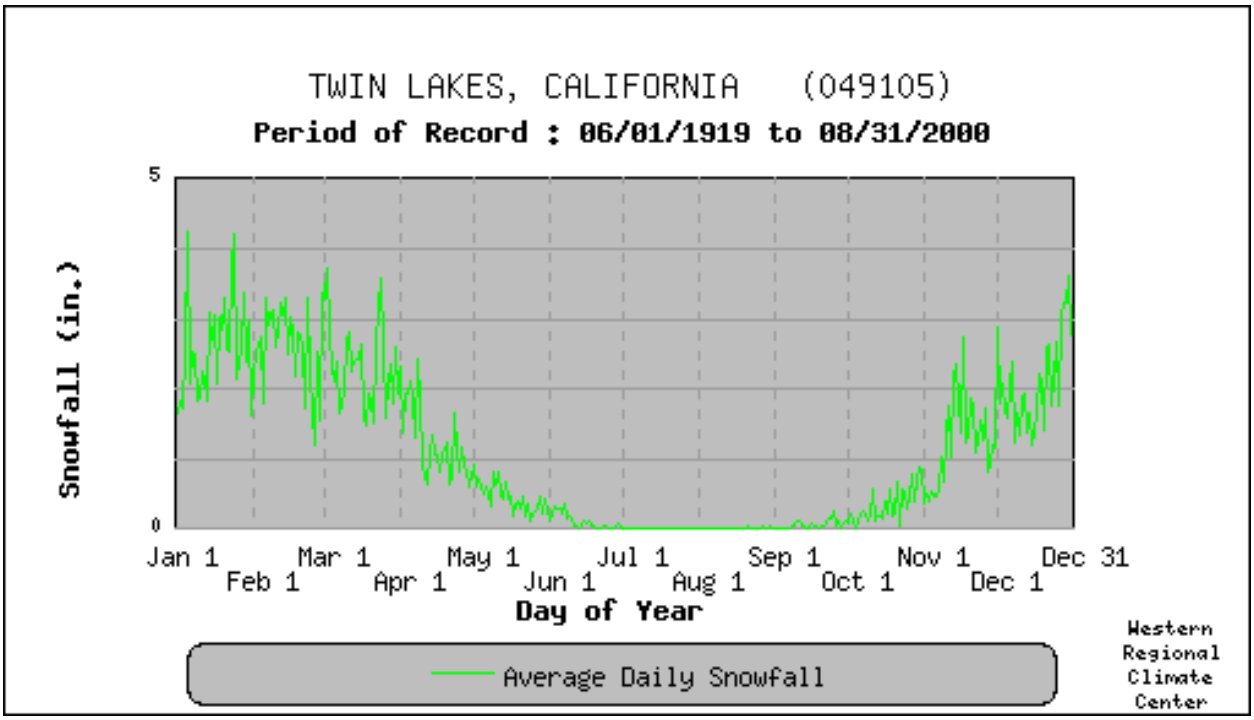
accumulation came in February of 1920, when 266.0 inches fell. Average snow depths in January through March vary from 48 to 76 inches. This can be seen in Figure 4-22.

Figure 4-24 Eastern Amador County—Snowfall Averages and Extremes



Source: Western Regional Climate Center

Figure 4-25 Eastern Amador County—Snow Depth Averages and Extremes

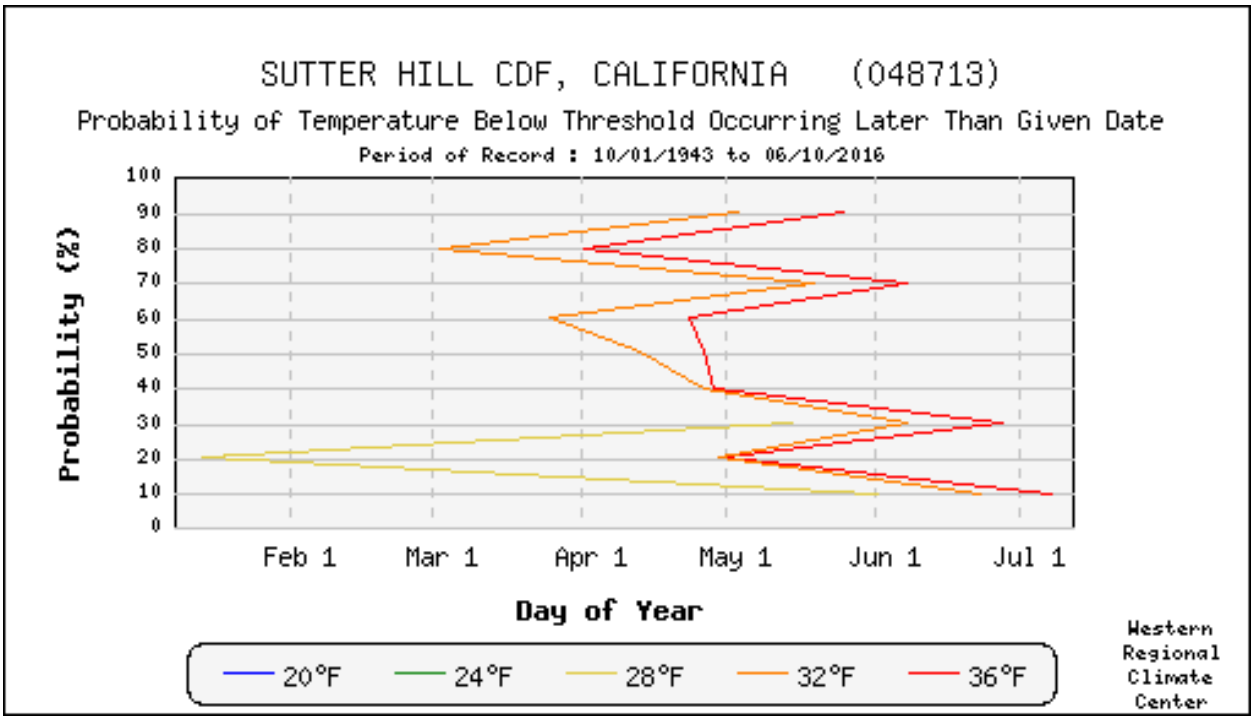


Source: Western Regional Climate Center

Location and Extent

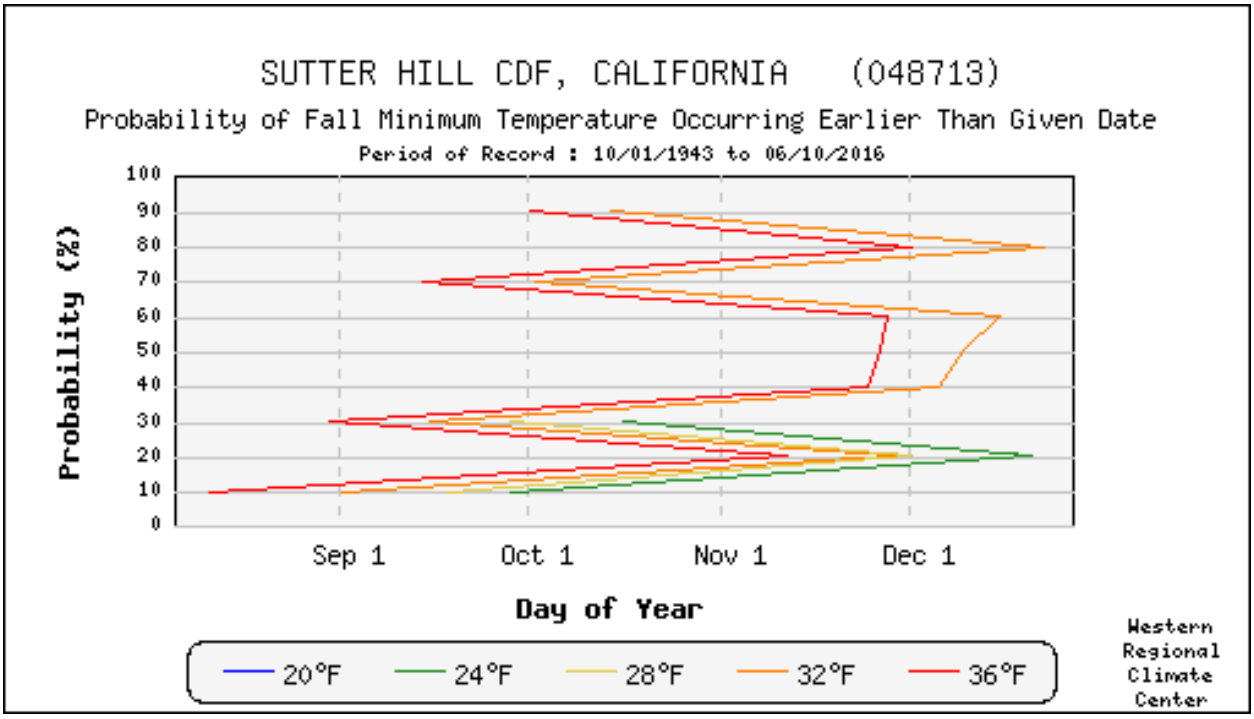
Extreme cold and freeze events occur on a regional basis. Extreme cold can occur in any location of the County. All portions of the County are at risk to extreme cold, with the upper elevations at greater risk. Extreme cold can affect agricultural products in the County. Freeze damages reduce the values of agricultural crops (discussed further in Section 4.2.6). 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. 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 4-26 and Figure 4-27 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 4-26 Western Amador County – Spring Freeze Probabilities



Source: Western Regional Climate Center

Figure 4-27 Western Amador County – Fall Freeze Probabilities

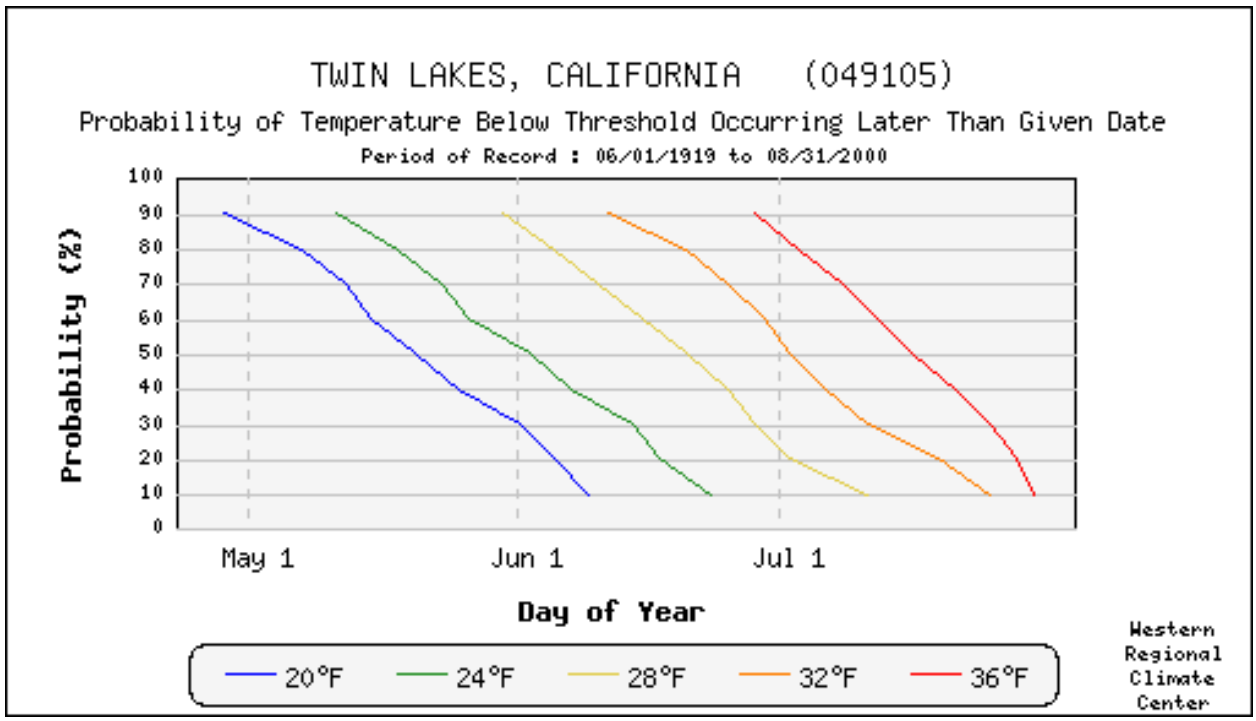


Source: Western Regional Climate Center

Figure 4-28 and Figure 4-29 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:

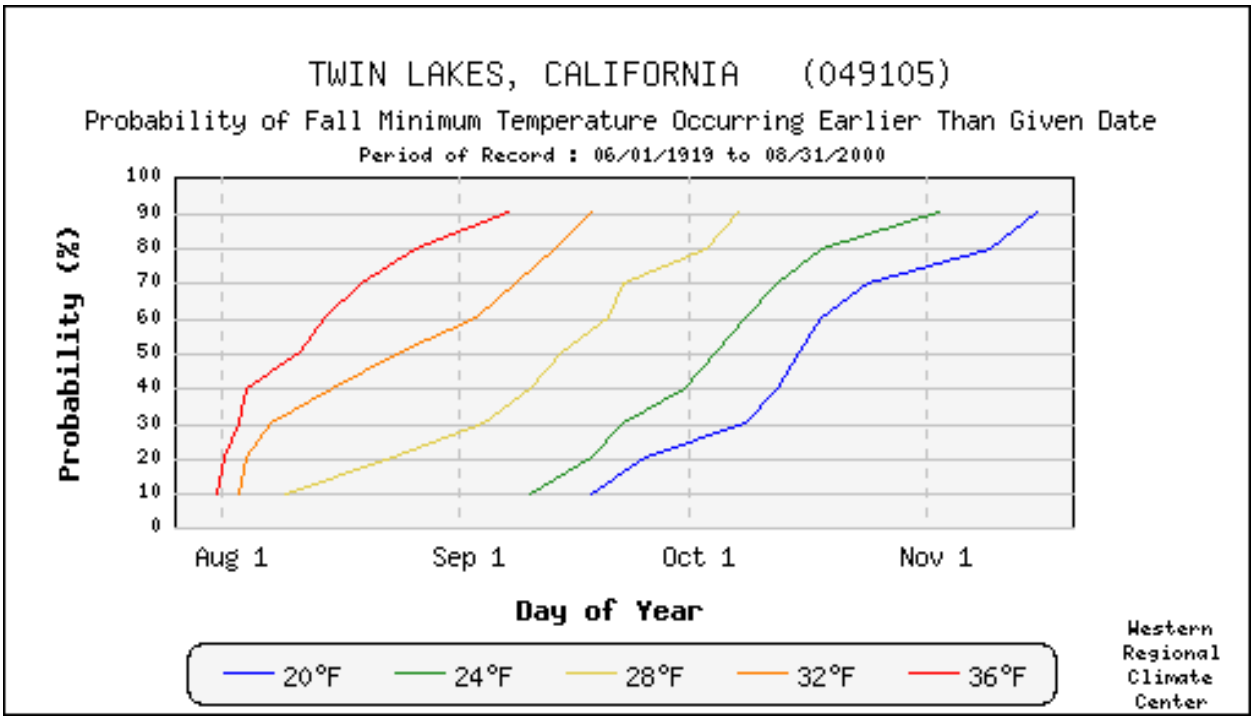
- May – 20.9 days
- June – 9.2 days
- July – 1.8 days
- August – 2.2 Days
- September – 6.5 days

Figure 4-28 Eastern Amador County – Spring Freeze Probabilities



Source: Western Regional Climate Center

Figure 4-29 Eastern Amador County – Fall Freeze Probabilities



Source: Western Regional Climate Center

Past Occurrences

Disaster Declaration History

The County has had no past federal or state disaster declarations for extreme cold and freeze, as shown on Table 4-4.

NCDC Events

The NCDC reports 238 events of past extreme cold and freeze for Amador County since 1996 in their database, as shown on Table 4-19. The winter weather events were likely rain in the lower elevations (as discussed in the past occurrences of Section 4.2.3).

*Table 4-19 NCDC Winter Storm and Freeze Events for Amador County 1996-5/31/2019**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Blizzard	1	0	0	0	0	$0	$0
Cold/Wind Chill	23	0	0	0	0	$0	$0
Extreme Cold/Wind Chill	3	0	0	0	0	$0	$0
Frost/Freeze	15	0	0	0	0	$700,000	$25,000,000
Winter Storm	155	1	1	3	1	$190,000	$0

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Winter Weather	41	1	3	0	0	$0	$0
Total	**238**	**2**	**4**	**3**	**1**	**$890,000**	**$25,000,000**

Source: NCDC

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

HMPC 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.

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.

Likelihood of Future Occurrence

Highly Likely—Extreme cold and freeze 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. This equates to a likelihood of future occurrences being considered highly likely.

Climate Change and Freeze and Snow

According to the 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.

4.2.6. Agricultural Hazards: Severe Weather/Insects/Pests

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 farmland intermingled with other uses in the rural setting which typifies much of the County.

According to the HMPC, agricultural losses occur on an annual basis and are usually associated with severe weather events, including heavy rains, floods, freeze, heat, and drought. The 2018 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, 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 invasive pests including that pose a significant threat to the agricultural industry and are therefore a concern 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. Amador County is home to over 375 farms that cover about 60 percent of the 363,500 acres in the County. 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), the County has 2,882 acres of prime farmland, 1,419 acres of farmland of statewide importance, 3,397 acres of unique farmland, 2,299 acres of farmland of local importance, and 188,115 acres of grazing land. There are also 63,129 acres of untillable land in the County. These numbers have been reduced since 2006 due in part to increased development in the County. (see Table 4-20).

Table 4-20 Amador County Farmland Inventory – 2006 and 2016

Soil Category	2006 Acres	2016 Acres
Prime Farmland	3,610	2,822
Farmland of Statewide Importance	1,717	1,419
Unique Farmland	3,596	3,397
Farmland of Local Importance	1,272	2,299
Grazing Land	188,569	188,115
Urban and Built-Up Land	8,094	8,791
Other Land	88,191	88,275
Water area	5,322	5,253
Total Area Inventoried	**300,371**	**300,371**

Source: State of California Department of Conservation Farmland Mapping and Monitoring Program, www.conservation.ca.gov/

According to the 2018 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 2018 were wine grapes, cattle and calves, and timber products.

According to the 2018 crop report, the total gross production value for all agricultural commodities produced in 2018 was $52,018,609. This is a 14.99% increase from the previous year's production value of $45,238,622. The increase was primarily due to wine grapes at 7.86% and timber at 102.54%. It is important to note that figures within this report show gross values only, and do not reflect a net return to the producer. A summation of crop production values, sourced from the Amador County Agricultural Commissioner's Annual Crop Reports, from 2014-2018 for Amador County is shown in Table 4-21.

Table 4-21 Amador County – Value of Agricultural Production 2014-2018

Crop	2014	2015	2016	2017	2018
Fruit & Nut	$16,296,553	$15,112,954	$18,720,477	$25,002,364	$26,927,885
Livestock Productions	$12,681,427	$12,648,758	$11,604,674	$12,760,988	$15,118,771
Livestock & Poultry Products	$71,809	$65,513	$54,023	$21,760	$18,620
Field Crops	$6,666,628	$7,424,754	$6,366,961	$5,690,929	$6,816,876
Timber	$901,275	$390,325	$499,130	$1,453,515	$2,943,940
Miscellaneous	$193,350	$194,600	$228,845	$309,067	$192,517
Total	**$36,813,056**	**$35,838,919**	**$37,476,126**	**$45,240,640**	**$52,020,627**

Source: Amador County Agricultural Commissioner

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.

Location and Extent of Severe Weather

Severe weather events that can affect agriculture are often regional events (droughts, wind, freeze, heavy rains, and extreme heat). The entirety of the agriculture producing areas of the County are at risk to these severe weather events. The speed of onset varies. Winds, freeze, extreme heat, and heavy rains can have short onset speeds, the onset of drought is much longer. Duration of events varies as well, with longer durations possible for drought and extreme temperatures and shorter durations for winds and heavy rains.

Insect 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 Agriculture Department deployed 318 traps between spring and fall in 2018. The Amador County Department of Agriculture traps and monitors all of these agricultural pests.

Location and Extent of Insect Pests

Insect pests can affect the whole of the County. The speed of onset can be short, while the duration of the infestation varies, but can be long. Insect pests affecting crop production result in economic disasters. These hazards can have a major economic impact on farmers, farm workers, packers, and shippers of agricultural products. They can also cause significant increases in food prices to the consumer due to shortages. Under some conditions, insects that have been present and relatively harmless can become hazardous. For example, severe drought conditions can weaken trees and make them more susceptible to destruction from insect attacks. The major forms of insects are:

- Chewing insects are defoliating insects. They generally strip plants of green matter such as leaves. Caterpillars and beetles make up the largest proportion of chewing insects. Under normal conditions, trees can usually bounce back from an attack of these defoliators, though repeat infestation will weaken a tree and can eventually kill it by starving it of energy.
- Boring, or tunneling, insects cause damage by boring into the stem, roots, or twigs of a tree. Some lay eggs which then hatch, and the larvae burrow more deeply into the wood, blocking off the water-conducting tissues of the tree. Boring insects generally feed on the vascular tissues of the tree. If the infestation is serious, the upper leaves are starved of nutrients and moisture, and the tree can die. Signs of borer infestation include entry/exit holes in the bark, small mounds of sawdust at the base, and sections of the crown wilting and dying.
- Sucking insects do their damage by sucking out the liquid from leaves and twigs. Many sucking insects are relatively immobile, living on the outside of a plant and forming a hard-protective outer coating while they feed on the plant's juices. Quite often they will excrete a sweet, sticky substance known as honeydew which contains unprocessed plant material. Honeydew can cause sooty mold to form on leaves and can become a nuisance. Signs of infestation include scaly formations on branches, dieback of leaves, and honeydew production.
- Also, while not technically an insect, it is worth noting that pathogens such as fungi can kill large stands of trees. For example, *Phytopthora ramorum*, the cause of Sudden Oak Death, which is devastating not only for oaks, but for many other species of trees as well, is spreading rapidly.

Weeds

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 4-22.

Table 4-22 Amador County Weeds of Concern

Species of Concern				
Rush Skeletonweed	Giant Reed	Oblong Spurge	Tamarisk	Yellow Starthistle

Species of Concern				
Scotch Broom	Perrenial Pepperweed	Scotch Thistle	Spanish Broom	Barb Goatgrass
French Bloom	Medusahead	Diffuse Knapweed	Spotted Knapweed	

Source: California Invasive Plant Council Weed Mapper – Containment Opportunities (high)

The Amador County Department of Agriculture uses a variety of control measures to contain many agricultural pests. Due to a lack of state and local funding for invasive weed management, many of the control projects have been postponed since 2014. Amador has applied to CDFA for funding in 2020 to control Oblong Spurge in the Mokelumne River watershed. Noxious weeds have been introduced in the Planning Area by a variety of means. An absence of natural controls, combined with the aggressive growth characteristics and unpalatability of many of these weeds, allows these weeds to dominate and replace more desirable native vegetation. Negative effects of weeds 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;
- Reduced cropland and farmland production; and
- Reduced land value and sale potential.

According to the HMPC, 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.

Location and Extent of Weeds

Agricultural hazards occur throughout the County where lands are used for farming and grazing. The County has large swaths of agricultural lands. These are shown for the County on Figure 4-83 later in this document in Section 4.3.1. Areas not as greatly affected by severe weather, insects, and pests are the incorporated jurisdictions in the County, as well as the forest lands in the eastern portion 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 and weeds can have short or long onset, and short or long durations. All agricultural losses can have a significant impact on affected communities.

Other Agricultural Hazards

The previous Amador County LHMP considered rabies and West Nile Virus as part of the agricultural hazards section. These hazards were dropped from concern due to both the lack of occurrences since 2014, as well as the fact that there are other planning mechanisms and programs in place in the County to deal with these issues.

Past Occurrences

Disaster Declaration History

The agricultural lands of Amador County have historically been affected by weather related events such as 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 2012 through 2019 (the length of data available on their website). These are shown in Table 4-23.

*Table 4-23 Amador County – USDA Disaster Declarations 2012 to 2019**

Year Declared/Disaster Type	Designation Number	Primary or Contiguous	Begin Date
2014			
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

Year Declared/Disaster Type	Designation Number	Primary or Contiguous	Begin Date
2014			
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
2018			
–	–	–	–
2019			
–	–	–	–

Source: Amador County Agricultural Commissioner, US Farm Service Agency

* Disaster declarations for 2019 were released, but no disasters have yet been declared for the County in the 2019 agricultural year

The HMPC noted that there have been other documented instances in which adverse weather events have 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 were damages 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.

NCDC Events

The NCDC does not track agriculture events.

Hazard Mitigation Planning Committee Events

The HMPC noted that agriculture events occur yearly, though with varying levels of damages to a variety of crops. Both severe weather and insect pests occur yearly.

Likelihood of Future Occurrence

Highly Likely—As long as severe weather events, insects, and weeds continue to be an ongoing concern to the Amador County Planning Area, the potential for agricultural losses remains.

Climate Change and Agricultural Hazards

According to the 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.

4.2.7. Aquatic Invasive Species

Hazard/Problem Description

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 economic and environmental issues related to invasive pests of a marine and freshwater nature.

The introduction of aquatic invasive species into Amador County waterways can cause significant and enduring economic and environmental impacts. One of the most widespread mechanisms by which introductions occur is through transport of ballast water in boats. Ballast water is taken on and released by a vessel during cargo loading and discharging operations to maintain the vessel's trim and stability. Ships ballast water obtained from locations outside the County can include non-native organisms, untreated sewage, and other contaminants. Once introduced, aquatic invasive species are likely to become a permanent part of an ecosystem and may flourish, creating environmental imbalances and economic havoc.

Marine Invasive Species

Invertebrates

Quagga and zebra mussels are an invasive species of the same genus, *Dreissena*. The two species appear similar and can be mistaken for the other. These mussels are native to Eurasia and have spread across the United States. They have the ability to multiply rapidly and have no natural predator in the United States. When established in a waterbody the mussels become an ecological and economical threat. They can

remove food and nutrients necessary for other species, clog pipes, damage boat motors. Quagga and zebra mussels are the size of a thumbnail (see Figure 4-30).

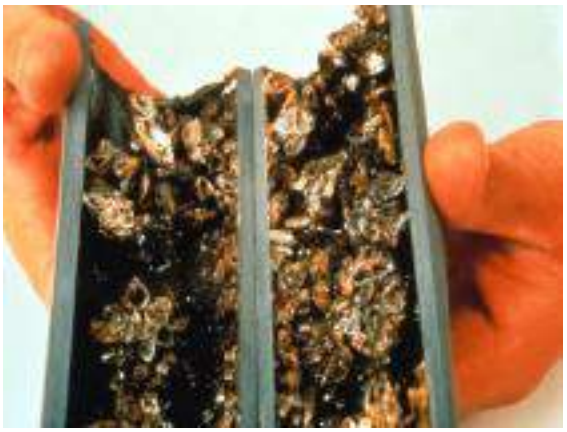
The introduction of quagga mussels (often referred to as Dreissenids) to the Pacific Southwest Region brings the potential to extend devastating impacts into a geographical area already challenged with water-related problems.

Figure 4-30 Quagga and Zebra Mussels

Source: US Fish and Wildlife Service

Zebra mussels are an invasive species first recognized in Lake St. Clair, near Detroit, Michigan, in 1988; shortly thereafter, the quagga mussel was identified. Since then, the Quagga mussel has rapidly spread across much of the western United States and in 2007 was detected at Lake Mead in Nevada. Later surveys found Quagga mussels in Lake Mohave in Nevada, Lake Havasu in Arizona, and the Colorado River Aqueduct System which serves Southern California. In California, the first confirmed find of zebra mussels occurred at San Justo Lake in 2008. These mussels have the ability to survive for a number of days on land by their ability to retain moisture. As a result, there is concern these mussels can spread into Amador County by transportation on recreational boats. The mussels reproduce quickly, disrupting the ecosystem, and have the potential to clog drinking water intakes and motorboat engines, and litter beaches with jagged, foul smelling shells. Figure 4-31 is an example of mussels clogging a pipe.

Figure 4-31 Mussels Clogging a Pipe



Source: Don Schloesser, USGS, Biological Resources Division

These mussels have not affected the waters in Amador County yet, but are still a cause for concern.

Cyanobacteria

Cyanobacteria is a photosynthetic bacteria that is single-celled but often form colonies in the form of filaments, sheets, or spheres and are found in diverse environments. Cyanobacteria is also called blue-green algae. Cyanobacteria are a normal part of most aquatic ecosystems, including lakes, rivers, and oceans. Usually, cyanotoxin concentrations are low, and not harmful to animals and humans. However, when toxic algae are present in an ecosystem, or when there are "algal blooms" (the rapid, uncontrolled growth of algae) they can be harmful. There are factors that contribute to algal blooms, including limiting nutrients, climate change, and pollution.

Ione has had issues in the summertime. Treatment plants have active monitoring plans for cyanobacteria. It is generally a taste and odor issue in Ione.

Location and Extent

All freshwater lakes, streams, and rivers are potentially at risk from aquatic invasive species. There is no established scale for aquatic invasive species. Magnitude is measured by the presence and counts of aquatic invasive species in waterways in Amador County. Speed of onset of these invasive species is short, as it only takes a careless boater to accidentally introduce an invasive species. However, the impacts associated with the introduction of a new invasive species can last years.

Past Occurrences

Disaster Declaration History

There have been no federal or state disaster declarations related to aquatic invasive species, as shown in Table 4-4.

NCDC Events

The NCDC does not track aquatic invasive species events.

HMPC Events

The HMPC was unable to find past occurrences in the County.

Likelihood of Future Occurrence

Unlikely – As of the writing of this plan, the HMPC felt there was a small chance of the County being affected by marine invasive species.

Climate Change and Aquatic Invasive Species

A report by the USDA from Cornell University research note that quagga mussels are usually restricted to the bottom of the lake and therefore depend on sedimentation and water circulation to access food. Water

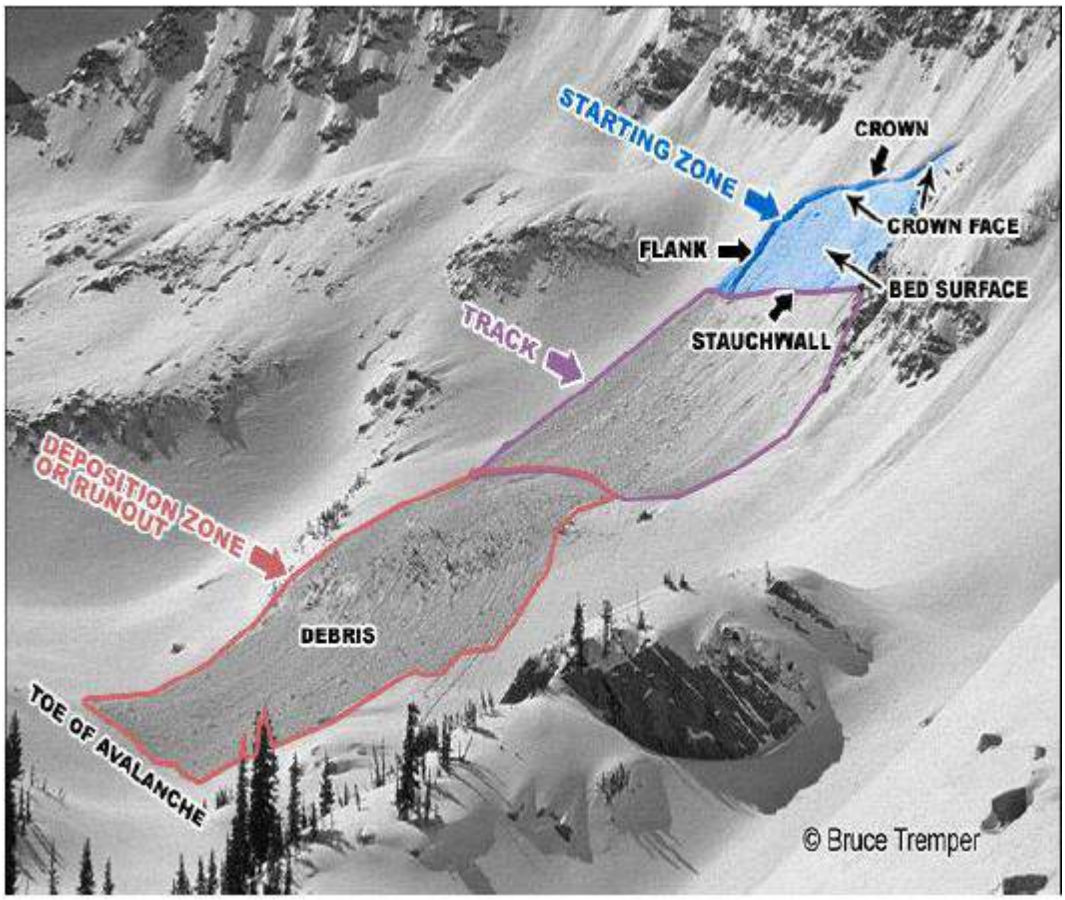
circulation is in turn affected by the morphometry of lakes and by temperature increases associated with climate change. These two drivers of ecological change (invasive mussels and climate change) will interact, but the degree of interactions and the magnitude of ecological change to the lakes will depend on the morphometry of the lake. Therefore, ecological forecasting requires consideration of both lake physics and lake biology. Climate change will likely affect quagga mussel proliferation if they ever enter Amador County.

4.2.8. Avalanche

Hazard/Problem Description

According to the 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 4-32.

Figure 4-32 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 4-24.

Table 4-24 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 database shows 4 avalanche events in Amador County since 1993. These are shown in Table 4-25. It should be noted that, due to the way data is reported to the NCDC, that most of the deaths and injuries occurred outside of Amador County.

*Table 4-25 NCDC Avalanche Events for Amador County 1993-5/31/2019**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Avalanche	4	2	0	3	0	$0	$0

Source: NCDC

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

HMPC Events

Historically, avalanches occur within the eastern portion of the County between the months of January and March, following snowstorms. Areas prone to avalanche hazards include the following areas within the County:

- Highway 88, Devils Gate Area
- Kirkwood Resort, Ski Area

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. 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.

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. This SR 88 spur was closed an estimated 28 days in 2019 for avalanche conditions and mitigation. 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.

With respect to avalanche hazards in the Kirkwood Resort Area, there have been no avalanche related fatalities, injuries, or property damage within Amador County during the existence of the Kirkwood Ski Resort since 1972/1973. The avalanche search and rescues at the resort that have taken place have all been on the Alpine County side. However, 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.

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.

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.

4.2.9. Climate Change

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. Secondary impacts include changes in precipitation patterns, the global water cycle, melting glaciers and ice caps, and rising sea levels. According to the Intergovernmental Panel on Climate Change (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. 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.

Climate change adaptation is a key priority of the State of California. The 2018 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.

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. 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 4-26 provides a summary of Cal-Adapt Climate Projections for the North Central Valley Region.

Table 4-26 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

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 impacts of climate change 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 each year, and the winter rains of 2017 were more intense.

Likelihood of Future Occurrence

Highly Likely – Climate change is virtually certain to continue without immediate and effective global action. According to NASA, 2017 one of the hottest years on record, and 15 of the 17 hottest years ever have occurred since 2000. Without significant global action to reduce greenhouse gas emissions, the IPCC concludes in its Fifth Assessment Synthesis Report (2014) 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

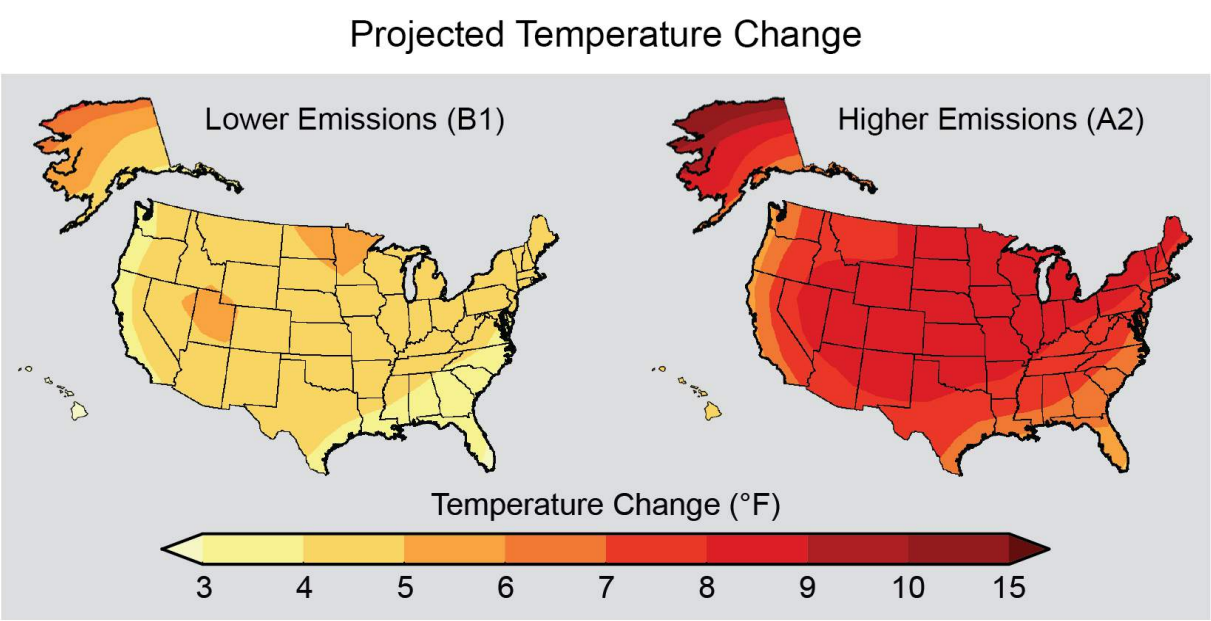
- Climate projections and impacts, like other types of research about future conditions, are characterized by uncertainty. Climate projection uncertainties include but are not limited to:
  - ✓ Levels of future greenhouse gas concentrations and other radiatively important gases and aerosols,
  - ✓ Sensitivity 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 4-33.

Figure 4-33 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 2014 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.

4.2.10. Dam Failure

Hazard/Problem Description

Dams are man-made 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; and/or
- Failure of upstream dams on the same waterway.

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Electric generating facilities and transmission lines could also be damaged

and affect life support systems in communities outside the immediate hazard area. Associated water supply, water quality and health concerns could also be an issue. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

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.

Dams and reservoirs have been built throughout California to supply water for agriculture and domestic use, to allow for flood control, as a source of hydroelectric power, and to serve as recreational facilities. The storage capacities of these reservoirs range from a few thousand acre feet to five million acre-feet. The water from these reservoirs eventually makes its way to the Pacific Ocean by way of several river systems.

The California Department of Water Resources (Cal 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. Cal DWR, DOSD assigns hazard ratings to large dams within the State. The following two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. Dams are classified in 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 Amador County, Cal DWR, and Cal OES, there are 42 dams in Amador County that were constructed for flood control, storage, treatment impoundments, electrical generation, and recreational purposes. 23 of these fall under the jurisdiction of the DSOD (jurisdictional dams described above). DSOD has mapped these dam locations. 19 of these dams do not fall under the DSOD jurisdiction.

Of these 23 jurisdictional dams in the County, 2 were rated as extremely high, 6 is rated as High Hazard, 6 as Significant Hazard, and 9 as Low Hazard. In addition, there are 10 dams located outside the County (from DSOD data) that could cause damage to Amador County.

Figure 4-34 identifies the dams located in the Amador County Planning Area. Table 4-27 gives information on each of the 23 dams in the County that fall under DSOD jurisdiction. These dams are shown on the Figure 4-34. Table 4-28 gives information on the 19 dams in Amador County that do not fall under DSOD jurisdiction. These dams are not mapped. Table 4-29 gives information on the dams outside the County that could affect areas in Amador County.

Figure 4-34 Amador County Dam Inventory

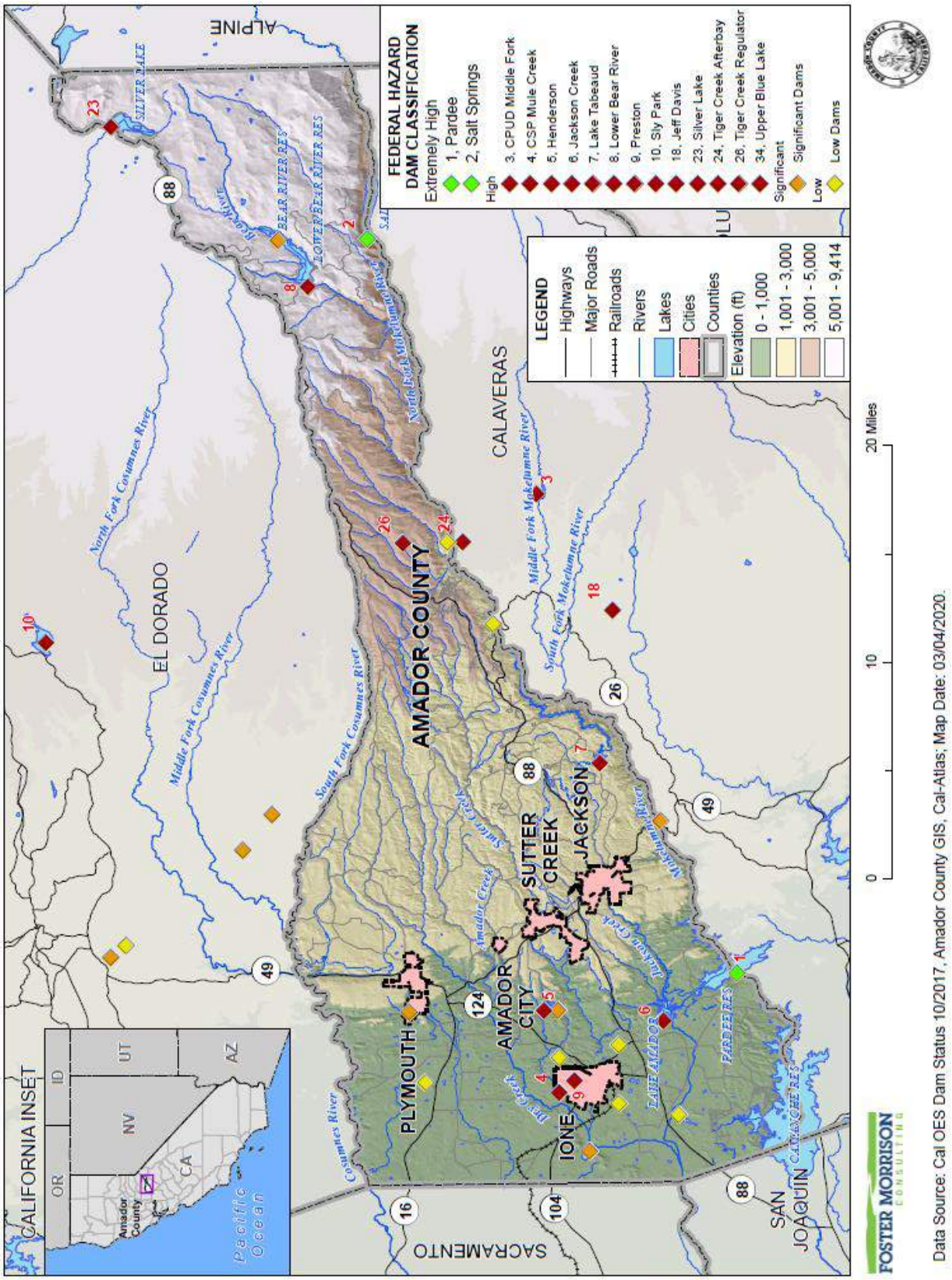


Table 4-27 Amador County – Inventory of Dams under DSOD Jurisdiction

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	Mapped
CSP Mule Creek	California Department of Corrections and Rehabilitation	High	Earth	Offstream	51	535	Y
Jackson Creek	Jackson Valley Irrigation District	High	Earth Concrete	Jackson Creek	193	22,000	Y
Lake Tabeaud	PG&E	High	Earth	South Fork of Jackson Creek	123	1,170	Y
Lower Bear River	PG&E	High	Rockfill	Bear River	253	48,750	Y
Pardee	East Bay Municipal Utility District	Extremely High	Concrete Gravity	Mokelumne River	345	197,950	Y
Salt Springs	PG&E	Extremely High	Rockfill	North Fork Mokelumne River	332	141,900	Y
Arroyo Seco	Greenrock Ranch Lands LLC	Significant	Earth	Tributary of Dry Creek	67	2,433	Y
Bear River	PG&E	Significant	Rockfill	Bear River	83	6,818	Y
Goffinet	Private Owner	Significant	Earth	Jackass Creek	38	197	Y
Henderson	Amador Regional Sanitation Authority	High	Earth	Jackass Creek	56	500	Y
Plymouth Effluent	City of Plymouth	Significant	Earth	Tributary of Lower Indian Creek	59	187	Y
Pond K	US Mine Corporation	Low	Earth	none	22	1,056	Y
Preston	Amador Regional Sanitation Authority	High	Earth	Tributary Mule Creek	40	268	Y
Silver Lake	El Dorado Irrigation District	High	CRIB	Silver Fork	26	3,840	Y

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	Mapped
Tiger Creek Afterbay	PG&E	High	VARA	North Fork Mokelumne River	115	3,960	Y
Tiger Creek Forebay	PG&E	Low	Earth	Tributary of Tiger Creek	33	36	Y
Tiger Creek Regulator	PG&E	High	SLBT	Tiger Creek	112	523	Y
Electra Diversion	PG&E	Low	Gravel	North Fork Mokelumne River	44	65	Y
Ione Canal	Amador Water Agency	Low	Earth	Ione Canal	48	24	Y
John Orr	Private Owner	Low	Earth	Tributary of Jackson Creek	20	152	Y
Preston Forebay	Amador Regional Sanitation Authority	Low	Earth	Offstream	40	30	Y
Shenandoah Lake	Renwood Ranch	Low	Earth	Pigeon Creek	33	168	Y
Vicini	Private Owner	Low	Earth	Tributary of Willow Creek	19	150	Y

Source: Cal OES and the National Performance of Dams Program

*One Acre Foot=326,000 gallons

Table 4-28 Amador County – Inventory of Dams not under DSOD Jurisdiction

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	Mapped
Allen	–	–	–	–	–	–	N
Amador	–	–	–	–	–	–	N
Argonaut	–	–	–	–	–	–	N
Cent Eureka Tailings	–	–	–	–	–	–	N
Clay Reservoir	–	–	–	–	–	–	N
Elephant Mine	–	–	–	–	–	–	N
Jameson	–	–	Earth	Tributary of Cosumnes River	31	102	N
Kennedy Debris	–	–	–	–	–	–	N

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	Mapped
Ludekens Brothers	–	–	–	–	–	–	N
Moore Mine	–	–	–	–	–	–	N
New Pond J	–	–	Earth	none	35	1,544	N
New York Reservoir	–	–	–	–	–	–	N
Original Amador	–	–	–	–	–	–	N
Penn Mining	–	–	–	–	–	–	N
Petty Forebay	–	–	–	–	–	–	N
Sand Plant	–	–	Earth	South Fork of Merchant Creek	30	414	N
Sutter Creek	–	–	–	–	–	–	N
Tanner Reservoir	–	–	–	–	–	–	N
Treasure Mine	–	–	–	–	–	–	N

Source: Cal OES and the National Performance of Dams Program

*One Acre Foot=326,000 gallons

Table 4-29 Dams Outside Amador County of Potential Concern to Amador County

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	Mapped
Aukum View – El Dorado County	Showcase Ranches Community Services District	Significant	Earth	Tributary of Flat Creek	32	136	Y
Big Canyon Creek – El Dorado County	Private Owner	Significant	Earth	Big Canyon Creek	63	395	Y
CPUD Middle Fork – Calaveras County	Calaveras Public Utility District	High	Earth	Middle Fork Mokelumne River	95	2,000	Y
D'Agostini – El Dorado County	Private Owner	Significant	Earth	Spanish Creek	32	355	Y
Jeff Davis– Calaveras County	Calaveras Public Utility District	High	Earth	Tributary of Wet Gulch Creek	114	1,800	Y

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	Mapped
Meadow Lake – Alpine County	PG&E	Significant	Earth	Tributary of North Fork Mokelumne River	77	5,160	Y
Mokelumne Hill – Calaveras County	Mokelumne Hill Sanitation District	Significant	Earth	Tributary of Mokelumne River	52	52	Y
Patterson – El Dorado County	Lake Oaks Community	Significant	Earth	Deadman Creek	37	350	Y
Sly Park – El Dorado County	El Dorado Irrigation District	High	Earth	Sly Park Creek	190	40,600	Y
Sly Park Saddle Dike – El Dorado County	El Dorado Irrigation District	High	Earth	Sly Park Creek	124	44,390	Y
Upper Blue Lake – Alpine County	PG&E	High	Earth and Rock	Blue Creek	31	7,556	Y

Source: Cal OES and the National Performance of Dams Program

*One Acre Foot=326,000 gallons

In addition to the dams listed, the Kennedy and Argonaut mine sites have earthen sludge and waters being held back by dams. The Argonaut mine site is 46 feet high, and only 400 yards from downtown Jackson. It has been deemed unstable for decades. U.S. Environmental Protection Agency and U.S. Army Corp of Engineer estimates show if the dam should fail, it could send a 15-foot-deep mudflow into the heart of Jackson, past Jackson Junior High School and into the historic downtown in as little as two minutes. However, it has been determined by Agencies that it was less dangerous to leave in place than do an offsite cleanup remedy.

Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, dam failure would most probably happen in consequence of the natural disaster triggering the event. However, Cal DWR DOSD assigns hazard ratings 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. Dams are classified in four categories that identify the potential hazard to life and property: Low, Significant, High, and Extremely High. There is no scale with which to measure dam 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.

Past Occurrences

Disaster Declaration History

There have been no disasters 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

The HMPC noted no events of dam failure that have affected the 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.

Climate Change and Dam Failure

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.

4.2.11. Drought and Water Shortage

Hazard/Problem Description

Drought

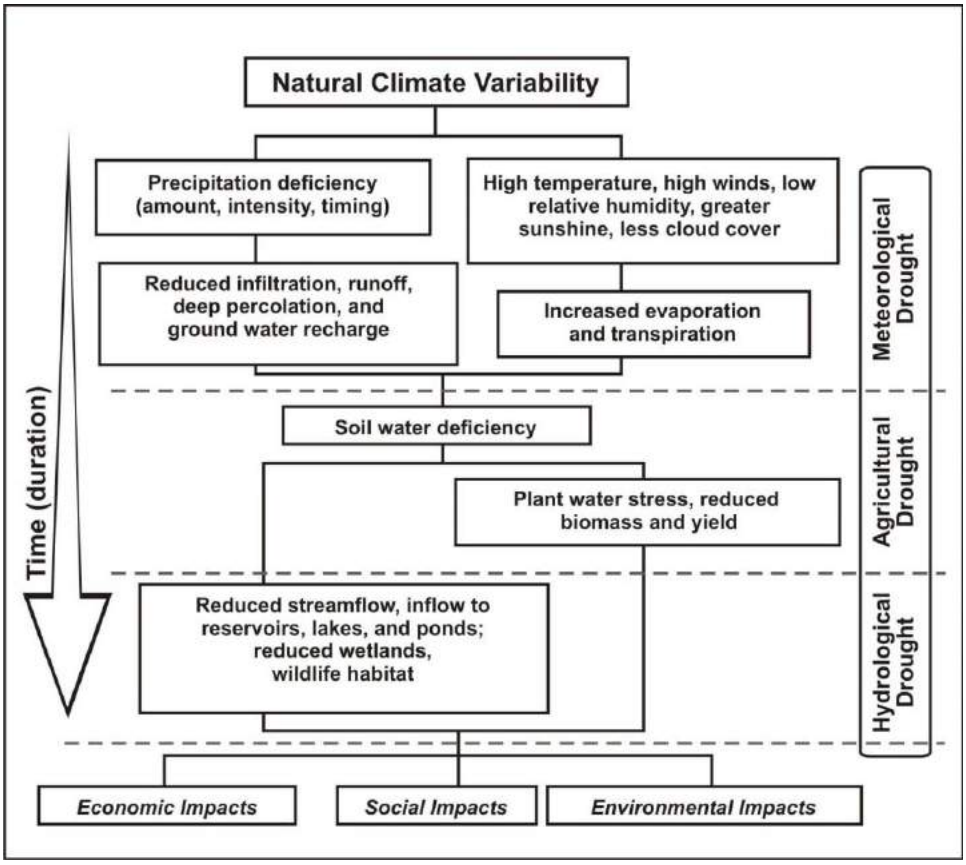
Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends. Water districts normally require at least a 10-year planning horizon to implement a multiagency improvement project to mitigate the effects of a drought and water supply shortage.

Drought is a complex issue involving (see Figure 4-35) 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 4-35 Causes and Impact of Drought



Source: National Drought Mitigation Center (NDMC)

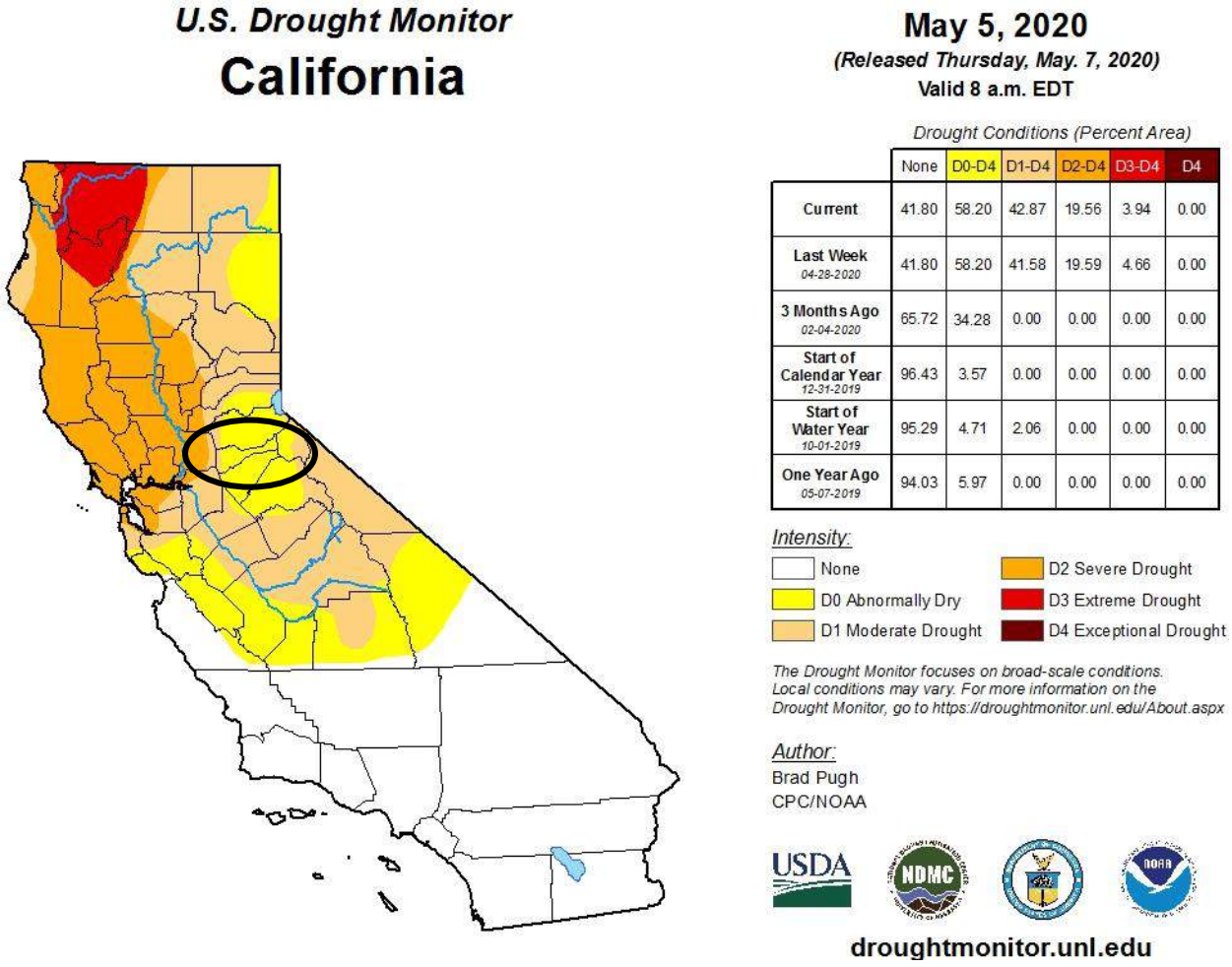
The HMPC noted that drought can cause increased wildfire risk, discussed in Section 4.2.17. During periods of drought, subsidence can also occur.

Location and Extent

Since drought is a regional phenomenon, it affects the whole of the County. Speed of onset of drought is slow, while the duration varies from short (months) to long (years) 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

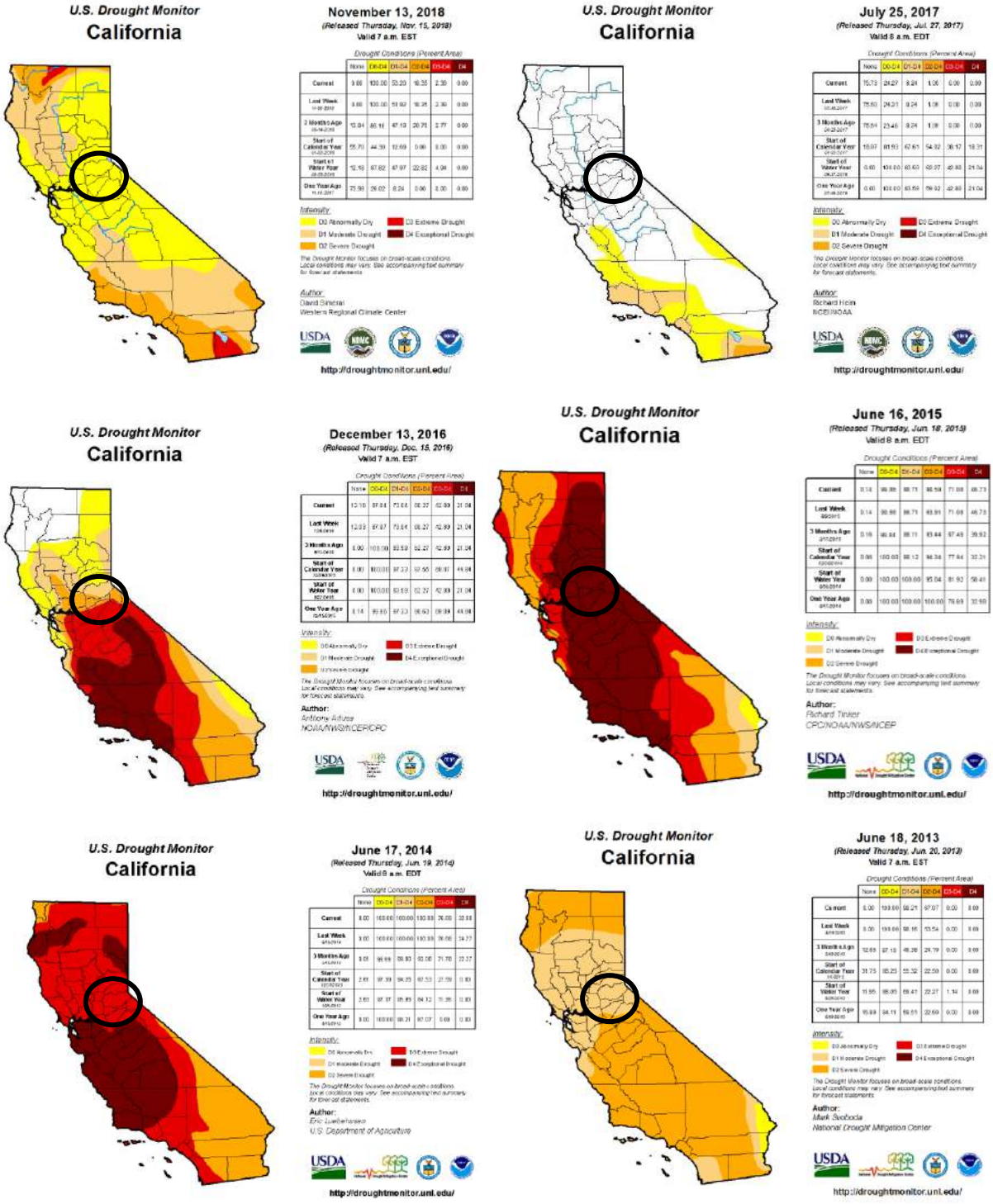
regions. A snapshot of the drought conditions in California and the Amador Planning Area can be found in Figure 4-36. Snapshots from 2013 and 2018 are shown in Figure 4-37.

Figure 4-36 Amador County – Current Drought Status



Source: US Drought Monitor

Figure 4-37 Previous Drought Status in Amador County



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 farming and federally protected fish habitats in California 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)

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.

Location and Extent

Since water shortage happens on a regional scale, the entirety of the County 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.

Past Occurrences

Disaster Declaration History

There has been one federal disaster related to drought and water shortage in Amador County issued in 1977. There have been two state disasters related to drought and water shortage in Amador County issued in 1976 and 2014. This can be seen in Table 4-30.

Table 4-30 Amador County – Disaster Declarations from Drought 1950-2020

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Drought	2	1976, 2014	1	1977

Source: FEMA, Cal OES

NCDC Events

There have been 70 NCDC drought events in Amador County, all related to events in the 2014 to 2016 drought. No deaths, injuries, or property damages were reported to the NCDC from these events.

*Table 4-31 NCDC Drought Events for Amador County 1996-5/31/2019**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Drought	70	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

Cal DWR and Hazard Mitigation Planning Committee Events

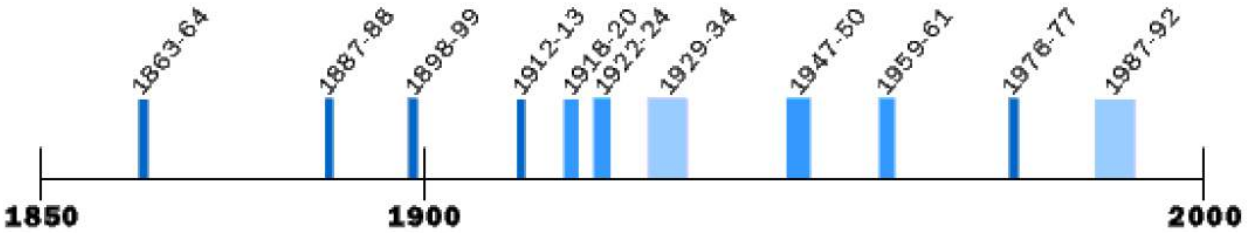
Historically, California has experienced multiple severe droughts. According to the DWR, droughts exceeding three years are relatively rare in Northern California, the source of much of the State's developed water supply. The 1929-34 drought established the criteria commonly used in designing storage capacity and yield of large northern California reservoirs. Table 4-32 compares the 1929-34 drought in the Sacramento and San Joaquin Valleys to the 1976-77, 1987-92, and 2007-09 droughts. Figure 4-38 depicts California's Multi-Year Historical Dry Periods, 1850-2000.

Table 4-32 Severity of Extreme Droughts in the Sacramento and San Joaquin Valleys

Drought Period	Sacramento Valley Runoff		San Joaquin Valley Runoff	
	(maf*/yr)	(percent Average 1901-96)	(maf*/yr)	(percent Average 1906-96)
1929-34	9.8	55	3.3	57
1976-77	6.6	37	1.5	26
1987-92	10.0	56	2.8	47
2007-09	11.2	64	3.7	61

Source: California's Drought of 2007-2009, An Overview. State of California Natural Resources Agency, California Department of Water Resources.
*maf=million acre feet

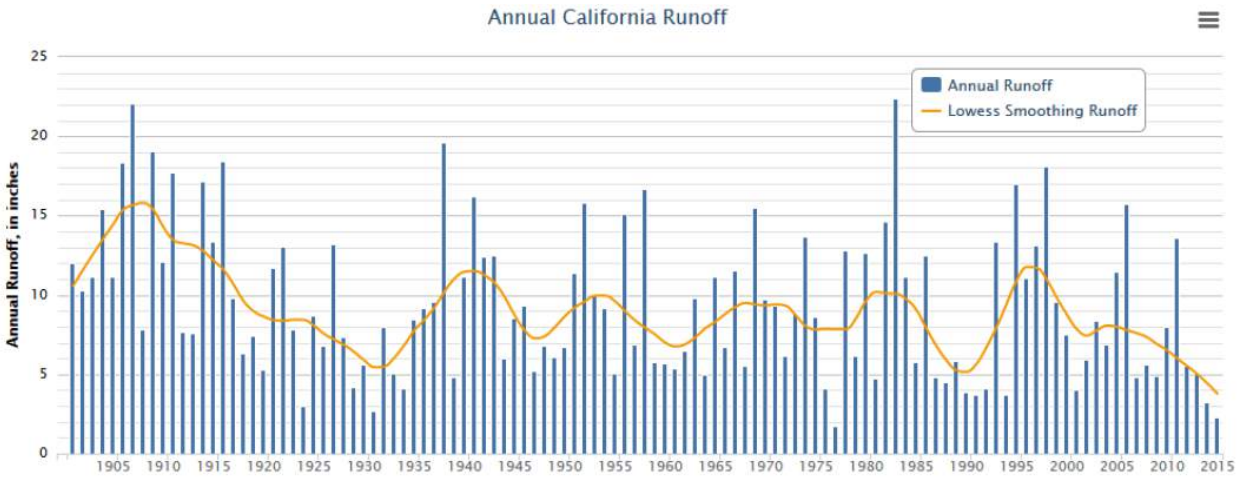
Figure 4-38 California's Multi-Year Historical Dry Periods, 1850-2000



Source: California Department of Water Resources, www.water.ca.gov/
Notes: Dry periods prior to 1900 estimated from limited data; covers dry periods of statewide or major regional extent

Figure 4-39 depicts runoff for the State from 1900 to 2015. This gives a historical context for the 2014-2015 drought to compare against past droughts.

Figure 4-39 Annual California Runoff –1900 to 2015



Source: California DWR

The 2018 California State Hazard Mitigation Plan fleshed out the major droughts from 1900 to 2017. This 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. 31 counties were affected, resulting in $2.67 billion in crop damages. No specific damages could be recalled in the

County from this drought. Individual wells in areas of the County went dry, and had to be deepened in order to reach the water table.

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. No specific damages could be recalled in the County from this drought. Individual wells in areas of the County went dry, and had to be deepened in order to reach the water table.

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. No specific damages could be recalled in the County from this drought. Individual wells in areas of the County went dry, and had to be deepened in order to reach the water table.

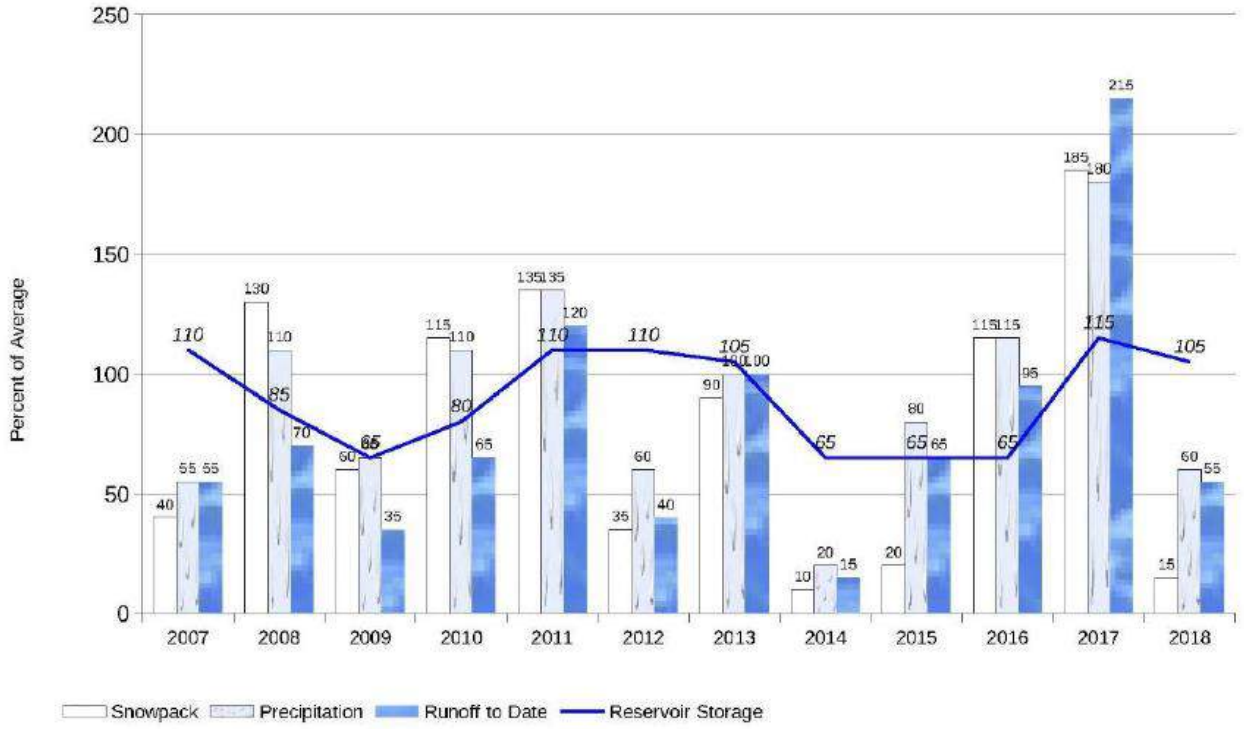
The 2012-2017 Drought

The statewide drought of 2012-2017 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. The immediate cause of California's 2014 drought can be traced to the altered route of atmospheric water vapor, which is necessary for strong winter precipitation in the state. Ordinarily, water evaporates from the ocean in the warm Tropical Pacific Ocean and winds carry that water vapor to the U.S. west coast. However, in 2014 the water vapor transport split into two branches and ended up going either north or south of California. During this drought, the JVID and AWA had impacts in the County. Those impacts are discussed in their respective annexes to this Plan Update. The HMPC reported that fire danger in 2013 and 2014 reached record levels as the drought produced dry, highly flammable fuel loads.

Water Shortage

Figure 4-40 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 2007 and 2018. The chart illustrates the cyclical nature of weather patterns in California.

Figure 4-40 Water Supply Conditions, 2007 to 2018



Source: 2018 State of California Hazard Mitigation Plan

Beginning in 2012, snowpack levels in California dropped dramatically. 2015 estimates place snowpack as 5 percent of normal levels. Snowpack measurements have been kept in California since 1950 and nothing in the historic record comes close to 2015's severely depleted level. The previous record for the lowest snowpack level in California, 25 percent of normal, was set both in 1976-77 and 2013-2014. In "normal" years, the snowpack supplies about 30 percent of California's water needs, according to the California Department of Water Resources. Snowpack levels began to increase in 2016, and in 2017 snowpack increased to the largest in 22 years, according to the State Department of Water Resources. In late 2017 and early 2018, drought conditions began to return to southern California but have been dampened by periods of above average rainfall in the first part of 2019.

With a reduction in water, water supply issues based on water rights becomes more evident. Irrigation of agricultural lands is an ongoing concern in the Amador County Planning Area. Some agricultural uses are severely impacted through limited water supply. Drought and water supply issues will continue to be a concern to the Planning Area. Irrigation of agricultural lands also continues to be a concern in the Planning Area.

Likelihood of Future Occurrence

Drought

Likely—Historical drought data for the Amador County Planning Area and region indicate there have been 5 significant droughts in the last 85 years. This equates to a drought every 17 years on average or a 5.9

percent chance of a drought in any given year. However, based on this data and given the multi-year length and cyclical nature of droughts, the HMPC determined that future drought occurrences in the Planning Area are 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.

Climate Change and Drought and Water Shortage

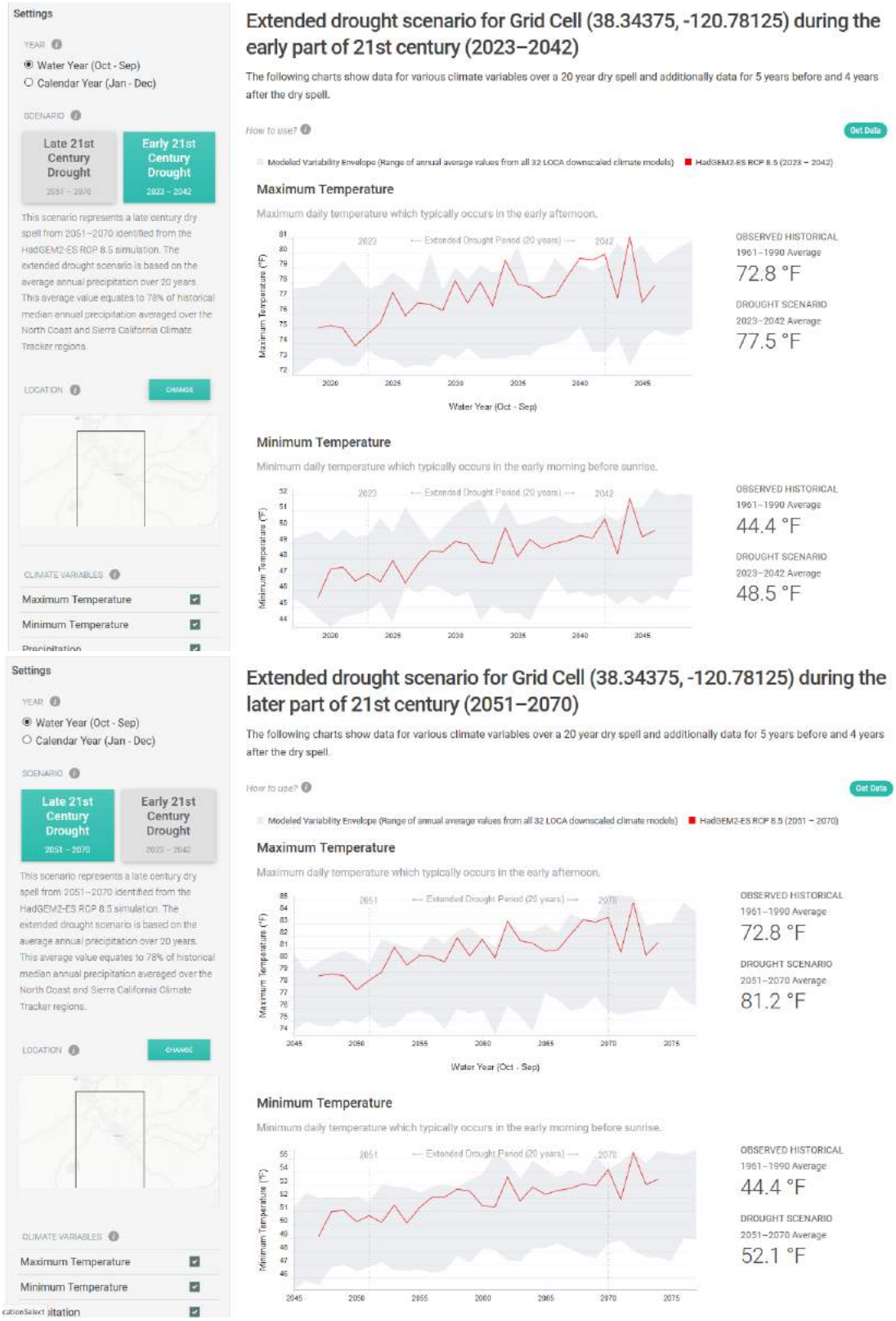
Climate scientists studying California find that drought conditions are likely to become more frequent and persistent over the 21st century due to climate change. The experiences of California during recent years underscore the need to examine more closely the state's water storage, distribution, management, conservation, and use policies. The 2014 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 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 derived from LOCA downscaled meteorological and hydrological simulations (Figure 4-41) – 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 4-41 Amador County – Future Extended Drought Scenarios



Source: Cal Adapt – Extended Drought Scenarios

4.2.12. Earthquake

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

Groundshaking is motion that occurs as a result of energy released during faulting. The damage or collapse of buildings and other structures caused by groundshaking is among the most serious seismic hazards. Damage to structures from this vibration, or groundshaking, 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.

Much of the populated County is located on alluvium which increases the amplitude of the earthquake wave. Ground motion lasts longer and waves are amplified on loose, water-saturated materials than on solid rock. As a result, structures located on alluvium typically suffer greater damage than those located on solid rock.

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 buildings [URM]) 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 has caused 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.

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.

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 - 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.

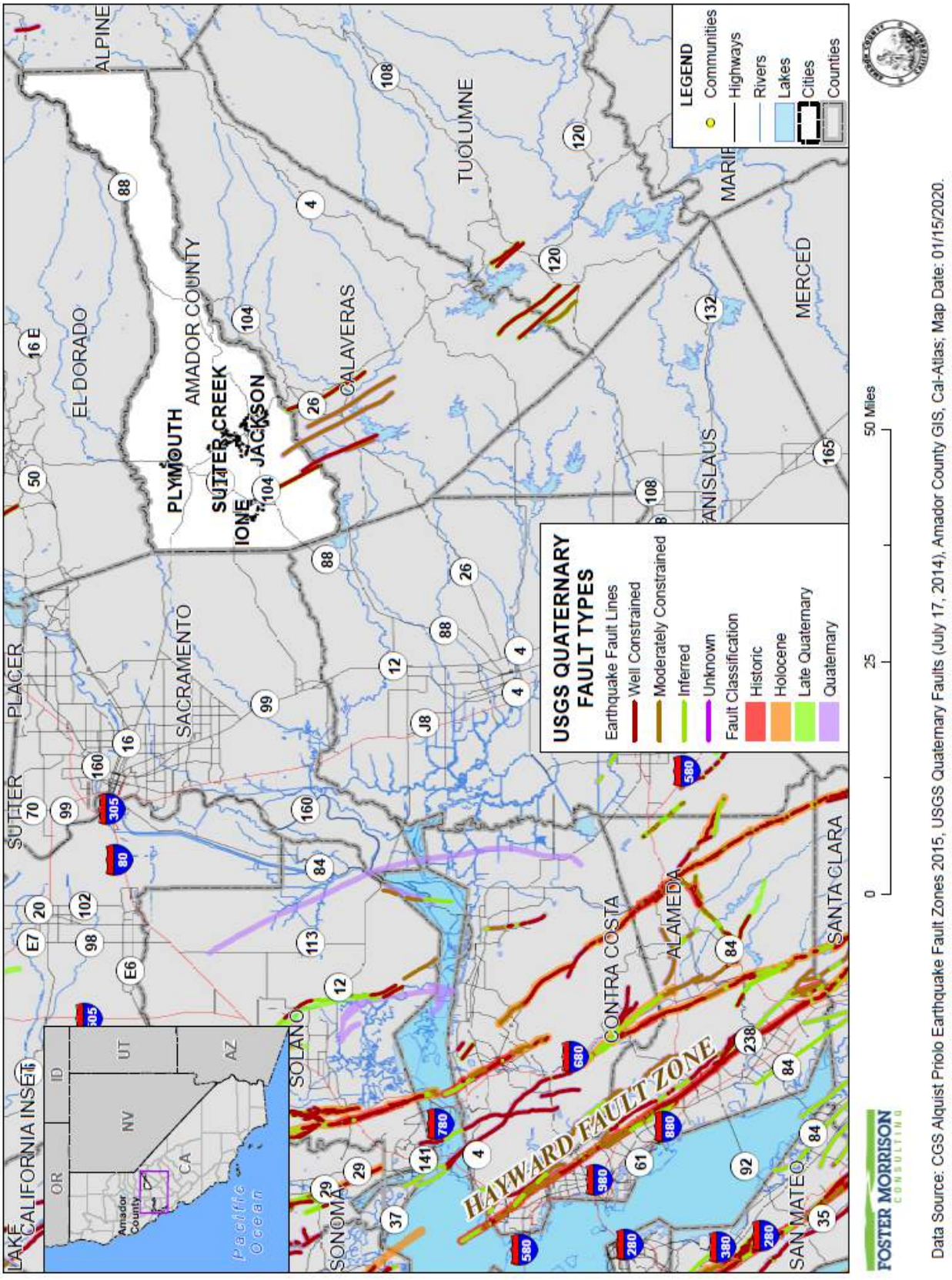
The California Division of Mines and Geology Open File Report 84-52 (1994) reports that special seismic zoning is not recommended for the fault system as the individual faults of the system are either poorly defined at the surface or lack evidence of Holocene (recent) faulting. The closest known source 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 4-42 shows fault locations in and near Amador County.

Figure 4-42 Active 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 4-33). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Table 4-33 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 4.2.14), particularly during the wet season, in areas of high water or saturated soils. Finally, earthquakes can cause dams to fail (see Section 4.2.7 Dam Failure).

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 4-34 shows the approximate distances earthquakes can be felt away from the epicenter. According to the USGS data, 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. There are 62 results that are detailed in Table 4-35.

Table 4-34 Approximate Relationships between Earthquake Magnitude and Intensity

Richter Scale Magnitude	Maximum Expected Intensity (MMI)*	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: United State Geologic Survey, Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977.

*Table 4-35 Magnitude 5.0 Earthquakes or greater within 90 Miles of Amador County**

Date	Richter Magnitude	Location
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
1/24/1980	5.8	San Francisco Bay area, California
10/7/1979	5	Central California

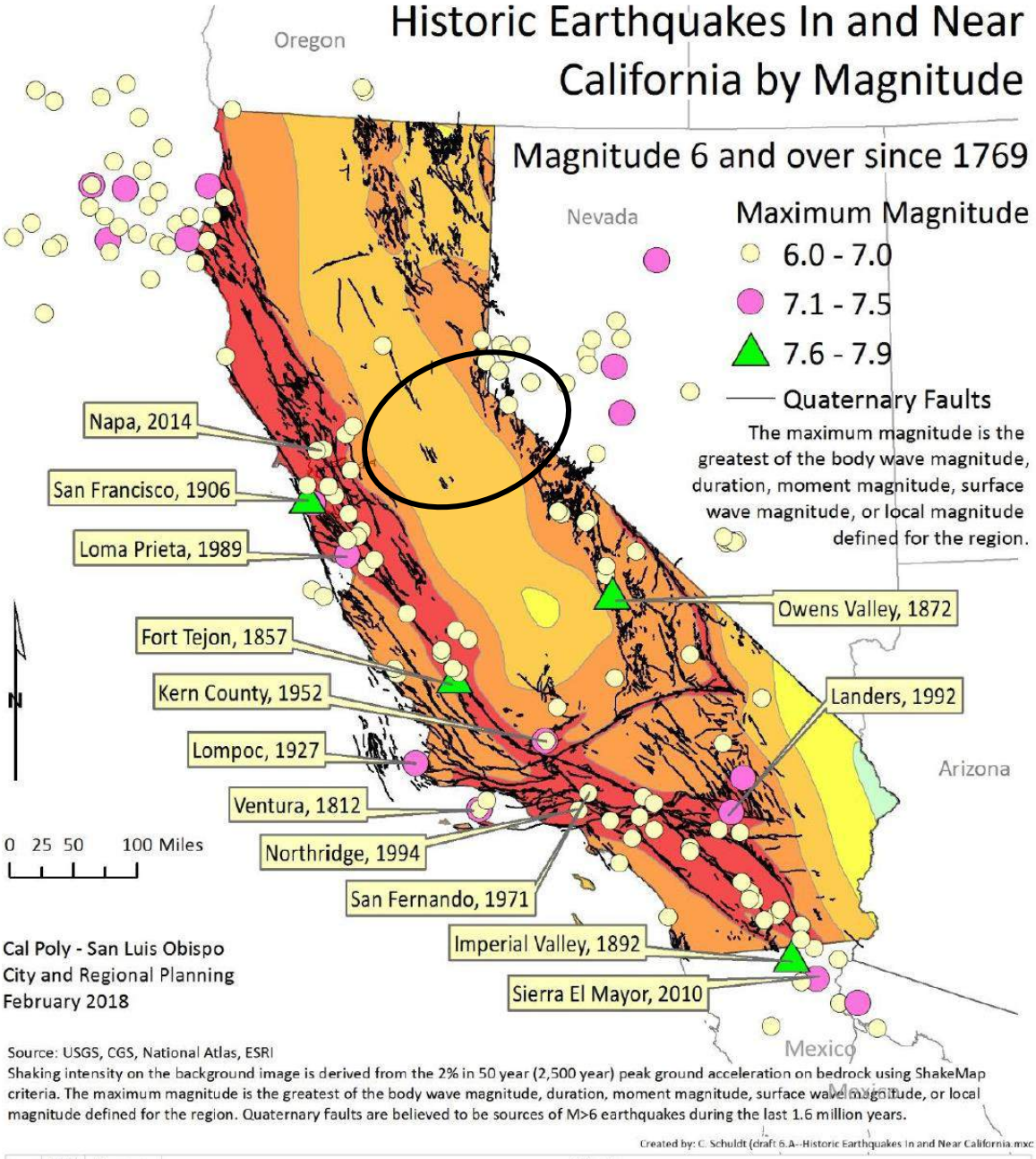
Date	Richter Magnitude	Location
8/2/1975	5.2	Northern California
8/2/1975	5.1	Northern California
8/1/1975	5.7	0km WSW of Palermo, California
9/12/1966	5.91	Northern California
4/13/1962	5.1	Central California
10/24/1955	5.4	San Francisco Bay area, California
9/5/1955	5.5	San Francisco Bay area, California
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
10/21/1868	6.8	The 1868 Hayward Fault Earthquake, California
9/17/1868	5.6	Near Markleeville, California

Date	Richter Magnitude	Location
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
*Search dates 1/1/1850 – 12/1/2019

Figure 4-43 shows major historical earthquakes in California from 1769 to 2017.

Figure 4-43 Historic Earthquakes in California 1769 to 2018



	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: 2018 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.

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.

Mapping of Future Occurrences

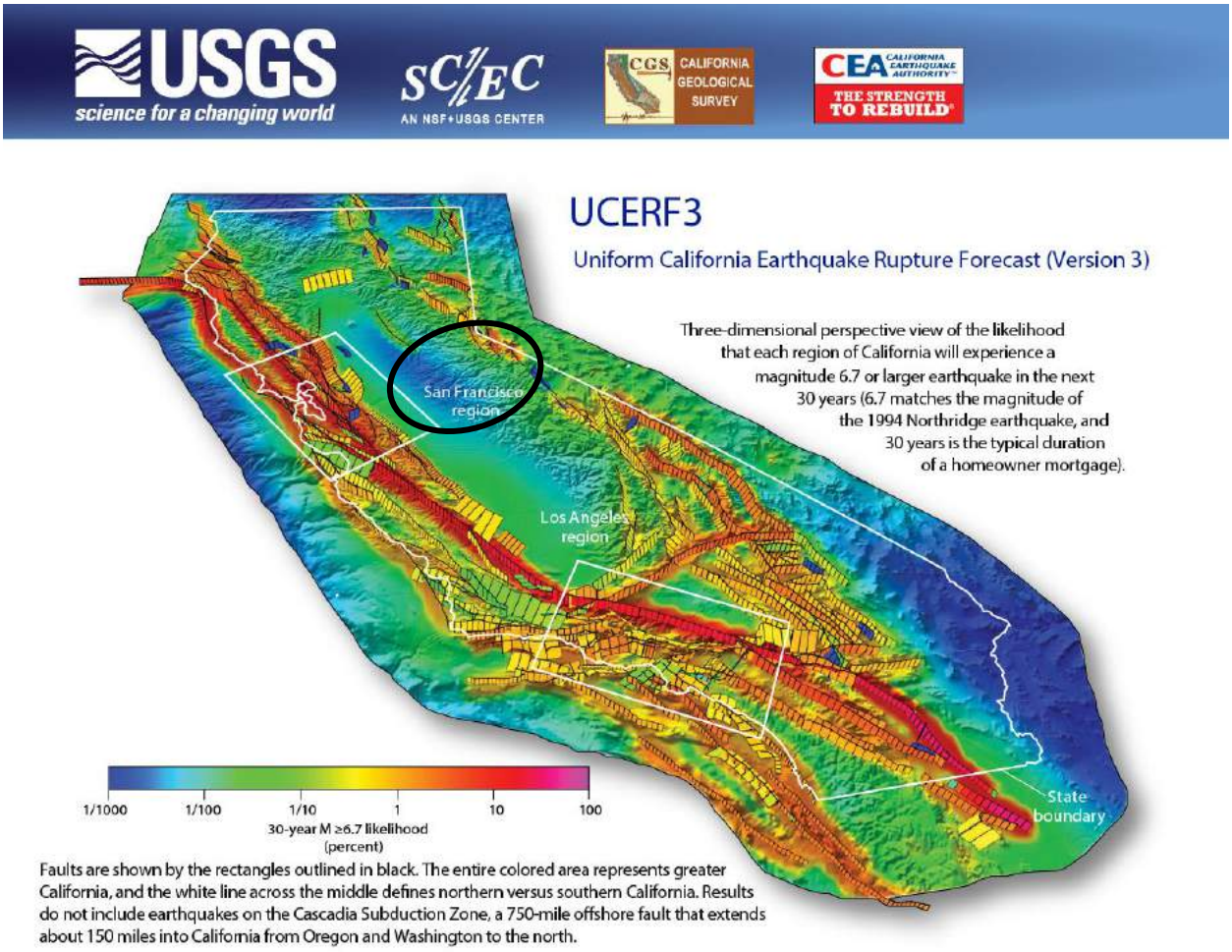
Maps indicating the maximum expectable intensity of ground shaking for the County are available through several sources. Figure 4-44, prepared by the California Division of Mines and Geology, shows the expected relative intensity of ground shaking and damage in California from anticipated future earthquakes. 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. This data shows that Amador County falls within an area of low seismic risk.

Figure 4-44 Maximum Expectable Earthquake Intensity – 2% Chance in 50 Years

Source: California Division of Mines and Geology

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 4-45 and indicates that Amador County has a low to moderate risk of earthquake occurrence, which coincides with the likelihood of future occurrence rating of occasional.

Figure 4-45 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 changes is unlikely to increase earthquake frequency or strength.

4.2.13. Flood: 1%/0.2% Annual Chance

Hazard/Problem Description

Flooding is the rising and overflowing of a body of water onto normally dry land. History clearly highlights floods as one of the primary natural hazards impacting Amador County. 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 as well as life safety issues. Floods can be extremely dangerous, and even 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. This is one reason 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.

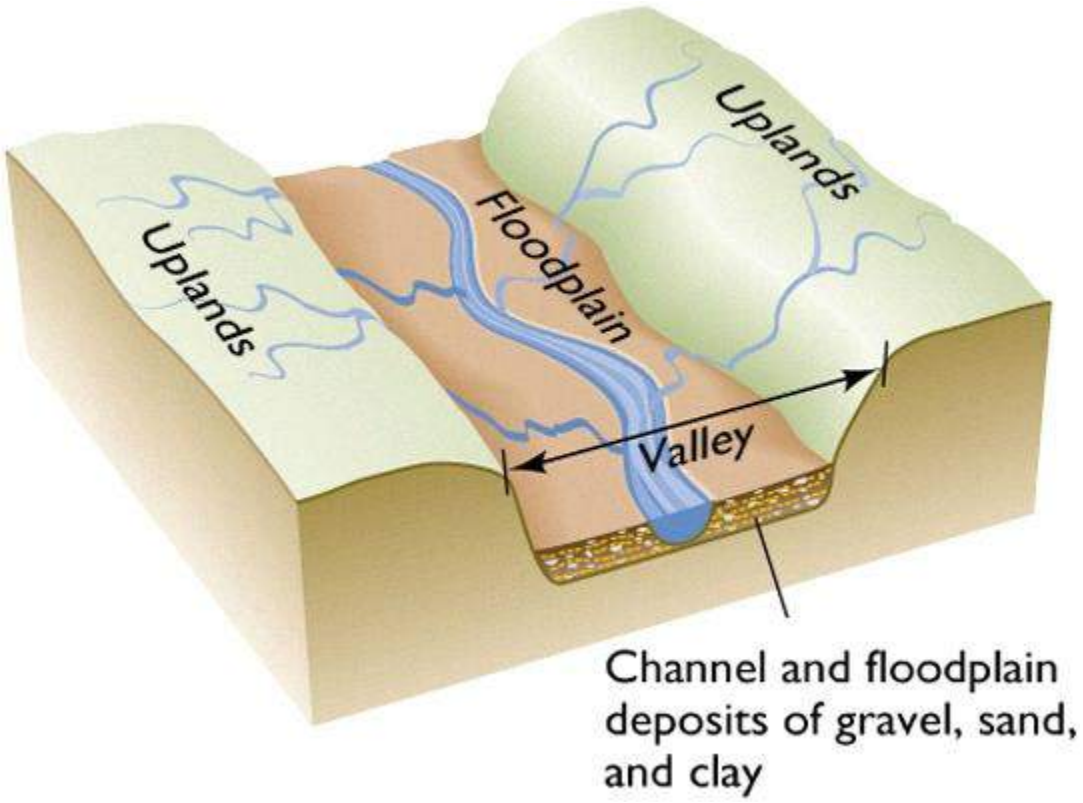
The 2016 FIS for Amador County noted that, for the unincorporated County, there are no significant flood-protection measures in the study area. Bridges and culverts have been provided at all road crossings, both public and private. The 2016 Amador County General Plan Safety Element noted that Flood flows 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.

Location and Extent

Floodplains

The area adjacent to a channel is the floodplain (see Figure 4-46). 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 200-year flood is one that has 0.5% 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 4-46 Floodplain Schematic



Source: FEMA

The Amador County Planning Area is susceptible to various types of flood events as described below.

- **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.
- **Flash flooding** – Flash flooding describes localized floods of great volume and short duration. This type of flood usually results from a 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 and thus early threat identification and warning is critical for saving lives
- **Localized/Stormwater flooding** – Localized flooding problems are often caused by flash flooding, severe weather, or an unusual amount of rainfall. Flooding from these intense weather events usually occurs in areas experiencing an increase in runoff from impervious surfaces associated with

development and urbanization as well as inadequate storm drainage systems. More on localized flooding can be found in Section 4.2.14.

- **Dam failure flooding** – Flooding from failure of one or more upstream dams is also a concern to the Amador County Planning Area. A catastrophic dam failure could easily overwhelm local response capabilities and require mass evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result, and there could be associated health concerns as well as problems with the identification and burial of the deceased. Dam failure is further addressed in Section 4.2.10 Dam Failure.

According to the 2016 Flood Insurance Study for Amador County, flooding can occur in the County anytime from October through April. Flooding results from prolonged heavy rainfall and is 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.

Cloudburst storms, sometimes lasting as long as three hours, occur over Amador County anytime from late spring to early fall, and they may occur as an extremely severe sequence within a general winter rainstorm. Cloudbursts are high-intensity storms that can produce peak flow equal to or somewhat greater than those of general rainstorms in portions of the study area. Flooding from cloudbursts is characterized by high peak flow, short duration of flood flow, and small volume of runoff.

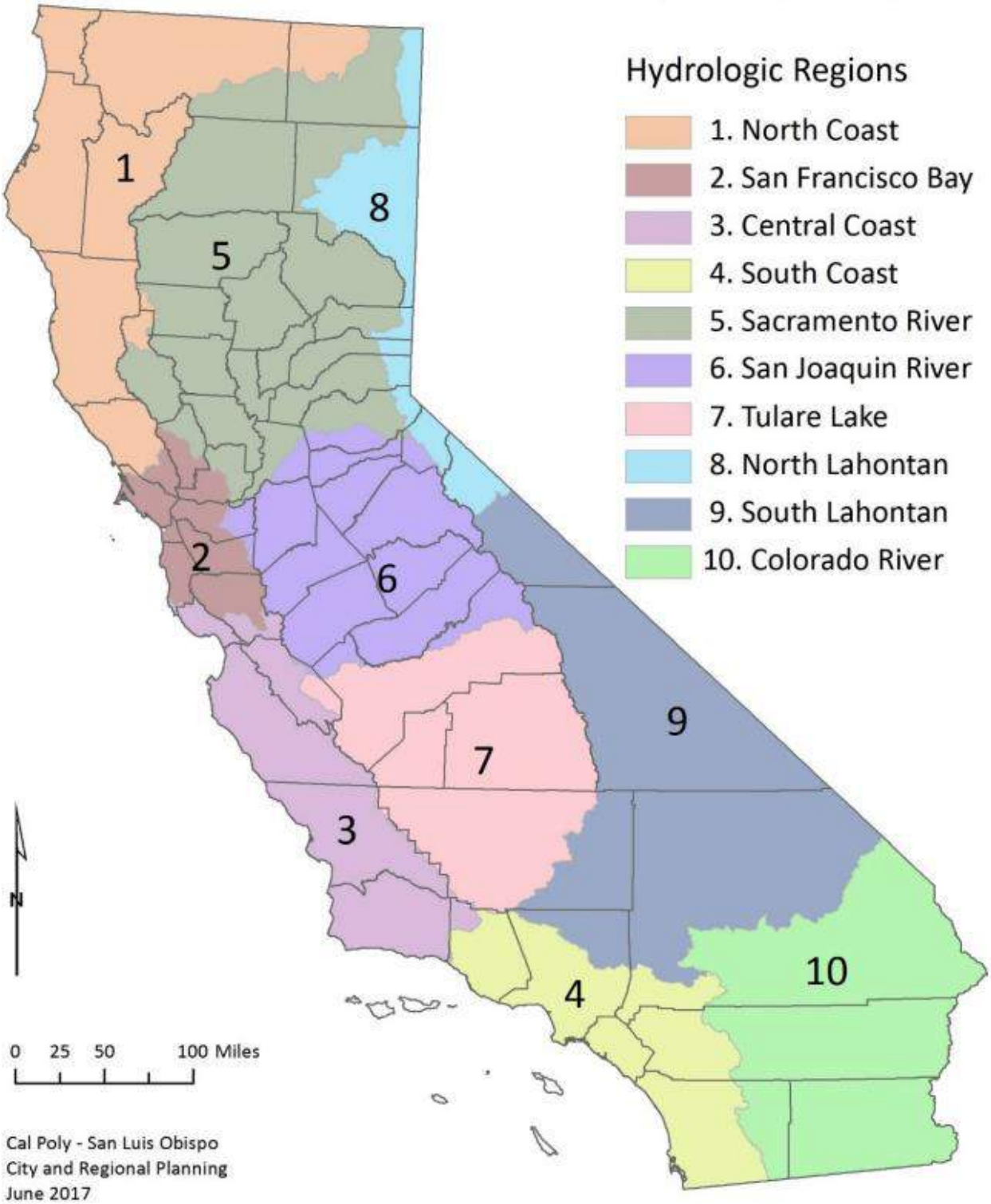
Amador County encompasses multiple rivers, streams, creeks, and associated watersheds. The County is situated in a region that dramatically drops in elevation from the eastern portion (Sierra Nevada) to the western portion, where excess rain on snow can contribute to downstream flooding. Damaging floods in Amador County occur primarily in the developed areas of the county. Flood flows generally follow defined stream channels, drainages, and watersheds.

Major Sources of Flooding

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 the California's hydrological regions is provided in Figure 4-47.

Figure 4-47 California Hydrologic Regions



Source: 2018 State of California Hazard Mitigation Plan

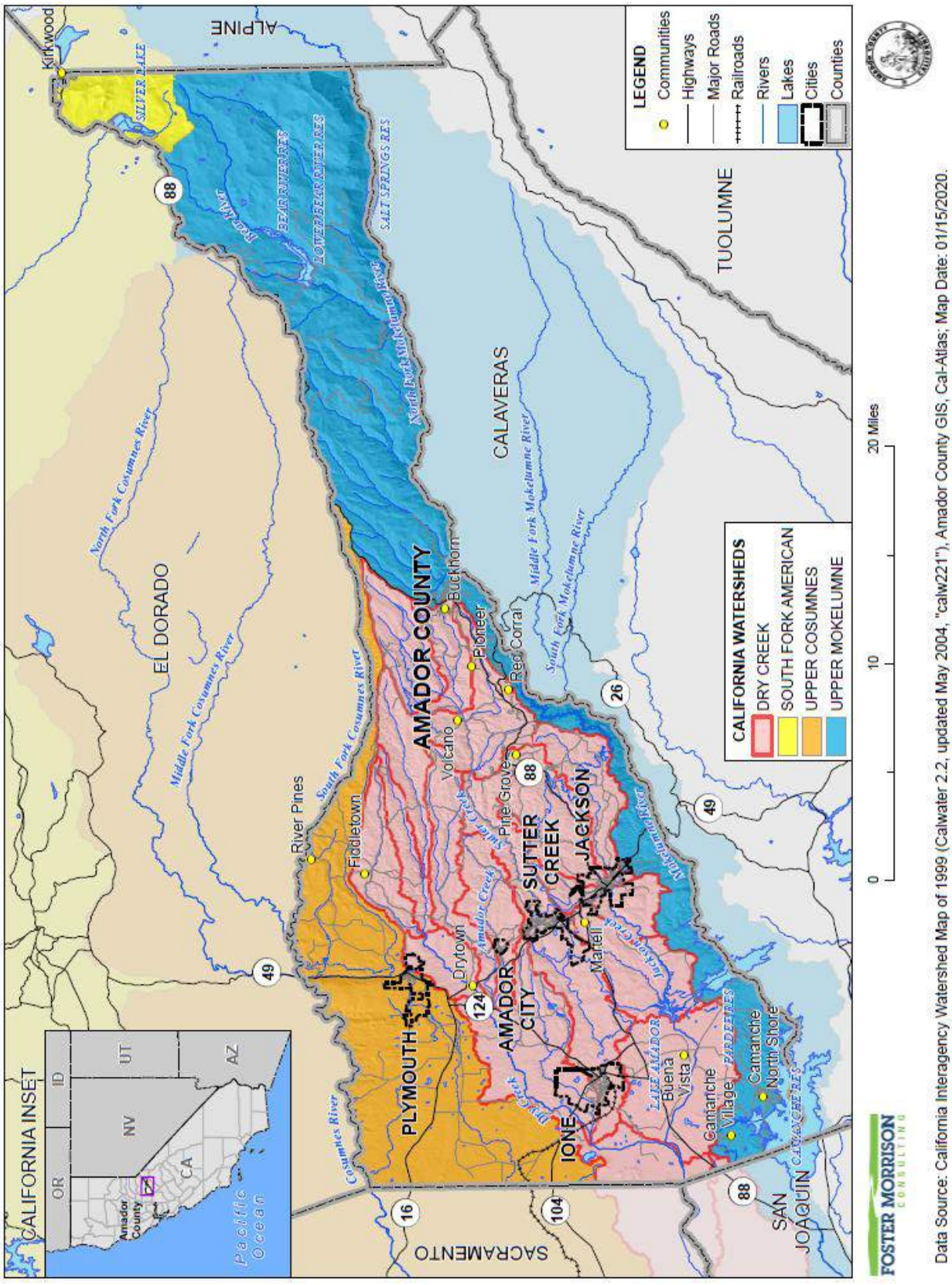
The Amador County Waterway System

Amador County encompasses multiple rivers, streams, creeks, and associated watersheds. Amador County crosses three watersheds. These include the following watersheds:

- Dry Creek Watershed
- Mokelumne Creek
- Cosumnes Watershed

Figure 4-48 illustrates the primary watersheds of Amador County, as well as the primary waterways in the County.

Figure 4-48 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

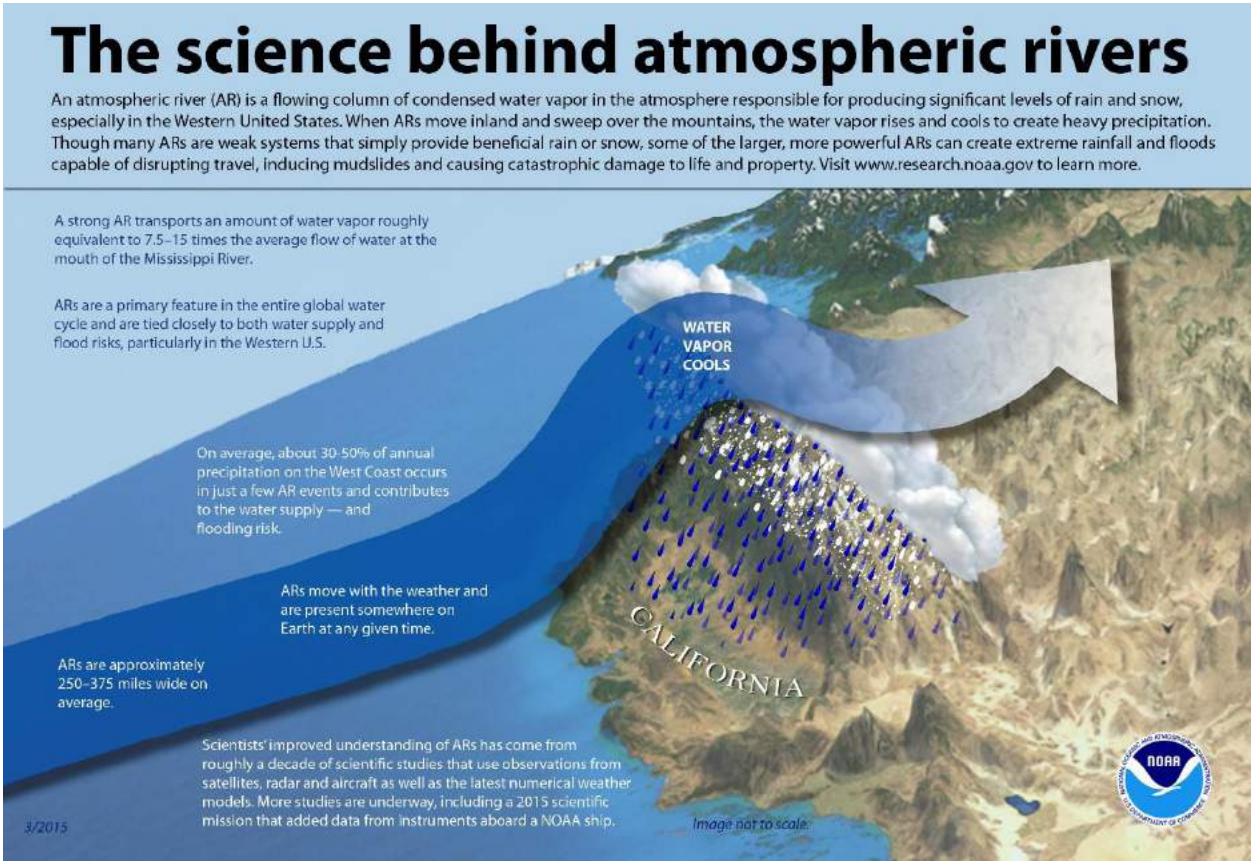
Cosumnes usually occurs November through April, generally as a result of heavy rains. According to the Cosumnes River Task Force Plan, peak flow years include: 1907, 1950 (27,600 cfs), 1955 (42,000 cfs), 1958 (29,300 cfs), 1963 (39,400 cfs), 1964 (37,500 cfs), 1980 (34,200), 1982 (37,000 cfs), 1986 (45,000 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.

Other Sources of Flooding

Amador County and the rest of Northern 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 4-49.

Figure 4-49 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.

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 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 are in Section 4.3 Vulnerability Assessment.

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 January 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.

Digital Flood Insurance Rate Maps (DFIRM)

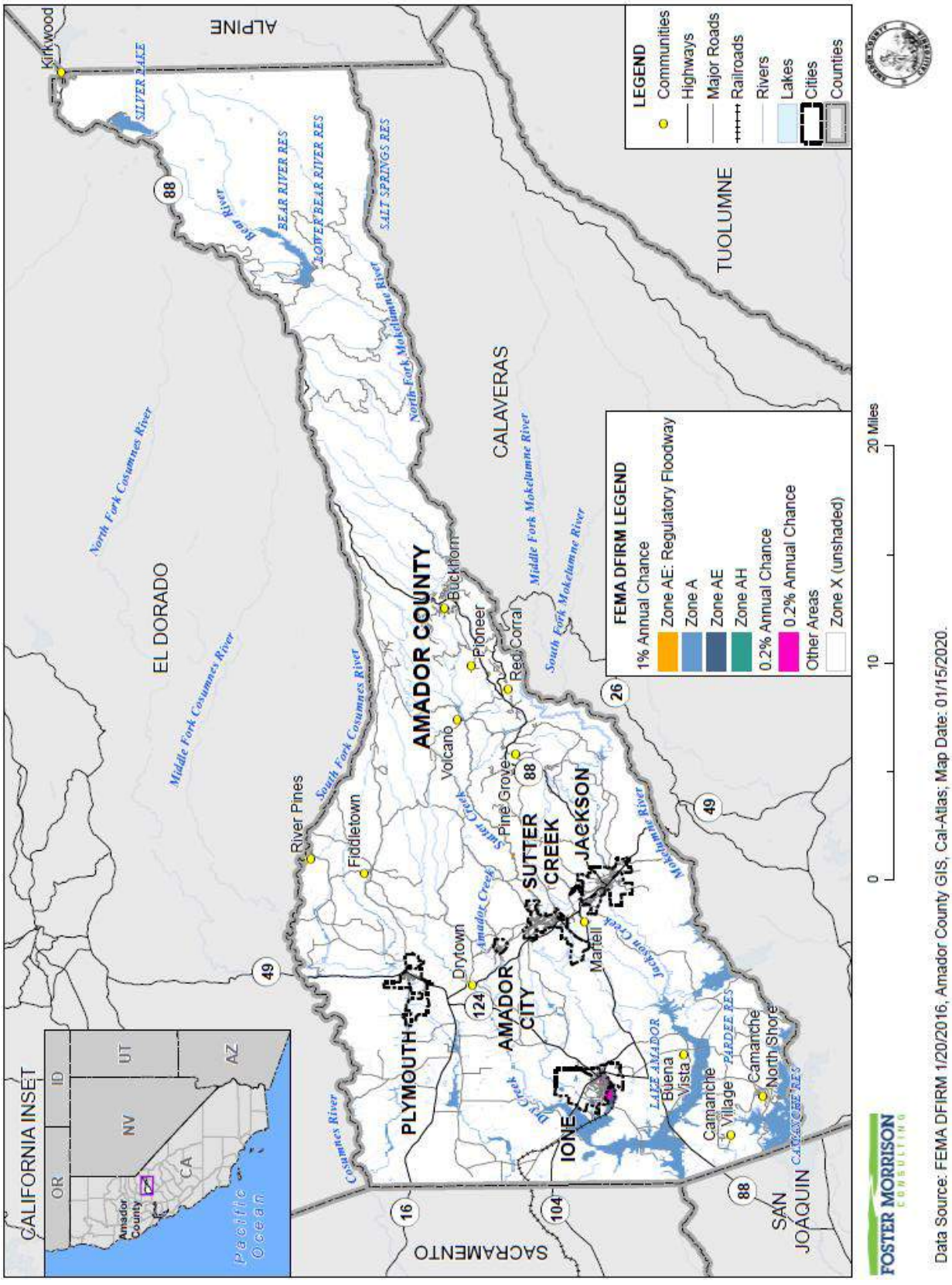
As part of its Map Modernization program, FEMA is converting paper FIRMS to digital FIRMs, DFIRMS. These digital maps:

- 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, are dated January 20, 2016, and are being used for the flood analysis for this LHMP Update. The DFIRM is shown in Figure 4-50.

Figure 4-50 Amador County DFIRM Flood Zones



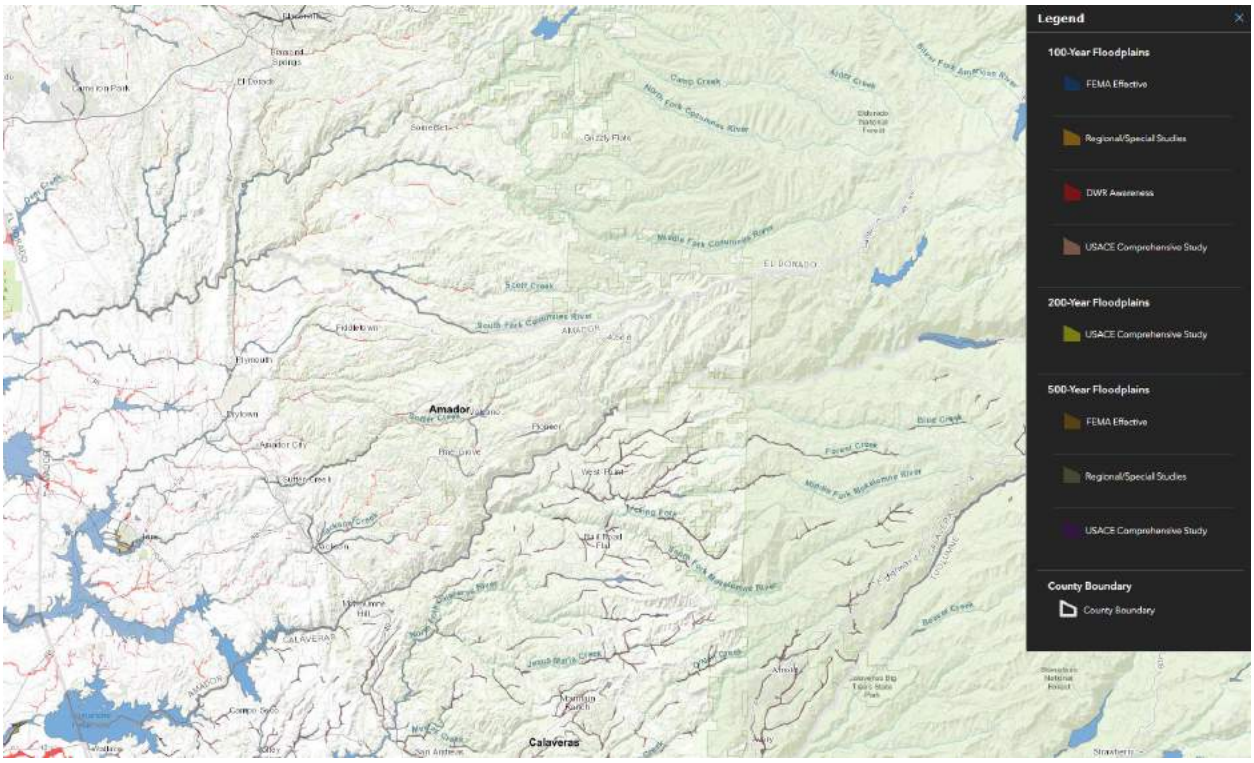
California Floodplain Mapping

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 4-51 shows the BAM for the Amador County Planning Area.

Figure 4-51 Amador County– Flood Awareness (Best Available) Map



Source: California DWR, Retrieved 12/18/2019

Legend explanation: Blue - FEMA 1%, Orange – Local 1% (developed from local agencies), Red – DWR 1%r (Awareness floodplains identify the 1% annual chance flood hazard areas using approximate assessment procedures.), Pink – USACE 1% (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 0.5% (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 0.2%, Grey – Local 0.2% (developed from local agencies), Purple – USACE 0.2%(2002 Sac and San Joaquin River Basins Comp Study).

Flood extents are usually measured in depths of flooding, geographical extent of the floodplain, as well as flood zones that a location falls in (i.e. 1% or 0.2% annual chance flood). Expected flood depths in the County vary and are not well defined. Flood durations in the County and incorporated jurisdictions tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Geographical flood extent from the FEMA DFIRMs is shown in Table 4-36.

Table 4-36 Amador County – Geographical Flood Hazard Extents in FEMA DFIRM Flood Zones

Flood Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
1% Annual Chance	16,869	4.3%	7,250	4.4%	9,619	4.3%
0.2% Annual Chance	217	0.1%	115	0.1%	103	0.0%
Other Areas	371,654	95.6%	158,336	95.6%	213,318	95.6%
Total	**388,740**	**100.00%**	**165,700**	**100.00%**	**223,039**	**100.00%**

Source: FEMA 1/20/2016 DFIRM

*Percentage of total acres is the percent of total acres of the entire County Planning Area

More information on flood zones is presented in the flood vulnerability assessment (Section 4.3.8).

Past Occurrences

Disaster Declaration History

A list of state and federal disaster declarations for Amador County from flooding, (including heavy rains and storms) is shown on Table 4-37.

Table 4-37 Amador County – State and Federal Disaster Declaration from Flood 1950-2020

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	15	1955, 1958, 1963, 1964, 1969, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1959, 1963 (twice), 1969, 1980, 1982, 1986, 1995, 1997, 1998

Source: Cal OES, FEMA

NCDC Events

The NCDC tracks flooding events for the County. Events have been tracked for flooding since 1993. Table 4-38 shows events in Amador County since 1993. Other heavy rain and storm events can be found in the Past Occurrences of the Severe Weather: Heavy Rains and Storms in Section 4.2.3.

*Table 4-38 NCDC Flood Events in Amador County 1993 to 5/31/2019**

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	34	3	0	0	0	$4,400,000	$7,800,000
Total	**37**	**3**	**0**	**0**	**0**	**$4,400,000**	**$7,800,000**

Source: NCDC

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

FIS Events

The 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 Lanch 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 4-39.

Table 4-39 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

Address	City	Problem	Cause	Damages
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
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 4-52 Amador County 2017 Flooding

Source: Jackson Valley Irrigation District

Figure 4-53 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.

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.

Climate Change and Flood

According to the CAS, climate change may affect flooding in Amador County. 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 temperature, 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. Future precipitation projections were shown in Figure 4-14 in Section 4.2.3. 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.

4.2.14. Flood: Localized Flooding

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 County 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

According to Amador County, numerous parcels and roads throughout the County not included in the FEMA 100- and 500-year 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.

These primary areas of localized flooding and the types of damage are shown on Figure 4-54 and presented in Table 4-40.

Figure 4-54 Amador County – Localized Flooding Areas

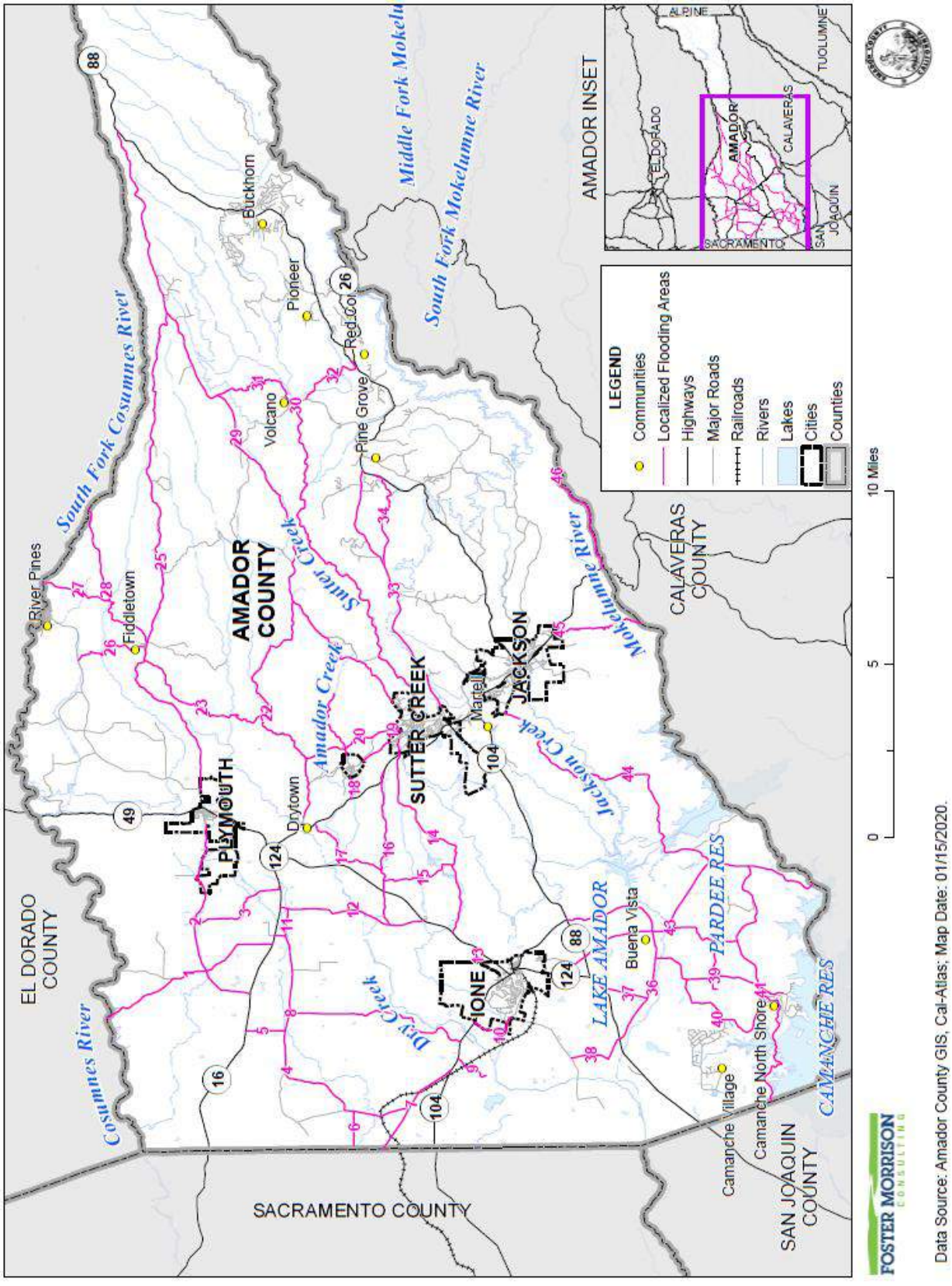


Table 4-40 Amador County Localized Flooding Areas

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

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. Localized flooding often has a short duration.

Past Occurrences

Disaster Declarations

There are no identified state or federal disaster declarations specifically related to 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 4.2.13.

Hazard Mitigation Planning Committee Events

The HMPC noted the following events:

- 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.

The following areas have had localized flooding:

Figure 4-55 Latrobe Road

Source: Amador County

Figure 4-56 Old Sacramento Road

Source: Amador County

Figure 4-57 Quartz Mountain Road

Source: Amador County

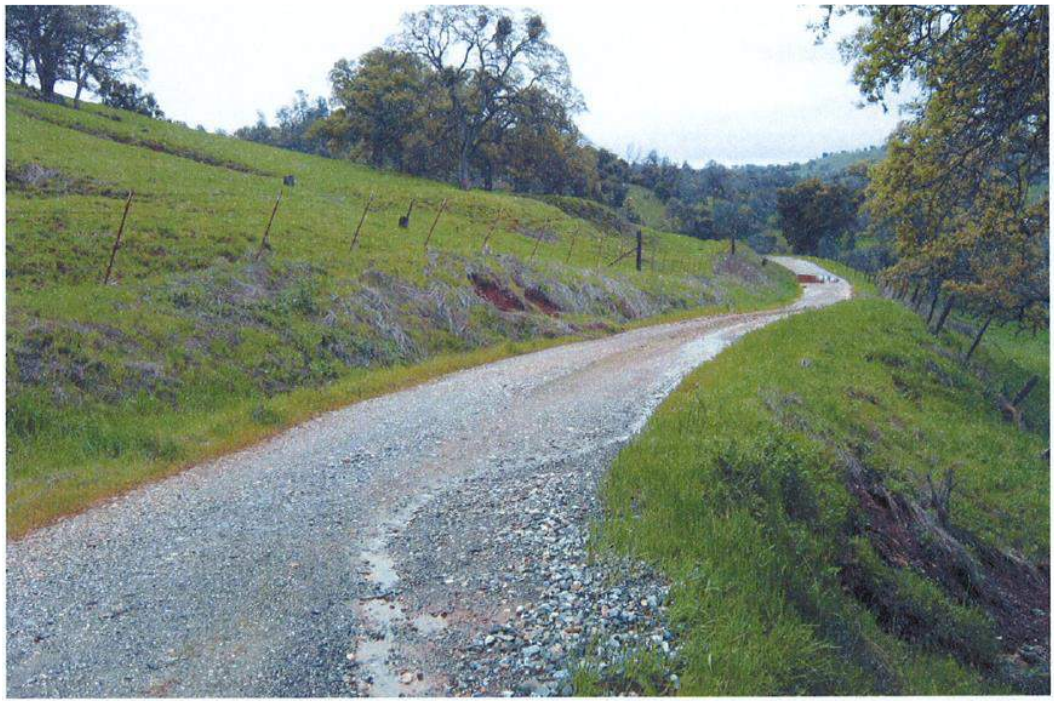
Figure 4-58 Tonzi Road

Source: Amador County

Figure 4-59 Carbondale Road

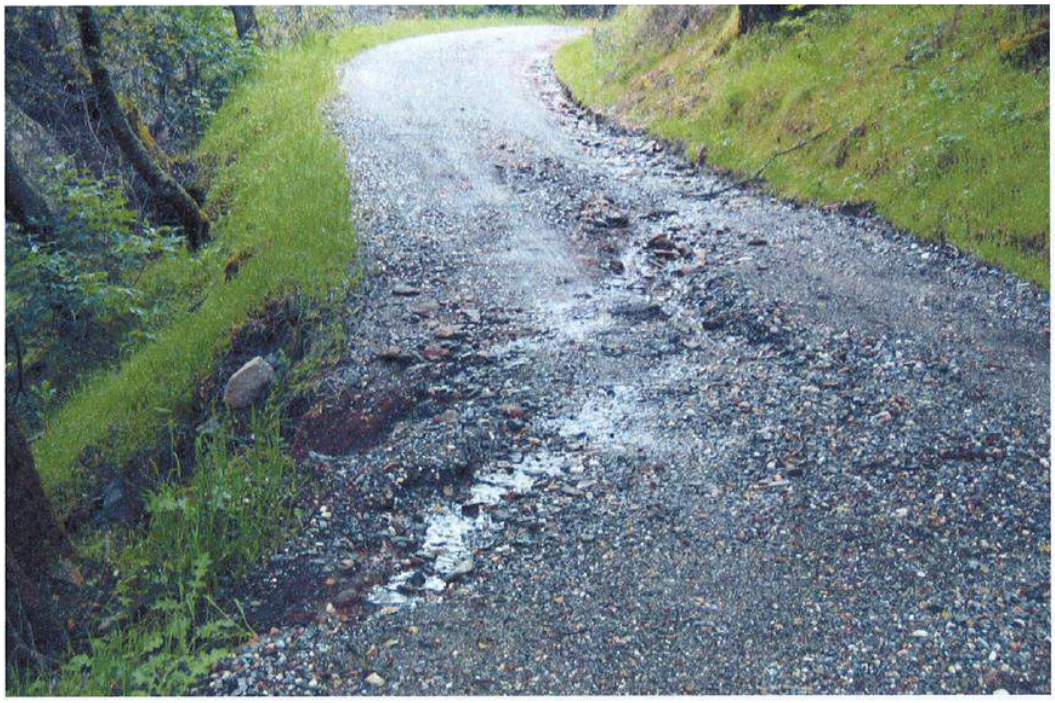
Source: Amador County

Figure 4-60 Mayflower Road #1



Source: Amador County

Figure 4-61 Mayflower Road #2



Source: Amador County

Figure 4-62 Paine Road

Source: Amador County

Figure 4-63 Sutter Ione Road #1

Source: Amador County

Figure 4-64 Sutter Ione Road #2

Source: Amador County

Figure 4-65 Climax Road

Source: Amador County

Likelihood of Future Occurrence

Highly Likely—With respect to the localized, stormwater flood issues, the potential for flooding may increase as storm water is channelized due to land development. Such changes can create localized flooding problems in and outside of natural floodplains by altering or confining natural drainage channels. Urban storm drainage systems have a finite capacity. When rainfall exceeds this capacity or systems clog, water accumulates in the street until it reaches a level of overland release. With older infrastructure, this type of flooding will continue to occur on an annual basis during heavy rains.

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.

4.2.15. Landslides, Mudslides, and Debris Flows

Hazard/Problem Description

According to the California Geological Survey, landslides refer to a wide variety of processes that result in the perceptible downward and outward movement of soil, rock, and vegetation under gravitational influence. Common names for landslide types include slump, rockslide, debris slide, lateral spreading, debris avalanche, earth flow, and soil creep. Landslides may be triggered by both natural and human-induced changes in the environment that result in slope instability.

The susceptibility of an area to landslides depends on many variables including steepness of slope, type of slope material, structure and physical properties of materials, water content, amount of vegetation, and proximity to areas undergoing rapid erosion or changes caused by human activities. These activities include mining, construction, and changes to surface drainage areas. Landslide events can be determined by the composition of materials and the speed of movement. A rockfall is dry and fast while a debris flow is wet and fast. Regardless of the speed of the slide, the materials within the slide, or the amount of water present in the movement, landslides are a serious natural hazard.

Another type of landslide, debris flows, also occur in some areas of the County. These debris flows generally occur in the immediate vicinity of existing drainage swales or steep ravines. Debris flows occur when near surface soil in or near steeply sloping drainage swales becomes saturated during unusually heavy precipitation and begins to flow downslope at a rapid rate. Debris flows also occur in post-wildfire burn areas.

Landslides often accompany or follow other natural hazard events, such as floods, wildfires, or earthquakes. A discussion on the effects of wildfire on landslides is included in the wildfire profile in Section 4.2.17. Landslides can occur slowly or very suddenly and can damage and destroy structures, roads, utilities, and forested areas, and can cause injuries and death.

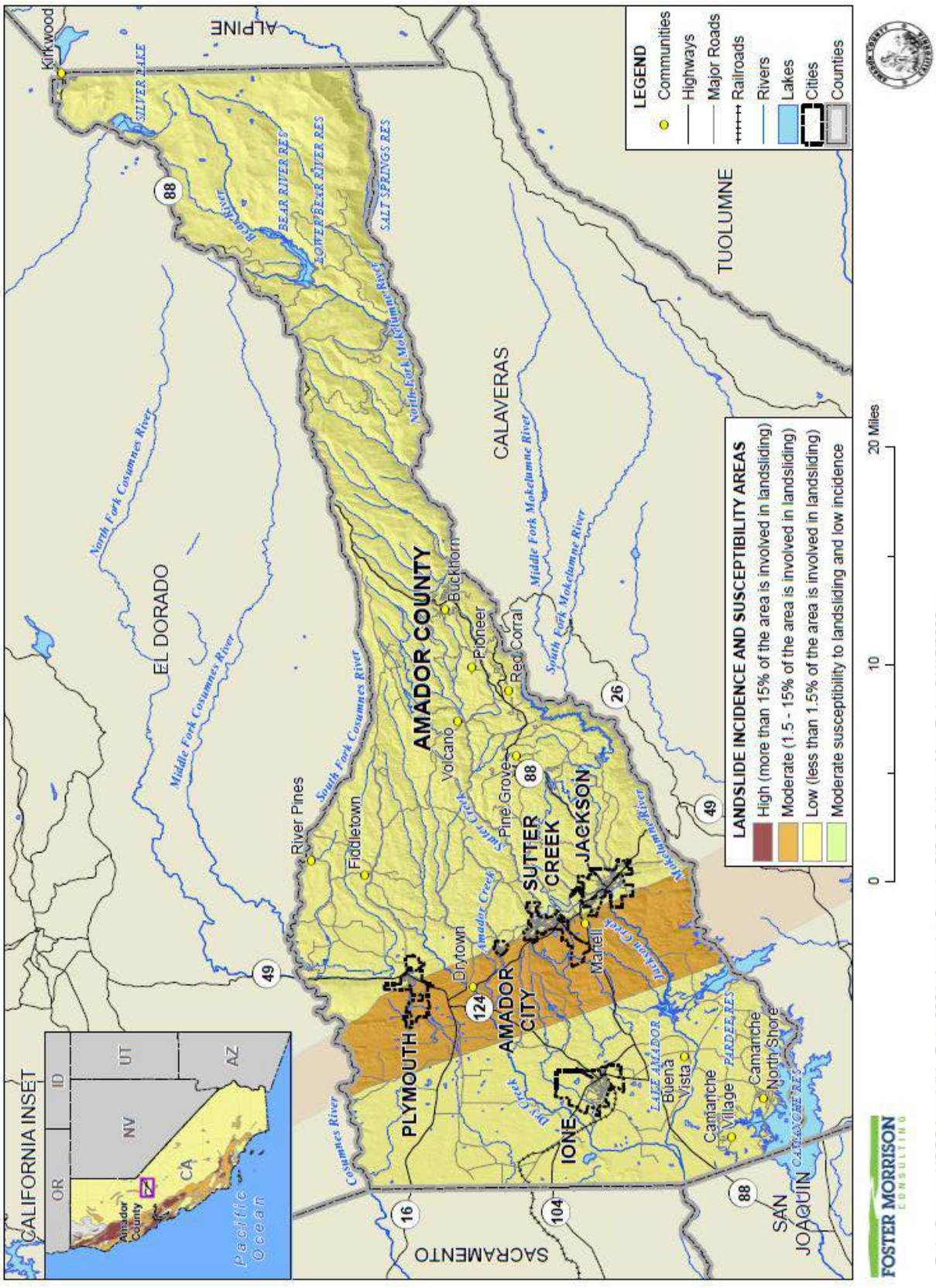
Soil erosion is another common form of soil instability. Erosion is a function of soil type, slope, rainfall intensity, and groundcover. It accounts for a loss in many dollars of valuable soil, is aesthetically

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.

Location and Extent

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. Figure 4-66 show the USGS Landslide Incidence and Susceptibility Areas in the County.

Figure 4-66 Landslide Incidence and Susceptibility Areas



The legend on Figure 4-66 shows the measurement system that the USGS uses to show the possible magnitude of landslides. It is a combination of slope class and rock strength. 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. However, there are certain areas throughout the Amador County Planning Area prone to landslides and where damages have occurred. These areas include Upper Shake Ridge Road, China Graveyard Road, and post-wildfire fire areas.

The 2001 Landslide Incidence and Susceptibility data was obtained for the Amador County Planning Area. According to the landslide layer obtained by the USGS there landslide incidence ranges from low to moderate in the Planning Area. Geographical extents of the USGS landslide incidence and susceptibility areas in the Amador County Planning Area are shown on Table 4-41.

Table 4-41 Amador County Planning Area – Geographical Extents of Landslide Incidence and Susceptibility Areas

Landslide Incidence and Susceptibility	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
High	0	0.0%	0	0.0%	0	0.0%
Moderate	46,346	11.9%	28,777	17.4%	17,569	7.9%
Low	342,538	88.1%	136,935	82.6%	205,604	92.1%
Total	**388,885**	**100.0%**	**165,712**	**100.0%**	**223,173**	**100.0%**

Source: USGS

*Percentage of total acres is the percent of total acres of the entire County Planning Area

Past Occurrences

Disaster Declaration History

There have been no disaster declarations associated with landslides in Amador County, as shown in Table 4-4.

NCDC Events

The NCDC contains no records for landslides in Amador County.

Hazard Mitigation Planning Committee Events

The HMPC reported that 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.

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.

There are certain areas within the County that are susceptible to slope failure resulting in localized landslides, mudslides, and debris flows. Areas identified by the County in the 2015 Amador County LHMP 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 4.60)
  - ✓ Sutter Creek Road
  - ✓ Trans Sierra Highway
  - ✓ Volcano Road

- Debris Flows
  - ✓ Comanche Road Bridge
  - ✓ Kit Carson Road
  - ✓ Little Bear Road (see Figure 4.61)
  - ✓ Old Sacramento Road
  - ✓ Sutter Creek Road
  - ✓ Pine Grove/Volcano Road

Figure 4-67 Stony Creek Road

Source: Amador County

Figure 4-68 Little Bear Road

Source: Amador County

Likelihood of Future Occurrence

Highly 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 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, as they have in the past.

Climate Change and Landslide and Debris Flows

According to the 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 4.2.3. 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.

4.2.16. Levee Failure

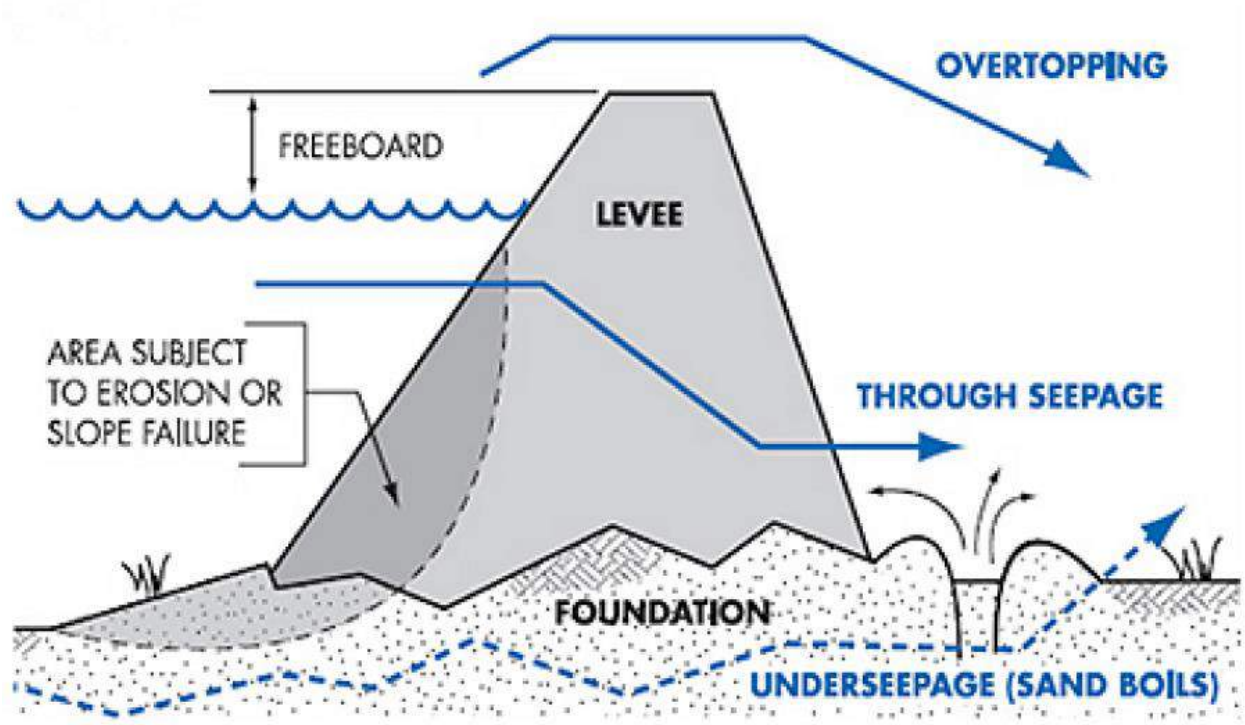
Hazard/Problem Description

A levee is a raised area that runs along the banks of a stream or canal. 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. A levee system failure or overtopping can create severe flooding and high-water velocities. It is important to remember that no levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

Under-seepage refers to water flowing under the levee through the levee foundation materials, often emanating from the bottom of the landside slope and ground surface and extending landward from the landside toe of the levee. Through-seepage refers to water flowing through the levee prism directly, often emanating from the landside slope of the levee. Both conditions can lead to failure by several mechanisms, including excessive water pressures causing foundation heave and slope instabilities, slow progressing internal erosion, and piping leading to levee slumping. Rodents can burrow into and compromise the levee system. Erosion can also lead to levee failure. Figure 4-69 depicts the causes of levee failure.

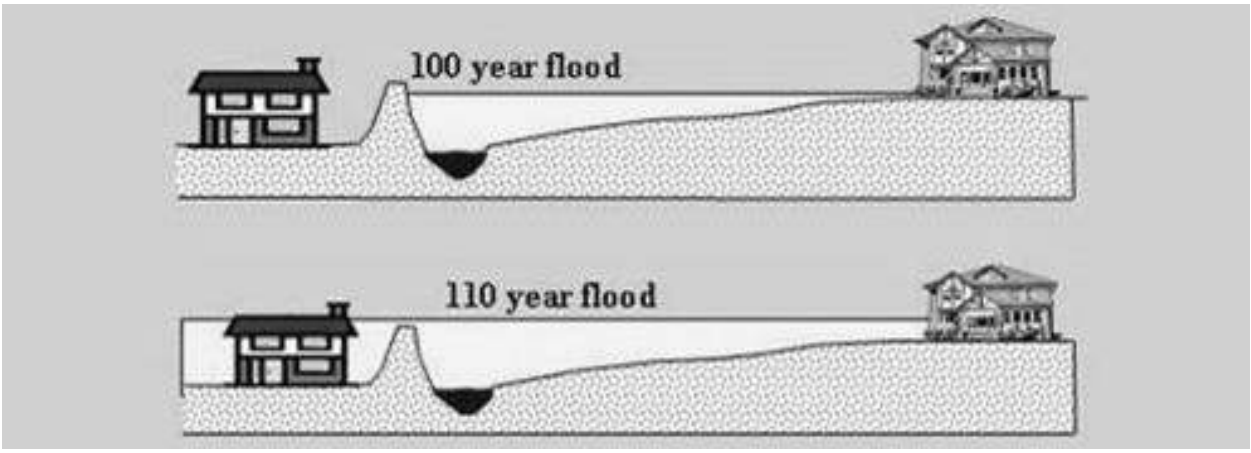
Figure 4-69 Potential Causes of Levee Failure



Source: USACE

Overtopping failure occurs when the flood water level rises above the crest of a levee. As shown in Figure 4-70, overtopping of levees can cause greater damage than a traditional flood due to the often lower topography behind the levee.

Figure 4-70 Flooding from Levee Overtopping



Source: Levees in History: The Levee Challenge. Dr. Gerald E. Galloway, Jr., P.E., Ph.D., Water Policy Collaborative, University of Maryland, Visiting Scholar, USACE, IWR.

Location and Extent

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. A more detailed description of the location of the floodwalls and levees within the City of Ione is shown below:

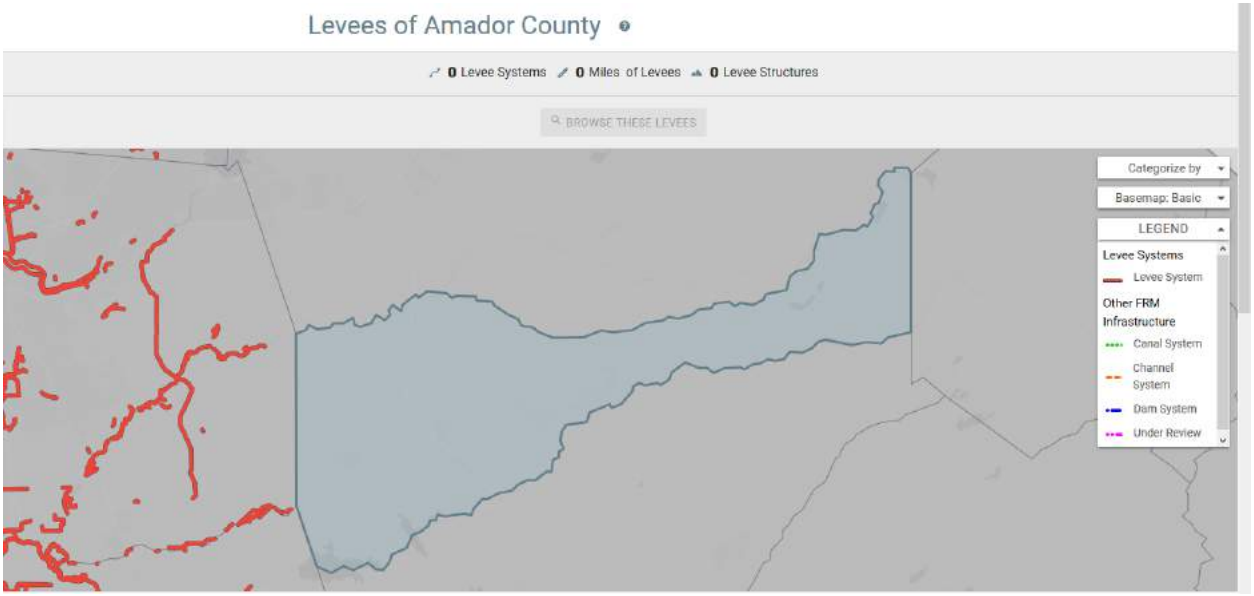
- A concrete floodwall on the south bank of Sutter Creek, starting at the Preston Avenue Bridge and extending upstream approximately 300 feet.
- A levee on the south bank, starting at the end of the floodwall and extending upstream approximately 400 feet.
- A levee on the south side of Sutter Creek, from downstream of Preston Avenue and extending downstream approximately 500 feet.
- A levee on the north bank of Sutter Creek, from downstream of Preston Avenue and extending downstream approximately 900 feet.

The Sutter Creek channel near Ione has been cleared and shaped at some locations, and stone slope protection has been placed at areas that were subject to erosion during the January 1995 flood event. Flapgates have been added to the major storm drain outfall structure located downstream of Highway 104 near the channel bend.

Additionally, the FIS noted that in the City of Sutter Creek there is an erosion-control retaining wall area located along Sutter Creek upstream from state Highway 49. However, this wall does not provide protection against 1-percent annual chance floodwaters. There are no other existing hydraulic structures providing flood protection measures in the City of Sutter Creek and the rest of the Amador County Planning Area.

A search of the National Levee Database also indicated no levees in Amador County Planning Area beyond those mentioned above. This includes any levees, whether certified as providing 1% annual chance protection, or not. A map of the County is shown on Figure 4-71. Information on levees protecting Ione can be found in their annex to this Plan Update. It is unknown who owns the levee in Ione.

Figure 4-71 Amador County – Levees



Source: National Levee Database. Retrieved February 2020.

There is not a scientific scale or measurement system in place for levee failure. It is usually measured in area covered and depth of flooding. Maps showing inundation depths due to a levee failure in the County do not exist. The speed of onset is slow as the river rises, but if a levee fails the warning times are short for those in the inundation area. The duration of levee failure risk times can be hours to weeks, depending on the river flows that the levee holds back.

Past Occurrences

Disaster Declaration History

There have been no disasters declarations related to levee failure in Amador County, as shown on Table 4-5.

NCDC Events

There have been no NCDC levee failure events in Amador County.

Hazard Mitigation Planning Committee Events

The HMPC could provide no events of levee failure. In 2017, Ione levees almost overtopped during winter storms/rains. The grocery store would have been taken out. Likewise, the levee was close to overtopping during rains/storms in 1997 and 2006.

Figure 4-72 January 2017 Flooding Near Ione that Threatened Ione Market

Source: Jackson Valley Irrigation District

Likelihood of Future Occurrence

Unlikely – It is important to remember that no levee provides protection from events for which it was not designed: they are not fail-safe.

Climate Change and Levee Failure

In general, increased flood frequency in California is a predicted consequence of climate change. Mechanisms whereby climate change leads to an elevated flood risk include more extreme precipitation events and shifts in the seasonal timing of river flows. This threat may be particularly significant because recent estimates indicate the additional force exerted upon the levees is equivalent to the square of the water level rise. These extremes are most likely to occur during storm events, leading to more severe damage from waves and floods. Though this is tempered by the fact that there are so few levees in the County that would be affected. So, while climate change can increase flood frequency, in Amador, it is unlikely to increase the potential for levee failure.

4.2.17. Pandemic

Hazard/Problem Description

According to the World Health Organization (WHO), a disease epidemic occurs when there are more cases of that disease than normal. A pandemic is a worldwide epidemic of a disease. A pandemic may occur when a new virus appears against which the human population has no immunity. It is important to realize that this Plan Update does not examine pandemic contingency plans, but instead focuses on examining the risk of a normal hazard occurrence.

A pandemic occurs when a new virus emerges for which people have little or no immunity, and for which there is no vaccine. This disease spreads easily person-to-person, causes serious illness, and can sweep across the country and around the world in a very short time. The U.S. Centers for Disease Control and Prevention has been working closely with other countries and the World Health Organization to strengthen systems to detect outbreaks of that might cause a pandemic and to assist with pandemic planning and preparation. An especially severe a pandemic could lead to high levels of illness, death, social disruption, and economic loss.

Location and Extent

During a pandemic, the whole of the County is at risk, as pandemic is a regional, national, or international event. The speed of onset of pandemic is usually short, while the duration is variable, but can last for more than a year as shown in the 1918/1919 Spanish Flu. There is no scientific scale to measure the magnitude of pandemic. Pandemics are usually measured in numbers affected by the pandemic, and by number who die from complications from the pandemic.

Past Occurrences

Disaster Declaration History

There has been one state and federal disaster declaration due to pandemic, as shown in Table 4-42.

Table 4-42 Amador County – State and Federal Pandemic Disaster Declarations 1950-2020

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Pandemic	1	2020	1	2020

Source: Cal OES, FEMA

NCDC Events

The NCDC does not track pandemic.

WHO Events

The 20th century saw three outbreaks of pandemic flu.

- The **1918-1919 Influenza Pandemic (H1N1),** (aka the Spanish Flu**),** is the catastrophe against which all modern pandemics are measured. It is estimated that approximately 20 to 40 percent of the worldwide population became ill and that over 50 million people died. Approximately 675,000 deaths from the flu occurred in the U.S. alone.
- The **February 1957-1958 Influenza Pandemic (H2N2)** (aka the Asian Flu) was first identified in the Far East. Immunity to this strain was rare in people less than 65 years of age, and a pandemic was predicted. In preparation, vaccine production began in late May 1957, and health officials increased surveillance for flu outbreaks. Unlike the virus that caused the 1918 pandemic, the 1957 pandemic virus was quickly identified, due to advances in scientific technology. Vaccine was available in limited supply by August 1957. The virus came to the U.S. quietly, with a series of small outbreaks over the summer of 1957. When U.S. children went back to school in the fall, they spread the disease in classrooms and brought it home to their families. Infection rates were highest among school children, young adults, and pregnant women in October 1957. Most influenza-and pneumonia-related deaths occurred between September 1957 and March 1958. The elderly had the highest rates of death. By December 1957, the worst seemed to be over. However, during January and February 1958, there was another wave of illness among the elderly. This is an example of the potential "second wave" of infections that can develop during a pandemic. The disease infects one group of people first, infections appear to decrease and then infections increase in a different part of the population. Although the Asian flu pandemic was not as devastating as the 1918-1919 flu, about 69,800 people in the U.S. died.
- The **1968 Influenza Pandemic (H3N2)** was first detected in Hong Kong (aka the Hong Kong Flu). The first cases in the U.S. were detected as early as September of that year, but illness did not become widespread in the U.S. until December. Deaths from this virus peaked in December 1968 and January 1969. Those over the age of 65 were most likely to die. The same virus returned in 1970 and 1972. The number of deaths between September 1968 and March 1969 for this pandemic was 33,800, making it the mildest pandemic in the 20th century.

To date, the 21st century has seen two acknowledged pandemics.

- **2009 Swine Flu (H1N1)**— 2009 H1N1 (sometimes called "swine flu") was a new influenza virus causing illness in people. This virus was originally referred to as "swine flu" because laboratory testing showed that many of the genes in this new virus were very similar to influenza viruses that normally occur in pigs (swine) in North America. But further study showed that this virus was very different from what normally circulates in North American pigs. It had two genes from flu viruses that normally circulate in pigs in Europe and Asia and bird (avian) genes and human genes. Scientists call this a "quadruple reassortant" virus. This virus spread from person-to-person worldwide, probably in much the same way that regular seasonal influenza viruses spread. On June 11, 2009, the World Health Organization (WHO) signaled that a pandemic of 2009 H1N1 flu was underway. It was first detected in the United States in early 2009 and spread to the world later that year. About 70 percent of people who were hospitalized with this 2009 H1N1 virus had one or more medical conditions previously recognized as placing people at "high risk" of serious seasonal flu-related complications. This included pregnancy, diabetes, heart disease, asthma, and kidney disease. Young children were also at high risk of serious complications from 2009 H1N1, just as they are from seasonal flu. And while people 65 and older were the least likely to be infected with 2009 H1N1 flu, if they got sick, they were also at "high risk" of developing serious complications from their illness. Some studies estimated that 11 to 21 percent of the global population at the time—or around 700 million to 1.4 billion people (of a total 6.8 billion)—contracted the illness. This was more than the number of people infected by the Spanish flu

pandemic, but only resulted in about 150,000 to 575,000 fatalities for the 2009 pandemic. A follow-up study done in September 2010 showed that the risk of serious illness resulting from the 2009 H1N1 flu was no higher than that of the yearly seasonal flu. For comparison, the WHO estimates that 250,000 to 500,000 people die of seasonal flu annually.

- **2019/2020** COVID 19 – During the creation of this LHMP Update, the world was under various forms of lockdown due to COVID-19 (known also as coronavirus). Coronaviruses are a large family of viruses which may cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The most recently discovered coronavirus causes coronavirus disease COVID-19. COVID-19 is the infectious disease caused by the most recently discovered coronavirus. This new virus and disease were unknown before the outbreak began in Wuhan, China, in December 2019. The most common symptoms of COVID-19 are fever, tiredness, and dry cough. Some patients may have aches and pains, nasal congestion, runny nose, sore throat, or diarrhea. These symptoms are usually mild and begin gradually. Some people become infected but do not develop any symptoms and do not feel unwell. Most people (about 80%) recover from the disease without needing special treatment. Around 1 out of every 6 people who gets COVID-19 becomes seriously ill and develops difficulty breathing. Older people, and those with underlying medical problems like high blood pressure, heart problems or diabetes, are more likely to develop serious illness. People with fever, cough and difficulty breathing should seek medical attention.

HMPC Events

The HMPC had no County specific information on the events of the 20th century. There were issues in both 21st century pandemics.

In the 2009 H1N1, the Amador County Public Health Department (ACPHD) response to H1N1 was a coordinated, multi-faceted answer to an outbreak of Novel Influenza A (H1N1). The response was ongoing, lasting for 312 days. During the initial phase of the outbreak, vaccine for high-risk patients was not readily available from customary sources. Antivirals were also in short supply. A "public health emergency" had been declared by the Acting Secretary of Health and Human Services. Overall, the response to H1N1 was successful. ACPHD worked well with county partners and State agencies to distribute needed vaccines. Vaccine was provided in special clinics as well as distributed to usual providers. Communications between partners, state and regional agencies, and the community were intensified to ensure that information was accurate and available, while rumors were quelled, and misinformation corrected. Public health nurses followed up on suspected cases of H1N1 and answered telephone questions from county residents. While public health staff mobilized to meet the threat of H1N1, essential functions were not neglected. Ultimately, schools remained open and no H1N1 fatalities were reported.

As of May 11th, the Amador County Public Health Department noted that there were:

- Laboratory Confirmed Cases: 7
- Hospitalized COVID-19 Cases to Date: 2
- Recovered Cases: 5
- Deaths: 0

Likelihood of Future Occurrence

Likely – The calculation for future occurrence of pandemic must first be considered in light of circumstances. The diseases are naturally occurring in the populations that reside in the County. In addition, this Plan is not examining the pandemic potential of these diseases, but instead examines when these diseases manifest in severe injury or fatalities among humans. Given these assumptions and the five outbreaks since 1900, the likelihood of future occurrence is considered likely.

Climate Change and Pandemic

According to the WHO, there are three categories of research into the linkages between climatic conditions and infectious disease transmission. The first examines evidence from the recent past of associations between climate variability and infectious disease occurrence. The second looks at early indicators of already-emerging infectious disease impacts of long-term climate change. The third uses the above evidence to create predictive models to estimate the future burden of infectious disease under projected climate change scenarios.

Historical Evidence

There is much evidence of associations between climatic conditions and infectious diseases. Malaria is of great public health concern, and it seems likely to be the vector-borne disease most sensitive to long-term climate change. Malaria varies seasonally in highly endemic areas. The link between malaria and extreme climatic events has long been studied in India, for example. Early last century, the river-irrigated Punjab region experienced periodic malaria epidemics. Excessive monsoon rainfall and high humidity was identified early on as a major influence, enhancing mosquito breeding and survival. Recent analyses have shown that the malaria epidemic risk increases around five-fold in the year after an El Niño event.

Early impacts of climate change

These include several infectious diseases, health impacts of temperature extremes and impacts of extreme climatic and weather events.

Predictive Modeling

The main types of models used to forecast future climatic influences on infectious diseases include statistical, process-based, and landscape-based models. These three types of model address somewhat different questions.

Statistical models require, first, the derivation of a statistical (empirical) relationship between the current geographic distribution of the disease and the current location-specific climatic conditions. This describes the climatic influence on the actual distribution of the disease, given prevailing levels of human intervention (disease control, environmental management, etc.). By then applying this statistical equation to future climate scenarios, the actual distribution of the disease in future is estimated, assuming unchanged levels of human intervention within any particular climatic zone. These models have been applied to climate change impacts on malaria, dengue fever and, within the USA, encephalitis. For malaria, some models have shown net increases in malaria over the coming halfcentury, and others little change.

Process-based (mathematical) models use equations that express the scientifically documented relationship between climatic variables and biological parameters – e.g., vector breeding, survival, and biting rates, and parasite incubation rates. In their simplest form, such models express, via a set of equations, how a given configuration of climate variables would affect vector and parasite biology and, therefore, disease transmission. Such models address the question: "If climatic conditions alone change, how would this change the potential transmission of the disease?" Using more complex "horizontal integration", the conditioning effects of human interventions and social contexts can also be incorporated.

This modelling method has been used particularly for malaria and dengue fever (4). The malaria modelling shows that small temperature increases can greatly affect transmission potential. Globally, temperature increases of 2-3ºC would increase the number of people who, in climatic terms, are at risk of malaria by around 3- 5%, i.e. several hundred million. Further, the seasonal duration of malaria would increase in many currently endemic areas.

Since climate also acts by influencing habitats, landscape-based modeling is also useful. This entails combining the climate-based models described above with the rapidly-developing use of spatial analytical methods, to study the effects of both climatic and other environmental factors (e.g. different vegetation types – often measured, in the model development stage, by ground-based or remote sensors). This type of modelling has been applied to estimate how future climate-induced changes in ground cover and surface water in Africa would affect mosquitoes and tsetse flies and, hence, malaria and African sleeping sickness.

Conclusion

Changes in infectious disease transmission patterns are a likely major consequence of climate change. We need to learn more about the underlying complex causal relationships, and apply this information to the prediction of future impacts, using more complete, better validated, integrated, models.

4.2.18. Wildfire

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. Generally, 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.

Location and Extent

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.

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.

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.

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 in Section 4.2.17) as well as the area around the communities that pose a fire threat.

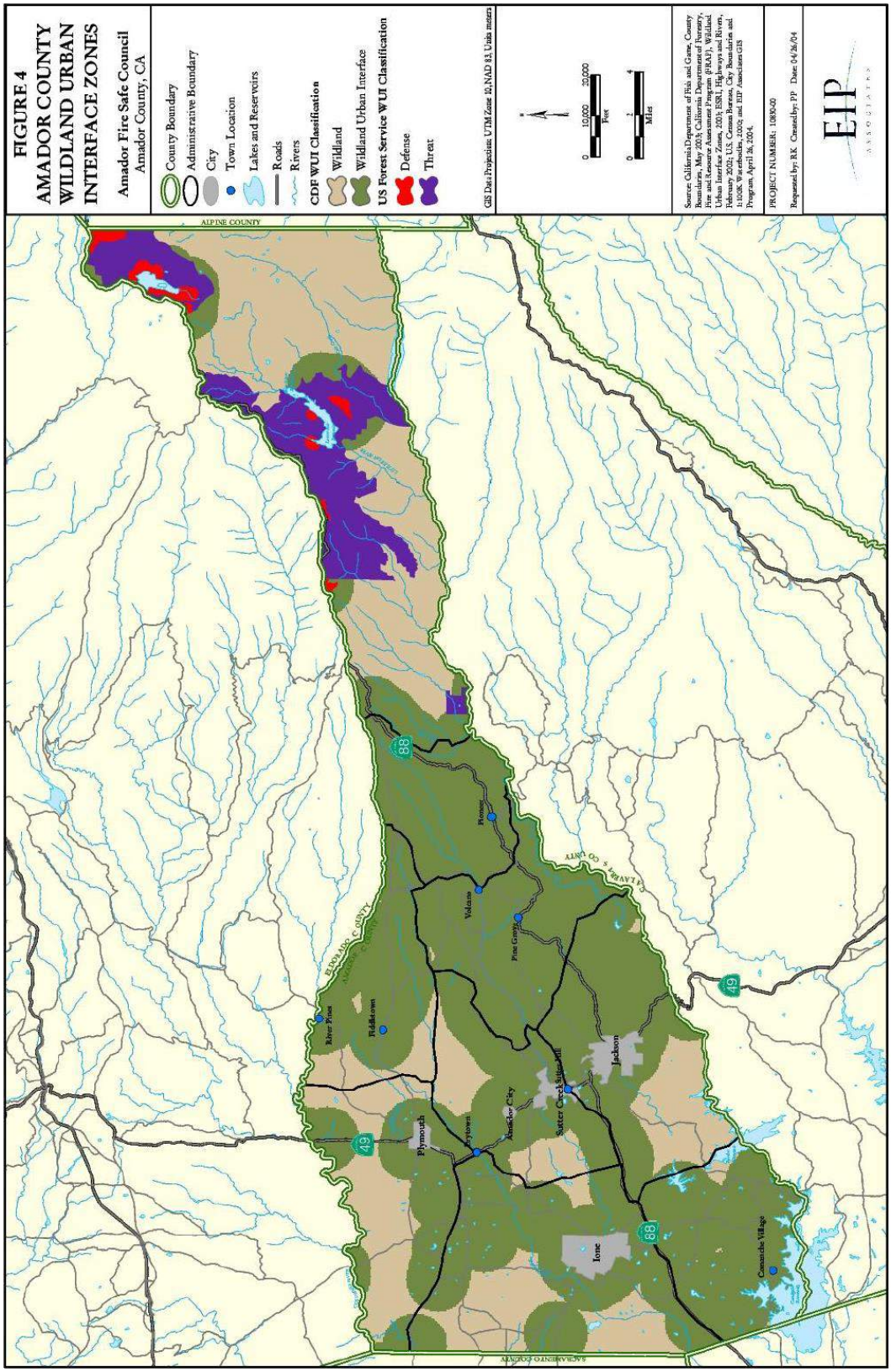
There are two types of WUI environments. The first is the true urban interface where development abruptly meets wildland. The second WUI environment is referred to as the wildland urban intermix. Wildland urban intermix communities are rural, low density communities where homes are intermixed in wildland 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 and urban development 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.

The pattern of increased damages is directly related to increased urban spread into historical forested areas that have wildfire as part of the natural ecosystem. Many WUI fire areas have long histories of wildland fires that burned only vegetation in the past. However, with new development, a wildland fire following a historical pattern will now burn developed areas. WUI fires can occur where there is a distinct boundary between the built and natural areas or where development or infrastructure has encroached or is intermixed in the natural area. WUI fires may include fires that occur in remote areas that have critical infrastructure easements through them, including electrical transmission towers, railroads, water reservoirs, communications relay sites or other infrastructure assets.

Figure 4-73 WUI Boundaries in Amador County



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 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. 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. Fuels are generally Sierra Mixed Conifer which is made up of heavy timber and significant loads of accumulated dead fuels. 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 4.2.4). 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.

Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned and the intensity of the burn. CAL FIRE measures fuels in the areas as part of their Fire Hazard Severity maps. Extents are measured in the following Fire Hazard Severity Zones (FHSZ) categories (discussed in more detail in Section 4.3.16):

- Very High
- High
- Moderate
- Non-Wildland/Non-Urban
- Urban/Unzoned

Geographical extents of these FHSZs in the County can be found on Table 4-43.

Table 4-43 Amador County Planning Area – Geographical Extents of Fire Hazard Severity Zones

Fire Hazard Severity Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
Very High	129,040	33.2%	30,330	18.3%	98,710	44.3%
High	40,816	10.5%	22,615	13.6%	18,201	8.2%
Moderate	211,654	54.4%	111,509	67.3%	100,145	44.9%
Non-Wildland/non-Urban	6,180	1.6%	752	0.5%	5,428	2.4%

Fire Hazard Severity Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
Urban Unzoned	1,050	0.3%	495	0.3%	555	0.2%
Total	**388,740**	**100.00%**	**165,700**	**100.00%**	**223,039**	**100.00%**

Source: CAL FIRE

*Percentage of total acres is the percent of total acres of the entire County Planning Area

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. In Amador County, the areas more at risk for burning tend to be those areas in the eastern portion of the County. These areas tend to be less populated. However, fires have and will continue to be an issue in western Amador.

Post-Wildfire Landslides and Debris Flows

Post-wildfire landslides and debris flows are a concern in Amador County. Fires that burn in sloped areas 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 begun to occur.

Past Occurrences

Disaster Declaration History

A search of FEMA and Cal OES disaster declarations turned up a single event. This is shown in Table 4-44. The federal disaster declaration in 2015 was for the Butte Fire. The state declaration in 1961 was for the Rancheria Creek Fire.

Table 4-44 Amador County – State and Federal Disaster Declaration from Wildfire 1950-2018

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	1	2015	1	1961

Source: Cal OES, FEMA

NCDC Events

The NCDC has tracked wildfire events in the County dating back to 1993. Events in Amador County in the database is shown in Table 4-45.

*Table 4-45 NCDC Wildfire Events in Amador County 1993 to 5/31/2019**

Date	Events	Injuries (direct)	Deaths (direct)	Property Damage	Crop Damage	Injuries (direct)	Deaths (direct)
Wildfire	22	3	0	32	21	$525,000	$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 4-46. Each of them was tracked by CAL FIRE. Many more small fires have occurred, but were not included in the analysis.

Figure 4-74 shows fire history for the County, colored by the size of the acreage burned. This map contains fires from 1950 to 2019, while the detailed tables of wildfire shown in Table 4-46 contain fires from 1910 to 2019, though the first recorded wildfire in this database in Amador County is from 1918.

Figure 4-74 Amador County Wildfire History – CAL FIRE 1910 to 2019

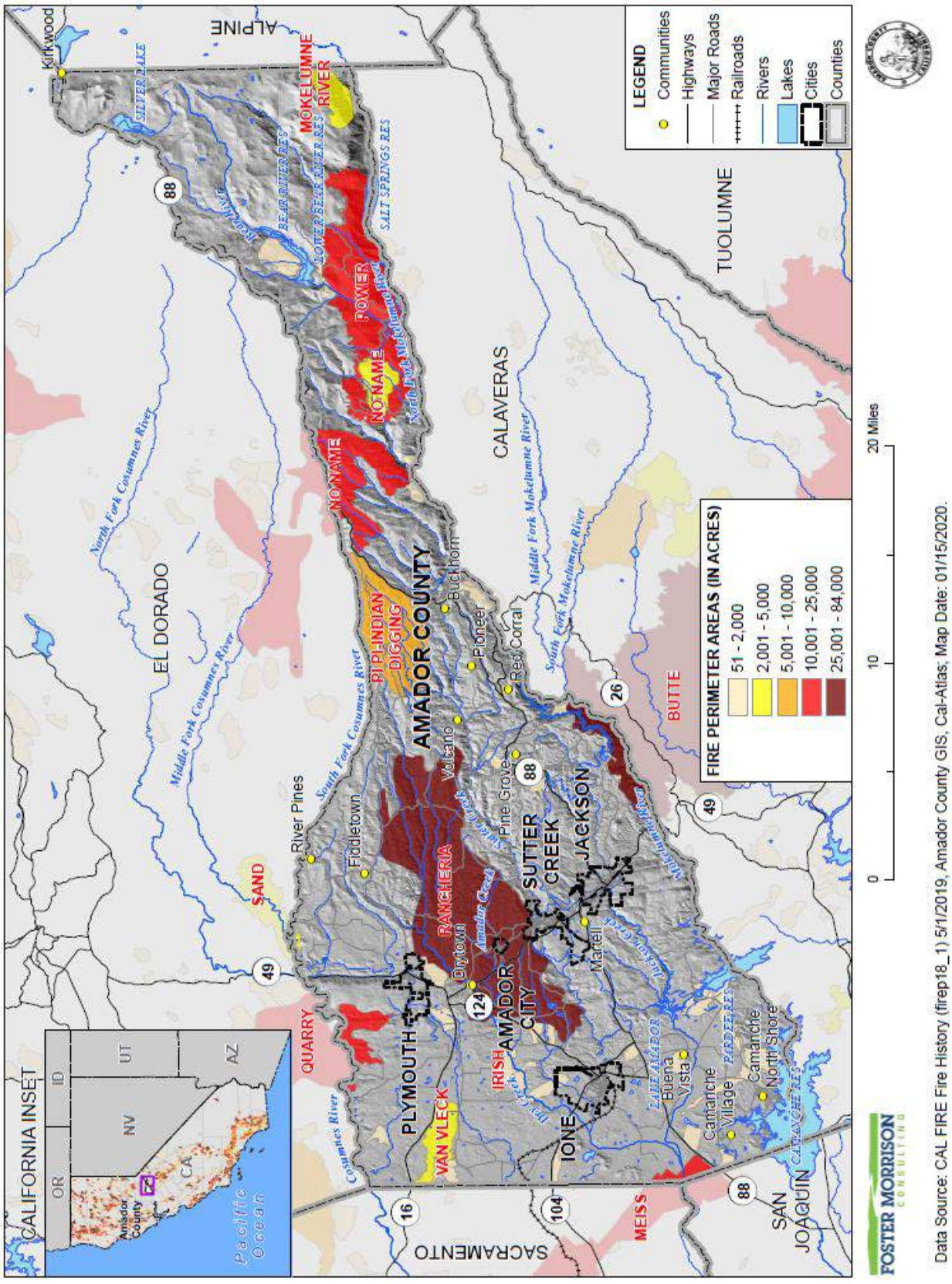


Table 4-46 Amador County – Wildfire History Summary by Cause 1910-2019

Wildfire Name	Date	Cause Description	GIS Acres
Amador City			
RANCHERIA	9/2/1961	Unknown / Unidentified	198
Ione			
IRISH HILL	10/8/1961	Unknown / Unidentified	199
Jackson			
JACKSON	7/26/2005	Vehicle	5
Plymouth			
HIGHWAY-16	7/6/2001	Equipment Use	24
PACIFIC MINE	7/18/1951	Unknown / Unidentified	2
RANCHERIA	9/2/1961	Unknown / Unidentified	2
Sutter Creek			
RANCHERIA	9/2/1961	Unknown / Unidentified	167
SUTTER CREEK	9/2/1961	Unknown / Unidentified	159
Amador County			
AMADOR	7/9/1985	Equipment Use	588
AMADOR	7/18/1988	Arson	329
ARROYO SECO NO. 6	7/29/1958	Unknown / Unidentified	436
BEAR 2	11/24/2002	Debris	49
BEAR RIVER FIRE	6/12/1918	Lightning	1,746
BELL	(blank)	Unknown / Unidentified	46
BUENA	8/15/2002	Unknown / Unidentified	21
BULL CK	6/12/1918	Lightning	51
BUSI	1/14/1961	Unknown / Unidentified	84
BUTTE	9/10/2015	Unknown / Unidentified	3,535
BUTTE PG&E #24	6/11/1990	Unknown / Unidentified	692
CABLE #2	5/19/1924	Miscellaneous	89
CAMANCHE	7/10/2006	Structure	79
CAMANCHE	6/17/2016	Unknown / Unidentified	210
CEDAR	1/2/1994	Miscellaneous	20
CLINTON TRAIL	8/15/1957	Unknown / Unidentified	661
COLD CK FIRE	8/24/1917	Lightning	462
DAFFODIL HILL	8/11/1959	Unknown / Unidentified	408
DAVIS	5/3/1925	Lightning	20
DEADMAN'S FLAT	7/18/1925	Lightning	189
DELL ORTO ESCAPE	8/17/1954	Unknown / Unidentified	369

Wildfire Name	Date	Cause Description	GIS Acres
DOAK'S RIDGE FIRE	5/16/1937	Miscellaneous	38
DRESSLER	8/8/1952	Unknown / Unidentified	7
DUFRENE ESCAPE	7/29/1954	Unknown / Unidentified	726
ELECTRA	6/13/2008	Powerline	251
ELLIS 2	11/15/2002	Debris	113
GOLD BUG	3/22/1923	Unknown / Unidentified	382
HIGHWAY 88 NO.1	7/22/1961	Unknown / Unidentified	336
HIGHWAY 88 SERIES	10/5/1980	Unknown / Unidentified	744
HIGHWAY-16	7/6/2001	Equipment Use	523
HIGHWAY-88	8/24/2001	Arson	15
HOYA	8/15/2016	Equipment Use	23
IRISH	7/6/2018	Equipment Use	825
IRISH HILL	10/8/1961	Unknown / Unidentified	533
JACKSON	6/13/2001	Equipment Use	1,671
JACKSON	7/26/2005	Vehicle	16
JACKSON	7/20/2006	Unknown / Unidentified	104
JOSES SERIES	7/5/1964	Unknown / Unidentified	680
KLOTZ	9/27/1962	Unknown / Unidentified	326
MEISS	6/14/1981	Miscellaneous	1,134
MICHIGAN BAR	7/29/1980	Unknown / Unidentified	692
MIDDLE	7/11/2016	Unknown / Unidentified	13
MOKE	6/17/2004	Campfire	352
MOKELUMNE RIVER	8/1/1924	Miscellaneous	2,242
MUD SPRINGS	5/21/1929	Unknown / Unidentified	19
NO NAME	(blank)	Lightning	2,051
NO NAME		Unknown / Unidentified	7,170
P.G. & E. #3	9/17/1965	Unknown / Unidentified	909
P.G. & E.CO MOKELUME	4/30/1927	Miscellaneous	1,131
PACIFIC MINE	7/18/1951	Unknown / Unidentified	900
PETERSON	8/19/1951	Unknown / Unidentified	312
PI PI-INDIAN DIGGING	8/18/1924	Miscellaneous	8,901
PONY	6/12/2002	Powerline	644
POWER	10/6/2004	Equipment Use	16,981
POWERHOUSE	9/5/2004	Powerline	113
QUARRY	6/23/1976	Unknown / Unidentified	2,631
RANCHERIA	9/2/1961	Unknown / Unidentified	33,737

Wildfire Name	Date	Cause Description	GIS Acres
RANCHO	6/28/2016	Vehicle	354
ROAD	5/10/1993	Debris	127
SALT	9/9/1969	Lightning	10
SALT	2/3/1992	Miscellaneous	53
SALT	7/18/2003	Campfire	216
SALT	12/1/2011	Miscellaneous	343
SALT	10/3/2016	Lightning	78
SAND	7/26/2014	Vehicle	392
SCULLY ROAD	7/3/1950	Unknown / Unidentified	416
STEVENS	8/27/1950	Unknown / Unidentified	3
STONY	7/3/2002	Equipment Use	68
STONY	7/2/2016	Miscellaneous	15
STONY	6/24/2017	Powerline	11
SUNNYBROOK	6/26/1994	Unknown / Unidentified	230
SUTTER CREEK	9/2/1961	Unknown / Unidentified	806
TIGER	8/18/2013	Lightning	16
TONZI	8/18/2003	Vehicle	99
TONZI	6/17/2017	Unknown / Unidentified	22
UPPER	8/12/1996	Miscellaneous	40
VAN VLECK	6/22/1968	Unknown / Unidentified	2,521
VOLCANO	8/16/1993	Powerline	18
WEST SHERMAN CK	9/15/1919	Unknown / Unidentified	681
WILLOW	8/30/2016	Vehicle	18
WINTON	8/28/2017	Arson	0
Unnamed	3/27/1978	Debris	130
Unnamed	9/3/1989	Smoking	8
Unnamed	4/19/1991	Lightning	154
Unnamed	–	Lightning	23
Unnamed	–	Miscellaneous	306
Unnamed	–	Unknown / Unidentified	2,989
Unnamed	11/20/1989	Debris	18
Unnamed	1/1/1994	Debris	19

Source: CAL FIRE

Hazard Mitigation Planning Committee

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 4-75 and Figure 4-76)

Figure 4-75 Rancheria Creek Fire Damages

Source: Amador County Archives

Figure 4-76 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.

Public Safety Power Shutoff 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:

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

It should be noted that customers in PG&E vernacular refer to households or business addresses.

Likelihood of Future Occurrence

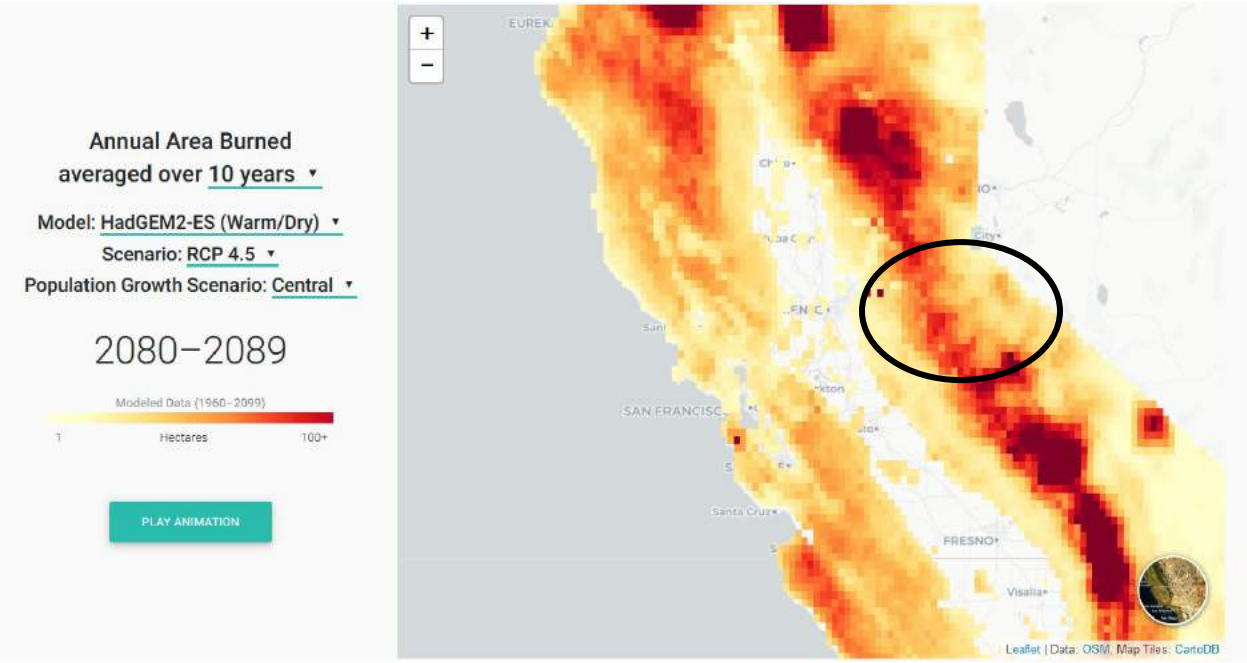
Highly Likely — Traditionally, from May to October of each year (though becoming more of a year around threat in recent years), Amador County faces a serious wildland fire threat. While generally limited to the sparsely populated, forested areas in the eastern portion of the County, fires will continue to occur on an annual basis in 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. However, most of the fires remain occur in more remote areas of the County with limited structures and people at risk.

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 2080-2089, as compared to recent (2010) conditions. This is shown in Figure 4-77. Based on this model, Cal-Adapt predicts that wildfire risk in Amador County will increase slightly (and much less than other California counties) in the near term and subside during mid-to late-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 Amador County, precipitation patterns, high levels of heat, topography, and fuel load will determine the frequency and intensity of future wildfire.

Figure 4-77 Amador County – Projected Increase in Wildfire Burn Areas



Source: Cal-Adapt

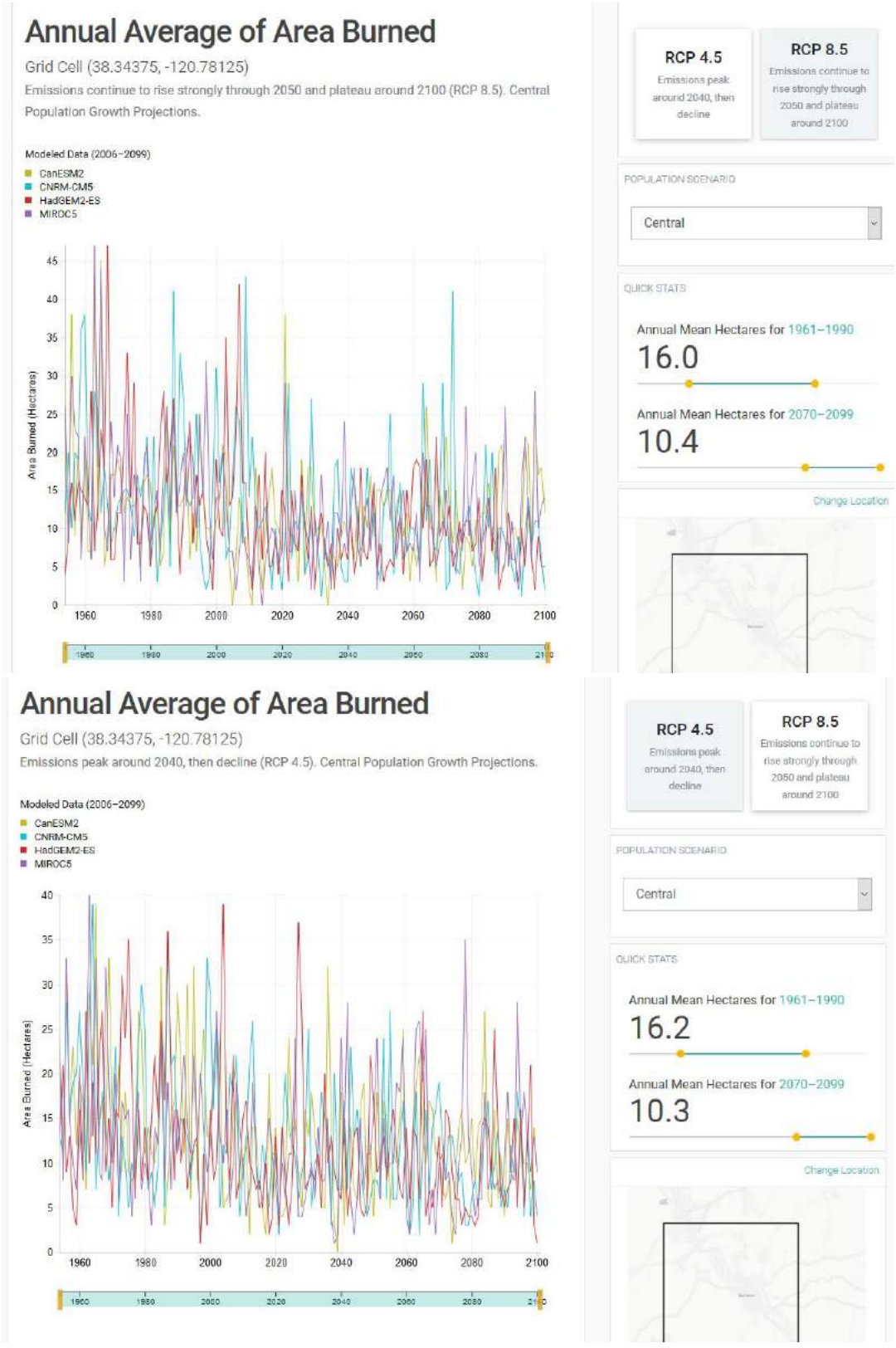
Cal-Adapt has also sought to model annual averages of area burned in the State. Four models have been selected by California's Climate Action Team Research Working Group as priority models for research contributing to California's Fourth Climate Change Assessment. Projected future climate from these four models can be described as producing:

- A warm/dry simulation (HadGEM2-ES) – shown by the red line on the below charts
- A cooler/wetter simulation (CNRM-CM5) – shown by the blue line on the below charts
- An average simulation (CanESM2) – shown by the green line on the below charts
- The model simulation that is most unlike the first three for the best coverage of different possibilities (MIROC5) – shown by the purple line on the below charts

Future modeled annual averages of area burned from Cal-Adapt for the Amador County Planning (using the quad that contains the City of Jackson) are shown in Figure 4-78. It shows the following:

- The upper chart shows annual averages of observed and projected precipitation values for the selected area on map under the RCP 8.5 scenario in which emissions continue to rise strongly through 2050 and plateau around 2100.
- The lower chart shows annual averages of observed and projected Precipitation values for the selected area on map under the RCP 4.5 scenario in which emissions peak around 2040, then decline.

Figure 4-78 Amador County– Future Acreage Burned: High and Low Emission Scenarios



Source: Cal-Adapt

4.2.19. Natural Hazards Summary

Table 4-47 summarizes the results of the hazard identification and hazard profile for the Amador County Planning Area based on the hazard identification data and input from the HMPC. For each hazard profiled in Section 4.3, this table includes the likelihood of future occurrence and whether the hazard is considered a priority hazard for the Amador County Planning Area.

Table 4-47 Hazard Identification/Profile Summary and Determination of Priority Hazards

Hazard	Likelihood of Future Occurrence	Priority Hazard
Agricultural Hazards: Severe Weather/Insect - Pests	Highly Likely	Y
Aquatic Invasive Species	Highly Likely	N
Avalanche	Likely	Y
Climate Change	Likely	Y
Dam Failure	Unlikely	Y
Drought & Water shortage	Likely/Occasional	Y
Earthquake (large damaging/small)	Unlikely/Likely	Y
Floods: 1%/0.2% annual chance	Occasional/ Unlikely	Y
Floods: Localized Stormwater	Highly Likely	Y
Landslide, Mudslide, Debris Flow	Highly Likely	Y
Levee Failure	Occasional	N
Pandemic	Likely	Y
Severe Weather: Extreme Heat	Highly Likely	Y
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Highly Likely	Y
Severe Weather: High Winds and Tornadoes	Highly Likely/ Occasional	Y
Severe Weather: Winter Storms and Freeze	Highly Likely	Y
Wildfire	Highly Likely	Y

4.3 Vulnerability Assessment

Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

With Amador County's hazards identified and profiled, the HMPC conducted a vulnerability assessment to describe the impact that each hazard would have on the Amador County Planning Area. The vulnerability assessment quantifies, to the extent feasible using best available data, assets at risk to natural hazards and estimates potential losses to Amador County (and the incorporated areas) as a whole.

This vulnerability assessment followed the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses*. This vulnerability assessment first describes the total vulnerability and assets at risk for the Amador County Planning Area followed by the unincorporated County and then discusses vulnerability for these areas by hazard.

Data Sources

Data used to support this assessment included the sources listed below. Where data and information from these studies, plans, reports, and other data sources were used, the source is referenced as appropriate throughout this vulnerability assessment.

- 2018 State of California Multi-Hazard Mitigation Plan
- ArkStorm at Tahoe – Stakeholder Perspectives on Vulnerabilities and Preparedness for an Extreme Storm Event in the Greater Lake Tahoe, Reno, and Carson City Region. 2014.
- Amador County 2016 General Plan Conservation Element
- Amador County 2016 General Plan Land Use Element
- Amador County 2016 General Plan Safety Element
- Amador County Assessor's Office
- Amador County Building Department
- Amador County Digital Flood Insurance Rate Map January 20, 2016
- Amador County Emergency Operations Plan
- Amador County Flood Insurance Study January 20, 2016

- Amador County General Plan Environmental Impact Report
- Amador County GIS data
- Amador County 2014-2019 Housing Element
- Cal Atlas
- CAL FIRE GIS datasets
- Cal-Adapt
- California Adaptation Planning Guide
- California Department of Conservation
- California Department of Finance, E-1 Report
- California Department of Finance, E-4 Report
- California Department of Finance, P-1 Report
- California Department of Fish and Wildlife's Natural Diversity Database
- California Department of Food and Agriculture
- California Department of Parks and Recreation Office of Historic Preservation
- California Department of Water Resources Best Available Maps
- California Department of Water Resources DAC Mapping Tool
- California Department of Water Resources Division of Safety of Dams
- California Native Plant Society
- California Natural Diversity Database – BIOS Viewer Tool
- California Office of Emergency Services – Dam Inundation Data
- California Office of Historic Preservation
- Cal-IPC
- Climate Change and Health Profile Report – Amador County
- County and City staff
- Existing plans and studies
- FEMA's HAZUS-MH 4.2 GIS-based inventory data
- Kenward, Alyson PhD, Adams-Smith, Dennis, and Raja, Urooj. Wildfires and Air Pollution – The Hidden Health Hazards of Climate Change. Climate Central. 2013.
- Liu, J.C., Mickley, L.J., Sulprizio, M.P. et al. Climatic Change. 138: 655. doi:10.1007/s10584-016-1762-6. 2016.
- National Drought Mitigation Center – Drought Impact Reporter
- National Levee Database
- National Park Service – Historic American Buildings Survey and Historic American Engineering Record
- Personal interviews with planning team members and staff from the County and participating jurisdictions
- Proceedings of the National Academy of Sciences
- Public Health Alliance of Southern California
- Statewide GIS datasets from other agencies such as Cal OES, FEMA, USGS, CGS, Cal Atlas, and others
- University of California
- U.S. Census Bureau 2010 Household Population Estimates
- U.S. Fish and Wildlife Service
- U.S. Fish and Wildlife Service's National Wetlands Inventory maps
- U.S. Geological Survey
- U.S. Geological Survey Landslide Maps

- U.S. Forest Service GIS datasets
- World Health Organization
- Written descriptions of inventory and risks provided by Amador County

4.3.1. Amador County Vulnerability and Assets at Risk

As a starting point for analyzing the Amador County Planning Area's vulnerability to identified hazards, the HMPC used a variety of data to define a baseline against which all disaster impacts could be compared. If a catastrophic disaster were to occur, this section describes significant assets at risk in the Planning Area. Data used in this baseline assessment included:

- Total values at risk;
- Critical facility inventory;
- Cultural, historical, and natural resources; and
- Growth and development trends.

Total Values at Risk

Parcel Inventory and Assessed Values

This analysis captures the values associated with assessed values located within Amador County. The 12/31/2018 Amador County Parcel/Assessor's data, obtained from Amador County, was used for as the basis of this analysis. This data provided by Amador County represents best available data.

Understanding the total assessed value of Amador County is a starting point to understanding the overall value of identified values at risk in the County. When the total assessed values are combined with potential values associated with other community assets such as public and private critical infrastructure, historic and cultural resources, and natural resources, the big picture emerges as to what is potentially at risk and vulnerable to the damaging effects of natural hazards within the County.

Methodology

Amador County's 12/31/2018 Assessor Data and the County's GIS parcel data were used as the basis for the inventory of assessed values for both improved and unimproved parcels within the County. 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 countywide mapping and analysis of values at risk. The Amador County GIS parcel data contained 17,829 parcels, including the areas of the City of Amador City, City of Ione, City of Jackson, City of Plymouth, City of Sutter Creek, and the unincorporated areas of Amador County. This plan focuses on the entire Amador County Planning Area, and therefore the GIS parcel data exclusively contained 17,829 parcels.

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 County. 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 infrastructure improvements are of greatest concern. As such, it is critical to note a specific limitation to the assessed values data within the County, 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 most likely low and may not reflect current market or true potential loss values for properties within the County.

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.

The 12/31/2018 GIS parcel and Assessor data was obtained to perform the spatial analysis. GIS was used to convert the parcel polygons into centroids representing each record in the assessor database. For the purposes of this analysis, the centroids which were not coincident in locations were re-positioned to overlay on the corresponding polygons so that each assessor record (with a unique assessor parcel number) was spatially positioned on the corresponding parcel. In addition, multiple parcels polygons in the GIS data were constructed as multi-part features, of which only one centroid was representative of each parcel polygon. The position of the centroids may result in less accurate hazard analysis overlay results. The data did not contain duplicate records. In total, 17,829 records were utilized for the analysis.

Property Use Categories

Amador County's GIS data contained land use designations which provide detailed descriptive information about how each property is generally used, such as agricultural, commercial, easement, government, industrial, institutional, recreational, residential, right of way, and unknown. The land use codes were refined and categorized into seven property use categories and linked back to the Amador County Assessor data. The final property use categories for Amador County are shown in Table 4-48.

Table 4-48 Amador County Planning Area – Property Use Categories

Amador County Assessor's Description	Amador County Property Use Categories
Agricultural	Agricultural
Commercial	Commercial
Government	Government
Industrial	Industrial
Institutional	Institutional
Easement, recreational, right of way, and unknown	Miscellaneous
Residential	Residential

Once the Property Use descriptions were grouped into categories, the number of total and improved parcels, as well as land and improved values were inventoried for the County by property use.

Estimated Content Replacement Values

Amador County's 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 were utilized to develop more accurate loss estimates for all mapped hazard analyses. FEMA's CRV factors estimate value as a percent of improved structure value by property use. Table 4-49 shows the breakdown of the different property uses in the County and their estimated CRV factors.

Table 4-49 Amador County – 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%
Government	Government	100%
Industrial	Industrial	150%
Miscellaneous	Other	100%
Residential	Residential	50%
Unknown	–	0%

Source: Hazus

Amador County Values at Risk Results

Values associated with land and improved structure, were identified and summed in order to determine assessed values at risk in the Amador County Planning Area. Together, the land value and improved structure value 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 total values at risk in the Planning Area.

Values at Risk with Contents

Table 4-50 shows the total values or exposure for the entire Amador County Planning Area (using CRV multipliers from Table 4-49). This table is important as potential losses to the County include structure contents. In addition, loss estimates contained in the hazard vulnerability sections of this Chapter will use calculations based on the total values, including content replacement values.

Table 4-50 Amador County Planning Area – Total Values at Risk by Jurisdiction

Jurisdiction	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
City of Amador City	181	111	$13,243,335	$16,405,643	$9,590,349	$39,239,327
City of Ione	2,034	1,671	$146,427,350	$312,506,962	$162,437,754	$621,372,066
City of Jackson	2,118	1,701	$164,928,386	$449,018,591	$308,393,929	$922,340,906
City of Plymouth	578	426	$49,553,067	$66,588,817	$43,052,234	$159,194,118
City of Sutter Creek	1,432	1,114	$107,612,762	$250,519,147	$152,611,083	$510,742,992
Unincorporated Amador County	17,829	12,243	$1,356,984,830	$2,268,852,082	$1,312,383,300	$4,938,220,212
Grand Total	**24,172**	**17,266**	**$1,838,749,730**	**$3,363,891,242**	**$1,988,468,649**	**$7,191,109,621**

Source: Amador County 12/31/2018 Parcel/Assessor's Data

The values for the entire Amador County Planning Area (all jurisdictions) are broken out by property use and are provided in Table 4-51. The values for unincorporated Amador County are broken out by property use type and are provided in Table 4-52. More information on assets at risk for each jurisdiction can be found in their respective annexes.

Table 4-51 Amador County Planning Area – Total Values at Risk by Jurisdiction and Property Use

Jurisdiction / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
City of Amador City						
Agricultural	7	2	$820,424	$725,315	$725,315	$2,271,054
Commercial	15	12	$1,509,183	$2,055,703	$2,055,703	$5,620,589
Industrial	2	1	$9,612	$2,222	$3,333	$15,167
Miscellaneous	11	1	$18,331	$10,404	$0	$28,735
Residential	143	95	$10,885,785	$13,611,999	$6,805,998	$31,303,782
Unknown	3	0	$0	$0	$0	$0
City of Amador City Total	**181**	**111**	**$13,243,335**	**$16,405,643**	**$9,590,349**	**$39,239,327**
City of Ione						
Agricultural	14	3	$6,827,931	$39,680	$39,680	$6,907,291
Commercial	66	62	$8,098,815	$18,019,216	$18,019,216	$44,137,247
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	131	19	$7,228,495	$5,690,352	$0	$12,918,847
Residential	1,776	1,587	$124,272,109	$288,757,714	$144,378,858	$557,408,681

Jurisdiction / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Unknown	47	0	$0	$0	$0	$0
City of Ione Total	**2,034**	**1,671**	**$146,427,350**	**$312,506,962**	**$162,437,754**	**$621,372,066**
City of Jackson						
Agricultural	11	2	$4,251,931	$531,814	$531,814	$5,315,559
Commercial	266	215	$46,200,733	$158,680,676	$158,680,676	$363,562,085
Industrial	12	9	$2,792,453	$5,011,363	$7,517,043	$15,320,859
Miscellaneous	61	2	$607,728	$1,465,924	$0	$2,073,652
Residential	1,687	1,473	$111,075,541	$283,328,814	$141,664,396	$536,068,751
Unknown	81	0	$0	$0	$0	$0
City of Jackson Total	**2,118**	**1,701**	**$164,928,386**	**$449,018,591**	**$308,393,929**	**$922,340,906**
City of Plymouth						
Agricultural	39	9	$7,533,031	$2,225,033	$2,225,033	$11,983,097
Commercial	61	48	$10,901,341	$17,290,621	$17,290,621	$45,482,583
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	32	0	$68,736	$0	$0	$68,736
Residential	441	369	$31,049,959	$47,073,163	$23,536,580	$101,659,702
Unknown	5	0	$0	$0	$0	$0
City of Plymouth Total	**578**	**426**	**$49,553,067**	**$66,588,817**	**$43,052,234**	**$159,194,118**
City of Sutter Creek						
Agricultural	6	2	$1,654,245	$361,000	$361,000	$2,376,245
Commercial	154	110	$22,347,840	$52,760,463	$52,760,463	$127,868,766
Industrial	2	2	$326,295	$790,798	$1,186,198	$2,303,291
Miscellaneous	38	0	$22,433	$0	$0	$22,433
Residential	1,203	1,000	$83,261,949	$196,606,886	$98,303,422	$378,172,257
Unknown	29	0	$0	$0	$0	$0
City of Sutter Creek Total	**1,432**	**1,114**	**$107,612,762**	**$250,519,147**	**$152,611,083**	**$510,742,992**
Unincorporated Amador County						
Agricultural	1,685	1,148	$247,047,304	$170,293,831	$170,293,831	$587,634,966
Commercial	451	319	$93,451,432	$170,828,482	$170,828,482	$435,108,396
Industrial	54	32	$21,236,814	$13,715,868	$20,573,799	$55,526,481
Miscellaneous	785	83	$26,025,654	$12,128,084	$0	$38,153,738
Residential	14,143	10,657	$963,349,667	$1,901,374,464	$950,687,188	$3,815,411,319
Unknown	711	4	$5,873,959	$511,353	$0	$6,385,312

Jurisdiction / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Unincorporated Amador County Total	**17,829**	**12,243**	**$1,356,984,830**	**$2,268,852,082**	**$1,312,383,300**	**$4,938,220,212**
Grand Total	**24,172**	**17,266**	**$1,838,749,730**	**$3,363,891,242**	**$1,988,468,649**	**$7,191,109,621**

Source: Amador County 12/31/2018 Parcel/Assessor's Data

Table 4-52 Unincorporated Amador County – Total Values at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Agricultural	1,685	1,148	$247,047,304	$170,293,831	$170,293,831	$587,634,966
Commercial	451	319	$93,451,432	$170,828,482	$170,828,482	$435,108,396
Industrial	54	32	$21,236,814	$13,715,868	$20,573,799	$55,526,481
Miscellaneous	785	83	$26,025,654	$12,128,084	$0	$38,153,738
Residential	14,143	10,657	$963,349,667	$1,901,374,464	$950,687,188	$3,815,411,319
Unknown	711	4	$5,873,959	$511,353	$0	$6,385,312
Amador County Total	**17,829**	**12,243**	**$1,356,984,830**	**$2,268,852,082**	**$1,312,383,300**	**$4,938,220,212**

Source: Amador County 12/31/2018 Parcel/Assessor's Data

Critical Facility Inventory

The Amador County worked with members of the HMPC to develop a definition of critical facilities for the Amador County Planning Area. 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.

A summary of critical facilities in the Amador County Planning Area can be found in Figure 4-79 and Table 4-53. Table 4-54 gives details of critical facilities in each jurisdiction by category. Details of individual critical facilities can be found in Appendix F of this Plan.

Figure 4-79 Amador County Planning Area – Critical Facilities

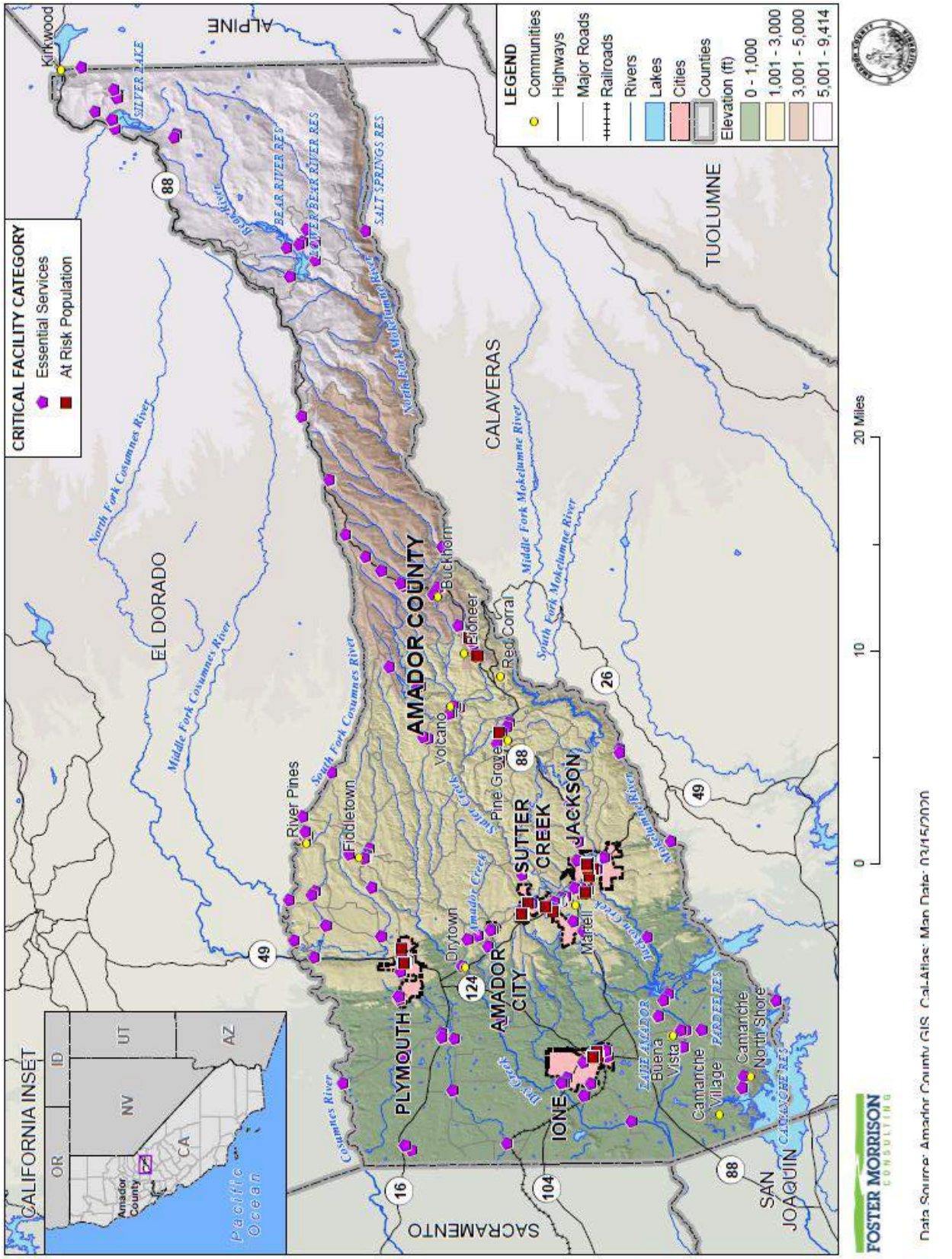


Table 4-53 Amador County Planning Area – Critical Facility Summary by Jurisdiction

Jurisdiction / Critical Facility Category	Facility Count
City of Amador City	
Essential Services	3
At Risk Population	0
City of Amador City Total	**3**
City of Ione	
Essential Services	14
At Risk Population	4
City of Ione Total	**17**
City of Jackson	
Essential Services	23
At Risk Population	8
City of Jackson Total	**31**
City of Plymouth	
Essential Services	9
At Risk Population	1
City of Plymouth Total	**10**
City of Sutter Creek	
Essential Services	7
At Risk Population	6
City of Sutter Creek Total	**13**
Unincorporated Amador County	
Essential Services	140
At Risk Population	5
Unincorporated Amador County Total	**145**
Grand Total	**220**

Source: Amador County GIS

Table 4-54 Amador County Planning Area – Critical Facilities by Jurisdiction and Facility Type

Jurisdiction/Critical Facility Category	Facility Type	Facility Count
City of Amador City		
Essential Services	Fire Station	1
	Post Office	1
	Public Administration Building	1

Jurisdiction/Critical Facility Category	Facility Type	Facility Count
	Total	3
City of Amador City Total		**3**
City of Ione		
Essential Services	Bridge	1
	Clinic	1
	EMS Station	2
	Evacuation Shelter	1
	Fire Station	2
	Library	1
	Police Station	1
	Post Office	1
	Power Substation	2
	Prison	1
	Public Administration Building	1
	Total	**14**
At Risk Population	School	4
	Total	**4**
City of Ione Total		**18**
City of Jackson		
Essential Services	Clinic	7
	Community Center	2
	Court House	1
	DMV	1
	EOC	1
	Fire Station	2
	Hospital	1
	Library	1
	Police Station	3
	Post Office	1
	Public Administration Building	2
	School District Office	1
	Total	**23**
At Risk Population	Residential Care Facility	5
	School	3
	Total	**8**
City of Jackson Total		**31**

Jurisdiction/Critical Facility Category	Facility Type	Facility Count
City of Plymouth		
Essential Services	Bridge	1
	Clinic	1
	EMS Station	1
	Evacuation Shelter	1
	Fire Station	1
	Library	1
	Post Office	1
	Power Substation	1
	Public Administration Building	1
	Total	**9**
At Risk Population	School	1
	Total	1
City of Plymouth Total		**10**
City of Sutter Creek		
Essential Services	Community Center	2
	Fire Station	2
	Police Station	1
	Post Office	1
	Public Administration Building	1
	Total	**7**
At Risk Population	Residential Care Facility	1
	School	5
	Total	**6**
City of Sutter Creek Total		**13**
Amador County		
Essential Services	Animal Shelter	1
	Bridge	31
	Clinic	5
	Community Center	5
	EMS Station	2
	Fire Station	16
	Library	2
	Post Office	6
	Power Plant	3
	Power Substation	3

Jurisdiction/Critical Facility Category	Facility Type	Facility Count
	Public Administration Building	1
	Public Water System	63
	Ranger Station	1
	Veterans Services	1
	Total	**140**
At Risk Population	School	5
	Total	**5**
Amador County Total		**145**
Grand Total		**220**

Source: Amador County GIS

Cultural, Historical, and Natural Resources

Assessing Amador County's vulnerability to disaster also involves inventorying the cultural, historical, and natural resource assets of the area. This information 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.
- In the event of a disaster, an accurate inventory of cultural, historical, and natural resources allows for more prudent care in the disaster's immediate aftermath when the potential for additional impacts is 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, for example, wetlands and riparian and sensitive habitats which help absorb and attenuate floodwaters and thus support overall mitigation objectives.

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 4-55.

Table 4-55 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
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
Site of Jackson's Pioneer Jewish Synagogue (865)		X		11/16/1973	Jackson

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City/ Community
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
Maiden's Grave (28)		X		8/1/1932	Kirkwood
Old Emigrant Road (662)		X		11/5/1958	Kirkwood
D. Stewart Co. Store (788)		X		11/21/1963	lone
Preston Castle (867)		X		1/11/1974	lone
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, http://ohp.parks.ca.gov/

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.

The Amador County General Plan Conservation Element noted that Amador County has a variety of known cultural and historic resources, including prehistoric sites, gold mining-related sites, and other historic sites.

It is important to note that these sites are generally identified in the course of an archaeological survey for a planned development, such as federal projects, new construction, or other similar activities. Therefore, the known sites tend to cluster in regions where development has occurred in the past. Although less information is available for less-developed areas, the density and types of known cultural resource sites are presumed to continue into unexplored areas. Examining groupings of similar site types can help to predict the types and densities of cultural resource sites in similar geographic locations within Amador County.

Prehistoric sites in Amador County include bedrock mortars, occupation sites, and traditional cultural properties (TCPs). Bedrock mortar sites tend to be found in locations that include nearby oak trees, a water source, and bedrock. TCPs can include gathering areas, religious sites, or mythic locations. These locations are important to maintain the continuing cultural identity of Native American communities.

Historic sites in Amador County include mining and prospect locations associated with the Gold Rush, and other sites ranging from historic houses and buildings to locations such as trails, cemeteries, and mills. Gold mining has enormous historical significance in Amador County and has literally shaped the landscape in many areas. Larger mining landscapes might include open pits, sluices, placer-scoured stream channels, ditches, open entries or shafts, tailings piles, and habitation areas. Smaller sites can contain any combination of these features. The groupings of mines can be interpreted as following gold-bearing geologic strata. Linear ditches and canals are generally found running from a higher-elevation water source down to the mine complex.

At some locations, combinations of different resource types are found, such as historic homestead sites and prehistoric sites. The same types of resources may have been exploited by both the historic and prehistoric occupants, such as nearby water and level land. Thus, these types of sites may be found together. In other instances, it is more likely to be coincidence, such as when prehistoric sites are later intersected by mining or logging efforts.

In addition, the California Department of Transportation (Caltrans) has designated a segment of State Route (SR) 88 from Dew Drop Ranger Station, east of Buckhorn, to the Nevada state line as a State Scenic Highway. The rest of SR 88 in Amador County (west of the Dew Drop Ranger Station), and the entire length of SR 49 traversing the County are eligible for State Scenic Highway listing, but neither is officially designated. The State Scenic Highway Program seeks to protect scenic beauty along particularly picturesque roadways to enhance the experience of travelers along the roadway as well as to support recreation and tourism in those areas. The officially designated segment of SR 88 is located east of Dew Drop, and based on the land use designations in this area, there is little potential for development along this portion of the highway.

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 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 4-56. Appendix E list 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 4-56 Amador County Planning Area – Summary of Special Status Species

Type	Number
Animals - Amphibians	8
Animals – Arachnids	2
Animals - Birds	13

Type	Number
Animals - Crustaceans	4
Animals - Fish	1
Animals - Insects	5
Animals - Mammals	10
Animals – Mollusks	1
Animals – Reptiles	3
Community – Aquatic	1
Community – Terrestrial	2
Plants - Bryophytes	2
Plants - Lichens	1
Plants – Vascular	19

Source: California Natural Diversity Database

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 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.

The Amador County General Plan Open Space Element noted that 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.

The US Fish and Wildlife Service has mapped wetlands areas throughout the United States. Figure 4-80 shows the wetlands areas in the County. Figure 4-81 shows the east side of the County and its associated wetlands in greater detail, while Figure 4-82 shows the west side of the County and its associated wetlands in greater detail. These areas are detailed in Table 4-57 by jurisdiction and wetland type.

Figure 4-80 Amador County – Wetlands Areas

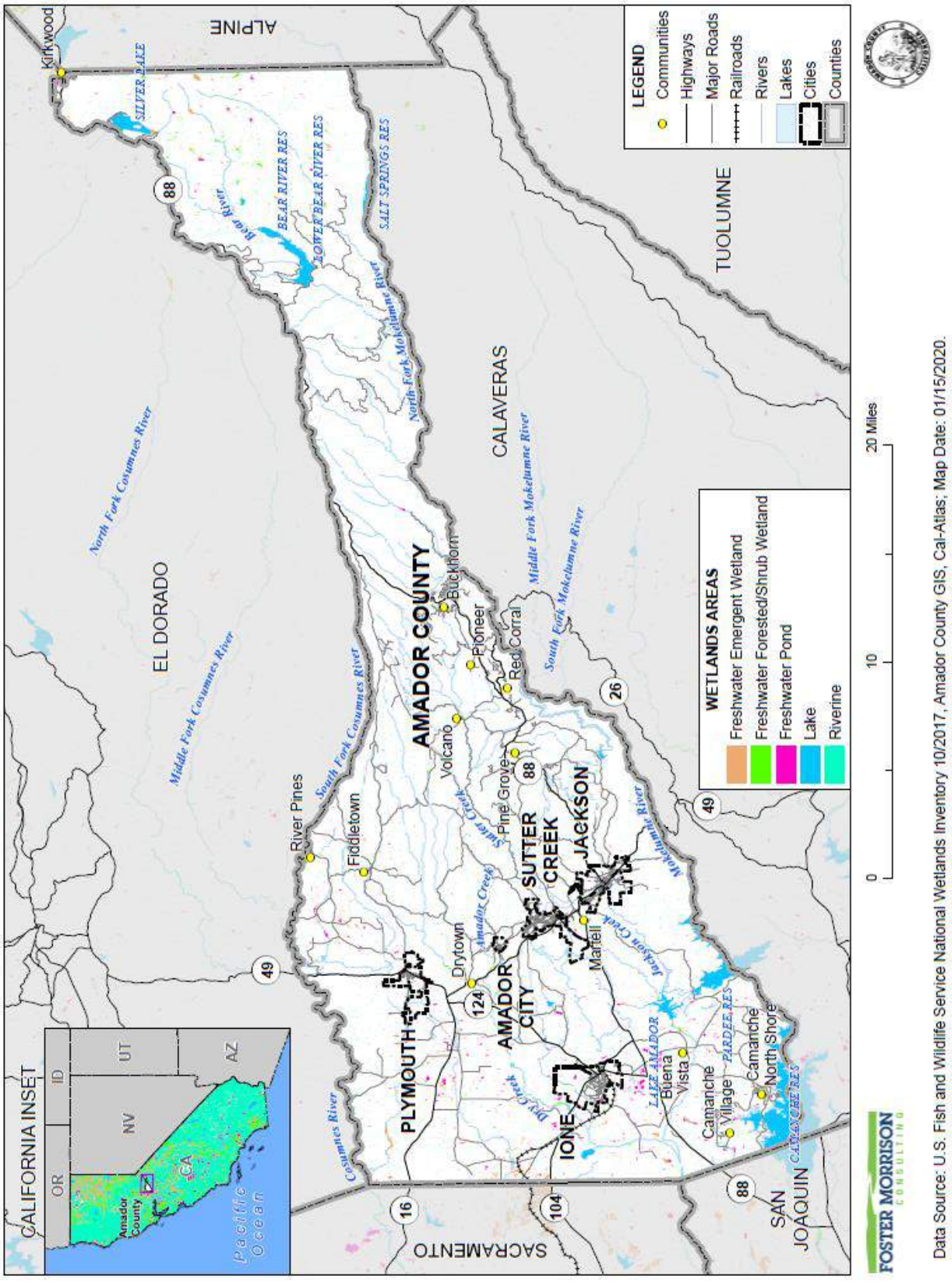


Figure 4-81 Amador County East – Wetlands Areas

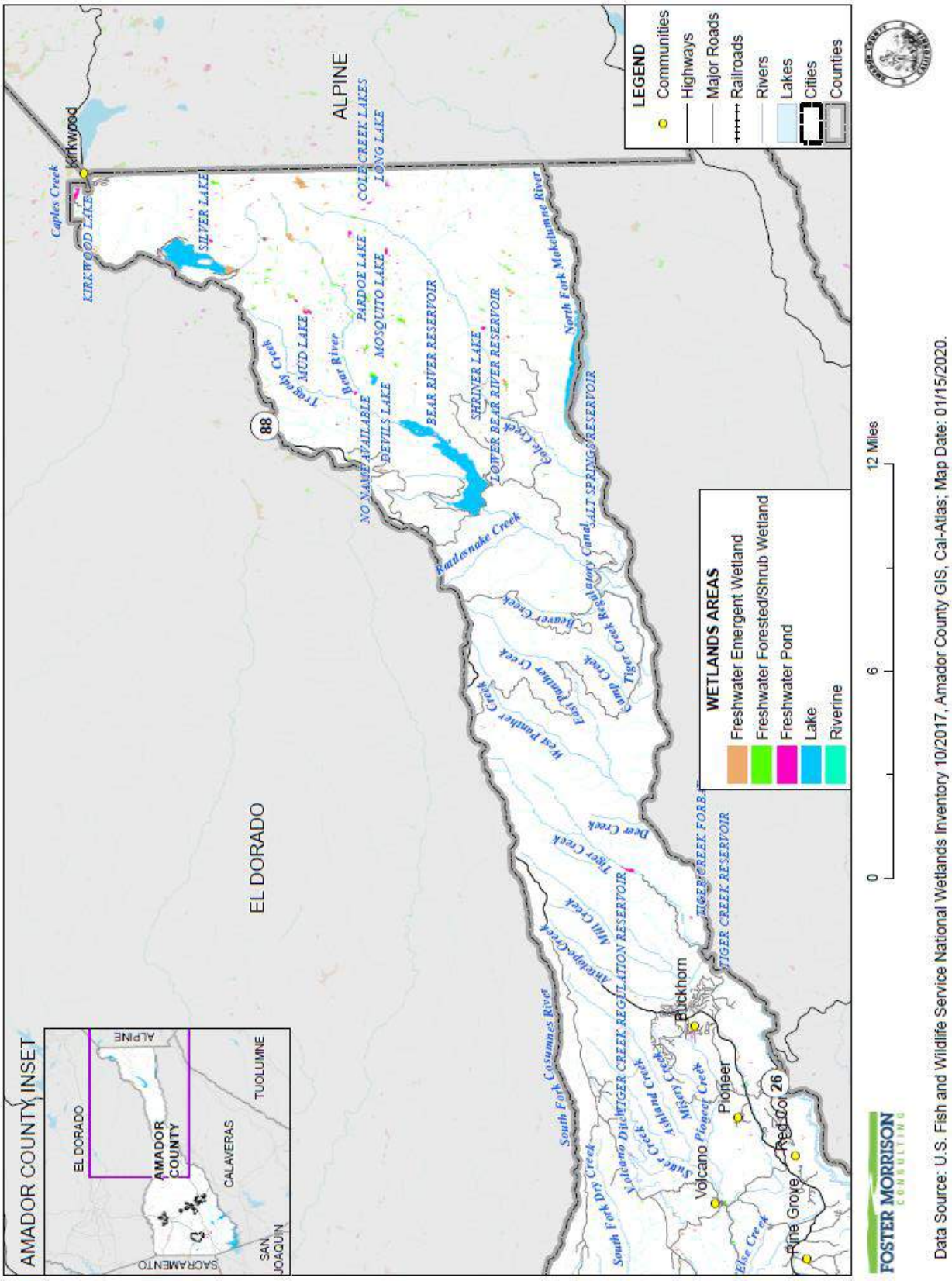


Figure 4-82 Amador County West – Wetlands Areas

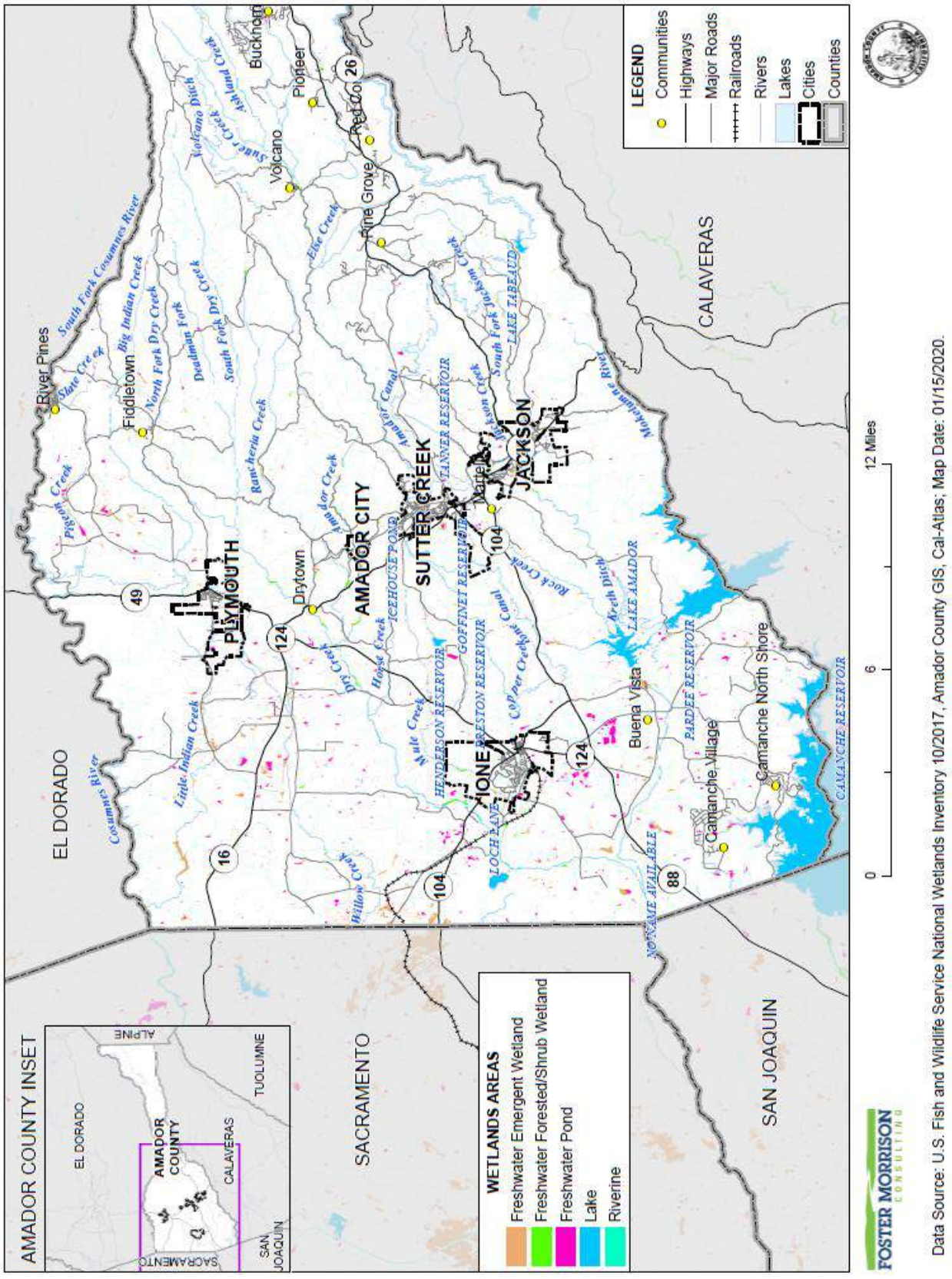


Table 4-57 Amador County Planning Area – Wetlands Areas by Jurisdiction and Area Type

Jurisdiction / Wetlands Area Type	Wetlands Count	Wetlands Area (in Acres)
Amador City		
Freshwater Emergent Wetland	1	0.53
Freshwater Forested/Shrub Wetland	2	2.17
Freshwater Pond	2	0.52
Lake	0	0
Riverine	4	0.58
Amador City Total	**9**	**3.81**
Ione		
Freshwater Emergent Wetland	30	28.90
Freshwater Forested/Shrub Wetland	15	15.73
Freshwater Pond	8	26.20
Lake	0	0
Riverine	18	24.00
Ione Total	**71**	**94.83**
Jackson		
Freshwater Emergent Wetland	20	16.01
Freshwater Forested/Shrub Wetland	13	10.61
Freshwater Pond	9	5.88
Lake	0	0
Riverine	22	22.25
Jackson Total	**64**	**54.75**
Plymouth		
Freshwater Emergent Wetland	35	19.80
Freshwater Forested/Shrub Wetland	6	3.23
Freshwater Pond	19	8.40
Lake	0	0
Riverine	19	9.75
Plymouth Total	**79**	**41.18**
Sutter Creek		
Freshwater Emergent Wetland	4	6.92
Freshwater Forested/Shrub Wetland	3	2.42
Freshwater Pond	0	0
Lake	0	0
Riverine	12	12.57
Sutter Creek Total	**19**	**21.91**

Jurisdiction / Wetlands Area Type	Wetlands Count	Wetlands Area (in Acres)
Amador County		
Freshwater Emergent Wetland	2,141	2,076.18
Freshwater Forested/Shrub Wetland	872	879.07
Freshwater Pond	1,402	1,216.36
Lake	48	6,750.24
Riverine	2,301	3,009.56
Amador County Total	**6,764**	**13,931.40**
Grand Total	**7,006**	**14,147.88**

Source: US Fish and Wildlife Service

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. The County has 91,092 acres under Williamson Act Contract as of 2015, the last year that data was reported by the County to the State.

