Multi-Jurisdictional Hazard Mitigation Plan

Volume 1—Basic Plan

March 2026

COUNTY OF Placer

TETRA TECH

Placer County Multi-Jurisdictional Hazard Mitigation Plan

March 2026

#105S052516

PREPARED FOR

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Executive Summary

Placer County has developed a Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) that updates its previous hazard mitigation planning document from 2021. The 2026 MJHMP includes an assessment of hazards, risk, and capabilities and identifies a coordinated framework that will be implemented over the next five years to mitigate the risks associated with hazards in the County.

Hazard mitigation is the use of long-term and short-term policies, programs, projects, and other activities to minimize the loss of life, injury, and property damage that can result from a disaster. Communities, residents, and businesses across the United States have been faced with continually increasing costs associated with natural and human-caused hazards. Hazard mitigation is the first step in reducing risk and is the most effective way to reduce costs associated with hazards.

The County of Placer is located in eastern California, stretching from Sacramento County in the west to the Sierra Nevada and Lake Tahoe areas in the east. The updated MJHMP will help the County reduce risks from disasters to the people, property, economy, and environment throughout the planning area. It was developed by the County and the following participating local jurisdictions (the Planning Partners):

- Ackerman Charter School District
- Alpine Springs County Water District
- Alta Fire Protection District
- Auburn Recreation & Park District
- City of Auburn
- City of Colfax
- City of Lincoln
- City of Rocklin
- Colfax Elementary School District
- Donner Summit Public Utility District
- Eureka Union School District
- Foresthill Fire District
- Foresthill Union School District
- Heather Glen Community Services District
- Nevada Irrigation District
- Newcastle Fire District
- North Tahoe Fire District
- North Tahoe Public Utility District
- Northstar Community Services District
- Olympic Valley Public Service District
- Penryn Fire District
- Placer County
- Placer County Air Pollution Control District
- Placer County Flood Control District
- Placer County Resource Conservation District
- Placer County Water Agency
- Placer Hills Fire District
- Placer Mosquito Vector Control District
- Rocklin Unified School District
- Roseville City School District
- San Juan Water District
- Sierra Joint Community College District
- South Placer Fire District
- Tahoe City Public Utility District
- Town of Loomis
- Truckee Donner Public Utility District

The MJHMP maintains the eligibility of all participating jurisdictions for Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance programs, as it aligns with current hazard mitigation planning best practices prescribed by FEMA and the California Governor’s Office of Emergency Services (Cal OES).

The Planning Process

The 2026 Placer County MJHMP updates the 2021 Placer County Local Hazard Mitigation Plan (LHMP). The planning process took place from March 2025 to April 2026 and involved all County departments, the Planning Partners, community stakeholders, and the public.

Overall Approach

To support the planning process, the Planning Partners accomplished the following:

- Developed a Hazard Mitigation Planning Committee consisting of key stakeholders and a countywide Planning Partnership made up of the Committee members, the Planning Partners, and other regional stakeholders
- Involved a wide range of stakeholders and the public in the plan update process
- Reviewed the 2021 Placer County LHMP
- Identified hazards of concern to the County to be included in the update
- Profiled the hazards of concern
- Estimated the inventory at risk and potential losses associated with the identified hazards
- Reviewed and updated mitigation goals and objectives
- Reviewed mitigation actions outlined in the 2021 LHMP to assess progress
- Developed new mitigation actions to reduce the vulnerability of assets from hazards of concern
- Developed mitigation plan maintenance procedures to be executed after obtaining approval of the plan from Cal OES and FEMA

Multiple Agency Support for Hazard Mitigation

Partners at the regional, state, and federal levels are available to assist local communities in developing hazard mitigation strategies. FEMA provides grants, tools, guidance, and training to support mitigation planning. Cal OES is the lead state agency providing hazard mitigation planning assistance.

The participating jurisdictions provided input into the preparation of this MJHMP, in particular the preparation of jurisdiction-specific annexes included in Volume 2. They coordinated with and solicited participation from county and local governments, local organizations, state and federal agencies, and the general public. This coordination ensured that stakeholders had established communication channels and relationships to support mitigation planning and mitigation actions included in the plan.