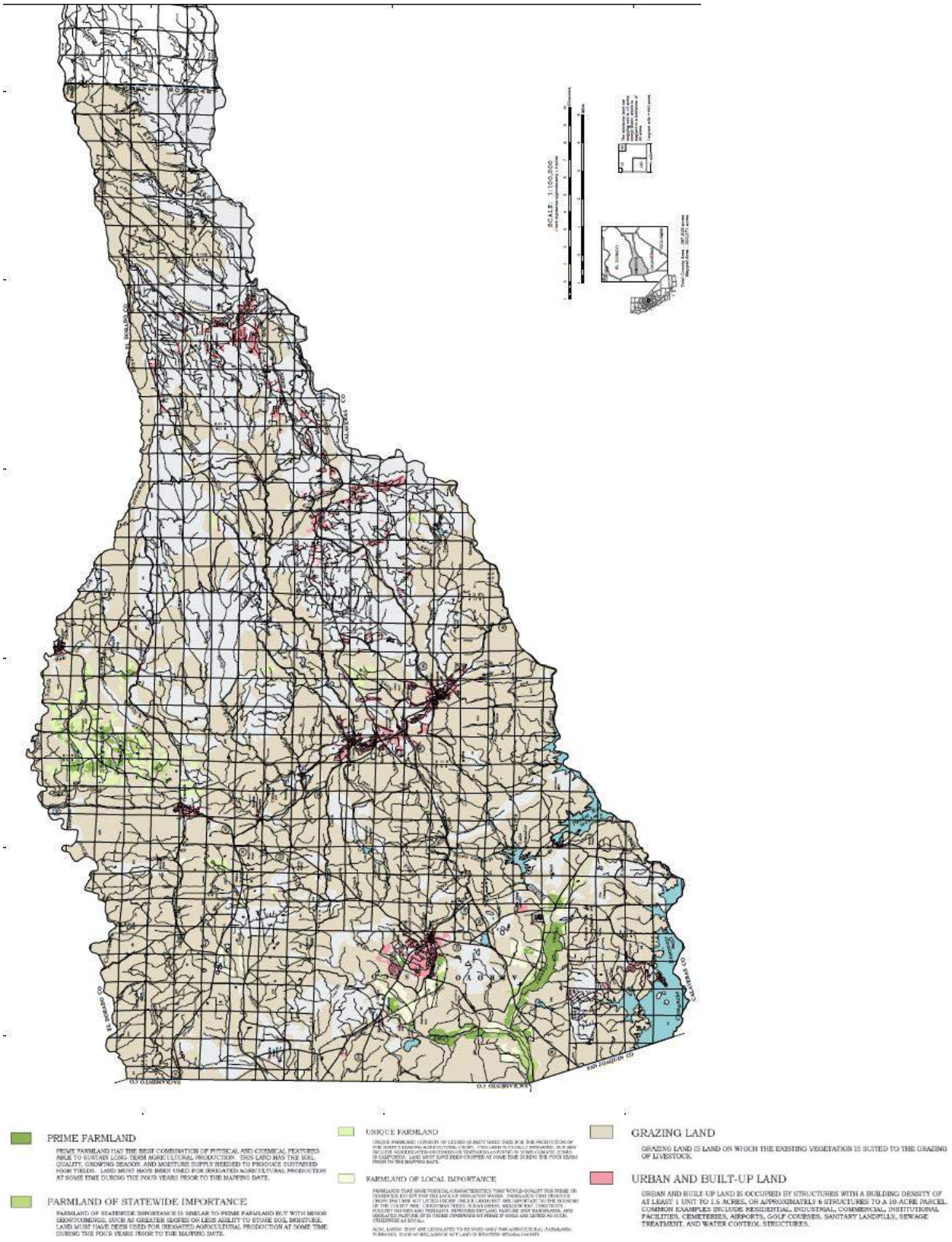
State Inventory of Important Farmland

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 2016 maps are the most recent versions. These lands are shown in Figure 4-83.

Figure 4-83 Amador County – Map of Important Farmlands 2016



Source: State of California Department of Conservation

Growth and Development Trends

As part of the planning process, the HMPC looked at changes in growth and development, both past and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability over time. Information from the Amador County General Plan Housing Element, the California Department of Finance, the US Census Bureau, and input from the participating jurisdictions form the basis of this discussion.

Current Status and Past Populations

The estimated population of Amador County (both incorporated communities and the unincorporated County) for January 1, 2019 was 38,294, representing a four-fold increase from 9,788 people in 1940. Table 4-58 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. Details on population growth in the cities is included in their respective annexes to this LHMP Update.

Table 4-58 Amador County Planning Area – Population Growth 1940-2019

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%
2019	38,294	0.7%

Sources: 2014-2019 Amador County Housing Element Background Report, California Department of Finance, US Census Bureau

Special Populations and Disadvantaged Communities

The Arc of Amador and Calaveras does research every three years into statistics of the disable community in Amador and Calaveras counties. Amador and Calaveras Counties have an 18.09 percent population of persons with disabilities according to the US Census Bureau 2013-2017 American Community Survey (ACS): Of the Non-Institutionalized residents: Amador County population: 37,306, of which 5,870 are disabled (16%). That is significantly higher than the 10.6 percent average of people with disabilities in the rest of California.

There is a somewhat sizable homeless population in Amador County. This causes issues with fire and pandemic. Additionally, there is limited transportation of elderly in rural areas for evacuations. There is a

migrant population that arrives for summer. Many of these are Spanish speakers, which can cause issues during periods of evacuation.

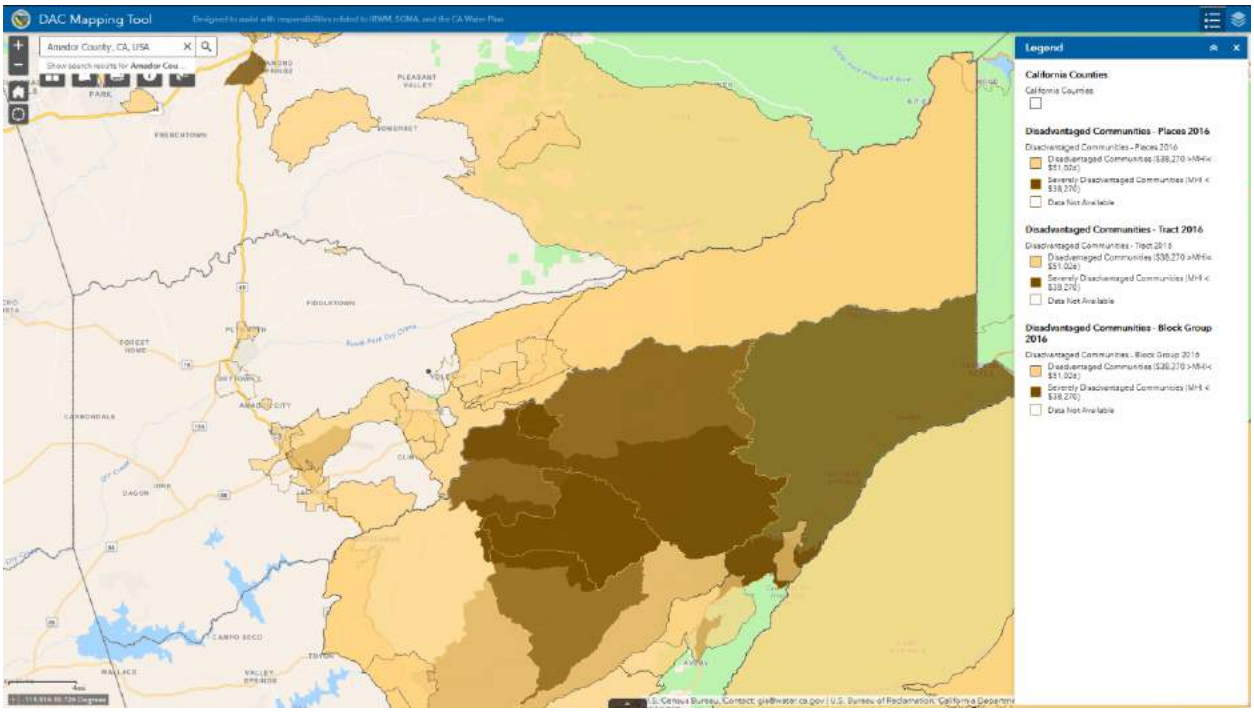
Cal DWR Special Population and Disadvantaged Community Mapping

Cal DWR has developed a web-based application to assist local agencies and other interested parties in evaluating disadvantaged community (DAC) status throughout the State, using the definition provided by Proposition 84 Integrated Regional Water Management (IRWM) Guidelines (2015). The DAC Mapping Tool is an interactive map application that allows users to overlay the following three US Census geographies as separate data layers:

- Census Place
- Census Tract
- Census Block Group

Only those census geographies that meet the DAC definition are shown on the map (i.e., only those with an annual median household income (MHI) that is less than 80 percent of the Statewide annual MHI (PRC Section 75005(g)). In addition, those census geographies having an annual MHI that is less than 60 percent of the Statewide annual MHI are shown as "Severely Disadvantaged Communities" (SDAC). The DAC map for Amador County is shown in Figure 4-84.

Figure 4-84 Amador County – Disadvantaged Communities



Source: Cal DWR. Retrieved May 12, 2020

Climate Change and Health Profile Report – Amador County

The 2017 Climate Change and Health Profile Report for Amador County was done by the California Department of Public Health and the University of California-Davis. The report noted that there are special populations in the County.

> ***In 2010, the age-adjusted death rate in Amador County was lower than the state average. Disparities in death rates among race/ethnicity groups highlight how certain populations disproportionately experience health impacts. Within the county, the highest death rate occurred among Whites and the lowest death rate occurred among Hispanics/Latinos.***
>
> ***In 2012, nearly 38% of adults (pooled for the Eastern Counties) reported one or more chronic health conditions including heart disease, diabetes, asthma, severe mental stress, or high blood pressure. In 2012, 11% of adults reported having been diagnosed with asthma (pooled for the Eastern Counties). In 2012 approximately 19% of adults were obese (pooled for the Eastern Counties; statewide average was 25%). In 2012, nearly 17% of residents aged 5 years and older had a mental or physical disability (statewide average was 10%).***
>
> ***In 2005-2010, there was an annual average of 11 heat-related emergency room visits and an age-adjusted rate of 26 emergency room visits per 100,000 persons (the statewide age-adjusted rate was 10 emergency room visits per 100,000 persons).***
>
> ***Among climate-vulnerable groups in 2010 were 1,431 children under the age of 5 years and 7,865 adults aged 65 years and older. In 2010, there were approximately 4,551 people living in nursing homes, dormitories, and other group quarters where institutional authorities would need to provide transportation in the event of emergencies.***
>
> ***Social and demographic factors and inequities affect individual and community vulnerability to the health impacts of climate change. In 2010, 0.1% of households (19) did not have a household member 14 years or older who spoke English proficiently (called linguistically isolated; statewide average was 10%).***
>
> ***In 2010, approximately 13% of adults aged 25 years and older had less than a high school education (statewide average was 19%). In 2010, 8% of the population had incomes below the poverty level (the statewide average was 14%). Seventeen percent of households paid 50% or more of their annual income on rent or a home mortgage (statewide average was 22%). In 2012, approximately 36% (pooled for the Eastern Counties) of low-income residents***

reported they did not have reliable access to a sufficient amount of affordable, nutritious food (called food insecurity; statewide average was 42%).

In 2010, Amador County had approximately 14,318 outdoor workers whose occupation increased their risk of heat illness. In 2010, roughly four percent of households did not own a vehicle that could be used for evacuation (statewide average was 8%).

In 2009, approximately 2% of households were estimated to lack air conditioning, a strategy to counter adverse effects of heat (statewide average was 36%). In 2011, tree canopy, which provides shade and other environmental benefits, was present on 33% of the county's land area (statewide average was 8%).

Development since 2014 Plan

The Amador County Building Department and Planning Department and similar departments for each jurisdiction tracked total building permits issued for new residential, commercial, and industrial structures since 2014 for their jurisdiction. A summary of this development is shown in Table 4-59. Development by known flood and fire hazard areas is shown in Table 4-60. All development in the identified hazard areas, including the 1% annual chance floodplains and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. 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/jurisdictions to identified priority hazards. Permits designated as "Other" represent permits issued for accessory structures or remodeling and repairs to existing structures.

*Table 4-59 Amador County Development 2014-2019 Summary**

Property Use	2015	2016	2017	2018	2019
Residential	28	26	34	33	28
Commercial	1	1	1	0*	3
Industrial	0	0	0	0	0
Other	878	872	1,019	927	1,313
Total	**907**	**899**	**1054**	**960**	**1,344**

Source: Amador County Building Department and Planning Department, *Does not include Buena Vista Casino, which is located in the Moderate FHSZ.

*Table 4-60 Amador County Development in Hazard Zones since 2014**

Property Use	1% Annual Chance Flood	Wildfire Risk Area
Residential	0	72
Commercial	0	4
Industrial	0	0

Property Use	1% Annual Chance Flood	Wildfire Risk Area
Other	0	0
Total	**0**	**76**

Source: Amador County Building Department and Planning Department, *Does not include Buena Vista Casino, which is located in the Moderate FHSZ.

Future Development

Future development in the County is discussed in the sections below.

Population Projections

As indicated in the previous section, Amador County had been steadily growing from 1940 to 2010, with a recent slowing in population growth. Long term forecasts by the California Department of Finance project population growth in Amador County continuing through the 2060. Table 4-61 shows the population projections for the County as a whole through 2060.

Table 4-61 Population Projections for Amador County (incorporated and unincorporated), 2020-2060

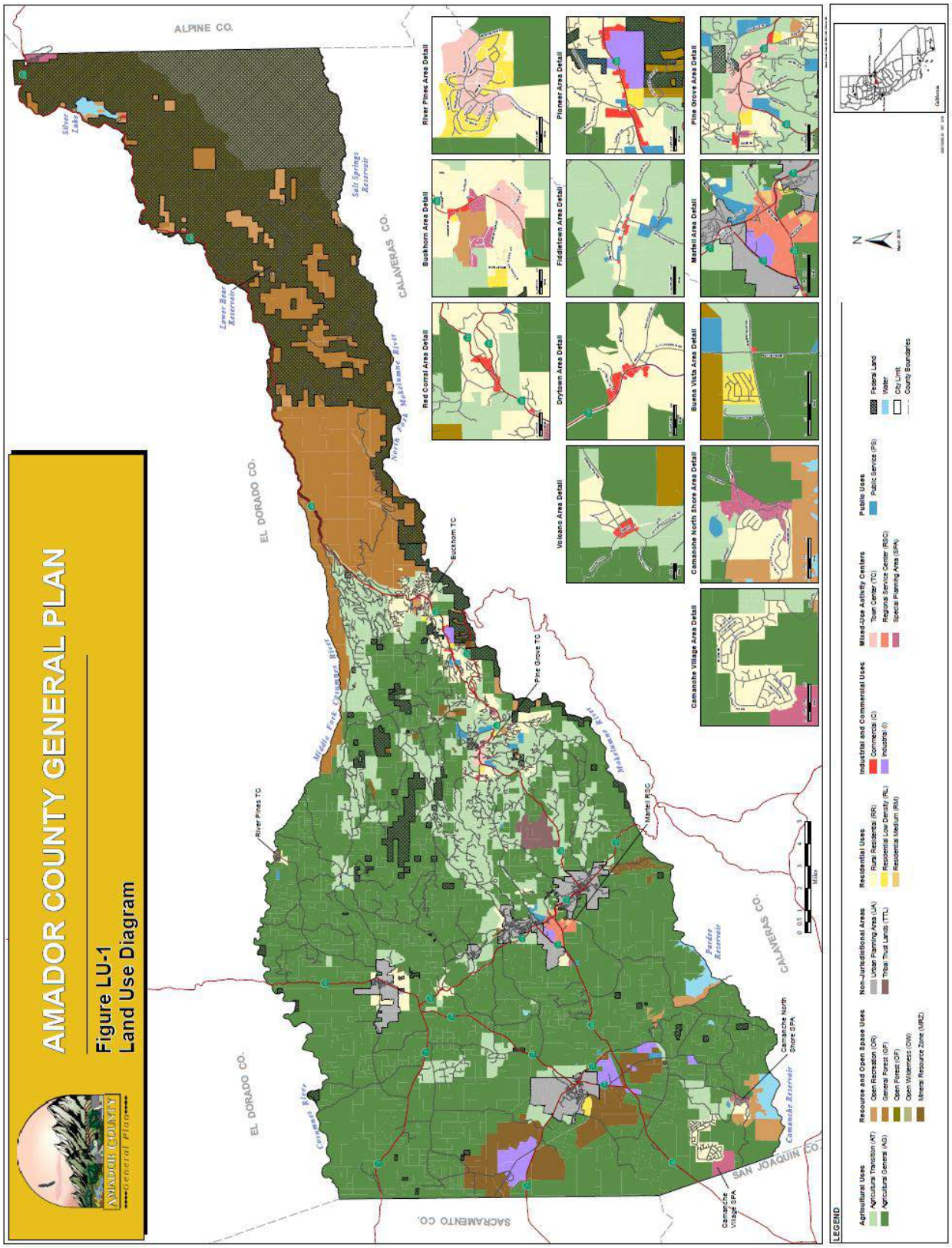
	2020	2030	2040	2050	2060
Amador County	39,352	42,035	44,200	44,829	45,116

Source: 2014-2019 Amador County Housing Element

Future 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 4-85 is sourced from this section.

Figure 4-85 Amador County General Plan Land Use



Source: Amador County 2016 General Plan Land Use Element

Future Development Area Analysis

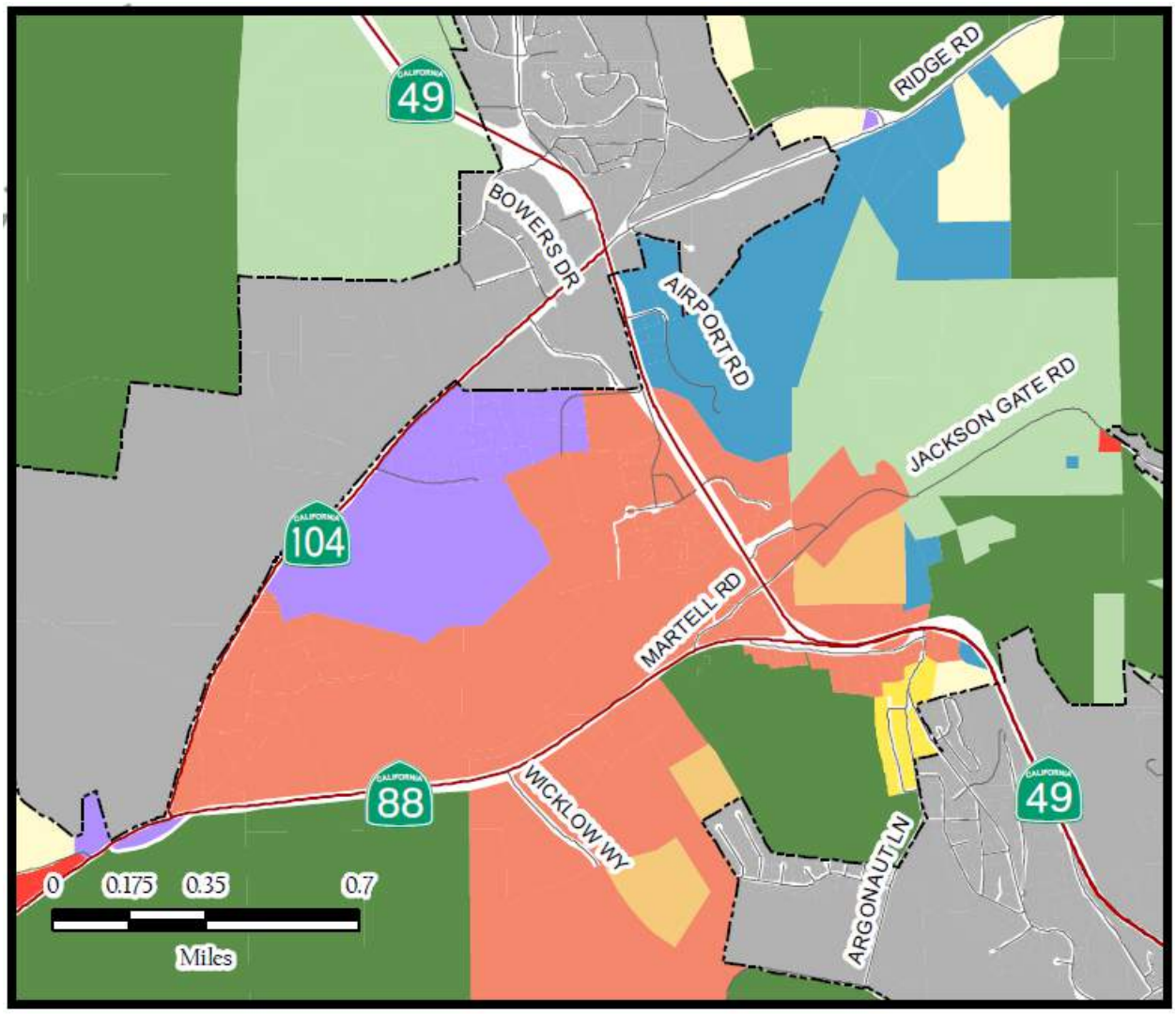
The Amador County 2016 General Plan included a discussion of future development areas in the County. The County reviewed these areas for this LHMP Update, and determined that 6 areas were most likely to be developed over the next five years covered by this LHMP Update:

- **Martell Regional Services Center** (shown on Figure 4-86 – The General Plan proposes one RSC, to be located in the community of Martell. The Martell RSC encompasses approximately 679 acres of land located near the intersection of SR 49, SR 88, and SR 104 near Westover Field. This RSC is planned to include a mix of retail commercial uses, industrial uses, and higher-density housing, and the designation of this area as an RSC is intended to encourage more creative future development, including potential for mixed-use development. A total of approximately 2,500,000 square feet of commercial and 1,000,000 square feet of industrial uses (compared to about 1,080,000 square feet of existing commercial and industrial uses) can be accommodated within the Martell RSC. About 678 acres are available for these uses (approximately 390 acres of which are currently vacant), developed at an overall intensity of 5,100 square feet per acre (0 .12 FAR), although any individual site could develop at up to 0.5 FAR. The Martell RSC can accommodate 1,200 to 3,000 housing units over a 20-year period, making it the largest future housing location in the unincorporated county. Densities range from 7 to 18 units per acre.
- **Pine Grove Town Center** (shown on Figure 4-87) – The Pine Grove TC includes approximately 360 acres of land in Pine Grove, centered along SR 88 between Ridge Road and Tabeaud Road. Land uses along an approximately 1-mile stretch of the highway include commercial uses such as individual retail stores, restaurants, small service and office buildings, and smaller strip shopping centers; some low density residential fronting the highway, some public uses such as government buildings, churches, a fire station, and a school; and some light industrial businesses. The Pine Grove TC will provide a "downtown" for the upcountry area, offering a central site where services will be available to upcountry residents.
- **Buckhorn Town Center** (shown on Figure 4-88) – The Buckhorn TC covers approximately 140 acres in Buckhorn, centered around SR 88 east of Buckhorn Ridge Road (near the Mace Meadow Golf Club). Similar to Pine Grove, land uses in Buckhorn are spread out along SR 88, although fewer residences are located adjacent to the highway. Commercial and light industrial uses such as gas stations, small markets, stores, restaurants, and a storage facility are located along the south side of the highway. In several places, stands of trees separate parking lots from small commercial centers. The terrain along the north side of the highway is slightly higher in most places than to the south. A small commercial office complex and a few residences are located to the north, although they are generally set back further from the highway than uses on the south side. Buckhorn will also be a "downtown" area offering local services and employment opportunities for residents, as well as a stopping point for tourists traveling through to Kirkwood and Lake Tahoe.
- **River Pines Town Center** (shown on Figure 4-89) – The River Pines TC includes approximately 35 acres in River Pines, extending along Shenandoah Road to the Cosumnes River. The community of River Pines is centered along Shenandoah Road as it bends around a hill on the south side of the road. Along the stretch of road that will comprise the core of the town center, land uses include primarily single-family residential units on both sides of the road, with some limited pockets of commercial. The area north of the road is generally more level than the land to the south, so most concentrated future development will likely occur there. A pedestrian-scaled rural center will be developed as a cluster or several connected clusters located primarily along the north side of Shenandoah Road. The center will

include commercial services and public uses for nearby residents, mixed with traveler services supporting the region's vineyards, as well as new homes mixed among other uses and apartments built above ground-level retail and commercial. Sidewalks, landscaping, and building styles will connect the various uses. Buildings should be designed within the character of the Shenandoah Valley, consistent with the County's commercial design guidelines. Similar to the other town centers, pedestrian access will be a priority, and the auto oriented character of the community will be de-emphasized. Development techniques appropriate for River Pines include placing buildings together in groups, fronting buildings directly to the street, locating parking lots behind buildings, sharing driveways to protect pedestrian access, and using ample landscaping and berms to establish and separate public and private spaces. The River Pines TC accommodates up to 100 housing units and approximately 20,000 square feet of tourist-supporting retail and service uses. In 2010, there were about 65 housing units and about 7,000 square feet of commercial space in River Pines.

- **Camanche Village Special Planning Area** (shown on Figure 4-90) – The Camanche Village SPA encompasses approximately 500 acres of land on the western edge of the Camanche community. A specific plan will be required prior to development of this area. The Camanche Village SPA may accommodate up to 1,000 residential units. Because this SPA is located adjacent to agricultural parcels in both Amador and San Joaquin Counties, future development densities and types shall provide a visual transition between agricultural lands and the developed portions of the Camanche Village SPA.
- **Camanche North Shore Special Planning Area** (shown on Figure 4-91) – The Camanche North Shore (Unit 6) SPA encompasses approximately 105 acres and comprises Lots 53 through 142, 217 through 254, and 367 through 388 as shown on that certain subdivision recorded in Book 3 of Subdivisions at Page 53, Official Records of Amador County. These lots are currently zoned "R2," "PD," "R1," "C1," or "H." Future land uses and designations shall remain a combination of these zone districts not to exceed an aggregate total of 600 residential units and 35,000 sq. ft. of commercial and service uses to provide for neighborhood commercial and tourism based services, such as convenience stores, service stations, drugstore, restaurants, boat or other outdoor recreation services, hotel, motel, and community facilities.

Figure 4-86 Martell Regional Service Center

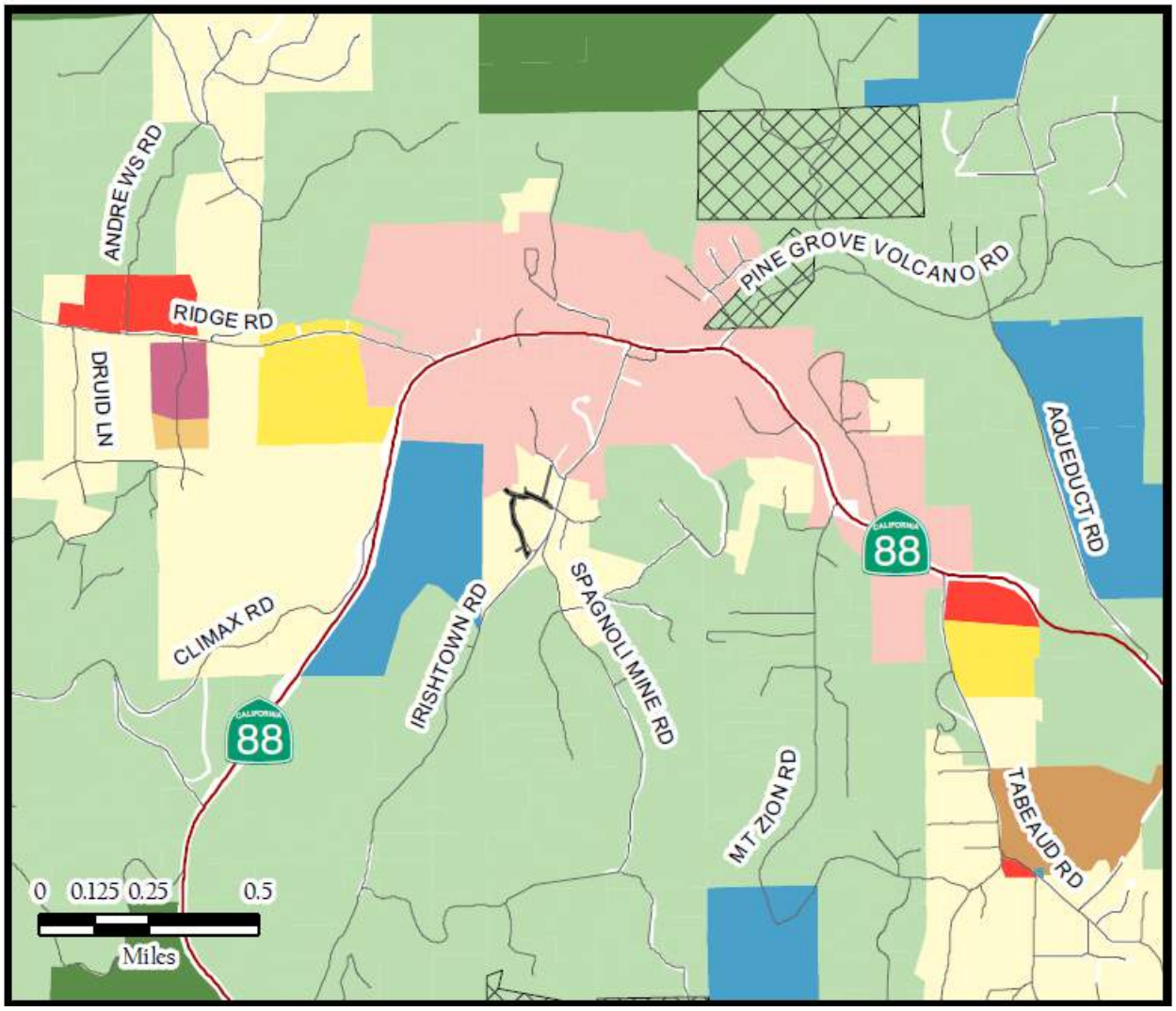


Mixed-Use Activity Centers

- Town Center (TC)
- Regional Service Center (RSC)
- Special Planning Area (SPA)

Source: Amador County 2016 General Plan

Figure 4-87 Pine Grove Town Center

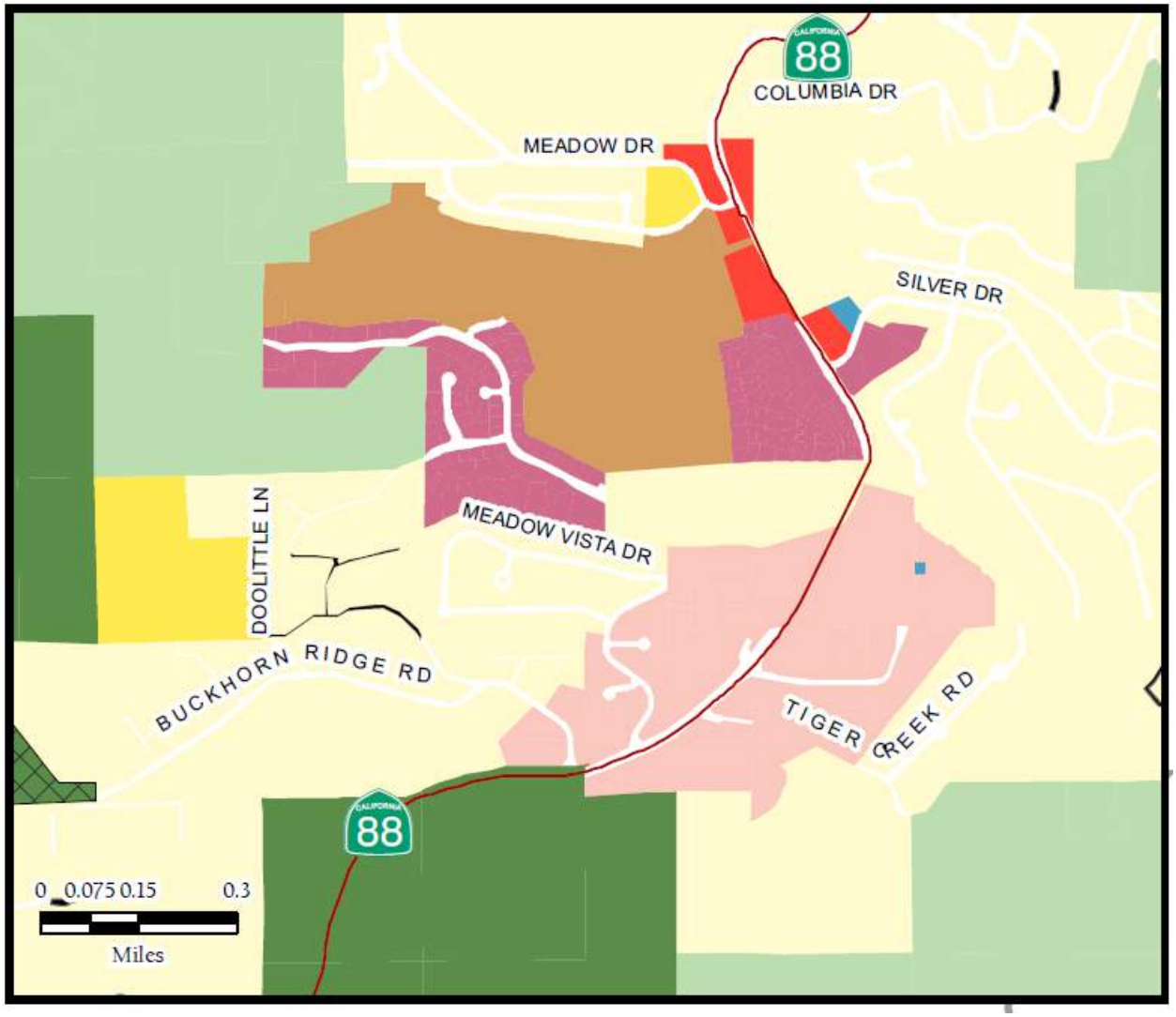


Mixed-Use Activity Centers

- Town Center (TC)
- Regional Service Center (RSC)
- Special Planning Area (SPA)

Source: Amador County 2016 General Plan

Figure 4-88 Buckhorn Town Center

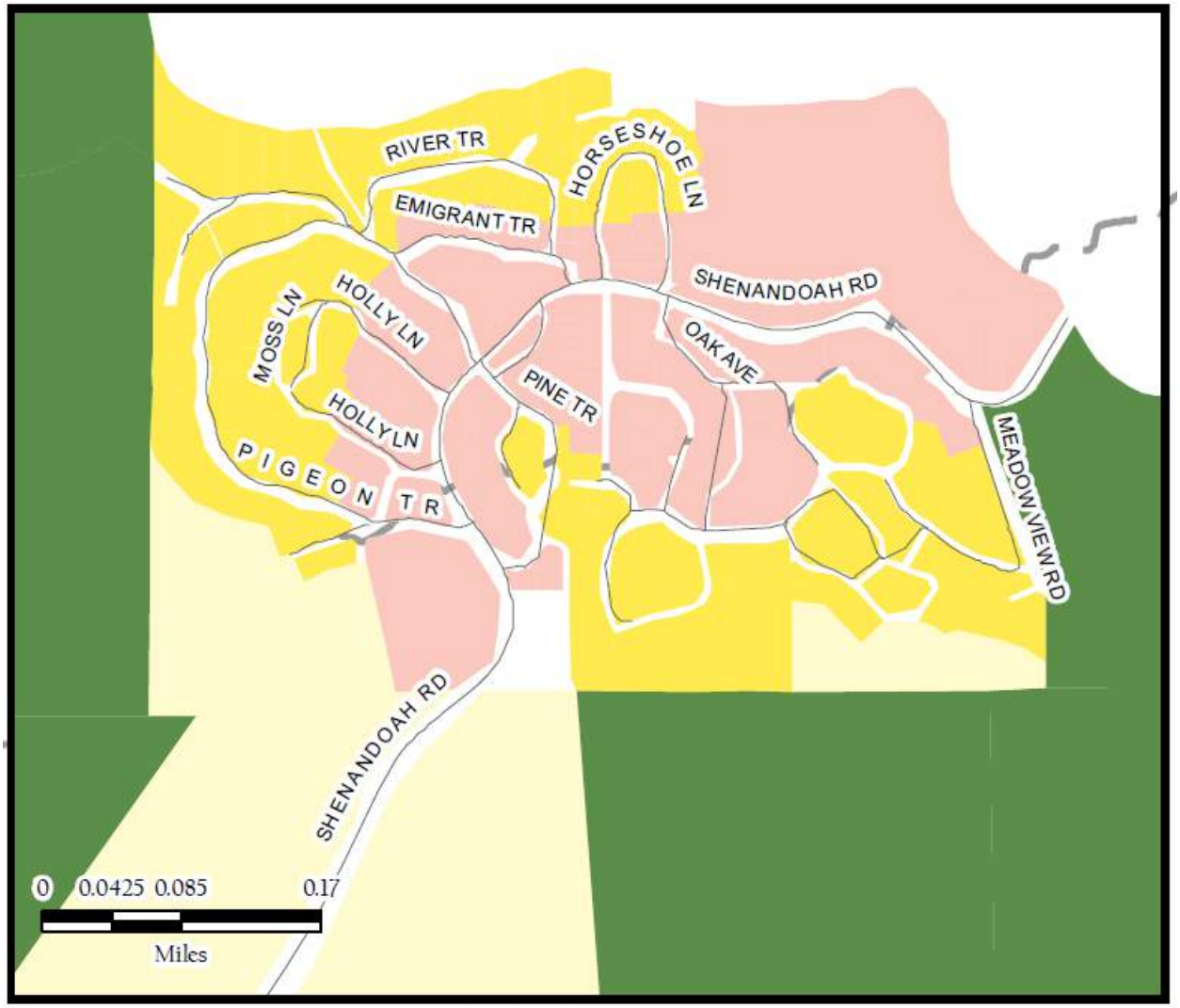


Mixed-Use Activity Centers

- Town Center (TC)
- Regional Service Center (RSC)
- Special Planning Area (SPA)

Source: Amador County 2016 General Plan

Figure 4-89 River Pines Town Center



Mixed-Use Activity Centers

- Town Center (TC)
- Regional Service Center (RSC)
- Special Planning Area (SPA)

Source: Amador County 2016 General Plan

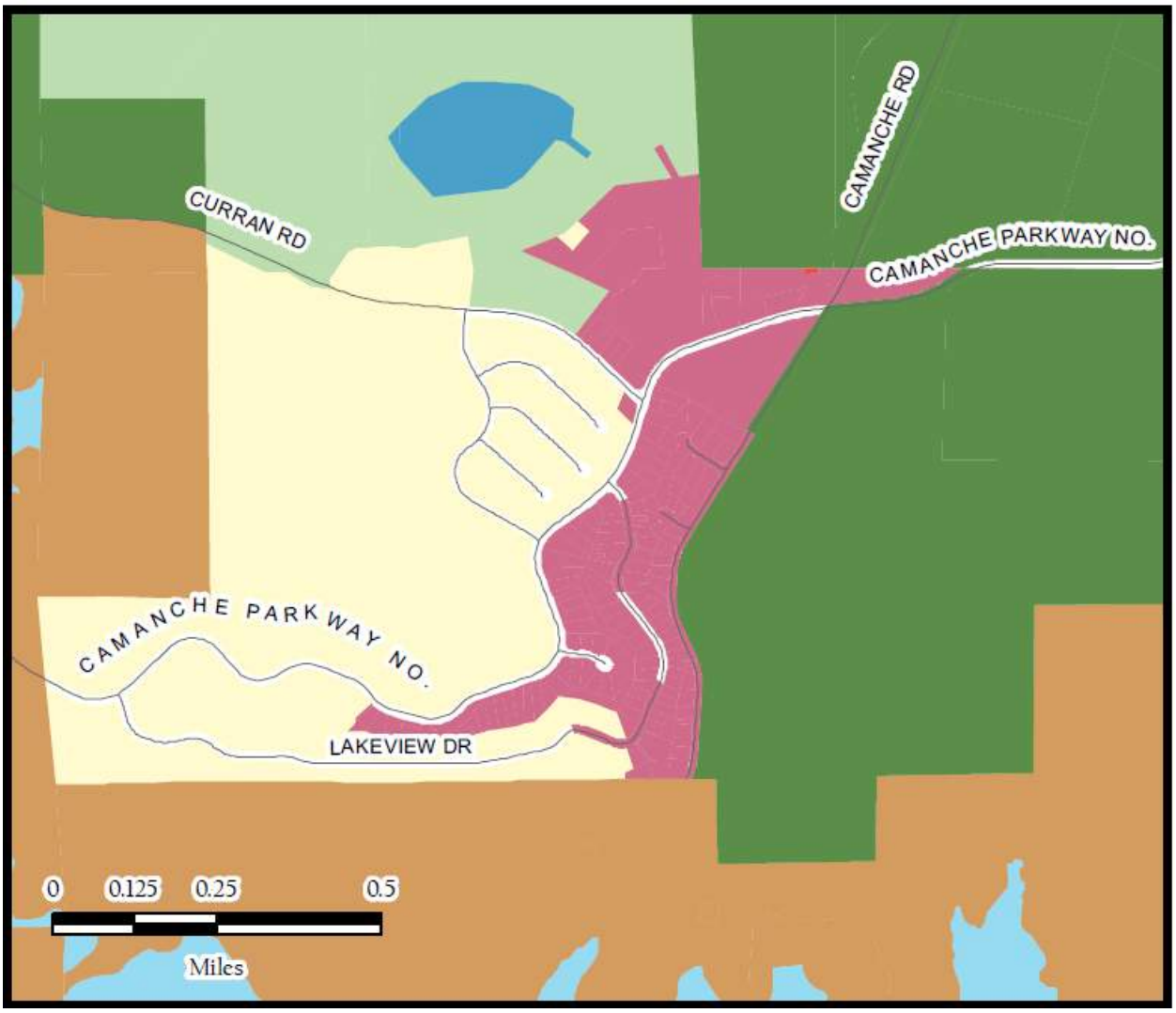
Figure 4-90 Camanche Village Special Planning Area

Mixed-Use Activity Centers

- Town Center (TC)
- Regional Service Center (RSC)
- Special Planning Area (SPA)

Source: Amador County 2016 General Plan

Figure 4-91 Camanche North Shore Special Planning Area



Source: Amador County 2016 General Plan

Mixed-Use Activity Centers

- Town Center (TC)
- Regional Service Center (RSC)
- Special Planning Area (SPA)

Future Development GIS Analysis

The above areas were provided by Amador County in mapped GIS format. Using GIS, the following methodology was used in determining parcel counts and values associated with future development in the

unincorporated Amador County Planning Area. In addition to the 6 areas noted above, the County provided a GIS layer of residential building sites that are likely to see development in the next 5 years. Amador County's 12/31/2018 Parcel/Assessor's data and data from the County planning department were used as the basis for the unincorporated County's inventory of parcels and acres of future development areas. The Amador County Planning Department provided a table containing the assessor parcel numbers (APNs) for the 2,410 parcels representing the six different future development projects or areas. Using the GIS parcel spatial file and the APNs, the six future development projects were mapped. These areas can be seen on Figure 4-92 and detailed in Table 4-62.

Figure 4-92 Amador County Planning Area – Future Development Areas

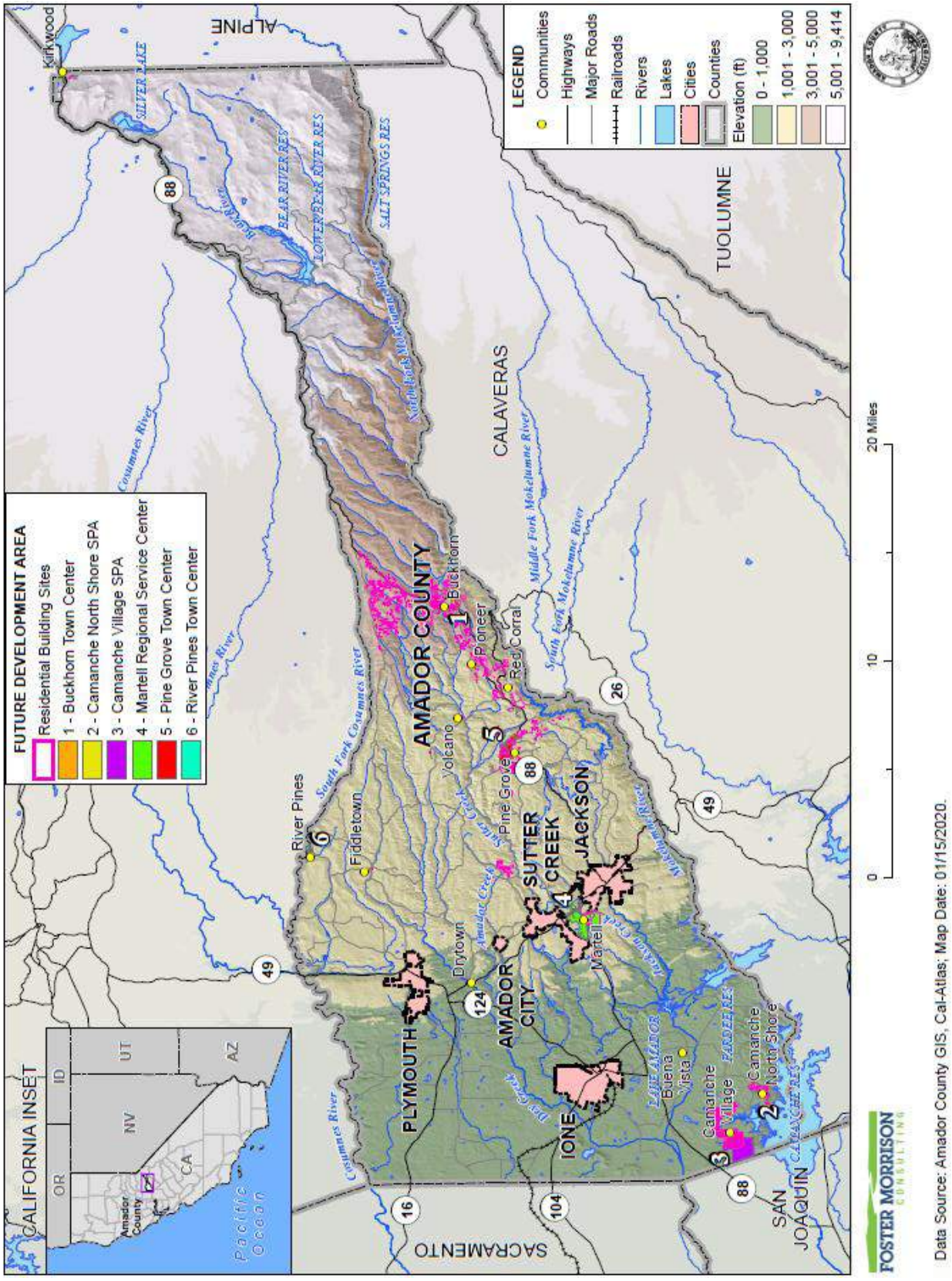


Table 4-62 Unincorporated Amador County – Future Development Area Parcel and Acre Counts

Future Development	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Buckhorn Town Center	79	71	8	120.23	105.70	14.53
Camanche North Shore SPA	183	124	59	130.11	58.68	71.43
Camanche Village Special Planning Area	1	1		501.05	501.05	
Martell Regional Service Center	148	101	47	700.13	213.08	487.05
Pine Grove Town Center	211	166	45	366.47	194.89	171.59
River Pines Town Center	134	94	40	58.65	49.37	9.28
Amador County - Other Areas	1,654	121	1,533	2,802.29	259.78	2,542.51
Grand Total	**2,410**	**678**	**1,732**	**4,678.94**	**1,382.56**	**3,296.38**

Source: Amador County GIS

4.3.2. Amador County Vulnerability to Specific Hazards

The Disaster Mitigation Act regulations require that the HMPC evaluate the risks associated with each of the hazards identified in the planning process. This section summarizes the possible impacts and quantifies, where data permits, the Amador County Planning Area's vulnerability to each of the hazards identified as a priority hazard in Section 4.2.19 Natural Hazards Summary.

Defining Significance (Priority) of a Hazard

Defining the significance or priority of a hazard to a community is based on a subjective analysis of several factors. This analysis is used to focus and prioritize hazards and associated mitigation measures for this LHMP. These factors include the following:

- **Past Occurrences**: Frequency, extent, and magnitude of historic hazard events.
- **Likelihood of Future Occurrences**: Based on past hazard events.
- **Ability to Reduce Losses through Implementation of Mitigation Measures**: This looks at both the ability to mitigate the risk of future occurrences as well as the ability to mitigate the vulnerability of the Planning Area to a given hazard event.

Based on information developed for the hazard profiles, the priority hazards evaluated further as part of this vulnerability assessment include:

- Agricultural Hazards:
- Severe Weather/Insect - Pests
- Avalanche
- Climate Change
- Dam Failure
- Drought & Water shortage
- Earthquake (large damaging/small)
- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- Landslide, Mudslide, Debris Flow
- Levee Failure
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (Hail, Lightning)
- Severe Weather: High Winds and Tornadoes
- Severe Weather: Winter Storms and Freeze
- Wildfire

An estimate of the vulnerability of the Amador County Planning Area to each identified priority hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. 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 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.

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 buildings 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 community facilities, historic structures, and valued natural resources. Together, this information conveys the impact, or vulnerability, of that area to that hazard.

The HMPC identified five hazards in the 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, landslide, and wildfire. The vulnerability of the flood (1%/0.2% annual chance), landslide, and wildfire hazards were analyzed using GIS and County parcel and assessor data.

The HMPC used FEMA's loss estimation software, HAZUS-MH, to analyze the County's vulnerability to earthquakes.

For dam failure, flood (1%/0.2% annual chance), landslide, and wildfire, the HMPC inventoried the following for each community, to the extent possible, to quantify vulnerability in identified hazard areas:

- General hazard-related impacts, including impacts to life, safety, and health
- Values at risk (i.e., types, numbers, and value of land and improvements)
- Population at risk
- Critical facilities at risk
- Overall community impact
- Future development/development trends within the identified hazard area

The vulnerability and potential impacts from 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
- Levee Failure
- Severe Weather: Heavy Rain and Storms
- Severe Weather: High Winds and Tornadoes
- Severe Weather: Winter Storm and Freeze

The vulnerability sections below are presented alphabetically.

4.3.3. Agricultural Hazards: Severe Weather/Insects/Pests Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Given the importance of agriculture to Amador County, agricultural hazards continue to be an ongoing concern. The primary causes of agricultural losses are severe weather events, such as drought, freeze, and extreme heat; insect/pest infestations; and noxious weeds. According to the County, agricultural losses occur on an annual basis throughout the County and are usually associated with these types of events.

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.

In addition to threats to agriculture from weather and other natural hazard events, agriculture in the County is at risk from insects, pests, and noxious weeds. Establishment of an invasive species would be detrimental to the agricultural industry of Amador County because of product losses, stringent quarantine regulations, loss of exporting opportunities and increased treatment costs. The introduction of exotic plants influences wildlife by displacing forage species, modifying habitat structure—such as changing grassland to a forb-dominated community—or changing species interactions within the ecosystem. In addition, invasive plants:

- Increase wildfire potential
- Reduce water resources
- Accelerate erosion and flooding
- Threaten wildlife

- Degrade rangeland, cropland, and timberland
- Diminish outdoor recreation opportunities.

Invasive plants cost California $82 million every year (2008 California Invasive Plan Council). Estimates on exact yearly losses in Amador County varies and was not available for the County. Due to the high economic value of crops in the County, invasive species have the ability to cause immense financial harm.

In an effort to protect Amador County's $30 million agriculture industry from invasive species, the Agricultural Commissioner, working in conjunction with the USDA and the CDFA has implemented defensive programs targeting invasive species.

The first line of defense is an extensive program to prevent the introduction of plant, animal, insect, and disease pests that may be introduced through the movement of legal and illegal trade. This program includes State/Federal inspections at shipping ports, airports, and highway border stations. On the local level, the Agricultural Commissioner performs inspections at high risk shipping and receiving locations.

The second line of defense includes early detection of invasive insect species through surveillance programs conducted by the Agricultural Commissioner. Early detection and the ability to respond rapidly are critical for preventing wide-scale invasion of many organisms. As a new invasive species spreads, the cost of control rises, the feasibility of eradication falls, and the potential for economic and environmental impacts increases.

Future Development

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. However, the HMPC did note that with additional development in the County, there may be additional competition for water resources thus possibly impacting the agricultural industry and the Amador County Planning Area.

4.3.4. Avalanche Vulnerability Assessment

Likelihood of Future Occurrence—Likely
Vulnerability—Medium

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.

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. 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.

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.

Future Development

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.

4.3.5. Climate Change Vulnerability Assessment

Likelihood of Future Occurrence—Likely
Vulnerability—Medium

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. The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change.

The APG: Defining Local and Regional Impacts focuses on understanding the ways in which climate change can affect a community. According to this APG, climate change impacts (temperature, precipitation, sea level rise, ocean acidification, and wind) affect a wide range of community structures, functions and populations. These impacts further defined by regional and local characteristics are discussed by secondary impacts and seven sectors found in local communities: Public Health, Socioeconomic, and equity impacts; Ocean and Coastal Resources; Water Management; Forest and Rangeland; Biodiversity and Habitat; Agriculture; and Infrastructure.

Amador County Climate Change Impacts

The APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra region in which the Amador County Planning Area is part of:

- Temperature increases
- Decreased precipitation
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

California's APG: Understanding Regional Characteristics provides input on adaptation considerations for the North Sierra Region. As detailed in this guide, climate change has the potential to disrupt many features that characterize the region, including ecosystems health, snowpack, and the tourist economy. Specific regional impacts include the following:

Ecosystems and Biodiversity. Exacerbated by new development in the region, climate change can cause habitats to shift, creating conditions that stress ecosystems and endemic species. Timber practices, also compounded by climate change, has resulted in forests with trees of similar age, lacking snags and underbrush, further reducing the diversity of the habitat. The Sierra's aquatic and riparian systems are one of the most altered habitats in the region through past development and water diversion activities. Continued changes in hydrologic flow regimes and increased temperatures will further stress these systems regional habitats supporting many special-status species.

Snowpack and Flooding. Climate-related decrease in snowpack can have significant consequences on the areas that depend on this water. In addition, a decrease in snowpack can increase impacts from flooding, landslide, and loss of economic base related to a drop in tourism. Recreation and tourism are likely to suffer due to lower water levels in waterways and reservoirs and declining snowpack. This can result in fewer ski days and impacts to hotels, restaurants, and second home development. Increases in flood events can further stress the region and increase flood related impacts and damages.

Wildfire. The North Sierra Region is already challenged through past fire suppression combined with the large number of structures that have been built throughout the WUI areas. Climate change is projected to result in large increases in wildfire frequency and size which will further compound the wildfire problem. In addition, potential impacts following fires, such as heavy rains causing landslide and erosion in post-burn areas can have significant consequences on waterways and entire watersheds.

Public Health, Socioeconomic, and Equity Impact. The foothills of the North Sierra Region show higher ozone levels and increased temperatures causing vulnerable populations to be at greater risk to these issues. In addition to the elderly population found in this region, people who work and play outdoors are also vulnerable.

In addition to the APG, a report from the Proceedings of the National Academy of Sciences (PNAS) states that some of the recent fire impacts may have been attributed to climate change. The PNAS report posits that climate influences wildfire potential primarily by modulating fuel abundance in fuel-limited environments, and by modulating fuel aridity in flammability-limited environments. Increased forest fire activity across the western United States in recent decades has contributed to widespread forest mortality, carbon emissions, periods of degraded air quality, and substantial fire suppression expenditures. Those most vulnerable to high levels of ozone and particulate matter include people who work or spend a lot of time outdoors, such as residents of this region who are employees of the tourist industry. Households eligible for energy utility financial assistance programs are an indicator of potential impacts. These households may be more at risk of not using cooling appliances, such as air conditioning, due to associated energy costs.

Future Development

Amador County in general 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. For example, sea level rise may disrupt economic activity and housing in coastal communities, resulting in migration to inland urban areas. Other interior western states may experience an exodus of population due to challenges in adapting to heat even more extreme than that which is projected

to occur here. While there are currently no formal studies of specific migration patterns expected to impact the Amador 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.

Climate change, coupled with shifting demographics and market conditions, could impact both the location of desired developments and the nature of development. Demand may increase for smaller dwellings that are less resource intensive, more energy efficient, easier to maintain and can be more readily adapted or even moved in response to changing conditions. Compact, mixed-use and infill developments that can help residents avoid long commutes and vulnerabilities associated with the transportation system will likely continue to grow in popularity. The value of open space and pressure to preserve it will likely increase, due in part to its restorative, recreational, environmental and habitat benefits but also for its ability to sequester carbon, help mitigate the accumulation of greenhouse gas in the atmosphere and slow down the global warming trend. Higher flood risks, especially if coupled with increased federal flood insurance rates, may decrease market demand for housing and other types of development in floodplains, while increased risk of wildfires may do the same for new developments in the urban-wildland interface. Flood risks may also inspire new development and building codes that elevate structures while maintaining streetscapes and neighborhood characteristics.

Climate change will stress water resources. Water is an issue in every region, but the nature of the potential impacts varies. Drought, related to reduced precipitation, increased evaporation, and increased water loss from plants, is an important issue in many U.S. regions, especially in the West. Floods, water quality problems, and impacts on aquatic ecosystems and species are likely to be amplified by climate change. Declines in mountain snowpack are important in Amador County the Sierra Nevada Mountains and across the state, where snowpack provides vital natural water storage and supply. The ability to secure and provide water for new development requires on-going monitoring and assurances. It is recommended that the ability to provide a reliable water supply from the appropriate water purveyor, continue to be in the conditions for project approval, and such assurances shall be verified and in place prior to issuing building permits.

Similarly, protecting and enhancing water supply will also need to be addressed. California's Sustainable Groundwater Management Act (SGMA) will contribute to addressing groundwater and aquifer recharge needs. Good groundwater management will provide a buffer against drought and climate change, and contribute to reliable water supplies regardless of weather patterns. California depends on groundwater for a major portion of its annual water supply, and sustainable groundwater management is essential to a reliable and resilient water system. Protection of critical recharge areas should be addressed across the County in the respective Groundwater Management Plans. Further, these plans should include provisions that guide development or curtail development in areas that would harm or compromise recharge areas.

Climate change will affect transportation. The transportation network is vital to the County and the region's economy, safety, and quality of life. While it is widely recognized that emissions from transportation have impacts on climate change, climate will also likely have significant impacts on transportation infrastructure and operations Examples of specific types of impacts include softening of asphalt roads and warping of railroad rails; damage to roads; flooding of roadways, rail routes, and airports from extreme events; and interruptions to flight plans due to severe weather. Climate change impacts considered in the plan include: extreme temperatures; increased precipitation, runoff and flooding;

increased wildfires; and landslides. Although landslides are not a direct result of climate change, these events are expected to increase in frequency due to increased rainfall, runoff, and wildfire. These events have the potential to cause injuries or fatalities, environmental damage, property damage, infrastructure damage, and interruption of operations. During flood events, these trails serve as secondary transportation facilities when roadways are blocked or otherwise impassible. During Hurricane Sandy, bicycles were one of the primary modes used to deliver food and water to residents stranded in their homes due to flood. Including dual or multi-purpose facilities and amenities as part of all new development provides not just desirable community amenities but critical infrastructure for climate resiliency.

Climate change will affect land uses and planning. Climate change coupled with shifting demographics and market conditions, could impact both the location of desired developments and the nature of development. Demand may increase for smaller dwellings that are less resource intensive, more energy efficient, easier to maintain and can be more readily adapted or even moved in response to changing conditions. Compact, mixed-use and infill developments that can help residents avoid long commutes and vulnerabilities associated with the transportation system will likely continue to grow in popularity. The value of open space, urban greening, green infrastructure, tree canopy expansion and pressure to preserve it will likely increase, due in part to its restorative, recreational, environmental, and habitat, and physical and mental health benefits but also for its ability to sequester carbon and cool the surrounding environment.

Climate change will affect Utilities. California is already experiencing impacts from climate change such as an increased number of wildfires, sea level rise and severe drought. Utility efforts to deal with these impacts range from emergency and risk management protocols to new standards for infrastructure design and new resource management techniques. Utilities are just beginning to build additional resilience and redundancy into their infrastructure investments from a climate adaptation perspective, but have been doing so from an overall safety and reliability perspective for decades. Significant efforts are also being made in those areas that overlap with climate change mitigation such as diversification of resources, specifically the addition of more renewables to the portfolio mix, as well as implementation of demand response efforts to curb peak demand. Efforts are also under way to upgrade the distribution grid infrastructure, which should add significant resilience to the grid as well. Next, they will issue a guidance document that expands upon the vulnerability assessments phase and includes plans for resilience solutions including cost/benefit analysis methodologies. The outcomes of this work will help to inform next steps on how infrastructure, the grid and other related operations will be modified to address climate change. New development will have to adapt and incorporate these new approaches as they evolve. Existing and new development will be affected from impacts that includes not only diminished capacity from all of the utility assets from generation to transmission and distribution, but also the cost consequences resulting from prevention, replacement, outage, and energy loss. These have the potential for greatly impacting not just residential development but commercial and industrial and all utility users.

Addressing Urban Heat Islands and Heat Events. New development will contribute to urban heat island (UHI) impacts and will need to incorporate urban greening methods into all aspects of development; interior and exterior of buildings, surrounding environment and beyond. New development will need to reduce its impacts to the overall UHI impacts affecting the county and surrounding region. On-going and expanding heat wave awareness and assistance will also affect new development. During heat waves in Amador County, a heat alert is issued, and news organizations are provided with tips on how vulnerable people can protect themselves. Programs used by health departments to engage with thousands of block captains to

check on elderly and other vulnerable residents, along with public cooling places extending their hours, or local businesses welcoming residents into their businesses for purposes of staying cool are examples of programs and services that will be necessary. Other programs to consider that could further involve hospitals and clinics are operating a "heatline" with nurses or other healthcare professionals ready to assist callers with heat-related health problems. In addition, continued funding for weatherization, reduced utility rates and similar programs that offers assistance to elderly, low-income residents to install roof insulation, solar, trees and cool surfaces to save energy and lower indoor temperatures.

4.3.6. Dam Failure Vulnerability Assessment

Likelihood of Future Occurrence—Unlikely
Vulnerability—High

Dam failure flooding can occur as the result of partial or complete collapse of an impoundment. Dam failures often result from prolonged rainfall and flooding. 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 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. Based on the risk assessment, it is apparent that a major dam failure could have a devastating impact on the Planning Area. Dam failure flooding presents a threat to life and property, including buildings, their contents, and their use. Large flood events can affect crops and livestock as well as lifeline critical utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, and the local and regional economies.

Dams of Concern

As detailed in Section 4.2.10, the County is most vulnerable to the following 15 dams:

Extremely High Hazard

- Pardee
- Salt Springs

High Hazard

- CSP Mule Creek
- Henderson
- Jackson Creek
- Jeff Davis – Calaveras County
- Lake Tabeaud*
- Lower Bear River*

- Middle Fork – Calaveras County
- Preston
- Silver Lake
- Sly Park – El Dorado County
- Tiger Creek Afterbay
- Tiger Creek Regulator
- Upper Blue Lake – Alpine County

*These dams did not have mapped dam inundation areas

Available dam inundation maps show areas that lie within the potential dam failure inundation areas, as shown in Figure 4-93.

Values at Risk

Dam inundation areas were available for 13 of the 15 dams of concern, as obtained from Cal DWR, DSOD and Cal OES, were used as the basis of this dam inundation analysis. Dams were grouped by hazard rating in order to perform analysis. The depth of flooding due to the failure of these dams is unknown.

Methodology and Results

The same methodology was used for both the extremely high hazard and high hazard dam analysis. Amador County's 12/31/2018 Parcel/Assessor Data, obtained from Amador County, were used for the County inventory of parcels and values. GIS was used to create a centroid, or point representing the center of the parcel polygon. The dam inundation areas, obtained from Cal OES and Cal DWR DSOD, were then overlaid on the parcel layer. For the purposes of this analysis, if the dam inundation layer intersected a parcel centroid, the entire parcel was considered to be in the dam inundation area. The parcels were segregated and analyzed in this fashion for the Amador County Planning Area. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessors database and the GIS parcel layer.

Breakdowns by land use by dam inundation area for the incorporated jurisdictions can be found in their respective annexes to this LHMP Update. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the dam inundation areas due primarily to Proposition 13 and to a lesser extent properties falling under the Williamson Act.

Extremely High Hazard Dams

Dam analysis was performed for the mapped extremely high hazard dams in the County with available inundation data. This includes Pardee and Salt Springs. Figure 4-93 shows the dam inundation areas of these dams of concern for the County. The depth of flooding due to the failure of a dam is unknown. Table 4-63 the total parcel counts, improved parcel counts, their improved structure and land values in each extremely high hazard dam inundation areas. Table 4-64 breaks down Table 4-63 to show the property uses affected by each dam inundation area.

Figure 4-93 Amador County – Extremely High Hazard Dam Inundation Areas

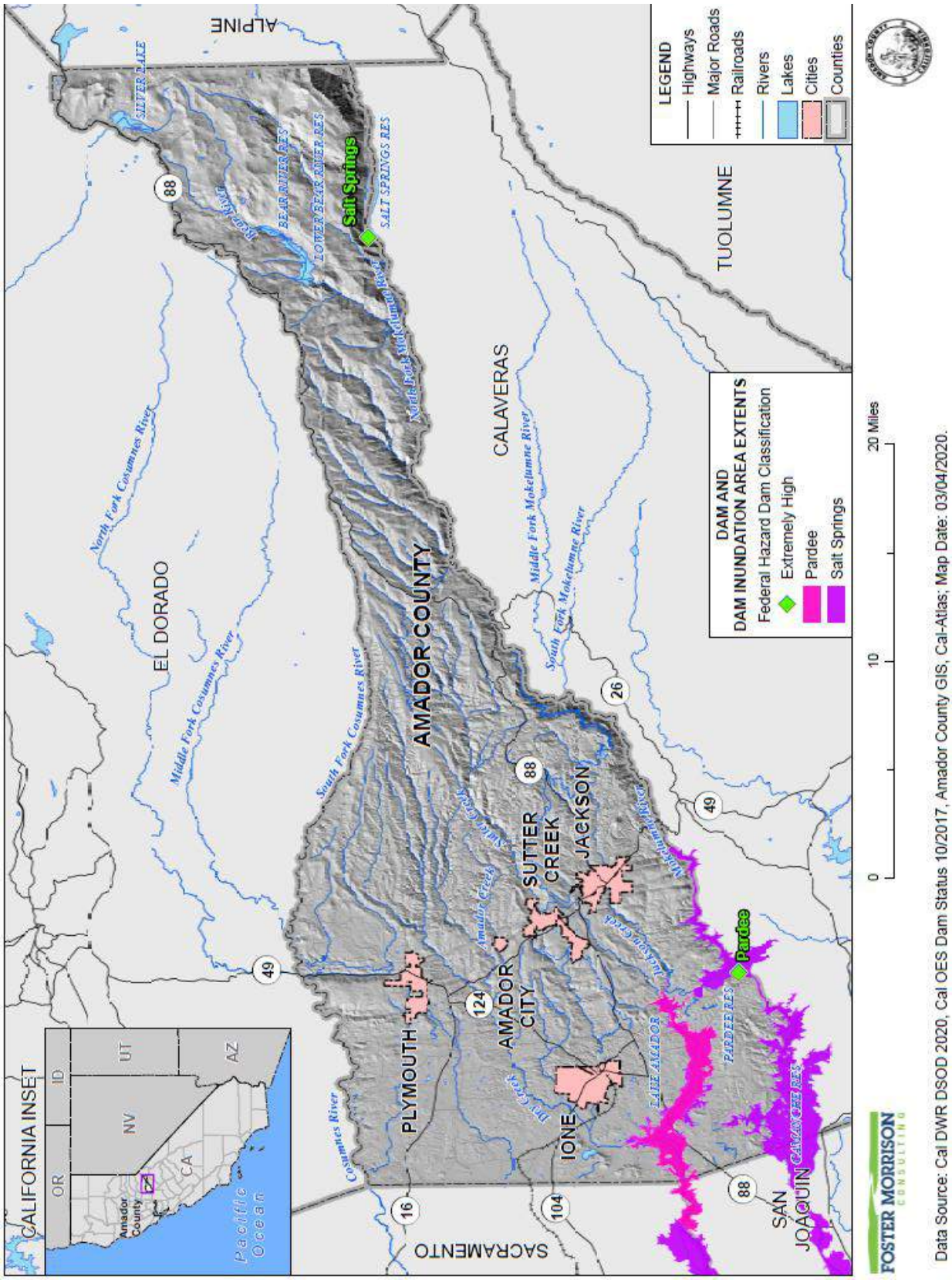


Table 4-63 Amador County Planning Area – Summary Count and Value of Parcels in the Extremely High Hazard Dam Inundation Areas

Extremely High Dam Inundation Areas	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Pardee	150	108	$13,407,786	$12,476,932	$9,657,975	$35,542,693
Salt Springs	145	75	$12,573,645	$11,961,405	$9,467,639	$34,002,689

Source: Amador County 12/31/2018 Parcel/Assessor's Data, Cal OES

Table 4-64 Amador County Planning Area – Count and Value of Parcels in the Extremely High Hazard Dam Inundation Areas by Property Use

Extremely High Dam Inundation Areas / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Pardee						
Agricultural	39	31	$6,919,009	$6,006,184	$6,006,184	$18,931,377
Commercial	2	2	$352,857	$671,134	$671,134	$1,695,125
Industrial	1	1	$291,958	$80,852	$121,278	$494,088
Miscellaneous	20	0	$0	$0	$0	$0
Residential	87	74	$5,843,962	$5,718,762	$2,859,379	$14,422,103
Unknown	1	0	$0	$0	$0	$0
Total	**150**	**108**	**$13,407,786**	**$12,476,932**	**$9,657,975**	**$35,542,693**
Salt Springs						
Agricultural	45	34	$7,655,640	$6,766,582	$6,766,582	$21,188,804
Commercial	1	1	$117,362	$45,591	$45,591	$208,544
Industrial	1	1	$291,958	$80,852	$121,278	$494,088
Miscellaneous	45	0	$0	$0	$0	$0
Residential	50	39	$4,508,685	$5,068,380	$2,534,188	$12,111,253
Unknown	3	0	$0	$0	$0	$0
Total	**145**	**75**	**$12,573,645**	**$11,961,405**	**$9,467,639**	**$34,002,689**

Source: Amador County 12/31/2018 Parcel/Assessor's Data, Cal OES

High Hazard Dams

Dam analysis was performed for the mapped high hazard dams in the County with available inundation data. This includes CSP Mule Creek, Henderson, Jackson Creek, Jeff Davis, Middle Fork, Preston, Slypark, Tiger Creek Afterbay, Tiger Creek Regulator, Upper Blue Lake, and Silver Lake. Figure 4-94 shows the dam inundation areas of these dams of concern for the County. The depth of flooding due to the failure of a dam is unknown. Table 4-65 the total parcel counts, improved parcel counts, their improved structure

and land values in each extremely high hazard dam inundation areas. Table 4-66 breaks down Table 4-65 to show the property uses affected by each dam inundation area.

Figure 4-94 Amador County – High Hazard Dam Inundation Areas

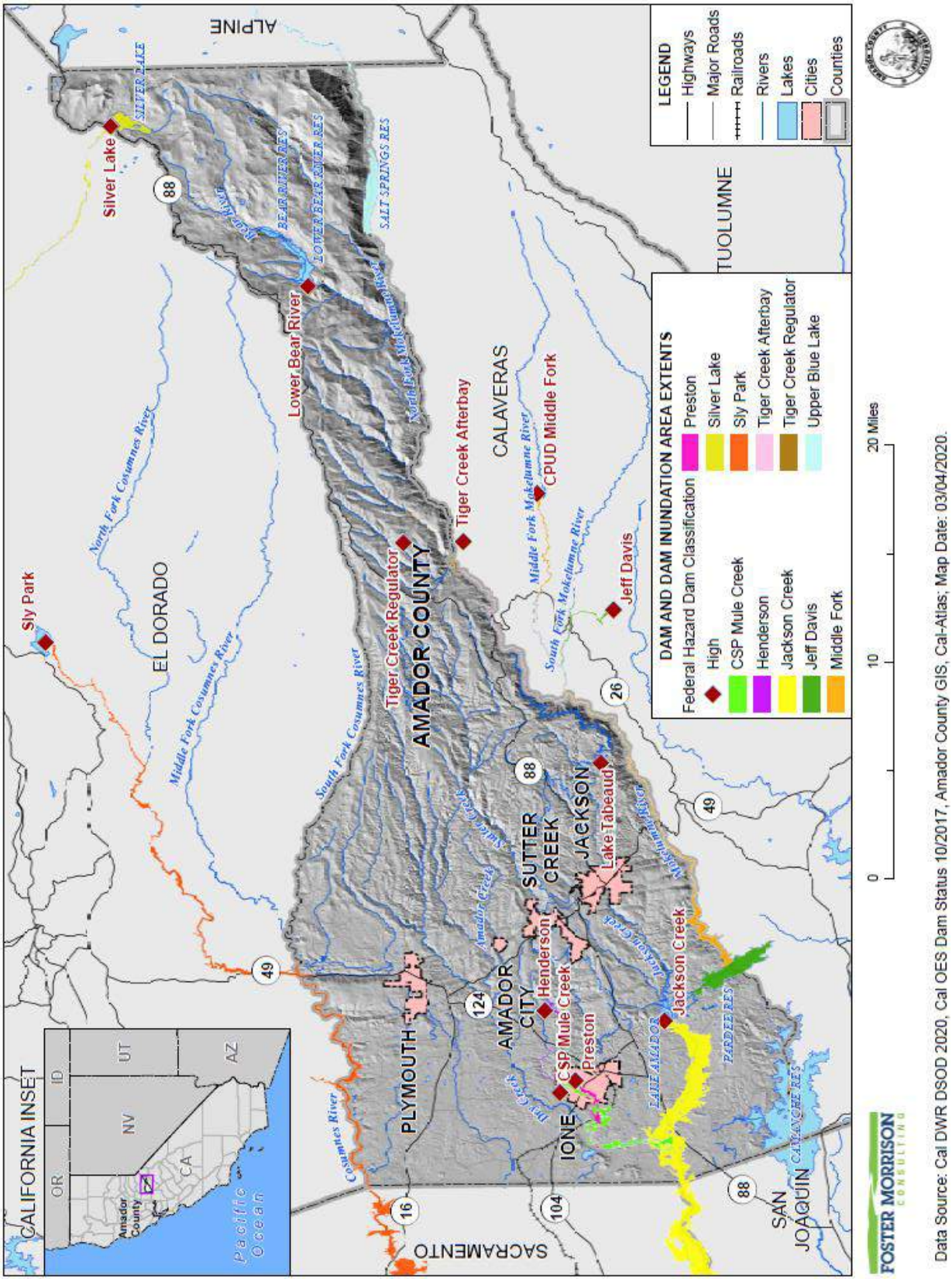


Table 4-65 Amador County Planning Area – Summary Count and Value of Parcels in the High Hazard Dam Inundation Areas

High Dam Inundation Areas	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
CSP Mule Creek	10	7	$1,654,435	$580,215	$580,215	$2,814,865
Henderson	6	3	$1,373,659	$453,422	$363,055	$2,190,136
Jackson Creek	74	54	$10,213,713	$9,445,654	$7,754,550	$27,413,917
Jeff Davis	15	1	$103,854	$416,489	$208,244	$728,587
Middle Fork	9	1	$103,854	$416,489	$208,244	$728,587
Preston	3	1	$1,138,725	$72,326	$72,326	$1,283,377
Slypark	19	10	$723,618	$934,290	$614,569	$2,272,477
Tiger Creek Afterbay	19	2	$109,974	$417,509	$208,754	$736,237
Tiger Creek Regulator	3	0	$0	$0	$0	$0
Upper Blue Lake	4	0	$0	$0	$0	$0
Silver Lake	3	1	$1,148,186	$1,511,364	$0	$2,659,550

Source: Amador County 12/31/2018 Parcel/Assessor's Data, Cal OES

Table 4-66 Amador County Planning Area – Count and Value of Parcels in the High Hazard Dam Inundation Areas by Property Use

High Dam Inundation Areas / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
CSP Mule Creek						
Agricultural	8	7	$1,154,002	$580,215	$580,215	$2,314,432
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	1	0	$500,433	$0	$0	$500,433
Unknown	1	0	$0	$0	$0	$0
Total	**10**	**7**	**$1,654,435**	**$580,215**	**$580,215**	**$2,814,865**
Henderson						
Agricultural	3	2	$706,339	$272,689	$272,689	$1,251,717
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	1	0	$0	$0	$0	$0

High Dam Inundation Areas / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Residential	2	1	$667,320	$180,733	$90,366	$938,419
Unknown	0	0	$0	$0	$0	$0
Total	**6**	**3**	**$1,373,659**	**$453,422**	**$363,055**	**$2,190,136**
Jackson Creek						
Agricultural	34	28	$6,121,333	$5,230,611	$5,230,611	$16,582,555
Commercial	2	2	$352,857	$671,134	$671,134	$1,695,125
Industrial	1	1	$291,958	$80,852	$121,278	$494,088
Miscellaneous	6	0	$0	$0	$0	$0
Residential	30	23	$3,447,565	$3,463,057	$1,731,527	$8,642,149
Unknown	1	0	$0	$0	$0	$0
Total	**74**	**54**	**$10,213,713**	**$9,445,654**	**$7,754,550**	**$27,413,917**
Jeff Davis						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	13	0	$0	$0	$0	$0
Residential	1	1	$103,854	$416,489	$208,244	$728,587
Unknown	1	0	$0	$0	$0	$0
Total	**15**	**1**	**$103,854**	**$416,489**	**$208,244**	**$728,587**
Middle Fork						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	7	0	$0	$0	$0	$0
Residential	1	1	$103,854	$416,489	$208,244	$728,587
Unknown	1	0	$0	$0	$0	$0
Total	**9**	**1**	**$103,854**	**$416,489**	**$208,244**	**$728,587**
Preston						
Agricultural	2	1	$638,292	$72,326	$72,326	$782,944
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	1	0	$500,433	$0	$0	$500,433
Unknown	0	0	$0	$0	$0	$0
Total	**3**	**1**	**$1,138,725**	**$72,326**	**$72,326**	**$1,283,377**

High Dam Inundation Areas / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Sly Park						
Agricultural	4	4	$119,935	$294,849	$294,849	$709,633
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	3	0	$0	$0	$0	$0
Residential	10	6	$603,683	$639,441	$319,720	$1,562,844
Unknown	2	0	$0	$0	$0	$0
Total	**19**	**10**	**$723,618**	**$934,290**	**$614,569**	**$2,272,477**
Tiger Creek Afterbay						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	14	0	$0	$0	$0	$0
Residential	3	2	$109,974	$417,509	$208,754	$736,237
Unknown	2	0	$0	$0	$0	$0
Total	**19**	**2**	**$109,974**	**$417,509**	**$208,754**	**$736,237**
Tiger Creek Regulator						
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	2	0	$0	$0	$0	$0
Total	**3**	**0**	**$0**	**$0**	**$0**	**$0**
Upper Blue Lake						
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	0	0	$0	$0	$0	$0
Unknown	4	0	$0	$0	$0	$0
Total	**4**	**0**	**$0**	**$0**	**$0**	**$0**
Silver Lake						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0

High Dam Inundation Areas / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	3	1	$1,148,186	$1,511,364	$0	$2,659,550
Residential	0	0	$0	$0	$0	$0
Unknown	0	0	$0	$0	$0	$0
Total	**3**	**1**	**$1,148,186**	**$1,511,364**	**$0**	**$2,659,550**

Source: Amador County 12/31/2018 Parcel/Assessor's Data, Cal OES

Dam Inundation - Flooded Acres

In addition to the centroid analysis used to obtain numbers of parcels and values at risk to the dam failure hazard, parcel boundary analysis was performed to obtain total acres and flooded acres by dam inundation area. The following is an analysis of inundated or flooded acres associated with dam failures and inundation areas in the County.

Methodology

GIS was used to calculate acres flooded by each Cal OES/Cal DWR DSOD dam inundation area. The parcel layer was intersected with the Cal OES dam inundation area data to obtain the acres inundated by dam. The Amador County parcel layer and inundation areas were intersected, and each segment divided by the intersection of inundation area and parcels was calculated for acres. The resulting data tables with flooded acreages were then imported into a database and linked back to the original parcels, including total acres by parcel number. Once this was completed, each parcel contained acreage values for flooded acre by dam inundation area within the parcel.

Limitations

One limitation created by this type of analysis is that with respect to the improved acres analysis, improvements are uniformly found throughout the parcel, while in reality, only portions of the parcel are improved, and improvements may or may not fall within the inundated portion of a parcel; thus, areas of improvements inundated, calculated through this method, may be higher or lower than those actually seen in a similar real-world event.

Analysis Results

The following tables represent a summary and detailed analysis of total acres for each dam inundation area in the Planning Area. Table 4-67 shows the flooded acres of the Amador County Planning Area in the inundation areas of each extremely high hazard dam. Table 4-68 shows the flooded acres of the Amador County Planning Area in the inundation areas of each high hazard dam

Table 4-67 Amador County Planning Area – Flooded Acres from Extremely High Hazard Dams

Dam Inundation Area	Total Acres	Improved Acres	Unimproved Acres
Pardee	5,742.8	4,108.4	1,634.4
Salt Springs	12,708.1	4,800.5	7,907.6

Source: Cal OES

Table 4-68 Amador County Planning Area – Flooded Acres from High Hazard Dams

Dam Inundation Area	Total Acres	Improved Acres	Unimproved Acres
CSP Mule Creek	994.2	636.3	357.9
Henderson	430.1	257.8	172.3
Jackson Creek	4,571.4	3,719.5	852.0
Jeff Davis	1,386.3	31.7	1354.6
Middle Fork	643.4	26.2	617.2
Preston	167.4	71.1	96.4
Slypark	695.8	288.0	407.9
Tiger Creek Afterbay	1,549.8	39.4	1,510.5
Tiger Creek Regulator	152.1	0.5	151.6
Upper Blue Lake	648.6	0.0	648.6
Silver Lake	519.1	510.6	8.5

Source: Cal OES

Population at Risk

A separate analysis was performed to determine population in dam inundation areas for dams with available inundation maps. Using GIS, the dam inundation area dataset was overlayed on the improved residential parcel data. Those parcel centroids that intersect an inundation area were counted and multiplied by the Census Bureau average household size for jurisdictions in Amador County. Table 4-69 shows the populations at risk to dam failure flooding for extremely high hazard dams. According to this analysis, for the entire Planning Area, there is a population of 260 in extremely high hazard dam inundation areas. It is unlikely that both dams that could affect Amador County would fail at the same time.

Table 4-69 Amador County Planning Area – Residential Population at Risk in Extremely High Hazard Dam Inundation Area by Jurisdiction

Jurisdiction	Pardee	Salt Springs
Amador City	0	0
Ione	0	0
Jackson	0	0
Plymouth	0	0
Sutter Creek	0	0

Jurisdiction	Pardee	Salt Springs
Unincorporated County	170	90
Total	**170**	**90**

Source: Cal OES Dam Inundation Data, US Census Bureau Average Household Sizes: Amador City (2.18); Ione (2.56), Jackson (2.14); Plymouth (2.47), Sutter Creek (2.14): and unincorporated Amador County (2.30)

Table 4-70 shows the populations at risk to dam failure flooding for high hazard dams. According to this analysis, for the entire Planning Area, there is a population of 120 in high hazard dam inundation areas. It is unlikely that all dams that could affect Amador County would fail at the same time.

Table 4-70 Amador County Planning Area – Residential Population at Risk in High Hazard Dam Inundation Area by Jurisdiction

Jurisdiction	Mule Creek	Hender-son	Jackson Creek	Jeff Davis	Middle Fork	Preston	Sly Park	Tiger Creek Afterbay	Tiger Creek Reg.	Upper Blue Lake	Silver Lake
Amador City	0	0	0	0	0	0	0	0	0	0	0
Ione	0	0	0	0	0	0	0	0	0	0	0
Jackson	0	0	0	0	0	0	0	0	0	0	0
Plymouth	0	0	0	0	0	0	0	0	0	0	0
Sutter Creek	0	0	0	0	0	0	0	0	0	0	0
Unincorporated County	0	2	53	2	2	0	14	5	0	0	0
Total	**0**	**2**	**53**	**2**	**2**	**0**	**14**	**5**	**0**	**0**	**0**

Source: Cal OES Dam Inundation Data, US Census Bureau Average Household Sizes: Amador City (2.18); Ione (2.56), Jackson (2.14); Plymouth (2.47), Sutter Creek (2.14): and unincorporated Amador County (2.30)

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Amador County and all jurisdictions to determine critical facilities in the areas affected dam failure. Using GIS, the Cal OES dam inundation areas were overlayed on the critical facility GIS layer. The analysis was broken up by dam hazard classification:

- Figure 4-95 shows the critical facilities and extremely high hazard dam inundation areas. Table 4-71 shows a summary of critical facilities in extremely high dam inundation areas by jurisdiction. Table 4-72 details the critical facilities in the unincorporated County that fall in extremely high dam inundation zones.
- Figure 4-96 shows the critical facilities and high hazard dam inundation areas. Table 4-73 shows a summary of critical facilities in high hazard dam inundation areas by jurisdiction Table 4-74 details the critical facilities in the unincorporated County that fall in high dam inundation zones.

Information on critical facilities in the incorporated jurisdictions in the County can be found in their respective annexes to this LHMP Update. Details of critical facility definition, type, name and address and jurisdiction by dam inundation area are listed in Appendix F.

Figure 4-95 Amador County Planning Area – Critical Facilities in Extremely High Hazard Dam Inundation Areas

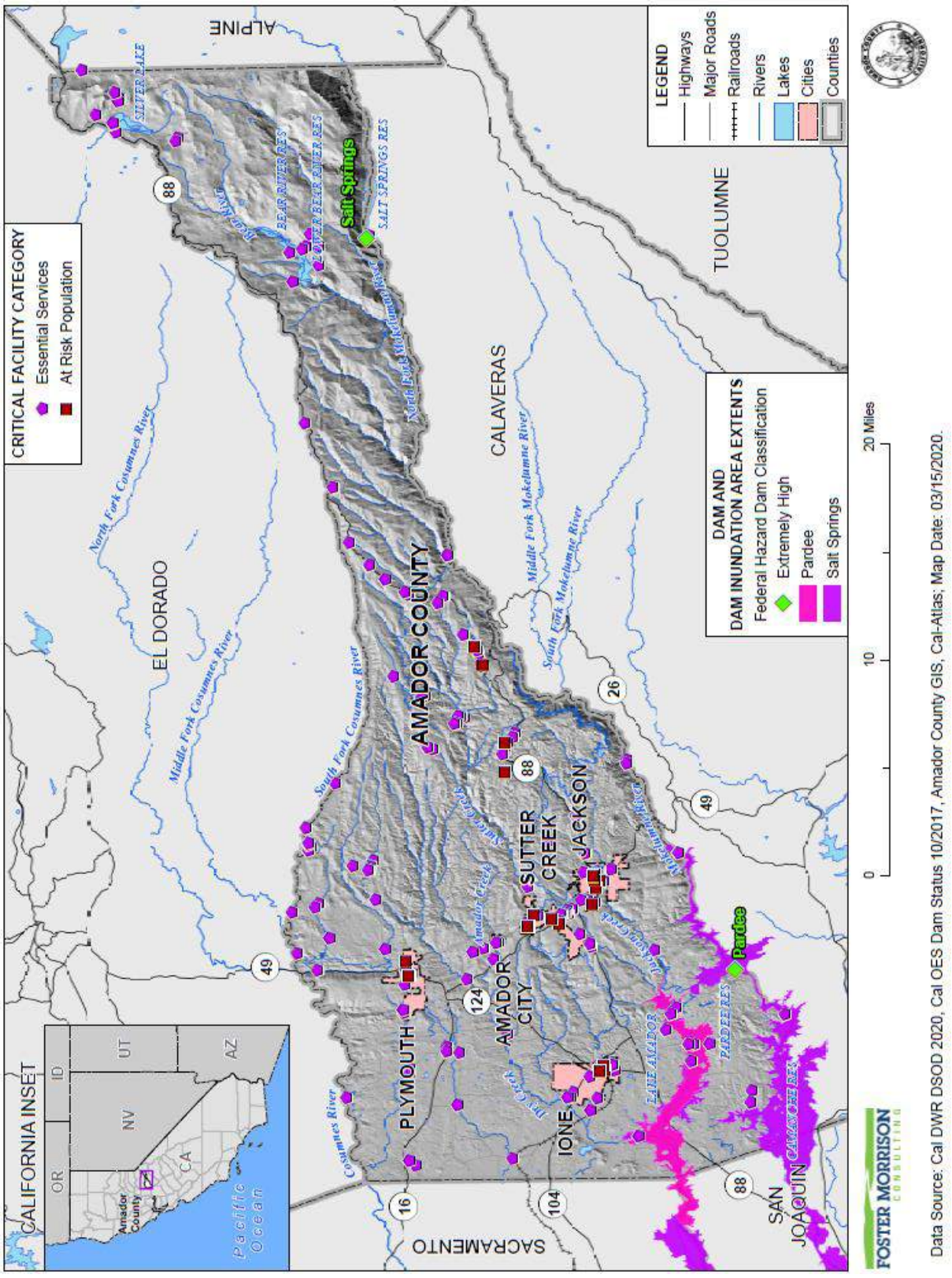


Table 4-71 Amador County Planning Area – Critical Facilities in Extremely High Hazard Dam Inundation Areas by Jurisdiction and Facility Category

Jurisdiction/ Critical Facility Category	Facility Count
Amador County	
Essential Services	7
At Risk Population	0
Amador County Total	**7**
Grand Total	**7**

Source: Amador County GIS, Cal OES, DSOD

Table 4-72 Unincorporated Amador County – Critical Facilities in Extremely High Hazard Dam Inundation Zones by Facility Category and Type

Dam Inundation Area	Critical Facility Category / Critical Facility Type	Pardee	Salt Springs
		Facility Count	Facility Count
Extremely High Dam Inundation Area	**Essential Services**		
	Bridge	3	5
	Fire Station	1	1
	Public Water System	1	1
	Essential Services Total	**5**	**7**
	Total	**5**	**7**
Grand Total		**5**	**7**

Source: Amador County GIS, Cal OES, DSOD

Figure 4-96 Amador County Planning Area – Critical Facilities in High Hazard Dam Inundation Areas

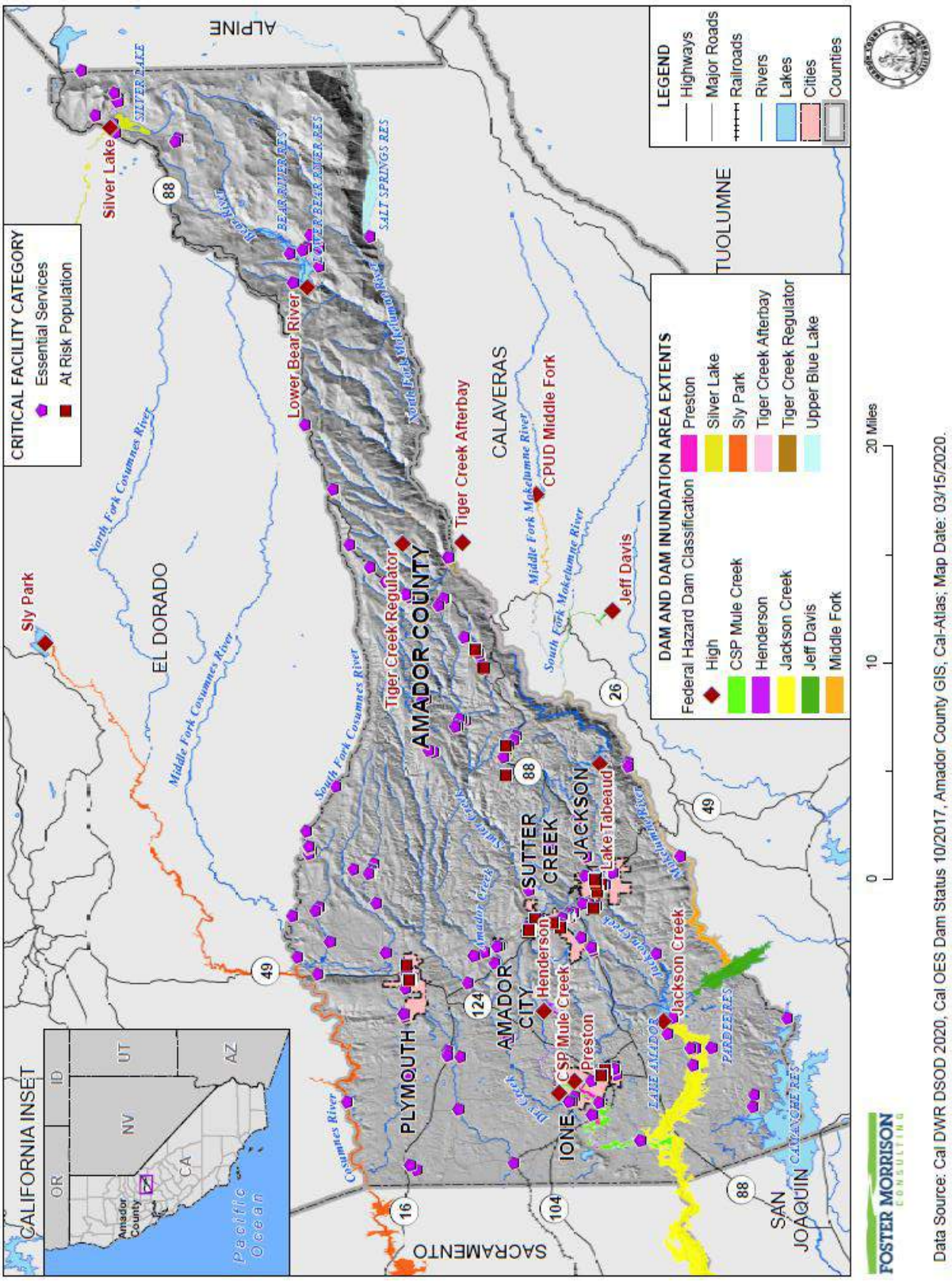


Table 4-73 Amador County Planning Area – Critical Facilities in High Hazard Dam Inundation Areas by Jurisdiction and Facility Category

Jurisdiction / Critical Facility Category	Facility Count
Amador County	
Essential Services	11
At Risk Population	0
Amador County Total	**11**
City of Ione	
Essential Services	1
At Risk Population	0
City of Ione Total	**1**
Grand Total	**12**

Source: Amador County GIS, Cal OES, DSOD

Table 4-74 Unincorporated Amador County – Critical Facilities in High Hazard Dam Inundation Zones by Facility Category and Type

Dam Inundation Area	Critical Facility Category /Critical Facility Type	CSP Mule Creek	Henderson	Jackson Creek	Jeff Davis	Middle Fork	Slypark	Tiger Creek Afterbay	Tiger Creek Regulator
		Facility Count	Facility Count	Facility Count	Facility Count	Facility Count	Facility Count	Facility Count	Facility Count
High Dam Inundation Area	**Essential Services**								
	Bridge	2	0	3	1	1	1	1	0
	Fire Station	0	0	1	0	0	0	0	0
	Power Plant	0	0	0	1	1	0	1	1
	Public Water System	0	0	0	0	0	0	0	2
	Essential Services Total	**2**	**0**	**4**	**2**	**2**	**1**	**2**	**3**
Grand Total		**2**	**0**	**4**	**2**	**2**	**1**	**2**	**3**

Source: Amador County GIS, Cal OES, DSOD

Overall Community Impact

Dam failure floods and their impacts vary by location and severity of any given dam failure event and will likely only directly affect certain areas of the Amador County Planning Area during specific times. Based on the risk assessment, it is evident that dam failure floods have the potential for devastating life safety,

property, environmental, and economic impacts to certain areas of the County. Impacts that are not always quantified, but can be anticipated in a large dam failure event, include:

- Injury and loss of life;
- Impacts to agricultural;
- Commercial and residential structural and property damage;
- Disruption of and damage to critical infrastructure and services;
- Health hazards associated with mold and mildew, contamination of drinking water, etc.;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community;
- Negative impact on commercial and residential property values; and
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.
- Impact on the overall mental health of the community.

Future Development

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.

Future Development GIS Analysis

No dam inundation areas from the mapped dam inundation areas intersect a future development area. As such, no maps or tabular analysis was created.

4.3.7. Drought and Water Shortage Vulnerability Assessment

Likelihood of Future Occurrence—Likely (Drought)/Occasional (Water Shortage)
Vulnerability—Medium

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue for agricultural, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Based on historical information, the occurrence of drought in California, including Amador County, 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 is often 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 of Amador County to drought is countywide, but impacts may vary and may include reduction in water supply, agricultural losses, and an increase in dry fuels.

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 4-75 show drought impacts for the Amador County Planning Area from 1850 to December 2019. The data represented is skewed, with the majority of these impacts from records within the past ten years.

Table 4-75 Amador County Drought Impacts

Category	Number of Impacts
General Awareness	256
Agriculture	120
Business and Industry	24
Energy	6
Fire	76
Plants & Wildlife	80
Relief, Response, and Restrictions	255
Society and Public Health	88
Tourism and Recreation	32
Water Supply and Quality	403
Total	**1,340**

Source: National Drought Mitigation Center, 1/1/1850-12/31/2019

The most significant qualitative impacts associated with drought in the Planning Area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Mandatory conservation measures are typically implemented during extended droughts. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

It is difficult to quantitatively assess drought impacts to Amador County because not many county-specific studies have been conducted. Some factors to consider include: the impacts of fallowed agricultural land, habitat loss and associated effects on wildlife, and the drawdown of the groundwater table. The most direct and likely most difficult drought impact to quantify is to local economies, especially agricultural economies. The State has conducted some empirical studies on the economic effects of fallowed lands with regard to water purchased by the State's Water Bank; but these studies do not quantitatively address the situation in Amador County. It can be assumed, however, that the loss of production in one sector of the economy would affect other sectors. This is especially true of agriculture in Amador County (discussed in greater detail in 4.3.3), which is highly vulnerable to drought conditions.

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. 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. The HMPC noted

that in the past, very few people had wells go dry; many of these occurring in the Pioneer and Shenandoah Valley area. Land subsidence can also occur when the groundwater table is depleted.

Tree Mortality

One of the specific vulnerabilities of drought in Amador County is the increased risk to trees from beetle kill and other tree mortality issues. Bark beetles mine the inner bark (the phloem-cambial region) on twigs, branches, or trunks of trees and shrubs. This activity often starts a flow of tree sap in conifers, but sometimes even in hardwoods like elm and walnut. The sap flow (pitch tube) is accompanied by the sawdust like frass created by the beetles. Frass accumulates in bark crevices or may drop and be visible on the ground or in spider webs. Small emergence holes in the bark are a good indication that bark beetles were present. Removal of the bark with the emergence holes often reveals dead and degraded inner bark and sometimes new adult beetles that have not yet emerged. Bark beetles frequently attack trees weakened by drought, disease, injuries, or other factors that may stress the tree. Bark beetles can contribute to the decline and eventual death of trees; however only a few aggressive beetle species are known to be the sole cause of tree mortality (see Figure 4-97).

Figure 4-97 Monterey Pine Killed by Engraver Beetles

Source: University of California

In addition to attacking larger limbs, some species such as cedar and cypress bark beetles feed by mining twigs up to 6 inches back from the end of the branch, resulting in dead tips. These discolored shoots hanging on the tree are often referred to as “flagging” or “flags.” (see Figure 4-98) Adult elm bark beetles feed on the inner bark of twigs before laying eggs. If an adult has emerged from cut logs or a portion of a tree that is infected by Dutch elm disease, the beetle’s body will be contaminated with fungal spores. When the adult beetle feeds on twigs, the beetle infects healthy elms with the fungi that cause Dutch elm disease. Elms showing yellowing or wilting branches in spring may be infected with Dutch elm disease.

Figure 4-98 Flag Tips from Cypress Bark Beetle Feeding

Source: University of California

More information regarding tree mortality is discussed in the wildfire vulnerability in Section 4.3.16.

Future Development

According to the HMPC, Amador County has access to large quantities of water through its surface water as well as through ground water. However, 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. Population growth will be a challenge not only with regard to Amador County's water access for ag production, but state- and nation-wide with regard to food production. As more cropland is taken out of production to provide housing to accommodate for population growth, it is noted that more food production would also be needed to provide for that same population growth. As Amador's food production is reduced, it seems likely that there would be less of a demand on the water tables. However, more homes require more home water service which will be taken from ground wells or from local water companies. Crops can be sustained from river water and canals while Amador County residence cannot.

4.3.8. Earthquake Vulnerability Assessment

Likelihood of Future Occurrence—Unlikely (moderate or major earthquake); Likely (minor earthquake)
Vulnerability—High

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable. The primary impacts of concern are life safety and property damage.

Ground shaking is the primary earthquake hazard. Many factors affect the survivability of structures and systems from earthquake-caused ground motions. These factors include proximity to the fault, direction of rupture, epicentral location and depth, magnitude, local geologic and soils conditions, types and quality of construction, building configurations and heights, and comparable factors that relate to utility, transportation, and other network systems. Ground motions become structurally damaging when average peak accelerations reach 10 to 15 percent of gravity, average peak velocities reach 8 to 12 centimeters per second, and when the Modified Mercalli Intensity Scale is about VII (18-34 percent peak ground acceleration), which is considered to be very strong (general alarm; walls crack; plaster falls).

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. Amador County's mountainous terrain lies near the North American and Pacific tectonic plate activity. There have been earthquakes as a result of this activity in the historic past, and there will continue to be earthquakes in the future of the California north coastal mountain region. According to maps developed by the Department of Conservation's California Geological Survey, Amador County has potential for ground shaking from earthquakes. The seismic hazard in this area is related to faults on both sides of the California-Nevada border. The eastern, upcountry portion of the county is at greatest risk from earthquakes. Structural damage from ground shaking has not historically been reported in Amador County.

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault. In general, newer construction is more earthquake resistant than older construction due to enforcement of improved building codes. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry, as was seen in the Oroville, Coalinga, Santa Cruz, and Paso Robles earthquakes.

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 is no URM or soft story buildings in the unincorporated County.

Impacts to the County would include damages to infrastructure (roads, bridges, railroad tracks, etc.), damages to utilities and critical infrastructure, damages to residential and commercial buildings, and possible loss of life and injuries. The HMPC also noted that there is PG&E infrastructure and dams above the County that could affect Amador County if they were to fail. This could also impact the water supply, as one of the main pump stations is thought to be original and has not been updated.

Estimating Potential Losses

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, two HAZUS-MH earthquake scenarios were run for this 2020 LHMP Update:

- A deterministic 6.7 Hayward Fault Event
- A probabilistic 7.0 earthquake event

2020 Earthquake Scenarios

Deterministic 6.7 Hayward Fault Earthquake Event

HAZUS-MH 4.2 was utilized to model earthquake losses for the County. Specifically, the deterministic magnitude used for Amador County utilized a 6.7 Hayward Fault magnitude earthquake, based on data from the Amador County General Plan. Hazus-MH 4.2 does not contain a fault dataset for the Foothills Fault system in 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. There are certain data limitations when using the default data, so the results should be interpreted accordingly; this is a planning level analysis.

The methodology for running the deterministic earthquake scenario used seismic hazard contour maps developed by the U.S. Geological Survey (USGS) for the 2002 update of the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of potential ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively. The 2,500-year return period analyzes ground shaking estimates with a 2 percent probability of being exceeded in 50 years, from the various seismic sources in the area. The International Building Code uses this level of ground shaking for building design in seismic areas and is more of a worst-case scenario.

The results of the deterministic scenario are captured in Table 4-76 and shown on Figure 4-99. Key losses included the following:

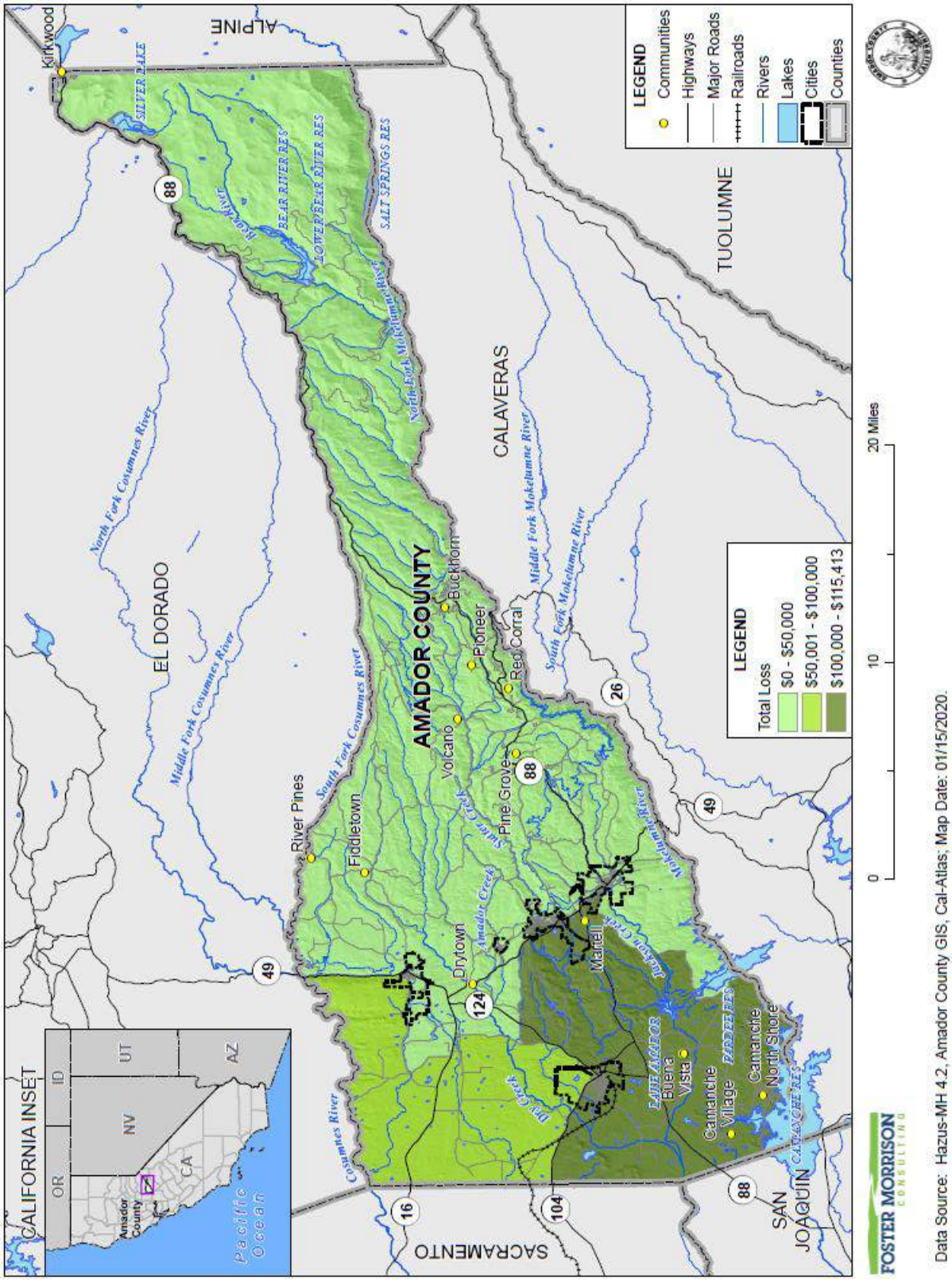
- Total economic loss estimated for the earthquake was $290,000, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $234,000.
- 4 buildings in the County were at least moderately damaged. No buildings were completely destroyed.
- Over 58 percent of the building- and income-related losses were residential structures.
- 23 percent of the estimated losses were related to business interruptions.
- No change was observed in casualties, regardless of time of strike. All modeled casualties were 0.
- No households experienced a loss of potable water or electricity the first day after the earthquake.

Table 4-76 HAZUS-MH Earthquake Loss Estimation Probabilistic 2,500-Year Scenario Results

Type of Impact	Impacts to County from 6.7 Hayward Earthquake	
Total Buildings Damaged (based on 18,000 buildings)	Slight: 21 Moderate: 4 Extensive: 0 Complete: 0	
Building and Income Related Losses	$290,000	
Total Economic Losses (Includes building, income, and lifeline losses)	$234,000	
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	
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 7,056 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 Power loss, Day 3: 0 Power 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-MH 4.2, 2020

Figure 4-99 Amador County - Total Loss Map from 6.7 Magnitude Hayward Fault Deterministic Hazus Earthquake Scenario



Probabilistic 7.0 Earthquake Event

HAZUS-MH 4.2 was utilized to model earthquake losses for the County. Specifically, the probabilistic magnitude used for Amador County utilized a 7.0 magnitude earthquake. Level 1 analyses were run, meaning that only the default data was used and not supplemented with local building inventory or hazard data. There are certain data limitations when using the default data, so the results should be interpreted accordingly; this is a planning level analysis.

The methodology for running the probabilistic earthquake scenario used probabilistic seismic hazard contour maps developed by the U.S. Geological Survey (USGS) for the 2002 update of the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of potential ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively. The 2,500-year return period analyzes ground shaking estimates with a 2 percent probability of being exceeded in 50 years, from the various seismic sources in the area. The International Building Code uses this level of ground shaking for building design in seismic areas and is more of a worst-case scenario.

The results of the probabilistic scenario are captured in Table 4-77 and shown on Figure 4-100. Key losses included the following:

- Total economic loss estimated for the earthquake was $362,510,000, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $321,360,000.
- 75 buildings in the County were at least moderately damaged. No buildings were completely destroyed.
- Over 61 percent of the building- and income-related losses were residential structures.
- 17 percent of the estimated losses were related to business interruptions.
- The mid-day earthquake showed the greatest number of fatalities: 6.
- 480 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.

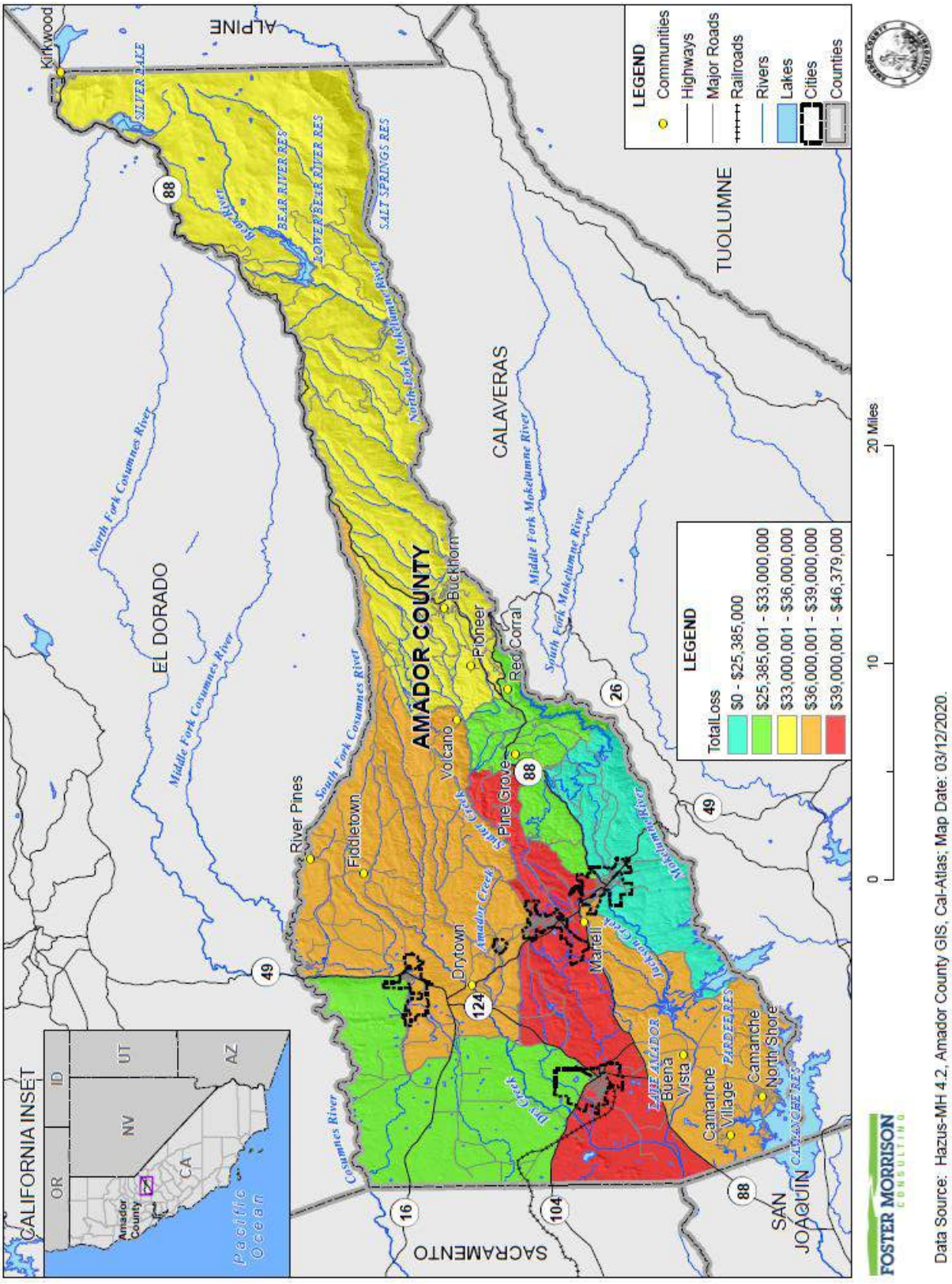
Table 4-77 HAZUS-MH Earthquake Loss Estimation Probabilistic 2,500-Year Scenario Results

Type of Impact	Impacts to County from 7.0 Earthquake Event
Total Buildings Damaged (based on 18,000 buildings)	Slight: 4,337 Moderate: 1,952 Extensive: 474 Complete: 75
Building and Income Related Losses	$321,360,000
Total Economic Losses (Includes building, income, and lifeline losses)	$362,510,000
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 32 Requiring hospitalization: 5 Life threatening: 0 Fatalities: 1
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 97 Requiring hospitalization: 22

Type of Impact	Impacts to County from 7.0 Earthquake Event	
	Life threatening: 3 Fatalities: 6	
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 61 Requiring hospitalization: 13 Life threatening: 2 Fatalities: 3	
Damage to Transportation Systems	None with at least moderate damage	
Damage to Essential Facilities	None with at least moderate damage	
Damage to Utility Systems	No facilities with at least moderate damage 109 potable water line breaks, 55 wastewater line breaks, and 19 natural gas line breaks	
Households without Power/Water Service (Based on 7,056 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: 480 Power loss, Day 3: 28 Power loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	85 displaced households	
Shelter Requirements	49 persons	
Debris Generation	62,000 tons	

Source: HAZUS-MH 4.2, 2020

Figure 4-100 Amador County - Total Loss Map from 7.0 Magnitude Probabilistic Hazus Earthquake Scenario



Comparison of Earthquake Scenarios

The results of the two earthquake scenarios were compared, as shown on Table 4-78. As shown, the San Andreas fault is expected to cause more damage in the County.

Table 4-78 Amador County – HAZUS-MH 2,500-year Earthquake Scenario Comparison Results

Impacts/Earthquake	6.7 Magnitude Earthquake (Hayward Fault)		7.0 Probabilistic Event	
Residential Buildings Damaged (Based upon 18,000 buildings)	Slight: 21 Moderate: 4 Extensive: 0 Complete: 0		Slight: 4,337 Moderate: 1,952 Extensive: 474 Complete: 75	
Building Related Loss	$290,000		$321,360,000	
Total Economic Loss	$234,000		$362,510,000	
Injuries (Based upon 2am time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0		Without requiring hospitalization: 32 Requiring hospitalization: 5 Life threatening: 0 Fatalities: 1	
Injuries (Based upon 2pm time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0		Without requiring hospitalization: 97 Requiring hospitalization: 22 Life threatening: 3 Fatalities: 6	
Injuries (Based upon 5pm time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0		Without requiring hospitalization: 61 Requiring hospitalization: 13 Life threatening: 2 Fatalities: 3	
Essential Facility Damage (Based upon 17 buildings)	None with at least moderate damage		None with at least moderate damage.	
Transportation and Utility Lifeline Damage	None with at least moderate damage		No facilities with at least moderate damage 109 potable water line breaks, 55 wastewater line breaks, and 19 natural gas line breaks	
Households w/out Power & Water Service (Based upon 7,066 households)	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	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	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	Power loss @ Day 1: 480 Power loss @ Day 3: 28 Power loss @ Day 7: 0 Power loss @ Day 30: 0 Power loss @ Day 90: 0
Displaced Households	0 displaced households		85 displaced households	
Shelter Requirements	0 persons		49 persons	
Debris Generation	0 tons		62,000 tons	

Source: Hazus MH 4.2

Future Development

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.

4.3.9. Flood: 1%/0.2% Annual Chance Vulnerability Assessment

Likelihood of Future Occurrence—1%– Occasional; 0.2% – Unlikely
Vulnerability—High

Flooding is a significant problem in Amador County. Historically, the Amador County Planning Area has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred both within the 1% and 0.2% annual chance floodplains and in other localized areas. The vulnerability of the County to severe flooding is high as it can result in significant life safety and property damage.

Floods have been a part of Amador County's historical past and will continue to be so in the County's future. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damages. Historically, much of the growth in the County has occurred adjacent to rivers or streams, resulting in significant damages to property, and losses from disruption of community activities during periods of flooding. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Predominantly, the effects of flooding are generally confined to areas near the waterways of the County. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat. This threatens structures in the floodplain. Structures can also be damaged from trees falling as a result of water-saturated soils. Electrical power outages happen, and the interruption of power causes major problems. Loss of power is usually a precursor to closure of governmental offices and community businesses. 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. People may be swept away in floodwaters, causing injuries or deaths.

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.

Flood Hazard Assessment

This risk assessment for the Amador County LHMP Update assessed the flood hazard specific to Amador County. This included an evaluation of multiple flood hazards including the Special Flood Hazard Area (SFHA) shown on the DFIRM; Repetitive Loss (RL) Areas; localized, stormwater flooding areas; other areas that have flooded in the past, but not identified on the DFIRM; other areas of shallow flooding identified through other studies and sources; levee failure flooding; dam failure flooding; and mudflow flooding especially in significant post-burn areas. This comprehensive flood risk assessment included an assessment of less-frequent flood hazards, areas likely to be flooded, and flood problems that are likely to get worse in the future as a result of changes in floodplain development and demographics, development in the watershed, and climate change or sea level rise. Existing studies, maps, historical data, and federal, state, and local community expertise and knowledge contributed to this current flood assessment for Amador County. An evaluation of the success of completed and ongoing flood control projects and associated maintenance aspects contributed to this flood hazard assessment and the resulting flood mitigation strategy for the Amador County Planning Area. This flood risk assessment for this LHMP Update also includes an assessment of future flooding conditions based on historic development in the floodplains and proposed future development as further described throughout this plan. The flood vulnerability assessment that follows focuses on the flood hazard based on FEMA DFIRMs.

Flood Analysis

The Amador County Planning Area has mapped FEMA flood hazard areas. This section of the vulnerability assessment focuses on the Amador County Planning Area (the 5 incorporated communities and the

unincorporated County). GIS was used to determine the possible impacts of flooding within the County and how the risk varies across Planning Area. The following methodology was followed in determining improved parcel counts and values at risk to the 1% annual chance flood event and 0.2% annual chance flood events.

FEMA DFIRMs

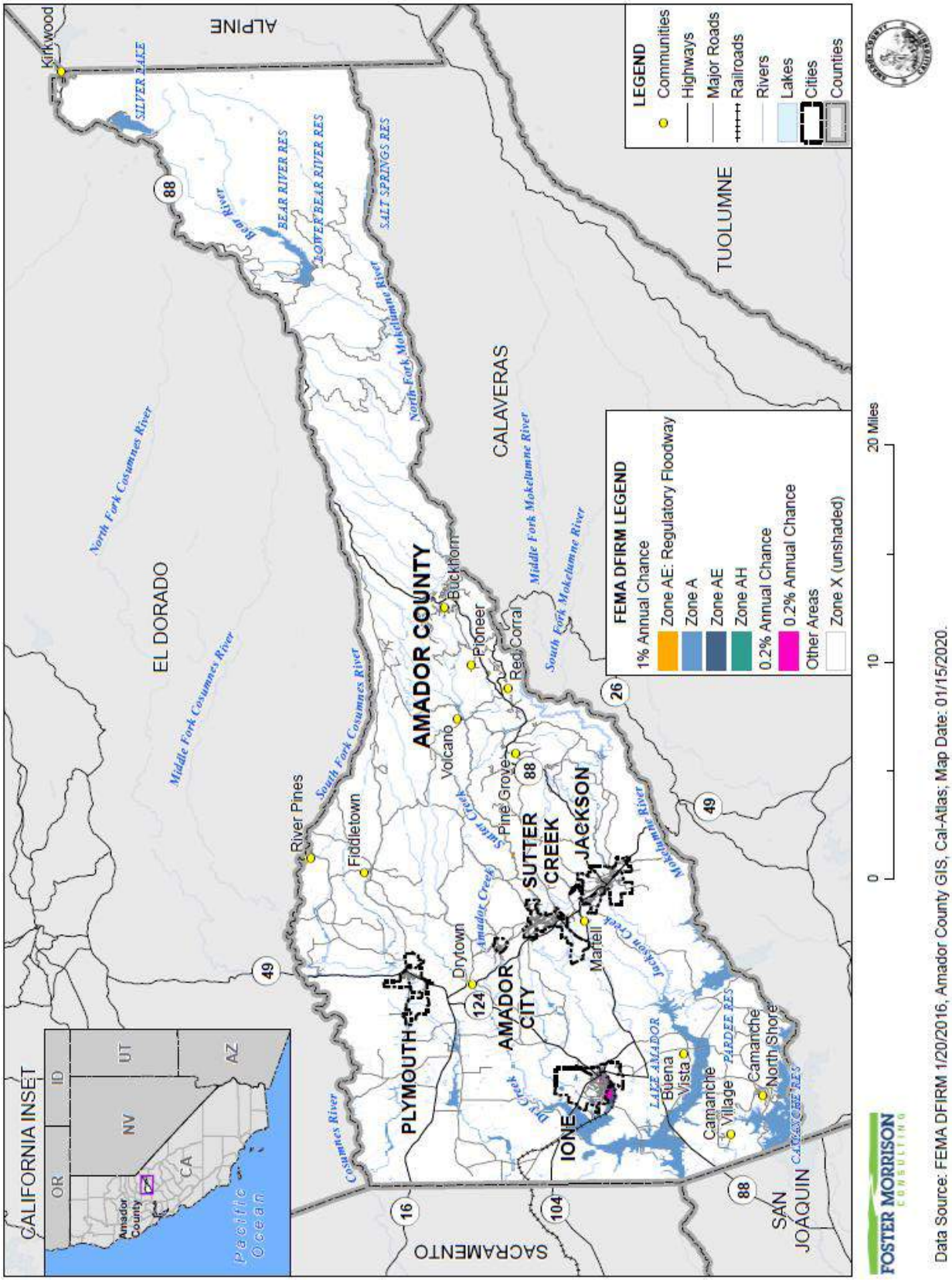
Amador County has a FEMA effective DFIRM dated 1/16/2016, which was obtained from the National Flood Hazard Layer to perform the flood analysis. Each of the DFIRM flood zones that begins with the letter 'A' depict the Special Flood Hazard Area, or the 1% annual chance flood event (commonly referred to as the 100-year flood). Table 4-79 explains the difference between DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the County. The effective DFIRM maps for the Amador County Planning Area are shown on Figure 4-101.

Table 4-79 Amador County Planning Area – DFIRM Flood Hazard Zones

Flood Zone	Description	Flood Zone Present in City of Amador City	Flood Zone Present in City of Ione	Flood Zone Present in City of Jackson	Flood Zone Present in City of Plymouth	Flood Zone Present in City of Sutter Creek	Flood Zone Present in unincorporated County
A	100-year Flood: No base flood elevations provided		X	X	X	X	X
AE	100-year Flood: Base flood elevations provided		X	X		X	X
AE Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided			X		X	X
Shaded X	500-year Flood: 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

Figure 4-101 Amador County – DFIRM Flood Zones



Values at Risk and Flood Loss Estimates Analysis

Quantifying the values at risk and estimating losses within mapped FEMA floodplains in the County is an important element in understanding the risk and vulnerability of the Amador County Planning Area to the flood hazard.

Methodology

Amador County's 12/31/2018 Parcel and Assessor Data, obtained from Amador County, was used as the basis for the county inventory of parcels, values, and acres. Amador County has a FEMA DFIRM dated 1/20/2016 which was utilized to perform the flood analysis.

In some cases, there are parcels in multiple flood zones, such as Zone A, Zone X, or Shaded X. GIS was used to create a centroid, or point representing the center of the parcel polygon. DFIRM flood data was then overlaid on the parcel layer. For the purposes of this analysis, the flood zone that intersected a parcel centroid was assigned the flood zone for the entire parcel. The parcels were segregated and analyzed in this fashion for the Amador County Planning Area. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessors database and the GIS parcel layer.

Analysis on values at risk to floods in the County is provided for Amador County Planning Area and the unincorporated County in the below results section.

Limitations

It also should be noted that the resulting flood analysis estimates may actually be more or less than that presented in the below tables as the County may include structures located within the 1% or 0.2% annual chance floodplain that are elevated at or above the level of the base flood elevation, according to local floodplain development requirements. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the floodplain due primarily to Proposition 13, and to a lesser extent, properties falling under the Williamson Act.

Flood Loss Estimate

The loss estimate for flood is based on the total of improved and contents value. Improved parcels include those with improved structure values identified in the Assessor's database. 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 are only present to show the value of the land associated with each flood zone.

The property use categories for the County (derived from zoning code descriptions) were used to develop estimated content replacement values (CRVs) that are potentially at loss from hazards, using FEMA Hazus methodologies as previously described in Section 4.3.1. The CRVs were added to the improved parcel values.

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 percent 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 the flood hazard analysis is an inventory of the numbers, types, and values of parcels subject to the flood hazard.

Values at Risk and Flood Loss Estimates Results

The end result of the values at risk and flood loss estimates analysis is an inventory of the numbers, types, and values of parcels and estimated losses subject to the flood hazard by flood zone. Results are presented here first for the Amador County Planning Area and secondly for unincorporated County. Results for the incorporated jurisdictions are presented in their annexes to this Plan.

Amador County Planning Area

Table 4-80 through Table 4-81 contain flood analysis results for the Amador County Planning Area. These tables show the number of parcels and values at risk to the 1% and 0.2% annual chance event for unincorporated Amador County. Table 4-80 shows a summary of the value of improved parcels by 1% and 0.2% annual chance flood zones in the Planning Area. Table 4-81 shows the total values in each flood zone by jurisdiction for the Planning Area.

Table 4-80 Amador County Planning Area– Count and Value of Parcels by 1% and 0.2% Flood Zone*

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard	644	444	$44,796,208	$78,786,542	$52,347,925	$175,930,675
0.2% Annual Chance Flood Hazard**	284	262	$19,231,411	$46,436,415	$26,910,259	$92,578,085
Other Areas	23,244	16,560	$1,774,722,111	$3,238,668,285	$1,909,210,465	$6,922,600,861
Grand Total	**24,172**	**17,266**	**$1,838,749,730**	**$3,363,891,242**	**$1,988,468,649**	**$7,191,109,621**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 4-81 Amador County Planning Area – Count and Value of Parcels by 1% and 0.2% Flood Zone by Jurisdiction*

Jurisdiction / Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
City of 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	181	111	$13,243,335	$16,405,643	$9,590,349	$39,239,327
City of Amador City Total	**181**	**111**	**$13,243,335**	**$16,405,643**	**$9,590,349**	**$39,239,327**
City of Ione						
1% Annual Chance Flood Hazard	219	174	$13,069,056	$30,051,560	$19,402,640	$62,523,256
0.2% Annual Chance Flood Hazard**	259	242	$17,214,720	$41,701,658	$23,452,756	$82,369,134
Other Areas	1,556	1,255	$116,143,574	$240,753,744	$119,582,358	$476,479,676
City of Ione Total	**2,034**	**1,671**	**$146,427,350**	**$312,506,962**	**$162,437,754**	**$621,372,066**
City of Jackson						
1% Annual Chance Flood Hazard	128	100	$8,095,390	$18,226,396	$11,473,740	$37,795,526
0.2% Annual Chance Flood Hazard**	7	5	$533,243	$2,168,520	$2,168,520	$4,870,283
Other Areas	1,983	1,596	$156,299,753	$428,623,675	$294,751,669	$879,675,097
City of Jackson Total	**2,118**	**1,701**	**$164,928,386**	**$449,018,591**	**$308,393,929**	**$922,340,906**
City of Plymouth						
1% Annual Chance Flood Hazard	8	1	$640,093	$58,838	$29,419	$728,350
0.2% Annual Chance Flood Hazard**	0	0	$0	$0	$0	$0
Other Areas	570	425	$48,912,974	$66,529,979	$43,022,815	$158,465,768
City of Plymouth Total	**578**	**426**	**$49,553,067**	**$66,588,817**	**$43,052,234**	**$159,194,118**
City of Sutter Creek						
1% Annual Chance Flood Hazard	51	34	$3,721,288	$6,399,960	$3,722,416	$13,843,664
0.2% Annual Chance Flood Hazard**	13	12	$684,439	$1,964,982	$989,225	$3,638,646
Other Areas	1,368	1,068	$103,207,035	$242,154,205	$147,899,442	$493,260,682
City of Sutter Creek Total	**1,432**	**1,114**	**$107,612,762**	**$250,519,147**	**$152,611,083**	**$510,742,992**

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	238	135	$19,270,381	$24,049,788	$17,719,710	$61,039,879
0.2% Annual Chance Flood Hazard**	5	3	$799,009	$601,255	$299,758	$1,700,022
Other Areas	17,586	12,105	$1,336,915,440	$2,244,201,039	$1,294,363,832	$4,875,480,311
Amador County Total	**17,829**	**12,243**	**$1,356,984,830**	**$2,268,852,082**	**$1,312,383,300**	**$4,938,220,212**
Grand Total	**24,172**	**17,266**	**$1,838,749,730**	**$3,363,891,242**	**$1,988,468,649**	**$7,191,109,621**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood also includes all parcels in the 1% annual chance floodplain.

Table 4-82 shows a summary table of loss estimates by 1% and 0.2% annual chance flood zone for the Amador County Planning Area. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the Planning Area) and displayed as a percentage of loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a flood. The County should keep in mind that the loss ratio could increase with additional development in the 1% and 0.2% annual chance flood zone, unless development is elevated in accordance with the local floodplain management ordinance.

Table 4-82 Amador County Planning Area – Flood Loss Estimate

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	644	444	$44,796,208	$78,786,542	$52,347,925	$131,134,467	$26,226,893	0.50%
0.2% Annual Chance Flood Hazard**	284	262	$19,231,411	$46,436,415	$26,910,259	$73,346,674	$14,669,335	0.28%
Grand Total	**928**	**706**	**$64,027,619**	**$125,222,957**	**$79,258,184**	**$204,481,141**	**$40,896,228**	**0.78%**

Source: FEMA DFIRM 1/20/2016, Amador County 12/31/2018 Parcel/Assessor's Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual flood zone, 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 also includes all parcels in the 1% annual chance flood zone.

According to the information in Table 4-80 through Table 4-82, the Amador County Planning Area has 444 improved parcels and roughly $131 million of structure and contents value in the 1% annual chance flood zone. There are an additional 262 improved parcels and roughly $73 million of structure and contents value in the 0.2% annual chance flood event. A loss ratio of 0.78% indicates that while the Amador County Planning Area has values at risk in the floodplain, flood losses would be limited compared to the total built environment and the community would likely be able to recover adequately.

Unincorporated Amador County

Table 4-83, Table 4-84, and Table 4-85 contain information for unincorporated Amador County only. Table 4-83 is a summary table which shows improved parcels and structure values summarized by DFRIM flood type. Table 4-84 breaks down Table 4-83 and shows the number of improved parcels and associated structure and other improved values at risk to the each of the FEMA flood zones using the DFIRM data by property use type. Table 4-85 shows potential losses summarized by 1% and 0.2% annual chance flood events with loss estimates and loss ratios.

Table 4-83 Unincorporated Amador County – Count and Value of Parcels by DFIRM Flood Zone*

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard	238	135	$19,270,381	$24,049,788	$17,719,710	$61,039,879
0.2% Annual Chance Flood Hazard**	5	3	$799,009	$601,255	$299,758	$1,700,022
Other Areas	17,586	12,105	$1,336,915,440	$2,244,201,039	$1,294,363,832	$4,875,480,311
Unincorporated Amador County Total	**17,829**	**12,243**	**$1,356,984,830**	**$2,268,852,082**	**$1,312,383,300**	**$4,938,220,212**

Source: FEMA DFIRM 1/20/2016, Amador County 12/31/2018 Parcel/Assessor's Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual flood zone, 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 also includes all parcels in the 1% annual chance flood zone.

Table 4-84 Unincorporated Amador County – Count and Value of Parcels and Detailed DFIRM Flood Zone 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						
Agricultural	62	50	$9,208,205	$7,679,966	$7,679,966	$24,568,137
Commercial	17	15	$922,781	$1,456,915	$1,456,915	$3,836,611
Industrial	2	2	$532,576	$1,882,058	$2,823,087	$5,237,721
Miscellaneous	50	1	$1,148,186	$1,511,364	$0	$2,659,550

Flood Zone/ Property Use	Total Parcel Count*	Improved Parcel Count*	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Residential	90	67	$7,458,633	$11,519,485	$5,759,742	$24,737,860
Unknown	17	0	$0	$0	$0	$0
1% Annual Chance Flood Hazard Total	**238**	**135**	**$19,270,381**	**$24,049,788**	**$17,719,710**	**$61,039,879**
0.2% Annual Chance Flood Hazard**						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	1	1	$530,457	$1,739	$0	$532,196
Residential	4	2	$268,552	$599,516	$299,758	$1,167,826
Unknown	0	0	$0	$0	$0	$0
0.2% Annual Chance Flood Hazard Total	**5**	**3**	**$799,009**	**$601,255**	**$299,758**	**$1,700,022**
Other Areas						
Agricultural	1,623	1,098	$237,839,099	$162,613,865	$162,613,865	$563,066,829
Commercial	434	304	$92,528,651	$169,371,567	$169,371,567	$431,271,785
Industrial	52	30	$20,704,238	$11,833,810	$17,750,712	$50,288,760
Miscellaneous	734	81	$24,347,011	$10,614,981		$34,961,992
Residential	14,049	10,588	$955,622,482	$1,889,255,463	$944,627,688	$3,789,505,633
Unknown	694	4	$5,873,959	$511,353		$6,385,312
Other Areas Total	**17,586**	**12,105**	**$1,336,915,440**	**$2,244,201,039**	**$1,294,363,832**	**$4,875,480,311**
Unincorporated Amador County Total	**17,829**	**12,243**	**$1,356,984,830**	**$2,268,852,082**	**$1,312,383,300**	**$4,938,220,212**

Source: FEMA DFIRM 1/20/2016, Amador County 12/31/2018 Parcel/Assessor's 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 also includes all parcels in the 1% annual chance flood zone.

Table 4-85 Unincorporated Amador County – 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	238	135	$19,270,381	$24,049,788	$17,719,710	$41,769,498	$8,353,900	0.16%

Flood Zone	Total Parcel Count*	Improved Parcel Count*	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate	Loss Ratio
0.2% Annual Chance Flood Hazard**	5	3	$799,009	$601,255	$299,758	$901,013	$180,203	0.00%
Grand Total	**243**	**138**	**$20,069,390**	**$24,651,043**	**$18,019,468**	**$42,670,511**	**$8,534,103**	**0.16%**

Source: FEMA DFIRM 1/20/2016, Amador County 12/31/2018 Parcel/Assessor's 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 also includes all parcels in the 1% annual chance flood zone.

According to Table 4-84 and Table 4-85, unincorporated Amador County has 135 improved parcels and roughly $42 million of structure and contents value in the 1% annual chance flood zone. The unincorporated County has 3 improved parcels and roughly $901,013 in structure and contents values in the 0.2% annual chance flood zone. These values can be refined a step further. Applying the 20 percent damage factor as previously described, there is a 1% chance in any given year of a flood event causing roughly $8.35 million in damage in the unincorporated areas of Amador County. Applying the same factor, there is a 0.2% chance of a flood event causing $180,203 in damage to the unincorporated County. A loss ratio of 0.16% indicates that while the unincorporated County has values at risk in the floodplain, flood losses would be limited compared to the total built environment and the community would likely be able to recover adequately.

Flooded Acres

In addition to the centroid analysis used to obtain numbers of parcels and values at risk to flood hazards, parcel boundary analysis was performed to obtain total acres and flooded acres by flood zone for each parcel. The parcel layer was intersected with the FEMA DFIRM data to obtain the acres flooded. The following is an analysis of flooded acres in the County.

Methodology

GIS was used to calculate acres flooded by FEMA flood zones and property use categories. The Amador County parcel layer and FEMA DFIRM were intersected, and each segment divided by the intersection of flood zone and parcels was calculated for acres. This process was conducted for 1% and 0.2% annual chance floodplain areas, with each segment being defined by zone type (A, AE, 0.2% Annual Chance, and X) and acres. The resulting data tables with flooded acreages were then imported into a database and linked back to the original parcels, including total acres by parcel number. Once this was completed, each parcel contained acreage values for flooded acre by zone type within the parcel. In the tables below, the 1% and 0.2% annual chance flood zones are summarized and then split out by property use, their total flooded acres, total improved acres, and percent of improved acres that are flooded.

Limitations

One limitation created by this type of analysis is that improvements are uniformly found throughout the parcel, while in reality, only portions of the parcel are improved, and improvements may or may not fall

within the flood zone portion of a parcel; thus, areas of improvements flooded calculated through this method may be higher or lower than those actually seen in a similar real-world event.

The following tables represent a summary and detailed analysis of total acres for each FEMA DFIRM flood zone in the Planning Area. Table 4-86 gives summary information for the Planning Area by 1% and 0.2% annual chance flood zone for the entire Amador County Planning Area. Table 4-87 shows the specific DFIRM flood zone designations that make up the 1% and 0.2% annual chance flood zones for the unincorporated County. Details on flooded acres by detailed flood zone for the incorporated jurisdictions in the County are shown in their respective annexes to this Plan Update. In all of these tables, the Other Areas are areas (Zone X Unshaded – areas outside mapped flood hazard areas) where there is no mapped flood hazard area.

Table 4-86 Amador County Planning Area – Flooded Acres Summary

Jurisdiction / Flood Zone /	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
City of Amador City						
1% Annual Chance Flood Hazard	0	0.00%	0	0.00%	0	0.00%
0.2% Annual Chance Flood Hazard	0	0.00%	0	0.00%	0	0.00%
Other Areas	183	100.00%	60	100.00%	122	100.00%
City of Amador City Total	**183**	**100.00%**	**60**	**100.00%**	**122**	**100.00%**
City of Ione						
1% Annual Chance Flood Hazard	231	8.20%	75	11.48%	156	7.20%
0.2% Annual Chance Flood Hazard	96	3.40%	76	11.67%	20	0.91%
Other Areas	2,494	88.40%	503	76.85%	1,991	91.89%
City of Ione Total	**2,821**	**100.00%**	**655**	**100.00%**	**2,166**	**100.00%**
City of Jackson						
1% Annual Chance Flood Hazard	91	4.28%	41	5.39%	50	3.66%
0.2% Annual Chance Flood Hazard	3	0.13%	2	0.23%	1	0.08%
Other Areas	2,024	95.58%	715	94.38%	1,309	96.25%

Jurisdiction / Flood Zone /	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
City of Jackson Total	**2,118**	**100.00%**	**758**	**100.00%**	**1,360**	**100.00%**
City of Plymouth						
1% Annual Chance Flood Hazard	28	1.70%	5	0.81%	23	2.19%
0.2% Annual Chance Flood Hazard	0	0.00%	0	0.00%	0	0.00%
Other Areas	1,624	98.30%	581	99.19%	1,043	97.81%
City of Plymouth Total	**1,652**	**100.00%**	**586**	**100.00%**	**1,066**	**100.00%**
City of Sutter Creek						
1% Annual Chance Flood Hazard	27	1.74%	15	1.98%	13	1.52%
0.2% Annual Chance Flood Hazard	7	0.41%	5	0.65%	2	0.20%
Other Areas	1,545	97.85%	721	97.37%	824	98.27%
City of Sutter Creek Total	**1,579**	**100.00%**	**741**	**100.00%**	**838**	**100.00%**
Unincorporated Amador County						
1% Annual Chance Flood Hazard	16,491	4.34%	7,115	4.37%	9,377	4.31%
0.2% Annual Chance Flood Hazard	112	0.03%	32	0.02%	80	0.04%
Other Areas	363,783	95.64%	155,755	95.61%	208,029	95.65%
Unincorporated Amador County Total	**380,387**	**100.00%**	**162,901**	**100.00%**	**217,486**	**100.00%**
Grand Total	**388,740**	**100.00%**	**165,700**	**100.00%**	**223,039**	**100.00%**

Source: FEMA DFIRM 1/20/2016, Amador County 12/31/2018 Parcel/Assessor's Data

*Percentage of each jurisdiction in the flooded area

Table 4-87 Unincorporated Amador County – Flooded Acres by Detailed DFIRM Flood Zones

Flood Zone / Jurisdiction	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood Hazard						
Zone A						
Agricultural	7,512	1.97%	5,608	3.44%	1,904	0.88%
Commercial	74	0.02%	49	0.03%	24	0.01%
Industrial	222	0.06%	222	0.14%	0	0.00%
Miscellaneous	6,453	1.70%	533	0.33%	5,920	2.72%
Residential	888	0.23%	554	0.34%	334	0.15%
Unknown	1,040	0.27%	0	0.00%	1,040	0.48%
Zone A Total	**16,189**	**4.26%**	**6,966**	**4.28%**	**9,223**	**4.24%**
Zone AE						
Agricultural	84	0.02%	12	0.01%	72	0.03%
Commercial	0	0.00%	0	0.00%	0	0.00%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	47	0.01%	47	0.03%	0	0.00%
Residential	33	0.01%	26	0.02%	6	0.00%
Unknown	38	0.01%	0	0.00%	38	0.02%
Zone AE Total	**203**	**0.05%**	**86**	**0.05%**	**117**	**0.05%**
Zone AE Floodway						
Agricultural	24	0.01%	14	0.01%	10	0.00%
Commercial	0	0.00%	0	0.00%	0	0.00%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	0	0.00%	0	0.00%	0	0.00%
Residential	67	0.02%	49	0.03%	18	0.01%
Unknown	9	0.00%	0	0.00%	9	0.00%
Zone AE Floodway Total	**100**	**0.03%**	**63**	**0.04%**	**37**	**0.02%**
1% Annual Chance Flood Hazard Total	**16,491**	**4.34%**	**7,115**	**4.37%**	**9,377**	**4.31%**
0.2% Annual Chance Flood Hazard						
Agricultural	62	0.02%	1	0.00%	61	0.03%
Commercial	0	0.00%	0	0.00%	0	0.00%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	29	0.01%	29	0.02%	0	0.00%

Flood Zone / Jurisdiction	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Residential	4	0.00%	2	0.00%	2	0.00%
Unknown	18	0.00%	0	0.00%	18	0.01%
0.2% Annual Chance Flood Hazard Total	**112**	**0.03%**	**32**	**0.02%**	**80**	**0.04%**
Other Areas						
Zone X (unshaded)						
Agricultural	154,777	40.69%	104,094	63.90%	50,683	23.30%
Commercial	2,908	0.76%	2,185	1.34%	723	0.33%
Industrial	1,179	0.31%	773	0.47%	406	0.19%
Miscellaneous	99,382	26.13%	1,947	1.20%	97,435	44.80%
Residential	68,589	18.03%	46,428	28.50%	22,161	10.19%
Unknown	36,949	9.71%	328	0.20%	36,621	16.84%
Zone X (unshaded) Total	**363,783**	**95.64%**	**155,755**	**95.61%**	**208,029**	**95.65%**
Other Areas Total	**363,783**	**95.64%**	**155,755**	**95.61%**	**208,029**	**95.65%**
Unincorporated Amador County Total	**380,387**	**100.00%**	**162,901**	**100.00%**	**217,486**	**100.00%**

Source: FEMA DFIRM 1/20/2016, Amador County 12/31/2018 Parcel/Assessor's Data

Insurance Coverage, Claims Paid, and Repetitive Losses

Unincorporated Amador County joined the NFIP on September 24, 1984. The County does not participate in the CRS. NFIP insurance data provided by DWR indicates that as of March 2,2020, there were 38 policies in force in the unincorporated County, resulting in $8,631,400 of insurance in force. There have been 14 closed paid losses totaling $297,392.31. Of these losses, 10 were parcels in A zones and 4 parcels were in B, C, or X zone. Of the 14 claims, 11 claims were associated with pre-FIRM structures and 3 with post-FIRM structures. There has been one Substantial Damage Claim since 1978. There are no repetitive loss (RL) or severe repetitive loss (SRL) properties in the unincorporated County.

Based on this analysis of insurance coverage, Amador County has values at risk to the 1% and 0.2% annual chance and greater floods. Of the 753 improved parcels within the 1% annual chance flood zone, 95 (or 12.6 percent) of those parcels maintain flood insurance. This can be seen on Table 4-88 along with insurance policies for the five unincorporated communities that comprise the Planning Area. Flood insurance details specific to the incorporated communities are included in their jurisdictional annexes.

Table 4-88 Amador County Planning Area – Percentage of Policy Holders to Improved Parcels in the 1% Annual Chance Floodplain

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
City of Amador City	0	0	0.0%
City of Ione	174	35	20.0%
City of Jackson	100	34	34.0%
City of Plymouth	1	0	0.0%
City of Sutter Creek	34	6	17.6%
Unincorporated County	444	20	4.5%
Total	**753**	**95**	**12.6%**

Source: FEMA DFIRM 1/20/2016, Amador County 12/31/2018 Parcel/Assessor's Data

Population at Risk

A separate analysis was performed to determine populations that reside in flood zones. Using GIS, the DFIRM Flood dataset was overlayed on the improved residential parcel data. Those parcel centroids that intersect a flood zone were counted and multiplied by the Census Bureau average household size for each jurisdiction; and tabulated by flood zone (see Table 4-89). According to this analysis, there is a population of 739 in the 1% annual chance flood zone, and 636 in the 0.2% annual chance flood zone.

Table 4-89 Amador County Planning Area – Residential Population at Risk to 1% and 0.2% Annual Chance Flooding

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	131	335	237	607
Jackson	86	184	0	0
Plymouth	1	2	0	0
Sutter Creek	30	64	11	24
Unincorporated Amador County	67	154	2	5
Total	**315**	**739**	**250**	**636**

Source: FEMA DFIRM 1/20/2016, US Census Bureau Average Household Sizes: Amador City (2.18); Ione (2.56), Jackson (2.14); Plymouth (2.47), Sutter Creek (2.14): and unincorporated Amador County (2.30)

*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

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Amador County and all jurisdictions to determine critical facilities in the 1% and 0.2 annual chance floodplains. Using GIS, the DFIRM flood zones were overlayed on the critical facility GIS layer. Figure 4-102 shows critical facilities, as well as the DFIRM flood zones. Table 4-90 summarizes the critical facilities in the County by DFIRM flood zone. Table 4-91 details critical facilities by facility type and count by jurisdiction for the Planning Area. Table 4-92 details critical facilities by facility type for the unincorporated County. Information on critical facilities in the incorporated jurisdictions in the County can be found in their respective annexes to this Plan Update. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix F.

Figure 4-102 Amador County Planning Area – Critical Facilities in DFIRM Flood Zones

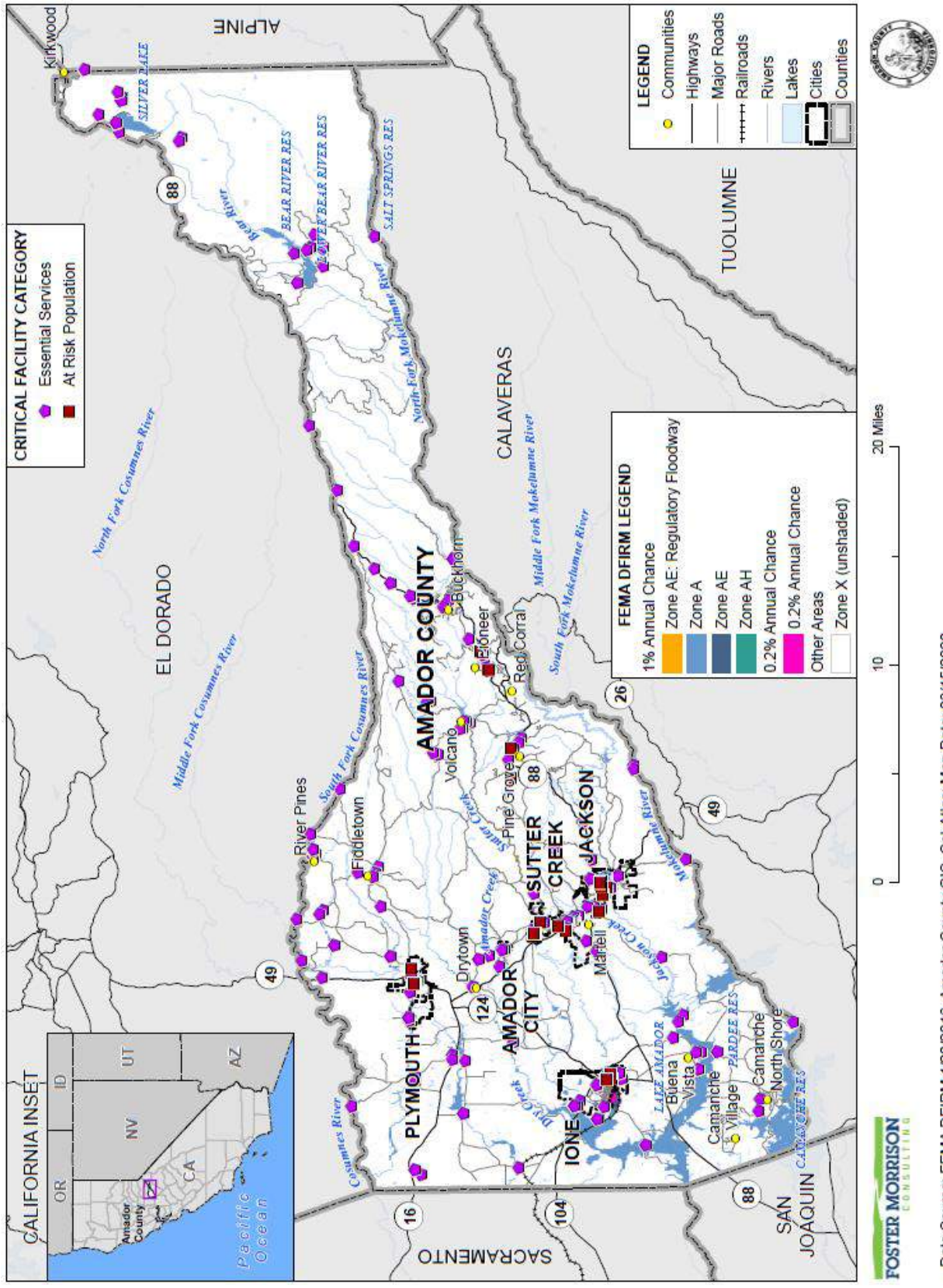


Table 4-90 Amador County Planning Area – Summary of Critical Facilities in DFIRM Flood Zones

Flood Zone/Critical Facility Category	Facility Count
1% Annual Chance Flood Hazard	
Essential Services Facilities	40
At Risk Population Facilities	2
1% Annual Chance Flood Hazard Total	**42**
0.2% Annual Chance Flood Hazard	
Essential Services Facilities	2
At Risk Population Facilities	0
0.2% Annual Chance Flood Hazard Total	**2**
Other Areas	
Essential Services Facilities	154
At Risk Population Facilities	22
Other Areas Total	**176**
Grand Total	**220**

Source: Amador County GIS, FEMA 1/20/2016 DFIRM

Table 4-91 Amador County Planning Area – Critical Facilities in DFIRM Flood Zones by Jurisdiction and Facility Category

Jurisdiction/Critical Facility Category /Flood Zone	Facility Count
City of Amador City	
Essential Services	
1% Annual Chance Flood Hazard	0
0.2% Annual Chance Flood Hazard	0
Other Areas	3
City of Amador City Total	3
City of Ione	
Essential Services	
1% Annual Chance Flood Hazard	7
0.2% Annual Chance Flood Hazard	0
Other Areas	7
At Risk Population	
1% Annual Chance Flood Hazard	2
0.2% Annual Chance Flood Hazard	0
Other Areas	2
City of Ione Total	**18**

Jurisdiction/Critical Facility Category /Flood Zone	Facility Count
City of Jackson	
Essential Services	
1% Annual Chance Flood Hazard	3
0.2% Annual Chance Flood Hazard	1
Other Areas	19
At Risk Population	
1% Annual Chance Flood Hazard	
0.2% Annual Chance Flood Hazard	
Other Areas	**8**
City of Jackson Total	**31**
City of Plymouth	
Essential Services	
1% Annual Chance Flood Hazard	0
0.2% Annual Chance Flood Hazard	0
Other Areas	9
At Risk Population	
1% Annual Chance Flood Hazard	
0.2% Annual Chance Flood Hazard	
Other Areas	1
City of Plymouth Total	**10**
City of 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
0.2% Annual Chance Flood Hazard	0
Other Areas	6
City of Sutter Creek Total	**13**
Unincorporated Amador County	
Essential Services	
1% Annual Chance Flood Hazard	28
0.2% Annual Chance Flood Hazard	0
Other Areas	112
At Risk Population	
1% Annual Chance Flood Hazard	0

Jurisdiction/Critical Facility Category /Flood Zone	Facility Count
0.2% Annual Chance Flood Hazard	0
Other Areas	5
Amador County Total	**145**
Grand Total	**220**

Source: Amador County GIS, FEMA 1/20/2016 DFIRM

Table 4-92 Unincorporated Amador County – Critical Facilities in Detailed DFIRM Flood Zones by Critical Facility Category and Type

Flood Zone	Critical Facility Category/Critical Facility Type	Facility Count
1% Annual Chance Flood Hazard		
Zone A	**Essential Services**	
	Bridge	23
	Community Center	1
	EMS Station	1
	Public Water System	2
	Essential Services Total	**27**
	Zone A Total	**27**
Zone AE Floodway	**Essential Services**	
	Bridge	1
	Essential Services Total	**1**
	Zone AE Floodway Total	**1**
1% Annual Chance Flood Hazard Total		**28**
Other Areas		
Zone X (unshaded)	**Essential Services**	
	Animal Shelter	1
	Bridge	7
	Clinic	5
	Community Center	4
	EMS Station	1
	Fire Station	16
	Library	2
	Post Office	6
	Power Plant	3
	Power Substation	3
	Public Administration Building	1
	Public Water System	61

Flood Zone	Critical Facility Category/Critical Facility Type	Facility Count
	Ranger Station	1
	Veterans Services	1
	Essential Services Total	**112**
	At Risk Population	
	School	5
	At Risk Population Total	**5**
	Zone X (unshaded) Total	**117**
Other Areas Total		**117**
Amador County Total		**145**

Source: Amador County GIS, FEMA 1/20/2016 DFIRM

Overall Community Impact

Floods and their impacts vary by location and severity of any given flood event and will likely only affect certain areas of the County during specific times. Natural areas, such as wetlands and riparian areas within the floodplain, often benefit from periodic flooding as a naturally recurring phenomenon. These natural areas often reduce flood impacts by allowing absorption and infiltration of floodwaters. Preserving and protecting these areas and associated functions are a vital component of sound floodplain management practices for Amador County. Based on the risk assessment, it is evident that floods will continue to have potentially devastating economic impacts to certain areas of the County. However, many of the floods in the County are minor, localized flood 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 and services;
- Health hazards associated with mold and mildew, contamination of drinking water, etc.;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community;
- Negative impact on commercial and residential property values; and
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.
- Impact on the overall mental health of the community.

Future Development and Future Flood Conditions

This section provides an analysis of the flood hazard and proposed future development within the County based on FEMA DFIRMs and also discusses considerations in evaluating future flooding conditions.

Future Development: General Considerations

Communities that participate in the NFIP adopt regulations and codes that govern development in special flood hazard areas 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 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 2015 International Code, 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. Also to be considered in reducing flooding in areas of existing and future development is to promote implementation of stormwater program elements and erosion and sediment controls, including the clearing of vegetation from natural and man-made drains that are critical to flood protection. Both native and invasive species can clog drains, and reduce flows of floodwaters, which slow that natural drainage process and can exacerbate flooding.

Future Development: DFIRM Analysis

Unincorporated Amador County has identified six future development projects within the unincorporated County area. GIS was used to determine the possible impacts of flooding to the six future development projects.

Methodology

Amador County's 12/31/2018 Parcel/Assessor's data and data from the County planning department were used as the basis for the unincorporated County's inventory of parcels and acres of future development areas. The Amador County Planning Department provided a table containing the assessor parcel numbers (APNs) for the 2,410 parcels representing the six different future development projects or areas. Using the GIS parcel spatial file and the APNs, the six future development projects were mapped.

For the flood analysis of future development areas, the parcel data was converted to a point layer using a centroid conversion process, in which each parcel was identified by a central point and linked to the Assessor's data. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts and acreage within each FEMA flood zone. DFIRM flood zones and future development areas are shown on Figure 4-103 and parcels and acreages in those areas are shown in Table 4-93.

Figure 4-103 Unincorporated Amador County – Future Development Areas in FEMA DFIRM Flood Zones

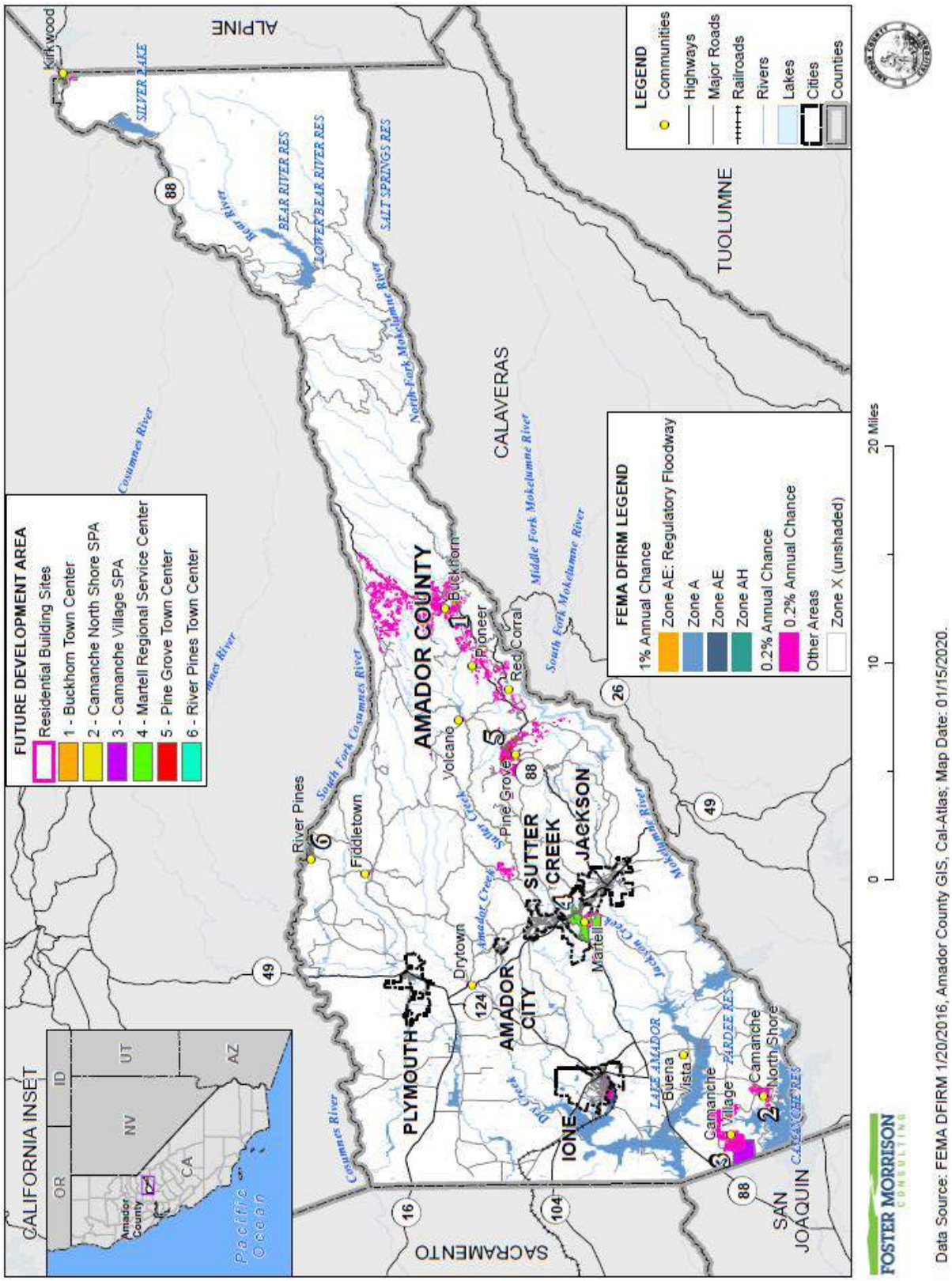


Table 4-93 Unincorporated Amador County – Future Development in DFIRM Flood Zones

Future Development / Flood Zones	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Buckhorn Town Center						
1% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
0.2% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
Other Areas Total	79	71	8	120.23	105.70	14.53
Buckhorn Town Center Total	**79**	**71**	**8**	**120.23**	**105.70**	**14.53**
Camanche North Shore SPA						
1% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
0.2% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
Other Areas Total	183	124	59	130.11	58.68	71.43
Camanche North Shore SPA Total	**183**	**124**	**59**	**130.11**	**58.68**	**71.43**
Martell Regional Service Center						
1% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
0.2% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
Other Areas Total	1	1	0	501.05	501.05	0.00
Martell Regional Service Center Total	**1**	**1**	**0**	**501.05**	**501.05**	**0.00**
Pine Grove Town Center						
1% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
0.2% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
Other Areas Total	148	101	47	700.13	213.08	487.05
Pine Grove Town Center Total	**148**	**101**	**47**	**700.13**	**213.08**	**487.05**
River Pines Town Center						
1% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
0.2% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
Other Areas Total	211	166	45	366.47	194.89	171.59
River Pines Town Center Total	**211**	**166**	**45**	**366.47**	**194.89**	**171.59**
Amador County Residential Building Sites						
1% Annual Chance Flood Hazard	2	0	2	0.56	0.00	0.56
0.2% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
Other Areas Total	1,652	121	1,531	2,801.73	259.78	2,541.95
1% Annual Chance Flood Hazard Total	**1,654**	**121**	**1,533**	**2,802.29**	**259.78**	**2,542.51**
Grand Total	**2,410**	**678**	**1,732**	**4,678.94**	**1,382.56**	**3,296.38**

Source: Amador County GIS, FEMA DFIRM 1/20/2016

Future Flood Conditions: The Effects of Climate Change

The effects of climate change on future flood conditions should also be considered. While the risk and associated short and long-term impacts of climate change are uncertain, experts in this field tend to agree that among the most significant impacts include those resulting from increased heat and precipitation events that cause increased frequency and magnitude of flooding. Changes associated with climate change and flooding could be significant given the higher elevations in the County where winter snow could turn to more significant rain events. Increases in damaging flood events will cause greater property damage, public health and safety concerns displacement, and loss of life. In addition, an increase in the magnitude and severity of flood events can lead to potential contamination of potable water and contamination of food crops given the agricultural industry in the County. Displacement of residents can include both temporary and long-term displacement, increase in insurance rates or restriction of coverage in vulnerable areas.

Amador County will continue to study the risk and vulnerability associated with future flood conditions, both in terms of future growth areas and other considerations such as climate change, as they evaluate and implement their flood mitigation and adaptation strategy for the Amador County Planning Area.

Future Flood Conditions: ARkStorm Scenario

Also to be considered in evaluating potential "worst case" future flood conditions, is the ARkStorm Scenario. Although much attention in California's focuses on the "Big One" as a high magnitude earthquake, there is the risk of another significant event in California – a massive, statewide winter storm. The last such storms occurred in the 19th century, outside the memory of current emergency managers, officials, and communities. However, massive storms are a recurring feature of the state, the source of rare but inevitable disasters. The USGS Multi Hazards Demonstration Project's (MHDP) developed a product called ARkStorm, which addressed massive U.S. West Coast storms analogous to those that devastated California in 1861-1862. Over the last decade, scientists have determined that the largest storms in California are the product of phenomena called Atmospheric Rivers, and so the MHDP storm scenario is called the ARkStorm, for Atmospheric River 1000 (a measure of the storm's size).

Scientific studies of offshore deposits in northern and southern California indicate that storms of this magnitude and larger have occurred about as often as large earthquakes on the southern San Andreas Fault. Such storms are projected to become more frequent and intense as a result of climate change. This scientific effort resulted in a plausible flood hazard scenario to be used as a planning and preparation tool by hazard mitigation and emergency response agencies.

For the ARkStorm Scenario, experts designed a large, scientifically realistic meteorological event followed by an examination of the secondary hazards (e.g., landslides and flooding), physical damages to the intense winter storms of 1861-62 that left California's Central Valley impassible. Storms far larger than the ARkStorm, dubbed megastorms, have also hit California at least six times in the last two millennia.

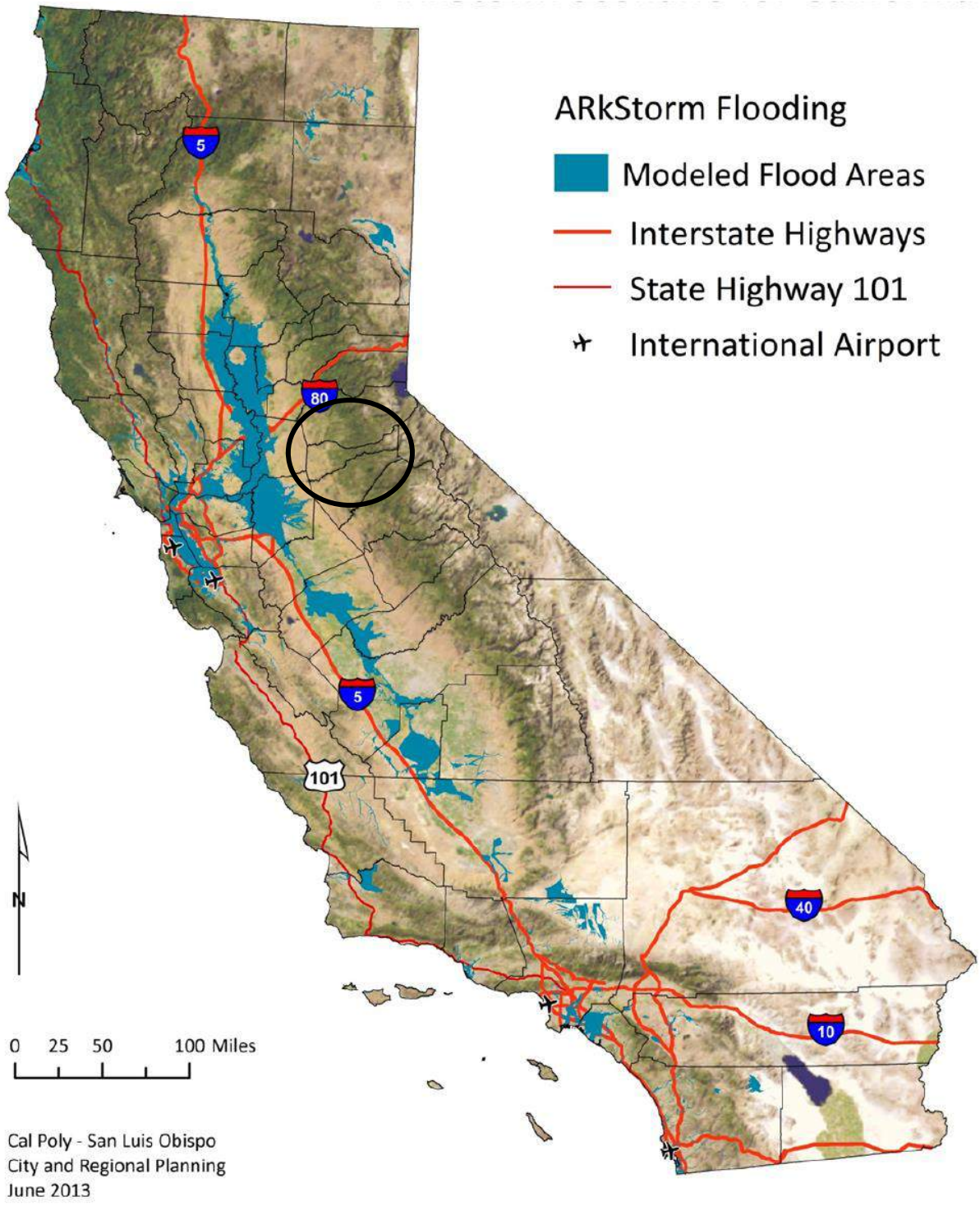
The ARkStorm produces precipitation in many places exceeding levels experienced on average every 500 to 1,000 years. Extensive flooding in many cases overwhelms the state's flood protection system, which is at best designed to resist 100- to 200-year runoffs (many flood protection systems in the state were designed for smaller runoff events). The Central Valley experiences widespread flooding. Serious flooding also

occurs in Orange County, Los Angeles County, San Diego, the San Francisco Bay Area, and other coastal communities. In some places, winds reach hurricane speeds, as high as 125 miles per hour. Hundreds of landslides occur, damaging roads, highways, and homes. Property damage exceeds $300 billion, most of it from flooding. Agricultural losses and other costs to repair lifelines, dewater flooded islands, and repair damage from landslides brings the total direct property loss to nearly $400 billion, of which only $20 to $30 billion would be recoverable through public and commercial insurance. Power, water, sewer, and other lifelines experience damage that takes weeks or months to restore. Flooding evacuation could involve over one million residents in the inland region and Delta counties.

A storm of ARkStorm's magnitude has important implications: 1) it raises serious questions about the ability of existing national, state, and local disaster policy to handle an event of this magnitude; 2) it emphasizes the choice between paying now to mitigate, or paying a lot more later to recover; 3) innovative financing solutions are likely to be needed to avoid fiscal crisis and adequately fund response and recovery costs; 4) responders and government managers at all levels could be encouraged to conduct self-assessments and devise table-top exercises to exercise their ability to address a similar event; 5) the scenario can be a reference point for application of FEMA and Cal OES guidance connecting federal, state, and local natural hazards mapping and mitigation planning under the NFIP and Disaster Mitigation Act of 2000; and 6) common messages to educate the public about the risk of such an extreme event could be developed and consistently communicated to facilitate policy formulation and transformation.

Figure 4-104 depicts an ARkStorm modeled scenario showing the potential for flooding primarily in the Central Valley as the result of a large storm. In Amador County, the modeled scenario suggests the County would face minimal inundation in the populated areas of the County.

Figure 4-104 Projected ARkStorm Flooding in California



Source: USGS ArkStorm

4.3.10. Flood: Localized Stormwater Flooding Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Historically, the Amador County Planning Area has been at risk to flooding primarily during the winter and spring months when stream systems in the County swell with heavy rainfall. Localized flooding also occurs throughout the Planning Area at various times throughout the year with several areas of primary concern unique to each community. Amador County tracks localized flooding areas as shown in Table 4-40 in Section 4.2.13.

Localized flooding can cause damage to roads, infrastructure, and utilities, as well as to buildings in the County. Temporary road closures due to localized flooding can be a significant issue in the County. In addition to flooding and road closures, damage to these areas during heavy storms includes, pavement deterioration, washouts, landslides/mudslides, debris areas, and downed trees. Impacts to property and life safety from localized flooding would be more limited.

Future Development

The risk of stormwater/localized flooding to future development can be minimized by accurate recordkeeping of repetitive localized storm activity. 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.

While limited much of the growth in Amador County is occurring through expansion of the urban 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.

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. Floodplain modeling and master planning should be based on build out property use to ensure that all new development remains safe from future flooding. While local floodplain management, stormwater management, and water quality regulations and policies address these changes on a site-by-site basis, their cumulative effects can have a negative impact on the floodplain.

4.3.11. Landslides, Mudslides, and Debris Flows Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Landslides in Amador County include a wide variety of processes resulting in downward and outward movement of soil, rock, and vegetation. Common names for landslide types include slumps, rockslides, debris slides, lateral spreading, debris avalanches, earth flows, and soil creep. 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 may be triggered by both natural- and human-caused activity. Impacts from landslide and debris flow are limited in the County, as the location in which they occur tends to be less populated or on federal lands. Impacts in the County may be to structures, infrastructure, and to life safety.

Although this hazard also includes related issues such as mudslides and debris flows, available mapped hazard data was limited to landslides; thus, the remainder of this section is focused on the landslide vulnerability.

Methodology

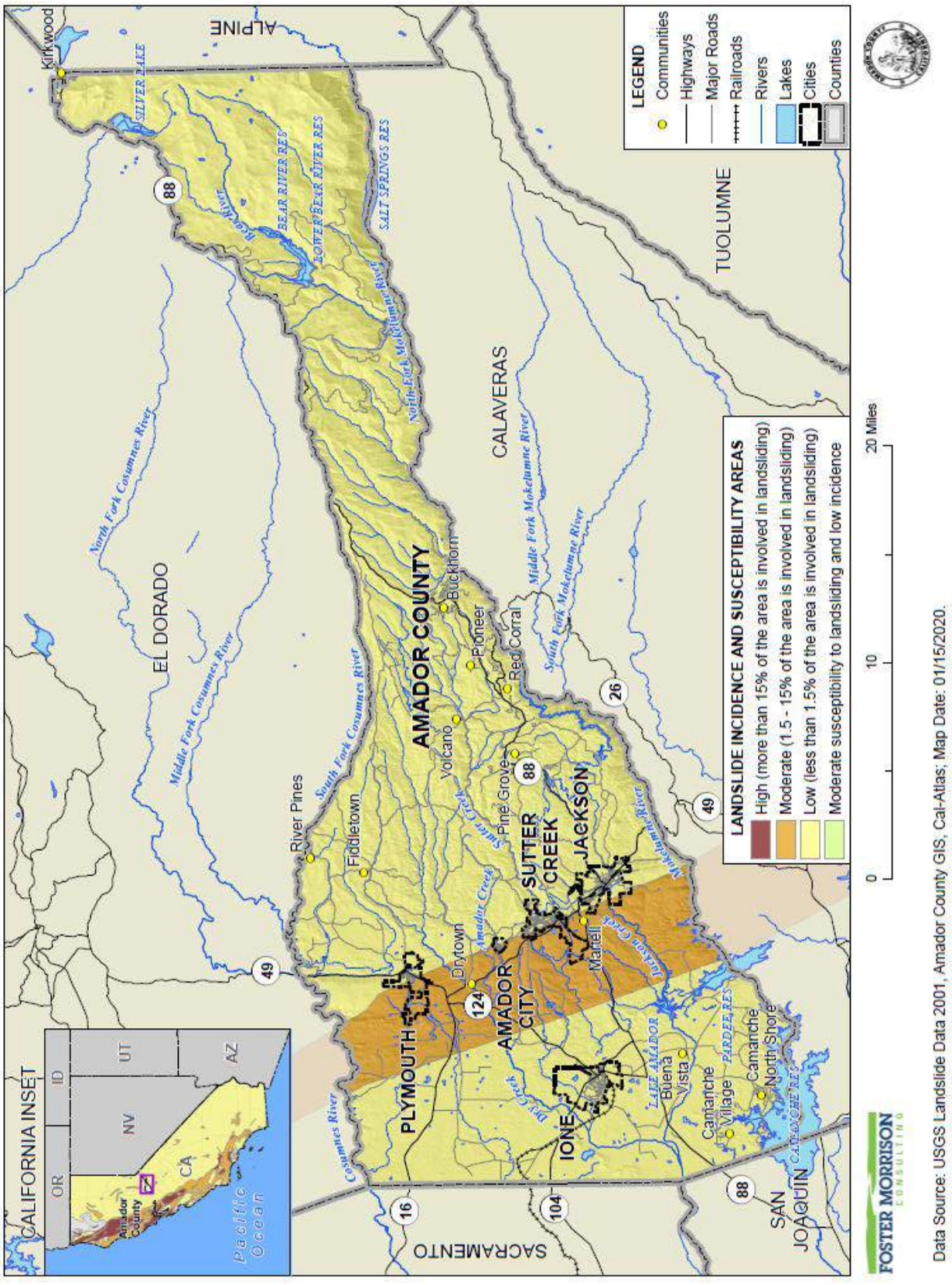
The landslide incidence and susceptibility data are a digital version of U.S. Geological Survey Professional Paper 1183, Landslide Overview Map of the Conterminous United States dated 2001. The map and digital data delineate areas in the conterminous United States where large numbers of landslides have occurred and areas which are susceptible to landsliding.

The 2001 Landslide Incidence and Susceptibility data was obtained for the Amador County Planning Area. According to the landslide layer obtained by the USGS there landslide incidence ranges from low to moderate in the Planning Area. Most of the Planning Area falling in the low, with small amounts in the foothill portion of the County falling in the moderate areas. The County's parcel layer was used as the basis for the inventory of all parcels within Amador County. GIS was used to overlay the landslide hazard layer onto the parcel layer centroids, and where the landslide zones intersected a parcel centroid, it was assigned with that hazard zone for the entire parcel. Note that the value of the improved land is also included in the total of values at risk as the land itself is at risk to landslide.

Values at Risk

The USGS landslide layer was overlaid with the Amador County parcel layer in GIS to obtain results. Areas of landslide incidence and susceptibility in the Amador County Planning Area is shown in Figure 4-105.

Figure 4-105 Amador County Planning Area – Landslide Incidence and Susceptibility Areas



Amador County Planning Area Landslide Analysis Results

Table 4-94 summarizes and Table 4-95 details and illustrates the potential estimated damages to Amador County Planning Area from landslides, including FEMA contents replacement values. Potential damages to the incorporated jurisdictions County by landslide incidence and susceptibility and property use type may be found in their respective annexes to this LHMP Update. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the landslide incidence and susceptibility areas due primarily to Proposition 13 and to a lesser extent properties falling under the Williamson Act.

Table 4-94 Amador County Planning Area – County and Value of Parcels in Landslide Incidence and Susceptibility Areas

Landslide Incidence and Susceptibility Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
High	0	0	$0	$0	$0	$0
Moderate	1,483	940	$180,665,015	$256,807,679	$200,172,949	$637,645,643
Low	22,689	16,326	$1,658,084,715	$3,107,083,563	$1,788,295,700	$6,553,463,978
Total	**24,172**	**17,266**	**$1,838,749,730**	**$3,363,891,242**	**$1,988,468,649**	**$7,191,109,621**

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data

Table 4-95 Amador County Planning Area – Count and Value of Parcels in Landslide Incidence and Susceptibility Areas by Jurisdiction

Jurisdiction/ Landslide Incidence and Susceptibility Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
City of Amador City						
Moderate	154	99	$10,973,614	$14,249,224	$8,359,983	$33,582,821
Low	27	12	$2,269,721	$2,156,419	$1,230,366	$5,656,506
City of Amador City Total	**181**	**111**	**$13,243,335**	**$16,405,643**	**$9,590,349**	**$39,239,327**
City of Ione						
Low	2,034	1,671	$146,427,350	$312,506,962	$162,437,754	$621,372,066
City of Ione Total	**2,034**	**1,671**	**$146,427,350**	**$312,506,962**	**$162,437,754**	**$621,372,066**
City of Jackson						
Moderate	105	97	$6,917,679	$18,404,863	$9,202,430	$34,524,972
Low	2,013	1,604	$158,010,707	$430,613,728	$299,191,499	$887,815,934
City of Jackson Total	**2,118**	**1,701**	**$164,928,386**	**$449,018,591**	**$308,393,929**	**$922,340,906**
City of Plymouth						
Moderate	106	46	$20,591,306	$23,553,845	$17,947,673	$62,092,824
Low	472	380	$28,961,761	$43,034,972	$25,104,561	$97,101,294

Jurisdiction/ Landslide Incidence and Susceptibility Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
City of Plymouth Total	**578**	**426**	**$49,553,067**	**$66,588,817**	**$43,052,234**	**$159,194,118**
City of Sutter Creek						
Moderate	184	121	$21,185,098	$43,603,974	$32,736,535	$97,525,607
Low	1,248	993	$86,427,664	$206,915,173	$119,874,548	$413,217,385
City of Sutter Creek Total	**1,432**	**1,114**	**$107,612,762**	**$250,519,147**	**$152,611,083**	**$510,742,992**
Amador County						
Moderate	934	577	$120,997,318	$156,995,773	$131,926,328	$409,919,419
Low	16,895	11,666	$1,235,987,512	$2,111,856,309	$1,180,456,972	$4,528,300,793
Amador County Total	**17,829**	**12,243**	**$1,356,984,830**	**$2,268,852,082**	**$1,312,383,300**	**$4,938,220,212**
Grand Total	**24,172**	**17,266**	**$1,838,749,730**	**$3,363,891,242**	**$1,988,468,649**	**$7,191,109,621**

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data

Unincorporated Amador County Landslide Analysis Results

Table 4-96 summarizes and Table 4-97 details and illustrates the potential damages to the unincorporated County by landslide incidence and susceptibility and property use type.

Table 4-96 Unincorporated Amador County– Parcels and Values at Risk in Landslide Incidence and Susceptibility Areas

Landslide Incidence and Susceptibility Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Moderate	934	577	$120,997,318	$156,995,773	$131,926,328	$409,919,419
Low	16,895	11,666	$1,235,987,512	$2,111,856,309	$1,180,456,972	$4,528,300,793
Amador County Total	**17,829**	**12,243**	**$1,356,984,830**	**$2,268,852,082**	**$1,312,383,300**	**$4,938,220,212**

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data

Table 4-97 Unincorporated Amador County – Count and Value of Parcels in Landslide Incidence and Susceptibility Areas by Property Use

Landslide Incidence and Susceptibility Area/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Moderate						
Agricultural	338	232	$37,097,738	$28,377,320	$28,377,320	$93,852,378
Commercial	111	67	$37,598,821	$76,480,997	$76,480,997	$190,560,815
Industrial	13	4	$1,866,871	$1,033,552	$1,550,329	$4,450,752
Miscellaneous	48	2	$6,272,041	$68,530		$6,340,571

Landslide Incidence and Susceptibility Area/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Residential	396	272	$38,161,847	$51,035,374	$25,517,682	$114,714,903
Unknown	28	0	$0	$0	$0	$0
Moderate Total	**934**	**577**	**$120,997,318**	**$156,995,773**	**$131,926,328**	**$409,919,419**
Low						
Agricultural	1,347	916	$209,949,566	$141,916,511	$141,916,511	$493,782,588
Commercial	340	252	$55,852,611	$94,347,485	$94,347,485	$244,547,581
Industrial	41	28	$19,369,943	$12,682,316	$19,023,470	$51,075,729
Miscellaneous	737	81	$19,753,613	$12,059,554	$0	$31,813,167
Residential	13,747	10,385	$925,187,820	$1,850,339,090	$925,169,506	$3,700,696,416
Unknown	683	4	$5,873,959	$511,353	$0	$6,385,312
Low Total	**16,895**	**11,666**	**$1,235,987,512**	**$2,111,856,309**	**$1,180,456,972**	**$4,528,300,793**
Amador County Total	**17,829**	**12,243**	**$1,356,984,830**	**$2,268,852,082**	**$1,312,383,300**	**$4,938,220,212**

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data

It should be noted that maps and analysis represent analyses based on best available data. There have been past occurrences of landslides in areas not shown to be at risk to landslide. Generally, landslide risk maps detail areas prone to slope failure; the maps rarely include the runout areas where the failed slope will go. By way of example, a landslide on March 22, 2014, killed 43 people when it wiped out a rural neighborhood in Oso, northeast of Seattle. While the failed slope area was mapped as prone to landslides, the runout area was not. It was the runout area that resulted in devastating loss. Thus, mapping of landslide susceptible areas should be considered as one part of the equation. Damages to the area that could be inundated by such slope failure should also be considered by communities.

Populations at Risk

Those residential parcel centroids that intersect the landslide risk areas were counted and multiplied by the 2010 Census Bureau average household factors for each jurisdiction in the Planning Area. This is shown in Table 4-98. According to this analysis, there is a total population of 975 residents in the Amador County Planning Area are risk to moderate incidence or greater landslide, all of which are in the unincorporated County.

Table 4-98 Amador County Planning Area –Residential Parcels and Population by Landslide Incidence and Susceptibility Areas

Jurisdiction	Improved Residential Parcels	Population at Risk
Amador City	84	183
Ione	0	0
Jackson	97	208
Plymouth	34	84

Jurisdiction	Improved Residential Parcels	Population at Risk
Sutter Creek	101	216
Unincorporated Amador County	272	626
Total	**588**	**1,317**

Source: USGS, US Census Bureau Average Household Sizes: Amador City (2.18); Ione (2.56), Jackson (2.14); Plymouth (2.47), Sutter Creek (2.14): and unincorporated Amador County (2.30)

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Amador County and all jurisdictions to determine critical facilities in the landslide potential areas. Using GIS, the UGSG landslide potential areas were overlayed on the critical facility GIS layer. Figure 4-106 shows critical facilities, as well as the landslide potential areas. Table 4-99 summarized critical facilities in landslide potential areas. Table 4-100 details critical facilities by facility type and count by jurisdiction for the Planning Area. Table 4-101 details critical facilities by facility type for the unincorporated County. Information on critical facilities in the incorporated jurisdictions in the County can be found in their respective annexes to this Plan Update. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix F.

Figure 4-106 Amador County Planning Area – Critical Facilities in Landslide Incidence and Susceptibility Areas

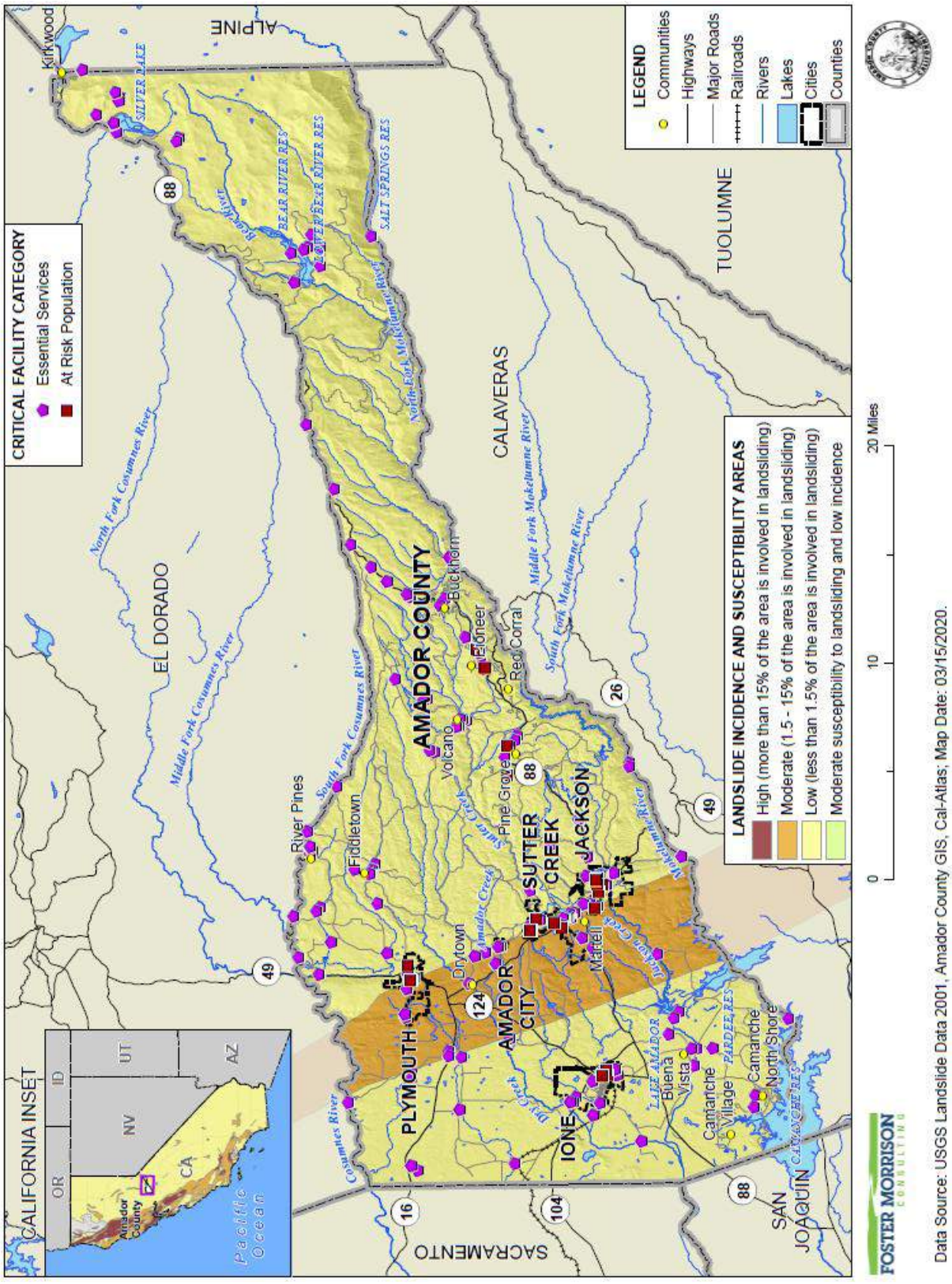


Table 4-99 Amador County Planning Area – Summary of Critical Facilities in Landslide Incidence and Susceptibility Areas

Landslide Incidence and Susceptibility Area / Critical Facility Category	Facility Count
High	
Essential Services Facilities	0
At Risk Population Facilities	0
High Total	**0**
Moderate	
Essential Services Facilities	20
At Risk Population Facilities	3
Moderate Total	**23**
Low	
Essential Services Facilities	176
At Risk Population Facilities	21
Low Total	**197**
Grand Total	**220**

Source: Amador County GIS, USGS

Table 4-100 Amador County Planning Area – Critical Facilities in Landslide Incidence and Susceptibility Areas by Jurisdiction

Jurisdiction / Landslide Incidence and Susceptibility Areas/Critical Facility Category	Facility Count
City of Amador City	
Moderate	
Essential Services	3
At Risk Population	0
Moderate Total	**3**
Low	
Essential Services	0
At Risk Population	0
Low Total	0
City of Amador City Total	**3**
City of Ione	
Moderate	
Essential Services	0
At Risk Population	0
Moderate Total	**0**
Low	

Jurisdiction / Landslide Incidence and Susceptibility Areas/Critical Facility Category	Facility Count
Essential Services	14
At Risk Population	4
Low Total	18
City of Ione Total	**18**
City of Jackson	
Moderate	
Essential Services	1
At Risk Population	1
Moderate Total	**2**
Low	
Essential Services	22
At Risk Population	7
Low Total	**29**
City of Jackson Total	**31**
City of Plymouth	
Moderate	
Essential Services	2
At Risk Population	
Moderate Total	**2**
Low	
Essential Services	7
At Risk Population	1
Low Total	**8**
City of Plymouth Total	**10**
City of Sutter Creek	
Moderate	
Essential Services	1
At Risk Population	2
Moderate Total	**3**
Low	
Essential Services	6
At Risk Population	4
Low Total	10
City of Sutter Creek Total	**13**
Unincorporated Amador County	
Moderate	
Essential Services	13

Jurisdiction / Landslide Incidence and Susceptibility Areas/Critical Facility Category	Facility Count
At Risk Population	0
Moderate Total	**13**
Low	
Essential Services	127
At Risk Population	5
Low Total	**132**
Amador County Total	**145**
Grand Total	**220**

Source: Amador County GIS, USGS

Table 4-101 Unincorporated Amador County – Critical Facilities in Landslide Incidence and Susceptibility Areas by Critical Facility Category and Type

Landslide Incidence and Susceptibility Area	Critical Facility Category / Critical Facility Type	Facility Count
Moderate	**Essential Services**	
	Bridge	4
	Clinic	2
	Fire Station	1
	Post Office	1
	Public Water System	5
	Essential Services Total	**13**
Moderate Total		**13**
Low	**Essential Services**	
	Animal Shelter	1
	Bridge	27
	Clinic	3
	Community Center	5
	EMS Station	2
	Fire Station	15
	Library	2
	Post Office	5
	Power Plant	3
	Power Substation	3
	Public Administration Building	1
	Public Water System	58
	Ranger Station	1
	Veterans Services	1

Landslide Incidence and Susceptibility Area	Critical Facility Category / Critical Facility Type	Facility Count
	Essential Services Total	**127**
	At Risk Population	
	School	5
	At Risk Population Total	**5**
Low Total		**132**
Amador County Total		**145**

Source: Amador County GIS, USGS

Overall Community Impact

Landslides, debris flows, and mud flow impacts vary by location and severity of any given event and will likely only affect certain areas of the Planning Area during specific times. Based on the risk assessment, it is evident that landslides will continue to have potentially large economic impacts to certain areas of the County. However, many of the landslides in the Planning Area are 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

Future Development

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

Unincorporated Amador County has identified six future development projects within the unincorporated County area. GIS was used to determine the possible impacts of landslide to the six future development projects.

Methodology

Amador County's 12/31/2018 Parcel/Assessor's data and data from the County planning department were used as the basis for the unincorporated County's inventory of parcels and acres of future development areas. The Amador County Planning Department provided a table containing the assessor parcel numbers (APNs) for the 2,410 parcels representing the six different future development projects or areas. Using the GIS parcel spatial file and the APNs, the six future development areas were mapped.

For the landslide analysis of future development areas, the parcel data was converted to a point layer using a centroid conversion process, in which each parcel was identified by a central point and linked to the Assessor's data. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts and acreage within each. USGS Landslide Incidence and Susceptibility Area. USGS Landslide Incidence and Susceptibility Areas and future development areas are shown on Figure 4-107 and parcels and acreages in those areas are shown in Table 4-102.

Figure 4-107 Unincorporated Amador County – Future Development Areas in Landslide Incidence and Susceptibility Areas

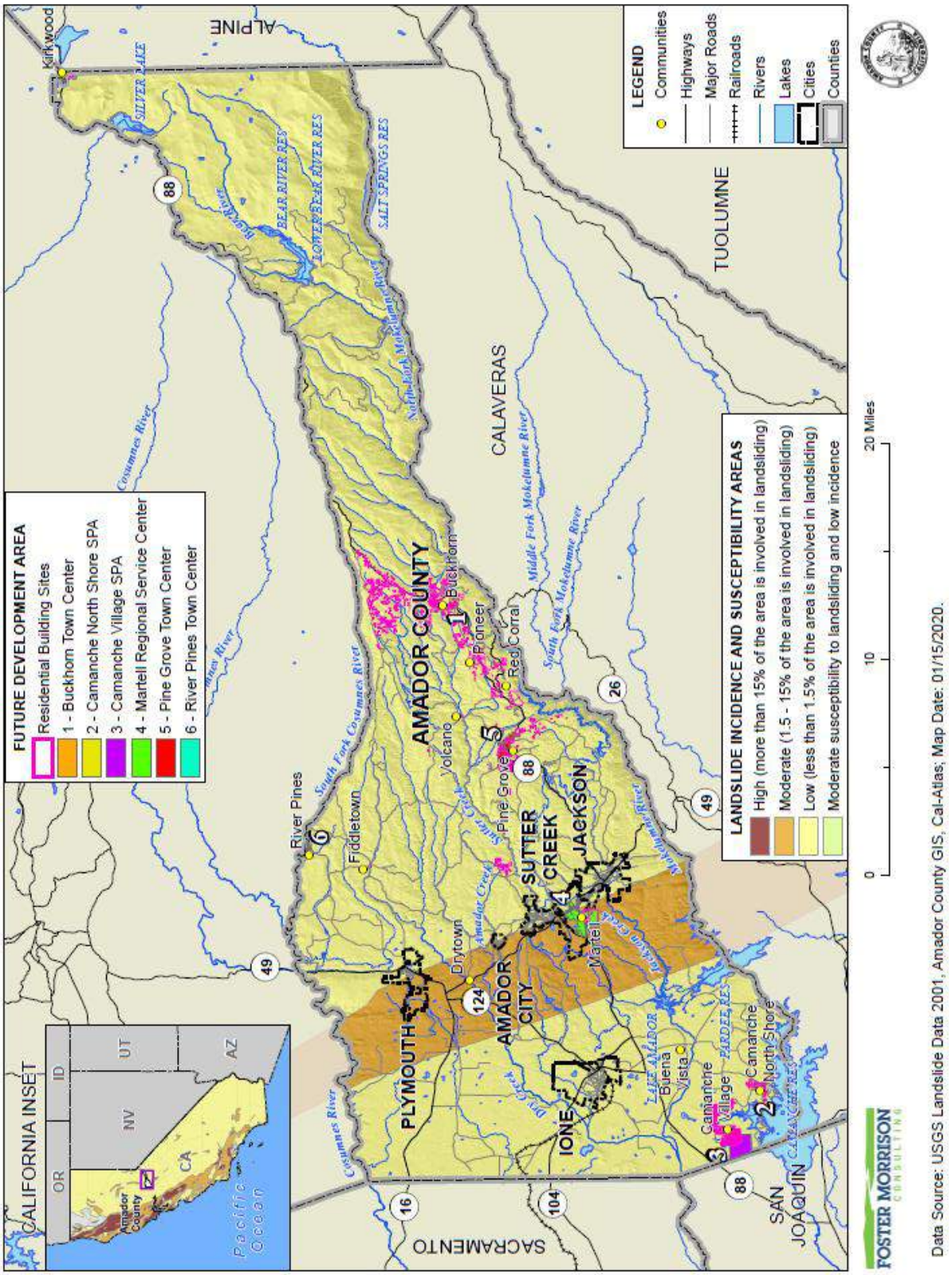


Table 4-102 Unincorporated Amador County – Future Development in Landslide Incidence Susceptibility Areas

Future Development / Landslide Incidence and Susceptibility Area	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Buckhorn Town Center						
Low	79	71	8	120.23	105.70	14.53
Moderate	0	0	0	0.00	0.00	0.00
Buckhorn Town Center Total	**79**	**71**	**8**	**120.23**	**105.70**	**14.53**
Camanche North Shore SPA						
Low	183	124	59	130.11	58.68	71.43
Moderate	0	0	0	0.00	0.00	0.00
Camanche North Shore SPA Total	**183**	**124**	**59**	**130.11**	**58.68**	**71.43**
Camanche Village SPA						
Low	1	1	**0**	501.05	501.05	0.00
Moderate	0	0	0	0.00	0.00	0.00
Camanche Village SPA Total	1	1	**0**	**501.05**	**501.05**	**0.00**
Martell Regional Service Center						
Low	73	56	17	118.97	85.06	33.91
Moderate	75	45	30	581.16	128.02	453.14
Martell Regional Service Center Total	**148**	**101**	**47**	**700.13**	**213.08**	**487.05**
Pine Grove Town Center						
Low	211	166	45	366.47	194.89	171.59
Moderate	0	0	0	0.00	0.00	0.00
Pine Grove Town Center Total	211	166	45	366.47	194.89	171.59
River Pines Town Center						
Low	134	94	40	58.65	49.37	9.28
Moderate	0	0	0	0.00	0.00	0.00
River Pines Town Center Total	**134**	**94**	**40**	**58.65**	**49.37**	**9.28**
Amador County Residential Building Sites						
Low	1,645	120	1,525	2,760.31	259.72	2,500.59
Moderate	9	1	8	41.98	0.06	41.91
Amador County Residential Total	**1,654**	**121**	**1,533**	**2,802.29**	**259.78**	**2,542.51**
Grand Total	**2,410**	**678**	**1,732**	**4,678.94**	**1,382.56**	**3,296.38**

Source: Amador County GIS, USGS

4.3.12. Pandemic Vulnerability Assessment

Likelihood of Future Occurrence—Likely
Vulnerability—Medium

According to the WHO, pandemic has and will continue to have impacts on human health in the region. A pandemic occurs when a new virus emerges for which there is little or no immunity in the human population; the virus causes serious illness and spreads easily from person-to-person worldwide. There are several strategies that public health officials can use to combat a pandemic. Constant surveillance regarding current pandemic, use of infection control techniques, and administration of vaccines once they become available. Citizens can help prevent spread of pandemic by staying home, or "self-quarantining," if they suspect they are infected.

Impacts

Impacts could range from school and business closings to the interruption of basic services such as public transportation, health care, and the delivery of food and essential medicines. Hospitalizations and deaths can occur, especially to the elderly or those with pre-existing underlying conditions. As seen with Covid-19, multiple businesses were forced to close temporarily (some permanently) an unemployment rose significantly. Supply chains for food can be interrupted. Prisons may need to release prisoners to comply with social distance standards.

Future Development

Future development is not expected to be significantly impacted by this hazard, though population growth in the County could increase exposure to pandemic, and increase the ability of each disease to be transmitted among the population of the County. If the median age of County residents continues to increase, vulnerability to pandemic diseases may increase, due to the fact that these diseases are often more deadly to senior citizens.

4.3.13. Severe Weather: Extreme Heat Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
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.

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 disadvantage in California. Factors such as

those bulleted above were combined to show what areas are at greater risk to hazards like extreme heat. This is shown on Figure 4-108.

Figure 4-108 Health Disadvantage Index by California Census Tract

Source: Public Health Alliance of Southern California

Vulnerable populations to extreme heat include:

- Homeless
- Infants and children under age five
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals with impaired mobility

In addition to vulnerable populations, pets and livestock are at risk to extreme heat.

Future Development

As the County shifts in demographics, more residents will become senior citizens. The residents of nursing homes and elder care facilities are especially vulnerable to extreme temperature events. It is encouraged that such facilities have emergency plans or backup power to address power failure during times of extreme heat and in the event of a PSPS. Low income residents and homeless populations are also vulnerable. Cooling centers for these populations should be utilized when necessary.

4.3.14. Severe Weather: Heavy Rains and Storms Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

According to historical hazard data, severe weather is an annual occurrence in Amador County. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rains and severe storms are the most frequent type of severe weather occurrences in the County during the fall, winter, and spring months. Wind and lightning sometimes accompany these storms and have caused damage in the past. Hail is rare in the County. Impacts from heavy rains include damages to property and infrastructure. However, actual damage associated with the primary effects of severe weather have been limited. It is the secondary hazards caused by weather, such as floods, fire, and agricultural losses that have had the greatest impact on the County. The risk and vulnerability associated with these secondary hazards are discussed in other sections of this plan (Section 4.3.3 Agriculture Hazards, Section 4.3.8 Flood: 1%/0.2% Annual Chance, Section 4.3.10 Flood: Localized Stormwater, Section 4.3.6 Dam Failure, and Section 4.3.17 Wildfire).

Future Development

New critical facilities such as communications towers and others should be built to withstand lightning, hail, and thunderstorm winds. Backup power sources for all critical facilities should be incorporated into all new facilities. Properly located, designed, and constructed, future losses to new development should be minimal.

4.3.15. Severe Weather: High Winds and Tornadoes

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Amador County is subject to potentially destructive straight-line 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 less common and tend to occur mostly in the western portion of the County. Straight line and tornadoes winds are primarily a public safety and economic concern. Windstorms and tornadoes can cause damage to structures and power lines which in turn can create hazardous conditions for people. Debris flying from high wind or tornado events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered.

Impacts from straight line winds and tornadoes include:

- Increased wildfire risk
- Erosion (soil loss)
- Dry land farming seed loss
- Windblown weeds
- Downed trees
- Power line impacts and economic losses from power outages
- Occasional building damage, primarily to roofs

Campers, mobile homes, barns, and sheds and their occupants are particularly vulnerable as windstorm events in the region can be sufficient in magnitude to overturn these lighter structures. Livestock that may

be contained in these structures may be injured or killed, causing economic harm to the rancher who owns both the structure and the livestock. Overhead power lines are vulnerable and account for the majority of historical damages. State highways can be vulnerable to high winds and dust storms, where high profile vehicles may be overturned by winds and lowered visibility can lead to multi-car accidents. The greatest threat to Amador County from wind is not from damage from the winds themselves, but from the spread of wildfires during windy days, and now from the periodic Public Safety Power Shutoff (PSPS) events.

Future Development

Future development projects should consider windstorm and tornado hazards at the planning, engineering, and architectural design stage with the goal of reducing vulnerability. 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.

4.3.16. Severe Weather: Winter Storm and Freeze Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Extreme cold and freeze events happen in Amador County each year. Extreme cold often accompanies a winter storm or is left in its wake. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat. Freezing temperatures and ice can cause accidents and road closures and can cause significant damage to the agricultural industry. Prolonged exposure to cold can cause frostbite or hypothermia and can be life-threatening. Vulnerable populations to cold and freeze include:

- Homeless
- Infants and children under age five
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals with impaired mobility

Of significant concern is the impact to populations with special needs such as the elderly and those requiring the use of medical equipment. The residents of nursing homes and elder care facilities are especially vulnerable to extreme temperature events. It is encouraged that such facilities have emergency plans or backup power to address power failure during times of extreme cold and freeze. In addition to vulnerable populations, pets and livestock are at risk to freeze and cold.

The varying elevations in the County, in part, determine the extent to which a given area is affected by freeze and cold. 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. High value crops, such as almond and citrus trees, can be severely damaged by freeze, causing large economic issues for farmers and the businesses they support.

Like most weather events, periods of heavy snow 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. Individuals and road associations are the primary resource with 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 above is the impact to populations with special needs such as the elderly and those requiring the use of medical equipment. Delays in emergency response services can be of significant concern. Further, there are economic impacts 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.

Future Development

Future development built to code should be able to withstand extreme cold and freeze. Pipes at risk of freezing should be mitigated be either burying or insulating them from freeze as new facilities are improved or added. Current County codes provide such provisions for new construction. Vulnerability to extreme cold will increase as the average age of the population in the County shifts resulting in a larger number of senior citizens in the Planning Area. Many of the residents of Amador County are self-sufficient and accustomed to rural living.

4.3.17. Wildfire Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability— Extremely High

Risk and vulnerability to the Amador County Planning Area from wildfire is of concern, with some areas of the County being at greater risk than others as described further in this section. High fuel loads in portions of the County, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. During the May to October fire season, the dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Wildfires can result in loss of life, injuries, damage to structures, and can cause short-term and long-term disruption to the County. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the County by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality. Fires may result in casualties and can destroy buildings and infrastructure.

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. In some cases, the economic impact of this loss of services may be comparable to the economic impact of physical damages or, in some cases, even greater. 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. Fires can also cause major damage to power plants and power lines needed to distribute electricity to operate facilities. As a result of PSPS incident, many residents have purchased generators. These generators are becoming a fire hazard. In 2019, a generator started a house fire in Pioneer.

In Amador County, past wildfires have caused damages to the County. The County has suffered loss of structures, loss of tax revenue, high costs to battle fires, and loss of lives.

The HMPC has noted that both developed and undeveloped areas are at risk. Many of the incorporated communities sit in densely wooded areas. Loss of industrial timberlands, grazing lands, agricultural crops such as grapes may occur as a result of wildfire. Localized road and school closures have been reported during wildfires. Roads, bridges, telecommunications, and high voltage transmission lines are also at risk to wildfire.

Amador County Communities at Risk to Wildfire

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

Tree Mortality

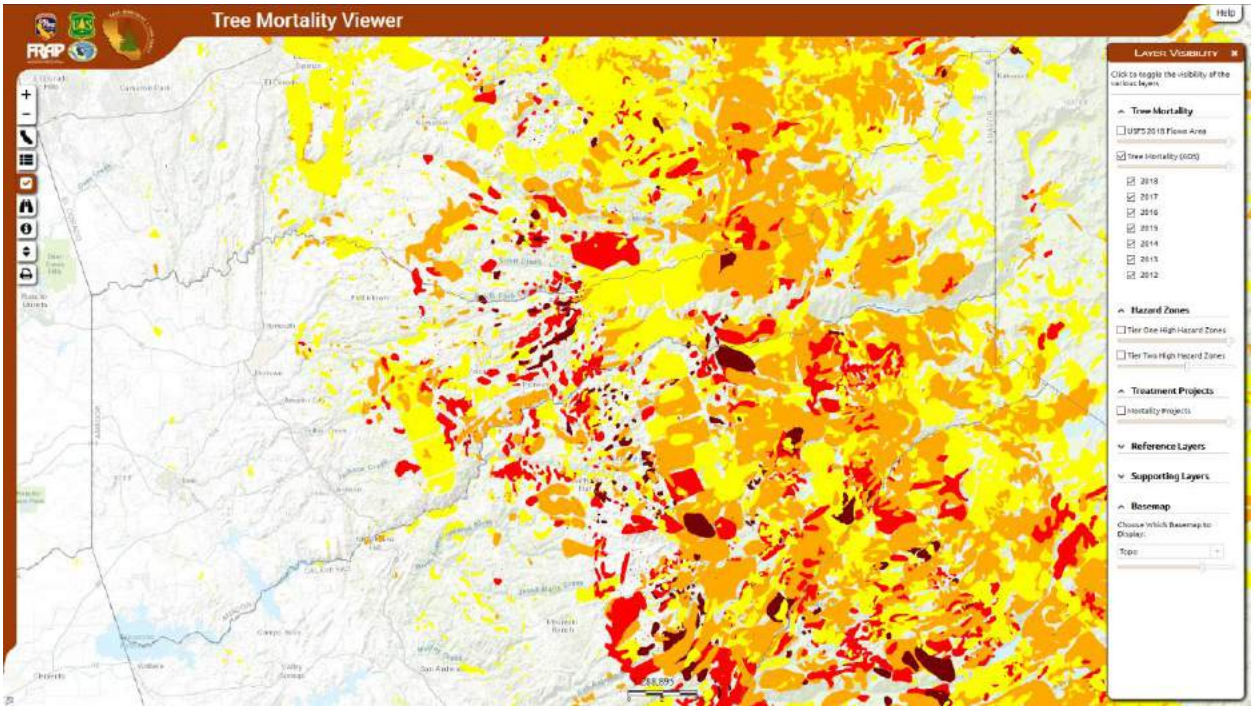
Drought can weaken trees, making them less resistant to bark beetles and other pests and diseases. These types of infestations attack trees, weaken them, and can kill them. These trees then become fuel for wildfires. This is discussed in greater detail in Section 4.3.7.

On October 30, 2015, Governor Brown proclaimed a State of Emergency and included provisions to expedite the removal and disposal of dead and dying hazardous trees. As a result, costs related to identification, removal, and disposal of dead and dying trees caused from drought conditions may be eligible for California Disaster Assistance Act (CDAA) reimbursement.

Many areas in Amador County have seen increases in tree mortality. The County has mapped these areas, and that map is shown in Figure 4-109. Shown are results of 2012-2018 aerial tree-mortality surveys. Using a color legend, the map shows:

- Deep burgundy depicting areas with more than 40 dead trees per acre
- Red depicting 40 - 15 dead trees per acre
- Orange depicting 15-5 dead trees per acre
- Yellow depicting 5 or less dead trees per acre

Figure 4-109 Amador County – Tree Mortality Areas



Source: CAL FIRE, map retrieved 1/17/2020

Wildfire (Smoke) and Air Quality

During many summer months in past years, Amador County residents have had to breathe wildfire smoke, from fires both within and outside of the County. 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.

Cal-Adapt is an online tool put together by the California Energy Commission that downscales global climate models to the California level with projections for sea-level rise, drought, temperature increase, heat, and wildfire, from 2020 out to 2085. Figure 4-77 in Section 4.2.17 showed the 2085 wildfire projection for Amador County. Air quality in these areas of the County could be greatly reduced due to wildfire if the scenario projected is accurate.

Insurance in WUI Areas

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.

Wildfire Analysis

The Amador County Planning Area has mapped CAL FIRE fire hazard severity zones (FHSZs) based on fire responsibility areas as further described below. GIS was used to determine the possible impacts of wildfire within the County and how the wildfire risk varies across the Planning Area. The wildfire analysis includes an analysis of affected parcels and values by Fire Responsibility areas and by CAL FIRE's FHSZs.

Fire Responsibility Area Analysis

There are numerous wildland fire protection agencies that have responsibility within the County, including the USDA Forest Service (USFS), the Bureau of Land Management (BLM), the BIA, and CAL FIRE. There are also numerous fire departments and fire protection districts that serve local areas, many of whom have mutual aid agreements with each other as well as state and federal agencies for fire suppression and protection. Fire Responsibility areas are generally categorized by Federal Responsibility Areas (FRA), State Responsibility Areas (SRA) and Local Responsibility Areas (LRA).

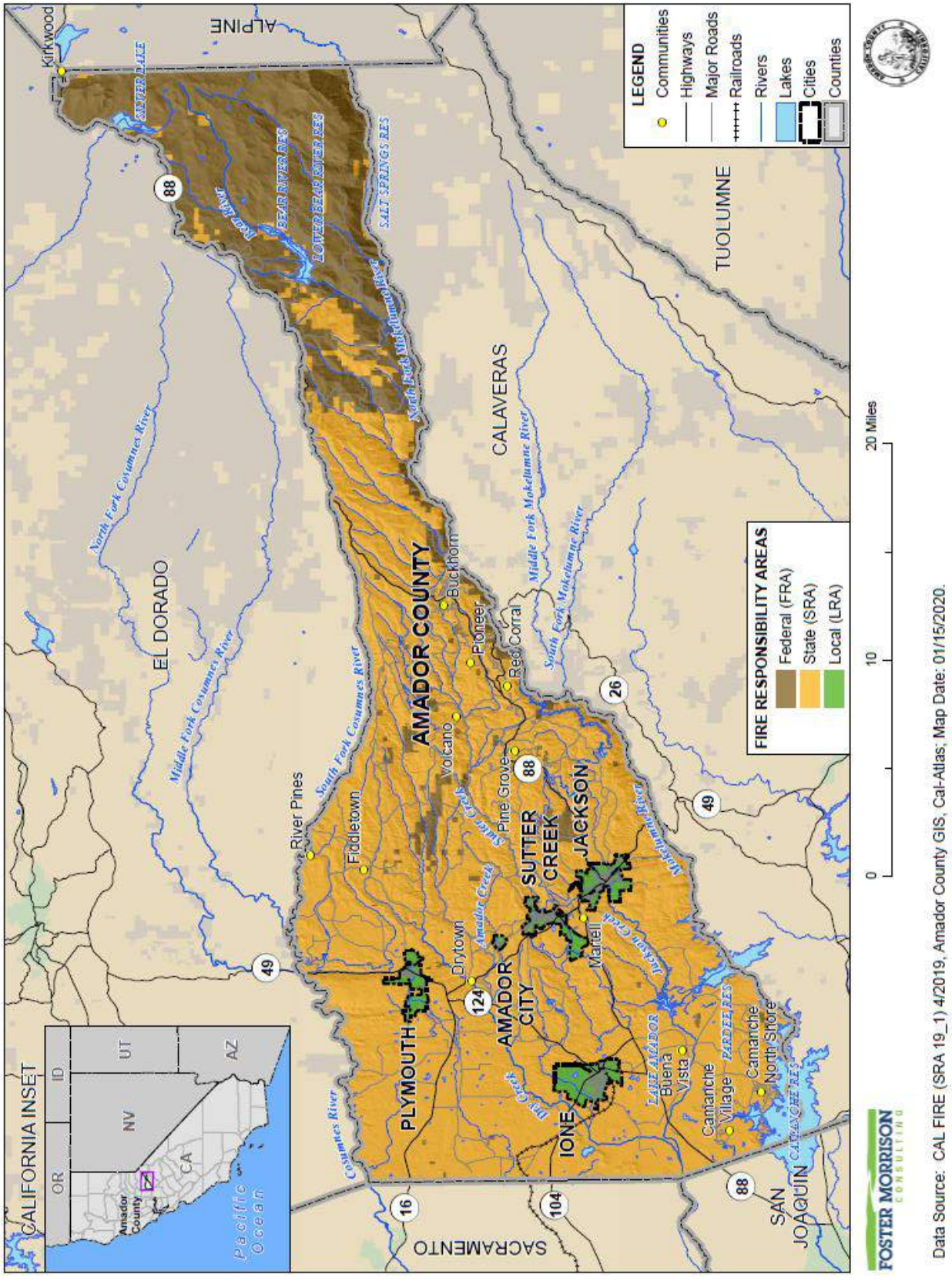
The CAL FIRE data, detailing Fire Responsibility Areas within the County Planning Area, was utilized to determine the locations, numbers, types, and values of land and structures falling within each Fire Responsibility Area. The following sections provide details on the methodology and results for this analysis.

Methodology

CAL FIRE has a legal responsibility to provide fire protection on all SRA lands, which are defined based on land ownership, population density and land use. CAL FIRE's State Responsibility Area layer was used in this analysis to show Amador County's parcel counts and values by FRA, SRA, and LRA.

The fire responsibility area layer was overlaid with the parcel data. Since it is possible for any given parcel to intersect with multiple fire responsibility areas, for purposes of this analysis, the parcel centroid was used to determine which fire responsibility area to assign to each parcel. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessor's database and the FIS parcel layer. Based on this approach, the fire responsibility areas for the Amador County Planning Area were determined and further broken out by jurisdiction and property use and included information on both land and improved values. Locations of each responsibility area are shown in Figure 4-110.

Figure 4-110 Amador County Planning Area – Fire Responsibility Areas by FRA, SRA, LRA



Fire Responsibility Areas and Values at Risk Results

Most of the physical area of Amador County falls in the FRA and SRA. The FRA contains 495 parcels, of which 165 are improved. The SRA contains 12,075 improved parcels, with over $4.9 billion in total value. The LRA has 17,266 improved parcels with $2.25 billion in total value. 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. The County parcel inventory and associated values by fire responsibility area are provided in Table 4-103 for the entire Amador County Planning Area, as described in the Total Values at Risk in Section 4.3.1. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the fire hazard severity zones due primarily to Proposition 13 and to a lesser extent properties falling under the Williamson Act.

Table 4-103 Amador County Planning Area – Count and Value of Parcels by Local, State, and Federal Responsibility Areas by Property Use

Jurisdiction/ Fire Responsibility Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
City of Amador City						
SRA	2	1	$34,993	$104,132	$52,066	$191,191
LRA	179	110	$13,208,342	$16,301,511	$9,538,283	$39,048,136
City of Amador City Total	**181**	**111**	**$13,243,335**	**$16,405,643**	**$9,590,349**	**$39,239,327**
City of Ione						
SRA	4	0	$147,181	$0	$0	$147,181
LRA	2,030	1,671	$146,280,169	$312,506,962	$162,437,754	$621,224,885
City of Ione Total	**2,034**	**1,671**	**$146,427,350**	**$312,506,962**	**$162,437,754**	**$621,372,066**
City of Jackson						
SRA	5	0	$737	$0	$0	$737
LRA	2,113	1,701	$164,927,649	$449,018,591	$308,393,929	$922,340,169
City of Jackson Total	**2,118**	**1,701**	**$164,928,386**	**$449,018,591**	**$308,393,929**	**$922,340,906**
City of Plymouth						
SRA	2	0	$0	$0	$0	$0
LRA	576	426	$49,553,067	$66,588,817	$43,052,234	$159,194,118
City of Plymouth Total	**578**	**426**	**$49,553,067**	**$66,588,817**	**$43,052,234**	**$159,194,118**
City of Sutter Creek						
SRA	2	0	$0	$0	$0	$0

Jurisdiction/ Fire Responsibility Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
LRA	1,430	1,114	$107,612,762	$250,519,147	$152,611,083	$510,742,992
City of Sutter Creek Total	**1,432**	**1,114**	**$107,612,762**	**$250,519,147**	**$152,611,083**	**$510,742,992**
Unincorporated Amador County						
FRA	495	165	$15,151,267	$10,798,106	$5,514,045	$31,463,418
SRA	17,321	12,074	$1,341,301,081	$2,257,045,589	$1,306,203,061	$4,904,549,731
LRA	13	4	$532,482	$1,008,387	$666,194	$2,207,063
Unincorporated Amador County Total	**17,829**	**12,243**	**$1,356,984,830**	**$2,268,852,082**	**$1,312,383,300**	**$4,938,220,212**
Grand Total	**24,172**	**17,266**	**$1,838,749,730**	**$3,363,891,242**	**$1,988,468,649**	**$7,191,109,621**

Source: CAL FIRE, Amador County 12/31/2018 Parcel/Assessor's Data

Fire Hazard Severity Zone Analysis

As part of the Fire and Resource Assessment Program (FRAP), CAL FIRE was mandated to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as FHSZs, then define the application of various mitigation strategies to reduce risk associated with wildland fires.

Fire hazard is a way to measure the physical fire behavior so that people can predict the damage a fire is likely to cause. Fire hazard measurement includes the speed at which a wildfire moves, the amount of heat the fire produces, and most importantly, the burning fire brands that the fire sends ahead of the flaming front.

The fire hazard model developed by CAL FIRE considers the wildland fuels. Fuel is that part of the natural vegetation that burns during the wildfire. The model also considers topography, especially the steepness of the slopes. Fires burn faster as they burn up-slope. Weather (temperature, humidity, and wind) has a significant influence on fire behavior. The model recognizes that some areas of California have more frequent and severe wildfires than other areas. Finally, the model considers the production of burning fire brands (embers) how far they move, and how receptive the landing site is to new fires.

In 2007, CAL FIRE updated its FHSZ maps for the State of California to provide updated map zones, based on new data, science, and technology that will create more accurate zone designations such that mitigation strategies are implemented in areas where hazards warrant these investments. The zones will provide specific designation for application of defensible space and building standards consistent with known mechanisms of fire risk to people, property, and natural resources. The program is still ongoing with fire hazard severity zone maps being updated based on designated responsibility areas: FRA, SRA, and LRA.

The CAL FIRE data, detailing FHSZs within the Amador County Planning Area, was utilized to determine the locations, numbers, types, and values of land and structures falling within each FHSZ. The following sections provide details on the methodology and results for this analysis.

Methodology

CAL FIRE mapped the SRA FHSZs, or areas of significant fire hazard, based on fuels, terrain, weather, and other relevant factors. Zones are designated with Very High, High, Moderate, Non-Wildland/Non-Urban and Urban Unzoned hazard classes. The goal of this mapping effort is to create more accurate fire hazard zone designations such that mitigation strategies are implemented in areas where hazards warrant these investments. The FHSZs will provide specific designation for application of defensible space and building standards consistent with known mechanisms of fire risk to people, property, and natural resources.

The "Draft" LRA FHSZ (c6fhszl06_1) dated September 2007 layer and the Adopted SRA FHSZ (fhszs06_3_6) dated November 2007 were used to get a complete coverage of Fire Hazards.

Analysis was performed using the FHSZ datasets, and using GIS, the parcel layer was overlaid on the Draft and Adopted FHSZ layers. For the purposes of this analysis, if the parcel centroid intersects the zone's area, it will be assumed that the entire parcel is in that area. This analysis illustrates the FHSZs specific to the Planning Area and the unincorporated County.

Fire Hazard Severity Zones Analysis Results: Values at Risk

Results are presented in this section for the Amador County Planning Area and the unincorporated County. Detail tables for the incorporated communities are included in their respective annexes to this LHMP Update.

Amador County Planning Area

The FHSZs in Amador County are shown in Figure 4-111. Analysis results for the entire Amador County Planning Area are summarized for the entire Planning Area in Table 4-104 and broken out by jurisdiction in Table 4-105. These tables summarizes by total parcel counts, improved parcel counts, and their improved and land values, other values, and the estimated contents replacement values based on the CRV factors detailed in Table 4-49.

Figure 4-111 Amador County Planning Area – Fire Hazard Severity Zones

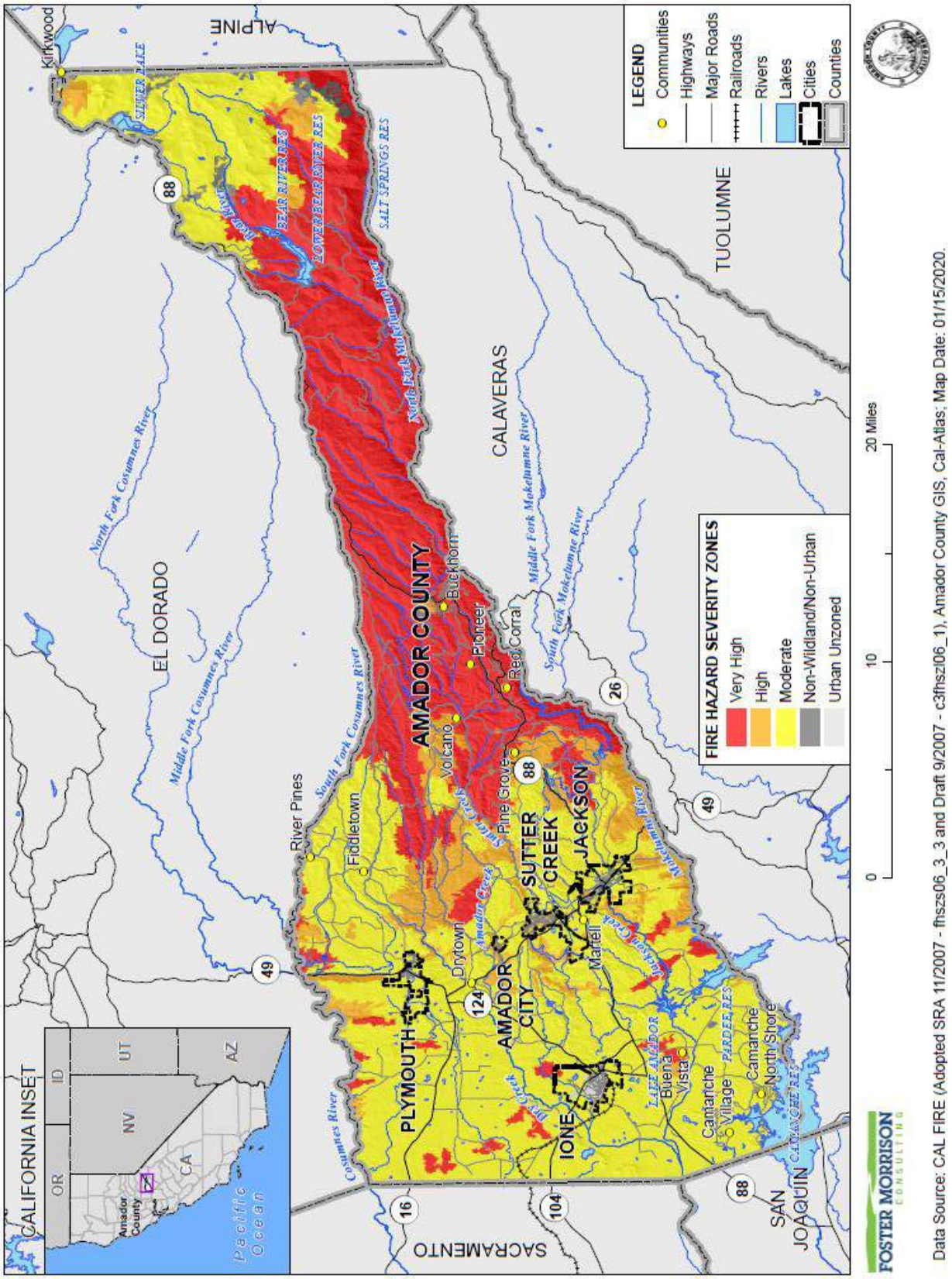


Table 4-104 Amador County Planning Area – Count and Value of Parcels in Fire Hazard Severity Zones

Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Very High	8,723	6,305	$516,144,913	$1,046,235,144	$552,142,640	$2,114,522,697
High	3,126	2,309	$223,869,348	$429,299,236	$233,205,649	$886,374,233
Moderate	10,061	6,694	$942,981,414	$1,531,194,941	$1,005,860,462	$3,480,036,817
Non-Wildland/Non-Urban	43	20	$3,183,954	$3,074,354	$1,175,592	$7,433,900
Urban Unzoned	2,219	1,938	$152,570,101	$354,087,567	$196,084,306	$702,741,974
Total	**24,172**	**17,266**	**$1,838,749,730**	**$3,363,891,242**	**$1,988,468,649**	**$7,191,109,621**

Source: CAL FIRE, Amador County 12/31/2018 Parcel/Assessor's Data

Table 4-105 Amador County Planning Area – Count and Value of Parcels in Fire Hazard Severity Zones by Jurisdiction

Jurisdiction/ Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
City of Amador City					
High	167	105	$12,575,273	$15,339,179	$27,914,452
Moderate	14	6	$668,062	$1,066,464	$1,734,526
City of Amador City Total	**181**	**111**	**$13,243,335**	**$16,405,643**	**$29,648,978**
City of Ione					
Moderate	437	260	$33,764,395	$47,483,829	$27,258,162
Urban Unzoned	1,597	1,411	$112,662,955	$265,023,133	$135,179,592
City of Ione Total	**2,034**	**1,671**	**$146,427,350**	**$312,506,962**	**$458,934,312**
City of Jackson					
High	164	133	$11,759,665	$28,230,152	$39,989,817
Moderate	1,478	1,158	$123,630,556	$353,647,551	$477,278,107
Urban Unzoned	476	410	$29,538,165	$67,140,888	$96,679,053
City of Jackson Total	**2,118**	**1,701**	**$164,928,386**	**$449,018,591**	**$613,946,977**
City of Plymouth					
High	157	139	$10,726,981	$18,356,667	$29,083,648
Moderate	277	173	$27,840,001	$28,970,059	$56,810,060
Non-Wildland/Non-Urban	6	4	$1,255,887	$567,415	$1,823,302
Urban Unzoned	138	110	$9,730,198	$18,694,676	$28,424,874
City of Plymouth Total	**578**	**426**	**$49,553,067**	**$66,588,817**	**$116,141,884**

Jurisdiction/ Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
City of Sutter Creek					
High	590	508	$38,744,838	$92,511,759	$131,256,597
Moderate	834	599	$68,229,141	$154,778,518	$223,007,659
Urban Unzoned	8	7	$638,783	$3,228,870	$3,867,653
City of Sutter Creek Total	**1,432**	**1,114**	**$107,612,762**	**$250,519,147**	**$358,131,909**
Unincorporated Amador County					
Very High	8,723	6,305	$516,144,913	$1,046,235,144	$1,562,380,057
High	2,048	1,424	$150,062,591	$274,861,479	$424,924,070
Moderate	7,021	4,498	$688,849,259	$945,248,520	$1,634,097,779
Non-Wildland/Non-Urban	37	16	$1,928,067	$2,506,939	$4,435,006
Unincorporated Amador County Total	**17,829**	**12,243**	**$1,356,984,830**	**$2,268,852,082**	**$3,625,836,912**
Grand Total	**24,172**	**17,266**	**$1,838,749,730**	**$3,363,891,242**	**$5,202,640,972**

Source: CAL FIRE, Amador County 12/31/2018 Parcel/Assessor's Data

Unincorporated Amador County

Table 4-106 summarized parcel counts and values in the unincorporated County by FHSZ using the CRVs described in Table 4-49 in Section 4.3.1. Table 4-107 breaks out Table 4-106 into greater details and shown the FHSZ by property use for the unincorporated County. As shown in the table, the County has substantial values at risk. $1.562 billion falls in the very high, $425 million falls in the high, and $1.634 billion falls in the moderate fire severity zone.

Table 4-106 Unincorporated Amador County – Count and Value of Parcels in Fire Hazard Severity Zones

Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Very High	8,723	6,305	$516,144,913	$1,046,235,144	**$1,562,380,057**
High	2,048	1,424	$150,062,591	$274,861,479	**$424,924,070**
Moderate	7,021	4,498	$688,849,259	$945,248,520	**$1,634,097,779**
Non-Wildland/Non-Urban	37	16	$1,928,067	$2,506,939	**$4,435,006**
Unincorporated Amador County Total	**17,829**	**12,243**	**$1,356,984,830**	**$2,268,852,082**	**$3,625,836,912**

Source: CAL FIRE, Amador County 12/31/2018 Parcel/Assessor's Data

Table 4-107 Unincorporated Amador County – Count and Value of Parcels in Fire Hazard Severity Zones by Property Use

Fire Hazard Severity Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Very High					
Agricultural	260	122	$30,368,517	$14,644,140	$45,012,657
Commercial	163	121	$19,606,428	$37,233,861	$56,840,289
Industrial	14	12	$2,023,611	$4,617,321	$6,640,932
Miscellaneous	353	52	$4,188,906	$2,921,637	$7,110,543
Residential	7,516	5,996	$454,356,325	$986,677,325	$1,441,033,650
Unknown	417	2	$5,601,126	$140,860	$5,741,986
Very High Total	**8,723**	**6,305**	**$516,144,913**	**$1,046,235,144**	**$1,562,380,057**
High					
Agricultural	221	160	$17,081,554	$16,880,820	$33,962,374
Commercial	44	33	$5,476,528	$9,161,269	$14,637,797
Industrial	1	1	$81,604	$467,950	$549,554
Miscellaneous	76	5	$574,014	$783,900	$1,357,914
Residential	1,640	1,224	$126,770,973	$247,441,047	$374,212,020
Unknown	66	1	$77,918	$126,493	$204,411
High Total	**2,048**	**1,424**	**$150,062,591**	**$274,861,479**	**$424,924,070**
Moderate					
Agricultural	1,204	866	$199,597,233	$138,768,871	$338,366,104
Commercial	242	163	$68,071,466	$124,212,576	$192,284,042
Industrial	39	19	$19,131,599	$8,630,597	$27,762,196
Miscellaneous	341	25	$20,114,548	$6,911,183	$27,025,731
Residential	4,973	3,424	$381,739,498	$666,481,293	$1,048,220,791
Unknown	222	1	$194,915	$244,000	$438,915
Moderate Total	**7,021**	**4,498**	**$688,849,259**	**$945,248,520**	**$1,634,097,779**
Non-Wildland/Non-Urban					
Agricultural	0	0	$0	$0	$0
Commercial	2	2	$297,010	$220,776	$517,786
Industrial	0	0	$0	$0	$0
Miscellaneous	15	1	$1,148,186	$1,511,364	$2,659,550
Residential	14	13	$482,871	$774,799	$1,257,670
Unknown	6	0	$0	$0	$0
Non-Wildland/Non-Urban Total	**37**	**16**	**$1,928,067**	**$2,506,939**	**$4,435,006**

Fire Hazard Severity Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Unincorporated Amador County Total	**17,829**	**12,243**	**$1,356,984,830**	**$2,268,852,082**	**$3,625,836,912**

Source: CAL FIRE, Amador County 12/31/2018 Parcel/Assessor's Data

Population at Risk

A separate analysis was performed to determine population that reside in FHSZs. Using GIS, the CAL FIRE FHSZ datasets were overlayed on the improved residential parcel data. Those parcel centroids that intersect each FHSZ were counted and multiplied by the Census Bureau average household size for each jurisdiction and the unincorporated County; results were tabulated by jurisdiction and FHSZ (see Table 4-108). According to this analysis, there is a population of 11,011 in the Moderate FHSZ, 4,662 in the High FHSZ, and 13,791 in the Very High FHSZ in the County.

Table 4-108 Amador County Planning Area – Residential Populations at Risk in Moderate or Higher Fire Hazard Severity Zones

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	0	0	90	196	5	11
Ione	0	0	0	0	239	612
Jackson	0	0	131	280	1,010	2,161
Plymouth	0	0	134	331	141	348
Sutter Creek	0	0	486	1,040	2	4
Unincorporated Amador County	5,996	13,791	1,224	2,815	3,424	7,875
Total	**5,996**	**13,791**	**2,065**	**4,662**	**4,821**	**11,011**

Source: CAL FIRE, US Census Bureau Average Household Sizes: Amador City (2.18); Ione (2.56), Jackson (2.14); Plymouth (2.47), Sutter Creek (2.14): and unincorporated Amador County (2.30)

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Butte County and all jurisdictions to determine critical facilities in the Fire Hazard Severity Zones. Using GIS, the CAL FIRE, Fire Hazard Severity Zones were overlayed on the critical facility GIS layer. Figure 4-112 shows critical facilities, as well as the Fire Hazard Severity Zones. Table 4-109 details critical facilities by facility type and count for the Planning Area. Table 4-110 details critical facilities by facility type for the unincorporated County. Information on critical facilities in the incorporated jurisdictions in the County can be found in their respective annexes to this Plan Update. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix F.

Figure 4-112 Amador County Planning Area – Critical Facilities in FHSZs

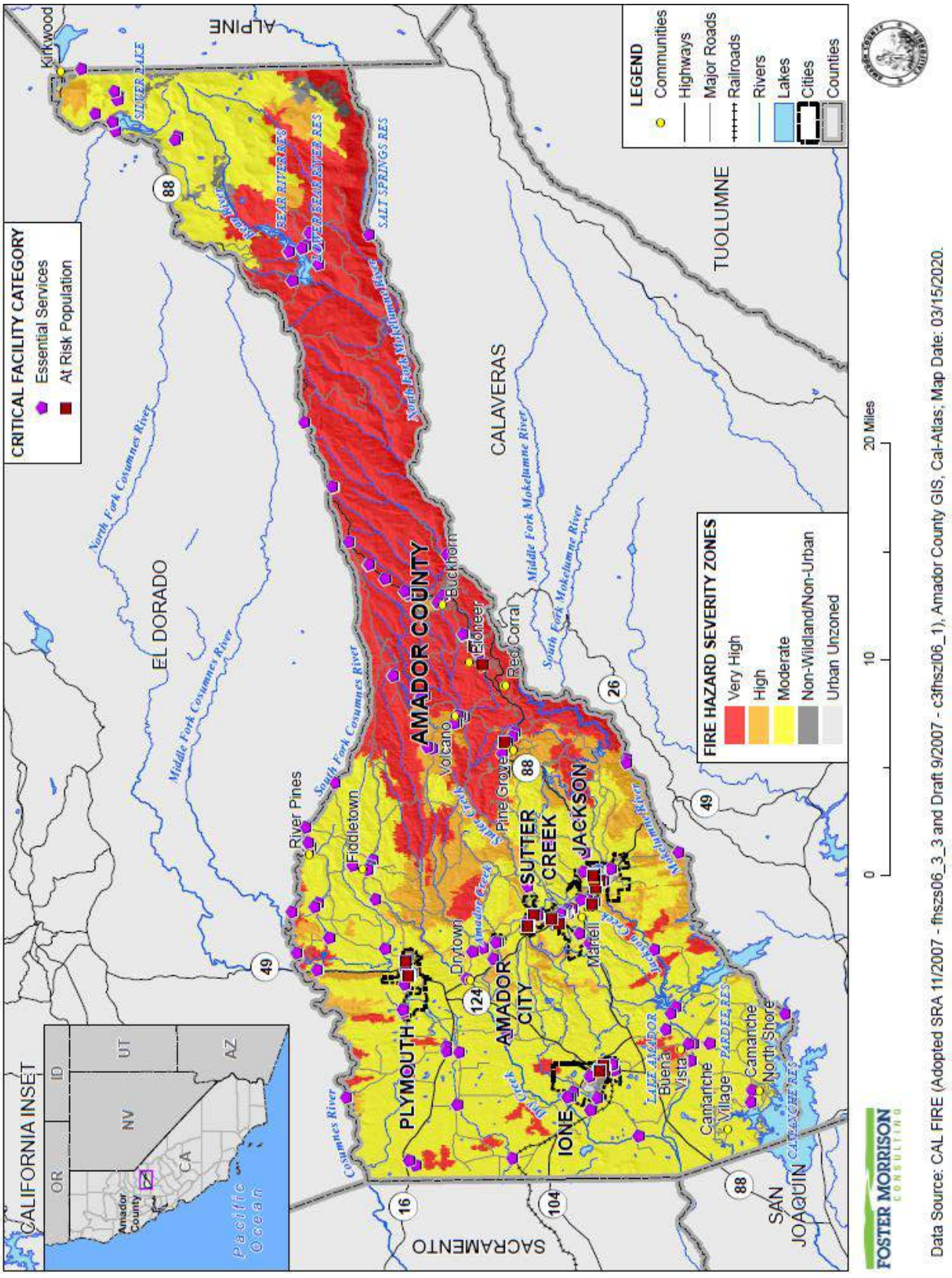


Table 4-109 Amador County Planning Area – Critical Facilities in FHSZs by Jurisdiction

Jurisdiction/ Fire Hazard Severity Zones / Critical Facility Category	Facility Count
City of Amador City	
High	
Essential Services	3
At Risk Population	0
High Total	3
City of Amador City Total	**3**
City of Ione	
Non-Very High	
Essential Services	14
At Risk Population	4
Non-Very High Total	18
City of Ione Total	**18**
City of Jackson	
High	
Essential Services	3
At Risk Population	1
High Total	**4**
Moderate	
Essential Services	12
At Risk Population	5
Moderate Total	**17**
Urban Unzoned	
Essential Services	8
At Risk Population	2
Urban Unzoned Total	**10**
City of Jackson Total	**31**
City of Plymouth	
Moderate	
Essential Services	5
At Risk Population	0
Moderate Total	**5**
Urban Unzoned	
Essential Services	4
At Risk Population	1
Urban Unzoned Total	**5**

Jurisdiction/ Fire Hazard Severity Zones / Critical Facility Category	Facility Count
City of Plymouth Total	**10**
City of Sutter Creek	
High	
Essential Services	0
At Risk Population	1
High Total	**1**
Moderate	
Essential Services	7
At Risk Population	5
Moderate Total	**12**
City of Sutter Creek Total	**13**
Amador County	
High	
Essential Services	11
At Risk Population	2
High Total	**13**
Moderate	
Essential Services	78
At Risk Population	0
Moderate Total	**78**
Very High	
Essential Services	51
At Risk Population	3
Very High Total	54
Amador County Total	**145**
Grand Total	**220**

Source: Amador County GIS, CAL FIRE

Table 4-110 Unincorporated Amador County – Critical Facilities in FHSZs by Critical Facility Category and Type

Fire Hazard Severity Zones	Critical Facility Category / Critical Facility Type	Facility Count
High	**Essential Services**	
	Bridge	2
	Community Center	1
	Fire Station	2
	Library	1

Fire Hazard Severity Zones	Critical Facility Category / Critical Facility Type	Facility Count
	Power Plant	1
	Power Substation	2
	Public Water System	2
	Essential Services Total	**11**
	At Risk Population	
	School	2
	At Risk Population Total	**2**
High Total		**13**
	Essential Services	
	Animal Shelter	1
	Bridge	26
	Clinic	4
	Community Center	2
	EMS Station	1
Moderate	Fire Station	8
	Post Office	3
	Power Substation	1
	Public Administration Building	1
	Public Water System	30
	Veterans Services	1
	Essential Services Total	**78**
Moderate Total		**78**
	Essential Services	
	Bridge	3
	Clinic	1
	Community Center	2
	EMS Station	1
	Fire Station	6
	Library	1
Very High	Post Office	3
	Power Plant	2
	Public Water System	31
	Ranger Station	1
	Essential Services Total	**51**
	At Risk Population	
	School	3
	At Risk Population Total	**3**

Fire Hazard Severity Zones	Critical Facility Category / Critical Facility Type	Facility Count
Very High Total		**54**
Amador County Total		**145**

Source: Amador County GIS, CAL FIRE

Overall Community Impact

The overall impact to the community from a severe wildfire includes:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Decreased water quality in area watersheds;
- Increase in post-fire hazards such as flooding, sedimentation, and debris flows/mudslides;
- Damage to natural resource habitats and other resources, such as crops, timber, and rangelands;
- Loss of water, power, roads, phones, and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents;
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures;
- Negative impact on commercial and residential property values;
- Loss of churches, which could severely impact the social fabric of the community;
- Loss of schools, which could severely impact the entire school system and disrupt families and teachers, as temporary facilities and relocations would likely be needed; and
- Impact on the overall mental health of the community.

In addition, there are natural resources at risk when wildland-urban interface fires occur. One is the watershed and ecosystem losses that occur from wildland fires. This includes impacts to water supplies and water quality as well as air quality. Another is the aesthetic value of the area. Major fires that result in visible damage detract from that value. Other assets at risk include wildland recreation areas, wildlife and habitat areas, and rangeland resources. The loss to these natural resources can be significant.

Future Development

Population growth and development in Amador County has recently slowed; however, additional growth and development within the WUI and other high fire hazard areas of the County would place additional values at risk to wildfire. County building codes are in effect to reduce this risk.

GIS Analysis

Unincorporated Amador County has identified six future development projects within the unincorporated County area. GIS was used to determine the possible impacts of wildfire to the six future development projects.

Methodology

Amador County's 12/31/2018 Parcel/Assessor's data and data from the County planning department were used as the basis for the unincorporated County's inventory of parcels and acres of future development areas. The Amador County Planning Department provided a table containing the assessor parcel numbers

(APNs) for the 2,410 parcels representing the six different future development projects or areas. Using the GIS parcel spatial file and the APNs, the six future development projects were mapped.

For the wildfire analysis of future development areas, the parcel data was converted to a point layer using a centroid conversion process, in which each parcel was identified by a central point and linked to the Assessor's data. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts and acreage within each CAL FIRE FHSZ. CAL FIRE FHSZs and future development areas are shown on Figure 4-113 and parcels and acreages in those areas are shown in Table 4-111.

Figure 4-113 Unincorporated Amador County – Future Development in FHSZs

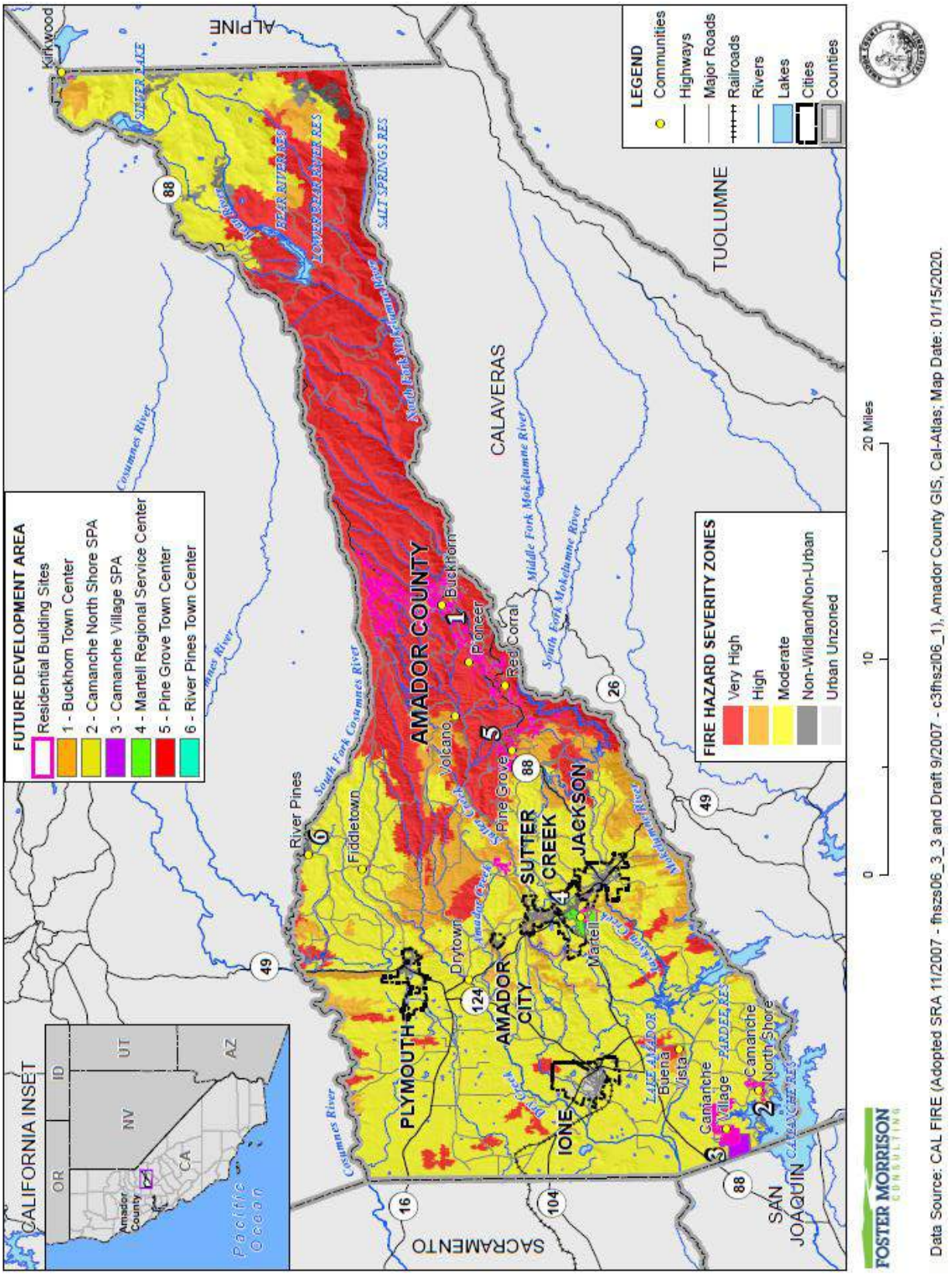


Table 4-111 Unincorporated Amador County – Future Development Areas in FHSZs

Future Development / Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Buckhorn Town Center						
Very High	79	71	8	120.23	105.70	14.53
High	0	0	0	0.00	0.00	0.00
Moderate	0	0	0	0.00	0.00	0.00
Urban Unzoned	0	0	0	0.00	0.00	0.00
Buckhorn Town Center Total	**79**	**71**	**8**	**120.23**	**105.70**	**14.53**
Camanche North Shore SPA						
Very High	0	0	0	0.00	0.00	0.00
High	0	0	0	0.00	0.00	0.00
Moderate	183	124	59	130.11	58.68	71.43
Urban Unzoned	0	0	0	0.00	0.00	0.00
Camanche North Shore SPA Total	**183**	**124**	**59**	**130.11**	**58.68**	**71.43**
Camanche Village SPA						
Very High	0	0	0	0.00	0.00	0.00
High	0	0	0	0.00	0.00	0.00
Moderate	1	1	0	501.05	501.05	0.00
Urban Unzoned	0	0	0	0.00	0.00	0.00
Camanche North Shore SPA Total	**1**	**1**	**0**	**501.05**	**501.05**	**0.00**
Martell Regional Service Center						
Very High	0	0	0	0.00	0.00	0.00
High	7	4	3	31.41	23.45	7.96
Moderate	141	97	44	668.73	189.64	479.09
Urban Unzoned	0	0	0	0.00	0.00	0.00
Martell Regional Service Center Total	**148**	**101**	**47**	**700.13**	**213.08**	**487.05**
Pine Grove Town Center						
Very High	166	138	28	277.35	170.75	106.60
High	44	28	16	88.90	24.14	64.76
Moderate	1	0	1	0.23		0.23
Urban Unzoned	0	0	0	0.00	0.00	0.00
Pine Grove Town Center Total	**211**	**166**	**45**	**366.47**	**194.89**	**171.59**
River Pines Town Center						
Very High	0	0	0	0.00	0.00	0.00
High	0	0	0	0.00	0.00	0.00
Moderate	134	94	40	58.65	49.37	9.28

Future Development / Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Urban Unzoned	0	0	0	0.00	0.00	0.00
River Pines Town Center Total	**134**	**94**	**40**	**58.65**	**49.37**	**9.28**
Amador County Residential Building Sites						
Very High	870	93	777	1,644.32	185.03	1,459.29
High	81	14	67	348.25	42.50	305.76
Moderate	703	14	689	809.71	32.25	777.46
Urban Unzoned	0	0	0	0.00	0.00	0.00
Amador County Residential Building Sites Total	**1,654**	**121**	**1,533**	**2,802.29**	**259.78**	**2,542.51**
Grand Total	**2,410**	**678**	**1,732**	**4,678.94**	**1,382.56**	**3,296.38**

Source: Amador County GIS, CAL FIRE

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 mitigation capability assessment. Combining the risk assessment with the mitigation capability assessment results in the County's net vulnerability to disasters, and more accurately focuses the goals, objectives, and proposed actions of this LHMP Update. A two-step approach was used to conduct this assessment for the County. 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 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. Similar to the HMPC's effort to describe hazards, risks, and vulnerability of the County, this mitigation capability assessment describes the County's existing capabilities, programs, and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. 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; mitigation education, outreach, and partnerships are discussed in Section 4.4.4, and other mitigation efforts are discussed in Section 4.4.5.

4.4.1. Amador County's Regulatory Mitigation Capabilities

Table 4-112 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Amador County. Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more detail on existing mitigation capabilities.

Table 4-112 Amador County Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
General Plan	Y 2016	Plan addresses hazards and mitigation. Plan can be used to implement mitigation plans.
Capital Improvements Plan	Y 2011	Plan is not hazard specific.
Economic Development Plan	N	
Local Emergency Operations Plan	N	
Continuity of Operations Plan	N	
Transportation Plan	Y 2019	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	Y	
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.
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Codes are enforced
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	Y	Rating: varies in areas in the County
Site plan review requirements	Y	Y
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	Ordinance is effective and enforced.
Subdivision ordinance	Y	Ordinance is effective and enforced.
Floodplain ordinance	Y	N – Needs update to reflect current standards

Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	Fire and other ordinances are effective and enforced.
Flood insurance rate maps	Y	Ordinance is effective and enforced.
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
CWPPs are being completed in other areas of the County. The Development Code needs to be streamlined, but limited staffing and resources have kept that from happening.		

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.

Goal LU-4	Ensure adequate wastewater treatment, storage, and disposal capacity exists to serve the county's current and future demand.
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.
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.

Goal C-2	Maintain and improve water supply planning and infrastructure.
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.
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.

Goal S-1	Prevent loss of life or property from flooding.
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 (currently under revision)

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 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.

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.

Dry Creek Watershed Assessment Plan (currently in draft state)

The Dry Creek Watershed Assessment project, initiated in 2005, is addressing concerns expressed by watershed stakeholders, which include improving water quality, water supply reliability, and ecosystem quality in the watershed. A major phase of this project will result in formal watershed management plan and identification and implementation of corrective measures to protect and restore the Dry Creek watershed. This plan is currently in draft state. The project area includes upper Dry Creek (Jackson Creek, Sutter Creek, Amador Creek, and others) and southern portions of the Cosumnes River Watershed (Cedar Creek, South Fork Cosumnes River, Scott Creek, Big Indian Creek, and others), areas primarily in Amador County or upstream from the community of River Pines.

Strategic Fire Plan Amador-El Dorado Unit (2014)

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 new 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.

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:

- Volcano 2005 CWPP
- Amador County 2005 CWPP
- Pioneer/Volcano 2012 CWPP
- Greater Pine Grove 2013 CWPP
- High Country 2016 CWPP
- Greater Fiddletown 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 Building Standards Code, 2007 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, together with the following Appendices: Appendix Chapter 1 (Administration), Appendix B (Board of Appeals), Appendix C (Group U-Agricultural Buildings), Appendix F (Rodent Proofing), Appendix G (Flood-Resistant Construction), Appendix H (Signs), Appendix I (Patio Covers), and Appendix J (Grading).
- California Electrical Code, 2007 Edition, based on the 2005 Edition National Electric Code, as published by the National Fire Protection Association, and as adopted by the California Building Standards Commission in Title 24 of the California Code of Regulations.

- California Mechanical Code, 2007 Edition, based on the 2006 Uniform Mechanical Code as published by the International Association of Plumbing and Mechanical Officials, and as adopted by the California Building Standards Commission in Title 24 of the California Code of Regulations.
- California Plumbing Code, 2007 Edition, based on the 2006 Uniform Plumbing Code as published by the International Association of Plumbing and Mechanical Officials, and as adopted by the California Building Standards Commission in Title 24 of the California Code of Regulations.
- California Energy Code, 2008 Edition.
- California Historical Code.
- California Existing Building Code, based on Appendix Chapter A1 of the 2006 International Existing Building Code as published by the International Code Council (ICC) and as adopted and amended by the California Building Standards Commission in the California Building Standards Code, Title 24 of the California Code of Regulations.
- California Referenced Standards Code. (Ord. 1693 §1 (part), 2010).

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)

15.30.080 Fire management plans.

A fire management plan may be required for any project if the project will have a significant effect on the provision 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;
- Fire hazards existing within the project;
- Requirements of this chapter which cannot be met due to project design or other constraints;
- Fire protection measures which are consistent with the provisions of this chapter or other recognized fire protection standards;
- Fuel modification plan will be required on specific projects, must be completed by a registered professional forester. (Ord. 1437 §1(part), 1997: Ord. 1385 §1(part), 1995).

15.30.090 Setback of structures for defensible space.

All buildings and accessory buildings on parcels one acre and larger shall have a minimum thirty-foot setback from all property lines or the center of a roadway, whichever is farthest.

Multi-parcel projects on land having a general plan population density of more than one family per acre shall have a thirty-foot setback from the exterior boundaries of the project if the project adjoins land zoned A or AG.

For parcels less than one acre, the same practical effect shall be provided for. (Ord. 1644 §2(part), 2006).

15.30.100 Maintenance of defensible space.

To ensure continued maintenance of properties in conformance with Section 15.30.080 of this chapter and to assure continued availability, access, and utilization of defensible space during a wildfire, provisions for annual maintenance shall be a condition of approval of the project and shall be included in fire management plans, roadway maintenance agreements, and similar documents..

Fuel modification shall be required to a width of ten feet on each side of roadways by reducing ground fuels to less than eighteen inches in height and by maintaining tree and shrub separations necessary to reduce fuel loading.

Fuel modification shall be required one hundred feet around all structures or to the property line, whichever is nearer, by reducing ground fuels to less than eighteen inches in height and by maintaining tree and shrub separations necessary to reduce fuel loading. (Ord. 1644 §2(part), 2006).

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), 2005).

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), 2005).

Fire Prevention Regulations and Enforcement

The laws and regulations concerning fire prevention on private land in Amador County are enforced primarily by CAL FIRE and the County. The following list contained within the Amador County Fire Hazard Plan provides a summary of the major laws and regulations currently in force in Amador County that pertain to fire prevention.

Public Resource Code (PRC 4291)

A person must maintain a minimum of a 100-foot-wide fuelbreak around all buildings and structures unless the CAL FIRE determines that 100 feet is needed for protection. PRC 4291 does not require the removal of individual trees, ornamental shrubbery or similar plants which are used as ground cover if they do not form a means of rapidly transmitting fire from the native growth to a building or structure. Other portions of this regulation address the requirement for 10 feet or more of space between trees branches and chimneys or stovepipes, the need to keep needles and leaves off of the roof, and the requirement to keep a screen over the outlet to a chimney or stovepipe.

PRC 4421

A person shall not set a fire which is on any land that is not his own without the permission of the owner.

PRC 4422

A person shall not allow a fire to burn uncontrolled on land he owns or escape to someone else's property.

PRC 4423

A person must have a permit to burn vegetative material during the fire season. The permits are obtained from the CAL FIRE. Open burning during any time of the year can only be done on "permissive burn days" as regulated by the Amador Air District. Burning on non-residential property may also require a permit from the Air District any time of the year and you should call them for guidance.

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 4-113 identifies the County personnel responsible for activities related to mitigation and loss prevention in the County.

Table 4-113 Amador County Administrative/Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Y	Y
Mitigation Planning Committee	Y	From this Plan.
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	N	
Mutual aid agreements		
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y FT	Y
Floodplain Administrator	Y FT	Y
Emergency Manager	Y FT	
Community Planner	Y FT	Y
Civil Engineer	Y FT	
GIS Coordinator	N	
Other		
Technical	**Y/N**	**Describe capability Has capability been used to assess/mitigate risk in the past?**
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	N	
Grant writing	Y	
Hazus analysis	N	
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.		

4.4.3. Amador County's Fiscal Mitigation Capabilities

Table 4-114 identifies financial tools or resources that the County could potentially use to help fund mitigation activities.

Table 4-114 Amador County Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (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	
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	Y	Current fees –no; future fees - yes
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	N	
Community Development Block Grant	Y	Mostly used for AWA infrastructure improvements.
Other federal funding programs	N	
State funding programs	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 4-115 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 4-115 Amador County Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access, and functional needs populations, etc.	Y	Local groups comment on development proposals to minimize environmental impacts, but these groups are not equipped to implement mitigation activities

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Amador Fire Safe Council
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Staffing and budgeting limit these items. Additional outreach activities are planned at the County Fair. This and many other items are included in a mitigation action to this Plan in Chapter 5.		

4.4.5. Other Mitigation Efforts

The County has other mitigation efforts that they pursue:

- The County has worked with California Department of Fish and Wildlife to be able to remove debris around bridges in the County. The Project is located within the boundaries of Amador County, California located at 19 project sites where streams cross under County roadways. The cumulative maintenance project area is approximately 1,200 linear feet and covers 0.69 acres. Each project area is equal to or less than 2,500 square feet in size.
- Weed control is done by Cal Trans along State Highways.
- Tree trimming is done and brush clearing is done on as many roads as possible each year. This is an ongoing yearly process.
- Annual creek bank clearing is done in the County.
- The September 2015 Butte Fire in Amador and Calaveras Counties was, and still is, a devastating tragedy for the community. Because of a strong partnership between CAL FIRE and the Amador Fire Safe Council, the communities of Pine Grove, Pine Acres and Pioneer were saved by several strategically placed fuel breaks.
- The Pine Acres South Fuel Break Implementation - The Amador Fire Safe Council worked with CALFIRE to complete the Pine Acres South Fuel Break. This fuel break encompasses some of the area that was affected by the Butte Fire. Work done on this fuel break prior to the fire helped to protect Amador County. The project includes a 300 foot wide shaded fuel break through public and private lands. The work for this project was completed by private contractors and the Pine Grove Youth Conservation Camp. Over 150 acres of ground work has been implemented by crews from the Pine Grove Youth Conservation Camp; making this not only an economical project but also helping to provide valuable on-the-ground training to the young men at this corrections camp. Thank you to the California Fire Safe Council for their funding and support of this project.
- 2018 PG&E Community Fuel Break Project - The Amador Fire Safe Council recently completed a fuel break and ingress/egress project funding by PG&E. The project aim was to reduce hazardous fuels

adjacent to roads (create fuel breaks), improve or create key evacuation corridors, improve access for firefighting equipment, and protect PG&E assets. The project focused on road edge clearing to create a fuel break and improve ingress and egress. Work has been completed along Sandar Road, Sutter Highlands Drive and Meadow Lark Lane. A community fuel break was completed near Dusty Way, the first Amador County FireWise community. A fuel break was also completed on the historic Kennedy Mine property in partnership with the Kennedy Mine Foundation.

- 2017 PG&E Ingress & Egress Project – In 2017 AFSC received funding from PG&E to reduced hazardous fuels adjacent to roads (create fuel breaks), improve or create key evacuation corridors, improve access for firefighting equipment, and protect PG&E assets. The project was completed at the end of 2017. A total of 5 roads, approximately 13.5 acres along 3 miles, were treated.

Chapter 5 Mitigation Strategy

Requirement §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 Amador County Local Hazard Mitigation Plan (LHMP) Update. It describes how the County and 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 Hazard Mitigation Planning Committee (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 2014 LHMP was conducted by the HMPC. Some of the initial goals and objectives from the 2014 Amador County LHMP were refined and reaffirmed, some goals were deleted, and others were added. The end result was a new set of goals, reorganized to reflect the completion of or progress towards the 2014 actions, the updated risk assessment and the new priorities of this 2020 LHMP Update. To support the new LHMP goals, the mitigation actions from 2014 were reviewed and assessed for their value in reducing risk and vulnerability to the Amador County Planning Area from identified hazards and 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 LHMP Update and Section 5.4 details the new mitigation action plan.

Taking all of the above into consideration, the 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 HMPC success stories so that the community better understands what can happen where and what they themselves can do to be better prepared.
- Implement the action plan recommendations of this Plan.
- Use existing rules, regulations, policies, and procedures already in existence.
- 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 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. Detailed below is a description of Amador County's flood management program to ensure continued compliance with the NFIP. Also to be considered are the numerous flood mitigation actions contained in this LHMP Update that support the ongoing efforts by the County and participating jurisdictions to minimize the risk and vulnerability of the community to the flood hazard and to enhance their overall floodplain management program. A summary of the flood management programs and continued compliance with the NFIP for the incorporated communities are detailed in their jurisdictional annexes.

Amador County's Flood Management Program

Amador County has participated in the Regular Phase of the NFIP since 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) 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, but may evaluate the overall value of joining CRS in the future during the implementation phase of this LHMP Update.

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. As well, the County's floodplain management activities apply to existing and new development areas, implementing flood protection measures for structures and maintaining drainage systems to help reduce the potential of flooding within the County.

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 are discussed on Table 5-1.

Table 5-1 Unincorporated Amador County NFIP Status

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	38 policies $21,671 in annual premiums $8,631,400 in coverage
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?	16 claims $397,392.31 in paid claims 1 substantial damage claim

NFIP Topic	Comments
How many structures are exposed to flood risk within the community?	135 in 1% annual chance floodplain 3 in 0.2% annual chance floodplain
Number of Repetitive and Severe Repetitive Loss Properties	0 RL structures 0 SRL structures
Describe any areas of flood risk with limited NFIP policy coverage	No known places of limited coverage
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	No
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Plan review to ensure construction is outside SFHA
What are the barriers to running an effective NFIP program in the community, if any?	Public education concerning the legality of FIRMs
Compliance History	
Is the community in good standing with the NFIP?	Y
Are there any outstanding compliance issues (i.e., current violations)?	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	9/22/2017 CAV
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
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Meet
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 (CRS)	
Does the community participate in CRS?	N
What is the community's CRS Class Ranking?	N/A
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/Amador County

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 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 all 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. As detailed in Section 4.4, the Capability Assessment for the unincorporated County and in the Annex's for the other participating jurisdictions, 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, 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 will 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 three main types of HMA grants: (1) Hazard Mitigation Grant Program, (2) Pre-Disaster Mitigation Program, and (3) Flood Mitigation Assistance Program. 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

Requirement §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 HMPC has 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.

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
- A 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 2014 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 given three index cards and asked to write a goal statement on each. Goal statements were collected and grouped into similar themes and displayed on the wall of the meeting room. The goal statements were then further grouped into similar topics. New goals from the HMPC were discussed until the team came to consensus. 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.

Based on the risk assessment review and goal setting process, the HMPC identified the following goals and objectives, 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 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 risk and vulnerability to dam failure
- 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.

5.3 Identification and Analysis of Mitigation Actions

Requirement §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 in the County is unlikely, the vulnerability of the county is low, or capabilities are already in place to mitigate negative 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. Pandemic was added at a hazard late in the planning process. It is clearly an issue that needs to be addressed, but no mitigation actions were able to be put forward. The County as a whole is addressing this issue in the public education and other multi-hazard actions.

Table 5-2 Amador County Planning Area: Mitigation Action Priority Hazards by Jurisdiction – Unincorporated County and Incorporated Jurisdictions

Priority Hazards for Mitigation Action Development	Amador County	Amador City	Ione	Jackson	Plymouth	Sutter Creek
Agricultural Hazards: Severe Weather/Insect/Pests	X					
Aquatic Invasive Species						
Avalanche	X					
Climate Change	X		X	X	X	X
Dam Failure	X			X		
Drought & Water shortage	X		X	X	X	X
Earthquake	X			X		X
Floods: 1%/0.2% annual chance	X		X	X		X
Floods: Localized Stormwater	X	X	X	X		X
Landslide, Mudslide, and Debris Flow	X	X		X		X
Levee Failure			X			
Severe Weather: Extreme Heat	X		X	X	X	X
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	X	X	X	X		X
Severe Weather: Wind and Tornado	X	X	X	X		X
Severe Weather: Winter Storms and Freeze	X			X		X
Wildfire	X	X	X	X	X	X

Table 5-3 Amador County Planning Area: Mitigation Action Priority Hazards by Jurisdiction – Special Districts

Priority Hazards for Mitigation Action Development	AWA	ACFSC	Lockwood FPD	JVID	Pine Grove CSD	River Pines PUD
Agricultural Hazards: Severe Weather/Insect/Pests	X		X	X		
Aquatic Invasive Species	X			X		
Avalanche						
Climate Change	X	X	X	X	X	
Dam Failure	X		X	X		
Drought & Water shortage	X	X	X	X	X	X
Earthquake	X			X		
Floods: 1%/0.2% annual chance	X			X		
Floods: Localized Stormwater	X		X			
Landslide, Mudslide, and Debris Flow	X		X			

Priority Hazards for Mitigation Action Development	AWA	ACFSC	Lockwood FPD	JVID	Pine Grove CSD	River Pines PUD
Levee Failure				X		
Severe Weather: Extreme Heat	X	X	X			X
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	X		X			
Severe Weather: Wind and Tornado	X	X	X			
Severe Weather: Winter Storms and Freeze	X		X	X	X	
Wildfire	X	X	X	X	X	X

It is important to note, however, that all the Hazards Addressed in this plan are included in the countywide multi-hazard public awareness mitigation action as well as in other multi-hazard, emergency management actions, and other hazard-specific actions, providing benefits to all participating jurisdictions to this Plan.

Once it was determined which hazards warranted the development of specific mitigation actions, the 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 from the 2014 LHMP and new actions identified during this planning process were reviewed and prioritized for inclusion in this 2020 LHMP Update. This comprehensive review of mitigation measures was performed using the criteria (alternatives and selection criteria) in Appendix C.

With these criteria in mind, HMPC members were each given a set of nine 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 team 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 considered in greater detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this 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 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

Requirement §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, infrastructure, and natural and cultural resources to future disaster losses. Emphasis was placed on both future and existing 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 all participating jurisdictions to this LHMP Update. For each mitigation action item included in Table 5-4, a detailed mitigation implementation strategy has been developed. Only those actions where the County is the lead jurisdiction are detailed further in this section. Actions specific to other participating jurisdictions, or where other jurisdictions are taking the lead, are detailed in each respective jurisdictional annex to this Plan.

The mitigation action plan detailed below contains both new action items developed for this LHMP Update as well as old actions that were yet to be completed from the 2014 Plan. Table 5-4 indicates whether the action is new or from the 2014 LHMP and Chapter 2 contains the details for each 2014 mitigation action item indicating whether a given action item has been completed, deleted, or deferred.

As described throughout this LHMP Update, Amador County 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 community to consider for implementation over the next 5-years covered by this 2020 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 Amador County and the participating jurisdictions have numerous existing, detailed action descriptions, which include benefit-cost estimates, in other planning documents, such as stormwater and drainage plans, fire plans, and capital improvement budgets and reports. These actions are considered to be part of this Plan, 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 Plan.

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 communities are not obligated by this document to implement any or all of these projects. Rather this mitigation strategy represents the desires of the community 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 action, 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 Plan.

Table 5-4 Amador County Planning Area Mitigation Actions

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 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	Amador County	2014 Action	X	X	X	Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Amador County and all jurisdictions	2014 Action	X	X	X	Public Information
Action 3. Evaluate All Major and Minor Structures Along Evacuation Routes within Amador County Right of Way	Amador County and all jurisdictions	New Action	X	X		Emergency Services
Action 4. Evaluate All Roadways Used as Evacuation Routes within Amador County Right of Way	Amador County and all jurisdictions	New Action	X	X		Emergency Services
Action 5. Harden and Enhance Cell service: Additional Cell/Repeater Towers/Mobile Repeaters, Generator Backup, Etc.	Amador County and all jurisdictions	New Action	X	X		Emergency Services
Action 6. Amador County Evacuation planning for all Hazards; Include Establishment of Sheltering in Place and Refuge areas.	Amador County and all jurisdictions	New Action	X	X		Emergency Services
Action 7. Reverse 911 Enhancements	Amador County and all jurisdictions	New Action	X	X		Prevention Emergency Services
Action 8. Enhance Agency Communications	Amador County and all jurisdictions	New Action	X	X		Prevention Emergency Services
Action 9. PRC 4290 Compliant Street and Address Signage for Rural Areas	Amador County and all jurisdictions	2014 Action	X	X		Prevention Emergency Services
Action 10. Fixed Generators to Essential County Facilities	Amador County and all jurisdictions	New Action	X	X		Prevention Emergency Services Property Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 11. Implement modern GIS capabilities in Amador County	Amador County and all jurisdictions	2014 Action	X	X		Prevention Emergency Services Property Protection
Avalanche Actions						
Action 12. Annual Review of Kirkwood Ski Area Avalanche Mitigation Program	Amador County	2014 Action	X	X		Prevention Property Protection
Agricultural Hazard Actions						
Action 13. Invasive Insect Pests	Amador County and all jurisdictions	2014 Action	X	X		Prevention Property Protection Natural Resource Protection
Action 14. Invasive Weed Pests	Amador County and all jurisdictions	2014 Action	X	X		Prevention Property Protection Natural Resource Protection
Climate Change Actions						
Action 15. Energy Action Plan	Amador County and all jurisdictions	New Action	X	X		Prevention
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	Amador County and all jurisdictions	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 17. Review and Amend Flood Ordinance as Appropriate	Amador County	2014 Actions	X	X	X	Prevention Property Protection
Action 18. Evaluate All Areas With Localized Flooding Along Amador County Maintained Roadways	Amador County and all jurisdictions	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 19. Monitor Shakeridge Road (upcountry) for Landslide or Road Movement	Amador County and all jurisdictions	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 20. Evaluate Each Roadways That is Subject to Local Land Movement and Minimize Debris Removal within Amador County Right of Way	Amador County and all jurisdictions	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Earthquake Actions						
Action 21. Identify Un-Reinforced Masonry (URM) and other seismically vulnerable buildings in the County	Amador County and all jurisdictions	2014 Action	X	X		Property Protection Structural Projects
Wildfire and Drought and Water Shortage Actions						
Action 22. Evaluate Evacuation Routes for Wildfire That Serve Critical Infrastructure	Amador County and all jurisdictions					Prevention Emergency Services
Action 23. Community Ingress/Egress – Phase I: Fire Safe Programs and Public Education Activities*	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Prevention Public Information Property Protection Natural Resource Protection
Action 24. Community Ingress/Egress – Phase II: Brush Clearing and Fuels Reduction*	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Prevention Public Information Property Protection Natural Resource Protection
Action 25. Construction of Mitchell Mine Fuelbreak*	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Property Protection Natural Resource Protection
Action 26. Outreach and Public Information Immobile Citizen Evacuation*	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Public Information Emergency Services Property Protection Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 27. Development of Firewise Communities in Amador County*	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Public Education Prevention Property Protection Natural Resource Protection
Action 28. Pine Acres Vegetation Management Program (2526 Acres)	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Public Education Prevention Property Protection Natural Resource Protection
Action 29. Shake Fiddletown Vegetation Management Program (2526 Acres)	Amador County, Fire Safe Council, and all jurisdictions	New Action	X	X		Public Education Prevention Property Protection Natural Resource Protection
City of Amador City Actions						
Localized Flood Actions						
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	City of Amador City	2014 Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	City of Amador City and all Jurisdictions	New Action	X	X	X	Public Information
Action 3. Wastewater Plant Emergency Power	City of Amador City	2014 Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 4. Midtown Sewer Crossing	City of Amador City	2014 Action	X	X	X	Property Protection Structural Project Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 5. Vegetation Management	City of Amador City	2014 Action	X	X		Prevention Property Protection Natural Resource Protection
Action 6. Landslide and Slope Failure Mitigation	City of Amador City	New Action	X	X		Prevention Property Protection Natural Resource Protection
City of Ione Actions						
Multi-Hazard Actions						
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	City of Ione	2014 Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	City of Ione and all Jurisdictions	New Action	X	X	X	Public Information
Action 3. Harden and Enhance Cell Service: Additional Call/repeater towers/mobile repeaters generator back up	City of Ione	New Action	X	X		Emergency Services
Action 4. Shelter Upgrades to Evalyn Bishop Hall (E.B. Hall)	City of Ione	2014 Action	X	X		Prevention Emergency Services
Action 5. Backup generators	City of Ione	New Action	X	X		Property Protection Emergency Services
Flood, Localized Flood, and Levee Failure Actions						
Action 6. Flood Ordinance Review and Update	City of Ione	New Action	X	X	X	Prevention
Action 7. Develop and Implement Storm Water Master Plan	City of Ione	New Action	X	X	X	Prevention Property Protection Structural Projects Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 8. Develop Watershed Based Flood Reduction Programs	City of Ione and all Jurisdictions	New Action	X	X	X	Prevention Property Protection Structural Projects Natural Resource Protection
Action 9. Stream Maintenance and Debris/Sediment Removal	City of Ione	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 10. Replace Five Mile Bridge	City of Ione and all Jurisdictions	New Action	X	X	X	Property Protection Structural Projects
Action 11. Pursue certification of the Levee along Sutter Creek					X	Property Protection Structural Projects
Wildfire Actions						
Action 12. Ordinance Review – Wildland Urban	City of Ione	New Action	X	X		Prevention
City of Jackson Actions						
Multi-Hazard Species Actions						
Action 1.Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	City of Plymouth	2014 Action	X	X		Prevention
Action 2.Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	City of Plymouth and all jurisdictions	New Action	X	X	X	Prevention Public Information
Action 3.Station 131 generator	City of Plymouth	New Action	X	X		Prevention Property Protection Emergency Services
Dam Failure, Flood, Localized Flood Actions						
Action 4.Buena Vista Flood Mitigation Project	City of Plymouth	2014 Action	X	X	X	Property Protection Structural Projects Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 5.Busi Parking Lot Slope Drainage	City of Plymouth	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 6.Annual Creek Cleaning	City of Plymouth	2014 Action	X	X	X	Property Protection Natural Resource Protection
Wildfire Actions						
Action 7.Starks Lane Bridge	City of Plymouth	New Action	X	X		Property Protection Structural Projects Natural Resource Protection
Action 8.Defensible Space	City of Plymouth	New Action	X	X		Property Protection Natural Resource Protection
Action 9.Picardo Bridge	City of Plymouth	New Action	X	X		Property Protection Structural Projects Natural Resource Protection
City of Plymouth Actions						
Multi-Hazard Actions						
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	City of Plymouth	2014 Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	City of Plymouth and all Jurisdictions	New Action	X	X	X	Prevention Public Information
Action 3. Secure City Hall as Critical Infrastructure with Commercial Generator	City of Plymouth	2014 Action	X	X		Prevention Property Protection Emergency Services

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 4. Indian Creek Stream Restoration & Culvert Improvement in Flood Hazard Zone	City of Plymouth	2014 Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 5. Maintain and Enhance Water Canal by Converting Earthen Arroyo Ditch to Fixed Pipeline or Gunite Lined Canal	City of Plymouth	2014 Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 6. Develop a Community Wildfire Prevention Plan	City of Plymouth	2014 Action	X	X		Prevention Public Information Property Protection Structural Projects Natural Resource Protection
City of Sutter Creek Actions						
Multi-Hazard Actions						
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	City of Sutter Creek	2014 Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	City of Sutter Creek and all Jurisdictions	New Action	X	X	X	Prevention Public Information
Action 3. Development of Walking Paths, Native Tree Protection & Native Tree Species Planting	City of Sutter Creek	New Action	X	X	X	Natural Resource Protection
Action 4. Installation of Generator at City Hall and Community Center	City of Sutter Creek	New Action	X	X		Property Protection
Action 5. Upgrade Ditches and Culverts	City of Sutter Creek	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 6. Develop a Stormwater Management Plan	City of Sutter Creek	New Action	X	X	X	Prevention Property Protection Structural Projects Natural Resource Protection
Floods and Localized Flood Actions						
Action 7. Sutter Creek City Hall Flooding	City of Sutter Creek	2014 Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 8. Sutter Creek Bank Stabilization	City of Sutter Creek	2014 Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Wildfire Actions						
Action 9. Perimeter Wildfire Protection Fuel Break	City of Sutter Creek and all Jurisdictions	New Action	X	X		Property Protection Natural Resource Protection
Amador Water Agency Actions						
Multi-Hazard Actions						
Action 1. AWP Standby Generators	Amador Water Agency and all Jurisdictions	New Action	X	X		Property Protection
Ag Hazards and Aquatic Invasive Species Actions						
Action 2. Amador and Ione Water Systems Taste and Odor Mitigation	Amador Water Agency and all Jurisdictions	New Action	X	X		Prevention
Climate Change Actions						
Action 3. Lower Bear Reservoir Expansion Study	Amador Water Agency and all Jurisdictions	New Action	X	X	X	Structural Projects
Drought and Water Shortage and Wildfire Actions						
Action 4. Replacement of Two Hypalon Lined and Covered Tanks with New Tanks	Amador Water Agency and all Jurisdictions	New Action	X	X		Property Protection Structural Projects

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 5. Mt. Crossman Main Area Tank for Upper CAWP System	Amador Water Agency and all Jurisdictions	New Action	X	X		Property Protection Structural Projects
Action 6. Upgrade Fire Pumps	Amador Water Agency and all Jurisdictions	2014 Action	X	X		Property Protection Structural Projects
Flood and Localized Flood Actions						
Action 7.Mace Meadows Pump Station Flooding	Amador Water Agency and all Jurisdictions	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 8.Eggiman Lane Flooding	Amador Water Agency and all Jurisdictions	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Amador Fire Safe Council Actions						
Multi-Hazard Actions						
Action 1. Community Ingress/Egress – Phase I: Fire Safe Programs and Public Education Activities*	Amador County and all Jurisdictions	New Action	X	X		Prevention Public Information Property Protection Natural Resource Protection
Action 2. Community Ingress/Egress – Phase II: Brush Clearing and Fuels Reduction*	Amador County and all Jurisdictions	New Action	X	X		Prevention Public Information Property Protection Natural Resource Protection
Action 3. Construction of Mitchell Mine Fuelbreak*	Amador County and all Jurisdictions	New Action	X	X		Property Protection Natural Resource Protection
Action 4. Outreach and Public Information Immobile Citizen Evacuation*	Amador County and all Jurisdictions	New Action	X	X		Public Information Emergency Services Property Protection Natural Resource Protection

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 5. Development of Fire Wise Communities in Amador County*	Amador County and all Jurisdictions	New Action	X	X		Public Education Prevention Property Protection Natural Resource Protection
Action 6. Establish Fire Breaks on three parallel ridges (Antelope, Doakes and Panther)*	Amador County and all Jurisdictions	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 7. Amador Soil Health and Agricultural Resiliency Program*	Amador County and all Jurisdictions	New Action	X	X		Prevention Property Protection Natural Resource Protection
Lockwood Fire Protection District Actions						
Multi-Hazard Actions						
Action 1. Emergency Action Plan and Post-Disaster Recovery Plan	LFPD, Amador County	New Action	X	X		Prevention Emergency Services
Action 2. COW – Celltower on Wheels	LFPD, Amador County	2014 Action	X	X		Emergency Services
Action 3. Undergrounding of Overhead Power Lines	LFPD, Amador County	New Action	X	X		Property Protection Structural Projects Natural Resource Protection
Flood: Localized Flooding and Heavy Rains and Storms						
Action 4. Water Hazards: Dam Failure Study; Dry Creek Ford crossing on Hale Road	LFPD, Amador County	New Action	X	X	X	Property Protection Natural Resource Protection
Wildfire Actions						
Action 5. Water Tanks Installation and GIS tank location recording	LFPD, Amador County	2014 Action	X	X		Property Protection Structural Projects
Action 6. Public Education, Defensible Space, Firewise Communities	LFPD, Amador County	New Action	X	X		Prevention Public Information

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 7. Remodel/renovation Stations 151, 152	LFPD, Amador County	2014 Action	X	X		Property Protection Structural Projects Emergency Services
Jackson Valley Irrigation District						
Ag Hazards Actions						
Action 1. Outreach to Farmers regarding Agricultural Hazards in the Area	JVID, Amador County	New Action	X	X		Public Information
Aquatic Invasive Species Actions						
Action 2. Lake Amador Aquatic Invasive Species Monitoring	JVID and all Jurisdictions	New Action	X	X		Prevention Property Protection
Climate Change Actions						
Action 3. Long Term Water Solutions Analysis Due to Climate Change	JVID and all Jurisdictions	New Action	X	X		Prevention
Dam Failure Actions						
Action 4. Jackson Creek Dam Immediate Inundation Area Public Outreach – Dam Failure	JVID, Amador County	New Action	X	X	X	Public Information Property Protection
Action 5. Jackson Creek Dam Spillway Apron Extension Project	JVID, Amador County	New Action	X	X	X	Property Protection Structural Projects
Drought and Water Shortage and Wildfire Actions						
Action 6. JVID Water Meter Maintenance Program	JVID	New Action	X	X		Prevention
Action 7. JVID Water Procurement and Additional Water Storage Study	JVID and all Jurisdictions	New Action	X	X		Prevention Structural Projects
Action 8. Lake Amador Spillway Rubber Dam Project	JVID, Amador County	New Action	X	X	X	Prevention Structural Projects
Earthquake Actions						
Action 9. Jackson Creek Dam Seismic Evaluation and Liquefaction Study	JVID, Amador County	New Action	X	X		Prevention Structural Projects
Flood Actions						

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 10. Lake Amador Drive Box Culvert Expansion Project	JVID, Amador County	New Action	X	X	X	Property Protection Structural Projects
Levee Failure Actions						
Action 11. Jackson Creek Levee Maintenance Project	JVID, Amador County	New Action	X	X	X	Property Protection Structural Projects Natural Resource Protection
Severe Weather Actions						
Action 12. JVID Office Backup Generator	JVID	New Action	X	X		Prevention Property Protection
Action 13. JVID Freeze Protection Project	JVID	New Action	X	X		Prevention Property Protection
Wildfire Actions						
Action 14. JVID Fire Hydrant Expansion Project	JVID, and all Jurisdictions	New Action	X	X		Prevention Property Protection Structural Projects Natural Resource Protection
Pine Grove CSD Actions						
Multi-Hazard Actions						
Action 1. Hydrant Project - Install water lines and add 16 fire hydrants to the area above Lupe Road in Pine Grove. There are 64 homes in this area that are on wells and there are no fire hydrants available.	PGCSD	New Action	X	X		Property Protection Structural Projects Natural Resource Protection
Severe Weather Actions						
Action 2. Warming/Cooling Center/Generator	PGCSD	New Action	X	X		Prevention
River Pines PUD Actions						
Multi-Hazard Actions						
Action 1. Wildfire Prevention and Public Education	RPPUD	New Action	X	X		Prevention Public Information

Action Title	Jurisdictions Benefitting from Action (s)	New Action/ 2014 Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 2. Stormwater Drainage	RPPUD	New Action	X	X	X	Prevention Property Protection Structural
Action 3. Backup Generators	RPPUD	New Action	X	X		Structural
Action 4. Rebuild Culvert/Road at Consumnes River Access Point	RPPUD	New Action	X	X	X	Property Protection Structural

* These actions are both County and Fire Safe Council joint 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/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Pandemic, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: 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 and planning departments for each incorporated jurisdiction.

Cost Estimate: Jurisdictional board/staff time

Participating Jurisdictions: County and incorporated cities.

Benefits (avoided Losses): 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

Timeline: 2019-2024

Project Priority: High

Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure,

Pandemic Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Amador County plays a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of natural hazards. A comprehensive multi-hazard public education program will better inform the community of natural hazards of concern and actions the public can take to be better prepared for the next natural disaster event.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The County will work with other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of natural hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will leverage and build upon existing mechanisms, will include elements to meet the objectives of Goal 3 of this LHMP Update, and will consider:

- Using a variety of information outlets, including websites, local radio stations, news media, schools, and local, public sponsored events;
- Creating and distributing (where applicable) brochures, leaflets, water bill inserts, websites, and public service announcements;
- Displaying public outreach information in County office buildings, libraries, and other public places and events;
- Developing public-private partnerships and incentives to support public education activities.

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing County outreach programs will be reviewed for effectiveness and leveraged and expanded upon to reach the broader region.

Responsible Office/Partners: Amador County, incorporated communities, and other jurisdictions

Participating Jurisdictions: County and all cities.

Priority (H, M, L): High

Cost Estimate: Annual costs to be determined, and will depend on the scope and frequency of activities and events as well as volunteer participation

Benefits (Losses Avoided): Increase residents' knowledge of potential hazards and activities required to mitigate hazards and be better prepared. Protect lives and reduce damages, relatively low cost to implement.

Potential Funding: Local budgets, grant funds

Timeline: Ongoing/Annual public awareness campaign

Action 3. Evaluate All Major and Minor Structures Along Evacuation Routes within Amador County Right of Way

Hazards Addressed: Multi-hazard. Applies to any hazard that requires evacuation.

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Identifying potential issues at major and minor structures along all evacuation routes within Amador County right of way, which could impede ingress and egress.

Project Description: Visually identify and inspect each major and minor structures along all evacuation routes within Amador County right of way. Identify any solutions to improve ingress and egress along all evacuation routes within Amador County right of way. Develop an action plan which can be used during evacuations.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Currently none

Responsible Office/Partners: Department of Transportation and Public Works

Cost Estimate: $100,000

Benefits (Losses Avoided): Identify structures inadequate to provide safe traffic movements along evacuation routes within Amador County right of way. Allows Amador County to place traffic control measures to improve safety during evacuations.

Potential Funding: County Funds

Timeline: Next two years

Project Priority: High

Action 4. Evaluate All Roadways Used as Evacuation Routes within Amador County Right of Way

Hazards Addressed: Multi-hazard. Applies to any hazard that requires evacuation.

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Identifying potential roadway issues along all evacuation routes within Amador County right of way, which could impede ingress and egress. This could include roadside brushing, turnouts or shoulders, widening of lanes, pavement repairs, drainage, water crossings, and signage.

Project Description: Visually identify and inspect each roadway along all evacuation routes within Amador County right of way. Identify any solutions to improve ingress and egress along all evacuation routes within Amador County right of way. Develop an action plan which can be used before evacuations and during evacuations.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Currently none

Responsible Office/Partners: Department of Transportation and Public Works

Cost Estimate: $100,000

Benefits (Losses Avoided): Identify roadways inadequate to provide safe traffic movements along evacuation routes within Amador County right of way. Allows Amador County to place traffic control measures to improve safety during evacuations.

Potential Funding: County Funds

Timeline: Next two years

Project Priority: High

Action 5. Harden and Enhance Cell service: Additional Cell/Repeater Towers/Mobile Repeaters, Generator Backup, Etc.

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Pandemic Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Poor cell service through most of the county. Ability to make emergency calls is paramount during hazard events.

Project Description: Additional cell towers, cell repeaters, mobile repeaters.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Possible funding through HSGP grant.

Responsible Office/Partners: OES/Sheriff's Office

Cost Estimate: $30.000+

Benefits (**Losses Avoided**): Increased ability to service citizens during times of hazards and emergencies.

Potential Funding: HSGP

Timeline: End of 2020.

Project Priority: Medium

Action 6. Amador County Evacuation planning for all Hazards; Include Establishment of Sheltering in Place and Refuge areas.

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Pandemic Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire). Applies to any hazard that requires evacuation.

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: There are limited roadways in Amador County. If evacuations occur, they would be slow.

Project Description: Update GIS mapping with passable roadways and create evacuation routes throughout the county.

Other Alternatives: County needs to employ/fund a GIS specialist.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Currently an employee (with GIS experience) of the Amador County Transportation Commission, Cal Fire and Public Works employees are mapping the county. These agencies along with OES are working map/plot evacuation routes through the GIS system.

Responsible Office/Partners: OES, ACTC, Cal Fire, Public Works

Cost Estimate: $30,000

Benefits (Losses Avoided): Planned evacuation routes will limit confusion in time of an emergency and will decrease the time it takes to evacuate an area.

Potential Funding: Cal Fire grants, county funding.

Timeline: End of 2020.

Project Priority: High

Action 7. Reverse 911 Enhancements

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure,

Pandemic Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Updating public of emergency information.

Project Description: CodeRED is an effective system, but would be substantially more effective if there was better cell phone coverage in the county.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: CodeRED is currently the tool used to inform people in Amador County of emergency information.

Responsible Office/Partners: OES/Sheriff's Office.

Cost Estimate: $13,000

Benefits (Losses Avoided): Reduced risk to the public. Increased times for citizens to react during times of hazards and emergencies.

Potential Funding: HSGP

Timeline: Currently implemented

Project Priority: High

Action 8. Enhance Agency Communications

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Pandemic, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Limited communication ability in Amador County. Timely response and backup, communication backup, and ability to make emergency calls is needed.

Project Description: Improve radio communications for LE/Fire and other county agencies in Amador County.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Unknown

Responsible Office/Partners: OES/Sheriff's Office, City/County Fire, city L.E.

Cost Estimate: $25,000

Benefits (Losses Avoided): Limited to radio dead spots in the county. Better communication capability.

Potential Funding: EMPG/HSGP, Sheriff's Office

Timeline: 2022

Project Priority: Medium

Action 9. PRC 4290 Compliant Street and Address Signage for Rural Areas

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Pandemic, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Homeowners either are unaware that their road signs and/or house signs are not adequate, do not know where to go to purchase PRC 4290 compliant signs, or balk at spending what it costs to obtain such a sign.

Project Description: Many homes in Amador County are on private roads and do not have adequate street signage. In addition, many more homes in rural Amador County do not have adequate house signage, which makes it difficult for emergency responders to quickly locate addresses requesting assistance.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office: California Department of Forestry and Fire Protection, Amador Fire Protection District, Amador County Sheriff's Office of Emergency Services

Cost Estimate:

- **Private Roads**: There are 350 privately owned roads in the county. The proposed project would provide funding for road signs and poles at $75 per for a total cost of $50,000 (includes duplicate signs for intersections).
- **Existing Homes**: Cost of a single PRC 4290 compliant sign is about $30 plus $5 for a stake. The proposed project would provide cost-share funds with homeowners paying $5 to $10 per sign (plus stake). There are approximately 3,500 homes that may need signage. Cost of project is $70,000 to $87,000. (The grant amount would have to be adjusted to include funds for administration of grant).
- **New Homes**: County building inspector will require installation of PRC 4290 compliant address signs prior to issuing final building permit. These signs are already required by County Code.

Benefits (Losses Avoided): Homeowners have no easy access to a source for PRC 4290-compliant signage. They have to do research to find a place to buy them and then they have to be willing to pay $35 per sign and install it once they receive it. This project would remove all of the above obstacles, and thereby facilitate emergency responders in locating addresses quickly.

The longer the response time, the greater the potential damage:

Structure fires attacked within 10 minutes of ignition have the greatest possibility of rapid extinguishments, and thus a decrease in potential life and property loss as well as reducing the likelihood that a house fire will spread to the wildlands.

Vegetation fire ignitions must be attacked quickly, or they can rapidly become quite large, depending on the amount and condition of the vegetation, the relative humidity, and wind.

Without medical intervention, certain death can occur in persons with heart attack, severe bleeding, and respiratory ailments in as little as four to six minutes.

Potential Funding: Possible funding sources are local, state, and federal grants and the Amador Fire Safe Council.

Schedule: As soon as funding is available.

Priority: High

Action 10. Fixed Generators to Essential County Facilities

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Pandemic, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Amador County has several essential County Facilities without power.

Project Description: Identify all essential County Facilities which currently have or do not have fixed generators. Consult, design, and install fixed generators or repair older generators for air quality.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Currently none

Responsible Office/Partners: General Services Administration

Cost Estimate: $ 500,000

Benefits (Losses Avoided): Identify solutions which will provide safety to the driving public in Amador County.

Potential Funding: County Funds

Timeline: Next three yeas

Project Priority: High

Action 11. Implement modern GIS capabilities in Amador County

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Pandemic, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Amador County system wide GIS data development is currently on hold as a result of budget cuts. Prior to the 2012 budget cuts, the GIS department supported other County departments in mitigation related items in many ways. The current legacy GIS system runs on unsupported software and hardware and will soon be retired.

Project Description: GIS technology is used to support decision making when location is a consideration. The Amador County GIS Division was created in 2006 to bring together useful information from different sources and make that information easily accessible to County staff and the public. Reinstating GIS in Amador County will render aid in mitigation of flood, wildfire, fuel mitigation, and etc. A reinstated GIS system may be hosted onsite, in the cloud, or a hybrid, and the system may be centralized while contributing partners are decentralized in a powerful data sharing capacity for the greatest benefit.

Other Alternatives: No action, continue without the benefits of a GIS department.

Existing Planning Mechanism(s) through which Action Will Be Implemented: County budget.

Responsible Office/Partners: Amador County Board of Supervisors, Amador County IT

Cost Estimate: To be determined.

Benefits (Losses Avoided): GIS can enhance mitigation actions and will increase both property protection and life safety for County residents.

Potential Funding: Existing budgets and grant opportunities

Timeline: Within 5 years

Project Priority: Medium

Avalanche Actions

Action 12. Annual Review of Kirkwood Ski Area Avalanche Mitigation Program

Hazards Addressed: Avalanche

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The 2003 Kirkwood Specific Plan requires Kirkwood Mountain Resort to provide an annual Avalanche Mitigation Report to the Tri-County Technical Advisory Committee. The Specific Plan also identifies avalanche risk and severity zones that are to be kept free of structures.

Project Description: Monitoring of Kirkwood Mountain Resort's avalanche mitigation program and review and development plans to ensure that structures are located outside of identified avalanche risk zones.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Annual review by the Tri-County Technical Advisory Committee

Responsible Office/Partners: Amador, Alpine, and El Dorado Planning Departments

Cost Estimate: Staff time

Benefits (Losses Avoided): Reduced potential for loss of life and property by maintaining avalanche mitigation protocols and prohibiting structures within identified avalanche risk zones.

Potential Funding: Grant funding

Timeline: Ongoing

Project Priority: Low

Agricultural Hazard Actions

Action 13. Invasive Insect Pests

Hazards Addressed: Invasive Species

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: 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: California Department of Food & Agriculture and Amador County Department of Agriculture

Cost Estimate: Cost of project varies each year. In an average year, the county expends $60,000 and the state expends $36,000.

Benefits (Losses Avoided): Occasionally an invasive insect is found. For example, a glassy winged sharpshooter has been found before it moved into the commercial agricultural areas.

Potential Funding: State funding through CDFA and county general fund support of the Ag department.

Timeline: Seasonal and ongoing

Project Priority: medium

Action 14. Invasive Weed Pests

Hazards Addressed: Introduction and establishment of invasive and noxious weeds

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Invasive weeds can decimate local Rangeland grapes, walnuts, and timber making the land unusable for livestock production, recreation, and native fauna. Noxious weeds crowd out native vegetation creating a monoculture and increase the risk of fire.

Project Description: Monitoring invasive Weeds such as Oblong Spurge and Rush Skeleton Weed, as well as control them, as funding becomes available. The quantity of work always exceeds the demand, so

projects are prioritized based upon CDFA rating system where A rated weeds have the most potential to spread and become difficult to eradicate.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: California Department of Food & Agriculture (CDFA) agreements with Amador County to control Oblong Spurge along the Mokelumne River watershed in southern Amador County.

Responsible Office/Partners: California Department of Food & Agriculture and Amador County Department of Agriculture and UCCE Farm Advisor

Cost Estimate: Cost of projects vary each year. In 2020/2021 Amador County applied for a grant from CDFA for $40,000 with anticipated cost share of $22,000 from the county general fund support of Ag department activities to control noxious weeds.

Benefits (Losses Avoided): Invasive and noxious weeds are located every year in Amador. The exact benefit to agriculture and the environment from less chemical herbicide use in commercial agricultural areas, open space for recreation preserved, and habitat for native flora and fauna is difficult to calculate.

Potential Funding: State funding through CDFA and county general fund support of the Ag department.

Timeline: Seasonal and ongoing

Project Priority: medium

Climate Change Actions

Action 15. Energy Action Plan

Hazards Addressed: Climate change, wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The County adopted an Energy Action Plan in 2015. The Plan's goal was to provide voluntary conservation measures that County government could take to reduce energy consumption and energy costs. A citizen working group was formed to promote the concepts to local businesses and homeowners. The working group currently has no membership.

Project Description: Encourage private sector use of the Energy Action Plan conservation measures.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Dissemination of EAP measures through revised working group, publication on City and County websites

Responsible Office/Partners: City and County Planning Departments

Cost Estimate: Staff time

Benefits (Losses Avoided): Reduced energy consumption and reduced GHG emissions associated with both energy production and consumption; reduced wildfire risk; reduced impacts from PSPS events

Potential Funding: Grant funding

Timeline: 5 years

Project Priority: Medium

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

Hazards Addressed: Localized Stormwater Flooding, Landslide, Mudslide and Debris Flow, Wildfire Response (in that less road damage during winter storms will contribute to a more resilient evacuation route network).

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Winter storms have increased in frequency and intensity in recent years. Flooding along county roadways has increased in parallel, with disproportionate levels of damage resulting from high-intensity storms. Unabated storm water flows fill culverts and drainage ditches with debris and undermine the roadbed in some areas.

Project Description: Data on locations of winter storm road damage will be evaluated to identify areas of repetitive damage that indicate underlying soil characteristics, slope, or other conditions exist that require mitigating actions to protect the road infrastructure.

Other Alternatives: none

Existing Planning Mechanism(s) through which Action Will Be Implemented: N/A

Responsible Office/Partners: Amador County Public Works, Amador County Transportation Commission

Cost Estimate: $2 million

Benefits (Losses Avoided):

- Improved stormwater drainage throughout the community
- Reduction in damage to flood control infrastructure
- Reduction in landslides, erosion, debris flow
- Fewer road closures
- Improved evacuation infrastructure

Potential Funding: FEMA Hazard Mitigation Grant Programs

Timeline: 2 years

Project Priority: High

Action 17. Review and Amend Flood Ordinance, as Appropriate

Hazards Addressed: Flood, Levee Failure

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: A community's flood damage prevention ordinance sets minimum rules, regulations, and standards for development in the SFHA. Since these standards are minimum protection standards, higher regulatory may be necessary to better protect properties from potential flood damage. This is certainly true when FIRM maps are updated, when floor control projects are completed or when a community has experienced a recent flood. The County and each community should evaluate their current higher regulatory standards and make decisions if additional higher standards may be necessary to protect both current and future development. Evaluation of higher regulatory standards is also important because it also provides continued compliance with the NFIP.

Project Description: Review current flood damage prevention higher regulatory standards and assess the need for additional higher regulations in terms of protecting both current and future development from potential flood damage.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: N/A

Responsible Office: Amador County Planning and Office of Emergency Services

Cost Estimate: Staff time

Benefits (Losses Avoided): Increased flood protection and reduction in the cost of flood insurance

Potential Funding: Existing budget

Timeline: Next 5 years

Project Priority: Medium

Action 18. Evaluate All Areas With Localized Flooding Along Amador County Maintained Roadways

Hazards Addressed: Localized flooding along Amador County maintained roadways.

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Amador County has local roads that flood/pond during storm events, which impedes ingress and egress.

Project Description: Visually identify and inspect each known location where flooding/ponding occur during storm events. Identify any solutions to improve or reduce flooding/ponding at identified location. Develop an action plan or project to correct the issues.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Currently none

Responsible Office/Partners: Department of Transportation and Public Works

Cost Estimate: $ 100,000

Benefits (Losses Avoided): Identify solutions which will provide safety to the driving public in Amador County.

Potential Funding: County Funds

Timeline: Next three yeas

Project Priority: High

Action 19. Monitor Shakeridge Road (upcountry) for Landslide or Road Movement

Hazards Addressed: Landslide

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Shakeridge Road is a connector to State Route 88. There is a mile and half that has had land movement. The area is subject to slides (upslope) yearly. 2017 the road had its first downslope slide that closed the road and is subject to more movement.

Project Description: Open road and monitor movement on the downslope side. Repair as needed. Develop long term solution.

Other Alternatives: Realign road or repair road for 50-year fix

Existing Planning Mechanism(s) through which Action Will Be Implemented: Currently none

Responsible Office/Partners: Amador County, FHWA, and CalTrans

Cost Estimate: $30,000

Benefits (Losses Avoided): Provide safe traffic movements along this route within Amador County. Allows Amador County to place traffic control measures to improve safety during evacuations.

Potential Funding: County Funds

Timeline: Now

Project Priority: High

Action 20. Evaluate Each Roadways That is Subject to Local Land Movement and Minimize Debris Removal within Amador County Right of Way

Hazards Addressed: Debris/landslide impeding ingress and egress along roadways within Amador County.

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Amador County has roadways which have steep inclines that allow land movement/slides. Identifying potential roadway areas subject to land movement/slide within Amador County right of way, which could impede ingress and egress.

Project Description: Visually identify and inspect each roadway areas subject to land movement/slide within Amador County right of way. Identify any solutions to reduce debris/slide within these areas to improve ingress and egress along Amador County right of way. Develop an action plan which can be used to combat/reduce landslides.

Other Alternatives: none

Existing Planning Mechanism(s) through which Action Will Be Implemented: Currently none

Responsible Office/Partners: Department of Transportation and Public Works

Cost Estimate: $100,000

Benefits (Losses Avoided): Provide safe traffic movements along roadways subject to land movement/slide within Amador County. Allows Amador County to place traffic control measures to improve safety.

Potential Funding: County Funds

Timeline: Next two years

Project Priority: High

Earthquake Actions

Action 21. Identify Un-Reinforced Masonry (URM) and other seismically vulnerable buildings in the County

Hazards Addressed: Earthquake

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Within Amador County, there are many old buildings with no record of the construction type or building method used in construction. Unincorporated areas such as Pine Grove, Volcano, and other communities have a number of these older buildings. Damages during an earthquake event would be greatest in URM and other vulnerable buildings.

Project Description: This project involves identifying and prioritizing URM and other seismically vulnerable buildings in the County and determining and implementing seismic retrofits as funding may be available.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: None at this time

Responsible Office/Partners: Amador County Building, Fire Protection, and OES

Cost Estimate: Staff time, grant funds

Benefits (Losses Avoided): Reducing the potential for loss of life and injury by reducing response time for emergency personnel by identifying the buildings with the highest risk of collapse due to earthquake. For those buildings that are retrofitted – property protection and life safety.

Potential Funding: Exiting budgets, grants

Timeline: Within 5 years

Project Priority: Medium

Wildfire Actions

Action 22. Evaluate Evacuation Routes for Wildfire That Serve Critical Infrastructure

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: California is facing increasingly deadly and destructive wildfires. Foothill counties such as Amador are particularly prone to wildfire risk.

Project Description: Evaluate evacuation routes that serve the hospital, clinics, fire stations, law enforcement offices, evacuation shelters, schools, and critical communication infrastructure. Identify solutions to improve ingress and egress, reduce adjacent fuel loads and protect these important arteries so as to maximize community resiliency during a wildfire event.

Other Alternatives: none

Existing Planning Mechanism(s) through which Action Will Be Implemented: N/A

Responsible Office/Partners: Amador County Public Works, Amador Fire Safe Council, Amador County Transportation Commission, CAL FIRE

Cost Estimate: $1 million

Benefits (Losses Avoided):

- Improved functionality of critical community resources in the event of a wildfire
- Reduced fire intensity adjacent to critical infrastructure
- Increased probability of containing a fire within fuel reduction zones, thereby protecting critical resources
- Reduced risk to public safety and critical resources

Potential Funding: FEMA Hazard Mitigation Grant Programs

Timeline: 2020 and ongoing

Project Priority: High

Action 23. Community Ingress/Egress – Phase I: Fire Safe Programs and Public Education Activities

Hazards Addressed: Multi hazard (Climate Change, Drought and Water Shortage, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Numerous communities in unincorporated areas of Amador County have been developed without any view as to wildfire evacuation. Roads are narrow, unpaved, one way in one way out, unsigned and choked with brush. Additionally, there is a need to develop and disseminate information regarding homeowner responsibility(ies) for fire safety and their property(ies).

Project Description: The project has been soliciting input and requests from local communities and individuals as to roads that are brush choked and thus restrict efficient evacuation in the event of wildfire. To date more than 50 locales have been identified. The roads all serve multiple residences. This project is Phase 1 of a 2 Phase project and includes the identification of project areas, project design, coordination, and outreach components. Phase 2 will address the actual brush clearing and fuels reduction components.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Amador Fire Safe Council has just received $1.04 million to implement this program

Responsible Office/Partners: Amador Fire Safe Council, Cal Fire, Amador County Fire

Cost Estimate: $100,000

Benefits (Losses Avoided): Home and properties brought into compliance with state law regarding fire safety. Home hardening using fire resistant materials. Roads serving multiple residences will be cleared via tree and brush removal at no cost to the homeowner. Implementation of both project phases will help protect lives and property from future wildfire events.

Potential Funding: Funding has been received.

Timeline: March 2022

Project Priority: High

Action 24. Community Ingress/Egress – Phase II: Brush Clearing and Fuels Reduction

Hazards Addressed: Multi hazard (Climate Change, Drought and Water Shortage, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Numerous communities in unincorporated areas of Amador County have been developed without any view as to wildfire evacuation. Roads are narrow, unpaved, one way in one way out, unsigned and choked with brush. Additionally, there is a need to develop and disseminate information regarding homeowner responsibility(ies) for fire safety and their property(ies).

Project Description: The project has been soliciting input and requests from local communities and individuals as to roads that are brush choked and thus restrict efficient evacuation in the event of wildfire. To date more than 50 locales have been identified. The roads all serve multiple residences. This project is

Phase 2 of a 2 Phase project and includes brush clearing and fuels reduction components. Phase 1 included the identification of project areas, project design, coordination, and outreach components.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Amador Fire Safe Council has just received $1.04 million to implement this program

Responsible Office/Partners: Amador Fire Safe Council, Cal Fire, Amador County Fire

Cost Estimate: $940,000

Benefits (Losses Avoided): Home and properties brought into compliance with state law regarding fire safety. Home hardening using fire resistant materials. Roads serving multiple residences will be cleared via tree and brush removal at no cost to the homeowner.

Potential Funding: Funding has been received.

Timeline: March 2022

Project Priority: High

Action 25. Construction of Mitchell Mine Fuelbreak

Hazards Addressed: Multi hazard (Climate Change, Drought and Water Shortage, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Wildfire in Amador County has long been an issue. Climate change and population growth have magnified this problem.

Project Description: Build a fuel break extending from the Mokelumne River across the eastern/northeastern portion of Amador County that will provide wildfire protection for Pine Grove, Volcano, and related communities.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: This project is underway and is approximately 50% completed

Responsible Office/Partners: Amador Fire Safe Council

Cost Estimate: $1 million

Benefits (Losses Avoided): Destruction by wildfire of the above-mentioned communities

Potential Funding: Grants

Timeline: Finish within one year or less

Project Priority: Medium

Action 26. Outreach and Public Information Immobile Citizen Evacuation

Hazards Addressed: Multi hazard (Climate Change, Drought and Water Shortage, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The death of 88 people (many of them senior citizens) in the Camp Fire highlighted the need for senior citizens to develop a personal evacuation plan. The concept is for church members, family, and friends to work with individuals to have a plan in place for senior citizens to be evacuated in the event of wildfire.

Project Description: This project is already in the implementation phase. The Amador Senior Center and the Amador County Commission on Aging have assembled outreach information and are disseminating it via community churches, fire safety seminars, the county fair etc.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: See project description above

Responsible Office/Partners: Amador Senior Center, Amador County Commission on Aging with input from CAL FIRE and AFSC

Cost Estimate: 50,000

Benefits (Losses Avoided): Save lives of senior citizens and disabled persons who are incapable of self-evacuation.

Potential Funding: Ingress/egress grant funding can be used for this purpose

Timeline: Underway and continuous—this is not a one-time operation

Project Priority: High

Action 27. Development of Fire Wise Communities in Amador County

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Amador County has only one Firewise Certified community.

Project Description: Engage entire communities in Firewise activities to reduce the risk of wildfire losses

Other Alternatives: None known

Existing Planning Mechanism(s) through which Action Will Be Implemented: At least one location in the county has been active in promoting Firewise. The primary mode of planning and execution is via community volunteers, activists with oversight and information via the fire agencies and the AFSC

Responsible Office/Partners: CalFire, Amador Fire Protection District, city fire departments and AFSC

Cost Estimate: US$100,000

Benefits (Losses Avoided): Reduce the risk, or avoid, loss of life and residential, commercial and infrastructure losses in the event of wildfire

Potential Funding: CAL FIRE grants

Timeline: Ongoing but delayed by coronavirus

Project Priority: High

Action 28. Pine Acres Vegetation Management Program (2526 Acres)

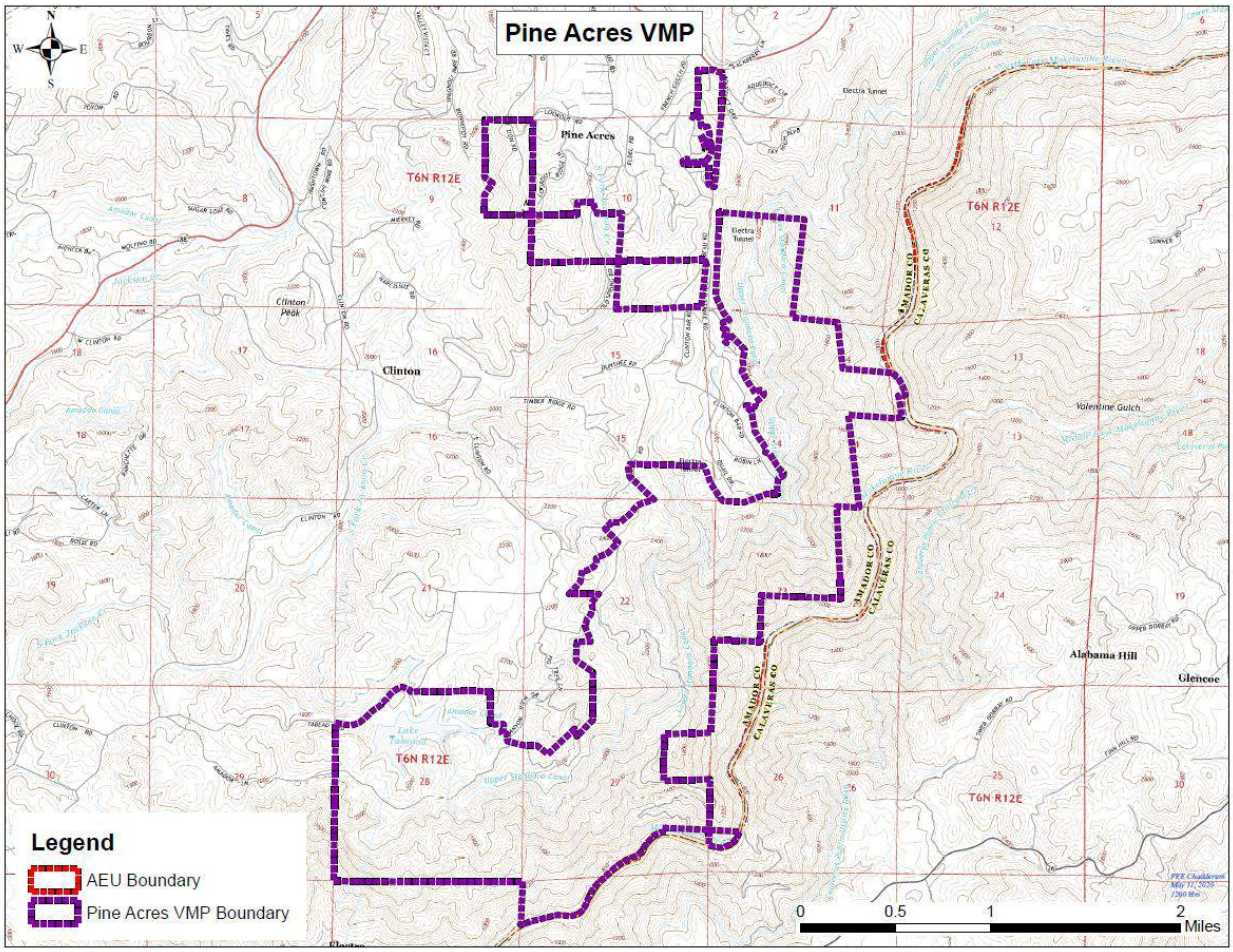
Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Areas in and around the Pine Grove community is overgrown with vegetation and fuels which can lead to out of control wildfires.

Project Description: This project will be multi-year, multi-agency project. The first phase that will begin in early 2016 will be the continuation and improvement of the Pine Acres fuel break. This fuel break will tie into the Butte Fire burn and proceed north to highway 88 along the Mokelumne River Canyon edge. This can be seen on Figure 5-1. It will be designed to protect the community of Pine Acres. The first phase will be funded by grants received by the Amador Fire Safe council, and the work will be completed by crews from Pine Grove Camp. Additional phases of this project are planned for upcoming years. The goal will be the continued treatment of fuels along the Mokelumne River and Sutter Creek drainages, to protect the greater Pine Grove Community.

Figure 5-1 Pine Acre VMP Area



Source: CAL FIRE

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Cal Fire Vegetation Management Plan(s)

Responsible Office/Partners: Cal Fire

Cost Estimate: Area-specific; to be determined

Benefits (Losses Avoided): Protection of property and lives.

Potential Funding: VMP Funded

Timeline: Current contract 8-1-2015 thru 7-31-2025. This project will be renewed again in the future.

Project Priority: High

Action 29. Shake Fiddletown Vegetation Management Program (2526 Acres)

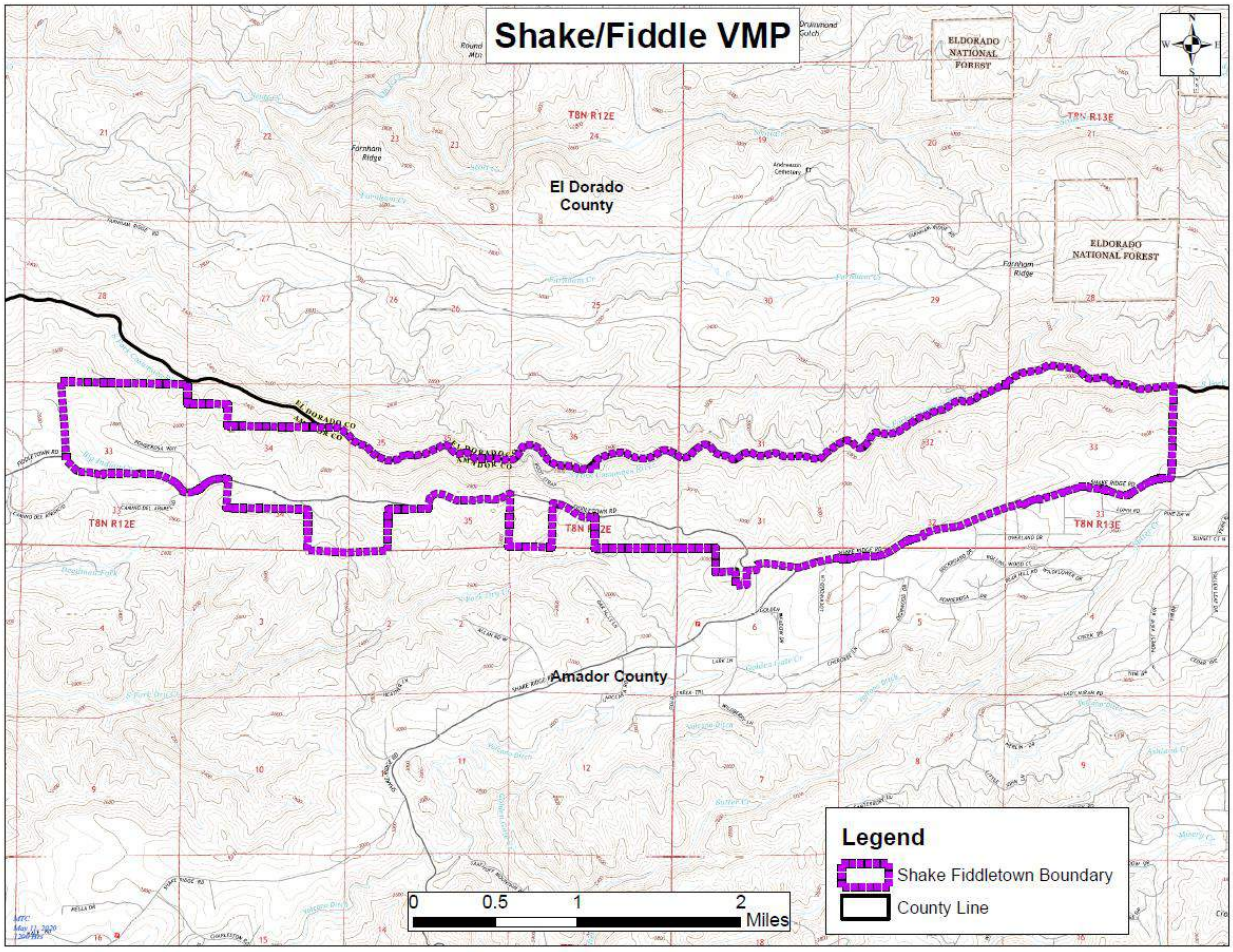
Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The areas along Shakeridge Road and Fiddletown Road are overgrown with vegetation and fuels which can lead to out of control wildfires.

Project Description: This project develops and maintains a fuel break along Shakeridge Road and Fiddletown Road. This can be seen on Figure 5-2. The project is West of and a continuation on the Shake Omo VMP that was completed in 2009. This project is ongoing and will consist of mechanical work, crew work and broadcast burning. This project is VMP funded and supported with labor from Pine Grove Camp and the California Conservation Corp (CCC).

Figure 5-2 Shake Fiddletown VMP Area



Source: CAL FIRE

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Cal Fire Vegetation Management Plan

Responsible Office/Partners: Cal Fire

Cost Estimate: Area-specific; to be determined

Benefits (Losses Avoided): Protection of property and lives.

Potential Funding: VMP Funded

Timeline: Current contract 12-1-2017 thru 11-30-2027. This project will be renewed again in the future.

Project Priority: High

Chapter 6 Plan Adoption

Requirement §201.6(c)(5) and §201.7(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 LHMP Update is to secure buy-in from Amador County and participating jurisdictions, raise awareness of the plan, and formalize the plan's implementation. The adoption of this 2020 LHMP Update completes Planning Step 9 of the 10-step planning process: Adopt the Plan, in accordance with the requirements of the Disaster Mitigation Act (DMA) of 2000. For Amador County and the incorporated communities this adoption also establishes compliance with AB 2140 requiring adoption by reference or incorporation into the Safety Element of the General Plan. Two resolutions were created – one for Amador County and the incorporated communities and one for participating Special Districts.

The governing board for each participating jurisdiction has adopted this 2020 Local Hazard Mitigation Plan by passing a resolution. A copy of the generic resolutions and the executed copies are included in Appendix D: Adoption Resolutions.

Chapter 7 Plan Implementation and Maintenance

Requirement §201.6(c)(4) and §201.7(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 LHMP Update is critical to the overall success of hazard mitigation planning. This is Planning Step 10 of the 10-step planning process. 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 this LHMP Update. The chapter also discusses incorporating this LHMP Update into existing planning mechanisms and how to address continued public involvement.

Chapter 3 Planning Process includes information on the implementation and maintenance process since the 2014 Amador County LHMP was adopted. This section includes information on the implementation and maintenance process for this 2020 LHMP Update.

7.1 Implementation

Once adopted, this LHMP Update faces the truest test of its worth: implementation. While this Plan contains many worthwhile actions, the participating jurisdictions will need to decide which action(s) to undertake first. Two factors will help with making that decision: the priority assigned to the actions during the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans and mechanisms, such as general plans, stormwater plans, Fire Plans, Emergency Operations Plans (EOP), evacuation plans, and other hazard and emergency management planning efforts for Amador County and participating jurisdictions. The County and participating jurisdictions already implement policies and programs to reduce losses to life and property from hazards. This LHMP Update 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.

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 and through constant, pervasive, and energetic efforts to network and highlight the multi-objective, win-win benefits to each program and the Amador County community and its stakeholders. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of programs for coordination and multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This could include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available, the participating jurisdictions will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal programs and earmarked funds, benefit assessments, and other grant programs, including those that can serve or support multi-objective applications.

Responsibility for Implementation of Goals and Activities

The elected officials and staff appointed to head each department within the County, Cities, and Special Districts are charged with implementation of various activities in this LHMP Update. During the annual review as described later in this section, an assessment of progress on each of the goals and activities in the LHMP should be determined and noted. At that time, recommendations should be made to modify timeframes for completion of activities, funding resources, and responsible entities. On an annual basis, the priority standing of various activities may also be changed. Some activities that are found not to be doable may be deleted from the LHMP entirely and activities addressing problems unforeseen during Plan development may be added.

7.1.1. Role of Hazard Mitigation Planning Committee (HMPC) in Implementation and Maintenance

With adoption of this 2020 LHMP Update, the participating jurisdictions will be responsible for the LHMP Update implementation and maintenance. The HMPC identified in Appendix A (or similar committee), led by Amador County OES, will reconvene each year to ensure mitigation strategies are being implemented and to record the implementation status of each mitigation action. As such, Amador County and the other participating jurisdictions will continue its relationship with the HMPC, and:

- 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 LHMP's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this Plan;
- Report on Plan progress and recommended changes to the various governing boards or councils of all participating jurisdictions; and
- Inform and solicit input from the public.

The primary duty of the participating jurisdictions is to see this LHMP Update successfully carried out and to report to their community 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 on the County website (and others as appropriate).

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 recognized.

7.2.1. Maintenance Schedule

The Amador County OES, Emergency Services Coordinator, as the HMPC lead, is responsible for initiating LHMP reviews and consulting with the other participating jurisdictions. In order to monitor progress and update the mitigation strategies identified in the action plan, Amador County OES and the individual jurisdictions will revisit this Plan annually and following a hazard event. The HMPC will meet annually to review progress on LHMP implementation and will provide annual evaluation reports. The HMPC 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 LHMP Update anticipated to be fully approved and adopted in late 2020, the next LHMP Update for the Amador County Planning Area will occur in 2025.

7.2.2. Maintenance Evaluation Process

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

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or
- Increased vulnerability as a result of new development (and/or annexation).
- 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 the LHMP 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 as well during the monitoring and update of this Plan to determine feasibility of future implementation. Updating of the Plan will be by written changes and submissions, as the HMPC deems appropriate and necessary, and as approved by the appropriate governing boards or councils of the other participating jurisdictions. In keeping with the five-year update process, the HMPC will convene public meetings to solicit public input on the Plan and its routine maintenance and the final product will be adopted by the governing boards or councils.

Annual Review Process

For the LHMP Update review process, the Amador County OES Emergency Services Coordinator, will be responsible for coordinating, scheduling, and facilitating reviews and maintenance of this Plan. The LHMP Update is intended to be a living document. Review of the LHMP Update will normally occur on an annual basis each year and will be conducted by the HMPC as follows:

- The Amador County OES will place an advertisement in the local newspaper advising the public of the date, time, and place for each annual review of the Plan and will be responsible for leading the meeting to review the Plan.
- Notices will be mailed or emailed 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 the Communities' Planning Commission 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 Plan will be available for public comment at Amador County and other participating jurisdictions.
- After the review meeting, minutes of the meeting and an annual report will be prepared by the HMPC and provided to the public and other interested stakeholders. The report will also be presented to the County and governing boards for other participating jurisdictions and a request will be made that the Boards take action to recognize and adopt any changes resulting from the review.

Criteria for Annual Reviews

The criteria recommended in 44 CFR 201 and 206 will be utilized in reviewing and updating this 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 (EOC) and whether the event resulted in a presidential 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 descriptions
- Documented damages due to the event
- 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 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 Hazard Mitigation Plan. 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.

7.2.3. Incorporation into Existing Planning Mechanisms

Another important implementation mechanism that is highly effective is incorporation of the hazard mitigation plan recommendations and their underlying principles into other County, City, and District 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 LHMP Update, 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 County and participating jurisdictions already implement policies and programs to reduce losses to life and property from hazards. This LHMP Update 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:

- County, City, and District general and master plans
- County, City, and District Emergency Operations Plans and other emergency management efforts
- County, City, and District ordinances
- Flood/stormwater management/master plans
- Fire Plans/Community Wildfire Protection plans
- Capital improvement plans and budgets
- Other plans and policies outlined in the capability assessments in the jurisdictional annexes
- Other plans, regulations, and practices with a mitigation focus

HMPC members involved in these other planning mechanisms will be responsible for integrating the findings and recommendations of this LHMP Update 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 LHMP into existing planning mechanisms include:

1. As recommended by Assembly Bill 2140, each community should adopt (by reference or incorporation) this LHMP into the Safety Element of their General Plan(s). Evidence of such adoption shall be provided to CAL OES and FEMA.

2. Integration of flood actions identified in this mitigation strategy with the actions and implementation priorities established in existing and new Watershed and Stormwater Plans.
3. Integration of wildfire actions identified in this mitigation strategy with the actions and implementation priorities established in existing Fire Plans, including local CWPPs.
4. Integration of many of the infrastructure, roads, and facility improvement projects with the jurisdictional Capital Improvement Programs.
5. Using the risk assessment information to update the hazard analysis and other data, such as Critical Facility locations, in local Emergency Operations Plans and other emergency management planning documents.

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 Update.

7.2.4. Continued Public Involvement

Continued public involvement is imperative to the overall success of this Plan's implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stores from the Plan implementation and seek additional public comment. The LHMP 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 local media and social media 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 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 be responsible for coordinating the activities necessary to involve the greater public. The HMPC will develop a plan for public involvement and will be responsible for disseminating information through a variety of media channels detailing the Plan update process. As part of this effort, public meetings will be held and public comments will be solicited on the next LHMP Update process.

Prelude to Jurisdictional Annexes

For this 2020 Amador County LHMP Update, the **Jurisdictional Annexes**, working in conjunction with the Base Plan, detail the hazard mitigation planning elements specific to participating jurisdictions, beyond the unincorporated County which is covered in the Base Plan. 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, as the umbrella document for this planning effort. As such, all Chapters 1-7 of the Base Plan and associated appendices, including the planning process and other procedural requirements and planning elements apply to and were met by each participating jurisdiction.

These Jurisdictional Annexes provide additional information specific to each participating jurisdiction, with a focus on providing additional details on the risk assessment and mitigation strategy beyond that provided in the Base Plan.

CITY OF AMADOR CITY
INCORPORATED JUNE 2, 1915
California

Annex A City of Amador City

A.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Amador City, a previously participating jurisdiction to the 2014 Amador County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the City. This Annex provides additional information specific to Amador City, with a focus on providing additional details on the risk assessment and mitigation strategy for this community.

A.2 Planning Process

As described above, Amador City followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Amador County Hazard Mitigation Planning Committee (HMPC), the City formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table A-1. Additional details on plan participation and City representatives are included in Appendix A.

Table A-1 City of Amador City – Planning Team

Name	Position/Title	How Participated
Dave Groth	Mayor	Comments on the draft plan.
Susan Bragstad	Vice Mayor	Attended meetings. Provided comments on draft plan.

Coordination with other community planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the City integrated the previously approved 2014 Plan into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2014 LHMP through other plans and programs shown in Table A-2.

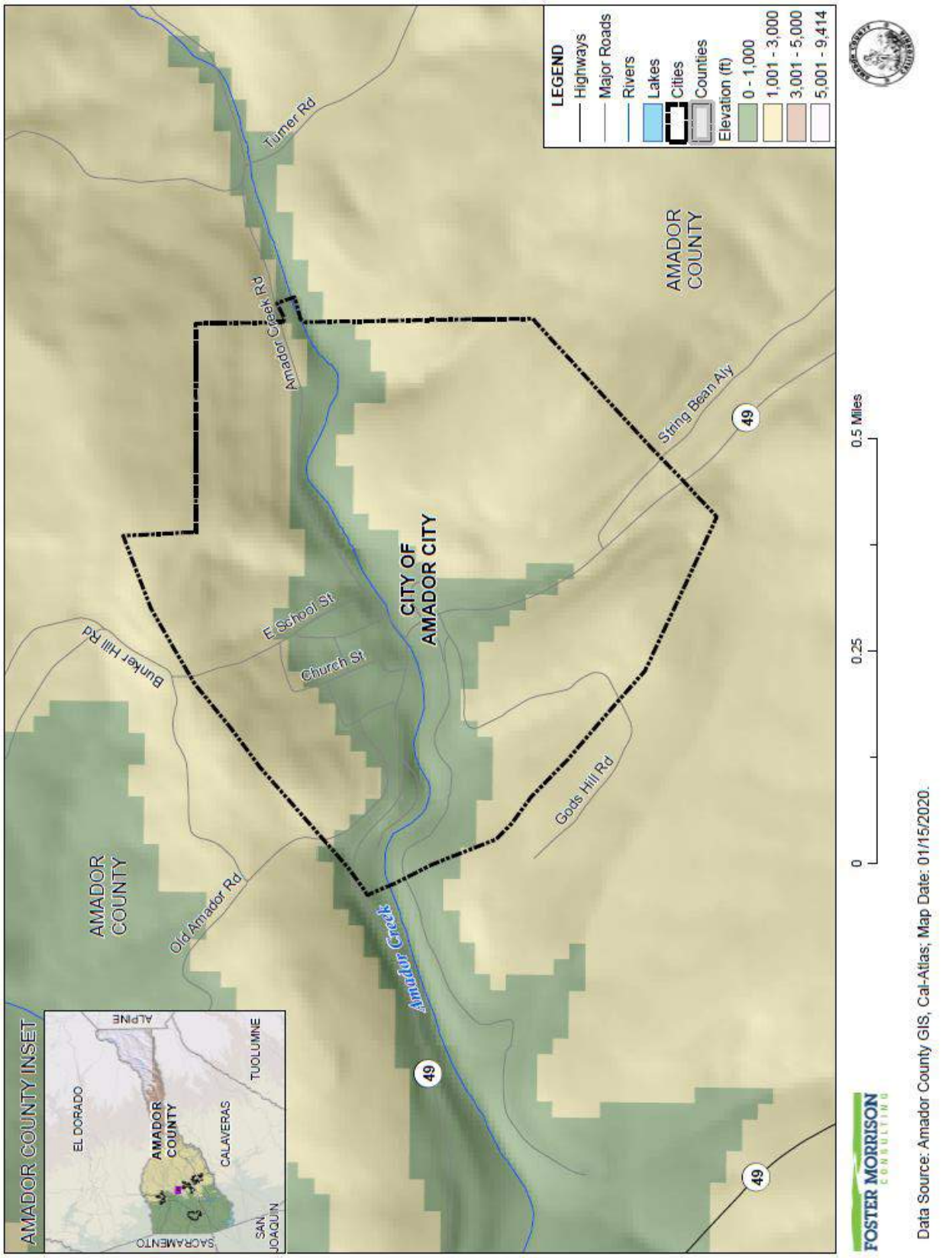
Table A-2 2014 LHMP Incorporation

Planning Mechanism 2014 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
N/A	There were no planning mechanisms since 2014 to incorporate the Plan into.

A.3 Community Profile

The community profile for the City of Amador City is detailed in the following sections. Figure A-1 displays a City map and the location of Amador City within Amador County.

Figure A-1 City of Amador City



A.3.1. Geography and Climate

Amador City is located on Highway 49 in California's Gold Country. The benchmark elevation for the City is 954 feet above sea level. However, elevations range from as low as 900 feet to about 1,320 feet in the southeast portion of the City. The terrain is common for the foothills area of the Sierra Nevada, variable and dominated by grasslands. The main part of the City is located in an east-west trending Canyon created by Amador Creek, which serves as the primary drainage basin. Slopes vary, with a large part of the City in the 15-30% and 30%+ categories. Climate is similar to the County, as described in the Base Plan.

A.3.2. History

Amador City, like the County, is named for Jose Maria Amador, a wealthy California rancher who mined along the creek in 1848. Amador City was settled in the summer of 1851, after gold outcroppings had been prospected on both sides of Amador's Creek. The "Original" or "Little" Amador Mine (north) and the Spring Hill (south) were probably Amador County's first gold mines. The City's most famous and productive mine, the Keystone, was organized in 1853 and, before it closed for good in 1942, produced about $24 million in gold. Today Amador City offers a wide range of tourist activities, including nearby access to area wineries and local shops and eateries.

A.3.3. Economy

US Census estimates show economic characteristics for the City of Amador City. These are shown in Table A-3 and Table A-4.

Table A-3 City of Amador City – Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	0	0.0%
Construction	13	21.7%
Manufacturing	0	0.0%
Wholesale trade	0	0.0%
Retail trade	0	0.0%
Transportation and warehousing, and utilities	0	0.0%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	4	6.7%
Professional, scientific, and management, and administrative and waste management services	9	15.0%
Educational services, and health care and social assistance	12	20.0%
Arts, entertainment, and recreation, and accommodation and food services	5	8.3%
Other services, except public administration	3	5.0%
Public administration	14	23.3%

Source: US Census Bureau American Community Survey 2013-2017 Estimates

Table A-4 City of Amador City – Income and Benefits

Income Bracket	Population	Percent
<$10,000	0	0.0%
$10,000 – $14,999	0	0.0%
$15,000 - $24,9999	4	17.4%
$25,000 – $34,999	2	8.7%
$35,000 – $49,999	2	8.7%
$50,000 – $74,999	0	0.0%
$75,000 – $99,999	4	17.4%
$100,000 – $149,999	5	21.7%
$150,000 – $199,999	0	0.0%
$200,000 or more	6	26.1%

Source: US Census Bureau American Community Survey 2013-2017 Estimates

A.3.4. Population

The California Department of Finance estimated the January 1, 2019 total population for the City of Amador City was 188.

A.4 Hazard Identification

Amador City's identified the hazards that affect the City and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to Amador City (see Table A-5).

Table A-5 City of Amador City—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests	Limited	Unlikely	Negligible	Low	Low
Aquatic Invasive Species	Limited	Unlikely	Negligible	Low	Low
Avalanche	Limited	Unlikely	Negligible	Low	Medium
Climate Change	Extensive	Likely	Limited	Low	–
Dam Failure	Limited	Unlikely	Negligible	Low	Medium
Drought & Water shortage	Extensive	Likely	Negligible	Low	High
Earthquake (large damaging/small)	Extensive	Occasional/ Unlikely	Negligible	Low	Low
Floods: 1%/0.2% annual chance	Limited	Occasional/ Unlikely	Limited	Low	Medium
Floods: Localized Stormwater	Limited	Likely	Limited	Medium	Medium
Landslide, Mudslide, Debris Flow	Limited	Occasional	Limited	Medium	Medium
Levee Failure	Limited	Unlikely	Negligible	Low	Medium
Severe Weather: Extreme Heat	Extensive	Unlikely	Negligible	Low	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Limited	Highly Likely	Limited	Medium	Medium
Severe Weather: High Winds and Tornadoes	Limited	Highly Likely	Limited	Medium	Low
Severe Weather: Winter Storms and Freeze	Limited	Likely	Negligible	Low	Medium
Wildfire	Limited	Likely	Critical	High	High

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

A.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Amador City's hazards and assess the City's vulnerability separate from that of the Amador County Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

A.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section A.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard affects the City and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Amador County Planning Area.

A.5.2. Vulnerability Assessment and Assets at Risk

This section identifies Amador City's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Values at Risk

The following data from the Amador County Assessor's Office is based on the 12/31/2018 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitations are created by Proposition 13 and the Williamson Act as detailed in the Base Plan. With respect to Proposition 13, instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. However, depending on the type of hazard and impact of any given hazard event, land values may be adversely affected; thus, land values are included as appropriate. Table A-6 shows the 12/31/2018 Assessor's values and content replacement values (e.g., the values at risk) broken down by property use for the City.

Table A-6 City of Amador City – Total Values at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Agricultural	7	2	$820,424	$725,315	$725,315	$2,271,054
Commercial	15	12	$1,509,183	$2,055,703	$2,055,703	$5,620,589
Industrial	2	1	$9,612	$2,222	$3,333	$15,167
Miscellaneous	11	1	$18,331	$10,404	$0	$28,735
Residential	143	95	$10,885,785	$13,611,999	$6,805,998	$31,303,782
Unknown	3	0	$0	$0	$0	$0
City of Amador City Total	**181**	**111**	**$13,243,335**	**$16,405,643**	**$9,590,349**	**$39,239,327**

Source: Amador County 12/31/2018 Parcel/Assessor's Data

Critical Facilities and Infrastructure

Critical facilities and infrastructure are those buildings and infrastructure that are crucial to a community. Should these be damaged, it makes it more difficult for the community to respond to and recover from a disaster. 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, and (3) Hazardous Materials Facilities, as discussed in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the City of Amador City from Amador County GIS is shown on Figure A-2. Table A-7 gives summary information about the critical facilities in the City. Table A-8 details the facility categories and breaks them down by facility type. Details of critical facility definition, type, name, address, and jurisdiction by hazard area or zone are listed in Appendix F. The critical facility inventory and associated maps for the City only include the first two categories of facility types; a GIS layer of Hazardous Materials Facilities was not available.

Figure A-2 City of Amador City – Critical Facilities

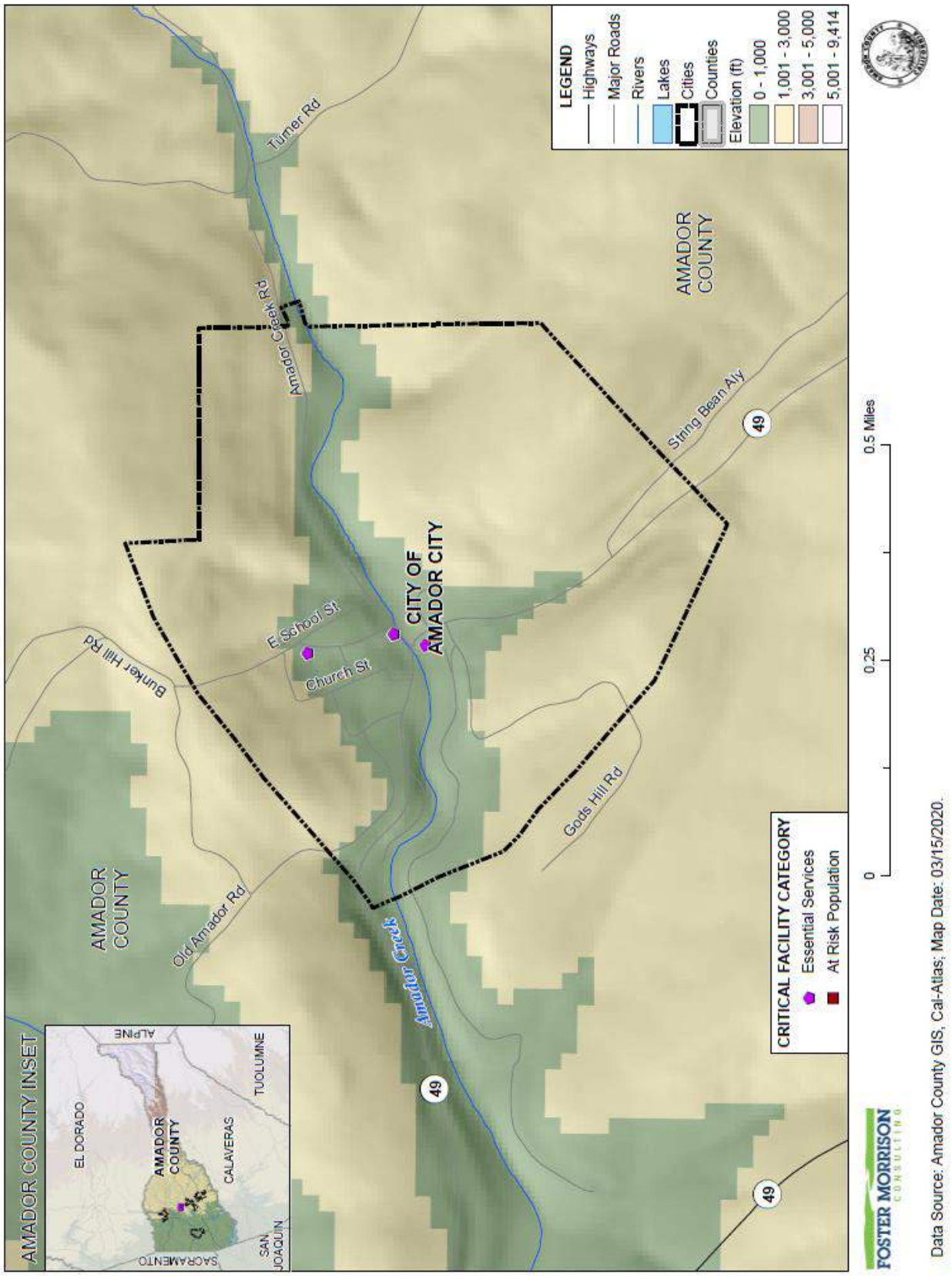


Table A-7 City of Amador City – Critical Facility Summary

Critical Facility Category	Facility Count
Essential Services	3
At Risk Population	0
City of Amador City Total	**3**

Source: Amador County GIS

Table A-8 City of Amador City – Critical Facilities by Facility Category and Type

Critical Facility Category	Facility Type	Facility Count
Essential Services	Fire Station	1
	Post Office	1
	Public Administration Building	1
	Total	3
City of Amador City Total		**3**

Source: Amador County GIS

Natural Resources

Natural resources are unique to each area and are difficult to replace. Should a natural disaster occur, these species and locations are at risk. Within the largely unimproved areas of the City, there are four major plant communities which serve as open space lands and provide key wildlife habitat. These plant communities include oak woodland/chaparral, grassland, riparian drainage, and stream side riparian.

According to the City's Open Space Element of the General Plan, none of the endangered and/or rare plant species listed by the California Native Plant Society's publication "*Inventory of Rare and Endangered Vascular Plants of California*" or listed by the Department of Fish and Game's "*List of Designated Endangered or Rare Plants of California*" are known to exist in the City.

The potential for animal diversity in the City is significant because the plant communities offer a broad range of food, cover, roosting and nesting sites, and water. According to the City's Open Space Element of the General Plan, none of the endangered and/or rare species and fauna are listed in the "*Federal Register of Endangered and Threatened Wildlife and Plants*", and the California Department of Fish and Game's "*Endangered, Rare, and Threatened Animals of California*" are known to inhabit the City.

There are wetlands located in the City. These wetlands have been mapped and tabulated. Figure A-3 shows the wetlands locations in the City. Table A-9 delineates the types, counts, and acreages of wetlands in the City.

Figure A-3 City of Amador City – Wetlands Locations

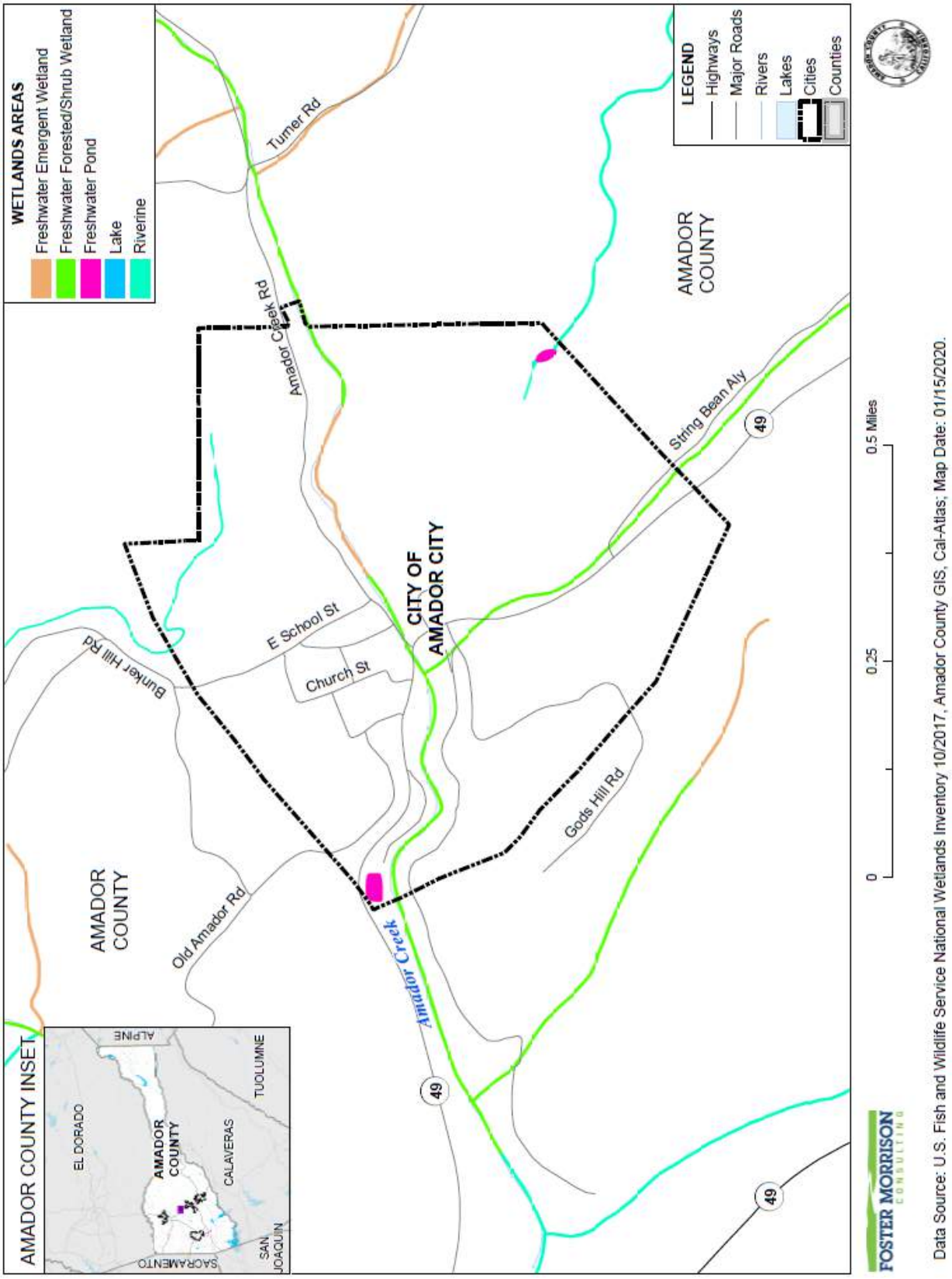


Table A-9 City of Amador City – Wetlands Area Types and Counts

Wetlands Area Type	Wetlands Count	Wetlands Area (in Acres)
Freshwater Emergent Wetland	1	0.53
Freshwater Forested/Shrub Wetland	2	2.17
Freshwater Pond	2	0.52
Lake	0	0.00
Riverine	4	0.58
Amador City Total	**9**	**3.81**

Source: US Fish and Wildlife Service

Historic and Cultural Resources

Historic and cultural resource are difficult to replace, and special care is needed when rebuilding or improvements are necessary. Should a natural disaster occur, these properties and locations are at risk.

The City of Amador City has a 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. 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. These requirements are detailed in Section 4.3.1 of the Base Plan. Table A-10 lists the historical buildings in the City.

Table A-10 City of Amador City – 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

Source: California Department of Parks and Recreation Office of Historic Preservation, http://ohp.parks.ca.gov/

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.

The following historical sites have been locally designated by the Amador County Historical Society and/ or the Amador Historical Landmarks Advisory Committee, and included in the California History Plan Inventory of Historic Features (1973).

- Amador Hotel
- Keystone Mine and Mine House Inn
- Imperial Hotel

- False Front Buildings

Growth and Development Trends

As part of the planning process, the HMPC looked at changes in growth and development, both past and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability over time. Information from the City of Amador City General Plan Housing Element, the California Department of Finance, and the US Census Bureau form the basis of this discussion.

Historic Population Trends and Current Population

Population growth can increase the number of people living in hazard prone areas. Amador City has seen periods of sizeable growth, as well as periods of sizable losses. Since 1990 the population of the City has stayed relatively flat. Amador has seen growth rates as shown in Table A-11.

Table A-11 City of Amador City – Population Changes Since 1950

Year	Population	Change	% Change
1950	151	–	–
1960	202	51	33.8%
1970	156	-46	-22.8%
1980	136	-20	-12.8%
1990	196	60	44.1%
2000	196	0	0.0%
2010[1]	185	-11	-5.6%
2019[2]	188	3	1.6%

Source: [1]US Census Bureau, [2]California Department of Finance

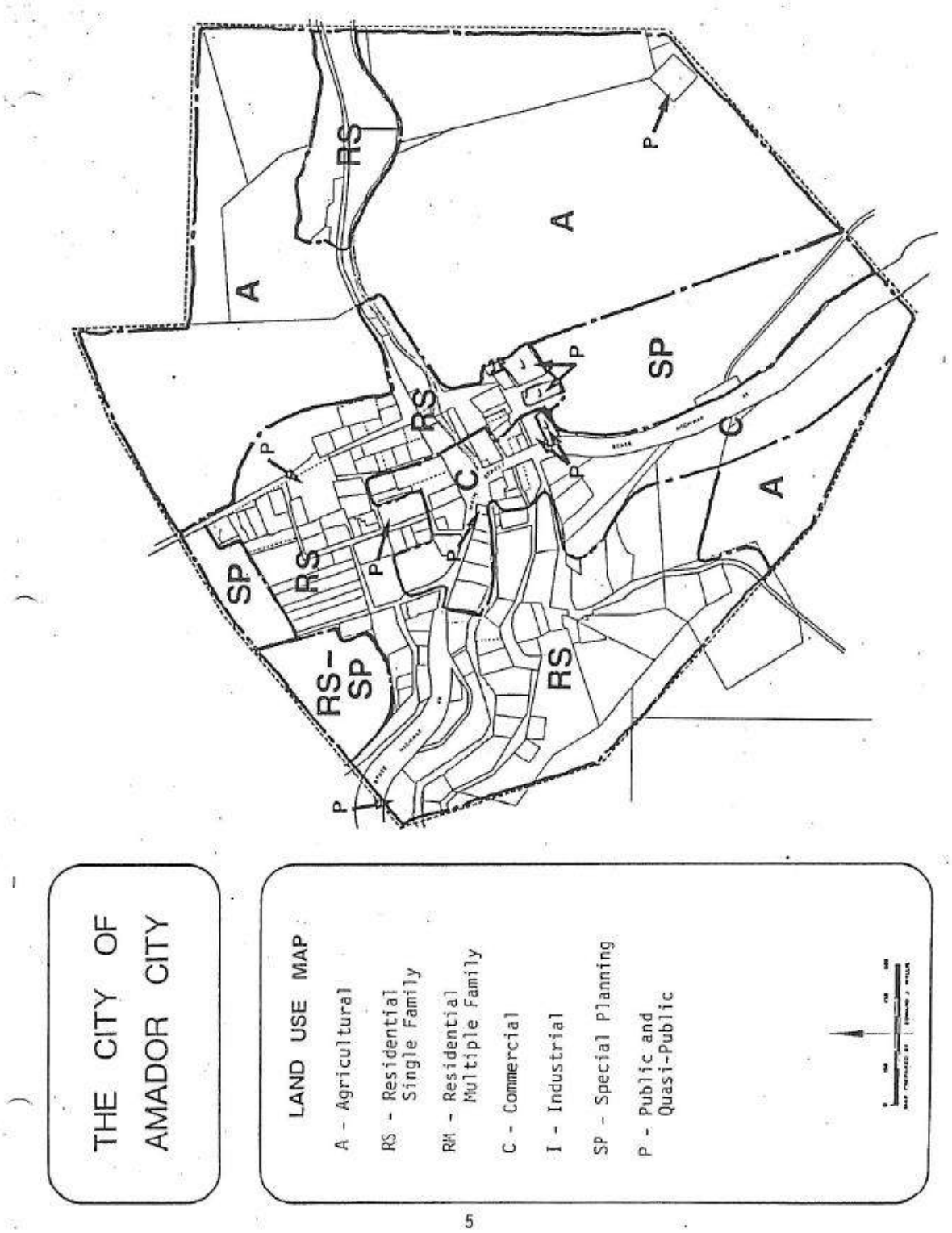
Special Populations and Disadvantaged Communities

The HMPC noted that there are many elderly residents in the City. These residents pose a special challenge in times of emergency.

Land Use

State planning law requires that the land use element of a general plan include a statement of the standard population density, building intensity, and allowed uses for the various land use designations in the plan (Government Code Section 65302(a)). The Amador City Municipal Code provides detailed land use and development standards for development. The Land Use Map for the City of Amador City is shown on Figure A-4.

Figure A-4 City of Amador City – Land Use



Source: City of Amador City Land Use Element

Development since 2014 Plan

As discussed in Section 4.3.1 of the Base Plan, future development has occurred in the City since the last plan. Some of this has occurred in hazard prone areas. Amador City tracks building permits issued since 2014 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table A-12 and Table A-13.

Table A-12 City of Amador City – Total Development Since 2014

Property Use	2015	2016	2017	2018	2019
Agricultural	0	0	0	0	0
Commercial	0	0	0	0	0
Industrial	0	0	0	0	0
Residential	1	0	0	0	0
Unknown	0	0	0	0	0
Total	**1**	**0**	**0**	**0**	**0**

Source: City of Amador City

Table A-13 City of Amador City – Development in Hazard Areas since 2014

Property Use	1% Annual Chance Flood	Landslide Susceptibility Area	Wildfire Risk Area[1]	Other
Agricultural				
Commercial				
Industrial				
Residential			1	
Unknown				
Total				

Source: City of Amador City

[1]Moderate or higher wildfire risk area

While development in Amador City since the 2014 LHMP only included one residential structure, two additional residential structures were also constructed in the same general area, but were constructed right outside the City boundary. No parcels for commercial or industrial uses have been developed since the 2014 LHMP.

Future Development

A discussion of future development is included below. Future development is important to hazard mitigation planning. Ensuring that future development does not place more people and property into known hazard zones is one of the goals of mitigation planning.

More general information on growth and development in Amador County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Amador County Vulnerability and Assets at Risk of the Base Plan.

GIS Analysis

Using GIS, the following methodology was used in determining parcel counts and acreages with future development projects in the City of Amador City.

Future development areas in the City came from two sources.

- Potential Development Areas – Amador City provided a mapped area where development possibilities for the City exist. The City noted that this development site would likely be for residential use.
- Sphere of Influence (SOI) – Amador County Local Agency Formation Commission (LAFCO) provided the SOI in mapped format for the City.

Using the GIS parcel spatial file for each of these areas, the 9 parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure A-5 shows the locations of future development areas the City is planning to develop in both the Potential Development Area and the SOI. Table A-14 shows the parcels and acreages of the future development in the City, broken out by Potential Development Area and Sphere of Influence.

Figure A-5 City of Amador City – SOI and Potential Development Areas

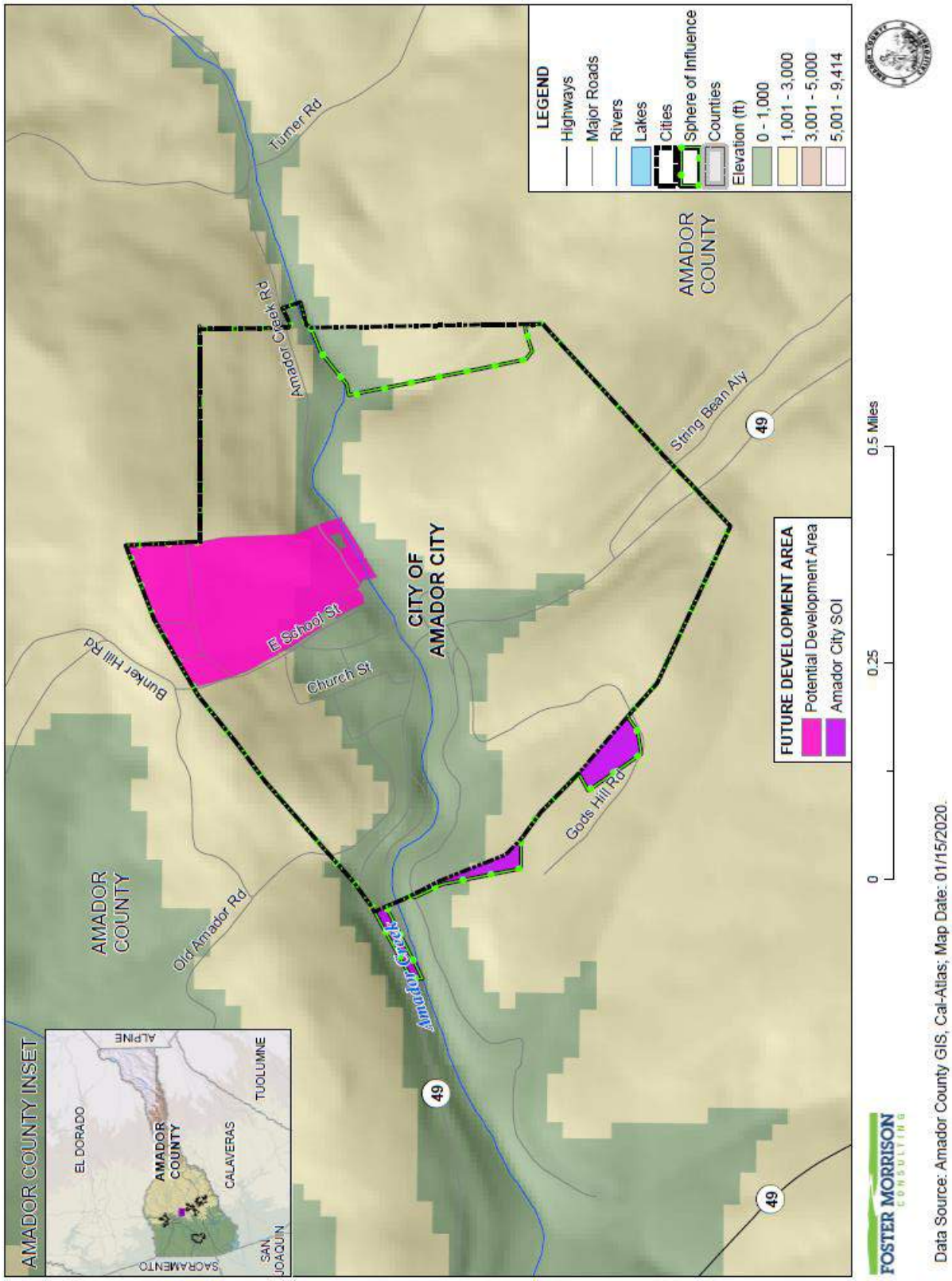


Table A-14 City of Amador City – Future Development Parcels and Acreages in SOI and Potential Development Areas

Future Development	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Potential Development Area	5	2	3	21.52	4.29	17.24
Amador City SOI	4	1	3	3.46	1.73	1.73
Grand Total	**9**	**3**	**6**	**24.99**	**6.02**	**18.97**

Source: City of Amador City, Amador County LAFCO

A.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table A-5 as high or medium significance hazards. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Amador County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. 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 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.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Earthquake (large damaging/small)

Likelihood of Future Occurrence–Unlikely
Vulnerability–Low

Hazard Profile and Problem Description

Note: Though a low significance hazard for the City, due to its importance in the State of California, earthquake is profiled here. It is a low significance hazard to the City for mitigation strategy planning purposes.

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.

Location and Extent

Since earthquakes are regional events, the whole of the City is at risk to earthquake. Amador City and the surrounding area are at limited risk to significant seismic and geologic hazards. There are no known or inferred active faults within the City.

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, as discussed in Section 4.2.12 of the Base Plan. 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 (equivalent to 5.5 to 6.5 on the Richter Scale). During a Mercalli VII, most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. The City is located in an area where few earthquakes of significant magnitude occur, so both magnitude and intensity of earthquakes are expected to remain low. Seismic shaking maps for the area show Amador County and the City fall within a low to moderate shake risk.

Past Occurrences

The City noted no past occurrences of earthquakes or that affected the City in any meaningful way.

Vulnerability to Earthquake

The combination of plate tectonics and associated California coastal mountain range building geology generates earthquake as a result of the periodic release of tectonic stresses. Amador County's mountainous terrain lies in the center of the North American and Pacific tectonic plate activity. There have been earthquakes as a result of this activity in the historic past, and there will continue to be earthquakes in the future of the California north coastal mountain region. Both the San Andreas Fault and the Sierra Frontal System faults poses possibly significant impacts to Amador County and the City as they have the capabilities of producing a quake.

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault; however, liquefaction can occur further from the source of the earthquake. In general, newer construction is more earthquake resistant than older construction due to enforcement of improved building codes. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions and associated liquefaction, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry (URM) and soft story buildings.

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. The City of Amador City is within the less hazardous Zone 3.

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable. The downtown area of the City includes several unreinforced masonry buildings from 1850. The City also owns the museum, which is located in an old stone building. These older masonry buildings could be vulnerable during a seismic event, but given the general area, the City is at low risk to a damaging earthquake.

Impacts from Earthquake

Impacts from earthquake in the City will vary depending on the fault that the earthquake occurs on, the depth of the earthquake strike, and the intensity of shaking. Large events could cause damages to infrastructure, critical facilities, residential and commercial properties, and possible injuries or loss of life.

Earthquake Analysis

Due to the regional effects of an earthquake, two Hazus earthquake analyses were performed on a countywide basis, a deterministic and probabilistic earthquake run. This can be found in Section 4.3.9 of the Base Plan. While these runs were not done specific to the City, maps showing damage in the County show greater areas of damage near the cities in the County. This is because most models reflect that the greatest damage occurs in the built-out, populated areas of the County. The deterministic 6.7 Hayward

Fault run showed minimal damage to the County and the City, while the probabilistic 6.7 earthquake scenario showed moderate to high damage to the County and the City.

Future Development

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. The City enforces the state building code, which mandates construction techniques that minimize seismic hazards. Future development in the City is subject to these building codes.

Flood: 100/500-Year

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–Low

Hazard Profile and Problem Description

Note: Though a low significance hazard for the City, due to its importance in the State of California, 1% and 0.2% annual chance flooding is profiled here. It is a low significance hazard to the City for mitigation strategy planning purposes.

This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the County or in the City, and have caused damages in the past. The City falls outside of mapped DFIRM flood zones, but has flood zones shown in the DWR BAM maps (discussed in more detail below and shown on Figure A-7). As noted from the BAM maps, DWR has done awareness mapping in areas considered part of a 100-year floodplain for non-flood insurance purposes. These areas are not available in GIS, so no analysis could be performed. All GIS analysis below has been performed on the DFIRM flood zones.

Location and Extent

The City of Amador City has all areas located outside of the 1% and 0.2% annual chance floodplain. This is seen in Figure A-6. While not part of the FEMA mapped floodplains, the City did note that Amador Creek has incurred damage in the City in the past from flooding. The Safety Element of the General Plan noted that a 50 foot development setback from Amador Creek has been required for many years based on the high water mark and extent of streamside vegetation. The basis for 100-year flood levels shall be the hydrologic data prepared for the Main Street bridge over Amador Creek and City Improvement Standards.

Figure A-6 City of Amador City – FEMA DFIRM Flood Zones

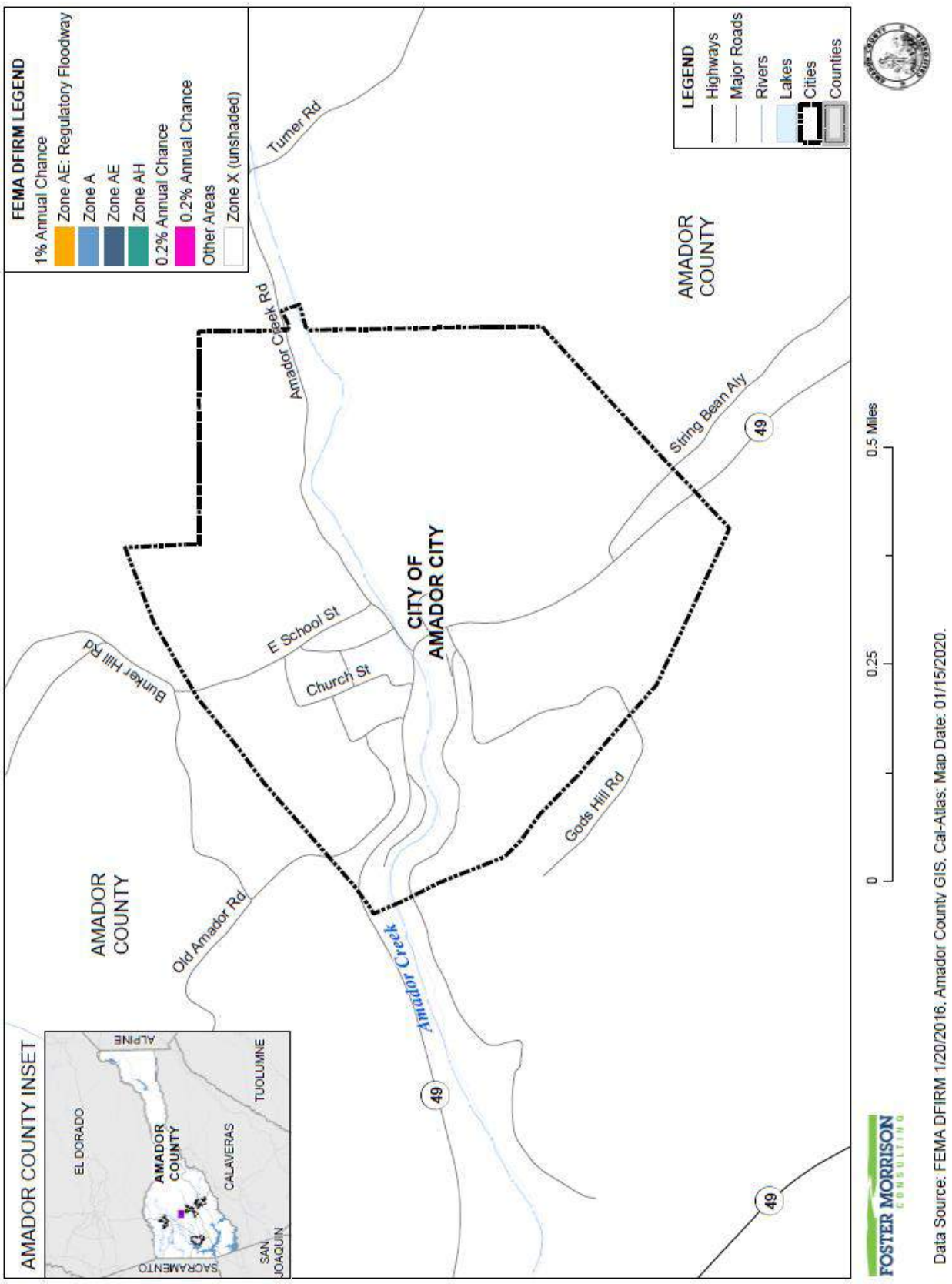


Table A-15 details the DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the City.

Table A-15 City of Amador City– DFIRM Flood Hazard Zones

Flood Zone	Description	Flood Zone Present in City of Amador City
A	100-year Flood: No base flood elevations provided	N
AE	100-year Flood: Base flood elevations provided	N
AE Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided	N
Shaded X	500-year Flood: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	N
X (unshaded)	No flood hazard	Y

Source: FEMA

Additionally, flood extents can generally be measured in volume, velocity, and depths of flooding. Expected flood depths in the City are expected to be minimal, since it is located outside the 1% and 0.2% annual chance floodplains. Flood durations in the City tend to be short. Flooding in the City tends to have a shorter speed of onset. Geographical flood extent from the FEMA DFIRMs is shown in Table A-16.

Table A-16 City of Amador City – Geographical Flood Hazard Extents in FEMA DFIRM Flood Zones

Flood Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
1% Annual Chance	0	0.00%	0	0.00%	0	0.00%
0.2% Annual Chance	0	0.00%	0	0.00%	0	0.00%
Other Areas	183	0.05%	60	0.04%	122	0.05%
Total	**183**	**0.05%**	**60**	**0.04%**	**122**	**0.05%**

Source: Amador County 1/20/2016 DFIRM

Past Occurrences

A list of state and federal disaster declarations for Amador County from flooding is shown on Table A-17. These events also likely affected the City to some degree.

Table A-17 Amador County – State and Federal Disaster Declarations from Flood 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	15	1955, 1958, 1963, 1964, 1969, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1959, 1963 (twice), 1969, 1980, 1982, 1986, 1995, 1997, 1998

Source: Cal OES, FEMA

Since the City does not have any 1% or 0.2% annual chance floodplains, past flooding events causing damage are included in the past occurrences section for Localized Flooding.

Vulnerability to Flood

The entire City is within the watershed of Amador Creek. Amador Creek originates east of the City, and its waters eventually join Rancheria Creek and then Dry Creek which exits the county to the west. Historical data indicates that flooding of the creek from its obvious high-water mark is a concern. Peak flows have not remained within normal creek limits. Flooding along Amador Creek can occur during heavy or prolonged rains and generally affects houses, some businesses, and the sewer plant and pipelines. The City requires a 50' setback from the creek for all new development which limits future vulnerability.

Impacts

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 as well as life safety issues. 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. Floodwaters can transport large objects downstream which can damage or remove stationary structures. 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. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Assets at Risk

Based on the vulnerability of Amador City to the flood hazard, the sections that follow describes significant assets at risk in the City of Amador City. This section includes the values at risk, flooded acres, population at risk, and critical facilities at risk.

Values at Risk

As previously noted, there are no mapped DFIRM floodplains in the City. As such, it is assumed that there are no parcels, structures, or contents at risk to the mapped FEMA floodplains. However, as previously described, some parcels and structures are at risk to flooding within the City, even though they are not within a FEMA mapped floodplain.

Flooded Acres

As previously noted, there are no mapped DFIRM floodplains in the City. As such, no analysis was performed on flooded acres.

Population at Risk

As previously noted, there are no mapped DFIRM floodplains in the City. As such, it is assumed that there are no populations at risk to the FEMA mapped floodplain.

Critical Facilities at Risk

As previously noted, there are no mapped DFIRM floodplains in the City. As such, it is assumed that there are no critical facilities at risk to the FEMA mapped floodplain.

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Amador City does not participate in the National Flood Insurance Program (NFIP) or the Community Rating System (CRS) because they have no FEMA mapped floodplains in which manage.

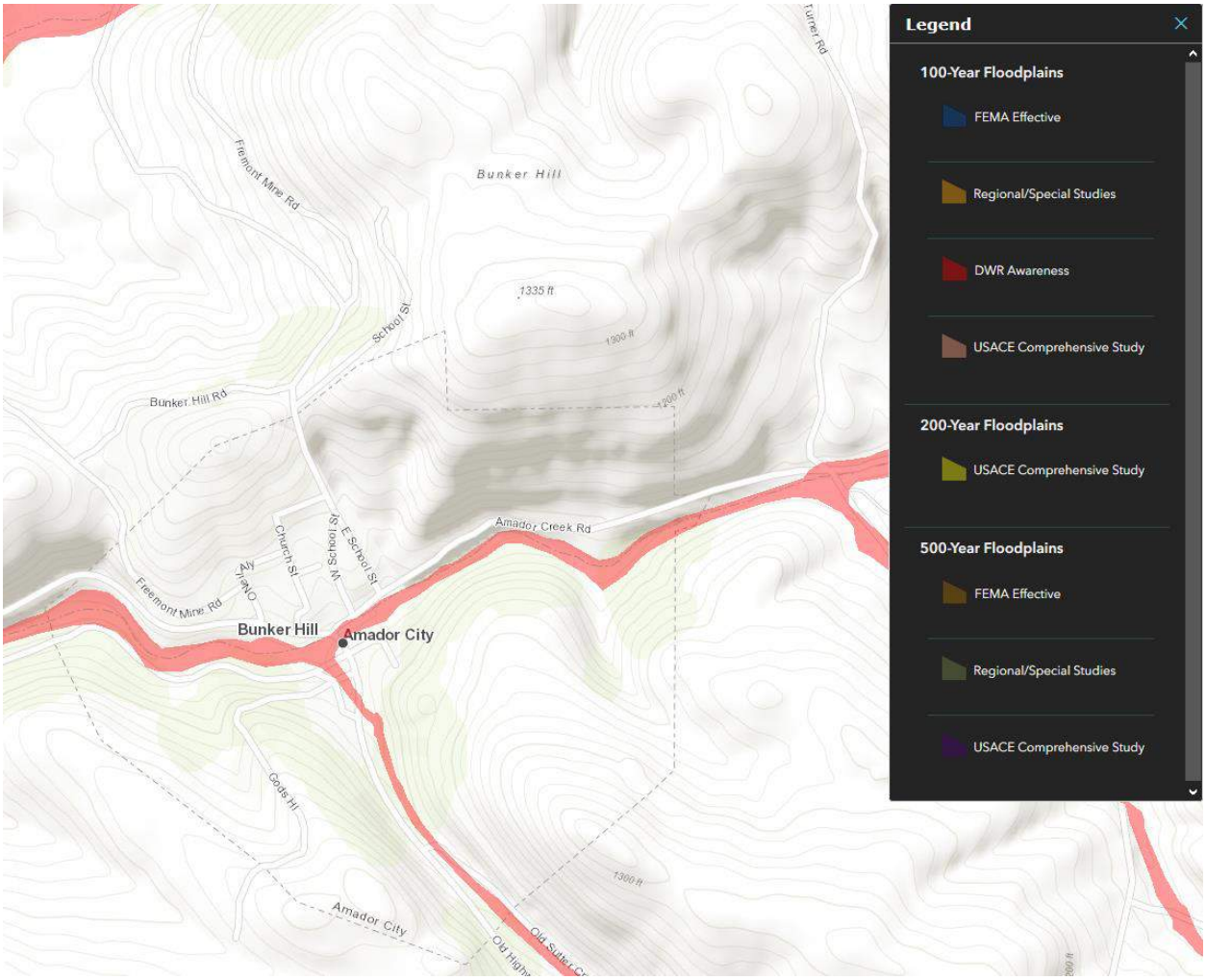
California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in Amador County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Nevada-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 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-(as applicable), and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year 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 City than that provided in the FEMA DFIRMs. The BAM map for Amador City is shown in Figure A-7. As shown, only a 100-year awareness zone falls in the City.

Figure A-7 City of Amador City – Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 1%, Orange – Local 1% (developed from local agencies), Red – DWR 1%r (Awareness floodplains identify the 1% annual chance flood hazard areas using approximate assessment procedures.), Pink – USACE 1% (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 0.5% (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 0.2%, Grey – Local 0.2% (developed from local agencies), Purple – USACE 0.2%(2002 Sac and San Joaquin River Basins Comp Study).

Future Development

Since there is no mapped floodplain, all future development will occur outside of the floodplain. Should the floodplain maps change, Amador City would need to put together and enforce a floodplain ordinance to address this hazard.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Flooding occurs in areas other than the FEMA mapped 1% and 0.2% annual chance 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 City 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 that can occur throughout the City.

Location and Extent

The City of Amador City is subject to localized flooding along Amador Creek and in other areas with limited drainage. Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the City vary by location. Flood durations in the City tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Localized flooding in the City tends to have a shorter speed of onset, especially when antecedent rainfall has soaked the ground and reduced its capacity to absorb additional moisture.

Past Occurrences

The City noted that localized flooding occurs throughout portions of the City annually. Historical data indicates that flooding of Amador Creek is a concern. Peak flows have not remained within normal creek limits. Flooding along Amador Creek can occur during heavy or prolonged rains and generally affects houses, some businesses, and the sewer plant and pipelines.

The City noted the following specific flood events:

- In both 1995 and 1997 there were retaining wall collapses and sewer lines were washed out. The City received FEMA assistance. Repairs to the retaining wall were estimated at $150,000.
- 2017 landslides were caused by heavy rains and flooding in three different areas: Fleehart, Water Street and God's Hill. The City received FEMA assistance for the God's Hill area of approximately $5,000. No FEMA assistance was provided for the other two areas as damages were limited to private property.
- In 2017, Amador Creek flood walls washed out. There was no FEMA assistance given for this event as the impacted area was determined to be on private property.

Vulnerability to Localized Flooding

Historically, much of the growth in the City and County has occurred adjacent to streams, resulting in significant damages to property, and losses from disruption of community activities when the streams overflow. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff. The City tracks localized flooding areas. Affected localized flood areas identified by Amador City are summarized in Table A-18.

Table A-18 City of Amador City – List of Localized Flooding Problem Areas

Area Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
Along Amador Creek	X		X	X	X	X	

Source: City of Amador City

Impacts

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. The Amador City sewer plant can be impacted during flood events. Standing water can cause damage to crops, roads, and structure foundations. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Future Development

Future development in the City will add more impervious surfaces causing an increase in stormwater runoff and the continued need to drain these waters. The City will need to be proactive to ensure that increased development has proper siting and drainage for stormwaters. Currently, the City requires a 50' setback from the creek for all new development. The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater flooding will reduce future risks of losses.

Landslide, Mudslide, Debris Flows

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

According to the California Geological Survey, landslides refer to a wide variety of processes that result in the perceptible downward and outward movement of soil, rock, and vegetation under gravitational influence. Common names for landslide types include slump, rockslide, debris slide, lateral spreading, debris avalanche, earth flow, and soil creep. Landslides may be triggered by both natural and human-induced changes in the environment that result in slope instability.

The susceptibility of an area to landslides depends on many variables including steepness of slope, type of slope material, structure and physical properties of materials, water content, amount of vegetation, and proximity to areas undergoing rapid erosion or changes caused by human activities. These activities include mining, construction, and changes to surface drainage areas. Landslide events can be determined by the composition of materials and the speed of movement. A rockfall is generally dry and fast while a debris

flow is generally wet and fast. Regardless of the speed of the slide, the materials within the slide, or the amount of water present in the movement, landslides are a serious natural hazard.

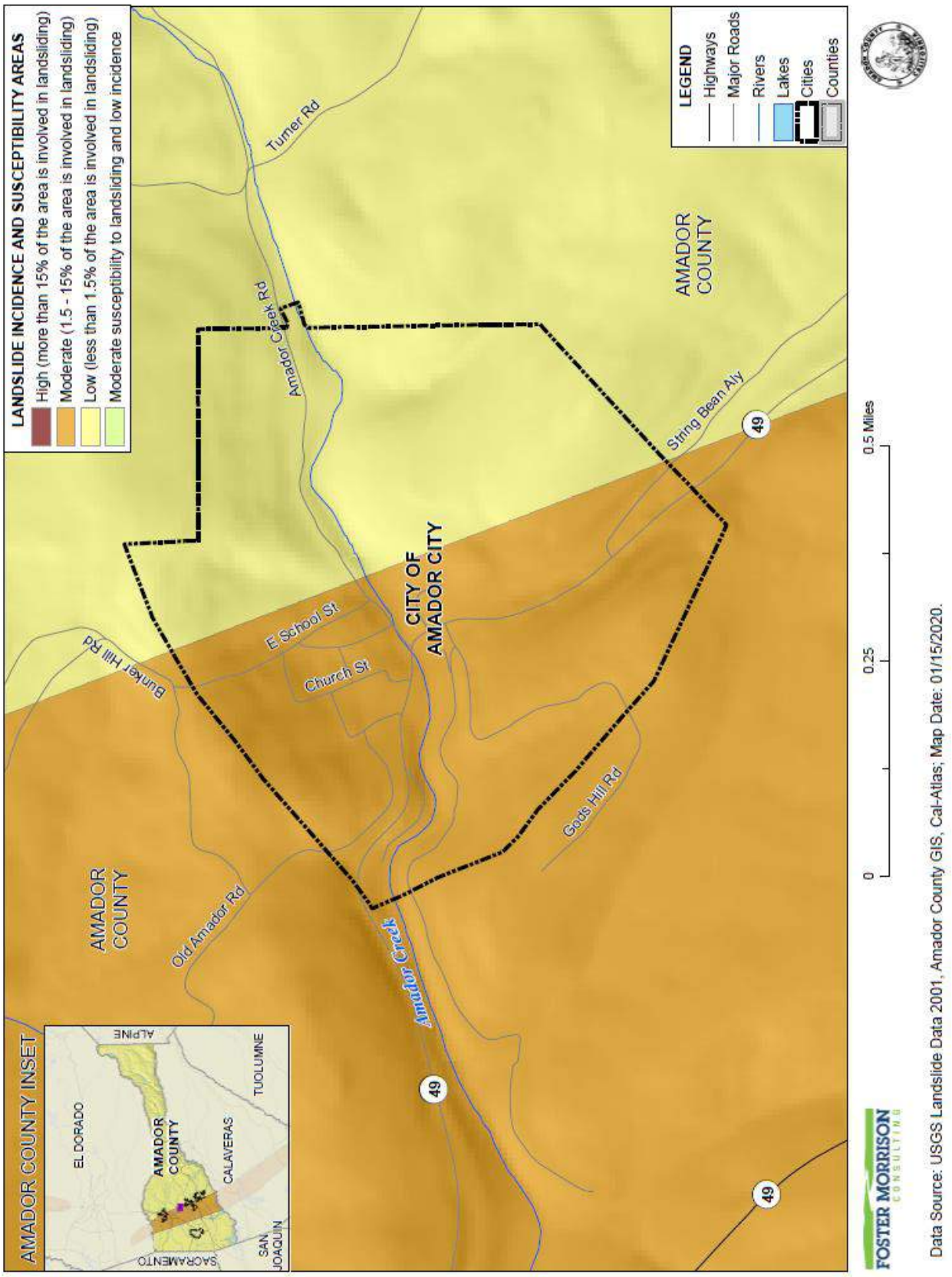
Another type of landslide, debris flows, also occur in some areas of the Amador County and the City. These debris flows generally occur in the immediate vicinity of existing drainage swales or steep ravines. Debris flows occur when near surface soil in or near steeply sloping drainage swales becomes saturated during unusually heavy precipitation and begins to flow downslope at a rapid rate.

Amador City is located in an area of hills and steep slopes creating a potential for washouts and landslides during periods of heavy rains. Specific areas of concern include God's Hill Road, Fleehart, and Water Street and other sloped areas throughout the City.

Location and Extent

Landslides, mudslides, and debris flows can affect certain areas of the City. The USGS has estimated that the risk varies across the City and has created maps showing risk variance. This risk variance falls into one of the following landslide incidence and susceptibility categories: High, Moderate, and Low. These are discussed in Section 4.3.12 of the Base Plan. Following the methodology described in Section 4.3.12 of the Base Plan, landslide incidence and susceptibility maps for the City of Amador City were created. Figure A-8 shows the USGS landslide incidence and susceptibility areas in the City. As shown on the maps, risk varies within the City range from low to moderate.

Figure A-8 City of Amador City – Landslide Incidence and Susceptibility Areas



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. Geographical landslide incidence and susceptibility areas from USGS are shown in Table A-19.

Table A-19 City of Amador City – Geographical Landslide Incidence and Susceptibility Area Extents

Landslide Incidence and Susceptibility	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
High	0	0.0%	0	0.0%	0	0.0%
Moderate	94	0.02%	51	0.03%	44	0.02%
Low	88	0.02%	10	0.01%	79	0.04%
Total	**183**	**0.05%**	**60**	**0.04%**	**122**	**0.05%**

Source: USGS

*Percentage of total acres is the percent of total acres of the entire County Planning Area, not the total acres of the jurisdiction

Past Occurrences

The City Planning Team noted a landslide in 2017 after heavy rains. These 2017 landslides were caused by heavy rains and flooding in three different areas: Fleehart, Water Street and God's Hill. The City received FEMA assistance for the God's Hill area of approximately $5,000. No FEMA assistance was provided for the other two areas as damages were limited to private property.

In addition to the above landslides, a minor landslide also occurred as a result of the heavy 2017 rains on Amador Creek Road.

Vulnerability to Landslide

Common names for landslide types include slumps, rockslides, debris slides, lateral spreading, debris avalanches, earth flows, and soil creep. 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 may be triggered by both natural- and human-caused activity.

Although this hazard also includes related issues such as mudslides and debris flows, available mapped hazard data was limited to landslides; thus, the remainder of this section is focused on the landslide vulnerability.

Impacts

Impacts from landslide and debris flow are limited in the City, as they occur in areas of high topographical change. Impacts in the City may be to structures, infrastructure, and to life safety.

Assets at Risk

Based on the vulnerability of Amador City to the landslide hazard, the sections that follow describes significant assets at risk in the City of Amador City. This section includes the values at risk, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of landslide within the City of Amador City. The methodology described in Section 4.3.12 of the Base Plan was followed in determining structures and values at risk in landslide incidence and susceptibility areas. Summary analysis results for Amador City are shown in Table A-20 incidence and susceptibility area. As shown, much of the City's values fall in the moderate landslide incidence areas. Table A-21 breaks down Table A-20, and shows the landslide incidence and susceptibility areas broken down by property use type.

Table A-20 City of Amador City – Parcels and Values at Risk in Landslide Incidence and Susceptibility Areas

Landslide Incidence and Susceptibility Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Moderate	154	99	$10,973,614	$14,249,224	$8,359,983	$33,582,821
Low	27	12	$2,269,721	$2,156,419	$1,230,366	$5,656,506
City of Amador City Total	**181**	**111**	**$13,243,335**	**$16,405,643**	**$9,590,349**	**$39,239,327**

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data

Table A-21 City of Amador City – Parcels and Values at Risk in Landslide Incidence and Susceptibility Areas by Property Use

Landslide Incidence and Susceptibility Area/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Moderate						
Agricultural	1	1	$39,406	$421,001	$421,001	$881,408
Commercial	15	12	$1,509,183	$2,055,703	$2,055,703	$5,620,589
Industrial	2	1	$9,612	$2,222	$3,333	$15,167
Miscellaneous	9	1	$17,754	$10,404		$28,158
Residential	125	84	$9,397,659	$11,759,894	$5,879,946	$27,037,499
Unknown	2	0	$0	$0	$0	$0
Moderate Total	**154**	**99**	**$10,973,614**	**$14,249,224**	**$8,359,983**	**$33,582,821**
Low						
Agricultural	6	1	$781,018	$304,314	$304,314	$1,389,646
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	2	0	$577	$0	$0	$577

Landslide Incidence and Susceptibility Area/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Residential	18	11	$1,488,126	$1,852,105	$926,052	$4,266,283
Unknown	1		$0	$0	$0	$0
Low Total	**27**	**12**	**$2,269,721**	**$2,156,419**	**$1,230,366**	**$5,656,506**
City of Amador City Total	**181**	**111**	**$13,243,335**	**$16,405,643**	**$9,590,349**	**$39,239,327**

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data

Population at Risk

The USGS landslide incidence and susceptibility areas were overlayed on the parcel layer. Those residential parcel centroids that intersect each landslide incidence and susceptibility areas were counted and multiplied by the 2010 Census Bureau average household factors for Amador City – 2.18. According to this analysis, there is a total population of 24 residents of the City at risk to a moderate landslide incidence and susceptibility area. This is shown in Table A-22.

Table A-22 City of Amador City – Count of Improved Residential Parcels and Population by Landslide Incidence and Susceptibility Area

Jurisdiction	Low		Moderate		High	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Amador City	84	183	11	24	0	0

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Amador City in identified landslide incidence and susceptibility areas. GIS was used to determine whether the critical facility locations intersect a USGS landslide incidence and susceptibility area. Details of critical facilities in mapped landslide incidence and susceptibility areas in the City of Amador City are shown in Figure A-9 and detailed in Table A-23. Details of critical facility definition, type, name and address and jurisdiction by landslide incidence and susceptibility area are listed in Appendix F.

Figure A-9 City of Amador City – Critical Facilities in Landslide Incidence and Susceptibility Areas

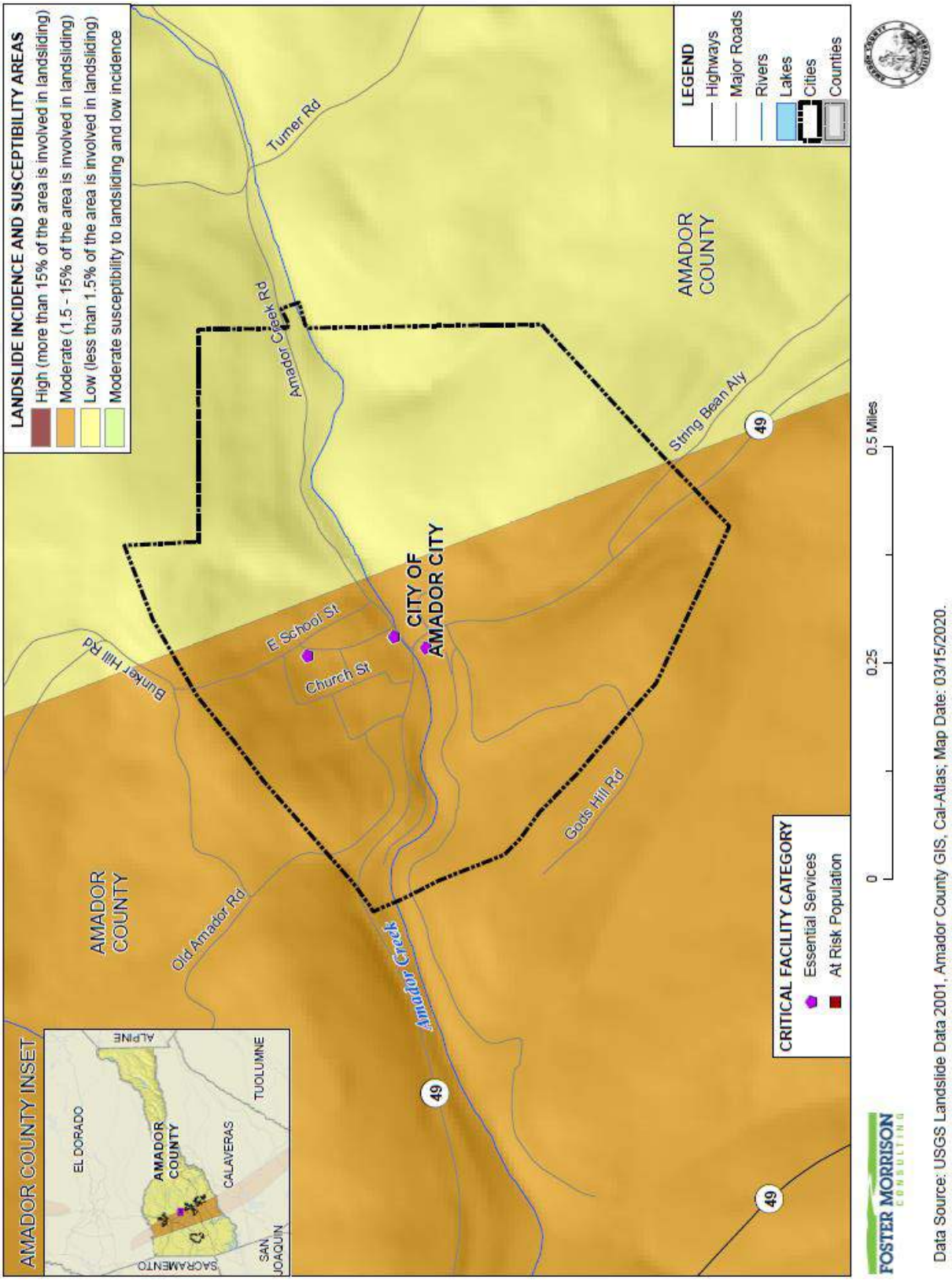


Table A-23 City of Amador City – Critical Facilities in Landslide Incidence and Susceptibility Areas

Landslide Incidence and Susceptibility	Critical Facility Category / Critical Facility Type	Facility Count
Moderate	**Essential Services**	
	Fire Station	1
	Post Office	1
	Public Administration Building	1
	Essential Services Total	**3**
Moderate Total		**3**
City of Amador City Total		**3**

Source: USGS, Amador County GIS

Future Development

Although new growth and development corridors would fall in the area affected by landslide, given the limited past occurrences of a major landslide and the building codes and erosion ordinance in effect, development in landslide prone areas will continue to occur in a limited fashion and should be built to current standards.

GIS Analysis

The City Potential Development Area and the Amador County LAFCO SOI were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the 2 areas and 9 parcels falling within the SOI and area associated with future development were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure A-10 shows the locations of future development areas the City has available for development in both the Potential Development Areas and the SOI overlayed on the USGS Landslide Incidence and Susceptibility Areas. Table A-24 shows the parcels and acreages of each future development area in the City in each USGS area, broken out by Potential Development Areas and SOI.

Figure A-10 City of Amador City – Potential Development Areas and SOI in Landslide Incidence and Susceptibility Areas

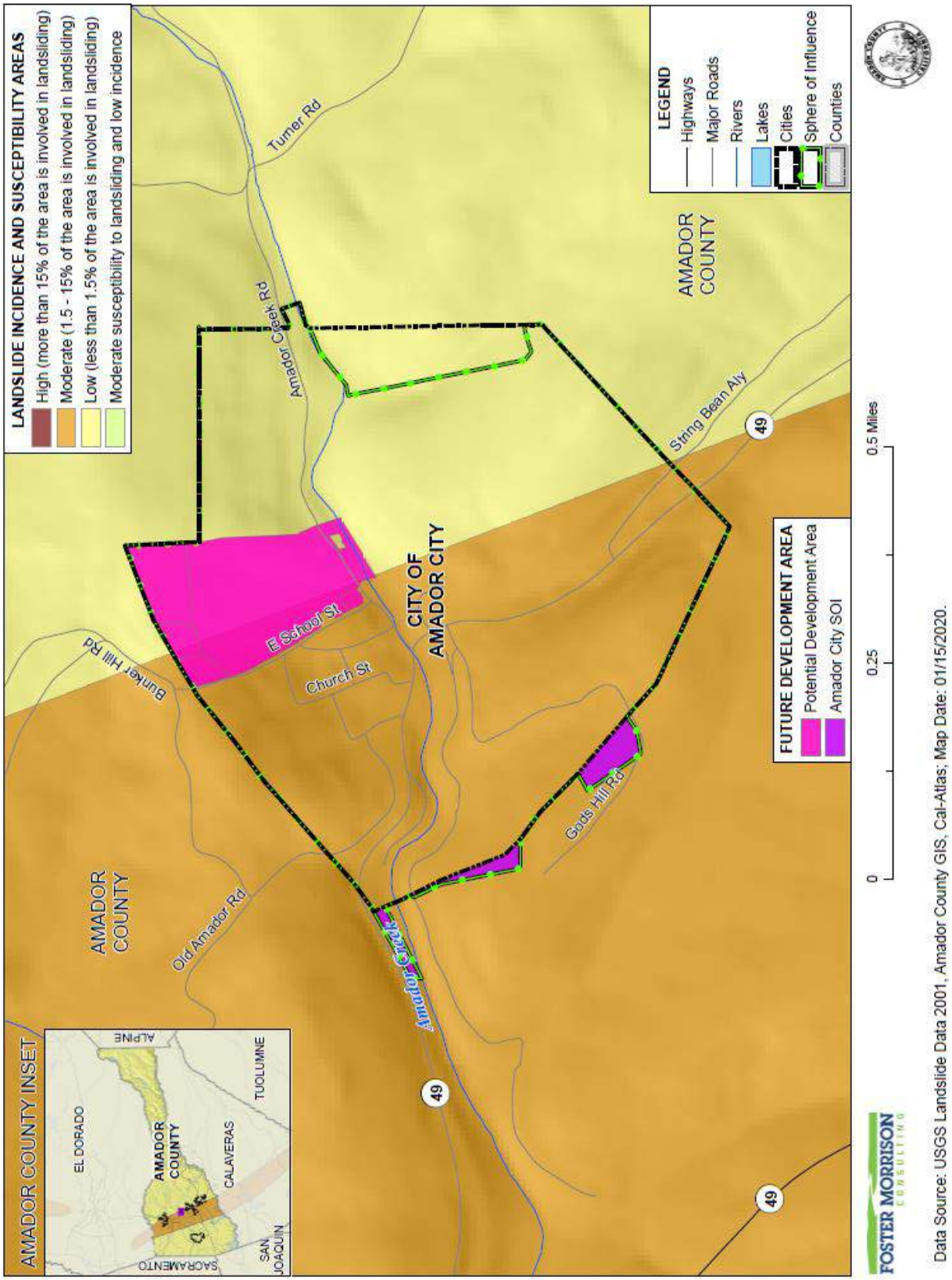


Table A-24 City of Amador City – SOI and Potential Development Area Parcels and Acreage in Landslide Incidence and Susceptibility Areas

Future Development /Landslide Incidence and Susceptibility Areas	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Potential Development Area						
Moderate	3	1	2	20.42	3.44	16.99
Low	2	1	1	1.10	0.85	0.25
Potential Development Area Total	**5**	**2**	**3**	**21.52**	**4.29**	**17.24**
Amador City SOI						
Moderate	0	0	0	0	0	0
Low	4	1	3	3.46	1.73	1.73
Amador City SOI Total	**4**	**1**	**3**	**3.46**	**1.73**	**1.73**
Grand Total	**9**	**3**	**6**	**24.99**	**6.02**	**18.97**

Source: City of Amador City, Amador County LAFCO, USGS

Severe Weather: Heavy Rains and Storms (Hail, Lightning)

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Storms in the City occur annually 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 City falls mainly in the fall, winter, and spring months.

Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the City. All portions of the City are at risk to heavy rains. Most of the severe rains occur during the fall, winter, and spring months. There is no scale by which heavy rains and severe storms are measured. 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. Hail and lightning are rare in the City. Duration of severe storms in California, Amador County, and the City can range from

minutes to hours to days. Information on precipitation extremes can be found in Section 4.2.3 of the Base Plan.

Past Occurrences

According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the City. This is the cause of many of the state and federal disaster declarations related to flooding. Also as detailed in the flood sections of this Annex, significant events occurring since the 2014 LHMP include those associated with the heavy rains and storms during the winter of 2017. These storms caused flooding of Amador Creek and other areas with minimal drainage infrastructure throughout the City and also resulted in landslides in several areas. One of these landslide areas on God's Hill was repaired utilizing FEMA Public Assistance (PA) funds. It was also noted, that while heavy storms occurred in 2019, no PA claims were made by the City.

Vulnerability to Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrences in the City. These events can cause localized flooding. Elongated events, or events that occur during times where the ground is already saturated can cause 1% and 0.2% annual chance flooding. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the City.

Impacts

Actual damage associated with the effects of severe storms include impacts to property, critical facilities (such as utilities), and life safety. Heavy rains and storms often result in localized flooding creating significant issues. Roads can become impassable and ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical infrastructure. The City's Sewer Plant can also become overwhelmed during heavy rains. Floodwaters and downed trees can break utilities and interrupt services.

Future Development

Building codes in the City ensure that new development is built to current building standards, which should reduce the risk to future development in the City. New critical facilities should be built to withstand hail damage, lightning, and thunderstorm winds. With adherence to development standards, future losses to new development should be minimal.

Severe Weather: High Winds and Tornadoes

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

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. High winds can cause significant property

and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. High winds during times of heat and low humidity can also lead to Public Safety Power Shutdowns (PSPS) in the City.

Portions of the City are also located in or near 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. These types of winds are also associated with the rapid spread of wildfires, making some regions which experience these winds particularly fire prone.

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 form when cool, dry air sits on top of warm, moist air. Tornadoes are the most powerful storms that exist. There have been no tornadoes near the City.

Location and Extent

The entire City is subject to significant, non-tornadic (straight-line), winds. Each area of the City 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 the County and the City is often short, ranging from minutes to hours. The Beaufort scale is an empirical 12 category scale that relates wind speed to observed conditions at sea or on land. Its full name is the Beaufort Wind Force Scale. The Beaufort Scale was shown in Section 4.2.4 of the Base Plan.

Tornadoes, while rare, can occur at any location in the County and City. The areas in the lower elevations of the County tend to be at greater risk than the areas in the foothills and higher. 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 (EF) 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. The F Scale and EF Scale are shown in Section 4.2.4 of the Base Plan.

Past Occurrences

The City noted that since high winds is a regional phenomenon, events that affected the lower elevations of the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.2.4. The City could not identify specific wind events causing damages within the City since the 2014 LHMP.

Vulnerability to Severe Weather: Wind and Tornado

High winds are common occurrences in the City throughout the entire year. Straight line winds are primarily a public safety and economic concern. Windstorm can cause damage to structures and power lines which in turn can create hazardous conditions for people. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered. High

winds can impact critical facilities and infrastructure and can lead to power outages. Wind can also drive wildfire flames, spreading wildfires quickly. High winds are also a component of red flag days, which can cause PG&E to enact the Public Safety Power Shutdowns (PSPS). The City noted that actual impacts from wind is limited, the more significant issues related to wind include problems with the Sewer Plant losing power and when the high winds contribute to a PSPS. In 2019, the City experienced several PSPSs; although, many of these were more limited than those occurring in other areas of the County. With the exception of one PSPS event lasting 3 days, the others were limited to several hours with no power.

Impacts

Impacts from high winds in the City will vary. Future losses from straight line winds include:

- Downed trees
- Power line impacts and economic losses from power outages, especially those related to the Sewer Plant
- Occasional building damage, primarily to roofs
- Campers, mobile homes, barns, and sheds and their occupants are particularly vulnerable as windstorm events in the region can be sufficient in magnitude to overturn these lighter structures
- PSPS events

Future Development

Future development projects will consider wind hazards at the planning, and design stage with the goal of reducing vulnerability. The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from windstorms. Future development in the City is subject to these building codes. New critical facilities should also consider adding generators for times of PSPS.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–High

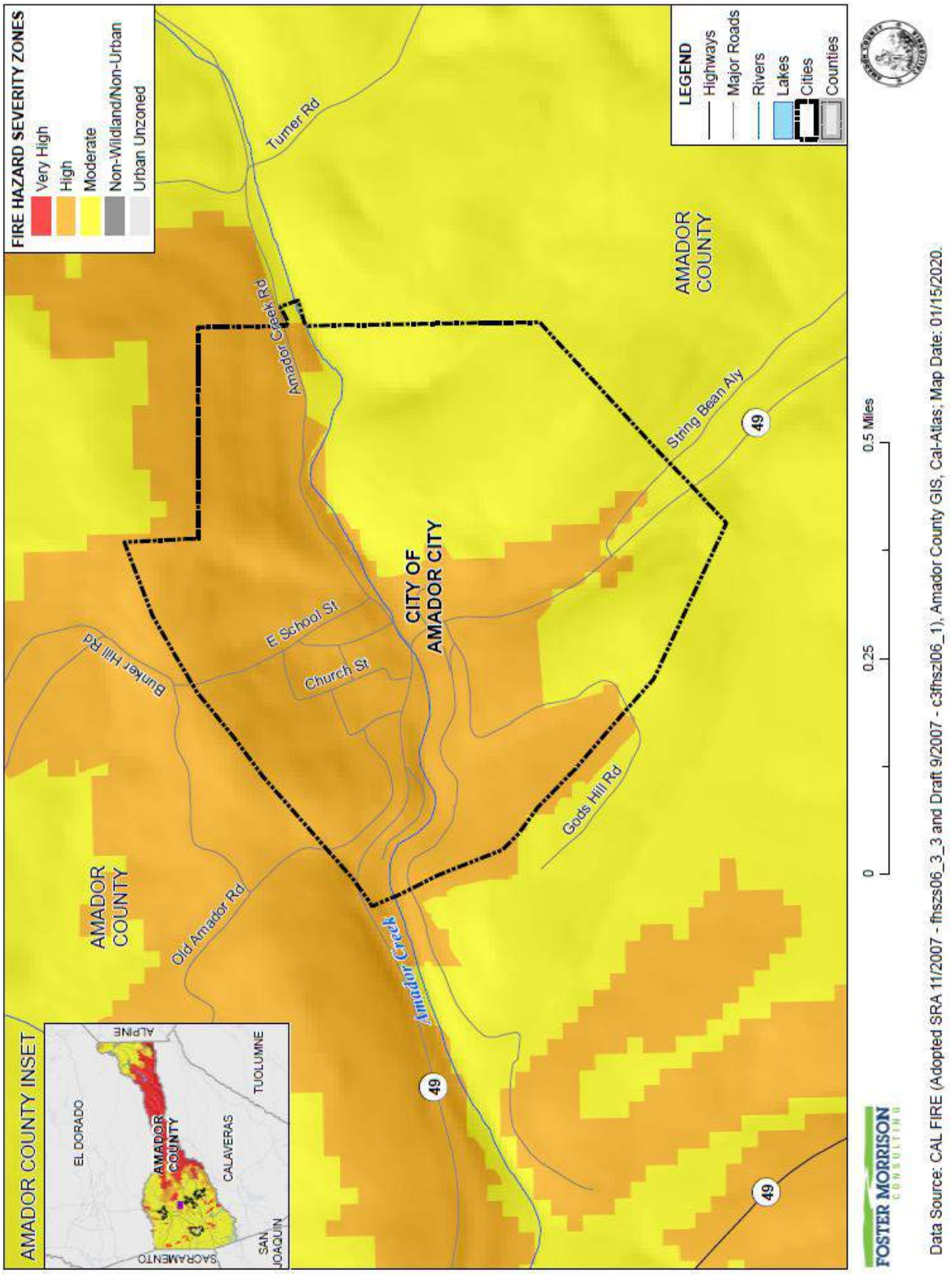
Hazard Profile and Problem Description

Wildland fire and the risk of a conflagration is an ongoing concern for the City of Amador City. 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. 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. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas such as Amador City.

Location and Extent

Wildfire can affect all areas of the City. CAL FIRE has estimated that the risk varies across the City and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the City of Amador City were created. Figure A-11 shows the CAL FIRE fire hazard severity zones (FHSZ) in the City. As shown on the maps, FHSZs within the City range from moderate to high.

Figure A-11 City of Amador City– Fire Hazard Severity Zones



Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more. Geographical FHSZ extent from CAL FIRE is shown in Table A-25.

Table A-25 City of Amador City – Geographical FHSZ Extents

Fire Hazard Severity Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
Very High	0	0.00%	0	0.00%	0	0.00%
High	109	0.03%	44	0.03%	65	0.03%
Moderate	73	0.02%	16	0.01%	57	0.03%
Non-Wildland/non-Urban	0	0.00%	0	0.00%	0	0.00%
Urban Unzoned	0	0.00%	0	0.00%	0	0.00%
Total	**183**	**0.05%**	**60**	**0.04%**	**122**	**0.05%**

Source: CAL FIRE

*Percentage of total acres is the percent of total acres of the entire County Planning Area, not the total acres of the jurisdiction

Past Occurrences

A list of state and federal disaster declarations for Amador County from wildfire is shown on Table A-17. These events also likely affected the City to some degree.

Table A-26 Amador County – State and Federal Disaster Declarations from Wildfire 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	1	2015	1	1961

Source: Cal OES, FEMA

The most significant fire that affected the City was in 1961, where several structures were impacted. Other recent fires, including those occurring since the 2014 LHMP such as the Butte and Irish fires did not impact the City. The City did note, while past impacts to the City from wildfire have been limited, wildfire is the most significant hazard of concern to the City and has the potential for catastrophic impacts.

Vulnerability to Wildfire

The wildfire hazard is one of the highest priority hazards in the County and City, and is the hazard with the greatest potential for catastrophic loss. High fuel loads in the County and City, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. The City is not immune from fire. The dry vegetation and hot

and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and City, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Amador City is not immune to numerous types of grass and brush fires and any one of them may accelerate into an urban interface wildfire. Such a situation could lead to evacuation of large portions of the population and the potential for significant loss of personal property, structures, and rangeland. The natural fuels available in or near the City vary greatly in the rate and intensity of burning. Fires in heavy brush and stands of trees burn with great intensity but more slowly than in dry grass and leaves. Dense fuels will propagate fire better than sparse fuels.

Impacts

Potential impacts from wildfire include loss of life and injuries; damage to structures 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 City. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the City 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 City; smoke and air pollution from wildfires can be a severe health hazard.

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 PSPSs 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.

Based on the vulnerability of the City of Amador to the wildfire hazard, the sections that follow describes significant assets at risk in the City.

Assets at Risk

Based on the vulnerability of Amador City to the wildfire hazard, the sections that follow describes significant assets at risk in the City of Amador City. This section includes the values at risk, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of wildfire within the City of Amador City. The methodology described in Section 4.3.18 of the Base Plan was followed in determining structures and

values at risk in fire hazard severity zones. Summary analysis results for Amador City are shown in Table A-27, which summarizes total parcel counts, improved parcel counts and their structure values by fire hazard severity zone.

Table A-27 City of Amador City – Count and Value of Parcels by Fire Hazard Severity Zone

Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
High	167	105	$12,575,273	$15,339,179	$27,914,452
Moderate	14	6	$668,062	$1,066,464	$1,734,526
City of Amador City Total	**181**	**111**	**$13,243,335**	**$16,405,643**	**$29,648,978**

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Table A-28 breaks out the Table A-27 by adding the property use details by fire hazard severity zone for the City. As shown in both of these tables, much of the City falls in the high FHSZ. Almost all of the residential property falls into the high FHSZ.

Table A-28 City of Amador City – Count and Value of Parcels by Fire Hazard Severity Zone and Property Use

Fire Hazard Severity Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
High					
Agricultural	6	2	$743,015	$725,315	$1,468,330
Commercial	15	12	$1,509,183	$2,055,703	$3,564,886
Industrial	0	0	$0	$0	$0
Miscellaneous	9	1	$17,754	$10,404	$28,158
Residential	134	90	$10,305,321	$12,547,757	$22,853,078
Unknown	3	0	$0	$0	$0
High Total	**167**	**105**	**$12,575,273**	**$15,339,179**	**$27,914,452**
Moderate					
Agricultural	1	0	$77,409	$0	$77,409
Commercial	0	0	$0	$0	$0
Industrial	2	1	$9,612	$2,222	$11,834
Miscellaneous	2	0	$577	$0	$577
Residential	9	5	$580,464	$1,064,242	$1,644,706
Unknown	0	0	$0	$0	$0
Moderate Total	**14**	**6**	**$668,062**	**$1,066,464**	**$1,734,526**
City of Amador City Total	**181**	**111**	**$13,243,335**	**$16,405,643**	**$29,648,978**

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Population at Risk

The FHSZ dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the FHSZs were counted and multiplied by the 2010 Census Bureau average household factors for the City of Amador City – 2.18. According to this analysis, there is a total population of 207 residents of Amador City at risk to moderate or higher FHSZs. This is shown in Table A-29.

Table A-29 City of Amador City – Count of Improved Residential Parcels and Population by Fire Hazard Severity Zone

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	0	0	90	196	5	11

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Amador City in identified FHSZs. Critical facilities in a FHSZ in the City of Amador City are shown in Figure A-12 and detailed in Table A-30. Details of critical facility definition, type, name and address and jurisdiction by fire hazard severity zone are listed in Appendix F.

Figure A-12 City of Amador City – Critical Facilities in Fire Hazard Severity Zones

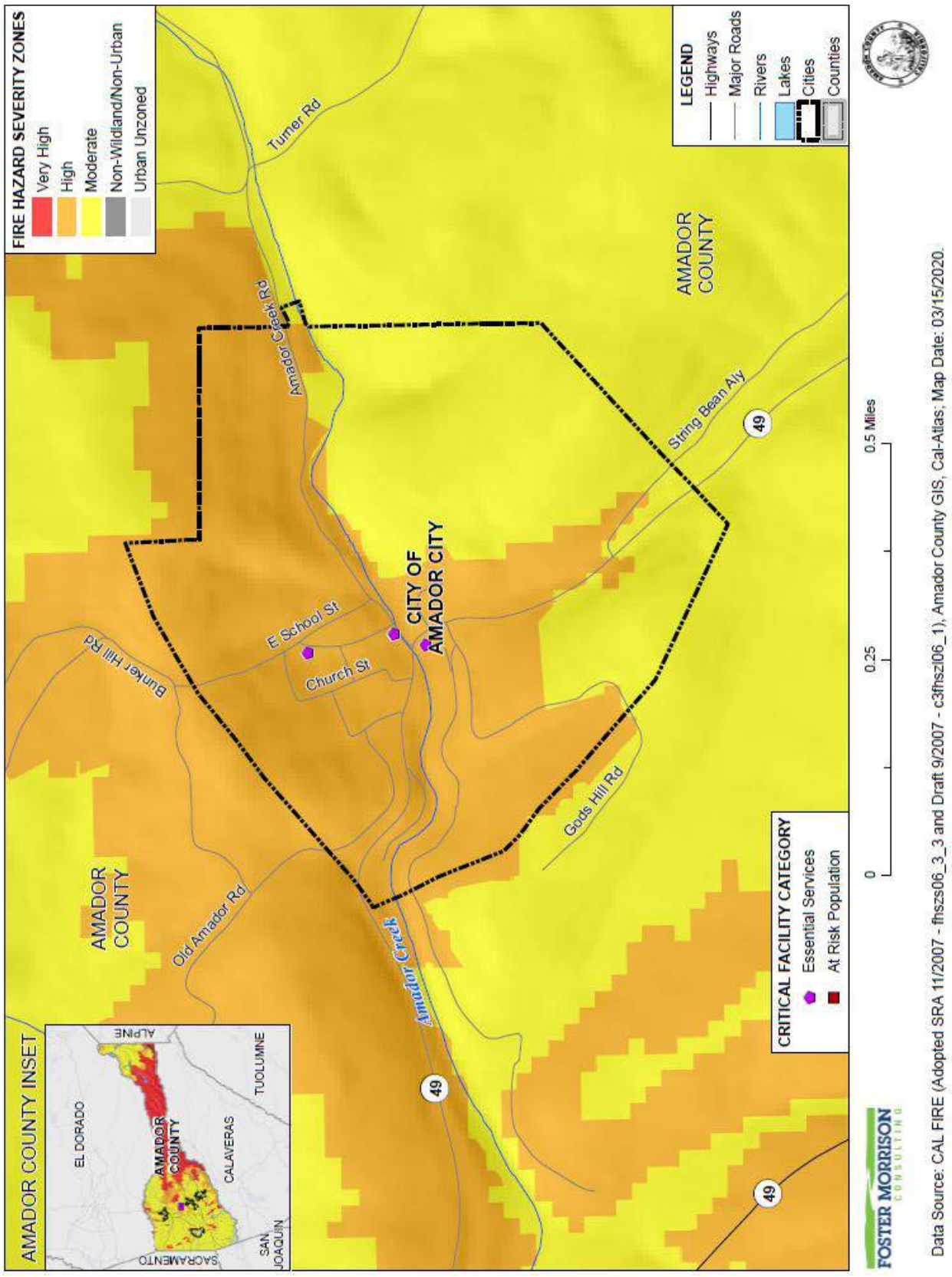


Table A-30 City of Amador City – Critical Facilities by Fire Hazard Severity Zone

Fire Hazard Severity Zones	Critical Facility Category / Critical Facility Type	Facility Count
High	**Essential Services**	
	Fire Station	1
	Post Office	1
	Public Administration Building	1
	Essential Services Total	**3**
High Total		**3**
City of Amador City Total		**3**

Source: CAL FIRE, Amador County GIS

Future Development

Additional growth and development within moderate or higher fire hazard severity zones in the City would place additional values at risk to wildfire. City building codes are in effect and should continue to be updated as appropriate to reduce this risk.

GIS Analysis

The City Potential Development Areas and the Amador County LAFCO SOI were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the 2 areas and 9 parcels falling within the SOI and area associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure A-13 shows the locations of future development areas the City is planning to develop in both the Potential Development Areas and the SOI overlayed on the CAL FIRE FHSZ. Table A-31 shows the parcels and acreages of each future development area in the City in each FHSZ, broken out by Potential Development Areas and Sphere of Influence.

Figure A-13 City of Amador City – SOI and Potential Development Areas in FHSZs

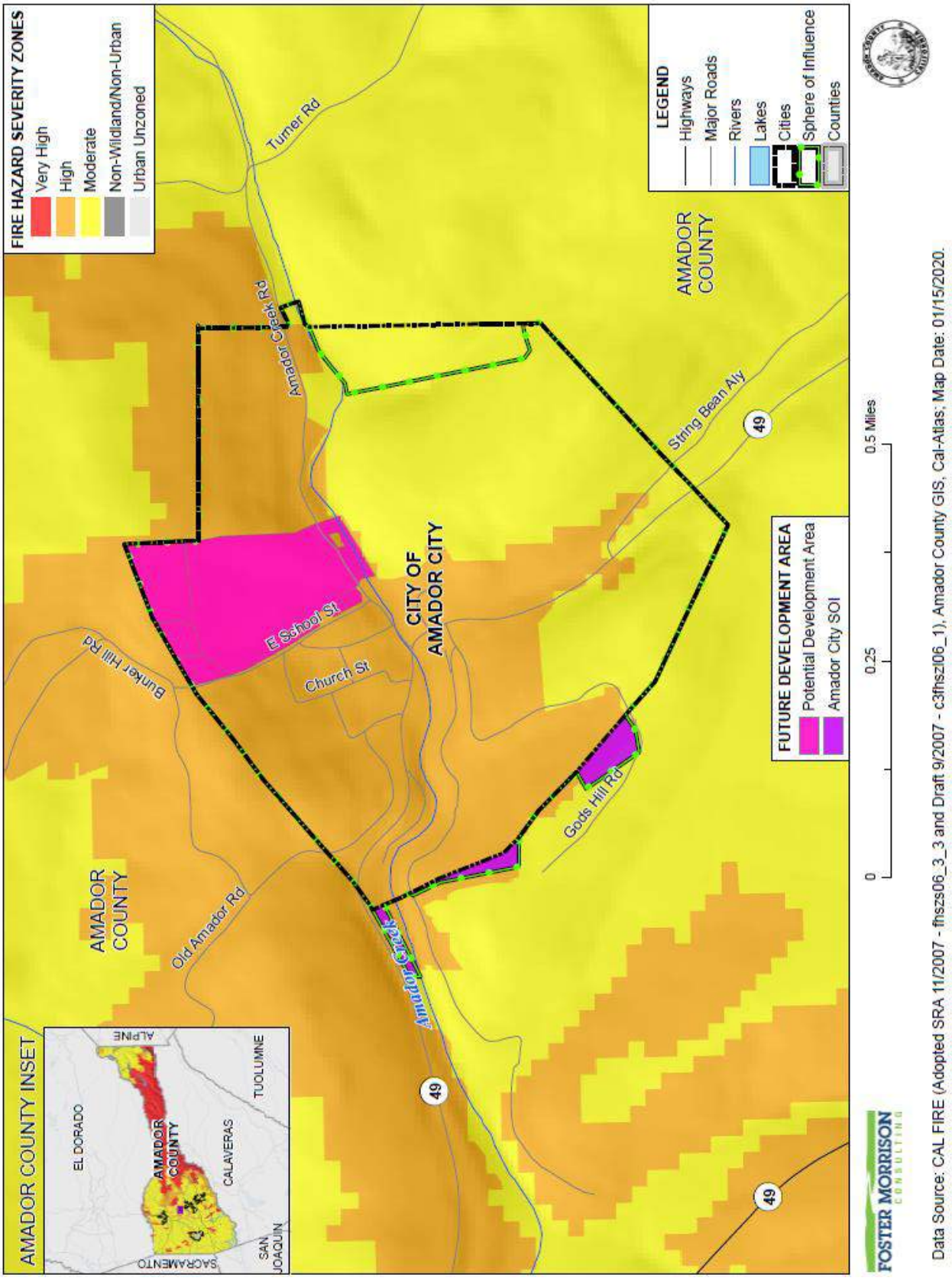


Table A-31 City of Amador City – Future Development SOI and Potential Development Area Parcels and Acreage in FHSZs

Future Development / Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Potential Development Area						
Very High	0	0	0	0	0	0
High	5	2	3	21.52	4.29	17.24
Moderate	0	0	0	0	0	0
Urban Unzoned	0	0	0	0	0	0
Potential Development Area Total	**5**	**2**	**3**	**21.52**	**4.29**	**17.24**
Amador City SOI						
Very High	0	0	0	0	0	0
High	4	1	3	3.46	1.73	1.73
Moderate	0	0	0	0	0	0
Urban Unzoned	0	0	0	0	0	0
Amador City SOI Total	**4**	**1**	**3**	**3.46**	**1.73**	**1.73**
Grand Total	**9**	**3**	**6**	**24.99**	**6.02**	**18.97**

Source: City of Amador City, Amador County LAFCO, CAL FIRE

A.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

A.6.1. Regulatory Mitigation Capabilities

Table A-32 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Amador City.

Table A-32 City of Amador City Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan/General Plan	Y Dates vary	Safety element addresses hazards, identifies mitigation actions, and strategies. Safety Element is from 2008. The General Plan elements are updated at different times.
Capital Improvements Plan	N	CIP projects are identified annually
Economic Development Plan	N	
Local Emergency Operations Plan	N	
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	Y	Rating: 06/8B
Site plan review requirements	Y	City Code Section 15.16.010 and15.16.060
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	Ordinance is effective, administered, and enforced.
Subdivision ordinance	Y	Ordinance is effective, administered, and enforced.
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	Erosion control is considered in all City projects
Other		
How can these capabilities be expanded and improved to reduce risk?		
The City would like to be part of the Countywide evacuation planning that is occurring in the County. Development of a stormwater drainage plan or ordinance would also help manage stormwater runoff in the City.		

Source: City of Amador City

City of Amador City General Plan (dates vary by Element)

The General Plan is a document that guides the future development within the City. It contains broad community values and goals, giving a picture of the desired character and quality of development in the County and policies which outline the steps to accomplish those goals. Of primary concern to this planning document is the Conservation and Open Space Elements of the General Plan. This Element, first adopted in 1983, has been updated to reflect changes within the community. Specifically, the Conservation and Open Space Elements is more specific, and implementation oriented with respect to protecting open space and natural resources.

Goals, Policies, and Implementation Measures related to hazard mitigation include the following:

- Goal #1: To assure the wise use, development and protection of the City's natural and cultural resources and open space lands.

Policies:

- Maintain the current flow characteristics and biotic quality of Amador Creek by minimizing increased flow from impermeable surfaces and controlling encroachment into the stream zone.
- Protect riparian and wetland habitats from unnecessary disturbance with the goal of no net loss.
- Encourage development appropriate to the terrain to limit visual and grading impacts.
- Designate particularly valuable, sensitive, or hazardous areas relative to visual; cultural; historic; recreation; wildlife, fish, or plant habitat; public trails; and publicly owned corridors as Open Space or related protected designation.
- Encourage the use of conservation easements and open space dedications in the City and its surroundings.
- All aspects of new growth and redevelopment shall preserve the sense of a compact, 19th century community in architecture, scale, and other design elements and be compatible with both the overall community and the surrounding neighborhood.
- The Historic Commercial District structures, features, public facilities, and layout shall be preserved to the greatest extent possible in Gold Rush era authenticity.
- Preserve the natural beauty of the City and its surroundings.
- Encourage linking of open space corridors.
- Protect the city's existing trees and woodlands.

Mitigation Related Ordinances

Health and Safety (Amador City Code Title 8, Chapters 8.12)

8.12.010 Definitions. As used in this chapter: "Nuisance" includes anything which is injurious to human health, is indecent, or is offensive to the senses. A nuisance interferes with the comfortable enjoyment of life or property. A nuisance affects at the same time an entire community, neighborhood, or a considerable number of persons although the extent of annoyance or damage inflicted upon the individual may be unequal. A nuisance includes all conditions of property including but not limited to, that condition which occurs as a result of the storage, removal, transport, processing, or disposal of solid waste. A nuisance includes dry grasses, weeds, dead shrubs, dead trees, rubbish, and waste matter that constitute a fire hazard in the R-1, R-2, R-3, R-4, C-l, and C-2 zones.

Buildings and Construction (Amador City Code Title 15, Chapters 15.04.010)

Adoption of Uniform Codes.

The following uniform codes are adopted by reference as the rules and regulations governing the construction, alteration, moving, demolition, repair and use of any building or structure within the city, and additions:

- The Uniform Building Code (UBC) and Uniform Building Code Standards (UBCS, 1991 Edition, as published by the International Conference of Building Officials (ICBO), including, but not limited to, Parts I through XI and the Appendix; excluding Appendix Chapters 1, 12, 23, 38, 51 and 53;
- The Uniform Plumbing Code, (UPC) 1991 Edition, as published by the International Association of Plumbing and Mechanical Officials including but not limited to Part I: Chapters 1 through 13; Appendices A through I, and the Installation Standards;
- The Uniform Mechanical Code, (UMC) 1991 Edition, as promulgated by the International Conference of Building Officials and the International Conference of Plumbing and Mechanical officials including but not limited to Parts I through IV; and Appendices A through D;
- The National Electric Code, (NEC) 1991 Edition, as published by the National Fire Protection Association and the International Conference of Building Officials, including the Uniform Administrative Code provisions, and Chapters 1 through 9; 5. The Uniform Housing Code, (HC) 1991 Edition as published by the International Conference of Building Officials, including only Chapters 1, 4, 5, 6 and Section 701 (b) and (c); 6. The Uniform Swimming Pool, Spa and Hot Tub Code, 1991 Edition, as published by the International Allocation of Plumbing and Mechanical officials, including, but not limited to, Chapters 1 through 5; excluding Part 1 Administration (Part I Administration of the UBC shall apply;
- The Uniform Administrative Code (UAC) 1988 Edition, as published by the International Conference of Building Officials, including Chapters 1, 2, and 3.

B. The following codes are adopted by reference as standards in conjunction with subsection A of this section:

- Uniform Fire Code, 1991 Edition as published by the International Conference of Building Officials and Western Fire Chiefs Association;
- National Fire Codes, 1991 Edition and Supplement as published by the National Fire Protection Association;

Zoning (Amador City Code Title 17)

An official land use zoning ordinance for the City is adopted and established to serve the public health, safety, comfort, convenience and general welfare and to provide the economic and social advantages resulting from an orderly planned use for the future growth and development of the city. (Ord. 55 § 1.00, 1980)

In order to classify, regulate, restrict, and segregate the uses of land and building to regulate and restrict the height and bulk of buildings; and to regulate the area of yards and other open spaces about buildings; and to regulate the density of population, six classes of land use zones are established.

The zones aforesaid and the boundaries of such zones are shown upon the map attached hereto and made a part of the ordinance codified in this title, being designated as the "zoning map," and such map and all the

notations, references, and other information shown thereon shall be as much a part of this title as if the matters and information set forth by such map were all fully described in this chapter. (Ord. 55 § 3.01, 1980)

Subdivisions (Amador City Code Title 16)

Soils and/or hazardous materials report.

A. A preliminary soils report and/or a hazardous materials report prepared by a civil engineer or engineering geologist registered in California, and based upon adequate test boring and/or other testing or analysis, may be required by the city engineer for any subdivision for which a final map is required by this title.

B. When the city engineer determines that a preliminary soils report is necessary, the planning commission may include the preparation of such report as a condition of approval of the tentative map.

C. When the preliminary soils report indicates the presence of critically expansive soils or other hazardous soils problems which, if not corrected or adequately addressed, would lead to structural defects, a soils investigation of each lot in the subdivision may be required.

D. Soils investigation shall be done by a professional engineer or engineering geologist of proper registration in California, who shall recommend the corrective actions necessary to prevent structural damage to structures proposed to be constructed in the area where such soils problems exist. (Ord. 159 (part), 2005)

16.16.170 Storm drainage.

The subdivider shall dedicate right-of-way for storm drainage purposes conforming substantially with the lines of any natural water course or channel, stream, or creek that traverses the subdivision. All storm drain improvements shall be in accordance with city improvement standards. The planning commission may require adequate fencing or other protection of all ditches and streams. Where drainage facilities are necessary on an area-wide basis to permit safe, healthful, and convenient development of the area, the subdivider may be required to pay a pro rata share of such facilities' cost, as determined by the city council. (Ord. 159 (part), 2005)

16.16.180 Grading and erosion control.

All grading and erosion control shall be in accordance with applicable provisions of the Uniform Building Code and an approved erosion control plan. Erosion control plan shall implement "best management practices" that will prevent construction pollutants from contacting storm water. All products of erosion shall be prevented from moving off-site into receiving waters. Construction practices shall be in accordance with an approved erosion control plan and methods contained in "Volume 3 of California Storm Water Best Management Practice Handbook." (Ord. 159 (part), 2005)

A.6.2. Administrative/Technical Mitigation Capabilities

Table A-33 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Amador City.

Table A-33 City of Amador City's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	N	
Mutual aid agreements	Y	Sutter Creek Fire, County Sheriff, Amador Water Agency, Amador Regional Sanitary Agency (ARSA)
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y	Contract City Engineer. Engineer is trained on mitigation related items.
Floodplain Administrator	N	
Emergency Manager	N	
Community Planner	Y	Contract Planner
Civil Engineer	Y	Contract City Engineer. Conducts design reviews. Engineer is trained on mitigation related items.
GIS Coordinator	Y	Contract City Engineer. Engineer is trained on mitigation related items.
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	N	
Grant writing	N	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
A grant writer would add value to the City in pursuing project funding.		