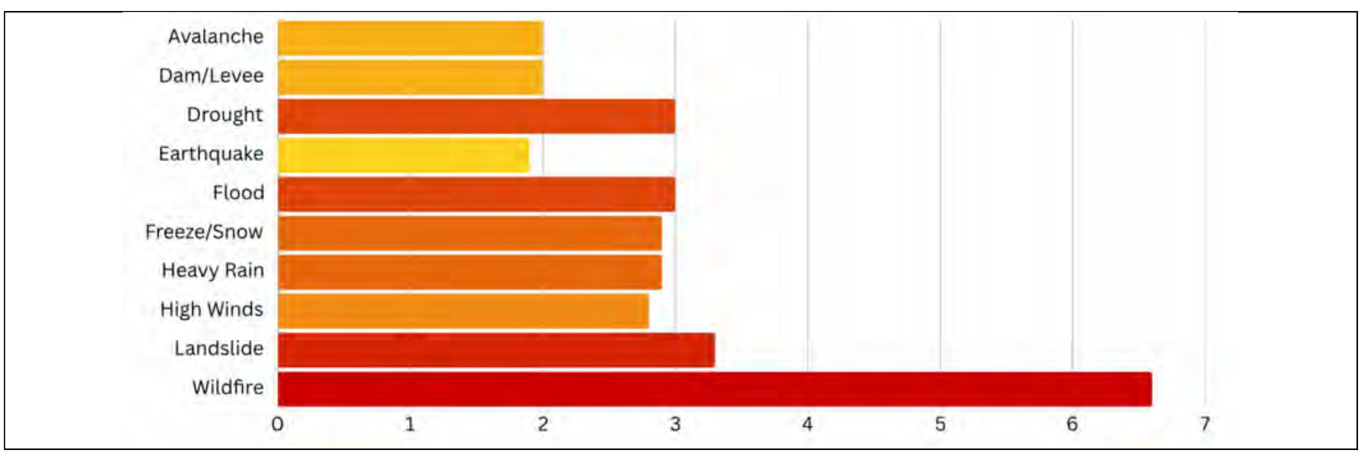
Under the project management of the Placer County Office of Emergency Services, the Hazard Mitigation Planning Committee provided oversight for the preparation of this plan. The committee includes representatives from the following:

- Placer County Office of Emergency Services
- Placer County Community Development Resource Agency
- Placer County Department of Public Works
- Placer County Public Information
- Placer County Health & Human Services
- Placer County Department Of Agriculture, Parks, And Natural Resources
- Placer County Executive Office
- Placer County Office of Education
- Placer County Fire Department
- Placer County Sheriff's Office
- Placer Land Trust
- City of Auburn
- City of Roseville
- Community Members at Large
- Connecting Point
- Greater Auburn Area Fire Safe Council
- Latino Leadership Counsel
- Nevada County OES
- North Tahoe Fire Protection District
- Placer County Transportation Planning Agency
- San Juan Water District
- Sierra Business Council
- Town of Truckee
- University of California Agriculture and Natural Resource

Risk Assessment for Local Hazards of Concern

The Planning Partners evaluated each jurisdiction's risk and vulnerability associated with each of the hazards of concern, based on past events, past and predicted future losses, and the expected probability of future occurrence. From these evaluations, hazards were ranked as high, medium, or low risk to each jurisdiction. The hazard rankings were used to prioritize individual jurisdictional mitigation strategies. Figure ES-1 shows overall hazard ranking scores for all of Placer County.

ES-1. Countywide Hazard Ranking Scores



Capability Assessment and Plan Integration into Other Local Mechanisms

Effective mitigation is achieved when hazard awareness and risk management become integral parts of public activities and decision-making. Placer County has many plans and programs that support hazard risk management. This MJHMP integrates, complements, and references those plans and programs to the extent that is practical in order for it to be a comprehensive resource for hazard mitigation.