Source: City of Amador City

A.6.3. Fiscal Mitigation Capabilities

Table A-34 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table A-34 City of Amador City's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (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	
Authority to levy taxes for specific purposes	Y	Late sewer billing can be added to tax rolls
Fees for water, sewer, gas, or electric services	Y	
Impact fees for new development	Y	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	N	
Community Development Block Grant	Y	But have not used this program in years
Other federal funding programs	N	
State funding programs	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Sewer funds are limited. Would like to determine how to implement improvements without raising sewer fees.		

Source: City of Amador City

A.6.4. Mitigation Education, Outreach, and Partnerships

Table A-35 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 A-35 City of Amador City's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	The City does have a Business Association addressing downtown issues and City helps fund the group.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	City does this. City is establishing a NextDoor to better facilitate this effort.
Natural disaster or safety related school programs	Y	District Program

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues		
Other		
How can these capabilities be expanded and improved to reduce risk?		
It would be beneficial to establish a disaster group or committee of City Council and citizens		

Source: City of Amador City

A.6.5. Other Mitigation Efforts

The City has many other completed or ongoing mitigation efforts that include the following:

- Flooding - Highway bridge replacement project at Main Street over Amador Creek was completed in 2014.
- Creek clearing occurs annually along Amador Creek.
- The City works with Sutter Creek Fire to inspect and work with property owners to conduct vegetation management throughout the City.

A.7 Mitigation Strategy

A.7.1. Mitigation Goals and Objectives

The City of Amador City adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

A.7.2. NFIP Mitigation Strategy

Amador City does not currently participate in the NFIP as it has no mapped FEMA floodplains. The City continues to evaluate the benefits of participation in the program. However, in light of the lack of good data to support valid mapping efforts, the City currently is adopting a wait and see approach. The City Engineer has valid data on flood levels and city staff cooperates to keep construction out of flood areas.

A.7.3. Mitigation Actions

The planning team for the City of Amador City identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Localized Flood
- Landslide
- Severe Weather: Heavy Rain and Storms
- Severe Weather: Winds and Tornadoes
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan 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 countywide public outreach action, 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 plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

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

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140).

Project Description: Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption 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: City of Amador City Planning Department

Cost Estimate: Jurisdictional board/staff time

Benefits (avoided Losses): 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

Timeline: As soon as possible

Project Priority: High

Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The City and County play a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of natural hazards. A comprehensive multi-hazard public education program will better inform the community of natural hazards of concern and actions the public can take to be better prepared for the next natural disaster event.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The City will work with the County and other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of natural hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will leverage and build upon existing mechanisms.

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing County outreach programs will be reviewed for effectiveness and leveraged and expanded upon to reach the broader region.

Responsible Office: City of Amador City in partnership with the County

Cost Estimate: Annual costs to be determined, and will depend on the scope and frequency of activities and events as well as volunteer participation

Benefits (Losses Avoided): Increase residents' knowledge of potential hazards and activities required to mitigate hazards and be better prepared. Protect lives and reduce damages, relatively low cost to implement.

Potential Funding: Local budgets, grant funds

Timeline: Ongoing/Annual public awareness campaign

Project Priority: High

Action 3. Wastewater Plant Emergency Power

Hazards Addressed: Flooding; Severe Weather: Heavy Rains and Storms, High Winds and Tornados

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Weather conditions can create extended power outages that could impact wastewater pumping to the Sutter Creek Collection System.

Project Description: The City is considering options for backup power supply for their Sewer Plant. Options may include a backup generator and solar options depending on what is most feasible.

Other Alternatives: A backup generator(s) and solar options are both being considered.

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office: Amador City

Cost Estimate: $300,000, depending on selected alternative

Benefits (Losses Avoided): This improvement would ensure the holding pond would never overflow and impact water quality in Amador Creek.

Potential Funding: FEMA Hazard Mitigation Grant or Clean Water Grant

Timeline: To be determined once funding has been identified.

Project Priority: Medium

Action 4. Midtown Sewer Crossing

Hazards Addressed: Flooding; Landslides, Severe Weather: Heavy Rains and Storms

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Under various flood events, an 8" diameter sewer line crossing of Amador Creek is inundated and subject to damage by large debris flow. This crossing was replaced after flooding in 1997, and withstood 2006 flooding. The crossing remains vulnerable to debris carried in large storm flows and relocation and reconstruction is needed to insure perpetual protection.

Other Alternatives: 1) Reinforcement at existing crossing; and 2) Increase creek channel cross section to reduce flood level and stream velocities.

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office: Amador City

Cost Estimate: $175,000

Benefits (Losses Avoided): Elimination of raw sewage discharge to Amador Creek.

Potential Funding: FEMA Hazard Mitigation Grant or Clean Water Grant with matching funds from city sewer account.

Timeline: To be determined once funding is obtained.

Project Priority: Medium

Action 5. Vegetation Management

Hazards Addressed: Wildfire, Severe Weather: Winds and Tornadoes, Heavy Rains and Storms

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Many areas of the City have become overgrown with vegetation including dead and dying trees creating an ongoing fire danger throughout the City. Removal of dead trees will also limit impacts to utility lines and structures from trees falling during severe weather events.

Project Description: This project entails cutting and removing dead trees and overgrown vegetation to reduce fuels in the City.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: This work will be conducted with Sutter Creek Fire and their fuels mitigation program.

Responsible Office/Partners: Amador City, Sutter Creek Fire

Cost Estimate: To be determined

Benefits (Losses Avoided): Reducing fuels in the City will reduce wildfire risk and limit impacts to structures and other property as well as limit the opportunity for an out of control wildfire in the which can also create life safety issues.

Potential Funding: FEMA and Fire grants, City budget

Timeline: Annually

Project Priority: High

Action 6. Landslide and Slope Failure Mitigation

Hazards Addressed: Landslides, Mudslides, and Debris Flows; Heavy Rains and Storms, Washouts

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Amador City is located in an area of hills and steep slopes creating a potential for washouts and landslides during periods of heavy rains. Specific areas of concern include God's Hill Road, Fleehart, and Water Street and other sloped areas throughout the City. Also, a concern are the historic stone retaining walls that run through the City along the creek; during periods of heavy rains these walls wash out periodically.

Project Description: This project entails identifying and repairing landslide and other sloped areas of concern in the City and evaluating options for enhanced slope stability in problem areas. Also, to be considered are permanent repairs to the retaining wall along the creek. This project may necessitate new surveys to determine property ownership in key areas and responsibility for repairs.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: None.

Responsible Office/Partners: Amador City

Cost Estimate: To be determined depending on the area of concern and the nature and extent of slope failure.

Benefits (Losses Avoided): Property protection of structures and critical facilities and infrastructure

Potential Funding: FEMA and other grants, City budget

Timeline: As necessary

Project Priority: Medium

Annex B City of Ione

B.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Ione, a previously participating jurisdiction to the 2014 Amador County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the City. This Annex provides additional information specific to Ione, with a focus on providing additional details on the risk assessment and mitigation strategy for this community.

B.2 Planning Process

As described above, Ione followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Amador County Hazard Mitigation Planning Committee (HMPC), the City formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table B-1. Additional details on plan participation and City representatives are included in Appendix A.

Table B-1 City of Ione – Planning Team

Name	Position/Title	How Participated
Stacy Rhoades	City Councilor	Attended County and City meetings
Ken Mackey	Fire Chief	Attended County and City meetings
Jon Hanken	City Manager	Attended County and City meetings

Coordination with other community planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the City integrated the previously approved 2014 Plan into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2014 LHMP through other plans and programs shown in Table B-2.

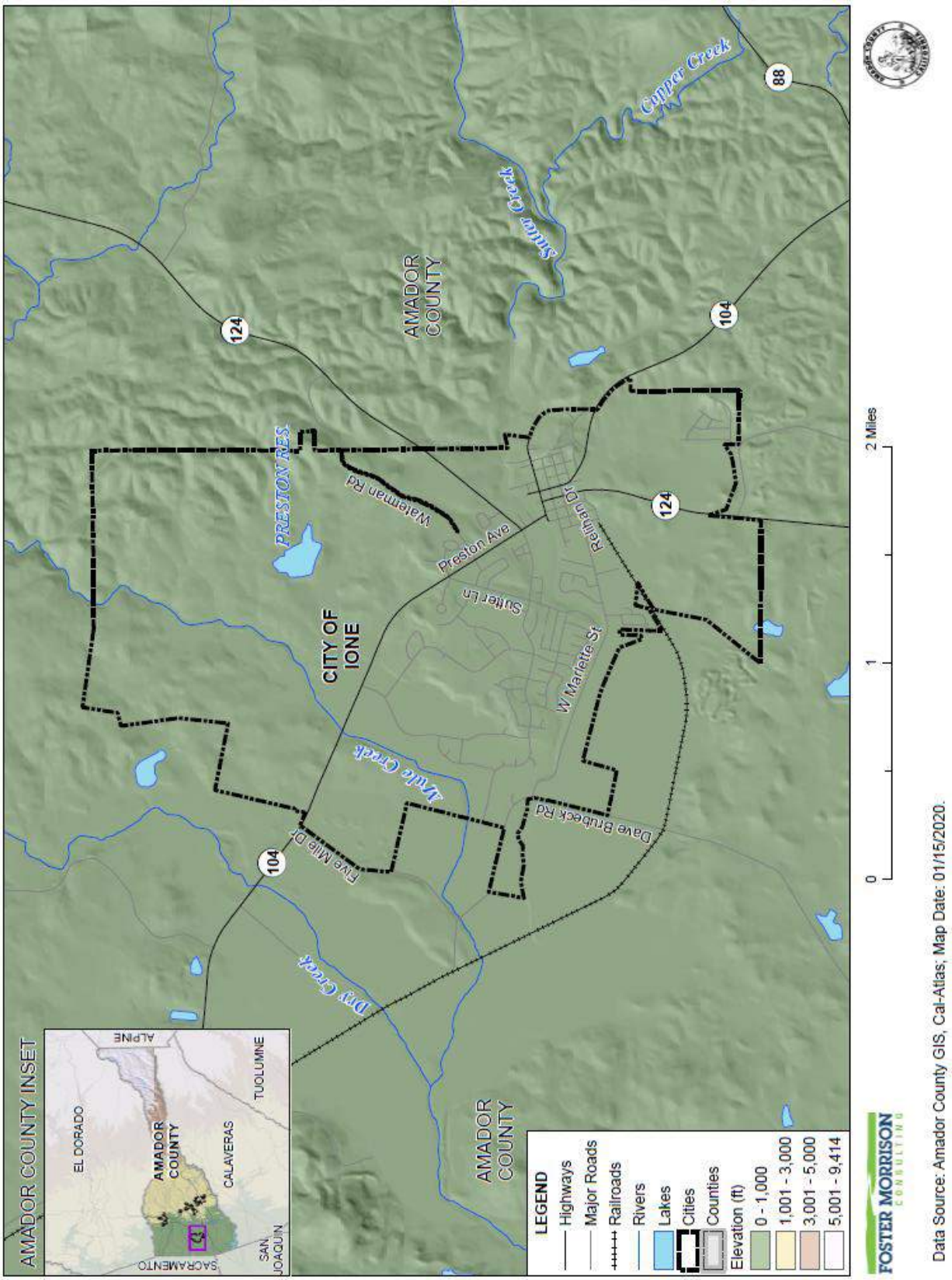
Table B-2 2014 LHMP Incorporation

Planning Mechanism 2014 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
City of Ione General Plan	LHMP was incorporated into Safety Element of General Plan. This was done with Resolution 2015-16

B.3 Community Profile

The community profile for the City of Ione is detailed in the following sections. Figure B-1 displays a City map and the location of Ione within Amador County.

Figure B-1 City of Ione



B.3.1. Geography and Climate

The City is located in the western boundary of the County, adjacent to Sacramento County. Elevation is approximately 298 feet above sea level. The terrain is relatively gentle and is dominated by grasslands.

The climate is generally moderate, with mild winters and hot, dry summers. Temperatures range from the low 40s F to the high 90s F, with an average daily maximum temperature of 74.7 F. The average annual rainfall is 20.5 inches, most of which occurs from November to April.

B.3.2. History

Ione is located in the Ione Valley in the "Gold Country" and is believed to be named by Thomas Brown around 1849 after one of the heroines in Edward Bulwer Lytton's drama "The Last Days of Pompeii." During the days of the Gold Rush, the miners knew the town by the names of "Bedbug" and "Freezeout." Unlike other communities in Amador County, which were founded on gold mining, Ione was a supply center, stage and rail stop and agricultural hub.

The Town of Ione continued to grow and prosper after its gold rush founding. The first school was built in 1853. The historic Methodist Church was organized in 1853 and the structure was completed in 1862. The first flour mill was built in 1855. The first brick building was built by Daniel Stewart in 1855 for his general merchandise store and is still owned and operated by the same family.

In 1876, Ione had a population of about 600 which included about 100 Chinese who lived in Ione's Chinatown. The town included one public school, 4 churches, 4 general stores, one meat market, one laundry, one brewery, a restaurant, millinery shop, an art gallery, six saloons, a drug store and barber shop, and many other business establishments. 1876 also marked the celebration of the completion of the railroad to the town of Ione.

The City of Ione was incorporated as a General Law City in 1953. The City currently houses many restaurants, businesses, and retail establishments. Also located within the incorporated limits of the City of Ione, the future Howard Park Industrial Park includes the potential for approximately 140 acres of office, industrial, and commercial lands that front State Route 124. Tourism is still a big part of the City; Ione has many interesting landmarks and historical points of interest.

B.3.3. Economy

US Census estimates show economic characteristics for the City of Ione. These are shown in Table B-3 and Table B-4. Mean household income in the City was $73,148. Median household income in the City was $67,351.

Table B-3 City of Ione – Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	50	3.3%

Industry	Estimated Employment	Percent
Construction	59	3.9%
Manufacturing	53	3.5%
Wholesale trade	33	2.2%
Retail trade	138	9.2%
Transportation and warehousing, and utilities	93	6.2%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	0	0.0%
Professional, scientific, and management, and administrative and waste management services	161	10.7%
Educational services, and health care and social assistance	265	17.7%
Arts, entertainment, and recreation, and accommodation and food services	243	16.2%
Other services, except public administration	96	6.4%
Public administration	310	20.7%

Source: US Census Bureau American Community Survey 2013-2017 Estimates

Table B-4 City of Ione – Income and Benefits

Income Bracket	Population	Percent
<$10,000	14	1.3%
$10,000 – $14,999	50	4.7%
$15,000 - $24,9999	22	2.1%
$25,000 – $34,999	61	5.7%
$35,000 – $49,999	100	9.3%
$50,000 – $74,999	239	22.3%
$75,000 – $99,999	172	16.0%
$100,000 – $149,999	282	26.3%
$150,000 – $199,999	85	7.9%
$200,000 or more	48	4.5%

Source: US Census Bureau American Community Survey 2013-2017 Estimates

In 2010, the State of California announce the closure of the Preston Youth Correctional Facility. The resulting lob loss had a huge negative impact on the local economy. In 2013, the State of California announced the expansion of Mule Creek State prison. Almost 1,400 jobs were added to the local economy, but that did not mean the City of Ione received all the benefit of those jobs. Many of the new Mule Creek prison employees live in other communities and commute to Ione. In 2016, the CalFire Training Facility in Ione started an expansion project to create more dorm rooms for cadets. This expansion also has a limited impact on the City's economy.

Ione's commercial area is small and primarily limited to the historic downtown area. In 2018/2019, the City began receiving more and more inquiries from owners of commercial properties regarding their desire

to build in Ione. The City anticipates that those who have expressed interest in developing their commercial property will do so in the next year or two.

B.3.4. Population

The California Department of Finance estimated the January 1, 2019 total population for the City of Ione was 7,991.

B.4 Hazard Identification

Ione identified the hazards that affect the City and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to Ione (see Table B-5).

Table B-5 City of Ione—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests	Limited	Unlikely	Negligible	Low	Low
Aquatic Invasive Species	Limited	Unlikely	Negligible	Low	Low
Avalanche	Limited	Unlikely	Negligible	Low	Medium
Climate Change	Extensive	Likely	Limited	Medium	–
Dam Failure	Limited	Unlikely	Negligible	Low	Medium
Drought & Water shortage	Extensive	Likely	Catastrophic	High	High
Earthquake (large damaging/small)	Extensive	Unlikely	Negligible	Low	Low
Floods: 1%/0.2% annual chance	Significant	Occasional	Limited	High	Medium
Floods: Localized Stormwater	Limited	Highly Likely	Critical	High	Medium
Landslide, Mudslide, Debris Flow	Significant	Occasional	Limited	Low	Medium
Levee Failure	Limited	Likely	Critical	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Critical	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Occasional	Limited	Low	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely	Limited	Medium	Low
Severe Weather: Winter Storms and Freeze	Extensive	Occasional	Limited	Low	Medium
Wildfire	Significant	Likely	Critical	High	High

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

B.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Ione's hazards and assess the City's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

B.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section B.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard affects the City and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Amador County Planning Area.

B.5.2. Vulnerability Assessment and Assets at Risk

This section identifies Ione's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Values at Risk

The following data from the Amador County Assessor's Office is based on the 12/31/2018 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitations are created by Proposition 13 and the Williamson Act as detailed in the Base Plan. With respect to Proposition 13, instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. However, depending on the type of hazard and impact of any given hazard event, land values may be adversely affected; thus, land values are included as appropriate. Table B-6 shows the 12/31/2018 Assessor's values and content replacement values (e.g., the values at risk) broken down by property use for the City.

Table B-6 City of Ione – Total Values at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Agricultural	14	3	$6,827,931	$39,680	$39,680	$6,907,291
Commercial	66	62	$8,098,815	$18,019,216	$18,019,216	$44,137,247
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	131	19	$7,228,495	$5,690,352	$0	$12,918,847
Residential	1,776	1,587	$124,272,109	$288,757,714	$144,378,858	$557,408,681
Unknown	47	0	$0	$0	$0	$0
City of Ione Total	**2,034**	**1,671**	**$146,427,350**	**$312,506,962**	**$162,437,754**	**$621,372,066**

Source: Amador County 12/31/2018 Parcel/Assessor's Data

Critical Facilities and Infrastructure

Critical facilities and infrastructure are those buildings and infrastructure that are crucial to a community. Should these be damaged, it makes it more difficult for the community to respond to and recover from a disaster. 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, and (3) Hazardous Materials Facilities, as discussed in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the City of Ione from Amador County GIS is shown on Figure B-2. Table B-7 gives summary information about the critical facilities in the City. Table B-8 details the facility categories and breaks them down by facility type. Details of critical facility definition, type, name, address, and jurisdiction by hazard area or zone are listed in Appendix F. The critical facility inventory and associated maps for the City only include the first two categories of facility types; a GIS layer of Hazardous Materials Facilities was not available.

Figure B-2 City of Ione – Critical Facilities

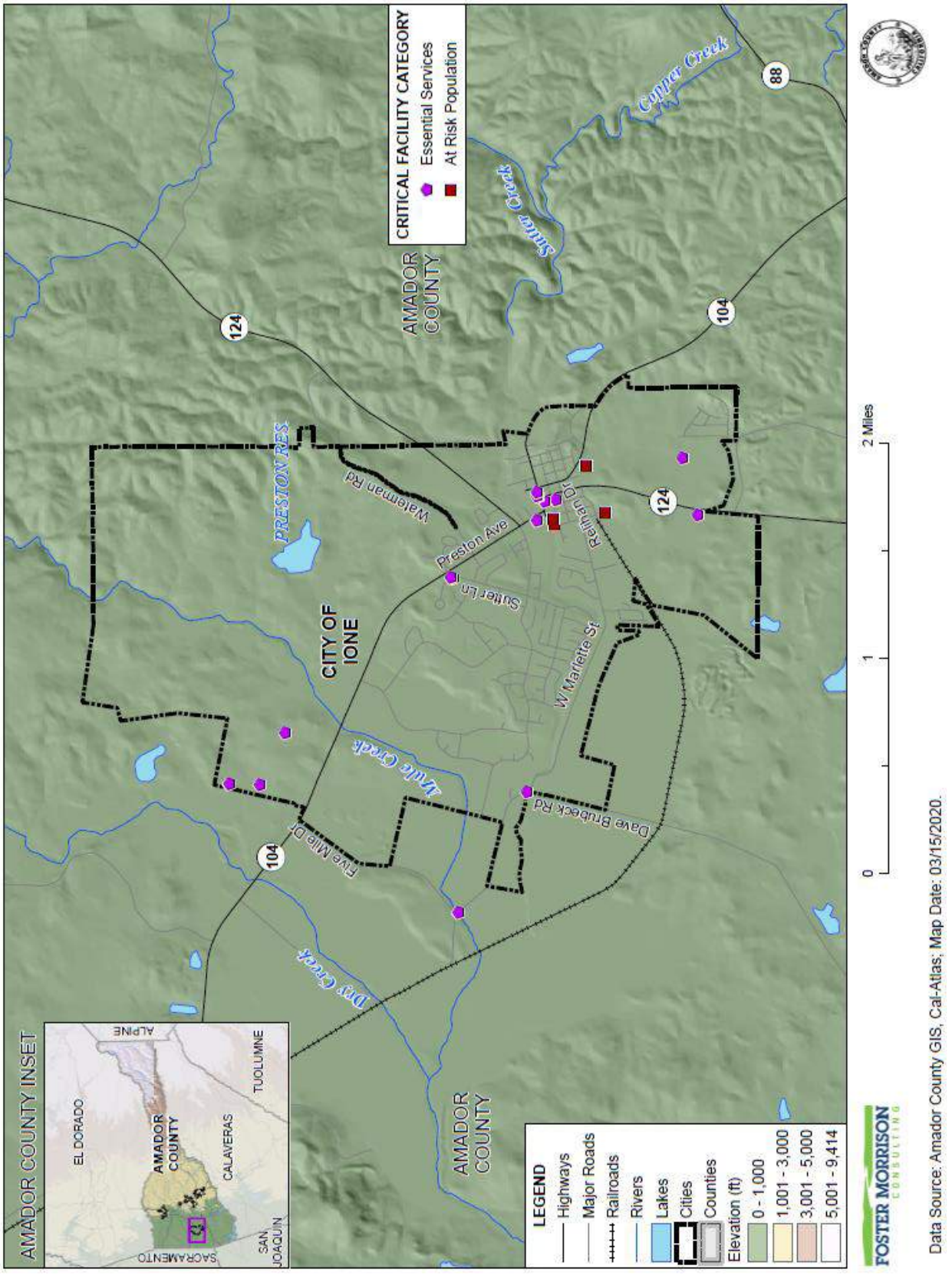


Table B-7 City of Ione – Critical Facility Summary

Critical Facility Category	Facility Count
Essential Services	14
At Risk Population	4
City of Ione Total	**17**

Source: Amador County GIS

Table B-8 City of Ione – Critical Facilities by Facility Category and Type

Critical Facility Category	Facility Type	Facility Count
Essential Services	Bridge	1
	Clinic	1
	EMS Station	2
	Evacuation Shelter	1
	Fire Station	2
	Library	1
	Police Station	1
	Post Office	1
	Power Substation	2
	Prison	1
	Public Administration Building	1
	Total	**14**
At Risk Population	School	4
	Total	**4**
City of Ione Total		**18**

Source: Amador County GIS

With respect to the critical facilities for Ione, the Mule Creek State Prison site also includes the Old Preston Youth Prison. In addition, the Cal Fire Training Academy located at 4501 CA-104 in Ione is not mapped, but should be considered a critical facility.

Natural Resources

Natural resources are unique to the City and are difficult to replace. Should a natural disaster occur, these species and locations are at risk.

Ione is located at the juncture of two major California vegetation zones: the Lower Sonoran Zone and the Upper Sonoran Zone. According to the California Natural Diversity Database (CNDDB) and the U.S. Fish and Wildlife Service (USFWS), 37 special-status species have the potential to occur within Amador County. Of these, five have been recorded within the Ione, California, quadrangle.

Ione manzanita (*Arctostaphylos myrtifolia*), Ione buckwheat (*Erigonum apricum var. apricum*), Bisbee Peak rush rose (*Heliantehmum suffrutescens*), and Parry's horkelia (*Horkelia parryi*) have all been

identified in the Ione, California, quadrangle. Ione manzanita (federally threatened), Bisbee Peak rush-rose (CNPS List 3), and Parry's horkelia (federal species of concern) have been found within the Planning Area. Ione buckwheat and Irish Hill buckwheat (*Erigonum apricum var prostratum*), also known to occur in Amador County, are both federally proposed endangered species and are listed as endangered by the state of California. Of these species, the California Native Plant Society (CNPS) has deemed Ione manzanita, Ione buckwheat, Irish Hill buckwheat, and Parry's horkelia as rare or endangered in California and elsewhere. Bisbee Peak rush-rose is a CNPS List 3 species. More information is needed to determine whether protection of this species is warranted.

There are wetlands located in the City. These wetlands have been mapped and tabulated. Figure B-3 shows the wetlands locations in the City. Table B-9 delineates the types, counts, and acreages of wetlands in the City.

Figure B-3 City of Ione – Wetlands Locations

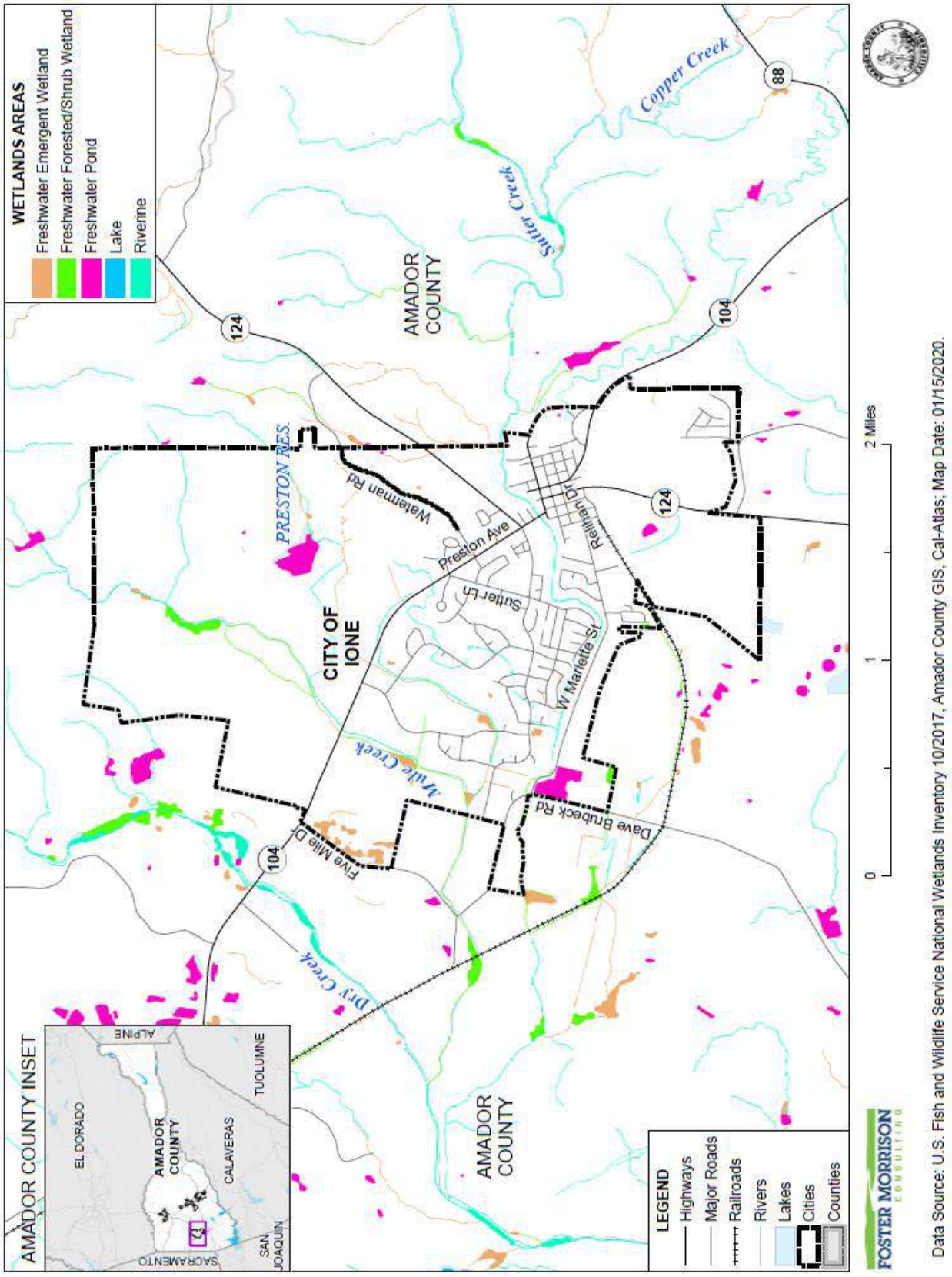


Table B-9 City of Ione– Wetlands Area Types and Counts

Wetlands Area Type	Wetlands Count	Wetlands Area (in Acres)
Freshwater Emergent Wetland	30	28.90
Freshwater Forested/Shrub Wetland	15	15.73
Freshwater Pond	8	26.20
Lake	0	0
Riverine	18	24.00
Ione Total	**71**	**94.83**

Source: US Fish and Wildlife Service

Historic and Cultural Resources

Historic and cultural resources are difficult to replace, and special care is needed when rebuilding or improvements are necessary. Should a natural disaster occur, these properties and locations are at risk.

The City of Ione has a 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. 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. These requirements are detailed in Section 4.3.1 of the Base Plan. Table B-10 lists the historical buildings in the City.

Table B-10 Amador County Planning Area – Historical Resources

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City/ Community
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

Source: California Department of Parks and Recreation Office of Historic Preservation, http://ohp.parks.ca.gov/

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.

Growth and Development Trends

As part of the planning process, the HMPC looked at changes in growth and development, both past and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability over time. Information from the City of Ione General Plan Housing Element, the California Department of Finance, and the US Census Bureau form the basis of this discussion.

Historic Population Trends and Current Population

Population growth can increase the number of people living in hazard prone areas. Ione has generally seen varying levels of growth. Ione has seen growth rates as shown in Table B-11. The City saw large growth periods in the 1960s and in the 1990s, a small period of loss in the 1980s, and moderate growth since 2000. However, because of a high prison population incarcerated in the two state correctional facilities in the City, Mule Creek State Prison and Preston School of Industry, this is not a true representation of the City's growth.

Table B-11 City of Ione – Population Changes Since 1960

Year	Population	Change	% Change
1960	1,118	–	–
1970	2,369	1,251	111.9%
1980	2,207	-162	-6.8%
1990	6,516	4,309	195.2%
2000	7,129	613	9.4%
2010[1]	7,918	789	11.1%
2019[2]	7,991	73	0.9%

Source: [1]US Census Bureau, [2]California Department of Finance

Special Populations and Disadvantaged Communities

There are certain populations in the City that are at greater risk to hazards, due to circumstances beyond their control. These populations in the City present a unique challenge when natural hazards arise.

Vulnerable populations in the City of Ione are primarily located in the Jose's Apartment Complex located off of North Arroyo Seco. This property is located next to Sutter Creek, but the 2016 FIRM map shows the vast majority of the property is located outside the 100-year floodplain. The Ione Apartments, located on South Church Street, also has vulnerable residents living in the facility.

Land Use

State planning law requires that the land use element of a general plan include a statement of the standard population density, building intensity, and allowed uses for the various land use designations in the plan (Government Code Section 65302(a)). The City's land use designations are generally described below and

mapped on the Land Use Diagram (Figure B-4). The Ione Municipal Code provides detailed land use and development standards for development.

Development since 2014 Plan

As discussed in Section 4.3.1 of the Base Plan, future development has occurred in the City since the last plan. Some of this has occurred in hazard prone areas. The Ione Building Department tracked total building permits issued since 2014 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table B-12 and Table B-13.

Table B-12 City of Ione – Total Development Since 2014

Property Use	2015	2016	2017	2018	2019
Agricultural	5	15	35	89	59
Commercial	0	0	0	0	0
Industrial	0	0	0	0	0
Residential	0	0	0	0	0
Unknown	**5**	**15**	**35**	**89**	**59**
Total	5	15	35	89	59

Source: Ione Building Department

Table B-13 City of Ione – Development in Hazard Areas since 2014

Property Use	1% Annual Chance Flood	Landslide Susceptibility Area	Wildfire Risk Area[1]	Other
Agricultural	0	0	0	0
Commercial	0	0	0	0
Industrial	0	0	0	0
Residential	0	0	0	0
Unknown	0	0	0	0
Total	**0**	**0**	**0**	**0**

Source: Ione Building Department

[1]Moderate or higher wildfire risk area

Future Development

A discussion of future development is included below. Future development is important to hazard mitigation planning. Ensuring that future development does not place more people and property into known hazard zones is one of the goals of mitigation planning.

In 2009, the City updated its General Plan, the policy document guiding land use planning and services within the City. The policies are regulations of the General Plan are limited to the City's incorporated limits; however, the City projects future, desired land uses outside of its boundary through the use of its General Plan Planning Area.

While the majority of land in the General Plan Planning Area is currently undeveloped, revitalization of existing residential and commercial areas is a significant priority in Ione. The City is working to establish incentives and programs for redevelopment/infill development within existing Ione.

The future land use plan for Ione is shown in the Land Use Maps (Figure B-4 and Figure B-5). The maps graphically illustrate the desired land uses for each parcel in the City and the General Plan Planning Area. Although uses are plotted for all property within the Planning Area, only land within the jurisdiction of the City is regulated by these land uses.

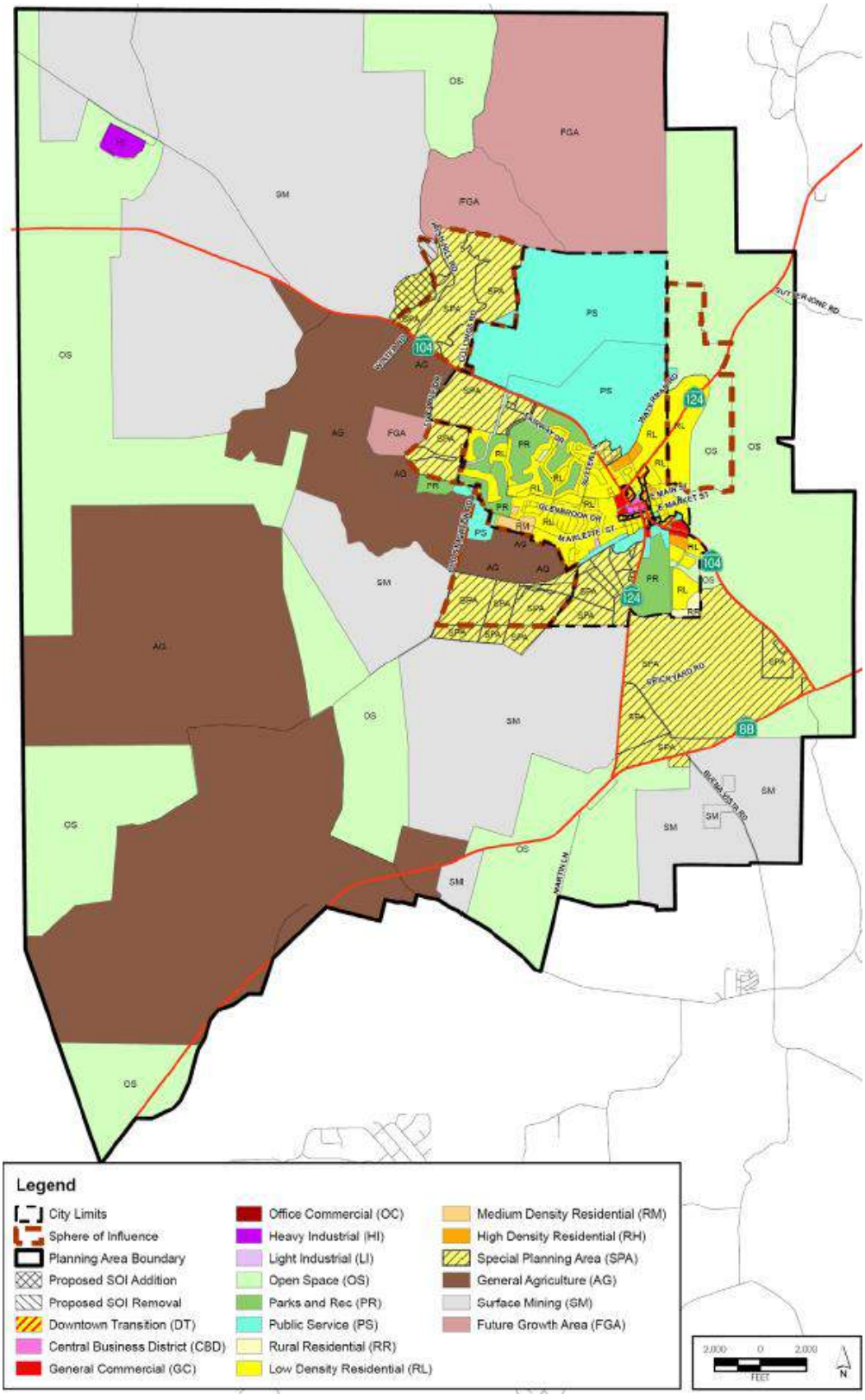
Figure B-4 illustrates the General Plan land use designations for the General Plan Planning Area. This map is parcel based with a specific land use category applied to each parcel. Subsequent zoning and new development/redevelopment must comply with the General Plan land use designation.

The Special Planning Area designation on Figure B-4 and Figure B-5 represents potential areas of new growth within Ione. These areas require a more specific level of policy direction to direct future growth, protect the unique characteristics of each area, and guide future development. A Special Planning Area (SPA) includes a mixture of residential uses (at varying densities), commercial activities, parks, and other uses as described in text and/or graphics within the General Plan. The exact land plan for the SPA(s) is to be created and refined through the adoption of a Specific Plan or Planned Development Master Plan. Development must be approved by the Planning Commission and the City Council.

The Future Growth Area designation on Figure B-4 and Figure B-5 represents potential areas of new growth. An area identified as a Future Growth Area (FGA) has the potential for future development after the majority of existing land designated in the General Plan for residential use has been developed or entitled. The City may accept an application for development of an FGA at an earlier point if development of the FGA creates a significant public benefit for Ione that could not be secured through development of other property within the City or its adopted Sphere of Influence. The General Plan includes basic policies and a vision for the FGAs, which applications must be consistent with, but will require a General Plan Amendment to fully adopt. These areas require a more specific level of policy direction, such as being comprehensively planned and developed through the use of Specific Plans or Planned Developments. As such, growth in this area must be approved by the Planning Commission and the City Council.

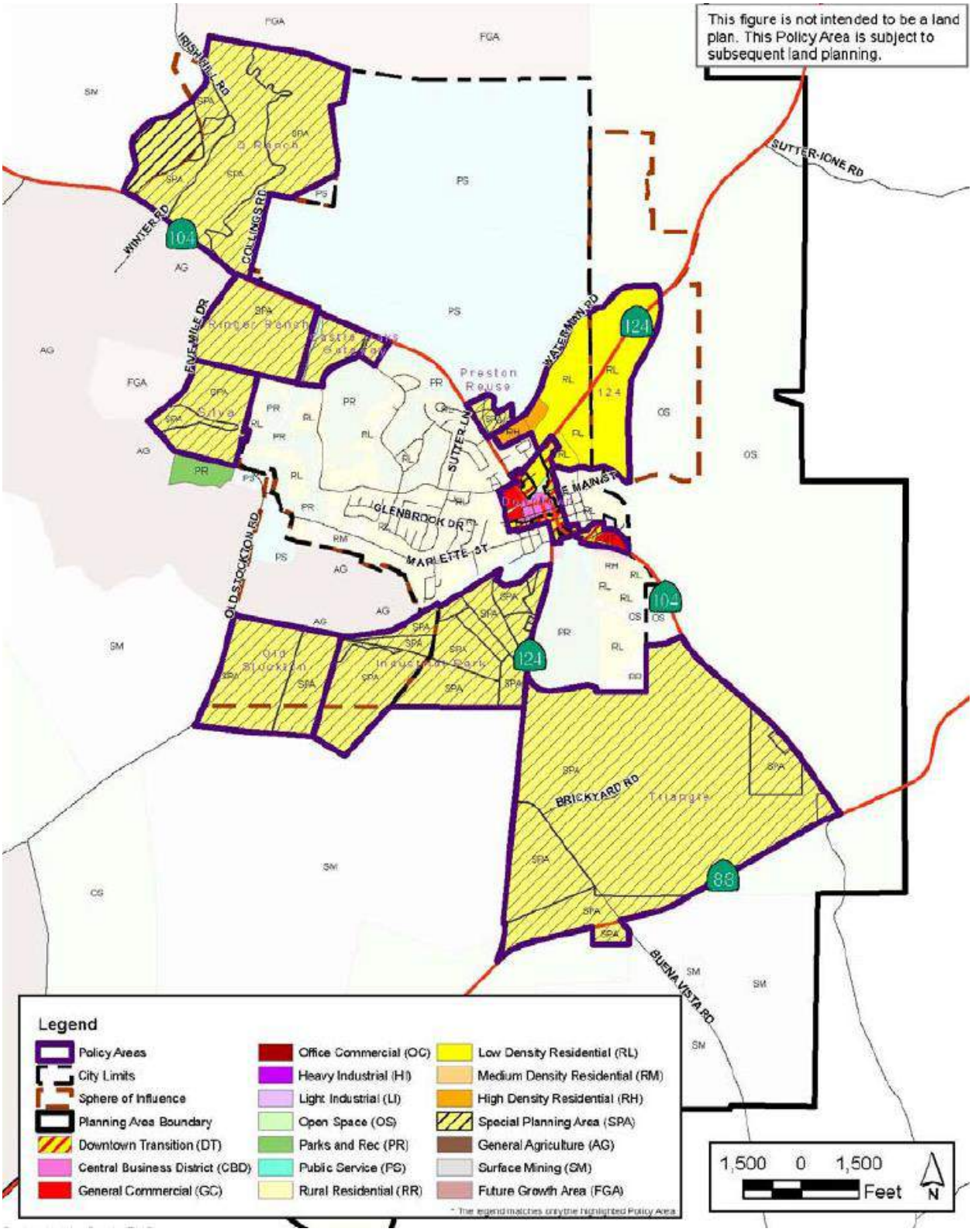
Figure B-5 identifies 10 individual Policy Areas within the General Plan Planning Area with unique characteristics/features that warrant more detailed planning efforts and specific policies. The Policy Areas have been established based on several criteria, including existing, proposed, or approved project boundaries; location within the General Plan Planning Area; ownership; type of existing or proposed land uses; distinctive issues; and geographic or environmental features. More information on these areas can be found on Figure B-6.

Figure B-4 City of Ione – Future Land Use



Source: City of Ione 2009 General Plan Land Use Element

Figure B-5 City of Ione – Policy Use Areas



Source: City of Ione 2009 General Plan Land Use Element

Figure B-6 City of Ione – Policy Area Development Potential

Policy Area	Acres (Estimate)	Dwelling Units	Commercial-Office Sq. Ft.	Commercial-Retail Sq. Ft.	Industrial Sq. Ft.	Average Residential Density
Castle Oaks Gateway	52	210	See Commercial-Retail	70,000 (retail & office total)	0	5.0 for RL; 12.0 for RM; 20.0 for RH
Downtown	75	--	--**	--**	--	--
Industrial Park	348	--	2,012,472	1,439,658	6,137,604	--
Old Stockton	190	119	--	0	0	1.0
Preston Reuse	17	25	760,000	--	0	5.0
Q Ranch	439	850	--	0	0	1.0 – 2.0 for RR, 5.0 for RL, 12.0 for RM
Ringer Ranch	139	670	See Commercial-Retail	50,000 (retail & office total)	0	5.0
Silva	105	552	See Commercial-Retail	20,000 (retail & office total)	0	5.0
124 Corridor	247	1,176 RL 326 RH	--	0	0	5.0 for RL; 20.0 for RH
Triangle	990	0	2,450,000	610,000	4,170,000	--

Source: City of Ione 2009 General Plan Land Use Element

* Note: This table represents maximum development potential for each Policy Area. Each Policy Area may have all of the development listed in the row corresponding to the Policy Area.

**Commercial Office and Commercial Retail are located in the Downtown but not quantified in this table.

Houses are currently being constructed in the Wildflower and Castle Oaks subdivisions. The Wildflower subdivision consists of relatively flat ground. However, the east end of Unit 5 sits on top of a hill with a steep slope abutting homes in Units 3 and 4. Soil disturbance and heavy rains could lead to erosion of the hillside if proper soil stabilization measures are not implemented during construction or after the homes are sold to private property owners. Soils could also be impacted by seismic events too.

The Castle Oaks development is moving forward with the constructing remaining villages. Villages 8 and 10 are located next to Mule Creek and while the individual parcels are out of the flood zone, there is still a possibility that flooding during storm events could occur. Future growth in Ione, i.e. properties in the City's "Sphere of Influence," will be constructed in areas that have the potential to be impacted by Dry Creek and Mule Creek.

More general information on growth and development in Amador County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Amador County Vulnerability and Assets at Risk of the Base Plan.

GIS Analysis

Using GIS, the following methodology was used in determining parcel counts and acreages with future development projects in the City of Ione. Future development areas in the City came from two sources.

- Future Development Areas – Ione provided 10 mapped areas where development possibilities for the City exist. This came from the General Plan, as discussed above.
- Sphere of Influence (SOI) – Amador County LAFCO provided the SOI in mapped format for the City.

Using the GIS parcel spatial file for each of these areas, the 10 areas and 263 parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure B-7 shows the locations of future development areas the City is planning to develop in both the Future Development Areas and the SOI. Table B-14 shows the parcels and acreages of each future development area in the City, broken out by Future Development Areas and Sphere of Influence. As seen on this figure, these areas overlap. In the table, the Future Development Areas are shown in their full acreages, while the SOI acreages in the table are the remainder of the SOI once the Future Development Areas have been subtracted from them.

Figure B-7 City of Ione – SOI and Future Development Areas

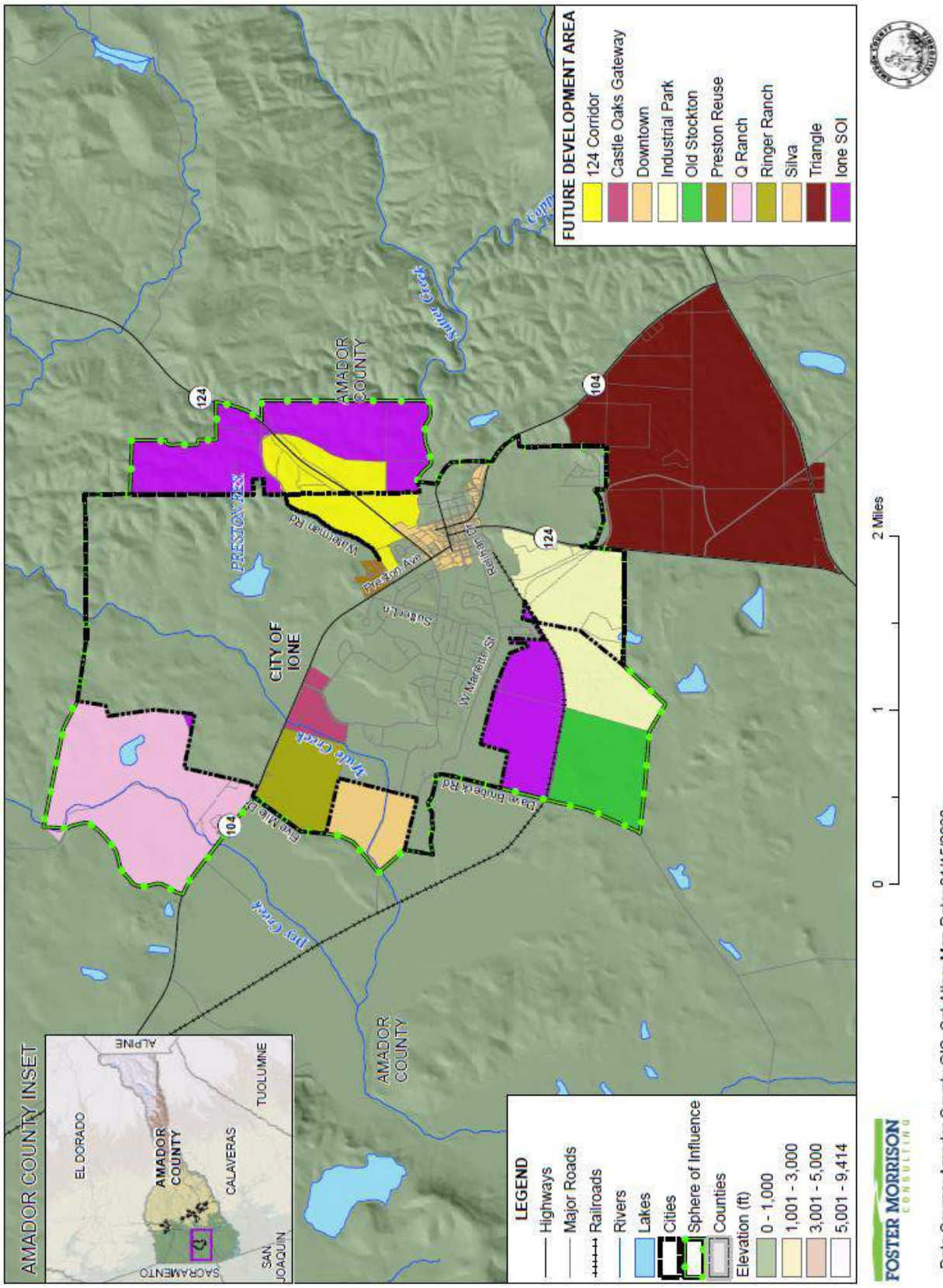


Table B-14 City of Ione – Future Development Parcels and Acreages in SOI and Future Development Areas

Future Development	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
124 Corridor	9	2	7	245.20	35.69	209.50
Castle Oaks Gateway	5	2	3	51.75	20.85	30.91
Downtown	184	144	40	69.95	40.03	29.91
Industrial Park	9	4	5	339.47	175.79	163.68
Old Stockton	1	0	1	183.16	0	183.16
Preston Reuse	1	0	1	16.88	0	16.88
Q Ranch	5	5	0	508.90	508.90	0
Ringer Ranch	2	2	0	133.92	133.92	0
Silva	2	1	1	110.40	46.86	63.54
Triangle	26	7	19	981.89	62.07	919.82
Ione SOI	19	9	10	589.81	170.42	419.40
Grand Total	**263**	**176**	**87**	**3,231.34**	**1,194.54**	**2,036.79**

Source: City of Ione, Amador County LAFCO

B.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table B-5 as high or medium significance hazards. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Amador County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. 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 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.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Climate Change

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Climate change adaptation is a key priority of the State of California. The 2018 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.

In Amador County and the City, the HMPC noted that each year it seems to get a bit warmer and snow seems to start at higher levels. It was also noted that 2017 was one of the wettest years ever.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the City, Amador County, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, 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

Climate change has never been directly linked to any declared disasters. While the City noted that climate change is of concern, no specific impacts of climate change could be recalled. The City and HMPC members noted that the strength of storms does seem to be increasing and the temperatures seem to be getting hotter.

Vulnerability to Climate Change

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the

unavoidable consequences of climate change. California's APG: 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. 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. This information can be used to guide climate adaptation planning in the City and Amador County Planning Area.

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra region in which the Amador County Planning Area is part of:

- Temperature increases
- Decreased precipitation
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

Future Development

The City 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. For example, interior western and southwestern states may experience an exodus of population due to challenges in adapting to heat even more extreme than that which is projected to occur here. While there are currently no formal studies of specific migration patterns expected to impact the City and 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.

Ione, like other communities, will need to adapt in order to comply with future state and federal mandates. This will include reducing the City's carbon footprint reducing dependence on fossil fuels. The City is currently in the process of installing a solar farm on property it owns by the Tertiary Plan/ Corp. Yard and the power that will be generated there will be used to power the Tertiary Plant, the City's Corp. Yard, and the City's waste water treatment plant. The City anticipates significant cost saving over time. The City is also looking to adding solar panels to the roofs of City building in an effort to reduce the City's carbon footprint and to reduce the City's electric costs.

Drought & Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Drought is a complex issue involving 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. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the City, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages and for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the City and the County are shown in Section 4.2.11 of the Base Plan.

Past Occurrences

Since drought is a regional phenomenon, past occurrences of drought for the City are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.2.11 of the Base Plan.

Vulnerability to Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the City, 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.

Impacts

The vulnerability of the City to drought is City-wide, 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. The increased dry fuels and fuel loads associated with drought conditions can also 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.

Other qualitative impacts associated with drought in the planning area are those related to water intensive activities such as, municipal usage, commerce, tourism, recreation, and agricultural use. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

With more precipitation likely falling as rain instead of snow in the Sierra's, 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.

The City of Ione has adopted Water Efficient Landscaping Ordinances and encourages property owners to incorporate low maintenance landscaping practices. Some examples of low maintenance landscaping include removing sod and replacing it with a decorative rock lawn or installing artificial grass. Another landscaping alternative is to plants that thrive in an arid climate.

Future Development

As the population in the area continues to grow, so will the demand for water. The Amador Water Agency (AWA) provides water to the City through reliable surface water sources. However, population growth in the City will continue to increase the demand for water. Ongoing planning will be needed by the City and AWA to account for population growth and increased water demands.

In an effort to conserve water, the City will, at some point, need to examine implementing a requirement that all new subdivisions be constructed to allow for tertiary treated recycled effluent to be used to irrigate yards, much in the same way Castle Oaks Golf Course uses tertiary treated effluent to irrigate the golf course. Using tertiary treated water for irrigating yards is being used in larger cities in the southwestern part of the United States.

The City will need to work to encourage the State of California to construct more reservoirs to capture rain and snow runoff for later use. Ongoing planning activities will also need to focus on additional enclosed potable water storage tanks for consumer use and fire protection.

Earthquake (large damaging/small)

Likelihood of Future Occurrence– Unlikely/Occasional
Vulnerability–Low

Hazard Profile and Problem Description

Note: Though a low significance hazard for the City, due to its importance in the State of California, earthquake is profiled here. It is a low significance hazard for mitigation strategy planning purposes.

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.

The City noted that the east end of Wildflower Unit 5 (near Charles Howard Park in southern Ione) sits on top of a hill with a steep slope abutting homes in Units 3 and 4. Soil disturbance and heavy rains could lead to erosion of the hillside if proper soil stabilization measures are not implemented during construction or after the homes are sold to private property owners. Soils in this area could also be impacted by seismic events too.

Location and Extent

Since earthquakes are regional events, the whole of the City is at risk to earthquake. Ione and the surrounding area are at limited risk from significant seismic and geologic hazards. There are no known or inferred active faults within the City.

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, as discussed in Section 4.2.12 of the Base Plan. 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 (equivalent to 5.5 to 6.5 on the Richter Scale). During a Mercalli VII, most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. The City is located in an area where few earthquakes of significant magnitude occur, so both magnitude and intensity of earthquakes are expected to remain low. Seismic shaking maps for the area show Amador County and the City fall within a low to moderate shake risk. The City of Ione 2009 General Plan Noise and Safety Element noted that the nearest fault to the planning area is the Foothill Fault System, which is approximately 7 miles to the east. The Foothill Fault System is considered a potentially active fault capable of an earthquake with a magnitude of 6.5 on the Richter scale.

Past Occurrences

The City noted no past occurrences of earthquakes or that affected the City in any meaningful way. Citizens, however, have felt tremors from time to time, but no damage has been recorded.

Vulnerability to Earthquake

The combination of plate tectonics and associated California coastal mountain range building geology generates earthquake as a result of the periodic release of tectonic stresses. Amador County's mountainous terrain lies in the center of the North American and Pacific tectonic plate activity. There have been earthquakes as a result of this activity in the historic past, and there will continue to be earthquakes in the future of the California north coastal mountain region. Both the San Andreas Fault and the Sierra Frontal System faults poses possibly significant impacts to Amador County and the City as they have the capabilities of producing a quake.

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault; however, liquefaction can occur further from the source of the earthquake. In general, newer construction is more earthquake resistant than older construction due to enforcement of improved building codes. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions and associated liquefaction, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry (URM) and soft story buildings. The commercial buildings in the historic portion of Ione would fall into the unreinforced masonry category. There are about 35 buildings in the area. The buildings in the former Preston Youth Facility would also fall into that category. The buildings are still owned by the State of California. The Ione Apartments would fall into the soft story category.

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. The City of Ione is within the less hazardous Zone 3.

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable.

Impacts from Earthquake

Impacts from earthquake in the City will vary depending on the fault that the earthquake occurs on, the depth of the earthquake strike, and the intensity of shaking. Large events could cause damages to infrastructure, critical facilities, residential and commercial properties, and possible injuries or loss of life. The commercial buildings in the Downtown Ione Historic District and the Preston Castle would potentially suffer the most damage from an earthquake due to the age of these structures. The City would also have concerns about the structural integrity of the two bridges that crossed Sutter Creek. The first is located on Hwys 104/124.These highways are the primary routes in and out of the City. Having that bridge structurally compromised would significantly delay any emergency rescue and response efforts. The second bridge is located at Marlette and Five Mile Drive.

Earthquake Analysis

Due to the regional effects of an earthquake, a Hazus earthquake analysis was performed on a countywide basis. This can be found in Section 4.3.9 of the Base Plan. While these runs were not done specific to the City, maps showing damage in the County show greater areas of damage near the cities in the County. This

is because most models reflect that the greatest damage occurs in the built-out, populated areas of the County. The deterministic 6.7 Hayward Fault run showed minimal damage to the County and the City, while the probabilistic 7.0 earthquake scenario showed moderate to high damage to the County and the City.

Future Development

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. The City enforces the state building code, which mandates construction techniques that minimize seismic hazards. Future development in the City is subject to these building codes. The City continually adopts updated building codes to ensure that new development meets seismic requirements.

Flood: 100/500-Year

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–High

Hazard Profile and Problem Description

This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the County or in the City and have caused damages in the past. Flooding is a significant problem in Amador County and the City. Historically, the City has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred both within the 1% and 0.2% annual chance floodplains and in other localized areas.

As previously described in Section 4.2.13 of the Base Plan, the Amador County Planning Area and the City of Ione have been subject to historical flooding. Ione is traversed by several stream systems and is at risk to the 1% and 0.2% flood.

Location and Extent

The City of Ione is located in the Sacramento-San Joaquin Drainage Basin. Stream courses generally align southwest from the foothills to the Central Valley. Major streams in the area include Sutter Creek, which flows through the center of town, and Mule Creek, which is located at the western City limits. Both flow into Dry Creek west of the City. Dry Creek eventually drains into the Cosumnes River. The City of Ione's flood concerns occur mostly where portions of Sutter Creek flow through the City. The City of Ione has properties in the 1% and 0.2% annual chance flood zone as defined by the Federal Emergency Management Agency (FEMA). This is seen in Figure B-8.

Figure B-8 City of Ione – FEMA DFIRM Flood Zones

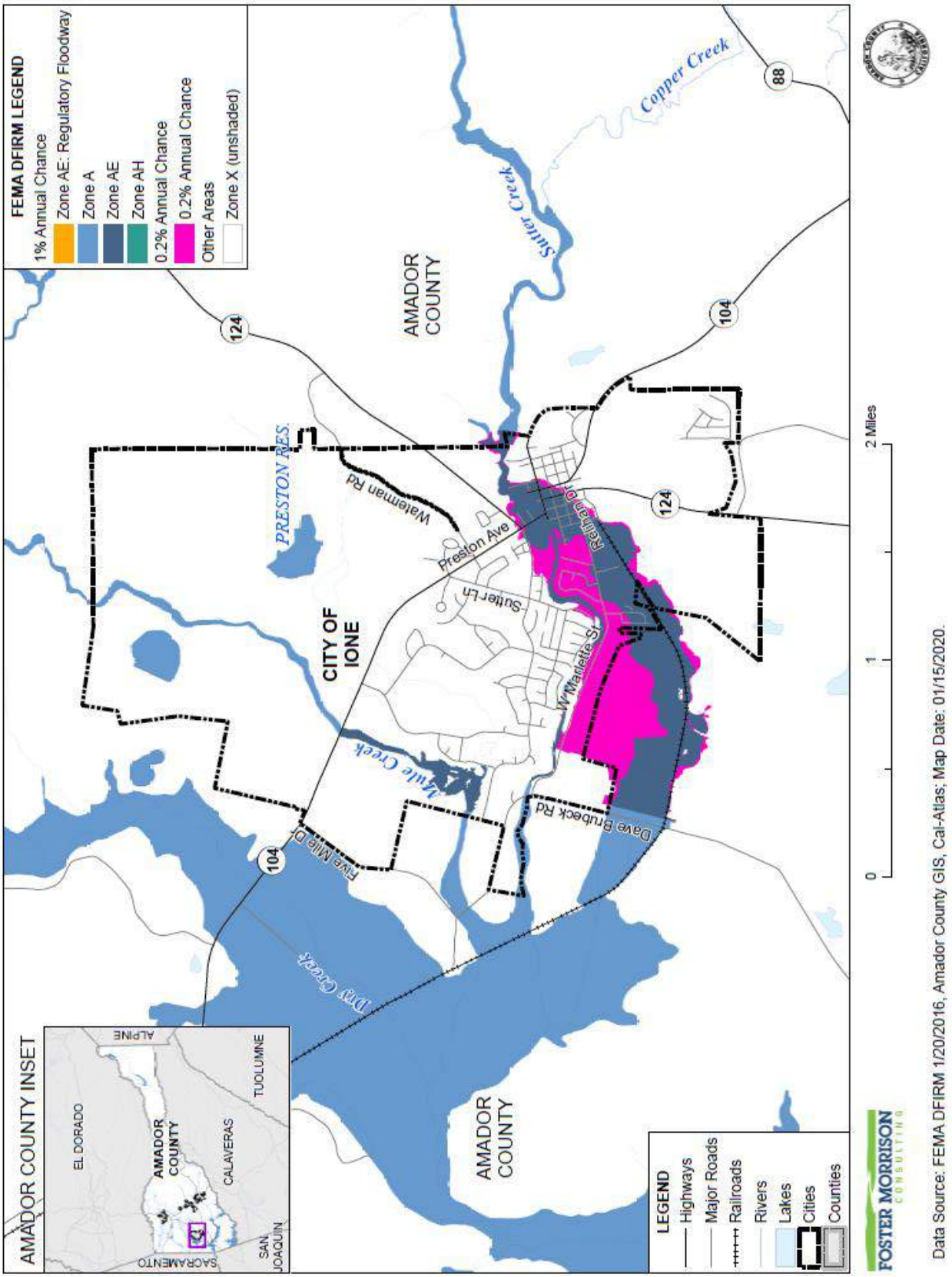


Table B-15 details the DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the City.

Table B-15 City of Ione– DFIRM Flood Hazard Zones

Flood Zone	Description	Flood Zone Present in City of Ione
A	100-year Flood: No base flood elevations provided	Y
AE	100-year Flood: Base flood elevations provided	Y
AE Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided	N
Shaded X	500-year Flood: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	Y
X (unshaded)	No flood hazard	Y

Source: FEMA

Additionally, flood extents can generally be measured in volume, velocity, and depths of flooding. Expected flood depths in the City vary, depending on the nature and extent of a flood event; specific depths are unknown. Flood durations in the City tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Flooding in the City tends to have a shorter speed of onset, due to the amount of water that flows through the City. Geographical flood extent from the FEMA DFIRMs is shown in Table B-16.

Table B-16 City of Ione – Geographical Flood Hazard Extents in FEMA DFIRM Flood Zones

Flood Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
1% Annual Chance	231	0.06%	75	0.05%	156	0.07%
0.2% Annual Chance	96	0.02%	76	0.05%	20	0.01%
Other Areas	2,494	0.64%	503	0.30%	1,991	0.89%
Total	**2,821**	**0.73%**	**655**	**0.40%**	**2,166**	**0.97%**

Source: Amador County 1/20/2016 DFIRM

*Percentage of total acres is the percent of total acres of the entire County Planning Area, not the total acres of the jurisdiction

Past Occurrences

A list of state and federal disaster declarations for Amador County from flooding is shown on Table B-17. These events also likely affected the City to some degree.

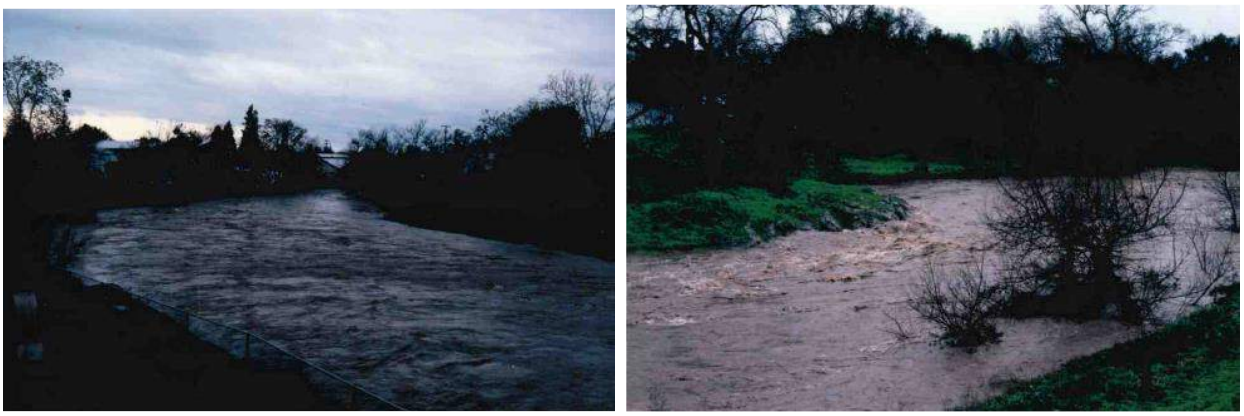
Table B-17 Amador County – State and Federal Disaster Declarations from Flood 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	15	1955, 1958, 1963, 1964, 1969, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1959, 1963 (twice), 1969, 1980, 1982, 1986, 1995, 1997, 1998

Source: Cal OES, FEMA

Flooding has been a documented hazard in Amador County and the City since the 1860s. The area bounded by Main Street, Highway 104, Washington Street, Highway 124, and El Dorado Street has historically experienced on-site flooding. The winter of 1984 to 1985 brought high water to Sutter Creek (see Figure B-9). Flows were generally contained within the river channel. During these times, the river was being dredged, allowing for higher flows.

Figure B-9 City of Ione – High Water in 1984/1985



Source: City of Ione

In 1997, Sutter Creek overflowed its banks, causing evacuations in flooded areas. This was the result of not dredging the Creek Bed. The pictures in Figure B-10 were taken prior to the crest, and do not show the highest point of flooding. Sutter Creek has many vertical banks within the City limits that are eroding and at risk of ultimately collapsing. The City recently rebuilt one area of the bank in order to save a backyard from destruction.

Figure B-10 City of Ione – 1997 Flooding

Source: City of Ione

In 2016, California received heavy rains and Sutter Creek was overflowing in the lower elevations of the City of Ione. The stream's current washed out property owner's stream banks along Sutter Creek, and an Amador Water Agency's pump station was damaged and made un-operable. Marlette Road, across from the City's wastewater treatment plant, was in danger of being undercut due to erosion of the stream bank. Areas of downtown Ione experienced localized flooding due to the storm drainage system not being able to handle all of the flow. Images of damage can be seen on Figure B-11.

Figure B-11 2016 Flooding (upper left and both lower) and Aftermath (upper right) in Ione

Source: City of Ione

Vulnerability to Flood

Floods have been a part of the City's historical past and will continue to be so in the future. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damages. Predominantly, the effects of flooding are generally confined to areas near the waterways of the City and County. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat. This threatens structures in the floodplain. Structures can also be damaged from trees falling as a result of water-saturated soils. Electrical power outages happen, and the interruption of power causes major problems. Loss of power is usually a precursor to 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. People may be swept away in floodwaters, causing injuries or deaths.

A member of the public and the HMPC noted that there are vulnerabilities to flooding in the City due to the patchwork of public agencies and private individuals who own land next to Sutter Creek. There are areas of the Creek that are overgrown with brush, trees, and other items that have fallen into the Creek that slow flows of water and compounds the flood problem during heavy storms. In periods of normal rainfall, no problems exist. During periods of high rainfall, water is not able to escape as quickly and can overflow the river channel, which can affect downtown Ione.

Impacts

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 as well as life safety issues. 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. Floodwaters can transport large objects downstream which can damage or remove stationary structures. 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. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Assets at Risk

Based on the vulnerability of Ione to the flood hazard, the sections that follow describes significant assets at risk in the City of Ione. This section includes the values at risk, flooded acres, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Ione. The methodology described in Section 4.3.10 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Table B-18 is a summary table for the

City of Ione. Parcel counts, values, estimated contents, and total values in the City are 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 B-19 breaks down Table B-18 and shows the property use, improved parcel count, improved values, estimated contents, and total values that fall within each floodplain in the City.

*Table B-18 City of Ione – Count and Value of Parcels at Risk in Summary DFIRM Flood Zones**

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard	219	174	$13,069,056	$30,051,560	$19,402,640	$62,523,256
0.2% Annual Chance Flood Hazard**	259	242	$17,214,720	$41,701,658	$23,452,756	$82,369,134
Other Areas	1,556	1,255	$116,143,574	$240,753,744	$119,582,358	$476,479,676
City of Ione Total	**2,034**	**1,671**	**$146,427,350**	**$312,506,962**	**$162,437,754**	**$621,372,066**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 B-19 City of Ione – Count and Values of Parcels at Risk by Detailed Flood Zone and 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 AE						
Agricultural	0	0	$0	$0	$0	$0
Commercial	46	43	$4,103,068	$8,753,726	$8,753,726	$21,610,520
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	9	0	$0	$0	$0	$0
Residential	154	131	$8,965,988	$21,297,834	$10,648,914	$40,912,736
Unknown	10	0	$0	$0	$0	$0
Zone AE Total	**218**	**173**	**$13,051,150**	**$29,955,577**	**$19,354,648**	**$62,361,375**
Zone A						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	1	1	$17,906.00	$95,983	$47,992	$161,881
Residential	0	0	$0	$0	$0	$0
Unknown	0	0	$0	$0	$0	$0

Flood Zone/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Zone A Total	**1**	**1**	**$17,906.00**	**$95,983**	**$47,992**	**$161,881**
1% Annual Chance Flood Hazard Total	**219**	**174**	**$13,069,056**	**$30,051,560**	**$19,402,640**	**$62,523,256**
0.2% Annual Chance Flood Hazard**						
Agricultural	1		$64,221	$0	$0	$64,221
Commercial	3	3	$2,004,117	$5,345,050	$5,345,050	$12,694,217
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	3	2	$30,146	$141,184	$0	$171,330
Residential	246	237	$15,116,236	$36,215,424	$18,107,706	$69,439,366
Unknown	6	0	$0	$0	$0	$0
0.2% Annual Chance Flood Hazard Total	**259**	**242**	**$17,214,720**	**$41,701,658**	**$23,452,756**	**$82,369,134**
Other Areas						
Agricultural	13	3	$6,763,710	$39,680	$39,680	$6,843,070
Commercial	17	16	$1,991,630	$3,920,440	$3,920,440	$9,832,510
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	119	17	$7,198,349	$5,549,168	$0	$12,747,517
Residential	1,376	1,219	$100,189,885	$231,244,456	$115,622,238	$447,056,579
Unknown	31	0	$0	$0	$0	$0
Other Areas Total	**1,556**	**1,255**	**$116,143,574**	**$240,753,744**	**$119,582,358**	**$476,479,676**
City of Ione Total	**2,034**	**1,671**	**$146,427,350**	**$312,506,962**	**$162,437,754**	**$621,372,066**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 B-20 summarizes Table B-19 above and shows City of Ione loss estimates and shows improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

*Table B-20 City of Ione – 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	219	174	$13,069,056	$30,051,560	$19,402,640	$49,454,200	$9,890,840	0.19%
0.2% Annual Chance Flood Hazard**	259	242	$17,214,720	$41,701,658	$23,452,756	$65,154,414	$13,030,883	0.25%
Grand Total	**478**	**416**	**$30,283,776**	**$71,753,218**	**$42,855,396**	**$114,608,614**	**$22,921,723**	**0.44%**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 Table B-19 and Table B-20, the City of Ione has 174 parcels and $49.5 million of structure and contents values or values in the 1% annual chance floodplain, and an additional 242 improved parcels and $65.2 million of structure and contents values in the 0.2% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the Base Plan, there is a1% chance in any given year of a flood event causing $9.9 million in damage and a 0.2% chance in any given year of a flood event causing $13.0 million in damage in the City of Ione. The loss ratio of 0.19% and 0.25% indicates that flood losses for 1% and 0.2% annual chance flooding, respectively, would be relatively easy to recover from.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the City in comparison to total area within the City limits. The same methodology, as discussed in Section 4.3.10 of the Base Plan, was used for the City of Ione as well as for the County as a whole. Table B-21 represents a detailed and summary analysis of total acres for each FEMA DFIRM flood zone in the City.

Table B-21 City of Ione – Flooded Acres

Flood Zone / Jurisdiction	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
1% Annual Chance Flood Hazard						
Zone A						
Agricultural	0	0.00%	0	0.00%	0	0.00%

Flood Zone / Jurisdiction	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
Commercial	0	0.00%	0	0.00%	0	0.00%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	85	3.02%	0	0.00%	85	3.93%
Residential	1	0.02%	1	0.08%	0	0.00%
Unknown	0	0.00%	0	0.00%	0	0.00%
Zone A Total	**86**	**3.04%**	**1**	**0.08%**	**85**	**3.93%**
Zone AE						
Agricultural	7	0.23%	0	0.03%	6	0.29%
Commercial	24	0.85%	23	3.48%	1	0.05%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	43	1.54%	0	0.06%	43	1.98%
Residential	61	2.16%	51	7.84%	10	0.45%
Unknown	11	0.38%	0	0.00%	11	0.50%
Zone AE Total	**146**	**5.16%**	**75**	**11.40%**	**71**	**3.27%**
1% Annual Chance Flood Hazard Total	**231**	**8.20%**	**75**	**11.48%**	**156**	**7.20%**
0.2% Annual Chance Flood Hazard						
Agricultural	5	0.18%	0	0.00%	5	0.23%
Commercial	19	0.68%	19	2.94%	0	0.00%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	4	0.15%	1	0.12%	4	0.16%
Residential	66	2.32%	56	8.61%	9	0.42%
Unknown	2	0.07%	0	0.00%	2	0.09%
0.2% Annual Chance Flood Hazard Total	**96**	**3.40%**	**76**	**11.67%**	**20**	**0.91%**
Other Areas						
Zone X (unshaded)						
Agricultural	312	11.04%	146	22.27%	166	7.65%
Commercial	32	1.12%	29	4.50%	2	0.11%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	1,707	60.50%	33	5.02%	1,674	77.27%
Residential	429	15.20%	295	45.07%	134	6.18%
Unknown	15	0.53%			15	0.69%

Flood Zone / Jurisdiction	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
Zone X (unshaded) Total	2,494	88.40%	503	76.85%	1,991	91.89%
Other Areas Total	**2,494**	**88.40%**	**503**	**76.85%**	**1,991**	**91.89%**
City of Ione Total	**2,821**	**100.00%**	**655**	**100.00%**	**2,166**	**100.00%**

Source: FEMA DFIRM 1/20/2016
*Percentage of the City of Ione

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the flood zones were counted and multiplied by the 2010 Census Bureau average household factors for Ione – 2.56. According to this analysis, there is a total population of 335 and 60 residents of the City at risk to flooding in the 1% and 0.2% annual chance floodplains, respectively. This is shown in Table B-22.

Table B-22 City of Ione – Count of Improved Residential Parcels and Population by Flood Zone

	1 % Annual Chance Flooding		0.2% Annual Chance Flooding	
Jurisdiction	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Ione	131	335	237	607

Source: FEMA DFIRM 1/20/2016, Amador County 12/31/2018 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory within Ione in DFIRM flood zones. GIS was used to determine whether the critical facility locations intersect a DFIRM flood zone, and if so, which zone it intersects. Details of critical facilities in mapped DFIRM flood zones in the City of Ione are shown in Figure B-12 and detailed in Table B-23. Details of critical facility definition, type, name and address and jurisdiction by DFIRM flood zone are listed in Appendix F.

Figure B-12 City of Ione – Critical Facilities in DFIRM Flood Zones

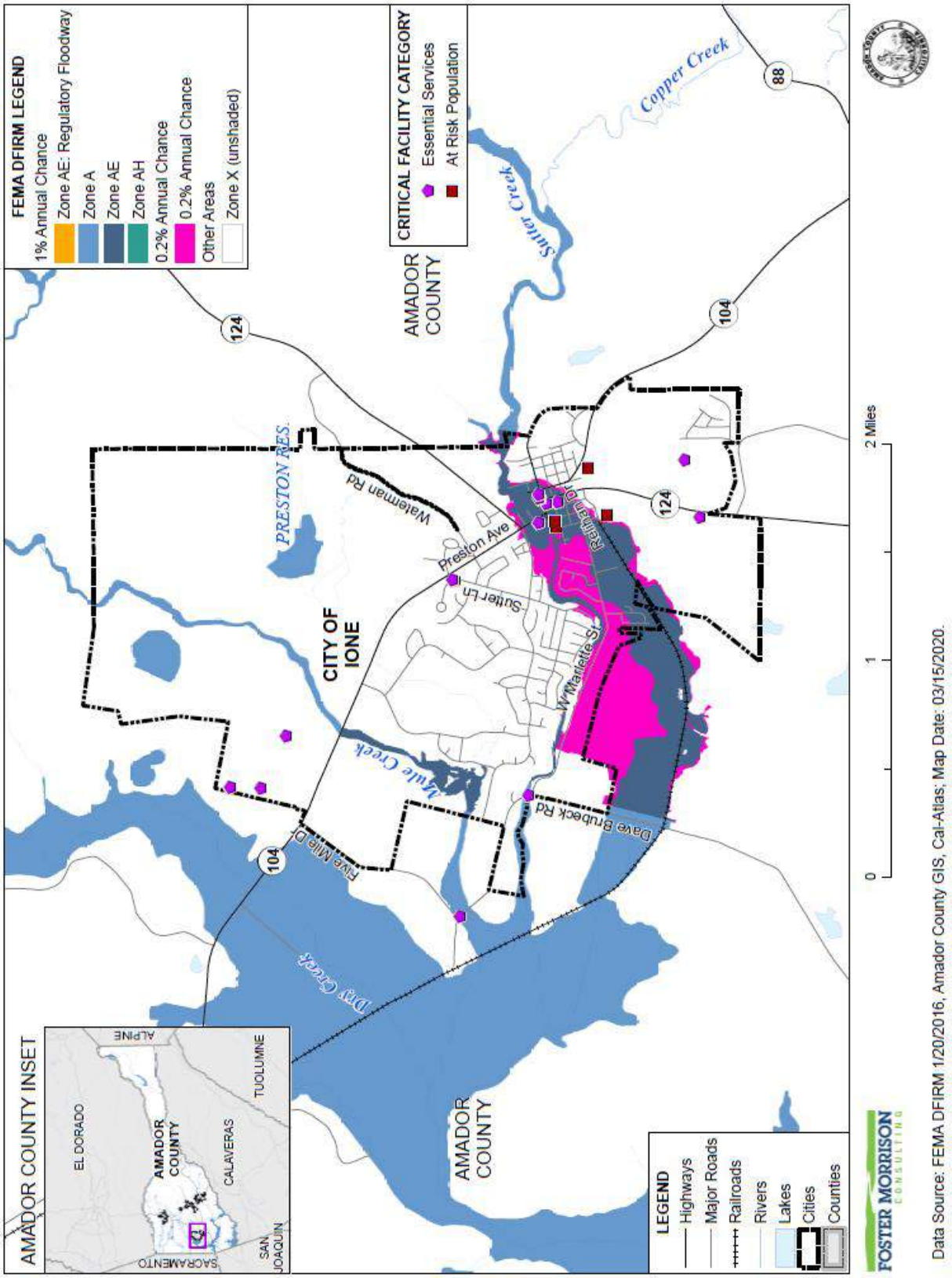


Table B-23 City of Ione – Critical Facilities in DFIRM Flood Zones

Flood Zone	Critical Facility Category/Critical Facility Type	Facility Count
1% Annual Chance Flood Hazard		
Zone A	**Essential Services**	
	Bridge	1
	Essential Services Total	**1**
	Zone A Total	**1**
Zone AE	**Essential Services**	
	Clinic	1
	Fire Station	1
	Library	1
	Police Station	1
	Post Office	1
	Public Administration Building	1
	Essential Services Total	**6**
	At Risk Population	
	School	2
	At Risk Population Total	**2**
	Zone AE Total	**8**
1% Annual Chance Flood Hazard Total		**9**
Other Areas		
Zone X (unshaded)	**Essential Services**	
	EMS Station	2
	Evacuation Shelter	1
	Fire Station	1
	Power Substation	2
	Prison	1
	Essential Services Total	**7**
	At Risk Population	
	School	2
	At Risk Population Total	**2**
	Zone X (unshaded) Total	**9**
Other Areas Total		**9**
City of Ione Total		**18**

Source: FEMA DFIRM 1/20/2016, Amador County GIS

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Ione joined the National Flood Insurance Program (NFIP) on July 8, 1980. The City does not participate in the CRS program. NFIP data indicates that as of March 2, 2020, there were 69 flood insurance policies in force in the City with $18,706,500 of coverage and $48,177 in premiums. There have been 6 historical claims for flood losses totaling $3,692. 5 were for pre-FIRM structures, while 1 was for a post-FIRM structure. 3 of these losses were in the A zone, while the other 3 was in the B, C, or X zones. NFIP data further indicates that there are 0 repetitive loss (RL) and 0 severe repetitive loss buildings in the City.

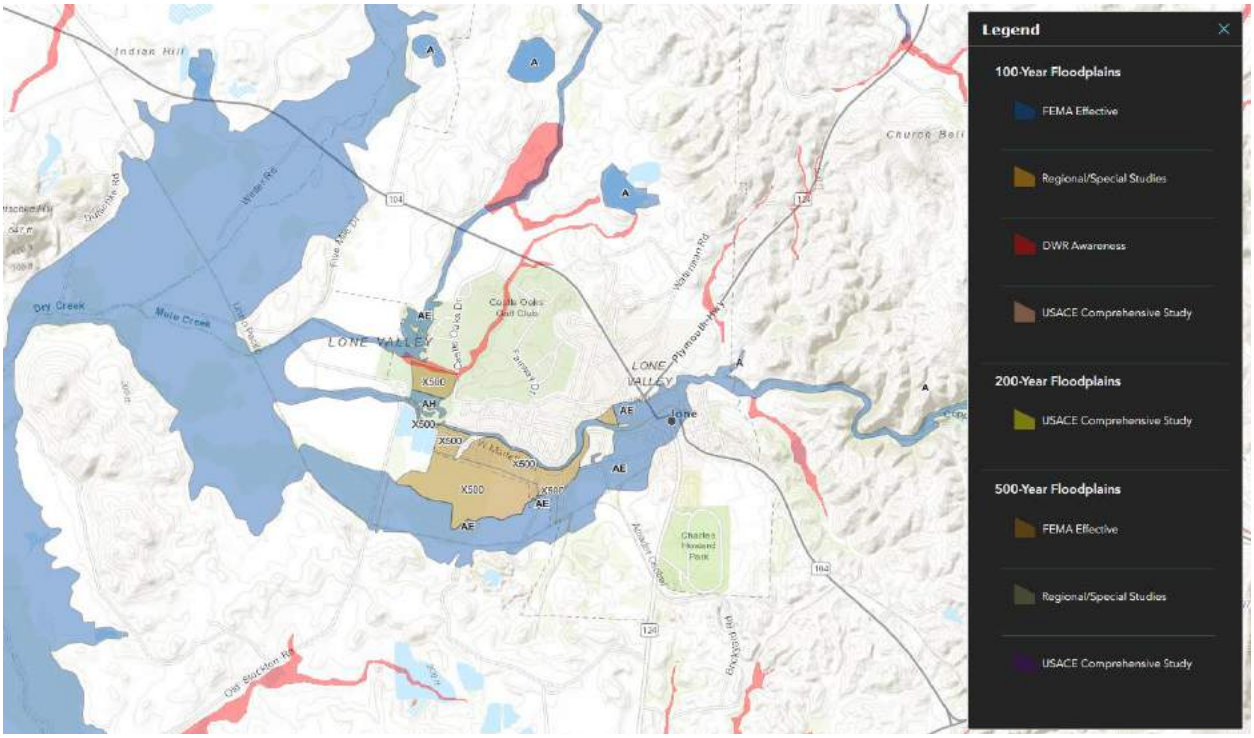
California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in Amador County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Nevada-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 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-(as applicable), and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year 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 City than that provided in the FEMA DFIRMs. The BAM map for Ione is shown in Figure B-13.

Figure B-13 City of Ione – Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 1%, Orange – Local 1% (developed from local agencies), Red – DWR 1%r (Awareness floodplains identify the 1% annual chance flood hazard areas using approximate assessment procedures.), Pink – USACE 1% (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 0.5% (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 0.2%, Grey – Local 0.2% (developed from local agencies), Purple – USACE 0.2%(2002 Sac and San Joaquin River Basins Comp Study).

Future Development

The potential for flooding may increase as floodwaters are channeled due to land development. Such changes can exacerbate flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. Floodplain modeling and master planning should be based on build out property use to ensure that all new development remains safe from future flooding. While local floodplain management, stormwater management, and water quality regulations and policies address these changes on a site-by-site basis, their cumulative effects can have a negative impact on the overall floodplain.

The City's floodplain ordinance prohibits development in the floodplain unless certain flood elevation and other standards are met. If new development is approved in the floodplain, it must be developed a minimum of 2 feet above base flood elevation, pursuant to City ordinance.

GIS Analysis

The City General Plan Future Development Areas and the Amador County LAFCO SOI were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these 10 areas, the 263 parcels within the SOI and area associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial

layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure B-14 shows the locations of future development areas in both the Future Development Areas and the SOI overlayed on the FEMA DFIRM. Table B-24 shows the parcels and acreages of each future development area in the City by DFIRM floodzones, broken out by Future Development Areas and Sphere of Influence.

Note: As seen on this figure, the Future Development Areas and SOI overlap. In the table, the Future Development Areas are shown in their full acreages, while the SOI acreages in the table are the remainder of the SOI once the Future Development Areas have been subtracted from them.

Figure B-14 City of Ione – Future Development Areas and SOI in DFIRM Flood Zones

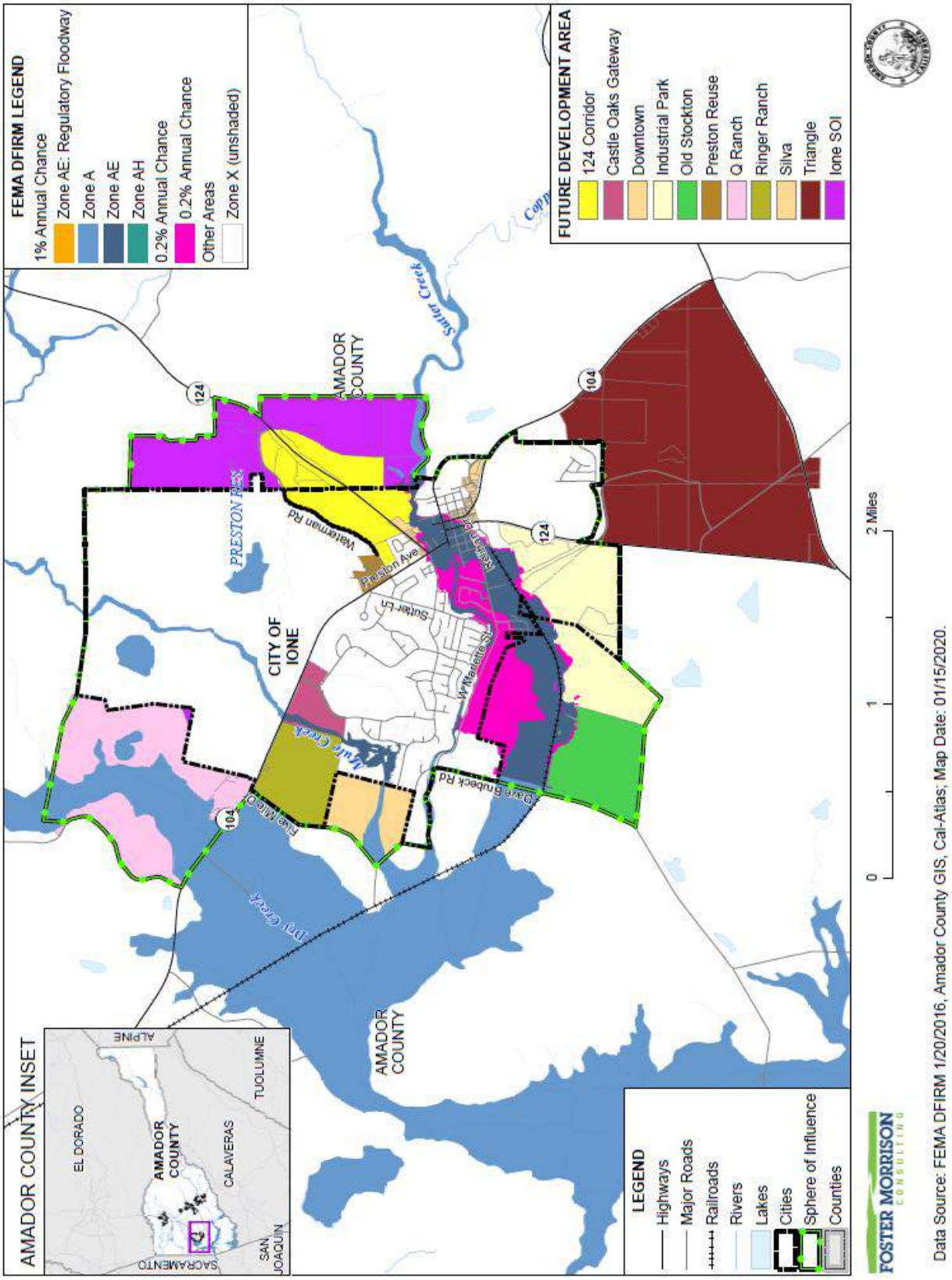


Table B-24 City of Ione – SOI and Potential Development Area Parcels and Acreage in DFIRM Flood Zones

Future Development Areas/ Flood Zones	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
124 Corridor						
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	9	2	7	245.20	35.69	209.50
124 Corridor Total	**9**	**2**	**7**	**245.20**	**35.69**	**209.50**
Castle Oaks Gateway						
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	5	2	3	51.75	20.85	30.91
Castle Oaks Gateway Total	**5**	**2**	**3**	**51.75**	**20.85**	**30.91**
Downtown						
1% Annual Chance Flood Hazard	99	81	18	27.05	23.53	3.52
0.2% Annual Chance Flood Hazard	18	17	1	4.18	3.88	0.30
Other Areas	67	46	21	38.72	12.62	26.10
Downtown Total	**184**	**144**	**40**	**69.95**	**40.03**	**29.91**
Industrial Park						
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	9	4	5	339.47	175.79	163.68

Future Development Areas/ Flood Zones	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Industrial Park Total	**9**	**4**	**5**	**339.47**	**175.79**	**163.68**
Old Stockton						
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	1	0	1	183.16	0	183.16
Old Stockton Total	**1**	**0**	**1**	**183.16**	**0**	**183.16**
Preston Reuse						
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	1	0	1	16.88	0	16.88
Preston Reuse Total	**1**	**0**	**1**	**16.88**	**0**	**16.88**
Q Ranch						
1% Annual Chance Flood Hazard	1	1	0	287.54	287.54	0
0.2% Annual Chance Flood Hazard	0	0	0	0	0	0
Other Areas	4	4	0	221.36	221.36	0
Q Ranch Total	**5**	**5**	**0**	**508.90**	**508.90**	**0**
Ringer Ranch						
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	2	2	0	133.92	133.92	0
Ringer Ranch Total	**2**	**2**	**0**	**133.92**	**133.92**	**0**

Future Development Areas/ Flood Zones	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Silva						
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	2	1	1	110.40	46.86	63.54
Silva Total	**2**	**1**	**1**	**110.40**	**46.86**	**63.54**
Triangle						
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	26	7	19	981.89	62.07	919.82
Triangle Total	**26**	**7**	**19**	**981.89**	**62.07**	**919.82**
Ione SOI						
1% Annual Chance Flood Hazard	2	2	0	1.38	1.38	0
0.2% Annual Chance Flood Hazard	5	3	2	64.52	62.84	1.67
Other Areas	12	4	8	523.92	106.19	417.73
Ione SOI Total	**19**	**9**	**10**	**589.81**	**170.42**	**419.40**
Grand Total	**263**	**176**	**87**	**3,231.34**	**1,194.54**	**2,036.79**

Source: City of Ione, Amador County LAFCO, Amador County 1/20/2016 DFIRM

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Flooding occurs in areas other than the FEMA mapped 1% and 0.2% annual chance 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 County 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.

Location and Extent

The City of Ione is subject to localized flooding throughout the City. Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the City vary by location. Flood durations in the City tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Localized flooding in the City tends to have a shorter speed of onset, especially when antecedent rainfall has soaked the ground and reduced its capacity to absorb additional moisture. The primary areas of the City subject to localized flooding are the older areas south of Sutter Creek where local stormwater conveyance systems are minimal.

Past Occurrences

The City noted that localized flooding occurs throughout portions of the City annually. The City noted the following specific past occurrences of localized flooding:

In January of 1997, Sutter Creek over-topped its banks and all drains to Sutter Creek backed up. All of downtown Ione and along Marlette was flooded with flood waters of up to three feet. Street flooding, resulting from backwater from drainage outfall, was experienced at Springcreek 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.

In October and November of 2012, the HMPC noted that there was localized flooding of downtown Ione buildings due to localized flooding. Property damage occurred due to one to two feet of stormwater in buildings. Property damage costs were not available.

Castle Oaks Golf Course had flooding issues during the heavy rains that occurred in 2016.

Vulnerability to Localized Flooding

Historically, much of the growth in the City and County has occurred adjacent to streams, resulting in significant damages to property, and losses from disruption of community activities when the streams overflow. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff, both in areas adjacent to streams as well as in other areas of the City. The City tracks localized flooding areas. Affected localized flood areas identified by the City of Ione are summarized in Table B-25.

Table B-25 City of Ione – List of Localized Flooding Problem Areas

Area Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
W. Marlette Road	Yes			Yes		Yes	Yes

Area Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
Main Street	Yes			Yes			
Springcreek Drive	Yes					Yes	Yes
Five Mile Drive	Yes					Yes	Yes
Castle Oaks Golf Course	Yes			Yes			Yes

Source: City of Ione

Localized flooding issues occur along Sutter Creek and in other areas. A significant portion of storm water runoff affecting Ione originates from up country properties. The increased flow and velocity of the stream water coming down Sutter Creek restricts Ione's storm water system from discharging into the stream, which in turn causes localized flooding in the downtown areas of Ione. This issue is primarily associated with the older areas of Ione south of Sutter Creek. Sutter Creek also overflows it banks and floods portions of Springcreek Drive, West Marlette Road and Five Mile Drive during storm events.

Impacts

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.

Future Development

Future development in the City will add more impervious surfaces causing an increase in stormwater runoff and the continued need to drain these waters. The City will need to be proactive to ensure that increased development has proper siting and drainage for stormwaters. The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater flooding will reduce future risks of losses. Regardless of where development occurs in the City of Ione, the removal of storm water will be contingent on making sure local streams are able to flow freely and runoff flows from upcountry are reduced through proper storm water management practices and land conservation efforts.

Levee Failure

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

A levee is a raised area that runs along the banks of a stream or canal. 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. For example, levees can be certified to provide protection against the 1% annual chance flood. Levees reduce, not eliminate, the risk to individuals and structures located behind them. A levee system failure or overtopping can create severe flooding and high water velocities. Levee failure can occur through overtopping or from seepage issues resulting from burrowing rodents, general erosion, excessive vegetation and root systems and other factors that compromise the integrity of the levee. No levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

Flood protection levees were built by the USACE along Sutter Creek in the City of Ione; however, the levees are not certified as providing protection from the 100-year flood. Flood and erosion-control retaining walls are located along Sutter Creek near the intersection of Preston and Main Streets; however, these structures also are not certified as providing protection from the 100-year flood. A more detailed description of the location of floodwalls, levees, and other flood control structures within the City of Ione is provided below:

- Levees and Floodwalls
  - ✓ A concrete floodwall on the south bank of Sutter Creek, starting at Preston Avenue Bridge and extending upstream approximately 300 feet.
  - ✓ A levee on the south bank, starting at the end of the floodwall and extending upstream approximately 400 feet.
  - ✓ A levee on the south side of Sutter Creek, from downstream of Preston Avenue and extending downstream approximately 500 feet.
  - ✓ A levee on the north bank of Sutter Creek, from downstream of Preston Avenue and extending downstream approximately 900 feet.

- Other Flood Control Structures
  - ✓ Howard Park Retention Basin
  - ✓ West Marlette Storm Drain System
  - ✓ Ione Oaks Drainage Ditch

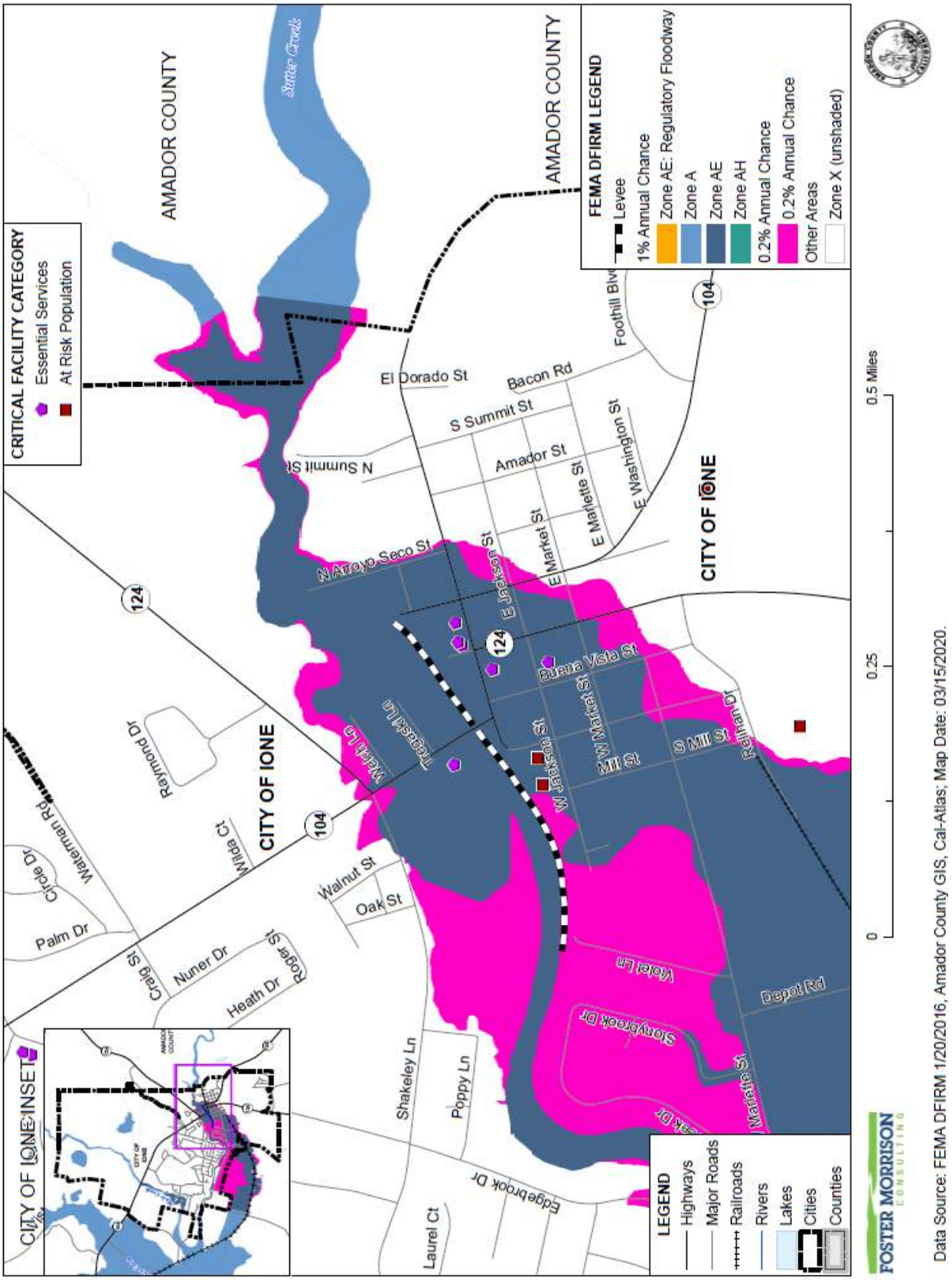
The Sutter Creek channel has been cleared and shaped at some locations, and stone slope protection has been placed at areas that were subject to erosion during the January 1995 flood event. Back-flow prevention valves have been added to the major storm drain outfall structure located downstream of Highway 104 near the channel bend.

Location and Extent

There is not a scientific scale or measurement system in place for levee failure. Expected flood depths from a levee failure in the City are not known. The speed of onset is slow as the river rises, but if a levee fails the warning times are generally short for those in the inundation area. The duration of levee failure risk

times can be hours to weeks, depending on the river flows that the levee holds back. The HMPC noted that when northern California reservoirs are nearing maximum capacity, they release water through the river systems, causing additional burdens on County levees. Though no GIS analysis could be performed on areas protected by levees, levee locations were available for the City in GIS. The levee locations and the FEMA DFIRM flood zones in the City are shown on Figure B-15.

Figure B-15 City of Ione – Levee Locations



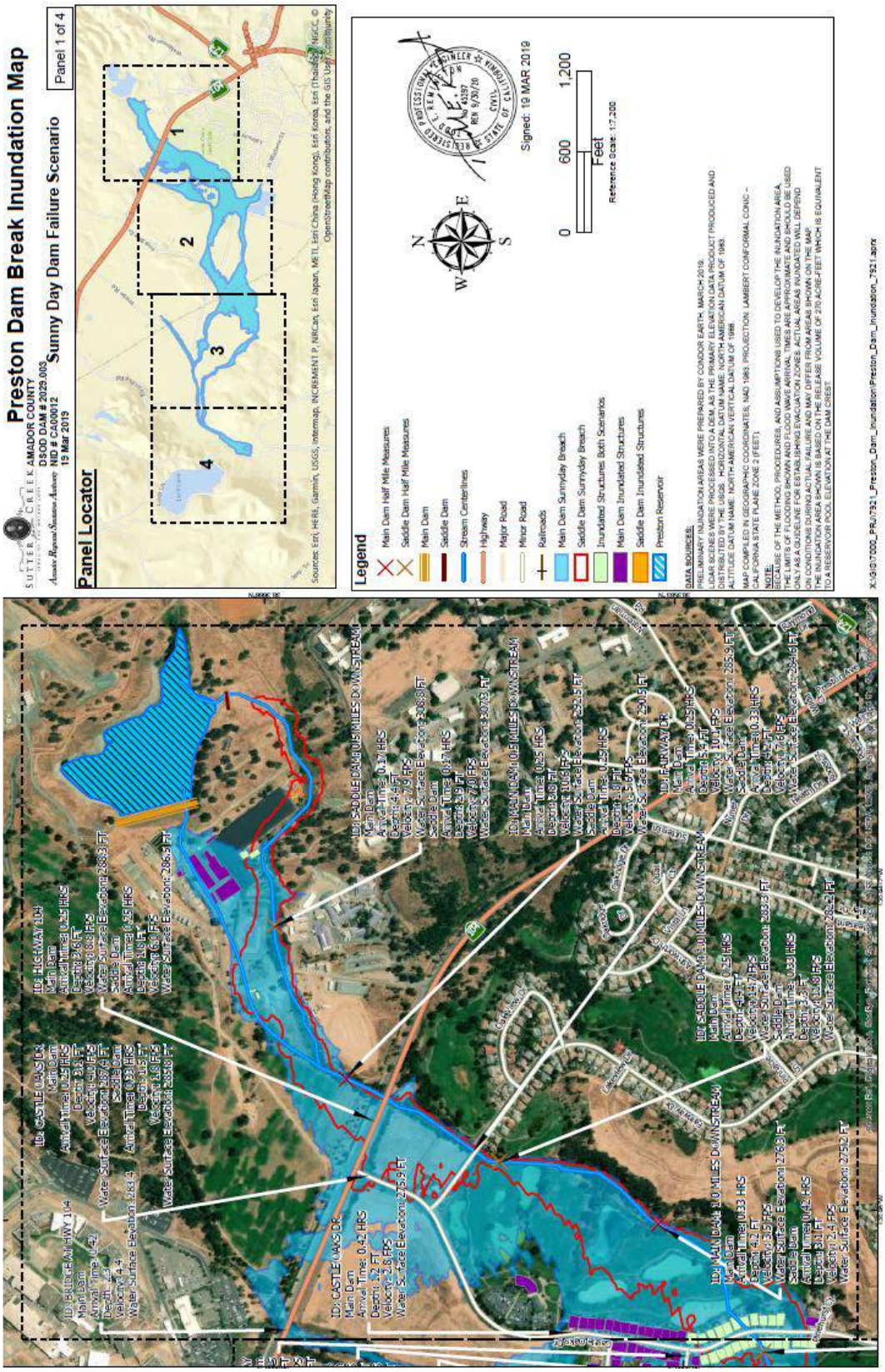
Past Occurrences

The City Planning Team noted no past occurrences of levee failures.

Vulnerability to Levee Failure

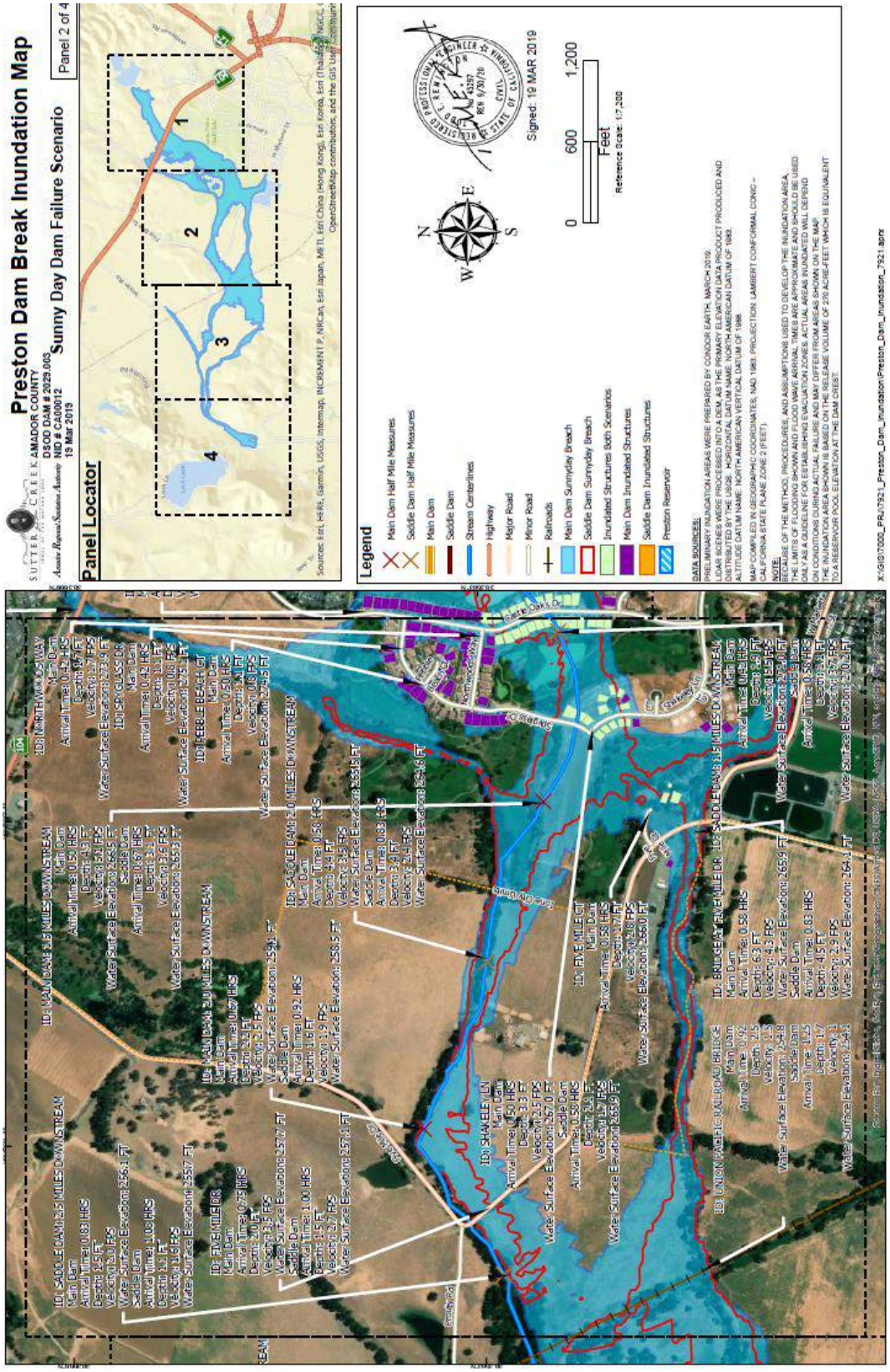
A levee failure can range from a small, uncontrolled release to a catastrophic failure. Levee failure flooding can occur as the result of prolonged rainfall and flooding. The primary danger associated with levee failure is the high velocity flooding of those properties outside and downstream of the breach. A second area of concern for the City of Ione is any potential breach of the Preston Reservoir, located on Mule Creek State Prison grounds. The reservoir is currently being used by the Amador Regional Sanitation Authority (ARSA) for storage of effluent. Should the reservoir breech or overflow, property located in the Castle Oaks subdivision and the Castle Oaks Golf Course would be flooded with effluent. This can be seen on Figure B-16 and Figure B-17.

Figure B-16 Flooding in Ione from Preston Reservoir Failure (Panel 1)



Source: ASRA Flood Plan

Figure B-17 Flooding in Ione from Preston Reservoir Failure (Panel 2)



Source: ASRA Flood Plan

Impacts

Should a levee fail, some or all of the area protected by the levees would be at risk to flooding. Impacts from a levee failure include property damage, critical facility damage, and life safety issues. Business and economic losses could be large as facilities could be flooded and services interrupted. School and road closures could occur. Road closures would impede both evacuation routes and ability of first responders to quickly respond to calls for aid. Other problems connected with levee failure flooding include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Future Development

Future development built in the areas protected by levees is subject to being built to the standards in the City of Ione Floodplain Ordinance. Whether a levee is certified as providing protection from the 1% annual chance flood would also factor into development requirements. There are limited opportunities for further development along Sutter Creek. Areas that could see further development are primarily in the Downtown Area. In 2012, the City adopted the Downtown Master Plan, which calls for developing a trail system along Sutter Creek. The details of this trail system are unknown and will need to consider the locations of levees. Future development in levee protected areas may be affected and should be effectively managed.

Severe Weather: Extreme Heat

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to 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 extreme heat and high humidity, evaporation is slowed, and the body must work extra hard to maintain a normal temperature." Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

In addition to the risks faced by citizens of the City, there are risks to the built environment from extreme heat. While extreme heat on its own does not usually affect structures, extreme heat during times of drought can cause wildfire risk to heighten. Extreme heat and high winds can cause Public Safety Power Shutoff (PSPS) events, causing issues to buildings in the City.

Location and Extent

Heat is a regional phenomenon and affects the whole of the City. 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 affect vulnerable populations and communities. Heat waves do not generally cause significant damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios.

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 Section 4.2.2 of the Base Plan.

Past Occurrences

The City Planning Team note that since extreme heat is a regional phenomenon, events that affected the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.2.2.

Vulnerability to Extreme Heat

The City experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-110°F in rather extreme situations. During these times, drought conditions may worsen. Also, PSPS events may occur during these times as well. Health impacts are the primary concern with this hazard, though economic impacts are also an issue.

Impacts

The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures. Nursing homes and elder care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning is not available. In addition, individuals below the poverty level may be at increased risk to extreme heat if use of air conditioning is not affordable. Extreme heat also affects homeless people and the transient population.

Days of extreme heat have been known to result in medical emergencies, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts. Extreme heat can also dry out vegetations, making it more vulnerable to wildfire ignitions. During periods of extreme heat (with high winds), PG&E can a PSPS.

Future Development

Future development of new buildings in the City will likely not be affected by extreme heat. Extreme heat is more likely to affect populations. Vulnerability to extreme heat will increase as the average age of the population in each City shifts. It is encouraged that any nursing homes and long-term elder care facilities constructed in the future have emergency plans or backup power to address power failure during times of extreme heat and in the event of a Public Safety Power Shutoff. Low income residents and homeless populations are also vulnerable. Cooling centers for these populations should be utilized when necessary.

Severe Weather: High Winds and Tornadoes

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

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. High winds can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss.

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. These types of winds are also associated with the rapid spread of wildfires, making some regions which experience these winds particularly fire prone.

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 form when cool, dry air sits on top of warm, moist air. Tornadoes are the most powerful storms that exist. Tornadoes, though rare, are another severe weather hazard that, though rare, can affect areas in the lower elevations of the Amador County Planning Area, primarily during the rainy season in the late fall, winter, and early spring.

Location and Extent

The entire City is subject to significant, non-tornadic (straight-line), winds. Each area of the City 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 12 category scale that relates wind speed to observed conditions at sea or on land. Its full name is the Beaufort Wind Force Scale. The Beaufort Scale was shown in Section 4.2.4 of the Base Plan.

Tornadoes, while rare, can occur at any location in the County and City. The areas in the lower elevations of the County, such as where the City is located, tend to be at greater risk than the areas in the foothills and higher. 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 (EF) 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. The F Scale and EF Scale are shown in Section 4.2.4 of the Base Plan.

Past Occurrences

The City noted that since high winds are a regional phenomenon, events that affected the lower elevations of the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.2.4.

Vulnerability to Severe Weather: Wind and Tornado

High winds are common occurrences in the City throughout the entire year. Straight line winds are primarily a public safety and economic concern. Windstorms can cause damage to structures and power lines which in turn can create hazardous conditions for people. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered. High winds can impact critical facilities and infrastructure and can lead to power outages. Wind can also drive wildfire flames, spreading wildfires quickly. High winds are also a component of red flag days, which can cause PG&E to enact a PSPS.

Impacts

Impacts from high winds in the City will vary. Future losses from straight line winds include:

- Downed trees
- Increased risk of wildfire and PSPS events
- Power line impacts and economic losses from power outages
- Occasional building damage, primarily to roofs
- Campers, mobile homes, barns, and sheds and their occupants are particularly vulnerable as windstorm events in the region can be sufficient in magnitude to overturn these lighter structures

Future Development

Future development projects will consider wind hazards at the planning, and design stage with the goal of reducing vulnerability. The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from windstorms. Future development in the City is subject to these building codes. Future development should also consider the installation of back-up generators to deal with Public Service Power Shutdowns.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

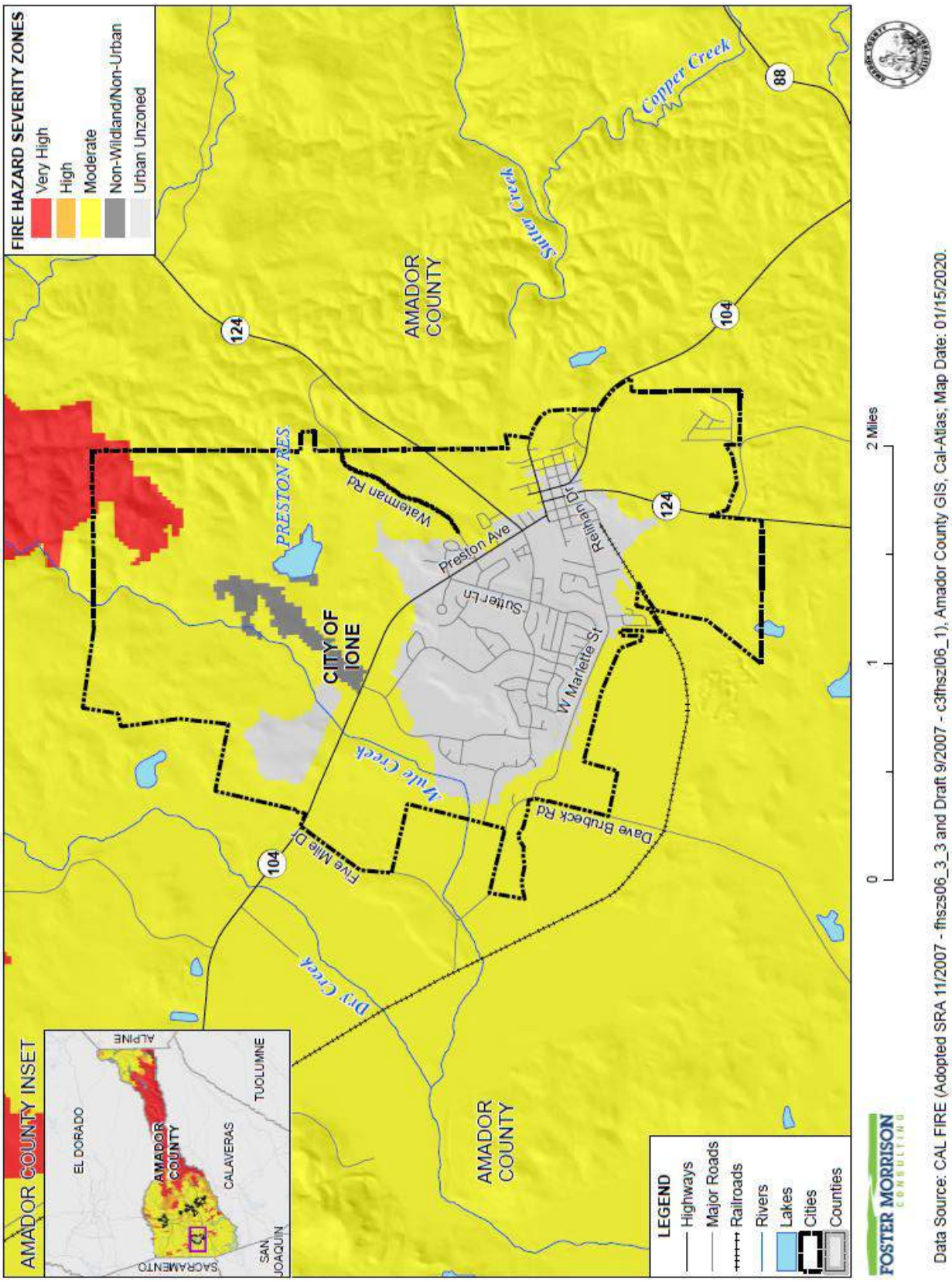
Wildland fire and the risk of a conflagration is an ongoing concern for the City of Ione. Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the ecosystem. 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. Historically, the fire season extends from

early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

Location and Extent

Wildfire can affect all areas of the City. CAL FIRE has estimated that the risk varies across the City and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the City of Ione were created. Figure B-18 shows the CAL FIRE Fire Hazard Severity Zones (FHSZ) in the City. As shown on the maps, FHSZs within the City range from urban unzoned (low) to very high.

Figure B-18 City of Ione – Fire Hazard Severity Zones



Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more. CAL FIRE has mapped wildfire risk in the State, County, and City. Geographical FHSZ extent from CAL FIRE is shown in Table B-26.

Table B-26 City of Ione – Geographical FHSZ Extents

Fire Hazard Severity Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
Very High	79	0.02%	0	0.00%	79	0.04%
High	0	0.00%	0	0.00%	0	0.00%
Moderate	1,968	0.51%	297	0.18%	1,670	0.75%
Non-Wildland/non-Urban	80	0.02%	0	0.00%	80	0.04%
Urban Unzoned	695	0.18%	357	0.22%	337	0.15%
Total	**2,959**	**0.76%**	**655**	**0.40%**	**2,305**	**1.03%**

Source: CAL FIRE

*Percentage of total acres is the percent of total acres of the entire County Planning Area, not the total acres of the jurisdiction

Past Occurrences

A list of state and federal disaster declarations for Amador County from wildfire is shown on Table B-17. These events also likely affected the City to some degree.

Table B-27 Amador County – State and Federal Disaster Declarations from Wildfire 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	1	2015	1	1961

Source: Cal OES, FEMA

The City noted that they had been indirectly affected by past fires:

- Butte Fire: The City was a Red Cross area for the fire, but the shelter was not heavily used. They received evacuees (people and animals) and provided shelters. The City also noted that there was significant smoke affecting the Ione area for a 2-day period where it was difficult to go outside.
- Sand Fire: City was not really affected except to the extent some people might have gone there to look for temporary housing.

Vulnerability to Wildfire

The wildfire hazard is one of the highest priority hazards in the County and City, and is the hazard with the greatest potential for catastrophic loss. High fuel loads in the County and Cities, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in

loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. The more urbanized areas within the County are not immune from fire. The dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and City, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

The 2009 City of Ione General Plan noted that the City is located in an area susceptible to risk of wildland fires. The entire County is classified as moderate to very high fire hazard severity based on CAL FIRE analysis of fuels, terrain, and weather. The rural setting coupled with hot, dry summers, dense clusters of trees as well as dry grasses present the potential for wildland fire. Fire season typically occurs from early spring to late fall when the rainy season ends and moisture content diminishes causing vegetation to dry. Wildland fires are primarily associated with the wildland-urban interface (i.e. areas where development is placed next to wildlands). As Ione grows, greater potential for exposure to wildland fires could occur. Additionally, several of the proposed developments in the City are abundant in natural vegetation, which have the potential to ignite and pose safety risks to adjacent and surrounding developments. The California Building Code contains specific regulations for construction in areas of urban-wildland interface, in order to prevent damages related to wildfires. Fire protection is provided by the City of Ione Fire Department, the Amador Fire Protection District, the Mule Creek State Prison Fire Department, and CAL FIRE. The services provided by these agencies are addressed in the Public Facilities Element of the General Plan.

Also noted as a wildfire concern is the creek area that is overgrown with trees, brush, and other debris. While this certainly contributes to the flood hazard during times of heavy rains, during the summer it creates a significant wildfire hazard.

Impacts

Potential impacts from wildfire include loss of life and injuries; damage to structures 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 City. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the City 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 City; smoke and air pollution from wildfires can be a severe health hazard. The City may also be impacted by fire events outside the City that cause people to evacuate and take shelter in Ione.

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 PSPSs 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.

Assets at Risk

Based on the vulnerability of Ione to the wildfire hazard, the sections that follow describes significant assets at risk in the City of Ione. This section includes the values at risk, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of wildfire within the City of Ione. The methodology described in Section 4.3.18 of the Base Plan was followed in determining structures and values at risk in FHSZs. Summary analysis results for Ione are shown in Table B-28, which summarizes total parcel counts, improved parcel counts and their structure values by FHSZ. As shown, the City has $27.3 million in values in the moderate FHSZ. Though there are areas of very high fire severity in the City limits, there are no structures located inside those areas.

Table B-28 City of Ione – Count and Value of Parcels by FHSZ

Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Moderate	437	260	$33,764,395	$47,483,829	$27,258,162
Urban Unzoned	1,597	1,411	$112,662,955	$265,023,133	$135,179,592
City of Ione Total	**2,034**	**1,671**	**$146,427,350**	**$312,506,962**	**$458,934,312**

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Table B-29 breaks out the Table B-28 by adding the property use details by FHSZ for the City. As shown in both of these tables, the City has no properties in the very high or high FHSZ. The City does have land in the very high and high FHSZ, but it is not developed. All of the City falls within the urban unzoned and moderate fire hazard severity zones.

Table B-29 City of Ione – Count and Value of Parcels by FHSZ and Property Use

Fire Hazard Severity Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Moderate					
Agricultural	14	3	$6,827,931	$39,680	$39,680
Commercial	18	17	$3,285,534	$7,028,216	$7,028,216
Industrial	0	0	$0	$0	$0
Miscellaneous	24	1	$1,876,501	$35,409	$0
Residential	358	239	$21,774,429	$40,380,524	$20,190,266
Unknown	23	0	$0	$0	$0
Moderate Total	**437**	**260**	**$33,764,395**	**$47,483,829**	**$27,258,162**

Fire Hazard Severity Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Urban Unzoned					
Agricultural	**0**	**0**	$0	$0	$0
Commercial	48	45	$4,813,281	$10,991,000	$10,991,000
Industrial	**0**	**0**	$0	$0	$0
Miscellaneous	107	18	$5,351,994	$5,654,943	$0
Residential	1,418	1,348	$102,497,680	$248,377,190	$124,188,592
Unknown	24	**0**	$0	$0	$0
Urban Unzoned Total	**1,597**	**1,411**	**$112,662,955**	**$265,023,133**	**$135,179,592**
City of Ione Total	**2,034**	**1,671**	**$146,427,350**	**$312,506,962**	**$458,934,312**

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Population at Risk

The FHSZ dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the FHSZs were counted and multiplied by the 2010 Census Bureau average household factors for the City of Ione – 2.56. According to this analysis, there is a total population of 612 residents of Ione at risk to moderate or higher FHSZs. This is shown in Table B-30.

Table B-30 City of Ione – Count of Improved Residential Parcels and Population by FHSZ

Jurisdiction	Moderate		High		Very High	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Ione	239	612	0	0	0	0

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Ione in identified FHSZs. Critical facilities in a FHSZ in the City of Ione are shown in Figure B-19 and detailed in Table B-31. Details of critical facility definition, type, name and address and jurisdiction by FHSZ are listed in Appendix F.

Figure B-19 City of Ione – Critical Facilities in FHSZs

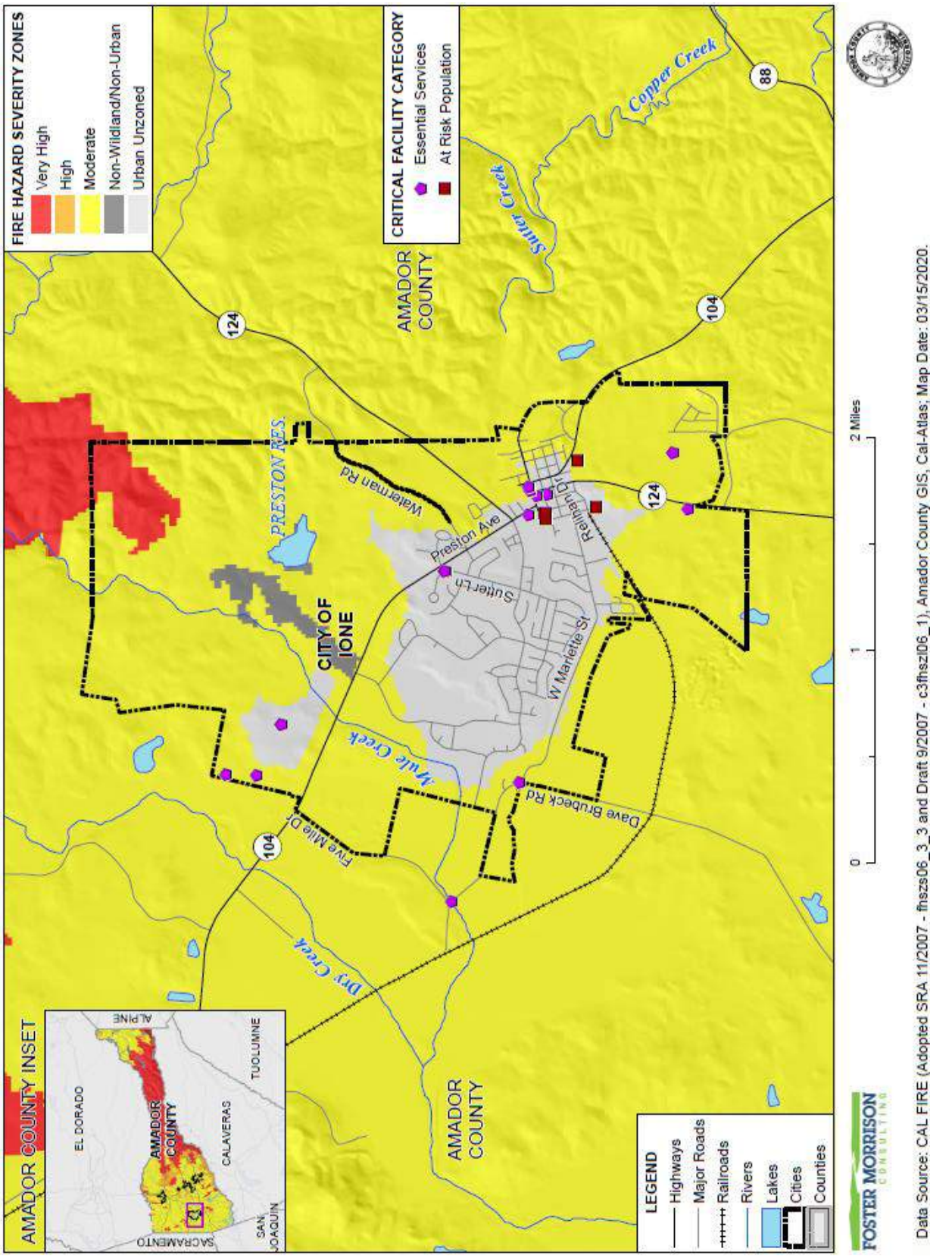


Table B-31 City of Ione – Critical Facilities by FHSZ

Fire Hazard Severity Zones	Critical Facility Category / Critical Facility Type	Facility Count
Non-Very High	**Essential Services**	
	Bridge	1
	Clinic	1
	EMS Station	2
	Evacuation Shelter	1
	Fire Station	2
	Library	1
	Police Station	1
	Post Office	1
	Power Substation	2
	Prison	1
	Public Administration Building	1
	Essential Services Total	**14**
	At Risk Population	
	School	4
	At Risk Population Total	**4**
Non-Very High Total		**18**
City of Ione Total		**18**

Source: CAL FIRE, Amador County GIS

Future Development

Additional growth and development within moderate or higher fire hazard severity zones in the City would place additional values at risk to wildfire. City building codes are in effect and should continue to be updated as appropriate to reduce this risk. This is especially true in the VHFSZ zones in the City. The City will also need to ensure that proper ingress and egress are fully constructed BEFORE houses in a subdivision are constructed. One of the key lessons from the Paradise fire was the lack of multiple escape routes added to the casualty list. Developments need at least 2 ways in and out of the subdivision to better ensure evacuation routes.

GIS Analysis

The City General Plan Future Development Areas and the Amador County LAFCO SOI were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these 10 areas, the 263 parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure B-20 shows the locations of future development areas the City is planning to develop in both the Future Development Areas and the SOI overlayed on the CAL FIRE FHSZs. Table B-32 shows the parcels and acreages of each future

development area in the City in each FHSZ, broken out by Future Development Areas and Sphere of Influence.

Note: As seen on this figure, the Future Development Areas and SOI overlap. In the table, the Future Development Areas are shown in their full acreages, while the SOI acreages in the table are the remainder of the SOI once the Future Development Areas have been subtracted from them.

Figure B-20 City of Ione – Future Development Areas in FHSZs

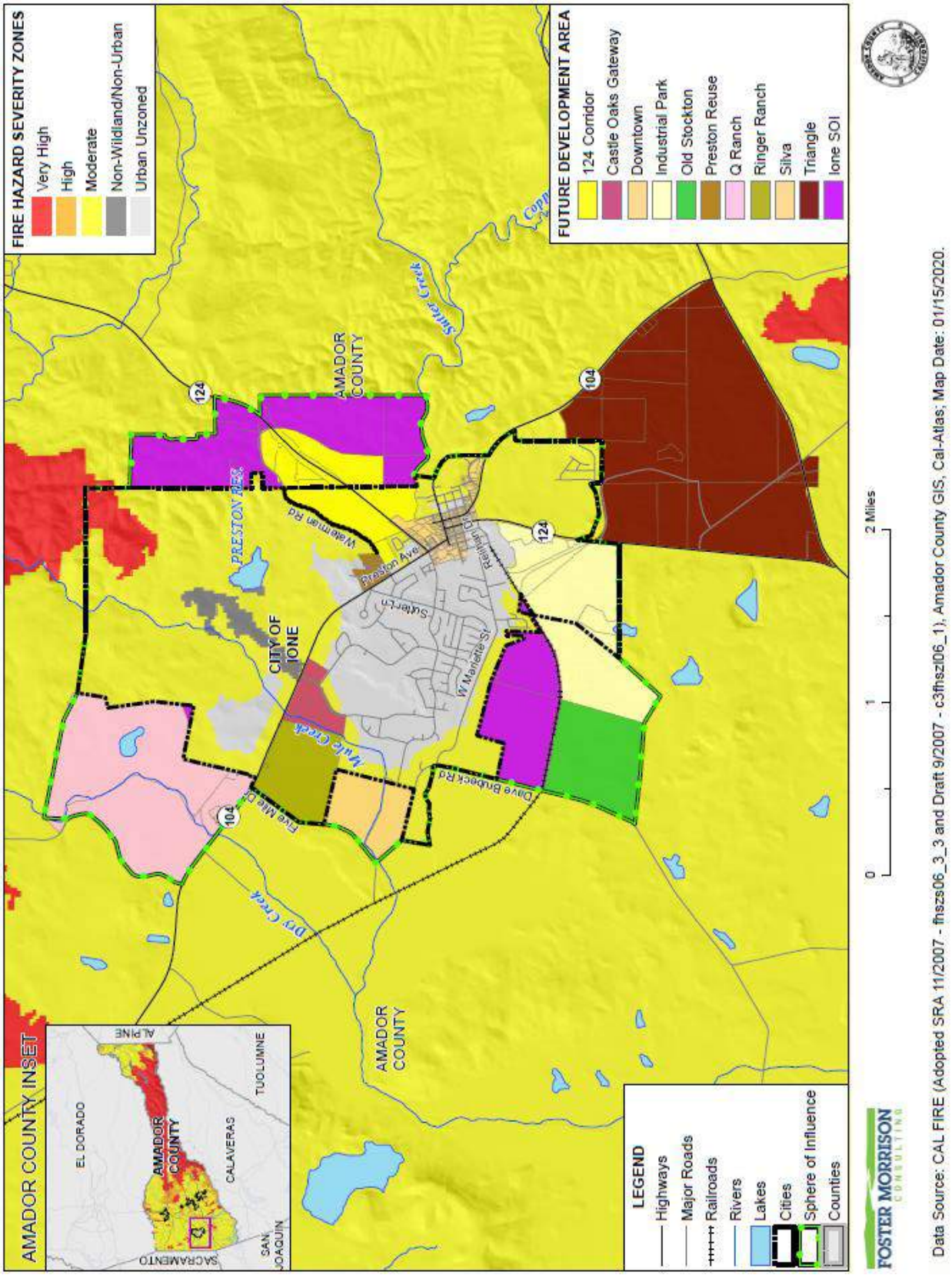


Table B-32 City of Ione – Future Development Areas in FHSZs

Future Development /Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
124 Corridor						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	7	2	5	134.30	35.69	98.60
Non-VHFHSZ	2	0	2	110.90	0	110.90
124 Corridor Total	**9**	**2**	**7**	**245.20**	**35.69**	**209.50**
Castle Oaks Gateway						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	1	0	1	4.52	0	4.52
Non-VHFHSZ	4	2	2	47.24	20.85	26.39
Castle Oaks Gateway Total	**5**	**2**	**3**	**51.75**	**20.85**	**30.91**
Downtown						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	10	0	10	16.24	0	16.24
Non-VHFHSZ	174	144	30	53.71	40.03	13.67
Downtown Total	**184**	**144**	**40**	**69.95**	**40.03**	**29.91**
Industrial Park						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	1	1	0	135.56	135.56	0
Non-VHFHSZ	8	3	5	203.91	40.23	163.68
Industrial Park Total	**9**	**4**	**5**	**339.47**	**175.79**	**163.68**
Old Stockton						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	1	0	1	183.16	0	183.16

Future Development /Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Non-VHFHSZ	0	0	0	0	0	0
Old Stockton Total	**1**	**0**	**1**	**183.16**	**0**	**183.16**
Preston Reuse						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	0	0	0	0	0	0
Non-VHFHSZ	1	0	1	16.88	0	16.88
Preston Reuse Total	**1**	**0**	**1**	**16.88**	**0**	**16.88**
Q Ranch						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	5	5	0	508.90	508.90	0
Non-VHFHSZ	0	0	0	0	0	0
Q Ranch Total	**5**	**5**		**508.90**	**508.90**	**0**
Ringer Ranch						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	0	0	0	0	0	0
Non-VHFHSZ	2	2	0	133.92	133.92	0
Ringer Ranch Total	**2**	**2**	**0**	**133.92**	**133.92**	**0**
Silva						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	2	1	1	110.40	46.86	63.54
Non-VHFHSZ	0	0	0	0	0	0
Silva Total	**2**	**1**	**1**	**110.40**	**46.86**	**63.54**
Triangle						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0

Future Development /Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Moderate	26	7	19	981.89	62.07	919.82
Non-VHFHSZ	0	0	0	0	0	0
Triangle Total	**26**	**7**	**19**	**981.89**	**62.07**	**919.82**
Ione SOI						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	17	7	10	588.44	169.04	419.40
Non-VHFHSZ	2	2	0	1.38	1.38	0
Ione SOI Total	**19**	**9**	**10**	**589.81**	**170.42**	**419.40**
Grand Total	**263**	**176**	**87**	**3,231.34**	**1,194.54**	**2,036.79**

Source: City of Ione, Amador County LAFCO, CAL FIRE

B.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

B.6.1. Regulatory Mitigation Capabilities

Table B-33 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Ione.

Table B-33 City of Ione Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
General Plan	Yes	Yes
Capital Improvements Plan	Yes	Yes
Economic Development Plan	Yes	No
Local Emergency Operations Plan	Yes	Yes

Continuity of Operations Plan	No	
Transportation Plan	Yes	Yes
Stormwater Management Plan/Program	No	
Engineering Studies for Streams	No	
Community Wildfire Protection Plan	No	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	No	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Yes	Yes
Building Code Effectiveness Grading Schedule (BCEGS) Score	3 (ISO rating)	Yes
Fire department ISO rating:	1	Yes
Site plan review requirements	Yes	Yes
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Yes	Yes Yes
Subdivision ordinance	Yes	Yes Yes
Floodplain ordinance	Yes	Yes Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Yes	Somewhat Yes
Flood insurance rate maps	Yes	Yes Yes
Elevation Certificates	Yes	Yes Yes
Acquisition of land for open space and public recreation uses	Yes	Yes Funding does not keep up with cost of maintaining.
Erosion or sediment control program	Yes	Yes Yes
Other		
How can these capabilities be expanded and improved to reduce risk?		
Existing plans and ordinances need to be continually updated. Participation in the Community Rating System (CRS) program would be of benefit to property owners in the flood plain		

Source: City of Ione

City of Ione General Plan (2009)

The City of Ione General Plan Program serves as the blueprint for future growth and development and provides comprehensive planning for the future. It encompasses what the City is now, and what it intends to be, and provides the overall framework of how to achieve this future condition (see the discussion in Section 4.3.1 Growth and Development Trends).

The General Plan includes a Safety Element that focuses on safety issues to be considered in planning for the present and future development of the City Planning Area. Identified hazards include wildfire, geologic/seismic, flooding, and other natural and man-made hazards (such as hazardous materials). Mitigation-related actions and objective summaries are as follows:

Goal NS-2: Maintain a safe community and environment.

Policies:

- Strive to reduce levels of risk of injury, death, and property damage resulting from reasonably foreseeable safety hazards in the area.
- Prepare for emergencies and disasters prior to their occurrence.

Goals NS-3: Reduce the possibility of flooding or drainage issues.

- Support and encourage efforts to limit and reduce the potential for community flooding from local waterways.
- Manage the risk of flooding by discouraging new development in areas which are likely to flood.
- Discourage the creation of new parcels when the presence of easements, floodplain, marsh or riparian habitat and/or other features would leave insufficient land to build and operate structures. This policy shall not apply to open space lots specifically created for dedication to the City or another appropriate party for habitat protection, flood control, drainage, or wetland maintenance.
- Ensure that adequate drainage exists for both existing and new development.
- Reduce the risk of adverse effects to residents or businesses as a result of geologic or seismic instability.
- Support efforts by federal, state, and local jurisdictions to investigate local seismic and geologic hazards and support those programs that effectively mitigate seismic and safety hazards.
- Ensure that new structures are protected from damage caused by geologic and/or soil conditions to the greatest extent feasible.
- Reduce the probability of fire damage to structures.
- The City shall ensure that the Ione Fire Department has sufficient resources and capabilities to reduce fire hazards, assist in fire suppression, and ensure efficient emergency medical response.
- Reduce the risks associated with wildfires in and around the City.

Mitigation Related Ordinances

Civil Defense and Disaster Council (Chapter 2.48)

The declared purposes of this chapter are to provide for the preparation and carrying out of plans for the protection of persons and property of the City of Ione in the event of an emergency, the direction of the emergency organization, and the coordination of the emergency services of this city with all other public agencies, corporations, organizations, and affected private persons. Any expenditures made in connection with said emergency and related activities, including mutual aid activities, shall be deemed conclusively to be for the direct protection and benefit of the residents and property of the city.

The city disaster council is hereby created, and shall consist of the following:

- The mayor, who shall serve as chairperson;
- The city manager, who shall serve as vice-chairperson and city's director of emergency services;
- The county director of emergency services;

- Such chiefs of emergency services as are provided for in a current city and Amador Emergency Operations Plan of this county, adopted pursuant to this chapter;
- Such representatives of civic, business, labor, veterans, professional, or other organizations having an official emergency responsibility, as may be appointed by the director with the advice and consent of the city council.

It shall be the duty of the city disaster council, and it is empowered, to develop and recommend for adoption by the city council, emergency and mutual-aid plans and agreements, and such ordinances and resolutions and rules and regulations as are necessary to implement such plans and agreements. The disaster council shall meet upon call of the chairman or, in his/her absence from the city or inability to call such meeting, upon call of the vice chairman.

Burning of Refuse, Vegetation, and Cuttings (Chapter 8.08)

This chapter is provided for the health, safety, and welfare of the residents of the city. No person, and no person for and on behalf of himself or herself or of any firm, partnership, association or corporation, shall set fire to or burn, inflame or ignite so as to cause to burn any weeds, brush at any place within the city limits, whether attended or unattended, without first obtaining a written permit to do so from the chief of the fire department of the city. Only burn piles are allowed, and shall not exceed four feet by four feet by four feet in height and shall be only vegetations and cuttings from the property for which the permit was issued.

No person, and no person for or on behalf of himself or herself or of any firm, partnership, association or corporation shall set fire to or burn, inflame or ignite so as cause to burn any trash, garbage, or other refuse at any place within the city limits.

Weed Abatement (Chapter 8.16)

All weeds, as defined in Section 39561.5 of the California Government Code, dry grasses, dead shrubs, dead trees, rubbish, or any material growing upon the streets, sidewalks, or upon private property within the city, which bear seeds of a wingy or downy nature or which by reason of their size, manner of growth and location constitute a fire hazard to any building, improvements, crops or other property, and weeds and grasses which, when dry, will in reasonable probability constitute such a fire hazard, are declared to be a public nuisance.

Cultivated and useful grasses and pastures shall not be considered a public nuisance. However, if the fire chief or his authorized representative shall determine it necessary to protect adjacent improved property from fire exposure, an adequate firebreak may be required. Any lot of less than two acres shall be cleaned of all debris prior to June 1st or the start of fire season, whichever occurs first.

Lots on which weeds, dry grass, or other non-cultivated or non-useful grasses and pastures exist, shall be mowed, and shall be cut to a maximum height of two inches so as to not constitute a fire hazard throughout the calendar year. Dry grass and/or weeds so mowed shall be removed from the premises and not allowed to remain on the lot.

Any lot of two acres or more shall either be cleaned of all debris or have a minimum 20-foot wide firebreak around the perimeter in place prior to June 1st or the start of fire season, whichever occurs first. Firebreaks shall be disked around the entire perimeter of the lot. Scraping will also be allowed, provided that the scraped material is removed or spread evenly over the remaining unscraped property. Weeds and/or dry grass which are disked, cultivated or rotor-tilled should be performed with equipment that will cut the sod growth loose and bury it under any growth existing at that time. Dry leaves or wood chips hauled onto lots must be disked or turned under. If leaves or wood chips are being retained for the purpose of mulch or compost, they must be placed in a container so as to not constitute a fire hazard. Maintenance of parkways are the responsibility of the abutting property owner.

Buildings and Construction (Title 15)

Adoption of Uniform Codes:

- The 2016 edition of the California Administrative Code, Title 24, Part 1, including tables, as adopted by the California Building Standards Commission in Title 24, Part 1 of the California Code of Regulations, and all future amendments thereto, are hereby adopted in the City of Ione.
- The 2016 edition of the California Building Code, Title 24, Part 2, including tables and Appendices C, I, and J, as amended herein, based on the 2015 International Building Code, as published by the California Building Standards Commission and codified in Title 24, Part 2 of the California Code of Regulations, and all future amendments thereto, are hereby adopted in the City of Ione, except as to amendments contained in this chapter.
- The 2016 edition of the California Residential Building Code, Title 24, Part 2.5, including tables and Appendix H, as amended herein, based on the 2015 International Residential Code, as adopted by the California Building Standards Commission in Title 24, Part 2.5 of the California Code of Regulations, and all future amendments thereto, are hereby adopted in the City of Ione.
- The 2016 edition of the California Mechanical Code, Title 24, Part 4, including tables, and Appendices B and D based on the 2015 Uniform Mechanical Code as published by the International Association of Plumbing and Mechanical Officials, and as adopted by the California Building Standards Commission in Title 24, Part 4 of the California Code of Regulations, and all future amendments thereto, are hereby adopted in the City of Ione.
- The 2016 edition of the California Plumbing Code, Title 24, part 5, including tables and Appendices A, B, D, H, and I, as amended, based on the 2015 Uniform Plumbing Code, as adopted and amended by the California Building Standards Commission and codified in Title 24, Part 5 of the California Code of Regulations, and all future amendments thereto, are hereby adopted in the City of Ione.
- The 2016 edition of the California Energy Code, Title 24 Part 6, including Tables and Appendix "1-A", as adopted by the California Building Standards Commission in Title 24, Part 6 of the California Code of Regulations, and all future amendments thereto, are hereby adopted in the City of Ione.
- The 2015 edition of the International Code Council Property Maintenance Code, as published by the International Code Council (ICC), and all future amendments thereto, are hereby adopted in the City of Ione.
- The 2016 edition of the California Historical Building Code, Title 24, Part 8, including Tables and Appendix "A", as adopted by the California Building Standards Commission in Title 24, Part 8 of the California Code of Regulations, and all future amendments thereto, are hereby adopted in the City of Ione.
- The 2016 edition of the California Fire Code, Title 24, Part 9, including Tables and Appendices, as amended, based upon the 2015 edition of the International Fire Code as published by the International Code Council (ICC), and as adopted by the California Building Standards Commission and codified in

Title 24, Part 9 of the California Code of Regulations, and all future amendments thereto are hereby adopted in the City of Ione, except as to amendments and additions contained in this Chapter.

- The 2016 edition of the California Existing Building Code, Title 24, Part 10, including tables, based on the 2015 International Existing Building Code, as adopted by the California Building Standards Commission in Title 24, Part 10 of the California Code of Regulations, and all future amendments thereto, are hereby adopted in the City of Ione.
- The 2016 edition of the California Green Building Standards Code, Title 24, Part 11, including tables and appendices, as adopted by the California Building Standards Commission in Title 24, Part 11 of the California Code of Regulations, and all future amendments thereto, are hereby adopted in the City of Ione.
- The 2016 edition of the California Referenced Standards Code, Title 24, Part 12, including tables, as adopted by the California Building Standards Commission in Title 24, Part 12 of the California Code of Regulations, and all future amendments thereto, are hereby adopted in the City of Ione.

A copy of this code is available for use and examination by the public at the Office of the Clerk of the City of Ione

Zoning (Title 17)

The city land use zoning code carries out the policies of the Ione general plan by classifying and regulating the uses of land and structures within the city, consistent with the general plan and the Municipal Code. This zoning code is adopted and established to serve the public health, safety, comfort, convenience and general welfare and to provide the economic and social advantages resulting from an orderly planned use of land resources, and to encourage, guide and provide a definite plan for the future growth and development of the city. More specifically, the purposes of this zoning code are to:

- Provide standards and guidelines for the orderly growth and development of the city that will assist in protecting the characteristics and community identity of Ione;
- Create a comprehensive and stable pattern of land uses up on which to plan transportation, water supply, sewerage, and other public facilities and utilities;
- Conserve and protect the city's natural features such as creeks, oak trees, and historic and environmental resources;
- Minimize automobile congestion by promoting safe and effective traffic circulation, and adequate off-street parking facilities; and
- Ensure compatibility between residential and non-residential development and land uses.

Subdivisions (Title 16)

It is the purpose of this title to regulate and control the division of land within the city and to supplement the provisions of the Subdivision Map Act concerning the design, improvement, and survey data of subdivisions, the form and content of all required maps provided by the Subdivision Map Act, and the procedure to be followed in securing the official approval of the city regarding the maps. To accomplish this purpose, the regulations contained in this title are determined to be necessary to:

- Preserve the public health, safety, and general welfare;
- Promote orderly growth and development through implementation of the city's general plan; and
- Ensure that properly designed infrastructure necessary to support public service needs, including but not limited to transportation and utility infrastructure, is provided in conjunction with subdivisions.

Floodplain Ordinance (Chapter 18.04)

The flood hazard areas of city are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare. These flood losses are caused by uses that are inadequately elevated, floodproofed, or protected from flood damage. The cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities also contributes to flood losses.

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 legally enforceable regulations applied uniformly throughout the community to all publicly and privately owned land within flood prone, mudslide [i.e. mudflow] or flood related erosion areas. These regulations are designed to:

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

In order to accomplish its purposes, this chapter includes regulations to:

- Restrict or prohibit 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;
- Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- Control filling, grading, dredging, and other development which may increase flood damage; and
- Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters, or which may increase flood hazards in other areas.

This chapter shall apply to all areas of special flood hazards within the jurisdiction of city.

B.6.2. Administrative/Technical Mitigation Capabilities

Table B-34 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Ione.

Table B-34 City of Ione's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Yes	Yes
Mitigation Planning Committee	No	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	No Capacity and funding are limited
Mutual aid agreements	Yes	Yes
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Yes	Yes Yes
Floodplain Administrator	Yes	Yes Yes
Emergency Manager	Yes	Yes Yes
Community Planner	Yes	Yes Yes
Civil Engineer	Yes	Yes Yes
GIS Coordinator	No	
Other		
Technical	**Y/N**	**Describe capability Has capability been used to assess/mitigate risk in the past?**
Warning systems/services (Reverse 911, outdoor warning signals)	Yes	Yes Yes
Hazard data and information	Yes	Yes Yes
Grant writing	Yes	Yes Yes
Hazus analysis	Not Sure	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Additional training and keeping up with current Best Management Practices would help to reduce risk. As the community grows, additional staff will be needed, but finances and income restrict the City's ability add new staff.		

Source: City of Ione

B.6.3. Fiscal Mitigation Capabilities

Table B-35 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table B-35 City of Ione's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (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	Yes	Yes Yes
Authority to levy taxes for specific purposes	Yes	Yes Yes
Fees for water, sewer, gas, or electric services	Yes	Yes Yes
Impact fees for new development	Yes	Yes Yes
Storm water utility fee	No	No Yes
Incur debt through general obligation bonds and/or special tax bonds	Yes	Yes Yes
Incur debt through private activities	Yes	Yes Yes
Community Development Block Grant	Yes	Yes Yes
Other federal funding programs	Yes	No Yes
State funding programs	Yes	Yes Yes
Other		
How can these capabilities be expanded and improved to reduce risk?		
The City needs to add a Stormwater Utility Fee to address stormwater maintenance issues. While the City has the capability to incur debt, repayment of additional debt will be a challenge. The City of Ione was ranked as the 14th most financially challenged community in California, by the California State Auditor's Office		

Source: City of Ione

B.6.4. Mitigation Education, Outreach, and Partnerships

Table B-36 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 B-36 City of Ione's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access, and functional needs populations, etc.	No	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	No	
Natural disaster or safety related school programs	Yes	Safety programs
StormReady certification	No	
Firewise Communities certification	Yes	

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Public-private partnership initiatives addressing disaster-related issues	No	
Other	No	
How can these capabilities be expanded and improved to reduce risk?		
The increase use of social media outlets, such as the City's web site, Face Book and Next Door Ione, can be utilized to provide ongoing public education and information.		

Source: City of Ione

B.6.5. Other Mitigation Efforts

The City has many other completed or ongoing mitigation efforts that include the following:

- Brush cutting to remove fire hazards

B.7 Mitigation Strategy

B.7.1. Mitigation Goals and Objectives

The City of Ione adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

B.7.2. NFIP Mitigation Strategy

The City of Ione joined the National Flood Insurance Program (NFIP) on July 8, 1980. As a participant of the NFIP, the City of Ione has administered floodplain management regulations that meet the minimum requirements of the NFIP. The management program objective is to protect people and property within the City. The City of Ione will continue to comply with the requirements of the NFIP in the future.

In addition, the City of Ione actively participates with Amador County to address local NFIP issues through a regional approach. Many of the program activities are the same for the City of Ione as for Amador County since participation at the County level includes all local jurisdictions.

The City of Ione Building Inspector/Public Works Department provides public outreach activities which include map information services, public awareness, public hazard disclosure, and flood protection information. This information is readily available to the public and consists of current and accurate flood mapping. In addition, the Planning and Engineering Department provides information about our stormwater management program and up-to-date information related to the maintenance of our drainage system.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS which are to

reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. The City of Ione is not a current participant in the CRS program.

More information about the floodplain administration in the City of Ione can be found in Table B-37.

Table B-37 City of Ione Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	69 policies $48,177 in premiums $18,706,500 in coverage
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?	6 paid losses $3,691.57 in losses paid 0 substantial damage claims
How many structures are exposed to flood risk within the community?	174 in the 1% annual chance 242 in the 0.2% annual chance
Repetitive Loss (RL) and Severe Repetitive Loss Properties (SRL)	0 RL properties 0 SRL properties
Describe any areas of flood risk with limited NFIP policy coverage	No areas exist in the City with limited NFIP policy coverage
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	Yes, city contract out services.
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review
What are the barriers to running an effective NFIP program in the community, if any?	No barriers noted
Compliance History	
Is the community in good standing with the NFIP?	Yes
Are there any outstanding compliance issues (i.e., current violations)?	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	Oct. 29, 2008 (CAV) 4/2/2013 (CAC)
Is a CAV or CAC scheduled or needed?	Yes
Regulation	
When did the community enter the NFIP?	July 8, 1980
Are the FIRMs digital or paper?	Paper
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes

NFIP Topic	Comments
Provide an explanation of the permitting process.	For the permitting process, typically when any applications are made, the engineering department checks the location of the proposed development in relationship to the floodplains and floodways within the City. If a property is in a floodplain, conditions (whether it be on a developer or a single applicant) are placed on the permit requiring them to meet the City's floodplain ordinance and building requirements. With respect to structures proposed in floodways, no construction is allowed in floodways. If construction is to take place within floodplains, flood elevation certificates are required for all homes to prove that the finished floor elevation meets with the City's ordinances. Additionally, if it is a development, a full floodplain analysis, CLOMR and LOMR is required.
Community Rating System	
Does the community participate in CRS?	N
What is the community's CRS Class Ranking?	–
What categories and activities provide CRS points and how can the class be improved?	–
Does the plan include CRS planning requirements?	–

B.7.3. Mitigation Actions

The planning team for the City of Ione identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Climate Change
- Drought and Water Shortage
- Flood: 100/500-year
- Flood: Localized
- Levee Failure
- Severe Weather: Heat
- Severe Weather: High Winds and Tornadoes
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan 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 countywide public outreach action, 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 plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

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

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140).

Project Description: Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption 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: City of Ione Planning Department

Cost Estimate: Jurisdictional board/staff time

Benefits (avoided Losses): 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

Timeline: As soon as possible

Project Priority: High

Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The City and County play a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of natural hazards. A comprehensive multi-hazard public education program will better inform the community of natural hazards of concern and actions the public can take to be better prepared for the next natural disaster event.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The City will work with the County and other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of natural hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will leverage and build upon existing mechanisms.

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing County outreach programs will be reviewed for effectiveness and leveraged and expanded upon to reach the broader region.

Responsible Office: City of Ione in partnership with the County

Cost Estimate: Annual costs to be determined, and will depend on the scope and frequency of activities and events as well as volunteer participation

Benefits (Losses Avoided): Increase residents' knowledge of potential hazards and activities required to mitigate hazards and be better prepared. Protect lives and reduce damages, relatively low cost to implement.

Potential Funding: Local budgets, grant funds

Timeline: Ongoing/Annual public awareness campaign

Project Priority: High

Action 3. Harden and Enhance Cell Service: Additional Call/repeater towers/mobile repeaters generator back up

Hazards Addressed: Emergency Services/Multi-hazards (Climate Change, Drought and Water Shortage, Flood: 100/500-year, Flood: Localized, Levee Failure, Severe Weather: Heat, Severe Weather: High Winds and Tornadoes, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: City needs to improve emergency communication abilities with other state and local agencies

Project Description: City will need to improve its radio repeater system. The City will also need to enhance their portable radios, cell phones, recharging stations, hand talkies and add additional FCC licenses. City will also need a backup generator.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Working with partners listed below

Responsible Office/Partners: City of Ione, Amador County, Amador OES, Cal-OES, FEMA, AT&T, Verizon, State of California

Cost Estimate: Estimated $250.000

Benefits (Losses Avoided): Improved communications between agencies during emergency events with reduce the amount of property and human loss.

Potential Funding: State and Local Funding

Timeline: When Funding is Available

Project Priority: Medium

Action 4. Shelter Upgrades to Evalyn Bishop Hall (E.B. Hall)

Hazards Addressed: Emergency Services/Multi-hazards (Climate Change, Drought and Water Shortage, Flood: 100/500-year, Flood: Localized, Levee Failure, Severe Weather: Heat, Severe Weather: High Winds and Tornadoes, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: E.B. Hall is designated as a Red Cross Shelter in Amador County, but needs major repairs and improvements to serve a population that needed to be related to the Hall because of some hazardous event.

Project Description: E.B. Hall needs a new roof, back-up generator, upgraded HVAC system, men's and women's locker room with shower and changing area, Improved access to the facility, cots, blankets, paper bath towels, traffic cones and barricades, electronic charging stations, portable fencing for pets, MREs, bottled water, commercial grade pots and pans, commercial grade cooking utensils, internet and Wi-Fi system and check in accountability system to keep records on who is at the Hall.

Other Alternatives: Build an entirely new facility

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Ione

Responsible Office/Partners: City of Ione, Amador County, Amador OES, Cal-OES, FEMA, State of California, Mobile Hospital Evacuation System, Red Cross

Cost Estimate: $4,000,000

Benefits (Losses Avoided): A fully functional and prepared emergency shelter will benefit all displaced citizens and will provide for more efficient delivery of services for displaced individuals.

Potential Funding: FEMA, State of California, City of Ione, Amador County

Timeline: Dependent on Funding

Project Priority: High

Action 5. Backup Generators

Hazards Addressed: Emergency Services/Multi-hazards (Climate Change, Drought and Water Shortage, Flood: 100/500-year, Flood: Localized, Levee Failure, Severe Weather: Heat, Severe Weather: High Winds and Tornadoes, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Backup generators that meet current emissions standards are needed at all each of Ione's critical facilities. Fuel storage capability is also needed.

Project Description: The City needs 8 50 kw diesel powered backup generators to ensure that the City's wastewater facilities, lift stations, city hall, police department, fire stations, and Evalyn Bishop Hall emergency shelter has power in emergency situations.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Ione Emergency Management Plan

Responsible Office/Partners: City of Ione, Amador County, Amador OES, Cal-OES, FEMA, State of California,

Cost Estimate: $325,000

Benefits (Losses Avoided): Backup generators, with adequate fuel storage, will ensure that critical facilities will be fully functional during power outages.

Potential Funding: FEMA, State of California, City of Ione, Amador County

Timeline: Dependent on Funding

Project Priority: High

Flood, Localized Flood, and Levee Failure Actions

Action 6. Flood Ordinance Review and Update

Hazards Addressed: Flood Hazard

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The Floodplain Ordinance was adopted in in Ione in 2009 and has not been reviewed or modifies since then. Changes in federal and state laws may have made Ione's ordinance outdated. Best Practices could have also made Ione's Flood Plain Ordinance out of date.

Project Description: Planning staff will review current ordinance and compare it to current state and federal laws. Planning staff will also compare the ordinance to Best Management Practices. Revisions to the ordinance will be brought through the City's Planning Commission before adoption by the Ione City Council.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Ione, Ione Planning Commission, Ione City Planner

Responsible Office/Partners: City of Ione, Amador County, Amador OES, Cal-OES, FEMA, State of California,

Cost Estimate: $20,000

Benefits (Losses Avoided): A revised and current Flood Plain Ordinance will reduce the amount of development in the flood plain and thereby reducing the damage caused to real and personal property during high water events.

Potential Funding: FEMA, State of California, City of Ione, Amador County

Timeline: Dependent on Funding

Project Priority: High

Action 7. Develop and Implement Storm Water Master Plan

Hazards Addressed: Flood, Localized Flood, Levee Failure, Severe Weather

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The City of Ione does not have a Storm Water Master Plan to address storm water issues and plan for capital improvements.

Project Description: A storm water master plan will be developed to address storm water issues in the city of Ione and will also address development in the City's Sphere of Influence which identifies future areas of residential, commercial, and industrial growth.

Other Alternatives: None

E**xisting Planning Mechanism(s) through which Action Will Be Implemented**: City of Ione, Ione City Engineer, Ione City Council, Ione Planning Commission.

Responsible Office/Partners: City of Ione, Amador County, Amador OES, Cal-OES, FEMA, State of California,

Cost Estimate: $60,000

Benefits (**Losses Avoided**): A new Storm Water Master Plan will identify improvements to the current storm water collection system and improve drainage which will reduce localized flooding resulting from heavy rains.

Potential Funding: FEMA, State of California, City of Ione, Amador County

Timeline: Dependent on Funding

Project Priority: High

Action 8. Develop Watershed Based Flood Reduction Programs

Hazards Addressed: Flood, Localized Flood, Levee Failure, Severe Weather

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Flooding issues in the City of Ione are in larger part caused by a lack of runoff and soil stability measures up country.

Project Description: Amador County and all the cities within the County need to develop watershed based flood control measures to lessen the impact of heavy rains and erosion downstream.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Ione, Amador County Sutter Creek, City of Jackson, City of Amador City, City of Plymouth.

Responsible Office/Partners: City of Ione, Amador County, Amador OES, Cal-OES, FEMA, State of California, Amador County NRCA, USDA

Cost Estimate: $200,000

Benefits (Losses Avoided): Watershed Flood Reduction Programs will reduce erosion, property loss, and flooding events

Potential Funding: FEMA, State of California, City of Ione, Amador County, USDA

Timeline: Dependent on Funding

Project Priority: High

Action 9. Stream Maintenance and Debris/Sediment Removal

Hazards Addressed: Flood Hazard

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Flood events result in deposits of debris and sediment in the streams. This build up increased the likelihood of flooding in Ione.

Figure B-21 Sediment Buildup

Project Description: The streams in Ione need to be cleared of vegetation, debris, and sedimentation every few years to ensure that the stream flows freely in high water events and the chances of flooding are reduced as much as possible.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Ione, Amador County, California Department of Fish and Wildlife, CalFire, California Department of Corrections and Rehabilitation (CDCR), FEMA USDA, Amador NRCS Office

Responsible Office/Partners: City of Ione, Amador County, Amador OES, Cal-OES, FEMA, State of California, Amador County NRCA, USDA

Cost Estimate: $200,000

Benefits (Losses Avoided): Free flowing streams will reduce the chances of flood and property damage.

Potential Funding: FEMA, State of California, City of Ione, Amador County, USDA

Timeline: Dependent on Funding

Project Priority: High

Action 10. Replace Five Mile Bridge

Hazards Addressed: Flood Hazard

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Ione has a limited number of creek crossings that would allow people to evacuate the city in the event of emergency issues. Currently the only bridge handling large volumes of traffic and heavy trucks on Hwy 104/124 is rated for heavy trucks.

Project Description: Constructing a bridge that is capable of handling truck traffic on Five Mile Drive.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Ione, Amador County Transportation Commission, California Department of Transportation U.S. Department of Transportation

Responsible Office/Partners: City of Ione, CalTrans, FEMA, Amador County Transportation Commission (ACTC)U.S. Department of Transportation

Cost Estimate: $35,000,000

Benefits (Losses Avoided): Having an additional bridge crossing will provide an additional crossing that will allow citizens access in and out of the City.

Potential Funding: FEMA, State of California, City of Ione

Timeline: Dependent on Funding

Project Priority: Medium

Action 11. Pursue Certification of the Levee along Sutter Creek

Hazards Addressed: Levee Failure

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Property in the downtown area are protected by an-uncertified levee that was constructed decades ago. Levee needs to be inspected and maintenance needs to be

Project Description: The levee along Sutter Creek needs to be inspected and improvements may need to be made in order to have the levee certified.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Ione, Amador County, California Department of Fish and Wildlife, Army Corp. of Engineers Amador NRCS Office, EIR, CEQA

Responsible Office/Partners: City of Ione, Amador County, Amador OES, Cal-OES, FEMA, State of California, Amador County NRCA, Army Corp. of Engineers

Cost Estimate: $200,000

Benefits (Losses Avoided): A certified levee would reduce the cost of flood insurance for homeowners who need to have it and would greater assurance the that the levee would breech during a flood event.

Potential Funding: FEMA, State of California, City of Ione, Amador County

Timeline: Dependent on Funding

Project Priority: High

Wildfire Actions

Action 12. Ordinance Review – Wildland Urban

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: City of Ione needs to update its fire prevention and safety ordinances

Project Description: Ordinance needs to be reviewed and brought up to current standards and Best Management Practices. Upgrade Strike Force guidelines, Improve Fire Safe Neighborhood and Fire Wise programs

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Ione, Amador County, County Fire Departments, CalFire, State of California, CalOES, Amador County OES, FEMA

Responsible Office/Partners: City of Ione,

Cost Estimate: $35,000

Benefits (Losses Avoided): Updated Wildland Ordinance will reduce property damages and loss of life.

Potential Funding: FEMA, State of California, City of Ione

Timeline: Dependent on Funding

Project Priority: Medium

Action 13. Ordinance Review – Defensible Space and Fuel Reduction

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: City of Ione needs to update its fire prevention and safety ordinances related to defensible space and fuel reduction

Project Description: Ordinance needs to be reviewed and brought up to current standards and Best Management Practices related to defensible space and fuel reduction

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Ione, Amador County, County Fire Departments, CalFire, State of California, CalOES, Amador County OES, FEMA

Responsible Office/Partners: City of Ione, Amador County, County Fire Departments, CalFire, State of California, CalOES, Amador County OES, FEMA

Cost Estimate: $35,000

Benefits (Losses Avoided): Updated ordinance on defensible space and will reduce property damages and loss of life.

Potential Funding: FEMA, State of California, City of Ione

Timeline: Dependent on Funding

Project Priority: Medium.

Annex C City of Jackson

C.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Jackson, a previously participating jurisdiction to the 2014 Amador County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the City. This Annex provides additional information specific to Jackson, with a focus on providing additional details on the risk assessment and mitigation strategy for this community.

C.2 Planning Process

As described above, Jackson followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Amador County Hazard Mitigation Planning Committee (HMPC), the City formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table C-1. Additional details on plan participation and City representatives are included in Appendix A.

Table C-1 City of Jackson – Planning Team

Name	Position/Title	How Participated
Yvonne Kimball	City Manager	Coordination and Oversight
Debbie Mackey	Fire Chief	Mitigation Analysis
Chris Mynderup	Police Chief	Mitigation Analysis
Susan Peters	City Planner	Mitigation Analysis and Document Review
Michael Hooper	Building Inspector	Mitigation Analysis and City Representation

Coordination with other community planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the City integrated the previously approved 2014 Plan into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2014 LHMP through other plans and programs shown in Table C-2.

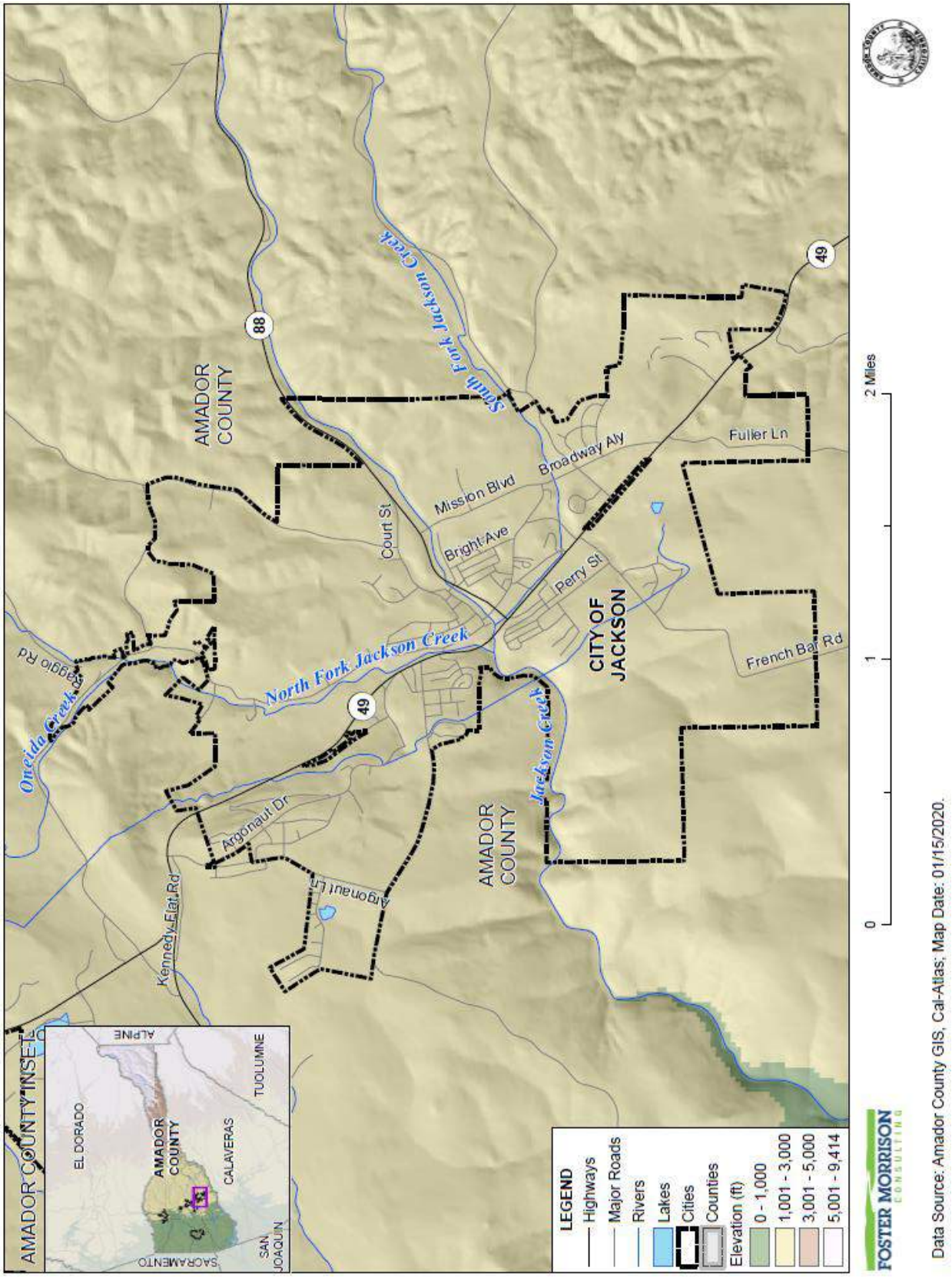
Table C-2 2014 LHMP Incorporation

Planning Mechanism 2014 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
Not Incorporated	Lack of funding to update the Safety Element of the General Plan. The City has received grant funds to update all elements of the General Plan. The 2020 LHMP will be incorporated into the update.

C.3 Community Profile

The community profile for the City of Jackson is detailed in the following sections. Figure C-1 displays a City map and the location of Jackson within Amador County.

Figure C-1 City of Jackson



C.3.1. Geography and Climate

The City of Jackson, at 1,200-1,600 feet, is located in the heart of California's historic Mother Lode in the Sierra Nevada foothills, 45 miles east of Sacramento and Stockton. Jackson began as a gold mining camp in 1848 and today is the County Seat. Jackson combines the gold rush era downtown district and Victorian era neighborhoods with modern subdivisions and shopping centers. Jackson enjoys a diversified economy supported by agribusiness, government, and tourism. Commercial activities include a vibrant historic downtown district, two major grocery chain stores, and a variety of personal service providers. Jackson is also home to the only movie theater complex in Amador County, and hosts a number of well attended seasonal events and festivities that are famous throughout the Mother Lode, the Sacramento Valley, and Northern California. The Shenandoah Valley and its wineries are also close by.

Generally, Jackson enjoys a relatively mild climate. The climate in Jackson is characterized by warm summer and moderate winter temperatures. The mean annual temperature in the Jackson area is 46°F in January and 78°F in July. The mean annual precipitation is 22 inches, of which 6.2 inches falls in January and only 0.2 inches in July.

Summer temperatures generally range between 80°F and 102°F, with the occasional summer thunderstorm. During the winter months, temperatures can dip below the freezing mark but not for prolonged periods of time. Occasional snow will fall but normally not enough to impede normal living routines. Jackson rarely has, only about once every 8 years, more than usual snowfall activity. Jackson has very shallow to moderately deep, rocky, or gravelly soils composed of metabasic rocks and metasedimentary slate and schist.

C.3.2. History

Jackson, the person, was born early in the Gold Rush when miners began working the area near Marshall's discovery site. In 1848, Col. Alden Jackson and his party set up camp near a spring in the center of town. For years, Jackson was known as a "Mother Lode Mecca." Pits and small shafts were used in the 1850s, but after placers ran out in the 1860s, hard rock mining was king. The downtown area of Jackson was almost totally destroyed by fire in August 1862. Many downtown buildings date from the 1862-63 reconstruction.

C.3.3. Economy

US Census estimates show economic characteristics for the City of Jackson. These are shown in Table C-3 and Table C-4. Mean household income in the City was $61,838. Median household income in the City was $45,278.

Table C-3 City of Jackson – Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	0	0.0%
Construction	136	7.0%

Industry	Estimated Employment	Percent
Manufacturing	46	2.3%
Wholesale trade	0	0.0%
Retail trade	238	12.2%
Transportation and warehousing, and utilities	56	2.9%
Information	43	2.2%
Finance and insurance, and real estate and rental and leasing	115	5.9%
Professional, scientific, and management, and administrative and waste management services	155	7.9%
Educational services, and health care and social assistance	493	25.2%
Arts, entertainment, and recreation, and accommodation and food services	409	20.9%
Other services, except public administration	146	7.5%
Public administration	118	6.0%

Source: US Census Bureau American Community Survey 2013-2017 Estimates

Table C-4 City of Jackson – Income and Benefits

Income Bracket	Population	Percent
<$10,000	49	2.4%
$10,000 – $14,999	165	8.0%
$15,000 - $24,9999	392	19.1%
$25,000 – $34,999	331	16.1%
$35,000 – $49,999	136	6.6%
$50,000 – $74,999	537	26.1%
$75,000 – $99,999	247	12.0%
$100,000 – $149,999	121	5.9%
$150,000 – $199,999	52	2.5%
$200,000 or more	26	1.3%

Source: US Census Bureau American Community Survey 2013-2017 Estimates

The 2014-2019 Amador County Joint Housing Element showed major employers in the area. Major employers in Jackson include:

- Amador County Sherriff and Coroner
- Jackson Junior High School
- Kit Carson Nursing and Rehab
- Raleys
- Grocery Outlet
- Cost Less Foods
- Sutter Amador Hospital and Lab

C.3.4. Population

The California Department of Finance estimated the January 1, 2019 total population for the City of Jackson was 4,770.

C.4 Hazard Identification

Jackson identified the hazards that affect the City and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to Jackson (see Table C-5).

Table C-5 City of Jackson—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests	Extensive	Highly Likely	Limited	Low	Low
Aquatic Invasive Species	Significant	Highly Likely	Limited	Low	Low
Avalanche	Limited	Likely	Negligible	Low	Medium
Climate Change	Extensive	Likely	Limited	Medium	–
Dam Failure	Limited	Unlikely	Critical	High	Medium
Drought & Water shortage	Extensive	Likely	Limited	Medium	High
Earthquake (large damaging/small)	Significant	Unlikely/ Likely	Catastrophic	High	Low
Floods: 1%/0.2% annual chance	Significant	Occasional/ Unlikely	Critical	High	Medium
Floods: Localized Stormwater	Extensive	Highly Likely	Critical	Medium	Medium
Landslide, Mudslide, Debris Flow	Significant	Likely	Critical	Medium	Medium
Levee Failure	Limited	Occasional	Limited	Low	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely	Limited	Medium	Low
Severe Weather: Winter Storms and Freeze	Significant	Highly Likely	Limited	Medium	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High	High

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

C.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Jackson's hazards and assess the City's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

C.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section C.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard affects the City and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Amador County Planning Area.

C.5.2. Vulnerability Assessment and Assets at Risk

This section identifies Jackson's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Values at Risk

The following data from the Amador County Assessor's Office is based on the 12/31/2018 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitations are created by Proposition 13 and the Williamson Act as detailed in the Base Plan. With respect to Proposition 13, instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. However, depending on the type of hazard and impact of any given hazard event, land values may be adversely affected; thus, land values are included as appropriate. Table C-6 shows the 12/31/2018 Assessor's values and content replacement values (e.g., the values at risk) broken down by property type for the City.

Table C-6 City of Jackson – Total Values at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Agricultural	11	2	$4,251,931	$531,814	$531,814	$5,315,559
Commercial	266	215	$46,200,733	$158,680,676	$158,680,676	$363,562,085
Industrial	12	9	$2,792,453	$5,011,363	$7,517,043	$15,320,859
Miscellaneous	61	2	$607,728	$1,465,924	$0	$2,073,652
Residential	1,687	1,473	$111,075,541	$283,328,814	$141,664,396	$536,068,751
Unknown	81	0	$0	$0	$0	$0
City of Jackson Total	**2,118**	**1,701**	**$164,928,386**	**$449,018,591**	**$308,393,929**	**$922,340,906**

Source: Amador County 12/31/2018 Parcel/Assessor's Data

Critical Facilities and Infrastructure

Critical facilities and infrastructure are those buildings and infrastructure that are crucial to a community. Should these be damaged, it makes it more difficult for the community to respond to and recover from a disaster. 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, and (3) Hazardous Materials Facilities, as discussed in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the City of Jackson from Amador County GIS is shown on Figure C-2. Table C-7 gives summary information about the critical facilities in the City. Table C-8 details the facility categories and breaks them down by facility type. Details of critical facility definition, type, name, address, and jurisdiction by hazard area or zone are listed in Appendix F. The critical facility inventory and associated maps for the City only include the first two categories of facility types; a GIS layer of Hazardous Materials Facilities was not available.

Figure C-2 City of Jackson – Critical Facilities

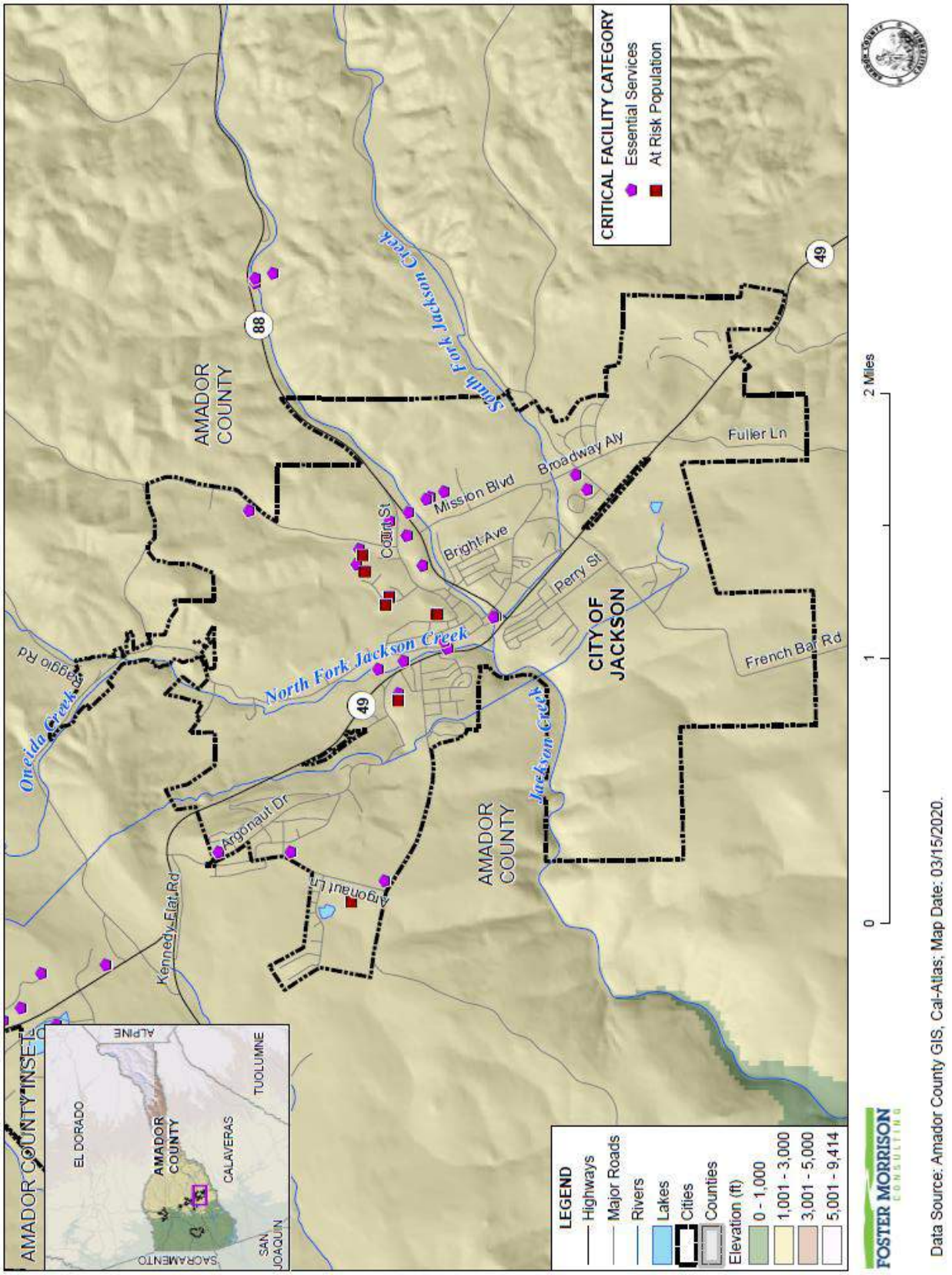


Table C-7 City of Jackson – Critical Facility Summary

Critical Facility Category	Facility Count
Essential Services	23
At Risk Population	8
City of Jackson Total	**31**

Source: Amador County GIS

Table C-8 City of Jackson – Critical Facilities by Facility Category and Type

Critical Facility Category	Facility Type	Facility Count
Essential Services	Clinic	7
	Community Center	2
	Court House	1
	DMV	1
	EOC	1
	Fire Station	2
	Hospital	1
	Library	1
	Police Station	3
	Post Office	1
	Public Administration Building	2
	School District Office	1
	Total	**23**
At Risk Population	Residential Care Facility	5
	School	3
	Total	**8**
City of Jackson Total		**31**

Source: Amador County GIS

Natural Resources

Natural resources are unique to the City and are difficult to replace. Should a natural disaster occur, these species and locations are at risk.

The three forks of Jackson Creek converge between the civic center and historic Downtown Jackson. These creeks played a key role in the early settlement of the Jackson area, not just by the American settlers who came in search of placer gold in the 1850s, but for the Native Americans who preceded them as well. There are also abundant areas of oak woodland in developed and undeveloped areas within City limits.

There are wetlands located in the City. These wetlands have been mapped and tabulated. Figure C-3 shows the wetlands locations in the City. Table C-9 delineates the types, counts, and acreages of wetlands in the City.

Figure C-3 City of Jackson – Wetland Locations

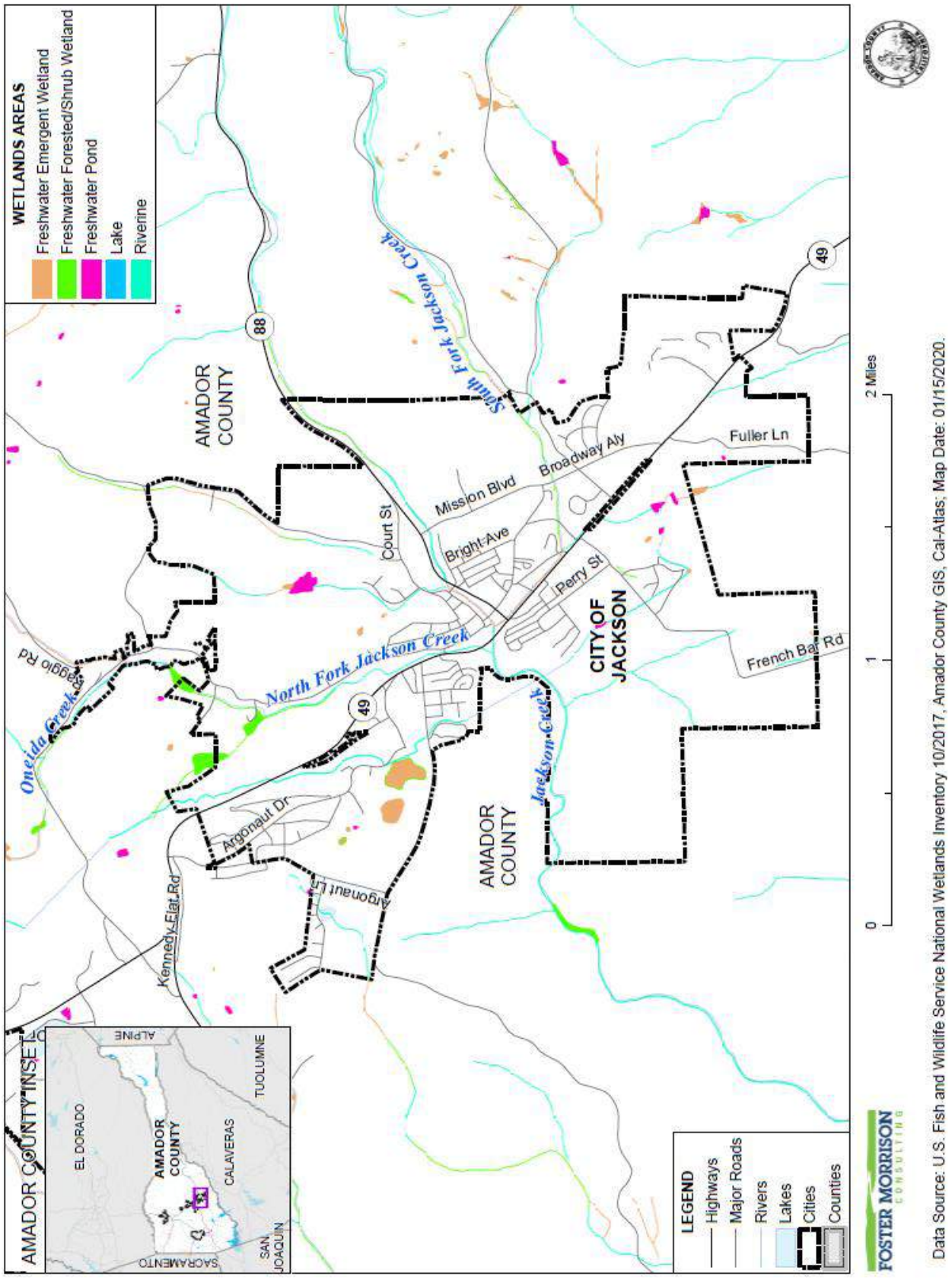


Table C-9 City of Jackson – Wetland Counts and Acreages

Wetlands Area Type	Wetlands Count	Wetlands Area (in Acres)
Freshwater Emergent Wetland	20	16.01
Freshwater Forested/Shrub Wetland	13	10.61
Freshwater Pond	9	5.88
Lake	0	0
Riverine	22	22.25
Jackson Total	**64**	**54.75**

Source: US Fish and Wildlife Service

Historic and Cultural Resources

Historic and cultural resource are difficult to replace, and special care is needed when rebuilding or improvements are necessary. Should a natural disaster occur, these properties and locations are at risk.

The City of Jackson has a 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. 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. These requirements are detailed in Section 4.3.1 of the Base Plan. Table C-10 lists the historical buildings in the City.

Table C-10 City of Jackson– Historical Resources

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City/ Community
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
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

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City/ Community
Paugh, William H., House (N2364)	X	X		6/5/2007	Jackson
Butterfield, John A., House (N1461)	X			9/11/1986	Jackson

Source: California Department of Parks and Recreation Office of Historic Preservation, http://ohp.parks.ca.gov/

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.

Growth and Development Trends

As part of the planning process, the HMPC looked at changes in growth and development, both past and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability over time. Information from the City of Jackson General Plan Housing Element, the California Department of Finance, the US Census Bureau form the basis of this discussion.

Historic Population Trends and Current Population

Population growth can increase the number of people living in hazard prone areas. Jackson has generally seen periods of moderate and intense growth. Jackson has seen growth rates as shown in Table C-11. The City experience small changes in the 1950s to 1960s. During the 1970s population grew steadily, and in the 1980s population grew quickly. The 1990s and 2000s saw steady growth. Growth has cooled in the 2010s.

Table C-11 City of Jackson – Population Changes Since 1950

Year	Population	Change	% Change
1950	1,879	–	–
1960	1,852	-27	-1.4%
1970	1,924	72	3.9%
1980	2,331	407	21.2%
1990	3,545	1,214	52.1%
2000	3,989	444	12.5%
2010[1]	4,651	662	16.6%
2019[2]	4,770	119	2.6%

Source: [1]US Census Bureau, [2]California Department of Finance

Special Populations and Disadvantaged Communities

There are certain populations in the City that are at greater risk to hazards, due to circumstances beyond their control. These populations in the City present a unique challenge when natural hazards arise.

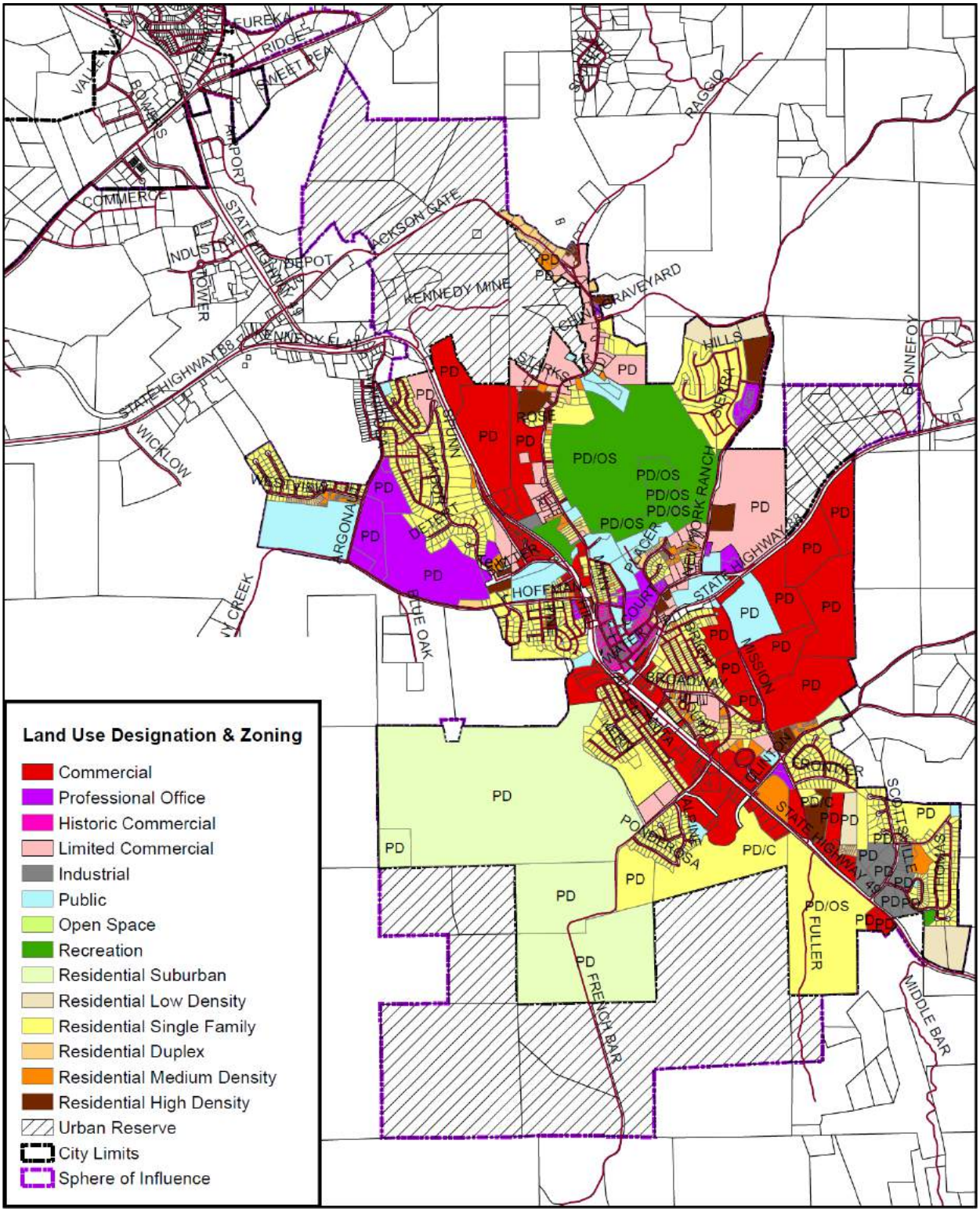
Approximately 27.5% (2010 Census) of the City's population is over the age of 65. The bulk of these citizens reside in three age restricted (55 and older) subdivisions within the City limits: Rollingwood Mobile Home Park, Village Glen, and Jackson View Estates. A fair number also reside in the five residential care facilities located in the City.

Land Use

State planning law requires that the land use element of a general plan include a statement of the standard population density, building intensity, and allowed uses for the various land use designations in the plan (Government Code Section 65302(a)). The City's land use designations are generally described below and mapped on the Land Use Diagram (Figure C-4). The Jackson Municipal Code provides detailed land use and development standards for development.

With this General Plan, a variety of new land use designations have been established to reflect the more mixed and, in some cases, more intense land uses envisioned for Jackson. New mixed-use designations provide the opportunity for a combination of residential, commercial, and office uses on a single site, depending on the designation. Land Use Designations and Zoning for the City is shown on Figure C-4.

Figure C-4 City of Jackson – Land Use Diagram



Source: City of Jackson General Plan Land Use Element

Development since 2014 Plan

As discussed in Section 4.3.1 of the Base Plan, future development has occurred in the City since the last plan. Some of this has occurred in hazard prone areas. The City Building Department tracked total building permits issued since 2014 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table C-12 and Table C-13.

Table C-12 City of Jackson – Total Development Since 2014

Property Use	2015	2016	2017	2018	2019
Agricultural	0	0	0	0	–
Commercial	0	0	0	0	–
Industrial	0	0	0	0	–
Residential	11	4	13	18	–
Unknown	0	0	0	0	–
Total	**11**	**4**	**13**	**18**	**–**

Source: City of Jackson Building Department

Table C-13 City of Jackson – Development in Hazard Areas since 2014

Property Use	1% Annual Chance Flood	Landslide Susceptibility Area	Wildfire Risk Area[1]	Other
Agricultural	0	0	0	0
Commercial	0	0	0	0
Industrial	0	0	0	0
Residential	0	69	69	0
Unknown	0	0	0	0
Total	**0**	**69**	**69**	**0**

Source: City of Jackson Building Department

[1]Moderate or higher wildfire risk area

Future Development

A discussion of future development is included below. Future development is important to hazard mitigation planning. Ensuring that future development does not place more people and property into known hazard zones is one of the goals of mitigation planning.

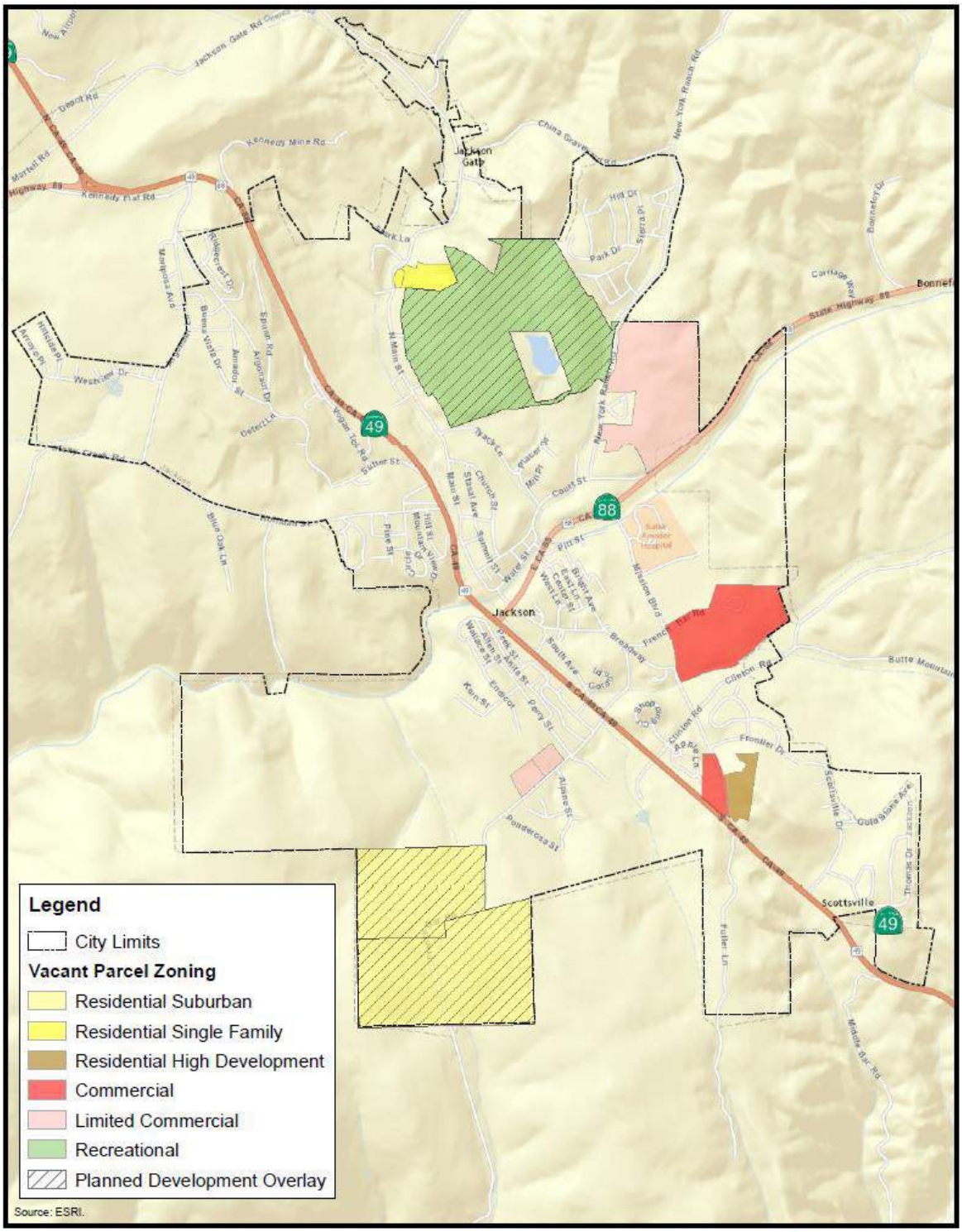
According to the City of Jackson 2008 Land Use Element to the General Plan, the total size of the City of Jackson is 2,280 acres. Of this, the total amount of vacant land (most of which is residential) is approximately 1,315 acres. Based on vacant property within the City and the current and proposed uses of that property, it is assumed that within a 20-year period the following development will occur within the existing incorporated city:

- Single-Family Residential Units 460
- Multi-Family Residential Units 125

- Commercial 373,500 square feet
- Office Space 70,000 square feet
- Industrial 117,000 square feet
- Public/Institutional 25,000 square feet

Areas targeted for future development include those areas identified on the Land Use Designation Maps shown above in Figure C-4. The "(pd)" designation applies to lands that are largely undeveloped where planned unit developments or neighborhood developments are encouraged. A map of available properties in the City can be seen on Figure C-5.

Figure C-5 City of Jackson – Available Land Inventory



Source: 2014-2019 Amador County Joint Housing Element

More general information on growth and development in Amador County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Amador County Vulnerability and Assets at Risk of the Base Plan.

GIS Analysis

Using GIS, the following methodology was used in determining parcel counts and acreages with future development projects in the City of Jackson. Future development areas in the City came from two sources.

- Future Development Areas – Jackson provided mapped areas where development possibilities for the City exist. This came from the City of Jackson. These areas include:
  - ✓ Argonaut II
  - ✓ Jackson View
  - ✓ Pine Meadows
  - ✓ Stonecreek
- Sphere of Influence (SOI) – Amador County LAFCO provided the SOI in mapped format for the City.

Using the GIS parcel spatial file for each of these areas, the 5 areas and 103 parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure C-6 shows the locations of future development areas the City is planning to develop in both the Future Development Areas and the SOI. Table C-14 shows the parcels and acreages of each future development area in the City, broken out by Future Development Areas and Sphere of Influence. As seen on this figure, these areas overlap. In the table, the Future Development Areas are shown in their full acreages, while the SOI acreages in the table are the remainder of the SOI once the Future Development Areas have been subtracted from them.

Figure C-6 City of Jackson – Future Development Areas

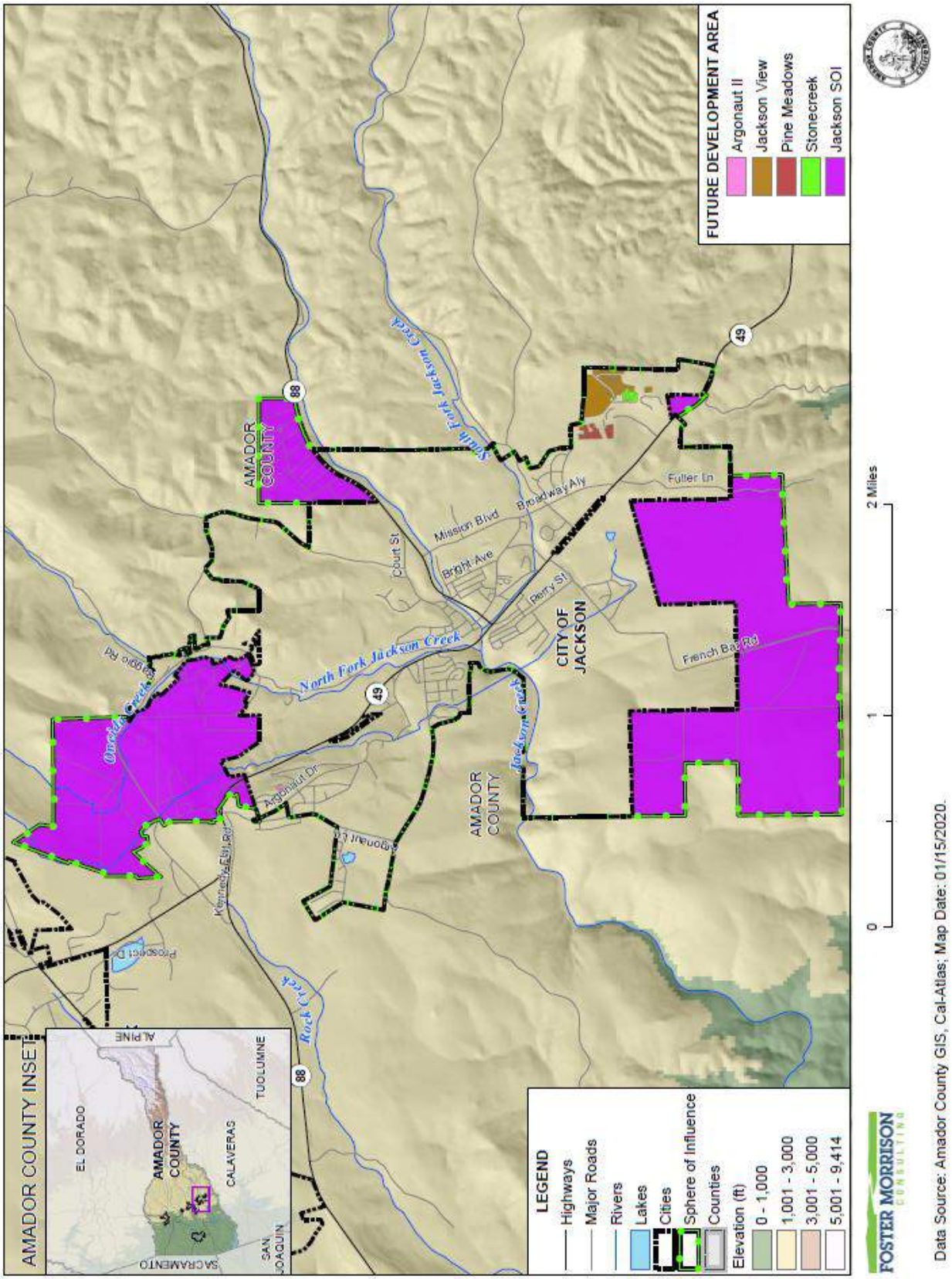


Table C-14 City of Jackson – Future Development Area Parcels and Acres

Future Development	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Argonaut II	2	0	2	0.36	0.00	0.36
Jackson View	32	0	32	22.02	0.00	22.02
Pine Meadows	12	0	12	5.08	0.00	5.08
Stonecreek	4	1	3	2.13	0.38	1.74
Jackson SOI	53	23	30	1,191.96	312.53	879.43
Grand Total	**103**	**24**	**79**	**1,221.54**	**312.91**	**908.63**

Source: City of Jackson GIS

C.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table C-5 as high or medium significance hazards. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Amador County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. 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 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.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Climate Change

Likelihood of Future Occurrence–Likely

Vulnerability–Medium

Hazard Profile and Problem Description

Climate change adaptation is a key priority of the State of California. The 2018 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.

In Amador County and the City, the HMPC noted that each year it seems to get a bit warmer and snow seems to start at higher levels. It was also noted that 2017 was one of the wettest years ever.

The 2015 Energy Action Plan for the City noted that the City of Jackson, like all foothill communities in the Sierra Nevada, faces challenges associated with climate change in the region. Increased frequency and altered timing of flooding will increase risks to agriculture, people, ecosystems, and infrastructure. Potential impacts on water resources include reduced mountain snowpack, delayed snow accumulation, earlier snow melting and ultimately shortages in runoff and water supply. Extended droughts may increase wildland fire risk. Since local economies in the area rely heavily on these resources for agriculture, tourism, recreation and other industries, climate change may negatively affect economic activity in Jackson, and ultimately impact quality of life for community members.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the City, Amador County, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, 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

Climate change has never been directly linked to any declared disasters. While the City noted that climate change is of concern, no specific impacts of climate change could be recalled. The City and HMPC members noted that the strength of storms does seem to be increasing and the temperatures seem to be getting hotter.

Vulnerability to Climate Change

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. California's APG: 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. 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. This information can be used to guide climate adaptation planning in the City and Amador County Planning Area.

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra region in which the Amador County Planning Area is part of:

- Temperature increases
- Decreased precipitation
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

Future Development

The City 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. For example, interior western and southwestern states may experience an exodus of population due to challenges in adapting to heat even more extreme than that which is projected to occur here. While there are currently no formal studies of specific migration patterns expected to impact the City and 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.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–High

Hazard Profile and 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.

Location and Extent

Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, a total dam failure would most probably happen as a consequence of the natural disaster triggering the event, such as an earthquake. There

is no scale with which to measure dam failure. However, Cal DWR Division of Safety of Dams (DSOD) assigns hazard ratings 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. Dams are classified in four categories that identify the potential hazard to life and property: Low, Significant, High, and Extremely High. These were discussed in more detail in Section 4.2.10 of the Base Plan.

While a dam may fill slowly with runoff from winter storms, a dam break can have a very quick speed of onset, depending on the nature of the failure. The duration of dam failure is generally not long – only as long as it takes to empty the reservoir of water the dam held back. The City would be affected for as long as the flood waters from the dam failure took to drain downstream.

Geographic flood extent from the Cal OES dam inundation areas showed no mapped dam inundations that affected the City. However, the City also noted that, while inundation data was not available, the City is at risk from the Argonaut Dam. 2017 heavy storms, which resulted in widespread flooding conditions in Northern California, have renewed concerns about the condition of the century old Eastwood Multiple Arch dam that holds back what some government estimates say may be up to 1 million cubic yards of water and tailings containing high levels of mercury, lead and arsenic left over from Argonaut Mine operations from the mid-1800s through 1942. The 46-foot-high, 420-foot-long dam, only 400 yards from downtown Jackson, has been deemed structurally unstable for decades. U.S. Environmental Protection Agency and U.S. Army Corp of Engineer estimates show if the dam should fail, it could send a 15-foot-deep mudflow into the heart of Jackson, past Jackson Junior High School and into the historic downtown in as little as two minutes. These concerns resulted in the dam being retrofitted by the EPA and DTSC.

Past Occurrences

The City noted no dam failure occurrences that have affected the City.

Vulnerability to Dam Failure

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. There are no dams with mapped inundation areas that affect the City. Due to that fact, no GIS analysis on asset at risk, critical facilities at risk, or populations at risk could be performed. However, downtown Jackson is at risk to dam failure from the Argonaut dam.

Impacts

Impacts to the City from a dam failure flood 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.

Future Development

Future dam failures are considered unlikely. The City enforces it floodplain ordinance, which helps to reduce risk to flooding by requiring structures to be above the base flood elevation, which depending on

inundation depths may provide some relief. Siting of future development areas should take dam failure flooding into account.

Drought & Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Drought is a complex issue involving 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. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

The HMPC did note that the City is served by the Amador Water Agency (AWA), which does have very "senior" water rights on the Mokelumne River, making the City less vulnerable than other areas in the State of California to drought and water shortage.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the City, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages and for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the City and the County are shown in Section 4.2.11 of the Base Plan.

Past Occurrences

Since drought is a regional phenomenon, past occurrences of drought for the City are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.2.11 of the Base Plan.

Vulnerability to Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the City, 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.

Impacts

The vulnerability of the City to drought is City-wide, 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. The increased dry fuels and fuel loads associated with drought conditions can also 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.

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, recreation, and agricultural use. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

With more precipitation likely falling as rain instead of snow in the Sierra's, 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.

Future Development

As the population in the area continues to grow, so will the demand for water. The AWA provides water to the City through reliable surface water sources. However, population growth in the City will continue to increase the demand for water. Ongoing planning will be needed by the City and AWA to account for population growth and increased water demands.

Earthquake (large damaging/small)

Likelihood of Future Occurrence–Unlikely/Occasional
Vulnerability–Medium

Hazard Profile and 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.

The City of Jackson General Plan Safety Element noted that the City of Jackson is located in a low earthquake (seismic), hazard area. A major earth shaking might occur with a frequency of once in 50 years. The maximum probable intensity of an earthquake in the area, (VII on the Modified Mercalli Scale) is described as:

> *Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices, unbraced parapets, and architectural ornaments. Some cracks in masonry. Waves on ponds. Water turbid with mud. Small slides and caving in along sand and gravel banks. Large bells ring. Concrete irrigation ditches damaged.*

A more likely earthquake, (Von the Modified Mercalli Scale), is described as:

> *Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.*

The epicenters of the highest magnitude earthquakes to be felt in this area are likely to be located along the San Andreas and Hayward faults in the Bay Area. The greatest concern for the City is related to the unreinforced masonry buildings in the City.

Location and Extent

Since earthquakes are regional events, the whole of the City is at risk to earthquake. Jackson and the surrounding area are relatively free from significant seismic and geologic hazards. There are no known or inferred active faults within the City.

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, as discussed in Section 4.2.12 of the Base Plan. 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 (equivalent to 5.5 to 6.5 on the Richter Scale). During a Mercalli VII, most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. The City is located in an area where few earthquakes of significant magnitude occur, so both magnitude and intensity of earthquakes are expected to remain low. Seismic shaking maps for the area show Amador County and the City fall within a low to moderate shake risk.

Past Occurrences

The City noted no past occurrences of earthquakes or that affected the City in any meaningful way.

Vulnerability to Earthquake

The combination of plate tectonics and associated California coastal mountain range building geology generates earthquake as a result of the periodic release of tectonic stresses. Amador County's mountainous terrain lies in the center of the North American and Pacific tectonic plate activity. There have been earthquakes as a result of this activity in the historic past, and there will continue to be earthquakes in the future of the California north coastal mountain region. Both the San Andreas Fault and the Sierra Frontal System faults poses possibly significant impacts to Amador County and the City as they have the capabilities of producing a quake.

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault; however, liquefaction can occur further from the source of the earthquake. In general, newer construction is more earthquake resistant than older construction due to enforcement of improved building codes. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions and associated liquefaction, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry (URM) and soft story buildings. There are URM buildings in the City, particularly in the downtown area, but the City does not currently have a retrofit program.

The City of Jackson General Plan Safety Element noted that there are pre-1955 structures built of masonry and chimneys, cornices, and second story porches where reinforcing was not provided to withstand seismic stresses and major storms. Many of the older structures, both masonry and wood frame, are historic and should be preserved but they need rehabilitation to provide structural safety, fire safety, sanitation facilities, and adequate exits in order to be used as places of public assembly.

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. The City of Jackson is within the less hazardous Zone 3.

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable.

Impacts from Earthquake

Impacts from earthquake in the City will vary depending on the fault that the earthquake occurs on, the depth of the earthquake strike, and the intensity of shaking. Large events could cause damages to infrastructure, critical facilities, residential and commercial properties, and possible injuries or loss of life.

Earthquake Analysis

Due to the regional effects of an earthquake, a Hazus earthquake analysis was performed on a countywide basis. This can be found in Section 4.3.9 of the Base Plan. While these runs were not done specific to the City, maps showing damage in the County show greater areas of damage near the cities in the County. This is because most models reflect that the greatest damage occurs in the built-out, populated areas of the County. The deterministic 6.7 Hayward Fault run showed minimal damage to the County and the City, while the probabilistic 7.0 earthquake scenario showed moderate to high damage to the County and the City.

Future Development

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. The City enforces the state building code, which mandates construction techniques that minimize seismic hazards. Future development in the City is subject to these building codes.

Flood: 100/500-Year

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–High

Hazard Profile and Problem Description

This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the County or in the City, and have caused damages in the past. Flooding is a significant problem in Amador County and the City. Historically, the City has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred both within the 1% and 0.2% annual chance floodplains and in other localized areas.

As previously described in Section 4.2.13 of the Base Plan, the Amador County Planning Area and the City of Jackson have been subject to historical flooding. Jackson is traversed by several stream systems and is at risk to the 1% and 0.2% flood.

Location and Extent

The City of Jackson has areas located in the 1% and 0.2% annual chance floodplain. This is seen in Figure C-7.

Figure C-7 City of Jackson – FEMA DFIRM Flood Zones

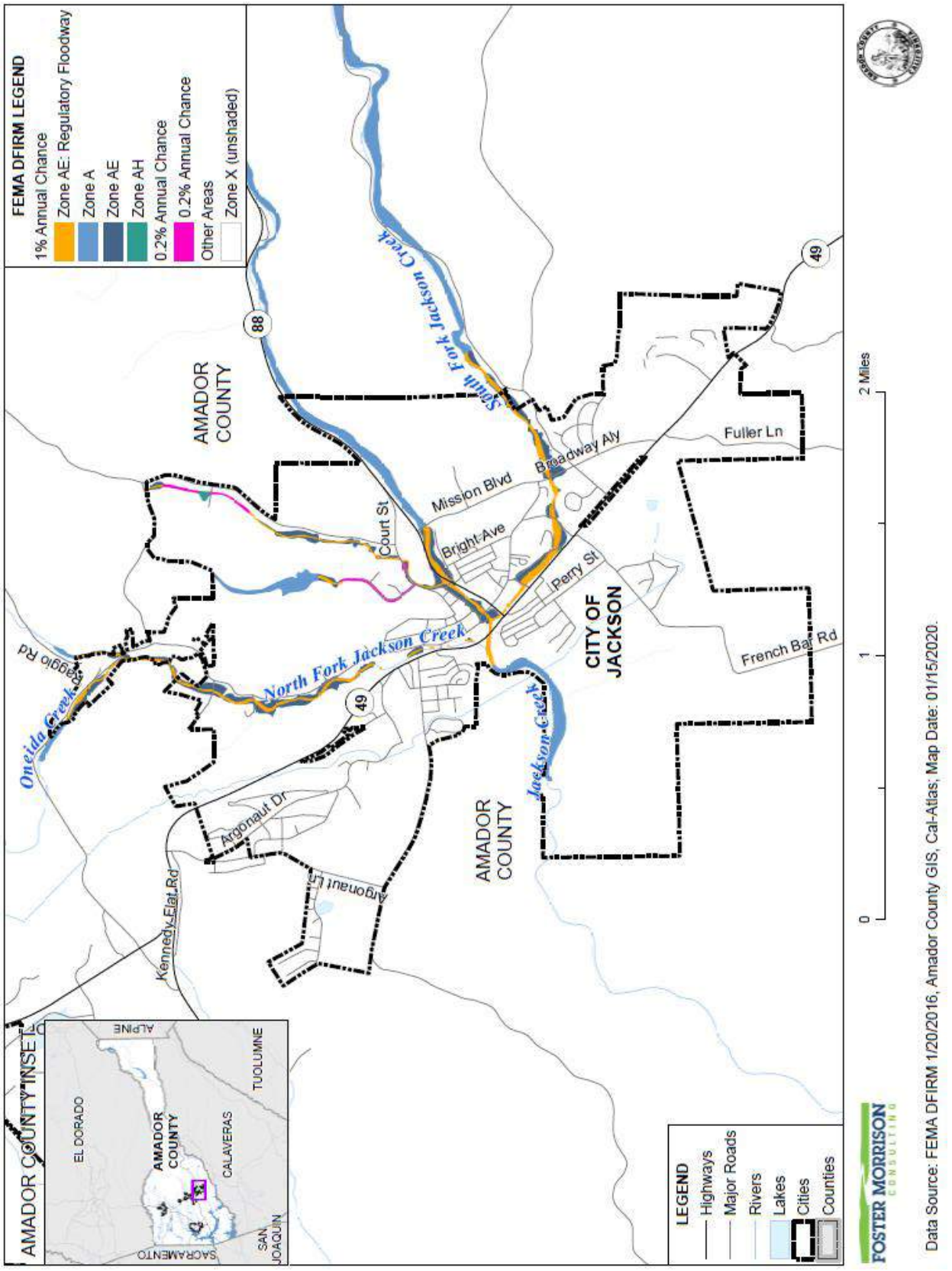


Table C-15 details the DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the City.

Table C-15 City of Jackson– DFIRM Flood Hazard Zones

Flood Zone	Description	Flood Zone Present in City of Jackson
A	100-year Flood: No base flood elevations provided	Y
AE	100-year Flood: Base flood elevations provided	Y
AE Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided	Y
Shaded X	500-year Flood: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	Y
X (unshaded)	No flood hazard	Y

Source: FEMA

Additionally, flood extents can generally be measured in volume, velocity, and depths of flooding. Expected flood depths in the City vary, depending on the nature and extent of a flood event; specific depths are unknown. Flood durations in the City tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Flooding in the City tends to have a shorter speed of onset, due to the amount of water that flows through the City. Geographical flood extent from the scale depicted in the FEMA DFIRMs is shown in Table C-16.

Table C-16 City of Jackson – Geographical Flood Hazard Extents in FEMA DFIRM Flood Zones

Flood Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
1% Annual Chance	91	0.02%	41	0.02%	50	0.02%
0.2% Annual Chance	3	0.00%	2	0.00%	1	0.00%
Other Areas	2,024	0.52%	715	0.43%	1,309	0.59%
Total	**2,118**	**0.54%**	**758**	**0.46%**	**1,360**	**0.61%**

Source: Amador County 1/20/2016 DFIRM

*Percentage of total acres is the percent of total acres of the entire County Planning Area

Past Occurrences

A list of state and federal disaster declarations for Amador County from flooding is shown on Table C-17. These events also likely affected the City to some degree.

Table C-17 Amador County – State and Federal Disaster Declarations from Flood 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	15	1955, 1958, 1963, 1964, 1969, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1959, 1963 (twice), 1969, 1980, 1982, 1986, 1995, 1997, 1998

Source: Cal OES, FEMA

The City noted event in January and February 2017. Heavy rains cause damages to multiple areas in the City:

- Wastewater Treatment Plant Road: The slope slipped at the road to the sewer treatment plant. An emergency repair was made to repair the slope and road. ($600,000 in damages)
- Michelle Drive/Kristi Court Intersection: Asphalt concrete experienced transverse cracking in multiple locations. Asphalt concrete would be ground out and replaced. ($20,000 in damages)
- Westview Drive and Westview Drive at Terry Place & Erinn Place Intersection: Asphalt concrete experienced alligator cracking in multiple locations. Asphalt concrete would be ground out and replaced. ($20,000 in damages)
- Busi Parking: There is slope slippage at the Busi Parking lot adjacent to Mel's Diner. The slope would require reconstruction. ($500,000 in damages)
- Summit Street: Asphalt erosion has deteriorated the road. Asphalt concrete would be ground out and replaced. ($30,000 in damages)
- City Hall Roof: High gusty winds damaged the roof at City Hall. The roof will require fixing to alleviate the damage. ($60,000 in damages)
- Argonaut Drive: Asphalt concrete has deteriorated on road way adjacent to Fire Station. Asphalt concrete would be ground out and replaced. ($20,000 in damages)
- Stark Ln: existing bridge deck damaged underneath the deck, concrete is falling off and reinforcement is now exposed. Bridge to be replaced with a concrete box culvert before it fails. ($950,000 in damages)
- Jackson Gate Rd - Kennedy Mine walking trail, the base rock was washed out and material ended up on Jackson Gate Road. The runoff has created large rills in the trail. Place new base rock and compact. ($20,000 in damages)
- Jackson Gate/China Graveyard: the material around an existing culvert that crosses Jackson Gate from China Graveyard was undermined from the large amount of runoff. Pipe needs to be exposed and re-backfilled with cement slurry and the trench repaved. ($12,000 in damages)
- China Graveyard: the existing roadside ditch along the north side of the road starting from New York Ranch Rd east 630 has been washed out and the westbound lane edge of pavement is sluffing off and starting to get undermined. A 6' wide section of the edge of the road needs to be rebuilt with 3" ac over 8" ab. Roadside ditch needs to be cleaned and regraded and RSP placed in the ditch. ($85,350 in damages)
- Mattley St: repair bank failure above city parking lot bathrooms. ($525,000 in damages)
- Sutter St: existing roadside ditch washed out and asphalt concrete ditch has been undermined from the high flows coming down Sutter St. 800 lf of a new asphalt concrete ditch that ties into the existing roadway edge of pavement needs to be constructed. ($52,600 in damages)
- Spunn Rd: there are two existing culverts that daylight on the east side of the road at 10340 Spunn Rd. High flows have eroded the bank at the outlet of the culverts. An energy dissipator is needed with rip rap at the two outlets. ($21,000 in damages)

Vulnerability to Flood

Floods have been a part of the City's historical past and will continue to be so in the future. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damages. Predominantly, the effects of flooding are generally confined to areas near the waterways of the County. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat. This threatens structures in the floodplain. Structures can also be damaged from trees falling as a result of water-saturated soils. Electrical power outages happen, and the interruption of power causes major problems. Loss of power is usually a precursor to 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. People may be swept away in floodwaters, causing injuries or deaths.

The General Plan Safety Element noted that the historic center of the Jackson area is the junction of the branches of Jackson Creek into the main stream. There are no major dams located on the creeks upstream from the City. Flooding is confined to narrow areas along the streams, typically less than 150 feet wide, as shown on the DFIRM. The flood waters seldom rise above the natural high banks of the streams. In the central business district, portions of the natural banks have been replaced with masonry walls and in a few places the North Fork has been covered over with buildings.

Impacts

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 as well as life safety issues. 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. Floodwaters can transport large objects downstream which can damage or remove stationary structures. 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. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Assets at Risk

Based on the vulnerability of Jackson to the flood hazard, the sections that follow describes significant assets at risk in the City of Jackson. This section includes the values at risk, flooded acres, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Jackson. The methodology described in Section 4.3.10 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Table C-18 is a summary table for the

City of Jackson. Parcel counts, values, estimated contents, and total values in the City are 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. As previously mentioned, there are no areas of the City within the 1% annual chance flood. Table C-19 breaks down Table C-18 and shows the property use, improved parcel count, improved values, estimated contents, and total values that fall in each floodplain in the City.

*Table C-18 City of Jackson – Count and Value of Parcels at Risk in Summary DFIRM Flood Zones**

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard	128	100	$8,095,390	$18,226,396	$11,473,740	$37,795,526
0.2% Annual Chance Flood Hazard**	7	5	$533,243	$2,168,520	$2,168,520	$4,870,283
Other Areas	1,983	1,596	$156,299,753	$428,623,675	$294,751,669	$879,675,097
City of Jackson Total	**2,118**	**1,701**	**$164,928,386**	**$449,018,591**	**$308,393,929**	**$922,340,906**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 C-19 City of Jackson – Count and Values of Parcels at Risk by Detailed Flood Zone and 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 AE Floodway						
Agricultural	0	0	$0	$0	$0	$0
Commercial	4	2	$245,107	$84,789	$84,789	$414,685
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	2	0	$0	$0	$0	$0
Residential	29	23	$1,166,175	$2,790,715	$1,395,358	$5,352,248
Unknown	1	0	$0	$0	$0	$0
Zone AE Floodway Total	**36**	**25**	**$1,411,282**	**$2,875,504**	**$1,480,147**	**$5,766,933**
Zone AE						
Agricultural	0	0	$0	$0	$0	$0
Commercial	16	10	$1,695,617	$3,622,040	$3,622,040	$8,939,697
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	3	0	$0	$0	$0	$0

Flood Zone/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Residential	68	63	$4,476,115	$10,714,594	$5,357,295	$20,548,004
Unknown	2	0	$0	$0	$0	$0
Zone AE Total	**89**	**73**	**$6,171,732**	**$14,336,634**	**$8,979,335**	**$29,487,701**
Zone A						
Agricultural	0	0	$0	$0	$0	$0
Commercial	2	2	$427,999	$1,014,258	$1,014,258	$2,456,515
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	1	0	$84,377	$0	$0	$84,377
Unknown	0	0	$0	$0	$0	$0
Zone A Total	**3**	**2**	**$512,376**	**$1,014,258**	**$1,014,258**	**$2,540,892**
1% Annual Chance Flood Hazard Total	**128**	**100**	**$8,095,390**	**$18,226,396**	**$11,473,740**	**$37,795,526**
0.2% Annual Chance Flood Hazard**						
Agricultural	0	0	$0	$0	$0	$0
Commercial	6	5	$533,243	$2,168,520	$2,168,520	$4,870,283
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Unknown	1	0	$0	$0	$0	$0
0.2% Annual Chance Flood Hazard Total	**7**	**5**	**$533,243**	**$2,168,520**	**$2,168,520**	**$4,870,283**
Other Areas						
Agricultural	11	2	$4,251,931	$531,814	$531,814	$5,315,559
Commercial	238	196	$43,298,767	$151,791,069	$151,791,069	$346,880,905
Industrial	12	9	$2,792,453	$5,011,363	$7,517,043	$15,320,859
Miscellaneous	56	2	$607,728	$1,465,924		$2,073,652
Residential	1,589	1,387	$105,348,874	$269,823,505	$134,911,743	$510,084,122
Unknown	77	0	$0	$0	$0	$0
Other Areas Total	**1,983**	**1,596**	**$156,299,753**	**$428,623,675**	**$294,751,669**	**$879,675,097**
City of Jackson Total	**2,118**	**1,701**	**$164,928,386**	**$449,018,591**	**$308,393,929**	**$922,340,906**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 C-20 summarizes Table C-19 above and shows City of Jackson loss estimates and shows improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

*Table C-20 City of Jackson – 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	128	100	$8,095,390	$18,226,396	$11,473,740	$29,700,136	$5,940,027	0.11%
0.2% Annual Chance Flood Hazard**	7	5	$533,243	$2,168,520	$2,168,520	$4,337,040	$867,408	0.02%
Grand Total	**135**	**105**	**$8,628,633**	**$20,394,916**	**$13,642,260**	**$34,037,176**	**$6,807,435**	**0.13%**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 Table C-19 and Table C-20, the City of Jackson has 100 parcels and $29.7 million of structure and contents values or values in the 1% annual chance floodplain, and 5 improved parcels and $4.3 million of structure and contents values in the 0.2% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the Base Plan, there is a1% chance in any given year of a flood event causing $5.9 million in damage and a 0.2% chance in any given year of a flood event causing $0.87 million in damage in the City of Jackson. The loss ratio of 0.11% and 0.02% indicates that flood losses for 1% and 0.2% annual chance flooding, respectively, would be relatively easy to recover from.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the City in comparison to total area within the City limits. The same methodology, as discussed in Section 4.3.10 of the Base Plan, was used for the City of Jackson as well as for the County as a whole. Table C-21 represents a detailed and summary analysis of total acres for each FEMA DFIRM flood zone in the City.

Table C-21 City of Jackson – Flooded Acres by Detailed Flood Zone and Property Use

Flood Zone / Property Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood Hazard						
Zone A						
Agricultural	14	0.65%	0	0.00%	14	1.01%
Commercial	3	0.13%	3	0.35%	0	0.01%

Flood Zone / Property Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Industrial	0	0.00%		0.00%		0.00%
Miscellaneous	1	0.03%	0	0	1	0.04%
Residential	17	0.80%	3	0.36%	14	1.04%
Unknown	0	0.00%	0	0.00%	0	0.00%
Zone A Total	**34**	**1.61%**	**5**	**0.71%**	**29**	**2.11%**
Zone AE						
Agricultural	4	0.17%	1	0.14%	2	0.18%
Commercial	7	0.34%	4	0.50%	3	0.26%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	3	0.13%	0	0.00%	3	0.20%
Residential	19	0.90%	15	2.03%	4	0.27%
Unknown	0	0.01%	0	0.00%	0	0.01%
Zone AE Total	**33**	**1.54%**	**20**	**2.67%**	**12**	**0.91%**
Zone AE Floodway						
Agricultural	3	0.14%	2	0.28%	1	0.06%
Commercial	6	0.26%	3	0.42%	2	0.17%
Industrial	0	0.00%		0.00%	0	0.00%
Miscellaneous	2	0.09%	0	0	2	0.15%
Residential	13	0.61%	9	1.22%	4	0.26%
Unknown	0	0.01%	0	0	0	0.01%
Zone AE Floodway Total	**23**	**1.10%**	**15**	**1.92%**	**9**	**0.65%**
Zone AH						
Agricultural	0	0.00%	0	0.00%	0	0.00%
Commercial	0	0.00%	0	0.00%	0	0.00%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	0	0.00%	0	0.00%	0	0.00%
Residential	1	0.03%	1	0.09%	0	0.00%
Unknown	0	0.00%	0	0.00%	0	0.00%
Zone AH Total	**1**	**0.03%**	**1**	**0.09%**	**0**	0.00%
1% Annual Chance Flood Hazard Total	**91**	**4.28%**	**41**	**5.39%**	**50**	**3.66%**
0.2% Annual Chance Flood Hazard						
Agricultural	0	0.00%	0	0.00%	0	0.00%

Flood Zone / Property Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Commercial	1	0.03%	1	0.07%	0	0.01%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	1	0.03%	0	0.00%	1	0.04%
Residential	1	0.06%	1	0.16%	0	0.00%
Unknown	0	0.02%	0	0.00%	0	0.04%
0.2% Annual Chance Flood Hazard Total	**3**	**0.13%**	**2**	**0.23%**	**1**	**0.08%**
Other Areas						
Zone X (unshaded)						
Agricultural	673	31.79%	84	11.11%	589	43.31%
Commercial	282	13.31%	184	24.25%	98	7.22%
Industrial	25	1.19%	9	1.23%	16	1.16%
Miscellaneous	148	6.98%	2	0.21%	146	10.76%
Residential	889	41.99%	436	57.58%	453	33.30%
Unknown	7	0.32%			7	0.50%
Zone X (unshaded) Total	**2,024**	**95.58%**	**715**	**94.38%**	**1,309**	**96.25%**
Other Areas Total	**2,024**	**95.58%**	**715**	**94.38%**	**1,309**	**96.25%**
City of Jackson Total	**2,118**	**100.00%**	**758**	**100.00%**	**1,360**	**100.00%**

Source: FEMA DFIRM 1/20/2016

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the flood zones were counted and multiplied by the 2010 Census Bureau average household factors for Jackson – 2.14. According to this analysis, there is a total population of 184 and 0 residents of the City at risk to flooding in the 1% and 0.2% annual chance floodplains, respectively. This is shown in Table C-22.

Table C-22 City of Jackson – Count of Improved Residential Parcels and Population by Flood Zone

Jurisdiction	1 % Annual Chance Flooding		0.2% Annual Chance Flooding	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Jackson	86	184	0	0

Source: FEMA DFIRM 1/20/2016, Amador County 12/31/2018 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Jackson in DFIRM flood zones. GIS was used to determine whether the critical facility locations intersect a DFIRM flood zone, and if so, which zone it intersects. Details of critical facilities in mapped DFIRM flood zones in the City of Jackson are shown in Figure C-8 and detailed in Table C-23. Details of critical facility definition, type, name and address and jurisdiction by DFIRM flood zone are listed in Appendix F.

Figure C-8 City of Jackson – Critical Facilities in DFIRM Flood Zones

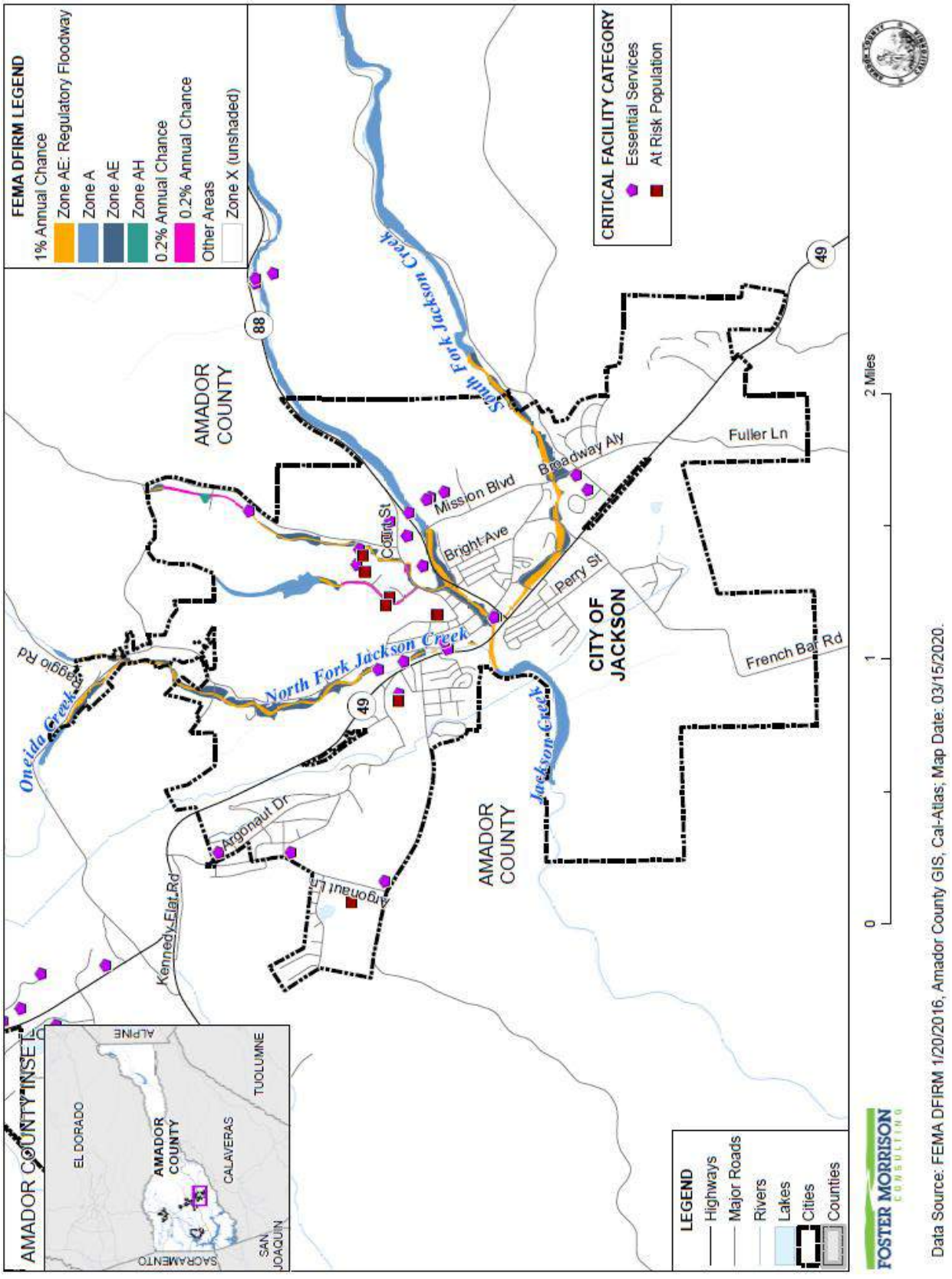


Table C-23 City of Jackson – Critical Facilities in DFIRM Flood Zones

Flood Zone	Critical Facility Category/Critical Facility Type	Facility Count
1% Annual Chance Flood Hazard		
Zone A	**Essential Services**	
	Clinic	1
	Essential Services Total	1
	Zone A Total	**1**
Zone AE	**Essential Services**	
	Police Station	1
	Public Administration Building	1
	Essential Services Total	2
	Zone AE Total	**2**
1% Annual Chance Flood Hazard Total		**3**
0.2% Annual Chance Flood Hazard		
Zone X (shaded)	**Essential Services**	
	Clinic	1
	Essential Services Total	**1**
0.2% Annual Chance Flood Hazard Total		**1**
Other Areas		
Zone X (unshaded)	**Essential Services**	
	Clinic	5
	Community Center	2
	Court House	1
	DMV	1
	EOC	1
	Fire Station	2
	Hospital	1
	Library	1
	Police Station	2
	Post Office	1
	Public Administration Building	1
	School District Office	1
	Essential Services Total	**19**
	At Risk Population	
	Residential Care Facility	5
	School	3
	At Risk Population Total	**8**
	Zone X (unshaded) Total	**27**

Flood Zone	Critical Facility Category/Critical Facility Type	Facility Count
Other Areas Total		**27**
City of Jackson Total		**31**

Source: FEMA DFIRM 1/20/2016, Amador County GIS

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Jackson joined the National Flood Insurance Program (NFIP) on August 19, 1985. The City does not participate in the CRS program. NFIP data indicates that as of March 2, 2020, there were 39 flood insurance policies in force in the City with $10,330,500 of coverage. There have been 34 historical claims for flood losses totaling $481,729.34. 26 were for pre-FIRM structures. 22 of these pre-FIRM losses was in the A zone, while the other 4 were in the B, C, or X zones. 2 were for post-FIRM structure in the A zone. NFIP data further indicates that there are 2 repetitive loss (RL) and 0 severe repetitive loss buildings in the City.

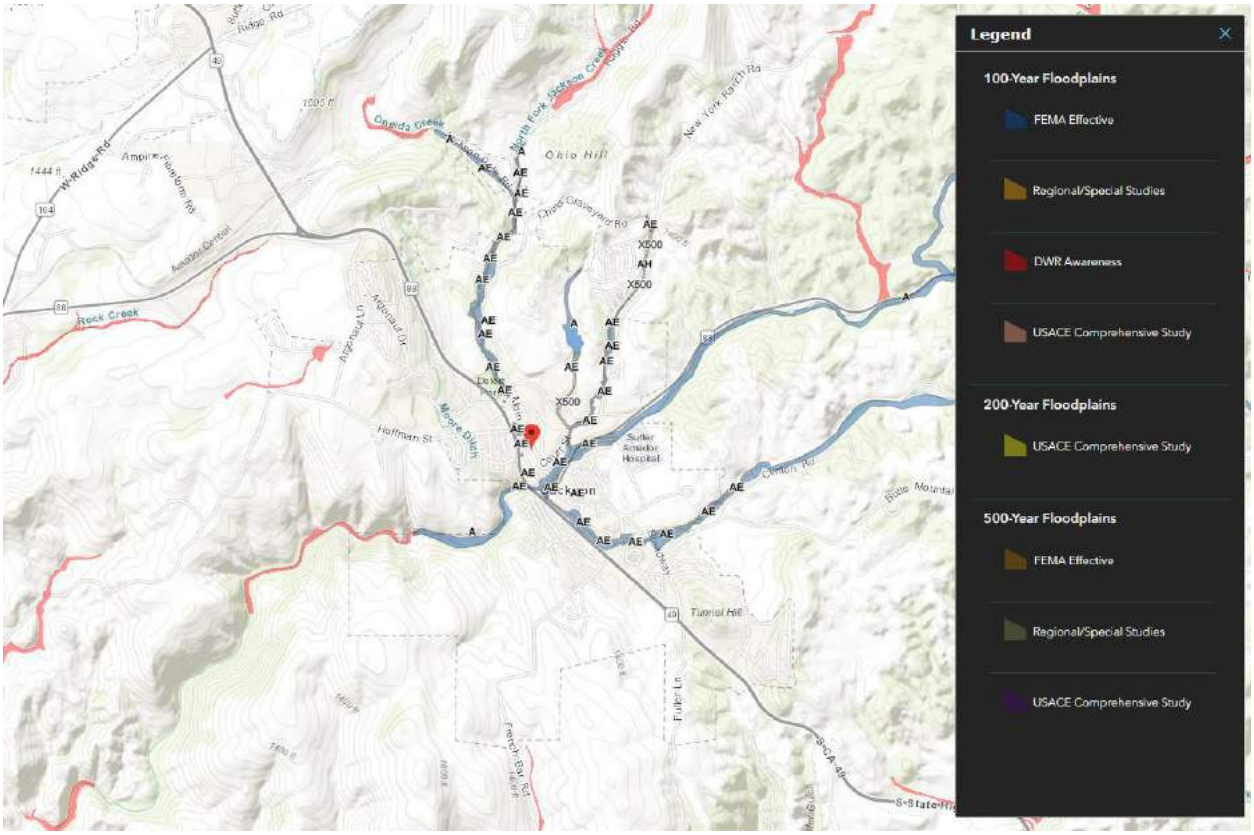
California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in Amador County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Nevada-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 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-(as applicable), and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year 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 City than that provided in the FEMA DFIRMs. The BAM map for Jackson is shown in Figure C-9.

Figure C-9 City of Jackson – Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 1%, Orange – Local 1% (developed from local agencies), Red – DWR 1%r (Awareness floodplains identify the 1% annual chance flood hazard areas using approximate assessment procedures.), Pink – USACE 1% (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 0.5% (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 0.2%, Grey – Local 0.2% (developed from local agencies), Purple – USACE 0.2%(2002 Sac and San Joaquin River Basins Comp Study).

Future Development

The City's floodplain ordinance prohibits development in the floodplain unless certain flood elevation standards are met. No development is expected in the floodplain in the future; however, if new development is approved in the floodplain, it must be developed a pursuant to the City's floodplain ordinance.

The potential for flooding may increase as floodwaters are channeled due to land development. Such changes can exacerbate flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. Floodplain modeling and master planning should be based on build out property use to ensure that all new development remains safe from future flooding. While local floodplain management, stormwater management, and water quality regulations and policies address these changes on a site-by-site basis, their cumulative effects can have a negative impact on the overall floodplain.

GIS Analysis

The City Future Development Areas and the Amador County LAFCO SOI were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the 5 areas and 103 parcels within the SOI and area associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure C-10 shows the locations of future development areas in both the Future Development Areas and the SOI overlayed on the FEMA DFIRM. Table C-24 shows the parcels and acreages of each future development area in the City by DFIRM floodzones, broken out by Future Development Areas and Sphere of Influence.

Note: As seen on this figure, the Future Development Areas and SOI overlap. In the table, the Future Development Areas are shown in their full acreages, while the SOI acreages in the table are the remainder of the SOI once the Future Development Areas have been subtracted from them.

Figure C-10 City of Jackson – Future Development Areas in DFIRM Flood Zones

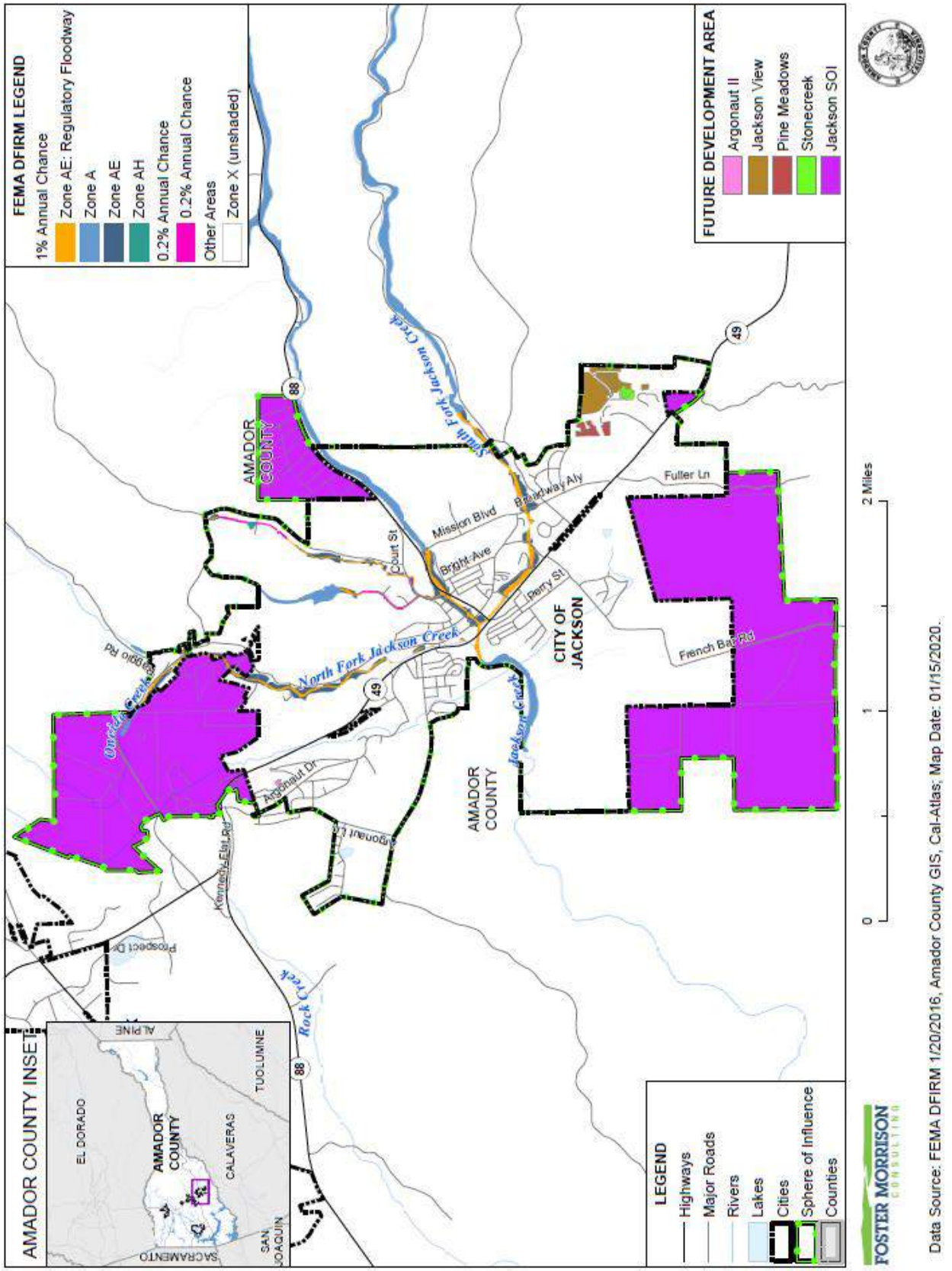


Table C-24 City of Jackson – Future Development Areas in DFIRM Flood Zones

Future Development / Flood Zones	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Argonaut II						
1% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
0.2% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
Other Areas	2	0	2	0.36	0.00	0.36
Argonaut II Total	**2**	**0**	**2**	**0.36**	**0.00**	**0.36**
Jackson View						
1% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
0.2% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
Other Areas	32	0	32	22.02	0.00	22.02
Jackson View Total	**32**	**0**	**32**	**22.02**	**0.00**	**22.02**
Pine Meadows						
1% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
0.2% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
Other Areas	12	0	12	5.08	0.00	5.08
Pine Meadows Total	**12**	**0**	**12**	**5.08**	**0.00**	**5.08**
Stonecreek						
1% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
0.2% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
Other Areas	4	1	3	2.13	0.38	1.74
Stonecreek Total	**4**	**1**	**3**	**2.13**	**0.38**	**1.74**
Jackson SOI						

Future Development / Flood Zones	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
1% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
0.2% Annual Chance Flood Hazard	0	0	0	0.00	0.00	0.00
Other Areas	53	23	30	1,191.96	312.53	879.43
Jackson SOI Total	**53**	**23**	**30**	**1,191.96**	**312.53**	**879.43**
Grand Total	**103**	**24**	**79**	**1,221.54**	**312.91**	**908.63**

Source: FEMA DFIRM 1/20/2016, City of Jackson GIS

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Flooding occurs in areas other than the FEMA mapped 1% and 0.2% annual chance 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 County and City 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.

Location and Extent

The City of Jackson is subject to localized flooding throughout the City. Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the City vary by location. Flood durations in the City tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Localized flooding in the City tends to have a shorter speed of onset, especially when antecedent rainfall has soaked the ground and reduced its capacity to absorb additional moisture.

Past Occurrences

The City noted that localized flooding happens every year, to varying extent. There were issues in 2017 that were discussed in the Flood:100/500-year section of this Annex.

Vulnerability to Localized Flooding

Historically, much of the growth in the City and County has occurred adjacent to streams, resulting in significant damages to property, and losses from disruption of community activities when the streams overflow. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff.

The City tracks localized flooding areas. Affected localized flood areas identified by the City of Jackson are summarized in Table C-25.

Table C-25 City of Jackson – List of Localized Flooding Problem Areas

Area Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
Argonaut Heights area along Buena Vista Drive	X						
Westview Drive in the Westview Estates subdivision area	X						
South Avenue	X						
Jackson Gate Road	X						
Area of 749 No. Main, Downstream of French Bar Bridge, Area of 315 No. Main St, Quail Hollow area	X						
Below Mattley St, Busi parking lot and downstream of Busi parking lot					X		

Source: City of Jackson

Impacts

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.

Future Development

Future development in the City will add more impervious surfaces causing an increase in stormwater runoff and the continued need to drain these waters. The City will need to be proactive to ensure that increased development has proper siting and drainage for stormwaters. The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized storm activity.

Mitigating the root causes of the localized stormwater flooding will reduce future risks of losses. It was noted that the bulk of new development will not affect the Jackson Creek basin.

Landslide, Mudslide, Debris Flows

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to the California Geological Survey, landslides refer to a wide variety of processes that result in the perceptible downward and outward movement of soil, rock, and vegetation under gravitational influence. Common names for landslide types include slump, rockslide, debris slide, lateral spreading, debris avalanche, earth flow, and soil creep. Landslides may be triggered by both natural and human-induced changes in the environment that result in slope instability.

The susceptibility of an area to landslides depends on many variables including steepness of slope, type of slope material, structure and physical properties of materials, water content, amount of vegetation, and proximity to areas undergoing rapid erosion or changes caused by human activities. These activities include mining, construction, and changes to surface drainage areas. Landslide events can be determined by the composition of materials and the speed of movement. A rockfall is dry and fast while a debris flow is wet and fast. Regardless of the speed of the slide, the materials within the slide, or the amount of water present in the movement, landslides are a serious natural hazard.

Another type of landslide, debris flows, also occur in some areas of the Amador County and the City. These debris flows generally occur in the immediate vicinity of existing drainage swales or steep ravines. Debris flows occur when near surface soil in or near steeply sloping drainage swales becomes saturated during unusually heavy precipitation and begins to flow downslope at a rapid rate.

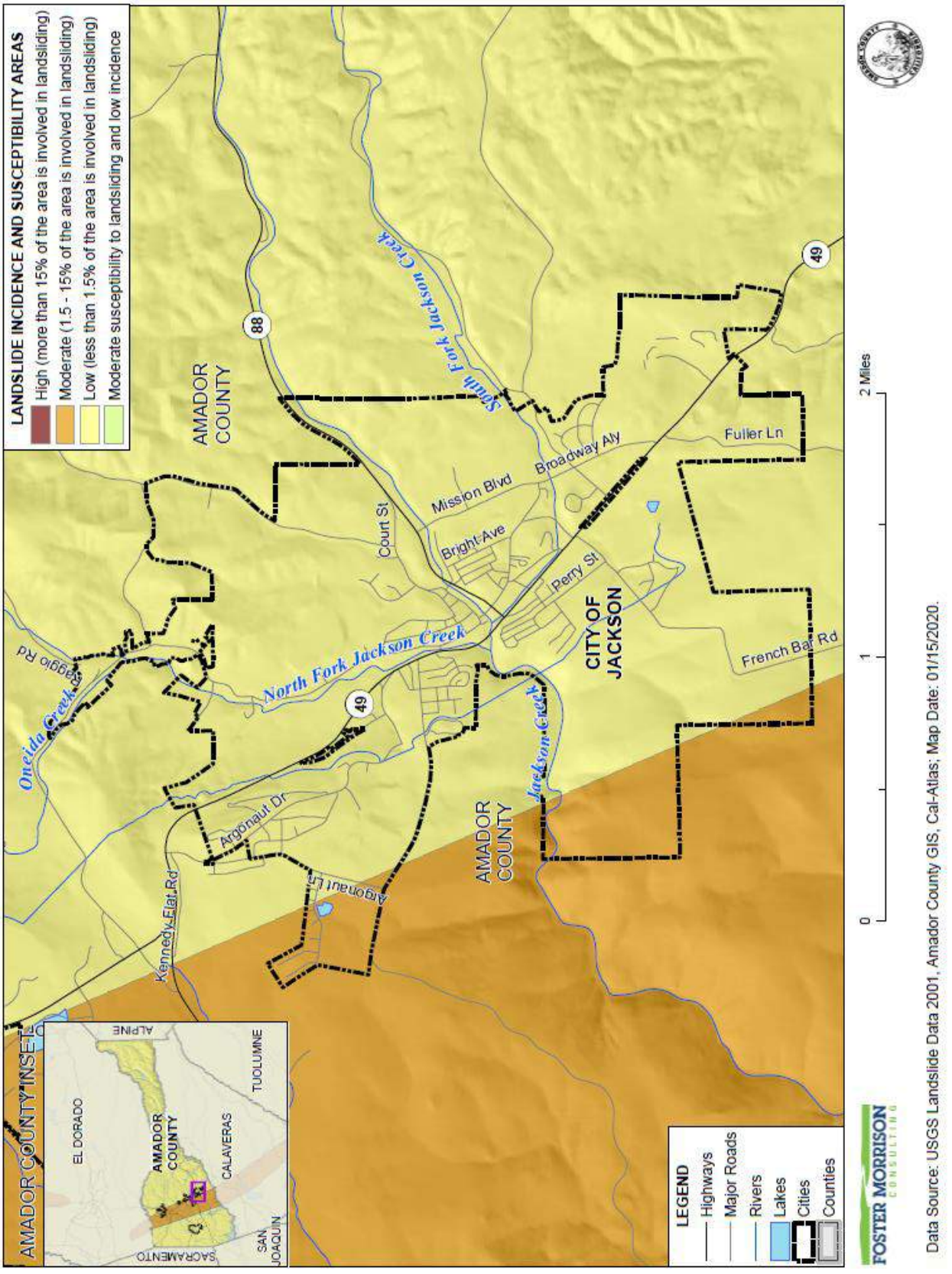
The City of Jackson General Plan Safety Element noted that due to the high angles of tilting in many of the rock sequences found in the Jackson area great care must be taken in making open cuts in rock slopes. Professional geophysical-geological advice is needed to avoid creating hazardous new rockslides. Two existing large cuts are located on the western side of Highway 88-49: one adjacent to the southern side of the Safeway market, the other on the northern side of the Busi Municipal Parking Lot. While the southern cut is quite stable, the rockslides in portions of the Busi cut are obvious. One can clearly see the fracturing, joint systems, and tilting of the rock strata north of the parking lot.

The bedrock in the Jackson area has undergone fracturing, tilting, faulting, and weathering creating areas of instability where there are steep slopes or open cuts. Where slopes of over 20% occur or are proposed, careful consideration must be given to any change in the landforms and to the uses to be placed or maintained on or near the steep slopes. The steep slopes are also the location of possible dangerous wildfires of natural vegetation. Because of the inaccessibility the vegetation is usually allowed to grow rankly providing considerable fuel in many years when there have been favorable weather conditions. The inaccessibility of the site frequently hampers firefighting. Adequate clearing of vegetation is needed around structures and land uses that would suffer severe damage from wildfires on the steep slopes.

Location and Extent

Landslides, mudslides, and debris flows can affect certain areas of the City. The USGS has estimated that the risk varies across the City and has created maps showing risk variance. This risk variance falls into one of the following landslide incidence and susceptibility categories: High, Moderate, and Low. These are discussed in Section 4.3.12 of the Base Plan. Following the methodology described in Section 4.3.12 of the Base Plan, landslide incidence and susceptibility maps for the City of Jackson were created. Figure C-11 shows the USGS landslide incidence and susceptibility areas in the City. As shown on the maps, risk varies within the City range from low to moderate.

Figure C-11 City of Jackson – Landslide Incidence and Susceptibility Areas



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. Geographical landslide incidence and susceptibility areas from USGS are shown in Table C-26.

Table C-26 City of Jackson – Geographical Landslide Incidence and Susceptibility Area Extents

Landslide Incidence and Susceptibility Area	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
High	0	0.0%	0	0.0%	0	0.0%
Moderate	174	0.04%	26	0.02%	148	0.07%
Low	1,943	0.50%	731	0.44%	1,212	0.54%
Total	**2,118**	**0.54%**	**758**	**0.46%**	**1,360**	**0.61%**

Source: USGS

*Percentage of total acres is the percent of total acres of the entire County Planning Area

Past Occurrences

The City has seen damages in the past from landslides. Members of the HMPC noted an event on March 4th of 2009. A hillside slip near Main Street and State Route 49/88 damaged a public building. Mattley Street was closed to evaluate the damages. Damages are shown in Figure C-12 through Figure C-14.

Figure C-12 City of Jackson – Past Damages from Landslide

Source: City of Jackson

Figure C-13 City of Jackson – Past Damages from Landslide

Source: City of Jackson

Figure C-14 City of Jackson – Past Damages from Landslide

Source: City of Jackson

The City had a slide in the Busi Parking Lot in 2017 during the storm events. Repairs have been made but that area is still unstable.

Vulnerability to Landslide

Common names for landslide types include slumps, rockslides, debris slides, lateral spreading, debris avalanches, earth flows, and soil creep. 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 may be triggered by both natural- and human-caused activity.

Although this hazard also includes related issues such as mudslides and debris flows, available mapped hazard data was limited to landslides; thus, the remainder of this section is focused on the landslide vulnerability.

Impacts

Impacts from landslide and debris flow are limited in the City, as they occur in areas of high topographical change. Impacts in the City may be to structures, infrastructure, utilities, and to life safety.

Assets at Risk

Based on the vulnerability of Jackson to the landslide hazard, the sections that follow describes significant assets at risk in the City of Jackson. This section includes the values at risk, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of landslide within the City of Jackson. The methodology described in Section 4.3.12 of the Base Plan was followed in determining structures and values at risk in USGS landslide susceptibility and incidence areas. Summary analysis results for Jackson are shown in Table C-27, which summarizes total parcel counts, improved parcel counts and their structure values by landslide incidence and susceptibility area. Table C-28 breaks down Table C-27 to show which property uses are in each landslide incidence and susceptibility area. According to this, there is $34.5 million of structure and contents value in the City in the moderate or higher landslide incidence and susceptibility area.

Table C-27 City of Jackson – Parcels and Values at Risk in Landslide Incidence and Susceptibility Areas

Landslide Incidence and Susceptibility Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Moderate	105	97	$6,917,679	$18,404,863	$9,202,430	$34,524,972
Low	2,013	1,604	$158,010,707	$430,613,728	$299,191,499	$887,815,934
City of Jackson Total	**2,118**	**1,701**	**$164,928,386**	**$449,018,591**	**$308,393,929**	**$922,340,906**

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data

Table C-28 City of Jackson – Parcels and Values at Risk in Landslide Incidence and Susceptibility Areas by Property Use

Landslide Incidence and Susceptibility Area / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Moderate						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	3	0	$0	$0	$0	$0
Residential	98	97	$6,917,679	$18,404,863	$9,202,430	$34,524,972
Unknown	4	0	$0	$0	$0	$0

Landslide Incidence and Susceptibility Area / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Moderate Total	**105**	**97**	**$6,917,679**	**$18,404,863**	**$9,202,430**	**$34,524,972**
Low						
Agricultural	11	2	$4,251,931	$531,814	$531,814	$5,315,559
Commercial	266	215	$46,200,733	$158,680,676	$158,680,676	$363,562,085
Industrial	12	9	$2,792,453	$5,011,363	$7,517,043	$15,320,859
Miscellaneous	58	2	$607,728	$1,465,924		$2,073,652
Residential	1,589	1,376	$104,157,862	$264,923,951	$132,461,966	$501,543,779
Unknown	77	0	$0	$0	$0	$0
Low Total	**2,013**	**1,604**	**$158,010,707**	**$430,613,728**	**$299,191,499**	**$887,815,934**
City of Jackson Total	**2,1184**	**1,701**	**$164,928,386**	**$449,018,591**	**$308,393,929**	**$922,340,906**

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data

Population at Risk

The USGS landslide incidence and susceptibility areas were overlayed on the parcel layer. Those residential parcel centroids that intersect each landslide incidence and susceptibility areas were counted and multiplied by the 2010 Census Bureau average household factors for Jackson – 2.14. According to this analysis, there is a total population of 208 residents of the City at risk to landslide. This is shown in Table C-22.

Table C-29 City of Jackson – Count of Improved Residential Parcels and Population by Landslide Incidence and Susceptibility Area

Jurisdiction	Low		Moderate		High	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Jackson	1,376	2,945	97	208	0	0

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Jackson in identified landslide incidence and susceptibility areas. GIS was used to determine whether the critical facility locations intersect a USGS landslide incidence and susceptibility area. Critical facilities in landslide incidence and susceptibility areas in the City of Jackson are shown in Figure C-18 and detailed in Table C-37. Details of critical facility definition, type, name and address and jurisdiction by landslide incidence and susceptibility area are listed in Appendix F.

Figure C-15 City of Jackson – Critical Facilities in Landslide Incidence and Susceptibility Areas

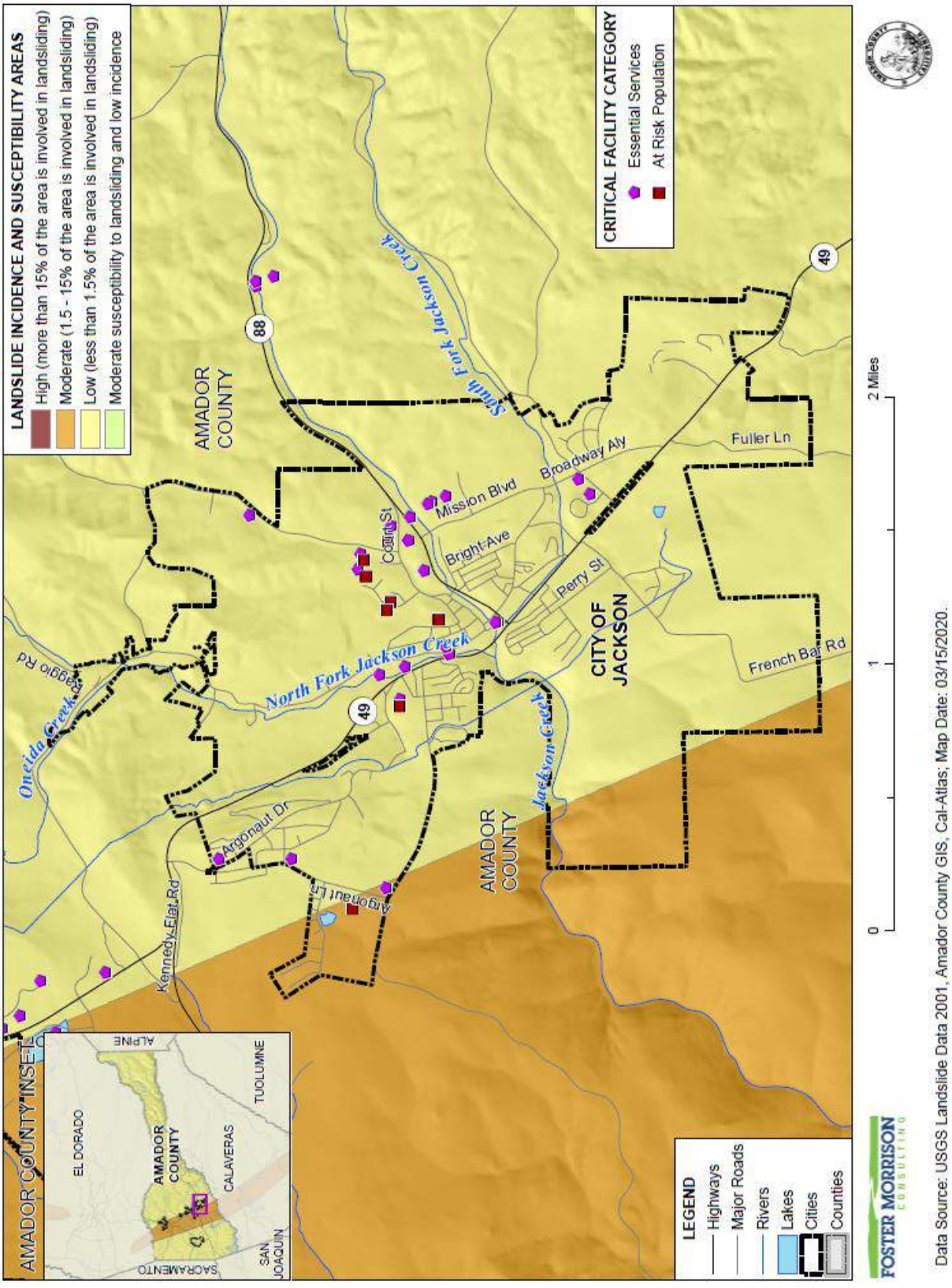


Table C-30 City of Jackson – Critical Facilities by Landslide Incidence and Susceptibility Area

Landslide Incidence and Susceptibility	Critical Facility Category / Critical Facility Type	Facility Count
Moderate	**Essential Services**	
	Court House	1
	Essential Services Total	**1**
	At Risk Population	
	School	1
	At Risk Population Total	**1**
Moderate Total		**2**
Low	**Essential Services**	
	Clinic	7
	Community Center	2
	DMV	1
	EOC	1
	Fire Station	2
	Hospital	1
	Library	1
	Police Station	3
	Post Office	1
	Public Administration Building	2
	School District Office	1
	Essential Services Total	22
	At Risk Population	
	Residential Care Facility	5
	School	2
	At Risk Population Total	**7**
Low Total		**29**
City of Jackson Total		**31**

Source: CAL FIRE, Amador County GIS

Future Development

Future landslides are considered likely. Siting of future development areas should take landslide into account.

GIS Analysis

The City Future Development Areas and the Amador County LAFCO SOI were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the 5 areas and 103 parcels within the SOI and area associated with future development projects for which

the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure C-16 shows the locations of future development areas in both the Future Development Areas and the SOI overlayed on the USGS data. Table C-31 shows the parcels and acreages of each future development area in the City by landslide incidence and susceptibility area, broken out by Future Development Areas and Sphere of Influence.

Note: As seen on this figure, the Future Development Areas and SOI overlap. In the table, the Future Development Areas are shown in their full acreages, while the SOI acreages in the table are the remainder of the SOI once the Future Development Areas have been subtracted from them.

Figure C-16 City of Jackson – Future Development Areas in Landslide Incidence and Susceptibility Areas

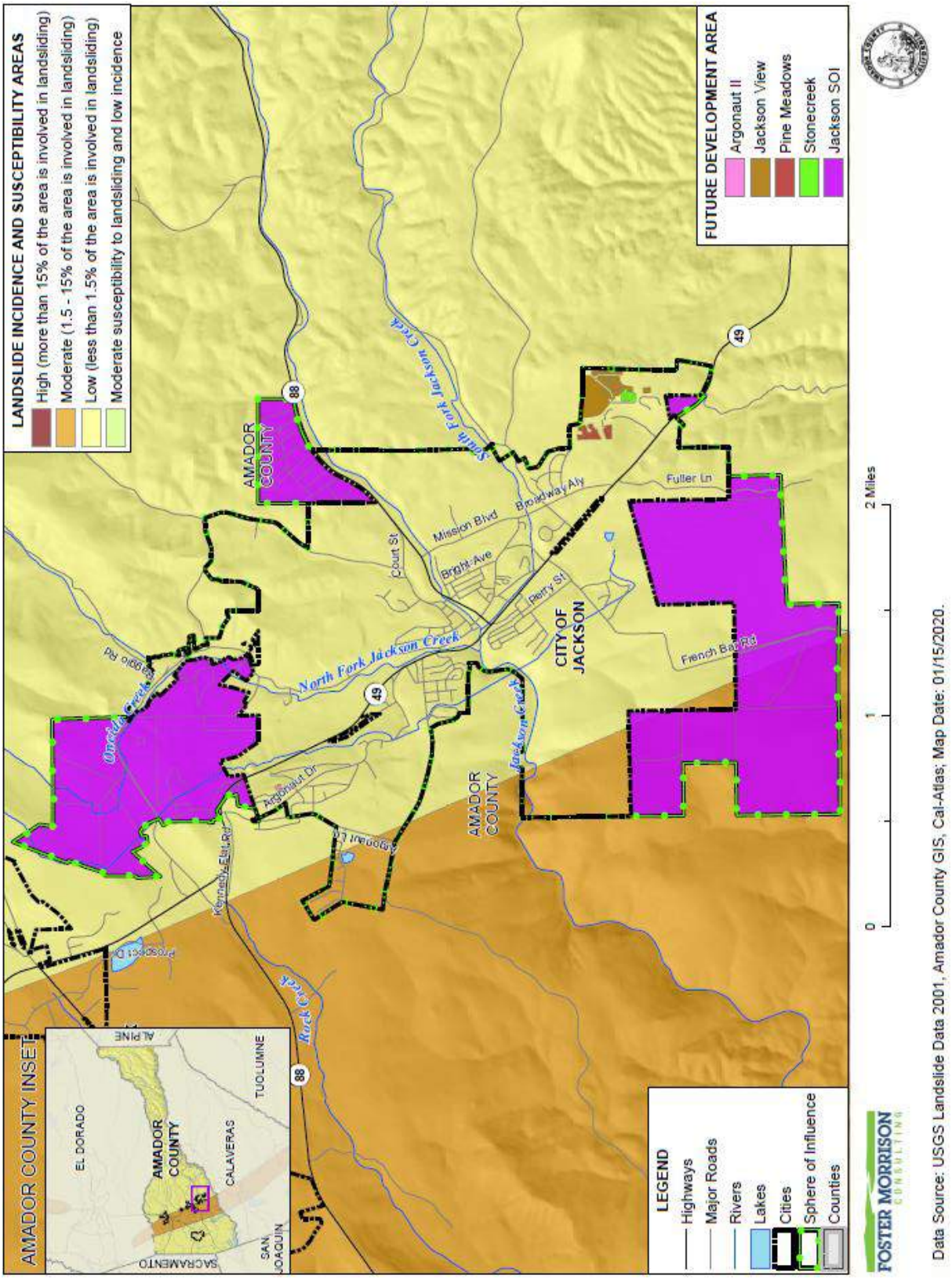


Table C-31 City of Jackson – Future Development Areas in Landslide Incidence and Susceptibility Areas

Future Development / Landslide Susceptibility and Incidence Area	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Argonaut II						
Low	2	0	2	0.36	0.00	0.36
Moderate	0	0	0	0.00	0.00	0.00
Argonaut II Total	**2**	**0**	**2**	**0.36**	**0.00**	**0.36**
Jackson View						
Low	32	0	32	22.02	0.00	22.02
Moderate	0	0	0	0.00	0.00	0.00
Jackson View Total	**32**	**0**	**32**	**22.02**	**0.00**	**22.02**
Pine Meadows						
Low	12	0	12	5.08	0.00	5.08
Moderate	0	0	0	0.00	0.00	0.00
Pine Meadows Total	**12**	**0**	**12**	**5.08**	**0.00**	**5.08**
Stonecreek						
Low	4	1	3	2.13	0.38	1.74
Moderate	0	0	0	0.00	0.00	0.00
Stonecreek Total	**4**	**1**	**3**	**2.13**	**0.38**	**1.74**
Jackson SOI						
Low	47	22	25	806.97	268.86	538.11
Moderate	6	1	5	384.99	43.67	341.32
Jackson SOI Total	**53**	**23**	**30**	**1,191.96**	**312.53**	**879.43**
Grand Total	**103**	**24**	**79**	**1,221.54**	**312.91**	**908.63**

Source: USGS, City of Jackson GIS

Severe Weather: Extreme Heat

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to 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 extreme heat and high humidity, evaporation is slowed, and the body must work extra hard to maintain a normal temperature." Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

In addition to the risks faced by citizens of the City, there are risk to the built environment from extreme heat. While extreme heat on its own does not usually affect structure, extreme heat during times of drought can cause wildfire risk to heighten. Extreme heat and high winds can cause Public Safety Power Shutoff (PSPS) events, causing issues to buildings in the City. The HMPC noted that the homeless and low-income citizens (those that do not have AC or cannot afford to run their AC) are hit hard during periods of extreme heat.

Location and Extent

Heat is a regional phenomenon and affects the whole of the City. 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 affect vulnerable populations and communities. Heat waves do not generally cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios.

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 Section 4.2.2 of the Base Plan.

Past Occurrences

The City Planning Team note that since extreme heat is a regional phenomenon, events that affected the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.2.2.

Vulnerability to Extreme Heat

The City experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-110°F in rather extreme situations. During these times, drought conditions may worsen.

Also when combined with high winds, PSPS events may occur during these times as well. Health impacts are the primary concern with this hazard, though economic impacts are also an issue.

Impacts

The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures. Nursing homes and elder care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning is not available. In addition, individuals below the poverty level may be at increased risk to extreme heat if use of air conditioning is not affordable. This is especially true of homeless people and the transient population.

Days of extreme heat have been known to result in medical emergencies, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts. Extreme heat can also dry out vegetations, making it more vulnerable to wildfire ignitions. During periods of extreme heat (with high winds), PG&E can institute the PSPS.

Future Development

Future development of new buildings in the City will likely not be affected by extreme heat. Extreme heat is more likely to affect populations. Vulnerability to extreme heat will increase as the average age of the population in each City shifts. It is encouraged that nursing homes and elder care facilities have emergency plans or backup power to address power failure during times of extreme heat and in the event of a PSPS. Low income residents and homeless populations are also vulnerable. Cooling centers for these populations should be utilized when necessary. The City offers cooling stations at the Fire Station on Main Street. Both fire stations offer bottled water and ice.

Severe Weather: Heavy Rains and Storms (Hail, Lightning)

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Storms in the City occur annually 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 City falls mainly in the fall, winter, and spring months.

Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the City. All portions of the City are at risk to heavy rains. Most of the severe rains occur during the fall, winter, and spring months. There is no scale by which heavy rains and severe storms are measured. 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 severe storms in California, Amador County, and the City can range from minutes to hours to days. Information on precipitation extremes can be found in Section 4.2.3 of the Base Plan.

Past Occurrences

According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the City. This is the cause of many of the federal disaster declarations related to flooding. The past occurrences of the Flood: 100-/500-year section of this Annex contains past occurrences where rains caused flooding.

Vulnerability to Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrences in the City. These events can cause localized flooding. Elongated events, or events that occur during times where the ground is already saturated can cause 1% and 0.2% annual chance flooding. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the City.

Impacts

Actual damage associated with the effects of severe storms include impacts to property, critical facilities (such as utilities), and life safety. Heavy rains and storms often result in localized flooding creating significant issues. Roads can become impassable and ground saturation can result in instability, collapse, or other damage to trees, structures, roadways, and other critical infrastructure. Floodwaters and downed trees can break utilities and interrupt services.

Future Development

Building codes in the City ensure that new development is built to current building standards, which should reduce the risk to future development in the City. 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, future losses to new development should be minimal.

Severe Weather: High Winds and Tornadoes

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

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. High winds can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss.

Portions of the County and City 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. These types of winds are also associated with the rapid spread of wildfires, making some regions which experience these winds particularly fire prone.

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 form when cool, dry air sits on top of warm, moist air. Tornadoes are the most powerful storms that exist. Tornadoes, though rare, are another severe weather hazard that, though rare, can affect areas in the lower elevations of the Amador County Planning Area, primarily during the rainy season in the late fall, winter, and early spring.

Location and Extent

The entire City 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 12 category scale that relates wind speed to observed conditions at sea or on land. Its full name is the Beaufort Wind Force Scale. The Beaufort Scale was shown in Section 4.2.4 of the Base Plan.

Tornadoes, while rare, can occur at any location in the County and City. The areas in the lower elevations of the County tend to be at greater risk than the areas in the foothills and higher. 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 (EF) 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. The F Scale and EF Scale are shown in Section 4.2.4 of the Base Plan.

Past Occurrences

The City noted that since high winds is a regional phenomenon, events that affected the lower elevations of the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.2.4.

Vulnerability to Severe Weather: Wind and Tornado

High winds are common occurrences in the City throughout the entire year. Straight line winds are primarily a public safety and economic concern. Windstorm can cause damage to structures and power lines which in turn can create hazardous conditions for people. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered. High winds can impact critical facilities and infrastructure and can lead to power outages. Wind can also drive wildfire flames, spreading wildfires quickly. High winds are also a component of red flag days, which can cause PG&E to enact a PSPS.

Impacts

Impacts from high winds in the City will vary. Future losses from straight line winds include:

- Downed trees
- Increased fire risk and increased risk of PSPS occurrences
- Power line impacts and economic losses from power outages
- Occasional building damage, primarily to roofs
- Campers, mobile homes, barns, and sheds and their occupants are particularly vulnerable as windstorm events in the region can be sufficient in magnitude to overturn these lighter structures

Future Development

Future development projects will consider wind hazards at the planning, and design stage with the goal of reducing vulnerability. The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from windstorms. Future development in the City is subject to these building codes.

Severe Weather: Winter Storms and Freeze

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to the National Weather Service, extreme cold often accompanies a winter storm or is left in its wake. Winter snowstorms can include heavy snow, ice, blizzard conditions, and cold temperatures. Freezing temperatures can also occur without the accompanying winter storm.

The HMPC noted that Jackson usually gets a dusting of snow a couple of times a year. Occasionally, Jackson will get an accumulation of a few inches.

Location and Extent

Winter storms and freeze are regional issues, meaning the entire City is at risk to freeze and winter storm. 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 21.8 days that fall below 32°F in western Amador County. 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. Snowfall often accompanies storms in the upper elevations of the County is measured in snow depths. It is rare for snow to fall in the City, and even rarer that snow accumulates in the City. Snowfall has an onset that is similar to freeze.

Past Occurrences

The City noted that freeze and winter storm is a regional phenomenon; events that affected the lower elevations of the County also affected the City. Those past occurrences were shown in the Base Plan in

Section 4.2.5. The HMPC noted that traffic accidents occur more frequently during these storms in the City.

Vulnerability to Severe Weather: Freeze and Winter Storms

The City experiences temperatures below 32 degrees during the winter months. The temperature moves to the teens in rather extreme situations. Freeze can cause injury or loss of life to residents of the City. While it is rare for buildings to be affected directly by freeze, damages to pipes that feed building can be damaged during periods of extreme cold.

Impacts

Extreme cold and freeze can affect critical facilities and infrastructure, down trees, break pipes, and can be a life safety issue. When extreme cold is coupled with high winds or ice storms, power lines may be downed, resulting in an interruption of utilities and critical services.

Occasionally, winter storms with snow and ice can affect the City. Transportation networks, communications, and utilities infrastructure are the most vulnerable physical assets in the City. The ability for the City to continue to operate during periods of winter storm and freeze is paramount. The elderly and young population is most vulnerable to temperature extremes. The residents of nursing homes and elder care facilities are especially vulnerable to extreme temperature events. Transient and homeless populations are also at risk to freeze.

Future Development

Future development built to code should be able to withstand issues associated with severe winter storms and freeze events. Pipes at risk of freezing should be buried or insulated from freeze as new facilities are improved or added. Vulnerability to extreme cold will increase as the average age of the population in the County shifts. The elderly are more at risk to the effects of freeze.

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

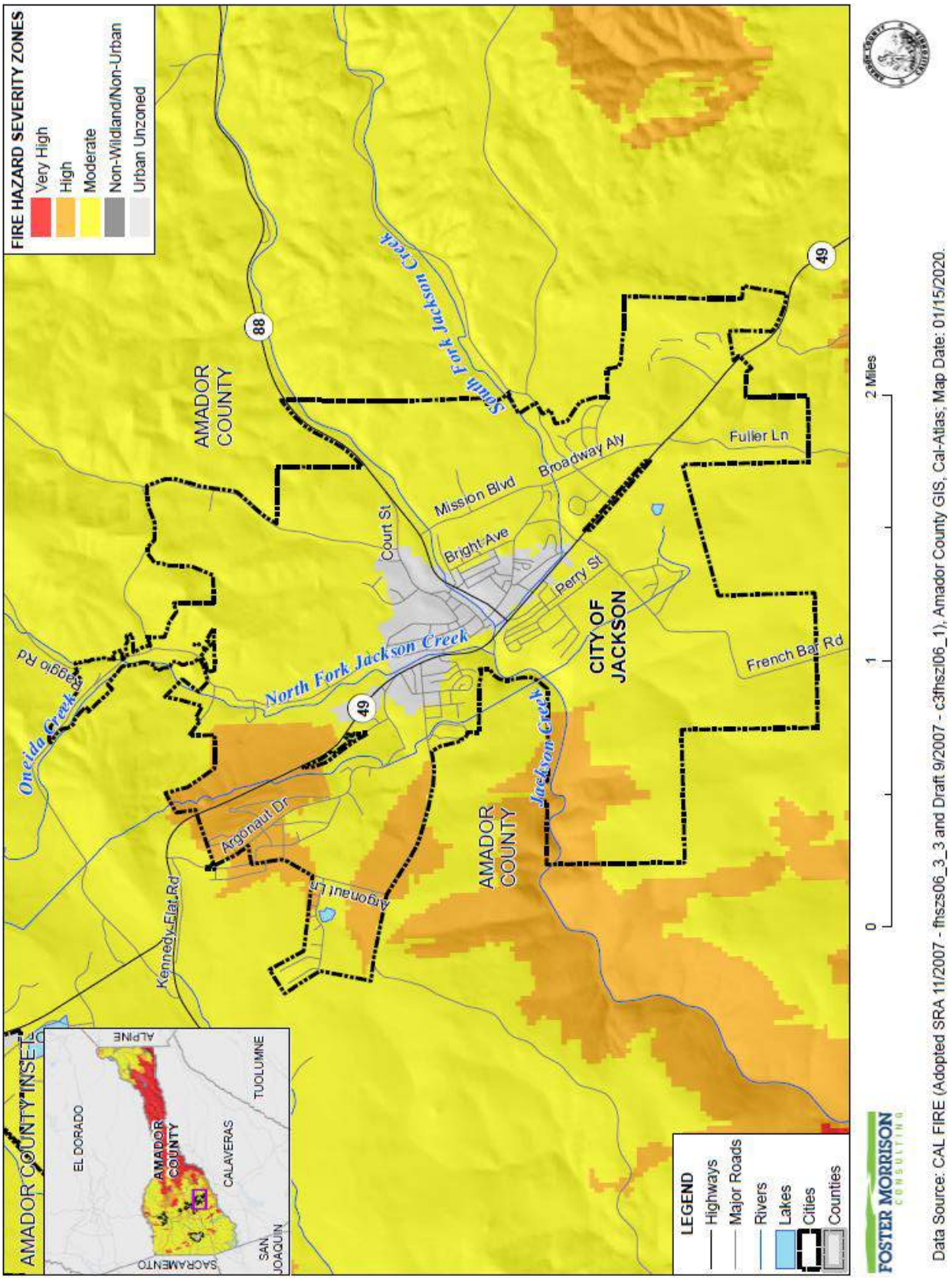
Wildland fire and the risk of a conflagration is an ongoing concern for the City of Jackson. Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the ecosystem. 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. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While

wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

Location and Extent

Wildfire can affect all areas of the City. CAL FIRE has estimated that the risk varies across the City and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the City of Jackson were created. Figure C-17 shows the CAL FIRE FHSZ in the City. As shown on the maps, fire hazard severity zones within the City range from urban/unzoned to moderate to high wildfire risk.

Figure C-17 City of Jackson – Fire Hazard Severity Zones



Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more. Geographical FHSZ extent from CAL FIRE is shown in Table C-32.

Table C-32 City of Jackson – Geographical FHSZ Extents

Fire Hazard Severity Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
Very High	0	0.00%	0	0.00%	0	0.00%
High	260	0.07%	59	0.04%	201	0.09%
Moderate	1,741	0.45%	619	0.37%	1,122	0.50%
Non-Wildland/non-Urban	0	0.00%	0	0.00%	0	0.00%
Urban Unzoned	116	0.03%	79	0.05%	37	0.02%
Total	**2,118**	**0.54%**	**758**	**0.46%**	**1,360**	**0.61%**

Source: CAL FIRE

*Percentage of total acres is the percent of total acres of the entire County Planning Area

Past Occurrences

A list of state and federal disaster declarations for Amador County from wildfire is shown on Table C-17. These events also likely affected the City to some degree.

Table C-33 Amador County – State and Federal Disaster Declarations from Wildfire 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	1	2015	1	1961

Source: Cal OES, FEMA

Vulnerability to Wildfire

The wildfire hazard is one of the highest priority hazards in the County and City, and is the hazard with the greatest potential for catastrophic loss. High fuel loads in the County and Cities, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. The more urbanized areas within the County are not immune from fire. The dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and City, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

The City of Jackson General Plan Safety Element also noted that the bedrock in the Jackson area has undergone fracturing, tilting, faulting, and weathering creating areas of instability where there are steep slopes or open cuts. Where slopes of over 20% occur or are proposed, careful consideration must be given to any change in the landforms and to the uses to be placed or maintained on or near the steep slopes. The steep slopes are also the location of possible dangerous wildfires of natural vegetation. Because of the inaccessibility the vegetation is usually allowed to grow rankly providing considerable fuel in many years when there have been favorable weather conditions. The inaccessibility of the site frequently hampers firefighting. Adequate clearing of vegetation is needed around structures and land uses that would suffer severe damage from wildfires on the steep slopes.

The City of Jackson General Plan Safety Element also noted that there are two major conflagration hazards: one would be a major fire in the historic central business district where there are few large open spaces between buildings; the other could occur in any built up portion of the area if a broad area wildfire occurred during an extremely dry spell with a high hot wind. Firefighting is difficult in the Jackson area because of the steep grades. Also, there are several narrow roadways and local access streets without turnaround areas in which the firefighting equipment can maneuver safely.

Impacts

Potential impacts from wildfire include loss of life and injuries; damage to structures 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 City. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the City 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 City; smoke and air pollution from wildfires can be a severe health hazard.

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 PSPSs 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.

Based on the vulnerability of the City of Jackson to the wildfire hazard, the sections that follow describes significant assets at risk in the City.

Assets at Risk

Based on the vulnerability of Jackson to the wildfire hazard, the sections that follow describes significant assets at risk in the City of Jackson. This section includes the values at risk, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of wildfire within the City of Jackson. The methodology described in Section 4.3.18 of the Base Plan was followed in determining structures and values at risk in FHSZs. Summary analysis results for Jackson are shown in Table C-34, which summarizes total parcel counts, improved parcel counts and their structure values by FHSZ.

Table C-34 City of Jackson – Count and Value of Parcels by FHSZ

Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
High	164	133	$11,759,665	$28,230,152	$39,989,817
Moderate	1,478	1,158	$123,630,556	$353,647,551	$477,278,107
Urban Unzoned	476	410	$29,538,165	$67,140,888	$96,679,053
City of Jackson Total	**2,118**	**1,701**	**$164,928,386**	**$449,018,591**	**$613,946,977**

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Table C-35 breaks out the Table C-34 by adding the property use details by FHSZ for the City. As shown in both of these tables, the City has significant numbers of properties that fall in the moderate ($477.3 million of land and structure value) and high ($96.7 million of land and structure value) fire hazard severity zone.

Table C-35 City of Jackson – Count and Value of Parcels by FHSZ and Property Use

Fire Hazard Severity Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
High					
Agricultural	1	0	$20,800	$0	$20,800
Commercial	3	2	$1,126,104	$1,193,461	$2,319,565
Industrial	0	0	$0	$0	$0
Miscellaneous	6	0	$100	$0	$100
Residential	145	131	$10,612,661	$27,036,691	$37,649,352
Unknown	9	0	$0	$0	$0
High Total	**164**	**133**	**$11,759,665**	**$28,230,152**	**$39,989,817**
Moderate					
Agricultural	10	2	$4,231,131	$531,814	$4,762,945
Commercial	165	135	$35,565,118	$136,713,012	$172,278,130

Fire Hazard Severity Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Industrial	12	9	$2,792,453	$5,011,363	$7,803,816
Miscellaneous	42	2	$607,628	$1,465,924	$2,073,552
Residential	1,190	1,010	$80,434,226	$209,925,438	$290,359,664
Unknown	59	0	$0	$0	$0
Moderate Total	**1,478**	**1,158**	**$123,630,556**	**$353,647,551**	**$477,278,107**
Urban Unzoned					
Agricultural	0	0	$0	$0	$0
Commercial	98	78	$9,509,511	$20,774,203	$30,283,714
Industrial	0	0	$0	$0	$0
Miscellaneous	13	0	$0	$0	$0
Residential	352	332	$20,028,654	$46,366,685	$66,395,339
Unknown	13	0	$0	$0	$0
Urban Unzoned Total	**476**	**410**	**$29,538,165**	**$67,140,888**	**$96,679,053**
City of Jackson Total	**2,118**	**1,701**	**$164,928,386**	**$449,018,591**	**$613,946,977**

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Population at Risk

The FHSZ dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the FHSZs were counted and multiplied by the 2010 Census Bureau average household factors for the City of Jackson – 2.14. According to this analysis, there is a total population of 2,441 residents of Jackson at risk to moderate or higher FHSZs. This is shown in Table C-36.

Table C-36 City of Jackson – Count of Improved Residential Parcels and Population by FHSZ

Jurisdiction	Moderate		High		Very High	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Jackson	1,010	2,161	131	280	0	0

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Jackson in identified FHSZs. Critical facilities in a FHSZ in the City of Jackson are shown in Figure C-18 and detailed in Table C-37. Details of critical facility definition, type, name and address and jurisdiction by FHSZ are listed in Appendix F.

Figure C-18 City of Jackson – Critical Facilities in FHSZs

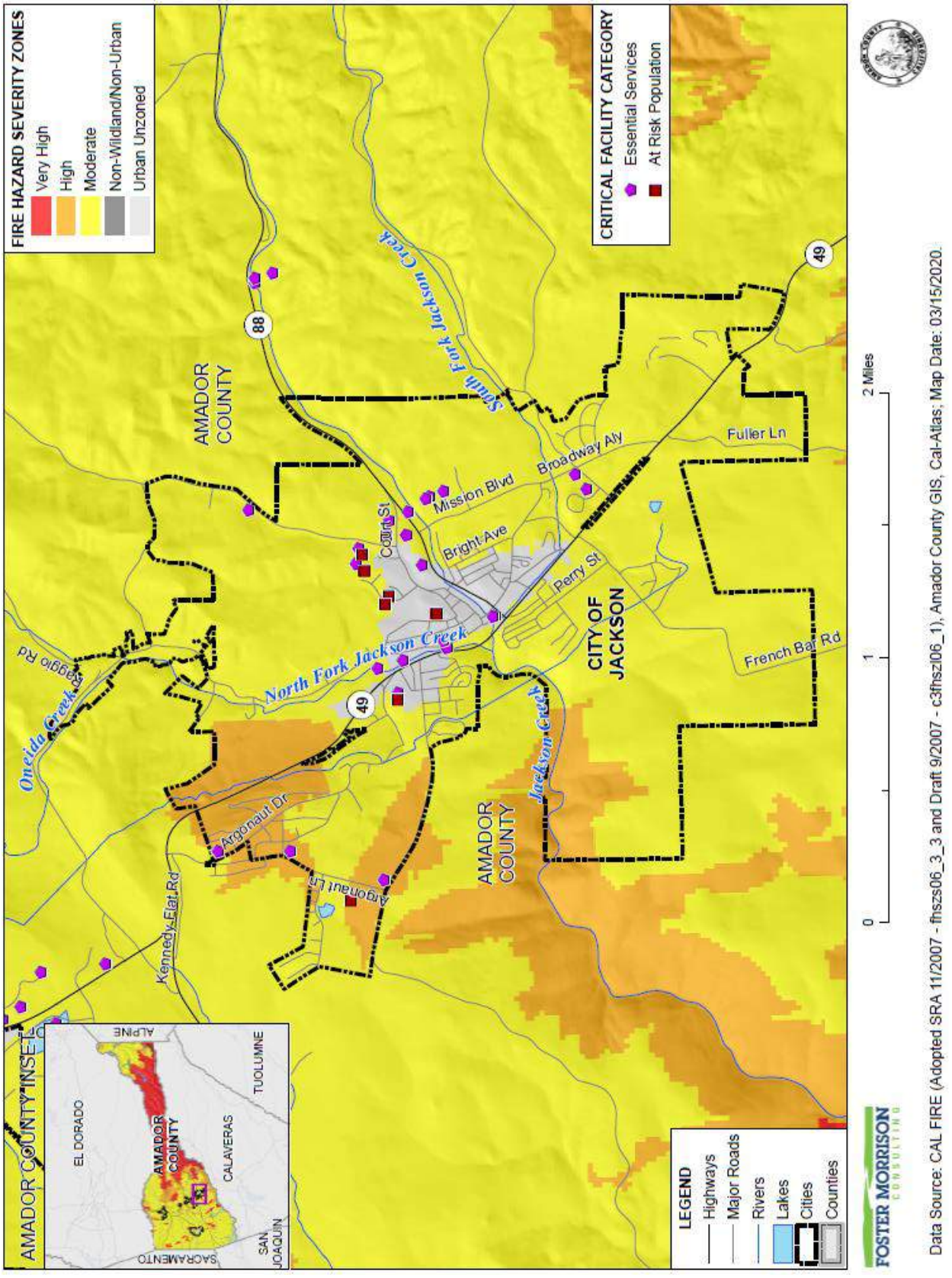


Table C-37 City of Jackson – Critical Facilities by FHSZ

Fire Hazard Severity Zones	Critical Facility Category / Critical Facility Type	Facility Count
High	**Essential Services**	
	Clinic	1
	Court House	1
	Fire Station	1
	Essential Services Total	**3**
	At Risk Population	
	School	1
	At Risk Population Total	**1**
High Total		**4**
Moderate	**Essential Services**	
	Clinic	6
	Community Center	1
	DMV	1
	Hospital	1
	Library	1
	Police Station	1
	Public Administration Building	1
	Essential Services Total	**12**
	At Risk Population	
	Residential Care Facility	5
	At Risk Population Total	**5**
Moderate Total		**17**
Urban Unzoned	**Essential Services**	
	Community Center	1
	EOC	1
	Fire Station	1
	Police Station	2
	Post Office	1
	Public Administration Building	1
	School District Office	1
	Essential Services Total	**8**
	At Risk Population	
	School	2
	At Risk Population Total	**2**
Urban Unzoned Total		**10**
City of Jackson Total		**31**

Source: CAL FIRE, Amador County

Future Development

Additional growth and development within moderate or higher fire hazard severity zones in the City would place additional values at risk to wildfire. City building codes are in effect and should continue to be updated as appropriate to reduce this risk.

GIS Analysis

The City Future Development Areas and the Amador County LAFCO SOI were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the 5 areas and 103 parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure C-19 shows the locations of future development areas the City is planning to develop in both the Future Development Areas and the SOI overlayed on the CAL FIRE FHSZs. Table C-38 shows the parcels and acreages of each future development area in the City in each FHSZ, broken out by Future Development Areas and Sphere of Influence.

Note: As seen on this figure, the Future Development Areas and SOI overlap. In the table, the Future Development Areas are shown in their full acreages, while the SOI acreages in the table are the remainder of the SOI once the Future Development Areas have been subtracted from them.

Figure C-19 City of Jackson – Future Development Areas in FHSZs

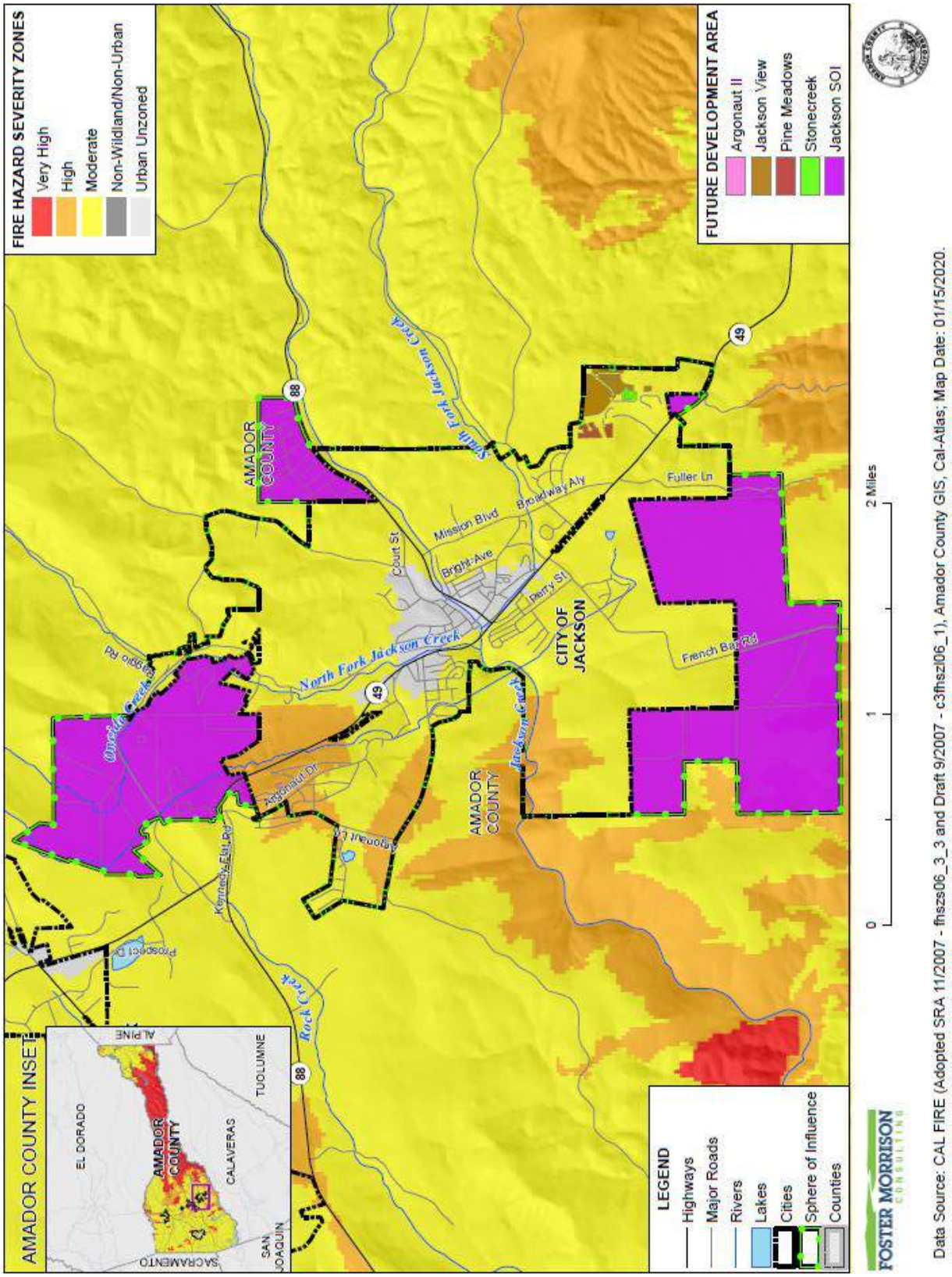


Table C-38 City of Jackson – Future Development Areas in FHSZs

Future Development / Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Argonaut II						
Very High	0	0	0	0.00	0.00	0.00
High	2	0	2	0.36	0.00	0.36
Moderate	0	0	0	0.00	0.00	0.00
Urban Unzoned	0	0	0	0.00	0.00	0.00
Argonaut II Total	**2**	0	**2**	**0.36**	**0.00**	**0.36**
Jackson View						
Very High	0	0	0	0.00	0.00	0.00
High	0	0	0	0.00	0.00	0.00
Moderate	32		32	22.02	0.00	22.02
Urban Unzoned	0	0	0	0.00	0.00	0.00
Jackson View Total	**32**	0	**32**	**22.02**	**0.00**	**22.02**
Pine Meadows						
Very High	0	0	0	0.00	0.00	0.00
High		0		0.00	0.00	0.00
Moderate	12	0	12	5.08	0.00	5.08
Urban Unzoned	0	0	0	0.00	0.00	0.00
Pine Meadows Total	**12**	0	**12**	**5.08**	**0.00**	**5.08**
Stonecreek						
Very High	0	0	0	0.00	0.00	0.00
High	0	0	0	0.00	0.00	0.00
Moderate	4	1	3	2.13	0.38	1.74
Urban Unzoned	0	0	0	0.00	0.00	0.00
Stonecreek Total	**4**	**1**	**3**	**2.13**	**0.38**	**1.74**
Jackson SOI						
Very High	0	0	0	0.00	0.00	0.00
High	1	1	0	4.41	4.41	0.00
Moderate	52	22	30	1,187.55	308.12	879.43

Future Development / Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Urban Unzoned	0	0	0	0.00	0.00	0.00
Jackson SOI Total	**53**	**23**	**30**	**1,191.96**	**312.53**	**879.43**
Grand Total	**103**	**24**	**79**	**1,221.54**	**312.91**	**908.63**

Source: CAL FIRE, City of Jackson GIS

C.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

C.6.1. Regulatory Mitigation Capabilities

Table C-39 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Jackson.

Table C-39 City of Jackson Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan/General Plan	Y Various Years	Yes
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	Y	Yes
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	

Building Code, Permitting, and Inspections	Y/N	Are codes adequately enforced?
Building Code		Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score:
Fire department ISO rating:		Rating:
Site plan review requirements	Y	Yes
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	Yes
Subdivision ordinance	Y	Yes
Floodplain ordinance	Y	Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	Yes
Flood insurance rate maps	Y	Yes
Elevation Certificates	Y	Yes
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
General Plan needs to be updated to address climate change, hazards, wildfire interface, emergency services, circulation, etc. The City has started the update process and anticipates being completed in June 2022.		

Source: City of Jackson

City of Jackson General Plan (dates vary by element)

The City of Jackson General Plan Program serves as the blueprint for future growth and development and provides comprehensive planning for the future. It encompasses what the City is now, and what it intends to be, and provides the overall framework of how to achieve this future condition (see the discussion in Section 4.3.1 Growth and Development Trends).

The General Plan is a document that guides the future development within the City. It contains broad community values and goals, giving a picture of the desired character and quality of development in the County and policies which outline the steps to accomplish those goals. Of primary concern to this planning document is the Safety and Land Use Elements of the General Plan. The Safety Element, adopted in 1981, reflects hazards related to the City. The Land Use Element, adopted in 2008, is more specific and implementation oriented with respect to protecting future development in the City.

Goals, Policies, and Implementation Measures related to hazard mitigation include the following:

- Goal 1: Growth in the City of Jackson shall occur only if new development adequately mitigates its environmental impacts, addresses housing availability and affordability needs, respects open space

resources and occurs so that the growth is in a manner which is not detrimental to the City's neighborhoods and small town quality of life.

- ✓ Policy 1.5: A hazards study shall be performed for the purpose of outlining areas considered hazardous due mainly to historic mining operations. The hazards study shall consider hazards associated with the use of hazardous materials and with ground disturbances that may have resulted in land instability. Once identified, these areas will be designated in a Hazards Overlay to be incorporated into this Land Use Element. New development standards for properties within this overlay shall be developed to protect the City's citizens from exposure to hazardous materials.

- Goal 2: The City of Jackson has numerous natural and historic features. These features shall be identified, enhanced if necessary, and protected.
  - ✓ Policy 2.5: Limit new development within the Creek/Floodplain overlay by requiring new development proposed within the overlay to obtain Planning Commission approval.

Mitigation Related Ordinances

Weed Abatement (Chapter 8.12)

This ordinance provides for the declaration and abatement of Nuisances to include, "any brush or weeds which attain such large growth as to become, when dry, a fire menace to adjacent improved property".

Uniform Codes (Chapter 14.04)

The following codes are adopted for the City of Jackson:

- The 2016 Edition of the California Administrative Code contained in Part 1 of Title 24 of the California Code of Regulations is hereby adopted by reference as the Administrative Code of the City of Jackson;
- The 2016 Edition of the California Building Code contained in Part 2, Volume 1 and Volume 2, of Title 24 of the California Code of Regulations, which incorporates and amends the 2015 Edition of the International Building Code published by the International Code Council, including Chapter 1, is hereby adopted by reference as the Building Code of the City of Jackson;
- The 2016 Edition of the California Residential Code contained in Part 2.5 of Title 24 of the California Code of Regulations, which incorporates and amends the 2015 Edition of the International Residential Code, Second Printing, and the 2012 Edition of the International Residential Code published by the International Code Council, including Chapter 1, is hereby adopted by reference as the Reference Code of the City of Jackson;
- The 2016 Edition of the California Electrical Code contained in Part 3 of Title 24 of the California Code of Regulations, which incorporates and amends the 2014 Edition of the National Electric Code published by the National Fire Protection Association, including Chapter 1, is hereby adopted by reference as the Electrical Code of the City of Jackson;
- The 2016 Edition of the California Mechanical Code contained in Part 4 of Title 24 of the California Code of Regulations, which incorporates and amends the 2015 Edition of the Uniform Mechanical Code published by the International Association of Plumbing and Mechanical Officials, including Chapter 1, is hereby adopted by reference as the Mechanical Code of the City of Jackson;
- The 2016 Edition of the California Plumbing Code contained in Part 5 of Title 24 of the California Code of Regulations, which incorporates and amends the 2015 Edition of the Uniform Plumbing Code published by the International Association of Plumbing and Plumbing Officials, including Chapter 1, is hereby adopted as the Plumbing Code of the City of Jackson;

- The 2016 Edition of the California Energy Code contained in Part 6 of Title 24 of the California Code of Regulations is hereby adopted by reference as the Energy Code of the City of Jackson;
- The 2016 Edition of the California Historical Building Code contained in Part 8 of Title 24 of the California Code of Regulations is hereby adopted by reference as the Historical Building Code of the City of Jackson;
- The 2016 Edition of the California Fire Code contained in Part 9 of Title 24 of the California Code of Regulations, which incorporates and amends the 2015 Edition of the International Fire Code as published by the International Code Council, including Chapter 1, is hereby adopted as the Fire Code of the City of Jackson;
- The 2016 Edition of the California Existing Building Code contained in Part 10 of Title 24 of the California Code of Regulations is hereby adopted by reference as the Existing Building Code of the City of Jackson;
- The 2016 Edition of the California Green Building Standards Code contained in Part 11 of Title 24 of the California Code of Regulations is hereby adopted by reference as the Green Building Standards Code of the City of Jackson;
- The 2016 Edition of the California Referenced Standards Code contained in Part 12 of Title 24 of the California Code of Regulations is hereby adopted by reference as the Referenced Standards Code of the City of Jackson;
- The 2015 Edition of the International Property Maintenance Code as published by the International Code Council is hereby adopted by reference as the Property Maintenance Code of the City of Jackson;
- The 2015 Edition of the Uniform Swimming Pool, Spa and Hot Tub Code as published by the International Association of Plumbing and Mechanical Officials is hereby adopted by reference as the Swimming Pool Code of the City of Jackson;
- The 1997 Edition of the Uniform Code for the Abatement of Dangerous Buildings, published by the International Conference of Building Officials, is hereby adopted by reference as the Dangerous Buildings Code of the City of Jackson;
- The 1997 Edition of the Uniform Housing Code, published by the International Conference of Building Officials, as referenced and adopted by the California Department of Housing and Community Development in Title 25 of the California Code of Regulations pursuant to Sections 17958, 17958.5, 17958.7, 17958.9 and 17959 of the Health & Safety Code is hereby adopted by reference as the Housing Code of the City of Jackson;
- The 1997 Edition of the Uniform Building Security Code, published by the International Conference of Building Officials, is hereby adopted by reference as the Security Building Code of the City of Jackson;

The above-identified codes in this Section 14.04.010 (hereinafter collectively referred to as the "Uniform Codes") are adopted for the purpose of prescribing regulations for the erection, construction, modification, repair, maintenance, demolition, use and occupancy of buildings and structures. One copy of each of the Uniform Codes shall be maintained for use and examination of the public in the Office of the Building Official.

Floodplain Management (Chapter 17.34)

The flood hazard areas of the City are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.

These flood losses are caused by uses that are inadequately elevated, floodproofed, or protected from flood damage. The cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities also contribute to the flood loss.

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; and streets and bridges located in areas of special flood hazard;
- Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage:
- Ensure that potential buyers are notified that property is in an area of special flood hazard; and
- Ensure that those who occupy areas of special flood hazard assume responsibility for their actions.
- In order to accomplish the above purpose, this Chapter includes methods and provisions to:
- Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damage increases in erosion or flood heights or velocities;
- Require that uses vulnerable to floods, including facilities which serve the uses, be protected against flood damage at the time of initial construction;
- Control the alteration of natural flood plains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
- Control, file, grade, dredge, and other development which may increase flood damage; and
- Prevent or regulate the construction of flood barriers which will unnaturally divert flood waters, or which may increase flood hazards in other areas.

17.34.220 – Floodways

Locations within areas of special flood hazard established in Section 17.34.070 (Basis for Establishing the Areas of Special Flood Hazard) are designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles, and erosion potential, the following provisions apply.

- Prohibit encroachments, including fill, new construction, substantial improvement, and other new development unless certification by a registered professional engineer or architect is provided demonstrating that encroachments shall not result in any increase in (the base) flood elevation during the occurrence of the base flood discharge.
- If subsection (A) is satisfied, all new construction, substantial improvement, and other proposed new development shall comply with all other applicable flood hazard reduction provisions of Sections 17.34.170 (Standards of Construction) through 17.34.250 (Flood-related Erosion-Prone Areas).

17.34.240 - Mudslide Prone Areas

The floodplain administrator shall review permits for proposed construction of other development to determine if it is proposed within a mudslide area.

Permits shall be reviewed to determine that the proposed site and improvement will be reasonably safe from mudslide hazards. Factors to be considered in making this determination include but are not limited to the:

- Type and quality of soils;
- Evidence of groundwater or surface water problems;
- Depth and quality of any fill;
- Overall slope of the site; and
- Weight that any proposed development will impose on the slope.

Within areas which may have mudslide hazards, the floodplain administrator shall require that:

- A site investigation and further review be made by persons qualified in geology and soils engineering;
- The proposed grading, excavation, new construction, and substantial improvement be adequately designed and protected against mudslide damages;
- The proposed grading, excavation, new construction, and substantial improvement not aggravate the existing hazard by creating either on-site or off-site disturbances; and
- Drainage, planting, watering, and maintenance not endanger slope stability.

17.34.250 - Flood-related Erosion-Prone Areas

- The floodplain administrator shall require permits for proposed construction and other development within all flood-related, erosion-prone areas identified by the community.
- Permit applications shall be reviewed to determine whether the proposed site alterations and improvements will be reasonably safe from flood-related erosion and will not cause flood-related erosion hazards or otherwise aggravate the existing hazard.
- If a proposed improvement is found to be in the path of flood-related erosion or would increase the erosion hazard, such improvement shall be relocated or adequate protective measures shall be taken to avoid aggravating the existing erosion hazard.
- Within Zone E on the Flood Insurance Rate Map, a setback is required for all new development from a body of water to create a safety buffer consisting of a natural vegetative or contour strip. This buffer shall be designated according to the flood related erosion hazard and erosion rate, in relation to the anticipated ―useful life of structures, and depending upon the geologic, hydrologic, topographic, and climatic characteristics of the land. The buffer may be used for suitable open space purposes, such as for agricultural, forestry, outdoor recreation, and wildlife habitat areas, and for other activities using temporary and portable structures only.

Development Code (Title 17)

This Development Code carries out the policies of the City of Jackson General Plan by classifying and regulating the uses of land and structures within the City of Jackson. This Development Code is adopted to protect and to promote the public health, safety, comfort, convenience, prosperity, and general welfare of residents, and businesses in the City. Additional purposes of this Development Code are to:

- Implement the General Plan by encouraging the uses of land designated by the General Plan;
- Provide standards for the orderly growth and development of the City that will maintain its established historic, small town, and open space characteristics;
- Enhance and maintain the relationship between the citizens of the City of Jackson, our environment, and the City's many attributes essential for a continued high quality of life.
- Encourage growth in a manner that does not detract from the City's attributes or negatively impact the environment.

- Require high quality planning and design for development, that enhances the visual character of the City, avoids conflicts between land uses, and preserves the scenic qualities of the City by maintaining adequate open space;
- Create a comprehensive and stable pattern of land uses consistent with the limitations of the Resource Constraints and Priority Allocation Ordinance; and
- Provide regulations for the subdivision of land in compliance with the Subdivision Map Act, Title 7, Section 4, Division 2 of the California Government Code.

C.6.2. Administrative/Technical Mitigation Capabilities

Table C-40 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Jackson.

Table C-40 City of Jackson's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Y	Yes
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Yes – When funding is available
Mutual aid agreements	Y	Yes
Other	N	
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y	Yes/Yes/Yes
Floodplain Administrator	Y	Yes/Yes/Yes
Emergency Manager	N	
Community Planner	Y	Yes/Yes/Yes
Civil Engineer	Y	Yes/Yes/Yes
GIS Coordinator	Y	
Other	N	
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	
Hazard data and information	Y	
Grant writing	N	
Hazus analysis	Unknown	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Additional Funding for increase training.		

Source: City of Jackson

C.6.3. Fiscal Mitigation Capabilities

Table C-41 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table C-41 City of Jackson's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (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	Yes/Yes
Authority to levy taxes for specific purposes	Y	Yes/Yes
Fees for water, sewer, gas, or electric services	Y	Yes/Yes
Impact fees for new development	Y	Yes/Yes
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	Yes/Yes
Incur debt through private activities	Y	Yes/Yes
Community Development Block Grant	Y	Yes/Yes
Other federal funding programs	Y	No/Yes
State funding programs	Y	Yes/Yes
Other		
How can these capabilities be expanded and improved to reduce risk?		
Funding to address deferred maintenance of infrastructure.		

Source: City of Jackson

C.6.4. Mitigation Education, Outreach, and Partnerships

Table C-42 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 C-42 City of Jackson's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access, and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	Y	School Programs

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
StormReady certification	N	
Firewise Communities certification		
Public-private partnership initiatives addressing disaster-related issues	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
Increased funding is necessary to expand programs.		

Source: City of Jackson

C.6.5. Other Mitigation Efforts

The City has many other completed or ongoing mitigation efforts that include the following:

- The City has successfully partnered with the State of California Office of Emergency Services and the County of Amador Office of Emergency Services on previous mitigation grants and outreach. This was the case with the Marcucci Lane Culvert Bridge replacement adjacent to Highway 49.
- The City also works with the CAL FIRE crews on an annual basis to clear the vegetation growth in Jackson Creek to reduce the potential for flooding within the City
- The City is in the process of replacing three potentially hazardous bridges: South Avenue Bridge, Pitt Street Bridge and French Bar Road Bridge. All three of these replacement projects are FHWA funded.
- The slide in the Busi Parking Lot has been repaired.
- The City utilized FEMA funds to repair the WWTP access road that was damaged during the 2017 storms.
- The City utilized FEMA funds to replace a damaged culvert on Jackson Gate Road.

C.7 Mitigation Strategy

C.7.1. Mitigation Goals and Objectives

The City of Jackson adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

C.7.2. NFIP Mitigation Strategy

The City of Jackson joined the National Flood Insurance Program (NFIP) on August 19, 1985. As a participant of the NFIP, the City of Jackson has administered floodplain management regulations that meet the minimum requirements of the NFIP. The management program objective is to protect people and property within the City. The City of Jackson will continue to comply with the requirements of the NFIP in the future.

In addition, the City of Jackson actively participates with Amador County to address local NFIP issues through a regional approach. Many of the program activities are the same for the City of Jackson as for Amador County since participation at the County level includes all local jurisdictions.

The City of Jackson Building Department provides public outreach activities which include map information services, public awareness, public hazard disclosure, and flood protection information. This information is readily available to the public and consists of current and accurate flood mapping. In addition, the Planning and Engineering Department provides information about our stormwater management program and up-to-date information related to the maintenance of our drainage system.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS which are to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. The City of Jackson is not a current participant in the CRS program.

More information about the floodplain administration in the City of Jackson can be found in Table C-43.

Table C-43 City of Jackson Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	39 policies $64,014 in premiums $10,330,500 in coverage
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?	34 claims $481,729 in paid claims 1 substantial damage claim
How many structures are exposed to flood risk within the community?	100 in the 1% annual chance floodplain 5 in the 0.2% annual chance floodplain
Repetitive Loss (RL) and Severe Repetitive Loss Properties (SRL)	2 RL structures 0 SRL Structures
Describe any areas of flood risk with limited NFIP policy coverage	None known.
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	No
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review
What are the barriers to running an effective NFIP program in the community, if any?	None known
Compliance History	
Is the community in good standing with the NFIP?	Y
Are there any outstanding compliance issues (i.e., current violations)?	N
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	1/28/2009 (CAV) 12/8/2017 (CAC)

NFIP Topic	Comments
Is a CAV or CAC scheduled or needed?	N
Regulation	
When did the community enter the NFIP?	August 19, 1985
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes
Provide an explanation of the permitting process.	For the permitting process, typically when any applications are made, the building department checks the location of the proposed development in relationship to the floodplains and floodways within the City. If a property is in a floodplain, conditions (whether it be on a developer or a single applicant) are placed on the permit requiring them to meet the City's_ floodplain ordinance and building requirements. With respect to structures proposed in floodways, no construction is allowed in floodways. If construction is to take place within floodplains, flood elevation certificates are required for all homes to prove that the finished floor elevation meets with the City's ordinances. Additionally, if its's a development, a full floodplain analysis, CLOMR and LOMR is required.
Community Rating System	
Does the community participate in CRS?	No
What is the community's CRS Class Ranking?	N/A
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

C.7.3. Mitigation Actions

The planning team for the City of Jackson identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Climate Change
- Dam Failure
- Drought & Water shortage

- Earthquake (large damaging/small)
- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- Landslide, Mudslide, Debris Flow
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (Hail, Lightning)
- Severe Weather: High Winds and Tornadoes
- Severe Weather: Winter Storms and Freeze
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan 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 countywide public outreach action, 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 plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

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

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140).

Project Description: Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption 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

Cost Estimate: Jurisdictional board/staff time

Benefits (avoided Losses): 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

Timeline: As soon as possible

Project Priority: High

Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The City and County play a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of natural hazards. A comprehensive multi-hazard public education program will better inform the community of natural hazards of concern and actions the public can take to be better prepared for the next natural disaster event.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The City will work with the County and other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of natural hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will leverage and build upon existing mechanisms.

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing County outreach programs will be reviewed for effectiveness and leveraged and expanded upon to reach the broader region.

Responsible Office: City of Jackson in partnership with the County

Cost Estimate: Annual costs to be determined, and will depend on the scope and frequency of activities and events as well as volunteer participation

Benefits (Losses Avoided): Increase residents' knowledge of potential hazards and activities required to mitigate hazards and be better prepared. Protect lives and reduce damages, relatively low cost to implement.

Potential Funding: Local budgets, grant funds

Timeline: Ongoing/Annual public awareness campaign

Project Priority: High

Action 3. Station 131 generator

Hazards Addressed: Wildfire, Climate Change, Earthquake, Dam Failure, & Severe Weather

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Fire station 131 located at 175 N. Main St does not have a backup power supply which is needed for emergency responses.

Project Description: Install generator

Other Alternatives: No alternatives

Existing Planning Mechanism(s) through which Action Will Be Implemented: None identified

Responsible Office/Partners: Fire Chief

Cost Estimate: $175,000

Benefits (Losses Avoided): Loss of life and or property due delayed responses due to no power

Potential Funding: None identified

Timeline: Unknown

Project Priority: High

Dam Failure, Flood, Localized Flood, and Landslide Actions

Action 4. Buena Vista Flood Mitigation Project

Hazards Addressed: Flood, Localized Flood, Dam Failure

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The Argonaut Heights area of Jackson was built shortly after World War II and was annexed into the City in the 1980's. There is virtually no storm drain system in the area other than surface run-off between the homes and some recent improvements by the EPA as part of the Argonaut Mine cleanup

effort. During periods of heavy rainfall, water gathers in the low spots, including where homes are located and floods properties.

Project Description: Construction of storm drain improvements in the area to address the flooding issues.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None identified.

Responsible Office/Partners: City Engineer

Cost Estimate: $110,000

Benefits (Losses Avoided): Protection of homes from flooding and mitigation of roadway hazards. Potential flood damage to adjacent homes and roadway damage from ponding water will be mitigated.

Potential Funding: No funding source at this time.

Timeline: Unknown

Action 5. Busi Parking Lot Slope Drainage

Hazards Addressed: Potential landslide due to unstable slope and poor drainage infrastructure.

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The storms of 2017/2018 caused a portion of the slope above the City's municipal parking lot to fail. The initial failure has been repaired and some drainage improvements have been implemented but a more robust drainage facility and additional slope stabilization would significantly reduce the likelihood of slope failure.

Project Description: Design and construction of improved drainage facilities at the top of the bank and installation of slope stabilizing materials to the face of the cut bank.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None identified.

Responsible Office/Partners: City Engineer

Cost Estimate: $300,000

Benefits (Losses Avoided): There are three houses located at the top of the slope. The proposed mitigation would reduce the risk of damage to those houses during flood events. Additionally, the damage to the parking lot infrastructure would be minimized.

Potential Funding: No funding source at this time.

Timeline: Unknown

Project Priority: Medium

Action 6. Annual Creek Cleaning

Hazards Addressed: Flooding

Issue/Background: Vegetation, debris and silt builds up in the drainages and Jackson Creek which can cause flooding.

Project Description: Annual creek cleaning and silt and debris removal.

Other Alternatives: None.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Department of Fish and Wildlife Streambed Alteration Agreement

Responsible Office/Partners: Public Works Superintendent

Cost Estimate: $5,000 - $50,000 depending on the amount of debris and silt that needs to be removed.

Benefits (Losses Avoided): Annual creek cleaning allows for uninterrupted streamflow which reduces the potential for flooding.

Potential Funding: General Fund

Timeline: Every Fall season

Project Priority: High

Wildfire Actions

Action 7. Starks Lane Bridge

Hazards Addressed: Wildfire, Drought, Extreme Heat, High Winds

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Weight restriction on bridge does not allow fire engine access

Project Description: Reinforce/replace bridge

Other Alternatives: No alternatives

Existing Planning Mechanism(s) through which Action Will Be Implemented: None identified

Responsible Office/Partners: Fire Chief

Cost Estimate: $350,000

Benefits (Losses Avoided): Loss of life and or property due to inability to access area with appropriate equipment

Potential Funding: None identified

Timeline: Unknown

Project Priority: High

Action 8. Defensible Space

Hazards Addressed: Wildfire, Drought, Extreme Heat, High Winds

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Our City has multiple wildland urban interface areas that pose a severe fire threat

Project Description: Develop and implement a wildland urban interface plan for our City that will assist with reducing the overall fire loss with prevention strategies

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Currently working with surrounding agencies to reduce fuel loads

Responsible Office/Partners: Fire Chief

Cost Estimate: unknown

Benefits (Losses Avoided): Reduce the risk of loss of life and property

Potential Funding: FEMA/CalFire

Timeline: Unknown

Project Priority: High

Action 9. Picardo Bridge

Hazards Addressed: Wildfire, Drought, Extreme Heat, High Winds

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Weight restriction on bridge does not allow fire engine access

Project Description: Reinforce/replace bridge

Other Alternatives: No alternatives

Existing Planning Mechanism(s) through which Action Will Be Implemented: None identified

Responsible Office/Partners: Fire Chief

Cost Estimate: $350,000

Benefits (Losses Avoided): Loss of life and or property due to inability to access area with appropriate equipment

Potential Funding: None identified

Timeline: Unknown

Project Priority: High

Annex D City of Plymouth

D.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Plymouth, a previously participating jurisdiction to the 2014 Amador County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the City. This Annex provides additional information specific to Plymouth, with a focus on providing additional details on the risk assessment and mitigation strategy for this community.

D.2 Planning Process

As described above, Plymouth followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Amador County Hazard Mitigation Planning Committee (HMPC), the City formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table D-1. Additional details on plan participation and City representatives are included in Appendix A.

Table D-1 City of Plymouth – Planning Team

Name	Position/Title	How Participated
Cathleen Johnson	Deputy Director of Public Works	All aspects

Coordination with other community planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the City integrated the previously approved 2014 Plan into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2014 LHMP through other plans and programs shown in Table D-2.

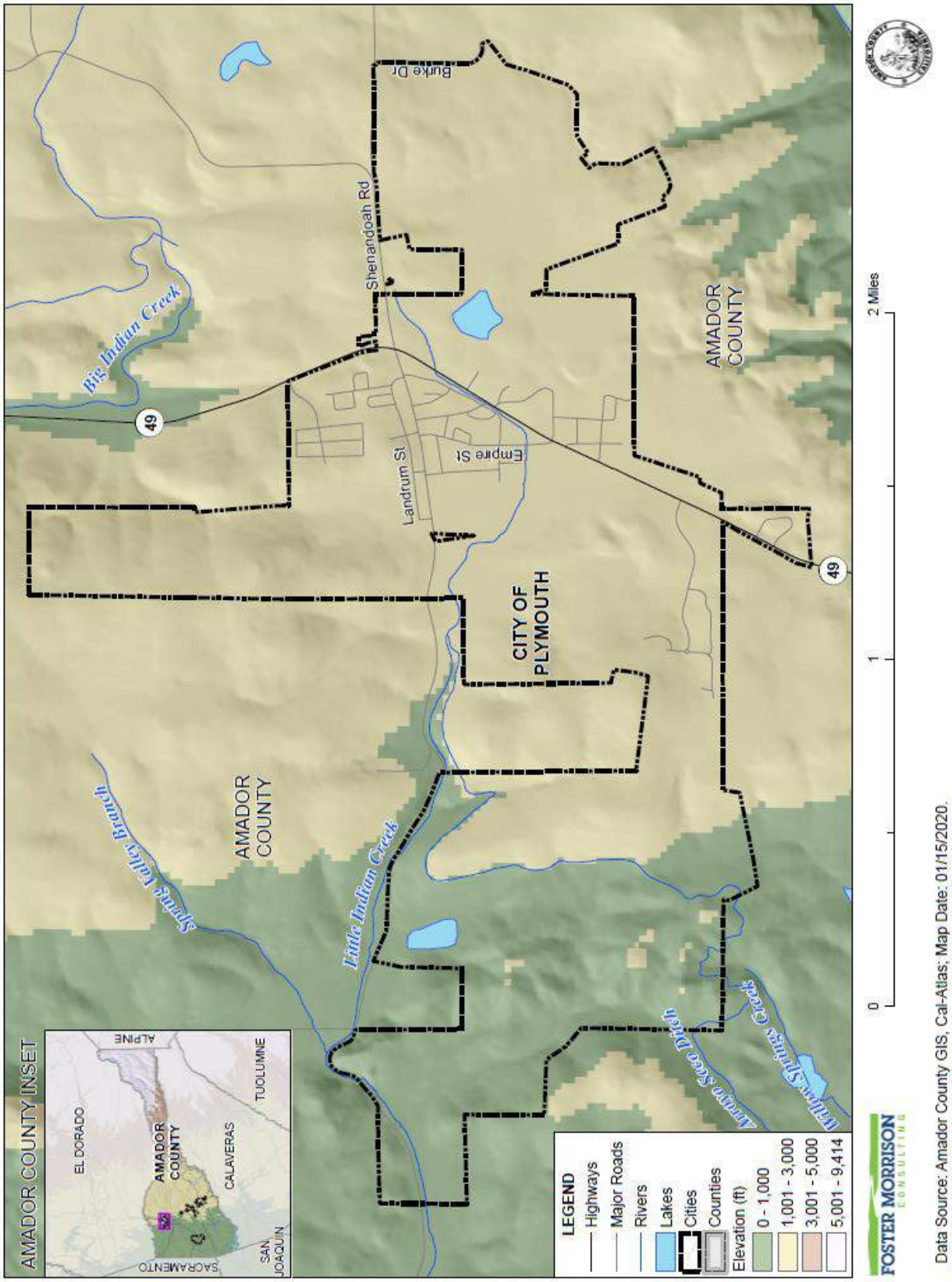
Table D-2 2014 LHMP Incorporation

Planning Mechanism 2014 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
General Plan	LHMP was incorporated into the Safety Element

D.3 Community Profile

The community profile for the City of Plymouth is detailed in the following sections. Figure D-1 displays a City map and the location of Plymouth within Amador County.

Figure D-1 City of Plymouth



D.3.1. Geography and Climate

The City of Plymouth lies on flat to gently rolling terrain located at the lower elevations of the Western Slope of California's Sierra Nevada. The benchmark elevation at the City is 1,086 feet. Changes in elevation across town vary less than one hundred feet. The City is traversed by several seasonal streams. They join together southwest of town and become the westward flowing Little Indian Creek. The climate is similar to the climate of other valley communities in Amador County, as discussed in the Base Plan.

D.3.2. History

Plymouth dates from 1852 when mining prospectors established a camp (Pokerville), before moving a mile to the permanent Puckerville in 1855. The name Plymouth was used for the first time a year later for a quartz mill, while the settlement itself became Plymouth in 1871, named after the Plymouth Mine Company, a gold mining concern. The last of the mines closed in the late 1940s, and today, Plymouth City, the "Gateway to the Shenandoah Valley", is renowned for its wine production.

D.3.3. Economy

US Census estimates show economic characteristics for the City of Plymouth. These are shown in Table D-3 and Table D-4. Mean household income in the City was $67,995. Median household income in the City was $61,591.

Table D-3 City of Plymouth – Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	47	9.0%
Construction	106	20.2%
Manufacturing	67	12.8%
Wholesale trade	0	0.0%
Retail trade	37	7.0%
Transportation and warehousing, and utilities	12	2.3%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	2	0.4%
Professional, scientific, and management, and administrative and waste management services	27	5.1%
Educational services, and health care and social assistance	99	18.9%
Arts, entertainment, and recreation, and accommodation and food services	60	11.4%
Other services, except public administration	35	6.7%
Public administration	33	6.3%

Source: US Census Bureau American Community Survey 2013-2017 Estimates

Table D-4 City of Plymouth – Income and Benefits

Income Bracket	Population	Percent
<$10,000	7	2.2%
$10,000 – $14,999	5	1.6%
$15,000 - $24,9999	47	14.6%
$25,000 – $34,999	40	12.4%
$35,000 – $49,999	42	13.0%
$50,000 – $74,999	53	16.5%
$75,000 – $99,999	58	18.0%
$100,000 – $149,999	51	15.8%
$150,000 – $199,999	19	5.9%
$200,000 or more	0	0.0%

Source: US Census Bureau American Community Survey 2013-2017 Estimates

Plymouth's largest employers are the 49 Village RV Resort, Pokerville Market and the numerous wineries located in the unincorporated area of Plymouth. Plymouth is home to a large senior/retired population, as well as winery agriculture workers. It is also the hub of Northwestern Amador County providing necessary essential services such as gas and groceries to the area. It relies heavily on the wine tourism market.

D.3.4. Population

The California Department of Finance estimated the January 1, 2019 total population for the City of Plymouth was 1,012.

D.4 Hazard Identification

Plymouth's identified the hazards that affect the City and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to Plymouth (see Table D-5).

Table D-5 City of Plymouth—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests	Limited	Unlikely	Negligible	Low	Low
Aquatic Invasive Species	Limited	Unlikely	Negligible	Low	Low
Avalanche	Limited	Unlikely	Negligible	Low	Medium
Climate Change	Extensive	Likely	Limited	Medium	–
Dam Failure	Limited	Unlikely	Negligible	Low	Medium
Drought & Water shortage	Extensive	Occasional	Negligible	Medium	High
Earthquake (large damaging/small)	Limited	Unlikely	Negligible	Low	Low
Floods: 1%/0.2% annual chance	Limited	Unlikely	Negligible	Low	Medium
Floods: Localized Stormwater	Limited	Unlikely	Limited	Low	Medium
Landslide, Mudslide, Debris Flow	Limited	Unlikely	Negligible	Low	Medium
Levee Failure	Limited	Unlikely	Negligible	Low	Medium
Severe Weather: Extreme Heat	Extensive	Likely	Limited	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Limited	Unlikely	Limited	Low	Medium
Severe Weather: High Winds and Tornadoes	Limited	Unlikely	Negligible	Low	Low
Severe Weather: Winter Storms and Freeze	Limited	Unlikely	Negligible	Low	Medium
Wildfire	Limited	Occasional	Limited	Medium	High

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

D.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Plymouth's hazards and assess the City's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

D.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section D.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard affects the City and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Amador County Planning Area.

D.5.2. Vulnerability Assessment and Assets at Risk

This section identifies Plymouth's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Values at Risk

The following data from the Amador County Assessor's Office is based on the 12/31/2018 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitations are created by Proposition 13 and the Williamson Act as detailed in the Base Plan. With respect to Proposition 13, instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. However, depending on the type of hazard and impact of any given hazard event, land values may be adversely affected; thus, land values are included as appropriate. Table D-6 shows the 12/31/2018 Assessor's values and content replacement values (e.g., the values at risk) broken down by property use for the City.

Table D-6 City of Plymouth – Total Values at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Agricultural	39	9	$7,533,031	$2,225,033	$2,225,033	$11,983,097
Commercial	61	48	$10,901,341	$17,290,621	$17,290,621	$45,482,583
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	32	0	$68,736	$0	$0	$68,736
Residential	441	369	$31,049,959	$47,073,163	$23,536,580	$101,659,702
Unknown	5	0	$0	$0	$0	$0
City of Plymouth Total	**578**	**426**	**$49,553,067**	**$66,588,817**	**$43,052,234**	**$159,194,118**

Source: Amador County 12/31/2018 Parcel/Assessor's Data

Critical Facilities and Infrastructure

Critical facilities and infrastructure are those buildings and infrastructure that are crucial to a community. Should these be damaged, it makes it more difficult for the community to respond to and recover from a disaster. 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, and (3) Hazardous Materials Facilities, as discussed in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the City of Plymouth from Amador County GIS is shown on Figure D-2. Table D-7 gives summary information about the critical facilities in the City. Table D-8 details the facility categories and breaks them down by facility type. Details of critical facility definition, type, name, address, and jurisdiction by hazard area or zone are listed in Appendix F. The critical facility inventory and associated maps for the City only include the first two categories of facility types; a GIS layer of Hazardous Materials Facilities was not available.

Figure D-2 City of Plymouth – Critical Facilities

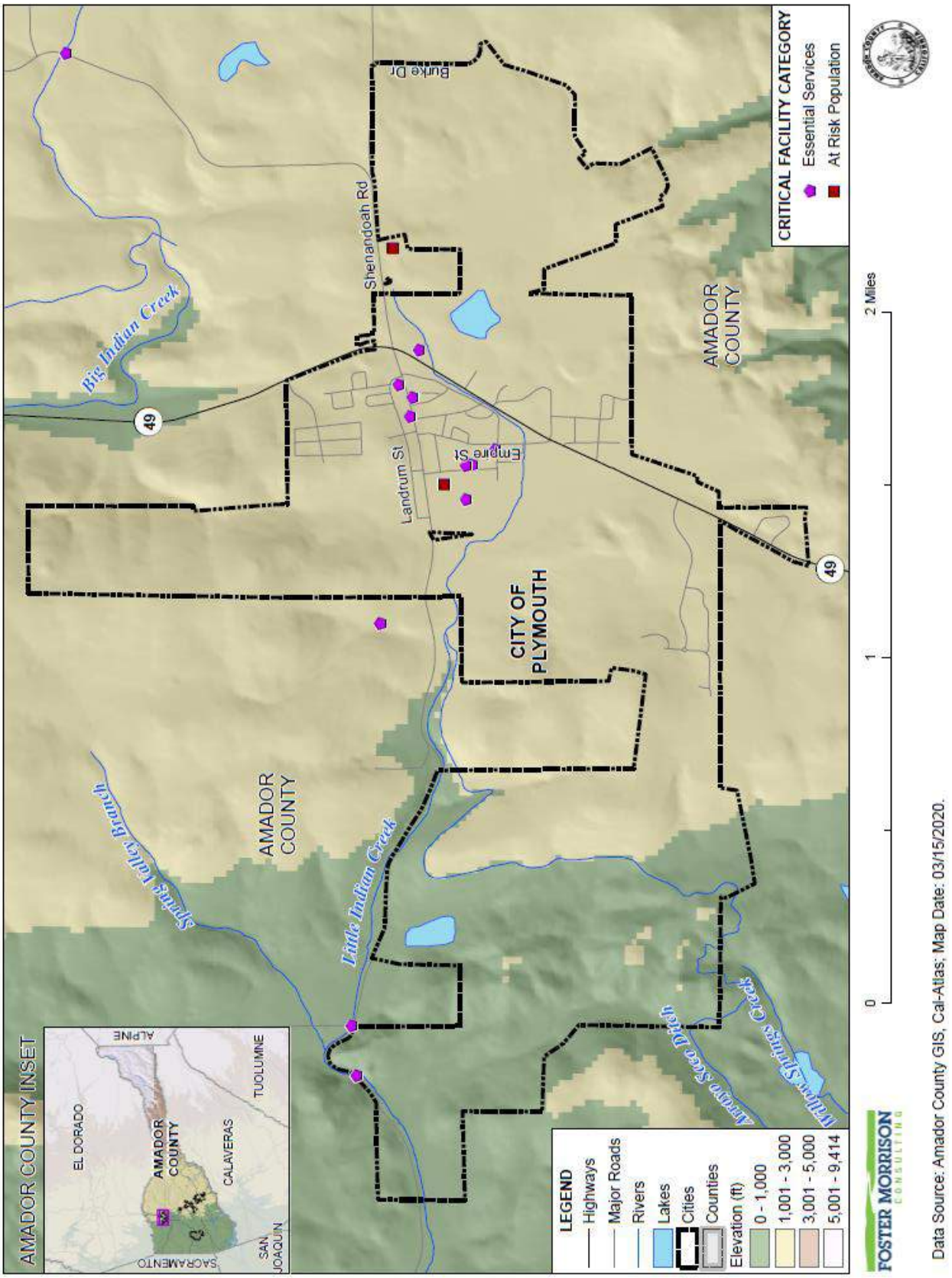


Table D-7 City of Plymouth – Critical Facility Summary

Critical Facility Category	Facility Count
Essential Services	9
At Risk Population	1
City of Plymouth Total	**10**

Source: Amador County GIS

Table D-8 City of Plymouth – Critical Facilities by Facility Category and Type

Critical Facility Category	Facility Type	Facility Count
Essential Services	Bridge	1
	Clinic	1
	EMS Station	1
	Evacuation Shelter	1
	Fire Station	1
	Library	1
	Post Office	1
	Power Substation	1
	Public Administration Building	1
	Total	**9**
At Risk Population	School	1
	Total	1
City of Plymouth Total		**10**

Source: Amador County GIS

Natural Resources

Natural resources are unique to the City and are difficult to replace. Should a natural disaster occur, these species and locations are at risk.

Plymouth is located in the Foothill Belt or Upper Sonoran Zone. It is a region that runs north and south along the foothills of the Sierra Nevada that is characterized by digger pine, interior live oak, blue oak, and various types of chaparral. A diverse group of wildlife species occur within the City and immediate area, due primarily to the variety of habitat types. Many of the wildlife species found are year-round residents, while others are migratory. Examples of wildlife found in the area include:

- Reptiles and amphibians. Garter snake, king snake, rattle snake, gopher snake, racers, western fence lizard, alligator lizard, western skink, slender salamander, arboreal salamander, western toad, California newt, and California tree frog.
- Birds. Scrub jay, Stellar's jay, rufous-sided towhee, sparrows, vireos, warblers, wrens, bluebird, western tanager, varied thrush, whitebreasted nuthatch, plain titmouse, acorn woodpecker, northern flicker, great horned owl, northern oriole, red-tailed hawk, American kestrel, wild turkey, and quail.

- Mammals. Mule deer, jack rabbit, bobcat, red fox, grey fox, mountain lion, black bear, deer mouse, California vole, Botta's pocket gopher, ground squirrel, western grey squirrel, striped skunk, raccoon, opossum, and porcupine.

Special status species are those plants and animals listed as rare, threatened, or endangered by the state or Federal governments, species designated as candidates for inclusion in those listings, and species categorized as California Species of Special Concern.

There are wetlands located in the City. These wetlands have been mapped and tabulated. Figure D-3 shows the wetlands locations in the City. Table D-9 delineates the types, counts, and acreages of wetlands in the City.

Figure D-3 City of Plymouth – Wetland Locations

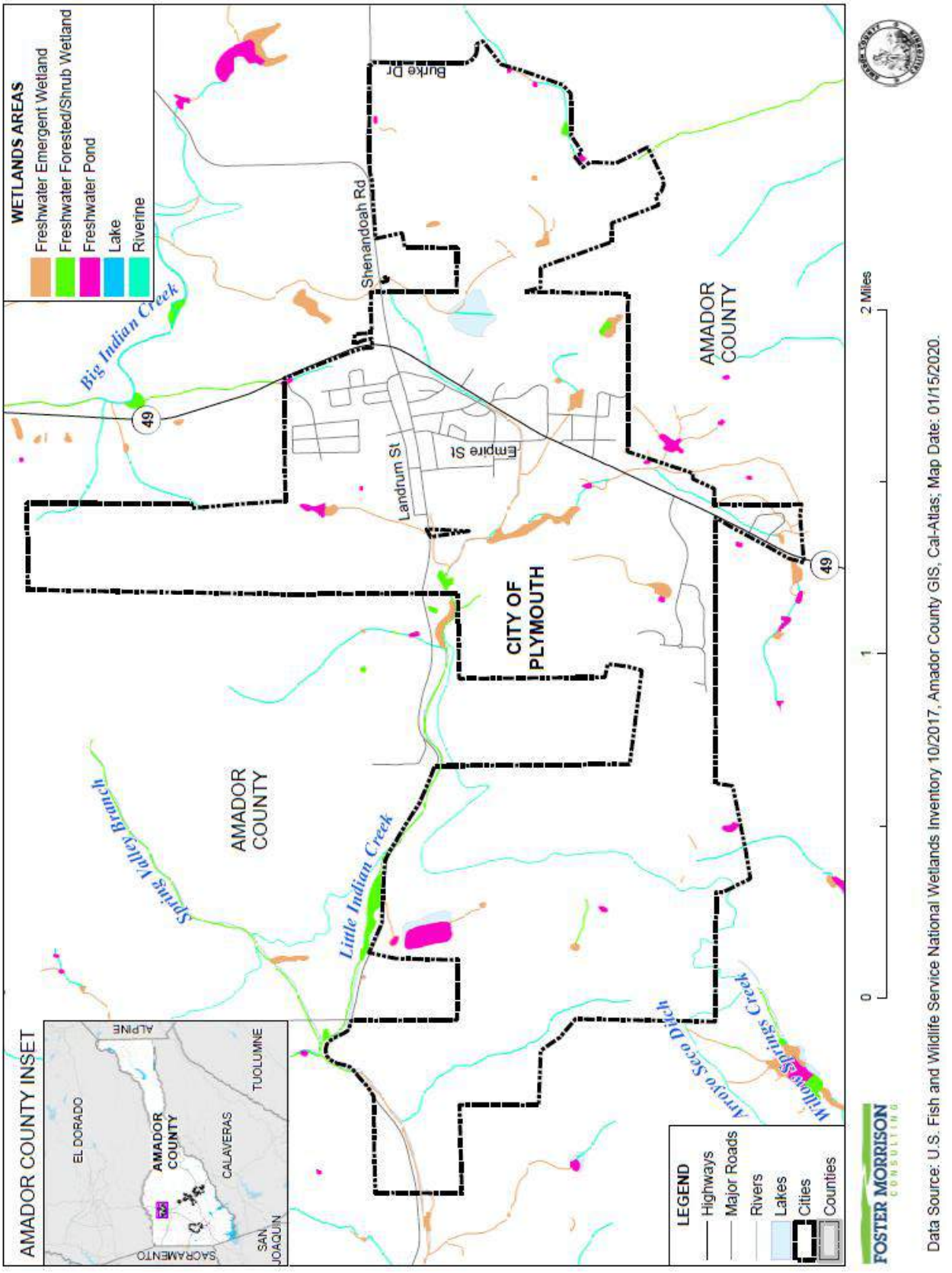


Table D-9 City of Plymouth – Wetland Types, Counts, and Acreages

Wetlands Area Type	Wetlands Count	Wetlands Area (in Acres)
Freshwater Emergent Wetland	35	19.80
Freshwater Forested/Shrub Wetland	6	3.23
Freshwater Pond	19	8.40
Lake		
Riverine	19	9.75
Plymouth Total	**79**	**41.18**

Source: US Fish and Wildlife Service

Historic and Cultural Resources

Historic and cultural resource are difficult to replace, and special care is needed when rebuilding or improvements are necessary. Should a natural disaster occur, these properties and locations are at risk.

The City of Plymouth has a 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. 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. These requirements are detailed in Section 4.3.1 of the Base Plan. Table D-10 lists the historical buildings in the City.

Table D-10 Amador County Planning Area – Historical Resources

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City/ Community
Plymouth Trading Post (470)		X		8/30/1950	Plymouth
D'Agostini Winery (762)		X		4/28/1961	Plymouth

Source: California Department of Parks and Recreation Office of Historic Preservation, http://ohp.parks.ca.gov/

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.

Growth and Development Trends

As part of the planning process, the HMPC looked at changes in growth and development, both past and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability over time. Information from the City of Plymouth

General Plan Housing Element, the California Department of Finance, the US Census Bureau form the basis of this discussion.

Historic Population Trends and Current Population

Population growth can increase the number of people living in hazard prone areas. Plymouth has generally seen steady growth. Plymouth has seen growth rates as shown in Table D-11.

Table D-11 City of Plymouth – Population Changes Since 1950

Year	Population	Change	% Change
1950	382	–	–
1960	489	107	28.0%
1970	501	12	2.5%
1980	699	198	39.5%
1990	811	112	16.0%
2000	890	79	20.8%
2010[1]	1,005	115	2.6%
2019[2]	1,012	7	0.7%

Source: [1]US Census Bureau, [2]California Department of Finance

Special Populations and Disadvantaged Communities

There are certain populations in the City that are at greater risk to hazards, due to circumstances beyond their control. These populations in the City present a unique challenge when natural hazards arise. The City noted a few special populations that exist in the City:

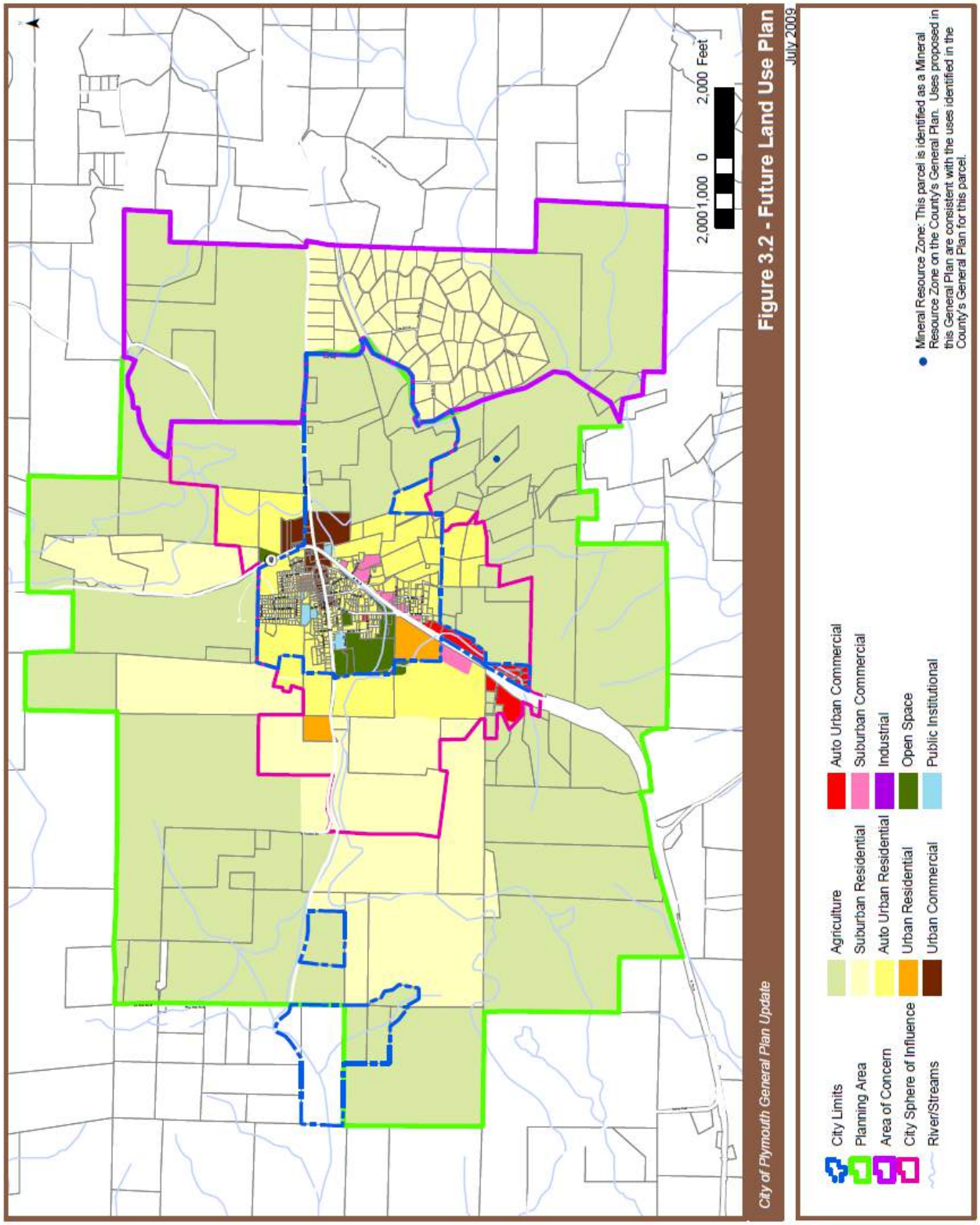
- 21.3% of the population speaks Spanish. Many of these are agricultural workers. This language barrier presents unique challenges.
- 12.9% of adults are senior citizens. Some (but not all) lack mobility. This can cause issues during evacuations. This can also cause challenges during times of Public Safety Power Shutdowns (PSPS).

Land Use

State planning law requires that the land use element of a general plan include a statement of the standard population density, building intensity, and allowed uses for the various land use designations in the plan (Government Code Section 65302(a)). The City's land use designations are generally described below and mapped on the Land Use Diagram (Figure D-4). The Plymouth Municipal Code provides detailed land use and development standards for development.

As a guide for land development and public improvement requirements, the plan depicted in Figure D-4, expresses the pattern and character of future development. It is independent of a growth plan as it does not indicate the timing or sequencing of development. Instead, this is a matter of local decision making that is to be determined through implementation of this plan. Future land use for the City of Plymouth from the City of Plymouth General Plan Land Use Element is shown on Figure D-4.

Figure D-4 City of Plymouth – Land Use Diagram



Source: City of Plymouth General Plan Land Use Element

Development since 2014 Plan

As discussed in Section 4.3.1 of the Base Plan, future development has occurred in the City since the last plan. Some of this has occurred in hazard prone areas. The City Building Department tracked total building permits issued since 2014 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table D-12 and Table D-13.

Table D-12 City of Plymouth – Total Development Since 2014

Property Use	2015	2016	2017	2018	2019
Agricultural	0	0	21	19	13
Commercial	0	0	0	0	0
Industrial	0	0	0	0	0
Residential	0	0	0	0	0
Unknown	0	0	0	0	0
Total	**0**	**0**	**21**	**19**	**13**

Source: City of Plymouth Building Department

Table D-13 City of Plymouth – Development in Hazard Areas since 2014

Property Use	1% Annual Chance Flood	Landslide Susceptibility Area	Wildfire Risk Area[1]	Other
Agricultural	0	0	0	0
Commercial	0	0	0	0
Industrial	0	0	0	0
Residential	0	0	0	0
Unknown	0	0	0	0
Total	**0**	**0**	**0**	**0**

Source: City of Plymouth Building Department

[1]Moderate or higher wildfire risk area

Future Development

A discussion of future development is included below. Future development is important to hazard mitigation planning. Ensuring that future development does not place more people and property into known hazard zones is one of the goals of mitigation planning.

The City of Plymouth General Plan Land Use Element noted that currently the City is divided into two residential, one commercial, two industrial, and two special (institutional and open space) zoning districts. In addition, there is a Planned Development (PD) zone and three combined zones. While the zoning ordinance establishes lot sizes there is no relationship to development character due to the span of uses and intensities allowed within each of the districts.

The Land Use Element also noted that the City had once before proposed an expanded SOI, which generally followed parcel ownership lines effectively squaring-off the official SOI. The SOI is significant because

this is the area within which the City intends to have ultimate land use authority. While there is no such land use authority until which time as the City requests from LAFCO annexation of land into its corporate limits, this is the area by which the City – in coordination with Amador County - presumes to have influence of the pattern and timing of development.

Interestingly, the City Land Use Element also noted that, due to the availability of water through an agreement with the Amador Water Agency the City is confronted with increased development pressure. This is significant and highly relevant as it relates to the City's SOI and its plan for annexation and provision of services. Considering the possible future availability of additional water via the Arroyo Ditch there is likely to be continuing pressure for development in the immediate and surrounding area, which will greatly influence the community and its character.

The City noted that two new residential development was planned for the City. Greilich and Zinfandel Ridge are on the southern edge of the City limits. The City noted that they will be built outside of the FEMA floodplains. According to the FHSZ maps in the wildfire section below, it is most likely that this will fall in the moderate FHSZ.

More general information on growth and development in Amador County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Amador County Vulnerability and Assets at Risk of the Base Plan.

GIS Analysis

Using GIS, the following methodology was used in determining parcel counts and acreages with future development projects in the City of Plymouth.

Future development areas in the City were provided in mapped format by the City. 3 areas were provided:

- Greilich
- Zinfandel
- Plymouth SOI

Using the GIS parcel spatial file for each of these areas, the 3 areas and 97 parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure D-5 shows the locations of future development areas the City is planning to develop. Table D-14 shows the parcels and acreages of each future development area in the City.

Figure D-5 City of Plymouth – Future Development Areas

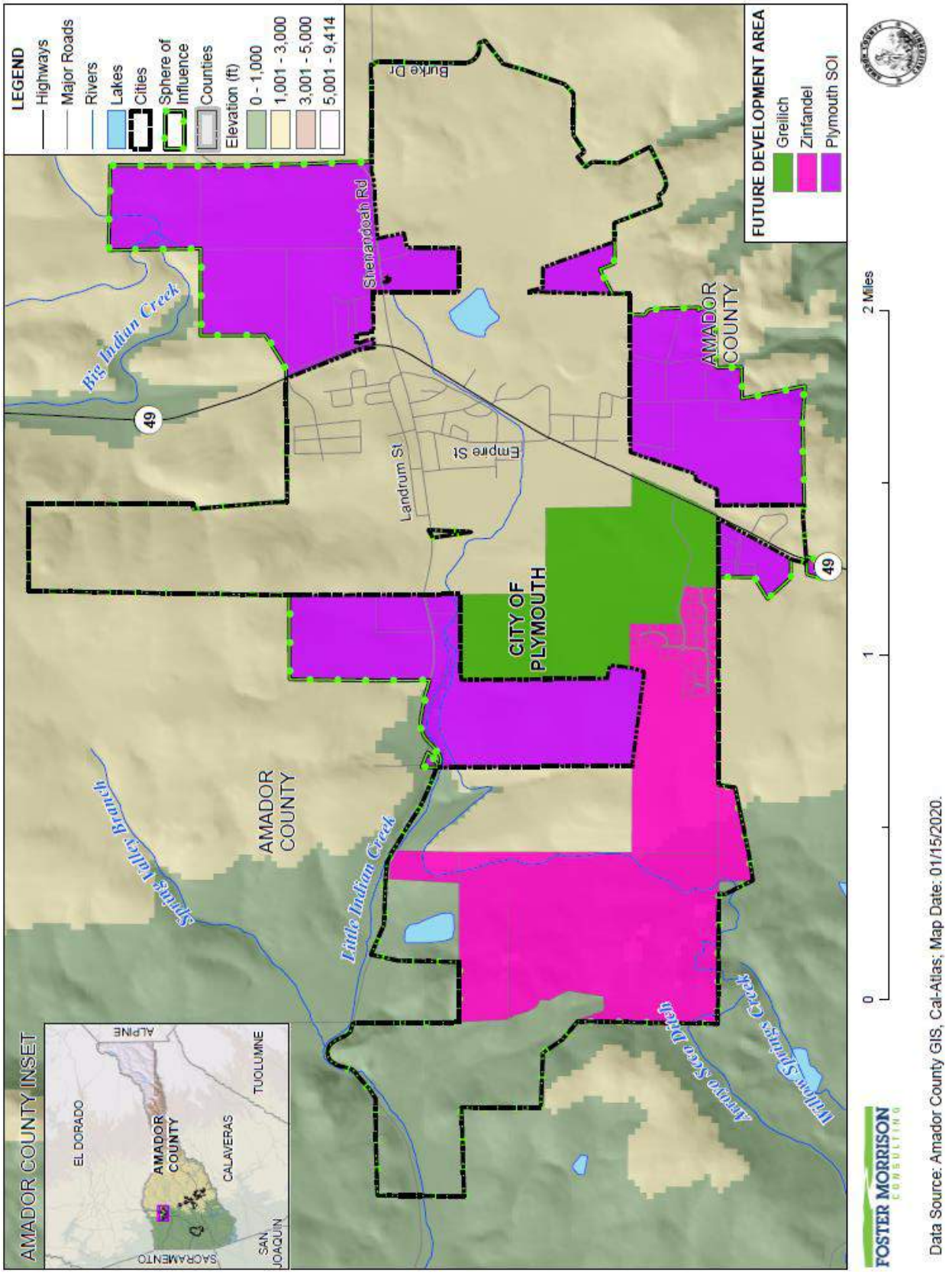


Table D-14 City of Plymouth – Future Development Parcels and Acres

Future Development	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Greilich	1	1	0	170.90	170.90	0
Zinfandel	63	27	36	362.27	11.48	350.79
Plymouth SOI	33	16	17	579.54	357.84	221.69
Grand Total	**97**	**44**	**53**	**1,112.71**	**540.22**	**572.48**

Source: City of Plymouth, Amador County LAFCO

D.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table D-5 as high or medium significance hazards. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Amador County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. 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 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.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Climate Change

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Climate change adaptation is a key priority of the State of California. The 2018 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.

In Amador County and the City, the HMPC noted that each year it seems to get a bit warmer and snow seems to start at higher levels. It was also noted that 2017 was one of the wettest years ever. Climate change concerns in the area especially those affecting dry season are the priority. Wildfire is a major concern and less moisture/rainfall and higher temperatures increase that risk. Natural grasses dry out sooner in the season creating ground fuel and tree mortality adds to fire fuel as well. Drought is also a worry as Plymouth's economy is centered around the Shenandoah Valley's wine industry, which brings in tourists and provides employment. Also, water flowing through the City's Arroyo Ditch has been impacted. This waterway provides agricultural water for numerous properties along it's banksides as well as in the City and beyond heading downstream.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the City, Amador County, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, 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

Climate change has never been directly linked to any declared disasters. While the City noted that climate change is of concern, no specific impacts of climate change could be recalled. The City and HMPC members noted that the strength of storms does seem to be increasing and the temperatures seem to be getting hotter.

Vulnerability to Climate Change

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. California's APG: 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. 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. This information can be used to guide climate adaptation planning in the City and Amador County Planning Area.

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra region in which the Amador County Planning Area is part of:

- Temperature increases
- Decreased precipitation
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

Future Development

The City 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. For example, interior western and southwestern states may experience an exodus of population due to challenges in adapting to heat even more extreme than that which is projected to occur here. While there are currently no formal studies of specific migration patterns expected to impact the City and 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.

Drought & Water Shortage

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Drought is a complex issue involving 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. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the City, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry

- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages and for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the City and the County are shown in Section 4.2.11 of the Base Plan.

Past Occurrences

Since drought is a regional phenomenon, past occurrences of drought for the City are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.2.11 of the Base Plan.

The HMPC did not that the drought of 2014 revealed several issues within the City. First, an increase in grass fires throughout the City. Second a lower flow level for the City's Arroyo Ditch which distributes agriculture water throughout the area. And thirdly, instituting water restriction policies, education, and enforcement on the community the City serves.

Vulnerability to Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the City, 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 City is no longer reliant on wells as its principal water source. In January of 2010, a pipeline was finished in conjunction with Amador Water Agency (AWA) which now provides Mokelumne River water via the Tanner Treatment Plant to the City of Plymouth. The wells and the Arroyo Ditch are maintained as emergency secondary sources in the event something should happen to the pipeline or primary water source.

Impacts

The vulnerability of the City to drought is City-wide, 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. The increased dry fuels and fuel loads associated with drought conditions can also 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.

Other qualitative impacts associated with drought in the planning area are those related to water intensive activities such as, municipal usage, commerce, tourism, recreation, and agricultural use. Drought

conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

With more precipitation likely falling as rain instead of snow in the Sierra's, 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.

Future Development

As the population in the area continues to grow, so will the demand for water. The AWA provides water to the City through reliable surface water sources. However, population growth in the City will continue to increase the demand for water. Ongoing planning will be needed by the City and AWA to account for population growth and increased water demands.

Earthquake (large damaging/small)

Likelihood of Future Occurrence–Unlikely/Occasional
Vulnerability–Low

Hazard Profile and Problem Description

Note: Though a low significance hazard for the City, due to its importance in the State of California, earthquake is profiled here. It is a low significance hazard for mitigation planning purposes.

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.

The City of Plymouth General Plan Safety Element noted that the location of Plymouth in the Foothills of the Sierra Nevada mountain range creates a number of safety issues for development. Rolling hills and steep slopes, combined with proximity to active seismic faults, make the City susceptible to geologic and seismic hazards.

Location and Extent

Since earthquakes are regional events, the whole of the City is at risk to earthquake. Plymouth and the surrounding area are relatively free from significant seismic and geologic hazards. There are no known or inferred active faults within the City.

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, as discussed in Section 4.2.12 of the Base Plan. 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 (equivalent to 5.5 to 6.5 on the Richter Scale). During a Mercalli VII, most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. The City is located in an area where few earthquakes of significant magnitude occur, so both magnitude and intensity of earthquakes are expected to remain low. Seismic shaking maps for the area show Amador County and the City fall within a low to moderate shake risk.

Past Occurrences

The City noted no past occurrences of earthquakes or that affected the City in any meaningful way.

Vulnerability to Earthquake

The combination of plate tectonics and associated California coastal mountain range building geology generates earthquake as a result of the periodic release of tectonic stresses. Amador County's mountainous terrain lies in the center of the North American and Pacific tectonic plate activity. There have been earthquakes as a result of this activity in the historic past, and there will continue to be earthquakes in the future of the California north coastal mountain region. Both the San Andreas Fault and the Sierra Frontal System faults poses possibly significant impacts to Amador County and the City as they have the capabilities of producing a quake.

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault; however, liquefaction can occur further from the source of the earthquake. In general, newer construction is more earthquake resistant than older construction due to enforcement of improved building codes. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions and associated liquefaction, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry (URM) and soft story buildings. The City Planning Team noted four URM buildings on the City's Main Street: the Burke Building, China House, Levaggi Store, and the Roos Building. There are no soft story buildings in the City.

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. The City of Plymouth is within the less hazardous Zone 3.

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable.

Impacts from Earthquake

Impacts from earthquake in the City will vary depending on the fault that the earthquake occurs on, the depth of the earthquake strike, and the intensity of shaking. Large events could cause damages to infrastructure, critical facilities, residential and commercial properties, and possible injuries or loss of life.

Earthquake Analysis

Due to the regional effects of an earthquake, a Hazus earthquake analysis was performed on a countywide basis. This can be found in Section 4.3.9 of the Base Plan. While these runs were not done specific to the City, maps showing damage in the County show greater areas of damage near the cities in the County. This is because most models reflect that the greatest damage occurs in the built-out, populated areas of the County. The deterministic 6.7 Hayward Fault run showed minimal damage to the County and the City, while the probabilistic 7.0 earthquake scenario showed moderate to high damage to the County and the City.

Future Development

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. The City enforces the state building code, which mandates construction techniques that minimize seismic hazards. Future development in the City is subject to these building codes.

Flood: 100/500-Year

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–Low

Hazard Profile and Problem Description

Note: Though a low significance hazard for the City, due to its importance in the State of California, flood is profiled here. It is a low significance hazard for mitigation strategy planning purposes.

This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the County or in the City, and have caused damages in the past. Flooding is a significant problem in Amador County and the City. Historically, the City has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm

drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred both within the 1% and 0.2% annual chance floodplains and in other localized areas.

As previously described in Section 4.2.13 of the Base Plan, the Amador County Planning Area and the City of Plymouth have been subject to historical flooding. Plymouth is traversed by several stream systems and is at risk to the 1% and 0.2% flood.

Location and Extent

The City of Plymouth has areas located in the 1% and 0.2% annual chance floodplain. This is seen in Figure D-6.

Figure D-6 City of Plymouth – FEMA DFIRM Flood Zones

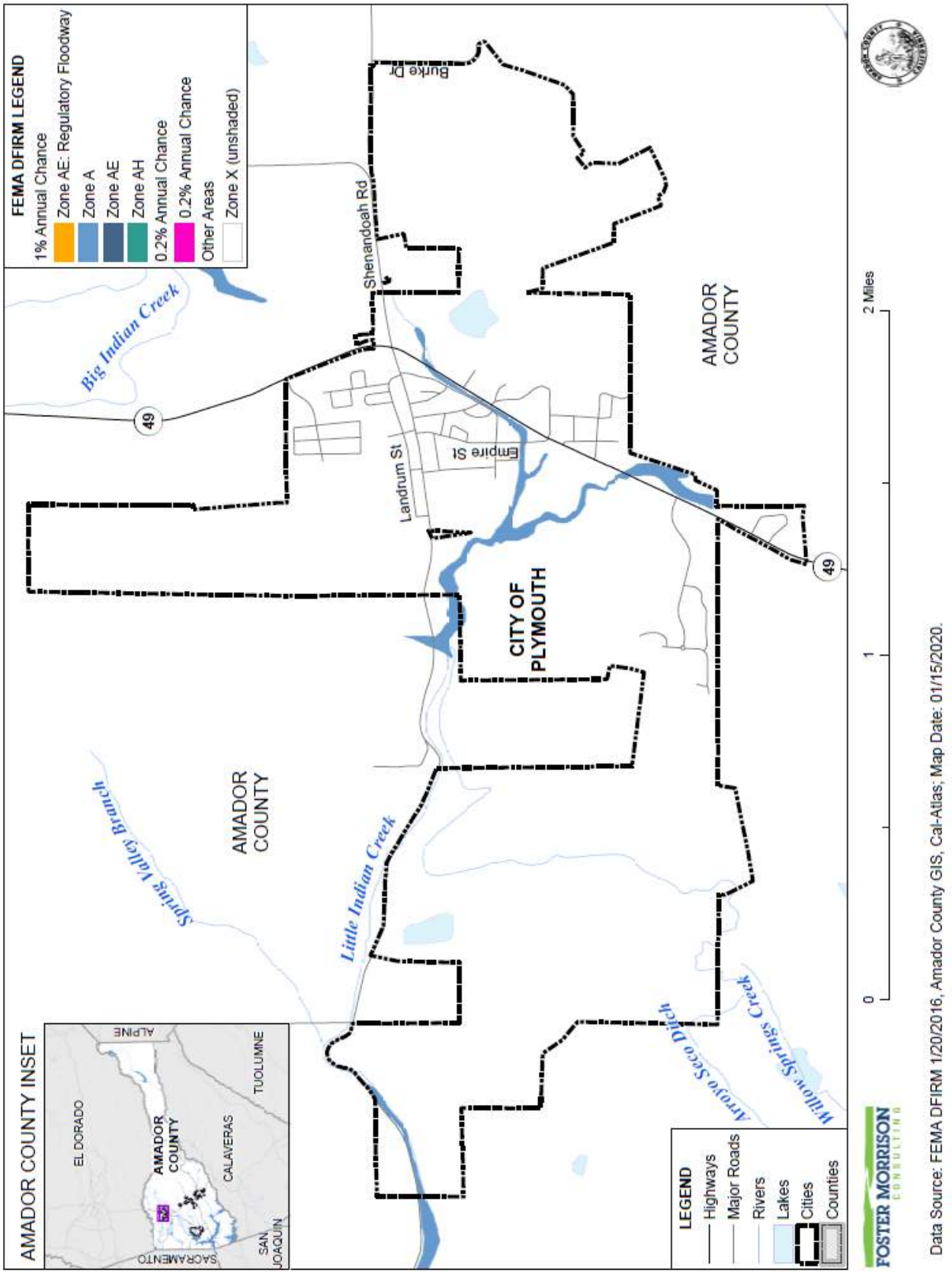


Table D-15 details the DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the City.

Table D-15 City of Plymouth– DFIRM Flood Hazard Zones

Flood Zone	Description	Flood Zone Present in City of Plymouth
A	100-year Flood: No base flood elevations provided	Y
AE	100-year Flood: Base flood elevations provided	N
AE Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided	N
Shaded X	500-year Flood: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	N
X (unshaded)	No flood hazard	Y

Source: FEMA

Additionally, flood extents can generally be measured in volume, velocity, and depths of flooding. Expected flood depths in the City vary, depending on the nature and extent of a flood event; specific depths are unknown. Flood durations in the City tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Flooding in the City tends to have a shorter speed of onset, due to the amount of water that flows through the City. Geographical flood extent from the FEMA DFIRMs is shown in Table D-16.

Table D-16 City of Plymouth – Geographical Flood Hazard Extents in FEMA DFIRM Flood Zones

Flood Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
1% Annual Chance	28	0.01%	5	0.00%	23	0.01%
0.2% Annual Chance	0	0.00%	0	0.00%	0	0.00%
Other Areas	1,624	0.42%	581	0.35%	1,043	0.47%
Total	**1,652**	**0.43%**	**586**	**0.35%**	**1,066**	**0.48%**

Source: Amador County 1/20/2016 DFIRM

Past Occurrences

A list of state and federal disaster declarations for Amador County from flooding is shown on Table D-17. These events also likely affected the City to some degree.

Table D-17 Amador County – State and Federal Disaster Declarations from Flood 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	15	1955, 1958, 1963, 1964, 1969, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1959, 1963 (twice), 1969, 1980, 1982, 1986, 1995, 1997, 1998

Source: Cal OES, FEMA

The City noted no other past occurrences of flooding. Major flooding did not occur in recent flood events. The Arroyo Ditch does seasonally flood near the crossing of Highway 16 on the eastern side of town.

Vulnerability to Flood

Floods have been a part of the City's historical past and will continue to be so in the future. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damages. Predominantly, the effects of flooding are generally confined to areas near the waterways of the County. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat. This threatens structures in the floodplain. Structures can also be damaged from trees falling as a result of water-saturated soils. Electrical power outages happen, and the interruption of power causes major problems. Loss of power is usually a precursor to 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. People may be swept away in floodwaters, causing injuries or deaths.

The General Plan Safety Element noted that flooding is an issue in the Foothills of the Sierra Nevada Mountains. With several months of rain and snow each year, the possibility of a flood warrants preparation by the City. The City has adopted the FEMA floodplain boundaries, which identify areas that present a risk of flooding every 100 years (1% chance of flooding each year). These boundaries are used to avoid a potential flood disaster.

The City also noted that the City is affected by flooding outside the City limits. Old Sacramento Road is a County Road that has had flooding issues in the past. Sacramento Road provides access to the City of Plymouth sewer plant. If it is unpassable, there is great difficulty reaching the sewer plant.

Impacts

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 as well as life safety issues. 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. Floodwaters can transport large objects downstream which can damage or remove stationary structures. 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. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Assets at Risk

Based on the vulnerability of Plymouth to the flood hazard, the sections that follow describes significant assets at risk in the City of Plymouth. This section includes the values at risk, flooded acres, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Plymouth. The methodology described in Section 4.3.10 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Table D-18 is a summary table for the City of Plymouth. Parcel counts, values, estimated contents, and total values in the City are 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. As previously mentioned, there are no areas of the City within the 1% annual chance flood. Table D-19 breaks down Table D-18 and shows the property use, improved parcel count, improved values, estimated contents, and total values that fall in each floodplain in the City.

*Table D-18 City of Plymouth – Count and Value of Parcels at Risk in Summary DFIRM Flood Zones**

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard	8	1	$640,093	$58,838	$29,419	$728,350
0.2% Annual Chance Flood Hazard**	0	0	$0	$0	$0	$0
Other Areas	570	425	$48,912,974	$66,529,979	$43,022,815	$158,465,768
City of Plymouth Total	**578**	**426**	**$49,553,067**	**$66,588,817**	**$43,052,234**	**$159,194,118**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 D-19 City of Plymouth – Count and Values of Parcels at Risk by Detailed Flood Zone and 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						

Flood Zone/ 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	5	0	$67,380	$0	$0	$67,380
Residential	3	1	$572,713	$58,838	$29,419	$660,970
Unknown	0	0	$0	$0	$0	$0
1% Annual Chance Flood Hazard Total	**8**	**1**	**$640,093**	**$58,838**	**$29,419**	**$728,350**
0.2% Annual Chance Flood Hazard**						
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	0	0	$0	$0	$0	$0
Unknown	0	0	$0	$0	$0	$0
0.2% Annual Chance Flood Hazard Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Other Areas						
Agricultural	39	9	$7,533,031	$2,225,033	$2,225,033	$11,983,097
Commercial	61	48	$10,901,341	$17,290,621	$17,290,621	$45,482,583
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	27	0	$1,356	$0	$0	$1,356
Residential	438	368	$30,477,246	$47,014,325	$23,507,161	$100,998,732
Unknown	5	0	$0	$0	$0	$0
Other Areas Total	**570**	**425**	**$48,912,974**	**$66,529,979**	**$43,022,815**	**$158,465,768**
City of Plymouth Total	**578**	**426**	**$49,553,067**	**$66,588,817**	**$43,052,234**	**$159,194,118**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 D-20 summarizes Table D-19 above and shows City of Plymouth loss estimates and shows improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

*Table D-20 City of Plymouth – 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	8	1	$640,093	$58,838	$29,419	$88,257	$17,651	0.00%
0.2% Annual Chance Flood Hazard**	0	0	$0	$0	$0	$0	$0	0.00%
Grand Total	**8**	**1**	**$640,093**	**$58,838**	**$29,419**	**$88,257**	**$17,651**	**0.00%**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 Table D-19 and Table D-20, the City of Plymouth has 1 improved parcel and $88,257 of structure and contents values or values in the 1% annual chance floodplain, and 0 improved parcels and $0 structure and contents values in the 0.2% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the Base Plan, there is a 1% chance in any given year of a flood event causing $17,561 in damage in the City of Plymouth. The loss ratio of 0.00% indicates that flood losses for 1% and 0.2% annual chance flooding, respectively, would be easy to recover from.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the City in comparison to total area within the City limits. The same methodology, as discussed in Section 4.3.10 of the Base Plan, was used for the City of Plymouth as well as for the County as a whole. Table D-21 represents a detailed and summary analysis of total acres for each FEMA DFIRM flood zone in the City.

Table D-21 City of Plymouth – Flooded Acres

Flood Zone / Jurisdiction	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood Hazard						
Zone A						
Agricultural	8	0.49%	2	0.37%	6	0.56%
Commercial	2	0.13%	2	0.29%	0	0.05%

Flood Zone / Jurisdiction	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	9	0.51%	0	0.00%	9	0.80%
Residential	9	0.54%	1	0.15%	8	0.75%
Unknown	0	0.02%	0	0.00%	0	0.03%
Zone A Total	28	1.70%	5	0.81%	23	2.19%
1% Annual Chance Flood Hazard Total	**28**	**1.70%**	**5**	**0.81%**	**23**	**2.19%**
Other Areas						
Zone X (unshaded)						
Agricultural	998	60.41%	395	67.45%	603	56.55%
Commercial	92	5.54%	62	10.64%	29	2.74%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	220	13.34%	0	0.00%	220	20.67%
Residential	313	18.95%	124	21.11%	189	17.77%
Unknown	1	0.05%	0	0.00%	1	0.08%
Zone X (unshaded) Total	1,624	98.30%	581	99.19%	1,043	97.81%
Other Areas Total	**1,624**	**98.30%**	**581**	**99.19%**	**1,043**	**97.81%**
City of Plymouth Total	**1,652**	**100.00%**	**586**	**100.00%**	**1,066**	**100.00%**

Source: FEMA DFIRM 1/20/2016

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the flood zones were counted and multiplied by the 2010 Census Bureau average household factors for Plymouth – 2.47. According to this analysis, there is a total population of 2 and 0 residents of the City at risk to flooding in the 1% and 0.2% annual chance floodplains, respectively. This is shown in Table D-22.

Table D-22 City of Plymouth – Count of Improved Residential Parcels and Population by Flood Zone

Jurisdiction	1 % Annual Chance Flooding		0.2% Annual Chance Flooding	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Plymouth	1	2	0	0

Source: FEMA DFIRM 1/20/2016, Amador County 12/31/2018 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Plymouth in DFIRM flood zones. GIS was used to determine whether the critical facility locations intersect a DFIRM flood zone, and if so, which zone it intersects. Details of critical facilities in mapped DFIRM flood zones in the City of Plymouth are shown in Figure D-7 and detailed in Table D-23. Details of critical facility definition, type, name and address and jurisdiction by DFIRM flood zone are listed in Appendix F.

Figure D-7 City of Plymouth – Critical Facilities in DFIRM Flood Zones

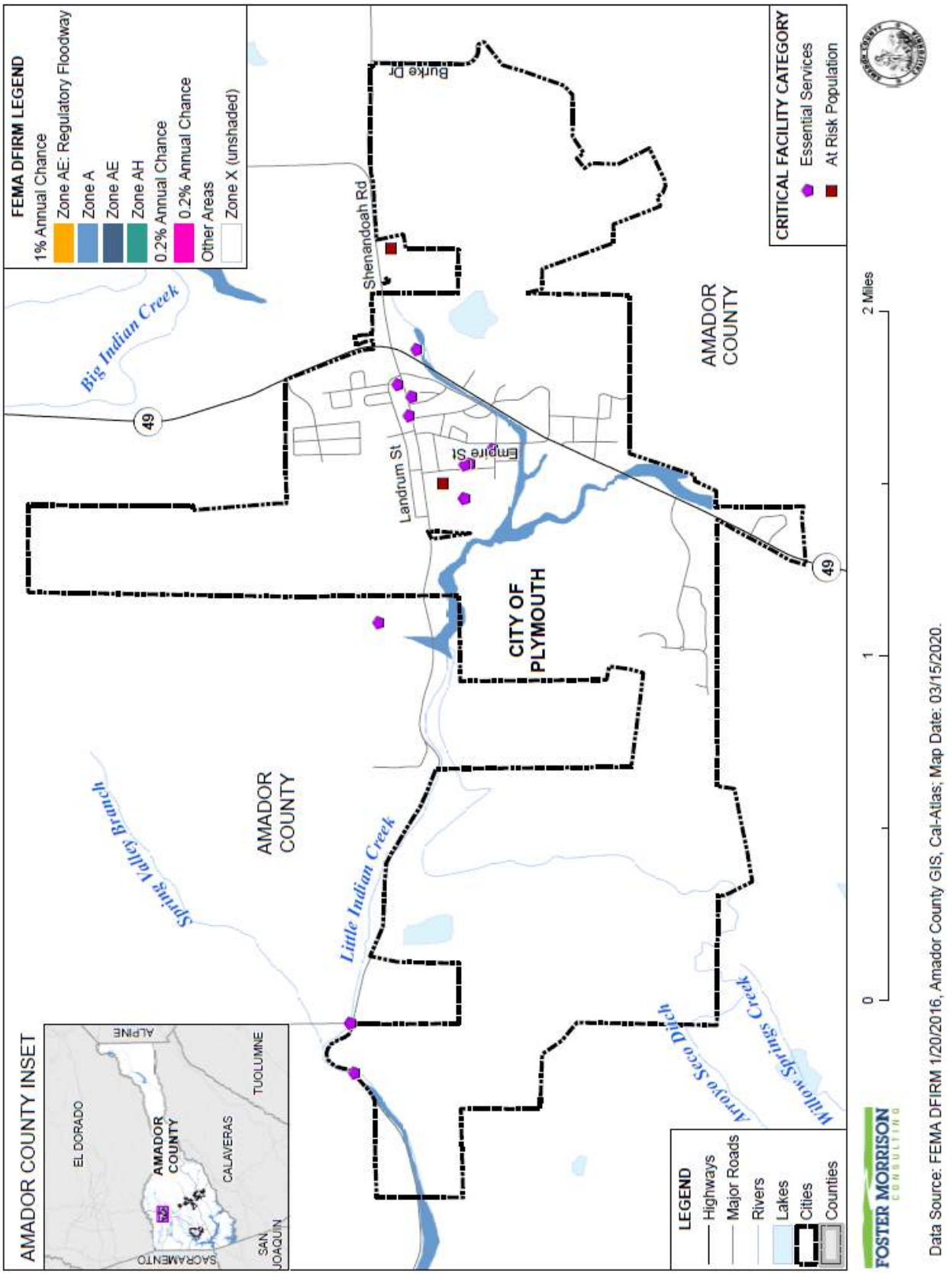


Table D-23 City of Plymouth – Critical Facilities in DFIRM Flood Zones

Jurisdiction/Flood Zone	Critical Facility Category/Critical Facility Type	Facility Count
Other Areas		
Zone X (unshaded)	**Essential Services**	
	Bridge	1
	Clinic	1
	EMS Station	1
	Evacuation Shelter	1
	Fire Station	1
	Library	1
	Post Office	1
	Power Substation	1
	Public Administration Building	1
	Essential Services Total	**9**
	At Risk Population	
	School	1
	At Risk Population Total	**1**
	Zone X (unshaded) Total	**10**
Other Areas Total		**10**
City of Plymouth Total		**10**

Source: FEMA DFIRM 1/20/2016, Amador County GIS

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Plymouth joined the National Flood Insurance Program (NFIP) on December 1, 1990. The City does not participate in the CRS program. NFIP data indicates that as of March 2, 2020, there were no flood insurance policies in force in the City with $0 of coverage. There have been no historical claims for flood losses. NFIP data further indicates that there are no repetitive loss (RL) and no severe repetitive loss buildings in the City.

California Department of Water Resources Best Available Maps (BAM)

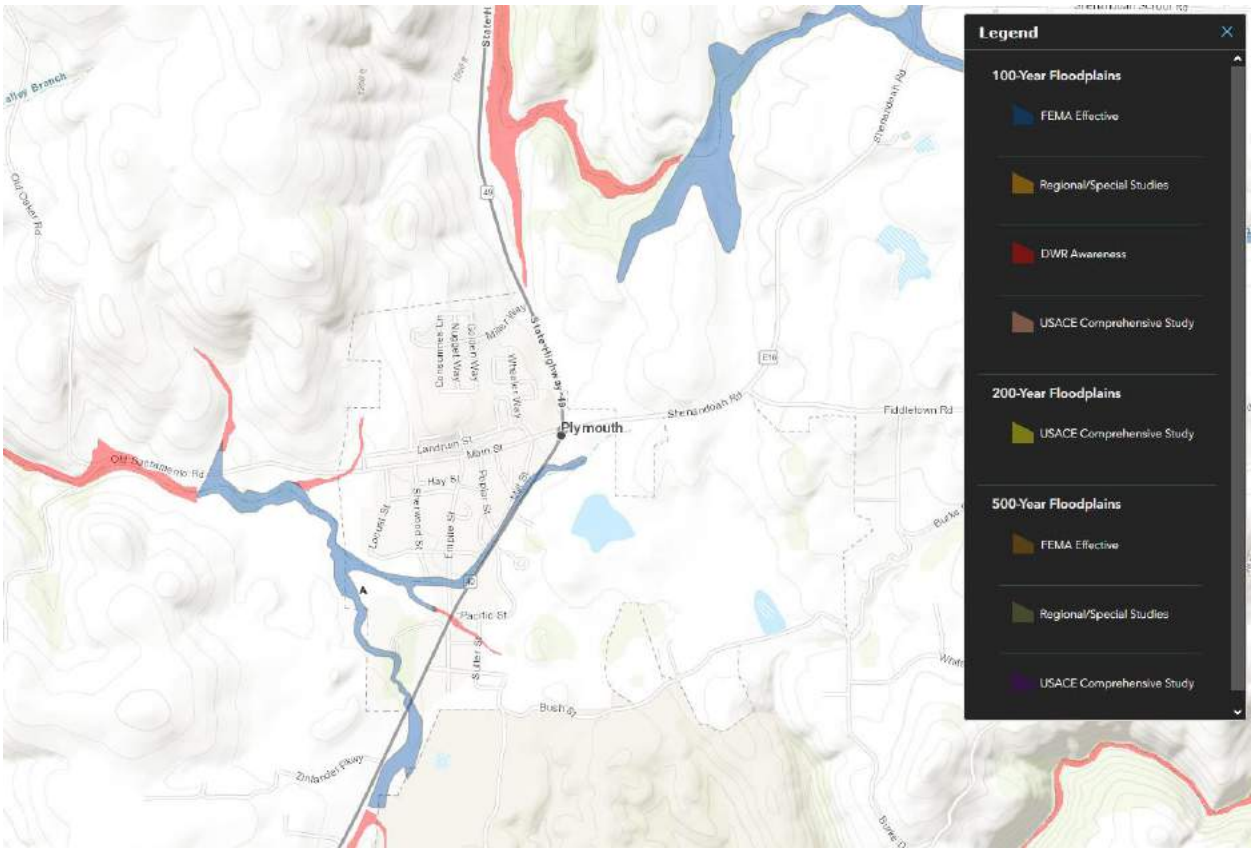
The FEMA regulatory maps provide just one perspective on flood risks in Amador County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Nevada-San Joaquin (SAC-SJ) Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-(as applicable), and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all

currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year 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 City than that provided in the FEMA DFIRMs. The BAM map for Plymouth is shown in Figure D-8.

Figure D-8 City of Plymouth – Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 1%, Orange – Local 1% (developed from local agencies), Red – DWR 1%r (Awareness floodplains identify the 1% annual chance flood hazard areas using approximate assessment procedures.), Pink – USACE 1% (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 0.5% (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 0.2%, Grey – Local 0.2% (developed from local agencies), Purple – USACE 0.2%(2002 Sac and San Joaquin River Basins Comp Study).

Future Development

The City's floodplain ordinance prohibits development in the floodplain, unless it meets specific criteria set forth in the City's floodplain ordinance. No development is expected in the floodplain in the future.

The potential for flooding may increase as floodwaters are channeled due to land development. Such changes can exacerbate flooding problems inside and outside of natural floodplains by altering or confining

natural drainage channels. Floodplain modeling and master planning should be based on build out property use to ensure that all new development remains safe from future flooding. While local floodplain management, stormwater management, and water quality regulations and policies address these changes on a site-by-site basis, their cumulative effects can have a negative impact on the overall floodplain.

GIS Analysis

The City provided Future Development Areas were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the 3 areas and 97 parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure D-9 shows the locations of future development areas the City is planning to develop on the FEMA DFIRM. Table D-24 shows the parcels and acreages of each future development area in the City by DFIRM flood zone.

Figure D-9 City of Plymouth – Future Development Areas in FEMA DFIRM Flood Zones

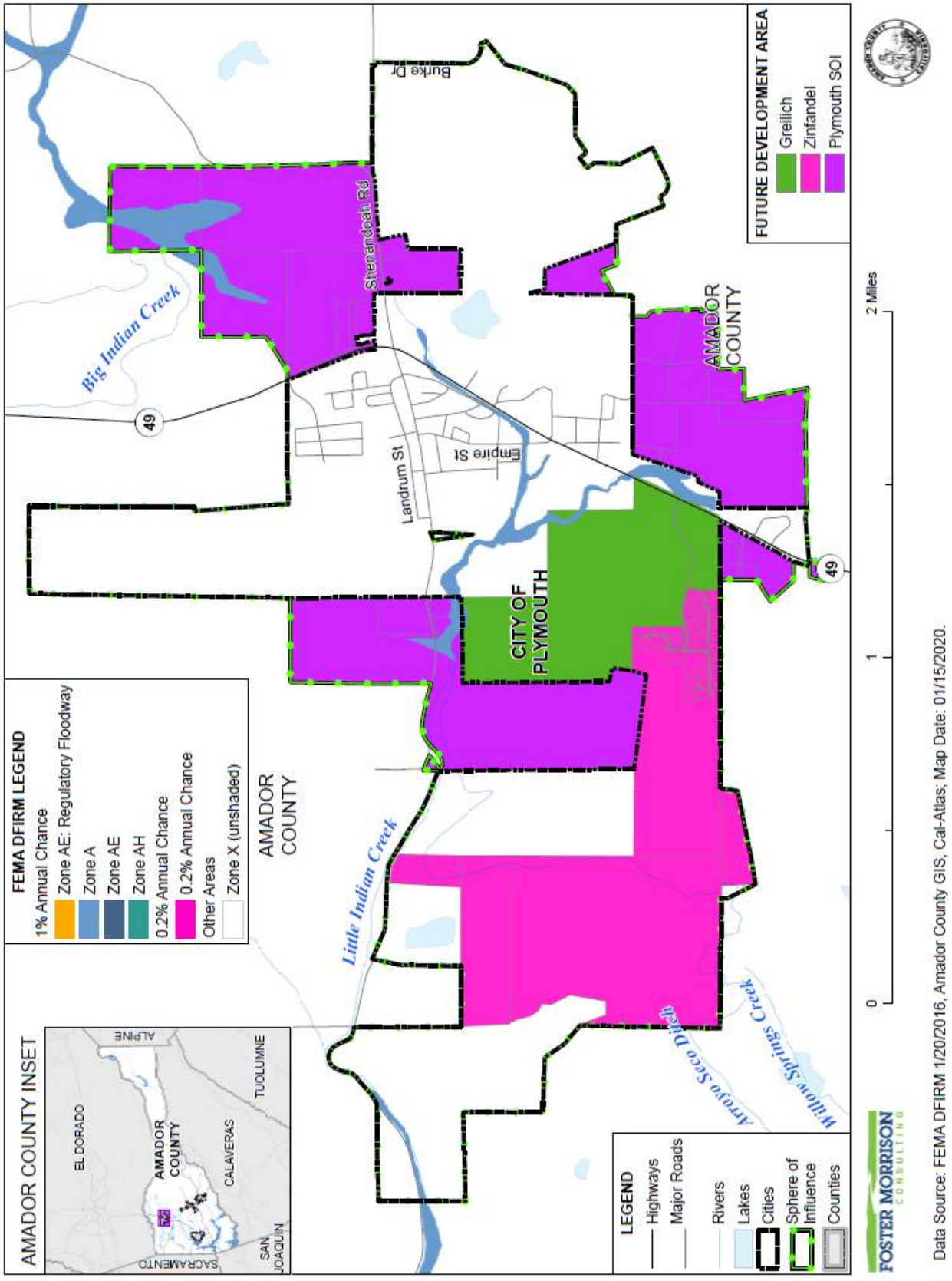


Table D-24 City of Plymouth – Future Development Parcels and Acres in FEMA DFIRM Flood Zones

Future Development / Flood Zones	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Greilich						
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	1	1		170.90	170.90	
Greilich Total	**1**	**1**	**0**	**170.90**	**170.90**	**0**
Zinfandel						
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	63	27	36	362.27	11.48	350.79
Zinfandel Total	**63**	**27**	**36**	**362.27**	**11.48**	**350.79**
Plymouth SOI						
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	33	16	17	579.54	357.84	221.69
Plymouth SOI Total	**33**	**16**	**17**	**579.54**	**357.84**	**221.69**
Grand Total	**97**	**44**	**53**	**1,112.71**	**540.22**	**572.48**

Source: City of Plymouth, Amador County LAFCO, Amador County 1/20/2016 DFIRM

Severe Weather: Extreme Heat

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to 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 extreme heat and high humidity, evaporation is slowed, and the body must work extra hard to maintain a normal temperature." Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

In addition to the risks faced by citizens of the City, there are risk to the built environment from extreme heat. While extreme heat on its own does not usually affect structure, extreme heat during times of drought can cause wildfire risk to heighten. Extreme heat and high winds can cause PSPS events, causing issues to

buildings in the City. Plymouth has numerous old structures and unmaintained structures within the City limits which are more susceptible to fire than the average structure.

Location and Extent

Heat is a regional phenomenon and affects the whole of the City. 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 affect vulnerable populations and communities. Heat waves do not generally cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios.

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 Section 4.2.2 of the Base Plan.

Past Occurrences

The City Planning Team note that since extreme heat is a regional phenomenon, events that affected the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.2.2.

Vulnerability to Extreme Heat

The City experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-110°F in rather extreme situations. During these times, drought conditions may worsen. Also, PSPS events may occur during these times as well. Health impacts are the primary concern with this hazard, though economic impacts are also an issue.

Impacts

The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures. Nursing homes and elder care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning is not available. In addition, individuals below the poverty level may be at increased risk to extreme heat if use of air conditioning is not affordable. Homeless people and the transient population are also at risk to extreme heat.

Days of extreme heat have been known to result in medical emergencies, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts. Extreme heat can also dry out vegetations, making it more vulnerable to wildfire ignitions. During periods of extreme heat (with high winds), PG&E can institute a PSPS.

Future Development

Future development of new buildings in the City will likely not be affected by extreme heat. Extreme heat is more likely to affect populations. Vulnerability to extreme heat will increase as the average age of the population in each City shifts. It is encouraged that nursing homes and elder care facilities have emergency plans or backup power to address power failure during times of extreme heat and in the event of a PSPS. Low income residents and homeless populations are also vulnerable. Cooling centers for these populations should be utilized when necessary. Plymouth City Hall is the area's cooling center.

Wildfire

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

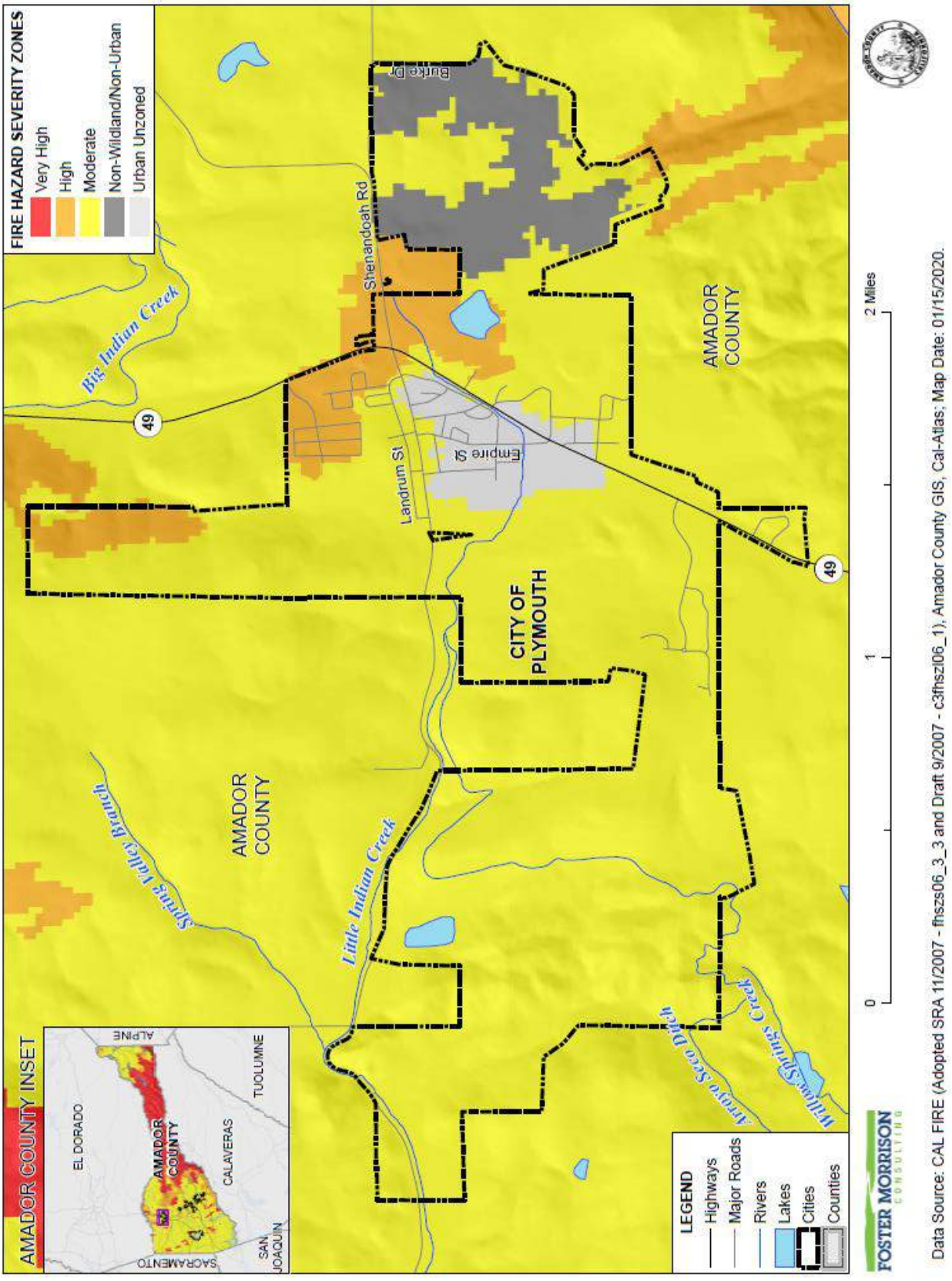
Hazard Profile and Problem Description

Wildland fire and the risk of a conflagration is an ongoing concern for the City of Plymouth. 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. 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. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

Location and Extent

Wildfire can affect all areas of the City. CAL FIRE has estimated that the risk varies across the City and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the City of Plymouth were created. Figure D-10 shows the CAL FIRE FHSZ in the City. As shown on the maps, fire hazard severity zones within the City range from urban/unzone (low) to high.

Figure D-10 City of Plymouth – Fire Hazard Severity Zones



Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more. Geographical FHSZ extent from CAL FIRE is shown in Table D-25.

Table D-25 City of Plymouth – Geographical FHSZ Extents

Fire Hazard Severity Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
Very High	0	0.00%	0	0.00%	0	0.00%
High	123	0.03%	34	0.02%	89	0.04%
Moderate	1,308	0.34%	377	0.23%	932	0.42%
Non-Wildland/non-Urban	148	0.04%	135	0.08%	14	0.01%
Urban Unzoned	73	0.02%	41	0.02%	32	0.01%
Total	**1,652**	**0.43%**	**586**	**0.35%**	**1,066**	**0.48%**

Source: CAL FIRE

Past Occurrences

A list of state and federal disaster declarations for Amador County from wildfire is shown on Table D-17. These events also likely affected the City to some degree.

Table D-26 Amador County – State and Federal Disaster Declarations from Wildfire 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	1	2015	1	1961

Source: Cal OES, FEMA

Fire is a significant concern to the City of Plymouth. Historic fires have occurred in and around the County for decades. Significant historical fires in the Plymouth area include:

- The **1961 Fire** was actually 2 fires which started on the same day. The second fire started on Dry Creek on September 2nd. Strong winds carried it past Plymouth in the surrounding unincorporated area. Four injuries were recorded and large agricultural losses. At that time, the wine tourism aspect of Plymouth did not exist, and Plymouth fortunately did not have the extensive losses that many other areas of the county suffered from this fire.
- The **2014 Sand Fire** affected the City. The fire burned from July 25, 2014 to August 2, 2014. The fire burned 67 structures outside the City Limits. 20 of these were residences and 47 were outbuildings. 1,200 residences (not all located in the City) were evacuated. The Arroyo Ditch suffered extensive damage. The waterway is still not functional since the wildfires. Air quality suffered, and tourism declined during this time.

Vulnerability to Wildfire

The wildfire hazard is one of the highest priority hazards in the County and City, and is the hazard with the greatest potential for catastrophic loss. High fuel loads in the County and Cities, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. The more urbanized areas within the County are not immune from fire. The dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and City, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

The City General Plan Safety Element noted that as a Foothills community, Plymouth's rural setting presents a constant threat of wildfire. The fuel load, made up of annual grasses, oaks, and other surface vegetation, is classified as a moderate risk for wild-land urban fires. In addition, the City has a significant threat to fire loss along Main Street due to shared common walls between businesses and the building materials used in construction.

Impacts

Potential impacts from wildfire include loss of life and injuries; damage to structures 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 City. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the City 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 City; smoke and air pollution from wildfires can be a severe health hazard.

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 PSPSs 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.

Based on the vulnerability of the City of Plymouth to the wildfire hazard, the sections that follow describes significant assets at risk in the City.

Assets at Risk

Based on the vulnerability of Plymouth to the wildfire hazard, the sections that follow describes significant assets at risk in the City of Plymouth. This section includes the values at risk, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of wildfire within the City of Plymouth. The methodology described in Section 4.3.18 of the Base Plan was followed in determining structures and values at risk in FHSZs. Summary analysis results for Plymouth are shown in Table D-27, which summarizes total parcel counts, improved parcel counts and their structure values by fire hazard severity zone.

Table D-27 City of Plymouth – Count and Value of Parcels by FHSZ

Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Very High	0	0	$0	$0	$0
High	157	139	$10,726,981	$18,356,667	$29,083,648
Moderate	277	173	$27,840,001	$28,970,059	$56,810,060
Non-Wildland/Non-Urban	6	4	$1,255,887	$567,415	$1,823,302
Urban Unzoned	138	110	$9,730,198	$18,694,676	$28,424,874
City of Plymouth Total	**578**	**426**	**$49,553,067**	**$66,588,817**	**$116,141,884**

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Table D-28 breaks out the Table D-27 by adding the property use details by fire hazard severity zone for the City. As shown in both of these tables, the City has large percentages of values in the moderate and high FHSZ.

Table D-28 City of Plymouth – Count and Value of Parcels by Fire Hazard Severity Zone and Property Use

Fire Hazard Severity Zone/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
High					
Agricultural	0	0	$0	$0	$0
Commercial	10	5	$1,630,550	$1,387,404	$3,017,954
Industrial	0	0	$0	$0	$0
Miscellaneous	3	0	$0	$0	$0
Residential	143	134	$9,096,431	$16,969,263	$26,065,694
Unknown	1	0	$0	$0	$0
High Total	**157**	**139**	**$10,726,981**	**$18,356,667**	**$29,083,648**
Moderate					

Fire Hazard Severity Zone/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	35	5	$6,277,144	$1,657,618	$7,934,762
Commercial	30	27	$4,398,772	$6,656,631	$11,055,403
Industrial	0	0	$0	$0	$0
Miscellaneous	13	0	$1,969	$0	$1,969
Residential	195	141	$17,162,116	$20,655,810	$37,817,926
Unknown	4	0	$0	$0	$0
Moderate Total	**277**	**173**	**$27,840,001**	**$28,970,059**	**$56,810,060**
Non-Wildland/Non-Urban					
Agricultural	4	4	$1,255,887	$567,415	$1,823,302
Commercial	0	0	$0	$0	$0
Industrial	0	0	$0	$0	$0
Miscellaneous	2	0	$0	$0	$0
Residential	0	0	$0	$0	$0
Unknown	0	0	$0	$0	$0
Non-Wildland/Non-Urban Total	**6**	**4**	**$1,255,887**	$567,415	$1,823,302
Urban Unzoned					
Agricultural	0	0	$0	$0	$0
Commercial	21	16	$4,872,019	$9,246,586	$14,118,605
Industrial	0	0	$0	$0	$0
Miscellaneous	14	0	$66,767	$0	$66,767
Residential	103	94	$4,791,412	$9,448,090	$14,239,502
Unknown	0	0	$0	$0	$0
Urban Unzoned Total	**138**	**110**	**$9,730,198**	**$18,694,676**	**$28,424,874**
City of Plymouth Total	**578**	**426**	**$49,553,067**	**$66,588,817**	**$116,141,884**

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Population at Risk

The FHSZ dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the FHSZs were counted and multiplied by the 2010 Census Bureau average household factors for the City of Plymouth – 2.47. According to this analysis, there is a total population of 669 residents of Plymouth at risk to moderate or higher FHSZs. This is shown in Table D-29.

Table D-29 City of Plymouth – Count of Improved Residential Parcels and Population by Fire Hazard Severity Zone

Jurisdiction	Moderate		High		Very High	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Plymouth	141	348	134	331	0	0

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Plymouth in identified FHSZs. Critical facilities in a FHSZ in the City of Plymouth are shown in Figure D-11 and detailed in Table D-30. Details of critical facility definition, type, name and address and jurisdiction by fire hazard severity zone are listed in Appendix F.

Figure D-11 City of Plymouth – Critical Facilities in Fire Hazard Severity Zones

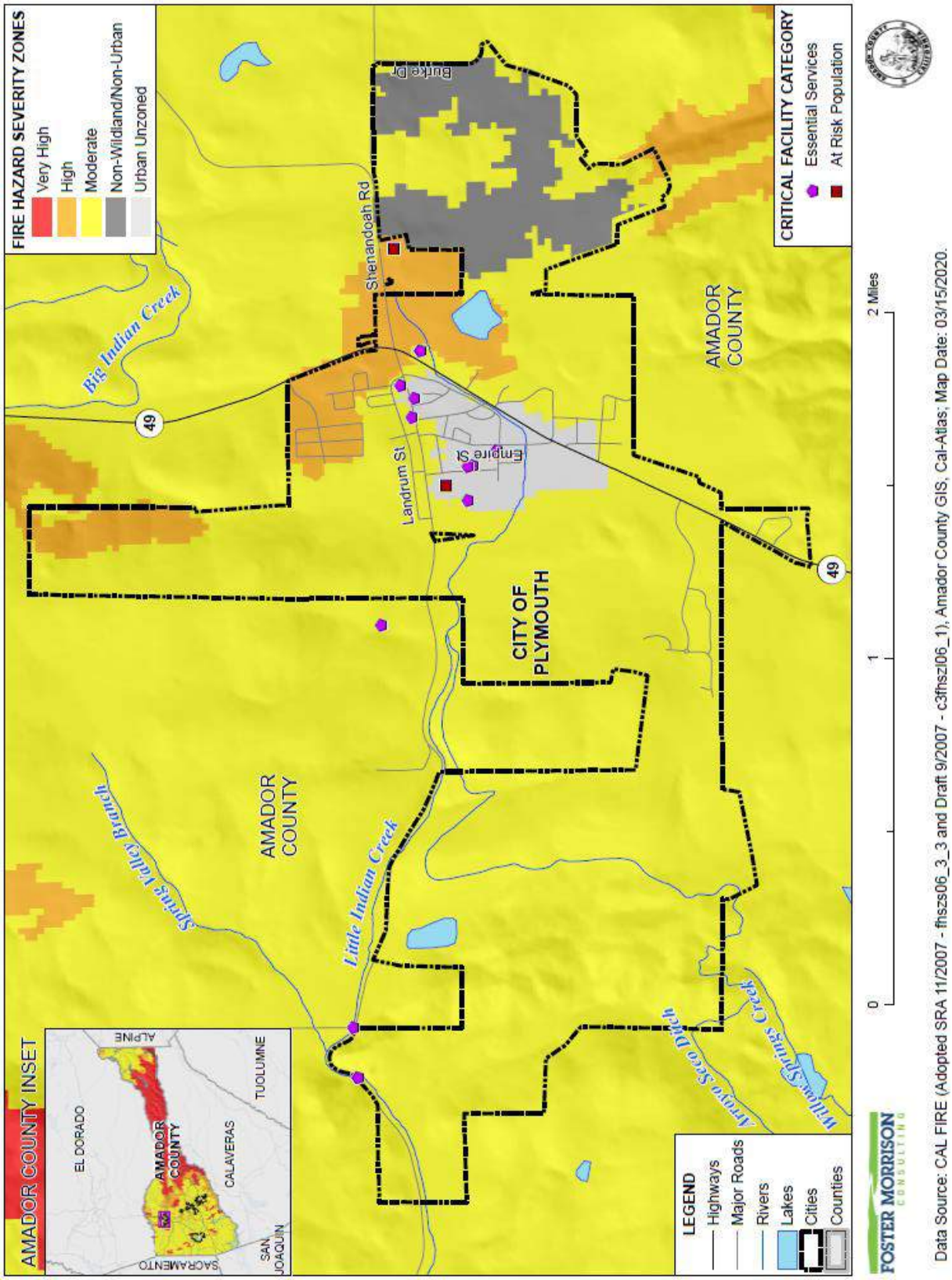


Table D-30 City of Plymouth – Critical Facilities by Fire Hazard Severity Zone

Fire Hazard Severity Zones	Critical Facility Category / Critical Facility Type	Facility Count
Moderate	**Essential Services**	
	Bridge	1
	Evacuation Shelter	1
	Library	1
	Post Office	1
	Power Substation	1
	Essential Services Total	**5**
Moderate Total		**5**
Urban Unzoned	**Essential Services**	
	Clinic	1
	EMS Station	1
	Fire Station	1
	Public Administration Building	1
	Essential Services Total	**4**
	At Risk Population	
	School	1
	At Risk Population Total	**1**
Urban Unzoned Total		**5**
City of Plymouth Total		**10**

Source: CAL FIRE, Amador County GIS

Future Development

Additional growth and development within moderate or higher fire hazard severity zones in the City would place additional values at risk to wildfire. City building codes are in effect and should continue to be updated as appropriate to reduce this risk. Outside of the City's core, the remainder of land is in the moderate and high FHSZs. Any building in these areas would place additional risk to wildfire.

GIS Analysis

The City provided Future Development Areas were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the 3 areas and 97 parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure D-12 shows the locations of future development areas the City is planning to develop on the FHSZs. Table D-31 shows the parcels and acreages of each future development area in the City in each FHSZ.

Figure D-12 City of Plymouth – Future Development Areas in FHSZs

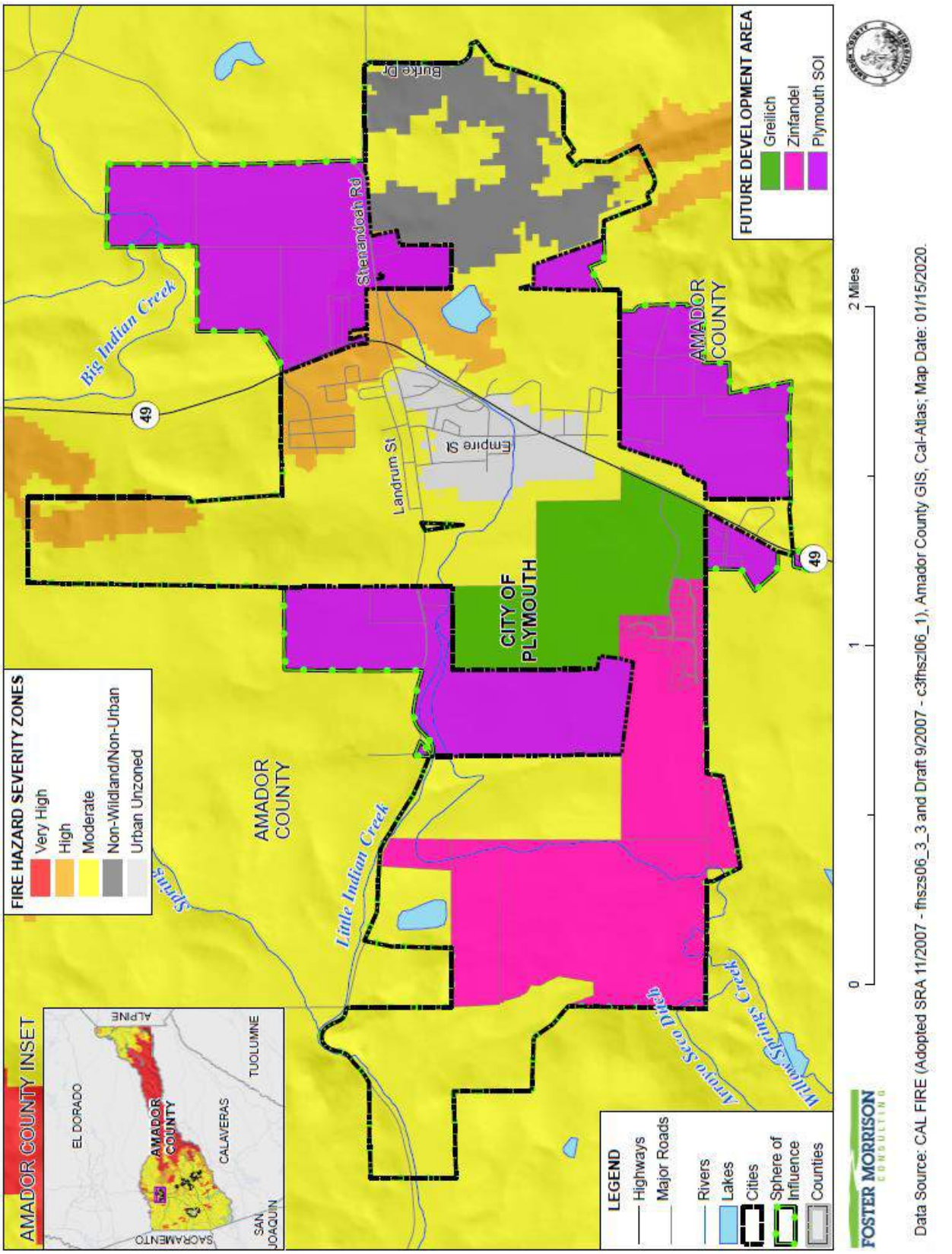


Table D-31 City of Plymouth – Future Development Parcels and Acres in FHSZs

Future Development / Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Greilich						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	1	27	0	170.90	11.48	0
Urban Unzoned	0	0	0	0	0	0
Greilich Total	**1**	**27**	**0**	**170.90**	**11.48**	**0**
Zinfandel						
Very High	0	0	0	0	0	0
High	0	2	0	0	22.67	0
Moderate	63	14	36	362.27	335.17	350.79
Urban Unzoned	0	0	0	0	0	0
Zinfandel Total	**63**	**16**	**36**	**362.27**	**357.84**	**350.79**
Plymouth SOI						
Very High	0	0	0	0	0	0
High	6	0	4	31.11	0	8.44
Moderate	27	1	13	548.43	170.90	213.25
Urban Unzoned	0	0	0	0	0	0
Plymouth SOI Total	**33**	**1**	**17**	**579.54**	**170.90**	**221.69**
Grand Total	**97**	**44**	**53**	**1,112.71**	**540.22**	**572.48**

Source: City of Plymouth, Amador County LAFCO, CAL FIRE

D.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

D.6.1. Regulatory Mitigation Capabilities

Table D-32 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Plymouth.

Table D-32 City of Plymouth Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan/General Plan	Y 2014	Plan addresses hazards and ways to mitigate them.
Capital Improvements Plan	Y	
Economic Development Plan	Y	
Local Emergency Operations Plan	Y	
Continuity of Operations Plan	N	
Transportation Plan	Y	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: 2013 CBC
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score:
Fire department ISO rating:	Y	Rating: 9
Site plan review requirements	Y	Adequately enforced/
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	Ordinance is effective, administered, and enforced.
Subdivision ordinance	Y	Ordinance is effective, administered, and enforced.
Floodplain ordinance	Y	Ordinance is effective, administered, and enforced.
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	

Erosion or sediment control program	N
Other	
How can these capabilities be expanded and improved to reduce risk?	
The City would greatly benefit from completing a Community Wildfire Protection Plan since wildfire is their greatest risk as well as establishing a Continuity of Operations plan to address all disasters.	

Source: City of Plymouth

City of Plymouth General Plan (2009)

The City of Plymouth General Plan Program serves as the blueprint for future growth and development and provides comprehensive planning for the future. It encompasses what the City is now, and what it intends to be, and provides the overall framework of how to achieve this future condition (see the discussion in Section 4.3.1 Growth and Development Trends).

California Law requires that every City and County in the state have a General Plan. The 2030 City of Plymouth General Plan was adopted in 2009. The General Plan is the most important policy and planning document in the city, and is used by virtually every department. The General Plan is the City's statement of its vision for the future. It contains broad community values and goals, giving a picture of the desired character and quality of development in the County and policies which outline the steps to accomplish those goals.

The General Plan includes a Safety Element that focuses on safety issues to be considered in planning for the present and future development of the City Planning Area. Identified hazards include wildfire, geologic/seismic, flooding, and other natural and man-made hazards (such as hazardous materials). Mitigation-related goals are as follows:

- 9A Use established laws and guidelines to effectively mitigate the impacts of new development and, when appropriate, assess fees to fund mitigation measures.
- 9B Provide appropriate training to adequately manage emergency and disaster situations.
- 9C Provide guidance to citizens regarding their suitable preparation for and response to emergencies.
- 9D Provide for citizen response teams to aid the City and other agencies in providing emergency response services.
- 9E Reduce the loss of life, injury, and property damage due to geological and seismic hazards.
- 9F Discourage development from occurring in areas with increased risk of geological and seismic hazards.
- 9G Maintain an updated emergency response plan to reflect the most current information available regarding the potential risks to persons and property from flooding within the City.
- 9H Provide guidance to citizens regarding their preparation for and response to floods.
- 9I Coordinate with the Fire Chief and the City Engineer to ensure adequate fire protection throughout the community.

Emergency Operations Plan, 2006

The plan is designed to provide a comprehensive, multi-use, emergency management program for the City of Plymouth, in an effort to: lessen the effects of hazards, enhance response during emergencies, provide necessary assistance to citizens, prepare for measures to be taken which will preserve life and minimize damage, and establish a recovery system in order to return the City to normal operations as soon as feasible.

Mitigation Related Ordinances

Emergency Organization and Functions (Chapter 8.07)

The declared purposes of this chapter are to provide for the preparation and carrying out of plans for the protection of persons and property within this City in the event of an emergency; the direction of the emergency functions of this City with all other public agencies, corporations, organizations, and affected private persons.

The Plymouth Disaster Council is hereby created and shall consist of the following:

- The Mayor, who shall be Director.
- A member of the City Council who shall be appointed by the City Council, who shall be Vice-Director.
- Such representative of civic, business, labor, veterans, professional or other organizations having an official emergency responsibility, as may be appointed by the Director with the advice and consent of the City Council.

It shall be the duty of the Plymouth Disaster Council, and it is hereby empowered, to develop and recommend for adoption by the City Council, emergency and mutual aid plans and agreements and such ordinances and resolutions and rules and regulations as are necessary to implement such plans and agreements. The Disaster Council shall meet upon call of the Director or, in his absence from the City or inability to call such meeting, upon call of the Vice-Director.

The Plymouth Disaster Council shall be responsible for the implementation of all parts of the Amador County Emergency Plan which are applicable to this City of Plymouth, which plan shall provide for the effective mobilization of all of the resources of this City, both public and private, to meet any condition constituting a local emergency, state of emergency or state of war emergency; and shall provide for the organization, powers and duties, services, and staff of the emergency organization.

Building and Construction (Title 15)

In accordance with California Government Code Section 50022.2, the following publications are hereby adopted by reference:

- The 2013 California Building Code based on the 2012 International Building Code, set forth in Title 24 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (Ord. 2011-01) (Ord 2016-09)
- The 2013 California Mechanical Code based on the 2012 Uniform Mechanical Code, set forth in Title 24 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (Ord. 2011-01) (Ord 2016-09)
- The 2013 California Electrical Code based on the 2011 National Electric Code, set forth in Title 24 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (Ord. 2011-01)(Ord. 2016-09)
- The 2013 California Plumbing Code based on the 2012 Uniform Plumbing Code, set forth in Title 24 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (Ord. 2011-01)(Ord. 2016-09)
- The 1997 Uniform Code for the Abatement of Dangerous Buildings, as published by the International Conference of Building Officials. (Ord. 2011-01)(Ord. 2016-09)

- The 2013 California Administrative Code, set forth in Title 24 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (Ord. 2011-01)(Ord. 2016-09)
- The 2013 California Existing Building Code based on the 2012 International Existing Building Code, set forth in Title 24 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (Ord. 2011-01)(Ord. 2016-09)
- The 2013 California Fire Code based on the 2012 International Fire Code, set forth in Title 24 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (Ord. 2011-01)(Ord. 2016-09)
- The 2013 California Energy Code, set forth in Title 24 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (Ord. 2011-01)(Ord. 2016-09)
- The 2013 California Referenced Standards Code, set forth in Title 24 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (2016-09)
- The 1997 Uniform Housing Code, set forth in Title 25 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (Ord. 2011-01)(Ord. 2016-09)
- The 2013 California Historical Building Code, set forth in Title 24 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (Ord. 2016-09)
- The 2013 California Residential Code based on the 2012 International Residential Code, set forth in Title 24 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (Ord. 2011-01)(Ord. 2016-09)
- The 2013 California Green Building Code, set forth in Title 24 of the California Code of Regulations, as adopted and amended by the California Building Standards Commission. (Ord. 2011-01)(Ord. 2016-09)

Subdivisions (Title 16)

This title is adopted to:

- Establish minimum permissible regulations and standards for the division and subdivision of land, for the design, improvement, and survey data related thereto, and for the physical alteration of the land involved therein, and;
- Provide a guide for owners in the proper division of their land, and to provide for orderly development of the City consistent with the General Plan.

Zoning (Title 19)

The purpose of this chapter is to establish standard procedures necessary for the clear and consistent processing of land use and planning permits and entitlements, as well as to establish procedures necessary for the efficient processing of planning and development applications and requests.

City of Plymouth Flood Damage Prevention Ordinance (Chapter 8.11)

The flood hazard areas of the City are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare. These flood losses are caused by the cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities, and when

inadequately anchored, damage uses in other areas. Uses that are inadequately floodproofed, elevated or otherwise protected from flood damage also contribute to the flood loss.

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;
- To minimize expenditure of public money for costly flood control projects;
- To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- To minimize prolonged business interruptions;
- To 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;
- To help maintain a stable tax base by providing for the second use and development of areas of special flood hazard so as to minimize future flood blight areas;
- To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.
- 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 flood waters or which may increase flood hazards in other areas.

This chapter shall apply to all areas of special flood hazards, areas of flood-related erosion hazards and areas of mudslide (i.e., mudflow) hazards within the jurisdiction of the City. A development permit shall be obtained before construction or development begins within any area of special flood hazards, areas of flood-related erosion hazards, or areas of mudslide.

Lands which are located within areas of special flood hazard are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles and erosion potential, the following provisions apply:

- Encroachments, including fill, new construction, substantial improvements, and other development are prohibited unless certification by a registered professional engineer or architect is provided demonstrating that the encroachments will not result in any increase in flood levels during the occurrence of the base flood discharge.
- If the previous is satisfied, all new construction and substantial improvements shall comply with all other applicable flood hazard reduction provisions.

This chapter also establishes the base flood elevation and requires new construction or substantial improvements to be located one foot above the base flood elevation.

D.6.2. Administrative/Technical Mitigation Capabilities

Table D-33 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Plymouth.

Table D-33 City of Plymouth's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Y	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Tree trimming on a contract basis. Clearing of drainage system is done by AWA and Public Works staff.
Mutual aid agreements		
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y PT	Contract
Floodplain Administrator	Y	City engineer
Emergency Manager	Y	Mayor
Community Planner	Y PT	Contract
Civil Engineer	Y	Contract
GIS Coordinator	N	Depend on County for GIS support
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	CodeRed communication system
Hazard data and information		
Grant writing	Y	
Hazus analysis		
Other		
How can these capabilities be expanded and improved to reduce risk?		
CodeRed training of additional staff is in progress, as well as a continual refinement of our system.		

Source: City of Plymouth

D.6.3. Fiscal Mitigation Capabilities

Table D-34 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table D-34 City of Plymouth's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (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	N	
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	Voter approval required.
Incur debt through private activities	N	
Community Development Block Grant	Y	Voter approval required.
Other federal funding programs	N	
State funding programs	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
A review of funding resources by the City Finance Director would be appropriate.		

Source: City of Plymouth

D.6.4. Mitigation Education, Outreach, and Partnerships

Table D-35 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 D-35 City of Plymouth's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access, and functional needs populations, etc.	Y	Foothill conservancy (environmental protection)
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Responsible water use, fire safety, and household preparedness information available to the public and provided in newsletters.
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Other		
How can these capabilities be expanded and improved to reduce risk?		
Review Firewise Community Program requirements since wildfire is a primary concern.		

Source: City of Plymouth

D.6.5. Other Mitigation Efforts

The City has many other completed or ongoing mitigation efforts that include the following:

- City performs tree trimming and removal of hazardous trees on City property.
- CodeRed was acquired and training was performed.
- The General Plan was updated, and the LHMP was integrated into it.

D.7 Mitigation Strategy

D.7.1. Mitigation Goals and Objectives

The City of Plymouth adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

D.7.2. NFIP Mitigation Strategy

The City of Plymouth joined the National Flood Insurance Program (NFIP) on December 1, 1990. As a participant of the NFIP, the City of Plymouth has administered floodplain management regulations that meet the minimum requirements of the NFIP. The management program objective is to protect people and property within the City. The City of Plymouth will continue to comply with the requirements of the NFIP in the future.

In addition, the City of Plymouth actively participates with Amador County to address local NFIP issues through a regional approach. Many of the program activities are the same for the City of Plymouth as for Amador County since participation at the County level includes all local jurisdictions.

The City of Plymouth Public Works (in conjunction with the City's contract engineer) Department provides public outreach activities which include map information services, public awareness, public hazard disclosure, and flood protection information. This information is readily available to the public and consists of current and accurate flood mapping. In addition, the Planning and Engineering Department provides information about our stormwater management program and up-to-date information related to the maintenance of our drainage system.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the

reduced flood risk resulting from the community actions meeting the three goals of the CRS which are to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. The City of Plymouth is not a current participant in the CRS program.

More information about the floodplain administration in the City of Plymouth can be found in Table D-36.

Table D-36 City of Plymouth Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	0 policies
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?	0 claims
How many structures are exposed to flood risk within the community?	1 in the 1% annual chance floodplain
Repetitive Loss (RL) and Severe Repetitive Loss Properties (SRL)	0 RL and SRL properties
Describe any areas of flood risk with limited NFIP policy coverage	None
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	N
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review. Inspections. Engineering capabilities.
What are the barriers to running an effective NFIP program in the community, if any?	No barriers currently exist that limits the effectiveness of the NFIP program.
Compliance History	
Is the community in good standing with the NFIP?	Y
Are there any outstanding compliance issues (i.e., current violations)?	N
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	12/17/2013 (CAC) 3/24/2005 (CAV)
Is a CAV or CAC scheduled or needed?	N
Regulation	
When did the community enter the NFIP?	12/1/1990
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Meet
Provide an explanation of the permitting process.	City engineer review permit, performs inspection, and ensures floodplain ordinance is enforced.
Community Rating System	
Does the community participate in CRS?	N
What is the community's CRS Class Ranking?	–
What categories and activities provide CRS points and how can the class be improved?	–

NFIP Topic	Comments
Does the plan include CRS planning requirements?	–

D.7.3. Mitigation Actions

The planning team for the City of Plymouth identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Climate Change
- Drought and Water Shortage
- Severe Weather: Extreme Heat
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan 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 countywide public outreach action, 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 plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

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

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140).

Project Description: Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety

Element of its General Plan. Adoption 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: City of Plymouth Planning Department

Cost Estimate: Jurisdictional board/staff time

Benefits (avoided Losses): 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

Timeline: As soon as possible

Project Priority: High

Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The City and County play a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of natural hazards. A comprehensive multi-hazard public education program will better inform the community of natural hazards of concern and actions the public can take to be better prepared for the next natural disaster event.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The City will work with the County and other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of natural hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will leverage and build upon existing mechanisms.

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing County outreach programs will be reviewed for effectiveness and leveraged and expanded upon to reach the broader region.

Responsible Office: City of Plymouth in partnership with the County

Cost Estimate: Annual costs to be determined, and will depend on the scope and frequency of activities and events as well as volunteer participation

Benefits (Losses Avoided): Increase residents' knowledge of potential hazards and activities required to mitigate hazards and be better prepared. Protect lives and reduce damages, relatively low cost to implement.

Potential Funding: Local budgets, grant funds

Timeline: Ongoing/Annual public awareness campaign

Project Priority: High

Action 3. Secure City Hall as Critical Infrastructure with Commercial Generator

Hazards Addressed: Excessive Heat/Cold, Climate Change, All General Emergencies

Goals Addressed: 1, 2, 3, 4, 5

Issues/Background: Plymouth is the only City located on the Northwestern side of Amador County. It is the hub for many smaller unincorporated communities which surround it, such as the Shenandoah Valley, Fiddletown, and River Pines. During emergencies City Hall is used as a shelter, heating and cooling station, charging station, information outlet and help center. To better support the communities in need a standby generator which could run more services from City Hall is essential.

Project Description:

- Purchase and install a commercial generator to run all aspects of City Hall which is used as a critical facility during emergencies, long term power outages and severe weather, serving multiple communities in Northwestern Amador.
- Determine and address all possible public assistance which may be increased with a stable energy system.

Other Alternatives: None

Existing Planning Mechanisms through which Action Will Be Implemented: N/A

Responsible Office/Partners: Building Department, Public Works, Administration

Cost Estimate: $30,000

Benefits/Losses Avoided:

Potential Funding: FEMA Hazard Mitigation Grant Program

Timeline: 1 year

Project Priority: High

Action 4. Indian Creek Stream Restoration & Culvert Improvement in Flood Hazard Zone

Hazards Addressed: Flood, Drought, Climate Change, and Storm Water Management

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Indian Creak travels through the City of Plymouth and it's flood zones. In storm season it overflows and leaks flooding public and privately owned areas and roads creating hazards and damage. In summer, water pulled from the Cosumnes River through City water rights is used for agriculture. Water lost from leaking creek beds, is water that is needed to maintain local agriculture in the community. This has become an even greater problem since the Sand Fire in 2014 (Damage was caused to the City's Arroyo Ditch line near the pull site of the Cosumnes River.), which has affected the water flow volumes higher up the creek, already reducing the amount of water that can travel into the City of Plymouth and beyond.

Project Description:

- Rebuild the levees to secure the water and stop damage from leakage. (One difficult area abuts the business of Rory's Towing & Repair, constantly flooding the business.)
- Clear creek beds of brush and debris allowing for fluent flow.
- Upgrade culverts to accommodate more volume to travel freely, save water from evaporation and help manage flooding in the City's flood zones.

Other Alternatives: None

Existing Planning Mechanisms through which Action Will Be Implemented: N/A

Responsible Office/Partners: Building Department, Public Works

Cost Estimate:

Benefits/Losses Avoided: Less water lost in winter causing damage to property and flooding roads and more available agriculture water in the dry season.

Potential Funding: FEMA Hazard Mitigation Grant Program

Timeline: 4 years

Project Priority: High

Action 5. Maintain and Enhance Water Canal by Converting Earthen Arroyo Ditch to Fixed Pipeline or Gunite Lined Canal

Hazards Addressed: Flood, Drought, Climate Change and Storm Water Management

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The Arroyo Ditch has been supplying water to the City of Plymouth under CA water rights for decades. It is still a vital water supply for the local agricultural community. In 2014 the Sand Fire burned much of the Arroyo Ditch destroying its wooden flues, covering the area with burn debris, and limiting access to the area. This has drastically reduced the amount of water which can now make its way to the Plymouth area. The City currently is working with CAL OES and FEMA to obtain funding to repair the damage from the Sand Fire. The City is currently holding waiting for a hearing date on the matter. The southern area of the ditch was not damaged by fire; however it is the area that enters into the City and needs the most water control to prevent flooding and serve the City. Much of the water pulled from the Cosumnes River is lost to evaporation and saturation and is never available as supply water. Piping or lining the canal with gunite would positively affect the efficiency of the water line and greatly increase water supply to the community.

Project Description: Replace the open earthen ditch with fixed pipe and/or gunite lining to increase available water supply eliminating evaporation and saturation.

Other Alternatives: None

Existing Planning Mechanisms through which Action Will Be Implemented: N/A

Responsible Office/Partners: City Engineering, Public Works

Cost Estimate: $500,000

Benefits/Losses Avoided: Potentially double available water supply from the Arroyo Ditch. Creating a more reliable water source for the local agricultural community and emergencies such as wildfire.

Potential Funding: FEMA Hazard Mitigation Grant Program

Timeline: 5 years

Project Priority: High

Action 6. Develop a Community Wildfire Prevention Plan

Hazards Addressed: Wildfire, Drought, High Winds and Extreme Heat

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Plymouth is surrounded by unincorporated area, which for the most part is WUI (Wildland Urban Interface). In 2014, the Sand Fire started in this type of area when a vehicle drove "off

road" into dry grasses. This fire destroyed 20 residences, 47 outbuildings, burned 4,240 acres and contributed to 2 deaths. Less than 5 miles outside City limits, a big factor that saved the City of approximately 1,000 residents was the direction of the wind. This small City was still greatly impacted, as firefighters made basecamp at the Amador County Fairgrounds and trucks pulled water non-stop from the City hydrants the population faced unsafe air quality, fear, and economic shutdown. Plymouth's businesses rely on tourism brought by the Shenandoah Valley wine industry. This event made it clear that planning and preparation for the next fire was essential to the City's survival.

Project Description:

- Develop and implement a Public Awareness Education Program including defensible space, best practice guidelines and self-preparedness and evacuation knowledge.
- Revise building requirements to ensure new development is using fire resistant materials and strategies and incentivize renovation projects on older buildings to do the same.
- Increase Fuel Management efforts focusing on undeveloped parcels, non-resident property owners whose land or property is neglected and WUI areas.

Other Alternatives: None

Existing Planning Mechanisms through which Action Will Be Implemented: This would create the planning mechanism.

Responsible Office/Partners: Building Department, Code Enforcement, Fire Department

Cost Estimate: To be determined

Benefits/Losses Avoided: Reduced risk to wildfire for City.

Potential Funding: FEMA Hazard Mitigation Grant Program

Timeline: 5 years

Project Priority: High

Annex E City of Sutter Creek

E.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Sutter Creek, a previously participating jurisdiction to the 2014 Amador County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the City. This Annex provides additional information specific to Sutter Creek, with a focus on providing additional details on the risk assessment and mitigation strategy for this community.

E.2 Planning Process

As described above, Sutter Creek followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Amador County Hazard Mitigation Planning Committee (HMPC), the City formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table E-1. Additional details on plan participation and City representatives are included in Appendix A.

Table E-1 City of Sutter Creek – Planning Team

Name	Position/Title	How Participated
Amy Gedney	City Manager	Updated documents; attended meetings
James O'Connell	Chief of Police	Reviewed information
George Allen	Foreman	Discussions with City Manager

Coordination with other community planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the City integrated the previously approved 2014 Plan into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2014 LHMP through other plans and programs shown in Table E-2.