The MJHMP includes capability assessments for each participating jurisdiction. A countywide capability assessment reviews plans, programs, and regulatory mechanisms at all levels of government (federal, state, county and local) that support hazard mitigation in the County. In the jurisdictional annexes, each participating jurisdiction assesses how it has integrated hazard risk management into its planning, regulatory and operational/administrative framework, and how it intends to continue to promote this integration. These assessments identify where each jurisdiction is currently able to implement hazard mitigation measures and where each would benefit from improved capabilities for such measures.

Mitigation Strategy

Hazard Mitigation Plan Goals and Objectives

The MJHMP includes mitigation goals for reducing or avoiding long-term vulnerabilities to the identified hazards of concern. The planning process included a review and update of previous mitigation goals and objectives developed to guide the selection of mitigation actions. The goals and objectives were updated based on the updated risk assessment, discussions, research, and input from plan participants and stakeholders. The goal development process considered goals included in the California State Hazard Mitigation Plan, as well as other relevant county and local planning documents. The 2026 MJHMP goals are as follows:

- **Goal 1—**Significantly reduce risk to life, community lifelines, the environment, property, and infrastructure by planning and implementing whole-community risk reduction and resilience strategies.
- **Goal 2—**Enhance disaster resilience among underserved populations and communities disproportionately impacted by disasters by building capacity and incorporating equity metrics, tools, and strategies into all mitigation planning, policy, funding, outreach, and implementation efforts.
- **Goal 3—**Apply the best available science and authoritative data to design, implement, and prioritize mitigation actions that maximize co-benefits and enhance resilience to natural hazards and climate change impacts.
- **Goal 4—**Integrate mitigation principles into laws, regulations, policies, and guidance to support equitable outcomes to benefit the whole community.

- **Goal 5—**Enhance community resilience by improving the safety and reliability of critical infrastructure to withstand natural hazards and protect natural systems.
- **Goal 6—**Maintain FEMA eligibility and position the communities for grant funding.

Implementation of the 2021 Plan

The statuses of the mitigation projects identified in the 2021 LHMP were reviewed for this MJHMP. Numerous projects and programs have been implemented that have reduced hazard vulnerability to assets in the planning area. Uncompleted projects have been reevaluated, modified as necessary, and incorporated into this plan. The Planning Partners' annexes describe these mitigation activities in more detail, and plan maintenance procedures have been developed to encourage thorough integration with local decisions and processes and regular review of implementation progress.

2026 Mitigation Strategy

Placer County and the participating jurisdictions identified 218 mitigation actions to pursue over the next five years. These actions represent a wide variety of project types across the 10 hazards of concern. The mitigation strategy for each jurisdiction is available in the annexes in Volume 2.

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1. Introduction

Placer County has developed this Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) to reduce risks from disasters to the people, property, economy, and environment within the County. Developed by the County and 36 participating local jurisdictions, this MJHMP updates the 2021 Placer County Local Hazard Mitigation Plan (LHMP). The 2026 MJHMP includes countywide analysis and assessment of hazards, risk, and capabilities.

1.1 Overview of Hazard Mitigation Planning

1.1.1 What Is Hazard Mitigation?

Hazard mitigation is any sustained action taken to reduce the long-term risk from hazards. The Federal Emergency Management Agency (FEMA) defines a hazard mitigation plan as the documentation of a state or local government's evaluation of natural hazards and strategies to mitigate them.

Effective mitigation planning helps people, organizations, and government agencies to better prepare for and respond when disasters occur. It also allows local governments to remain eligible for FEMA grant funding for mitigation projects that will reduce the impact of future disaster events. FEMA estimates that for every dollar spent on damage prevention (mitigation), twice that amount is saved by not having to perform post-disaster repairs. The long-term benefits of mitigation planning and implementation include the following:

- An increased understanding of hazards faced by local communities
- A more sustainable and disaster-resistant community
- Financial savings through partnerships that support planning and mitigation efforts
- Focused use of limited resources on hazards that have the biggest impact on the community
- Reduced long-term impacts on people and structures
- Reduced costs associated with response and recovery efforts, including repairs

1.1.2 Regulatory Framework

Federal policy encourages communities to assess their vulnerability to hazards before disaster strikes and then take actions to reduce potential risks. A disaster-resistant community can rebound more quickly and cost-effectively from a natural disaster, with less human injury or loss of property. This minimizes other losses associated with disasters, such as the time lost from productive activity by businesses and industries.