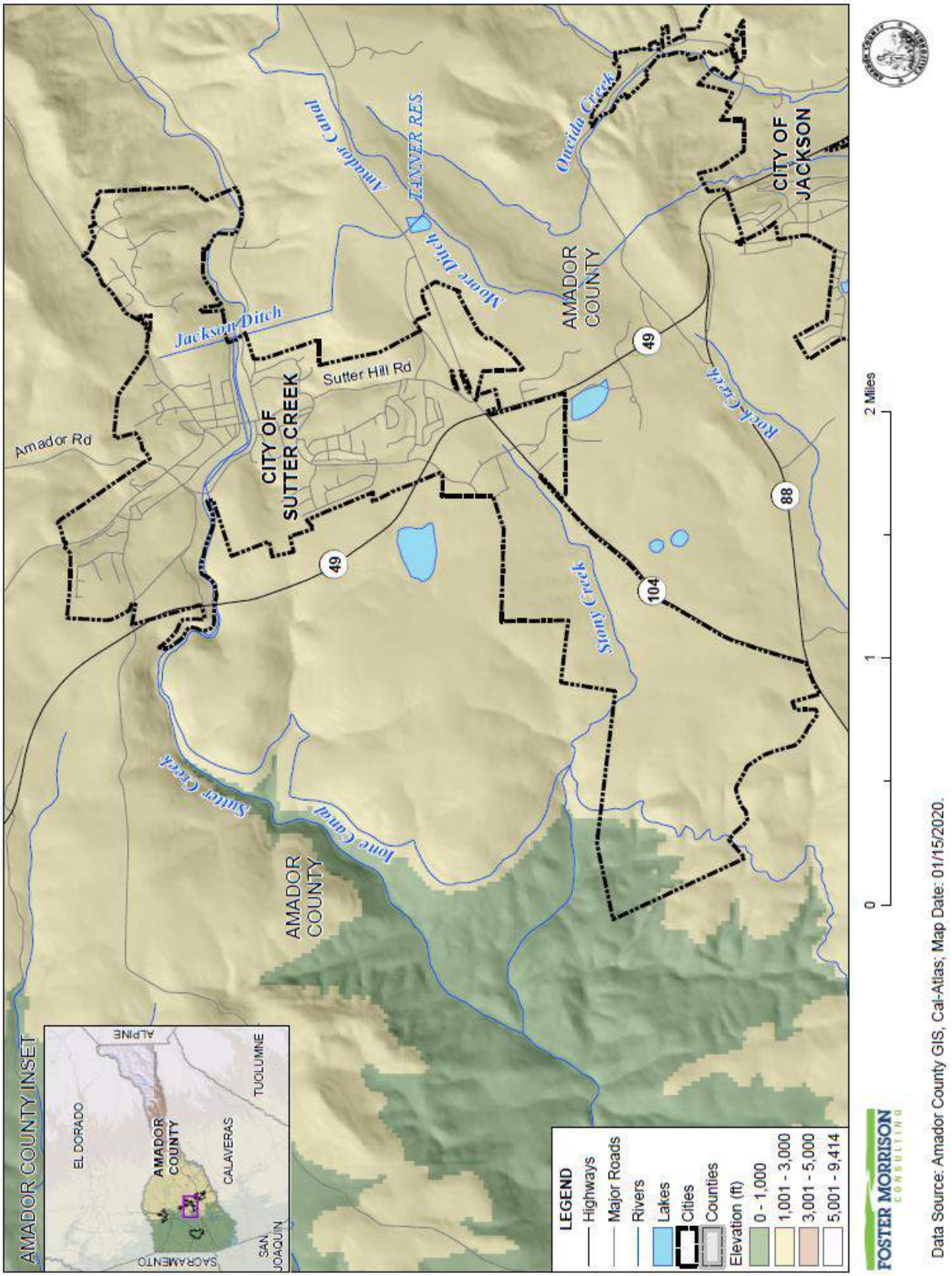
Table E-2 2014 LHMP Incorporation

Planning Mechanism 2014 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
2019 General Plan Update	LHMP was incorporated into the Safety Element

E.3 Community Profile

The community profile for the City of Sutter Creek is detailed in the following sections. Figure E-1 displays a City map and the location of Sutter Creek within Amador County.

Figure E-1 City of Sutter Creek



E.3.1. Geography and Climate

The City of Sutter Creek is located in Amador County on the western slope foothills of the Sierra Nevada. The entire City planning area includes the area within present City limits as well as additional contiguous areas which the City believes presently bears relation to its planning. The City planning area covers approximately 5.25 square miles. Approximately 50% of this total area or 2.5 square miles (approximately 1,580 acres) are within City limits. California's famous "Mother Lode" or "Golden Chain" Highway 49 runs north/south through the City. Downtown Sutter Creek is considered one of the best examples of an historic mining community to be found along this route. The State has registered the City as an historic landmark.

Historically, the City planning area was characterized by a small valley area where the main historic part of the City is located. This valley is surrounded by hills, many parts of which exhibit attractive California oak grassland environment. Annexation of Sutter Hill and Gold Rush Ranch has extended the planning area into the hills south and southwest of the valley. The area's vegetation includes pine, oak, and brush lands or chaparral. Elevations range from approximately 1,200 feet above mean sea level (msl) in the historic downtown heart of the City (the valley bottom) to 1,556 feet msl at the Sutter Hill area, a generally commercial and industrial area located at the southern City limits. Sutter Creek itself flows generally from east to west through the City crossing under Old Highway 49 (Main Street) in the historic downtown area. Climate of the City is much like that of valley areas of Amador County.

E.3.2. History

Sutter Creek, a historic gold country town, located in the heart of Amador County incorporated in 1854. Sutter Creek, known as the "Jewel of the Mother Lode," was named after John Sutter, who sent a party to the area in 1846 in search of timber. His discovery of gold at nearby Coloma triggered the California Gold Rush and Sutter Creek also became a destination for fortune hunters, although Sutter himself only visited the mining camp once. Although plenty of gold was found here, quartz was discovered in 1851 and that became the mainstay of the local economy for many years. In 1932 the Central Eureka mine, discovered in 1869, had reached the 2,300-foot level. By 1939, it was the best-paying mine at Sutter Creek.

With the prosperity brought by quartz mining, Sutter Creek became a boom town. Many of the original brick buildings are still standing, as well as some of the mansions built by the wealthier residents. Leland Stanford was one of Sutter Creek's most famous residents.

The mines continued operations until the 1950s. Today, Sutter Creek is a tourist town with many shops and restaurants.

E.3.3. Economy

US Census estimates show economic characteristics for the City of Sutter Creek. These are shown in Table E-3 and Table E-4. Mean household income in the City was $59,296. Median household income in the City was $44,353.

Table E-3 City of Sutter Creek – Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	39	4.3%
Construction	34	3.7%
Manufacturing	69	7.5%
Wholesale trade	0	0.0%
Retail trade	149	16.3%
Transportation and warehousing, and utilities	0	0.0%
Information	20	2.2%
Finance and insurance, and real estate and rental and leasing	34	3.7%
Professional, scientific, and management, and administrative and waste management services	114	12.5%
Educational services, and health care and social assistance	128	14.0%
Arts, entertainment, and recreation, and accommodation and food services	153	16.7%
Other services, except public administration	30	3.3%
Public administration	145	15.8%

Source: US Census Bureau American Community Survey 2013-2017 Estimates

Table E-4 City of Sutter Creek – Income and Benefits

Income Bracket	Population	Percent
<$10,000	107	8.8%
$10,000 – $14,999	106	8.7%
$15,000 - $24,9999	164	13.5%
$25,000 – $34,999	108	8.9%
$35,000 – $49,999	195	16.0%
$50,000 – $74,999	245	20.1%
$75,000 – $99,999	135	11.1%
$100,000 – $149,999	85	7.8%
$150,000 – $199,999	28	2.3%
$200,000 or more	35	2.9%

Source: US Census Bureau American Community Survey 2013-2017 Estimates

Tourism is the largest income generator for the City of Sutter Creek. Tourists are attracted to the City as a historic destination. The City has eleven wine tasting rooms and there are continuous events that attract tourists.

E.3.4. Population

The California Department of Finance estimated the January 1, 2019 total population for the City of Sutter Creek was 2,559.

E.4 Hazard Identification

Sutter Creek identified the hazards that affect the City and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to Sutter Creek (see Table E-5).

Table E-5 City of Sutter Creek—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests	Limited	Highly Likely	Limited	Low	Low
Aquatic Invasive Species	Limited	Highly Likely	Limited	Low	Low
Avalanche	Limited	Likely	Negligible	Low	Medium
Climate Change	Extensive	Likely	Limited	Medium	–
Dam Failure	Limited	Unlikely	Critical	Low	Medium
Drought & Water shortage	Extensive	Likely	Limited	Medium	High
Earthquake (large damaging/small)	Significant	Unlikely/ likely	Catastrophic	Medium	Low
Floods: 1%/0.2% annual chance	Extensive	Occasional/ Unlikely	Critical	High	Medium
Floods: Localized Stormwater	Significant	Highly likely	Critical	High	Medium
Landslide, Mudslide, Debris Flow	Significant	Likely	Critical	Medium	Medium
Levee Failure	Limited	Occasional	Limited	Low	Medium
Severe Weather: Extreme Heat	Extensive	Highly likely	Limited	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Highly likely	Critical	Medium	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly likely	Limited	Medium	Low
Severe Weather: Winter Storms and Freeze	Significant	Highly likely	Limited	Medium	Medium
Wildfire	Extensive	Highly likely	Catastrophic	High	High

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

E.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Sutter Creek's hazards and assess the City's vulnerability separate from that of the Amador County Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

E.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section E.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard affects the City and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Amador County Planning Area.

E.5.2. Vulnerability Assessment and Assets at Risk

This section identifies Sutter Creek's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Values at Risk

The following data from the Amador County Assessor's Office is based on the 12/31/2018 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitations are created by Proposition 13 and the Williamson Act as detailed in the Base Plan. With respect to Proposition 13, instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. However, depending on the type of hazard and impact of any given hazard event, land values may be adversely affected; thus, land values are included as appropriate. Table E-6 shows the 12/31/2018 Assessor's values and content replacement values (e.g., the values at risk) broken down by property use for the City.

Table E-6 City of Sutter Creek – Total Values at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Agricultural	6	2	$1,654,245	$361,000	$361,000	$2,376,245
Commercial	154	110	$22,347,840	$52,760,463	$52,760,463	$127,868,766
Industrial	2	2	$326,295	$790,798	$1,186,198	$2,303,291
Miscellaneous	38	0	$22,433	$0	$0	$22,433
Residential	1,203	1,000	$83,261,949	$196,606,886	$98,303,422	$378,172,257
Unknown	29	0	$0	$0	$0	$0
City of Sutter Creek Total	**1,432**	**1,114**	**$107,612,762**	**$250,519,147**	**$152,611,083**	**$510,742,992**

Source: Amador County 12/31/2018 Parcel/Assessor's Data

Critical Facilities and Infrastructure

Critical facilities and infrastructure are those buildings and infrastructure that are crucial to a community. Should these be damaged, it makes it more difficult for the community to respond to and recover from a disaster. 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, and (3) Hazardous Materials Facilities, as discussed in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the City of Sutter Creek from Amador County GIS is shown on Figure E-2. Table E-7 gives summary information about the critical facilities in the City. Table E-8 details the facility categories and breaks them down by facility type. Details of critical facility definition, type, name, address, and jurisdiction by hazard area or zone are listed in Appendix F. The critical facility inventory and associated maps for the City only include the first two categories of facility types; a GIS layer of Hazardous Materials Facilities was not available.

Figure E-2 City of Sutter Creek – Critical Facilities

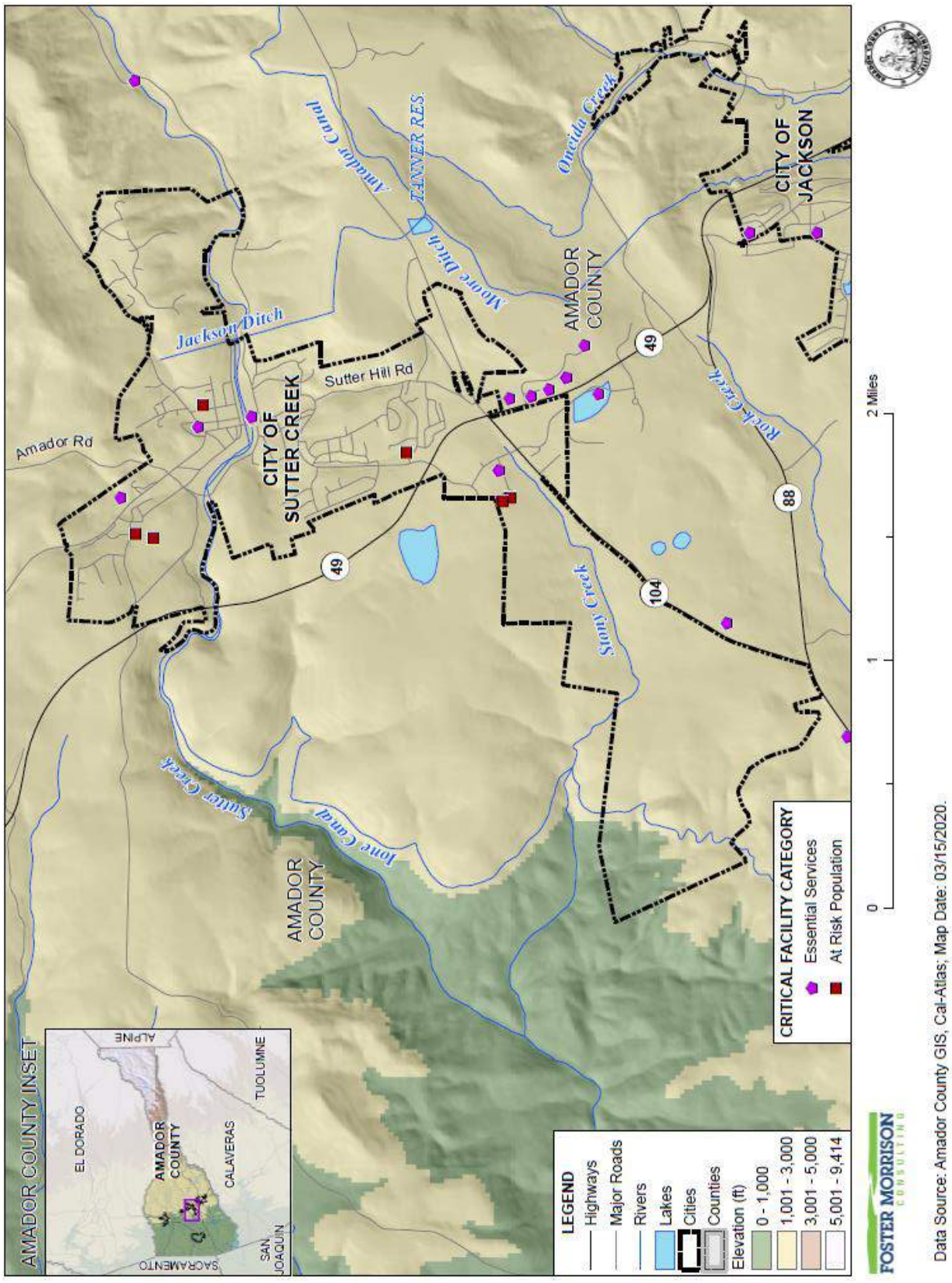


Table E-7 City of Sutter Creek – Critical Facility Summary

Critical Facility Category	Facility Count
Essential Services	7
At Risk Population	6
City of Sutter Creek Total	**13**

Source: Amador County GIS

Table E-8 City of Sutter Creek – Critical Facilities by Facility Category and Type

Critical Facility Category	Facility Type	Facility Count
Essential Services	Community Center	2
	Fire Station	2
	Police Station	1
	Post Office	1
	Public Administration Building	1
	Total	**7**
At Risk Population	Residential Care Facility	1
	School	5
	Total	**6**
City of Sutter Creek Total		**13**

Source: Amador County GIS

Natural Resources

Natural resources are unique to the City and are difficult to replace. Should a natural disaster occur, these species and locations are at risk.

Natural resources of significance to the City include Sutter Creek, open space areas, and the Oak forests found on surrounding hillsides. The City is located in the "upper Sonoran," or "foothill" life zone, a long belt of lands containing similar plants and animals which generally runs at the 200 to 2,000-foot elevation north to south through the Sierra Nevada foothills. This belt is usually characterized by intermingled pine-oak woodland and brush lands. Brush lands within the planning area are generally less extensive than in other parts of the foothill belt. Some of the City's visually and environmentally sensitive areas contain aspects of the neighboring lower Sonoran zone or great central valley; valley oak, grasslands, riparian areas and wetlands.

There are wetlands located in the City. These wetlands have been mapped and tabulated. Figure E-3 shows the wetlands locations in the City. Table E-9 delineates the types, counts, and acreages of wetlands in the City.

Figure E-3 City of Sutter Creek – Wetland Locations

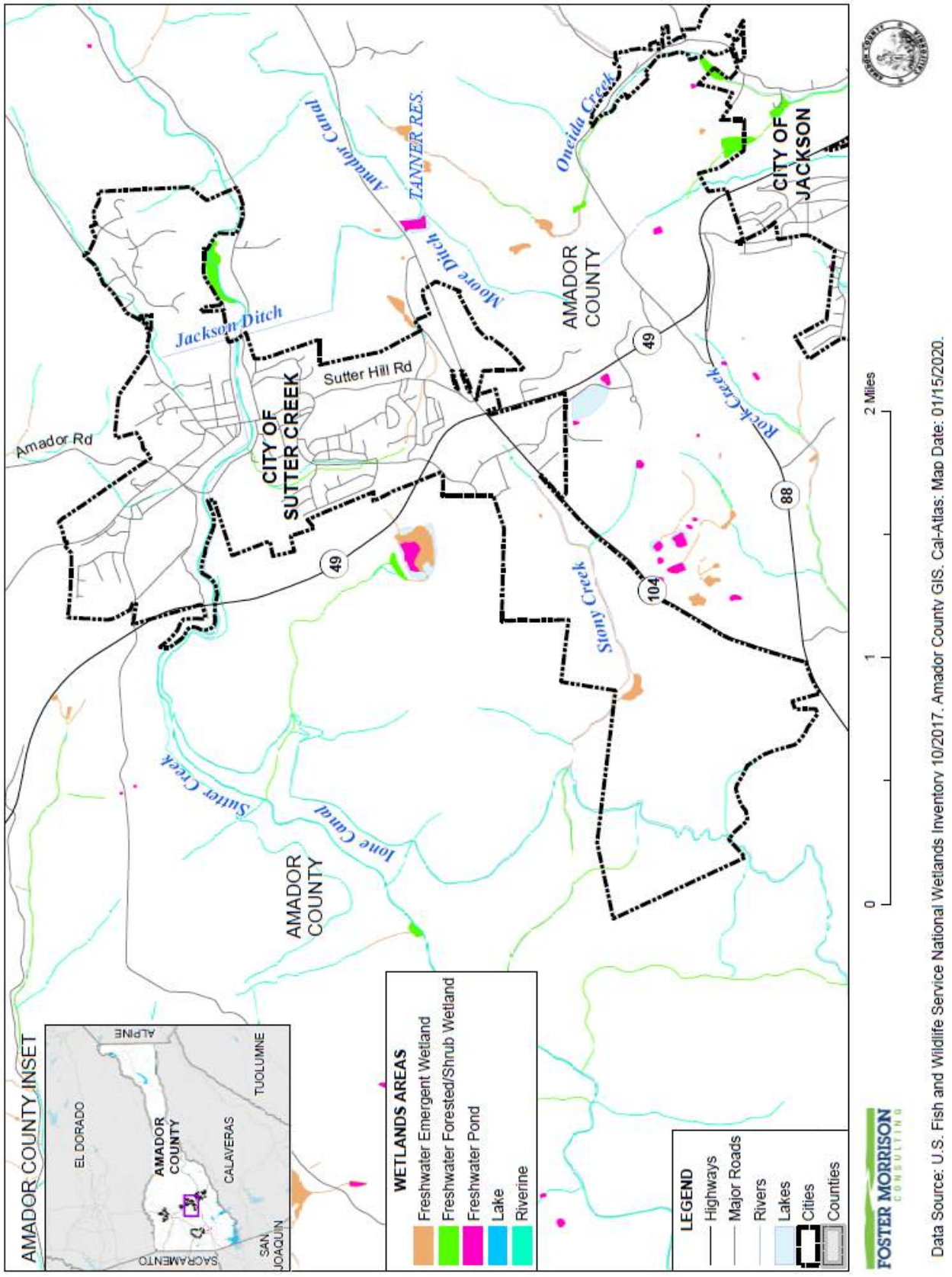


Table E-9 City of Sutter Creek – Wetlands Types, Counts, and Acreages

Wetlands Area Type	Wetlands Count	Wetlands Area (in Acres)
Freshwater Emergent Wetland	4	6.92
Freshwater Forested/Shrub Wetland	3	2.42
Freshwater Pond	0	0
Lake	0	0
Riverine	12	12.57
Sutter Creek Total	**19**	**21.91**

Source: US Fish and Wildlife Service

Historic and Cultural Resources

Historic and cultural resource are difficult to replace, and special care is needed when rebuilding or improvements are necessary. Should a natural disaster occur, these properties and locations are at risk.

The City of Sutter Creek has a 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. 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. These requirements are detailed in Section 4.3.1 of the Base Plan. Table E-10 lists the historical buildings in the City.

Table E-10 City of Sutter Creek – Historical Resources

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City/ Community
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

Source: California Department of Parks and Recreation Office of Historic Preservation, http://ohp.parks.ca.gov/

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.

Growth and Development Trends

As part of the planning process, the HMPC looked at changes in growth and development, both past and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability over time. Information from the City of Sutter Creek General Plan Housing Element, the California Department of Finance, the US Census Bureau form the basis of this discussion.

Historic Population Trends and Current Population

Population growth can increase the number of people living in hazard prone areas. Sutter Creek has generally seen steady growth. Sutter Creek has seen growth rates as shown in Table E-11.

Table E-11 City of Sutter Creek – Population Changes Since 1950

Year	Population	Change	% Change
1950	1,151	–	-
1960	1,161	10	0.9%
1970	1,508	347	29.9%
1980	1,705	197	13.1%
1990	1,835	130	7.6%
2000	2,303	478	25.5%
2010[1]	2,501	198	8.6%
2019[2]	2,559	58	2.3%

Source: [1]US Census Bureau, [2]California Department of Finance

Special Populations and Disadvantaged Communities

There are certain populations in the City that are at greater risk to hazards, due to circumstances beyond their control. These populations in the City present a unique challenge when natural hazards arise. The City noted a few special populations that exist in the City:

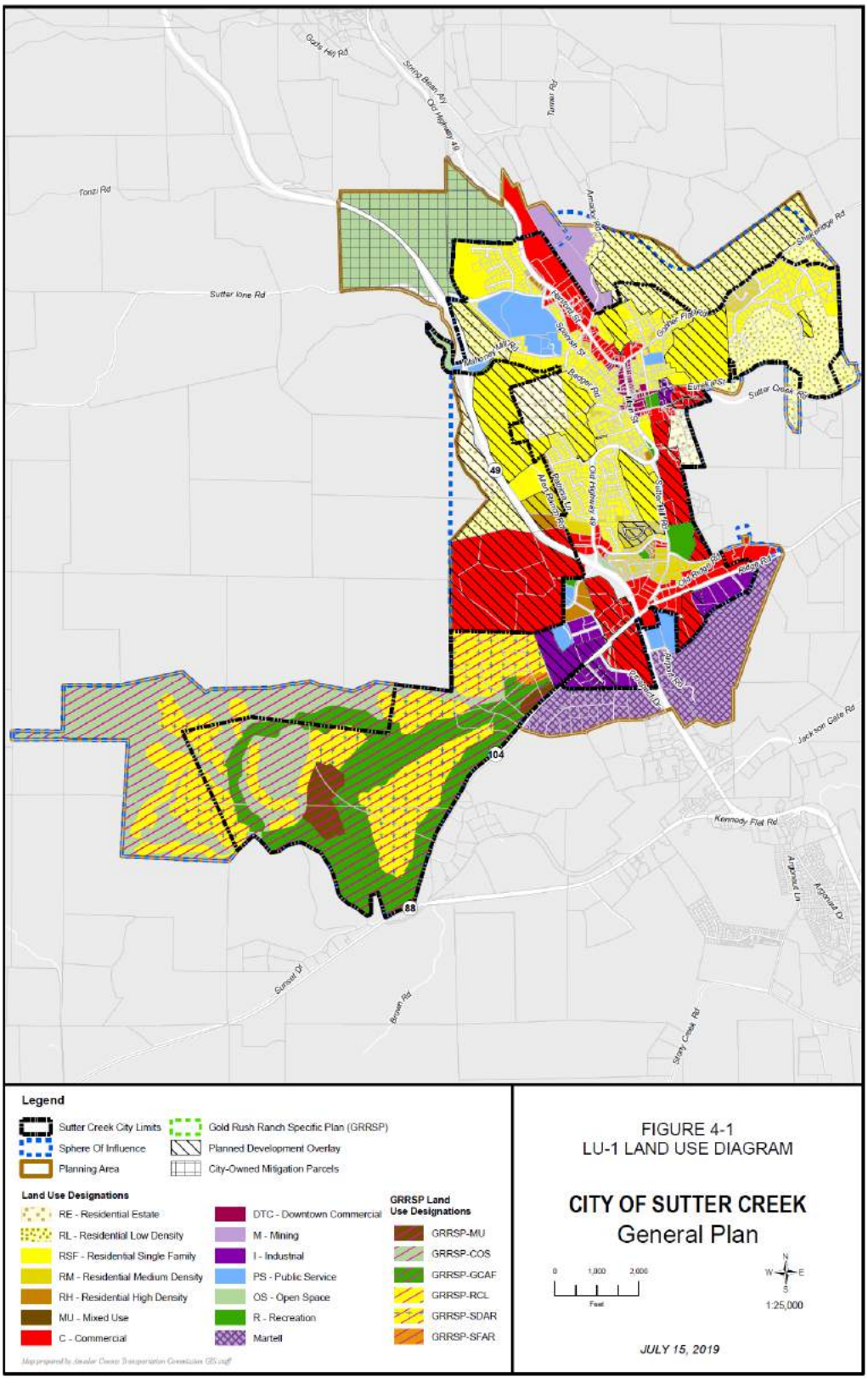
- Gold Strike Terrace: Senior residential housing
- Various apartment units- low income housing

Land Use

State planning law requires that the land use element of a general plan include a statement of the standard population density, building intensity, and allowed uses for the various land use designations in the plan (Government Code Section 65302(a)). The City's land use designations are mapped on the Land Use Diagram. The Sutter Creek Municipal Code provides detailed land use and development standards for development.

The City's proposed general distribution of land uses is shown on the General Plan Land Use Diagram, as shown on Figure E-4.

Figure E-4 City of Sutter Creek – Land Use Diagram



Source: City of Sutter Creek General Plan Land Use Element

Development since 2014 Plan

As discussed in Section 4.3.1 of the Base Plan, future development has occurred in the City since the last Plan. Some of this has occurred in hazard prone areas. The City Building Department tracked total building permits issued since 2014 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table E-12 and Table E-13.

Table E-12 City of Sutter Creek – Total Development Since 2014

Property Use	2015	2016	2017	2018	2019
Agricultural	0	0	0	0	0
Commercial	0	0	0	0	0
Industrial	0	0	0	0	0
Residential	1	0	2	3	2
Unknown	0	0	0	0	0
Total	**1**	**0**	**2**	**3**	**2**

Source: City of Sutter Creek Building Department

Table E-13 City of Sutter Creek – Development in Hazard Areas since 2014

Property Use	1% Annual Chance Flood	Landslide Susceptibility Area	Wildfire Risk Area[1]	Other
Agricultural	0	0	0	0
Commercial	0	0	0	0
Industrial	0	0	0	0
Residential	0	0	0	0
Unknown	0	0	0	0
Total	**0**	**0**	**0**	**0**

Source: City of Sutter Creek Building Department

[1]Moderate or higher wildfire risk area

Future Development

A discussion of future development is included below. Future development is important to hazard mitigation planning. Ensuring that future development does not place more people and property into known hazard zones is one of the goals of mitigation planning.

Data was received from the City of Sutter Creek on future development. Areas of expected development in the next 5 years was provided. The City noted that historically, development cycles within the city limits have been very slow for full buildout. Below are the APNs, the type of use, gross acreage and the anticipated development within the 5- year planning period 2020-2025. These are shown in Table E-14.

Table E-14 City of Sutter Creek – Planned Future Development Areas

Map ID	APN	Type of Use	Gross Acreage	Development
1	040-030-060 (not annexed)	Residential	8.8	7 SFR units
2-10	Various infill parcels	Residential		9 SFR infill lots
12-15	044-020-117; 044-020-116; 044-020-113; 044-020-112; 044-020-108	Commercial	2+	Commercial – restaurant, small store
16 (currently under construction)	044-020-095	High density Residential	3.7	60 units
17 -22	044-020-032; 044-020-132; 044-020-127; 044-020-128; 044-020-054	Commercial	3+	Fast food; restaurant; general office

Source: City of Sutter Creek

More general information on growth and development in Amador County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Amador County Vulnerability and Assets at Risk of the Base Plan.

GIS Analysis

Using GIS, the following methodology was used in determining parcel counts and acreages with future development projects in the City of Sutter Creek.

Future development areas in the City were provided in mapped format by the City. 5 of these came from the City General Plan, and 1 other came from Amador County LAFCO for the Sphere of Influence (SOI). Using the GIS parcel spatial file for each of these areas, the 6 areas identified in Table E-14 and 84 parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure E-5 shows the locations of future development areas the City is planning to develop. Table E-15 shows the parcels and acreages of each future development area in the City.

Figure E-5 City of Sutter Creek – Future Development Areas

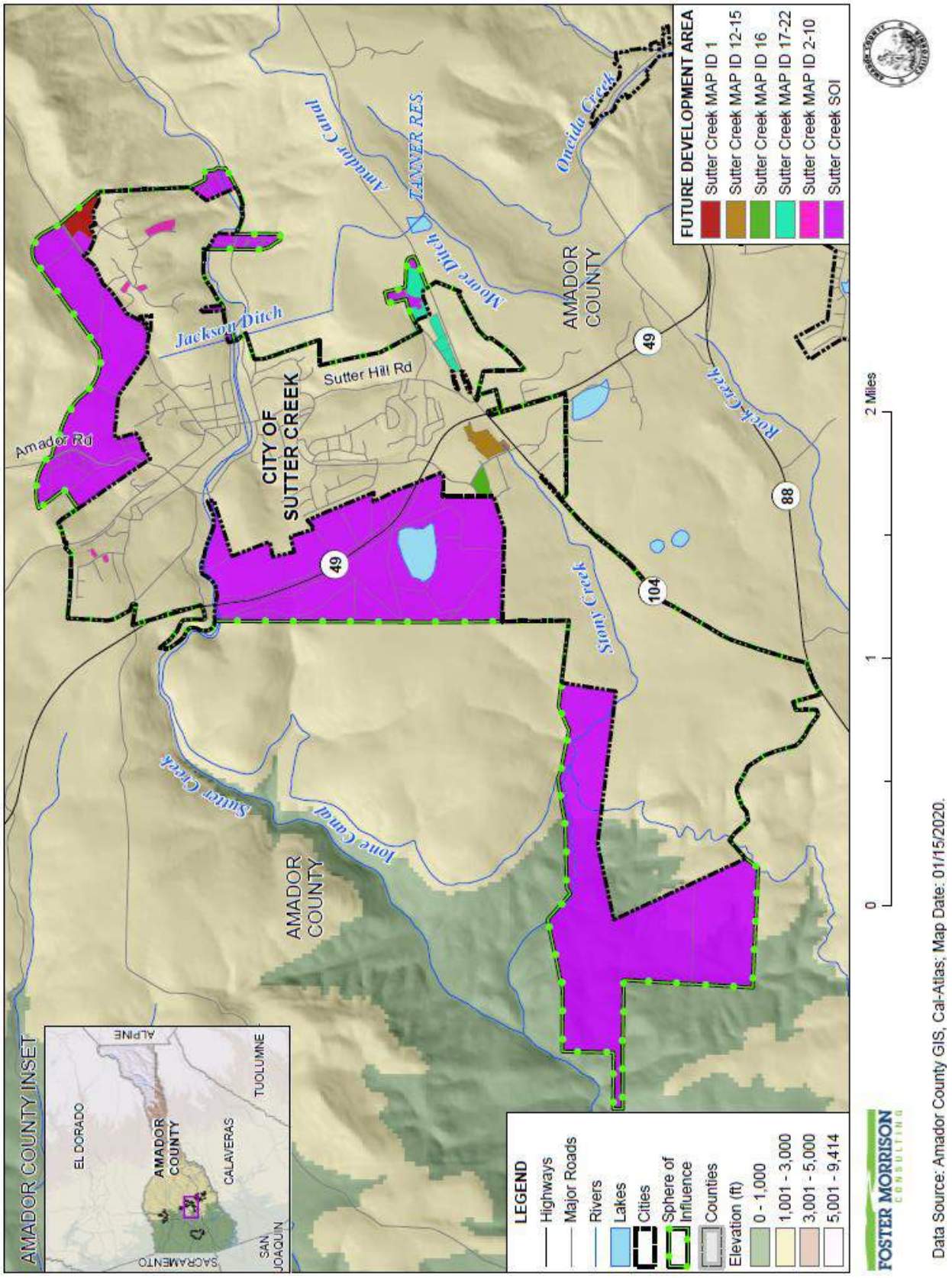


Table E-15 City of Sutter Creek – Future Development Parcels and Acres

Future Development	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Sutter Creek MAP ID 1	1	1	0	8.46	8.46	0
Sutter Creek MAP ID 2-10	9	0	9	4.49	0	4.49
Sutter Creek MAP ID 12-15	5	0	5	7.72	0	7.72
Sutter Creek MAP ID 16	1	0	1	3.88	0	3.88
Sutter Creek MAP ID 17-22	5	2	3	13.05	8.01	5.04
Sutter Creek SOI	63	28	35	868.25	67.89	800.36
Grand Total	**84**	**31**	**53**	**905.85**	**84.36**	**821.49**

Source: City of Sutter Creek, Amador County LAFCO

E.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table E-5 as high or medium significance hazards. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Amador County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. 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 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.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Issues Affecting all Hazards

The City's traffic circulation system, which originated in the Gold Rush era, is in many areas ill-equipped to handle the large volumes of traffic that could occur in association with a disaster in the City. Many streets in older parts of the City are narrow and winding. Street widening is precluded in most areas by historic buildings. Old State Highway 49 is the only direct route across Sutter Creek in the downtown area. When this area is congested, emergency vehicles or evacuation routes become long, roundabout, difficult, and time consuming to use. This situation is a primary justification of the completed Highway 49 bypass project.

Climate Change

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Climate change adaptation is a key priority of the State of California. The 2018 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.

In Amador County and the City, the HMPC noted that each year it seems to get a bit warmer and snow seems to start at higher levels. It was also noted that 2017 was one of the wettest years ever.

City of Sutter Creek 2019 General Plan recognized that climate change resulting from the greenhouse gas emissions of human activities is a reality. Global average surface temperatures are rising due to intensification of activities that release carbon dioxide and other greenhouse gases into the atmosphere. City of Sutter Creek is located within climate zone 4B and it characterized as dry, according to the U.S. Department of Energy's Climate Zones. A dry climate is generally defined as a region with approximately 3,600 heating degree days or more and fewer than approximately 5,400 heating degree days (65°F basis). Potential impacts of climate change include reduced snowpack, delayed snow accumulation and earlier snow melting, loss of critical habitat and ecosystems, shortages in runoff and water supply, forest disease, reduced tourism and heightened exposure to vector borne diseases.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the City, Amador County, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, 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

Climate change has never been directly linked to any declared disasters. While the City noted that climate change is of concern, no specific impacts of climate change could be recalled. The City and HMPC members noted that the strength of storms does seem to be increasing and the temperatures seem to be getting hotter.

Vulnerability to Climate Change

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. California's APG: 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. 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. This information can be used to guide climate adaptation planning in the City and Amador County Planning Area.

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra region in which the Amador County Planning Area is part of:

- Temperature increases
- Decreased precipitation
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

Future Development

The City 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. For example, interior western and southwestern states may experience an exodus of population due to challenges in adapting to heat even more extreme than that which is projected to occur here. While there are currently no formal studies of specific migration patterns expected to impact the City and 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.

Drought & Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Drought is a complex issue involving 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. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

The City's parks are valuable assets that would be affected by a drought. Additionally, Sutter Creek, a popular attraction and the City's name sake would run dry resulting in a deterioration of the City's beauty. With drought comes increased fire danger. Given the City's topography, increased fire danger is a great threat. The City is surrounded by grassland hills that could carry fire into the City.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the City, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages and for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the City and the County are shown in Section 4.2.11 of the Base Plan.

Past Occurrences

Since drought is a regional phenomenon, past occurrences of drought for the City are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.2.11 of the Base Plan.

As a result of the most recent drought, once the rain occurred, the City experienced increased mud slides onto its roadways and into Sutter Creek.

Vulnerability to Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the City, 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.

Impacts

The vulnerability of the City to drought is City-wide, 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. The increased dry fuels and fuel loads associated with drought conditions can also 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.

Other qualitative impacts associated with drought in the planning area are those related to water intensive activities such as, municipal usage, commerce, tourism, recreation and agricultural use. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

With more precipitation likely falling as rain instead of snow in the Sierra's, 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.

Future Development

As the population in the area continues to grow, so will the demand for water. The Amador Water Agency (AWA) provides water to the City through reliable surface water sources. However, population growth in the City will continue to increase the demand for water. Ongoing planning will be needed by the City and AWA to account for population growth and increased water demands.

Earthquake (large damaging/small)

Likelihood of Future Occurrence–Unlikely/Likely
Vulnerability–Medium

Hazard Profile and 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.

Sutter Creek is located adjacent to the Melones Fault, a major north-south trending fault associated with numerous other faults of the Foothills' fault system. The Draft Environmental Impact Report for the Oak Knolls Subdivision lists other "local faults of significant extent that have been identified in the general area:

- Bear Mountains Fault Zone — located approximately 4 to 5 miles westerly;
- An unnamed fault system — located approximately 2 miles westerly;
- An unnamed fault trace — located approximately 1/2 mile northwesterly and 1/2 mile southerly; unpublished mining data indicates that this fault dips about 60 degrees to the northeast and presumably underlies the project at depth; and the
- Melones Fault Zone — located from approximately 0.1 mile to 0.8 miles easterly of the project boundary. (Nelson, 1992, p. 6-2.)"

There are no State identified seismic hazard zones in or near the planning area. Until recently, the Foothill fault system was considered inactive. After the Oroville earthquake (5.7 Richter scale) in 1975 and evaluations for the Auburn and New Melones dam sites were completed, this designation was changed. The Foothills' fault system is now considered "active", (i.e., having experienced displacement in the last 100,000 years).

Location and Extent

Since earthquakes are regional events, the whole of the City is at risk to earthquake. Sutter Creek and the surrounding area are relatively free from significant seismic and geologic hazards. There are no known or inferred active faults within the City.

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, as discussed in Section 4.2.12 of the Base Plan. 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 (equivalent to 5.5 to 6.5 on the Richter Scale). During a Mercalli VII, most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. The City is located in an area where few earthquakes of significant magnitude occur, so both magnitude and intensity of earthquakes are expected to remain low. Seismic shaking maps for the area show Amador County and the City fall within a low to moderate shake risk.

Past Occurrences

The City noted no past occurrences of earthquakes or that affected the City in any meaningful way.

Vulnerability to Earthquake

The combination of plate tectonics and associated California coastal mountain range building geology generates earthquake as a result of the periodic release of tectonic stresses. Amador County's mountainous terrain lies in the center of the North American and Pacific tectonic plate activity. There have been earthquakes as a result of this activity in the historic past, and there will continue to be earthquakes in the future of the California north coastal mountain region. Both the San Andreas Fault and the Sierra Frontal System faults poses possibly significant impacts to Amador County and the City as they have the capabilities of producing a quake.

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault; however, liquefaction can occur further from the source of the earthquake. In general, newer construction is more earthquake resistant than older construction due to enforcement of improved building codes. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions and associated liquefaction, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry (URM) and soft story buildings. Data on URM and soft story buildings was unavailable for the City.

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. The City of Sutter Creek is within the less hazardous Zone 3.

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable.

Impacts from Earthquake

Impacts from earthquake in the City will vary depending on the fault that the earthquake occurs on, the depth of the earthquake strike, and the intensity of shaking. Large events could cause damages to infrastructure, critical facilities, residential and commercial properties, and possible injuries or loss of life.

Earthquake Analysis

Due to the regional effects of an earthquake, a Hazus earthquake analysis was performed on a countywide basis. This can be found in Section 4.3.9 of the Base Plan. While these runs were not done specific to the City, maps showing damage in the County show greater areas of damage near the cities in the County. This is because most models reflect that the greatest damage occurs in the built-out, populated areas of the County. The deterministic 6.7 Hayward Fault run showed minimal damage to the County and the City, while the probabilistic 7.0 earthquake scenario showed moderate to high damage to the County and the City.

Future Development

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. The City enforces the state building code, which mandates construction techniques that minimize seismic hazards. Future development in the City is subject to these building codes.

Flood: 100/500-Year

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–High

Hazard Profile and Problem Description

This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the County or in the City, and have caused damages in the past. Flooding is a significant problem in Amador County and the City. Historically, the City has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred both within the 1% and 0.2% annual chance floodplains and in other localized areas.

As previously described in Section 4.2.13 of the Base Plan, the Amador County Planning Area and the City of Sutter Creek have been subject to historical flooding. Sutter Creek is traversed by several stream systems and is at risk to the 1% and 0.2% flood.

Location and Extent

The major source of flooding in the City is associated with Sutter Creek, which traverses east to west through the community. There are four creeks that feed into Sutter Creek. The flooding issues associated with each of these creeks are described below. One creek begins in the area of Old Sutter Hill Road and travels down Bryson, then along highway 49 to Raylan Drive where it crosses the highway and cuts back east to join Sutter Creek at Badger St. between Karsan Drive and Allen Ranch Road. This creek was the focus of a major Hazard Elimination Project in 2000 and has not been a problem since then.

The second creek begins up Gopher Flat Road and follows it as an open creek until it reaches Cole Street. After this point, it travels in a culvert all the way under Main Street, along Hayden Alley, and finally across a residential lot until it reaches Sutter Creek. Historically, the culvert between Cole Street and Main Street has been too small and is now deteriorating due to age and corrosion. The City completed drainage projects in 1998 and 2012 that corrected much of the problem but a small section near Gopher Flat and Main Street could not be corrected due to a dense greenstone rock section. The City decided to reduce the flow upstream via a diversion at Manor Court and via a new drainage pipe along Broad St. Only one of these projects has been completed. The third creek begins near the Sutter Creek Fire Hall at the north end of the city and travels across Highway 49 to China Gulch. It travels behind the Days Inn and meets the intersection of Badger Street/Spanish Street/North Amelia/Mahoney Mill Road. It goes into a culvert under this 5-way intersection and then into a ditch until it joins Sutter Creek next to the Badger Street Bridge. This last culvert has proved to be too small in the past and has caused the creek to overflow across Spanish Street and down North Amelia. A hazard mitigation grant has been filed but has been in the queue for several years. A development project in the area of the Sutter Creek fire hall may correct the problem by on-site retention but the project is not yet approved. The last creek begins on Amador Road and travels along it to Amelia Street where it goes into pipe. This pipe runs down Amelia Street to Badger Street and then into a pipe that crosses the grounds of the Leland Stanford house. The City replaced the pipe across the property in the 2003-2004 budget year. There have not been any problems with this drainage since then.

The City of Sutter Creek has areas located in the 1% and 0.2% annual chance floodplain. This is shown in Figure E-6.

Figure E-6 City of Sutter Creek – FEMA DFIRM Flood Zones

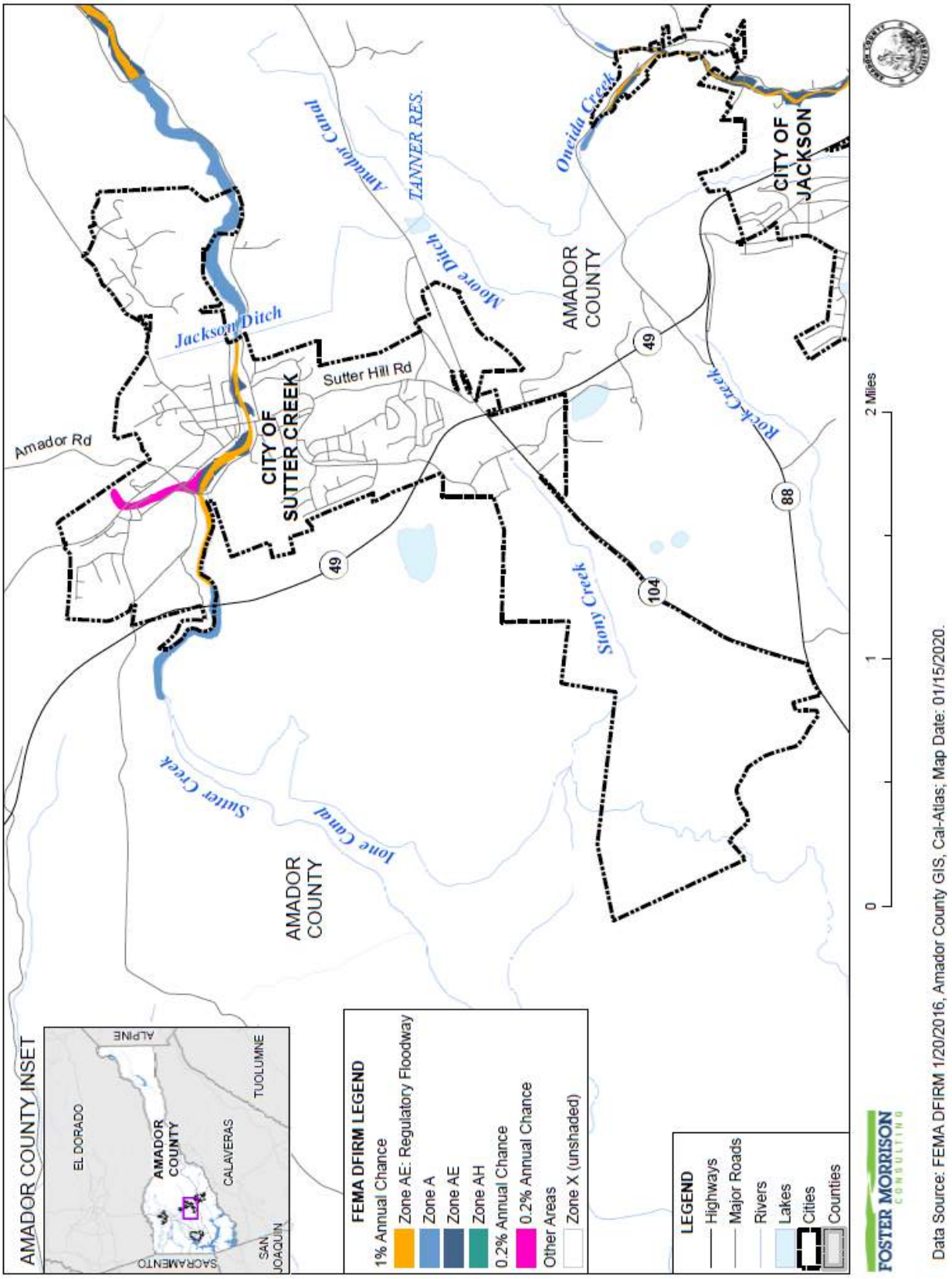


Table E-16 details the DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the City.

Table E-16 City of Sutter Creek– DFIRM Flood Hazard Zones

Flood Zone	Description	Flood Zone Present in City of Sutter Creek
A	100-year Flood: No base flood elevations provided	Y
AE	100-year Flood: Base flood elevations provided	Y
AE Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided	Y
Shaded X	500-year Flood: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	Y
X (unshaded)	No flood hazard	Y

Source: FEMA

*Percentage of total acres is the percent of total acres of the entire County Planning Area, not the total acres of the jurisdiction

Additionally, flood extents can generally be measured in volume, velocity, and depths of flooding. Expected flood depths in the City vary, depending on the nature and extent of a flood event; specific depths are unknown. Flood durations in the City tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Flooding in the City tends to have a shorter speed of onset, due to the amount of water that flows through the City.

Geographical flood extent from the FEMA DFIRMs is shown in Table E-17.

Table E-17 City of Sutter Creek – Geographical Flood Hazard Extents in FEMA DFIRM Flood Zones

Flood Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
1% Annual Chance	27	0.01%	15	0.01%	13	0.01%
0.2% Annual Chance	7	0.00%	5	0.00%	2	0.00%
Other Areas	1,545	0.40%	721	0.44%	824	0.37%
Total	**1,579**	**0.41%**	**741**	**0.45%**	**838**	**0.38%**

Source: Amador County 1/20/2016 DFIRM

Past Occurrences

A list of state and federal disaster declarations for Amador County from flooding is shown on Table E-18. These events also likely affected the City to some degree.

Table E-18 Amador County – State and Federal Disaster Declarations from Flood 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	15	1955, 1958, 1963, 1964, 1969, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1959, 1963 (twice), 1969, 1980, 1982, 1986, 1995, 1997, 1998

Source: Cal OES, FEMA

HMPC representative from the City noted problems from winter storms and flooding have affected the City in the past. Specific dates and problems include:

1980

Records of flows in Sutter Creek indicate that in 1980 almost 7,000 cubic feet per second (CFS) passed through the City in the channel that accommodates an average annual 32.4 CFS. County Emergency Services Coordinator Mary Culver has commented that this may have been close to a 100-year flood occurrence in the City. The Oak Knolls Subdivision Draft EIR suggests that 8,750 CFS would constitute a 100-year flood occurrence. A comparison of the flood hazard safety area shown on Map 2-3 with existing development on lots in the area suggest that serious property damage and a threat to public health and safety will likely exist in the event of a 100-year flood occurrence. The 1980 storm did not flood buildings in the City. Damage was most severe east of the City where bridges and some roads were destroyed by Sutter Creek and its tributaries. In normal rainfall situations, some tributaries in the planning area cause flooding problems such as are occurring at the Badger Street Bridge. Such problems should be considered in the Master Drainage Plan called for in the Public Services and Facilities Element.

January 1997

Severe winter storms caused flooding city wide. Landslides and debris flows also resulted from the excess rains. Historic rock wall and pedestrian bridge failure and damage to adjacent residences were impacts felt by the city. Garages, basements, and carports flooded city wide. The City Hall and library were flooded. The sewer plant and collection lines were flooded and incurred damages. The Gopher Flat Road width was reduced by 25% for approximately 250 feet and significant cut bank sloughing; storm drain conduits plugged with debris. Spanish Street, Mahoney Mill Road, Church Street, Sutter Hill Road, Gold Strike Court, and Bryson Drive were all flooded.

2006

Severe winter storms caused flooding city wide. Landslides and debris flows also resulted from the excess rains. Bank failures, driveway flooding, and minor structure damages impacted the city. Flooding caused damages in the City Hall basement. In addition, the sewer plant was inundated with debris, as were storm drain facilities and street surfaces city wide. Similar damages occurred in 1996.

2016 & 2017

In October 2016, the City had 8 inches of rain in a 48-hour period causing flash flooding. In January and February of 2017, 8 inches of rain causing severe mudslides and flooding. The City had damage to the

basement at City Hall. In addition, the sewer plant was inundated with debris, as were storm drain facilities and street surfaces city wide.

Vulnerability to Flood

Floods have been a part of the City's historical past and will continue to be so in the future. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damages. Predominantly, the effects of flooding are generally confined to areas near the waterways of the County. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat. This threatens structures in the floodplain. Structures can also be damaged from trees falling as a result of water-saturated soils. Electrical power outages happen, and the interruption of power causes major problems. Loss of power is usually a precursor to 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. People may be swept away in floodwaters, causing injuries or deaths.

The City of Sutter Creek 2019 General Plan Safety Element noted concern for the flooding of Sutter Creek (as well as its main tributaries in the planning area) is increased as new development removes natural vegetation and compacts and covers over soils, thereby increasing the rate at which storm runoff reaches these drainage courses. This impact involves developments in the 49+ square mile drainage area of Sutter Creek outside of the planning area as well as those that may be constructed inside of the planning area.

Impacts

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 as well as life safety issues. 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. Floodwaters can transport large objects downstream which can damage or remove stationary structures. 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. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Assets at Risk

Based on the vulnerability of Sutter Creek to the flood hazard, the sections that follow describes significant assets at risk in the City of Sutter Creek. This section includes the values at risk, flooded acres, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Sutter Creek. The methodology described in Section 4.3.10 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Table E-19 is a summary table for the City of Sutter Creek. Parcel counts, values, estimated contents, and total values in the City are 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. As previously mentioned, there are no areas of the City within the 1% annual chance flood. Table E-20 breaks down Table E-19 and shows the property use, improved parcel count, improved values, estimated contents, and total values that fall in each floodplain in the City.

*Table E-19 City of Sutter Creek – Count and Value of Parcels at Risk in Summary DFIRM Flood Zones**

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard	51	34	$3,721,288	$6,399,960	$3,722,416	$13,843,664
0.2% Annual Chance Flood Hazard**	13	12	$684,439	$1,964,982	$989,225	$3,638,646
Other Areas	1,368	1,068	$103,207,035	$242,154,205	$147,899,442	$493,260,682
City of Sutter Creek Total	**1,432**	**1,114**	**$107,612,762**	**$250,519,147**	**$152,611,083**	**$510,742,992**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 E-20 City of Sutter Creek – Count and Values of Parcels at Risk by Detailed Flood Zone and 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 AE Floodway						
Agricultural	0	0	$0	$0	$0	$0
Commercial	1	1	$4,299	$27,418	$27,418	$59,135
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	1	0	$1,106	$0	$0	$1,106
Residential	16	7	$812,398	$1,394,411	$697,204	$2,904,013
Unknown	0	0	$0	$0	$0	$0
Total Zone AE Floodway	**18**	**8**	**$817,803**	**$1,421,829**	**$724,622**	**$2,964,254**

Flood Zone/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Zone AE						
Agricultural	0	0	$0	$0	$0	$0
Commercial	2	2	$209,482	$298,804	$298,804	$807,090
Industrial	1	1	$171,750	$359,325	$538,988	$1,070,063
Miscellaneous	2	0	$0	$0	$0	$0
Residential	26	23	$2,446,453	$4,320,002	$2,160,002	$8,926,457
Unknown	0	0				
Zone AE Total	**31**	**26**	**$2,827,685**	**$4,978,131**	**$2,997,794**	**$10,803,610**
Zone A						
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	2	0	$75,800	$0	$0	$75,800
Unknown	0	0	$0	$0	$0	$0
Zone A Total	2	0	$75,800	$0	$0	$75,800
1% Annual Chance Flood Hazard Total	**51**	**34**	**$3,721,288**	**$6,399,960**	**$3,722,416**	**$13,843,664**
0.2% Annual Chance Flood Hazard**						
Agricultural	0	0	$0	$0	$0	$0
Commercial	1	1	$193,554	$13,469	$13,469	$220,492
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	12	11	$490,885	$1,951,513	$975,756	$3,418,154
Unknown	0	0	$0	$0	$0	$0
0.2% Annual Chance Flood Hazard Total	**13**	**12**	**$684,439**	**$1,964,982**	**$989,225**	**$3,638,646**
Other Areas						
Agricultural	6	2	$1,654,245	$361,000	$361,000	$2,376,245
Commercial	150	106	$21,940,505	$52,420,772	$52,420,772	$126,782,049
Industrial	1	1	$154,545	$431,473	$647,210	$1,233,228
Miscellaneous	35	0	$21,327	$0	$0	$21,327
Residential	1,147	959	$79,436,413	$188,940,960	$94,470,460	$362,847,833
Unknown	29	0	$0	$0	$0	$0

Flood Zone/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Other Areas Total	**1,368**	**1,068**	**$103,207,035**	**$242,154,205**	**$147,899,442**	**$493,260,682**
City of Sutter Creek Total	**1,432**	**1,114**	**$107,612,762**	**$250,519,147**	**$152,611,083**	**$510,742,992**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 E-21 summarizes Table E-20 above and shows City of Sutter Creek loss estimates and shows improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

*Table E-21 City of Sutter Creek – 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	51	34	$3,721,288	$6,399,960	$3,722,416	$10,122,376	$2,024,475	0.04%
0.2% Annual Chance Flood Hazard**	13	12	$684,439	$1,964,982	$989,225	$2,954,207	$590,841	0.01%
Grand Total	**64**	**46**	**$4,405,727**	**$8,364,942**	**$4,711,641**	**$13,076,583**	**$2,615,316**	**0.05%**

Source: FEMA 1/20/2016 DFIRM, Amador County 12/31/2018 Parcel/Assessor's 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 Table E-20 and Table E-21, the City of Sutter Creek has 34 parcels and $10.1 million of structure and contents values or values in the 1% annual chance floodplain, and 12 improved parcels and $3.0 million of structure and contents values in the 0.2% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the Base Plan, there is a 1% chance in any given year of a flood event causing $2.0 million in damage and a 0.2% chance in any given year of a flood event causing $0.6 million in damage in the City of Sutter Creek. The loss ratio of 0.04% and 0.01% indicates that flood losses for 1% and 0.2% annual chance flooding, respectively, would be relatively easy to recover from.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the City in comparison to total area within the City limits. The same methodology, as discussed in Section 4.3.10 of the Base Plan, was used for the City of Sutter Creek as well as for the County as a whole. Table E-22 represents a detailed and summary analysis of total acres for each FEMA DFIRM flood zone in the City.

Table E-22 City of Sutter Creek – Flooded Acres

Flood Zone / Property Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood Hazard						
Zone A						
Agricultural	0	0.00%	0	0.00%	0	0.00%
Commercial	0	0.00%	0	0.00%	0	0.00%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	1	0.07%	0	0.00%	1	0.13%
Residential	6	0.39%	0	0.06%	6	0.69%
Unknown	0	0.00%	0	0.00%	0	0.00%
Zone A Total	**7**	**0.46%**	**0**	**0.06%**	**7**	**0.81%**
Zone AE						
Agricultural	0	0.00%	0	0.00%	0	0.00%
Commercial	1	0.05%	1	0.10%	0	0.00%
Industrial	0	0.02%	0	0.05%	0	0.00%
Miscellaneous	1	0.04%	0	0.00%	1	0.07%
Residential	5	0.32%	5	0.63%	0	0.04%
Unknown	0	0.00%	0	0.00%	0	0.01%
Zone AE Total	**7**	**0.43%**	**6**	**0.78%**	**1**	**0.12%**
Zone AE Floodway						
Agricultural	0	0.00%	0	0.00%	0	0.00%
Commercial	1	0.08%	1	0.08%	1	0.08%
Industrial	1	0.03%	1	0.07%	0	0.00%
Miscellaneous	1	0.09%	0	0.00%	1	0.17%
Residential	10	0.65%	7	0.99%	3	0.34%
Unknown	0	0.00%	0	0.00%	0	0.00%
Zone AE Floodway Total	**13**	**0.85%**	**8**	**1.14%**	**5**	**0.59%**

Flood Zone / Property Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood Hazard Total	**27**	**1.74%**	**15**	**1.98%**	**13**	**1.52%**
0.2% Annual Chance Flood Hazard						
Agricultural	0	0.00%	0	0.00%	0	0.00%
Commercial	1	0.04%	1	0.09%	0	0.00%
Industrial	0	0.00%	0	0.00%	0	0.00%
Miscellaneous	0	0.00%	0	0.00%	0	0.00%
Residential	6	0.37%	4	0.56%	2	0.20%
Unknown	0	0.00%	0	0.00%	0	0.00%
0.2% Annual Chance Flood Hazard Total	**7**	**0.41%**	**5**	**0.65%**	**2**	**0.20%**
Other Areas						
Zone X (unshaded)						
Agricultural	553	35.01%	215	29.06%	338	40.27%
Commercial	195	12.37%	123	16.61%	72	8.62%
Industrial	1	0.09%	1	0.20%	0	0.00%
Miscellaneous	68	4.33%	0	0.00%	68	8.16%
Residential	727	46.03%	381	51.50%	345	41.20%
Unknown	0	0.02%	0	0.00%	0	0.00%
Zone X (unshaded) Total	**1,545**	**97.85%**	**721**	**97.37%**	**824**	**98.27%**
Other Areas Total	**1,545**	**97.85%**	**721**	**97.37%**	**824**	**98.27%**
City of Sutter Creek Total	**1,579**	**100.00%**	**741**	**100.00%**	**838**	**100.00%**

Source: FEMA DFIRM 1/20/2016

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the flood zones were counted and multiplied by the 2010 Census Bureau average household factors for Sutter Creek – 2.14. According to this analysis, there is a total population of 64 and 24 residents of the City at risk to flooding in the 1% and 0.2% annual chance floodplains, respectively. This is shown in Table E-23.

Table E-23 City of Sutter Creek – Count of Improved Residential Parcels and Population by Flood Zone

Jurisdiction	1 % Annual Chance Flooding		0.2% Annual Chance Flooding	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Sutter Creek	30	64	11	24

Source: FEMA DFIRM 1/20/2016, Amador County 12/31/2018 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Sutter Creek in DFIRM flood zones. GIS was used to determine whether the critical facility locations intersect a DFIRM flood zone, and if so, which zone it intersects. Details of critical facilities in mapped DFIRM flood zones in the City of Sutter Creek are shown in Figure E-7 and detailed in Table E-24. Details of critical facility definition, type, name and address and jurisdiction by DFIRM flood zone are listed in Appendix F.

Figure E-7 City of Sutter Creek – Critical Facilities in DFIRM Flood Zones

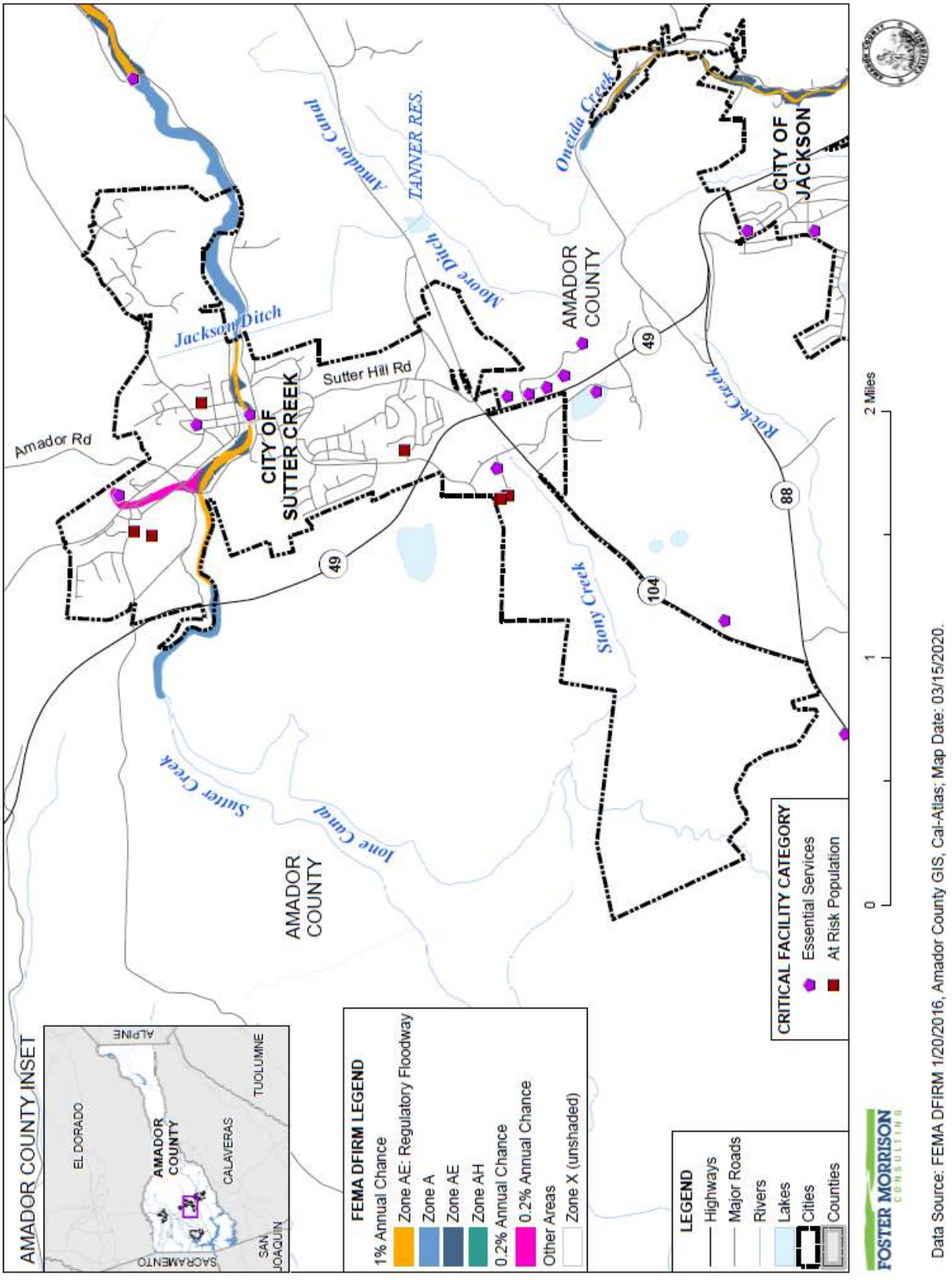


Table E-24 City of Sutter Creek– Critical Facilities in DFIRM Flood Zones

Flood Zone	Critical Facility Category/Critical Facility Type	Facility Count
1% Annual Chance Flood Hazard		
Zone AE Floodway	**Essential Services**	
	Fire Station	1
	Police Station	1
	Essential Services Total	**2**
	Zone AE Floodway Total	**2**
1% Annual Chance Flood Hazard Total		**2**
0.2% Annual Chance Flood Hazard		
Zone X (shaded)	**Essential Services**	
	Fire Station	1
	Essential Services Total	**1**
0.2% Annual Chance Flood Hazard Total		**1**
Other Areas		
Zone X (unshaded)	**Essential Services**	
	Community Center	2
	Post Office	1
	Public Administration Building	1
	Essential Services Total	**4**
	At Risk Population	
	Residential Care Facility	1
	School	5
	At Risk Population Total	**6**
	Zone X (unshaded) Total	**10**
Other Areas Total		**10**
City of Sutter Creek Total		**13**

Source: FEMA DFIRM 1/20/2016, Amador County GIS

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Sutter Creek joined the National Flood Insurance Program (NFIP) on September 24, 1987. The City does not participate in the CRS program. NFIP data indicates that as of March 2, 2020, there were 7 flood insurance policies in force in the City with $1,731,300 of coverage. There have been 11 historical claims for flood losses totaling $53,469.09. Of these, 5 were in A zones and 6 were in B, C, or X zones. 9 of the claims were for pre-FIRM structures, while 2 were for post-FIRM structures in the B, C, or X zone. NFIP data further indicates that there is 1 repetitive loss (RL) and no severe repetitive loss buildings in the City.

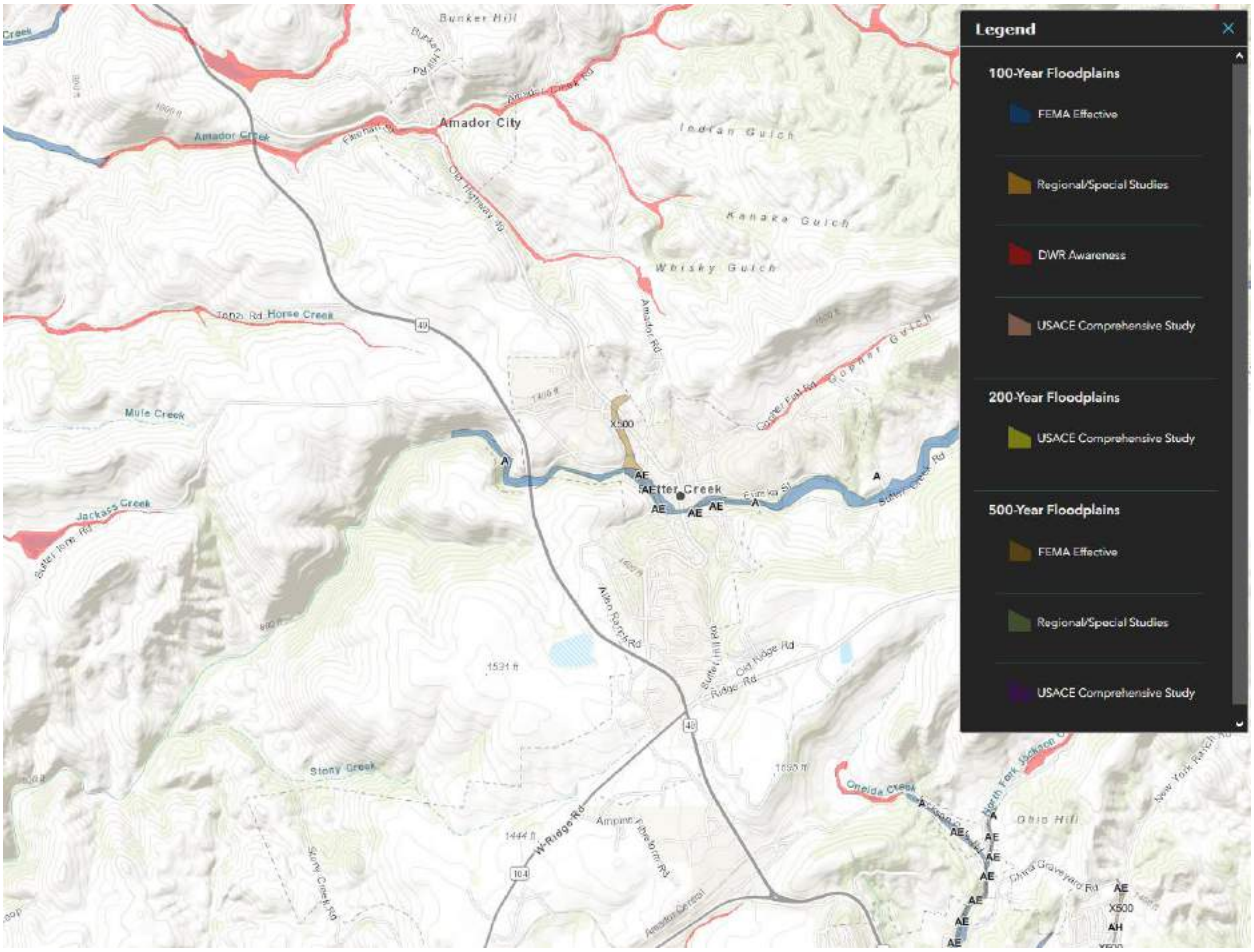
California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in Amador County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Nevada-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 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-(as applicable), and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year 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 City than that provided in the FEMA DFIRMs. The BAM map for Sutter Creek is shown in Figure E-8.

Figure E-8 City of Sutter Creek – Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 1%, Orange – Local 1% (developed from local agencies), Red – DWR 1% (Awareness floodplains identify the 1% annual chance flood hazard areas using approximate assessment procedures.), Pink – USACE 1% (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 0.5% (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 0.2%, Grey – Local 0.2% (developed from local agencies), Purple – USACE 0.2%(2002 Sac and San Joaquin River Basins Comp Study).

Future Development

The City's floodplain ordinance prohibits development in the floodplain, unless the development meets the requirements set forth in the floodplain ordinance.

The potential for flooding may increase as floodwaters are channeled due to land development. Such changes can exacerbate flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. Floodplain modeling and master planning should be based on build out property use to ensure that all new development remains safe from future flooding. While local floodplain management, stormwater management, and water quality regulations and policies address these changes on a site-by-site basis, their cumulative effects can have a negative impact on the overall floodplain.

GIS Analysis

The City provided Future Development Areas were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the 6 areas and 84 parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure E-9 shows the locations of future development areas the City is planning to develop on the FEMA DFIRM. Table E-25 shows the parcels and acreages of each future development area in the City in each DFIRM flood zone.

Figure E-9 City of Sutter Creek – Future Development Areas in FEMA DFIRM Flood Zones

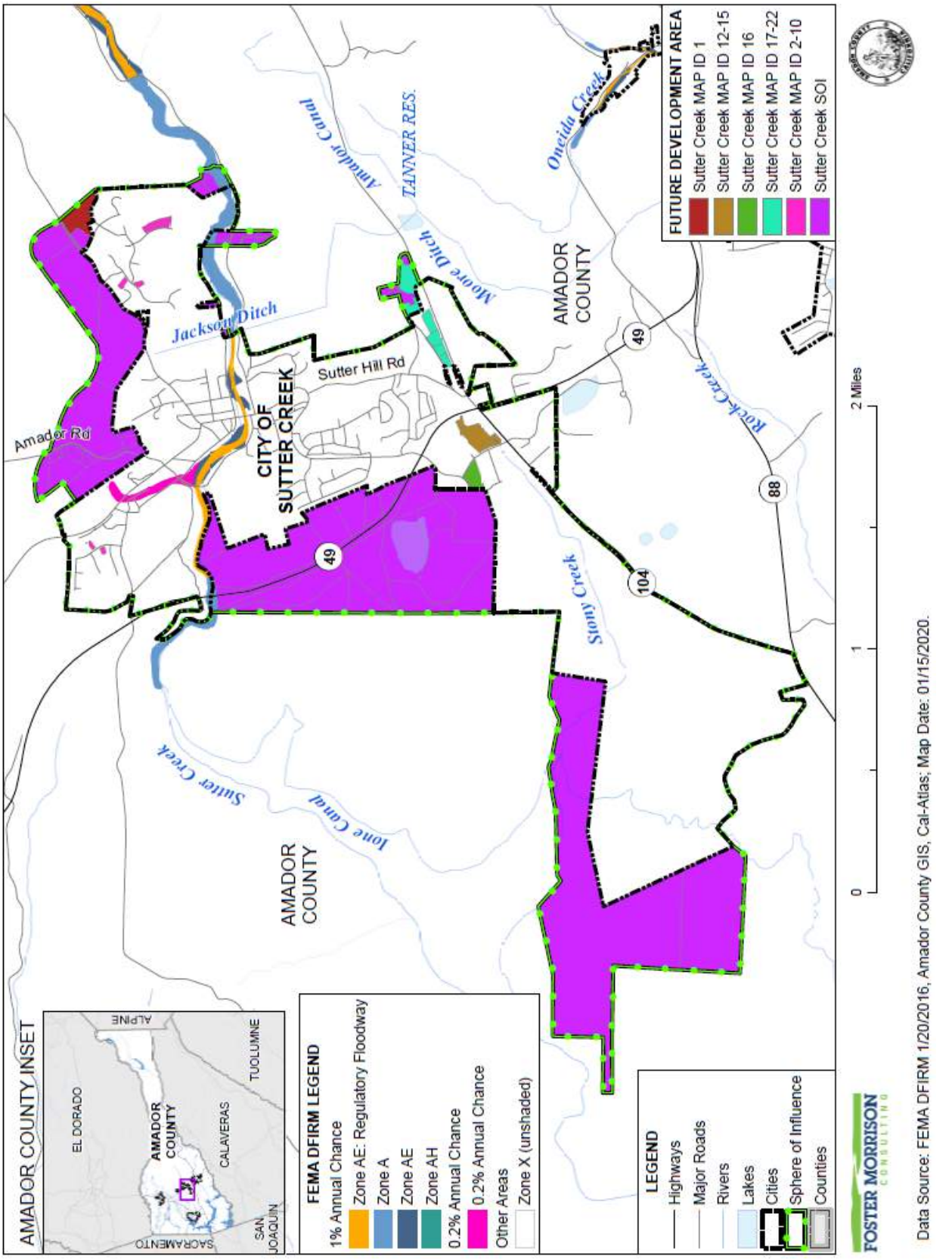


Table E-25 City of Sutter Creek – Future Development Parcels and Acres in FEMA DFIRM Flood Zones

Future Development / Flood Zones	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Sutter Creek MAP ID 1						
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	1	1	0	8.46	8.46	0
Sutter Creek MAP ID 1 Total	**1**	**1**	**0**	**8.46**	**8.46**	**0**
Sutter Creek MAP ID 2-10						
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	9	0	9	4.49	0	4.49
Sutter Creek MAP ID 2-10 Total	**9**	**0**	**9**	**4.49**	**0**	**4.49**
Sutter Creek MAP ID 12-15						
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	5	0	5	7.72	0	7.72
Sutter Creek MAP ID 12-15 Total	**5**	**0**	**5**	**7.72**	**0**	**7.72**
Sutter Creek MAP ID 16						
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	1	0	1	3.88	0	3.88
Sutter Creek MAP ID 16 Total	**1**	**0**	**1**	**3.88**	**0**	**3.88**
Sutter Creek MAP ID 17-22						
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	5	2	3	13.05	8.01	5.04
Sutter Creek MAP ID 17-22 Total	**5**	**2**	**3**	**13.05**	**8.01**	**5.04**
Sutter Creek SOI						
1% Annual Chance Flood Hazard	4	4	0	4.33	4.33	0
0.2% Annual Chance Flood Hazard	0	0	0	0	0	0
Other Areas	59	24	35	863.92	63.56	800.36
Sutter Creek SOI Total	**63**	**28**	**35**	**868.25**	**67.89**	**800.36**
Grand Total	**84**	**31**	**53**	**905.85**	**84.36**	**821.49**

Source: City of Sutter Creek, Amador County LAFCO, Amador County 1/20/2016 DFIRM

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Flooding occurs in areas other than the FEMA mapped 1% and 0.2% annual chance 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 County 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.

Location and Extent

The City of Sutter Creek is subject to localized flooding throughout the City. Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the City vary by location. Flood durations in the City tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Localized flooding in the City tends to have a shorter speed of onset, especially when antecedent rainfall has soaked the ground and reduced its capacity to absorb additional moisture.

Past Occurrences

The City noted that the times of flooding and localized flooding have coincided. These were discussed in the Past Occurrences Section of the Flood:100-/500-Year section above.

Vulnerability to Localized Flooding

Historically, much of the growth in the City and County has occurred adjacent to streams, resulting in significant damages to property, and losses from disruption of community activities when the streams overflow. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff.

The City tracks localized flooding areas. Affected localized flood areas identified by the City of Sutter Creek are summarized in Table E-26.

Table E-26 City of Sutter Creek – List of Localized Flooding Problem Areas

Area Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
Eureka		X				X	X
Spanish Street	X	X					
Broad Street/Gopher Flat	X	X				X	
Badger/Main	X	X				X	
Bryson	X	X				X	

Area Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
Gold Strike Ct	X	X				X	

Source: City of Sutter Creek

Localized flooding, outside of the 100-year floodplain, also occurs due to drainage problems that restrict flows in the following areas:

- Bryson Drive undercrossing
- Bryson Creek Drainage near Badger Street, David Drive and Raylan Drive
- Sutter Hill Road between Old Eureka Road and Highway 49
- Gopher Gulch Creek along Gopher Flat Road between Manor Court and Sutter Creek
- Sutter Creek East drainage bypass to Sutter Creek Broad Street drainage
- Sutter Creek Cemetery and Mahoney Mill Road
- Oro Madre Road drainage between Oro Madre and Amador High School
- China Gulch drainage between the Sutter Creek Fire Hall and Badger Street
- Spanish Street Drainage from Amador City Road and North Amelia Street
- Drainage on Fiefield Alley behind Belotti's and Skunk Hollow gulch near Greenstone Terrace
- Drainage along Ridge Road between Highway 49 and Ampine Drive.
- Drainage from the Amador airport and Old Sutter Hill Road

Impacts

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.

Future Development

Future development in the City will add more impervious surfaces causing an increase in stormwater runoff and the continued need to drain these waters. The City will need to be proactive to ensure that increased development has proper siting and drainage for stormwaters. The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater flooding will reduce future risks of losses. Future development will be required to meet requirements for onsite retention and release.

Landslide, Mudslide, Debris Flows

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to the California Geological Survey, landslides refer to a wide variety of processes that result in the perceptible downward and outward movement of soil, rock, and vegetation under gravitational influence. Common names for landslide types include slump, rockslide, debris slide, lateral spreading, debris avalanche, earth flow, and soil creep. Landslides may be triggered by both natural and human-induced changes in the environment that result in slope instability.

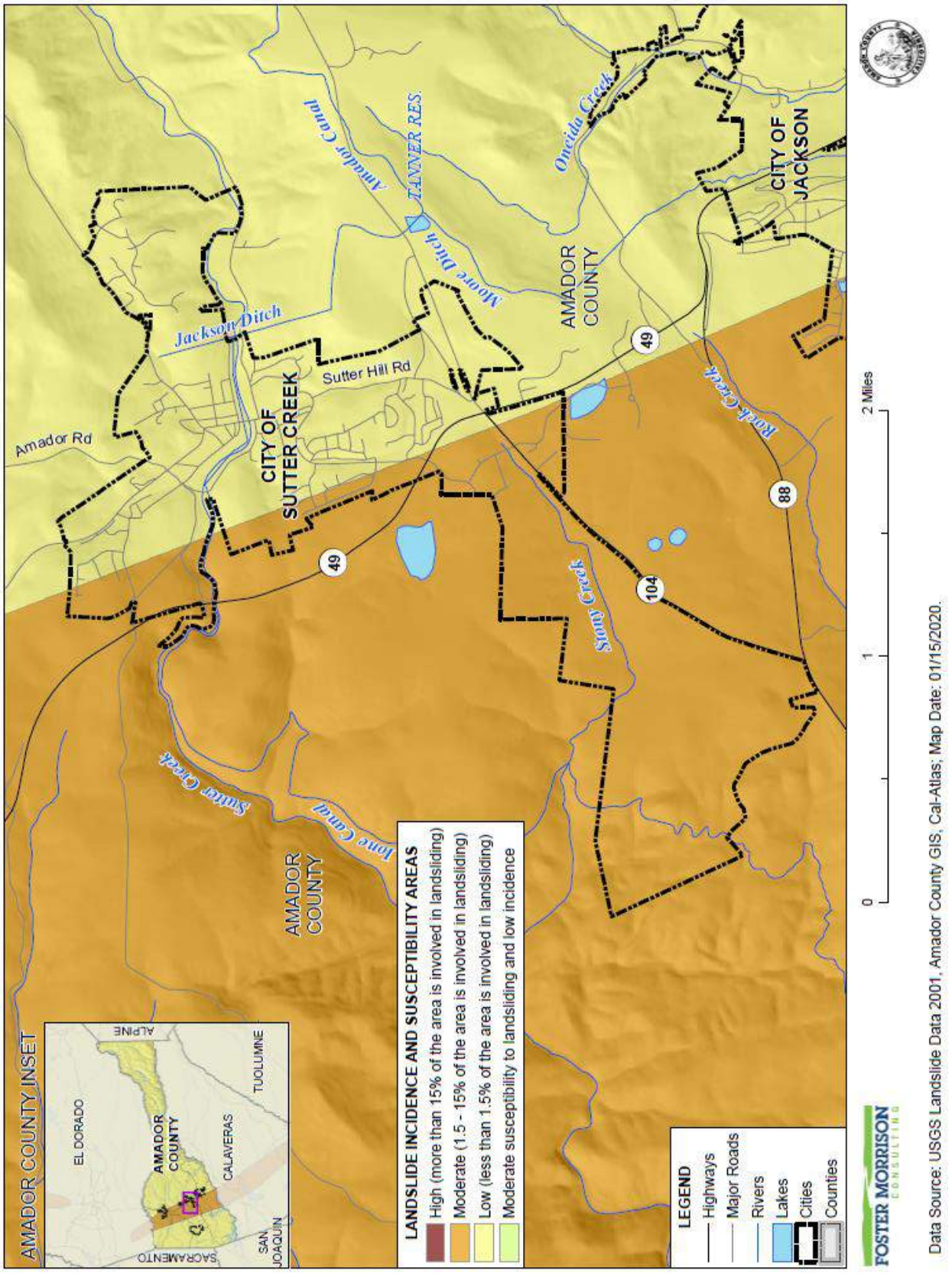
The susceptibility of an area to landslides depends on many variables including steepness of slope, type of slope material, structure and physical properties of materials, water content, amount of vegetation, and proximity to areas undergoing rapid erosion or changes caused by human activities. These activities include mining, construction, and changes to surface drainage areas. Landslide events can be determined by the composition of materials and the speed of movement. A rockfall is dry and fast while a debris flow is wet and fast. Regardless of the speed of the slide, the materials within the slide, or the amount of water present in the movement, landslides are a serious natural hazard.

Another type of landslide, debris flows, also occur in some areas of the Amador County and the City. These debris flows generally occur in the immediate vicinity of existing drainage swales or steep ravines. Debris flows occur when near surface soil in or near steeply sloping drainage swales becomes saturated during unusually heavy precipitation and begins to flow downslope at a rapid rate.

Location and Extent

Landslides, mudslides, and debris flows can affect certain areas of the City. The USGS has estimated that the risk varies across the City and has created maps showing risk variance. This risk variance falls into one of the following landslide incidence and susceptibility categories: High, Moderate, and Low. These are discussed in Section 4.3.12 of the Base Plan. Following the methodology described in Section 4.3.12 of the Base Plan, landslide incidence and susceptibility maps for the City of Sutter Creek were created. Figure E-10 shows the USGS landslide incidence and susceptibility areas in the City. As shown on the maps, risk varies within the City range from low to moderate.

Figure E-10 City of Sutter Creek – Landslide Incidence and Susceptibility Areas



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. Geographical landslide incidence and susceptibility areas from USGS are shown in Table E-27.

Table E-27 City of Sutter Creek – Geographical Landslide Incidence and Susceptibility Area Extents

Landslide Incidence and Susceptibility	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
High	0	0.0%	0	0.0%	0	0.0%
Moderate	831	0.21%	294	0.18%	537	0.24%
Low	748	0.19%	447	0.27%	301	0.13%
Total	**1,579**	**0.41%**	**741**	**0.45%**	**838**	**0.38%**

Source: USGS

*Percentage of total acres is the percent of total acres of the entire County Planning Area, not the total acres of the jurisdiction

Past Occurrences

The City Planning Team noted the following past occurrences of landslides:

- In 2017, during two peak storm events, unreinforced mine tailings began to cause a mudslide onto Old Highway 49 causing a pile up of debris into the roadway.
- Smaller mudslides on Gopher Flat also occurred.

Vulnerability to Landslide

Common names for landslide types include slumps, rockslides, debris slides, lateral spreading, debris avalanches, earth flows, and soil creep. 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 may be triggered by both natural- and human-caused activity.

Although this hazard also includes related issues such as mudslides and debris flows, available mapped hazard data was limited to landslides; thus, the remainder of this section is focused on the landslide vulnerability.

Impacts

Impacts from landslide and debris flow are limited in the City, as they occur in areas of high topographical change. Impacts in the City may be to structures, infrastructure, and to life safety.

Assets at Risk

Based on the vulnerability of Sutter Creek to the landslide hazard, the sections that follow describes significant assets at risk in the City of Sutter Creek. This section includes the values at risk, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of landslide within the City of Sutter Creek. The methodology described in Section 4.3.12 of the Base Plan was followed in determining structures and values at risk in USGS landslide incidence and susceptibility areas. Summary analysis results for Sutter Creek are shown in Table E-28, which summarizes total parcel counts, improved parcel counts and their structure values by landslide incidence and susceptibility area. Table E-29 breaks down Table E-28 to show which property uses are in each landslide incidence and susceptibility area. According to this, there is $97.5 million of structure and contents value in the City in the moderate or higher landslide incidence and susceptibility area.

Table E-28 City of Sutter Creek – Parcels and Values at Risk in Landslide Incidence and Susceptibility Areas

Landslide Incidence and Susceptibility Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Moderate	184	121	$21,185,098	$43,603,974	$32,736,535	$97,525,607
Low	1,248	993	$86,427,664	$206,915,173	$119,874,548	$413,217,385
City of Sutter Creek Total	**1,432**	**1,114**	**$107,612,762**	**$250,519,147**	**$152,611,083**	**$510,742,992**

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data

Table E-29 City of Sutter Creek – Parcels and Values at Risk in Landslide Incidence and susceptibility Areas by Property Use

Landslide Incidence and Susceptibility Area/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
Moderate						
Agricultural	4	2	$1,123,943	$361,000	$361,000	$1,845,943
Commercial	38	17	$7,788,481	$20,645,154	$20,645,154	$49,078,789
Industrial	1	1	$154,545	$431,473	$647,210	$1,233,228
Miscellaneous	5	0	$0	$0	$0	$0
Residential	131	101	$12,118,129	$22,166,347	$11,083,171	$45,367,647
Unknown	5	0	$0	$0	$0	$0
Moderate Total	**184**	**121**	**$21,185,098**	**$43,603,974**	**$32,736,535**	**$97,525,607**
Low						
Agricultural	2		$530,302	$0	$0	$530,302
Commercial	116	93	$14,559,359	$32,115,309	$32,115,309	$78,789,977
Industrial	1	1	$171,750	$359,325	$538,988	$1,070,063
Miscellaneous	33		$22,433	$0	$0	$22,433
Residential	1,072	899	$71,143,820	$174,440,539	$87,220,251	$332,804,610
Unknown	24		$0	$0	$0	$0
Low Total	**1,248**	**993**	**$86,427,664**	**$206,915,173**	**$119,874,548**	**$413,217,385**

Landslide Incidence and Susceptibility Area/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value
City of Sutter Creek Total	**1,432**	**1,114**	**$107,612,762**	**$250,519,147**	**$152,611,083**	**$510,742,992**

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data

Population at Risk

The USGS landslide incidence and susceptibility areas were overlayed on the parcel layer. Those residential parcel centroids that intersect each landslide incidence and susceptibility areas were counted and multiplied by the 2010 Census Bureau average household factors for Sutter Creek – 2.14. According to this analysis, there is a total population of 216 residents of the City at risk to landslide. This is shown in Table E-23.

Table E-30 City of Sutter Creek – Count of Improved Residential Parcels and Population by Landslide Incidence and Susceptibility Area

Jurisdiction	Low		Moderate		High	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Sutter Creek	899	1,924	101	216	0	0

Source: USGS, Amador County 12/31/2018 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Sutter Creek in identified landslide incidence and susceptibility areas. GIS was used to determine whether the critical facility locations intersect a USGS landslide incidence and susceptibility area. Details of critical facilities in mapped landslide incidence and susceptibility areas in the City of Sutter Creek are shown in Figure E-11 and detailed in Table E-31. Details of critical facility definition, type, name and address and jurisdiction by dam inundation area are listed in Appendix F.

Figure E-11 City of Sutter Creek – Critical Facilities in Landslide Incidence and Susceptibility Areas

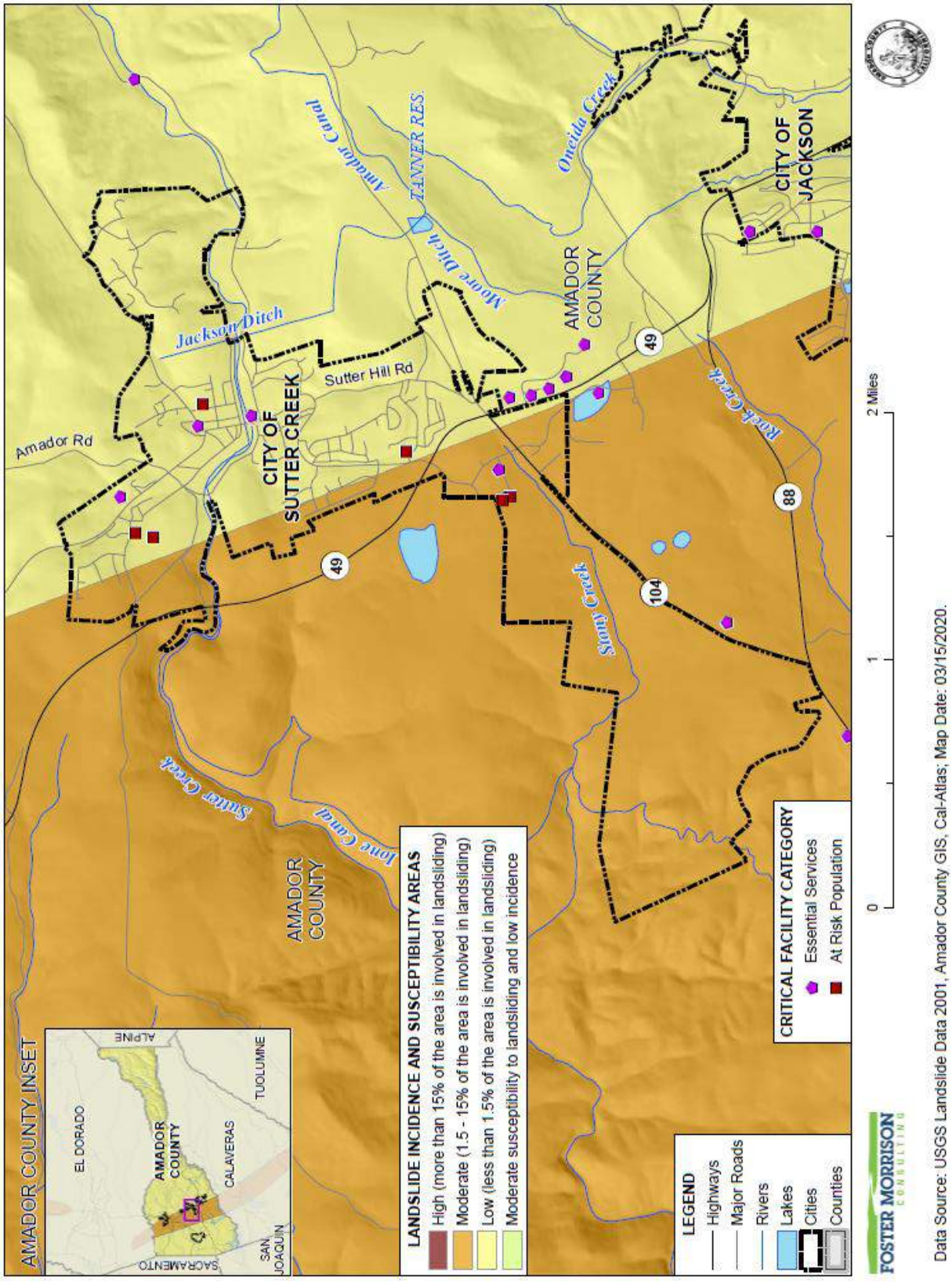


Table E-31 City of Sutter Creek – Critical Facilities in Landslide Incidence and Susceptibility Areas

Landslide Incidence and Susceptibility	Critical Facility Category / Critical Facility Type	Facility Count
Moderate	**Essential Services**	
	Community Center	1
	Essential Services Total	1
	At Risk Population	
	School	2
	At Risk Population Total	**2**
Moderate Total		**3**
Low	**Essential Services**	
	Community Center	1
	Fire Station	2
	Police Station	1
	Post Office	1
	Public Administration Building	1
	Essential Services Total	**6**
	At Risk Population	
	Residential Care Facility	1
	School	3
	At Risk Population Total	**4**
Low Total		**10**
City of Sutter Creek Total		**13**

Source: USGS, Amador County GIS

Future Development

Future landslides are considered unlikely. Siting of future development areas should take landslide into account.

GIS Analysis

The City provided Future Development Areas were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the 6 areas and 84 parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure E-12 shows the locations of future development areas the City is planning to develop on the USGS Landslide Incidence and Susceptibility Layer. Table E-32 shows the parcels and acreages of each future development area in the City in each landslide area.

Figure E-12 City of Sutter Creek – Future Development in Landslide Incidence and Susceptibility Areas

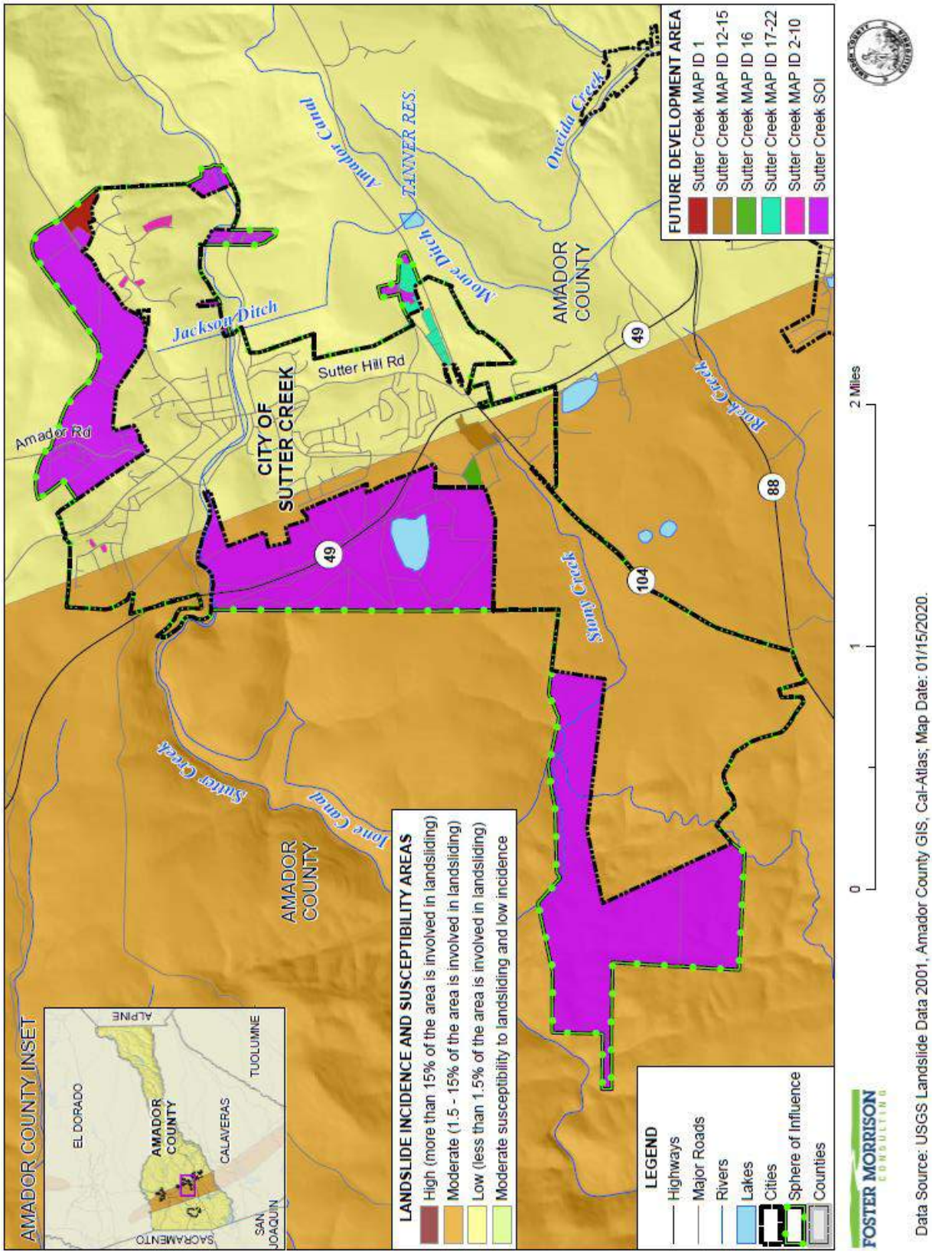


Table E-32 City of Sutter Creek – Future Development Parcels and Acres in Landslide Incidence and Susceptibility Areas

Future Development / Landslide Incidence and Susceptibility Area	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Sutter Creek MAP ID 1						
Low	1	1	0	8.46	8.46	0
Moderate	0	0	0	0	0	0
Sutter Creek MAP ID 1 Total	**1**	**1**	**0**	**8.46**	**8.46**	**0**
Sutter Creek MAP ID 2-10						
Low	9	0	9	4.49	0	4.49
Moderate	0	0	0	0	0	0
Sutter Creek MAP ID 2-10 Total	**9**	**0**	**9**	**4.49**	**0**	**4.49**
Sutter Creek MAP ID 12-15						
Low	1	0	1	0.68	0	0.68
Moderate	4	0	4	7.04	0	7.04
Sutter Creek MAP ID 12-15 Total	**5**	**0**	**5**	**7.72**	**0**	**7.72**
Sutter Creek MAP ID 16						
Low	0	0	0	0	0	0
Moderate	1	0	1	3.88	0	3.88
Sutter Creek MAP ID 16 Total	**1**	**0**	**1**	**3.88**	**0**	**3.88**
Sutter Creek MAP ID 17-22						
Low	5	2	3	13.05	8.01	5.04
Moderate	0	0	0	0	0	0
Sutter Creek MAP ID 17-22 Total	**5**	**2**	**3**	**13.05**	**8.01**	**5.04**
Sutter Creek SOI						
Low	44	25	19	220.48	38.07	182.41
Moderate	19	3	16	647.76	29.81	617.95

Future Development / Landslide Incidence and Susceptibility Area	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Sutter Creek SOI Total	**63**	**28**	**35**	**868.25**	**67.89**	**800.36**
Grand Total	**84**	**31**	**53**	**905.85**	**84.36**	**821.49**

Source: City of Sutter Creek, Amador County LAFCO, USGS

Severe Weather: Extreme Heat

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to 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 extreme heat and high humidity, evaporation is slowed, and the body must work extra hard to maintain a normal temperature." Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

In addition to the risks faced by citizens of the City, there are risk to the built environment from extreme heat. While extreme heat on its own does not usually affect structure, extreme heat during times of drought can cause wildfire risk to heighten. Extreme heat and high winds can cause Public Safety Power Shutoff (PSPS) events, causing issues to buildings in the City.

Location and Extent

Heat is a regional phenomenon and affects the whole of the City. 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 affect vulnerable populations and communities. Heat waves do not generally cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios.

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 Section 4.2.2 of the Base Plan.

Past Occurrences

The City Planning Team note that since extreme heat is a regional phenomenon, events that affected the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.2.2.

Vulnerability to Extreme Heat

The City experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-110°F in rather extreme situations. During these times, drought conditions may worsen. Also, PSPS events may occur during these times as well. Health impacts are the primary concern with this hazard, though economic impacts are also an issue.

Impacts

The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures. Nursing homes and elder care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning is not available. In addition, individuals below the poverty level may be at increased risk to extreme heat if use of air conditioning is not affordable. This is especially true of homeless people and the transient population.

Days of extreme heat have been known to result in medical emergencies, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts. Extreme heat can also dry out vegetations, making it more vulnerable to wildfire ignitions. During periods of extreme heat (with high winds), PG&E can institute the PSPS.

Future Development

Future development of new buildings in the City will likely not be affected by extreme heat. Extreme heat is more likely to affect populations. Vulnerability to extreme heat will increase as the average age of the population in each City shifts. It is encouraged that nursing homes and elder care facilities have emergency plans or backup power to address power failure during times of extreme heat and in the event of a Public Safety Power Shutoff. Low income residents and homeless populations are also vulnerable. Cooling centers for these populations should be utilized when necessary.

Severe Weather: Heavy Rains and Storms (Hail, Lightning)

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Storms in the City occur annually 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 City falls mainly in the fall, winter, and spring months.

Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the City. All portions of the City are at risk to heavy rains. Most of the severe rains occur during the fall, winter, and spring months. There is no scale by which heavy rains and severe storms are measured. 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 severe storms in California, Amador County, and the City can range from minutes to hours to days. Information on precipitation extremes can be found in Section 4.2.3 of the Base Plan.

Past Occurrences

According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the City. This is the cause of many of the federal disaster declarations related to flooding.

Vulnerability to Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrences in the City. These events can cause localized flooding. Elongated events, or events that occur during times where the ground is already saturated can cause significant flooding. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the City.

Impacts

Actual damage associated with the effects of severe weather include impacts to property, critical facilities (such as utilities), and life safety. Heavy rains and storms often result in localized flooding creating significant issues. Roads can become impassable and ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical infrastructure. Floodwaters and downed trees can break utilities and interrupt services.

Future Development

Building codes in the City ensure that new development is built to current building standards, which should reduce the risk to future development in the City. 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, future losses to new development should be minimal.

Severe Weather: High Winds and Tornadoes

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

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. High winds can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss.

Portions of the County and City 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. These types of winds are also associated with the rapid spread of wildfires, making some regions which experience these winds particularly fire prone.

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 form when cool, dry air sits on top of warm, moist air. Tornadoes are the most powerful storms that exist. Tornadoes, though rare, are another severe weather hazard that, though rare, can affect areas in the lower elevations of the Amador County Planning Area, primarily during the rainy season in the late fall, winter, and early spring.

Location and Extent

The entire City is subject to significant, non-tornadic (straight-line), winds. Each area of the County and City 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 12 category scale that relates wind speed to observed conditions at sea or on land. Its full name is the Beaufort Wind Force Scale. The Beaufort Scale was shown in Section 4.2.4 of the Base Plan.

Tornadoes, while rare, can occur at any location in the County and City. The areas in the lower elevations of the County tend to be at greater risk than the areas in the foothills and higher. 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 (EF) 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. The F Scale and EF Scale are shown in Section 4.2.4 of the Base Plan.

Past Occurrences

The City noted that since high winds is a regional phenomenon, events that affected the lower elevations of the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.2.4.

Vulnerability to Severe Weather: Wind and Tornado

High winds are common occurrences in the City throughout the entire year. Straight line winds are primarily a public safety and economic concern. Windstorm can cause damage to structures and power lines which in turn can create hazardous conditions for people. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered. High winds can impact critical facilities and infrastructure and can lead to power outages. Wind can also drive wildfire flames, spreading wildfires quickly. High winds are also a component of red flag days, which can cause PG&E to enact the PSPS.

Impacts

Impacts from high winds in the City will vary. Future losses from straight line winds include:

- Downed trees
- Increased wildfire risk and PSPS event occurrence
- Power line impacts and economic losses from power outages
- Occasional building damage, primarily to roofs
- Campers, mobile homes, barns, and sheds and their occupants are particularly vulnerable as windstorm events in the region can be sufficient in magnitude to overturn these lighter structures

Future Development

Future development projects will consider wind hazards at the planning, and design stage with the goal of reducing vulnerability. The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from windstorms. Future development in the City is subject to these building codes.

Severe Weather: Winter Storms and Freeze

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to the National Weather Service), extreme cold often accompanies a winter storm or is left in its wake. Winter snowstorms can include heavy snow, ice, blizzard conditions, and cold temperatures. Freezing temperatures can also occur without the accompanying winter storm. The City noted that while snow does fall, very little accumulation occurs.

Location and Extent

Winter storms and freeze are regional issues, meaning the entire City is at risk to freeze and winter storm. 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 21.8 days that fall below 32°F in western Amador County. 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. Snowfall often accompanies storms in the upper elevations of the County is measured in snow depths. It is rare for snow to fall in the City, and even rarer that snow accumulates in the City. Snowfall has an onset that is similar to freeze.

Past Occurrences

The City noted that freeze and winter storm is a regional phenomenon; events that affected the lower elevations of the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.2.5. The General Plan Safety Element noted that there have been past issues in the City. The last time a state of emergency was declared in the City was March of 1989 when, for 24 hours, snowfall and broken or fallen trees created hazards and disrupted power and other public services.

Vulnerability to Severe Weather: Freeze and Winter Storms

The City experiences temperatures below 32 degrees during the winter months. The temperature moves to the teens in rather extreme situations. Freeze can cause injury or loss of life to residents of the City. While it is rare for buildings to be affected directly by freeze, damages to pipes that feed building can be damaged during periods of extreme cold.

Impacts

Extreme cold and freeze can affect critical facilities and infrastructure, down trees, break pipes, and can be a life safety issue. When extreme cold is coupled with high winds or ice storms, power lines may be downed, resulting in an interruption of utilities and critical services.

Occasionally, winter storms with snow and ice can affect the City. Transportation networks, communications, and utilities infrastructure are the most vulnerable physical assets in the City. The ability for the City to continue to operate during periods of winter storm and freeze is paramount. The elderly and young population is most vulnerable to temperature extremes. The residents of nursing homes and elder care facilities are especially vulnerable to extreme temperature events. Transient and homeless populations are also at risk to freeze.

Future Development

Future development built to code should be able to withstand issues associated with severe winter storms and freeze events. Pipes at risk of freezing should be buried or insulated from freeze as new facilities are improved or added. Vulnerability to extreme cold will increase as the average age of the population in the County shifts. The elderly are more at risk to the effects of freeze.

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

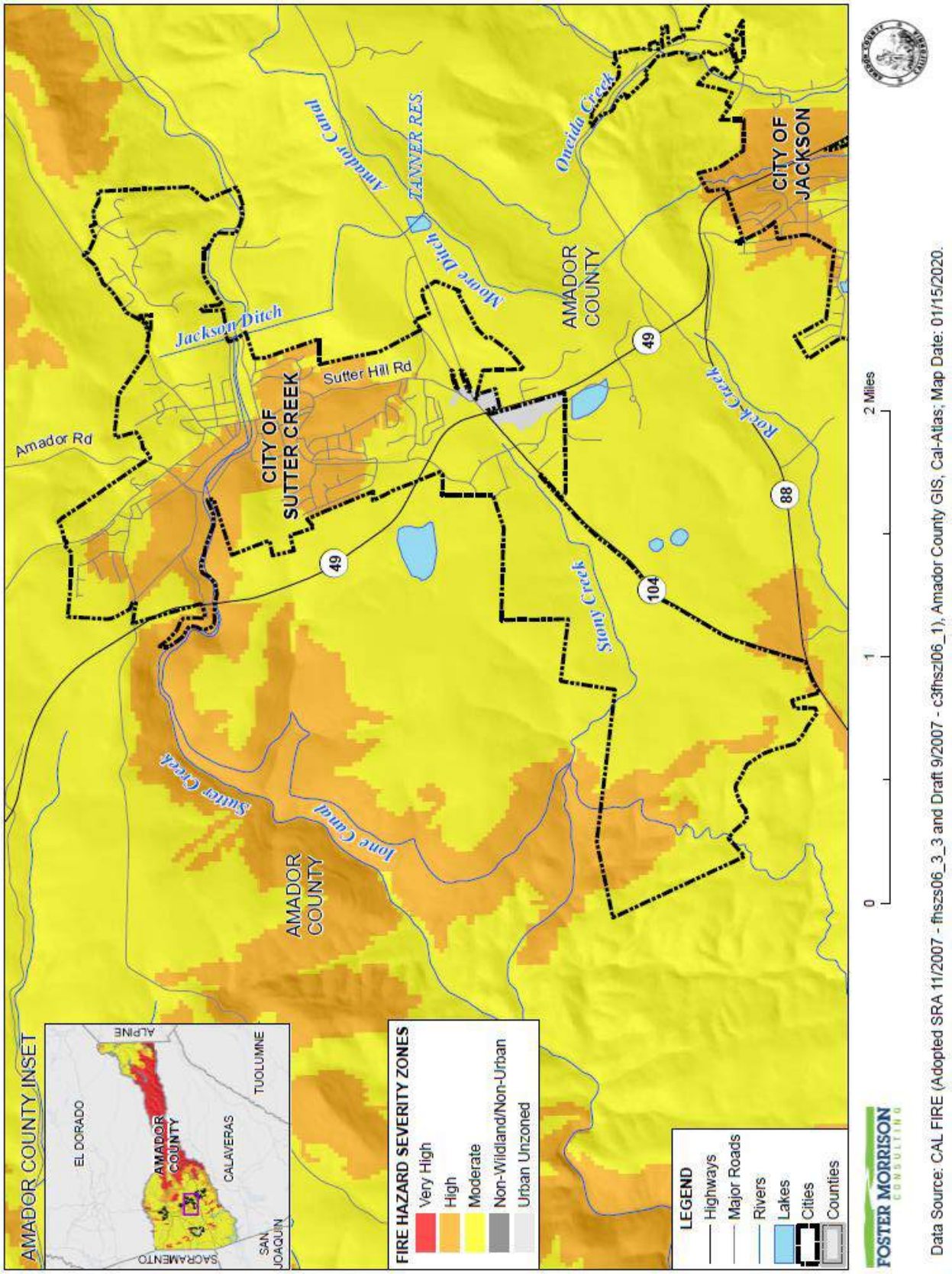
Hazard Profile and Problem Description

Wildland fire and the risk of a conflagration is an ongoing concern for the City of Sutter Creek. 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. 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. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

Location and Extent

Wildfire can affect all areas of the City. CAL FIRE has estimated that the risk varies across the City and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the City of Sutter Creek were created. Figure E-13 shows the CAL FIRE FHSZ in the City. As shown on the maps, FHSZs within the City range from moderate to high.

Figure E-13 City of Sutter Creek – FHSZs



Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more. Geographical FHSZ extent from CAL FIRE is shown in Table E-33.

Table E-33 City of Sutter Creek – Geographical FHSZ Extents

Fire Hazard Severity Zone	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
Very High	0	0.00%	0	0.00%	0	0.00%
High	393	0.10%	193	0.12%	199	0.09%
Moderate	1,169	0.30%	530	0.32%	639	0.29%
Non-Wildland/non-Urban	0	0.00%	0	0.00%	0	0.00%
Urban Unzoned	17	0.00%	17	0.01%	0	0.00%
Total	**1,579**	**0.41%**	**741**	**0.45%**	**838**	**0.38%**

Source: CAL FIRE

*Percentage of total acres is the percent of total acres of the entire County Planning Area, not the total acres of the jurisdiction

Past Occurrences

A list of state and federal disaster declarations for Amador County from wildfire is shown on Table E-18. These events also likely affected the City to some degree.

Table E-34 Amador County – State and Federal Disaster Declarations from Wildfire 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	1	2015	1	1961

Source: Cal OES, FEMA

Vulnerability to Wildfire

The wildfire hazard is one of the highest priority hazards in the County and City, and is the hazard with the greatest potential for catastrophic loss. High fuel loads in the County and Cities, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. The more urbanized areas within the County are not immune from fire. The dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and City, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Sutter Creek is not immune to numerous types of grass and brush fires and any one of them may accelerate into an urban interface wildfire. Such a situation could lead to evacuation of large portions of the population and the potential for significant loss of personal property, structures, and rangeland. The natural fuels available in or near the City vary greatly in the rate and intensity of burning. Fires in heavy brush and stands of trees burn with great intensity but more slowly than in dry grass and leaves. Dense fuels will propagate fire better than sparse fuels.

The General Plan Safety Element also noted that that most of the downtown historic district can be considered an urban fire hazard area. This is because of common walls, building materials, and the lack of adequate fire protection standards when the area was built. A major fire in the area could destroy a block of buildings or more.

Impacts

Potential impacts from wildfire include loss of life and injuries; damage to structures 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 City. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the City 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 City; smoke and air pollution from wildfires can be a severe health hazard.

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 PSPSs 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.

Based on the vulnerability of the City of Sutter Creek to the wildfire hazard, the sections that follow describes significant assets at risk in the City.

Assets at Risk

Based on the vulnerability of Sutter Creek to the wildfire hazard, the sections that follow describes significant assets at risk in the City of Sutter Creek. This section includes the values at risk, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of wildfire within the City of Sutter Creek. The methodology described in Section 4.3.18 of the Base Plan was followed in determining structures and

values at risk in fire hazard severity zones. Summary analysis results for Sutter Creek are shown in Table E-35, which summarizes total parcel counts, improved parcel counts and their structure values by FHSZ.

Table E-35 City of Sutter Creek – Count and Value of Parcels by FHSZ

Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Very High	0	0	$0	$0	$0
High	590	508	$38,744,838	$92,511,759	$131,256,597
Moderate	834	599	$68,229,141	$154,778,518	$223,007,659
Urban Unzoned	8	7	$638,783	$3,228,870	$3,867,653
City of Sutter Creek Total	**1,432**	**1,114**	**$107,612,762**	**$250,519,147**	**$358,131,909**

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Table E-36 breaks out the Table E-35 by adding the property use details by fire hazard severity zone for the City. As shown in both of these tables, most of the City (99.2% of all values) is located in the moderate or high FHSZ.

Table E-36 City of Sutter Creek – Count and Value of Parcels by FHSZ and Property Use

Fire Hazard Severity Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
High					
Agricultural	2	0	$660,285	$0	$660,285
Commercial	22	22	$2,101,178	$5,693,007	$7,794,185
Industrial	0	0	$0	$0	$0
Miscellaneous	21	0	$15,798	$0	$15,798
Residential	539	486	$35,967,577	$86,818,752	$122,786,329
Unknown	6	0	$0	$0	$0
High Total	**590**	**508**	**$38,744,838**	**$92,511,759**	**$131,256,597**
Moderate					
Agricultural	4	2	$993,960	$361,000	$1,354,960
Commercial	126	83	$19,800,976	$44,343,262	$64,144,238
Industrial	2	2	$326,295	$790,798	$1,117,093
Miscellaneous	17	0	$6,635	$0	$6,635
Residential	662	512	$47,101,275	$109,283,458	$156,384,733
Unknown	23	0	$0	$0	$0
Moderate Total	**834**	**599**	**$68,229,141**	**$154,778,518**	**$223,007,659**
Urban Unzoned					
Agricultural	0	0	$0	$0	$0
Commercial	6	5	$445,686	$2,724,194	$3,169,880

Fire Hazard Severity Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Industrial	0	0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0
Residential	2	2	$193,097	$504,676	$697,773
Unknown	0	0	$0	$0	$0
Urban Unzoned Total	**8**	**7**	**$638,783**	**$3,228,870**	**$3,867,653**
City of Sutter Creek Total	**1,432**	**1,114**	**$107,612,762**	**$250,519,147**	**$358,131,909**

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Population at Risk

The FHSZ dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the FHSZs were counted and multiplied by the 2010 Census Bureau average household factors for the City of Sutter Creek – 2.14. According to this analysis, there is a total population of 1,044 residents of Sutter Creek at risk to moderate or higher FHSZs. This is shown in Table E-37.

Table E-37 City of Sutter Creek – Count of Improved Residential Parcels and Population by FHSZ

Jurisdiction	Moderate		High		Very High	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population	Improved Residential Parcels	Population
	2	4	486	1,040	0	0

Source: Amador County 12/31/2018 Parcel/Assessor's Data, CAL FIRE

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Sutter Creek in identified FHSZs. Critical facilities in a FHSZ in the City of Sutter Creek are shown in Figure E-14 and detailed in Table E-38. Details of critical facility definition, type, name and address and jurisdiction by fire hazard severity zone are listed in Appendix F.

Figure E-14 City of Sutter Creek – Critical Facilities in FHSZs

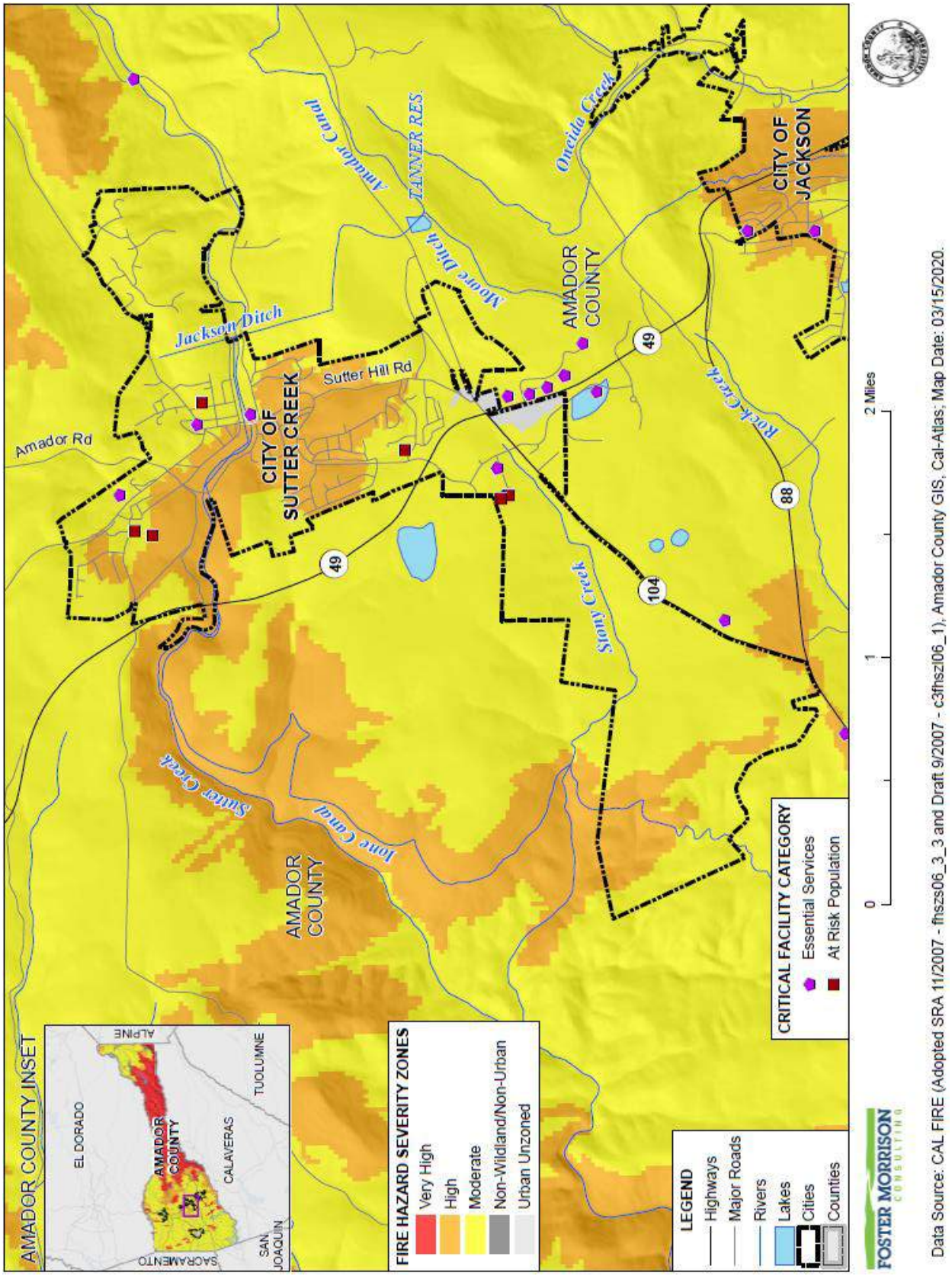


Table E-38 City of Sutter Creek – Critical Facilities by FHSZ

Fire Hazard Severity Zones	Critical Facility Category / Critical Facility Type	Facility Count
High	**At Risk Population**	
	School	1
	At Risk Population Total	**1**
High Total		**1**
Moderate	**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
	School	4
	At Risk Population Total	**5**
Moderate Total		**12**
City of Sutter Creek Total		**13**

Source: CAL FIRE, Amador County GIS

Future Development

Additional growth and development within moderate or higher fire hazard severity zones in the City would place additional values at risk to wildfire. City building codes are in effect and should continue to be updated as appropriate to reduce this risk.

GIS Analysis

The City provided Future Development Areas were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the 6 areas and 84 parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure E-15 shows the locations of future development areas the City is planning to develop on the FHSZs. Table E-39 shows the parcels and acreages of each future development area in the City in each FHSZ.

Figure E-15 City of Sutter Creek – Future Development Areas in FHSZs

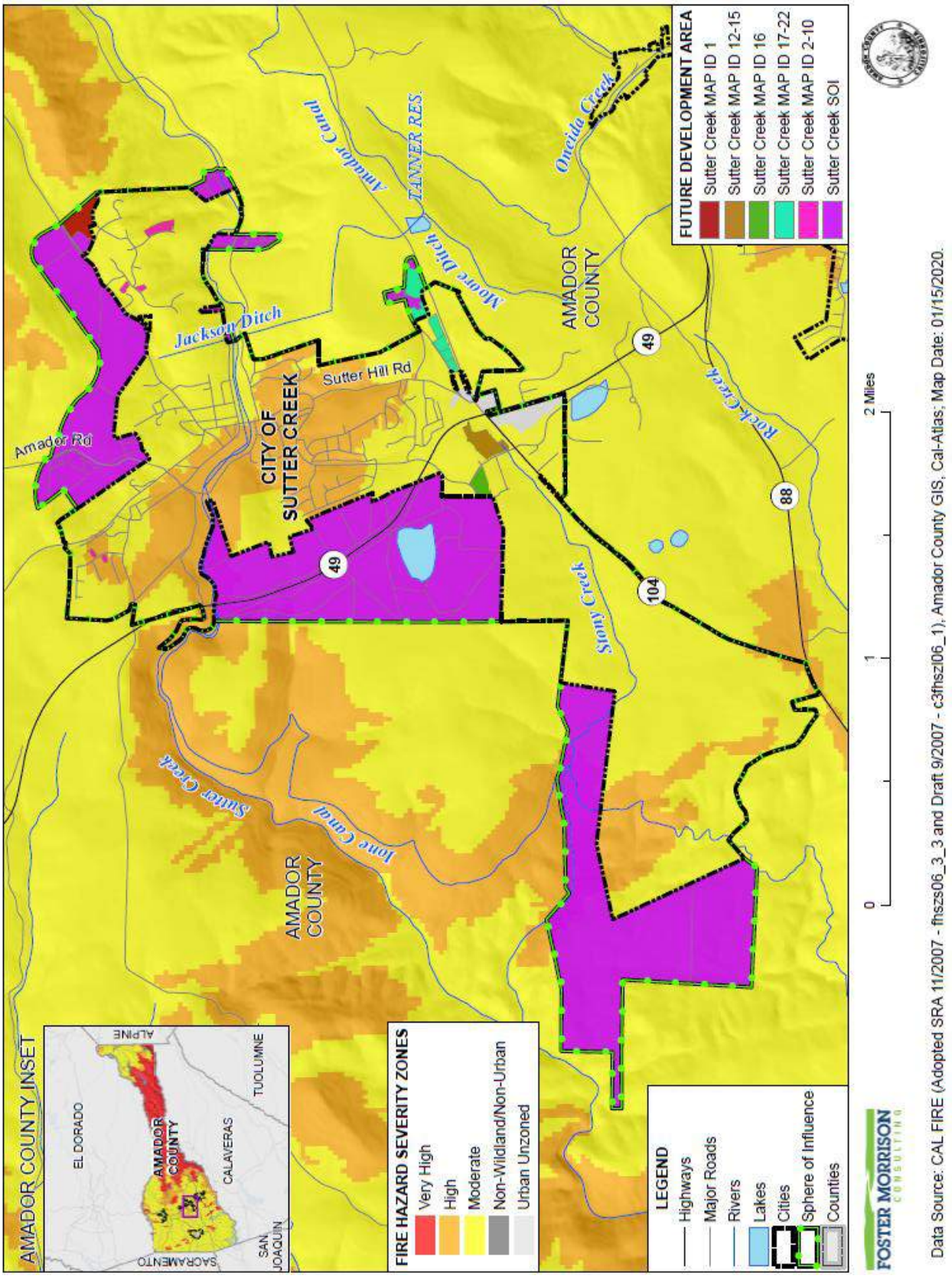


Table E-39 City of Sutter Creek – Future Development Parcels and Acres in FHSZs

Future Development / Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
Sutter Creek MAP ID 1						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	1	1	0	8.46	8.46	0
Urban Unzoned	0	0	0	0	0	0
Sutter Creek MAP ID 1 Total	1	1	0	8.46	8.46	0
Sutter Creek MAP ID 2-10						
Very High	0	0	0	0	0	0
High	2	0	2	0.69	0	0.69
Moderate	7	0	7	3.80	0	3.80
Urban Unzoned	0	0	0	0	0	0
Sutter Creek MAP ID 2-10 Total	**9**		**9**	**4.49**		**4.49**
Sutter Creek MAP ID 12-15						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	5	0	5	7.72	0	7.72
Urban Unzoned	0	0	0	0	0	0
Sutter Creek MAP ID 12-15 Total	**5**		**5**	**7.72**		**7.72**
Sutter Creek MAP ID 16						
Very High	0	0	0	0	0	0
High	0	0	0	0	0	0
Moderate	1	0	1	3.88	0	3.88
Urban Unzoned	0	0	0	0	0	0
Sutter Creek MAP ID 16 Total	**1**	**0**	**1**	**3.88**	**0**	**3.88**
Sutter Creek MAP ID 17-22						
Very High	0	0	0	0	0	0

Future Development / Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Unimproved Parcel Count	Total Acres	Total Improved Acres	Total Unimproved Acres
High	0	0	0	0	0	0
Moderate	5	2	3	13.05	8.01	5.04
Urban Unzoned	0	0	0	0	0	0
Sutter Creek MAP ID 17-22 Total	**5**	**2**	**3**	**13.05**	**8.01**	**5.04**
Sutter Creek SOI						
Very High	0	0	0	0	0	0
High	2	0	2	25.60		25.60
Moderate	61	28	33	842.65	67.89	774.76
Urban Unzoned	0	0	0	0	0	0
Sutter Creek SOI Total	**63**	**28**	**35**	**868.25**	**67.89**	**800.36**
Grand Total	**84**	**31**	**53**	**905.85**	**84.36**	**821.49**

Source: City of Sutter Creek, Amador County LAFCO, CAL FIRE

E.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

E.6.1. Regulatory Mitigation Capabilities

Table E-40 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Sutter Creek.

Table E-40 City of Sutter Creek Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
General Plan	Y/2019	Yes, Yes, and Yes
Capital Improvements Plan	N	
Economic Development Plan	N	

Local Emergency Operations Plan		
Continuity of Operations Plan	N	
Transportation Plan	Developing now	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Yes
Building Code Effectiveness Grading Schedule (BCEGS) Score		
Fire department ISO rating:		
Site plan review requirements	Yes	Yes
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Yes	Yes, we are currently updating it.
Subdivision ordinance	Yes	Yes, Yes
Floodplain ordinance	Yes	Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Yes	Yes; wildfire needs improvement
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
We need to incorporate some of the above into our development standards which are currently underway.		

Source: City of Sutter Creek

City of Sutter Creek General Plan (2019)

The City of Sutter Creek General Plan Program serves as the blueprint for future growth and development and provides comprehensive planning for the future. It encompasses what the City is now, and what it intends to be, and provides the overall framework of how to achieve this future condition (see the discussion in Section 4.3.1 Growth and Development Trends).

The General Plan includes a Safety Element that focuses on safety issues to be considered in planning for the present and future development of the City Planning Area. Identified hazards include wildfire, geologic/seismic, flooding, and other natural hazards. Mitigation-related actions and objective summaries are as follows:

Earthquakes

Objective S-1.1: To minimize possible threat to life or property due to earthquakes.

- Policy S-1.1.1: State building code requirements pertaining to earthquake safety for seismic Zone 3 shall be applied to new construction and remodeling projects that require a building permit.

Other Geologic Hazards

Objective S-1.2: To minimize possible threat to life or property due to geological hazards such as soils related damage or hazards and mine-related hazards.

- Policy S-1.2.1: Site-specific soils investigations will be required for construction projects when and wherever there is concern for soils-related hazards.
- Policy S-1.2.2: Development proposals involving the creation of more than four lots, parcels, or units shall be required to investigate the potential for mine collapse and other mine-related hazards in parts of the City known or suspected of being underlain by mine shafts, drifts, or vents.
- Policy S-1.2.3: Mine hazards such as vent, drift, or shaft openings should be plugged, covered, fenced, signed, and/or otherwise managed to protect public health and safety.
- Policy S-1.2.4: Site-specific soils investigations will be required to evaluate the health risk from proposed projects within or adjacent to mine waste materials. Schools, day care centers, hospitals, and residential subdivisions should not be located in areas where hazardous materials are present in mine waste materials.
- Policy S-1.2.5: Records concerning mining activities within the planning area should be collected and maintained at City Hall for reference and use by the City and developers.

Flooding and Dam Failure

Objective S-1.3: To minimize possible threat to life or property due to flooding.

- Policy S-1.3.1: Building and planning permit applications proposing improvements within the FEMA/FIRM map Zones ‘A’ or ‘AE’ shall comply with the City’s flood plain management ordinance.
- Policy S-1.3.2: The City of Sutter Creek and County of Amador should require new development projects within the Sutter Creek drainage area to control peak flow runoff such that post-development discharge rates are not greater than pre-development discharge rates, ensuring new development does not significantly add to flooding hazards.
- Policy S-1.3.3: The County of Amador should give the City of Sutter Creek the opportunity to review development projects within the Sutter Creek drainage area to ensure flood hazards within the City are not increased.
- Policy S-1.3.4: Reduce the extent of flooding that threatens existing developed areas within the City.

Wildland and Urban Fires

Objective S-1.4: To minimize possible threat to life or property due to wildland and urban fires.

- Policy S-1.4.1: The Sutter Creek Fire District shall be asked by the City to review development plans, land division projects, and planned developments to ensure compliance with fire suppression and prevention requirements.
- Policy S-1.4.2: New development shall ensure there is sufficient water supply and facilities for fire suppression units in the event of a wildland fire.
- Policy S-1.4.3: Looped water systems shall be installed within new developments, where feasible, and new water systems shall provide for adequate pressure and volumes at each hydrant installed.
- Policy S-1.4.4: In new developments there shall be sufficient access for emergency vehicles and evacuation of residents. Two or more routes of access should be provided, preferably on different sides of the development.
- Policy S-1.4.5: Roads in wildland fire areas shall be well marked and homes shall have addresses in plain view.
- Policy S-1.4.6: New roadways shall comply with City standards.
- Policy S-1.4.7: Vehicular access shall be provided to within 150 feet of a structure.
- Policy S-1.4.8: Buildings in urban-wildland interface areas shall comply with California Department of Forestry and Fire Protection recommendations on defensible space.
- Policy S-1.4.9: Property owners in the Main Street Historic District should become organized to plan for and fund a program to reduce or eliminate the threat of urban fire.

Evacuation and Emergency Preparedness

Objective S-1.5: To minimize possible threat to life or property through evacuation and emergency preparedness.

- Policy S-1.5.1: The County Office of Emergency Services should complete an upgrade of the County's Emergency Management Plan making the document more usable by jurisdictions involved.
- Policy S-1.5.2: Coordinated interagency emergency drills should be conducted on a regular basis, especially in hazard areas identified in this plan.
- Policy S-1.5.3: Major developments and large commercial or industrial activities should have their own emergency plans and periodic drills.

Mitigation Related Ordinances

Buildings and Construction (Sutter Creek Code Title 15)

The following codes are adopted by the City.

- The 2013 California Building Standards Administrative Code contained in Part 1 of Title 24 of the California Code of Regulations is hereby adopted by reference as the Building Standards Administrative Code of the City of Sutter Creek.
- The 2013 California Building Code contained in Part 2 of Title 24 of the California Code of Regulations, including Appendix C (Group U—Agricultural Building), Appendix H (Signs), Appendix I (Patio Covers) and Appendix J (Grading) is hereby adopted by reference as the Building Code of the City of Sutter Creek.
- The 2013 California Residential Building Code contained in Part 2.5 of Title 24 of the California Code of Regulations, is hereby adopted by reference as the Residential Building Code of the City of Sutter Creek.
- The 2013 California Electrical Code contained in Part 3 of Title 24 of the California Code of Regulations, including Article 89, is hereby adopted by reference as the Electrical Code of the City of Sutter Creek.

- The 2013 California Mechanical Code contained in Part 4 of Title 24 of the California Code of Regulations, is hereby adopted by reference as the Mechanical Code of the City of Sutter Creek.
- The 2013 California Plumbing Code contained in Part 5 of Title 24 of the California Code of Regulations, is hereby adopted as the Plumbing Code of the City of Sutter Creek.
- The 2013 California Energy Code contained in Part 6 of Title 24 of the California Code of Regulations, including Appendix 1-A is hereby adopted by reference as the Energy Code of the City of Sutter Creek.
- The 2013 California Historical Building Code contained in Part 8 of Title 24 of the California Code of Regulations is hereby adopted by reference as the Historical Building Code of the City of Sutter Creek.
- The 2013 California Fire Code contained in Part 9 of Title 24 of the California Code of Regulations, is hereby adopted as the Fire Code of the City of Sutter Creek.
- The 2013 California Existing Building Code contained in Part 10 of Title 24 of the California Code of Regulations, is hereby adopted by reference as the Existing Building Code of the City of Sutter Creek.
- The 2013 California Green Building Standards Code contained in Part 11 of Title 24 of the California Code of Regulations is hereby adopted by reference as the Green Building Standards Code of the City of Sutter Creek.
- The 2013 California Referenced Standards Code contained in Part 12 of Title 24 of the California Code of Regulations is hereby adopted by reference as the Referenced Standards Code of the City of Sutter Creek.
- The 2012 International Property Maintenance Code as published by the International Code Council and referenced in Title 24, Part 2, of the California Building Code is hereby adopted by reference as the Property Maintenance Code of the City of Sutter Creek.
- The 1997 Uniform Code for the Abatement of Dangerous Buildings, published by the International Conference of Building Officials, is hereby adopted by reference as the Dangerous Buildings Code of the City of Sutter Creek.

The above-identified codes in this section 15.04.010 (hereinafter collectively referred to as the "Building Codes") are adopted for the purpose of prescribing regulations for the erection, construction, modification, repair, maintenance, demolition, use and occupancy of buildings and structures. One copy of each of the Building Codes shall be maintained for use and examination of the public in the office of the building official.

Zoning (Sutter Creek Code Title 18)

An official land use zoning ordinance for the city is adopted and established to assist in implementing the General Plan, to serve the public health, safety, comfort, convenience and general welfare, to provide for the economic and social advantages resulting from an orderly planned use of land resources, and to encourage, guide and provide a definite plan for the future growth and development of the city.

Subdivisions (Sutter Creek Code Title 17)

This title is adopted:

- To establish minimum permissible regulations and standards for the division and subdivision of land, for the design, improvement, and survey data related thereto, and for the physical alteration of the land involved therein, and;
- To, provide a guide for owners in the proper division of their land, and to provide for orderly development of the city consistent with the general plan.

Floodplain Ordinance (Title 15, Chapter 15.20)

The flood hazard areas of the city are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.

These flood losses are caused by the cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities, and when inadequately anchored, damage uses in other areas. Uses that are inadequately floodproofed, elevated or otherwise protected from flood damage also contribute to the flood loss.

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;
- To minimize expenditure of public money for costly flood control projects;
- To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- To minimize prolonged business interruptions;
- To 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;
- To 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 flood blight areas;
- To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

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 fill, 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.

This chapter shall apply to all areas of special flood hazards, areas of flood-related erosion hazards and areas of mudslide (i.e., mudflow) hazards within the jurisdiction of Sutter Creek

Storm Drainage (Title 17, Chapter 17.16.170)

Storm drainage falls under the subdivision zoning ordinance. When developing subdivisions in the City:

- The subdivider shall dedicate a right-of-way for storm drainage purposes conforming substantially with the lines of any natural water course or channel, stream, or creek that traverses the subdivision. All storm drain improvements shall be in accordance with city Improvement Standards.
- The planning commission may require adequate fencing or other protection of all ditches and streams.
- In cases where drainage facilities are necessary on an area-wide basis to permit safe, healthful and convenient development of the area, the subdivider may be required to pay a pro rata share of such facilities' cost, as determined by the city council.

E.6.2. Administrative/Technical Mitigation Capabilities

Table E-41 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Sutter Creek.

Table E-41 City of Sutter Creek's Administrative and Technical Mitigation Capabilities

Administration	**Y/N**	**Describe capability Is coordination effective?**
Planning Commission	Y	Yes
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Needs improvement
Mutual aid agreements	Yes	
Other	-	
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y/PT	Yes, Yes. Yes
Floodplain Administrator	N	
Emergency Manager	N	
Community Planner	N	
Civil Engineer	Y	Yes, Yes, Yes
GIS Coordinator	Y	Yes, Yes, Yes
Other		
Technical	**Y/N**	**Describe capability Has capability been used to assess/mitigate risk in the past?**
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	N	
Grant writing	N	
Hazus analysis	N	
Other		

How can these capabilities be expanded and improved to reduce risk?
Additional enforcement for education of and enforcement of fire fuel mitigation efforts would assist in reducing fire risks.

Source: City of Sutter Creek

E.6.3. Fiscal Mitigation Capabilities

Table E-42 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table E-42 City of Sutter Creek's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (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	
Authority to levy taxes for specific purposes	Y	We have not done this
Fees for water, sewer, gas, or electric services	Y	Yes
Impact fees for new development	Y	Yes
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	We have never done this.
Incur debt through private activities	N	
Community Development Block Grant	Y	
Other federal funding programs	Y	
State funding programs	Y	
Other		
How can these capabilities be expanded and improved to reduce risk?		
There is too much administrative overhead to receive grant funding making it extremely cumbersome for small jurisdictions to be competitive without having to hire additional staff.		

Source: City of Sutter Creek

E.6.4. Mitigation Education, Outreach, and Partnerships

Table E-43 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 E-43 City of Sutter Creek's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	We have tried but have had little interest
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	We continually place information in our monthly newsletters regarding wildfire safety.
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
We lack staffing to do many of these activities.		

Source: City of Sutter Creek

E.6.5. Other Mitigation Efforts

The City engages in the following mitigation efforts:

- Earthquake – Compliance with Building Codes for Earthquake Safety
- Floods: Localized Stormwater – continuous cleaning of storm drain inlets and system.
- Landslide, Mudslide, Debris Flow – Bank stabilization, natural vegetation
- Wildfire – Aggressive fire fuel mitigation program including education and enforcement.

E.7 Mitigation Strategy

E.7.1. Mitigation Goals and Objectives

The City of Sutter Creek adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

E.7.2. NFIP Mitigation Strategy

The City of Sutter Creek joined the National Flood Insurance Program (NFIP) on September 24, 1987. As a participant of the NFIP, the City of Sutter Creek has administered floodplain management regulations that meet the minimum requirements of the NFIP. The management program objective is to protect people and property within the City. The City of Sutter Creek will continue to comply with the requirements of the NFIP in the future.

In addition, the City of Sutter Creek actively participates with Amador County to address local NFIP issues through a regional approach. Many of the program activities are the same for the City of Sutter Creek as for Amador County since participation at the County level includes all local jurisdictions.

The City of Sutter Creek Planning Department provides public outreach activities which include map information services, public awareness, public hazard disclosure, and flood protection information. This information is readily available to the public and consists of current and accurate flood mapping. In addition, the Planning and Engineering Department provides information about our stormwater management program and up-to-date information related to the maintenance of our drainage system.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS which are to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. The City of Sutter Creek is not a current participant in the CRS program.

More information about the floodplain administration in the City of Sutter Creek can be found in Table E-44.

Table E-44 City of Sutter Creek Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	7 policies in force $7,496 in annual premiums $1,731,300 in coverage
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?	11 paid claims $53,469.09 in paid losses 0 substantial damage claims
How many structures are exposed to flood risk within the community?	34 in the 1% annual chance flood 12 in the 0.2% annual chance flood
Repetitive Loss (RL) and Severe Repetitive Loss Properties (SRL)	1 RL structure 0 SRL structures
Describe any areas of flood risk with limited NFIP policy coverage	No known areas with limited NFIP coverage.
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	No
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review
What are the barriers to running an effective NFIP program in the community, if any?	Funding
Compliance History	
Is the community in good standing with the NFIP?	Y
Are there any outstanding compliance issues (i.e., current violations)?	N

NFIP Topic	Comments
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	5/17/2011 (CAV) 10/5/2017 (CAC)
Is a CAV or CAC scheduled or needed?	No
Regulation	
When did the community enter the NFIP?	8/24/1987
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Meet
Provide an explanation of the permitting process.	Applicants submit building plans for review and approval. They are examined by our Building Inspector who reviews and approves for compliance with the Zoning Code and Building Code.
Community Rating System	
Does the community participate in CRS?	No
What is the community's CRS Class Ranking?	N/A
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

E.7.3. Mitigation Actions

The planning team for the City of Sutter Creek identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Climate Change
- Drought & Water shortage
- Earthquake (large damaging/small)
- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- Landslide, Mudslide, Debris Flow
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (Hail, Lightning)
- Severe Weather: High Winds and Tornadoes
- Severe Weather: Winter Storms and Freeze
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan 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 countywide

public outreach action, 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 plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

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

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140).

Project Description: Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption 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: City of Sutter Creek Planning Department

Responsible Office: City of Amador City Planning Department

Cost Estimate: Jurisdictional board/staff time

Benefits (avoided Losses): 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

Timeline: As soon as possible

Project Priority: High

Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect/Pests, Aquatic Invasive Species, Avalanche, Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 100/500 year, Floods: Localized Stormwater, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms, Severe Weather: Wind and Tornado, Severe Weather: Winter Storm and Freeze, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The City and County play a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of natural hazards. A comprehensive multi-hazard public education program will better inform the community of natural hazards of concern and actions the public can take to be better prepared for the next natural disaster event.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The City will work with the County and other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of natural hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will leverage and build upon existing mechanisms.

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing County outreach programs will be reviewed for effectiveness and leveraged and expanded upon to reach the broader region.

Responsible Office: City of Sutter Creek in partnership with the County

Cost Estimate: Annual costs to be determined, and will depend on the scope and frequency of activities and events as well as volunteer participation

Benefits (Losses Avoided): Increase residents' knowledge of potential hazards and activities required to mitigate hazards and be better prepared. Protect lives and reduce damages, relatively low cost to implement.

Potential Funding: Local budgets, grant funds

Timeline: Ongoing/Annual public awareness campaign

Project Priority: High

Action 3. Development of Walking Paths, Native Tree Protection & Native Tree Species Planting

Hazards Addressed: Climate change, Drought, Extreme Heat, Severe Weather, and Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: To reduce our carbon footprint, safe walking spaces are needed that encourage walking as a mode of travel. Walking in and around Sutter Creek can be difficult without paths, toepaths, and shaded spaces during the hotter months. During drought and extreme heat periods, the City of Sutter Creek gets extremely hot, due to its lowland location, heat gets trapped.

Project Description: The project would develop walking/toepaths in and around Sutter Creek with native tree plantings that would provide shade.

Other Alternatives: Do nothing.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Safety Element of the General Plan, Subdivision ordinance, Landscape Ordinance

Responsible Office/Partners: Sutter Creek Planning Department

Cost Estimate: $250,000

Benefits (Losses Avoided): Reduction in energy consumption

Potential Funding: Parks grants, CDBG, Urban forestry grants, community sponsorships

Timeline: On going

Project Priority: Medium

Action 4. Installation of Generator at City Hall and Community Center

Hazards Addressed: Climate change, Drought, Extreme Heat, Severe Weather, and Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: During power outages there is no backup power to keep emergency operations and communication systems up and running.

Project Description: The project would develop provide backup power during power outages/

Other Alternatives: Do nothing.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Safety Element of the General Plan

Responsible Office/Partners: City Manager

Cost Estimate: $250,000

Benefits (Losses Avoided): Ability to communicate with the public, provide cooling stations during an outage, or a warming station.

Potential Funding: City general fund, state grant

Timeline: within a year

Project Priority: High

Action 5. Upgrade Ditches and Culverts

Hazards Addressed: Climate change, Severe Weather, Flood

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: With decaying infrastructure and mine shaft waste, the city's storm drain system is slowly eroding. There are many areas with galvanized pipe that needs repair to avoid flood damage and to facilitate efficient runoff during storm events. Additionally, culverts and ditches inside and outside of the city limits need repair or cleaning.

Project Description: Upgrade and repair existing ditches, culverts, and storm drainpipes

Other Alternatives: Do nothing.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Safety Element of the General Plan, Subdivision ordinance, Landscape Ordinance

Responsible Office/Partners: Public Works and City Engineer

Cost Estimate: $500,000

Benefits (Losses Avoided): Flood damage

Potential Funding: USDA rural infrastructure, CDBG,

Timeline: On going

Project Priority: Medium

Action 6. Develop a Stormwater Management Plan

Hazards Addressed: Climate change, Flood

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: With decaying infrastructure and mine shaft waste, the city's storm drain system is slowly eroding. An overall plan for stormwater management should address the entire city for new development.

Project Description: Creation of a stormwater management plan to address stormwater.

Other Alternatives: Do nothing.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Safety Element of the General Plan, Subdivision ordinance, Landscape Ordinance

Responsible Office/Partners: Public Works and City Engineer

Cost Estimate: $100,000

Benefits (Losses Avoided): Flood damage

Potential Funding: USDA rural infrastructure, CDBG,

Timeline: On going

Project Priority: Medium

Flood Actions

Action 7. Sutter Creek City Hall Flooding

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: During periods of heavy rainfall, the basement at City Hall has flooded, in both 1998 and 2017.

Project Description: Redesign of storage areas in the basement of city hall

Other Alternatives: Relocation of evidence storage area and city records.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Safety Element

Responsible Office/Partners: City of Sutter Creek Finance and Police Departments

Cost Estimate: $40,000

Benefits (Losses Avoided): Records retention

Potential Funding: COPS, public safety grants

Timeline: Ongoing

Project Priority: Medium

Action 8. Sutter Creek Bank Stabilization

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The Sutter Creek creek bank adjacent to a city park is eroding. Significant eroding occurred during the 2016/2017 storms. The City applied for FEMA grants, however, the amount of grant versus the estimated costs made accepting the grant unacceptable. The overall cost estimate was 1.2 million and the grant award was roughly $200,000.

Project Description: This project would require a re-engineered stabilization of the bank ensuring that water flows during the peak period and the bank remains intact.

Other Alternatives: Do nothing.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The City Engineer will continue to monitor the existing conditions.

Responsible Office/Partners: City of Sutter Creek City Engineer

Cost Estimate: $1.2 million

Benefits (Losses Avoided): Downstream impacts, park underlying structure stability

Potential Funding: FEMA, Parks grants

Timeline: On going

Project Priority: Medium

Wildfire Actions

Action 9. Perimeter Wildfire Protection Fuel Break

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The City of Sutter Creek borders are surrounded by open dry grassland making residential areas vulnerable to the threat of wildfire.

Project Description: The project would provide for establishment of perimeter firebreaks surrounding the City.

Other Alternatives: Do nothing.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Safety Element of the General Plan,

Responsible Office/Partners: Sutter Creek Fire Department

Cost Estimate: $500,000

Benefits (Losses Avoided): Residential fire prevention

Potential Funding: FEMA, Parks grants, Cal Fire grants

Timeline: On going

Project Priority: High

Annex F Amador Water Agency

F.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Amador Water Agency (AWA or Agency), a previously participating jurisdiction to the 2014 Amador County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the Agency. This Annex provides additional information specific to AWA, with a focus on providing additional details on the risk assessment and mitigation strategy for this Agency.

F.2 Planning Process

As described above, the Agency followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Amador County Hazard Mitigation Planning Committee (HMPC), the Agency formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table F-1. Additional details on plan participation and Agency representatives are included in Appendix A.

Table F-1 Amador Water Agency – Planning Team

Name	Position/Title	How Participated
Rick Ferriera	Operations Manager	Coordinated effort and put team together, researched data
Darrel Evensen	Engineering Manager	Participates in outside groups, researched data
Andrea Hinton	Regulatory Compliance Specialist	Researched data, water quality and reporting. Participated in UWMP
Linda Nafus	Administrative Assistant II	Researched data and submitted information

Coordination with other community and Agency planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the Agency integrated the previously approved 2014 Plan into existing planning mechanisms and programs. Specifically, the Agency incorporated into or implemented the 2014 LHMP through other plans and programs shown in Table F-2.

Table F-2 2014 LHMP Incorporation

Planning Mechanism 2014 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
UWMP/LTUNSS/IRUMP	The agency has referred back to the 2014 LHMP many times to assist with the development of multiple studies.
General Plan (draft)	Portions of the LHMP were used to inform portions of the General Plan draft.
CAWP EIR	Portions of the LHMP were used to inform portions of the CAWP.

F.3 Agency Profile

The Agency profile for the AWA is detailed in the following sections. Figure F-1 displays a map and the location of the Agency within Amador County. Figure F-2 shows who the AWA provides water to, while Figure F-3 shows the AWA wastewater systems.

Figure F-1 Amador Water Agency

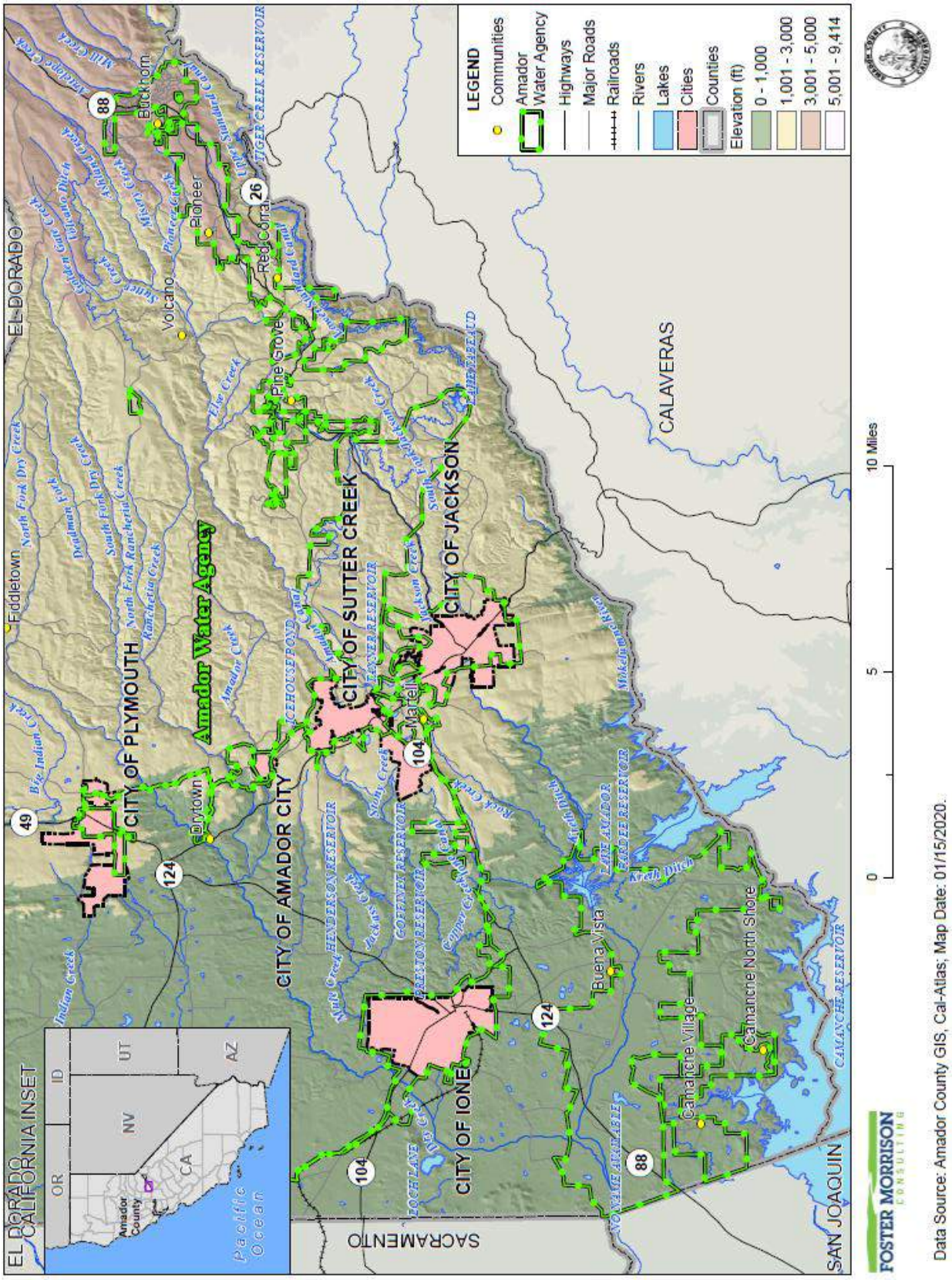


Figure F-2 AWA Water Systems

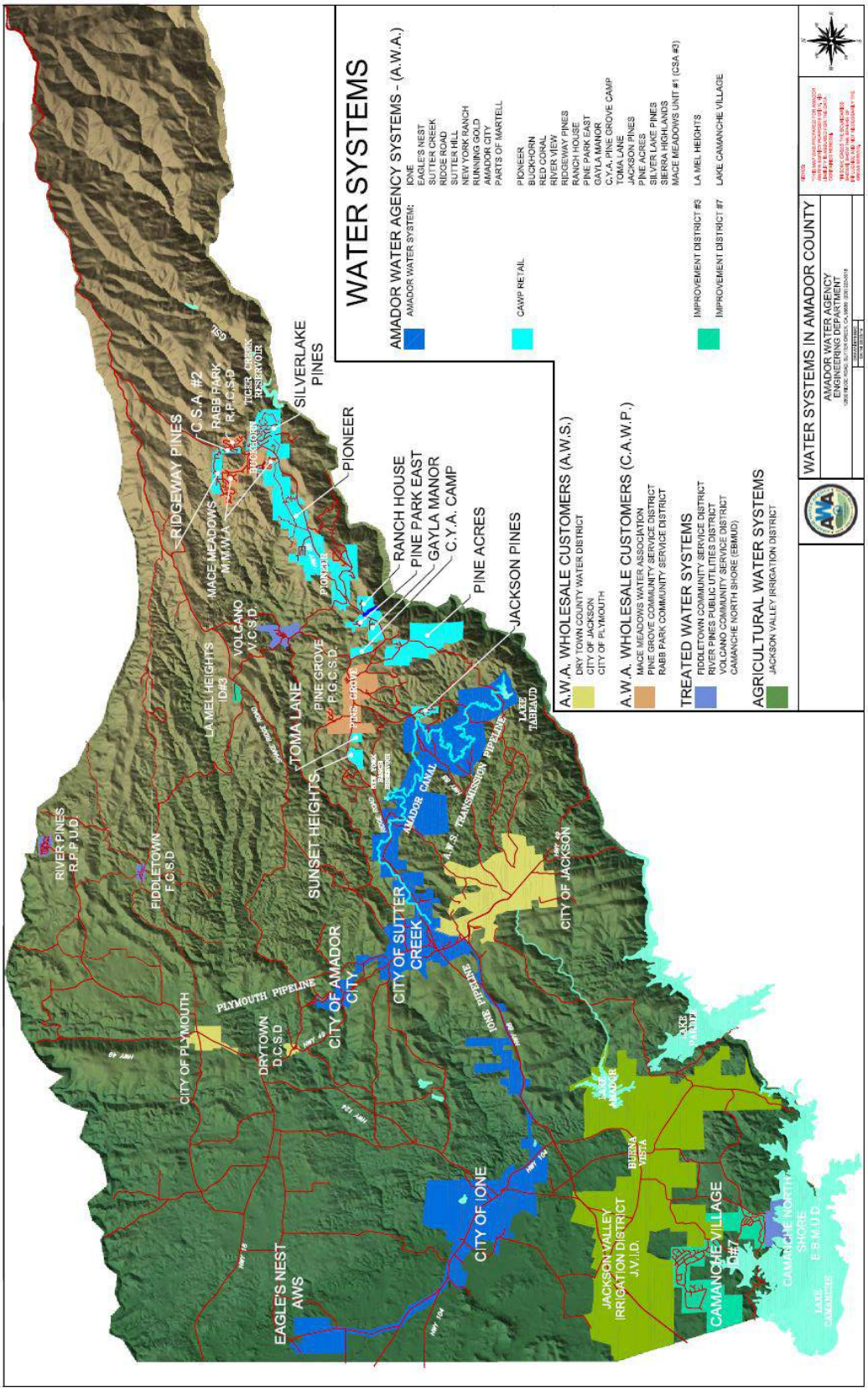
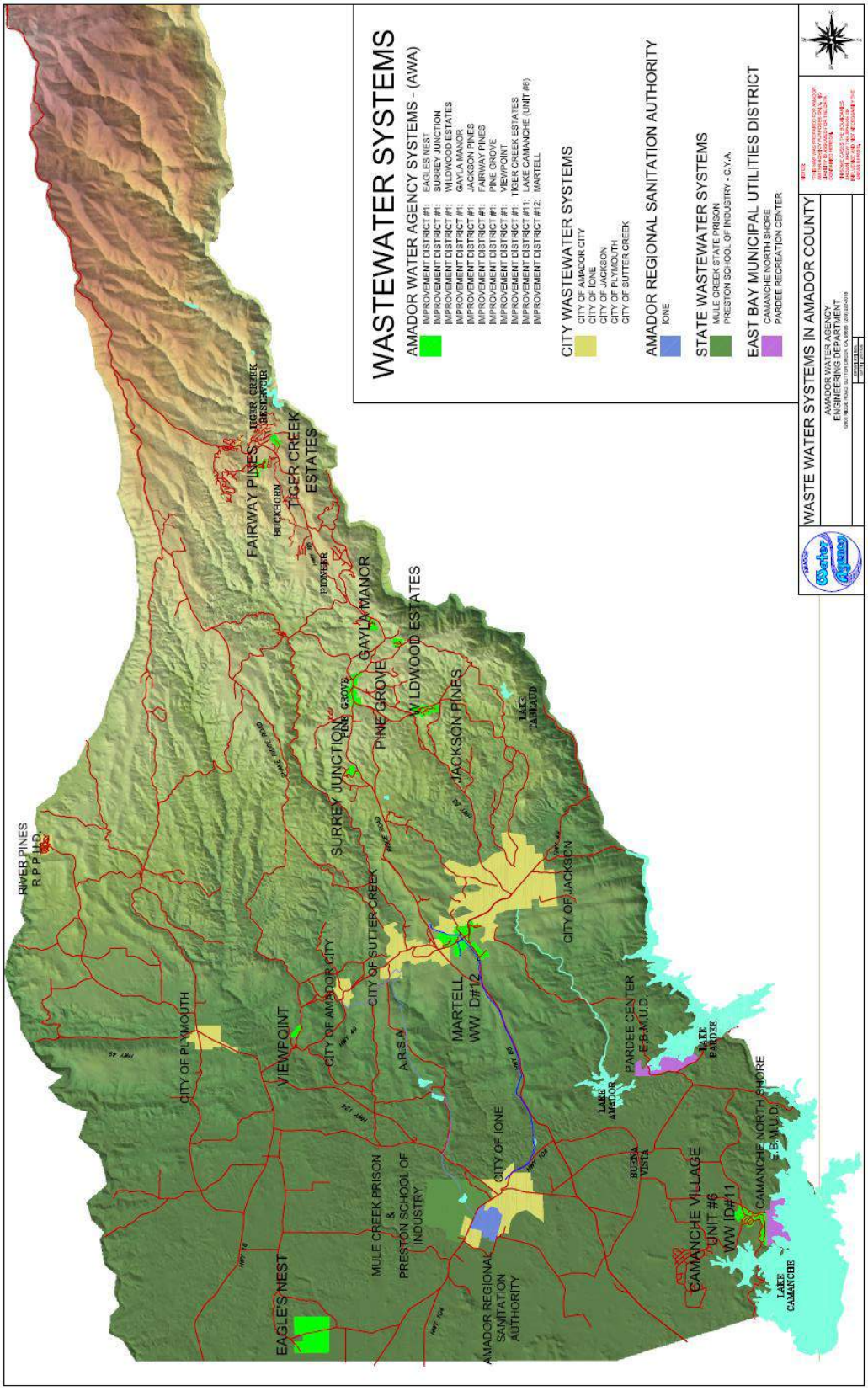


Figure F-3 AWA Wastewater System



F.3.1. Overview and Background

In 1959, the AWA was formed for the purpose of providing water and wastewater services to the residents of Amador County. The AWA is the main water supplier for the western portion of Amador County. The Agency has two sources of water: surface water and groundwater. Surface water accounts for approximately 94% of total supply. AWA is the primary supplier of water to Amador County.

The primary source of consumptive water is the Mokelumne River which is supplied from rainfall and snowmelt from the Sierra Mountain Range. This water is diverted from the Tiger Creek afterbay or Lake Tabeaud forebay and then either it gravity flows or is pumped to AWA treatment plants. The Agency's two main water systems are the Amador Water System (AWS) and the Central Amador Water Project System (CAWP). The Agency supplies drinking water to the communities of Jackson, Ione, Sutter Creek, Amador City, Drytown, Plymouth, the communities along the Highway 88 corridor, and the Lake Camanche and LaMel Heights areas. The agency is located on Ridge Road in Sutter Creek; however, their assets are located throughout the County and beyond.

Water Sources

The North Fork of the Mokelumne River, located in the California Sierra Nevada Mountains, is the primary source for the CAWP system, the AWS, and the PG&E Tiger Creek Powerhouse system. Water supplied from rainfall and snowmelt is stored in Tiger Creek Afterbay and gravity feeds to the PG&E Tiger Creek Powerhouse Memcor Plant where it is treated and serves the PG&E Conference Center. Water from the Tiger Creek Afterbay is gravity fed via the Gravity Supply Line to the Buckhorn Water Treatment Plant where it is treated and ready for use by Agency customers in Pine Grove, Pine Acres, Sunset Heights, Fairway Pines, Jackson Pines, Pioneer, Gayla Manor, Ranch House Estates, Toma Lane, Sierra Highlands, Silver Lake Pines, Ridgeway Pines, Rabb Park, and Mace Meadows. Water from the Mokelumne River is also stored in Lake Tabeaud and conveyed by pipeline to the Tanner Water Treatment Plant where it is treated for use by the customers of Jackson, Sutter Creek, Amador City, Drytown, and Plymouth. The Ione Pipeline transports raw water from the Tanner Reservoir to the Ione Water Treatment Plant where it is treated for use by customers of Ione. The Agency's La Mel Heights customers get their water from a pair of wells located in the La Mel Heights Subdivision and Lake Camanche residents get their water from four wells located in the Lake Camanche area.

F.4 Hazard Identification

AWA identified the hazards that affect the Agency and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to Agency (see Table F-3).

Table F-3 AWA—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests	Extensive	Highly Likely	Limited	Low	Low
Aquatic Invasive Species	Extensive	Likely	Critical	High	Low
Avalanche	Limited	Unlikely	Negligible	Low	Medium
Climate Change	Extensive	Likely	Critical	High	–
Dam Failure	Extensive	Unlikely	Catastrophic	High	Medium
Drought & Water shortage	Extensive	Likely	Limited	Medium	High
Earthquake (large damaging/small)	Significant	Unlikely	Catastrophic	High	Low
Floods: 1%/0.2% annual chance	Significant	Occasional	Critical	Medium	Medium
Floods: Localized Storm water	Significant	Highly Likely	Limited	Medium	Medium
Landslide, Mudslide, Debris Flow	Significant	Likely	Critical	Medium	Medium
Levee Failure	Limited	Occasional	Limited	Low	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely	Limited	Medium	Low
Severe Weather: Winter Storms and Freeze	Significant	Highly Likely	Limited	Medium	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High	High

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

F.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile the Agency's hazards and assess the Agency's vulnerability separate from that of the Amador County Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the Agency is included in this Annex. This vulnerability assessment analyzes the property and other assets at risk to hazards ranked of medium or high significance specific to the Agency. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

F.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section F.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard (as shown in Table F-3) affects the Agency and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Agency and the Amador County Planning Area.

F.5.2. Vulnerability Assessment and Assets at Risk

This section identifies the Agency's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the Agency.

Assets at Risk and Critical Facilities

This section considers the AWA's assets at risk, with a focus on key Agency assets such as critical facilities, infrastructure, and other Agency assets and their values. With respect to Agency assets, the majority of these assets are considered critical facilities as defined for this Plan. Critical facilities are defined for this Plan 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, and (3) Hazardous Materials Facilities, as discussed in Section 4.3.1 of the Base Plan.

Table F-4 lists critical facilities and other Agency assets identified by the Agency Planning Team as important to protect in the event of a disaster. AWA's physical assets (located above ground), valued at over $95 million, consist of the buildings and infrastructure to support the Agency's operations.

Table F-4 AWA Critical Facilities, Infrastructure, and Other Agency Assets

Service Area	Facility Type	Facility Name	Replacement Value	Which Hazards Pose Risk
AWS/Ione	Pump Station	Prison Station & backwash tank	$1,209,390	Wildfires, Climate Change, Severe Weather, High Winds
AWS/Ione	WTP	Ione WTP	$13,306,119	Wildfires, Climate Change, Severe Weather, High Winds
AWS/ Ione	Tank	Prison Tank	$1,895,136	Wildfires, Climate Change, Severe Weather, High Winds
AWS/Sutter Creek	AWA	Tanner WTP Building, Trailer & Shop	$19,251,445	Wildfires, Climate Change, Severe Weather, High Winds
AWS/ Sutter Creek	Backwash Facility	Backwash Recycling System & Controls	$3,908,885	Wildfires, Climate Change, Severe Weather, High Winds
AWS/Sutter Creek	Pump Station	Ridge Pump Station	$275,513	Wildfires, Climate Change, Severe Weather, High Winds
AWS/Sutter Creek	Pump Station	Canal Bypass Pump Station	$421,297	Wildfires, Climate Change, Severe Weather, High Winds
AWS/Sutter Creek	Pump Station	Trent Pump Station	$330,869	Wildfires, Climate Change, Severe Weather, High Winds
AWS/Sutter Creek	Pump Station	Airport Pump Station	$285,573	Wildfires, Climate Change, Severe Weather, High Winds
AWS/Sutter Creek	Supply Pump	Lake Tabeaud Canal Supply	$125,571	Wildfires, Climate Change, Severe Weather, High Winds
AWS/Sutter Creek	Canal	Flumes	$288,750	Wildfires, Climate Change, Severe

Service Area	Facility Type	Facility Name	Replacement Value	Which Hazards Pose Risk
				Weather, High Winds
AWS/Sutter Creek	Tank	Trent Ridge Tank, bolted steel	$229,489	Wildfires, Climate Change, Severe Weather, High Winds
AWS/Sutter Creek	WTP	Tanner WTP Yard	$996,064	Wildfires, Climate Change, Severe Weather, High Winds
AWS/Sutter Creek	WTP	Tanner Reservoir	$254,958	Wildfires, Climate Change, Severe Weather, High Winds
AWS/Sutter Creek	Building & Controls	Amador Transmission Line - ATL	$300,436	Wildfires, Climate Change, Severe Weather, High Winds
AWS/ Sutter Creek	Hydroelectric Plant	Tanner Hydro	$1,746,826	Wildfires, Climate Change, Severe Weather, High Winds
AWS/Sutter Creek	Building	Administration Building	$1,899,814	Wildfires, Climate Change, Severe Weather, High Winds
AWS/ Sutter Creek	Plant	Cummings fixed generator	$85,000	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Lift Station	Lift Station A	$350,324	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Camanche	Lift Station	Lift Station B	$350,324	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Camanche	Lift Station	Lift Station C	$503,440	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Camanche	Lift Station	Lift Station D	$540,400	Wildfires, Climate Change, Severe Weather,

Service Area	Facility Type	Facility Name	Replacement Value	Which Hazards Pose Risk
				Flooding, High Winds
Camanche	Pump	Well #10	$292,985	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Tank	12A, 12b Wood Storage Tank	$1,375,399	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Tank	#6 Storage Tank, wood	$233,592	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Tank	Well #9 Storage, wood	$350,219	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Tank	Tank #10, redwood	$292,985	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Tank #9	Telemetry	$12,857	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Tank	Tank #8, redwood	$94,650	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Tank/Booster Pump	Tank 8, bolted steel	$248,967	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Warehouse	Camanche Warehouse	$921,000	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Well	Well #12	$1,259,523	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Well #12	CAT fixed generator	$148,300	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Well	Well #6	$253,090	Wildfires, Climate Change, Severe

Service Area	Facility Type	Facility Name	Replacement Value	Which Hazards Pose Risk
				Weather, High Winds
Camanche	Well	Well #14	$141,245	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Well	Well #9	$67,950	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	WWTP	Camanche WWTP	$12,944,000	Wildfires, Climate Change, Severe Weather, High Winds
Camanche	Well #9 Generator	Cummings Fixed	$65,452	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Buckhorn WTP	Buckhorn WTP	$7,822,502	Wildfires, Climate Change, Severe Weather, High Winds
CAWP System	Backwash	Backwash Recycling	$2,291,178	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Storage Shed	Storage Shed	$35,116	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	Madrone Tank, bolted steel	$136,000	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	Frank's Tank, welded steel	$124,248	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	CSA 2 Tank 1, wood	$82,862	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Building	GSL Regulator Building – Tiger Creek	$582,765	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	Jackson Pines, bolted steel, telemetry	$262,857	Wildfires, Climate Change, Severe

Service Area	Facility Type	Facility Name	Replacement Value	Which Hazards Pose Risk
				Weather, High Winds
CAWP system	Tank	Mace Meadows #5 Tank, bolted steel, telemetry	$224,641	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	CAWP Tank, bolted steel	$137,151	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	Rabb Park Tank, bolted steel, Shed	$240,935	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	Sunset Heights Tank, welded steel	$117,477	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	Tank C, redwood	$211,384	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	Mace Meadows #3, redwood, Telemetry	$159,653	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	Mace Meadows #4, bolted steel, Telemetry	$266,519	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	Alpine Tank #2, welded steel	$334,834	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	Tank B Storage Tank, bolted steel	2,000,000	Wildfires, Climate Change, Severe Weather, High Winds
CAWP system	Tank	Tank A Storage Tank, welded steel	$2,000,000	Wildfires, Climate Change, Severe Weather, High Winds
CAWP System	Storage Shed	Building & Equipment	$38,812	Wildfires, Climate Change, Severe Weather, High Winds
CAWP System	Plant	CAT fixed generator	$227,500	Wildfires, Climate Change, Severe

Service Area	Facility Type	Facility Name	Replacement Value	Which Hazards Pose Risk
				Weather, High Winds
CAWP System	Tiger Creek Regulator	Generac fixed generator	$45,755	Wildfires, Climate Change, Severe Weather, High Winds
Eaglesnest	Chlorine Station	Eaglesnest Chlorine Station	$33,189	Wildfires, Climate Change, Severe Weather, High Winds
Gayla Manor	WWTP	Gayla Manor WWTP	$247,889	Wildfires, Climate Change, Severe Weather, High Winds
LaMel Heights	Pump Station	LaMel Hts Pump Station	$349,800	Wildfires, Climate Change, Severe Weather, High Winds
LaMel Heights	Tank	LaMel Hts Tank, bolted steel	$200,132	Wildfires, Climate Change, Severe Weather, High Winds
Martell	Lift Station	Martell Lift Stations	$1,290,271	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Martell	Lift Station	Wal-Mart Lift Station	$254,247	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Martell	Lift Station	Kmart Lift Station	$374,247	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Martell	Lift Station	Lift Station 1	$555,243	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Martell	Lift Station	Lift Station 2	$754,621	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Martell	Lift Station	Ford fixed generator	$85,400	Wildfires, Climate Change, Severe

Service Area	Facility Type	Facility Name	Replacement Value	Which Hazards Pose Risk
				Weather, Flooding, High Winds
Martell	Lift Station	Sierra West Lift Station	$774,247	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Martell	Lift Station	General fixed generator	$65,570	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Martell	Lift Station	Amador Central List Station	$680,996	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Martell	Lift Station	General fixed generator	$77,590	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Mt Crossman	Pump Station	Mt. Crossman Pump Station	$611,379	Wildfires, Climate Change, Severe Weather, High Winds
Mt Crossman	Pump Station	CAT fixed generator	$52,340	Wildfires, Climate Change, Severe Weather, High Winds
Pine Acres	Pump Station	Pine Acres Pump Station	$229,598	Wildfires, Climate Change, Severe Weather, High Winds
Pine Acres	Tank	Pine Acres tank, wood	$400,000	Wildfires, Climate Change, Severe Weather, High Winds
Pine Acres	Tank	Pine Acres tank, wood	$400,000	Wildfires, Climate Change, Severe Weather, High Winds
Pine Acres	Tank	Pine Acres tank, welded steel	$620,000	Wildfires, Climate Change, Severe Weather, High Winds
Ranch House	Pump Station	Ranch House Pump Station	$50,299	Wildfires, Climate Change, Severe

Service Area	Facility Type	Facility Name	Replacement Value	Which Hazards Pose Risk
				Weather, High Winds
Ranch House	Tank	Ranch House Tank, bolted steel	$506,227	Wildfires, Climate Change, Severe Weather, High Winds
Raven Rd	Vault	Raven Rd Vault Pit A & B Tank Site	$126,274	Wildfires, Climate Change, Severe Weather, High Winds
Ridge Rd	Lift Station	Ridge Lift Station	$202,491	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Ridgeway Pines	Tank	Ridgeway Pines Tank, Redwood	$90,446	Wildfires, Climate Change, Severe Weather, High Winds
Rocky Lane	Pressure Regulating Station	Rocky Lane Pressure Sta.	$35,829	Wildfires, Climate Change, Severe Weather, High Winds
Silver Lake Pines	Pump Station	SLP Pump Station	$1,265,641	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
Tiger Creek	Pump Station	Tiger Creek Pump Station	$937,082	Wildfires, Climate Change, Severe Weather, Flooding, High Winds
		TOTAL	**$95,871,074.00**	

Source: AWA

Natural Resources

AWA has a variety of natural resources of value to the Agency. These natural resources parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Historic and Cultural Resources

AWA has a variety of historic and cultural resources of value to the Agency. These historic and cultural resources parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Growth and Development Trends

The Amador Water Agency has identified development trends within the following studies-

- Long Term Water Needs Study 2017
- Integrated Regional Water Management Plan Update 2018
- Central Amador Water Project (CAWP) Environmental Impact Report 2017
- Urban Water Management Plan 2015; and the Master Water Plan (draft)

General growth in the Agency parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Development since 2014

The AWA noted the following facilities constructed since 2014.

- Buckhorn Backwash Facility was constructed and began recycling water in 2018
- Ione Backwash Recycling Facility was constructed and began recycling water in 2016
- Tanner Backwash Facility was constructed and began recycling water in 2019
- Since 2014 the number of Service Connections increased by 635. This is primarily in Ione subdivisions and Martell commercial.
- Tanner Hydroelectric Plant in 2107 and has been generating power since then.
- Ione Hydroelectric Plant in 2020

Future Development

The Agency has no control over future development in areas the Agency provides water in. Future development in these areas parallels that of Amador County. More general information on growth and development in Amador County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Amador County Vulnerability and Assets at Risk of the Base Plan.

F.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table F-3 as high or medium significance hazards. Impacts of past events and vulnerability of the Agency to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Amador County Planning Area).

An estimate of the vulnerability of the Agency to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. 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 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.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Aquatic Invasive Species

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Invasive species are organisms that are introduced into an area beyond their natural range and become a pest in the new environment. The terms: Marine Invasive Species and Non-native Aquatic Species (NAS) are used interchangeably. This hazard considers the economic, environmental, and other issues related to invasive pests of a marine and freshwater nature, particularly euryhaline organisms. These are species having the ability to tolerate a wide range of salinity and can transition in and out of fresh and saltwater.

Examples include the zebra mussel and the propagation of water hyacinth in the California Delta. Quagga and zebra mussels are an invasive, non-native species that breed very fast, have no known predators, and can quickly colonize new areas within California waters. A local bull frog is also a concern to the aquatic systems within the County.

Location and Extent

All freshwater lakes, streams, and rivers in Amador County are potentially at risk from aquatic invasive species. There is no established scale for aquatic invasive species. Magnitude is measured by the presence and counts of aquatic invasive species in waterways in the Agency and Amador County. Speed of onset of these invasive species is short, as it only takes a careless resident or visitor to accidentally introduce an invasive species. However, the impacts associated with the introduction of a new invasive species can last years.

Past Occurrences

The HMPC was able to find no past occurrences that affected the Agency.

Vulnerability to and Impacts from Aquatic Invasive Species

Once introduced, invasive species are likely to become a permanent part of an ecosystem and may flourish, creating environmental imbalances and wreaking economic havoc. Examples include the zebra mussel infestation in the Great Lakes and the propagation of water hyacinth in the California Delta. Quagga and zebra mussels are an invasive, non-native species that breed very fast, have no known predators, and can quickly colonize new areas within California waters. Once established, these mussels can clog water intake and delivery pipes; dam intake gates and pipes; adhere to boats, pilings, and most hard and some soft substrates, and litter beaches and shores with jagged, foul smelling shells. Both the zebra mussel and the quagga mussel are concerns for California, Amador County, and the Agency. These mussels have not affected the waters in Amador County yet, but are still a cause for concern. A local bull frog is also a concern to the aquatic systems within the County.

The most serious measurable economic impacts associated with aquatic invasive species are suffered by communities, water Agencies and other users of water who may have increased maintenance costs due to plugged water pipes, intake screens, and possible damage to pumps and other equipment. It even impacts citizens through increased costs for drinking water and food prices passed along to consumers by the water and agriculture industries brought on by their increased costs in maintenance and equipment repair. It impacts the local fisheries, and in some lakes, has caused a collapse in the populations of sport fish.

Aquatic invasive species have the ability to tolerate a wide range of conditions and are extremely adaptable. Once they have infected a water body, they are difficult to eradicate. They can readily spread into downstream waters. Aquatic invasive species can cause significant economic impacts. Of notable concern, should quagga mussels reach Amador County, the economic impacts would be substantial to all communities. The AWA noted that there have been no impacts to date, but there is concern about the future.

Assets at Risk

Please refer to Table F-4.

Future Development

None planned at this time that would be affected by this hazard. This could change in the future if there is an influx of these invasive species.

Climate Change

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Climate change adaptation is a key priority of the State of California. The 2018 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.

In Amador County and the Agency, the HMPC noted that each year it seems to get a bit warmer and snow seems to start at higher levels. It was also noted that 2017 was one of the wettest years ever.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the Agency, Amador County, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, 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

Climate change has never been directly linked to any declared disasters. While the Agency noted that climate change is of concern, no specific impacts of climate change could be recalled. The Agency and HMPC members noted that the strength of storms does seem to be increasing and the temperatures seem to be getting hotter.

Vulnerability to and Impacts from Climate Change

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. California's APG: 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. 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. This information can be used to guide climate adaptation planning in the Agency and Amador County Planning Area.

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra region in which the Amador County Planning Area is part of:

- Temperature increases
- Decreased precipitation
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

The AWA also noted additional impacts.

- A wildfire incident would impact the Agency's ability to produce and provide raw supply and domestic drinking water to the customers.
- Wildfires can easily damage wooden domestic drinking water tanks.
- Temperature and wildfires can have an effect on communication facilities causing widespread Communication interruptions for landlines, radio, and cell systems. Could cause water treatment plant production issues and prevent staff from controlling and managing water systems.
- Lack of precipitation and snowpack can reduce surface water supplies affecting our ability to supply customers' domestic drinking water and possible proper fire flows and supplies.

Assets at Risk

Please refer to Table F-4.

Future Development

Future development will be impacted by climate change as wildfires become more prevalent and AWA facilities will have to be replaced by CMU concrete block walls and metal roofs instead of wood structures. AWA facilities around Lake Camanche and the City of Ione will have increased hot summers that will require more air conditioning demands to keep chemicals and electrical equipment safe.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–High

Hazard Profile and 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.

Location and Extent

Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, a total dam failure would most probably happen as a consequence of the natural disaster triggering the event, such as an earthquake. There is no scale with which to measure dam failure. However, Cal DWR Division of Safety of Dams (DSOD) assigns hazard ratings 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. Dams are classified in four categories that identify the potential hazard to life and property: Low, Significant, High, and Extremely High. These were discussed in more detail in Section 4.2.10 of the Base Plan.

While a dam may fill slowly with runoff from winter storms, a dam break has a very quick speed of onset. The duration of dam failure is generally not long – only as long as it takes to empty the reservoir of water the dam held back. The Agency would be affected for as long as the flood waters from the dam failure took to drain downstream.

Dam inundation layers were obtained from Cal OES for the extremely high and high hazard dams in Amador County. Not all extremely high and high hazard dams had inundation maps. Those mapped dams are shown in Figure F-4 (extremely high hazard dams) and Figure F-5 (high hazard dams) for the Agency.

Figure F-4 AWA – Extremely High Hazard Dam Inundation Areas

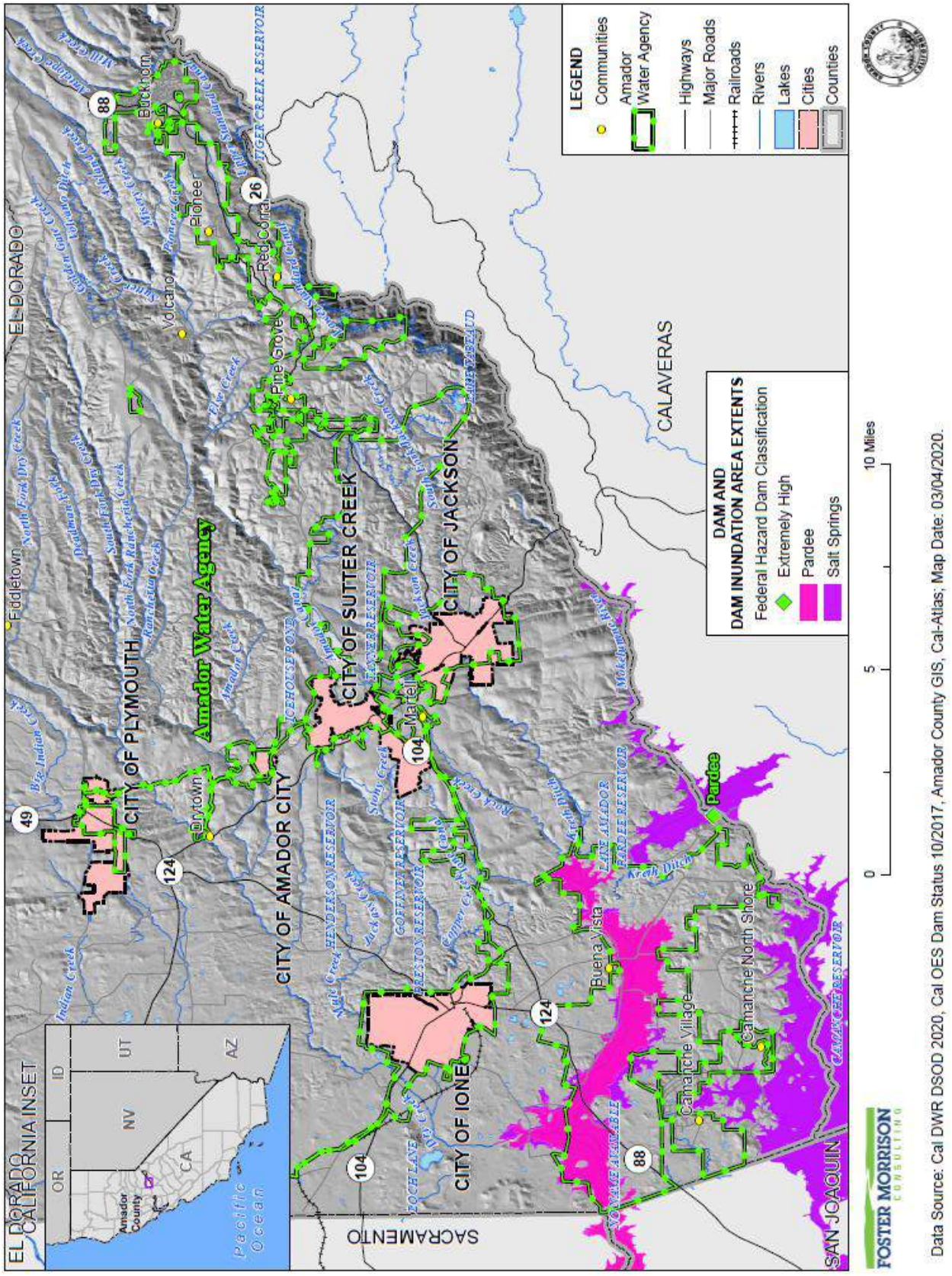
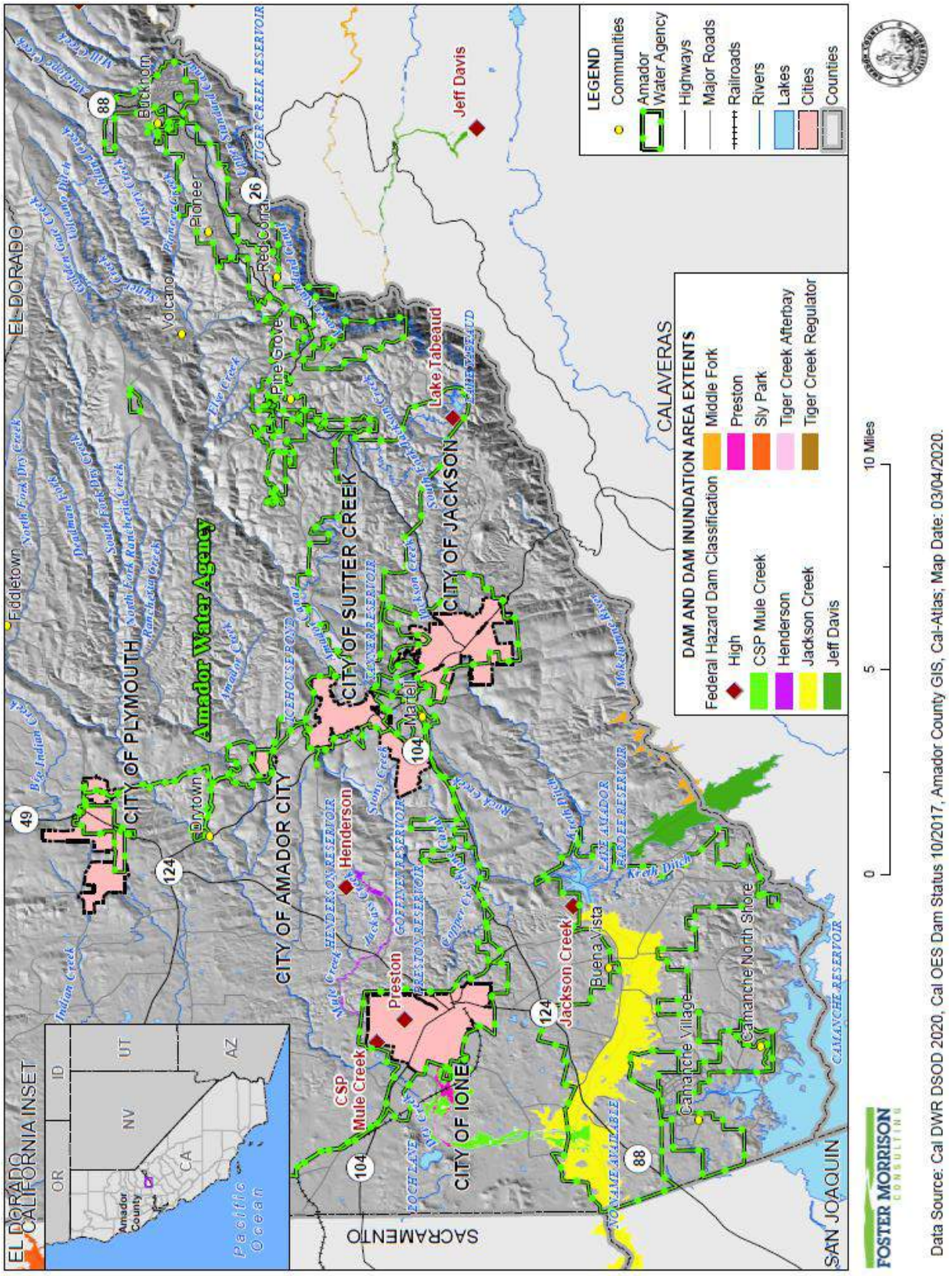


Figure F-5 AWA – High Hazard Dam Inundation Areas



The Agency owns the Ione Canal Dam, the Gayla Manor wastewater storage pond dam, and the Lake Camanche wastewater storage pond dam, all of which are low hazard dams. The primary risk from these low hazard dams involves property and potential environmental damage.

Past Occurrences

The Agency noted no dam failure occurrences that have affected the Agency.

Vulnerability to and Impacts from Dam Failure

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Impacts to the Agency from a dam failure flood 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.

PG&E Mokelumne River Project – Emergency Action Plan FERC # 137

The recently completed Ione Hydro facility depends on the Ione Reservoir to contain the discharged water for future use at the Ione Water Treatment Plant. If the dam fails, the water would be wasted down the natural drainage and not captured for future potable water treatment. Dam failure would also inundate the future site of a new Ione Res Water Treatment Plant. Careful consideration of treatment plant layout will be needed to correct for this potential risk.

Assets at Risk

Please refer to Table F-4.

Future Development

Dam failure would also inundate the future site of a new Ione Res Water Treatment Plant. Careful consideration of treatment plant layout will be needed to correct for this potential risk.

Drought & Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Drought is a complex issue involving 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. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and

commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the Agency, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages and for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the Agency and the County are shown in Section 4.2.11 of the Base Plan.

Past Occurrences

Since drought is a regional phenomenon, past occurrences of drought for the Agency are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.2.11 of the Base Plan.

The last drought period 2015 – 2017 saw an increase in infrastructure breaks within the water distribution systems.

Vulnerability to and Impacts from Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the Agency, 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.

Surface water accounts for approximately 94% of the Agency's total water supply. Surface water is the sole supply source for both the Amador Water System (AWS) and the Central Amador Water Project (CAWP) and is obtained from the Mokelumne River watershed. The Agency's main water supply is the Mokelumne River, a snow- and rain-fed river originating in the Sierra Nevada. The Mokelumne River watershed is a relatively narrow and steep watershed located northeast of the Sacramento-San Joaquin Delta on the western slope of the Sierra Nevada. The watershed, upstream of Camanche Dam, covers an area of 627 square miles and extends from Highland Peak (elevation 10,934 feet above sea level) near the crest of the Sierra Mountains to Camanche Reservoir (elevation 235 feet above sea level) located in the lower western foothills near Clements.

Annual precipitation (rainfall and snowfall) in the Mokelumne River Watershed, and thus river runoff, is extremely variable in Northern California. Within a year, precipitation is highly seasonal with most precipitation normally occurring between November and May and very little occurring between late spring and fall. Peak flows in the Mokelumne River normally occur during winter storms or during the spring snow-melt season from March through June. River flows decrease to a minimum in late summer or fall.

Amador County has a varying range of temperature and precipitation. The Sierra Nevada foothill areas experience hot, dry summers and mild winters. The higher elevations, about 5,000 feet, experience long and severe winters accompanied by heavy snowfall. The Agency is the main water purveyor for the western portion of Amador County. The Agency has the legal jurisdiction to serve water throughout Amador County

Relatively high water losses have been historically attributed to the Agency's raw water ditch conveyance and delivery system, specifically the Amador Canal and Ione Canal. The new Amador Transmission Pipeline, completed in July 2007, replaced the majority of the conveyance requirement for the canal by constructing a 33-inch pipeline between Lake Tabeaud and the Tanner Reservoir. The new pipeline mitigates for water historically lost during conveyance through the Amador Canal, lowering effective system demand and allowing the Agency to more efficiently use its water entitlements. Also, by eliminating canal losses, the Agency has been able to better identify residential, commercial and industrial losses.

Agency operational experience during normal, dry and multiple dry year conditions, such as 1988 to 1994, indicates that the spring runoff will continue to fill PG&E reservoirs to near capacity. These reservoirs form the head of both the AWS and CAWP surface water diversions. Even during unusually severe droughts, such as occurred in 1976/1977, and the prolonged drought of 1988 to 1994, the PG&E storage capacity and the priority of the water rights for such storage enables PG&E to deliver the full annual contract entitlements to the Agency. For the limited groundwater sources utilized by the Agency, the firm yield determined at the time of well installation indicates that the supply is consistent for normal, dry or multiple dry years. Climatic change is not considered to be a factor in the Agency's water supply reliability.

The original La Mel Heights groundwater well has been run continuously through a variety of seasonal and climatic conditions and has continued to produce a steady yield. The Agency added a second well in the La Mel Heights area to provide additional supply as well as to provide redundancy.

The Agency has completed a Groundwater Sustainability Study for the Lake Camanche Village service area, as directed by the State Department of Public Health (CDPH). To date, the water Cosumnes Sub-basin that supplies Lake Camanche Village has supplied sufficient water, but it should be noted that the Agency did not receive ownership of the system until 2001, therefore supply data for dry and multiple dry years is not available. With the existing four (4) wells and the requirement to be able to take the largest producing well (well 14) offline, there is limited ability to extend services.

There is potential for a huge impact in the Lake Camanche Village area as 2 of the 4 groundwater drinking water wells cannot be utilized because of contamination. It is difficult to find good producing groundwater wells in the area, but AWA may be able to work with EBMUD for production from their south shore membrane water treatment facility.

Assets at Risk

Please refer to Table F-4.

Future Development

Could have an impact on the Camanche Village future development due to lack of available water.

Earthquake (large damaging/small)

Likelihood of Future Occurrence–Unlikely
Vulnerability–High

Hazard Profile and 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.

Due to the Agency's geographic location and the areas seismic classification, service interruption due to seismic activity is considered minimal and is therefore not addressed in the Emergency Handbook.

Location and Extent

Since earthquakes are regional events, the whole of the Agency is at risk to earthquake. AWA and the surrounding area are relatively free from significant seismic and geologic hazards. There are no known or inferred active faults within the Agency.

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, as discussed in Section 4.2.12 of the Base Plan. 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 (equivalent to 5.5 to 6.5 on the Richter Scale). During a Mercalli VII, most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. The Agency is located in an area where few earthquakes of significant magnitude occur, so both magnitude and intensity of earthquakes are expected to remain low. Seismic shaking maps for the area show Amador County and the Agency fall within a low to moderate shake risk.

Past Occurrences

The Agency noted no past occurrences of earthquakes or that affected the Agency in any meaningful way.

Vulnerability to and Impacts from Earthquake

The combination of plate tectonics and associated California coastal mountain range building geology generates earthquake as a result of the periodic release of tectonic stresses. Amador County's mountainous terrain lies in the center of the North American and Pacific tectonic plate activity. There have been earthquakes as a result of this activity in the historic past, and there will continue to be earthquakes in the future of the California north coastal mountain region. Both the San Andreas Fault and the Sierra Frontal System faults poses possibly significant impacts to Amador County and the Agency as they have the capabilities of producing a quake.

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault; however, liquefaction can occur further from the source of the earthquake. In general, newer construction is more earthquake resistant than older construction due to enforcement of improved building codes. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions and associated liquefaction, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry (URM) and soft story buildings. The Agency has approximately 5 URM buildings, and no soft story buildings.

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. The AWA is within the less hazardous Zone 3.

Impacts from earthquake in the Agency will vary depending on the fault that the earthquake occurs on, the depth of the earthquake strike, and the intensity of shaking. Large events could cause damages to infrastructure, critical facilities, residential and commercial properties, and possible injuries or loss of life.

Assets at Risk

Due to the regional effects of an earthquake, a Hazus earthquake analysis was performed on a countywide basis. This can be found in Section 4.3.9 of the Base Plan. While these runs were not done specific to the Agency, maps showing damage in the County show greater areas of damage near the Agency in the County. The deterministic 6.7 Hayward Fault run showed minimal damage to the County. The probabilistic 6.7 scenario showed moderate to high damage to areas that the AWA serves. Please refer to Table F-4.

Future Development

Earthquakes are common in California and a large earthquake would have a devastating effect on AWA older facilities that are not up to current Seismic Code from the building requirements.

Flood: 100-/500-Year

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the County or in the Agency, and have caused damages in the past. Flooding is a significant problem in Amador County and the Agency. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred both within the 1% and 0.2% annual chance floodplains and in other localized areas.

As previously described in Section 4.2.13 of the Base Plan, the Amador County Planning Area and the AWA have been subject to historical flooding. AWA is traversed by several stream systems and is at risk to the 1% and 0.2% flood.

Location and Extent

The AWA has areas located in the 1% and 0.2% annual chance floodplain. This is seen in Figure F-6.

Figure F-6 Amador Water Agency – FEMA DFIRM Flood Zones

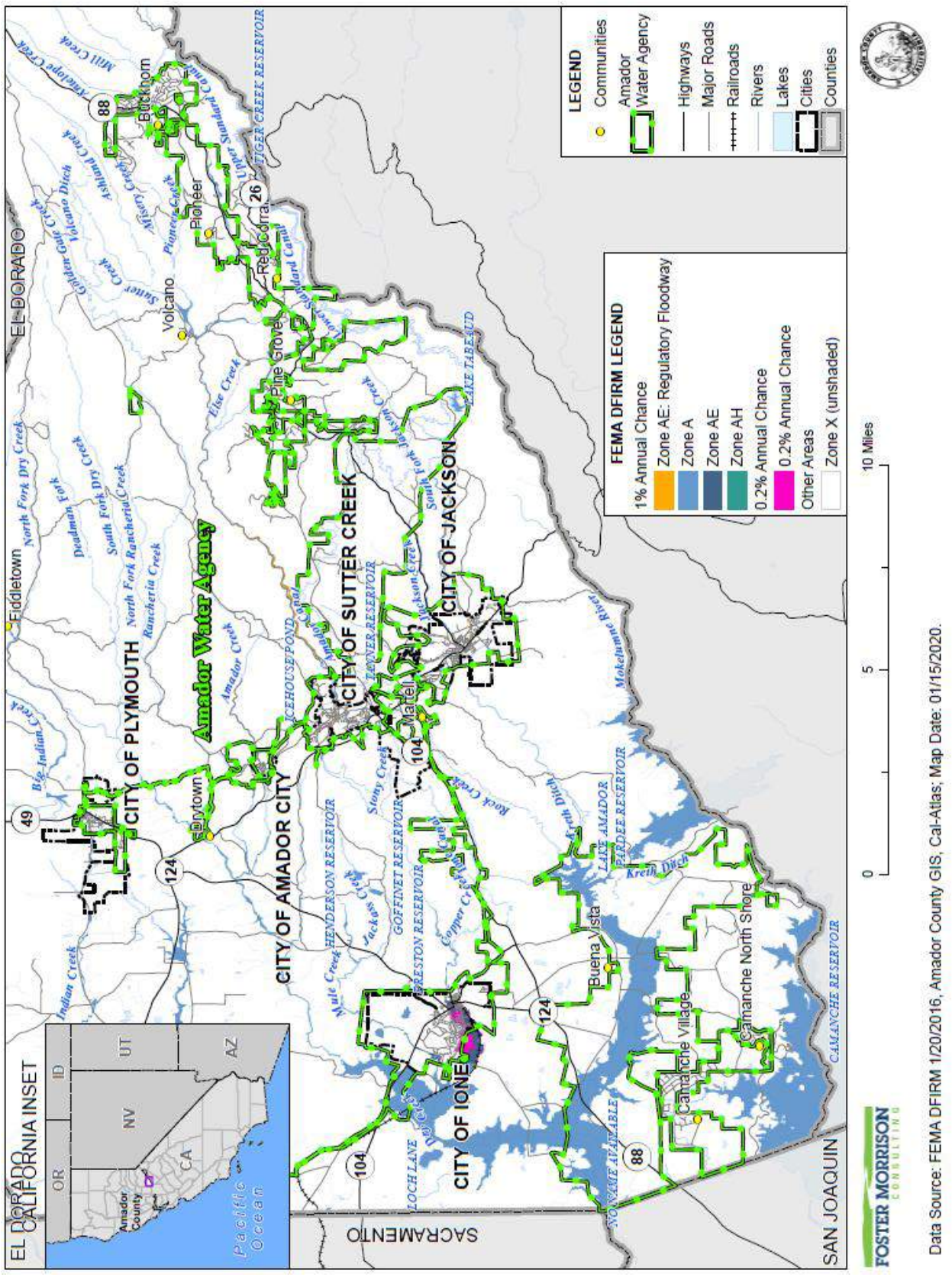


Table F-5 details the DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the Agency.

Table F-5 Amador Water Agency– DFIRM Flood Hazard Zones

Flood Zone	Description	Flood Zone Present in the Agency
A	100-year Flood: No base flood elevations provided	Y
AE	100-year Flood: Base flood elevations provided	Y
AE Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided	Y
Shaded X	500-year Flood: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	Y
X (unshaded)	No flood hazard	Y

Source: FEMA

Additionally, flood extents can generally be measured in volume, velocity, and depths of flooding. Expected flood depths in the Agency vary, depending on the nature and extent of a flood event; specific depths are unknown. Flood durations in the Agency tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Flooding in the Agency tends to have a shorter speed of onset, due to the amount of water that flows through the Agency.

Past Occurrences

A list of state and federal disaster declarations for Amador County from flooding is shown on Table F-6. These events also likely affected the Agency to some degree.

Table F-6 Amador County – State and Federal Disaster Declarations from Flood 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	15	1955, 1958, 1963, 1964, 1969, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1959, 1963 (twice), 1969, 1980, 1982, 1986, 1995, 1997, 1998

Source: Cal OES, FEMA

The AWA noted that flooding affected the Agency in February of 2017. Flooding and heavy rains eroded an embankment at the Preston Pump Station. The erosion extended up to and underneath the pump slab, threatening the stability of the structure. The Agency removed the building, pumps, and pump station from the AWA system. The AWA was granted $377,841 in HMGP funds to replace the pumps and structure.

In addition to the Preston Pump Station, the Amador Canal was damaged near Highway 88. The earth foundation supporting the berm is steep (45° angle). When the supporting earth became saturated, the berm lost support. AWA lowered the water in the canal to reduce pressure on the damaged berm. The AWA was granted $769,920 by FEMA and Cal OES to repair the damages. $12,000 in damages were sustained by the Agency.

Flooding at Mace Meadows on 2/6/2017 created runoff that twice overtopped the AWA Mace Meadow Pump Station. Once floodwaters overtopped the station, 2 60 horsepower electric pumps and contactor switches were burned out. This caused almost $12,000 in damages. On the same day, heavy rains and discharge from a nearby culvert inundated Eggiman Lane, which AWA uses as an easement for pipe access. When the road was washed away, it exposed a 6" pipeline. 480' of pipe was damaged as a result. $50,915 in damages was sustained by the Agency.

Vulnerability to and Impacts from Flood

Floods have been a part of the Agency's historical past and will continue to be so in the future. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damages. Predominantly, the effects of flooding are generally confined to areas near the waterways of the County. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat. This threatens structures in the floodplain. Structures can also be damaged from trees falling as a result of water-saturated soils. Electrical power outages happen, and the interruption of power causes major problems. Loss of power is usually a precursor to 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. People may be swept away in floodwaters, causing injuries or deaths.

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 as well as life safety issues. 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. Floodwaters can transport large objects downstream which can damage or remove stationary structures. 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. Other problems connected with flooding and storm water runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Assets at Risk

Please refer to Table F-4.

Future Development

Careful consideration of future development will keep facilities safe from floods except for the existing facilities with water intake structures, pumping stations and water treatment facilities near rivers and streams. The Tiger Creek water treatment facility and Tiger Creek pumping station are adjacent to a river.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Flooding occurs in areas other than the FEMA mapped 1% and 0.2% annual chance 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 County 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.

Location and Extent

The AWA is subject to localized flooding throughout the Agency. Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the Agency vary by location. Flood durations in the Agency tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Localized flooding in the Agency tends to have a shorter speed of onset, especially when antecedent rainfall has soaked the ground and reduced its capacity to absorb additional moisture.

Past Occurrences

The AWA noted that flooding affected the Agency in February of 2017. Flooding and heavy rains eroded an embankment at the Preston Pump Station. The erosion extended up to and underneath the pump slab, threatening the stability of the structure. The Agency removed the building, pumps, and pump station from the AWA system. The AWA was granted $377,841 in HMGP funds to replace the pumps and structure.

In addition to the Preston Pump Station, the Amador Canal was damaged near Highway 88. The earth foundation supporting the berm is steep (45° angle). When the supporting earth became saturated, the berm lost support. AWA lowered the water in the canal to reduce pressure on the damaged berm. The AWA was granted $769,920 by FEMA and Cal OES to repair the damages. $12,000 in damages were sustained by the Agency.

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Vulnerability to and Impacts from Localized Flooding

Historically, much of the growth in the Agency and County has occurred adjacent to streams, resulting in significant damages to property, and losses from disruption of community activities when the streams

overflow. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff.

The Agency noted that localized stormwater flooding issues are estimated to occur in approximately 1% of the Amador Water Agency's (Agency) jurisdiction, but it still poses a sever threat if and when flooding occurs. The Agency has multiple facilities in the 100-year to 500-year flood zone and a few facilities in higher severity areas as defined by the Federal Emergency Management Agency (FEMA). Although the chance of flooding is low, when a flood event occurs, it can put multiple Agency utility facilities and service in jeopardy, or even complete destruction. In 2017 the Agency lost and/or incurred damage to multiple facilities. Overall, localized stormwater flooding poses a significant financial impact to the Agency, therefore we are working towards identifying any pre-existing conditions on a regular basis.

The Agency tracks localized flooding areas. Affected localized flood areas identified by the AWA are summarized in Table F-7.

Table F-7 AWA – List of Localized Flooding Problem Areas

Area Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
LaMel Heights	X	X	X	X	X	X	X
Tanner	X	X	X	X	X	X	X
Buckhorn/CAWP	X	X	X	X	X	X	X
Ione	X	X	X	X	X	X	X
Lake Camanche	X	X	X	X	X	X	X
PG & E at Tiger Creek	X	X	X	X	X	X	X

Source: AWA

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, and degradation of water quality, losses of environmental resources, and certain health hazards.

Assets at Risk

Please refer to Table F-4.

Future Development

The AWA does not think that future development will be affected by localized flooding. Appropriate siting and mitigation of possible localized flooding occurs during the building of facilities

Landslide, Mudslide, Debris Flows

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to the California Geological Survey, landslides refer to a wide variety of processes that result in the perceptible downward and outward movement of soil, rock, and vegetation under gravitational influence. Common names for landslide types include slump, rockslide, debris slide, lateral spreading, debris avalanche, earth flow, and soil creep. Landslides may be triggered by both natural and human-induced changes in the environment that result in slope instability.

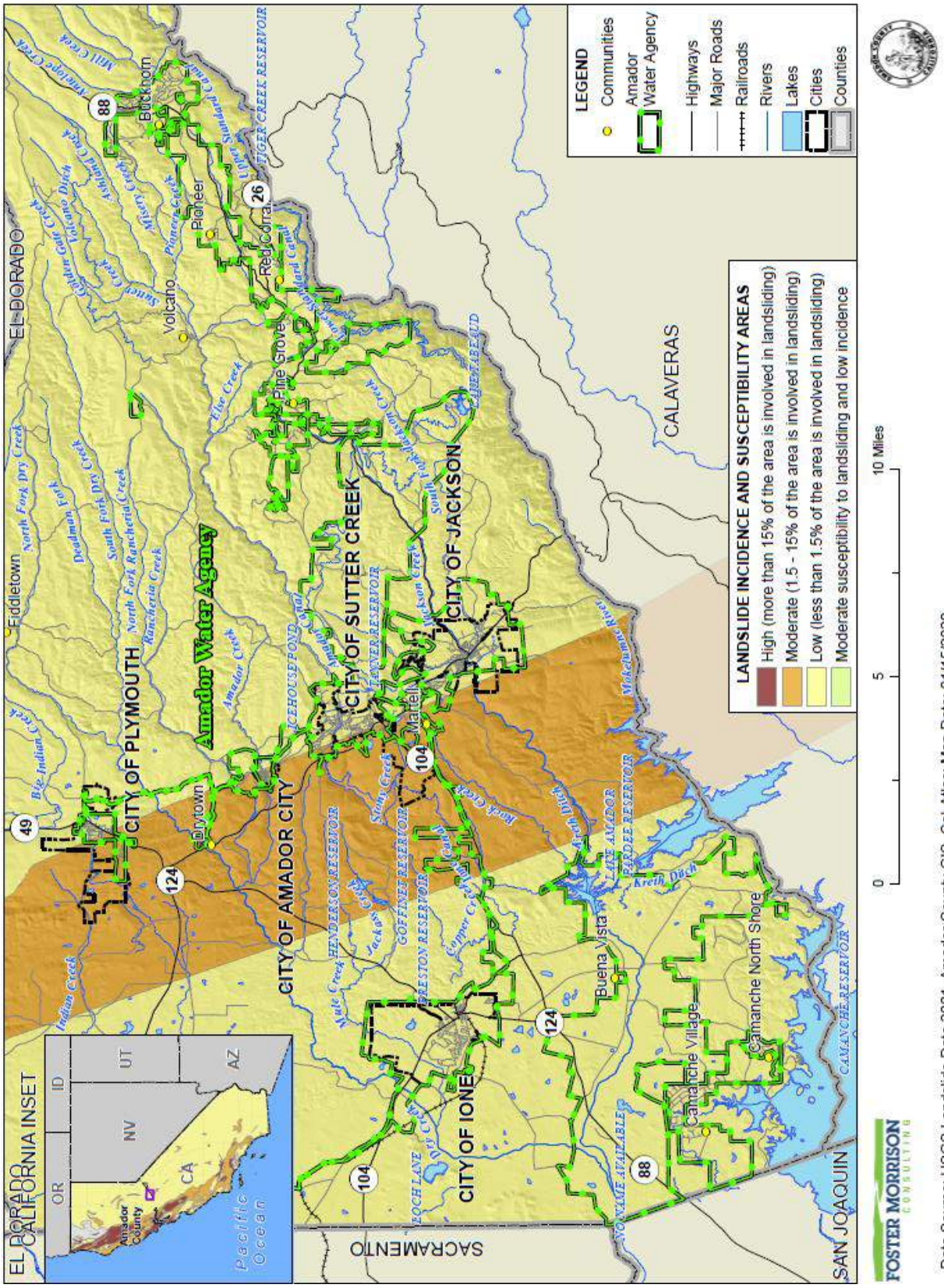
The susceptibility of an area to landslides depends on many variables including steepness of slope, type of slope material, structure and physical properties of materials, water content, amount of vegetation, and proximity to areas undergoing rapid erosion or changes caused by human activities. These activities include mining, construction, and changes to surface drainage areas. Landslide events can be determined by the composition of materials and the speed of movement. A rockfall is dry and fast while a debris flow is wet and fast. Regardless of the speed of the slide, the materials within the slide, or the amount of water present in the movement, landslides are a serious natural hazard.

Another type of landslide, debris flows, also occur in some areas of the Amador County and the Agency. These debris flows generally occur in the immediate vicinity of existing drainage swales or steep ravines. Debris flows occur when near surface soil in or near steeply sloping drainage swales becomes saturated during unusually heavy precipitation and begins to flow downslope at a rapid rate.

Location and Extent

Landslides, mudslides, and debris flows can affect certain areas of the Agency. The USGS has estimated that the risk varies across the Agency and has created maps showing risk variance. This risk variance falls into one of the following landslide incidence and susceptibility categories: High, Moderate, and Low. These are discussed in Section 4.3.12 of the Base Plan. Following the methodology described in Section 4.3.12 of the Base Plan, landslide incidence and susceptibility maps for the AWA were created. Figure F-7 shows the USGS landslide incidence and susceptibility areas in the Agency. As shown on the maps, risk varies within the Agency range from low to moderate.

Figure F-7 Amador Water Agency – Landslide Incidence and Susceptibility Areas



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.

Past Occurrences

In 2005, the north side of Ridge Road near Sutter Creek failed. A landslide took out 300 feet of water supply ditch. This supply fed 6 cities/towns. The area was affected for one week. No towns were out of water due to the conservation, stored reserves of water and quick action. No one was completely out of water. Primary water supply is now delivered via pipeline.

The AWA noted that flooding affected the Agency in February of 2017. Flooding and heavy rains eroded an embankment at the Preston Pump Station. The erosion extended up to and underneath the pump slab, threatening the stability of the structure. The Agency removed the building, pumps, and pump station from the AWA system. The AWA was granted $377,841 in HMGP funds to replace the pumps and structure.

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Vulnerability to and Impacts from Landslide

Common names for landslide types include slumps, rockslides, debris slides, lateral spreading, debris avalanches, earth flows, and soil creep. 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 may be triggered by both natural- and human-caused activity.

Land/mudslides, and debris flow occur at various times throughout the year, there are several areas of concern unique to the Agency. Historically the Agency has been at risk for the above referenced events, primarily during the winter and spring months when waterways swell due to heavy rainfall. These events may produce hazards in multiple areas of the Agency, and can cause an impact to their canals, tanks, pipelines, treatment plants, private roadways, and pump stations. Historically the Agency has suffered loss or financial burden due to said events. Overall vulnerability to land/mudslides in the Agency is low but the Agency continues to monitor known areas at risk with the intent to minimize the impact to customers.

Assets at Risk

Please refer to Table F-4.

Future Development

Landslides will impact the costs of maintaining access to our existing facilities. At this time there is no future developments planned in a landslide area.

Severe Weather: Extreme Heat

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to 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 extreme heat and high humidity, evaporation is slowed, and the body must work extra hard to maintain a normal temperature." Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

In addition to the risks faced by citizens of the Agency, there are risk to the built environment from extreme heat. While extreme heat on its own does not usually affect structure, extreme heat during times of drought can cause wildfire risk to heighten. Extreme heat and high winds can cause Public Safety Power Shutoff (PSPS) events, causing issues to buildings in the Agency.

Extreme heat affects the Agency's ability to perform operation and maintenance. Additional need to purchase stand-by generator equipment, increasing costs in fuel and manpower to keep equipment fueled and running. The generators are required during a PSPS to run the following facilities such as Pump Stations, Sewer Lift Stations, Water and Wastewater Treatment Plants, Administration offices and Communication systems such as radio, landlines and cell phones. It does have an effect to adequately supply water for fire protection during severe heat and wind events.

Location and Extent

Heat is a regional phenomenon and affects the whole of the Agency. 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 affect vulnerable populations and communities. Heat waves do not generally cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios.

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 Section 4.2.2 of the Base Plan.

Past Occurrences

The Agency Planning Team note that since extreme heat is a regional phenomenon, events that affected the County also affected the Agency. Those past occurrences were shown in the Base Plan in Section 4.2.2.

Vulnerability to and Impacts from Extreme Heat

The Agency experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-115°F in rather extreme situations. During these times, drought conditions may worsen. Also, PSPS events may occur during these times as well. Health impacts for AWA employees are the primary concern with this hazard, though economic impacts are also an issue.

Days of extreme heat have been known to result in medical emergencies, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts. Extreme heat can also dry out vegetation, making it more vulnerable to wildfire ignitions. During periods of extreme heat (with high winds), PG&E can institute the Public Safety Power Shutoff (PSPS).

Extreme heat affects the Agency's ability to perform operation and maintenance. Additional need to purchase stand-by generator equipment, increasing costs in fuel and manpower to keep equipment fueled and running. The generators are required during a PSPS to run the following facilities such as Pump Stations, Sewer Lift Stations, Water and Wastewater Treatment Plants, Administration offices and Communication systems such as radio, landlines and cell phones. It does have an effect to adequately supply water for fire protection during severe heat and wind events.

Assets at Risk

Please refer to Table F-4.

Future Development

AWA facilities around Lake Camanche and the City of Ione will have increased hot summers with extreme heat that will require more air conditioning to keep chemicals and electrical equipment safe. Costs will increase in operations and maintenance that will be passed on to the ratepayers.

Severe Weather: Heavy Rains and Storms (Hail, Lightning)

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Storms in the Agency occur annually 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 Agency falls mainly in the fall, winter, and spring months.

Primary concerns associated with heavy rains 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 storm water runoff include erosion, sedimentation, and degradation of water quality, losses of environmental resources, and certain health hazards.

Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the Agency. All portions of the Agency are at risk to heavy rains. Most of the severe rains occur during the fall, winter, and spring months. There is no scale by which heavy rains and severe storms are measured. 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 severe storms in California, Amador County, and the Agency can range from minutes to hours to days. Information on precipitation extremes can be found in Section 4.2.3 of the Base Plan.

Past Occurrences

According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the Agency. This is the cause of many of the federal disaster declarations related to flooding.

The AWA noted that flooding affected the Agency in February of 2017. Flooding and heavy rains eroded an embankment at the Preston Pump Station. The erosion extended up to and underneath the pump slab, threatening the stability of the structure. The Agency removed the building, pumps, and pump station from the AWA system. The AWA was granted $377,841 in HMGP funds to replace the pumps and structure.

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Vulnerability to and Impacts from Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrences in the Agency. These events can cause localized flooding. Elongated events, or events that occur during times where the ground is already saturated can cause 1% and 0.2% annual chance flooding. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the Agency.

Actual damage associated with the effects of severe weather include impacts to property, critical facilities (such as utilities), and life safety. Heavy rains and storms often result in localized flooding creating significant issues. Roads can become impassable and ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical infrastructure. Floodwaters and downed trees can break utilities and interrupt services.

Heavy rains impact access to AWA facilities due landslides**,** downed trees, and flooding. Power outages affect communication and increases labor costs to fuel and maintain generators. Heavy rains and storms affect our ability to maintain wastewater ponds which leads to spills which lead to potential notices of violations and fines from regulatory agencies.

Assets at Risk

Please refer to Table F-4.

Future Development

Future development will require review of storm drainage and watershed flows to prevent and protect our water and wastewater infrastructure.

Severe Weather: High Winds and Tornadoes

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

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. High winds can cause significant property

and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss.

Portions of the County and Agency 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. These types of winds are also associated with the rapid spread of wildfires, making some regions which experience these winds particularly fire prone.

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 form when cool, dry air sits on top of warm, moist air. Tornadoes are the most powerful storms that exist. Tornadoes, though rare, are another severe weather hazard that, though rare, can affect areas in the lower elevations of the Amador County Planning Area, primarily during the rainy season in the late fall, winter, and early spring.

High winds impact access to our facilities due to downed trees. Power outages affect communication and increases labor costs to fuel and maintain generators.

Location and Extent

The entire Agency is subject to significant, non-tornadic (straight-line), winds. Each area of the County and Agency 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 12 category scale that relates wind speed to observed conditions at sea or on land. Its full name is the Beaufort Wind Force Scale. The Beaufort Scale was shown in Section 4.2.4 of the Base Plan.

Tornadoes, while rare, can occur at any location in the County and Agency. The areas in the lower elevations of the County tend to be at greater risk than the areas in the foothills and higher. 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 (EF) 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. The F Scale and EF Scale are shown in Section 4.2.4 of the Base Plan.

Past Occurrences

The Agency noted that since high winds is a regional phenomenon, events that affected the lower elevations of the County also affected the Agency. Those past occurrences were shown in the Base Plan in Section 4.2.4. Many minor events that have created access problem by blocking roads due to fallen trees, downed power lines, roof damage to tanks and buildings.

Vulnerability to and Impacts from Severe Weather: Wind and Tornado

High winds are common occurrences in the Agency throughout the entire year. Straight line winds are primarily a public safety and economic concern. Windstorm can cause damage to structures and power lines which in turn can create hazardous conditions for people. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered. High winds can impact critical facilities and infrastructure and can lead to power outages. Wind can also drive wildfire flames, spreading wildfires quickly. High winds are also a component of red flag days, which can cause PG&E to enact the Public Safety Power Shutdowns (PSPS).

High winds impact access to our facilities due to downed trees. Power outages affect communication and increases labor costs to fuel and maintain generators. High winds that cause power outages also affect our ability to supply water and keep wastewater systems operational. Occasionally there is damage to tanks and buildings (primarily roofs)

Assets at Risk

Please refer to Table F-4.

Future Development

Future development would include the need for stand by power. Design facilities out of different materials such as underground concrete tanks instead of above-ground steel tanks. Consider building facilities out of CMU (concrete block) instead of metal buildings to withstand high winds and fire.

Severe Weather: Winter Storms and Freeze

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to the National Weather Service), extreme cold often accompanies a winter storm or is left in its wake. Winter snowstorms can include heavy snow, ice, blizzard conditions, and cold temperatures. Freezing temperatures can also occur without the accompanying winter storm.

The upcountry areas of the county in the CAWP system get snow and freezing weather and the lower elevations get freezing weather.

Location and Extent

Winter storms and freeze are regional issues, meaning the entire Agency is at risk to freeze and winter storm. 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 21.8 days that fall below 32°F in western Amador County. 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. Snowfall often

accompanies storms in the upper elevations of the County is measured in snow depths. The Agency sees little snowfall in the areas it serves in the lower elevations of the County. In the upper elevations, snow not only falls but can accumulate.

Past Occurrences

The Agency noted that freeze and winter storm is a regional phenomenon; events that affected the lower elevations of the County also affected the Agency. Those past occurrences were shown in the Base Plan in Section 4.2.5.

There have been past events that have affected the Agency. In 2003 a severe winter storm hit near Pioneer. Downed power lines were widely reported. There were road and school closures. The power outage affected the Agency's ability to run the water treatment plant and pump stations that pump the water to the required service areas.

Winter storms and freezing temperatures lead to broken pipes. Snow load on facility roofs cause damage. Heat tape added to eaves of roofs to keep snow load to a minimum.

Vulnerability to and Impacts from Severe Weather: Freeze and Winter Storms

The Agency experiences temperatures below 32 degrees during the winter months. The temperature moves to the teens in rather extreme situations, especially in the upper elevations of the District. Freeze can cause injury or loss of life to residents of the Agency. While it is rare for buildings to be affected directly by freeze, damages to pipes that feed building can be damaged during periods of extreme cold. Extreme cold and freeze can affect critical facilities and infrastructure, down trees, break pipes, and can be a life safety issue. When extreme cold is coupled with high winds or ice storms, power lines may be downed, resulting in an interruption of utilities and critical services. Occasionally, winter storms with snow and ice can affect the Agency. Transportation networks, communications, and utilities infrastructure are the most vulnerable physical assets in the Agency. The ability for the Agency to continue to operate during periods of winter storm and freeze is paramount.

The Agency is unable to recycle backwash water at the Buckhorn plant due to the drying beds freezing. Snow and icy conditions make it difficult to access the facilities. Meter readers are unable to read meters. Increase in customer calls for broken and frozen pipes. Frozen distribution pipes lead to no water calls and breaks.

Assets at Risk

Please refer to Table F-4.

Future Development

Consider designing facilities to incorporate mechanisms to combat freezing. This will increase operations and maintenance cost.

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

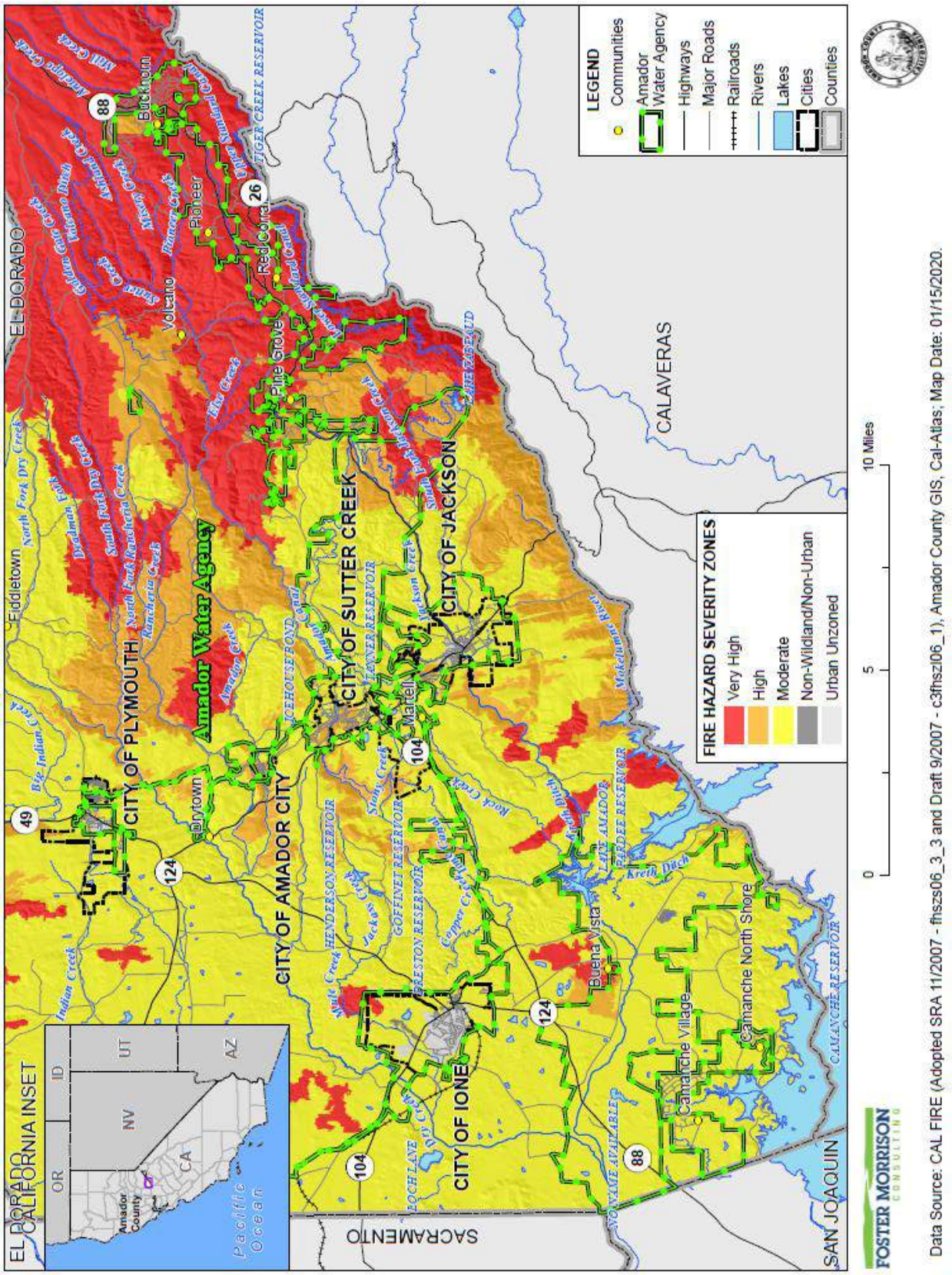
Hazard Profile and Problem Description

Wildland fire and the risk of a conflagration is an ongoing concern for the AWA. 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. Wildland fires affect grass, forest, and brush lands, 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. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

Location and Extent

Wildfire can affect all areas of the Agency. CAL FIRE has estimated that the risk varies across the Agency and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the AWA were created. Figure F-8 shows the CAL FIRE FHSZ in the Agency. As shown on the maps, fire hazard severity zones within the Agency range from urban unzoned (low) to very high.

Figure F-8 Amador Water Agency – Fire Hazard Severity Zones



Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more.

Past Occurrences

A list of state and federal disaster declarations for Amador County from wildfire is shown on Table F-6. These events also likely affected the Agency to some degree.

Table F-8 Amador County – State and Federal Disaster Declarations from Wildfire 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	1	2015	1	1961

Source: Cal OES, FEMA

In 2007, a wildfire occurred twenty miles east of Pioneer. Roads were closed and forested areas damaged. There was an increase in water turbidity, but it was manageable even with the short loss of power.

2015 Butte Fire FEMA 5111-FM, FEMA ID: 000-UYUB9-00 CAL OES ID 005-91001 While we did not lose any facilities due to the Butte fire, extensive resources were used to mobilize generators for power outages, provide water to non-agency customers who could not operate their wells. The Agency provided water to animals in need and kept staff on-call to keep an eye on the fire development. Staff kept Agency facilities secure from vandalism.

Vulnerability to Wildfire

The wildfire hazard is one of the highest priority hazards in the County and Agency, and is the hazard with the greatest potential for catastrophic loss. High fuel loads in the County and Cities, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. The more urbanized areas within the County are not immune from fire. The dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and Agency, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Potential impacts from wildfire include loss of life and injuries; damage to structures 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 Agency. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the Agency 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 Agency; smoke and air pollution from wildfires can be a severe health hazard.

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 PSPSs 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.

While we did not lose any facilities due to the Butte fire, extensive resources were used to mobilize generators for power outages, provide water to non-agency customers who could not operate their wells. The Agency provided water to animals in need and kept staff on-call to keep an eye on the fire development. Staff kept Agency facilities secure from vandalism.

Assets at Risk

Please refer to Table F-4.

Future Development

Ensure all facilities are kept cleared of debris and adequate fire protection. Improve our ability to deliver adequate fire flows by designing pump stations and distribution systems with fire flow protections. Design our tanks to be built with concrete or steel instead of redwood. Install stand-by power at all facilities to ensure fire flow protection.

F.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

F.6.1. Regulatory Mitigation Capabilities

Table F-9 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the AWA.

Table F-9 AWA Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
General Plan	Y	yes, yes, yes
Capital Improvements Plan	Y	yes, yes, yes
Economic Development Plan	N	
Local Emergency Operations Plan	Y	yes, yes, yes
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Yes
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	
Fire department ISO rating:	Y	Yes
Site plan review requirements	Y	Yes
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	N/A	
Subdivision ordinance	N/A	
Floodplain ordinance	N/A	
Natural hazard specific ordinance (storm water, steep slope, wildfire)	N/A	
Flood insurance rate maps	N/A	
Elevation Certificates	N/A	
Acquisition of land for open space and public recreation uses	N/A	
Erosion or sediment control program	N/A	
Other	N/A	
How can these capabilities be expanded and improved to reduce risk?		
Continued refinement of Agency capabilities will be pursued to reduce risk.		

Source: AWA

Integrated Regional Water Management Plan Update (November 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). Because IRWM Plans are not required to follow the exact outline of the IRWM Plan Standards, the2018 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 2018 IRWM Plan Standards are met by this MAC Plan 2018 Update

Urban Water Management Plan (2015)

The Urban Water Management Plan was prepared in accordance with the Urban Water Management Act. The Act is defined by the California Water Code, Division 6, Part 2.6, and §§10610 through §§10657. The Act became part of the California Water Code with the passage of Assembly Bill 797 during the 1983-1984 regular session of the California legislature. The Act requires urban water suppliers providing municipal water to more than 3,000 connections or supplying more than 3,000 ac-ft. of water annually to adopt and submit a plan every five years to the California Department of Water Resources (DWR).

Amador Water Agency provides potable and raw water to more than 25,000 people for municipal, industrial, and irrigation uses as well as wastewater collection and treatment services to meet the needs of our customers. While demands for Agency water have flattened during 2008 recession, the Agency intends to use this UWMP to manage the Agency's water supplies and water demands over a range of normal and emergency conditions.

The Agency is committed to maximizing available water resources and minimizing the need to obtain additional water supplies. The Agency has done this and will continue to do this by utilizing water management tools and developing strategic partnerships with upstream, downstream, and nearby agencies and districts.

Water Conservation Plan (November 2010)

Efficient use of existing water supplies is extremely important to Amador Water Agency. In reflection of this philosophy, the Agency has developed this Conservation Plan, building upon conservation strategies identified and documented in the Urban Water Management Plan with the intent to further extend the Agency's water resources. Amador Water Agency is committed to maximizing available water resources and minimizing the need to obtain additional water supplies. The Agency has done this, and will continue to do so, by utilizing water management tools and developing strategic partnerships with upstream, downstream, and nearby agencies and districts. Further, the Agency is committed to working with the public to facilitate regional water management efforts and to educate regarding the importance of water conservation. The Agency predicts that, by working with their numerous partners and implementing the

programs described in this Conservation Plan, they will be able to continue managing and efficiently using their existing water supply sources through at least the year 2030.

Water Code (Revised July 2, 2007) Revision in Process by end of 2020

The Amador Water Agency Water Code sets out the general policies for operating its water system. The Water Code delineates the specifics of how the Agency runs day to day operations, as well as its rules and regulations. Voluntary and mandatory water conservation measures during drought situations are set forth.

F.6.2. Administrative/Technical Mitigation Capabilities

Table F-10 identifies the Agency department(s) responsible for activities related to mitigation and loss prevention in the Agency.

Table F-10 AWA's Administrative and Technical Mitigation Capabilities

Administration	**Y/N**	**Describe capability Is coordination effective?**
Planning Commission	N	Amador County
Mitigation Planning Committee	N	Amador County
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	The Agency has started maintenance activities for Fire Mitigation, we have a long way to go but AWA is working towards a more effective maintenance plan.
Mutual aid agreements	Y	Jackson Valley Irrigation District; WARN; City of Plymouth; River Pines PUD
Other	N/A	
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	Amador County
Floodplain Administrator	N	Amador County
Emergency Manager	Y/FT	Staff needs more Hazard Mitigation training and better coordination between Agencies.
Community Planner	N	Amador County
Civil Engineer	Y/FT	Staff needs more Hazard Mitigation training and better coordination between Agencies.
GIS Coordinator	Y/FT	Staff needs more Hazard Mitigation training and better coordination between Agencies.
Other	N/A	
Technical	**Y/N**	**Describe capability Has capability been used to assess/mitigate risk in the past?**
Warning systems/services (Reverse 911, outdoor warning signals)	Y	The IVR (Interactive Voice Response) is used on a regular basis at the Agency and is quite effective.
Hazard data and information	N	

Grant writing	Y	AWA staff has full capabilities in grant writing and has utilizes grant writing regularly.
Hazus analysis		
Other	N/A	
How can these capabilities be expanded and improved to reduce risk?		
More education and training		

Source: AWA

F.6.3. Fiscal Mitigation Capabilities

Table F-11 identifies financial tools or resources that the Agency could potentially use to help fund mitigation activities.

Table F-11 AWA's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (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	Yes. Hazard mitigation and capital replacement projects. Yes.
Authority to levy taxes for specific purposes	Y	
Fees for water, sewer, gas, or electric services	Y	
Impact fees for new development	Y	
Storm water utility fee	Y	
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities	Y	
Community Development Block Grant	Y	
Other federal funding programs	Y	
State funding programs	Y	
Other	Y	
How can these capabilities be expanded and improved to reduce risk?		
These capabilities can be expanded with additional staffing to manage grants and grant writing.		

Source: AWA

F.6.4. Mitigation Education, Outreach, and Partnerships

Table F-12 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 F-12 AWA's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	The Agency uses Facebook, mailings, and our website as a source of ongoing public education.
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	Y	
Other	N/A	
How can these capabilities be expanded and improved to reduce risk?		
Additional programs can help educate customers and will help improve preparedness response.		

Source: AWA

F.6.5. Other Mitigation Efforts

The Agency has many other completed or ongoing mitigation efforts that include the following:

- Funding was received in 2018 from FEMA to replace 4 redwood tanks with 3 fire resistant (steel tanks).
- Long Term Water Needs Study 2017
- Integrated Regional Water Management Plan Update 2018
- Central Amador Water Project (CAWP) Environmental Impact Report 2017
- Urban Water Management Plan 2015; and Master Water Plan (draft).

F.7 Mitigation Strategy

F.7.1. Mitigation Goals and Objectives

The AWA adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

F.7.2. Mitigation Actions

The planning team for the AWA identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and

timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Aquatic Invasive Species
- Climate Change
- Dam Failure
- Drought & Water shortage
- Earthquake (large damaging/small)
- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- Landslide, Mudslide, Debris Flow
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (Hail, Lightning)
- Severe Weather: High Winds and Tornadoes
- Severe Weather: Winter Storms and Freeze
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan 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 countywide public outreach action, 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 plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

Action 1. CAWP Standby Generators

Hazards Addressed: Wildfire, Climate Change, Dam Failure, Earthquake, all Severe Weather hazards, Landslide

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: AWAs CAWP water system has been built on many smaller developments being rolled into one by Amador County and AWA where critically small pipelines exist and multiple small potable water tanks do not provide the necessary fire flow during a wildfire or fire event. With PG&E, the local power company, disconnecting the electrical grid multiple times during the wildfire season to protect the area, AWA must deliver water for both potable drinking water use and fire flow. Generators provide the redundancy necessary for addressing the tragic wildfire events.

Project Description: Add 13 generators to AWA facilities throughout the CAWP system.

Other Alternatives: Continue with the risk of wildfire destroying multiple tanks and houses with unavailable fire flow with loss of power.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The AWA Master Plan to be completed in October 2020. AWA has consistently added standby generators to agency sites as funding becomes available.

Responsible Office/Partners: N/A

Cost Estimate: Estimated at $650,000

Benefits (Losses Avoided): Estimated at $1,500,000

Potential Funding: Unknown at this time

Timeline: 1-3 years

Project Priority: High

Invasive Species Actions

Action 2. Amador and Ione Water Systems Taste and Odor Mitigation

Hazards Addressed: Aquatic Invasive Species

Goals Addressed: 1, 2, 3, 4, 5

Issue / Background: Historically, the Ione reservoir has always experienced increased odors (and as a result taste issues) during the spring / summer transition. In 2004 an AWA construction crew replaced the single pipeline intake with a manifold reservoir intake of 4 pipes. This retrofit eliminated short circuiting in the reservoir, improved reservoir circulation overall, and reduced issues associated with Taste and Odor in the community. In 2005 the 960 cubic feet of Granular Activated Carbon (GAC) in the filters at the Ione Water Treatment Plant was replaced. This work effort all but eliminated taste and odor complaints from the community. In 2016 and 2017, the Ione WTP had its first Taste and Odor (T&O) incidents since replacing the GAC filter media, starting on June 10, 2016 and July 10, 2017. Typically, Ione T&O events occur in the summer months when the weather turns extremely hot, warming reservoirs, and creating perfect conditions for algae and other organisms to grow. T&O events occur naturally throughout the world and are not exclusive to the Amador County region. Many solutions have been attempted at many different locations; however the most effective method is a continuous monitoring program whereby T&O events are caught before they become a major nuisance to the customers which we serve.

In the summers of 2016 and 2017, the number of complaints regarding T&O in the City of Ione spiked with many people noting earthy/musky flavors in the water. Samples were also taken from the Tanner Raw Reservoir with negligible results. The negligible results at the Tanner Raw Reservoir indicated a problem localized to the Ione Reservoir. Algae blooms were not observed at the Ione Reservoir in 2016 or 2017. A full spectrum analysis of cyanobacteria in the Ione Reservoir was performed on July 14th, 2017, and

revealed no detectable cyanobacteria present in the Ione Reservoir, Ione WTP raw influent, nor in the Ione WTP treated effluent.

In 2019, Tanner Raw Reservoir Samples indicated geosmin levels were above historical high levels, indicating the source may be farther upstream than originally believed.

Project Description: Investigate cause(s) of geosmin production. Design solutions to mitigate geosmin production, or geosmin effects.

Other Alternatives: Continue with Taste and Odor Monitoring Program in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Ione Reservoir Taste and Odor Monitoring Program

Responsible Office / Partners: N/A

Cost Estimate: Estimated at $200,000 over proposed timeline

Benefits (Losses Avoided): Estimated at $500,000 over proposed timeline

Potential Funding: Unknown at this time

Timeline: 3-5 years

Project Priority: Low

Climate Change Actions

Action 3. Lower Bear Reservoir Expansion Study

Hazards Addressed: Climate Change

Goals Addressed: 1, 2, 3, 4, 5

Issue / Background: Study will evaluate enlarging Lower Bear Reservoir by raising the existing dam (embankment) 32 feet to increase surface water storage capacity within the upper Mokelumne River watershed. Previous studies suggest that Lower Bear Reservoir would provide 18,300 AF/yr. of additional yield (Willard 2005). In addition to modifications to the dam itself, other facilities that would need to be constructed include an updated intake structure and spillway. East Bay MUD could benefit from the added supply in dry years. Jackson Valley Irrigation District will benefit with additional water to meet needs within its district. Besides the increase storage of winter flows, other benefits include flood control, power generation, improved water quality and cold water releases to improve fisheries. This project could provide 72 million kilowatt hours of clean energy. Enough power to provide electricity to 6,600 homes for one year thereby reducing the equivalent need for energy from other sources.

Project Description: Study the enlarging of the Lower Bear Reservoir

Other Alternatives: Build new reservoirs which are highly unlikely at this time. Recycle wastewater would help some but could not meet all the potable water demands of the future.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The AWA 5-year CIP.

Responsible Office/Partners: AWA

Cost Estimate: Estimated at $200,000 over proposed timeline

Benefits (Losses Avoided): NA

Potential Funding: Grants and Loans

Timeline: 1-2 years

Project Priority: High

Drought and Water Shortage and Wildfire Actions

Action 4. Replacement of Two Hypalon Lined and Covered Tanks with New Tanks

Hazards Addressed: Drought and Water Shortage, Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue / Background: The state has required AWA to remove all hypalon liners during improvements of facilities. With the Butte Fire, AWA became acutely aware of the extreme hazard of having storage facilities upcountry in the wildfire prone areas along Highway 88, especially AWA redwood and Hypalon lined and covered tanks.

AWA's Draft Water Master Plan shows that the Ranch House Hypalon Lined and Covered 750,000-gallon potable water storage tank is oversized and should be 250,000 gallons. The Hypalon liner covers an earthen base and also covers the water on top.

The 125,000-gallon Jackson Pines tank also has a Hypalon lined earthen floor and water cover.

The Hypalon liners have worked well over the years but they can potentially introduce contaminants into the potable water and will melt into the water during a wildfire. The state is not allowing any new potable water storage with Hypalon covers.

Project Description: Replace Two Hypalon Lined and Covered Tanks with Two New Welded Steel Tanks for Wildfire Hazard Mitigation

Other Alternatives: Continue with the risk of wildfire destroying the tanks and introducing toxins into the drinking water.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The AWA Water Master Plan to be completed in October 2020. The draft Water Master Plan mentions resizing of the one water tank.

Responsible Office / Partners: N/A

Cost Estimate: Estimated at $1,750,000 over proposed timeline

Benefits (Losses Avoided): Estimated at $1,000,000 over proposed timeline

Potential Funding: Unknown at this time

Timeline: 2-4 years

Project Priority: High

Action 5. Mt. Crossman Main Area Tank for Upper CAWP System

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue / Background: AWAs CAWP water system has been built on many smaller developments being rolled into one by Amador County and AWA where critically small pipelines exist and multiple small potable water tanks do not provide the necessary fire flow during a wildfire or house fire event. The Mt. Crossman Tank site sits at an elevation of 3800 feet and AWA proposes to build a partially buried 1.0-million-gallon concrete potable water tank. The construction of this partially buried concrete tank will not only protect infrastructure from wildfire but also eliminate up to 9 welded and bolted steel water tanks that are in fair to poor shape.

Project Description: Build one principal partially buried concrete water tank for the Upper CAWP System for Wildfire Hazard Mitigation.

Other Alternatives: Continue with the risk of wildfire destroying multiple tanks with inadequate fire flow to protect against wildfire and house fires.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The AWA Water Master Plan to be completed in October 2020. The tank site has been discussed for years at AWA as it eliminates a lot of operation and maintenance issues as well as provides protection from wildfires.

Responsible Office / Partners: N/A

Cost Estimate: Estimated at $3,500,000 over proposed timeline

Benefits (Losses Avoided): Estimated at $1,500,000 over proposed timeline

Potential Funding: Unknown at this time

Timeline: 1-4 years

Project Priority: Medium

Action 6. Upgrade Fire Pumps

Hazards Addressed: Wildfire, Climate Change

Goals Addressed: 1,2,3,4,5

Issue/Background: AWAs CAWP water system has several facilities that are old and inadequate for current fire pumping equipment. AWA must deliver water to fight wildfires at the required flow.

Project Description: Replace and upsize three fire pump installations.

Other Alternatives: Continue with the risk of wildfire destroying multiple tanks and houses with unavailable fire flow because of inadequate pumping.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The AWA Master Plan to be completed in October 2020. AWA has consistently added pumps dedicated to fire flow as facilities are upgraded as funding becomes available.

Responsible Office/Partners: N/A

Cost Estimate: Estimated at $125,000

Benefits (Losses Avoided): Estimated at $1,500,000. Provides fire flow.

Potential Funding: State and Federal programs

Timeline: 1-3 years

Project Priority: Medium

Flooding and Localized Flooding Actions

Action 7. Mace Meadows Pump Station Flooding

Hazards Addressed: Flooding and Localized Flooding

Goals Addressed: 1, 2, 3, 4, and 5

Issue / Background: AWAs Buckhorn Water treatment plant discharges its recycle wastewater to the Mace Meadows pond that is then pumped for use onto a Golf Course. The pump station is located in a meadow area and has taken on water several times damaging electrical equipment or floods the building making it unsafe to operate. During atmospheric rivers and server rain events like in 2017 the pump station was flooded, and electrical equipment was damage.

Project Description: Build a new pump station with 2 ea. 60 horsepower pumps with new piping to new location above the meadow at a higher elevation.

Other Alternatives: Continue with the risk of flooding damaging or destroying electrical switch gear, pumps, and motors.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The AWA has identified a location as a potential site and will be looking at this further in the 20/21 Wastewater Master Plan to be completed by June 2021. This has been an ongoing historical problem that cause unsafe operations and prevents the agency from properly disposing of its treatment plant wastewater.

Responsible Office / Partners: N/A

Cost Estimate: Estimated at $225,000 over proposed timeline

Benefits (Losses Avoided): Estimated at $300,000 to over proposed timeline

Potential Funding: Unknown at this time

Timeline: 1-4 years

Project Priority: Medium

Action 8. Eggiman Lane Flooding

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4, and 5

Issue / Background: AWAs has a 10-inch potable water main that hangs off an old pedestrian foot bridge off Eggiman Lane in the City of Ione. This foot bridge also cares the City of Ione's sewer main pipe. The bridge spans a small creek that cannot handle the server rain or atmospheric storms like we experienced in 2017. The bridge has been damaged many times by trees and other debris for many years and the bridge now bent. The water and sewer pipes hanging from this bridge are in jeopardy of being damage and the risk of a total bridge failure along with the water and sewer infrastructure is high.

Project Description: Build a new bridge at a higher elevation along with the water and sewer pipes.

Other Alternatives: Another alternative is to construct a new 10-inch water pipe under the creek. This second alternative cost will have to be weighed against the new bridge project. Continue with the risk of flooding that will damage or destroy the water and sewer systems.

Existing Planning Mechanism(s) through which Action Will Be Implemented: AWA is currently going through a water master plan which will be complete in October of 2020.

Responsible Office / Partners: N/A

Cost Estimate: Estimated at $450,000 over proposed timeline

Benefits (Losses Avoided): Estimated at $800,000 to over proposed timeline

Potential Funding: Unknown at this time

Timeline: 2-7 years

Project Priority: Medium

Annex G Amador Fire Safe Council

G.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Amador Fire Safe Council (AFSC or Council), a previously participating jurisdiction of the 2014 Amador County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the Council. This Annex provides additional information specific to the AFSC, with a focus on providing additional details on the risk assessment and mitigation strategy for the AFSC.

G.2 Planning Process

As described above, the AFSC followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Amador County Hazard Mitigation Planning Committee (HMPC), the AFSC formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table G-1. Additional details on plan participation and Council representatives are included in Appendix A.

Table G-1 Amador Fire Safe Council – Planning Team

Name	Position/Title	How Participated
Pat Minyard	President	Attended meetings. Provided input on past hazards. Provided mitigation actions. Reviewed annex and added comments.

Coordination with other community planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the AFSC integrated the previously approved 2014 Plan into existing planning mechanisms and programs. Specifically, the AFSC incorporated into or implemented the 2014 LHMP through other plans and programs shown in Table G-2.

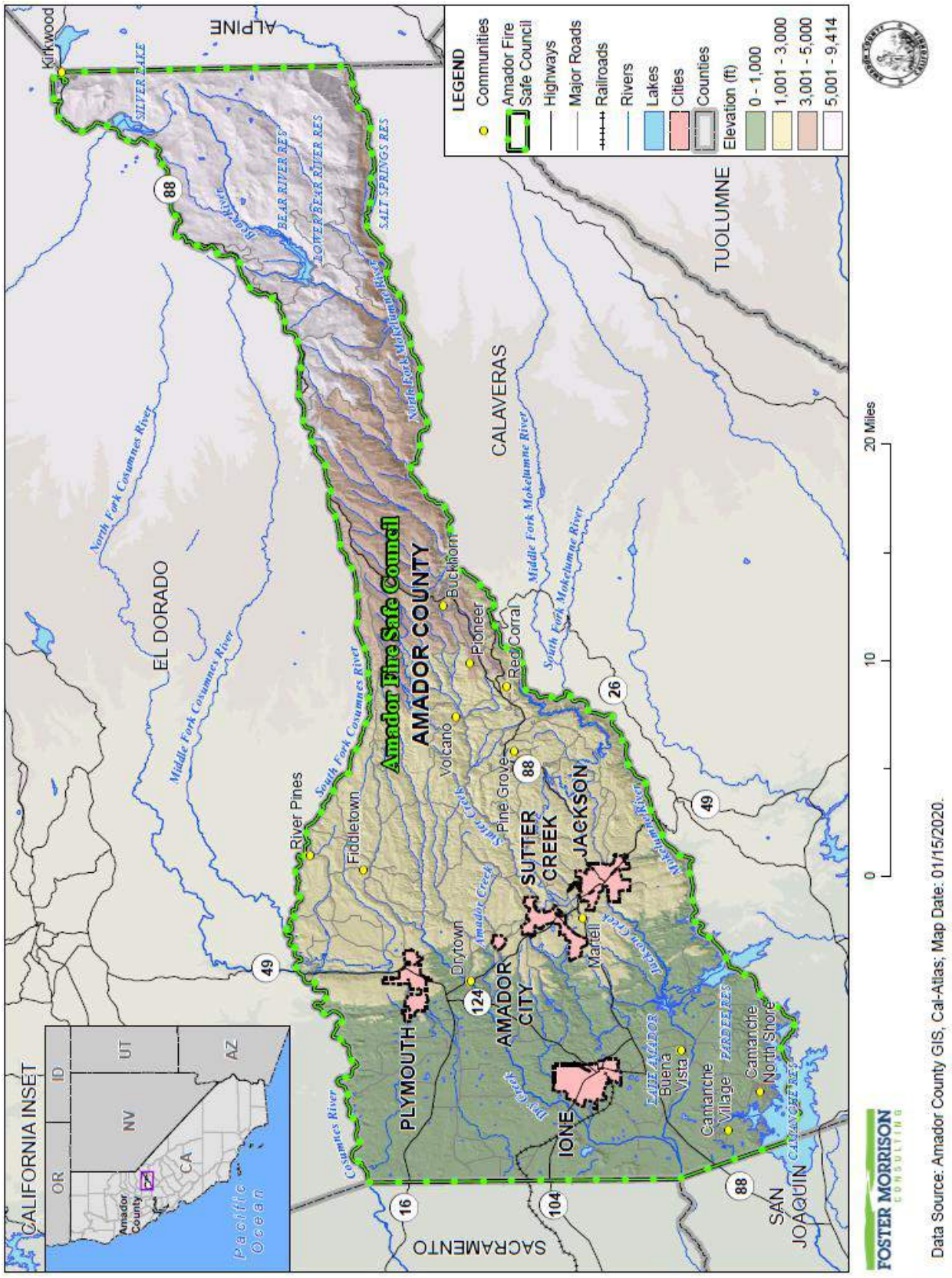
Table G-2 2014 LHMP Incorporation

Planning Mechanism 2014 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
–	No planning mechanisms were completed by AFSC since the 2014 LHMP.

G.3 Council Profile

The AFSC profile is detailed in the following sections. Figure G-1 displays a map and the location of the AFSC within Amador County.

Figure G-1 Amador Fire Safe Council



G.3.1. Overview and Background

The Amador County Fire Safe Council is a non-profit organization that partners with local businesses, community organizations, and property owners of Amador County. It is assisted by the USFS, CDF, BLM, Amador Resource Conservation Council, the Amador County Board of Supervisors and Central Sierra RC&D. The Amador County Fire Safe Council was established to provide a means for Amador County residents to participate in wildfire prevention, wildfire protection, and wildfire damage mitigation.

The AFSC began meeting in the fall of 2001 as a small group of homeowners and agency personnel who were concerned about fire hazard reduction and safety in the central Sierra foothill county of Amador. In 2002, the AFSC was formed into a non-profit corporation based on partnerships between public and private interests. The mission statement of the AFSC was established "to protect the people of Amador County and their property from the effects of catastrophic wildfire through education, cooperation, motivation, and action." This mission was to be accomplished through strong public and private partnerships and cooperation focusing on public education, wildland fuel reduction, and community fire hazard reduction projects and programs. Initial accomplishments by the AFSC focused on increasing public awareness of the fire risks and risk reduction methods using printed materials, public meetings, and demonstration projects. Community help projects were also implemented such as a Senior Citizen Assistance Program, Community Chipper Program, and the development of a Community Evacuation Plan preparation kit. In order to proceed into more extensive fuel modification work, it was determined by the AFSC that the development of a fuels management plan was needed to help identify, prioritize, and coordinate future fuel and fire hazard reduction programs.

In 2005, a Community Wildfire Protection Plan (CWPP) was developed. In the CWPP, the County was divided into 9 prioritized administrative units based on fire hazard, geography, risk, population. As the plan is updated, the AFSC will be addressing the highest risk units first. To date, there is a completed Pioneer/Volcano update and a completed Pine Grove update. The High Country Unit CWPP (formerly known as the Upcountry Unit) and the Greater Fiddletown Unit CWPP were begun in the spring of 2013; with expected completion in early 2014.

The current AFSC board makeup is less than three years old as a result there is no institutional memory. A review of the CWPP's from 2014 reveals that few of the projects listed were ever completed. There is no record as to why except that they were overly ambitious, and funding was not forthcoming. The current board is of the opinion that the CWPP's need revision. The High Country and Greater Fiddletown CWPP's were never started.

G.4 Hazard Identification

The AFSC identified the hazards that affect the Council and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to the AFSC (see Table G-3).

Table G-3 Amador Fire Safe Council—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests	–	–	–	–	Low
Aquatic Invasive Species	–	–	–	–	Low
Avalanche	–	–	–	–	Medium
Climate Change	Extensive	Highly Likely	Catastrophic	High	–
Dam Failure	–	–	–	–	Medium
Drought & Water shortage	Extensive	Likely	Critical	High	High
Earthquake (large damaging/small)	–	–	–	–	Low
Floods: 1%/0.2% annual chance	–	–	–	–	Medium
Floods: Localized Stormwater	–	–	–	–	Medium
Landslide, Mudslide, Debris Flow	–	–	–	–	Medium
Levee Failure	–	–	–	–	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Critical	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Limited	Highly Likely	Limited	Medium	Medium
Severe Weather: High Winds and Tornadoes	–	–	–	–	Low
Severe Weather: Winter Storms and Freeze	–	–	–	–	Medium
Wildfire	Limited	Highly Likely	Critical	High	High

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

G.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile the AFSC's hazards and assess their vulnerability separate from that of the Amador County Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the AFSC is included in this Annex. This vulnerability assessment analyzes the property and other assets at risk to hazards ranked of medium or high significance specific to the Council. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

G.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section G.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard (as shown in Table G-3) affects the AFSC and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Amador County Planning Area.

G.5.2. Vulnerability Assessment and Assets at Risk

This section identifies the AFSC's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk specific to the AFSC.

Assets at Risk and Critical Facilities

The AFSC owns no assets, property, or infrastructure.

Natural Resources

The AFSC covers the whole of the County, so the natural resources parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Historic and Cultural Resources

The AFSC covers the whole of the County, so the historic and cultural resources parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Growth and Development Trends

General growth in the AFSC parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Development since 2014

There are no AFSC owned buildings; therefore, no AFSC facilities have been constructed since 2014.

Future Development

Future development in the AFSC is the same as that of Amador County. More general information on growth and development in Amador County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Amador County Vulnerability and Assets at Risk of the Base Plan.

G.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table G-3 as high or medium significance hazards. Impacts of past events and vulnerability of the AFSC to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Amador County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the AFSC to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. 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 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.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Climate Change

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Climate change adaptation is a key priority of the State of California. The 2018 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.

In Amador County and the AFSC, the HMPC noted that each year it seems to get a bit warmer and snow seems to start at higher levels. It was also noted that 2017 was one of the wettest years ever. It is expected that climate change will result in a warmer, drier climate resulting in more wildfires. The role of the AFSC as a participant in wildfire prevention will become more important. The Council has active programs in: Construction of two major fuel breaks—Mitchell Mine and Tiger Creek; public outreach and education regarding home hardening, fire clearances, availability of insurance; working with the Board of Supervisors to enact an ordinance requiring fire clearances on occupied and vacant lots; placement of fire cameras (in conjunction with Univ. of Nevada Reno) to provide early warning of nascent wildfires; conducting a community based effort to identify private roads whereby ingress/egress can be improved by clearing brush. The Council has recently received a grant of $1.04 million for the ingress/egress program. In the past year, the AFSC has worked with the Amador Senior Center and the Amador Council on Aging to establish an information program for isolated seniors. The program centers on providing evacuation programs through neighbors, family, and friends. In all efforts the Council works cooperatively with CalFire and all local fire agencies.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the AFSC, Amador County, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, 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

Climate change has never been directly linked to any declared disasters. While the Council noted that climate change is of concern, no specific impacts of climate change could be recalled. The Council and HMPC members noted that the strength of storms does seem to be increasing and the temperatures seem to be getting hotter.

Vulnerability to and Impacts from Climate Change

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the

unavoidable consequences of climate change. California's APG: 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. 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. This information can be used to guide climate adaptation planning in the Council and Amador County Planning Area.

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra region in which the Amador County Planning Area is part of:

- Temperature increases
- Decreased precipitation
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

Assets at Risk

The AFSC noted that it owns no facilities, so there are no AFSC assets at risk to this hazard.

Future Development

The AFSC noted that it owns no facilities and has no plans to build any, so future development of the AFSC will not be affected by climate change.

Drought & Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Drought is a complex issue involving 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. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the AFSC, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages and for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the AFSC and the County are shown in Section 4.2.11 of the Base Plan.

Past Occurrences

Since drought is a regional phenomenon, past occurrences of drought for the AFSC are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.2.11 of the Base Plan.

Vulnerability to and Impacts from Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the AFSC, 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 specific vulnerabilities noted in G.5.3 above are the same for drought.

Assets at Risk

The AFSC noted that it owns no facilities, so there are no AFSC assets at risk to this hazard.

Future Development

The Council noted that it owns no facilities and has no plans to build any, so future development of the AFSC will not be affected by drought.

Severe Weather: Extreme Heat

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to 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 extreme heat and high humidity, evaporation is slowed, and the body must work extra hard to maintain a normal temperature." Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

The primary concern of the AFSC is the increased risk of wildfire, especially to the built environment. While extreme heat on its own does not usually affect structure, extreme heat during times of drought can cause wildfire risk to heighten. Extreme heat and high winds can cause Public Safety Power Shutoff (PSPS) events.

Location and Extent

Heat is a regional phenomenon and affects the whole of the AFSC. 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 affect vulnerable populations and communities. Heat waves do not generally cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios.

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 Section 4.2.2 of the Base Plan.

Past Occurrences

The AFSC Planning Team note that since extreme heat is a regional phenomenon, events that affected the County also affected the AFSC. Those past occurrences were shown in the Base Plan in Section 4.2.2.

Vulnerability to and Impacts from Extreme Heat

The Council experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-115°F in rather extreme situations. During these times, drought conditions may worsen. Also, PSPS events may occur during these times as well.

Days of extreme heat have been known to result in medical emergencies, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts. Extreme heat can also dry out vegetations, making it more vulnerable to wildfire ignitions. During periods of extreme heat (with high winds), PG&E can institute a PSPS. The Council has no responsibilities under the PSPS program.

Assets at Risk

The AFSC noted that it owns no facilities, so there are no AFSC assets at risk to this hazard.

Future Development

The AFSC noted that it owns no facilities and has no plans to build any, so future development of the AFSC will not be affected by extreme heat.

Severe Weather: Heavy Rains and Storms (Hail, Lightning)

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Storms in Amador County occur annually 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 Amador County falls mainly in the fall, winter, and spring months.

Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the County and AFSC. All portions of the AFSC are at risk to heavy rains. Most of the severe rains occur during the fall, winter, and spring months. There is no scale by which heavy rains and severe storms are measured. 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 severe storms in California, Amador County, and the AFSC l can range from minutes to hours to days. Information on precipitation extremes can be found in Section 4.2.3 of the Base Plan.

Past Occurrences

According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the County. This is the cause of many of the federal disaster declarations related to flooding.

Vulnerability to and Impacts from Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrences in Amador County. These events can cause localized flooding. Elongated events, or events that occur during times where the ground is already saturated can cause 1% and 0.2% annual chance flooding. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the AFSC.

Actual damage associated with the effects of severe weather include impacts to property, critical facilities (such as utilities), and life safety. Heavy rains and storms often result in localized flooding creating significant issues. Roads can become impassable and ground saturation can result in instability, collapse, or other damage to trees, structures, roadways, and other critical infrastructure. Floodwaters and downed trees can break utilities and interrupt services. Heavy rains and storms can cause issues in wildfire burn scars. These areas are at risk from landslide and debris flows.

Assets at Risk

The AFSC noted that it owns no facilities, so there are no AFSC assets at risk to this hazard.

Future Development

The AFSC noted that it owns no facilities and has no plans to build any, so future development of the AFSC will not be affected by heavy rains and storms.

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

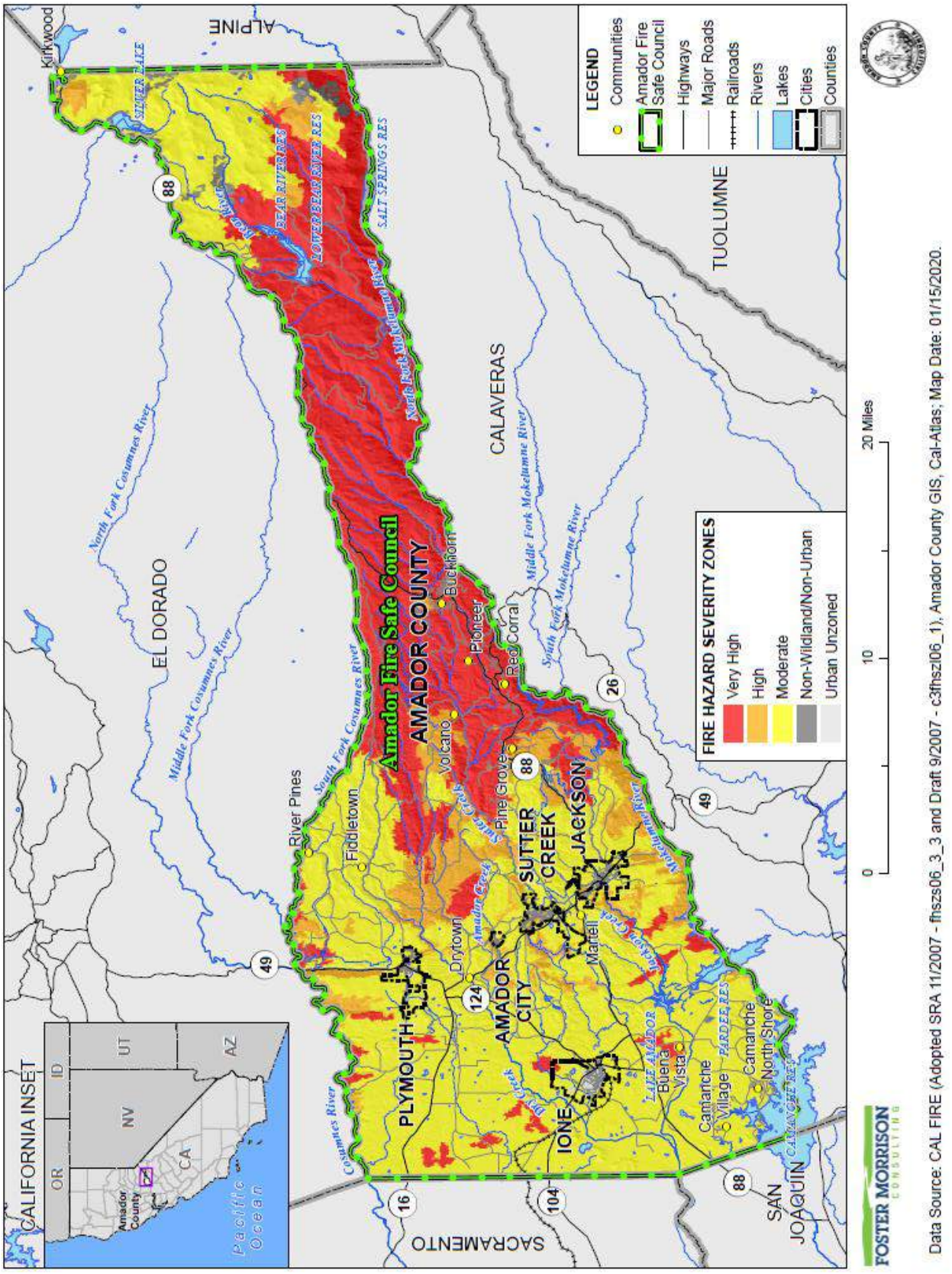
Wildland fire and the risk of a conflagration is an ongoing concern for the AFSC. Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the ecosystem. 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. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

The AFSC is an active element of the wildfire prevention program in Amador County as outlined in G.5.3 above

Location and Extent

Wildfire can affect all areas of the AFSC. CAL FIRE has estimated that the risk varies across the Council and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the AFSC were created. Figure G-2 shows the CAL FIRE FHSZ in the AFSC. As shown on the maps, fire hazard severity zones within the AFSC range from urban/unzoned (low) to very high.

Figure G-2 Amador Fire Safe Council – Fire Hazard Severity Zones



Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more.

Past Occurrences

A list of state and federal disaster declarations for Amador County from wildfire is shown on Table G-4.

Table G-4 Amador County – State and Federal Disaster Declarations from Wildfire 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	1	2015	1	1961

Source: Cal OES, FEMA

Past occurrences of wildfires in the AFSC are the same as that of the County as a whole. These past occurrences can be found in the Base Plan in Section 4.2.18.

Vulnerability to Wildfire

The wildfire hazard is the highest priority hazard for the AFSC, and is the hazard with the greatest potential for catastrophic loss. High fuel loads in the County and Cities, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. The more urbanized areas within the County are not immune from fire. The dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout Amador County, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Potential impacts from wildfire include loss of life and injuries; damage to structures 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 Council. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the Council 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 Council; smoke and air pollution from wildfires can be a severe health hazard.

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 PSPSs 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.

Assets at Risk

The AFSC noted that it owns no facilities, so there are no AFSC assets at risk to this hazard.

Future Development

The AFSC noted that it owns no facilities and has no plans to build any, so future development of the AFSC will not be affected by wildfire.

G.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

G.6.1. Regulatory Mitigation Capabilities

Table G-5 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the AFSC.

Table G-5 AFSC Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan/General Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	N	
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	Y	Amador County CWPP; Pioneer Volcano CCWPP; Greater Pine Grove CCWPP, High Country CWPP, and Greater Fiddletown CWPPs can be found on our website at www.amadorfiresafe.org.

Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N/A	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N/A	Score:
Fire department ISO rating:	N/A	Rating:
Site plan review requirements	N/A	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	N/A	
Subdivision ordinance	N/A	
Floodplain ordinance	N/A	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N/A	
Flood insurance rate maps	N/A	
Elevation Certificates	N/A	
Acquisition of land for open space and public recreation uses	N/A	
Erosion or sediment control program	N/A	
Other		
How can these capabilities be expanded and improved to reduce risk?		
There are CWPPs that are still in process, and some of the originals will need to be updated.		

Source: AFSC

G.6.2. Administrative/Technical Mitigation Capabilities

Table G-6 identifies the AFSC department(s) responsible for activities related to mitigation and loss prevention in the AFSC.

Table G-6 FSC's Administrative and Technical Mitigation Capabilities

Administration	**Y/N**	**Describe capability Is coordination effective?**
Planning Commission	N/A	
Mitigation Planning Committee	N/A	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	N/A	
Mutual aid agreements	N/A	
Other		

Staff	Y/N FT/PT	Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	N/A	
Floodplain Administrator	N/A	
Emergency Manager	N/A	
Community Planner	N/A	
Civil Engineer	N/A	
GIS Coordinator	Y	Staff is trained and adequate.
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N/A	
Hazard data and information	N/A	
Grant writing	Y	
Hazus analysis	N/A	Staff is trained and adequate.
Other		
How can these capabilities be expanded and improved to reduce risk?		
Due to the nature of the AFSC, very little can be added to these capabilities.		

Source: AFSC

G.6.3. Fiscal Mitigation Capabilities

Table G-7 identifies financial tools or resources that the AFSC could potentially use to help fund mitigation activities.

Table G-7 AFSC's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (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	N	
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	N	
Community Development Block Grant	N	
Other federal funding programs	N	

Funding Resource	Access/ Eligibility (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?
State funding programs	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Consistent grant opportunities		

Source: AFSC

G.6.4. Mitigation Education, Outreach, and Partnerships

Table G-8 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 G-8 AFSC's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access, and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Amador Fire Safe Council conducts monthly public education events for fire safety, defensible space, environmental education, and animal and human evacuation.
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	Y	There are three communities the Council has worked with that are ready for Firewise certification.
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Encouraging additional Firewise communities		

Source: AFSC

G.6.5. Other Mitigation Efforts

The AFSC has many other completed or ongoing mitigation efforts that include the following:

- Since 2005, Amador Fire Safe Council has created shaded fuel breaks surrounding Pine Grove, Pioneer, Volcano, and Fiddletown comprising approximately 2,400 treated acres. We have created defensible

space around the homes of 450 low income senior and elderly residents; and offered free community roadside chipping services to approximately 350 residents. Additionally, we developed and wrote the community wildfire protection plans for the county; the town of Volcano; the Greater Pioneer/Volcano area; the Greater Pine Grove area, the High Country area (from Dewdrop east to the Alpine County line) and the Greater Fiddletown area.

G.7 Mitigation Strategy

G.7.1. Mitigation Goals and Objectives

The AFSC adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

G.7.2. Mitigation Actions

The planning team for the AFSC identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Climate Change
- Drought and Water Shortage
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms
- Wildfire

Mitigation actions for wildfire are as noted in G.5.3 above and throughout this document. The current AFSC within the last year obtained two million-dollar grants that will enable the full development of two large scale fuel breaks, a robust, community-based program to provide improved ingress/egress on private roads that serve residential communities throughout Amador County. The grant will also allow an improved public outreach and education component.

The AFSC has developed a strategic plan, mission statement and an improved website. The website is under revision. These changes and improvements will allow the AFSC to continue to be an active element in the overall program of wildfire prevention in Amador County.

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan 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 countywide public outreach action, 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 plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to

implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

Action 1. Community Ingress/Egress – Phase I: Fire Safe Programs and Public Education Activities

Hazards Addressed: Multi hazard (Climate Change, Drought and Water Shortage, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Numerous communities in unincorporated areas of Amador County have been developed without any view as to wildfire evacuation. Roads are narrow, unpaved, one way in one way out, unsigned and choked with brush. Additionally, there is a need to develop and disseminate information regarding homeowner responsibility(ies) for fire safety and their property(ies).

Project Description: The project has been soliciting input and requests from local communities and individuals as to roads that are brush choked and thus restrict efficient evacuation in the event of wildfire. To date more than 50 locales have been identified. The roads all serve multiple residences. This project is Phase 1 of a 2 Phase project and includes the identification of project areas, project design, coordination, and outreach components. Phase 2 will address the actual brush clearing and fuels reduction components.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Amador Fire Safe Council has just received $1.04 million to implement this program

Responsible Office/Partners: Amador Fire Safe Council, Cal Fire, Amador County Fire

Cost Estimate: $100,000

Benefits (Losses Avoided): Home and properties brought into compliance with state law regarding fire safety. Home hardening using fire resistant materials. Roads serving multiple residences will be cleared via tree and brush removal at no cost to the homeowner. Implementation of both project phases will help protect lives and property from future wildfire events.

Potential Funding: Funding has been received.

Timeline: March 2022

Project Priority: High

Action 2. Community Ingress/Egress – Phase II: Brush Clearing and Fuels Reduction

Hazards Addressed: Multi hazard (Climate Change, Drought and Water Shortage, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Numerous communities in unincorporated areas of Amador County have been developed without any view as to wildfire evacuation. Roads are narrow, unpaved, one way in one way out, unsigned and choked with brush. Additionally, there is a need to develop and disseminate information regarding homeowner responsibility(ies) for fire safety and their property(ies).

Project Description: The project has been soliciting input and requests from local communities and individuals as to roads that are brush choked and thus restrict efficient evacuation in the event of wildfire. To date more than 50 locales have been identified. The roads all serve multiple residences. This project is Phase 2 of a 2 Phase project and includes brush clearing and fuels reduction components. Phase 1 included the identification of project areas, project design, coordination, and outreach components.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Amador Fire Safe Council has just received $1.04 million to implement this program

Responsible Office/Partners: Amador Fire Safe Council, Cal Fire, Amador County Fire

Cost Estimate: $940,000

Benefits (Losses Avoided): Home and properties brought into compliance with state law regarding fire safety. Home hardening using fire resistant materials. Roads serving multiple residences will be cleared via tree and brush removal at no cost to the homeowner.

Potential Funding: Funding has been received.

Timeline: March 2022

Project Priority: High

Action 3. Construction of Mitchell Mine Fuelbreak

Hazards Addressed: Multi hazard (Climate Change, Drought and Water Shortage, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Wildfire in Amador County has long been an issue. Climate change and population growth have magnified this problem.

Project Description: Build a fuel break extending from the Mokelumne River across the eastern/northeastern portion of Amador County that will provide wildfire protection for Pine Grove, Volcano, and related communities.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: This project is underway and is approximately 50% completed

Responsible Office/Partners: Amador Fire Safe Council

Cost Estimate: $1 million

Benefits (Losses Avoided): Destruction by wildfire of the above-mentioned communities

Potential Funding: Grants

Timeline: Finish within one year or less

Project Priority: Medium

Action 4. Outreach and Public Information Immobile Citizen Evacuation

Hazards Addressed: Multi hazard (Climate Change, Drought and Water Shortage, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, and Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The death of 88 people (many of them senior citizens) in the Camp Fire highlighted the need for senior citizens to develop a personal evacuation plan. The concept is for church members, family, and friends to work with individuals to have a plan in place for senior citizens to be evacuated in the event of wildfire.

Project Description: This project is already in the implementation phase. The Amador Senior Center and the Amador County Commission on Aging have assembled outreach information and are disseminating it via community churches, fire safety seminars, the county fair etc.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: See project description above

Responsible Office/Partners: Amador Senior Center, Amador County Commission on Aging with input from CAL FIRE and AFSC

Cost Estimate: 50,000

Benefits (Losses Avoided): Save lives of senior citizens and disabled persons who are incapable of self-evacuation.

Potential Funding: Ingress/egress grant funding can be used for this purpose

Timeline: Underway and continuous—this is not a one-time operation

Project Priority: High

Action 5. Development of Firewise Communities in Amador County

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Amador County has only one Firewise Certified community.

Project Description: Engage entire communities in Firewise activities to reduce the risk of wildfire losses

Other Alternatives: None known

Existing Planning Mechanism(s) through which Action Will Be Implemented: At least one location in the county has been active in promoting Firewise. The primary mode of planning and execution is via community volunteers, activists with oversight and information via the fire agencies and the AFSC

Responsible Office/Partners: CalFire, Amador Fire Protection District, city fire departments and AFSC

Cost Estimate: US$100,000

Benefits (Losses Avoided): Reduce the risk, or avoid, loss of life and residential, commercial and infrastructure losses in the event of wildfire

Potential Funding: CAL FIRE grants

Timeline: Ongoing but delayed by coronavirus

Project Priority: High

Action 6. Establish Fire Breaks on three parallel ridges (Antelope, Doakes and Panther).

Hazards Addressed: Wildfire protection for much of Upper Amador County

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: In upper Amador County there are a number of parallel ridges that trend roughly NNE to SSW. By placing a fire break atop each ridge it would establish a multitiered wildfire safety network for the lower, more populated, portion of the county. An established fire break prevented the Butte Fire from

spreading into Amador County when the fire was halted upon encountering the fire break. Additionally, the breaks would provide a location for rapid staging of fire equipment and aerial operations.

Project Description: The AFSC is already establishing a fire break via the Mitchell Mine project and is going to begin work on a similar project on Shake Ridge. Both of these ridges are on relatively low level ridges. Each successive ridge mentioned above is higher and higher up the Western Slope of the Sierra Nevada mountain range. The additional breaks would be established at higher and higher elevations-thus offering multiple opportunities to stop and/or hinder wildfire progress.

Other Alternatives: None practical

Existing Planning Mechanism(s) through which Action Will Be Implemented: The AFSC is already engaged in establishing fire breaks on ridge tops and thus has the experience, infrastructure, and local, state and national contacts to effectively engage in the work necessary to conduct these projects.

Responsible Office/Partners: Amador County Fire Safe Council in concert with CalFire, Amador Fire Protection District and local fire departments, University of Nevada Reno

Cost Estimate: $4-5 million

Benefits (Losses Avoided): Stopping wildfire before it can reach the lower portions of the County thus reducing or avoiding the potential loss of live, destruction of property, degradation of the ecosystem, water, esthetics, air quality etc.

Potential Funding: FEMA, CalFire, Sierra Nevada Conservancy

Timeline: Between mid-2022 and 2025

Project Priority: High

Action 7. Amador Soil Health and Agricultural Resiliency Program

Hazards Addressed: Climate change, drought, agricultural resiliency

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: With changing climates, Sierra foothill agriculture is faced with adapting to higher temperatures, potential for decreased water supply, increase fire threat, and increased pressure for development. Planning for these changes and implementing the soil health/natural resources best management practices will help to prepare producers by making their operations more resilient. Many of the agricultural operations within Amador County are family-owned and operated and depend on the vitality of all natural resources. Planning for resiliency will be an important tool for these operations, helping to capture the value of the ecosystem services provided to the region and beyond.

Project Description: The Amador RCD and partners will work with agricultural operations to prepare Carbon Farm Plans (CFP). Carbon Farm Plans or CFPs have benefits beyond carbon sequestration. The multiple benefits are often of great significance to producers as they have agronomic benefits that realize

the direct value of carbon sequestration within the context of agricultural production. Increased water infiltration and decreased soil erosion, for example, are critical improvements related to CFP practices that producers in the region value. These plans will identify and quantify the multiple benefits that CFP can provide. The Amador RCD will continue to work with producers to implement these plans. This will include: funding assistance, practice design, and facilitation of a network of producers to assist with implementation.

The Amador RCD will also be involved in regional planning and coordination.

Other Alternatives: $400,000

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Amador RCD long-term strategic plan.

Responsible Office/Partners: Amador RCD. Partners: California Association of RCDs, Calaveras RCD, Tuolumne RCD, Carbon Cycle Institute, Fibershed, University of California Cooperative Extension.

Cost Estimate:

Benefits (Losses Avoided): Developing an agricultural system that is more resilient in the face drought, fire, and climate change.

Potential Funding: Private Funding, Sierra Nevada Conservancy, Wildlife Conservation Board, USDA, California Department of Food & Agriculture

Timeline: 3+ years. This program is scalable and is estimated to continue past the original 3-year plan, as funding is available.

Project Priority: Medium

Lockwood Fire Protection District

Annex H Lockwood Fire Protection District

H.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Lockwood Fire Protection District (LFPD or District), a previously participating jurisdiction to the 2014 Amador County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the District. This Annex provides additional information specific to LFPD, with a focus on providing additional details on the risk assessment and mitigation strategy for this community.

H.2 Planning Process

As described above, the District followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Amador County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table H-1. Additional details on plan participation and District representatives are included in Appendix A.

Table H-1 LFPD – Planning Team

Name	Position/Title	How Participated
Cathy M Koos	Consultant	Primary author
Ben Fisher	Engineer, Retired	Advisor
John King	Chief, Retired	Advisor

Coordination with other community planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the District integrated the previously approved 2014 Plan into existing planning mechanisms and programs. Specifically, the District incorporated into or implemented the 2014 LHMP through other plans and programs shown in Table H-2.

Table H-2 2014 LHMP Incorporation

Planning Mechanism 2014 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
–	No planning mechanisms related to the LHMP were completed since 2014.

H.3 District Profile

The District profile for the LFPD is detailed in the following sections. Figure H-1 displays a map and the location of the District within Amador County. Figure H-2 shows locations of fire stations in the District.

Figure H-1 LFPD

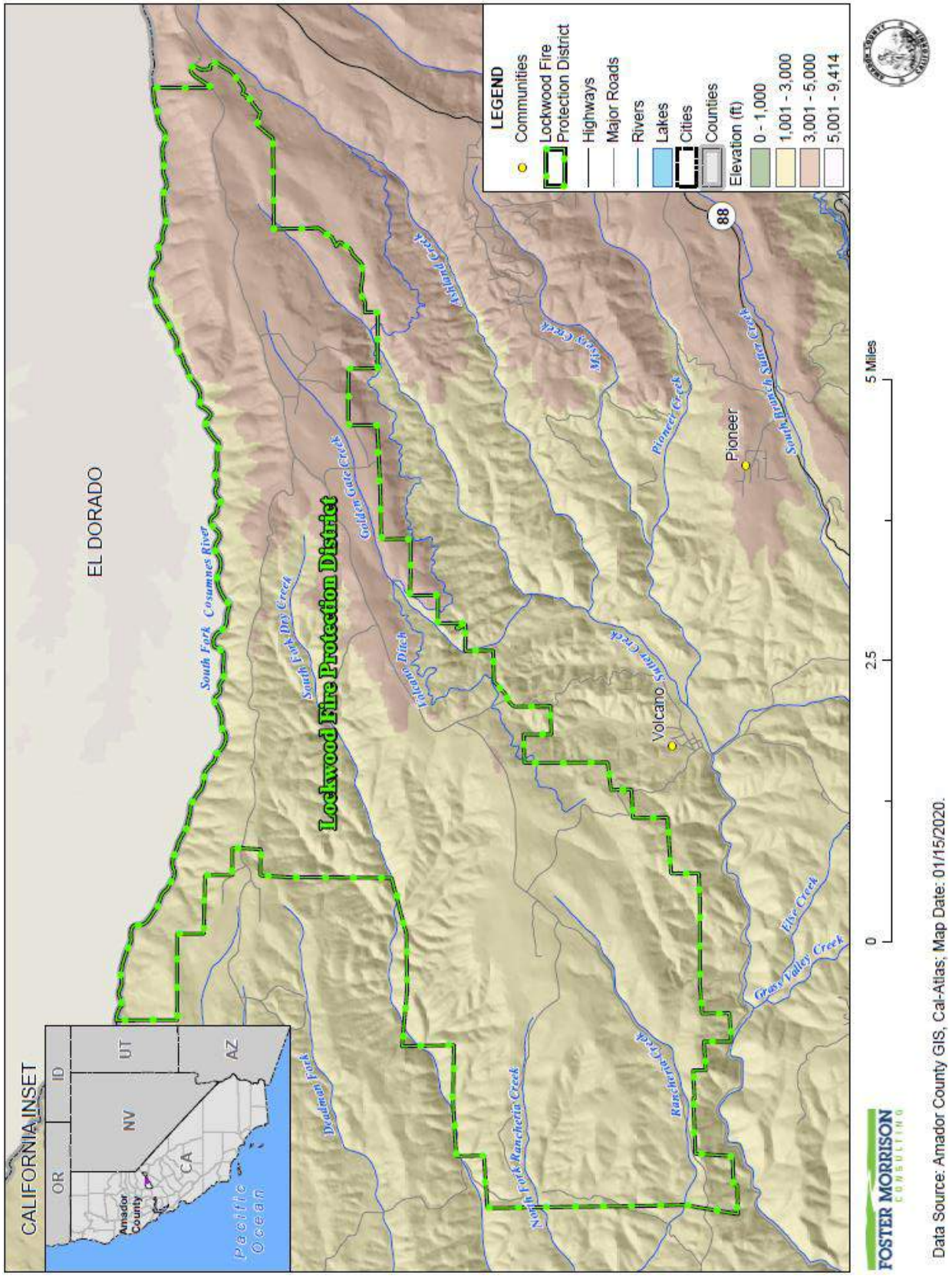
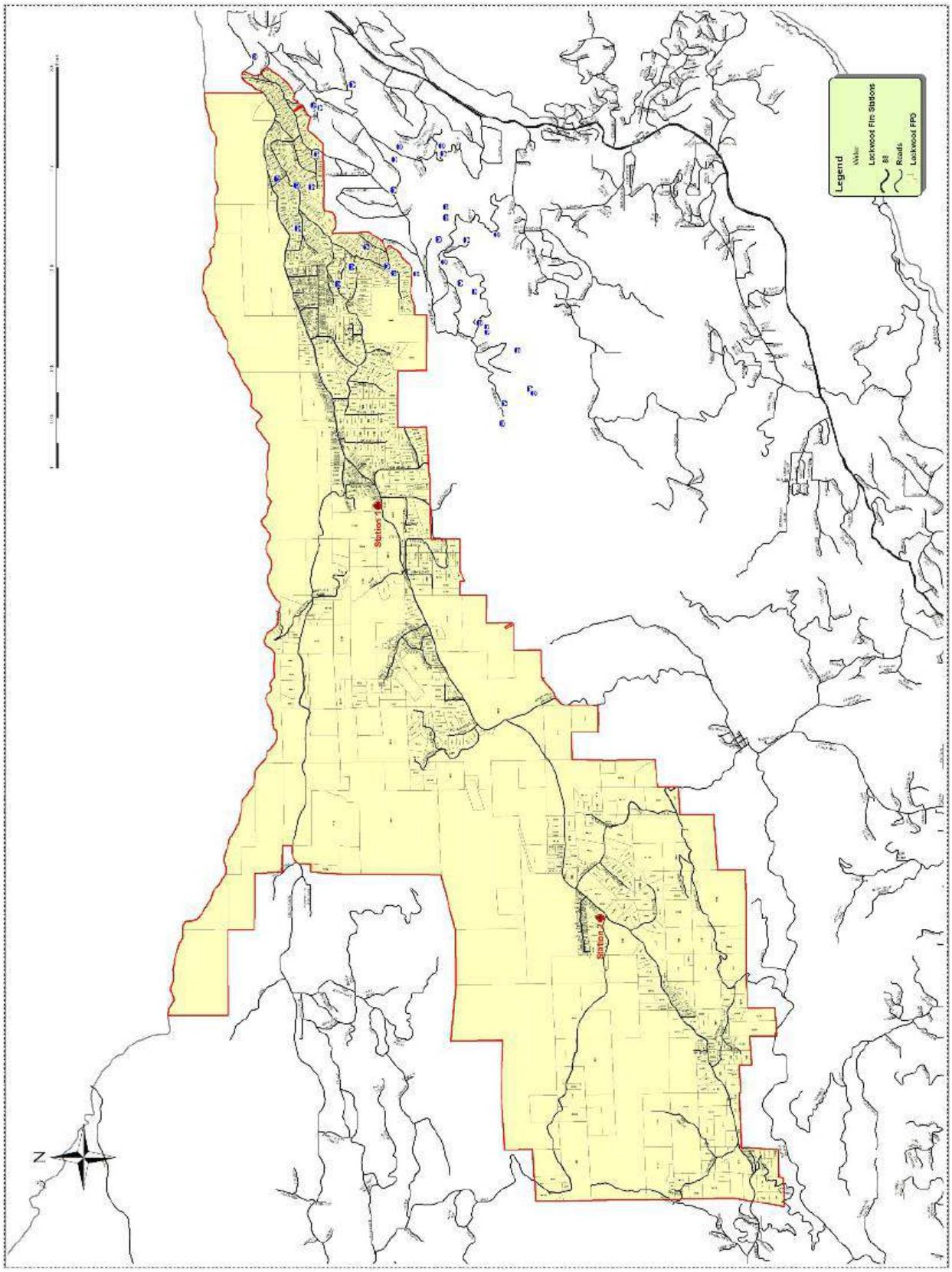


Figure H-2 LFPD Fire Stations and Roads



H.3.1. Overview and Background

The Lockwood Fire Protection District was created by dedicated volunteers in 1982 and remains a well-trained volunteer force of 15 members today, providing professional fire and emergency medical services to 2500 residents over a 32 square mile area covering rural, rugged Volcano, Pioneer, and parts of Fiddletown and Sutter Creek. The LFPD district is comprised of rural subdivisions, small to large ranches, vineyards, and industrial timberlands.

Other than Station 152, there is no public infrastructure for gathering or sheltering of the public within the district and the Station 152 facility has limited services. The nearest possible gathering place is the town hall in Volcano (12 miles) or a church in Buckhorn (14 miles).

Since the 2014 plan, the department has moved forward in a number of public safety areas. Generators have been sited at each station; Station 152 kitchen has been remodeled to allow more efficient feeding; a used Type 6 engine has been purchased; remodeling of Station 151 is partially completed with a new handicap accessible entry, removal of roll up doors and replacement with a solid front wall, new more efficient windows; private water tanks have been installed in the district and recorded on the district map (paper) at 151. Still to be completed for 151 is addition of a shower and kitchen area so that 151 can be used as a command post.

H.4 Hazard Identification

LFPD identified the hazards that affect the District and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to District (see Table H-3).

Table H-3 LFPD—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests	Extensive	Likely	Critical	High	High
Aquatic Invasive Species	Limited	Unlikely	Negligible	Low	Low
Avalanche	Significant	Likely	Limited	Low	Medium
Climate Change	Extensive	Highly Likely	Critical	High	High
Dam Failure	Limited	Likely	Critical	Medium	Medium
Drought & Water shortage	Extensive	Occasional	Critical	Medium	Medium
Earthquake (large damaging/small)	Limited	Unlikely	Negligible	Low	Low
Floods: 1%/0.2% annual chance	Limited	Occasional	Limited	Low	Low
Floods: Localized Stormwater	Limited	Likely	Limited	Medium	Medium
Landslide, Mudslide, Debris Flow	Limited	Highly Likely	Catastrophic	High	High
Levee Failure	Limited	Unlikely	Negligible	Low	Low
Severe Weather: Extreme Heat	Extensive	Likely	Limited	Medium	Medium
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Highly Likely	Critical	High	High
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: Winter Storms and Freeze	Extensive	Highly Likely	Limited	Medium	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High	High

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

H.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile the District's hazards and assess the District's vulnerability separate from that of the Amador County Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the District is included in this Annex. This vulnerability assessment analyzes the property and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

H.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section H.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard (as shown in Table H-3) affects the District and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Planning Area.

H.5.2. Vulnerability Assessment and Assets at Risk

This section identifies the District's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the District. This data is not hazard specific, but is representative of total assets at risk within the District.

Assets at Risk and Critical Facilities

This section considers the LFPD's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this LHMP Update. Critical facilities are defined for this Plan 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, and (3) Hazardous Materials Facilities, as discussed in Section 4.3.1 of the Base Plan.

Table H-4 lists critical facilities and other District assets identified by the District Planning Team as important to protect in the event of a disaster. LFPD's physical assets, valued at over $3.5 million, consist of the buildings and infrastructure to support the District's operations.

Table H-4 LFPD Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Replacement Value	Which Hazards Pose Risk
LFPD Station 151	Fire station and EOC	$500,000	fire, winter storms, lightning, flooding
LFPD Station 152	Fire station	$500,000	fire, winter storms
Contents of Stations 151 and 152	Engines, water tenders, squads	$2,500,000	fire, winter storms, lightning, flooding
Type 6 Engine	Engine	$20,000	fire, winter storms, lightning, flooding
4-10,000 gallon water tanks	Water tank	$40,000	fire, winter storms, lightning, flooding
Total		**$3,560,000**	

Source: LFPD

Natural Resources

LFPD has a variety of natural resources of value to the District. These natural resources parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Historic and Cultural Resources

LFPD has a variety of historic and cultural resources of value to the District. These historic and cultural resources parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Growth and Development Trends

Housing is generally concentrated in several large rural subdivisions (Sierra Pines, Amador Pines, Carson Pass Pines), and along the Shake Ridge Road corridor, and to a lesser extent along the Fiddletown Road corridor. Along the north side of the jurisdiction lie private commercial timberlands, cattle grazing lands, and some federal (BLM and US Forest Service) lands. Most of the heavy development occurred in the 1960-1980s, when the 3 large subdivisions were built out. Currently, high permitting costs and difficulty in obtaining fire insurance are likely keeping new building development to a minimum. Land use and zoning maps can be obtained from the County offices.

Of the 2,500 residents in the LFPD jurisdiction, the majority are seniors. Per capita, Amador County has the second highest population of low-income seniors in the State of California. In the District, the median age is 50.6; and the poverty rate is 10.6%.

Development since 2014

No District facilities have been constructed since 2014.

Future Development

The District has no control over future development in areas the District provides fire protection. Future development in these areas parallels that of Amador County. More general information on growth and development in Amador County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Amador County Vulnerability and Assets at Risk of the Base Plan.

H.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table H-3 as high or medium significance hazards. Impacts of past events and vulnerability of the District to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Amador County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the District to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. 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 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.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Agricultural Hazards: Severe Weather/Insects and Pests

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

According to the USDA and County Agricultural Commissioner, agricultural losses generally occur on an annual basis and are often associated with severe weather events, including heavy rains, floods, heat, and drought. The 2018 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, heavy rains, flooding, crop and livestock disease, and noxious weeds.

In addition to severe weather, 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 severe weather and invasive species that pose a significant threat to the agricultural industry and are therefore a concern in the Amador County Planning Area. This hazard does not address pest and plants that cause impacts to human health, as those issues are addressed in other planning mechanisms in the County.

Location and Extent

Severe weather events that can affect agriculture and timber production are often regional events (droughts, wind, freeze, heavy rains, and extreme heat). The entirety of the agriculture and timber producing areas of the County are at risk to these severe weather events. The speed of onset varies. Winds, freeze, extreme heat, and heavy rains can have short onset speeds, the onset of drought is much longer. Duration of events varies as well, with longer durations possible for drought and extreme temperatures and shorter durations for winds and heavy rains.

Insects and pests can affect areas and can vary between being localized or regional events. Speed of onset of insects is often short, though this can vary depending on the type of insect infestation occurs. Duration of these events varies as well. Insects often have shorter lifespans, but can reproduce multiple times. If these insects are not controlled, they can affect large areas of land in the County.

Past Occurrences

The District noted that agriculture events occur yearly, though with varying levels of damages to a variety of crops. The drought and subsequent bark beetle pandemic hit the Sierra right after the 2014 plan was written. This severely impacted both private timberlands and residential parcels. Dead and dying stands of trees necessitated salvage logging/removal and locating areas to dump the dead trees.

Vulnerability and Impacts from Agricultural Hazards

According to the USDA, every year natural disasters, such as droughts, 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. Given the importance of agriculture to the District and Amador County, agricultural hazards continue to be an ongoing concern. The primary causes of agricultural losses in the District are severe weather events, such as drought, freeze, and extreme heat; insect/pest infestations; and noxious weeds.

The Districts concern with this hazard is with the commercial timberlands located in the District. As we saw with the drought and Western Bark beetle pandemic, private timberlands had large stands of dead and dying trees which raised a risk of wildfire and spreading of the beetle from dying stands to living stands, thus moving the beetle into residential areas. Sudden Oak death is not an issue in this location, nor is Dutch Elm or Ash Borer. There are some scattered effects of madrone psyllid, but the primary marketable timber in this area is Ponderosa pine, white and Douglas fir.

Assets at Risk

Both Station 151 and 152 are at risk from fire coming off the commercial timberlands, and 151 is at risk of bark beetle infestation.

Future Development

There are no plans at this time to build any new facilities. The County is in the process of returning ownership of both parcels (151 and 152) to the District. The locations of both stations are well positioned to respond to calls.

Climate Change

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Climate change adaptation is a key priority of the State of California. The 2018 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.

In Amador County and the District, the HMPC noted that each year it seems to get a bit warmer and snow seems to start at higher levels. It was also noted that 2017 was one of the wettest years ever.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the District, Amador County, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, 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

Climate change has never been directly linked to any declared disasters. While the District noted that climate change is of concern, no specific impacts of climate change could be recalled. The District and HMPC members noted that the strength of storms does seem to be increasing and the temperatures seem to be getting hotter.

Vulnerability to and Impacts from Climate Change

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. California's APG: 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. 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. This information can be used to guide climate adaptation planning in the District and Amador County Planning Area.

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra region in which the Amador County Planning Area is part of:

- Temperature increases
- Decreased precipitation
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

The District noted that increased heat and winter rain will impact wells and water supply; heat will impact health and welfare; increases in temperatures also results in an increased fire danger.

Assets at Risk

The District noted that its facilities will most likely not be at risk from climate change. The District Planning Team noted that facilities could be at risk from wildfire and drought, which are discussed in separate sections of this Annex.

Future Development

Future development of District facilities is unlikely to be affected by climate change. There are no plans at this time to build any new facilities. The County is in the process of returning ownership of both parcels (151 and 152) to the District. The locations of both stations are well positioned to respond to calls.

Dam Failure

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and 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.

Location and Extent

Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, a total dam failure would most probably happen as a consequence of the natural disaster triggering the event, such as an earthquake. There is no scale with which to measure dam failure. However, Cal DWR Division of Safety of Dams (DSOD) assigns hazard ratings 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. Dams are classified in four categories that identify the potential hazard to life and property: Low, Significant, High, and Extremely High. These were discussed in more detail in Section 4.2.10 of the Base Plan.

While a dam may fill slowly with runoff from winter storms, a dam break has a very quick speed of onset. The duration of dam failure is generally not long – only as long as it takes to empty the reservoir of water the dam held back. The District would be affected for as long as the flood waters from the dam failure took to drain downstream.

No mapped Cal OES dams have inundation areas that intersect the LFPD boundaries. However, the District also noted that, while inundation data was not available, the following dams are also a concern to the District: (1) Dam owned by Sierra Pacific Industries off of Shake Ridge Road and (2) Lake Marie dam on Lake Marie Road.

Past Occurrences

The District noted no dam failure occurrences that have affected the District.

Vulnerability to and Impacts from Dam Failure

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Impacts to the District from a dam failure flood 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. The District noted that if either dam fails, downstream impacts will occur

Assets at Risk

There are no District assets in the dam failure flooding areas.

Future Development

As no facilities sit in dam failure inundation areas, future development will not be affected by dam failure.

Drought & Water Shortage

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Drought is a complex issue involving 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. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water. In the District, it was noted that most residents rely on private wells.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the District, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages and for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the District and the County are shown in Section 4.2.11 of the Base Plan.

Past Occurrences

Since drought is a regional phenomenon, past occurrences of drought for the District are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.2.11 of the Base Plan.

Neither station has been impacted by droughts in the past. Station 151 has a very high functioning well. However, Station 152 shares a well/storage tank with the La Mel Heights subdivision. During wildfires, multiple fills of the water tender seriously impact water supply for the subdivision.

Vulnerability to and Impacts from Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the District, 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 District would be vulnerable if the well or well pump failed at Station 151. We would be unable to fill the storage tanks. At Station 152, we are vulnerable because of the shared well with the adjacent subdivision, La Mel Heights.

Assets at Risk

The District's water tanks and wells, as shown in Table H-4, would be at risk to drought and water shortage.

Future Development

Future development of District facilities is unlikely to be affected by drought and water shortage.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Flooding occurs in areas other than the FEMA mapped 1% and 0.2% annual chance 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 County 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.

Location and Extent

The LFPD is subject to localized flooding throughout the District. Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the District vary by

location. Flood durations in the District tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Localized flooding in the District tends to have a shorter speed of onset, especially when antecedent rainfall has soaked the ground and reduced its capacity to absorb additional moisture.

Past Occurrences

The District noted the following past occurrences of localized flooding:

- During heavy rains in 2017 (8+ inches in one day), the upper part of Shake Ridge Road washed out, taking the embankment, pavement, culverts, and trees, and carrying debris nearly ¼ mile onto private timberlands. The following year, in 2018, the road was repaired and subsequently failed in the same location in the winter of 2019. This portion of Shake Ridge Road is the only emergency evacuation route for approximately 2500 residents, in the event of a fire coming from the west. At the writing of this LHMP Update, no plans have been made to affect the repair.

Vulnerability to and Impacts from Localized Flooding

Historically, much of the growth in the District and County has occurred adjacent to streams, resulting in significant damages to property, and losses from disruption of community activities when the streams overflow. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff. Localized/stormwater flood issues are scattered throughout the LFPD area and are in direct response to heavy rains and snow melt. Critical to prevention is ditching of county roads prior to winter and maintenance of culverts on both county and private roads.

The District tracks localized flooding areas. Affected localized flood areas identified by the LFPD are summarized in Table H-5.

Table H-5 LFPD – List of Localized Flooding Problem Areas

Area Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
Upper Shake Ridge Rd	X	X	X		X	X	X
Hale Road at S F Dry Creek	X	X	X	X	X	X	
Shake Ridge Rd x Stone Jug	X	X	X	X	X	X	X
LFPD Station 151	X	X	X			X	
Pine Dr W x Ponderosa	X	X	X	X		X	X
Inspiration E, N, Hill Rd, Ashland Cr	X	X	X	X	X	X	X
Volcano Village	X	X	X	X	X	X	X

Source: LFPD

More info on these locations is discussed below:

- Shake Road – see the discussion the in Past Occurrences section above.

- Hale Road – the ford that crosses South Fork Dry Creek. During even modest rain events, the ford can be 2 or more feet deep, preventing even emergency vehicles passage.
- Shake Ridge Road above and below Stone Jug Road, Rancheria Creek crosses under the road several times. Culverts are insufficient to carry runoff. The road floods and pavement has deteriorated.
- LFPD Station 151, 23141 Shake Ridge Road. Due to a concrete apron installed by the County at the entrance without a culvert underneath, the road regularly floods during even modest rain events.
- Pine Drive West x Ponderosa Drive in the Amador Pines Subdivision. Sutter Creek flows through a small culvert at this intersection. The culvert is substandard, and the pavement has been significantly damaged in the past two winters.
- Inspiration East, Inspiration North, Hill Road, and Ashland Creek Road, Amador Pines Subdivision, in the vicinity of the Amador Pines Pond. During significant rain events, Ashland Creek flows at high rates into the pond, then floods the outlet.
- Downtown Volcano. Sutter Creek, Pioneer Creek and Ashland Creek converge on this small village of 100 residents. The Sutter Creek frequently overflows its shallow banks and floods Pine Grove Volcano Road. Due to the lava caps in and near town, runoff frequently floods some of the businesses in this historic town.

Primary concerns associated with stormwater flooding include impacts to infrastructure that provides a means of ingress and egress throughout the community. Response times can increase due to stormwater flooding affecting driving routes. 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.

Assets at Risk

The pavement at Station 151 is at risk from localized flooding.

Future Development

No new facilities are planned. As such, future development is unlikely to be affected by localized flood.

Landslide, Mudslide, Debris Flows

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

According to the California Geological Survey, landslides refer to a wide variety of processes that result in the perceptible downward and outward movement of soil, rock, and vegetation under gravitational influence. Common names for landslide types include slump, rockslide, debris slide, lateral spreading, debris avalanche, earth flow, and soil creep. Landslides may be triggered by both natural and human-induced changes in the environment that result in slope instability.

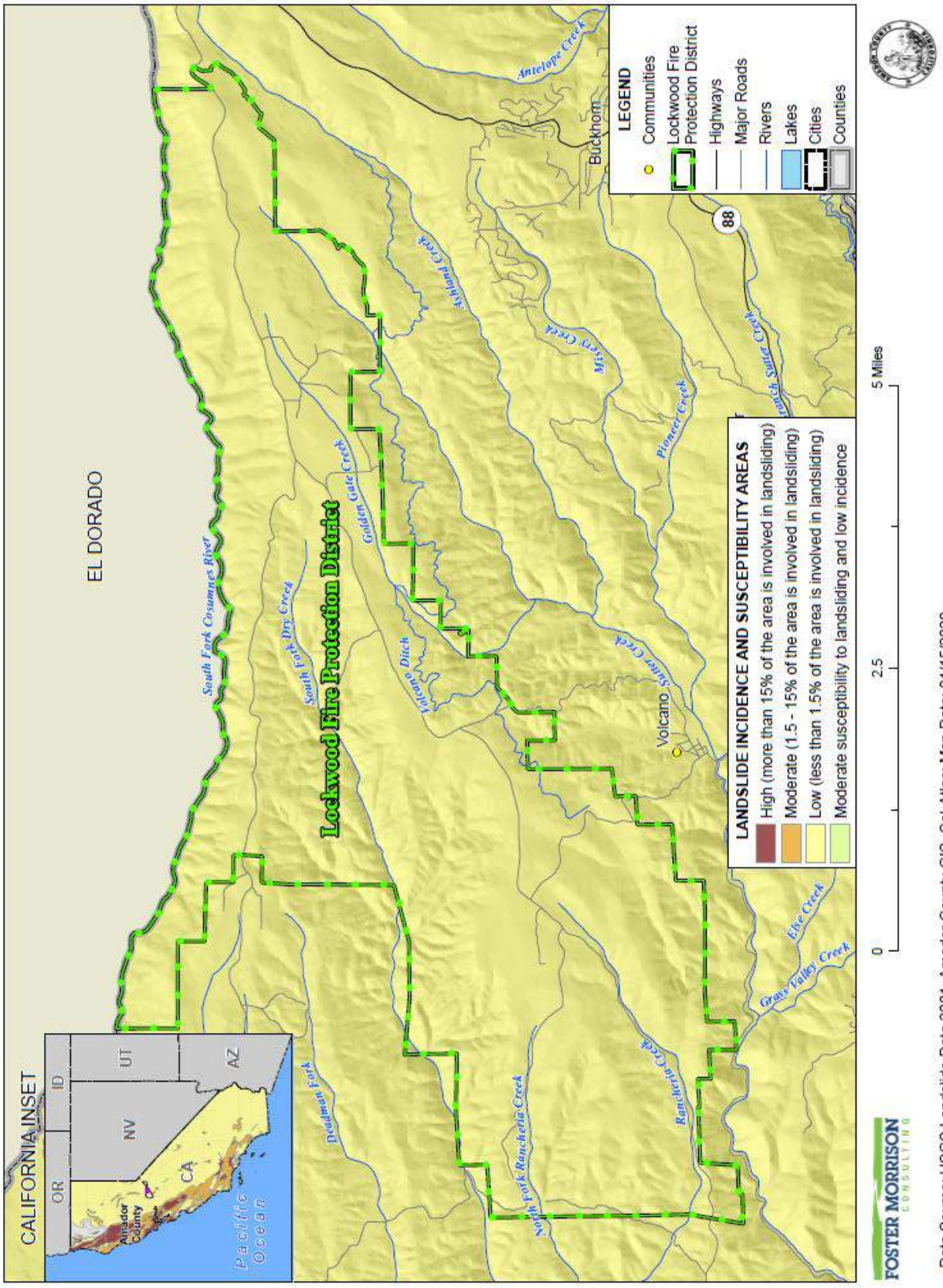
The susceptibility of an area to landslides depends on many variables including steepness of slope, type of slope material, structure and physical properties of materials, water content, amount of vegetation, and proximity to areas undergoing rapid erosion or changes caused by human activities. These activities include mining, construction, and changes to surface drainage areas. Landslide events can be determined by the composition of materials and the speed of movement. A rockfall is dry and fast while a debris flow is wet and fast. Regardless of the speed of the slide, the materials within the slide, or the amount of water present in the movement, landslides are a serious natural hazard.

Another type of landslide, debris flows, also occur in some areas of the Amador County and the District. These debris flows generally occur in the immediate vicinity of existing drainage swales or steep ravines. Debris flows occur when near surface soil in or near steeply sloping drainage swales becomes saturated during unusually heavy precipitation and begins to flow downslope at a rapid rate. The District noted that Uppers Shake Ridge Road, and Shake Ridge at Stone Jug have had problems in the past.

Location and Extent

Landslides, mudslides, and debris flows can affect certain areas of the District. The USGS has estimated that the risk varies across the District and has created maps showing risk variance. This risk variance falls into one of the following landslide incidence and susceptibility categories: High, Moderate, and Low. These are discussed in Section 4.3.12 of the Base Plan. Following the methodology described in Section 4.3.12 of the Base Plan, landslide incidence and susceptibility maps for the LFPD were created. Figure H-3 shows the USGS landslide incidence and susceptibility areas in the District. As shown on the maps, risk within the District according to the USGS is low.

Figure H-3 LFPD – Landslide Incidence and Susceptibility Areas



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.

Past Occurrences

The District noted that there have been past occurrences at the locations at risk in the District:

- Upper Shake Ridge has had two land/mudslides and debris flows in the past 3 years, each time closing the road. Repairs made after the first incident subsequently failed and the road remains closed, compromising public safety during fire season. Road currently closed indefinitely. This is a major evacuation route for approximately 2,500 residents.
- Shake Ridge x Stone Jug. Rancheria Creek regularly overflows onto the pavement, causing debris and pavement deterioration. Lake Marie (privately owned) can accommodate some of this heavy runoff as long as the landowner is available to manage the water gates on the dam. BLM land is also impacted.

Vulnerability to and Impacts from Landslide

Common names for landslide types include slumps, rockslides, debris slides, lateral spreading, debris avalanches, earth flows, and soil creep. 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 may be triggered by both natural- and human-caused activity.

Impacts from landslide and debris flow are limited in the District, as they occur in areas of high topographical change. Impacts in the District may be to structures, infrastructure, and to life safety. Landslides impact evacuation routes and first responder response time is delayed, impacting public safety during fires.

The District planning team noted impacts that can affect the District: continued road damage, debris flows, landslides from the Upper Shake Ridge Road pavement failure; and smaller landslides along both Shake Ridge and Fiddletown Roads.

Assets at Risk

The pavement at Station 151 can be affected by this hazard.

Future Development

No new facilities are planned. As such, future development is unlikely to be affected by landslide.

Severe Weather: Extreme Heat

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to 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 extreme heat and high humidity, evaporation is slowed, and the body must work extra hard to maintain a normal temperature." Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

In addition to the risks faced by citizens of the District, there are risk to the built environment from extreme heat. While extreme heat on its own does not usually affect structure, extreme heat during times of drought can cause wildfire risk to heighten. Extreme heat and high winds can cause Public Safety Power Shutoff (PSPS) events, causing issues to buildings in the District.

Location and Extent

Heat is a regional phenomenon and affects the whole of the District. 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 affect vulnerable populations and communities. Heat waves do not generally cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios.

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 Section 4.2.2 of the Base Plan.

Past Occurrences

The District Planning Team note that since extreme heat is a regional phenomenon, events that affected the County also affected the District. Those past occurrences were shown in the Base Plan in Section 4.2.2.

Vulnerability to and Impacts from Extreme Heat

The District experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-115°F in rather extreme situations. Also, PSPS events may occur during these times as well

Many months see a high number of days where daily high temperatures exceed 90°F. Health impacts are a primary concern. Generally, people who live and work in this weather are prepared to cope with the extremes. There are few homes in the District with air conditioning. Continued heat due to climate change combined with power outages may cause residents to need a cooling place. Station 151 has a modest swamp cooler and Station 152 has no air conditioning.

Days of extreme heat have been known to result in medical emergencies, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts. During these times, drought conditions may worsen. Extreme heat can also lead to an increase in tree mortality and dry out vegetation, making it more vulnerable to wildfire ignitions and spread. During periods of extreme heat (with high winds), PG&E can institute the PSPS, which can leave people without power for days. In areas that rely on well water, a PSPS can limit access both for household use and for fire suppression. Economic impacts can also result.

Power outages go hand-in-hand with extreme heat, with or without wind events.

Assets at Risk

There is a swamp cooler at Station 151; however, the interior of Station 152 and equipment stored there gets extremely hot with no way to cool the interior.

Future Development

No new facilities are planned. As such, future development is unlikely to be affected by extreme heat.

Severe Weather: Heavy Rains and Storms (Hail, Lightning)

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Storms in the District occur annually 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 District falls mainly in the fall, winter, and spring months.

Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the District. All portions of the District are at risk to heavy rains. Most of the severe rains occur during the fall, winter, and spring months. There is no scale by which heavy rains and severe storms are measured. 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 severe

storms in California, Amador County, and the District can range from minutes to hours to days. Information on precipitation extremes can be found in Section 4.2.3 of the Base Plan.

Past Occurrences

According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the District. This is the cause of many of the federal disaster declarations related to flooding. Past events of flooding were also discussed in the past occurrences sections of Localized Stormwater Flooding and Landslide sections of this Annex.

Each year, the district is also impacted by winter storms, both heavy snow and heavy rains. Impacts from these winter storms include lengthy power outages; damage to homes and electric wires from snow-felled trees; closed roads due to fallen trees; and localized flooding from heavy rain events, such as the winter storms of 1991, 1996-97, 2009, 2010.

Vulnerability to and Impacts from Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrence in the District. These events can cause localized flooding. Elongated events, or events that occur during times where the ground is already saturated can cause 1% and 0.2% annual chance flooding. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the District.

Actual damage associated with the effects of severe weather include impacts to property, critical facilities (such as utilities), and life safety. Heavy rains and storms often result in localized flooding creating significant issues. Roads can become impassable and ground saturation can result in instability, collapse, or other damage to trees, structures, roadways, and other critical infrastructure. Floodwaters and downed trees can break utilities and interrupt services.

The District can be impacted by pavement deterioration at both stations; pavement deterioration and flooding on roads in the district; and by landslides.

Assets at Risk

The District note that the pavement at both stations is at risk, and there is a risk of roof leaks that could cause damages to equipment.

Future Development

No new facilities are planned. As such, future development is unlikely to be affected by heavy rains and storms.

Severe Weather: High Winds and Tornadoes

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

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. High winds can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss.

In addition, fires are often driven by winds in the District. The normal summer winds come from the southwest. These winds push upslope following major river canyons and branching into lesser drainages as they go. These canyons and side drainages form natural chimneys that favor the rapid spread of wildfires. Foehn winds (type of dry down-slope wind that occurs in the downwind side of a mountain range) can also affect the District. The winds are often hot and dry and are especially dangerous during fire seasons.

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 form when cool, dry air sits on top of warm, moist air. Tornadoes are the most powerful storms that exist. Tornadoes, though rare, are another severe weather hazard that, though rare, can affect areas in the lower elevations of the Amador County Planning Area, primarily during the rainy season in the late fall, winter, and early spring.

Location and Extent

The entire County and District is subject to significant, non-tornadic (straight-line), 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 12 category scale that relates wind speed to observed conditions at sea or on land. Its full name is the Beaufort Wind Force Scale. The Beaufort Scale was shown in Section 4.2.4 of the Base Plan.

Tornadoes, while rare, can occur at any location in the County and District. The areas in the lower elevations of the County tend to be at greater risk than the areas in the foothills and higher. 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 (EF) 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. The F Scale and EF Scale are shown in Section 4.2.4 of the Base Plan.

Past Occurrences

The District noted that since high winds is a regional phenomenon, events that affected the lower elevations of the County also affected the District. Those past occurrences were shown in the Base Plan in Section 4.2.4. Windstorms in 2016 and 2017 damaged areas in and around the District.

Vulnerability to and Impacts from Severe Weather: Wind and Tornado

High winds are common occurrences in the District throughout the entire year. Straight line winds are primarily a public safety and economic concern. Windstorm can cause damage to structures and power lines which in turn can create hazardous conditions for people; downed power lines can also ignite fires. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered. High winds can impact critical facilities and infrastructure and can lead to power outages. Wind can also drive wildfire flames, spreading wildfires quickly. High winds are also a component of red flag days, which can cause PG&E to enact the PSPS.

Impacts from high winds in the District will vary. Future losses from straight line winds include:

- Downed trees
- Power line impacts and economic losses from power outages, including potential wildfire ignitions
- Occasional building damage, primarily to roofs
- Increase in wildfire and potential for out of control, fast spreading wildfires
- Increase in PSPSs which can impact fire suppression abilities

While the District does not see tornadoes, we do have seasonal foehn winds and winds from winter storms that cause downed trees and powerlines

Assets at Risk

Both Station 151 and 152 have excellent tree clearance so downed tree impact is minimal. However, all power lines are above ground and at risk.

Future Development

No new facilities are planned. As such, future development is unlikely to be affected by winds and tornadoes.

Severe Weather: Winter Storms and Freeze

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to the National Weather Service), extreme cold often accompanies a winter storm or is left in its wake. Winter snowstorms can include heavy snow, ice, blizzard conditions, and cold temperatures. Freezing temperatures can also occur without the accompanying winter storm. Like most weather events,

periods of heavy snow occur on an annual basis in the higher elevations of the County. This is true in the area served by the District.

Location and Extent

Winter storms and freeze are regional issues, meaning the entire District is at risk to freeze and winter storm. 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 21.8 days that fall below 32°F in western Amador County. 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. Snowfall often accompanies storms in the upper elevations of the County is measured in snow depths.

Past Occurrences

Like most weather events, periods of heavy snow occur on an annual basis in the higher elevations of the County. This is true in the area served by the District. The HMPC reported events in November 2010, November 2011, and December of 2011. Heavy wet snow occurred, with 48" in 48 hours. Other impacts included falling trees, downed power lines, road closures, motor vehicle accidents, and high winds (in excess of 60 mph). Winter storms and freeze cause frequent power outages and frozen pipes, which prevent access to water from the well. Snow can preclude responder access to both stations if the County does not plow.

Each year, the district is also impacted by winter storms, both heavy snow and heavy rains. Impacts from these winter storms include lengthy power outages; damage to homes and electric wires from snow-felled trees; closed roads due to fallen trees; and localized flooding from heavy rain events, such as the winter storms of 1991, 1996-97, 2009, 2010.

Recent winter storms in December 2011 saw a combination of brief heavy snow followed by extreme winds, which caused wildland fires adjacent to snow fields.

With climate change, expectations are increased wildland fires, increased timber loss due to drought, and increased severe winter storms.

Vulnerability to and Impacts from Severe Weather: Freeze and Winter Storms

The District experiences temperatures below 32 degrees during the winter months. The temperature moves to the teens in rather extreme situations. Freeze can cause injury or loss of life to residents of the District. While it is rare for buildings to be affected directly by freeze, damages to pipes that feed building can be damaged during periods of extreme cold. Extreme cold and freeze can affect critical facilities and infrastructure, down trees, break pipes, and can be a life safety issue. When extreme cold is coupled with high winds or ice storms, power lines may be downed, resulting in an interruption of utilities and critical services. Occasionally, winter storms with snow and ice can affect the District. Transportation networks, communications, and utilities infrastructure are the most vulnerable physical assets in the District. The ability for the District to continue to operate during periods of winter storm and freeze is paramount.

Winter storms and freeze cause frequent power outages and frozen pipes, which prevent access to water from the well. Snow can preclude responder access to both stations if the County does not plow.

Assets at Risk

Power outages and frozen pipes at both stations.

Future Development

No new facilities are planned. As such, future development is unlikely to be affected by freeze and winter storm.

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

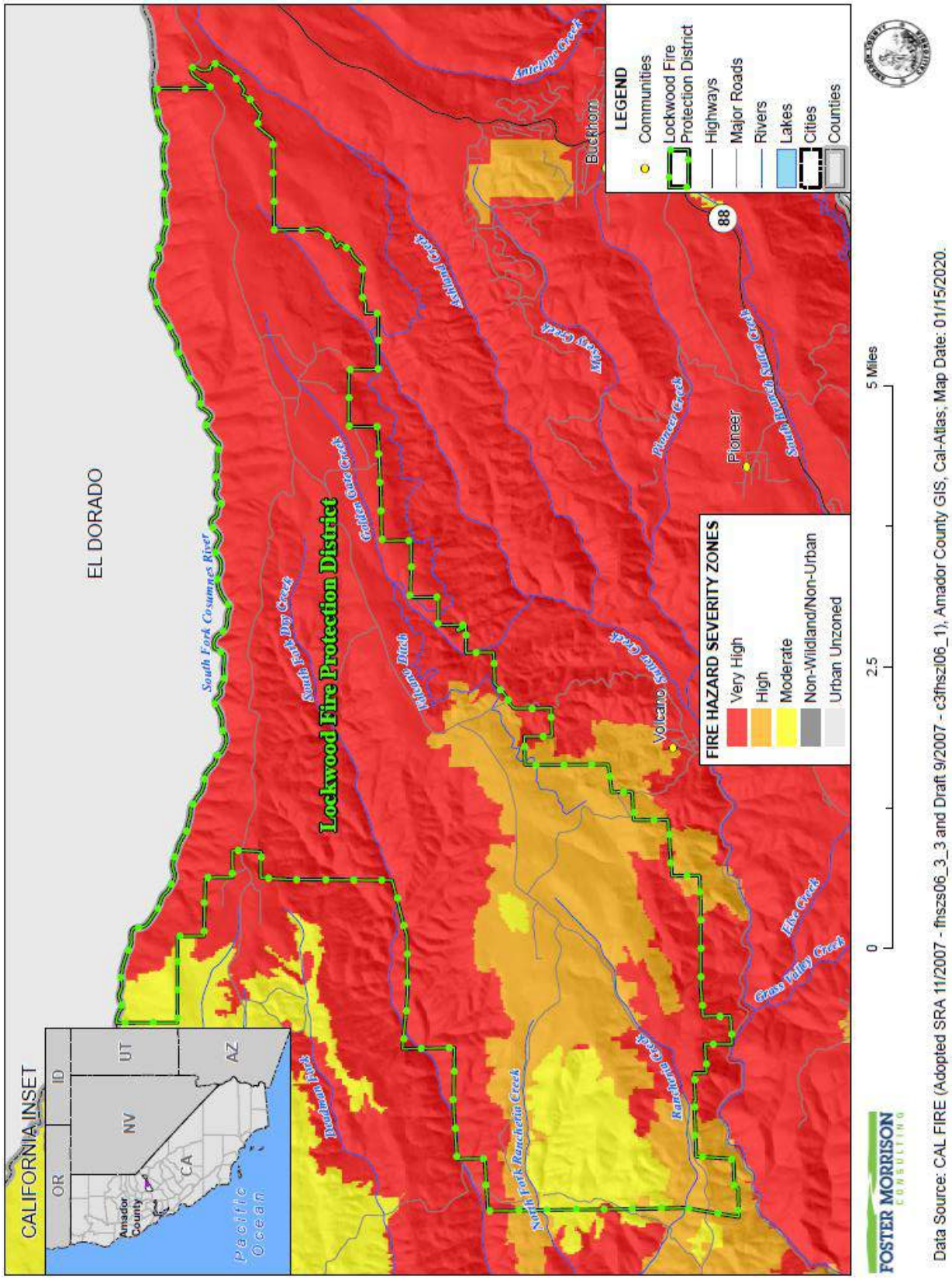
Hazard Profile and Problem Description

Wildland fire and the risk of a conflagration is an ongoing concern for the LFPD. 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. 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. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

Location and Extent

Wildfire can affect all areas of the District. CAL FIRE data indicates that the risk varies across the District and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the LFPD were created. Figure H-4 shows the CAL FIRE FHSZ in the District. As shown on the maps, FHSZs within the District range from moderate to very high.

Figure H-4 LFPD – FHSZs



Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more.

Past Occurrences

A list of state and federal disaster declarations for Amador County from wildfire is shown on Table H-6. These events also likely affected the District to some degree.

Table H-6 Amador County – State and Federal Disaster Declarations from Wildfire 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	1	2015	1	1961

Source: Cal OES, FEMA

The 1961 Rancheria Fire started in the Lockwood District, 34,000 acres in 36 hours, 1 ag building lost. Population and development were significantly lower in 1961. An overlay of the Rancheria Fire footprint onto today's development shows a similar fire would affect high losses of property and life today. No other declaration-sized fires have occurred in the District since 1961.

Historically, large fires (100 acres+) impact the district every 30 to 35 years, with numerous smaller fires of 20 acres or less occurring every year. Fire starts range from a combination of lightning; wind-driven events; humans; and utilities. The 1924 Indian Diggings Fire burned the area that is now a 600-parcel rural subdivision and was human caused. The 1961 Rancheria Fire was a human start that was further fueled by an autumn wind-driven event, burning 34,000 acres in 24 hours. At the time, only one agricultural building was lost, but the footprint of the fire today would result in the loss of 400-500 homes.

With climate change, expectations are increased wildland fires, increased timber loss due to drought, and increased severe winter storms.

Vulnerability to Wildfire

The wildfire hazard is one of the highest priority hazards in the County and District, and is the hazard with the greatest potential for catastrophic loss. High fuel loads in the County and District, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. The more urbanized areas within the County are not immune from fire. The dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and District, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Potential impacts from wildfire include loss of life and injuries; damage to structures 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 District. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the District 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 District; smoke and air pollution from wildfires can be a severe health hazard.

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 PSPSs 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.

There is only one store-front-type business (a mini-market) in the District, but there are significant numbers of home-based businesses at risk.

Assets at Risk

Station 151 and 152 are at risk from wildfire.

Future Development

No new facilities are planned. As such, future development is unlikely to be affected by wildfire.

H.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

H.6.1. Regulatory Mitigation Capabilities

Table H-7 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the LFPD.

Table H-7 LFPD Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?

Comprehensive/Master Plan/General Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	N	
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	Y	Multiple CWPPs in the area. They are available at https://amadorfiresafe.org/community-wildfire-plans/
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N/A	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N/A	Score:
Fire department ISO rating:	Y	Rating: 5/5y
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	N/A	
Subdivision ordinance	N/A	
Floodplain ordinance	N/A	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N/A	
Flood insurance rate maps	N/A	
Elevation Certificates	N/A	
Acquisition of land for open space and public recreation uses	N/A	
Erosion or sediment control program	N/A	
Other		
How can these capabilities be expanded and improved to reduce risk?		
LFPD has a volunteer-run board and no staff to administer programs. This limits capabilities of the District. The only way to remedy this is to add staff, which is unlikely.		

Source: LFPD

H.6.2. Administrative/Technical Mitigation Capabilities

Table H-8 identifies the District department(s) responsible for activities related to mitigation and loss prevention in LFPD.

Table H-8 LFPD's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	N	
Mutual aid agreements	Y	CALFIRE, PG&E and the Amador Fire Safe Council occasionally have tree/brush removal programs available.
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	N	
Community Planner	N	
Civil Engineer	N	
GIS Coordinator	N	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	The Amador County Sheriff's office manages the Code Red program
Hazard data and information	N	
Grant writing	N	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
LFPD has a volunteer-run board and no staff to administer programs. This limits capabilities of the District. The only way to remedy this is to add staff, which is unlikely.		

Source: LFPD

H.6.3. Fiscal Mitigation Capabilities

Table H-9 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table H-9 LFPD's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (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	Using funds from the Auxiliary and our capital improvements budget, we have been able to purchase a used Type 6 engine and begin remodeling both stations for allow for better staffing and community access during emergencies
Authority to levy taxes for specific purposes	Y	Approximately 10 years ago, LFPD added an assessment of $75/parcel, which is collected through property taxes
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	Y	LFPD receives some building permit and impact fees
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	N	
Community Development Block Grant	N	
Other federal funding programs	Y	We do apply for Safer and AFG grants. Never awarded
State funding programs	Y	We occasionally receive Assistance to Firefighter grants (50-50) from CALFIRE
Other		
How can these capabilities be expanded and improved to reduce risk?		
Go to the voters for another fire assessment; more aggressively apply for grants		

Source: LFPD

H.6.4. Mitigation Education, Outreach, and Partnerships

Table H-10 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 H-10 LFPD's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access, and functional needs populations, etc.	Y	Instituting a CERT program has been discussed at various times in the past 5 years, but no action has taken place.

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)		Volunteers installed a Firewise Demonstration Garden in front of Station 151; Once a year the district hosts a disaster preparedness fair for the public.
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Increase public education programs, revive the Firewise Communities certification, and the CERT program		

Source: LFPD

H.7 Mitigation Strategy

H.7.1. Mitigation Goals and Objectives

The LFPD adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

H.7.2. Mitigation Actions

The planning team for the LFPD identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Agricultural Hazards: Severe Weather/Insect - Pests
- Climate Change
- Dam Failure
- Drought & Water Shortage
- Floods: Localized Stormwater
- Landslide, Mudslide, Debris Flow
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (Hail, Lightning)
- Severe Weather: High Winds and Tornadoes
- Severe Weather: Winter Storms and Freeze
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan 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 countywide public outreach action, 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 plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

Action 1. Emergency Action Plan and Post-Disaster Recovery Plan

Hazards Addressed: Multi-hazard (Agricultural Hazards: Severe Weather/Insect – Pests, Climate Change, Dam Failure, Drought & Water shortage, Floods: Localized Stormwater, Landslide, Mudslide, Debris Flow, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms (Hail, Lightning), Severe Weather: High Winds and Tornadoes, Severe Weather: Winter Storms and Freeze, Wildfire)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Lockwood FPD has approximately 2500 residents, primarily seniors, living in a rural, mountainous area with narrow winding roads and poor cell coverage.

Project Description: Each resident should be acquainted with methods to prepare for an emergency (wildfire, winter storm, power outage); how to endure the emergency; and have a plan for recovery.

Other Alternatives: Do nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: consultants

Responsible Office/Partners: LFPD Board

Project Priority: High

Cost Estimate: $50,000

Benefits (Losses Avoided): Loss of life; loss of returning residents after emergency

Potential Funding: grants

Timeline: As soon as possible

Action 2. COW – Celltower on Wheels

Hazards Addressed: Multi-hazard – Frequent PSPS (Public Safety Power Shutoff) by PG&E; power outages during winter storms, wind events, landslides, and wildfires

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The Lockwood District has a history of frequent power outages due to above-ground power lines. The vast majority of the residents, as well as both Station 151 and 152, rely on electricity for cell service (and water). Recent PSPS and other power outages have experienced battery failure in the commercial cell towers.

Project Description: Purchase a COW (Celltower on Wheels) that can be moved from point to point, based on need.

Other Alternatives: (1) Encourage cell phone tower companies to install better batteries. (2) Engage with AT&T or Verizon to install a cell tower at station

Existing Planning Mechanism(s) through which Action Will Be Implemented: Apply for a grant

Responsible Office/Partners: LFPD Board

Project Priority: High

Cost Estimate: $45,000

Benefits (Losses Avoided): Provide cell service to impacted residents; expedite response time; lives saved.

Potential Funding: grant

Timeline: As soon as possible

Action 3. Undergrounding of Overhead Power Lines

Hazards Addressed: Downed power lines during Wind, Wildfire, and Snow events

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: All power lines are above ground in the Lockwood District. Each winter, power lines come down during wind and snowstorms, causing power outages and dangerous conditions for residents and responders. Additionally, during fire season, winds, and wildfire cause lines to come down, increasing fire dangers, loss of life and homes, and danger to first responders.

Project Description: Install all overhead power lines underground.

Other Alternatives: Do nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: No existing mechanism exists.

Responsible Office/Partners: PG&E

Project Priority: High

Cost Estimate: Unknown

Benefits (Losses Avoided): Reduce fires due to downed power lines

Potential Funding: PG&E

Timeline: As soon as possible

Flood: Localized Flooding and Heavy Rains and Storms

Action 4. Water Hazards: Dam Failure Study; Dry Creek Ford crossing on Hale Road

Hazards Addressed: Localized Flooding, Heavy Rain and Storms, Dam Failure

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: There are several aging, significant dams on private property within the district. Dry Creek Ford on Hale Road – during a heavy rain event or snow melt event, the ford can be 2-3 feet deep, preventing or endangering emergency response

Project Description: Dam Failure Study and Ford Study

Other Alternatives: Do nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: This study will be the planning mechanism.

Responsible Office/Partners: LFPD Board, Amador County

Cost Estimate: unknown

Benefits (Losses Avoided): Reduced loss from flooding

Potential Funding: grant

Timeline: As soon as funding is available

Project Priority: Medium

Wildfire Actions

Action 5. Water Tanks Installation and GIS tank location recording

Hazards Addressed: Wildfire, Extreme Heat, Drought, High Winds

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: In the Lockwood Fire Protection District, there is one fire hydrant. Lockwood's water tender and engines are filled by four 5000 tanks at Station 151. During a small-scale wildland fire, the tanks were emptied in the first 4 hours, requiring first responders to search neighborhoods for additional tanks. By installing water tanks in critical fire areas and neighborhoods, response time will be reduced.

Lockwood is in a unique area impacted by seasonal wind events which occur, generally, in the autumn months. Autumn is also the time of lowest relative humidity and time of seasonal drought. Four 10,000-gallon tanks are present at Station 151, as well as four 5,000-gallon tanks on Sierra Pacific Industries (SPI)property. Both sites have experienced theft of water during critical dry season. The SPI tanks are currently not filled.

Insurance companies are cancelling homeowner fire insurance throughout the District. By encouraging local homeowners to install tanks on their property, we can reduce water tender refill time and reduce water theft, since the tanks will be near homes. Presence of more tanks may help with insurance cancellations.

Project Description:

- Public education to encourage homeowners to install these critical firefighting water tanks in every neighborhood.
- Offering an incentive to homeowners – such as signage, publicity, modest recognition awards such as address signs.
- Currently, approximately 35 tanks have been installed by homeowners, out of approximately 1000 property owners. In the past, first responder volunteers would visit homes and inspect the installation, then conduct a courtesy defensible space inspection and install an address sign with a blue "W" for water. Additional funding is needed for address signs.

Other Alternatives: Alternatives: do nothing more

Existing Planning Mechanism(s) through which Action Will Be Implemented: Public education events

Responsible Office/Partners: LFPD volunteers and Board

Project Priority: High

Cost Estimate: $5000

Benefits (Losses Avoided): In addition to increasing water sources within the district, the addition of address signs will improve first responders' ability to locate the water source quickly, as well as respond to calls at the address more quickly.

Potential Funding: Grants

Timeline: Ongoing

Action 6. Public Education, Defensible Space, Firewise Communities

Hazards Addressed: Wildfire, Extreme Heat, Drought, High Winds, Agricultural Hazards

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: CALFIRE has rated the Lockwood District as Very High Fire Danger. We need to continually engage the public and help them understand the need for each resident to do their part to maintain their property in a fire safe manner.

Project Description: This multi-faceted project will include:

- Green waste disposal bins
- Chipping days
- Hazard fair
- Firewise Communities designation
- Reflective address signs

Other Alternatives: Do nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: CWPPs

Responsible Office/Partners: LFPD Board

Project Priority: High

Cost Estimate: $100,000

Benefits (Losses Avoided): Loss of homes

Potential Funding: grant

Timeline: As soon as possible

Action 7. Remodel/renovation Stations 151, 152

Hazards Addressed: Wildfire, Extreme Heat, Drought, High Winds

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Station 151 is the primary response station and location of the Chief's office, built in 1980. Station 152 is the lower elevation secondary station but in 2004. While 151 is the primary response station, there are no shower facilities available for volunteers to wash up after a fire or medical call. Their

choice is to either drive 6 miles to 152 (further contaminating vehicles) or go home and bring the contaminates home to their families.

During power outages, storms, and large fire events, there is no sleeping accommodation at either station, so volunteers have resorted to sleeping on the floor or tables. Neither station had a generator for auxiliary power.

Project Description: Install sleeping, cooking, showering facilities, and generators at 151 and remodel kitchen area at 152. 152 would make an ideal gathering point during evacuations and 151 would make an ideal command center if those facilities were present. At 151, four 5000-gallon water tanks are present. Without a generator, there is no capability of keeping the tanks filled during a power outage. Station 152 only has one man door with no secondary entry/exit.

Other Alternatives: Do nothing.

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: LFPD Board, Auxiliary, grants

Project Priority: High

Cost Estimate: 151- $50,000; 152 - $15,000

Benefits (Losses Avoided): Evacuation gathering site; public information during disaster; health improvement for volunteers

Potential Funding: grants

Timeline: Ongoing

Annex I Jackson Valley Irrigation District

I.1 Introduction

This Annex details the hazard mitigation planning elements specific to Jackson Valley Irrigation District (JVID or District), a new participating jurisdiction to the 2020 Amador County Local Hazard Mitigation Plan (LHMP) Update (which is an update of the 2014 Amador County LHMP). ***Note***: JVID participated in the original 2006 Amador County LHMP. A copy of that document could not be located by JVID, Amador County, Cal OES, or FEMA. Additionally, staff turnover in the past 14 years has reduced institutional memory of that 2006 Plan. It can be assumed that none of JVID's proposed mitigation actions were completed, JVID's mitigation priorities at that time are unknown, and that the 2006 Plan was not incorporated into any JVID planning mechanisms. Development in the District since 2006 was described by JVID as minimal, and a general description of more recent development in the District is included in Section I.5.2 of this Annex.

This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the District. This Annex provides additional information specific to JVID, with a focus on providing additional details on the risk assessment and mitigation strategy for the JVID.

I.2 Planning Process

As described above, the District followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Amador County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table I-1. Additional details on plan participation and District representatives are included in Appendix A.

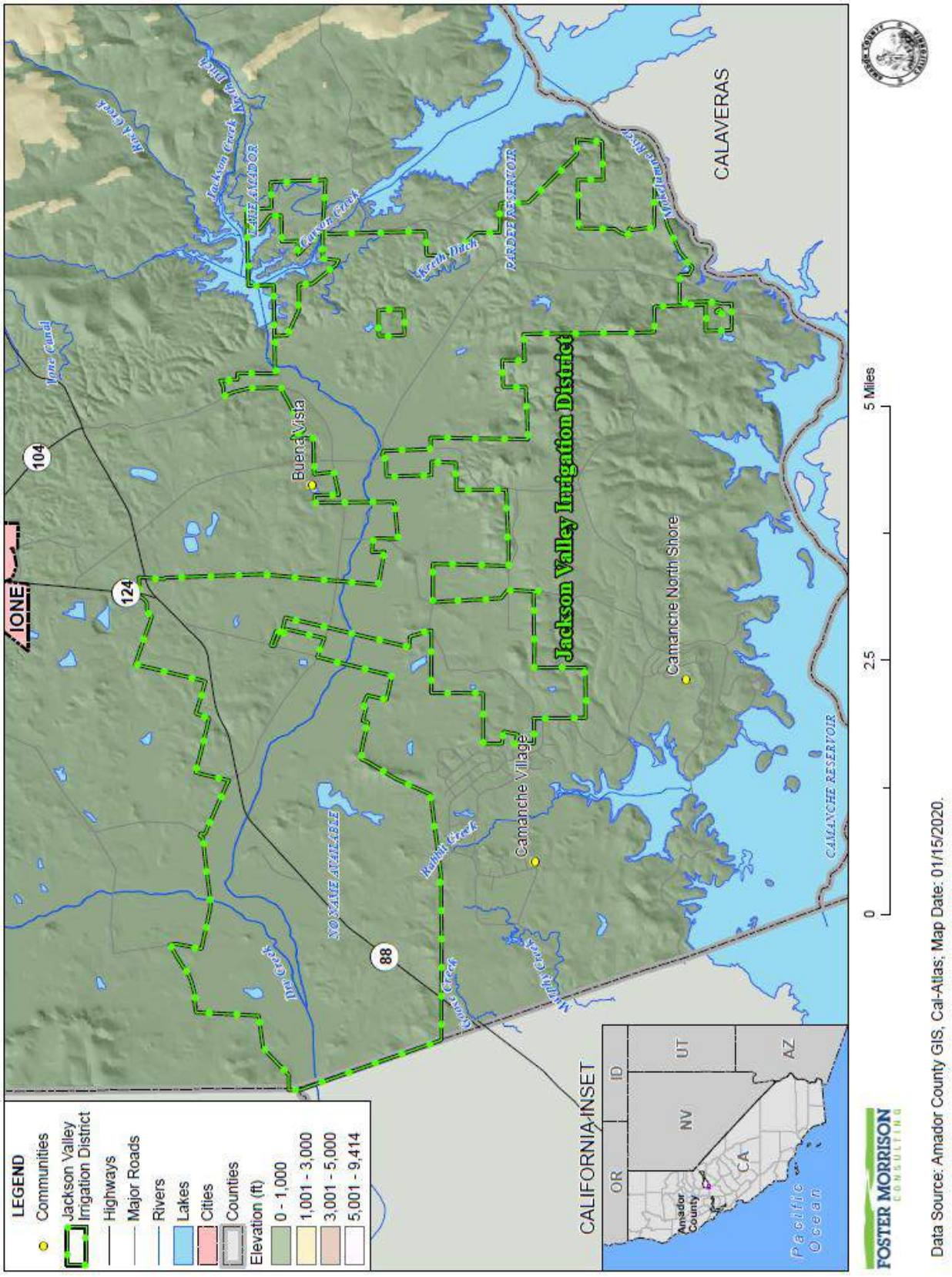
Table I-1 JVID – Planning Team

Name	Position/Title	How Participated
Steven Fredrick	General Manager	Attended all LHMP meetings, completed worksheets, provided feedback on draft documents.

I.3 District Profile

The District profile for the JVID is detailed in the following sections. Figure I-1 displays a map and the location of the District within Amador County.

Figure I-1 JVID



I.3.1. Overview and Background

JVID provides wholesale water supply, distribution of raw water to irrigation, industrial and domestic users, distribution of bottled water to domestic users, and hydroelectric power generation. JVID has an agreement with a private company to operate the Lake Amador recreation facilities. Its recreation concessionaire operates domestic water treatment and wastewater services at Lake Amador.

JVID was formed in October of 1956 as an independent special district to provide irrigation services to the Jackson Valley area. The principal act that governs the District is the Irrigation District Law. The principal act empowers such districts to provide water "for any beneficial use" and may do any act to put to any beneficial use any water under its control. In addition, irrigation districts may provide water-related drainage services and, under certain circumstances, electric and wastewater services. Districts must apply and obtain LAFCO approval to exercise those services authorized by the principal act but not already provided by the district in 2000 (i.e., latent powers).

The JVID boundary is located in southwestern Amador County, west of the Pardee Reservoir and east of the Amador-San Joaquin County line. Lake Amador is located within the northeast portion of the District. Communities in the vicinity of JVID include Buena Vista and the Buena Vista Rancheria, Camanche Village and Camanche North Shore. The boundary of JVID encompasses the residential community of Buena Vista Estates. The District has a boundary area of approximately 13,665 acres (21 square miles). Records of the District's boundary history include four annexations and three detachments.

I.4 Hazard Identification

JVID identified the hazards that affect the District and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to District (see Table I-2).

Table I-2 JVID—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests	Extensive	Likely	Catastrophic	High	Low
Aquatic Invasive Species	Extensive	Occasional	Critical	Medium	Low
Avalanche	Limited	Unlikely	Negligible	Low	Medium
Climate Change	Significant	Occasional	Limited	Medium	–
Dam Failure	Extensive	Unlikely	Catastrophic	High	Medium
Drought & Water shortage	Extensive	Likely	Critical	High	High
Earthquake (large damaging/small)	Extensive	Occasional	Limited	Medium	Low
Floods: 1%/0.2% annual chance	Significant	Occasional	Limited	Medium	Medium
Floods: Localized Stormwater	Limited	Likely	Limited	Low	Medium
Landslide, Mudslide, Debris Flow	Limited	Likely	Limited	Low	Medium
Levee Failure	Significant	Occasional	Critical	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Likely	Limited	Low	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Likely	Limited	Low	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Likely	Limited	Low	Low
Severe Weather: Winter Storms and Freeze	Limited	Occasional	Limited	Medium	Medium
Wildfire	Extensive	Occasional	Critical	Medium	High

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

I.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile the District's hazards and assess the District's vulnerability separate from that of the Amador County Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the District is included in this Annex. This vulnerability assessment analyzes the property and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

I.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section I.5.2, includes a hazard profile/problem description as to how each medium or high significant hazard (as shown in Table I-2) affects the District and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Planning Area.

I.5.2. Vulnerability Assessment and Assets at Risk

This section identifies the District's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the District. This data is not hazard specific, but is representative of total assets at risk within the District.

Assets at Risk and Critical Facilities

This section considers the JVID's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this LHMP Update. Critical facilities are defined for this Plan 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, and (3) Hazardous Materials Facilities, as discussed in Section 4.3.1 of the Base Plan.

Table I-3 lists critical facilities and other District assets identified by the District Planning Team as important to protect in the event of a disaster. JVID's physical assets, valued at over $72 million, consist of the buildings and infrastructure to support the District's operations.

Table I-3 JVID Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Replacement Value	Which Hazards Pose Risk
Dam	Earth Fill Reservoir Storage	$50,000,000	Earthquake, Dam Failure
Transmission, Piping, Outlet Works	Water Transmission	$15,000,000	Earthquake, Dam Failure, Aquatic Invasive Species, Freezing
Spillway	Water / Flood releases	$2,000,000	Flood
Power House	Power Generation	$1,300,000	Dam Failure, Drought, Aquatic Invasive Species
Irrigation Pump Station	Water Transmission	$150,000	Levee Failure
Water Treatment Plant	Domestic Water Production	$2,500,000	Dam Failure, Drought, Severe Weather, Aquatic Invasive Species
Admin Office and Shop	Governmental Administration	$1,200,000	Earthquake, Drought, Severe Weather, Agriculture Hazards
Total		**$72,150,000**	

Source: JVID

There is estimated to be about 400 homes within the service area of JVID. Within the immediate JVID facility there is an Earth fill Dam, Outlet works /piping, Spillway Structure, Powerhouse w/ (4) generators, water treatment plant w/ 200,000-gallon tank, and Administration office.

Natural Resources

JVID has a variety of natural resources of value to the District. These natural resources parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Historic and Cultural Resources

JVID has a variety of historic and cultural resources of value to the District. These historic and cultural resources parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Growth and Development Trends

General growth in the District parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Being a primarily agriculture zone there has not been much growth or development within the District itself. Most of the parcels are 5 acres to 100+ acre parcels that are used for small to large ranching and farming activities. There has been some development nearby which has increase traffic flows through the District to a new Harrah's Casino that was completed in 2019. There is also another small proposed development of a 50+ spot R.V. Park less than 2/3rds of mile downstream of Lake Amador in the inundation area. Not sure of the likelihood of the project actually occurring but just of recently they have approached the County Planning Department for a request in zoning change to move forward with this development. The project is a conversion of a gravel quarry to R.V. park that could increase vulnerability and some concerns for JVID operations because of the increased population in the inundation zone that JVID as the dam owner would have to mitigate for.

There is a low-income community (The Oaks Community Association) located in the JVID service area, that JVID supplies treated water to that consists of 210 mobile / manufactured homes. Also, the Buena Vista community is downstream from the JVID facility within the immediate dam inundation area that is comprised of about 5-10 homes that is less than 1 mile from the dam.

Future Development

The District has no control over future development in areas the District provides water in. Future development in these areas parallels that of Amador County. More general information on growth and development in Amador County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Amador County Vulnerability and Assets at Risk of the Base Plan.

I.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table I-2 as high or medium significance hazards. Impacts of past events and vulnerability of the District to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Amador County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the District to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. 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 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.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Agricultural Hazards: Severe Weather/Insects and Pests

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

According to the USDA and County Agricultural Commissioner, agricultural losses generally occur on an annual basis and are often associated with severe weather events, including heavy rains, floods, heat, and drought. The 2018 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, heavy rains, flooding, crop and livestock disease, and noxious weeds.

In addition to severe weather, 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 severe weather and invasive species that pose a significant threat to the agricultural industry and are therefore a concern in the Amador County Planning Area. This hazard does not address pest and plants that cause impacts to human health, as those issues are addressed in other planning mechanisms in the County.

Jackson Valley Irrigation District provides irrigation water to many types or crops including approximately; 300 acres of Alfalfa, 200 acres of Nut Trees, 400 acres of Grapes, 50 acres of miscellaneous vegetables, and 2,800 acres of irrigated pasture. Drought & water shortage, severe weather, climate change, and invasive pests are all specific concerns that JVID has when it comes to crop production.

Location and Extent

Severe weather events that can affect agriculture are often regional events (droughts, wind, freeze, heavy rains, and extreme heat). The entirety of the agriculture producing areas of the County are at risk to these severe weather events. The speed of onset varies. Winds, freeze, extreme heat, and heavy rains can have short onset speeds, the onset of drought is much longer. Duration of events varies as well, with longer durations possible for drought and extreme temperatures and shorter durations for winds and heavy rains.

Insects and pests can affect areas and can vary between being localized or regional events. Speed of onset of insects is often short, though this can vary depending on the type of insect infestation occurs. Duration of these events varies as well. Insects often have shorter lifespans, but can reproduce multiple times. If these insects are not controlled, they can affect large areas of land in the County.

Past Occurrences

The District noted that agriculture events occur yearly, though with varying levels of damages to a variety of crops. The most recent notable event was the 2014 drought where JVID had to allocate water which in consequence reduced crop production in some cases up to 50% due to the lack of water. There was a handful of farming operations that completely fallowed fields and elected to not even take water. The financial damage it caused the district was it took nearly two years before those irrigators to go back into production because of the drought.

Vulnerability and Impacts from Agricultural Hazards

According to the USDA, every year natural disasters, such as droughts, 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. Given the importance of agriculture to the District and Amador County, agricultural hazards continue to be an ongoing concern. The primary causes of agricultural losses in the District are severe weather events, such as drought, freeze, and extreme heat; insect/pest infestations; and noxious weeds.

JVID includes alfalfa, nut trees (walnuts), grapes, vegetables (corn, row crops), and pasture. Drought and lack of water is the biggest concern for the district when it comes to operation. Severe weather such as freezing, extreme heat and invasive pests can be hazards that are a concern for perennial crops (trees, grapes) that can have a large investment and be compromised in one season due to the unforeseen hazards. Row crops and Pasture being more of annual crop is less vulnerable to the long-term impacts of from agriculture hazards but is still a large concern for the district because of the financial impacts to the not only the district but the County itself.

Assets at Risk

Agricultural hazards; drought & water shortage, severe weather, invasive plants, invasive pests directly impact the financial wellbeing of the district and the asset directly impacted would be the administration office and internal operations and functionality of JVID.

Future Development

JVID cannot do much to mitigate for agricultural hazards when it comes to future development besides implementing best management practices for water efficiently and proper maintenance of the existing facility and distribution system to ensure a reliable consistent water source. JVID is always considering building more water storage to mitigate drought concerns but it is extremely expensive in today's environmental and governmental climate.

Aquatic Invasive Species

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Invasive species are organisms that are introduced into an area beyond their natural range and become a pest in the new environment. The terms: Marine Invasive Species and Non-native Aquatic Species (NAS) are used interchangeably. This hazard considers the economic, environmental, and other issues related to invasive pests of a marine and freshwater nature, particularly euryhaline organisms. These are species having the ability to tolerate a wide range of salinity and can transition in and out of fresh and saltwater.

Currently there are no known aquatic invasive species in the District. JVID does monitor along with California Fish and Wildlife for the Quagga and Zebra Mussel in Lake Amador but to date none have been found. Invasive plant species, algae and hydrogen sulfides from bacteria present in the reservoir are a concern that the District monitors closely and can affect the operation of the District.

Location and Extent

All freshwater lakes, streams, and rivers in Amador County are potentially at risk from aquatic invasive species. There is no established scale for aquatic invasive species. Magnitude is measured by the presence and counts of aquatic invasive species in waterways in the District and Amador County. Speed of onset of these invasive species is short, as it only takes a careless resident or visitor to accidentally introduce an invasive species. However, the impacts associated with the introduction of a new invasive species can last years.

Past Occurrences

The HMPC was able to find no past occurrences that affected the District. No past occurrences regarding invasive aquatic animal species, there have been occasional problems with invasive plant or algae and annual issues with hydrogen sulfide gas from bacteria in the reservoir.

Vulnerability to and Impacts from Aquatic Invasive Species

Once introduced, aquatic invasive species have the ability to tolerate a wide range of conditions and are extremely adaptable., creating environmental imbalances and wreaking economic havoc. Once they have infected a water body, they are difficult to eradicate. They can readily spread into downstream waters. Examples include the zebra mussel infestation in the Great Lakes and the propagation of water hyacinth in the California Delta. Quagga and zebra mussels are an invasive, non-native species that breed very fast, have no known predators, and can quickly colonize new areas within California waters. Once established, these mussels can clog water intake and delivery pipes; dam intake gates and pipes; adhere to boats, pilings, and most hard and some soft substrates, and litter beaches and shores with jagged, foul smelling shells. Both the zebra mussel and the quagga mussel are concerns for California, Amador County, and the District. These mussels have not affected the waters in Amador County yet, but are still a cause for concern. A local bull frog is also a concern to the aquatic systems within the County.

Some of California's most serious weed problems occur in waterways, lakes and streams. The aquatic plant hydrilla is considered one of the most serious aquatic weed problems in the world and the California Department of Food and Agriculture (CDFA) maintains an intensive program to survey and eradicate this aquatic weed pest. It can quickly take over lakes and streams, crowding out native animals and plants and blocking hydroelectric plants, while impeding water flow and delivery. Its rapid growth and ease of spread by boats makes it critical to detect early and eradicate.

The most serious measurable economic impacts associated with aquatic invasive species are suffered by communities, water districts and other users of water who may have increased maintenance costs due to plugged water pipes, intake screens, and possible damage to pumps and other equipment. It even impacts citizens through increased costs for drinking water and food prices passed along to consumers by the water and agriculture industries brought on by their increased costs in maintenance and equipment repair. It impacts the local fisheries, and in some lakes, has caused a collapse in the populations of sport fish.

If the Quagga or Zebra Mussel was able to establish in the Lake Amador it would cause severe damage to the infrastructure. An invasive species like the mussel or plant species could cause damage the dam outlet works, valves, piping, and generators to the point they would not function properly which could lead to catastrophic failure. On a seasonal basis during lake turnover JVID deals with a large amount of hydrogen sulfide gas in the water at levels that can kill fish. This greatly impacts the two fish raising operations below the dam on an annual basis sometimes impacting a large number of fish depending on the levels.

Assets at Risk

Assets at risk would include the transmission system, dam outlet works, piping, valves, powerhouse generators and water treatment plant.

Future Development

There is not much JVID can do to mitigate the aquatic invasive species besides monitor and address the problem as it arises. This could include cleaning screens more often or implement chemical agents to mitigate problems. This hazard would not dictate how future development would occur but could impact operation procedures.

Climate Change

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Climate change adaptation is a key priority of the State of California. The 2018 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.

In Amador County and the District, the HMPC noted that each year it seems to get a bit warmer and snow seems to start at higher levels. It was also noted that 2017 was one of the wettest years ever. Depending on the severity of extremely dry verses extremely wet consequences of Climate Change the District could be impacted in different ways. Dry would exacerbate the drought concerns which would impact the district finically and wet consequences would focus more on the flood hazard and damages that could occur to the assets such as the dam, spillway and pumping stations.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the District, Amador County, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, 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

Climate change has never been directly linked to any declared disasters. While the District noted that climate change is of concern, no specific impacts of climate change could be recalled. The District and HMPC members noted that the strength of storms does seem to be increasing and the temperatures seem to be getting hotter.

Vulnerability to and Impacts from Climate Change

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. California's APG: 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. 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. This information can be used to guide climate adaptation planning in the District and Amador County Planning Area.

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra region in which the Amador County Planning Area is part of:

- Temperature increases
- Decreased precipitation
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress

- Water temperature increase (potential for increase in bacteria and invasive plant species)
- Increased wildfire

Assets at Risk

The District noted that its facilities will most likely not be at risk from climate change.

Future Development

Future development of District facilities is unlikely to be affected by climate change.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–High

Hazard Profile and 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.

JVID is the owner of a dam in Amador County. Jackson Creek Dam is located on Jackson Creek, approximately four miles southeast of Ione, California, and six miles west of Jackson, California, in the foothills of the Sierra Nevada Mountains. Jackson Creek Dam is owned and operated by the Jackson Valley Irrigation District (JVID) for irrigation, recreation, domestic, and power generation purposes and is regulated by both the Federal Energy Regulatory Commission (FERC) and California Division of Safety of Dams (DSOD). The dam is classified as "High Hazard Potential." Construction of the earth-fill dam began in 1964 and was completed in 1965.

Jackson Creek Dam impounds Jackson Creek to form Lake Amador with a reservoir that has an area of 400 acres and a gross storage capacity of 22,000 acre-feet at the normal maximum reservoir level of Elevation (El.) 468.0 feet (USC&GS datum) or the spillway crest level. The reservoir serves the primary function of storing winter and spring runoff and releasing it throughout the year to serve local irrigation commitments downstream along with serving a small amount of domestic water to customers. Generating power is a secondary function and only conducted if ample water exists during the winter and spring.

Figure I-2 Jackson Creek Dam

Source: JVID

Location and Extent

Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, a total dam failure would most probably happen as a consequence of the natural disaster triggering the event, such as an earthquake. There is no scale with which to measure dam failure. However, Cal DWR Division of Safety of Dams (DSOD) assigns hazard ratings 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. Dams are classified in four categories that identify the potential hazard to life and property: Low, Significant, High, and Extremely High. These were discussed in more detail in Section 4.2.10 of the Base Plan.

While a dam may fill slowly with runoff from winter storms, a dam break has a very quick speed of onset. The duration of dam failure is generally not long – only as long as it takes to empty the reservoir of water the dam held back. The District would be affected for as long as the flood waters from the dam failure took to drain downstream.

Maps showing the available DSOD and Cal OES inundation areas and how the intersect the District boundaries are shown on Figure I-3 (for extremely high hazard dams) and Figure I-4 (for high hazard dams).

Figure I-3 JVID - Extremely High Hazard Dam Inundation Areas

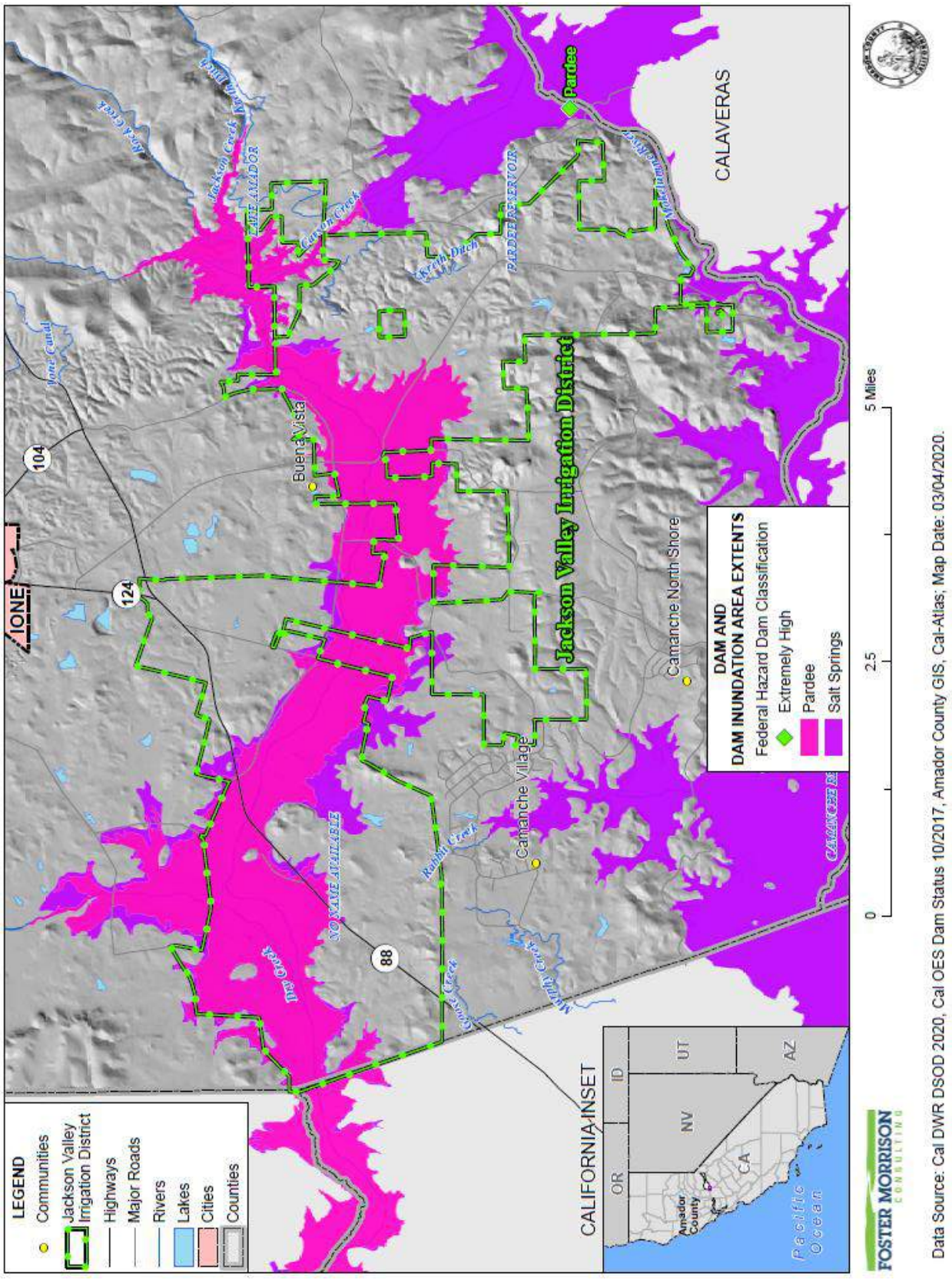
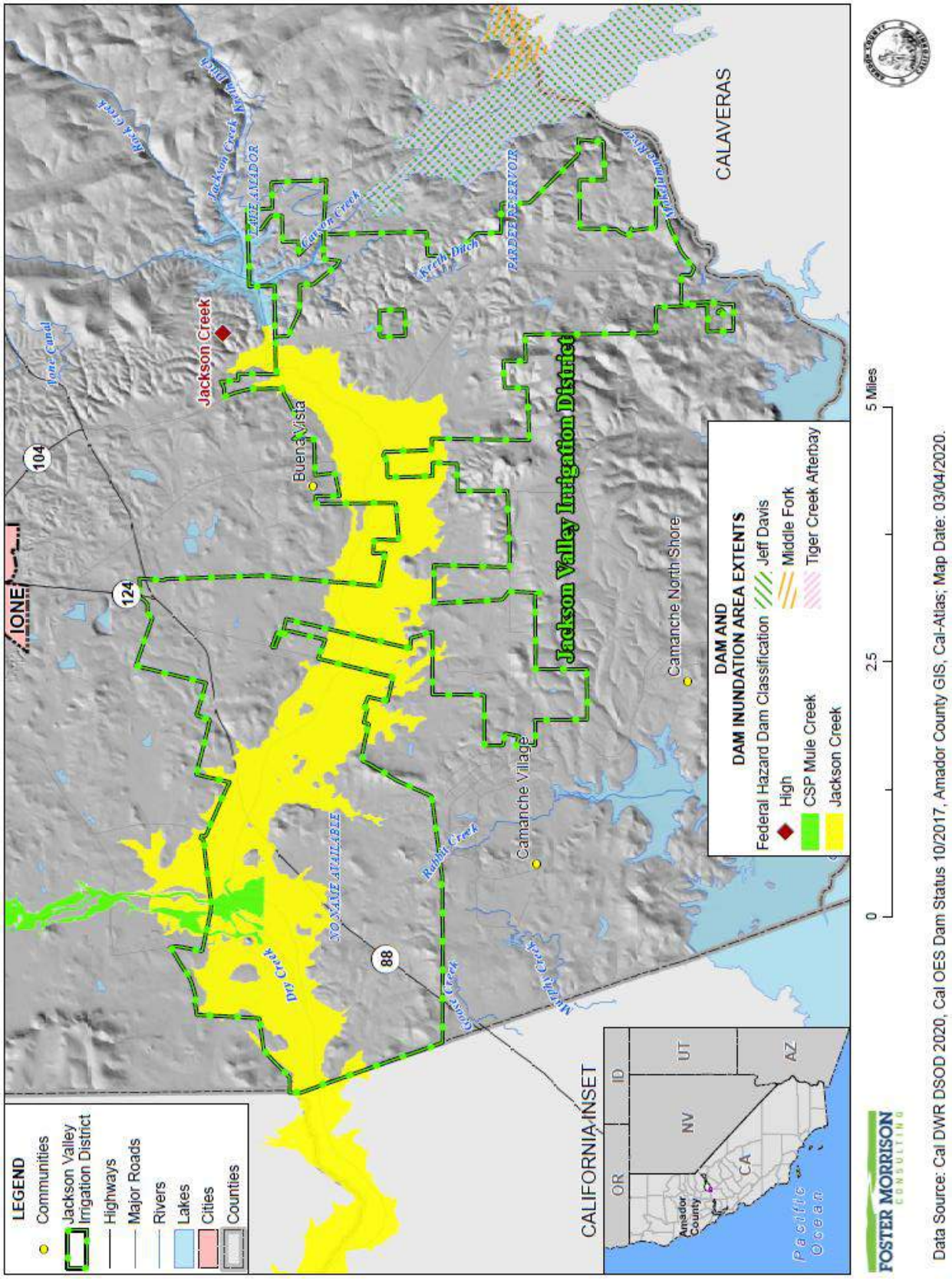


Figure I-4 JVID - Extremely High Hazard Dam Inundation Areas



The District also noted that, while inundation data was not available, the following dams are also a concern to the District. The North Spillway Dam of Pardee Reservoir located roughly 1 mile upstream of Lake Amador. The Lake Tabeaud dam and reservoir located roughly 15 miles upstream on the Jackson Creek. There are also several other small dams that store water or mine tailings located throughout the watershed above Lake Amador. The mine tailing dams around the City of Jackson pose and environmental risk due to the fact some of these dams were constructed 100 plus years ago and if they fail could send arsenic laden and highly toxic contaminated soil into Lake Amador.

Past Occurrences

The District noted no dam failure occurrences that have affected the District. The dam and facility are inspected annually by FERC and DSOD as part of an annual inspection, and every five years, JVID is required to do a detailed independent review of the facility to ensure the safety of the dam, which includes an in-depth survey checking for dam movement.

Though no dam failures have occurred, in January and February of 2017, Lake Amador Dam suffered erosion in the spillway. 5,000 cfs plus flowed over the Lake Amador Spillway and heavy stormwater runoff on dam face. Considerable erosion took place in our downstream spillway area due to high spill flows from the Jackson Creek. There was also some residual damage to the concrete sill and apron that this event contributed to where some additional concrete reinforcement had to be done to protect the sill from future damage. There was also some superficial erosion to the dam face from stormwater runoff. JVID received Approximately $225,000 of FEMA funding to repair and mitigate the eroded areas that were damage from the large storm event.

Vulnerability to and Impacts from Dam Failure

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Impacts to the District from a dam failure flood 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.

The small community of Buena Vista less than 1 miles downstream could see losses of houses and or lives. It would be very hard for JVID to recover from a dam failure as the costs to rebuild would be insurmountable.

Assets at Risk

Assets at risk include the dam, water transmission system, hydro plant, and water treatment plant raw water source.

Future Development

Mitigation measures to educate and inform the public of the potential consequences of a dam failure within the inundation area and create evacuation plans and notification systems for such of an event. This Dam Failure hazard is considered a minimal risk and most likely will not affect future development.

Drought & Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Drought is a complex issue involving 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. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the District, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages and for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the District and the County are shown in Section 4.2.11 of the Base Plan.

Past Occurrences

Since drought is a regional phenomenon, past occurrences of drought for the District are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.2.11 of the Base Plan.

The District did note that there were large impacts during the 2014 drought event. Information provided from a study on drought impacts to the Amador Water Agency and JVID are discussed below:

> *In January 2014, the California Department of Public Health (CDPH) announced 17 water agencies and towns in California that were at severe risk of drinking water shortages due to the drought. Based on surveying the State's community water systems, CDPH compiled the list of communities that could face severe impacts within 60 to 100 days of the announcement if no actions were taken to supplement supplies. JVID, which*

serves 12,800 acres along Jackson Creek owned by farmers and ranchers in Amador County, was included on the list.

JVID provides wholesale water supply; distributes raw water for agricultural irrigation and fish farms, as well as industrial and domestic uses; distributes bottled water to domestic users; and generates hydroelectric power in southwestern Amador County. It serves primarily agricultural and rural customers in the area between Lake Amador and Lake Camanche. JVID provides irrigation water to the farms and ranches in Jackson Valley and is the only source of water for dozens of homes, including those in the Oaks Mobile Home Park in Buena Vista, a severely disadvantaged community with a median household income (MHI) just 52% of California's statewide MHI. The primary agricultural activity in JVID includes alfalfa, walnuts, vineyards, and pasture, and most of the water JVID supplies is used for irrigation. The 2008 Municipal Service Review (MSR) for Amador County states that JVID's surface water use averages 2 acre-feet (AF) per acre, per year. Given this estimation, JVID provides about 8,382 AF per year for irrigation uses.

JVID receives most of its water from surface water sources, such as Jackson Creek and the Mokelumne River. JVID has rights to store up to 36,000 AF of flows from Jackson Creek and divert 3,850 AF of flows from the Mokelumne River (but no storage is currently in place). JVID's water rights on the Mokelumne River are subject to reversion and substitution with recycled water, and the flows from Jackson Creek contain 5% wastewater effluent about 30% of the time. The lack of diversity and the unpredictable nature of its water rights leaves JVID's water supply highly vulnerable, especially in light of the current drought.

According to the 2014 MSR for Amador County, JVID is not meeting existing drinking water or agricultural demands for the areas it serves. On January 27, 2014 JVID made a formal request to purchase water from AWA to help offset the shortfall as a result of the severe drought impacts. AWA staff and its Drought Ad Hoc committee met several times and agreed to provide JVID up to 5,000 acre-feet of water this summer and fall to get them through this challenging time and allow the farmers and ranchers to save their growing season.

Farms were affected by the drought some fallowed fields and took several years to go back into production. There was financial damage to the District for lost revenue and the District had to implement emergency rates, purchase water and pull from reserve funds to survive the impacts of the drought.

Vulnerability to and Impacts from Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the District, 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. All JVID customers are vulnerable to droughts and the impacts.

Assets at Risk

The powerhouse and lack of water during a drought impacts the District's budget. The Water Treatment Plant is affected by droughts due to lack of water and having to purchase or pump water from different sources. Also the administration of the District is impacted due to lack of revenue.

Future Development

There is no way to plan for future developments and droughts besides being conservative and efficient with the water and putting in place agreements to purchase more water or increase storage.

Earthquake (large damaging/small)

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and 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.

Location and Extent

Since earthquakes are regional events, the whole of the District is at risk to earthquake. JVID and the surrounding area are at limited risk from significant seismic and geologic hazards. There are no known or inferred active faults within the District. However, should an earthquake occur, impacts to JVID facilities, such as the dam and water systems could be significant.

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, as discussed in Section 4.2.12 of the Base Plan. 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 (equivalent to 5.5 to 6.5 on the Richter Scale). During a Mercalli VII, most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. The District is located in an area where few earthquakes of significant magnitude occur, so both magnitude and intensity of earthquakes are expected to remain low. Seismic shaking maps for the area show Amador County and the District fall within a low to moderate shake risk.

Past Occurrences

The District noted no past occurrences of earthquakes or that affected the District in any meaningful way.

Vulnerability to and Impacts from Earthquake

The combination of plate tectonics and associated California coastal mountain range building geology generates earthquake as a result of the periodic release of tectonic stresses. Amador County's mountainous terrain lies in the center of the North American and Pacific tectonic plate activity. There have been earthquakes as a result of this activity in the historic past, and there will continue to be earthquakes in the future of the California north coastal mountain region. Both the San Andreas Fault and the Sierra Frontal System faults poses possibly significant impacts to Amador County and the District as they have the capabilities of producing a quake.

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault; however, liquefaction can occur further from the source of the earthquake. In general, newer construction is more earthquake resistant than older construction due to enforcement of improved building codes. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions and associated liquefaction, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry (URM) and soft story buildings. There are no URM or soft story buildings owned by the District.

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. The JVID is within the less hazardous Zone 3.

Impacts from earthquake in the District will vary depending on the fault that the earthquake occurs on, the depth of the earthquake strike, and the intensity of shaking. Large events could cause damages to infrastructure, critical facilities, residential and commercial properties, and possible injuries or loss of life. Lake Amador Dam is vulnerable to an earthquake but according to the District the earthquake must be very large and direct to cause any failure of the dam. There have been engineering studies and reports on this subject and all analysis concludes that the facility is at minimal risk for earthquake.

Assets at Risk

Due to the regional effects of an earthquake, a Hazus earthquake analysis was performed on a countywide basis. This can be found in Section 4.3.9 of the Base Plan. While these runs were not done specific to the District, maps showing damage in the County show greater areas of damage near the District in the County. The deterministic 6.7 Hayward Fault run showed minimal damage to the County. The probabilistic 6.7 scenario showed significant damages, many of which would occur in or near the District service territory.

Earthquakes are a large concern for any dam owner, this is one hazard that could compromise the dam. The dam and transmission system could be impacted by an earthquake by compromising or breaking the

structures. The administrative part of the district would also be impacted because if a dam failure or large break happened to the water transmission system it would be hard for the district to finically to recover.

Future Development

Future development within the inundation area of a dam failure could be impacted or mitigation measure would have to be in place to ensure the safety to the downstream public.

Flood: 100-/500-Year

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the County or in the District, and have caused damages in the past. Flooding is a significant problem in Amador County and the District. Historically, the District has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred both within the 1% and 0.2% annual chance floodplains and in other localized areas.

As previously described in Section 4.2.13 of the Base Plan, the Amador County Planning Area and the JVID have been subject to historical flooding. JVID is traversed by several stream systems and is at risk to the 1% annual chance flood.

Location and Extent

The JVID has areas located in the 1% annual chance floodplain. This is seen in Figure I-5.

Figure I-5 JVID – FEMA DFIRM Flood Zones

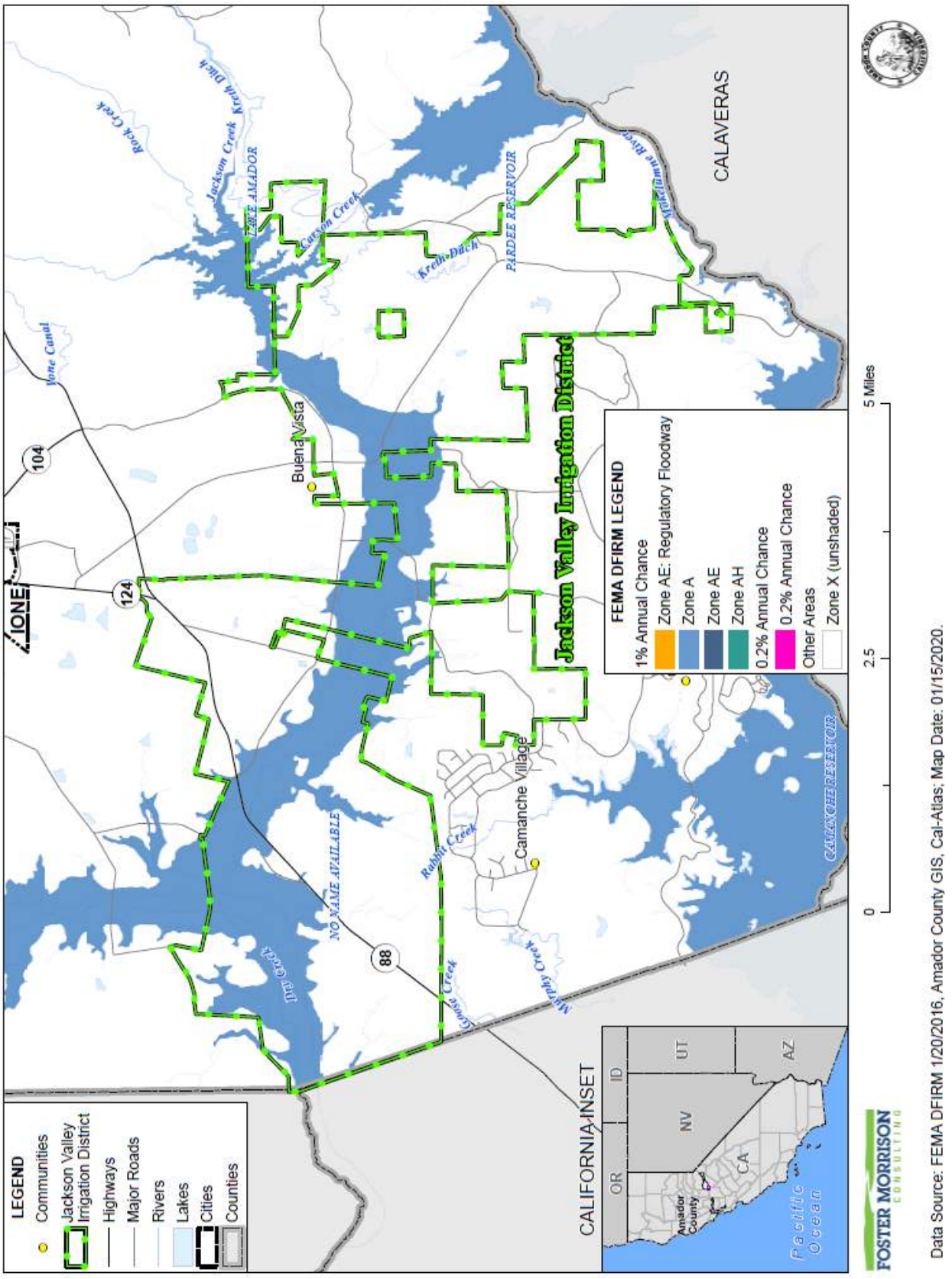


Table I-4 details the DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the District.

Table I-4 JVID– DFIRM Flood Hazard Zones

Flood Zone	Description	Flood Zone Present in the District
A	100-year Flood: No base flood elevations provided	
AE	100-year Flood: Base flood elevations provided	X
AE Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided	
Shaded X	500-year Flood: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	
X (unshaded)	No flood hazard	X

Source: FEMA

Additionally, flood extents can generally be measured in volume, velocity, and depths of flooding. Expected flood depths in the District vary, depending on the nature and extent of a flood event; specific depths are unknown. Flood durations in the District tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Flooding in the District tends to have a shorter speed of onset, due to the amount of water that flows through the District.

Past Occurrences

A list of state and federal disaster declarations for Amador County from flooding is shown on Table I-5. These events also likely affected the District to some degree.

Table I-5 Amador County – State and Federal Disaster Declarations from Flood 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	15	1955, 1958, 1963, 1964, 1969, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1959, 1963 (twice), 1969, 1980, 1982, 1986, 1995, 1997, 1998

Source: Cal OES, FEMA

JVID noted that it seems to be once in every 20 -30-year event where flows over 5,000 cfs occur. The last occurrence was **1997**. It will most likely happen again the same if not worse in the future.

In January and February of 2017, Lake Amador Dam suffered erosion in the spillway. 5,000 cfs plus flowed over the Lake Amador Spillway and heavy stormwater runoff on dam face. Considerable erosion took place in our downstream spillway area due to high spill flows from the Jackson Creek. There was also some residual damage to the concrete sill and apron that this event contributed to where some additional concrete reinforcement had to be done to protect the sill from future damage. There was also some superficial erosion to the dam face from stormwater runoff. JVID received Approximately $225,000 of FEMA funding to repair and mitigate the eroded areas that were damage from the large storm event.

Figure I-6 Spillway Overtopping in 2017

Source: JVID

During the same event, a creek bank/levee failed next to a farmer's field and the creek jumped its banks and damaged a creek pumping station operated by JVID due to high stream flows. The District had to remove debris regrade and replant irrigated pasture field. This impacted farmers but had minimal impact to the District beside having to clean out debris, mud and sand from heavy flows around pump station. JVID received approximately $75,000 of FEMA funding to repair and mitigate the damaged Levee due to damage from the large storm event.

Vulnerability to and Impacts from Flood

Floods have been a part of the District's historical past and will continue to be so in the future. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damages. Predominantly, the effects of flooding are generally confined to areas near the waterways of the County. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat. This threatens structures in the floodplain. Structures can also be damaged from trees falling as a result of water-saturated soils. Electrical power outages happen, and the interruption of power causes major problems. Loss of power is usually a precursor to 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. People may be swept away in floodwaters, causing injuries or deaths.

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 as well as life safety issues. 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. Floodwaters can transport large objects downstream which can damage or remove stationary structures. 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. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

JVID deals with high flows over spillway that can create hillside erosion downstream. During the 2017 storm events the District experienced considerable erosion to the downstream area below the spillway. JVID applied for FEMA funding to add protection to these areas using concrete. During high flows we also deal with debris such as downed trees and vegetation flowing in the creek channel that plug up culverts and can cause damage to roads. During the stormwater even we experienced damage to the face of Lake Amador Dam an earth fill structure were the flows eroded channels in the dam itself. Although primarily superficial FEMA funded a project to mitigate this damage by installing large rip-rap in the eroded areas to slow down the stormwater runoff and protect the dam face.

Assets at Risk

The spillway structure is a concern for flooding and the ability to function correctly under large flooding conditions.

Future Development

JVID can only construct and build mitigation such as reinforcing spillway structure with additional concrete and or rip-rap.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

A levee is a raised area that runs along the banks of a stream or canal. 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. For example, levees can be certified to provide protection against the 1% annual chance flood. Levees reduce, not eliminate, the risk to individuals and structures located behind them. A levee system failure or overtopping can create severe flooding and high water velocities. Levee failure can occur through overtopping or from seepage issues resulting from burrowing rodents, general erosion, excessive vegetation and root systems and other factors that compromise the integrity of the levee. No levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

JVID does have a small section of levee that it maintains as part of pumping station operation on the Jackson Creek. This is used to control the flow of water down the Jackson Creek and protect nearby farmers' fields. JVID in 2017 completed some mitigation by installing rip rap and rebuilding a portion of the levee with compacted soils due to a failure in the 2017 storm events.

Location and Extent

There is not a scientific scale or measurement system in place for levee failure. Expected flood depths from a levee failure in the District are not known. The speed of onset is slow as the river rises, but if a levee fails the warning times are generally short for those in the inundation area. The duration of levee failure risk times can be hours to weeks, depending on the river flows that the levee holds back. The HMPC noted that when northern California reservoirs are nearing maximum capacity, they release water through the river systems, causing additional burdens on County levees.

Past Occurrences

The District Planning Team noted levee failure at the District's Jackson Creek Pumping Station has failed twice once in 1997 and again in 2017 due to heavy stream flows.

Figure I-7 Inundated Pumping Station 2017

Source: JVID

Vulnerability to and Impacts from Levee Failure

A levee failure can range from a small, uncontrolled release to a catastrophic failure. Levee failure flooding can occur as the result of prolonged rainfall and flooding. The primary danger associated with levee failure is the high velocity flooding of those properties outside and downstream of the breach.

Should a levee fail, some or all of the area protected by the levees would be at risk to flooding. Impacts from a levee failure include property damage, critical facility damage, and life safety issues. Business and economic losses could be large as facilities could be flooded and services interrupted. School and road closures could occur. Road closures would impede both evacuation routes and ability of first responders to quickly respond to calls for aid. Other problems connected with levee failure flooding include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

The Districts pumping station would be impacted and inoperable in the event of a levee failure. It could be estimated that about 700 acres of irrigated land would be affected if the pump station was out of operation. This could have major negative impacts to the irrigation revenue of the District.

Assets at Risk

The Jackson Creek Pumping Station is reliant to the Jackson Creek levees to function properly.

Future Development

Future development is not impacted by this levee because in the event of failure it is mostly irrigated pasture and fields that are impacted.

Severe Weather: Winter Storms and Freeze

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to the National Weather Service), extreme cold often accompanies a winter storm or is left in its wake. Winter snowstorms can include heavy snow, ice, blizzard conditions, and cold temperatures. Freezing temperatures can also occur without the accompanying winter storm.

The District noted no snow events, but hard freezes are concern because temperature below 20°F are uncommon and in such of an event, we do not have mitigation in place to protect for hard freezes. This could impact pumps, pipes, generators and the general functionality of moving water because of freezing.

Location and Extent

Winter storms and freeze are regional issues, meaning the entire District is at risk to freeze and winter storm. 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 21.8 days that fall below 32°F in western

Amador County. 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. Snowfall often accompanies storms in the upper elevations of the County is measured in snow depths. It is rare for snow to fall in the District, and even rarer that snow accumulates in the District. Snowfall has an onset that is similar to freeze.

Past Occurrences

The District noted that freeze and winter storm is a regional phenomenon; events that affected the lower elevations of the County also affected the District. Those past occurrences were shown in the Base Plan in Section 4.2.5.

JVID has experienced a few hard freezes where exposed pipes, pumps, etc. have been destroyed by cracking or freezing no specific storm or event.

Vulnerability to and Impacts from Severe Weather: Freeze and Winter Storms

The District experiences temperatures below 32 degrees during the winter months. The temperature moves to the teens in rather extreme situations. Freeze can cause injury or loss of life to residents of the District. While it is rare for buildings to be affected directly by freeze, damages to pipes that feed building can be damaged during periods of extreme cold. Extreme cold and freeze can affect critical facilities and infrastructure, down trees, break pipes, and can be a life safety issue. When extreme cold is coupled with high winds or ice storms, power lines may be downed, resulting in an interruption of utilities and critical services. Occasionally, winter storms with snow and ice can affect the District. Transportation networks, communications, and utilities infrastructure are the most vulnerable physical assets in the District. The ability for the District to continue to operate during periods of winter storm and freeze is paramount.

Assets at Risk

Transmission system in the District and anything that moves water that is exposed to the freezing can be at risk.

Future Development

In preparation to heavy freezing conditions JVID can only temporarily mitigated the problem by installing insulation, heat tape, or heaters in pump station buildings and powerhouse to ensure the freezing does not occur.

Wildfire

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

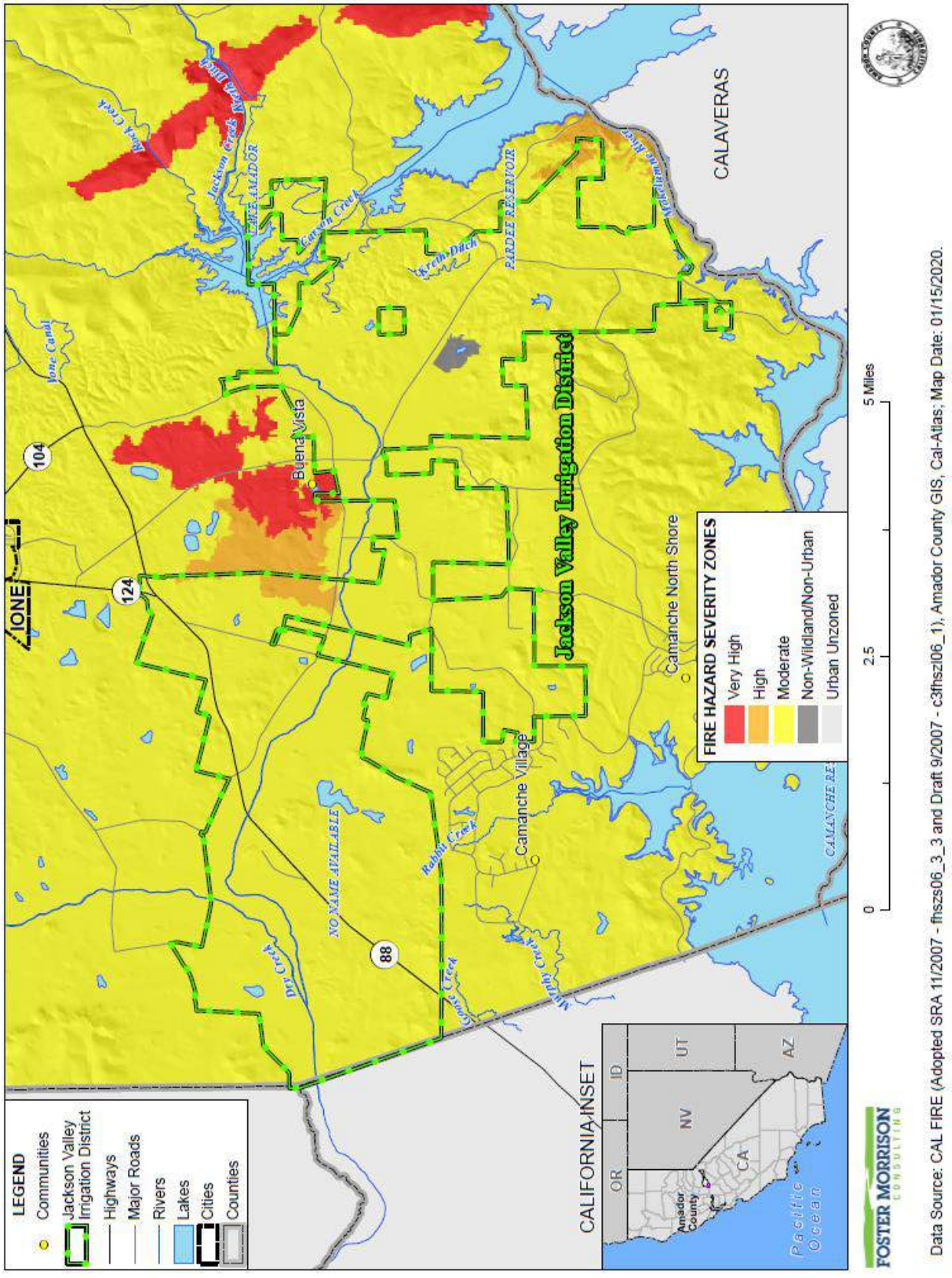
Hazard Profile and Problem Description

Wildland fire is an ongoing concern for the JVID. 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. 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. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

Location and Extent

Wildfire can affect all areas of the District. CAL FIRE has estimated that the risk varies across the District and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the JVID were created. Figure I-8 shows the CAL FIRE FHSZ in the District. As shown on the maps, FHSZs within the District range from mostly moderate to areas of high and very high.

Figure I-8 JVID – FHSZs



Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more.

Past Occurrences

A list of state and federal disaster declarations for Amador County from wildfire is shown on Table I-5. These events also likely affected the District to some degree.

Table I-6 Amador County – State and Federal Disaster Declarations from Wildfire 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	1	2015	1	1961

Source: Cal OES, FEMA

Vulnerability to Wildfire

The wildfire hazard is one of the highest priority hazards in the County and District, and is the hazard with the greatest potential for catastrophic loss. High fuel loads in the County and Cities, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. The more urbanized areas within the County are not immune from fire. The dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and District, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Potential impacts from wildfire include loss of life and injuries; damage to structures 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 District. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the District 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 District; smoke and air pollution from wildfires can be a severe health hazard.

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 PSPSs 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.

Impacts of wildfire would be potential crops or land takin out of production or facilities damaged during the event.

Assets at Risk

The District noted that the powerhouse, water treatment plant, and any exposed water transmission plumbing that could be damaged by fire.

Future Development

JVID is an asset to fire protection by providing fire hydrants thought the District for fighting local fires. There are 20 hydrants throughout the service area that the local fire department has the ability to access to fight fires.

I.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

I.6.1. Regulatory Mitigation Capabilities

Table I-7 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the JVID.

Table I-7 JVID Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
General Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	Y	JVID has an Emergency Action Plan for Dam Failure
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	

Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N	
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	
Fire department ISO rating:	N	
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts?** **Is the ordinance adequately administered and enforced?**
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Public outreach and training could be expanded to inform the public of a concern of a dam failure.		

Source: JVID

I.6.2. Administrative/Technical Mitigation Capabilities

Table I-8 identifies the District department(s) responsible for activities related to mitigation and loss prevention in JVID.

Table I-8 JVID's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	

Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	N	
Mutual aid agreements	N	
Other	N	
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	Y	General Manager, trained in hazard mitigation and between agencies.
Community Planner	N	
Civil Engineer	Y	JVID uses a total of 3 different engineering firms for different purposes.
GIS Coordinator	N	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	JVID uses the Sheriff's office Code Red phone system.
Hazard data and information	N	
Grant writing	Y	JVID General Manager has written and applied for several grants and JVID has used outside help to grant write.
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Public outreach would reduce risk.		

Source: JVID

I.6.3. Fiscal Mitigation Capabilities

Table I-9 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table I-9 JVID's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (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	Small budget to incorporate improvement projects annually
Authority to levy taxes for specific purposes	Y	We have the ability to assess JVID members
Fees for water, sewer, gas, or electric services	Y	Water fees are collected by the District

Funding Resource	Access/ Eligibility (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?
Impact fees for new development	N	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	N	
Community Development Block Grant	N	
Other federal funding programs	Y	JVID has used FEMA and USDA Grants in past.
State funding programs	Y	JVID has used Prop. 50 and Prop. 1 water bond grants for projects.
Other		
How can these capabilities be expanded and improved to reduce risk?		
Using additional grant funds once a project is identified as beneficial could reduce risk.		

Source: JVID

I.6.4. Mitigation Education, Outreach, and Partnerships

Table I-10 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 I-10 JVID's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	No	
Natural disaster or safety related school programs	No	
StormReady certification	No	
Firewise Communities certification	No	
Public-private partnership initiatives addressing disaster-related issues	No	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Possibly adding a JVID Board committee to work with local residents within the inundation area to come up evacuation plans and early warning systems.		

Source: JVID

I.6.5. Other Mitigation Efforts

The District has many other completed or ongoing mitigation efforts that include the following:

- JVID is always mitigating for hazards by removing trees, vegetation and debris etc. around facilities and infrastructure to ensure that it is working properly and the way it was designed.

JVID does own the Jackson Creek dam. There have been no historical problems associated with the dam. The dam and facility are inspected annually by FERC and DSOD as part of an annual inspection, and every five years, JVID is required to do a detailed independent review of the facility to ensure the safety of the dam, which includes an in-depth survey checking for dam movement. In addition, JVID is required to have an Emergency Action Plan as part of the FERC and DSOD operating license. On an annual basis, JVID participates in exercises with local OES services to review and comment called a "tabletop discussion" and reprints the whole document every five years. JVID staff completes daily routines and inspections to collect data on flows, lake levels, observations, etc. for recording. On an annual basis, staff weed eats, sprays, trims trees, etc. to protect the facilities from fire and other hazards. Recent significant projects/activities:

- 2014: Installed a SCADA computer operating system to be able to remotely view system operations through a computer system so staff could better manage the water within the system and log data on an hourly, daily, monthly basis.
- 2014: Installed +- 70 irrigation style water meters to promote water conservation and efficiency on irrigation customers.
- 2016: Installed Guardrail on the crest of the dam to protect the public from driving into the lake or over the edge of the dam. FERC safety requirement.
- 2018: Updated inundation maps as part of the DSOD requirement putting into an electronic GIS format so OES could have a better understanding of the inundation areas for evacuation planning.
- 2018: FEMA/Cal OES project to install rip-rap in the left and right dam groin areas of the dam to prevent face erosion from heavy rains.
- 2018: FEMA/ Cal OES Project to rebuild 300' of the levee at the District Pumping Station on the Jackson Creek due to the 2017 floods.
- 2018: FEMA/ Cal OES Project to repair damage to the spillway plunge pool area from damage caused by the 2017 storms.
- 2019: FEMA/ Cal OES project on the Spillway area to protect three large erosion areas immediately downstream from the concrete sill with concrete from damage caused by the 2017 storms.
- 2019: Paved crest of the dam with new asphalt to protect the crest from the water penetrating the dam vertically.
- 2020: Installed a new seepage monitoring station at the base of the dam to be able to monitor any seepage coming from the groin areas.
- 2020: Public outreach workshops are scheduled with downstream residents within the immediate inundation area to teach the hazards of living downstream of the reservoir and what to do in the event of dam failure.

I.7 Mitigation Strategy

I.7.1. Mitigation Goals and Objectives

The JVID adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

I.7.2. Mitigation Actions

The planning team for the JVID identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Agricultural Hazards: Severe Weather/Insect - Pests
- Aquatic Invasive Species
- Climate Change
- Dam Failure
- Drought & Water shortage
- Earthquake (large damaging/small)
- Floods: 1%/0.2% annual chance
- Levee Failure
- Severe Weather: Winter Storms and Freeze
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan 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 countywide public outreach action, 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 plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Agricultural Hazard Actions

Action 1. Outreach to Farmers regarding Agricultural Hazards in the Area

Hazards Addressed: Agricultural Hazards: Severe Weather/ Insects – Pests

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: All farms could be impacted by severe weather, insects and pests that could cause crop damage and or complete loss. A loss to the farmer is a loss to the District as a working customer and could cause a trickle down to the JVID budget.

Project Description: Send information to farmers regarding how to protect crops from severe weather and insects that could cause damage. Inform JVID customers of potential insect hazards or outbreaks that may be identified in the area and inform how to protect.

Other Alternatives: NA

Existing Planning Mechanism(s) through which Action Will Be Implemented: Amador County Agriculture Department and University of California Extension and USDA outreach programs

Responsible Office/Partners: JVID, Amador County Agriculture Department

Cost Estimate: $2,500

Benefits (Losses Avoided): Informing farmers of potential hazards and mitigating for them could save thousands in damage from lost crops that could otherwise be preventable.

Potential Funding: JVID Reserves, USDA, Grants

Timeline: Annual

Project Priority: Low

Aquatic Invasive Species Actions

Action 2. Lake Amador Aquatic Invasive Species Monitoring

Hazards Addressed: Aquatic Invasive Species

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Lake Amador has been fortunate to not have an impact to aquatic invasive species. There is a concern in California regarding the Zebra and Quagga Mussels. If these invasive species were to take hold in Lake Amador it could cause devastating affects to valving, piping, and other water transportation mechanisms within the water distribution system. Other invasive aquatic invasive species could include plants or algae.

Project Description: JVID currently has a monitoring station to monitor for the Zebra and Quagga Mussel in partnership with California Fish and Wildlife that is checked annually. This project would continue that partnership but also work to identify other concerns within the lake that could have negative impacts on the operation of the reservoir.

Other Alternatives: NA

Existing Planning Mechanism(s) through which Action Will Be Implemented: California Fish and Wildlife

Responsible Office/Partners: JVID, California Fish and Wildlife

Cost Estimate: $5,000

Benefits (Losses Avoided): $1 to 100s of thousands depending on the amount of damage incurred

Potential Funding: JVID Reserves, California Fish and Wildlife, Grants

Timeline: Annual

Project Priority: Low

Climate Change Actions

Action 3. Long Term Water Solutions Analysis Due to Climate Change

Hazards Addressed: Climate Change

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The changing environment could cause negative impacts such as availability for consistent water reliability from the small JVID watershed. Hotter or colder weather cycles could force farmers to change crop types and or fallow fields.

Project Description: Work with a climate change consultant to come up with a long-term plan and analysis of the potential impacts that could be expected to impact JVID specific to address climate change.

Other Alternatives: NA

Existing Planning Mechanism(s) through which Action Will Be Implemented: NA

Responsible Office/Partners: JVID, California EPA, USDA

Cost Estimate: $5,000

Benefits (Losses Avoided): $1 to Millions depending on the severity climate change could cause

Potential Funding: JVID Reserves, Grants

Timeline: 2050

Project Priority: Low

Dam Failure Actions

Action 4. Jackson Creek Dam Immediate Inundation Area Public Outreach – Dam Failure

Hazards Addressed: Dam Failure

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Jackson Creek Dam has been identified as a high hazard dam by the California Department of Safety of Dams (DSOD) and by the Federal Energy Regulatory Commission (FERC) both who share in the responsibility in regulatory oversite of the Dam. There are about 40 residents that live in the immediate inundation area of the Jackson Creek Dam and that could be impacted by a sudden dam failure and it is the responsibility of the Dam owner to ensure public safety.

Project Description: JVID to come up with an outreach program to notify the downstream residents of the potential hazard with living within the immediate inundation area of Jackson Creek Dam. Within this plan to include information of what do to in the event of a failure, notification procedures and evacuation plans.

Other Alternatives: NA

Existing Planning Mechanism(s) through which Action Will Be Implemented: JVID Emergency Action Plan

Responsible Office/Partners: DSOD, FERC

Cost Estimate: $20,000

Benefits (Losses Avoided): $1 to Millions depending on the severity of damage caused by dam failure

Potential Funding: JVID Reserves, Emergency Planning Grants

Timeline: 2020 – and annual outreach after program is developed

Project Priority: High

Action 5. Jackson Creek Dam Spillway Apron Extension Project

Hazards Addressed: Dam Failure

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: In 2019 JVID completed a FEMA funded project to protect 3 large erosion areas just downstream from the concrete sill of the spillway. This project did not include protecting the area between these erosion areas and concrete sill which varies from 20-50 feet in distance. This area just downstream the sill could be another area of concern during heavy spillway flows.

Project Description: Extend a 4 to 6-inch-thick apron the length of the sill and connect with concrete the sill and erosion areas.

Other Alternatives: NA

Existing Planning Mechanism(s) through which Action Will Be Implemented: NA

Responsible Office/Partners: JVID, DSOD, FERC

Cost Estimate: $200,000

Benefits (Losses Avoided): Protecting the spillway an important piece of dam operating infrastructure from future damage.

Potential Funding: JVID Reserves, Grants

Timeline: 2050

Project Priority: Low

Drought and Water Shortage Actions

Action 6. JVID Water Meter Maintenance Program

Hazards Addressed: Drought & Water Shortage

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: As a result of the 2014 California Drought JVID installed over 70 large irrigation meters to manage and regulate water within the JVID distribution system. Over time these meters "wear out", get damaged from use or need to be calibrated. It is an expensive endeavor to physically dig up and replace parts on the meters to ensure they are working properly. Sometimes it is not just the meter that needs attention but the valves or piping that the meter is connected to as part of the meter repair.

Project Description: Come up with a maintenance program that annually a certain number of meters or repaired or upgraded to ensure they are working properly.

Other Alternatives: Spillway Gates

Existing Planning Mechanism(s) through which Action Will Be Implemented: JVID Maintenance and Capitol Improvement Budget Items

Responsible Office/Partners: JVID

Cost Estimate: $5,000

Benefits (Losses Avoided): Added meter efficiency and reliability allows JVID to better manage water loss.

Potential Funding: JVID Annual Budget, Water Efficiency Grants

Timeline: 2020 – Annually

Project Priority: High

Action 7. JVID Water Procurement and Additional Water Storage Study

Hazards Addressed: Drought & Water Shortage

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Water availability and drought has always been one of the biggest concerns for JVID. Procuring additional water from other nearby watersheds and looking for areas to store additional water has always been a priority for JVID.

Project Description: Hire a consultant to help JVID to identify potential projects such as the raising of Lower Bear River Project that JVID could be a project for JVID to store water outside the Lake Amador Reservoir and also identify water that could be purchased from other water right holder to supplement Lake Amador storage during times of drought.

Other Alternatives: NA

Existing Planning Mechanism(s) through which Action Will Be Implemented: NA

Responsible Office/Partners: JVID, Amador Water Agency, PG&E

Cost Estimate: $30,000

Benefits (Losses Avoided): Additional water and storage would give JVID assurance and security to operate.

Potential Funding: JVID Reserves

Timeline: 2030

Project Priority: High

Action 8. Lake Amador Spillway Rubber Dam Project

Hazards Addressed: Drought & Water Shortage

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: When Lake Amador was constructed due to the geology and ease of construction at the spillway site the final lake elevation the dam was left with over 10 feet of freeboard on the dam when the reservoir is full. This additional freeboard could be account for an additional 2,000 to 4,000-acre feet of storage to the reservoir if you were to place a dam in the spillway.

Project Description: Install a 2 foot up to 5-foot-tall inflatable rubber dam on the 400' long spillway sill. In the late spring after the lake is done filling from winter run off one would inflate the temporary dam with air to take up some of the additional free board on the dam. Depending on the height of the rubber dam it could add more water storage that could be used for irrigation.

Other Alternatives: Spillway Gates

Existing Planning Mechanism(s) through which Action Will Be Implemented: NA

Responsible Office/Partners: DSOD, FERC

Cost Estimate: $3,000,0000

Benefits (Losses Avoided): Additional Storage and Water Supply to mitigated water shortage and drought concerns

Potential Funding: JVID Reserves, Grants, Loans

Timeline: 2050

Project Priority: Medium

Earthquake Actions

Action 9. Jackson Creek Dam Seismic Evaluation and Liquefaction Study

Hazards Addressed: Earthquake

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Jackson Creek Dam is an Earth fill reservoir that could be compromised by a large earthquake if the dam is not working the way it was designed.

Project Description: Complete a study by collecting data on the building materials and complete an analysis using today's technology to see if the dam is still working the way it was designed and is able to function during a large earthquake.

Other Alternatives: NA

Existing Planning Mechanism(s) through which Action Will Be Implemented: Federal Energy Regulatory Commission (FERC) requirement

Responsible Office/Partners: JVID, California Division of Safety of Dams (DSOD) and Federal Energy Regulatory Commission (FERC).

Cost Estimate: $250,000

Benefits (Losses Avoided): $50 million in costs to rebuild the dam and potential loss of life due to dam failure.

Potential Funding: JVID Reserves, Grants, Loans

Timeline: 2025

Project Priority: High

Flood Actions

Action 10. Lake Amador Drive Box Culvert Expansion Project

Hazards Addressed: Floods 1%/0.2% annual chance

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: While entering Lake Amador Drive into the recreation and campground area the road crosses over the Jackson Creek Dam spillway discharge area. In severe storms or large flood there is a 1,000 feet area of road that is submerged by flood waters and becomes impassable. Currently there is a two-box culvert bridge that was installed in the past that can only handle about 3,000 cfs of flow anything greater inundates the road.

Project Description: Install additional box culverts and raise the roadway above the historical flood stage. A 1% annual chance flood could be as much as 10,000 cfs of spillway discharge. Install enough drains / culverts to handle a greater than 10,000 cfs flow.

Other Alternatives: NA

Existing Planning Mechanism(s) through which Action Will Be Implemented: NA

Responsible Office/Partners: JVID

Cost Estimate: $450,000

Benefits (Losses Avoided): Allows permanent residents, Lake Amador customers and JVID staff to safely access the facility in the event of large flood.

Potential Funding: JVID Reserves, Grants, Loans

Timeline: 2050

Project Priority: Medium

Levee Failure Actions

Action 11. Jackson Creek Levee Maintenance Project

Hazards Addressed: Levee Failure

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The Jackson Creek has several miles of levees that farmers have built and used for years to contain the creek flows. During heavy flooding conditions of more than 3,000 cfs historically there have been problems and or leaks in these levees. A lot of these stretches of levees have not been maintained from burrowing animals, trees, brush or erosion.

Project Description: Come up with a maintenance plan to clear trees and brush from the levees. Assess the levees condition, regrade if necessary and add additional stabilization materials such as rip rap in areas that could be or have been damaged by erosion.

Other Alternatives: NA

Existing Planning Mechanism(s) through which Action Will Be Implemented: NA

Responsible Office/Partners: JVID

Cost Estimate: $200,000

Benefits (Losses Avoided): Protecting farmers' fields, pump stations and wildlife habitat by containing the creek flows to the historical channel and preventing further erosion from flood waters.

Potential Funding: JVID Reserves, Grants

Timeline: 2050

Project Priority: Medium

Severe Weather Actions

Action 12. JVID Office Backup Generator

Hazards Addressed: Severe Weather: Winter Storms and Freeze

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The JVID office does not have a backup generator or power supply and during the winter or during scheduled PSPS events being in somewhat of a rural area of Ione there can be power outages. The power typically goes out on average two or more times a year and could be up to several days.

The internet modem for the whole SCADA system is located in the office and during a power outage the signal is lost and staff does not access to remotely view the system.

Project Description: Install a backup generator at the JVID office to mitigate a power outage and loss of internet and SCADA system.

Other Alternatives: NA

Existing Planning Mechanism(s) through which Action Will Be Implemented: NA

Responsible Office/Partners: JVID

Cost Estimate: $25,000

Benefits (Losses Avoided): Allows JVID staff to monitor the system during a power outage which can be beneficial to the public health and safety specifically with the Treated Water System.

Potential Funding: JVID Reserves, Grants

Timeline: 2030

Project Priority: High

Action 13. JVID Freeze Protection Project

Hazards Addressed: Severe Weather: Winter Storms and Freeze

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Historically the JVID service area is not located in an area of mild climate which does not see many serious cold winter storms and or freezing. When a cold storm or heavy freeze does occur, it creates havoc on JVID infrastructure. This is because there are numerous valves, piping, pumps that are all exposed to the elements that could be damaged by freezing.

Project Description: Identify specific infrastructure that is exposed to the elements and then insult. Insulating could be as easy as putting and insulated cover, pipe wrapping, heat lamps or building a pump house or shed to protect the pumps or valves.

Other Alternatives: NA

Existing Planning Mechanism(s) through which Action Will Be Implemented: NA

Responsible Office/Partners: JVID

Cost Estimate: $25,000

Benefits (Losses Avoided): Protecting Infrastructure that could be damaged by freezing that could cause catastrophic damage to valving or pumps which could cost the District thousands of dollars to replace.

Potential Funding: JVID Reserves

Timeline: 2050

Project Priority: Low

Wildfire Actions

Action 14. JVID Fire Hydrant Expansion Project

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The wildfires in the Jackson Valley area are mostly grass, brush or fast-moving fires that can get out of control very fast if not quickly extinguished. Being that JVID has over 30 miles of pressurized irrigation water pipeline having fire hydrants readily available throughout the system would be very useful in fighting these quickly moving grass fires.

Project Description: Work with the local fire department to identify areas where fire hydrants would be useful in the event of a fire and install a good functioning hydrant that can provided enough water to effectively fight a fire.

Other Alternatives: NA

Existing Planning Mechanism(s) through which Action Will Be Implemented: NA

Responsible Office/Partners: JVID, Jackson Valley Fire Department, Cal Fire

Cost Estimate: $150,000

Benefits (Losses Avoided): Avoid the loss of numerous amounts of acreage, farmlands and potential loss of lives, homes and structures due to fast moving fires.

Potential Funding: JVID Reserves, Grants, Jackson Valley Fire Department Hydrant Program

Timeline: 2050

Project Priority: Low

Annex J Pine Grove Community Services District

J.1 Introduction

This Annex details the hazard mitigation planning elements specific to Pine Grove Community Services District (PGCSD or District), a new participating jurisdiction to this 2020 Amador County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the District. This Annex provides additional information specific to PGCSD, with a focus on providing additional details on the risk assessment and mitigation strategy for this District.

J.2 Planning Process

As described above, the District followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Amador County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table J-1. Additional details on plan participation and District representatives are included in Appendix A.

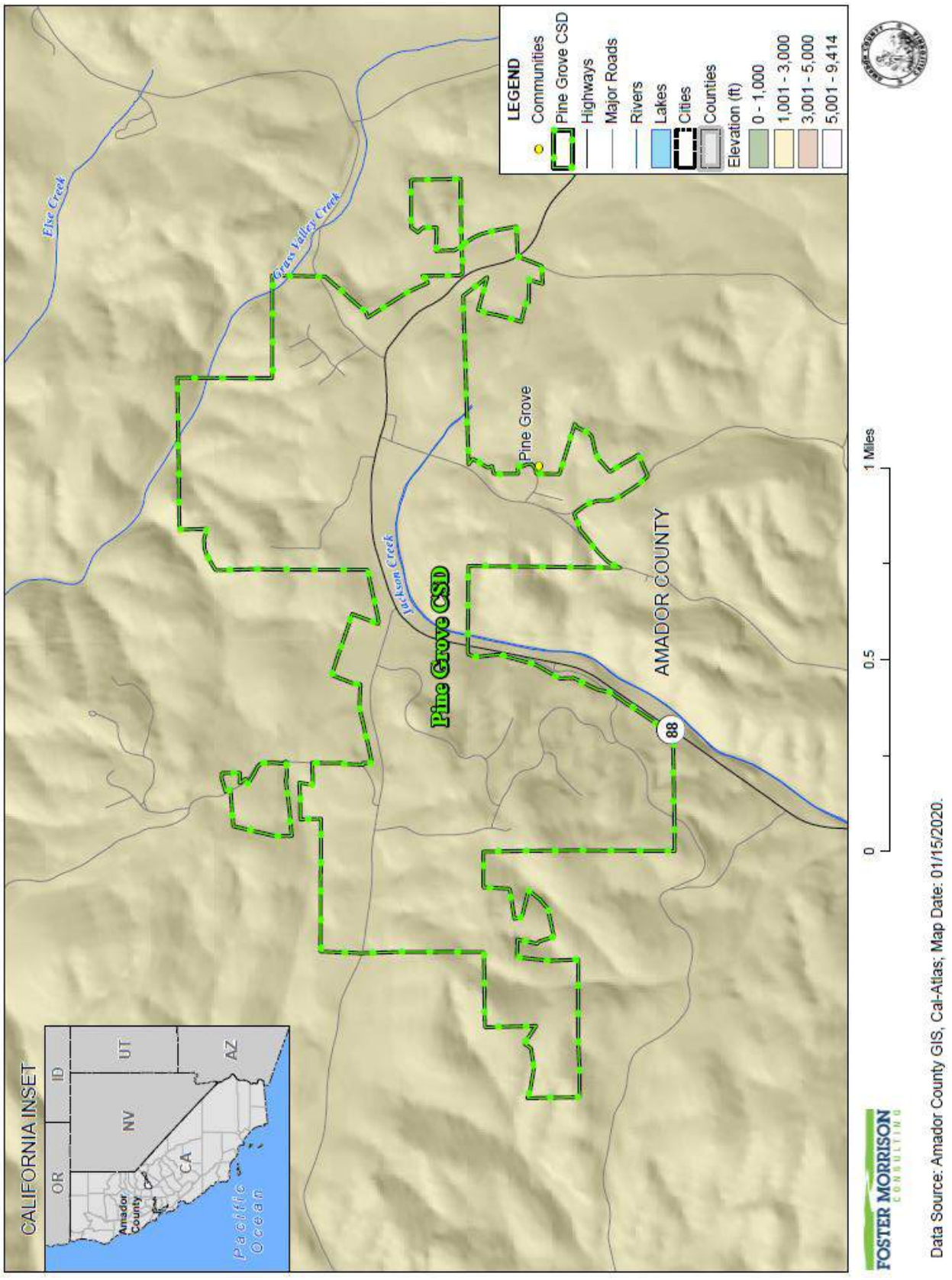
Table J-1 Pine Grove Community Services District – Planning Team

Name	Position/Title	How Participated
Lori Arnberg	General Manager	Attended meetings. Provided input on draft documents.
Paul Johnston	Director	Provided input on draft documents.
Richard Chultz	President	Provided input on draft documents.
Kevin McCann	Vice-President	Provided input on draft documents.
Richard Schlaman	Director	Provided input on draft documents.

J.3 District Profile

The District profile for the PGCSD is detailed in the following sections. Figure J-1 displays a map and the location of the District within Amador County.

Figure J-1 Pine Grove Community Services District



J.3.1. Overview and Background

Pine Grove Community Services District (PGCSD) was formed on November 19, 1965, as an independent special district. PGCSD was formed to provide "domestic and commercial supply of water, and fire protection facilities, including hydrants." On June 27, 1966, the Pine Grove Park was granted to the District from the town trustees. Currently the park's maintenance is paid for through a lease of land on our water tank site to AT&T for a cell tower. In 1994, PGCSD fire service was transferred to Amador Fire Protection District. The principal act that governs the District is Community Services District Law.

The PGCSD boundary includes the community of Pine Grove, which is located in central Amador County, along SR 88 and Ridge Road. The boundary area encompasses portions of the community zoned for low-density and suburban residential, and commercial uses. The boundary extends east to west along Ridge Road (SR 104) and SR 88 from Ponderosa Way to Mt. Zion Road, north along Lupe Road and Pine Grove Volcano Road, and south along Irishtown Road and Spagnoli Mine Road. The District has a boundary area of approximately 524 acres (0.82 square miles).

PGCSD has 387 meters as of October 2018, of those 63 are commercial and 324 are residential. The District serves 555 service units (Combined properties including apartments and mobile home parks that are served through master meters. The total population served as of October 2018 is approximately 900 people. PGCSD is governed by a five-member governing body. Directors are to be selected via elections at large; however, in practice positions have not been contested in the last 15years and members are appointed by the Board of Supervisors. The Principal Act requires that districts have five-member governing boards and appoint a general manager to implement board policies. The District is managed by a part-time General Manager. The District currently employs a part-time Water Manager (Technician) and a part-time Technician's Assistant.

PGCSD purchases treated water from the Amador Water Agency through the Central Amador Water Project (CAWP) and distribute it to residential and commercial users. The District does not provide water treatment services; PGCSD purchases treated surface water from Tiger Reservoir from AWA. The water is treated at AWA's Buckhorn Treatment Plant, passes through the CAWP transmission pipeline, and fills the storage tanks serving the District. The District provides necessary maintenance and operation of the water distribution system. The District uses groundwater for non-potable uses and maintains a single well at the district office. The well is used primarily to provide bulk water to developers for construction sites.

J.4 Hazard Identification

PGCSD identified the hazards that affect the District and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to District (see Table J-2).

Table J-2 PGCSD—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests	Limited	Limited	Limited	Low	Low
Aquatic Invasive Species	Limited	Limited	Limited	Low	Low
Avalanche	Limited	Limited	Limited	Low	Low
Climate Change	Extensive	Likely	Limited	Medium	
Dam Failure	Limited	Unlikely	Limited	Low	Low
Drought & Water shortage	Extensive	Likely	Limited	Medium	High
Earthquake (large damaging/small)	Significant	Unlikely	Negligible	Low	Low
Floods: 1%/0.2% annual chance	Limited	Unlikely	Negligible	Low	Low
Floods: Localized Stormwater	Limited	Likely	Limited	Low	Medium
Landslide, Mudslide, Debris Flow	Limited	Unlikely	Limited	Low	Low
Levee Failure	Limited	Unlikely	Negligible	Low	Low
Severe Weather: Extreme Heat	Limited	Likely	Limited	Low	Low
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Likely	Limited	Medium	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Likely	Critical	Medium	Medium
Severe Weather: Winter Storms and Freeze	Significant	Highly Likely	Limited	Medium	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High	High

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

J.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile the District's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Amador County Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the District is included in this Annex. This vulnerability assessment analyzes the property and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

J.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section J.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard (as shown in Table J-2) affects the District and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Planning Area.

J.5.2. Vulnerability Assessment and Assets at Risk

This section identifies the District's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the District. This data is not hazard specific, but is representative of total assets at risk within the District.

Assets at Risk and Critical Facilities

This section considers the PGCSD's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this Plan. Critical facilities are defined for this Plan 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, and (3) Hazardous Materials Facilities, as discussed in Section 4.3.1 of the Base Plan.

Table J-3 lists critical facilities and other District assets identified by the District Planning Team as important to protect in the event of a disaster. PGCSD's physical assets, valued at over $26.2 million, consist of the buildings and infrastructure to support the District's operations.

Table J-3 PGCSD Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Replacement Value	Which Hazards Pose Risk
Infrastructure	Water lines	$23,250,000.00	Fire
Tank	Water holding tank	$2,500,000.00	Fire
Office	Water Office building & Fire Station	$450,000.00	Fire
Total		**$26,200,000**	

Source: PGCSD

Natural Resources

PGCSD has a variety of natural resources of value to the District. These natural resources parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Historic and Cultural Resources

PGCSD has a variety of historic and cultural resources of value to the District. These historic and cultural resources parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Growth and Development Trends

General growth in the District parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Business development in Pine Grove has been and is likely to be minimal. In the area the District services, there is one car wash and gas station combination being built next to the Pine Grove market; this is the first business development in many years. Pine Grove has two developers with multiple lots for sale for residential use. One development is owned by Riverland Homes. The second development is owned by Del Rapini. The two developments mentioned above are in tree filled mountains that are at high risk for wildfire.

Special Populations in the District

Pine Grove has a large population of retirees. According to the World Population Review website, there are 1,908 adults, (728 of whom are seniors) in Pine Grove. Currently there are 4 known homeless people. The average median income according to the State Waterboards for Pine grove is $48,326, this qualifies as low income according to the State Water Board.

Future Development

The District has no control over future development in areas the District provides services in. Future development in these areas parallels that of Amador County. More general information on growth and development in Amador County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Amador County Vulnerability and Assets at Risk of the Base Plan.

The Pine Grove Park is in excellent condition and is well-maintained and therefore not the current focus of this plan. Our water system is old and in need of significant infrastructure replacement, maintenance and updates to the system's meters and pipeline. The District will primarily focus on operations and infrastructure during the next 5 years.

J.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table J-2 as high or medium significance hazards. Impacts of past events and vulnerability of the District to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Amador County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the District to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. 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 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.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Climate Change

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Climate change adaptation is a key priority of the State of California. The 2018 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.

In Amador County and the District, the HMPC noted that each year it seems to get a bit warmer and snow seems to start at lower elevations. It was also noted that 2017 was one of the wettest years ever.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the District, Amador County, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, 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

Climate change has never been directly linked to any declared disasters. While the District noted that climate change is of concern, no specific impacts of climate change could be recalled. The District and HMPC members noted that the strength of storms does seem to be increasing and the temperatures seem to be getting hotter.

Vulnerability to and Impacts from Climate Change

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. California's APG: 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. 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. This information can be used to guide climate adaptation planning in the District and Amador County Planning Area.

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra region in which the Amador County Planning Area is part of:

- Temperature increases
- Decreased precipitation

- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

The CSD noted that Pine Grove is primarily a retirement community with fragile elderly individuals who would be at greater risk to future extreme heat events. There is no cooling location or transportation available for our Seniors to be taken to a cooling location on days when extreme heat occurs.

Assets at Risk

Assets and future assets at risk to the district due to climate change related drought will likely also be fire related as the area is surrounded in trees. Many residences are built in areas beyond water service where there are no fire hydrants. It is assumed that future building would not be allowed without a requirement for hydrants located within 500 feet.

Future Development

Future development of District facilities and service area is unlikely to be affected by climate change.

Drought & Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Drought is a complex issue involving 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. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

PGCSD purchases treated water from the Amador Water Agency through the Central Amador Water Project (CAWP) and distribute it to residential and commercial users.

The District does not provide water treatment services; PGCSD purchases treated surface water from Tiger Reservoir from AWA. The water is treated at AWA's Buckhorn Treatment Plant, passes through the CAWP transmission pipeline, and fills the storage tanks serving the District.

The District provides necessary maintenance and operation of the water distribution system. The District uses groundwater for non-potable uses and maintains a single well at the district office. The well is used primarily to provide bulk water to developers for construction sites.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the District, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages and for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the District and the County are shown in Section 4.2.11 of the Base Plan.

Past Occurrences

Since drought is a regional phenomenon, past occurrences of drought for the District are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.2.11 of the Base Plan.

The District noted that in the 2014 drought, there were issues in the County and in the District. The 2014 drought has had a significant impact on the area of Pine Grove, located in the foothills of the Sierra Nevada. With little rain in the foothills and record low snowfall in the Sierra Nevada, water supplies are significantly depleted. The District noted that there were high (but not quantifiable) damages to crops in the County. In the District, there were wells that went dry.

Vulnerability to and Impacts from Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the District, 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 District noted that there are many homes in Pine Grove on wells, some of which are already dry – the threat of drought for this group is very high. The cost for the District to expand its water system or for the residents to join the water system is too high for many. Some relief for residents to help with the cost of joining a public water system would be helpful.

Assets at Risk

Assets and future assets at risk to the district due to drought will likely also be fire related as the area is surrounded in trees. Many residences are built in areas beyond water service where there are no fire hydrants. It is assumed that future building would not be allowed without a requirement for hydrants located within 500 feet.

Future Development

Future development of District facilities will take drought into account when planning amounts of water use required or expected in any new developments.

Severe Weather: Heavy Rains and Storms (Hail, Lightning)

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Storms in the District occur annually 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 District falls mainly in the fall, winter, and spring months.

Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the District. All portions of the District are at risk to heavy rains. Most of the severe rains occur during the fall, winter, and spring months. There is no scale by which heavy rains and severe storms are measured. 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 severe storms in California, Amador County, and the District can range from minutes to hours to days. Information on precipitation extremes can be found in Section 4.2.3 of the Base Plan.

Past Occurrences

According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the District. This is the cause of many of the federal disaster declarations related to flooding.

Vulnerability to and Impacts from Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrences in the District. These events can cause localized flooding. Elongated events, or events that occur during times where the

ground is already saturated can cause 1% and 0.2% annual chance flooding. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the District.

Actual damage associated with the effects of severe weather include impacts to property, critical facilities (such as utilities), and life safety. Heavy rains and storms often result in localized flooding creating significant issues. Roads can become impassable and ground saturation can result in instability, collapse, or other damage to trees, structures, roadways, and other critical infrastructure. Floodwaters and downed trees can break utilities and interrupt services.

Primary issues and impacts in the District from heavy rains and storms are downed trees; however, the District noted that it did not have any danger of falling trees to district property.

Assets at Risk

As previously stated, no District assets are at risk from the primary issue of downed trees.

Future Development

Future development of District facilities is unlikely to be affected by heavy rains and storms. Future District facilities will be built to codes that reduce risk from heavy rains and storms.

Severe Weather: High Winds and Tornadoes

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

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. High winds can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss.

Portions of the County and District 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. These types of winds are also associated with the rapid spread of wildfires, making some regions which experience these winds particularly fire prone.

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 form when cool, dry air sits on top of warm, moist air. Tornadoes are the most powerful storms that exist. Tornadoes, though rare, are another severe weather hazard that, though rare, can affect areas in the lower elevations of the Amador County Planning Area, primarily during the rainy season in the late fall, winter, and early spring.

Location and Extent

The entire District and County is subject to significant, non-tornadic (straight-line), 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 12 category scale that relates wind speed to observed conditions at sea or on land. Its full name is the Beaufort Wind Force Scale. The Beaufort Scale was shown in Section 4.2.4 of the Base Plan.

Tornadoes, while rare, can occur at any location in the County and District. The areas in the lower elevations of the County tend to be at greater risk than the areas in the foothills and higher. 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 (EF) 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. The F Scale and EF Scale are shown in Section 4.2.4 of the Base Plan.

Past Occurrences

The District noted that since high winds is a regional phenomenon, events that affected the lower elevations of the County also affected the District. Those past occurrences were shown in the Base Plan in Section 4.2.4.

Vulnerability to and Impacts from Severe Weather: Wind and Tornado

High winds are common occurrences in the District throughout the entire year. Straight line winds are primarily a public safety and economic concern. Windstorm can cause damage to structures and power lines which in turn can create hazardous conditions for people. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered. High winds can impact critical facilities and infrastructure and can lead to power outages. Wind can also drive wildfire flames, spreading wildfires quickly. High winds are also a component of red flag days, which can cause PG&E to enact the Public Safety Power Shutdowns (PSPS).

Impacts from high winds in the District will vary. Future losses from straight line winds include:

- Downed trees
- Higher risk of wildfire and PSPS events
- Power line impacts and economic losses from power outages
- Occasional building damage, primarily to roofs

The District has not had any impacts due to high wind and likely will not since its water lines run underground. High wind impacts in the District area are mostly due to downed trees.

Assets at Risk

As previously stated, no District assets are at risk from the primary issue of downed trees.

Future Development

Future development of District facilities is unlikely to be affected by winds and tornadoes. Future District facilities will be built to codes that reduce risk from high winds. Tornadoes are extremely rare in the District and are not expected to impact future District buildings.

Severe Weather: Winter Storms and Freeze

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to the National Weather Service), extreme cold often accompanies a winter storm or is left in its wake. Winter snowstorms can include heavy snow, ice, blizzard conditions, and cold temperatures. Freezing temperatures can also occur without the accompanying winter storm.

Location and Extent

Winter storms and freeze are regional issues, meaning the entire District is at risk to freeze and winter storm. 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 21.8 days that fall below 32°F in western Amador County. 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. Snowfall often accompanies storms in the upper elevations of the County is measured in snow depths. It is rare for snow to fall in the District, and even rarer that snow accumulates in the District. Snowfall has an onset that is similar to freeze.

Past Occurrences

The District noted that freeze and winter storm is a regional phenomenon; events that affected the lower elevations of the County also affected the District. Those past occurrences were shown in the Base Plan in Section 4.2.5. The District noted that in 2016 and 2017, extreme cold events occurred in the District.

Vulnerability to and Impacts from Severe Weather: Freeze and Winter Storms

The District experiences temperatures below 32 degrees during the winter months. The temperature moves to the teens in rather extreme situations. Freeze can cause injury or loss of life to residents of the District. While it is rare for buildings to be affected directly by freeze, damages to pipes that feed building can be damaged during periods of extreme cold. Extreme cold and freeze can affect critical facilities and infrastructure, down trees, break pipes, and can be a life safety issue. When extreme cold is coupled with high winds or ice storms, power lines may be downed, resulting in an interruption of utilities and critical

services. Occasionally, winter storms with snow and ice can affect the District. Transportation networks, communications, and utilities infrastructure are the most vulnerable physical assets in the District. The ability for the District to continue to operate during periods of winter storm and freeze is paramount.

Pine Grove is primarily a retirement community with fragile elderly individuals. Pine Grove has no warming location or transportation available for our Seniors to be taken to a warming location on days when extreme heat occurs.

Assets at Risk

Since the water system is underground, no District assets are expected to be at risk from winter storms and freeze.

Future Development

Future development of District facilities is unlikely to be affected by winter storms and freeze. Future District facilities will be built to codes that reduce risk from winter storms and freeze.

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

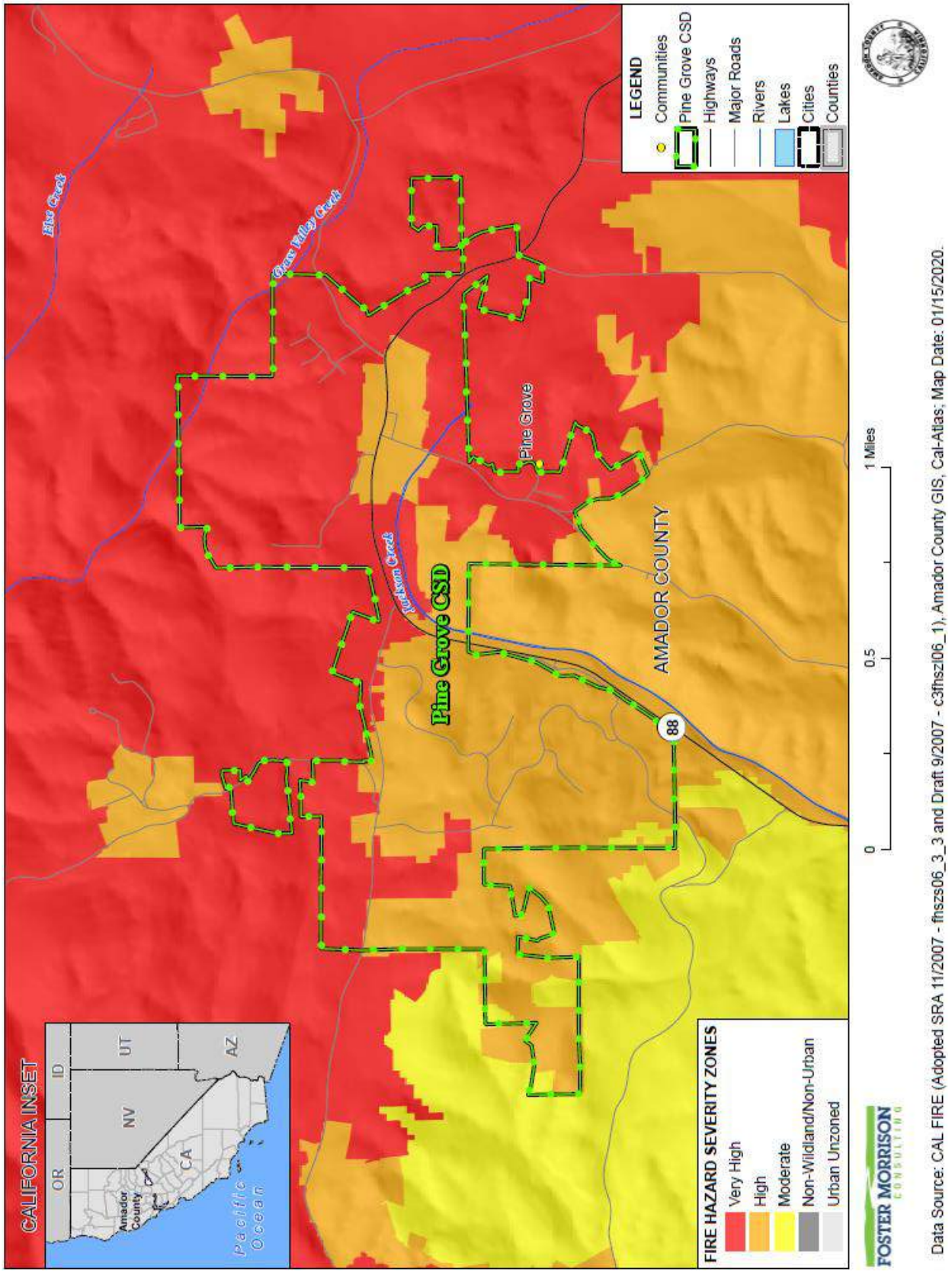
Hazard Profile and Problem Description

Wildland fire is an ongoing concern for the PGCSD. 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. 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. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

Location and Extent

Wildfire can affect all areas of the District. CAL FIRE has estimated that the risk varies across the District and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the PGCSD were created. Figure J-2 shows the CAL FIRE FHSZ in the District. As shown on the maps, fire hazard severity zones within the District range from high to very high.

Figure J-2 PGCSD – Fire Hazard Severity Zones



Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more.

Past Occurrences

A list of state and federal disaster declarations for Amador County from wildfire is shown on Table J-4. These events also likely affected the District to some degree.

Table J-4 Amador County – State and Federal Disaster Declarations from Wildfire 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	1	2015	1	1961

Source: Cal OES, FEMA

A wildfire occurred near the District on September 9, 2015. The fire damaged or destroyed 865 buildings in the County. An unknown number of these fell in the District service area. All Amador County schools were closed.

Vulnerability to Wildfire

The wildfire hazard is one of the highest priority hazards in the County and District, and is the hazard with the greatest potential for catastrophic loss. High fuel loads in the County and Cities, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. The more urbanized areas within the County are not immune from fire. The dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and District, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Potential impacts from wildfire include loss of life and injuries; damage to structures 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 District. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the District 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 District; smoke and air pollution from wildfires can be a severe health hazard.

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 PSPSs 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 District noted that there are currently 62 homes in Pine Grove that are beyond water lines to have hydrants. This causes a critical threat to these properties should a wildfire occur. These properties are listed in Cal Fire's highest risk zone.

Assets at Risk

All district assets would be at risk if there is a wildfire, however the tank can withstand high heat and is at lowest risk. In the California CAMP fire water lines were damaged causing contaminants to enter the water system and depending on the location of the fire this could occur through part or the whole system. The office building sits in the center of Pine Grove and across from a large PG and E facility and could be at high risk for loss.

Future Development

There are currently no new developments planned by the District, the District is replacing a water tank in 2020, but it will be housed at the same location.

J.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

J.6.1. Regulatory Mitigation Capabilities

Table J-5 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the PGCSD.

Table J-5 PGCSD Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
General Plan		County of Amador has capability and authority
Capital Improvements Plan		County of Amador has capability and authority
Economic Development Plan		County of Amador has capability and authority
Local Emergency Operations Plan		County of Amador has capability and authority

Continuity of Operations Plan		County of Amador has capability and authority
Transportation Plan		County of Amador has capability and authority
Stormwater Management Plan/Program		County of Amador has capability and authority
Engineering Studies for Streams		Upper Mokelumne Watershed Authority http://www.umrwa.org/docs.html
Community Wildfire Protection Plan		County of Amador has capability and authority
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		Unknown
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code		Unknown
Building Code Effectiveness Grading Schedule (BCEGS) Score		Unknown
Fire department ISO rating:		Unknown
Site plan review requirements		Unknown
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance		Unknown
Subdivision ordinance		Unknown
Floodplain ordinance		Unknown
Natural hazard specific ordinance (stormwater, steep slope, wildfire)		Unknown
Flood insurance rate maps		Unknown
Elevation Certificates		Unknown
Acquisition of land for open space and public recreation uses		Unknown
Erosion or sediment control program		Unknown
Other		
How can these capabilities be expanded and improved to reduce risk?		
Altering zoning for new buildings to minimize structures in high risk areas as well as require hydrants within 300 ft, of buildings will help to mitigate some of the fire danger Increased tree trimming and removal will also mitigate the spread and damage due to fire.		

Source: PGCSD

J.6.2. Administrative/Technical Mitigation Capabilities

Table J-6 identifies the District department(s) responsible for activities related to mitigation and loss prevention in PGCSD.

Table J-6 PGCSD Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission		County of Amador has capability and authority
Mitigation Planning Committee		County of Amador has capability and authority
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)		County of Amador has capability and authority, PG&E. Department of Forestry, Mokelumne Watershed Authority and Cal Fire are all working to mitigate tree related issues
Mutual aid agreements		County of Amador has capability and authority
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official		Unknown
Floodplain Administrator		Unknown
Emergency Manager		Unknown
Community Planner		Unknown
Civil Engineer		Unknown
GIS Coordinator		unknown
Other		
Technical	**Y/N**	**Describe capability Has capability been used to assess/mitigate risk in the past?**
Warning systems/services (Reverse 911, outdoor warning signals)	Y	The District has a web site as well as an emergency alert system that can automatically call, text, and email customers to alert them of emergency information
Hazard data and information		Unknown
Grant writing		Unknown
Hazard analysis		Unknown
Other		
How can these capabilities be expanded and improved to reduce risk?		
Funding for private properties to trim or remove trees is a high need in this area. The majority of residents are elderly and on fixed incomes, so they do not have the ability or finances available to mitigate tree hazards on their properties. It would benefit all residents and property owners if vacant properties were required to eliminate tree hazards and if not completed, they could be completed by an agency with the expense added to the property owners' taxes.		

Source: PGCSD

J.6.3. Fiscal Mitigation Capabilities

Table J-7 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table J-7 PGCSD's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (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	Yes	Can only be used to improve water lines to hydrants and for public drinking water
Authority to levy taxes for specific purposes	Yes	Can only be used to improve water lines to hydrants and for public drinking water
Fees for water, sewer, gas, or electric services	Yes	Can only be used to improve water lines to hydrants and for public drinking water
Impact fees for new development	No	
Storm water utility fee	No	
Incur debt through general obligation bonds and/or special tax bonds	No	
Incur debt through private activities	No	
Community Development Block Grant	Yes	We are eligible to apply
Other federal funding programs	Yes	We are eligible to apply
State funding programs	Yes	We are eligible to apply and currently have one grant accepted to replace a failed water tank
Other		
How can these capabilities be expanded and improved to reduce risk?		
Expanding water lines and installing hydrants to residential areas who currently do not have hydrants could reduce fire hazard		

Source: PGCSD

J.6.4. Mitigation Education, Outreach, and Partnerships

Table J-8 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 J-8 PGCSD Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access, and functional needs populations, etc.		Unknown
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Drought education for water customers to conserve, emergency alert system used for all customers
Natural disaster or safety related school programs		Unknown
StormReady certification		Unknown

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Firewise Communities certification		Unknown
Public-private partnership initiatives addressing disaster-related issues		Unknown
Other		
How can these capabilities be expanded and improved to reduce risk?		
Expanded educational programs presented by the small water systems as a group would help to reach more people and allow more educational opportunities than we can each provide individually.		

Source: PGCSD

J.6.5. Other Mitigation Efforts

The District has many other completed or ongoing mitigation efforts that include the following:

- 12" Water line installed to new developments to supply water but also to increase fire flow capacity for fire hydrants.
- The District is in the process of seeking State funding to replace 45% of its water lines in order to increase fire flow to fire hydrants.
- The District is working with members of 62 residents who live beyond the service area to find funding to extend our lines and install hydrants, these residents do not currently have hydrants in the area and fire danger is a significant risk.
- The District is seeking funding to purchase a filtration system for its well in order to provide potable water to residents in the event that our drinking water distribution system were to be compromised due to a disaster.

J.7 Mitigation Strategy

J.7.1. Mitigation Goals and Objectives

The PGCSD adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

J.7.2. Mitigation Actions

The planning team for the PGCSD identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Climate Change
- Drought and Water Shortage
- Severe Weather: Winter Storm and Freeze
- Wildfire

After review of the available hazard information, one hazard was dropped from consideration for mitigation planning purposes:

- Severe Weather: Heavy Rains and Storms

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan 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 countywide public outreach action, 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 plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

Action 1. Hydrant Project - Install water lines and add 16 fire hydrants to the area above Lupe Road in Pine Grove. There are 64 homes in this area that are on wells and there are no fire hydrants available.

Hazards Addressed: Climate Change, Drought and Water Shortage, Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Wildfire is a significant concern in Pine Grove, CA as the area has not burned and is located in Cal Fire's "Very High" fire severity zone. Wildfires are often started by resident's burn piles getting out of control and structure fires; hydrants are the first firefighting tool to extinguish these fires before they become wildfires.

Project Description: Extend water mains from Pine Grove distribution system on Lupe Road (main currently ends on Leona Lane) along Lupe Road to Rainbow Lane and along Rainbow Mine Road, Ponderosa Way and Gloria Lane to their ends for fire protection purposes. Install 16 new hydrants on these new mains (500' maximum spacing).

Other Alternatives: Water storage tanks. 180,000 gallons provides 1,500 gallons per minute for 2 hours.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Pine Grove community Service District currently does not have infrastructure in this area in order to provide fire hydrants. In addition to installing the water lines and hydrants.

Responsible Office/Partners: Responsible office – Pine Grove community Service District in partnership with Amador Water Agency

Cost Estimate: $3,000,000

Benefits (Losses Avoided): This project would greatly assist in mitigating the potential loss of life, structures, and wildland. In comparison to the same area, the Butte Fire in 2015 destroyed 70,000+ acres, resulted in two deaths and the loss of 475 residences and 343 outbuildings at a cost of $16.5 Billion.

Potential Funding: The Pine Grove Community Service District would seek FEMA funding with a 25% match from the district.

Timeline: The Pine Grove Community Service District would be able to complete this project within 12 months after grant funding is secured.

Project Priority: High

Severe Weather Actions

Action 2. Warming/Cooling Center/Generator

Hazards Addressed: Extreme Heat and Extreme cold

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Pine Grove California has 728 Seniors, many of whom are either on oxygen or are unable to drive. There are no current warming/cooling centers in Pine Grove and the closest location is in Jackson, 9 miles away.

Project Description: Purchase a Generator and have it wired to automatically heat/cool the Pine Grove Town Hall as well as provide power for those on oxygen.

Other Alternatives: Buses to Jackson with door to door service – very limited

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Pine Grove Community Improvement Group over sees the Town Hall. The Town Hall belongs to Amador county but is maintained by the Improvement Group. The improvement group is in discussions with PG and E regarding use of the center and discussions are in the planning stages

Responsible Office/Partners: Lori Arnberg – Pine Grove Community Service District, Pine Grove Community Improvement Group

Cost Estimate: $15,000

Benefits (Losses Avoided): Provide fragile populations with a safe place to go in extreme heat or cold.

Potential Funding: FEMA, Pine Grove Improvement Group, PG and E

Timeline: 1 year

Project Priority: High

RIVER PINES
PUBLIC UTILITY DISTRICT

Annex K River Pines Public Utility District

K.1 Introduction

This Annex details the hazard mitigation planning elements specific to River Pine Public Utility District (RPPUD or District), a new participating jurisdiction to the 2020 Amador County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the District. This Annex provides additional information specific to RPPUD, with a focus on providing additional details on the risk assessment and mitigation strategy for this District.

K.2 Planning Process

As described above, the District followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Amador County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table K-1. Additional details on plan participation and District representatives are included in Appendix A.

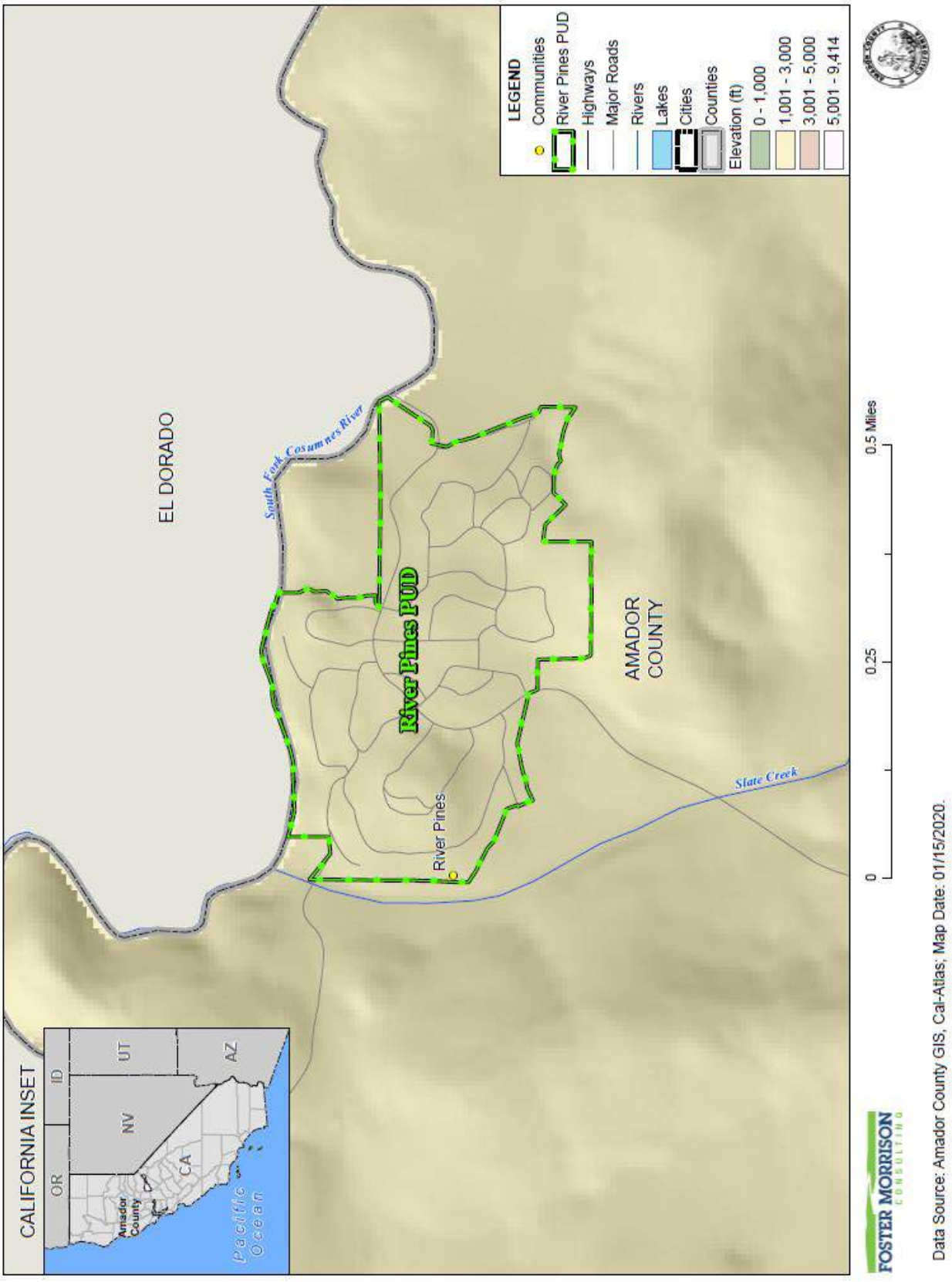
Table K-1 RPPUD – Planning Team

Name	Position/Title	How Participated
Rocky Raymond	Board Director	Attended Meetings and helped identify hazards and complete paperwork
Candi Bingham	General Manager	Helped identify hazards and complete paperwork

K.3 District Profile

The District profile for the RPPUD is detailed in the following sections. Figure K-1 displays a map and the location of the District within Amador County.

Figure K-1 RPPUD



K.3.1. Overview and Background

RPPUD was formed on July 24, 1961, as an independent special district.1RPPUD was formed to provide water services to the River Pines community. The sewer system was completed in 1988, to address public health hazards from failing private septic systems. LAFCO authorized water and sewer related services in 2012 in conjunction with adopting a sphere of influence for the district. The principal act that governs the District is the Public Utility District Act. The principal act empowers the District to acquire, construct, own, operate, control, or use works for supplying light, water, power, heat, transportation, telephone service, or other means of communication, or means for the disposal of garbage, sewage, or refuse matter. In addition, the District may acquire, construct, own, complete, use, and operate a fire department, street lighting system, public parks and other recreation facilities, and provide for the drainage of roads, streets, and public places.

The RPPUD boundary area encompasses the community of River Pines, which is located in northern Amador County. The boundary area encompasses the portion of the community zoned for low-density residential uses, and excludes outlying parcels zoned for suburban-residential use. The boundary extends north to the South Fork of the Cosumnes River, east to Meadow View Road, south to include parcels on Spring Lane and Circle Avenue, and west to include parcels on Pigeon Trail and Emigrant Trail Roads. The District has a boundary area of approximately 84 acres. The District is known to provide service to three parcels outside its boundaries within Amador County and to approximately 13 properties in El Dorado County.

As of 2018, District staff includes a General Manager who is sub-contracted and works approximately a 40-hour week with office hours Monday - Thursday. All plant operations are sub-contracted with Amador Water Agency (AWA).

In 2018, an Income Survey was completed for the District. That document stated that River Pines PUD serves 279 parcels: 83 are vacant lots; 24 are vacant homes; 10 are vacation homes, and 5 are commercial.

K.4 Hazard Identification

RPPUD identified the hazards that affect the District and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to District (see Table K-2).

Table K-2 RPPUD—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude / Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect/Pests*	Extensive	Highly Likely	Limited	Low	Low
Aquatic Invasive Species	Significant	Highly Likely	Limited	Low	Low
Avalanche	Limited	Likely	Negligible	Low	Medium
Climate Change	Extensive	Likely	Limited	Low	–
Dam Failure	Limited	Unlikely	Critical	Low	Medium
Drought & Water shortage	Extensive	Occasional	Limited	Medium	High
Earthquake (large damaging/small)	Significant	Unlikely/Likely	Catastrophic	Low	Low
Floods: 1%/0.2% annual chance	Significant	Occasional/ Unlikely	Critical	Low	Medium
Floods: Localized Stormwater	Extensive	Highly Likely	Critical	Low	Medium
Landslide, Mudslide, Debris Flow	Significant	Unlikely	Critical	Low	Medium
Levee Failure	Limited	Occasional	Limited	Low	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Highly Likely	Critical	Low	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely/ Occasional	Limited	Low	Low
Severe Weather: Winter Storms and Freeze	Significant	Highly Likely	Limited	Low	Medium
Wildfire	Extensive	Likely	Catastrophic	High	High

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

*The District is at risk to bark beetles, which are discussed in the wildfire section of this Annex.

K.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile the District's hazards and assess the District's vulnerability separate from that of the Amador County Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the District is included in this Annex. This vulnerability assessment analyzes the property and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

K.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section K.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard (as shown in Table K-2) affects the District and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Planning Area.

K.5.2. Vulnerability Assessment and Assets at Risk

This section identifies the District's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Assets at Risk and Critical Facilities

This section considers the RPPUD's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this LHMP Update. Critical facilities are defined for this Plan 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, and (3) Hazardous Materials Facilities, as discussed in Section 4.3.1 of the Base Plan.

Table K-3 lists critical facilities and other District assets identified by the District Planning Team as important to protect in the event of a disaster. RPPUD's physical assets, valued at over $1.1 million, consist of the buildings and infrastructure to support the District's operations.

Table K-3 RPPUD Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Replacement Value	Which Hazards Pose Risk
Shop Building	Equipment/supply storage	$80,000	Extreme flooding
Slow Sand Filter Building	Equipment for river diversion	$110,000	Extreme flooding
Slate Creek Lift Station	Sewage Pump station	$100,000	Extreme flooding
Emigrant Sewer Pond Access Road	ONLY road to sewer facilities	$50,000	Extreme flooding
Well 3R	Water Production	$350,000	Drought
Well 2	Water Production	$350,000	Drought
Town Hall	District Office/Community Building	$150,000	Flooding
Total		**$1,190,000**	

Source: RPPUD

Natural Resources

RPPUD has a variety of natural resources of value to the District. These natural resources parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Historic and Cultural Resources

RPPUD has a variety of historic and cultural resources of value to the District. These historic and cultural resources parallels that of Amador County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Growth and Development Trends

The District noted that River Pines is a severely disadvantaged area where many elderly have resided most of their lives. In 2018, the state conducted a survey which recognized River Pines as severely disadvantaged. An income survey completed in 2018 provided by the District showed that the median household income in the River Pines PUD is $28,660. Also, there is a lone narrow road (one car at a time) that make evacuations difficult. The District noted that there is no room for growth; however, there are approximately 20 lots still vacant that could be developed. This would add to the already difficult evacuation problems.

Future Development

The District has no control over future development in areas the District provides services in. Future development in these areas parallels that of Amador County. More general information on growth and

development in Amador County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Amador County Vulnerability and Assets at Risk of the Base Plan.

K.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table K-2 as high or medium significance hazards. Impacts of past events and vulnerability of the District to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Amador County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the District to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. 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 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.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Drought & Water Shortage

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Drought is a complex issue involving 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. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and

commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the District, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages and for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the District and the County are shown in Section 4.2.11 of the Base Plan.

Past Occurrences

Since drought is a regional phenomenon, past occurrences of drought for the District are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.2.11 of the Base Plan.

In 2014, Well 2 went completely dry. The District was operating on one well which is under the influence of ground water. District received an emergency USDA grant for the installation of a new well and for Well 2 to be drilled deeper. In order for production to meet demand, the new well (Well 3R) and Well 2 must operate simultaneously.

Vulnerability to and Impacts from Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the District, 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.

During periods of extended drought, the aquifers do not have the ability to recharge which in turn the Wells do not recharge. The District has many past Wells that have had to be capped and another Well drilled in order to continue providing water to the people in River Pines.

Assets at Risk

The HMPC noted that Well 2 and Well 3R would be at risk to this hazard.

Future Development

Due to the limited property in River Pines, the District may only have future developments where existing buildings are located. All District useable owned property is currently occupied, therefore, existing buildings/structures must be demolished and replaced. This also insures that should future wells need to be drilled, due to existing wells becoming non-operational, the vacant land will be available for perking.

Severe Weather: Extreme Heat

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

According to 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 extreme heat and high humidity, evaporation is slowed, and the body must work extra hard to maintain a normal temperature." Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

In addition to the risks faced by citizens of the District, there are risk to the built environment from extreme heat. While extreme heat on its own does not usually affect structure, extreme heat during times of drought can cause wildfire risk to heighten. Extreme heat and high winds can cause Public Safety Power Shutoff (PSPS) events, causing issues to buildings in the District.

Location and Extent

Heat is a regional phenomenon and affects the whole of the District. 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 affect vulnerable populations and communities. Heat waves do not generally cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios.

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 Section 4.2.2 of the Base Plan.

Past Occurrences

The District Planning Team note that since extreme heat is a regional phenomenon, events that affected the County also affected the District. Those past occurrences were shown in the Base Plan in Section 4.2.2.

Vulnerability to and Impacts from Extreme Heat

The District experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-115°F in rather extreme situations. Also, PSPS events may occur during these times as well

Many months see a high number of days where daily high temperatures exceed 90°F. Health impacts are a primary concern. Generally, people who live and work in this weather are prepared to cope with the extremes. There are few homes in the District with air conditioning. Continued heat due to climate change combined with power outages may cause residents to need a cooling place.

Assets at Risk

Due to PG&E now practicing PSP's, the District's sewer operations and water service are both extremely at risk from this hazard. The District's wells operate on a generator; however, those generators need to be monitored and in good working condition. As for the sewer, the lift stations operate on generators, however, two of the District's generators are over 30 years old. Should a generator fail to operate, there is a high probability that the lift stations could spill into the Cosumnes River as they are located on the edge of the river. Also, when PG&E does there PSP's, the sewer ponds are at risk of overflowing, as the pumps are unable to operate.

Future Development

In order to reduce the District's inability to provide water and prevent sewer spill/overflows, generators would need to be installed to operate all pumps, lift stations and all grinders. Also, a restructure of the sewer operations could also reduce contamination of the Cosumnes River. By relocating the lift stations, and perhaps a redesign of the sewage transport to the ponds, could also reduce the possibility of contamination to the Cosumnes River.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

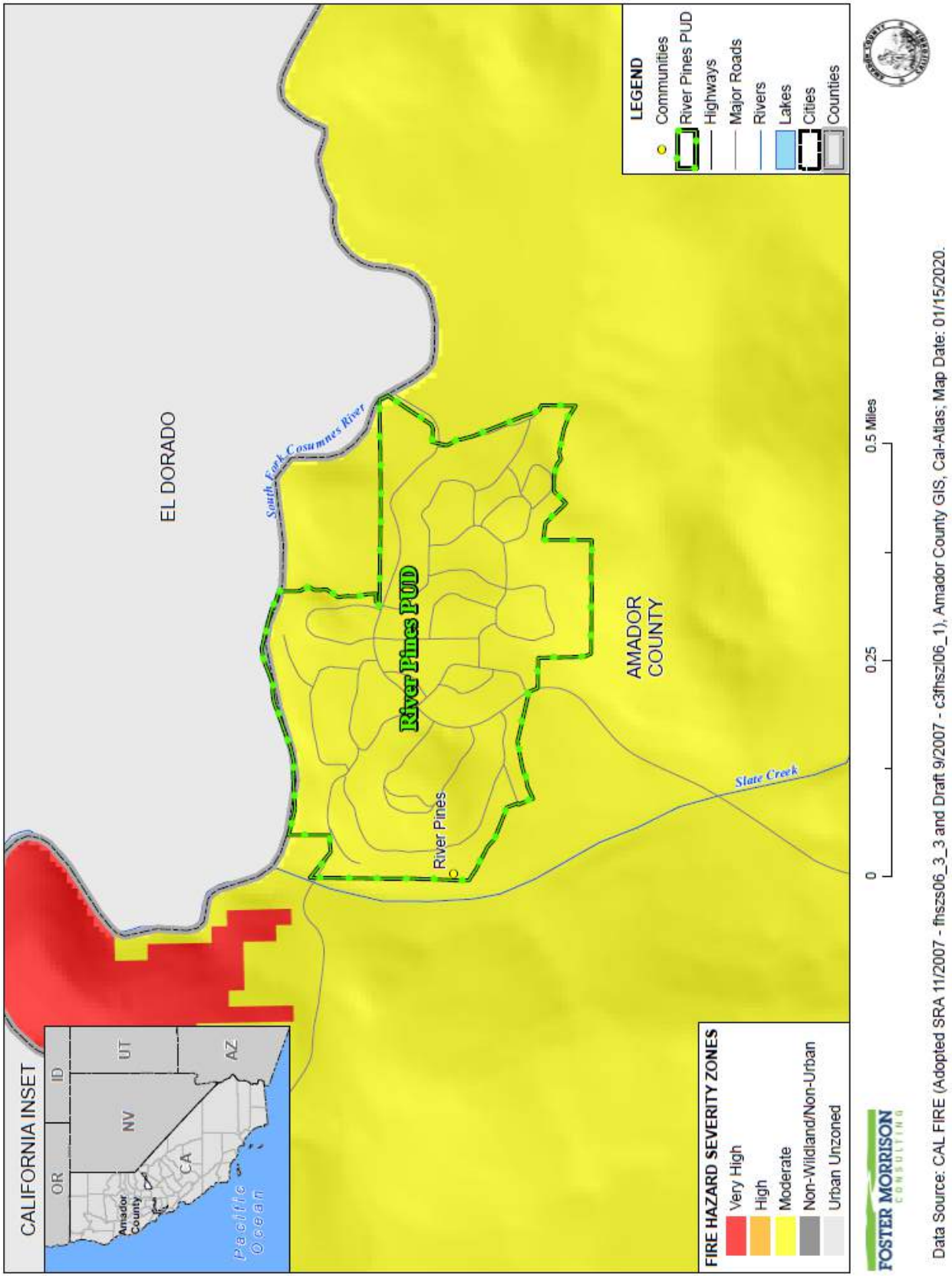
Wildland fire is an ongoing concern for the RPPUD. Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the ecosystem. Wildland fires affect 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. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated

with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

Location and Extent

Wildfire can affect all areas of the District. CAL FIRE has estimated that the risk varies across the District and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the RPPUD were created. Figure K-2 shows the CAL FIRE FHSZ in the District. As shown on the maps, fire hazard severity zones within the District is moderate.

Figure K-2 RPPUD – Fire Hazard Severity Zones



Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more.

Past Occurrences

A list of state and federal disaster declarations for Amador County from wildfire is shown on Table K-4. These events also likely affected the District to some degree.

Table K-4 Amador County – State and Federal Disaster Declarations from Wildfire 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	1	2015	1	1961

Source: Cal OES, FEMA

The District noted no past occurrences of wildfire, but noted if a wildfire did occur, it could wipe out the entirety of River Pines.

Vulnerability to Wildfire

The wildfire hazard is one of the highest priority hazards in the County and District, and is the hazard with the greatest potential for catastrophic loss. High fuel loads in the County and Cities, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. The more urbanized areas within the County are not immune from fire. The dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and District, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Potential impacts from wildfire include loss of life and injuries; damage to structures 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 District. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the District 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 District; smoke and air pollution from wildfires can be a severe health hazard.

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 PSPSs 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.

Should a fire breakout in River Pines, this could highly affect the District's ability to provide water to the public and to the fire department to extinguish the fire. Also, depending on the location of the fire, sewer operations could also be affected.

Assets at Risk

Due to the compact area of River Pines, all District assets would be at high risk of being destroyed. The District's water operation buildings, sewer buildings and operations are all surrounded by pine trees in River Pines. The District would no longer have the ability to provide water/sewer for the people.

Future Development

Should future development occur, the District should research ways structure may be built to resist fire. Clearing all operational areas of debris and trees could also reduce the risk of District's assets perishing should a wildfire occur.

K.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

K.6.1. Regulatory Mitigation Capabilities

Table K-5 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RPPUD.

Table K-5 RPPUD Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan/General Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	N	
Continuity of Operations Plan	N	

Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	By LAFCO
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Due to the small size of the District, and the lack of jurisdiction over much of these regulatory mitigation capabilities, it is difficult to expand these capabilities.		

Source: RPPUD

K.6.2. Administrative/Technical Mitigation Capabilities

Table K-6 identifies the District department(s) responsible for activities related to mitigation and loss prevention in RPPUD.

Table K-6 RPPUD's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	

Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	N	
Mutual aid agreements	N	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	N	
Community Planner	N	
Civil Engineer	N	
GIS Coordinator	N	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Voice broadcast services
Hazard data and information	N	
Grant writing	N	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Due to the small size of the District, and the lack of jurisdiction over much of these administrative mitigation capabilities, it is difficult to expand these capabilities.		

Source: RPPUD

K.6.3. Fiscal Mitigation Capabilities

Table K-7 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table K-7 RPPUD's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (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	No
Authority to levy taxes for specific purposes	Y	Compete yearly in the County
Fees for water, sewer, gas, or electric services	Y	Water and sewer
Impact fees for new development	Y	None
Storm water utility fee	N	

Funding Resource	Access/ Eligibility (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?
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	N	
Community Development Block Grant	Y	Received for planning distribution
Other federal funding programs	Y	USDA – Emergency Water Project
State funding programs	Y	In process now for distribution funding
Other		
How can these capabilities be expanded and improved to reduce risk?		
There is so much "red tape" that a District must go through to receive funding. Funding resources should look at ways to reduce the difficulty and the length of time it takes to receive funding for projects. Also, funding should be allocated based on risk, need etc., opposed to "first come first served." It would also help if the funding resources had the ability to reach out to those District's that may need funding and inform them of what is available.		

Source: RPPUD

K.6.4. Mitigation Education, Outreach, and Partnerships

Table K-8 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 K-8 RPPUD's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
The District would like to do all of the above, but lack of size, staff, and budget make it difficult. The only way to expand, would be to add more staff or more budget.		

Source: RPPUD

K.6.5. Other Mitigation Efforts

The District has many other completed or ongoing mitigation efforts that include the following:

- District is trying to install solar panels. The installation of solar would help tremendously for both electricity cost, but more importantly when PG&E is in the middle of their PSP's the solar could help provide the District with electricity for their operations that currently needs generators.

K.7 Mitigation Strategy

K.7.1. Mitigation Goals and Objectives

The RPPUD adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

K.7.2. Mitigation Actions

The planning team for the RPPUD identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Drought & Water shortage
- Severe Weather: Extreme Heat
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan 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 countywide public outreach action, 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 plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

Action 1. Wildfire Prevention and Public Education

Hazards Addressed: Drought and Water Shortage, Extreme Heat, Wildfire,

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Wildfire threat and ability to exit town and ability of emergency vehicles ingress, existing narrow roadways prevent two-way traffic, lack of fire hydrants, water storage and water delivery, public education and public notification by phone and siren.

Project Description: Ingress/egress fuel load reduction, vacant property mastication/clearing, sewer spray field, convert some roads to one way, water infrastructure and storage, fire education, relocate and connect local siren to Amador County Fire, convert slow sand filter to water storage with CAL FIRE.

Other Alternatives: Approved water distribution system gran in process

Existing Planning Mechanisms through which Action will be Implemented: RRPUD Mitigation Action Committee

Responsible Office: RRPUD

Priority (H, M, L): High

Cost Estimate: $2,200,000

Potential Funding: federal, state, and county grants, as well as local bonds

Benefits (avoided Losses): Increased life safety and property protection

Schedule: 5 years

Action 2. Stormwater Drainage

Hazards Addressed: Flooding; Hillside/Roadway Erosion

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Currently during mild to heavy winters, rainwater flows off hillsides and has no direct place to flow. This is causing erosion and washout of already poor roads in the area. The roads are already extremely narrow and when parts of them continue to washout, this leaves little roadway left to access homes and District water/sewer operations.

Project Description: Install mechanisms for water to flow in a controlled manner which diverts it from washing out the hillsides and roadways. Upgrade/create ditches in all areas of rainwater flow.

Other Alternatives: None Known

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: River Pines PUD

Cost Estimate: $100,000

Benefits (Losses Avoided): Protected roadways, reduce hillside erosion, and area flooding.

Potential Funding: Federal; State

Timeline: Within next five years

Project Priority: Medium

Action 3. Backup Generators

Hazards Addressed: Multi-Hazard, Severe Heat, Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: During power outages, the District relies on generators to supply water to the customers. Generators are also needed for the houses along the river. Houses along the river have grinders to pump the sewage up the hill to the lift stations. During power outages, there is a risk of sewage overflow into the Cosumnes River because there are no permanent generators for these grinders.

Project Description: Install permanent generators at each grinder. This will allow automatic operations during power outages to pump the sewage up the hills to the lift stations which currently have generators to pump the sewage to the ponds.

Other Alternatives: None known

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: River Pines PUD

Cost Estimate: $70,000

Benefits (Losses Avoided): Sewage spill fines; contamination; people's health

Potential Funding: Federal, State

Timeline: One year

Project Priority: High

Action 4. Rebuild Culvert/Road at Cosumnes River Access Point

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: When the Cosumnes River is at high flow the culvert backs up because it is too small to handle debris and water flow, so the road floods and the District has no way of accessing the sewer ponds. Also, there are six residents that have no way of getting out or back home.

Project Description: Rebuild/structure the culverts/road to handle the high river flow.

Other Alternatives: Obtain an easement through unowned property for alternative access road and install road.

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: River Pines PUD

Cost Estimate: $85,000-$100,000

Benefits (Losses Avoided): Full-time access to sewer operations; avoid state fines

Potential Funding: Federal; State

Timeline: Now

Project Priority: High – state has already demanded this to be completed

Appendix A Planning Process

A.1 Lists of HMPC Invites/Stakeholders

Table A-1 Initial LHMP Invite List

Name	Agency/Title	Email
A. Wooden	Denovo Planning	awooden@denovoplanning.com
Aaron Watkins	Amador County Fire Protection District	awatkins@amadorgov.org
Amanda Watson	Amador Resource Conservation District	amanda@amadorrcd.org
Amy Gedney	City of Sutter Creek, City Manager	agedney@cityofsuttercreek.org
Andrea Petretti	Amador Water Agency	apetretti@amadorwater.gov
Brian Oneto	Amador County Board of Supervisors	boneto@amadorgov.org
Candi Bingham	River Pines Public Utility District, General Manager	rppud@rppud.org
Carmel Mitchell	Cal Fire	carmel.mitchell@fire.ca.gov
Carrie Bassett	Amador County Agricultural Department	cbassett@amadorgov.org
Cathleen Johnson	City of Plymouth, Public Works	cjohnson@cityofplymouth.org
Cathy Koos	Lockwood Fire Protection District	cmkoos0001@gmail.com
Chris Mynderup	City of Jackson	cmynderup@ci.jackson.ca.us
Chuck Beatty	Amador County Planning	CBeatty@amadorgov.org
Cindy Engel	Amador County Transportation Commission, GIS Coordinator	cindy@actc-amador.org
Colleen McCarthy	Jackson Casino	cmccarthy@jacksoncasino.com
Constance Gonsalves		constance.gonsalves@goaaa.com
Cox, Timothy	East Bay Mud	tcox@ebmud.com
Dave Seawell	Harrahs	d.seawell@harrahs.com
David Passey	FEMA	david.passey@fema.dhs.gov
Debbie Calcote	Amador Red Cross	debbie.calcote@redcross.org
Debbie Mackey	City of Jackson, City Manager	dmackey@ci.jackson.ca.us
Derek selman	Amador County Public Works	dselman@amadorgov.org
Diana Evensen	Amador County Public Health	devensen@amadorgov.org
Dominic Moreno	Sutter Creek Fire Department	b20moreno@yahoo.com
Elsy Votino	Cal OES	Elsy.Votino@caloes.ca.gov
Eric Mayberry	Amador County Agricultural Commissioner	emayberry@amadorgov.org

Name	Agency/Title	Email
Eric Mikkelson	Amador County Animal Control	emikkelson@amadorgov.org
Frank Axe	Amador County Board of Supervisors	faxe@amadorgov.org
Gene Mancebo	Amador Water Agency, General Manager	gmancebo@amadorwater.gov
Holly Sandman	Amador County Public Health	HSandman@amadorgov.org
James Foley	Amador County Health and Human Services	JFoley@amadorgov.org
Jan Hewitt	Lockwood Fire Protection District	san_fran@pacbell.net
Jared Critchfield	Amador County Unified School District	jcritchfield@acusd.org
Jason Navarre	Amador County Sheriff OES, Sergeant	jnavarre@amadorgov.org
Jeanine Foster	Foster Morrison, Project Manager	jeanine.foster@fostermorrison.com
Jeff Brown	Amador County Supervisor	JeffBrown@amadorgov.org
Jeff White	Amador County IT	jwhite@amadorgov.org
Jenna Peckham	Cal Fire	jenna.peckham@fire.ca.gov
Jered Reinking	Amador County Director of Public Works	JReinking@amadorgov.org
Jim O'Connell	City of Sutter Creek, Police Department	joconnell@cityofsuttercreek.org
Jim Rooney	Amador County Assessor	jrooney@amadorgov.org
John Gedner	Amador County Transportation Commission	john@actc-amador.org
John Silva	Amador County Sheriff OES, Sergeant	jsilva@amadorgov.org
Jon Hanken	City of Ione, City Manager	jhanken@ione-ca.com
Joyce Davidson	Amador City, City Clerk	cityclerk@amadorcity.net
Kandi Thompson	Amador County Recreation Agency	acra@amadorgov.org
Kelly Reason	Amador County Animal Control	kreason@amadorgov.org
Ken Mackey	City of Ione Fire	kmackey@ione-ca.com
Kenneth Hansen	Harrahs	k.hansen@harrahs.com
Kevin Darrow	City of Sutter Creek, City Clerk	kdarrow@cityofsuttercreek.org
Kevin Thomas	Fish & Wildlife	kevin.thomas@wildlife.ca.gov
Kim Vinciguerra	ARC of Amador	kvinciguerra@arcofamador.org
Linda Nafus	Amador Water Agency	lnafus@amadorwater.org
Lori Arnberg	Pine Grove Community Services District, General Manager	pgcomser@volcano.net
Lucas Carthew	Amador Water Agency	lcarthew@amadorwater.org

Name	Agency/Title	Email
Lurali Moore	ARC of Amador & Calaveras	lmoore@arcofamador.org
Maggie Amarant	Amador Transit	maggie@amadortransit.com
Mark Hopkins	Amador County Public Works	mhopkins@amadorgov.org
Martin Ryan	Amador County Sheriff	martinryan@amadorgov.org
Matt Hill	Cal Fire Amador-Eldorado Unit	Matt.Hill@fire.ca.gov
Michael Hooper	City of Jackson, Inspector/Code Enforcement	mhooper@ci.jackson.ca.us
Michelle Mead	NOAA - National Weather Service, Sacramento	michelle.mead@noaa.gov
Mike Israel	Amador County Environmental Health	misrael@amadorgov.org
Nell Raymond	River Pines Public Utility District	nell@nellrock.com
Nettie	Amador Senior Center	nettie@amadorseniorcenter.org
Pat Crew	Amador County Board of Supervisors	pcrew@amadorgov.org
Pat Minyard	Amador County Fire Safe Council	pminyard@volcano.net
Patrick Henry	River Pines Public Utility District	psrisingstarpyrs@yahoo.com
R. Hopson	US Forest Service	rhopson@fs.fed.us
Rayda Ward	Sutter Health	wardrl@sutterhealth.org
Rex Osborn	City of Plymouth, City Manager	rexo@cityofplymouth.org
Richard Forster	Amador County Board of Supervisors	rforster@amadorgov.org
Rick Ferriera	Amador Water Agency, Operations Manager	rferriera@amadorwater.org
Rita Kerr	Amador County Public Health/Health Officer	hofficer@amadorgov.org
Rob Withrow	Cal Fire	robert.withrow@fire.ca.gov
Rocky Raymond	River Pines Public Utility District	rraymond@riverpinespud.org
Roseanne Chamberlain	LAFCO Agency	amador.lafco@gmail.com
Rudy Baltazar	Cal Fire Land Use	rudy.baltazar@fire.ca.gov
Ryan Hamre	Amador Fire	rhamre@amadorgov.org
Sami Nell	Cal DWR Office of Floodplain Management	Sami.Nall@water.ca.gov
Sandy Swafford	Sutter Health	browl4@sutterhealth.org
Scott Meyer	Amador County Environmental Health	smeyer@amadorgov.org
Sharon Nickerson	Amador Transit	sharon@amadortransit.com
Stacy Rhoades	City of Ione, Council Member	srhoades@ione-ca.com
Steve Fredrick	Jackson Valley Irrigation District, General Manager	steve@jvid.org

Name	Agency/Title	Email
Susan Bragstadt	City of Amador City, Vice Mayor	amadorolive@twinwolf.net
Susan Peters	City of Sutter Creek, Planner	speters@cityofsuttercreek.org
Todd Barr	Amador County Chief Building Official	tbarr@amadorgov.org
Todd Waklee	City of Ione	twaklee@ione-ca.com
Victoria LaMar-Haas	Cal OES, Planning	victoria.lamar-haas@caloes.ca.gov
Walt White	Amador Fire Protection District	wwwhite@amadorgov.org
Yvonne Kimball	City of Jackson, City Manager	ykimball@ci.jackson.ca.us
	PG&E	ccb0@pge.com
	Cal DWR Dam Safety	damsafety@water.ca.gov
	Cal DOT	district10publicaffairs@dot.ca.gov
	USACE	spk-pao@usace.army.mil
	LAFCO Agency	LAFCO@amadorgov.org
		chief6100@live.com
	BLM	blm_ca_web_ml@blm.gov

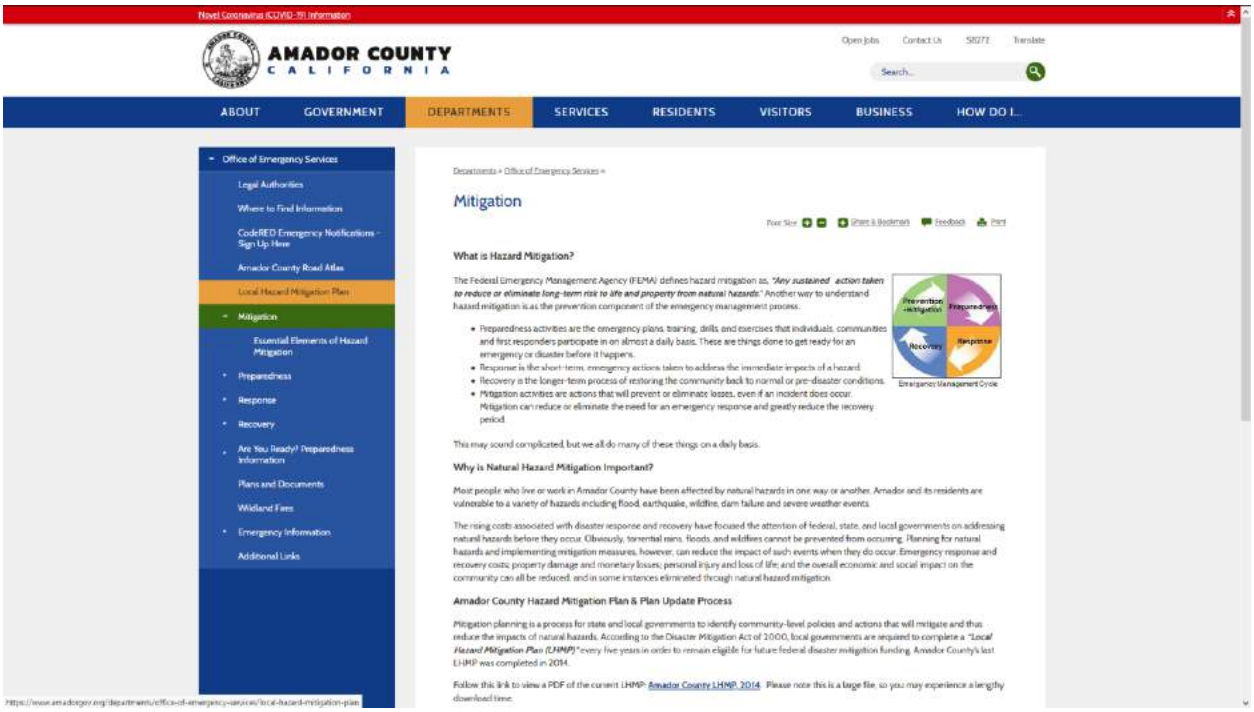
Table A-2 HMPC Participant List

Name	Agency/Title	Email
Aaron Watkins	Amador County Fire Protection District	awatkins@amadorgov.org
Amy Gedney	City of Sutter Creek, City Manager	agedney@cityofsuttercreek.org
Andrea Petretti	Amador Water Agency	apetretti@amadorwater.gov
Candi Bingham	River Pines Public Utility District, General Manager	rppud@rppud.org
Carmel Mitchell	Cal Fire	carmel.mitchell@fire.ca.gov
Carrie Bassett	Amador County Agricultural Department	cbassett@amadorgov.org
Cathleen Johnson	City of Plymouth, Public Works	cjohnson@cityofplymouth.org
Cathy Koos	Lockwood Fire Protection District	cmkoos0001@gmail.com
Chuck Beatty	Amador County Planning	CBeatty@amadorgov.org
Cindy Engel	Amador County Transportation Commission, GIS Coordinator	cindy@actc-amador.org
Dave Seawell	Harrahs	d.seawell@harrahs.com
Debbie Calcote	Amador Red Cross	debbie.calcote@redcross.org
Debbie Mackey	City of Jackson, City Manager	dmackey@ci.jackson.ca.us
Derek selman	Amador County Public Works	dselman@amadorgov.org
Diana Evensen	Amador County Public Health	devensen@amadorgov.org
Elsy Votino	Cal OES	Elsy.Votino@caloes.ca.gov
Eric Mayberry	Amador County Agricultural Commissioner	emayberry@amadorgov.org
Eric Mikkelson	Amador County Animal Control	emikkelson@amadorgov.org
Gene Mancebo	Amador Water Agency, General Manager	gmancebo@amadorwater.gov
Holly Sandman	Amador County Public Health	HSandman@amadorgov.org
James Foley	Amador County Health and Human Services	JFoley@amadorgov.org
Jan Hewitt	Lockwood Fire Protection District	san_fran@pacbell.net
Jason Navarre	Amador County Sheriff OES, Sergeant	jnavarre@amadorgov.org
Jeanine Foster	Foster Morrison, Project Manager	jeanine.foster@fostermorrison.com
Jeff Brown	Amador County Supervisor	JeffBrown@amadorgov.org
Jeff White	Amador County IT	jwhite@amadorgov.org
Jenna Peckham	Cal Fire	jenna.peckham@fire.ca.gov
Jim O'Connell	City of Sutter Creek, Police Department	joconnell@cityofsuttercreek.org

Name	Agency/Title	Email
John Gedner	Amador County Transportation Commission	john@actc-amador.org
John Silva	Amador County Sheriff OES, Sergeant	jsilva@amadorgov.org
Jon Hanken	City of Ione, City Manager	jhanken@ione-ca.com
Ken Mackey	City of Ione Fire	kmackey@ione-ca.com
Kenneth Hansen	Harrahs	k.hansen@harrahs.com
Kevin Darrow	City of Sutter Creek, City Clerk	kdarrow@cityofsuttercreek.org
Linda Nafus	Amador Water Agency	lnafus@amadorwater.org
Lori Arnberg	Pine Grove Community Services District, General Manager	pgcomser@volcano.net
Lucas Carthew	Amador Water Agency	lcarthew@amadorwater.org
Lurali Moore	ARC of Amador & Calaveras	lmoore@arcofamador.org
Maggie Amarant	Amador Transit	maggie@amadortransit.com
Mark Hopkins	Amador County Public Works	mhopkins@amadorgov.org
Matt Hill	Cal Fire Amador-Eldorado Unit	Matt.Hill@fire.ca.gov
Michael Hooper	City of Jackson, Inspector/Code Enforcement	mhooper@ci.jackson.ca.us
Mike Israel	Amador County Environmental Health	misrael@amadorgov.org
Nell Raymond	River Pines Public Utility District	nell@nellrock.com
Pat Minyard	Amador County Fire Safe Council	pminyard@volcano.net
Patrick Henry	River Pines Public Utility District	psrisingstarpyrs@yahoo.com
R. Hopson	US Forest Service	rhopson@fs.fed.us
Rayda Ward	Sutter Health	wardrl@sutterhealth.org
Rick Ferriera	Amador Water Agency, Operations Manager	rferriera@amadorwater.org
Rita Kerr	Amador County Public Health/Health Officer	hofficer@amadorgov.org
Rob Withrow	Cal Fire	robert.withrow@fire.ca.gov
Rocky Raymond	River Pines Public Utility District	rraymond@riverpinespud.org
Roseanne Chamberlain	LAFCO Agency	amador.lafco@gmail.com
Ryan Hamre	Amador Fire	rhamre@amadorgov.org
Sami Nell	Cal DWR Office of Floodplain Management	Sami.Nall@water.ca.gov
Sandy Swafford	Sutter Health	browl4@sutterhealth.org
Scott Meyer	Amador County Environmental Health	smeyer@amadorgov.org
Sharon Nickerson	Amador Transit	sharon@amadortransit.com

Name	Agency/Title	Email
Stacy Rhoades	City of Ione, Council Member	srhoades@ione-ca.com
Steve Fredrick	Jackson Valley Irrigation District, General Manager	steve@jvid.org
Susan Bragstadt	City of Amador City, Vice Mayor	amadorolive@twinwolf.net
Susan Peters	City of Sutter Creek, Planner	speters@cityofsuttercreek.org
Todd Barr	Amador County Chief Building Official	tbarr@amadorgov.org
Walt White	Amador Fire Protection District	wwwhite@amadorgov.org
Yvonne Kimball	City of Jackson, City Manager	ykimball@ci.jackson.ca.us

A.2 Website for Hazard Mitigation Plan



A.3 Kickoff Meeting

A.3.1. Kickoff Meeting Invite to Stakeholders

From: John Silva <jsilva@amadorgov.org>
Sent: Wednesday, September 11, 2019 2:36 PM
To: darla.cofer@water.ca.gov; Carrie Bowen <district10publicaffairs@dot.ca.gov>; flood@water.ca.gov; LAFCO Agency <LAFCO@amadorgov.org>; pgcomser@volcano.net; rppud@rppud.org; acra@amadorgov.org; Amador City <cityclerk@amadorcity.net>; Amanda Watson <amadorfiresafe@gmail.com>; Amanda Watson <amanda@amadorrcd.org>; Amy Gedney <agedney@cityofsuttercreek.org>; Antonio Moreno <b20moreno@yahoo.com>; April Wooden <awooden@denovoplanning.com>; Brian Oneto <boneto@amadorgov.org>; CA DWR Div of Dam Safety <damsafety@water.ca.gov>; Chris C Bennett <ccb0@pge.com>; Chris Mynderup <cmynderup@ci.jackson.ca.us>; Chuck Beatty <CBeatty@amadorgov.org>; Cindy Engel <cindy@actc-amador.org>; Colleen McCarthy <cmccarthy@jacksoncasino.com>; Connie Gonsalves <constance.gonsalves@goaaa.com>; David Passy <david.passey@fema.dhs.gov>; Debbie Mackey <dmackey@ci.jackson.ca.us>; Diana Evensen <devensen@amadorgov.org>; Dr. Rita Kerr <hofficer@co.amador.ca.us>; Elizabeth Meyer-Shields <BLM_CA_Web_ML@blm.gov>; Elsy Votino <elsy.votino@caloes.ca.gov>; Eric Mayberry <emayberry@amadorgov.org>; Frank Axe <faxe@amadorgov.org>; Gene Mancebo <gmancebo@amadorwater.org>; Holly Sandman <HSandman@amadorgov.org>; James Beggs <jbeggs@cityofplymouth.org>; James Foley <JFoley@amadorgov.org>; James Handura <spk-pao@usace.army.mil>; Jared Critchfield <jcritchfield@acusd.org>; Jeanine Foster <jeanine.foster@fostermorrison.com>; Jeff Brown <jeffbrown@amadorgov.org>; Jeff White <jwhite@amadorgov.org>; Jered Reinking <jreinking@amadorgov.org>; Jim O'Connell <joconnell@cityofsuttercreek.org>; Jim Rooney <jrooney@amadorgov.org>; Jon Hanken <jhanken@ione-ca.com>; Kelly Reason <kreason@amadorgov.org>; Ken Mackey <chief6200@sbcglobal.net>; Kevin Thomas <kevin.thomas@wildlife.ca.gov>; Kim Vinceguerra <kvinciguerra@arcofamador.org>; Kyle Hansen <k.hansen@harrahs.com>; LaSandra Brown <BrowL4@sutterhealth.org>; Leonard Burns <lburns@ci.plymouth.ca.us>; Lisa Hopkins <lhopkins@amadorgov.org>; Martin Ryan <martinryan@amadorgov.org>; Michelle Mead <michelle.mead@noaa.gov>; Mike Israel <misrael@amadorgov.org>; Nettie Fox <nettie@amadorseniorcenter.org>; Pat Minyard <pminyard@volcano.net>; Patrick Crew <pcrew@amadorgov.org>; Randy Makemson <chief6100@live.com>; RED CROSS - Debbie Calcote <Debbie.Calcote@redcross.org>; Rex Osborn <rexo@cityofplymouth.org>; Richard Forster <rforster@amadorgov.org>; Rick Ansel <ransel@kmpud.com>; Rick Ferriera <rferriera@amadorwater.org>; Rick Hopson <rhopson@fs.fed.us>; Rob Withrow <robert.withrow@fire.ca.gov>; Robin Peters <rpeters@cityofsuttercreek.org>; Rudy Baltazar <rudy.baltazar@fire.ca.gov>; Steve Cannon <arcd@amadorrcd.org>; Steven Fredrick <steve@jvid.org>; Tim Cox <tcox@ebmud.com>; Todd Barr <tbarr@amadorgov.org>; Todd Waklee <twaklee@ione-ca.com>; Victoria Lamar-Haas <victoria.lamar-haas@caloes.ca.gov>; Walt White <wwwhite@amadorgov.org>; Yvonne Kimball <ykimball@ci.jackson.ca.us>
Cc: Gary Redman <gredman@amadorgov.org>; Jason Navarre <jnavarre@amadorgov.org>
Subject: Local Hazard Mitigation Plan Update Invitation

Amador County LHMP Update: Kickoff meeting email invite

Greetings:

Amador County is kicking off efforts to develop a **Local Hazard Mitigation Plan (LHMP) Update** to the current 2014 LHMP. The County is partnering with the five

incorporated communities and several special Districts for this Update. The purpose of the LHMP process is to help reduce the impacts of natural hazards to the citizens, property, and critical infrastructure in the County. The Disaster Mitigation Act of 2000 (DMA 2000) requires that local governments have a FEMA approved LHMP in place in order to be eligible for certain pre & post-disaster mitigation funding to protect communities from future disaster-related losses. You are receiving this notice because we would like to invite you to take part in this plan update as a member of the Hazard Mitigation Planning Committee (HMPC).

County and agency participation and coordination is a requirement of an approved plan, as is the inclusion of any hazard data, information, and mitigation projects your department or agency may want to see included in this Update. Thus, your input will be critical to the success of this project.

Participation includes:

- Attending and participating in the HMPC meetings (5 anticipated over the next 6-8 months)
- Providing available data/information requested of the HMPC
- Reviewing and providing comments on the plan drafts

Amador County Sheriff's Office of Emergency Services is taking the lead on coordinating this project for the County. A project kickoff meeting will be held at the following location and time:

September 25, 2019, 1 pm-4:00 pm, Health & Human Services

10877 Conductor Blvd (Conference Rooms B & C), Sutter Creek, CA

The kickoff meeting will explain the process and how you can be involved. A public stakeholder meeting will also be held the evening of the same day of the kickoff meeting. Details on the public meetings will be forthcoming.

Please RSVP and plan on attending or delegating attendance to this important meeting.

--

John Silva - Sergeant
Office of Emergency Services Coordinator
Amador County Sheriff's Office
700 Court Street
Jackson, CA 95642
209-223-6384 (Office)

A.3.2. Kickoff Meeting Agenda

Amador County
Local Hazard Mitigation Plan (LHMP) Update
HMPC (Kickoff) Meeting #1
September 25, 2019

1. Introductions
2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements
3. The Role of the Hazard Mitigation Planning Committee (HMPC)
4. Planning for Public Input
5. Coordinating with other Agencies
6. Hazard Identification
7. Schedule
8. Data Needs
9. Questions and Answers

SIGN-IN SHEET
Amador County
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Kickoff Meeting #1
September 25, 2019

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Kenneth Hansen	Khansen@Harrahs.com	209-400-1646	Harrah's NorCal
Mark Hopkins / Public Works	mhopkins@amadorgov.org	209-223-6248	Public Work
Carmel Mitchell	carmel.mitchell@fire.ca.gov	530-410-5142	CALFIRE
Amy Gedney City Mgr.	agedney@cityofsuttercreek.org		COSC
Kayda Ward SAH ED Director	Wardr1@Sutterhealth.org	209-257-5842	SAH, ED
Holly Sandman	hsandman@amadorgov.org	223-6670	PH
Sharon Nickerson	sharon@amadortransit.com	418-5079	Amador Transit
Lurali Moore / Director of Ops - #	lmoore@arcofamador.org	209 267 5978	The Arc of Amador & Calaveras
Eric Mikkelsen / ACO II	EMIKKELSEN@AMADORGOV.ORG	209-223-6548	Animal Control
Scott Meyer REHS	SMeyer@amadorgov.org	223-6539	Environmental Health
Roseanne Chamberlain	amador.lafco@gmail.com	209 418-9377	LAFCO
Jeff White	JWhite@amadorgov.org	209-223-6555	County IT
Cathy Koos / Lockwood FPD	Cmkoos0881@gmail.com	256-7975	Lockwood FPD

SIGN-IN SHEET
Amador County
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Kickoff Meeting #1
September 25, 2019

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
DAVE SEALWELL/HARRAH'S	DSEALWELL@HARRAHS.COM	209-790-4443	HARRAH'S
Debbie Calcote DPM / ~~American Red Cross~~	debbie.calcote@redcross.org	209-346-1854	ARC
ROCKY RAYMOND	rraymond@riverpinespud.org	408-705-7227	RIVERPINES P.U.D
Nell Raymond	nell@nellrock.com	408-660-6144	River Pines P.U.D.
Cathleen Johnson Deputy Director of Public Works	cjohnson@cityofplymouth.org	209-257-9414	City of Plymouth
Cindy Engel, GIS Coordinator	cindy@actc-amador.org	209-267-2282	ACTC
JOHN GEDNEY, ACTC	JOHN@ACTC-AMADOR.ORG	209 267-2282	ACTC
GENE MANCEBO	gmancebo@amadorwater.org	209 257-5245	AWA
Carrie Bassett	Cbassett@amadorgov.org	223-6832	Amador Ag
LORI ARNBERG	PGCOMSER@VOLCANO.NET	296-7188	PINE GROVE CSD
Steven Fredrick	steve@jvid.org	274-2037	JVID
Jeff Brown	jeffbrown@amadorgov.org	419-9035	Supervisor Amador
Rick Ferreira	rferreira@amadorgov.org	5304174760	OPS MANAGER

SIGN-IN SHEET

Amador County

LOCAL HAZARD MITIGATION PLANNING PROJECT

HMPC Kickoff Meeting #1

September 25, 2019

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Diana Evensen	devensen@amadorgov.org	223-6407	PH
Rita Kerr	hofficer@amadorgov.org	223-6407	PH/HO
Pat Minyard	pminyard@volcano.net	916-671-0153	AFSC
Maggie Amarant	maggie@amadortransit.com	(209) 267-5079	Amador Transit
JIM FOLEY/HHS	jfoley@amadorgov.org	209 223 6625	HHS
Jim O'Connell	jocunnell@cityofsuttercreek.org	267 5046	SCPD
TODD BARR CHIEF BLDG OFFICIAL	tbarr@amadorgov.org		
WALT WHITE	wwhite@amadorfgov		AFPD
[illegible]			
Candi Bingham	RPPUD@RPPUD.ORG	209-245-6723	River Pines PUD
Mike Israel	MISRAEL@amadorGOV.ORG	223-6439	ENV. Health Dept
J. Navarre/Sergeant	jnavarre@amadorgov.org	209-223-6500	ACSO
J. SILVA/SERGEANT	jsilva@amadorgov.org	209-223-6384	ACSO

A.4 Risk Assessment Meeting

A.4.1. Email Invite to Risk Assessment Meetings

From: Jason Navarre <jnavarre@amadorgov.org>
Sent: Friday, December 13, 2019 10:18 AM
To: Amador County Recreation Agency <acra@amadorgov.org>; Scott Meyer <smeyer@amadorgov.org>; maggie@amadortransit.com; ransel@kpmud.com; pgcomser@volcano.net; Frank Axe <faxe@amadorgov.org>; rudy.baltazar@fire.ca.gov; Todd Barr <tbarr@amadorgov.org>; Carrie Bassett <cbassett@amadorgov.org>; Chuck Beatty <CBeatty@amadorgov.org>; jbeggs@cityofplymouth.org; ccb0@pge.com; rppud@rppud.org; Jeff Brown <JeffBrown@amadorgov.org>; Swafford, LaSandra (Sandy) <browl4@sutterhealth.org>; lburns@ci.plymouth.ca.us; damsafety@water.ca.gov; flood@water.ca.gov; darla.cofer@water.ca.gov; district10publicaffairs@dot.ca.gov; debbie.calcote@redcross.org; arcd@amadorrcd.org; amador.lafco@gmail.com; Amador City <cityclerk@amadorcity.net>; Cox, Timothy <tcox@ebmud.com>; Pat Crew <pcrew@amadorgov.org>; jcritchfield@acusd.org; Cindy Engel <cindy@actc-amador.org>; Diana Evensen <devensen@amadorgov.org>; rferriera@amadorwater.org; James Foley <JFoley@amadorgov.org>; Richard Forster <rforster@amadorgov.org>; Jeanine Foster <jeanine.foster@fostermorrison.com>; nettie@amadorseniorcenter.org; steve@jvid.org; Amy Gedney <agedney@cityofsuttercreek.org>; john@actc-amador.org; constance.gonsalves@goaaa.com; spk-pao@usace.army.mil; Jon Hanken <jhanken@ione-ca.com>; Kenneth Hansen <k.hansen@harrahs.com>; Mark Hopkins <mhopkins@amadorgov.org>; rhopson@fs.fed.us; Mike Israel <misrael@amadorgov.org>; cjohnson@cityofplymouth.org; Health Officer <hofficer@co.amador.ca.us>; Yvonne Kimball <ykimball@ci.jackson.ca.us>; LAFCO Agency <LAFCO@amadorgov.org>; victoria.lamar-haas@caloes.ca.gov; dmackey@ci.jackson.ca.us; Ken Mackey <chief6200@sbcglobal.net>; chief6100@live.com; gmancebo@amadorwater.org; Eric Mayberry <emayberry@amadorgov.org>; Colleen McCarthy <cmccarthy@jacksoncasino.com>; michelle.mead@noaa.gov; blm_ca_web_ml@blm.gov; Eric Mikkelson <emikkelson@amadorgov.org>; pminyard@volcano.net; carmel.mitchell@fire.ca.gov; lmoore@arcofamador.org; b20moreno@yahoo.com; cmynderup@ci.jackson.ca.us; sharon@amadortransit.com; Jim O'Connell <joconnell@cityofsuttercreek.org>; Brian Oneto <boneto@amadorgov.org>; Rex Osborn <rexo@cityofplymouth.org>; david.passey@fema.dhs.gov; rpeters@cityofsuttercreek.org; nell@nellrock.com; rraymond@riverpinespud.org; Kelly Reason <kreason@amadorgov.org>; Jered Reinking <JReinking@amadorgov.org>; srhoades@ione-ca.com; Jim Rooney <jrooney@amadorgov.org>; Martin Ryan <martinryan@amadorgov.org>; Holly Sandman <HSandman@amadorgov.org>; d.seawell@harrahs.com; kevin.thomas@wildlife.ca.gov; kvinciguerra@arcofamador.org; Votino, Elsy@CalOES <Elsy.Votino@caloes.ca.gov>; twaklee@ione-ca.com; wardrl@sutterhealth.org; amadorfiresafe@gmail.com; amanda@amadorrcd.org; Jeff White <jwhite@amadorgov.org>; Walt White <wwhite@amadorgov.org>; Rob Withrow <robert.withrow@fire.ca.gov>; awooden@denovoplanning.com
Subject: Re: Invitation - LHMP Milestones Meeting

You are invited to the second planning team meeting – The Risk Assessment Meeting - for the development of the Amador County Local Hazard Mitigation Plan (LHMP) Update. Earlier this year, Amador County initiated its hazard mitigation planning effort, with support of Foster Morrison Consulting. Many of you attended the planning team kickoff meeting in September of this year. Over the past few months, the Foster Morrison team has been working with the County and participating jurisdictions to collect data to develop Chapter 4 of our LHMP, the Risk Assessment Chapter.

This upcoming meeting will be held on Tuesday, January 28. During this meeting, we will be reviewing the risk assessment data developed to date and will be looking for your feedback in refining and adding to this in-process Risk Assessment Chapter.

The meeting will be held as follows:

Tuesday, January 28

Meeting Location, Conference Rooms B and C

9:00 am to 12:00 pm

Please RSVP to me and plan on attending or delegating attendance to this Risk Assessment Meeting for the LHMP Update. Your ongoing participation and input is critical to the success of this project.

--

Sergeant Navarre
Amador County Sheriff's Office
209-223-6330

A.4.2. Risk Assessment Meeting Agenda

Amador County
Local Hazard Mitigation Plan (LHMP) Update
HMPC Meeting #2 – Risk Assessment Part 1
January 28, 2020

1. Introductions
2. Status of the DMA Planning Process
3. Review of Risk Assessment
4. Review of Data Needs
5. Next Steps

SIGN-IN SHEET
Amador County
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC #2 – Risk Assessment
January 28, 2020

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Stacy Rhoades IONE city council	stacy@rhoadescompany.com	209-304-4217	City of Ione
Jon G. Hanken	jhanken@ione-ca.com	209 274-2412	City of Ione
Steven Fredrick	steve@jvid.org	209-274-2037	JVID
Lori Ahlberg/GM	pgcomserc@volcano.net	209-296-7188	Pine Grove CSD
Rick Ferriera OPS MANAGER	rferriera@amadorwater.org	5304174700	AWA
J. Navarre Sergeant/OES Coordinator	jnavarre@amadorgov.org	209-223-6384	
Cindy Engel/GIS Coordinator	cindy@actc-amador.org	209-267-2282	Amador Co. Transportation Comm.
Sharon Nickerson/ OP	sharon@amadortransit.com	2092675089	Amador Transit
Andrea Petretti	apetretti@amadorwater.org	209-257-5230	Amador Water Agency
Lurali Moore	lmoore@arcofamador.org	267-5978	The Arc
Debbie Mackey	dmackey@ci.jackson.ca.us	2092564494	City of Jackson
Jeff White Co. IT Director	Jwhite@amadorgov.org	209-223-6553	County Technology
Kathleen Johnson Deputy Director of Public Works	cjohnson@cityofplymouth.org	209 245 6941	City of Plymouth

SIGN-IN SHEET
Amador County
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC #2 – Risk Assessment
January 28, 2020

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Rita Kerr	hofficer@amadorgov.org	223-6407	Public Health
Elsy Votaw	Elsy.Votaw@Caloes.ca.gov	916 8692786	Cal OES
SANDY SWAFFORD	BROWL4@SUTTERHEALTH.ORG	209-257-5826	SUTTER HEALTH

A.5 Mitigation Strategy Meetings

A.5.1. Email Invites to Mitigation Strategy Meetings

From: **Jason Navarre** <jnavarre@amadorgov.org>
Date: Tue, Feb 4, 2020 at 3:52 PM
Subject: LHMP - Mitigation Strategy Meeting
To: Amador County Recreation Agency <acra@amadorgov.org>, Scott Meyer <smeyer@amadorgov.org>, Maggie <maggie@amadortransit.com>, <ransel@kpmud.com>, <pgcomser@volcano.net>, Frank Axe <faxe@amadorgov.org>, <rudy.baltazar@fire.ca.gov>, Todd Barr <tbarr@amadorgov.org>, Carrie Bassett <cbassett@amadorgov.org>, Chuck Beatty <CBeatty@amadorgov.org>, <jbeggs@cityofplymouth.org>, <ccb0@pge.com>, <rppud@rppud.org>, Jeff Brown <JeffBrown@amadorgov.org>, Swafford, LaSandra (Sandy) <browl4@sutterhealth.org>, <lburns@ci.plymouth.ca.us>, <damsafety@water.ca.gov>, <flood@water.ca.gov>, <darla.cofer@water.ca.gov>, <district10publicaffairs@dot.ca.gov>, Calcote, Debbie <debbie.calcote@redcross.org>, <arcd@amadorrcd.org>, <amador.lafco@gmail.com>, Amador City <cityclerk@amadorcity.net>, Cox, Timothy <tcox@ebmud.com>, Pat Crew <pcrew@amadorgov.org>, <jcritchfield@acusd.org>, Cindy Engel <cindy@actc-amador.org>, Diana Evensen <devensen@amadorgov.org>, <rferriera@amadorwater.org>, James Foley <JFoley@amadorgov.org>, Richard Forster <rforster@amadorgov.org>, Jeanine Foster <jeanine.foster@fostermorrison.com>, <nettie@amadorseniorcenter.org>, <steve@jvid.org>, Amy Gedney <agedney@cityofsuttercreek.org>, <john@actc-amador.org>, <constance.gonsalves@goaaa.com>, <spk-pao@usace.army.mil>, Jon Hanken <jhanken@ione-ca.com>, Kenneth Hansen <k.hansen@harrahs.com>, Mark Hopkins <mhopkins@amadorgov.org>, <rhopson@fs.fed.us>, Mike Israel <misrael@amadorgov.org>, <cjohnson@cityofplymouth.org>, Health Officer <hofficer@co.amador.ca.us>, Yvonne Kimball <ykimball@ci.jackson.ca.us>, LAFCO Agency <LAFCO@amadorgov.org>, <victoria.lamar-haas@caloes.ca.gov>, <dmackey@ci.jackson.ca.us>, Ken Mackey <chief6200@sbcglobal.net>, <chief6100@live.com>, <gmancebo@amadorwater.org>, Eric Mayberry <emayberry@amadorgov.org>, Colleen McCarthy <cmccarthy@jacksoncasino.com>, Michelle Mead - NOAA Federal <michelle.mead@noaa.gov>, <blm_ca_web_ml@blm.gov>, Eric Mikkelson <emikkelson@amadorgov.org>, Pat Minyard <pminyard@volcano.net>, <carmel.mitchell@fire.ca.gov>, <lmoore@arcofamador.org>, <b20moreno@yahoo.com>, <cmynderup@ci.jackson.ca.us>, <sharon@amadortransit.com>, Jim O'Connell <joconnell@cityofsuttercreek.org>, Brian Oneto <boneto@amadorgov.org>, Rex Osborn <rexo@cityofplymouth.org>, <david.passey@fema.dhs.gov>, <rpeters@cityofsuttercreek.org>, <nell@nellrock.com>, <rraymond@riverpinespud.org>, Kelly Reason <kreason@amadorgov.org>, Jered Reinking <JReinking@amadorgov.org>, <srhoades@ione-ca.com>, Jim Rooney <jrooney@amadorgov.org>, Martin Ryan <martinryan@amadorgov.org>, Holly Sandman <HSandman@amadorgov.org>, <d.seawell@harrahs.com>, <kevin.thomas@wildlife.ca.gov>, <kvinciguerra@arcofamador.org>, Votino, Elsy@CalOES <Elsy.Votino@caloes.ca.gov>, <twaklee@ione-ca.com>, <wardrl@sutterhealth.org>, <amadorfiresafe@gmail.com>, <amanda@amadorrcd.org>, Jeff White <jwhite@amadorgov.org>, Walt White <wwwhite@amadorgov.org>, Rob Withrow <robert.withrow@fire.ca.gov>, <awooden@denovoplanning.com>, <amadorolive@twinwolf.net>

Hazard Mitigation Planning Team:

You are invited to the 3rd and 4th planning team meetings for the development of Amador County's 2020 LHMP Update. In September of 2019, Amador County kicked-off its hazard mitigation planning effort. A 2nd risk assessment meeting was held last week on January 28th.

These two upcoming meetings will be held on February 19 and 20 (Wednesday, Thursday), and will begin the most important phase of our LHMP planning process – the Mitigation Strategy. During the first meeting, we will be briefly revisiting the risk assessment data developed to date and will again be looking for your feedback in refining and adding to this in-process Risk Assessment Chapter. We will also be establishing plan goals and objectives. During the second meeting, the planning team will be working to identify and evaluate potential mitigation actions for reducing the community's risk and vulnerability to identified hazards and disasters. A copy of the Draft Risk Assessment Chapter will be provided in advance of the upcoming Mitigation Strategy Meetings.

The meetings will be held as follows:

Wednesday, February 19 at: (CAC) 810 Court St, Jackson, Flr 2 - Rm C 1:00 pm till 4:00 pm

Thursday, February 20 at: (CAC) 810 Court St, Jackson, Flr 2 - Rm C, 9:00 am till 12:00pm

Please RSVP and plan on attending or delegating attendance to these important meetings. **Everyone** with mitigation project ideas needs to attend. County, city and agency participation and coordination is a requirement of an approved plan, as is the inclusion of any hazard data, information, and mitigation projects your department or agency may want to see included in the Plan. **If you are a participating jurisdiction, you must attend these meetings!** We suggest that at a minimum the County and all Cities attend with their public works representatives and others with all their mitigation ideas. Your continued participation and input is critical to the success of this project and your FEMA approval as a participating jurisdiction.

Thank You!

--

Sergeant Navarre
Office of Emergency Services Coordinator
Amador County Sheriff's Office
209-223-6384

A.5.2. Mitigation Strategy Meeting Agenda

Amador County
Local Hazard Mitigation Plan (LHMP) Update
Mitigation Strategy Meetings
February 19 and 20, 2019

HMPC Meeting #2:

1. Introductions
2. Status of the DMA Planning Process
3. Risk Assessment Update
4. Outstanding Items
5. Develop Updated Plan Goals and Objectives
6. Identify and Review Mitigation Alternatives/Projects

HMPC Meeting #3:

7. Introductions
8. Identify and discuss Mitigation Alternatives/Projects
9. Review Mitigation Selection Criteria
10. Prioritize Mitigation Projects
11. Mitigation Action Worksheet
12. Review of Schedule/Next Steps

SIGN-IN SHEET
Amador County
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Mitigation Strategy Meeting #3
February 19, 2020

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
		916-671-0153	
Pat Miniyard	pminyard@volcano.net		AFSC
Cindy Engel	cindy@actc-amador.org		ACTC
Michael Hooper Inspector	mhooper@ci.jackson.ca.us	209-304-7038	COJ
Nell Raymond	nell@nellrock.com	408-660-6144	RPPUD
Candi Bingham	RDFUD@Riverpinespud.org		RPPUD
Aaron Watkins	awatkins@amadorgov.org	(209) 256-3552	AFPD
Jeff White	Jwhite@amadorgov.org	209-223-6555	County Technology
Kathleen Johnson Dep Dir Public Works	cjohnson@cityofplymouth.org	209-245-6941	City of Plymouth
Jon Heath	San_fran@pacbell.net	209 2961267	Lockwood FPD
WALT WHITE	WWWhite@amadorgov.org	209-304-9575	AFPD
Steven Fredrick	Steve@jvid.org	209-274-2037	JVID
Sharon Mckerson	sharon@amadorTransit.com		
Ken AMackey	KMackey@Ione-ca.com	(209)256-4498	Ione Fire

SIGN-IN SHEET
Amador County
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Mitigation Strategy Meeting #3
February 19, 2020

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Cathy M. Koos	cmkoos0001@gmail.com	209-257-7975	Lockwood FPD
Jason Navarre	jnavarre@amadorgov.org	209-223-6384	Amador County S.O.
Lori Ahlberg	pgcomserc@volcano.net	209-296-7188	Pine Grove CSD
Susan Bragstad	amadorolivi@frontiernet.net	209-304-3041	Amador City
Chuck Beatty	cbeatty@amadorgov.org	209 223 6380	Amador Co Planning
Mark Hopkins	mhopkins@amadorgov.org	209-223-6298	Amador Co PW
Holly Sandman	hsandman@amadorgov.org	223-6407	PH
Diana Evenson	devenson@amadorgov.org	223-6407	ACPH
Lucas Carthew	lcarthew@amadorwater.org	257-5207	AWA
Rocky Raymond	rraymond@riverpinespud.org	209-295-7227	RPPUD
Jenna Peckham	Jenna.Peckham@fire.ca.gov	2092675215	CALFIRE
Stacy Rhoades	stacy@rhoadescompany.com	304-4217	City Zone
Jim O'Connell	joconnell@cityofsuttercreek.org		Sutter Creek

SIGN-IN SHEET
Amador County
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Mitigation Strategy Meeting #4
February 20, 2020

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Jon Hanken	jhanken@ione-ca.com	209 274-2412	City of Ione
Cathleen Johnson	cjohnson@cityofplymouth.org	209-257-9414	City of Plymouth
Susan Bragstad	amadorolivia@twinwolf.net	209-304-3041	Amador City
Sharon Nickerson	sharon@amadortransit.com	209-267-5089	Amador Transit.
Tat Dwyer	[illegible]	209-295-9626	AFSC
LUCAS CARTHEW	LCARTHEW@AMADORWATER.ORG	257-5207	AWA
Darek Selman	dselman@Amadorgov.org	223-6279	Amador County Public Works
Michael Hooper	mhooper@ci.jackson.ca.us	209-304-7038	COJ, Inspector, Code Enf.
ROCKY RAYMOND	rraymond@riverpinespud.org	408-705-7227	RIVERPINES P.U.D
PATRICK HENRY	PSRISINGSTARPYRS@yahoo.com	209.768.2061	River Pines P.U.D.
Jeff White	Jwhite@amadorgov.org	209-223-6555	County IT
Jan Hewitt	San_fran@pacbell.net	209 2961267	Lockwood FPD
Cindy Engel	cindy@actc-amador.org	209-267-2282	ACTC

SIGN-IN SHEET
Amador County
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Mitigation Strategy Meeting #4
February 20, 2020

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Lori Ahlberg, GM	PGCOMSERC@volcano.net	209-296-7188	Pine Grove CSD
Stacy Rhoades	Stacy@Rhoadescompany.com	304-4277	Ione city
Steven Fredrick	steve@jvid.org	(209)274-2037	JVID
Ken Mackey	KMackey@Ione-CA.com	(209)256-4498	Ione Fire
AMY GODNEY	agodney@cityofsuttercreek.org	209-267-5647	City of Sutter Creek
Jason Navarre	jnavarre@amadorgov.org	209-223-6384	A.C.S.D.
Rita Kerr	hofficer@amadorgov.org	209-223-6407	Public Health
JENNA PECKHAM	JENNA.PECKHAM@FIRE.CA.GOV	209 267 5215	CAL FIRE
Chuck Beatty	cbeatty@amadorgov.org	209-223-6380	Amador Co. Planning
RYAN HAMRE	RHAMRE@AMADORGOV.ORG	209-223-7694	AMADOR FIRE
WALT WHITE	WWhite@amadorgov.org	209 304-9575	AMADOR FIRE

A.6 Final Team Meeting

A.6.1. Final Team Meeting Invite

From: Jason Navarre <jnavarre@amadorgov.org>
Sent: Thursday, April 23, 2020 3:35 PM
To: Amador County Recreation Agency <acra@amadorgov.org>; Scott Meyer <smeyer@amadorgov.org>; Maggie <maggie@amadortransit.com>; pgcomser@volcano.net; Frank Axe <faxe@amadorgov.org>; rudy.baltazar@fire.ca.gov; Todd Barr <tbarr@amadorgov.org>; Carrie Bassett <cbassett@amadorgov.org>; Chuck Beatty <CBeatty@amadorgov.org>; jbeggs@cityofplymouth.org; ccb0@pge.com; rppud@rppud.org; Jeff Brown <JeffBrown@amadorgov.org>; damsafety@water.ca.gov; flood@water.ca.gov; district10publicaffairs@dot.ca.gov; amador.lafco@gmail.com; Amador City <cityclerk@amadorcity.net>; Pat Crew <pcrew@amadorgov.org>; Cindy Engel <cindy@actc-amador.org>; Diana Evensen <devensen@amadorgov.org>; rferriera@amadorwater.org; James Foley <JFoley@amadorgov.org>; Richard Forster <rforster@amadorgov.org>; nettie@amadorseniorcenter.org; steve@jvid.org; Amy Gedney <agedney@cityofsuttercreek.org>; john@actc-amador.org; constance.gonsalves@goaaa.com; spk-pao@usace.army.mil; Jon Hanken <jhanken@ione-ca.com>; Kenneth Hansen <k.hansen@harrahs.com>; Mark Hopkins <mhopkins@amadorgov.org>; rhopson@fs.fed.us; Mike Israel <misrael@amadorgov.org>; cjohnson@cityofplymouth.org; Health Officer <hofficer@co.amador.ca.us>; Yvonne Kimball <ykimball@ci.jackson.ca.us>; LAFCO Agency <LAFCO@amadorgov.org>; victoria.lamar-haas@caloes.ca.gov; dmackey@ci.jackson.ca.us; Ken Mackey <chief6200@sbcglobal.net>; chief6100@live.com; Eric Mayberry <emayberry@amadorgov.org>; Colleen McCarthy <cmccarthy@jacksoncasino.com>; Michelle Mead - NOAA Federal <michelle.mead@noaa.gov>; blm_ca_web_ml@blm.gov; Eric Mikkelson <emikkelson@amadorgov.org>; Pat Minyard <pminyard@volcano.net>; carmel.mitchell@fire.ca.gov; lmoore@arcofamador.org; b20moreno@yahoo.com; cmynderup@ci.jackson.ca.us; sharon@amadortransit.com; Jim O'Connell <joconnell@cityofsuttercreek.org>; Brian Oneto <boneto@amadorgov.org>; Rex Osborn <rexo@cityofplymouth.org>; david.passey@fema.dhs.gov; rpeters@cityofsuttercreek.org; nell@nellrock.com; rraymond@riverpinespud.org; Kelly Reason <kreason@amadorgov.org>; Jered Reinking <JReinking@amadorgov.org>; srhoades@ione-ca.com; Jim Rooney <jrooney@amadorgov.org>; Martin Ryan <martinryan@amadorgov.org>; Holly Sandman <HSandman@amadorgov.org>; d.seawell@harrahs.com; kevin.thomas@wildlife.ca.gov; kvinciguerra@arcofamador.org; twaklee@ione-ca.com; wardrl@sutterhealth.org; amadorfiresafe@gmail.com; amanda@amadorrcd.org; Jeff White <jwhite@amadorgov.org>; Walt White <wwhite@amadorgov.org>; Rob Withrow <robert.withrow@fire.ca.gov>; awooden@denovoplanning.com; amadorolive@twinwolf.net; cmkoos0001@gmail.com; Matt.Hill@fire.ca.gov; Swafford, LaSandra (Sandy) <browl4@sutterhealth.org>; Calcote, Debbie <debbie.calcote@redcross.org>; Cox, Timothy <tcox@ebmud.com>; Votino, Elsy@CalOES <Elsy.Votino@caloes.ca.gov>; Jeanine Foster <jeanine.foster@fostermorrison.com>
Subject: Amador County 2020 LHMP Update: Final Steps

Hello Everyone,

Please see below information on the final steps for our Amador County 2020 LHMP Update:

LHMP Public Review Draft. The LHMP Public Review Draft is up on the County website for public review and comment at: https://www.amadorgov.org/departments/office-of-emergency-services/local-hazard-mitigation-plan. Note, the public meeting on the Draft LHMP Update has been cancelled due to Covid-19 restrictions. A press release is being issued by the County to provide information on how the public can provide input on the draft Plan. Please help get the word out to the public in your area. All public comments will be due by the date of our final meeting, May 7, 2020.

Final HMPC Meeting. Our final planning team meeting is scheduled for Thursday, May 7 from 9:00-11:30am. This final meeting will be done via Zoom. A Zoom meeting invite will be sent out later. It is important that everyone attend this final meeting to address any public comments received and to finalize all input to the Plan.

Final LHMP Input. All final planning team input to the Draft LHMP needs to be provided **no later than Friday May 8, the day after our final meeting.** Please take this time to download and review the document from the County website or from the project Dropbox: https://www.dropbox.com/sh/sfpethm3my62ppc/AABJ5NjJ1DVR5XCanyIcIihRa?dl=0. You will link directly to the Public Review Draft folder. Here is what is currently in the folder:

--A complete copy of the LHMP Update

--The LHMP broken out into several PDFs: all Chapters, All Appendices, each Annex as a separate file

--Items to Complete for each of the participating jurisdictions

Also attached is a master items to complete document that will assist in locating the yellow highlighted areas in the documents where we still need your input. The green highlighted areas will be filled in by Foster Morrison. This information is critical to ensure our plan will be approved by Cal OES and FEMA.

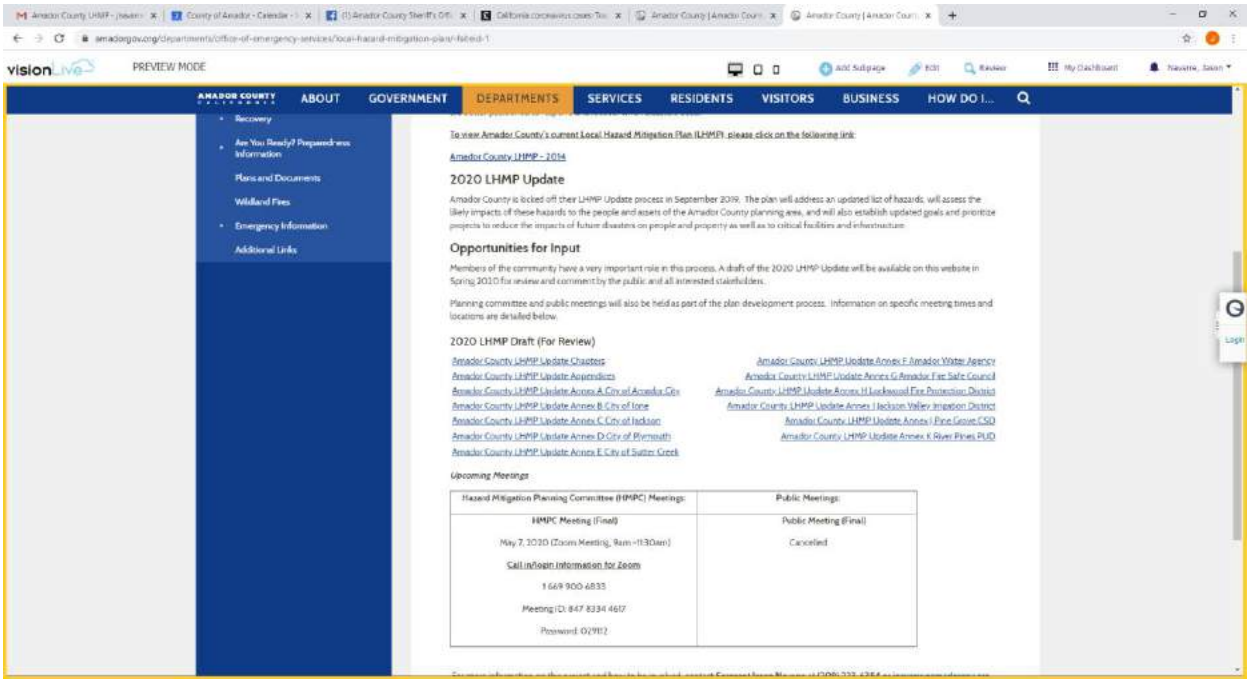
Actions, Actions, Actions. Note, almost all jurisdictions still need actions for their priority hazards! All jurisdictions need at least one action to address their priority hazards in order to receive FEMA approval of the LHMP. Only those projects included in this LHMP Update will be eligible for FEMA funding! Also, make sure you update the 2014 actions that appear in your Items to Complete document. You might actually find that you want to carry old actions forward – if so, please complete the Mitigation Action Worksheet attached for all projects to be included in this Update.

If you have any questions, please contact Jeanine.foster@fostermorrison.com or 303.717.7171.

Thank you for your continued engagement in the process.

--
Sergeant Navarre
Office of Emergency Services Coordinator
Amador County Sheriff's Office
209-223-6384

A.6.2. Final Meeting Invite on Amador County Website



A.6.3. Final Team Meeting Agenda

AGENDA
Amador County Local Hazard Mitigation Plan (LHMP) Update
Final Meeting
May 7, 2020

1. Introductions
2. Status of the LHMP Update Process
3. Addressing Public Comments
4. Summary of Changes in Amador County Planning Area Vulnerabilities/ Mitigation Priorities
5. Public Input: Data/Projects
6. Final Steps

A.6.4. Final Team Meeting Sign in Sheet

Attendance was kept for the final meeting. The meeting was held virtually using Zoom, so the sign in sheet below reflects the attendance of the meeting.

Name	Agency/Title	Email
Amanda Watson	Amador Resource Conservation District	amanda@amadorrcd.org
Amy Gedney	City of Sutter Creek, City Manager	agedney@cityofsuttercreek.org
Andrea Petretti	Amador Water Agency	apetretti@amadorwater.gov
Cathy Koos	Lockwood Fire Protection District	cmkoos0001@gmail.com
Elsy Votino	Cal OES	Elsy.Votino@caloes.ca.gov
Eric Mayberry	Amador County Agricultural Commissioner	emayberry@amadorgov.org
Jason Navarre	Amador County Sheriff OES, Sergeant	jnavarre@amadorgov.org
Jeanine Foster	Foster Morrison, Project Manager	jeanine.foster@fostermorrison.com
Jeff White	Amador County IT	jwhite@amadorgov.org
Jon Hanken	City of Ione, City Manager	jhanken@ione-ca.com
Kandi Thompson	Amador County Recreation Agency	acra@amadorgov.org
Kevin Darrow	City of Sutter Creek, City Clerk	kdarrow@cityofsuttercreek.org
Linda Nafus	Amador Water Agency	lnafus@amadorwater.org
Lori Arnberg	Pine Grove Community Services District, General Manager	pgcomser@volcano.net
Lurali Moore	ARC of Amador & Calaveras	lmoore@arcofamador.org
Mark Hopkins	Amador County Public Works	mhopkins@amadorgov.org
Matt Hill	Cal Fire Amador-Eldorado Unit	Matt.Hill@fire.ca.gov
Pat Minyard	Amador County Fire Safe Council	pminyard@volcano.net
Sharon Nickerson	Amador Transit	sharon@amadortransit.com
Steve Fredrick	Jackson Valley Irrigation District, General Manager	steve@jvid.org
Susan Bragstadt	City of Amador City, Vice Mayor	amadorolive@twinwolf.net
Walt White	Amador Fire Protection District	wwwhite@amadorgov.org

A.7 Public Involvement

A.7.1. Early Public Meeting Flyer

Martin A. Ryan, Sheriff-Coroner

AMADOR COUNTY SHERIFF'S OFFICE OF EMERGENCY SERVICES

MEDIA RELEASE

DATE: 09/19/19

TIME: 11:00 am

CONTACT: Sgt. John Silva

TELEPHONE: 209-223-6384

County of Amador
Local Hazard Mitigation Plan Update: Kickoff Meeting
Public Meeting #1

Get Involved!

HELP YOUR COMMUNITY BE HAZARD-READY!

Amador County, CA: Amador County is collaborating with the incorporated communities and several special districts to update their 2014 Local Hazard Mitigation Plan (LHMP). Floods, drought, wildfires, and severe weather are just a few of the hazards of concern to our local communities. While natural hazards cannot be prevented, an LHMP forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Communities with a FEMA-approved LHMP are eligible to apply for both pre- and post-disaster mitigation grant funding.

The people most aware of potential hazards are the people that live and work in the affected communities. In addition to plan participation by local, state and federal agencies, the community is seeking members of the public to participate in our LHMP Update process.

An initial public information meeting will be held as follows:

September 25, 2019
Amador County 2020 LHMP Update - Public Information Meeting
5:30 – 7:00 pm
Amador County Health & Human Services
Conference Rooms B & C
10877 Conductor Blvd, Sutter Creek

For more information, contact Sergeant John Silva at 209-223-6384 or jsilva@amadorgov.org.

To review the 2014 LHMP document, please go to:

https://www.amadorgov.org/departments/office-of-emergency-services/local-hazard-mitigation-plan.

700 COURT STREET • JACKSON, CA 95642 • (209) 223-6500 • FAX (209) 223-1609
ADMININSTRATION (209)223-6515 • EMERGENCY SERVICES (209)223-6384 • CIVIL (209)223-6544
CORONER (209)223-6754 • JAIL (209)223-6522

A.7.2. Early Public Meeting: Kickoff Meeting – Public Agenda

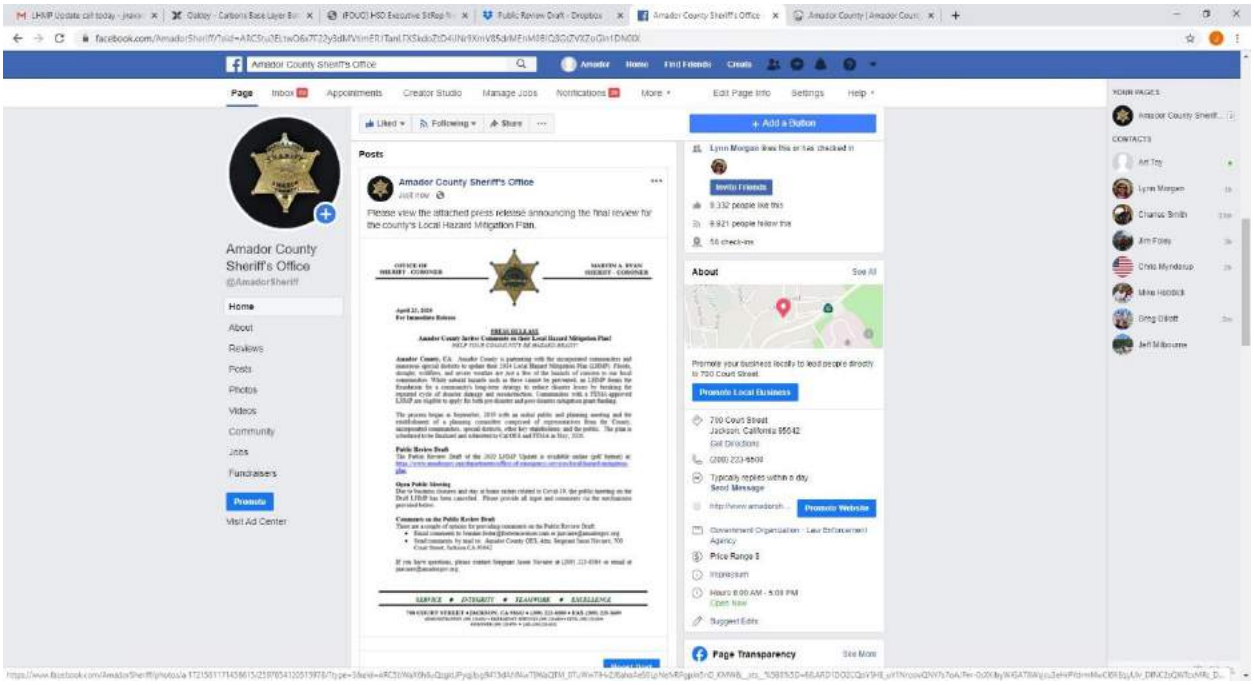
Amador County
Local Hazard Mitigation Plan (LHMP)
Public Meeting #1
September 25, 2019

1. Introductions
2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements
3. Hazard Identification and Profiles
4. Opportunities for Public Participation and Input
5. Schedule
6. Questions and Answers

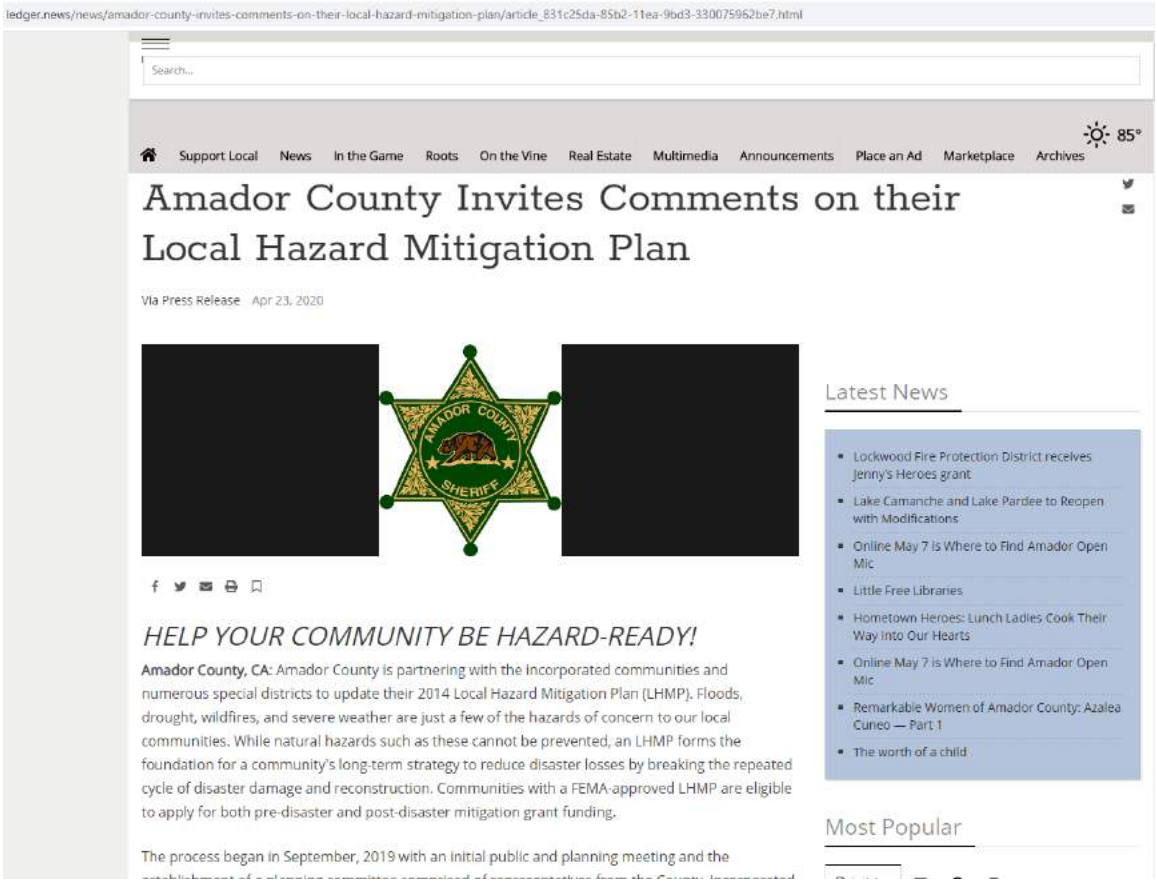
SIGN-IN SHEET
Amador County
LOCAL HAZARD MITIGATION PLANNING PROJECT
Public Meeting #1
September 25, 2019

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Larry W. Rhoades		209-274-4195	
Bette Rhoades	betterhoades@yahoo.com	209 607 4465	
David McNaughtan	DMCNAUGHTAN@LEDGER.NEWS	209-275-6773	
Amber Watson	awatsonnotary@gmail.com	209.304.0410	LDS Church
Dave Herner	dherner@siliconridge.com	209-295-3283	
JOHN SILVA	jsilva@amadorgov.org	209-223-6384	ACSO/OES
J. Navarre	jnavarre@amadorgov.org	209-223-6500	ACSO/OES

A.7.4. Facebook Press Release for Final Public Meeting



A.7.5. Final Public Meeting Invite on Ledger News



ledger.news/news/amador-county-invites-comments-on-their-local-hazard-mitigation-plan/article_831c25da-85b2-11ea-9bd3-330075962be7.html

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Amador County Invites Comments on their Local Hazard Mitigation Plan

Via Press Release Apr 23, 2020

HELP YOUR COMMUNITY BE HAZARD-READY!

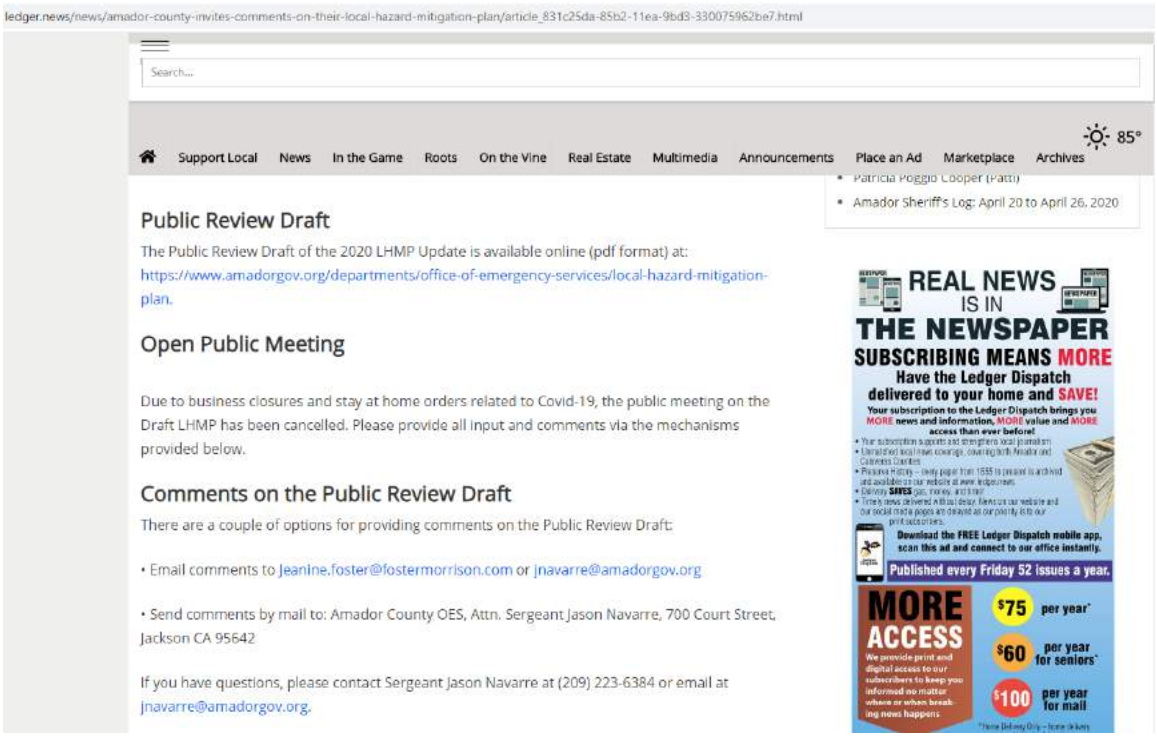
Amador County, CA: Amador County is partnering with the incorporated communities and numerous special districts to update their 2014 Local Hazard Mitigation Plan (LHMP). Floods, drought, wildfires, and severe weather are just a few of the hazards of concern to our local communities. While natural hazards such as these cannot be prevented, an LHMP forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Communities with a FEMA-approved LHMP are eligible to apply for both pre-disaster and post-disaster mitigation grant funding.

The process began in September, 2019 with an initial public and planning meeting and the

Latest News

- Lockwood Fire Protection District receives Jenny's Heroes grant
- Lake Camanche and Lake Pardee to Reopen with Modifications
- Online May 7 is Where to Find Amador Open Mic
- Little Free Libraries
- Hometown Heroes: Lunch Ladies Cook Their Way Into Our Hearts
- Online May 7 is Where to Find Amador Open Mic
- Remarkable Women of Amador County: Azalea Cuneo — Part 1
- The worth of a child

Most Popular



ledger.news/news/amador-county-invites-comments-on-their-local-hazard-mitigation-plan/article_831c25da-85b2-11ea-9bd3-330075962be7.html

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- Patricia Poggio Cooper (Patti)
- Amador Sheriff's Log: April 20 to April 26, 2020

Public Review Draft

The Public Review Draft of the 2020 LHMP Update is available online (pdf format) at: https://www.amadorgov.org/departments/office-of-emergency-services/local-hazard-mitigation-plan.

Open Public Meeting

Due to business closures and stay at home orders related to Covid-19, the public meeting on the Draft LHMP has been cancelled. Please provide all input and comments via the mechanisms provided below.

Comments on the Public Review Draft

There are a couple of options for providing comments on the Public Review Draft:

• Email comments to Jeanine.foster@fostermorrison.com or jnavarre@amadorgov.org

• Send comments by mail to: Amador County OES, Attn. Sergeant Jason Navarre, 700 Court Street, Jackson CA 95642

If you have questions, please contact Sergeant Jason Navarre at (209) 223-6384 or email at jnavarre@amadorgov.org.

A.7.6. Final Public Meeting: Review of Plan – Public

Due to Covid-19 restrictions, the Public Meeting was cancelled.

A.8 Meeting Handouts

A.8.1. Kickoff Meeting Handouts

Amador County Hazard Identification and Profiles – 2019/2020

Disaster Declarations and National Weather Service Research

Amador County – Disaster Declarations 1950-2019

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
2019	California Severe Winter Storms, Flooding, Landslides, And Mudslides	Flood	Storms	DR-4434	–	5/17/2019
2017	California Severe Winter Storms, Flooding, Mudslides	Flood	Storms	DR-4308	–	4/1/2017
2017	California Severe Winter Storms, Flooding, Mudslides	Flood	Storms	DR-4301	–	2/14/2017
2015	Butte Fire	Fire	Fire	FM-5111	–	9/10/2015
2014	California Drought	Drought	Drought	GP 2014-13	1/17/2014	–
2006	2006 June Storms	Flood	Storms	DR 1646	–	6/5/2006
2005/2006	2005/06 Winter Storms	Flood	Storms	DR-1628	–	2/3/2006
2005	Hurricane Katrina Evacuations	Economic	Hurricane	EM-3248 2005	–	9/13/2005
2001	Energy Emergency	Economic	Greed	GP 2001	1/1/2001	–
1998	1998 El Nino Floods	Flood	Storms	DR-1203	Proclaimed	2/19/1998
1997	1997 January Floods	Flood	Storms	DR-1155	1/2/97-1/31/97	1/4/1997
1995	California Severe Winter Storms, Flooding, Landslides, Mud Flows	Flood	Storms	DR-1046	Proclaimed	3/12/1995
1995	1995 Severe Winter Storms	Flood	Storms	DR-1044	1/6/95-3/14/95	1/13/1995
1986	1986 Storms	Flood	Storms	DR-758	2/18-86-3/12/86	2/18/1986

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
1982	Heavy Rain and Flooding	Flood	Storms	DC-82-03	4/1/1982	–
1980	April Storms	Flood	Storms	–	4/1/1980	–
1977	1977 Drought	Drought	Drought	EM-3023	–	1/20/1977
1976	1976 Drought	Drought	Drought	–	2/9/76 2/13/76 2/24/76 3/26/76 7/6/76	–
1969	Severe Storms and Flooding	Flood	Flood	DR 253	1/27/1970 - 3/2/1970	1/26/1969
1964	1964 Late Winter Storms	Flood	Storms	DR-183	–	12/24/1964
1963	1963 Floods and Rains	Flood	Storms	DR-145	2/7/63, 2/26/63, 2/29/63, & 4/22/63	2/25/63
1963	1963 Floods	Flood	Storms	–	2/14/1964	–
1961	1961 Widespread Fires	Fire	Fire	–	9/8/61	–
1959	1959 Heavy Rains	Flood	Storms	–	9/7/1959	–
1958	1958 April Storms and Floods	Flood	Storms	DR-52	4/5/1958	4/4/1958
1958	1958 February Storms and Floods	Flood	Storms	CDO 58-03	2/26/1958	–
1955	1955 Floods	Flood	Flood	DR-47	12/22/1955	12/23/1955
1950	1950 Floods	Flood	Flood	OCD 50-01	11/21/1950	–

Source: FEMA, Cal OES

Amador County Disaster Declaration Summary Table 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Drought	1	1977	2	1976, 2014
Economic	1	2005	1	2001
Fire	1	2015	1	1961
Flood (including heavy rains and storms)	15	1955, 1958, 1963, 1964, 1969, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1959, 1963 (twice), 1969, 1980, 1982, 1986, 1995, 1997, 1998
Totals	**18**	–	**18**	**–**

Source: FEMA, Cal OES

Disasters since 2014 Plan

- 2014 Drought (state)
- 2015 Fire (federal)
- 2017 Flood (two federal)
- 2019 Flood (federal)

*NCDC Severe Weather Events for Amador County 1950-5/31/2019**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Avalanche	4	2	0	3	0	$0	$0
Blizzard	1	0	0	0	0	$0	$0
Cold/Wind Chill	23	0	0	0	0	$0	$0
Debris Flows	1	0	0	0	0	$100,000	$0
Dense Fog	16	9	9	44	19	$3,210,000	$0
Dense Smoke	2	0	0	0	0	$0	$0
Drought	70	0	0	0	0	$0	$1,500,000,000
Excessive Heat	7	6	2	1	0	$0	$0
Extreme Cold/Wind Chill	3	0	0	0	0	$0	$0
Flash Flood	3	0	0	0	0	$0	$0
Flood	34	3	0	0	0	$4,400,000	$7,800,000
Frost/Freeze	15	0	0	0	0	$700,000	$25,000,000
Funnel Cloud	2	0	0	0	0	$0	$0
Hail	2	0	0	0	0	$0	$0
Heat	65	2	3	18	3	$0	$0
Heavy Rain	5	0	0	0	0	$0	$0
Heavy Snow	104	1	3	2	1	$1,125,000	$0
High Wind	58	1	0	5	0	$16,103,000	$48,000
Strong Wind	38	2	1	4	3	$5,275,500	$0
Thunderstorm Wind	1	0	0	0	0	$0	$0
Wildfire	22	3	0	32	21	$525,000	$0
Winter Storm	155	1	1	3	1	$190,000	$0
Winter Weather	41	1	3	0	0	$0	$0
Total	**672**	**31**	**22**	**112**	**48**	**$31,628,500**	**$1,532,848,000**

Source: NCDC

*Note: Losses reflect totals for all impacted areas

**Due to the regional nature of reporting certain hazard events, these hazards are included in the NCDC database for Amador County

Amador County Hazard Identification from 2014

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/Severity	Significance
Avalanche	Limited	Likely	Negligible	Low
Dam Failure	Limited	Unlikely	Critical	Low
Drought	Extensive	Likely	Limited	Low
Earthquake	Significant	Occasional	Critical	Medium
Floods: 100/500 year	Limited	Occasional	Limited	Medium
Floods: Localized/Stormwater	Significant	Likely	Limited	Medium
Invasive Species: Insect/Pests	Significant	Likely	Negligible	Low
Landslide/Debris Flows	Limited	Occasional	Limited	Medium
Land Subsidence	Limited	Unlikely	Negligible	Low
Levee Failure	Limited	Unlikely	Negligible	Low
Marine Invasive Species	Limited	Unlikely	Negligible	Low
Severe Weather: Extreme Heat	Significant	Highly Likely	Negligible	Low
Severe Weather: Fog	Limited	Occasional	Negligible	Low
Severe Weather: Heavy rain, thunderstorm, hail, and lightning	Extensive	Highly Likely	Limited	Medium
Severe Weather: Tornado	Limited	Unlikely	Negligible	Low
Severe Weather: Wind	Extensive	Highly Likely	Limited	Low
Severe Weather: Winter Storm and Freeze	Significant	Highly Likely	Limited	Medium
Wildfire	Extensive	Likely	Critical	High
Volcanoes	Limited	Unlikely	Negligible	Low

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability 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

Hazards Comparisons Summary

2014 Amador County Plan	General Plan Safety Element	2018 State of California Plan Applicable Hazards	Proposed Amador County 2019 Hazards
Avalanche	–		Avalanche
–	–	Climate Change & Related Hazards	Climate Change
Dam Failure	Seismically induced conditions	Dam Failure	Dam Failure
Drought	–	Droughts and Water Shortage	Drought and Water Shortage
Earthquake	Seismically induced conditions	Earthquake	Earthquake
Floods: 100/500 year	Flooding	Flood	Flood: 1%/0.2% annual chance
Floods: Localized/Stormwater	Flooding	Flood	Flood: Localized/Stormwater
Invasive Species: Insect/Pests	–	Agriculture Pests and Diseases	Ag Hazards: Severe Weather/Insect Pests
Landslide/Debris Flows	Slope instability	Landslide	Landslide, Mudslide, and Debris Flows
Land Subsidence	Subsidence	Not a stand-alone hazard – part of drought	(Include in Drought)
Levee Failure	Flooding	Levee Failure	Levee Failure
Marine Invasive Species	–	Aquatic Invasive Species	Aquatic Invasive Species
Severe Weather: Extreme Heat	–	Extreme Heat	Severe Weather: Extreme Heat
Severe Weather: Fog	–	Severe Weather and Storms	(Remove)
Severe Weather: Heavy rain, thunderstorm, hail, and lightning	–	Severe Weather and Storms	Severe Weather: Heavy Rains and Storms
Severe Weather: Tornado	–	Severe Weather and Storms	Severe Weather: High Winds and Tornadoes
Severe Weather: Wind	–	Severe Weather and Storms	(Consolidated above)
Severe Weather: Winter Storm and Freeze	–	Severe Weather and Storms	Severe Weather: Winter Storm and Freeze
Volcanoes	–	Volcano	Volcano
Wildfire	Wildland and Urban Fires	Wildfire	Wildfire

Amador County Hazard Identification 2019

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests					Low
Aquatic Invasive Species					Low
Avalanche					Medium
Climate Change					–
Dam Failure					Medium
Drought & Water shortage					High
Earthquake					Low
Floods: 1%/0.2% annual chance					Medium
Floods: Localized Stormwater					Medium
Landslide, Mudslide, and Debris Flow					Medium
Levee Failure					Medium
Severe Weather: Extreme Heat					High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)					Medium
Severe Weather: High Winds and Tornadoes					Low
Severe Weather: Winter Storms and Freeze					Medium
Volcano					Low
Wildfire					High

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.
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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

Hazard Identification Table - Jurisdiction:_____

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests					Low
Aquatic Invasive Species					Low
Avalanche					Medium
Climate Change					–
Dam Failure					Medium
Drought & Water shortage					High
Earthquake					Low
Floods: 1%/0.2% annual chance					Medium
Floods: Localized Stormwater					Medium
Landslide, Mudslide, and Debris Flow					Medium
Levee Failure					Medium
Severe Weather: Extreme Heat					High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)					Medium
Severe Weather: High Winds and Tornadoes					Low
Severe Weather: Winter Storms and Freeze					Medium
Volcano					Low
Wildfire					High

Geographic Extent
Limited: Less than 10% of planning area
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Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
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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

Amador County LHMP Update: 2019 Hazards

- Agricultural Hazards: Severe Weather/Insect – Pests
- Aquatic Invasive Species
- Avalanche
- Climate Change
- Dam Failure
- Drought and Water Shortage
- Earthquake
- Flood: (100/500 year)
- Flood: Localized/Stormwater
- Landslide Mudslide, and Debris Flow
- Levee Failure
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (Hail, Lightning)
- Severe Weather: High Winds and Tornadoes
- Severe Weather: Winter Storms and Freeze
- Volcano
- Wildfire

Amador County Historic Hazard Worksheet (Past Occurrences)

Please fill out one sheet for each significant hazard event with as much detail as possible. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of event	
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Opinion on likelihood of occurring again	
Source of information	
Comments	

	Please return worksheets by mail, email, or fax to: Jeanine Foster, Foster Morrison 5628 West Long Place Littleton, CO 80123 fax: (720) 893-0863 email: jeanine.foster@fostermorrison.com
Prepared by:	
Phone:	
Email:	
Date:	

Amador County
2019 Local Hazard Mitigation Plan Update
County and Participating Jurisdiction: Vulnerability & Capability Worksheets

Risk and Vulnerability Questions

Localized/Stormwater Flooding

1. Please describe the localized/stormwater flood issue specific to your jurisdiction in paragraph form. In addition, please complete a table similar to the below example detailing types and location of localized/stormwater flooding problems. If available, also attach a map of problem areas.

Text Description:

Table 3 Localized Flooding Areas

Road Name	Flooding	Pavement Deterioration	Washouts	High Water/ Creek Crossing	Landslides/ Mudslides	Debris	Downed Trees

Earthquake Vulnerability

1. Number of unreinforced masonry buildings. If available, please provide an inventory of URM buildings specific to your jurisdiction. Include any tables and/or maps. Is this a layer available in GIS?

Special Populations

1. Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, low-income, or migrant farm workers.

Development Trends

1. Describe development trends and expected growth areas and how they relate to hazard areas and vulnerability concerns/issues. Please provide zoning maps and maps and tables detailing areas targeted for future development within your jurisdiction.

CAPABILITY ASSESSMENT

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.

Planning and Regulatory

The following planning and land management tools are typically used by local jurisdictions to implement hazard mitigation activities. Please indicate which of the following your jurisdiction has in place. If your jurisdiction does not have this capability or authority, please indicate in the comments column if a higher level of government has the authority.

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
General Plan		
Capital Improvements Plan		
Economic Development Plan		
Local Emergency Operations Plan		
Continuity of Operations Plan		
Transportation Plan		
Stormwater Management Plan/Program		
Engineering Studies for Streams		
Community Wildfire Protection Plan		
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code		
Building Code Effectiveness Grading Schedule (BCEGS) Score		
Fire department ISO rating:		
Site plan review requirements		
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts?** **Is the ordinance adequately administered and enforced?**
Zoning ordinance		
Subdivision ordinance		
Floodplain ordinance		

Natural hazard specific ordinance (stormwater, steep slope, wildfire)	
Flood insurance rate maps	
Elevation Certificates	
Acquisition of land for open space and public recreation uses	
Erosion or sediment control program	
Other	
How can these capabilities be expanded and improved to reduce risk?	

Administrative/Technical

Identify the technical and personnel resources responsible for activities related to hazard mitigation/loss prevention within your jurisdiction. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, please indicate so in the comments column.

Administration	**Y/N**	**Describe capability Is coordination effective?**
Planning Commission		
Mitigation Planning Committee		
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)		
Mutual aid agreements		
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official		
Floodplain Administrator		
Emergency Manager		
Community Planner		
Civil Engineer		
GIS Coordinator		
Other		
Technical	**Y/N**	**Describe capability Has capability been used to assess/mitigate risk in the past?**

Warning systems/services (Reverse 911, outdoor warning signals)
Hazard data and information
Grant writing
Hazus analysis
Other
How can these capabilities be expanded and improved to reduce risk?

Fiscal

Identify whether your jurisdiction has access to or is eligible to use the following financial resources for hazard mitigation

Funding Resource	Access/ Eligibility (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		
Authority to levy taxes for specific purposes		
Fees for water, sewer, gas, or electric services		
Impact fees for new development		
Storm water utility fee		
Incur debt through general obligation bonds and/or special tax bonds		
Incur debt through private activities		
Community Development Block Grant		
Other federal funding programs		
State funding programs		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Education and Outreach

Identify education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.		
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)		
Natural disaster or safety related school programs		
StormReady certification		
Firewise Communities certification		
Public-private partnership initiatives addressing disaster-related issues		
Other		
How can these capabilities be expanded and improved to reduce risk?		

National Flood Insurance Program (NFIP) Worksheet

Use this worksheet to collect information on your community's participation in and continued compliance with the NFIP, as well as identify areas for improvement that could be potential mitigation actions.

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	FM to complete
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?	FM to complete
How many structures are exposed to flood risk within the community?	FM to complete
Describe any areas of flood risk with limited NFIP policy coverage	
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	
What are the barriers to running an effective NFIP program in the community, if any?	
Compliance History	
Is the community in good standing with the NFIP?	
Are there any outstanding compliance issues (i.e., current violations)?	
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	
Is a CAV or CAC scheduled or needed?	
Regulation	
When did the community enter the NFIP?	FM to complete
Are the FIRMs digital or paper?	FM to complete
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	
Provide an explanation of the permitting process.	
Community Rating System	
Does the community participate in CRS?	
What is the community's CRS Class Ranking?	
What categories and activities provide CRS points and how can the class be improved?	
Does the plan include CRS planning requirements?	

Prepared by:	Date	Email	Phone

HISTORIC HAZARD EVENTS WORKSHEET

Please fill out one sheet for each significant hazard event with as much detail as possible. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of event	
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Opinion on likelihood of occurring again	
Source of information	
Comments	

	Please return worksheets by mail, email, or fax to: Jeanine Foster, Foster Morrison 5628 West Long Place Littleton, CO 80123 fax: (720) 893-0863 email: jeanine.foster@fostermorrison.com
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Date:	

A.8.2. Risk Assessment Meeting Handouts

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude / Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests	Extensive	Highly Likely	Limited	Medium	Low
Aquatic Invasive Species	Significant	Highly Likely	Limited	Medium	Low
Avalanche	Limited	Likely	Negligible	Low/ Medium	Medium
Climate Change	Extensive	Likely	Limited	Medium	–
Dam Failure	Limited	Unlikely	Critical	High	Medium
Drought & Water shortage	Extensive	Likely/Occasional	Limited	Medium	High
Earthquake (large damaging/small)	Significant	Unlikely/Likely	Catastrophic	High	Low
Floods: 1%/0.2% annual chance	Significant	Occasional/ Unlikely	Critical	High	Medium
Floods: Localized Stormwater	Extensive	Highly Likely	Critical	Medium	Medium
Landslide, Mudslide, Debris Flow	Significant	Highly Likely	Critical	Medium	Medium
Levee Failure	Limited	Occasional	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely/ Occasional	Limited	Medium	Low
Severe Weather: Winter Storms and Freeze	Significant	Highly Likely	Limited	Medium	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High	High

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

Risk Assessment Methodology

Calculating Likelihood of Future Occurrence

The frequency of past events is used in this section to gauge the likelihood of future occurrences. Based on historical data, the likelihood of future occurrence is categorized into one of the following classifications:

- **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.

Calculating Vulnerability

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:

- **Extremely Low**: The occurrence and potential cost of damage to life and property is very minimal to non-existent.
- **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 already occurred in the past.
- **Extremely High**: Very widespread and catastrophic impact.

Defining Significance (Priority) of a Hazard

Defining the significance or priority of a hazard to a community is based on a subjective analysis of several factors. This analysis is used to focus and prioritize hazards and associated mitigation measures for the plan. These factors include the following:

- **Past Occurrences**: Frequency, extent, and magnitude of historic hazard events.
- **Likelihood of Future Occurrences**: Based on past hazard events.
- **Ability to Reduce Losses through Implementation of Mitigation Measures**: This looks at both the ability to mitigate the risk of future occurrences as well as the ability to mitigate the vulnerability of a community to a given hazard event.

Risk Assessment Summary: Amador County Planning Area

Agricultural Hazards: Severe Weather/Insects-Pests

- Given the importance of the agricultural industry in Amador County, it is addressed as a separate hazard. Severe weather is a primary concern to the Ag industry: heavy rains, flood, drought, heat, freeze.
- Insects of concern to plants and crops include Asian longhorn beetle, Caribbean fruit fly, Glassy-winged sharp shooter, Guava fruit fly, Gypsy moth, Japanese beetle, Mediterranean fruit fly, Melon fruit fly, Mexican fruit fly, Olive fruit fly, Oriental fruit fly, and Bark beetle. Invasive weeds include Scotch Broom, Barb Goatgrass, Parrotfeather, Italian Thistle, and others.
- There have been no FEMA or state disaster declarations associated specifically with the Agricultural industry. The NCDC contains no records of Ag incidents in the County. The USDA has issued numerous Ag declarations over the past 50 years.
- CAN THE COUNTY PROVIDE INFORMATION ON PAST OCCURRENCES OR SPECIFIC CONCERNS/ISSUES?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

Aquatic Invasive Species

- Zebra and Quagga Mussels, invasive fish species, and aquatic weeds such as hydrilla, water hyacinth, Arundo, Loosestrife, Sesbania, South American Spongeplant, and others are the primary issues.
- There have been no disaster declarations associated with invasive species in Amador County. The NCDC contains no records of invasive species in the County. Neither of these databases track these issues.
- CAN THE COUNTY PROVIDE INFORMATION ON PAST OCCURRENCES OR SPECIFIC CONCERNS/ISSUES? HAVE QUAGGA MUSSELS BEEN AN ACTIVE CONCERN IN THE COUNTY?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Climate Change

- The 2018 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 both snowmelt and rainwater running off sooner in the year. Climate Change has the potential to alter the nature and frequency of most hazards.
- CAN THE COUNTY PROVIDE INFORMATION ON EVIDENCE OF PAST OCCURRENCES OR SPECIFIC CONCERNS/ISSUES?
- Likelihood of Future Occurrence: Likely
- Vulnerability: Medium
- Priority Hazard

Avalanche

- 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. The combination of steep slopes, abundant snow, weather, snowpack, and an impetus to cause movement create an avalanching episode.
- Avalanche-prone areas are found upcountry in eastern Amador, along SR 88 in the Devil's Gate and Kirkwood areas, where these combinations readily occur.
- No federal or state disaster declarations. The NCDC database shows 4 avalanche events in Amador County since 1993. While past occurrences show annual incidents of avalances, there had been no avalanche related deaths in Amador, specifically at Kirkwood, until 2018 where a mother and her son died skiing back to their cabin in Kirkwood.
- CAN THE COUNTY PROVIDE INFORMATION ON PAST OCCURRENCES OR SPECIFIC CONCERNS/ISSUES?
- Likelihood of Future Occurrence: Likely
- Vulnerability: Medium
- Non-Priority Hazard

Dam failure

- According to data provided by Cal OES and National Performance of Dam's data, there are 42 dams in Amador County constructed for flood control, storage, electrical generation, and recreational purposes. Of these 23 are considered jurisdictional dams; 2 were rated as extremely high, 6 is rated as High Hazard, 6 as Significant Hazard, and 9 as Low Hazard.
- In addition to these dams located within Amador County, there are 10 other dams (3 High Hazard, 7 significant) outside the County with the potential to affect people and property in Amador County. The 3 High Hazard dams (located outside the County) are: CPUD Middle Fork – Calaveras County, Sly Park – El Dorado County, and Sly Park Saddle Dike – El Dorado County.
- NEED TO GET DATA ON ALL DAM CLASSIFICATIONS AND AVAILABLE INUNDATION LAYERS
- The most significant dams of concern include the Extremely High and High Hazard where loss of life is possible. The failure of a dam may affect the dam site, downstream areas, floodwater routing, or all three.
- According to multiple sources, there have been no past dam failure events or issues of concern.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: High
- Priority Hazard

Drought and Water Shortage

- Historical drought data for the Amador County Planning Area and region indicate there have been 5 significant droughts in the last 84 years.
- Since 2012, snowpack levels in California had dropped dramatically. 2015 estimates place snowpack at 5 percent of normal levels. However, snowpack levels increased in 2016 and in 2017 snowpack levels were the highest they've been in 22 years. But then back down again in early 2018, only to be back up again in late 2018/2019. 2019/2020 is continuing to see a fair amount of rain.

- 2 state (1976, 2014) disaster declarations and 1 federal declaration (1977) for Amador County since 1950. There have been 70 NCDC drought events in Amador County, all related to events in the 2014 to 2016 drought.
- The 2016 Amador County General Plan Conservation Element noted that groundwater from individual wells represents a major water source in the County. WHAT ELSE CAN YOU ADD ON WATER SUPPLY SOURCES AND RELIABILITY?
- HMPC – CAN YOU PROVIDE DAMAGES OR RESTRICTIONS THAT HAVE OCCURRED IN THE COUNTY RECENTLY DUE TO THE MOST RECENT DROUGHT. WHAT HAS BEEN IMPACTED THE MOST? CONFIRM THE PRIMARY SOURCE OF WATER AND HOW HAS WATER SUPPLY BEEN AFFECTED IN THE COUNTY?
- Likelihood of Future Occurrence: Drought - Likely/Water supply - Occasional
- Vulnerability: Medium
- Priority Hazard

Earthquake

- 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.
- 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
- The USGS National Seismic Hazard Maps provides acceleration and probabilities for various time periods. This data indicates that the expected severity of earthquakes in the region is mostly low.
- USGS identified 62, 5.0 or greater earthquakes have occurred within 90 miles of City of Jackson in Amador.
- The County has felt ground shaking from earthquakes with epicenters located elsewhere. TRUE? HMPC – WHAT WERE THERE ISSUES IN THE COUNTY FROM HISTORICAL EARTHQUAKES? HAVE ANY STUDIES BEEN DONE ON EARTHQUAKE AND SECONDARY IMPACTS SUCH AS TO DAMS AND LEVEES? DO COMMUNITIES HAVE A WORKING URM INVENTORY?
- Likelihood of Future Occurrence: Unlikely – large, damaging earthquake; Occasional – minor earthquake
- Vulnerability: High
- Priority Hazard

Flood Hazards

100/500 year

- Historically, portions of Amador County have always been at risk to flooding because of its annual percentage of rainfall in the winter and the number of watercourses that traverse the County. Flooding in Amador County results from prolonged heavy rainfall (sometimes combined with snowmelt) over tributary areas primarily during the period from November through March.

- 14 state and 15 federal declarations from 1950-present were for heavy rains and flooding. Flooding is an ongoing issue for the planning area.
- HMPC - REVIEW RISK ASSESSMENT AND ADD INFORMATION ON MAJOR FLOOD EVENTS. NEED SUMMARY OF IMPACTS FROM THE (2) 2017 AND 2019 FLOOD EVENTS (THAT RESULTED IN DISASTER DECLRATIONS).
- Likelihood of Future Occurrence: 100-Occasional; 200 – Unlikely; 500-Unlikely
- Vulnerability: High
- Priority Hazard

Localized/Stormwater flooding

- Significant localized flood history in the County – occurs annually
- CAN THE HMPC PROVIDE DETAILS ON THESE AREAS? PICTURES/DESCRIPTIONS - NEED SPECIFIC TO EACH JURISDICTION
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Landslides, Mudslides, and Debris Flows

- There have been no disaster declarations associated with landslides in Amador County. The NCDC contains no records of landslides in the County.
- Landslide mapping indicate that portions of the eastern County are at moderate to high risk for landslides.
- WHAT SPECIFIC AREAS ARE AT RISK TO LANDSLIDES?
- CAN THE COUNTY PROVIDE INFORMATION ON PAST LANDSLIDE EVENTS?
- Likelihood of Future Occurrence: Likely
- Vulnerability: Medium
- Priority Hazard?

Levee Failure

- A few flood control levees have been constructed in the Amador County Planning Area, all within the City of Ione. TRUE? These levees along Sutter Creek are not certified as providing protection from the 1% annual chance flood.
- CAN WE CONFIRM THE LOCATION OF LEVEES AND THE LEVELS OF PROTECTION THEY PROVIDE? CERTIFIED VS. NON-CERTIFIED LEVEES? THESE JUST INCLUDE 3-4 LEVEE SEGMENTS, ALL WITHIN CITY OF IONE? DOES THE CITY HAVE MAPS?
- No disaster declarations associated with levee failures; the NCDC does not identify any levee failure events.
- ANY PAST LEVEE FAILURE EVENTS/ISSUES TO NOTE?
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Medium
- Priority Hazard

Severe weather

Extreme Heat

- Annual occurrences of hot temperatures. The highest recorded daily extreme was 110°F in July 2006 and July 1972 in western Amador. In a typical year, maximum temperatures exceed 90°F on 69.3 days in western Amador. The highest recorded daily extreme was 95°F in July 1998 eastern Amador. In a typical year, maximum temperatures exceed 90°F on 0.3 days.
- 7 extreme heat event (NCDC) since 1993; No state or federal disaster declarations
- PLEASE PROVIDE DETAILS ON EXTREME HEAT EVENTS IN THE COUNTY, AND HOW YOUR JURISDICTION WAS AFFECTED.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Heavy rains and storms (Hail, Lightning)

- Significant County history: annual occurrences
- The NCDC data recorded 2 hail, 5 heavy rain, 4 winter weather, and 0 lightning events for Amador County since 1950.
- There have been 15 federal and 14 state declarations since 1950 for flooding, including heavy rains and storms.
- CAN THE HMPC PROVIDE DETAILS ON HEAVY RAIN AND STORM EVENTS IN THE COUNTY. JANUARY 2017/2018 / 2019/2020 STORMS – PA SHEEETS? EOC ACTIVATIONS?
- Severe storms/heavy rains are the primary cause of most major flooding
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

High Winds and Tornadoes

- Significant County history: annual occurrences of high winds; tornadoes more sporadic
- Portions of the County are 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.
- The NCDC data recorded 99 high wind and 2 funnel clouds for Amador County since 1955.
- Biggest issues are associated with wind fueling fires and also triggering PSPS events.
- CAN THE HMPC PROVIDE INFORMATION ON PAST HIGH WINDS AND TORNADO EVENTS AND DAMAGES? WHAT ARE THE PRIMARY CONCERNS TO THE COUNTY AND OTHER JURISDICTIONS?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium? High?
- Priority Hazard

Winter Storms and Freeze

- Annual occurrences of cold temperatures. The lowest recorded daily extreme was 20°F in December 1998 in western Amador. In a typical year, minimum temperatures fall below 32°F on 5.2 days in western Amador, with no days falling below 0°. In eastern Amador, the lowest recorded daily extreme was -26°F in January 20, 1937. In a typical year, minimum temperatures fall below 32°F on 231.4 days with 8.5 days falling below 0°F.
- Average snowfall in western Amador is 1.42 inches with record snowfall in 1967 of 9 inches. Average snowfall in eastern Amador is 380.2 inches with record snowfall in 1967 of 693.4 inches.
- The County has had 2 past federal and 2 past state disaster declarations for extreme cold and freeze. NCDC identified 41 extreme cold or freeze events as well as 196 winter weather and storms.
- PLEASE PROVIDE DETAILS ON EXTREME COLD, FREEZE, AND WINTER STORM (SNOW) EVENTS IN THE COUNTY. WHAT ARE THE MOST SIGNIFICANT ISSUES/CONCERNS?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Wildfire

- Wildfires occur on an annual basis in the Amador County Planning Area.
- Any ignition has the potential to become an out of control wildfire. Wildfire is one of the most significant hazard the County faces.
- 1 federal (2015 Butte Fire) and 1 state (1961Rancheria Creek Fire) disaster declarations for Wildfire since 1950; 23 NCDC wildfire events since 1993.
- CAN EACH PARTICIPATING JURISDICTION PROVIDE US IMPACTS/DAMAGES TO THEIR JURISDICTION FROM THE 2015 BUTTE FIRE?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Extremely High
- Priority Hazard

Data Needs

Review of Key Items to date:

- Hazard-specific data
  - ✓ Hazard ID tables
  - ✓ Historic Hazard Worksheets or list of past hazard occurrences and impact to jurisdiction
- Risk Assessment Worksheets
- 2014 Mitigation Action Status Update

County/City/District:

- Old participating jurisdictions – need past occurrences/hazard history since 2013
- New participating jurisdictions –significant hazard occurrences - back 50 years or so

Other Data Items:

General:

- Logos for each participating jurisdiction
- Historic Hazard Data and Key areas affected by Jurisdiction (items identified in today's meeting)
- EOC Activations
- PA Summaries
- Photos, Photos, Photos
- Critical Facilities - Update
- Future Development Areas by Jurisdiction
- Levee Inventory/Status Map & Data (Ione, others?)
- New Dam inundation mapping and Data

A.8.3. Mitigation Strategy Meeting Handouts

Handouts specific to the Mitigation Strategy Meeting can be found in Appendix C.

A.8.4. Final Meeting Handouts

Handouts specific to the Final Meeting can be found in Section 2.2 of the Base Plan Update. That section provides a summary by hazard of significant changes in current conditions, Planning Area vulnerability, and any resulting modifications to the community's mitigation program priorities since the 2014 LHMP:

A.8.5. Early Public Meeting Handouts

Amador County LHMP Update: 2020 Hazards

- Agricultural Hazards: Severe Weather/Insect – Pests
- Aquatic Invasive Species
- Avalanche
- Climate Change
- Dam Failure
- Drought and Water Shortage
- Earthquake
- Flood: (100/500 year)
- Flood: Localized/Stormwater
- Landslide Mudslide, and Debris Flow
- Levee Failure
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (Hail, Lightning)
- Severe Weather: High Winds and Tornadoes
- Severe Weather: Winter Storms and Freeze
- Volcano
- Wildfire

Amador County Historic Hazard Worksheet (Past Occurrences)

Please fill out one sheet for each significant hazard event with as much detail as possible. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of event	
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Opinion on likelihood of occurring again	
Source of information	
Comments	

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Prepared by:	
Phone:	
Email:	
Date:	

A.8.6. Final Public Meeting Handouts

Due to restrictions from Covid-19, no public meetings were held. As such, no handouts were distributed.

Appendix B References

2014 Amador County Hazard Mitigation Plan

2018 State of California Multi-Hazard Mitigation Plan

Amador County 2014-2019 Housing Element

Amador County 2016 General Plan Conservation Element

Amador County 2016 General Plan Land Use Element

Amador County 2016 General Plan Safety Element

Amador County Agricultural Commissioner Crop Reports

Amador County Assessor's Office

Amador County Building Department

Amador County Digital Flood Insurance Rate Map

Amador County Digital Flood Insurance Rate Map January 20, 2016

Amador County Emergency Operations Plan

Amador County Flood Insurance Study January 20, 2016

Amador County General Plan Background Report

Amador County General Plan Environmental Impact Report

Amador County GIS data

Amador County Housing Element

Amador County Local Area Formation Commission

Amador Water Agency Water Code

Amador Water Agency Water Conservation Plan

ArkStorm at Tahoe - Stakeholder Perspectives on Vulnerabilities and Preparedness for an Extreme Storm Event in the Greater Lake Tahoe, Reno and Carson City Region. 2014.

Cal Atlas

CAL FIRE GIS datasets

CAL FIRE Wildfire History Database

Cal-Adapt

Cal-Adapt – Precipitation: Decadal Averages Map

Cal-Adapt – Temperature: Decadal Averages Map

California Adaptation Planning Guide

California Climate Adaptation Strategy

California Department of Conservation

California Department of Finance, E-1 Report

California Department of Finance, E-4 Report

California Department of Finance, P-1 Report

California Department of Fish and Wildlife's Natural Diversity Database

California Department of Food and Agriculture

California Department of Parks and Recreation Office of Historic Preservation

California Department of Public Health

California Department of Water Resources Best Available Maps

California Department of Water Resources DAC Mapping Tool

California Department of Water Resources Division of Safety of Dams

California Department of Water Resources Groundwater Information Center

California Division of Mines and Geology

California Invasive Plant Council

California Native Plant Society

California Natural Diversity Database – BIOS Viewer Tool

California Natural Resource Agency

California Office of Emergency Services

California Office of Emergency Services – Dam Inundation Data

California Office of Historic Preservation

California's Drought of 2007-2009, An Overview. State of California Natural Resources Agency, California Department of Water Resources."

Cal-IPC

City of Amador City General Plan and associated Elements

City of Ione General Plan and associated Elements

City of Ione General Plan Environmental Impact Report

City of Ione, City of Jackson, City of Sutter Creek Housing Element

City of Jackson Energy Action Plan

City of Jackson General Plan and associated Elements

City of Plymouth General Plan and associated Elements

City of Sutter Creek General Plan and associated Elements

Climate Change and Health Profile Report – Amador County

Climate Change Impacts in the United States

County and City staff

Enhanced Fujita Scale. National Oceanic and Atmospheric Administration Storm Prediction Center.

Existing plans and studies

Federal Emergency Management Agency – Disaster Declaration Database

Federal Emergency Management Agency – Wind Zones in the United States

Federal Emergency Management Agency: Building Performance Assessment: Oklahoma and Kansas Tornadoes

Federal Emergency Management Agency: Multi-Hazard Identification and Risk Assessment.

FEMA Disaster Declaration Database

FEMA's HAZUS-MH 4.2 GIS-based inventory data

Galloway, Jr Dr. Gerald E. Levees in History: The Levee Challenge. Water Policy Collaborative, University of Maryland, Visiting Scholar, USACE, IWR.

HMPC input

Integrated Regional Water Management Plan Update (November 2018)

Intergovernmental Panel on Climate Change

Jackson Valley Irrigation District Municipal Service Review

Kenward, Alyson PhD, Adams-Smith, Dennis, and Raja, Urooj. Wildfires and Air Pollution – The Hidden Health Hazards of Climate Change. Climate Central. 2013.

Liu, J.C., Mickley, L.J., Sulprizio, M.P. et al. Climatic Change. 138: 655. doi:10.1007/s10584-016-1762-6. 2016.

Lockwood Fire Protection District Municipal Service Review

Multi-Hazard Identification and Risk Assessment, FEMA 1997

National Aeronautics and Space Administration

National Climate Assessment

National Climatic Data Center Storm Events Database.

National Drought Mitigation Center

National Drought Mitigation Center – Drought Impact Reporter

National Flood Insurance Program

National Integrated Drought Information System

National Levee Database

National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC) Storm Events Database

National Oceanic and Atmospheric Administration Storm Prediction Center

National Oceanic and Atmospheric Administration's National Climatic Data Center

National Park Service

National Park Service – Historic American Buildings Survey and Historic American Engineering Record

National Performance of Dams Program

National Weather Service HeatRisk

Personal interviews with planning team members and staff from the County and participating jurisdictions

Pine Grove Community Services District Municipal Service Review

Proceedings of the National Academy of Sciences

Public Health Alliance of Southern California

Public Policy Institute of California. If drought continues: Environment and poor rural communities most likely to suffer. [press release].

River Pins Public Utility District Income Survey

River Pines Public Utility District Municipal Service Review

Science Magazine

Sierra Avalanche Center

State of California Department of Conservation Farmland Mapping and Monitoring Program

Statewide GIS datasets from other agencies such as Cal OES, FEMA, USGS, CGS, Cal Atlas, and others

U.S. Census Bureau 2010 Household Population Estimates

U.S. Fish and Wildlife Service

U.S. Fish and Wildlife Service's National Wetlands Inventory maps

U.S. Forest Service GIS datasets

U.S. Geological Survey

U.S. Geological Survey Landslide Maps

Underwood, E. Models predict longer, deeper US droughts. Science, 347(6223) 707 DOI: 10.1126/science.347.6223.707. 2015.

United State Geologic Survey. Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977.

University of California

Urban Water Management Plan (2015)

US Army Corps of Engineers

US Bureau of Reclamation

US Department of Agriculture

US Department of Agriculture – Farm Service Agency Secretarial Disasters Declarations

US Drought Monitor

US Fish and Wildlife Service

US Geological Survey – Biological Resource Division

US Geological Survey Open File Report 2015-3009

US Geological Survey Publication 2014-3120

US Natural Resource Conservation Service

USA Today

Vaisala National Lightning Detection Network

Western Regional Climate Center

World Health Organization

Written descriptions of inventory and risks provided by Amador County

Appendix C Mitigation Strategy

C.1 Mitigation Strategy Meeting Handout

Amador County
Local Hazard Mitigation Plan Update
HMPC Meetings #4 & 5 - Mitigation Strategy
February 19 & 20, 2020

Table of Contents:

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AGENDA

Amador County
Local Hazard Mitigation Plan (LHMP) Update
HMPC Meetings #3 & #4 - Mitigation Strategy
February 19 & 20, 2020

HMPC Meeting #3:

1. Introductions
2. Status of the DMA Planning Process
3. Risk Assessment Status
4. Develop Plan Goals and Objectives
5. Identify and discuss Mitigation Alternatives/Actions/Projects

HMPC Meeting #4:

1. Introductions
2. Identify and discuss Mitigation Alternatives/Actions/Projects
3. Review Mitigation Selection Criteria
4. Prioritize Mitigation Projects
5. Review of Schedule/Data Needs

Mitigation Strategy Meetings
February 19 & 20, 2020
Day 1

Amador County Hazard Identification & Profiles

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude / Severity	Significance	Climate Change Influence
Agricultural Hazards: Severe Weather/Insect - Pests	Extensive	Highly Likely	Limited	Medium	Low
Aquatic Invasive Species	Significant	Highly Likely	Limited	Low	Low
Avalanche	Limited	Likely	Negligible	Low/ Medium	Medium
Climate Change	Extensive	Likely	Limited	Medium	–
Dam Failure	Limited	Unlikely	Critical	High	Medium
Drought & Water shortage	Extensive	Likely/Occasional	Limited	Medium	High
Earthquake (large damaging/small)	Significant	Unlikely/Likely	Catastrophic	High	Low
Floods: 1%/0.2% annual chance	Significant	Occasional/ Unlikely	Critical	High	Medium
Floods: Localized Stormwater	Extensive	Highly Likely	Critical	Medium	Medium
Landslide, Mudslide, Debris Flow	Significant	Highly Likely	Critical	Medium	Medium
Levee Failure	Limited	Occasional	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely/ Occasional	Limited	Medium	Low
Severe Weather: Winter Storms and Freeze	Significant	Highly Likely	Limited	Medium	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High	High

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

Risk Assessment Methodology

Calculating Likelihood of Future Occurrence

The frequency of past events is used in this section to gauge the likelihood of future occurrences. Based on historical data, the likelihood of future occurrence is categorized into one of the following classifications:

- **Highly Likely**: Near 100% chance of occurrence in next year, or happens every year.
- **Likely**: Between 10 and 90% 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.

Calculating Vulnerability

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:

- **Extremely Low**: The occurrence and potential cost of damage to life and property is very minimal to non-existent.
- **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 already occurred in the past.
- **Extremely High**: Very widespread and catastrophic impact.

Defining Significance (Priority) of a Hazard

Defining the significance or priority of a hazard to a community is based on a subjective analysis of several factors. This analysis is used to focus and prioritize hazards and associated mitigation measures for the plan. These factors include the following:

- **Past Occurrences**: Frequency, extent, and magnitude of historic hazard events.
- **Likelihood of Future Occurrences**: Based on past hazard events.
- **Ability to Reduce Losses through Implementation of Mitigation Measures**: This looks at both the ability to mitigate the risk of future occurrences as well as the ability to mitigate the vulnerability of a community to a given hazard event.

Risk Assessment Summary: Amador County Planning Area

Agricultural Hazards: Severe Weather/Insects-Pests

- Given the importance of the agricultural industry in Amador County, it is addressed as a separate hazard. Severe weather is a primary concern to the Ag industry: heavy rains, flood, drought, heat, freeze.
- Insects of concern to plants and crops include Asian longhorn beetle, Caribbean fruit fly, Glassy-winged sharp shooter, Guava fruit fly, Gypsy moth, Japanese beetle, Mediterranean fruit fly, Melon fruit fly, Mexican fruit fly, Olive fruit fly, Oriental fruit fly, and Bark beetle. Invasive weeds include Scotch Broom, Barb Goatgrass, Parrotfeather, Italian Thistle, and others.
- There have been no FEMA or state disaster declarations associated specifically with the Agricultural industry. The NCDC contains no records of Ag incidents in the County. The USDA has issued numerous Ag declarations over the past 50 years.
- CAN THE COUNTY PROVIDE INFORMATION ON PAST OCCURRENCES OR SPECIFIC CONCERNS/ISSUES?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

Aquatic Invasive Species

- Zebra and Quagga Mussels, invasive fish species, and aquatic weeds such as hydrilla, water hyacinth, Arundo, Loosestrife, Sesbania, South American Spongeplant, and others are the primary issues.
- There have been no disaster declarations associated with invasive species in Amador County. The NCDC contains no records of invasive species in the County. Neither of these databases track these issues.
- CAN THE COUNTY PROVIDE INFORMATION ON PAST OCCURRENCES OR SPECIFIC CONCERNS/ISSUES? HAVE QUAGGA MUSSELS BEEN AN ACTIVE CONCERN IN THE COUNTY?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Non-Priority Hazard

Climate Change

- The 2018 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 both snowmelt and rainwater running off sooner in the year. Climate Change has the potential to alter the nature and frequency of most hazards.
- CAN THE COUNTY PROVIDE INFORMATION ON EVIDENCE OF PAST OCCURRENCES OR SPECIFIC CONCERNS/ISSUES?
- Likelihood of Future Occurrence: Likely
- Vulnerability: Medium

- Priority Hazard

Avalanche

- 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. The combination of steep slopes, abundant snow, weather, snowpack, and an impetus to cause movement create an avalanching episode.
- Avalanche-prone areas are found upcountry in eastern Amador, along SR 88 in the Devil's Gate and Kirkwood areas, including the road up to Kirkwood, where these combinations readily occur.
- No federal or state disaster declarations. The NCDC database shows 4 avalanche events in Amador County since 1993. While past occurrences show annual incidents of avalanches, there had been no avalanche related deaths in Amador, specifically at Kirkwood, until 2018 where a mother and her son died skiing back to their cabin in Kirkwood.
- CAN THE COUNTY PROVIDE INFORMATION ON PAST OCCURRENCES OR SPECIFIC CONCERNS/ISSUES? Road to Kirkwood (Spur) gets backed up – significant avalanche hazard
- Likelihood of Future Occurrence: Likely
- Vulnerability: Medium
- Priority Hazard?

Dam failure

- According to data provided by Cal OES and National Performance of Dam's data, there are 42 dams in Amador County constructed for flood control, storage, electrical generation, and recreational purposes. Of these 23 are considered jurisdictional dams; 2 were rated as extremely high, 6 is rated as High Hazard, 6 as Significant Hazard, and 9 as Low Hazard.
- In addition to these dams located within Amador County, there are 10 other dams (3 High Hazard, 7 significant) outside the County with the potential to affect people and property in Amador County. The 3 High Hazard dams (located outside the County) are: CPUD Middle Fork – Calaveras County, Sly Park – El Dorado County, and Sly Park Saddle Dike – El Dorado County.
- NEED TO GET DATA ON ALL DAM CLASSIFICATIONS AND AVAILABLE INUNDATION LAYERS
- The most significant dams of concern include the Extremely High and High Hazard where loss of life is possible. The failure of a dam may affect the dam site, downstream areas, floodwater routing, or all three.
- According to multiple sources, there have been no past dam failure events or issues of concern.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: High
- Priority Hazard

Drought and Water Shortage

- Historical drought data for the Amador County Planning Area and region indicate there have been 5 significant droughts in the last 84 years.
- Since 2012, snowpack levels in California had dropped dramatically. 2015 estimates place snowpack at 5 percent of normal levels. However, snowpack levels increased in 2016 and in 2017 snowpack levels

were the highest they've been in 22 years. But then back down again in early 2018, only to be back up again in late 2018/2019. 2019/2020 is continuing to see a fair amount of rain.

- 2 state (1976, 2014) disaster declarations and 1 federal declaration (1977) for Amador County since 1950. There have been 70 NCDC drought events in Amador County, all related to events in the 2014 to 2016 drought.
- The 2016 Amador County General Plan Conservation Element noted that groundwater from individual wells represents a major water source in the unincorporated County. All Cities obtain water from AWA – reliable, surface water source.
- HMPC – CAN YOU PROVIDE DAMAGES OR RESTRICTIONS THAT HAVE OCCURRED IN THE COUNTY RECENTLY DUE TO THE MOST RECENT DROUGHT. WHAT HAS BEEN IMPACTED THE MOST?
- Likelihood of Future Occurrence: Drought - Likely/Water supply - Occasional
- Vulnerability: Medium
- Priority Hazard

Earthquake

- 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.
- 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
- The USGS National Seismic Hazard Maps provides acceleration and probabilities for various time periods. This data indicates that the expected severity of earthquakes in the region is mostly low.
- USGS identified 62, 5.0 or greater earthquakes have occurred within 90 miles of City of Jackson in Amador.
- The County has felt ground shaking from earthquakes with epicenters located elsewhere. TRUE? HMPC – WHAT WERE THERE ISSUES IN THE COUNTY FROM HISTORICAL EARTHQUAKES? HAVE ANY STUDIES BEEN DONE ON EARTHQUAKE AND SECONDARY IMPACTS SUCH AS TO DAMS AND LEVEES? DO COMMUNITIES HAVE A WORKING URM INVENTORY?
- PG&E dams above County critical water supply source – if these dams are compromised in an Earthquake, water supply could be interrupted.
- Likelihood of Future Occurrence: Unlikely – large, damaging earthquake; Occasional – minor earthquake
- Vulnerability: High
- Priority Hazard

Flood Hazards

100/500 year

- Historically, portions of Amador County have always been at risk to flooding because of its annual percentage of rainfall in the winter and the number of watercourses that traverse the County. Flooding in Amador County results from prolonged heavy rainfall (sometimes combined with snowmelt) over tributary areas primarily during the period from November through March.
- 14 state and 15 federal declarations from 1950-present were for heavy rains and flooding. Flooding is an ongoing issue for the planning area.
- HMPC - REVIEW RISK ASSESSMENT AND ADD INFORMATION ON MAJOR FLOOD EVENTS. NEED SUMMARY OF IMPACTS FROM THE (2) 2017 AND 2019 FLOOD EVENTS (THAT RESULTED IN DISASTER DECLRATIONS).
- Likelihood of Future Occurrence: 100-Occasional; 200 – Unlikely; 500-Unlikely
- Vulnerability: High
- Priority Hazard

Localized/Stormwater flooding

- Significant localized flood history in the County – occurs annually
- CAN THE HMPC PROVIDE DETAILS ON THESE AREAS? PICTURES/DESCRIPTIONS - NEED SPECIFIC TO EACH JURISDICTION
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Landslides, Mudslides, and Debris Flows

- There have been no disaster declarations associated with landslides in Amador County. The NCDC contains no records of landslides in the County.
- Landslide mapping indicate that portions of the eastern County are at moderate to high risk for landslides.
- WHAT SPECIFIC AREAS ARE AT RISK TO LANDSLIDES? Tiger Creek Road (PG&E), Shake Ridge Road
- CAN THE COUNTY PROVIDE INFORMATION ON PAST LANDSLIDE EVENTS?
- Likelihood of Future Occurrence: Likely
- Vulnerability: Medium
- Priority Hazard?

Levee Failure

- A few flood control levees have been constructed in the Amador County Planning Area, all within the City of Ione. These levees along Sutter Creek are not certified as providing protection from the 1% annual chance flood.
- CAN WE CONFIRM THE LOCATION OF LEVEES AND THE LEVELS OF PROTECTION THEY PROVIDE? CERTIFIED VS. NON-CERTIFIED LEVEES? THESE JUST INCLUDE 3-4 LEVEE SEGMENTS, ALL WITHIN CITY OF IONE? DOES THE CITY HAVE MAPS?

- No disaster declarations associated with levee failures; the NCDC does not identify any levee failure events.
- ANY PAST LEVEE FAILURE EVENTS/ISSUES TO NOTE?
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Medium
- Priority Hazard

Severe weather

Extreme Heat

- Annual occurrences of hot temperatures. The highest recorded daily extreme was 110°F in July 2006 and July 1972 in western Amador. In a typical year, maximum temperatures exceed 90°F on 69.3 days in western Amador. The highest recorded daily extreme was 95°F in July 1998 eastern Amador. In a typical year, maximum temperatures exceed 90°F on 0.3 days.
- 7 extreme heat event (NCDC) since 1993; No state or federal disaster declarations
- PLEASE PROVIDE DETAILS ON EXTREME HEAT EVENTS IN THE COUNTY, AND HOW YOUR JURISDICTION WAS AFFECTED.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Heavy rains and storms (Hail, Lightning)

- Significant County history: annual occurrences
- The NCDC data recorded 2 hail, 5 heavy rain, 4 winter weather, and 0 lightning events for Amador County since 1950.
- There have been 15 federal and 14 state declarations since 1950 for flooding, including heavy rains and storms.
- CAN THE HMPC PROVIDE DETAILS ON HEAVY RAIN AND STORM EVENTS IN THE COUNTY. JANUARY 2017/2018 / 2019/2020 STORMS – PA SHEEETS? EOC ACTIVATIONS?
- Severe storms/heavy rains are the primary cause of most major flooding
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

High Winds and Tornadoes

- Significant County history: annual occurrences of high winds; tornadoes more sporadic
- Portions of the County are 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.
- The NCDC data recorded 99 high wind and 2 funnel clouds for Amador County since 1955.
- Biggest issues are associated with wind fueling fires and also triggering PSPS events.
- CAN THE HMPC PROVIDE INFORMATION ON PAST HIGH WINDS AND TORNADO EVENTS AND DAMAGES? WHAT ARE THE PRIMARY CONCERNS TO THE COUNTY AND OTHER JURISDICTIONS?

- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Winter Storms and Freeze

- Annual occurrences of cold temperatures. The lowest recorded daily extreme was 20°F in December 1998 in western Amador. In a typical year, minimum temperatures fall below 32°F on 5.2 days in western Amador, with no days falling below 0°. In eastern Amador, the lowest recorded daily extreme was -26°F in January 20, 1937. In a typical year, minimum temperatures fall below 32°F on 231.4 days with 8.5 days falling below 0°F.
- Average snowfall in western Amador is 1.42 inches with record snowfall in 1967 of 9 inches. Average snowfall in eastern Amador is 380.2 inches with record snowfall in 1967 of 693.4 inches.
- The County has had 2 past federal and 2 past state disaster declarations for extreme cold and freeze. NCDC identified 41 extreme cold or freeze events as well as 196 winter weather and storms.
- PLEASE PROVIDE DETAILS ON EXTREME COLD, FREEZE, AND WINTER STORM (SNOW) EVENTS IN THE COUNTY. WHAT ARE THE MOST SIGNIFICANT ISSUES/CONCERNS?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Wildfire

- Wildfires occur on an annual basis in the Amador County Planning Area.
- Any ignition has the potential to become an out of control wildfire. Wildfire is one of the most significant hazard the County faces.
- 1 federal (2015 Butte Fire) and 1 state (1961Rancheria Creek Fire) disaster declarations for Wildfire since 1950; 23 NCDC wildfire events since 1993.
- CAN EACH PARTICIPATING JURISDICTION PROVIDE US IMPACTS/DAMAGES TO THEIR JURISDICTION FROM THE 2015 BUTTE FIRE and SAND FIRE?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Extremely High
- Priority Hazard

Amador County Priority Hazards

- Agricultural Hazards: Severe Weather/ Insect-Pests
- Avalanche?
- Climate Change
- Dam Failure
- Drought & Water Shortage
- Earthquake
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Landslide, Mudslide & Debris Flows
- Levee Failure
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (wind, hail, lightning)
- Severe Weather: High Winds and Tornadoes
- Severe Weather: Winter Storms and Freeze
- Wildfire

Non-Priority Hazards:

- Aquatic Invasive Species

Jurisdiction: _____

Priority Hazards???

- Agricultural Hazards: Severe Weather/ Insect-Pests
- Aquatic Invasive Species
- Avalanche
- Climate Change
- Dam Failure
- Drought & Water Shortage
- Earthquake
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Landslide, Mudslide & Debris Flows
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- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (wind, hail, lightning)
- Severe Weather: High Winds and Tornadoes
- Severe Weather: Winter Storms and Freeze
- Wildfire

Data Needs

Review of Key Items to date:

- Hazard-specific data
    - Hazard ID tables
    - Historic Hazard Worksheets or list of past hazard occurrences and impacts to each jurisdiction
        - Old participating jurisdictions – need past occurrences/hazard history since 2014
        - New participating jurisdictions –significant hazard occurrences - back 50 years or so
- Risk Assessment Worksheets
- 2014 Mitigation Action Status Update
- Data on future development areas (County/Cities)

Other Data Items:

General:

- Logos for each participating jurisdiction
- Historic Hazard Data and Key problem areas affected by Hazard by Jurisdiction
- EOC Activations
- PA Summaries
- Photos, Photos, Photos
- Review of Updated Chapter 4 Risk Assessment and Jurisdictional Annexes
- List of Mitigation Actions for each participating jurisdiction for each Priority Hazard
- Other?

Mitigation Strategy: Goals

The most important element of the LHMP is the resulting mitigation strategy which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy is comprised of three components:

1. Mitigation Goals
2. Mitigation Actions
3. Action (Implementation) Plan

Mitigation Goals

Up to now, the HMPC has been involved in collecting and providing data for the Amador County Local Hazard Mitigation Plan Update. From this information, a Risk Assessment has been developed that describes the risk and vulnerability of the Amador County Planning Area to identified hazards and includes an assessment of the area's current capabilities for countering these threats through existing policies, regulations, programs, and projects.

This analysis identifies areas where improvements could or should be made. Formulating Goals will lead us to incorporating these improvements into the Mitigation Strategy portion of the LHMP. Our planning goals should provide direction for what loss reduction activities can be undertaken to make the planning area more disaster resistant.

Mitigation Goals are general guidelines that represent the community's vision for reducing or avoiding losses from identified hazards. Goals are stated without regard for achievement, that is, implementation cost, schedule, and means are not considered. Goals are public policy statements that:

- Represent basic desires of the jurisdiction;
- Encompass all aspects of planning area, 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.

While goals are not specific (quantitative), they should not be so general as to be meaningless or unachievable.

Goals statements will form the basis for objectives. They should be stated in such a way as to develop one or more objectives related to each goal.

The key point in writing goals is to remember that they must deal with results, not the activities that produce those results.

Finally, before we formulate our goals, we should discuss other planning area goals from other regional/county/city programs and priorities. This keeps us from "reinventing the wheel," as well as being consistent with Multi-Objective Management --- or "MOM" --- where communities strive for efficiency by combining projects/needs that are similar in nature or location. Utilizing "MOM" effectively can result in identifying multiple sources of funding that can be "packaged" and broadening the supporting constituency base by including "outcomes" desired by various stakeholder groups.

Types/Sources of other area mitigation plans and programs include:

- General Plans
- Stormwater Program and Plans
- Flood/Watershed Management Plans and Studies
- Drought Plans
- Community Wildfire Protection Plans
- Strategic Fire Plans
- Dam Emergency Action Plans
- Emergency Operations Plans
- Climate Adaptation Plans
- Other?

Sample Goals from other Plans

Goals from the 2018 California State Hazard Mitigation Plan

1. Significantly reduce life loss and injuries.

2. Minimize damage to structures and property, as well as minimizing interruption of essential services and activities.

3. Protect the environment.

4. Promote community resilience through integration of hazard mitigation with public policy and standard business practices.

Goals from the Amador County General Plan ***Safety Element, 2016***

Purpose: The purpose of the Safety Element is to reduce or avoid potential hazards to community residents, structures, community facilities, and infrastructure. This element identifies actions needed to manage crisis situations such as earthquakes, fires, and floods. Specific policies and guidance to regulate development in hazard-prone areas (such as floodplains, seismic risk areas, or high fire-danger areas) are included. The objectives of the Safety Element include:

- Reduce risks associated with earthquakes, fires, floods, and other natural and human-caused disasters; and,

- Respond effectively to emergencies

Goals:

Flood Hazards

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 100year 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.

Fire Hazards

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 to maximize fire protection capabilities across the county.

Seismic and Geologic Hazards

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.

Mining and Hazardous Materials Sites

Goal S-6: Protect people and resources from hazards posed by mining facilities and hazardous materials site.

Public Safety and Emergency Preparedness

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 facilities during emergencies, including flood emergencies.

Amador County Community Wildfire Protection Plan (CWPP), 2005

- Identify and prioritize the most critical fuel reduction projects.
- Provide the AFSC with planning and background information to obtain grants and secure funds for future fuel reduction projects or other project work.
- Provide a summary of alternatives that are currently feasible to reduce fuels.
- Create a Property Owners Fire Information package that is suitable for reproduction and dissemination.

Amador County 2014 LHMP Update (This is what we are updating)

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

- Minimize economic and resource impact
- Minimize impact to both existing and future development
- Prevent and reduce agricultural losses
- Minimize risk and vulnerability of the community to wildfire
- Minimize risk and vulnerability of the community to flood

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

- Update and maintain list of critical facilities: Essential Services, At-Risk Populations, Hazardous Materials Facilities

Goal #3: Improve community 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

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

- Improve community capability to mitigate hazards and reduce losses
- Increase the capacity to respond, countywide

- Improve interagency (local, state, federal) emergency coordination, communication, and operational capacity to ensure effective community preparedness, response and recovery
- Enhance the use of shared resources/Develop a strong mutual aid support system
- Make better use of technology
- 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
- Consider environmental requirements (NEPA/CEQA) in the early stages of project planning and implementation

Goals Development

You will each be given 3 sticky notes. On each note you will write what you think the goals for this mitigation planning effort should be. To get you started, provided below are possible goals for this mitigation plan. You may reword these or develop your own. These goal statements should serve as examples. It is vital that our Hazard Mitigation Planning Committee establish its own goals. Use one note card for each goal. The purpose of the goal development is to reach a consensus on plan goals.

- Minimize risk and vulnerability from natural hazards
- Increase communities' awareness of vulnerability to hazards
- Increase the use of shared resources
- Improve communities' capabilities to mitigate losses
- Maintain coordination of disaster plans with changing DHS/FEMA needs
- Maintain FEMA eligibility/position jurisdictions for grant funding
- Maintain/enhance the flood mitigation program to provide 200/500-year flood protection
- Maintain current service levels
- Provide protection for existing buildings from hazards
- Provide protection for future development from hazards
- Provide protection for natural and cultural resources from hazard impacts
- Provide protection for people's lives from hazards
- Provide protection for public health
- Provide protection for critical services (fire, police, etc.) from hazard impacts
- Provide protection for critical lifeline utilities from hazard impacts
- Reduce exposure to hazard related losses
- Reduce the number of emergency incidents
- Make better use of technology

When done, we will:

- Pin/tape them to the wall/easel-chart and arrange them by category
- Combine and reword them into 3-4 goals for the plan.

Mitigation Strategy Meetings
February 19 & 20, 2020
Day 2

Mitigation Strategy: Actions

Mitigation Actions are specific projects and activities that help achieve the goals and accomplish risk reduction in the community.

Categories of Mitigation Measures

PREVENTION: Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open Space Preservation
- Land Development Regulations
  - ✓ Subdivision regulations
  - ✓ Building Codes
    - Fire-Wise Construction
  - ✓ Floodplain development regulations
  - ✓ Geologic Hazard Areas development regulations (for roads too!)
- Storm Water Management
- Fuels Management, Fire-Breaks

EMERGENCY SERVICES: protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (flooding, tornadoes, winter storms, geologic hazards, fire)
  - ✓ NOAA Weather Radio
  - ✓ Sirens
  - ✓ "Reverse 911" (Emergency Notification System)
- Emergency Response
  - ✓ Evacuation & Sheltering
  - ✓ Communications
  - ✓ Emergency Planning
    - Activating the EOC (emergency management)
    - Closing streets or bridges (police or public works)
    - Shutting off power to threatened areas (utility company)
    - Holding/releasing children at school (school district)
    - Ordering an evacuation (mayor)
    - Opening emergency shelters (Red Cross)
    - Monitoring water levels (engineering)
    - Security and other protection measures (police)
- Critical Facilities Protection (Buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)

- ✓ Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
- ✓ Lifeline Utilities Protection

➢ Post-Disaster Mitigation

➢ Building Inspections
- ✓ ID mitigation opportunities & funding before reconstruction

PROPERTY PROTECTION: Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

➢ Retrofitting/disaster proofing
- ✓ Floods
  - Wet/Dry floodproofing (barriers, shields, backflow valves)
  - Relocation/Elevation
  - Acquisition
  - Retrofitting
- ✓ High Winds/Tornadoes
  - Safe Rooms
  - Securing roofs and foundations with fasteners and tie-downs
  - Strengthening garage doors and other large openings
- ✓ Winter Storms
  - Immediate snow/ice removal from roofs, tree limbs
  - "Living" snow fences
- ✓ Geologic Hazards (Landslides, earthquakes, sinkholes)
  - Anchoring, bracing, shear walls
  - Dewatering sites, agricultural practices
  - Catch basins
- ✓ Drought
  - Improve water supply (transport/storage/conservation)
  - Remove moisture competitive plants (Tamarisk/Salt Cedar)
  - Water Restrictions/Water Saver Sprinklers/Appliances
  - Grazing on CRP lands (no overgrazing-see Noxious Weeds)
  - Create incentives to consolidate/connect water services
  - Recycled wastewater on golf courses
- ✓ Wildfire, Grassfires
  - Replacing building components with fireproof materials
  - Roofing, screening
  - Create "Defensible Space"
  - Installing spark arrestors
  - Fuels Modification

- ✓ Noxious Weeds/Insects
  - Mowing
  - Spraying
  - Replacement planting
  - Stop overgrazing
  - Introduce natural predators
- Insurance

NATURAL RESOURCE PROTECTION: Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- storage of floodwaters
- absorption of flood energy
- reduction in flood scour
- infiltration that absorbs overland flood flow
- groundwater recharge
- removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- habitat for flora and fauna
- recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Wetlands Protection
- Riparian Area/Habitat Protection/Threatened-Endangered Species
- Erosion & Sediment Control
- Best Management Practices

Best management practices ("BMPs") are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project's design to permanently address nonpoint source pollutants. There are three general categories of BMPs:

4. Avoidance: setting construction projects back from the stream.
5. Reduction: Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
6. Cleanse: Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained

- Dumping Regulations
- Set-back regulations/buffers

- Fuels Management
- Water Use Restrictions
- Landscape Management
- Weather Modification

STRUCTURAL: Projects that have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they "stop" flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

- They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.
- They disturb the land and disrupt natural water flows, often destroying habitats or requiring Environmental Assessments.
- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/Retention structures
- Erosion and Sediment Control
- Basins/Low-head Weirs
- Channel Modifications
- Culvert resizing/replacement/Maintenance
- Levees and Floodwalls
- Anchoring, grading, debris basins (for landslides)
- Fencing (for snow, sand, wind)
- Drainage System Maintenance
- Reservoirs (for flood control, water storage, recreation, agriculture)
- Diversions
- Storm Sewers

PUBLIC INFORMATION: A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection

- Hazard Maps and Data
- Outreach Projects (mailings, media, web, speakers, displays)
- Library Resources
- Real Estate Disclosure
- Environmental Education

Mitigation Strategy: Action Plan

The mitigation action plan describes how the mitigation actions will be implemented, including how those actions will be prioritized, administered, and incorporated into the community's existing planning mechanism. Each participating jurisdiction must have a mitigation action(s) and an action plan specific to that jurisdiction and its priority hazards and vulnerabilities.

Mitigation Criteria

For use in selecting and prioritizing Proposed Mitigation Measures

1. STAPLEE

Social: Does the measure treat people fairly? (different groups, different generations)

- Community Acceptance
- Effect on Segment of Population
- Social Benefits

Technical: Will it work? (Does it solve the problem? Is it feasible?)

- Technical Feasibility
- Reduce Community Risk
- Long Term Solution/Sustainable
- Secondary Impacts

Administrative: Do you have the capacity to implement & manage project?

- Staffing
- Funding Allocated
- Maintenance/Operations

Political: Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support?

- Political Support
- Local Champion
- Public Support
- Achieves Multiple Objectives
- Supported by a broad array of Stakeholders

Legal: Does your organization have the authority to implement? Is it legal? Are there liability implications?

- Existing Local Authority
- State Authority
- Potential Legal Challenges

Economic: Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development?

- Benefit of Action
- Cost of Action
- Cost Effective/Economic Benefits
- Economically Viable
- Outside Funding Required

Environmental: Does it comply with Environmental regulations?

- Effect on Land/Water
- Effect on Endangered Species
- Effect on Cultural Resources
- Effect on Hazmat sites
- Consistent with Community Environmental Goals
- Consistent with Environmental Laws
- Environmental Benefits

2. SUSTAINABLE DISASTER RECOVERY

- Quality of Life
- Social Equity
- Hazard Mitigation
- Economic Development
- Environmental Protection/Enhancement
- Community Participation

3. SMART GROWTH PRINCIPLES

- Infill versus Sprawl
- Efficient Use of Land Resources
- Full Use of Urban Resources
- Mixed Uses of Land
- Transportation Options
- Detailed, Human-Scale Design

4. OTHER

- Does measure address area with highest risk?
- Does measure protect …
  - ✓ The largest # of people exposed to risk?
  - ✓ The largest # of buildings?
  - ✓ The largest # of jobs?
  - ✓ The largest tax income?
  - ✓ The largest average annual loss potential?
  - ✓ The area impacted most frequently?

- ✓ Critical Infrastructure (access, power, water, gas, telecommunications)
- Timing of Available funding
- Visibility of Project
- Community Credibility

Mitigation Action Prioritization Instructions

Our Team recommendations are listed on flip-chart paper around the room.

You each have 3 sets of colored dots:

- 3 red dots
- 3 blue dots
- 3 green dots

The red dots are for high priority (5 points each)

The blue dots are for medium priority (3 points each)

The green dots are for low priority (1 point each)

Place your dots on the recommendations, using the different colors to indicate your priority. You may use as many of your dots, of any color, on any recommendation --- or you may spread them out using as few of your dots as you wish. The dots will indicate the consensus of the team.

Use your list of criteria to help you make your determinations.

After the totals are counted, we will discuss them further to confirm or change any of the results as we see fit.

Mitigation Action Worksheet

Jurisdiction:	
Mitigation Action/Project Title:	
Hazards Addressed:	
Issue/Background:	
Project Description:	
Other Alternatives:	
Existing Planning Mechanism(s) through which Action Will Be Implemented:	
Responsible Office/Partners:	
Cost Estimate:	
Benefits (Losses Avoided):	
Potential Funding:	
Timeline:	
Project Priority:	

Worksheet completed by:	
Name and Title:	
Phone:	

Amador County
Local Hazard Mitigation Plan Update
Mitigation Strategy Meetings: Mitigation Actions v/1
February 19 and 20, 2020

Responsible Department/ Staff	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
County/Cities (FM to complete worksheet) Other Juris?	Public awareness, education, outreach, and preparedness program enhancements for all hazards – whole community (all local jurisdictions), consistent messaging, utilizing a variety of mechanisms (multi-media, educate and clarify various emergency systems, messaging and training; promote self-responsibility)	Public Outreach/ Multi-hazard	20
County/Cities (FM to complete worksheet)	Incorporate LHMP Update by reference through council adoption into the safety element of the General Plan	Multi-hazard	N/A*
County Other?	Establish siren system (include education piece)	Emergency Services/ Multi-hazard	9
County Other?	Enhance agency communications – cell phones, radios, Other	Emergency Services/ Multi-hazard	11
County	Reverse 911 enhancements	Emergency Services/ Multi-hazard	N/A*
County Other?	Amador County evacuation planning for all hazards; include establishment of sheltering in place and refuge areas (to include all critical hazards, at risk populations, medical, ADA, animals)	Emergency Services/ Multi-hazard	13
County Other?	Evaluate and implement shelter upgrades	Emergency Services/ Multi-hazard	N/A*
County Other?	Establish a County-based GIS program to encompass hazard data (multi-agency, public access)	Emergency Services/ Multi-hazard	31
County/Cities	PRC 4290 – Compliant street/address signage	Emergency Services/ Multi-hazard	2
County/Cities Other?	Enhance access in wildfire prone areas	Emergency Services/ Multi-hazard	1
All jurisdictions	Multi-agency regional, integrated planning for PSPS issues	Emergency Services/Multi-hazard	N/A*
All jurisdictions	Establish backup power/generators for critical facilities	Emergency Services/Multi-hazard	33
County/Cities	Evaluate land use/establish hazard constraints and overlays	Multi-hazard	N/A*
County/Cities	Undergrounding utilities (focus on wildfire risk areas)	Multi-hazard	5

Responsible Department/ Staff	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
County/Cities	Climate Change Adaptation Planning	Climate Change	0
All jurisdictions	Greenhouse emissions reduction	Climate Change	0
County	Evaluate early warning systems	Emergency Services/Dam Failure	3
All jurisdictions	Water supply infrastructure improvements	Drought & Water Shortage	3
County Others?	Participation in regional water management plan	Drought & Water Shortage	0
County/Cities	URM and vulnerable structures inventory and retrofits	Earthquake	0
AWA	Canal retrofits	Earthquake	2
JVID	High Hazard Dam Seismic evaluation (e.g., Jackson Creek)	Earthquake	11
County/ Cities	Flood Ordinance review and update	Flood	5
County/ Cities	Develop and Implement Stormwater Master Plan and implement resulting projects	Flood	22
All Jurisdictions	Establish watershed-based flood reduction program and implement resulting projects	Flood	22
All Jurisdictions	Creek maintenance/vegetation removal (upcountry to down country)	Flood	17
All Jurisdictions	Silt/sedimentation/debris removal	Flood	9
Jackson	Relocate sewer (gravity fed) from center of stream	Flood	5
County/Cities	Culvert upgrades/upsizing	Flood	5
Sutter Creek	Stream bank repairs	Flood	2
Sutter Creek	Street is undermined by creek; install drainage pipe or otherwise determine how to drain	Flood	1
Amador City	Stone wall replacement	Flood	3
Amador City	Develop system to capture drainage	Flood	0
County Cities	Stormwater system improvements/retrofits	Flood	5
JVID	Enlarge box culverts	Flood	1
County/Cities	Enlarge box culverts in areas of creek crossings (Hale Road, New Chicago road, Quartz Mt Road, Volcano road, Amador Creek road, etc.)	Flood	3
County/Cities	Bridge enhancements/replacements	Flood	0
Jackson	Rose Lane, Piccardo, other bridges – identify solution to prevent backup and flooding	Flood	8
Ione	Replacement of 5-mile Bridge	Flood	0
County	Old Sacramento Road – raise road/culvert replacements	Flood	8
River Pines	Road Repairs and culvert projects	Flood	5
Sewer Agencies	Implement sewer upgrades (e.g. lift stations, generators, etc.)	Flood	N/A*

Responsible Department/ Staff	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
County	Develop/update Heat Contingency Plan with options for cooling center, transportation, public education	Extreme Heat	0
All jurisdictions	Tree mitigation	Drought/ Extreme Heat/ Heavy Rains and Storms/High Winds/Wildfire	9
County	Mitigation Shake Ridge Road	Landslide/ mudslide/debris flow	8
County/Cities	Identify and mitigate problem landslide and slip out areas (Jackson to include for Mattley St, above Mels, etc.)	Landslide/ mudslide/debris flow	0
AWA	Canal improvements	Landslide/ mudslide/debris flow	19
FSC/ All jurisdictions	Update CWPPs and project implementation	Wildfire	0
County/Cities	Fire (vegetation management) ordinance enhancements, including enforcement, ability to mitigate vacant lots, other	Wildfire	52
County Cities/FSC	Insurance – evaluate alternatives for obtaining insurance (possible defensible space "certificate" program	Wildfire	40
All jurisdictions	Water storage/supply enhancements	Drought/ Wildfire	46
AWA	Consolidate tanks/pump station	Wildfire	11
County/Cities	Evaluate the use of impact fees for capital	Wildfire	11
Fire Agencies	Control burns	Wildfire	0
County/Fire Agencies	Install cameras in remote areas for early detection	Wildfire	2
County/Cities	Home hardening	Wildfire	11
All jurisdictions	Defensible space	Wildfire	41
All jurisdictions	Fuel breaks	Wildfire	22
All jurisdictions	Fuels reduction/modifications	Wildfire	29
County/Cities	Ordinance Review/Enhance requirements for new development	Wildfire	5
County/ FSC Fire Agencies	Promote Firewise communities	Wildfire	3
County/Cities	Wildfire Ordinance review and update to include Ignition resistant development and standards	Wildfire	0
All jurisdictions	Scotch Broom eradication	Ag Hazard/Wildfire	0

*N/A – scoring is not applicable; project added after mitigation strategy meetings

Appendix D Adoption Resolution

Note to Reviewers: When this plan has been reviewed and approved pending adoption by FEMA Region IX, the adoption resolutions will be signed by the participating jurisdictions and added to this appendix. Two model resolutions are provided below. The first sample resolution is for the County and incorporated communities; the second is for participating districts.

Sample Resolution: Amador County and incorporated communities

Resolution # _____

Adopting the Amador County Local Hazard Mitigation Plan Update

WHEREAS, The (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

WHEREAS, the U.S. Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards; and

WHEREAS, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments; and

WHEREAS, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS, the (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) fully participated in the FEMA-prescribed mitigation planning process to prepare this local hazard mitigation plan; and

WHEREAS, the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials have reviewed the Amador County Local Hazard Mitigation Plan and approve it contingent upon this official adoption of the participating governing body; and

WHEREAS, the (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Amador County Local Hazard Mitigation Plan by reference into the Safety Element of the General Plan in accordance with the requirements of AB 2140; and

WHEREAS, adoption by the governing body for the (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this Local Hazard Mitigation Plan; and

WHEREAS, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

NOW, THEREFORE, BE IT RESOLVED that the (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) adopts the Amador County Local Hazard Mitigation Plan as an official plan; and

BE IT RESOLVED, that the (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) adopts the Amador County Local Hazard Mitigation Plan by reference into the safety element of their general plan in accordance with the requirements of AB 2140; and

BE IT FURTHER RESOLVED, the (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) will submit this adoption resolution to the California Office of Emergency Services and FEMA Region IX officials to enable the plan's final approval in accordance with the requirements of the Disaster Mitigation Act of 2000 and to establish conformance with the requirement of AB 2140.

Passed:_____
(date)

_____
Certifying Official

Sample Resolution: Special Districts in Amador County

Resolution # _____

Adopting the Amador County Local Hazard Mitigation Plan Update

Whereas, (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) recognizes the threat that natural hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

Whereas, the U.S. Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

Whereas, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments;

Whereas, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, (Name of Government/District/Organization) fully participated in the FEMA-prescribed mitigation planning process to prepare this local hazard mitigation plan; and

Whereas, the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials have reviewed the Amador County Local Hazard Mitigation Plan and approved it contingent upon this official adoption of the participating governing body;

Whereas, the (Name of Government/District/Organization) desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Amador County Local Hazard Mitigation Plan;

Whereas, adoption by the governing body for the (Name of Government/District/Organization), demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this Local Hazard Mitigation Plan.

Whereas, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

Now, therefore, be it resolved, that the (Name of Government/District/Organization) adopts the Amador County Local Hazard Mitigation Plan as an official plan; and

Be it further resolved, (Name of Government/District/Organization) will submit this adoption resolution to the California Office of Emergency Services and FEMA Region IX officials to enable the plan's final approval in accordance with the requirements of the Disaster Mitigation Act of 2000.

Passed:_____
(date)

_____
Certifying Official

Appendix E Threatened and Endangered Species

Table E-1 Special Status Species in Amador County

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Animals - Amphibians					
Ambystoma californiense	California tiger salamander	Threatened	Threatened	WL	–
Ambystoma macrodactylum sigillatum	southern long-toed salamander	None	None	SSC	–
Batrachoseps diabolicus	Hell Hollow slender salamander	None	None	–	–
Rana boylii	foothill yellow-legged frog	None	Candidate Threatened	SSC	–
Rana draytonii	California red-legged frog	Threatened	None	SSC	–
Rana muscosa	southern mountain yellow-legged frog	Endangered	Endangered	WL	–
Rana sierrae	Sierra Nevada yellow-legged frog	Endangered	Threatened	WL	–
Spea hammondii	western spadefoot	None	None	SSC	–
Animals - Arachnids					
Banksula grubbsi	Grubbs' cave harvestman	None	None	–	–
Banksula rudolphi	Rudolph's cave harvestman	None	None	–	–
Animals - Birds					
Aquila chrysaetos	golden eagle	None	None	FP ; WL	–
Elanus leucurus	white-tailed kite	None	None	FP	–
Haliaeetus leucocephalus	bald eagle	Delisted	Endangered	FP	–
Ardea alba	great egret	None	None	–	–
Ardea herodias	great blue heron	None	None	–	–
Falco mexicanus	prairie falcon	None	None	WL	–
Spinus lawrencei	Lawrence's goldfinch	None	None	–	–
Gavia immer	common loon	None	None	SSC	–
Agelaius tricolor	tricolored blackbird	None	Threatened	SSC	–
Icteria virens	yellow-breasted chat	None	None	SSC	–
Picoides arcticus	black-backed woodpecker	None	None	–	–
Strix nebulosa	great gray owl	None	Endangered	–	–
Strix occidentalis occidentalis	California Spotted Owl	None	None	SSC	–
Aquila chrysaetos	golden eagle	None	None	FP ; WL	–

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Elanus leucurus	white-tailed kite	None	None	FP	–
Haliaeetus leucocephalus	bald eagle	Delisted	Endangered	FP	–
Ardea alba	great egret	None	None	–	–
Ardea herodias	great blue heron	None	None	–	–
Falco mexicanus	prairie falcon	None	None	WL	–
Spinus lawrencei	Lawrence's goldfinch	None	None	–	–
Gavia immer	common loon	None	None	SSC	–
Agelaius tricolor	tricolored blackbird	None	Threatened	SSC	–
Icteria virens	yellow-breasted chat	None	None	SSC	–
Picoides arcticus	black-backed woodpecker	None	None	–	–
Strix nebulosa	great gray owl	None	Endangered	–	–
Strix occidentalis occidentalis	California Spotted Owl	None	None	SSC	–
Animals - Crustaceans					
Branchinecta lynchi	vernal pool fairy shrimp	Threatened	None	–	–
Stygobromus gradyi	Grady's Cave amphipod	None	None	–	–
Stygobromus grahami	Graham's Cave amphipod	None	None	–	–
Linderiella occidentalis	California linderiella	None	None	–	–
Animals - Fish					
Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	Threatened	None	–	–
Animals - Insects					
Bombus morrisoni	Morrison bumble bee	None	None	–	–
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	Threatened	None	–	–
Chrysis tularensis	Tulare cuckoo wasp	None	None	–	–
Atractelmis wawona	Wawona riffle beetle	None	None	–	–
Lepidostoma ermanae	Cold Spring caddisfly	None	None	–	–
Animals - Mammals					
Vulpes vulpes necator	Sierra Nevada red fox	Candidate	Threatened	–	–
Erethizon dorsatum	North American porcupine	None	None	–	–
Gulo gulo	California wolverine	Proposed Threatened	Threatened	FP	–
Martes caurina sierrae	Sierra marten	None	None	–	–
Pekania pennanti	fisher - West Coast DPS	None	Threatened	SSC	–
Taxidea taxus	American badger	None	None	SSC	–
Ochotona princeps schisticeps	gray-headed pika	None	None	–	–
Antrozous pallidus	pallid bat	None	None	SSC	–

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Corynorhinus townsendii	Townsend's big-eared bat	None	None	SSC	–
Myotis evotis	long-eared myotis	None	None	–	–
Animals - Mollusks					
Anodonta californiensis	California floater	None	None	–	–
Animals - Reptiles					
Emys marmorata	western pond turtle	None	None	SSC	–
Thamnophis gigas	giant gartersnake	Threatened	Threatened	–	–
Phrynosoma blainvillii	coast horned lizard	None	None	SSC	–
Community - Aquatic					
–	Central Valley Drainage Hardhead/Squawfish Stream	None	None	–	–
Community - Terrestrial					
–	Ione Chaparral	None	None	–	–
–	Northern Hardpan Vernal Pool	None	None	–	–
Plants - Bryophytes					
Bryum chryseum	brassy bryum	None	None	–	4.3
Orthotrichum holzingeri	Holzinger's orthotrichum moss	None	None	–	1B.3
Plants - Lichens					
Peltigera gowardii	western waterfan lichen	None	None	–	4.2
Plants - Vascular					
Chlorogalum grandiflorum	Red Hills soaproot	None	None	–	1B.2
Allium tribracteatum	three-bracted onion	None	None	–	1B.2
Eryngium pinnatisectum	Tuolumne button-celery	None	None	–	1B.2
Tauschia glauca	glaucous tauschia	None	None	–	4.3
Balsamorhiza macrolepis	big-scale balsamroot	None	None	–	1B.2
Jensia yosemitana	Yosemite tarplant	None	None	–	3.2
Githopsis pulchella ssp. serpentinicola	serpentine bluecup	None	None	–	4.3
Stellaria obtusa	obtuse starwort	None	None	–	4.3
Crocanthemum suffrutescens	Bisbee Peak rush-rose	None	None	–	3.2
Dryopteris filix-mas	male fern	None	None	–	2B.3
Arctostaphylos myrtifolia	Ione manzanita	Threatened	None	–	1B.2
Lathyrus sulphureus var. argillaceus	dubious pea	None	None	–	3
Calochortus clavatus var. avius	Pleasant Valley mariposa-lily	None	None	–	1B.2

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Lilium humboldtii ssp. humboldtii	Humboldt lily	None	None	–	4.2
Claytonia parviflora ssp. grandiflora	streambank spring beauty	None	None	–	4.2
Lewisia kelloggii ssp. hutchisonii	Hutchison's lewisia	None	None	–	3.2
Clarkia virgata	Sierra clarkia	None	None	–	4.3
Botrychium ascendens	upswept moonwort	None	None	–	2B.3
Botrychium crenulatum	scalloped moonwort	None	None	–	2B.2
Botrychium minganense	Mingan moonwort	None	None	–	2B.2
Botrychium montanum	western goblin	None	None	–	2B.1
Cypripedium montanum	mountain lady's-slipper	None	None	–	4.2
Piperia colemanii	Coleman's rein orchid	None	None	–	4.3
Erythranthe inconspicua	small-flowered monkeyflower	None	None	–	4.3
Erythranthe laciniata	cut-leaved monkeyflower	None	None	–	4.3
Erythranthe marmorata	Stanislaus monkeyflower	None	None	–	1B.1
Sphenopholis obtusata	prairie wedge grass	None	None	–	2B.2
Navarretia myersii ssp. myersii	pincushion navarretia	None	None	–	1B.1
Eriogonum apricum var. apricum	Ione buckwheat	Endangered	Endangered	–	1B.1
Eriogonum apricum var. prostratum	Irish Hill buckwheat	Endangered	Endangered	–	1B.1
Eriogonum tripodum	tripod buckwheat	None	None	–	4.2
Delphinium hansenii ssp. ewanianum	Ewan's larkspur	None	None	–	4.2
Horkelia parryi	Parry's horkelia	None	None	–	1B.2
Bolandra californica	Sierra bolandra	None	None	–	4.3
Jepsonia heterandra	foothill jepsonia	None	None	–	4.3

Sources: California Natural Diversity Database BIOS Viewer Tool

Federal Status

Endangered: The classification provided to an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range.

Threatened: The classification provided to an animal or plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Proposed Endangered: The classification provided to an animal or plant that is proposed for federal listing as Endangered in the Federal Register under Section 4 of the Endangered Species Act.

Proposed Threatened: The classification provided to an animal or plant that is proposed for federal listing as Threatened in the Federal Register under Section 4 of the Endangered Species Act.

Candidate: The classification provided to an animal or plant that has been studied by the United States Fish and Wildlife Service, and the Service has concluded that it should be proposed for addition to the Federal Endangered and Threatened species list.

None: The plant or animal has no federal status.

Delisted: The plant or animal was previously listed as Endangered or Threatened, but is no longer listed on the Federal Endangered and Threatened species list.

CDFW Status

FP: Fully Protected: This classification was the State of California's initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction.

SSC: Species of Special Concern: To this end, the Department has designated certain vertebrate species as "Species of Special Concern" because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction. The goal of designating species as "Species of Special Concern" is to halt or reverse their decline by calling attention to their plight and addressing the issues of concern early enough to secure their long-term viability.

WL: Watch List: Species that were previously designated as "Species of Special Concern" but no longer merit that status, or which do not yet meet SSC criteria, but for which there is concern and a need for additional information to clarify status.

CA Rare Plant Rank

1A: Plants presumed extinct in California and rare/extinct elsewhere

1B.1: Plants rare, threatened, or endangered in California and elsewhere; seriously threatened in California

1B.2: Plants rare, threatened, or endangered in California and elsewhere; fairly threatened in California

1B.3: Plants rare, threatened, or endangered in California and elsewhere; not very threatened in California

2A: Plants presumed extirpated in California, but more common elsewhere

2B.1: Plants rare, threatened, or endangered in California, but more common elsewhere; seriously threatened in California

2B.2: Plants rare, threatened, or endangered in California, but more common elsewhere; fairly threatened in California

2B.3: Plants rare, threatened, or endangered in California, but more common elsewhere; not very threatened in California

3.1: Plants about which we need more information; seriously threatened in California

3.2: Plants about which we need more information; fairly threatened in California

3.3: Plants about which we need more information; not very threatened in California

4.1: Plants of limited distribution; seriously threatened in California

4.2: Plants of limited distribution; fairly threatened in California

4.3: Plants of limited distribution; not very threatened in California

Appendix F Critical Facilities

Table F-1 Amador County Critical Facilities

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Bridge 26C-0007: BUENA VISTA RD (MOKELUMNE R)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Extremely High Dam Inundation Area
JVFPD 171 - County	Fire Station	Essential Services	Amador County	2701 Curran Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
CAMANCHE HILLS HUNT CLUB - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
CDF 181 (Buena Vista) - Calfire	Fire Station	Essential Services	Amador County	4655 Coal Mine Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0003: BUENA VISTA RD (JACKSON CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	High Dam Inundation Area	Extremely High Dam Inundation Area
Bridge 26C-0012: CAMANCHE RD (JACKSON CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	High Dam Inundation Area	Extremely High Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
JVFPD 172 - County	Fire Station	Essential Services	Amador County	5700 Buena Vista Rd	Other Areas	Low	Moderate	High Dam Inundation Area	Extremely High Dam Inundation Area
Bridge 30C-0016: MIDDLE BAR RD (MOKELUMNE R)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	High	High Dam Inundation Area	Extremely High Dam Inundation Area
LAKE AMADOR - TREATED	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
LAKE AMADOR - RAW	Public Water System	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Extremely High Dam Inundation Area
MP ASSOCIATES - WELL 01 - TREATED - ARSENIC	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
MP ASSOCIATES - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0038: STONY CREEK RD (JACKSON CRK)	Bridge	Essential Services	Amador County		Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0011: COOK RD (DRY CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	High Dam Inundation Area	Extremely High Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Electra Rd Powerhouse	Power Plant	Essential Services	Amador County	End Electra Rd; Jackson	Other Areas	Low	High	High Dam Inundation Area	Outside of Dam Inundation Area
Electra Rd Substation	Power Substation	Essential Services	Amador County	Electra Rd; Jackson	Other Areas	Low	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Clay Substation	Power Substation	Essential Services	City of Ione	Hwy 124/1 mi S of Ione	Other Areas	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Howard Park	Evacuation Shelter	Essential Services	City of Ione		Other Areas	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
California Department of Motor Vehicles	DMV	Essential Services	City of Jackson	201 Clinton Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
California Highway Patrol (State)	Police Station	Essential Services	City of Jackson	301 Clinton Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Ione Junior High School (6-8)	School	At Risk Population	City of Ione	450 S Mill St	Other Areas	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Jackson City Hall	Public Administration Building	Essential Services	City of Jackson	33 Broadway	1% Annual Chance Flood Hazard	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Jackson Police Department (City)	Police Station	Essential Services	City of Jackson	33-D Broadway	1% Annual Chance Flood Hazard	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Ione Elementary School (K-5)	School	At Risk Population	City of Ione	415 S Ione St	Other Areas	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
IFD 161 - City	Fire Station	Essential Services	City of Ione	22 W. Jackson St	1% Annual Chance Flood Hazard	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Mountain Oaks Charter School ( )	School	At Risk Population	City of Ione	217 W. Jackson St	1% Annual Chance Flood Hazard	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
JFD 131 - City	Fire Station	Essential Services	City of Jackson	175 Main St	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Foothill Indian Ed. Alliance AfterSch (K-6)	School	At Risk Population	City of Ione	25 Sacramento St	1% Annual Chance Flood Hazard	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
The HUB Youth and Community Center	Community Center	Essential Services	City of Jackson	206 N Main St	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Sutter Amador Hospital	Hospital	Essential Services	City of Jackson	200 Mission Blvd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Jackson Elementary School (K-5)	School	At Risk Population	City of Jackson	220 Church St	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Ione Post Office	Post Office	Essential Services	City of Ione	18 W Main St	1% Annual Chance Flood Hazard	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Sutter Amador Health Pediatric Center	Clinic	Essential Services	City of Jackson	200 Mission Blvd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Ione Police Department (City)	Police Station	Essential Services	City of Ione	1 E Main St	1% Annual Chance Flood Hazard	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Ione City Hall	Public Administration Building	Essential Services	City of Ione	1 E Main St	1% Annual Chance Flood Hazard	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Sutter Amador Women's Service	Clinic	Essential Services	City of Jackson	200 Mission Blvd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Ione Library	Library	Essential Services	City of Ione	25 E Main St	1% Annual Chance Flood Hazard	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Lodi Memorial Hospital Prime Med Clinic	Clinic	Essential Services	City of Ione	307 Preston Ave	1% Annual Chance Flood Hazard	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Amador County Sheriff's Department	EOC	Essential Services	City of Jackson	700 Court St	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador County Sheriff's Department (County)	Police Station	Essential Services	City of Jackson	700 Court St	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0002: FIVE MILE DR (SUTTER CRK)	Bridge	Essential Services	City of Ione		1% Annual Chance Flood Hazard	Low	Non-Very High	High Dam Inundation Area	Outside of Dam Inundation Area
Gold Country Medical Center	Clinic	Essential Services	City of Jackson	820 State Highway 88	1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador County Administration Center	Public Administration Building	Essential Services	City of Jackson	810 Court St	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Jackson Post Office	Post Office	Essential Services	City of Jackson	422 Sutter St	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Jackson Junior High School (6-8)	School	At Risk Population	City of Jackson	7475 Sutter St	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador County Unified School District Office	School District Office	Essential Services	City of Jackson	333 Rex Ave	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Jackson Gardens	Residential Care Facility	At Risk Population	City of Jackson	185 Placer Dr	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Sutter Family Medicine	Clinic	Essential Services	City of Jackson	815 Court St	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Kit Carson Convalescent	Residential Care Facility	At Risk Population	City of Jackson	811 Court St	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador Residential Care Facility	Residential Care Facility	At Risk Population	City of Jackson	155 Placer Dr	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador Superior Court	Court House	Essential Services	City of Jackson	500 Argonaut Ln	Other Areas	Moderate	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Jackson Library	Library	Essential Services	City of Jackson	530 Sutter St	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Oak Manor	Residential Care Facility	At Risk Population	City of Jackson	223 New York Ranch Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
United Home Care	Residential Care Facility	At Risk Population	City of Jackson	245 New York Ranch Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Sutter Family Practice	Clinic	Essential Services	City of Jackson	255 New York Ranch Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador Senior Center	Community Center	Essential Services	City of Jackson	255 New York Ranch Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Argonaut High School (9-12)	School	At Risk Population	City of Jackson	501 Argonaut Ln	Other Areas	Moderate	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
SUNSET WEST - WELL 01 - TREATED - IRON	Public Water System	Essential Services	Amador County		Other Areas	Moderate	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0032: FIVE MILE DR (FIVE MILE CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	High Dam Inundation Area	Outside of Dam Inundation Area
SUNSET WEST - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Moderate	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
American Legion Post 108; Station 6	EMS Station	Essential Services	City of Ione	853 Sutter Ln	Other Areas	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
American Legion Post 108; Station 1	EMS Station	Essential Services	City of Ione	857 Sutter Ln	Other Areas	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Sierra Wind Wellness and Recovery Center	Clinic	Essential Services	City of Jackson	10354 Argonaut Ln	Other Areas	Low	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
MELODY OAKS - WELL 02 - ABANDONED	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
MELODY OAKS - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
MELODY OAKS - WELL 01 - TREATED	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador Family Physicians	Clinic	Essential Services	City of Jackson	605 New York Ranch Rd	0.2% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
JFD 132 - City	Fire Station	Essential Services	City of Jackson	10600 Argonaut Dr	Other Areas	Low	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador County Mental Health	Clinic	Essential Services	Amador County	10877 Conductor blvd	Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0010: PREVITALI RD (JACKSON CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Mule Creek State Prison	Prison	Essential Services	City of Ione	4001 State Highway 104	Other Areas	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Martell Substation	Power Substation	Essential Services	Amador County	Hwy 49/0.5 mi N H88	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
MCSPFD - Calfire	Fire Station	Essential Services	City of Ione	4001 State Highway 104	Other Areas	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
WellSpace Health	Clinic	Essential Services	Amador County	11333 Prospect Dr	Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Ione Substation	Power Substation	Essential Services	City of Ione	Collins Rd/0.5mi N H104	Other Areas	Low	Non-Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador County Animal Control	Animal Shelter	Essential Services	Amador County	12340 Airport Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador County General Services Administration	Public Administration Building	Essential Services	Amador County	12200 Airport Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
American Legion Post 108; Station 2	EMS Station	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Amador County Veterans Services	Veterans Services	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
North Star Independent Study (K-12)	School	At Risk Population	City of Sutter Creek	525 Independence Dr	Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
CDF 60 (Sutter Hill) - Calfire	Fire Station	Essential Services	Amador County	11600 State Highway 49	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Independence Continuation High (9-12)	School	At Risk Population	City of Sutter Creek	525 Independence Dr	Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
The Arc of Amador and Calaveras	Community Center	Essential Services	City of Sutter Creek	75 Academy Dr	Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Gold Quartz Inn Retirement Home	Residential Care Facility	At Risk Population	City of Sutter Creek	15 Bryson Dr	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Jackson Rancheria Health Complex	Clinic	Essential Services	Amador County	12168 New York Ranch Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
MACT Health Board	Clinic	Essential Services	Amador County	12140 New York Ranch Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Sutter Creek Auditorium	Community Center	Essential Services	City of Sutter Creek	16 Main St	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Sutter Creek City Hall	Public Administration Building	Essential Services	City of Sutter Creek	18 Main St	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
SCFPD 142 - City	Fire Station	Essential Services	City of Sutter Creek	18 Main St	1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Sutter Creek Police Department (City)	Police Station	Essential Services	City of Sutter Creek	18 Main St	1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Sutter Creek Primary School (K-3)	School	At Risk Population	City of Sutter Creek	110 Broad St	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Sutter Creek Post Office	Post Office	Essential Services	City of Sutter Creek	3 Gopher Flat Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador High School (9-12)	School	At Risk Population	City of Sutter Creek	330 Spanish St	Other Areas	Low	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Sutter Creek Elementary School (4-6)	School	At Risk Population	City of Sutter Creek	340 Spanish St	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Bridge 26C-0041: SUTTER CREEK RD (SUTTER CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
SCFPD 141 - City	Fire Station	Essential Services	City of Sutter Creek	350 Hanford St	0.2% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
TABEAU MHP - WELL 02	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
TABEAU MHP - WELL 01 - DESTROYED	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0017: CARBONDALE RD (WILLOW CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
MALLO GOLD MINE PLAZA - WELL 02	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
MALLO GOLD MINE PLAZA - WELL 01 - INACTIVE	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0015: WILLOW CREEK RD (WILLOW CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Pine Grove Post Office	Post Office	Essential Services	Amador County	20116 State Highway 88	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Community Christian School (P-8)	School	At Risk Population	Amador County	14045 Ponderosa Wy	Other Areas	Low	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Pine Grove Substation	Power Substation	Essential Services	Amador County	H88/Irishtown Rd	Other Areas	Low	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
AFPD 114 - County	Fire Station	Essential Services	Amador County	14186 Irishtown Rd	Other Areas	Low	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Pine Grove Elementary School (K-6)	School	At Risk Population	Amador County	20101 State Highway 88	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Pine Grove Town Hall	Community Center	Essential Services	Amador County	19889 State Highway 88	Other Areas	Low	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Pine Grove Library	Library	Essential Services	Amador County	19889 State Highway 88	Other Areas	Low	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
CDF 80 (Zion) - Calfire	Fire Station	Essential Services	Amador County	19587 State Highway 88	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
SCFPD 143 - City	Fire Station	Essential Services	City of Amador City		Other Areas	Moderate	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador City Post Office	Post Office	Essential Services	City of Amador City	10781 Water St	Other Areas	Moderate	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador City City Hall	Public Administration Building	Essential Services	City of Amador City	14531 E School St	Other Areas	Moderate	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0042: OLD AMADOR RD (RANCHERIA CRK)	Bridge	Essential Services	Amador County		Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0043: BUNKER HILL RD (RANCHERIA CRK)	Bridge	Essential Services	Amador County		Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Pioneer Montessori Pre-School (P)	School	At Risk Population	Amador County	23714 St Hwy 88	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
AFPD 112 - County	Fire Station	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Pioneer Post Office	Post Office	Essential Services	Amador County	24282 State Highway 88	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
American Legion Post 108; Station 3	EMS Station	Essential Services	Amador County	24440 State Highway 88	1% Annual Chance Flood Hazard	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Pioneer Elementary School (K-6)	School	At Risk Population	Amador County	24625 State Highway 88	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Sutter Amador Health Pioneer	Clinic	Essential Services	Amador County	24685 State Highway 88	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
DRYTOWN - AWA PURCHASED SOURCE	Public Water System	Essential Services	Amador County		Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Drytown Post Office	Post Office	Essential Services	Amador County	15929 State Highway 49	Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0040: PINE GROVE VOLCANO RD (SUTTER CRK)	Bridge	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Pioneer Library	Library	Essential Services	Amador County	25070 Buckhorn Ridge Rd	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Pioneer Community Veterans Hall	Community Center	Essential Services	Amador County	25070 Buckhorn Ridge Rd	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Volcano Post Office	Post Office	Essential Services	Amador County	16120 Main St	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Armory Hall	Community Center	Essential Services	Amador County	21349 Consolation St	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0031: CARBONDALE RD (WILLOW CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
VOLCANO CSD - WELL 01 - STANDBY	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0030: CARBONDALE RD (WILLOW CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
VOLCANO CSD - CLEVELAND TUNNEL - TREATED	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
VOLCANO CSD - CLEVELAND TUNNEL - RAW	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Tiger Creek Powerhouse	Power Plant	Essential Services	Amador County	29000 Powerhouse Rd	Other Areas	Low	Very High	High Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
TIGER CREEK POWERHOUSE - TREATED	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	High Dam Inundation Area	Outside of Dam Inundation Area
TIGER CREEK POWERHOUSE - AFTEBAY - RAW	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	High Dam Inundation Area	Outside of Dam Inundation Area
AFPD 121 - County	Fire Station	Essential Services	Amador County	16850 Demartini Rd	Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
AMADOR CHRISTIAN CENTER - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador USFS Ranger Station	Ranger Station	Essential Services	Amador County	26820 Silver Dr	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
USFS Amador Ranger - USFS	Fire Station	Essential Services	Amador County	26820 Silver Dr	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
AFPD 111 - County	Fire Station	Essential Services	Amador County	26517 Meadow Dr	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
LFPD 152 - County	Fire Station	Essential Services	Amador County		Other Areas	Low	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
ALLAN ROAD HOA - SPRING 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
GOLDEN VALLEY CAMP - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
GOLDEN VALLEY CAMP - WELL 02	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
HOPE FOUNDATION - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Sutter Amador Health Plymouth	Clinic	Essential Services	City of Plymouth	9279 Locust St	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
AFPD 122 - County	Fire Station	Essential Services	City of Plymouth	18534 Sherwood St	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
American Legion Post 108; Station 5	EMS Station	Essential Services	City of Plymouth	18544 Sherwood St	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador County Fairgrounds	Evacuation Shelter	Essential Services	City of Plymouth	18621 Sherwood St	Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Bridge 26C-0009: LATROBE RD (LITTLE INDIAN CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0018: OLD SACRAMENTO RD (LITTLE INDIAN CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
DEER RIDGE INN - WELL #3 - DESTROYED	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
HOPE FOUNDATION - WELL 02	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
DEER RIDGE INN - WELL #2	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
DEER RIDGE INN - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Plymouth Elementary School (K-6)	School	At Risk Population	City of Plymouth	10601 Sherwood St	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Oleta Substation	Power Substation	Essential Services	City of Plymouth	Hwy49/Main St; Plymouth	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Plymouth City Hall	Public Administration Building	Essential Services	City of Plymouth	9426 Main St	Other Areas	Low	Urban Unzoned	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Plymouth Library	Library	Essential Services	City of Plymouth	9375 Main St	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Plymouth Post Office	Post Office	Essential Services	City of Plymouth	9477 Main St	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Amador County Juvenile Hall/Community (K-12)	School	At Risk Population	Amador County	10010 Shenandoah Rd	Other Areas	Low	High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
OK CORRAL - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
RANCHO DEL ORO - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0019: OLD SACRAMENTO RD (LITTLE INDIAN CRK)	Bridge	Essential Services	City of Plymouth		Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0033: SPRING VALLEY RD (LITTLE INDIAN CRK)	Bridge	Essential Services	Amador County		Other Areas	Moderate	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
LFPD 151 - County	Fire Station	Essential Services	Amador County	23141 Shake Ridge Rd	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0022: SHENANDOAH RD (BIG INDIAN CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0021: FIDDLETOWN RD (NORTH FORK DRY CRK)	Bridge	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0020: FIDDLETOWN RD (NORTH FORK DRY CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Fiddletown Community Center	Community Center	Essential Services	Amador County	14445 Fiddletown Rd	1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
AFPD 123 - County	Fire Station	Essential Services	Amador County	14410 Jibboom St	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0039: JIBBOOM ST (NORTH FORK DRY CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Salt Springs Powerhouse	Power Plant	Essential Services	Amador County	47 mi E of Jackson	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
BLACK S STATION - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Fiddletown Post Office	Post Office	Essential Services	Amador County	14283 Jibboom St	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
FIDDLETOWN CSD - WELL 02 - TREATED	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
FIDDLETOWN - WELL 01 - DESTROYED	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
ORO MADRE MOOSE - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
CDF 10 (Dew Drop) - Calfire	Fire Station	Essential Services	Amador County	29300 Dew Drop Cutoff	Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0001: LATROBE RD (CONSUMNES R)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	High	High Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Bridge 26C-0029: TYLER RD (SOUTH FORK COSUMNES R)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
COOK S STATION - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
COOK S STATION - WELL 02	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0013: BELL RD (PIGEON CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
SPINETTA VINEYARD - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
BEAR RIVER SOUTH SHORE - SPRING 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
BEAR RIVER GROUP CAMP - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0026: BELL RD (BIG INDIAN CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Bridge 26C-0027: BELL RD (EAST FORK INDIAN CRK)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
AMADOR HARVEST INN - WELL 01	Public Water System	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
River Pines Town Hall	Community Center	Essential Services	Amador County	22900 Canyon Ave	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
BEAR RIVER SUMMER HOME TRACT - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
River Pines Post Office	Post Office	Essential Services	Amador County	14754 Shenandoah Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
CDF 30 (Pine Lodge) - Calfire	Fire Station	Essential Services	Amador County	15035 Shenandoah Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0014: SHENANDOAH RD (SOUTH FORK CONSUMNES R)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
Bridge 26C-0028: LAWRENCE RD (SOUTH FORK CONSUMNES R)	Bridge	Essential Services	Amador County		1% Annual Chance Flood Hazard	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
CAMP WINTON - SPRING 01 - ABANDONED	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
CAMP WINTON - SPRING 02 - ABANDONED	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
CAMP WINTON - SPRING 03 - ABANDONED	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
CAMP WINTON - SPRING 04 - ABANDONED	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
HAM'S STATION - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
CAMP WINTON - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
RANCHO CICADA - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
BEAR RIVER LAKE RESORT - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
Bridge 26C-0016: UPTON RD (SOUTH FORK CONSUMNES R)	Bridge	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
CAMP RITCHIE	Public Water System	Essential Services	Amador County		Other Areas	Low	Very High	Outside of Dam Inundation Area	Outside of Dam Inundation Area
STOCKTON MUN FAMILY CAMP - PLASSE'S SPRING 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
PLASSES CABIN'S - PLASSE'S SPRING 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
S. SILVER LAKE HOA - SPRING 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
E. SILVER LAKE HOA - MEADOW SPRING	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
E. SILVER LAKE HOA - CREEK SPRING	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
E. SILVER LAKE HOA - MUD SPRING - ABANDONED	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Facility Name	Facility Type	Facility Category	Jurisdiction	Address	Flood Zone	Landslide Incidence and Susceptibility Area	FHSZ	High Hazard Dam Inundation	Extremely High Hazard Dam Inundation
KAY'S RESORT - WELL 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
E. SILVER LAKE HOA - TIMBERLINE SPRING	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
KIT CARSON LODGE - POLAR BEAR WELL	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
KIT CARSON LODGE - LODGE WELL - STANDBY	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
SILVER LAKE CAMPGROUND - SPRING 01	Public Water System	Essential Services	Amador County		Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area
KFD KwdMdws - County	Fire Station	Essential Services	Amador County	33540 Loop Rd	Other Areas	Low	Moderate	Outside of Dam Inundation Area	Outside of Dam Inundation Area

Source: Amador County GIS

Appendix G Wildfire History

Table G-1 Amador County Wildfire History

Wildfire Name	Date	Cause	Cause Description	GIS Acres
Amador City				
RANCHERIA	9/2/1961	14	Unknown / Unidentified	198.0
Amador City Total				**198.0**
Ione				
IRISH HILL	10/8/1961	14	Unknown / Unidentified	198.8
No Fire History	(blank)		No Fire	2,760.0
Ione Total				**2,958.8**
Jackson				
JACKSON	7/26/2005	10	Vehicle	5.1
No Fire History	(blank)		No Fire	2,286.6
Jackson Total				**2,291.7**
Plymouth				
HIGHWAY-16	7/6/2001	2	Equipment Use	23.8
PACIFIC MINE	7/18/1951	14	Unknown / Unidentified	2.1
RANCHERIA	9/2/1961	14	Unknown / Unidentified	1.6
No Fire History	(blank)		No Fire	1,672.9
Plymouth Total				**1,700.5**
Sutter Creek				
RANCHERIA	9/2/1961	14	Unknown / Unidentified	166.5
SUTTER CREEK	9/2/1961	14	Unknown / Unidentified	159.3
No Fire History	(blank)		No Fire	1,481.7
Sutter Creek Total				**1,807.5**
Amador County				
AMADOR	7/9/1985	2	Equipment Use	587.7
AMADOR	7/18/1988	7	Arson	329.0
ARROYO SECO NO. 6	7/29/1958	14	Unknown / Unidentified	435.9

Wildfire Name	Date	Cause	Cause Description	GIS Acres
BEAR 2	11/24/2002	5	Debris	48.8
BEAR RIVER FIRE	6/12/1918	1	Lightining	1,746.1
BELL	(blank)	14	Unknown / Unidentified	45.8
BUENA	8/15/2002	14	Unknown / Unidentified	20.8
BULL CK	6/12/1918	1	Lightining	51.0
BUSI	1/14/1961	14	Unknown / Unidentified	84.3
BUTTE	9/10/2015	14	Unknown / Unidentified	3,534.7
BUTTE PG&E #24	6/11/1990	14	Unknown / Unidentified	692.3
CABLE #2	5/19/1924	9	Miscellaneous	89.3
CAMANCHE	7/10/2006	15	Structure	79.4
CAMANCHE	6/17/2016	14	Unknown / Unidentified	209.6
CEDAR	1/2/1994	9	Miscellaneous	20.2
CLINTON TRAIL	8/15/1957	14	Unknown / Unidentified	660.9
COLD CK FIRE	8/24/1917	1	Lightining	461.7
DAFFODIL HILL	8/11/1959	14	Unknown / Unidentified	408.2
DAVIS	5/3/1925	1	Lightining	20.2
DEADMAN'S FLAT	7/18/1925	1	Lightining	188.8
DELL ORTO ESCAPE	8/17/1954	14	Unknown / Unidentified	369.4
DOAK'S RIDGE FIRE	5/16/1937	9	Miscellaneous	38.0
DRESSLER	8/8/1952	14	Unknown / Unidentified	7.1
DUFRENE ESCAPE	7/29/1954	14	Unknown / Unidentified	726.4
ELECTRA	6/13/2008	11	Powerline	250.5
ELLIS 2	11/15/2002	5	Debris	112.5
GOLD BUG	3/22/1923	14	Unknown / Unidentified	381.9
HIGHWAY 88 NO.1	7/22/1961	14	Unknown / Unidentified	336.4
HIGHWAY 88 SERIES	10/5/1980	14	Unknown / Unidentified	744.1
HIGHWAY-16	7/6/2001	2	Equipment Use	522.7

Wildfire Name	Date	Cause	Cause Description	GIS Acres
HIGHWAY-88	8/24/2001	7	Arson	15.1
HOYA	8/15/2016	2	Equipment Use	22.6
IRISH	7/6/2018	2	Equipment Use	824.9
IRISH HILL	10/8/1961	14	Unknown / Unidentified	533.2
JACKSON	6/13/2001	2	Equipment Use	1,670.8
JACKSON	7/26/2005	10	Vehicle	16.2
JACKSON	7/20/2006	14	Unknown / Unidentified	104.3
JOSES SERIES	7/5/1964	14	Unknown / Unidentified	679.6
KLOTZ	9/27/1962	14	Unknown / Unidentified	326.1
MEISS	6/14/1981	9	Miscellaneous	1,133.7
MICHIGAN BAR	7/29/1980	14	Unknown / Unidentified	691.8
MIDDLE	7/11/2016	14	Unknown / Unidentified	12.6
MOKE	6/17/2004	4	Campfire	352.3
MOKELUMNE RIVER	8/1/1924	9	Miscellaneous	2,242.1
MUD SPRINGS	5/21/1929	14	Unknown / Unidentified	18.9
NO NAME	(blank)	1	Lightining	2,050.7
NO NAME		14	Unknown / Unidentified	7,170.0
P.G. & E. #3	9/17/1965	14	Unknown / Unidentified	908.7
P.G. & E.CO MOKELUME	4/30/1927	9	Miscellaneous	1,130.8
PACIFIC MINE	7/18/1951	14	Unknown / Unidentified	900.3
PETERSON	8/19/1951	14	Unknown / Unidentified	311.8
PI PI-INDIAN DIGGING	8/18/1924	9	Miscellaneous	8,900.8
PONY	6/12/2002	11	Powerline	644.4
POWER	10/6/2004	2	Equipment Use	16,981.3
POWERHOUSE	9/5/2004	11	Powerline	113.4
QUARRY	6/23/1976	14	Unknown / Unidentified	2,630.8

Wildfire Name	Date	Cause	Cause Description	GIS Acres
RANCHERIA	9/2/1961	14	Unknown / Unidentified	33,736.8
RANCHO	6/28/2016	10	Vehicle	353.8
ROAD	5/10/1993	5	Debris	126.8
SALT	9/9/1969	1	Lightining	10.4
SALT	2/3/1992	9	Miscellaneous	52.8
SALT	7/18/2003	4	Campfire	216.4
SALT	12/1/2011	9	Miscellaneous	342.9
SALT	10/3/2016	1	Lightining	77.8
SAND	7/26/2014	10	Vehicle	392.2
SCULLY ROAD	7/3/1950	14	Unknown / Unidentified	416.1
STEVENS	8/27/1950	14	Unknown / Unidentified	2.5
STONY	7/3/2002	2	Equipment Use	67.6
STONY	7/2/2016	9	Miscellaneous	15.1
STONY	6/24/2017	11	Powerline	10.9
SUNNYBROOK	6/26/1994	14	Unknown / Unidentified	229.7
SUTTER CREEK	9/2/1961	14	Unknown / Unidentified	806.5
TIGER	8/18/2013	1	Lightining	16.3
TONZI	8/18/2003	10	Vehicle	99.1
TONZI	6/17/2017	14	Unknown / Unidentified	22.4
UPPER	8/12/1996	9	Miscellaneous	40.3
VAN VLECK	6/22/1968	14	Unknown / Unidentified	2,521.2
VOLCANO	8/16/1993	11	Powerline	18.1
WEST SHERMAN CK	9/15/1919	14	Unknown / Unidentified	681.1
WILLOW	8/30/2016	10	Vehicle	18.0
WINTON	8/28/2017	7	Arson	0.2
(blank)	3/27/1978	5	Debris	129.6
(blank)	9/3/1989	3	Smoking	8.2
(blank)	4/19/1991	1	Lightining	154.0
(blank)	(blank)	1	Lightining	22.6
(blank)		9	Miscellaneous	306.4
(blank)		14	Unknown / Unidentified	2,989.5

Wildfire Name	Date	Cause	Cause Description	GIS Acres
(blank)	11/20/1989	5	Debris	18.3
(blank)	1/1/1994	5	Debris	18.6
No Fire History	(blank)		No Fire	284,507.0
Amador County Total				**392,020.2**
Grand Total				**400,976.6**

Source: CAL FIRE

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