The federal Disaster Mitigation Act of 2000 (DMA) encourages hazard mitigation planning by states, tribes, and local governments. Under the DMA, communities seeking certain hazard-related federal funding must identify potential natural hazards and identify and prioritize actions that can be taken by the community to mitigate those hazards before disaster strikes.

Regulations implementing the DMA are included in Title 44 of the Code of Federal Regulations, Section 201 (44 CFR 201). To be eligible for hazard mitigation assistance from the federal government, communities must have an approved hazard mitigation plan and must update it on a 5-year basis.

One goal of the federal regulations is to facilitate cooperation between state and local authorities. This enables local and state governments to better articulate their mitigation needs, resulting in faster allocation of funding and more effective risk reduction projects. In California, responsibility for fulfilling the requirements of the DMA and 44 CFR 201 has been delegated to the California Governor's Office of Emergency Services (Cal OES). Table 1-1 summarizes the 44 CFR 201 requirements and where each is addressed in this hazard mitigation plan.

Table 1-1. FEMA Local Mitigation Plan Review Crosswalk

Plan Criteria	Primary Location in Plan
Prerequisites—Adoption by the Local Governing Body: §201.6(c)(5)	Chapter 2; Appendix A
Planning Process—Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)	Chapter 2
Risk Assessment—Identifying Hazards: §201.6(c)(2)(i)	Chapter 5
Risk Assessment—Profiling Hazards: §201.6(c)(2)(i)	Chapters 6 – 15
Risk Assessment—Assessing Vulnerability: Overview: §201.6(c)(2)(ii)	Chapter 4
Risk Assessment—Assessing Vulnerability: Identifying Structures: §201.6(c)(2)(ii)(A)	Chapter 3; Chapters 6 – 15
Risk Assessment—Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)	Chapter 3; Chapters 6 – 15
Risk Assessment—Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)	Chapter 3; Chapters 6 – 15
Mitigation Strategy—Local Hazard Mitigation Goals: §201.6(c)(3)(i)	Chapter 18; Volume 2
Mitigation Strategy—Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)	Chapter 18; Volume 2
Mitigation Strategy—Implementation of Mitigation Actions: §201.6(c)(3)(iii)	Chapter 18; Volume 2
Mitigation Strategy—Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)	Chapter 18; Volume 2
Plan Maintenance—Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(i)	Chapter 19
Plan Maintenance—Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)	Chapter 19; Volume 2
Plan Maintenance—Continued Public Involvement: §201.6(c)(4)(iii)	Chapter 19

1.1.3 Specialized Terms and Concepts

Hazard mitigation has developed over the years its own set of terms and concepts with particular meanings within the hazard mitigation practice. A full glossary and list of acronyms is provided in Appendix B. The list below provides a quick reference for specialized terms whose use is especially prominent in this hazard mitigation plan:

- **Adaptive capacity—**the ability of a human or natural system to adjust to climate change by moderating potential damage, taking advantage of opportunities, or coping with the consequences (EPA 2023)
- **Asset—**anything that is important to the character and function of a community (e.g., people, structures, community lifelines, the economy, and natural, historic, and cultural resources) (FEMA 2025c)
- **Capability assessment—**an evaluation of which authorities, policies, programs, funding and resources a participant has to accomplish hazard mitigation (FEMA 2025c)
- **Cascading impacts—**a chain of consequences associated with a primary hazard event (National Academies of Sciences, Engineering, and Medicine 2022)
- **Community lifelines—**the most fundamental services in a community that, when stabilized, enable all other aspects of society to function (FEMA 2025c)
- **Extent—**the potential intensity of a hazard within a community, often expressed using quantitative scientific scales (FEMA 2022)
- **Hazard profile—**a description of a hazard's location, extent, previous occurrences and probability of future events within a community (FEMA 2025c)
- **Hazard ranking—**the process of identifying the hazards that pose the greatest risk to a community, based on how likely the hazard is to occur, the potential consequences if the hazard does occur, and other relevant local factors
- **Impact—**the consequences or effects of a hazard on a community's assets (FEMA 2025c)
- **Integration—**the inclusion of hazard mitigation principles, vulnerability information and mitigation actions into other existing community planning to leverage activities that have co-benefits, reduce risk and increase resilience (FEMA 2022)
- **Mitigation action—**measures, projects, plans or activities to reduce the current and future vulnerabilities identified in the risk assessment (FEMA 2025c)
- **Mitigation strategy—** the long-term blueprint for reducing the potential hazard-related losses identified in the risk assessment; the strategy consists of mitigation goals, mitigation actions, and a plan for implementing the actions (FEMA 2025c)
- **Natural hazard—**a source of harm or difficulty created by a meteorological, environmental or geological event (FEMA 2025c)
- **Plan maintenance—**monitoring and updating a hazard mitigation plan as warranted by changing conditions, availability of new information, and progress on the proposed mitigation actions (FEMA 2025c)
- **Planning process—**the procedures used to develop a hazard mitigation plan with broad acceptance across the community
- **Risk—**the potential for damage or loss when natural hazards interact with people or assets (FEMA 2025c)

- **Risk assessment—**a data-driven analysis to find where a local jurisdiction is vulnerable to hazards (FEMA 2025c)
- **Social vulnerability—**the potential for loss within an individual or social group, as affected by traits that influence an individual's or group's resilience, which is their ability to prepare, respond, cope or recover from an event (FEMA 2025c)
- **Stakeholder—**individuals or groups that a mitigation action or policy affects, including businesses, private organizations and residents (FEMA 2025c)
- **Vulnerability—**a description of which assets within locations identified to be hazard prone are at risk from the effects of the hazard (FEMA 2025c)

1.2 History of Hazard Mitigation Planning in Placer County

1.2.1 Previous Placer County MJHMPs

Placer County prepared and adopted its first MJHMP in 2005. The plan has been regularly updated since then, with updates adopted in 2010, 2016, and 2021.

1.2.2 Key Changes in the Current Update

The following are the most significant changes made between the 2021 LHMP and the current (2026) update:

- The hazards of concern to the community were re-evaluated based on most current hazard information. The new list of hazards of concern is identified in Chapter 5.
- The 2021 update represented 5 incorporated communities and 20 special districts. The 2026 update represents 5 incorporated communities and 31 special districts:
  - The Foresthill Public Utility District participated in the 2021 LHMP but chose not to participate in the 2026 update.
  - New participants in the 2026 update are Ackerman Charter School District, Auburn Recreation & Park District, Auburn Union School District, Colfax Elementary School District, Donner Summit Public Utility District, Eureka Union School District, Foresthill Union School District, Heather Glen Community Services District, Penryn Fire District, Placer County Air Pollution Control District, Placer Mosquito Vector Control District, and Roseville City School District.
- The structure of the MJHMP was reorganized to meet new planning requirements and improve readability.

1.3 Plan Organization

The 2026 Placer County MJHMP is organized into two volumes: Volume 1 includes all information that applies to the entire planning area (Placer County); and Volume 2 includes specific information for each participating jurisdiction.

Volume 1 is a resource for ongoing mitigation analysis. It includes a description of the County and its jurisdictions as well as information on the planning process and how the risk assessment and capability assessment were performed. Volume 1 includes the following chapters:

- Chapter 1, Introduction
- Chapter 2, Planning Process—A description of the plan methodology and development process, committee and stakeholder roles and activities, and how the plan will be incorporated into existing programs. Information regarding the adoption of the plan by each participating jurisdiction.
- Chapter 3, County Profile—An overview of Placer County, including general information and physical conditions, land use patterns and trends, population and demographics, economy, general building stock inventory, community lifelines, and natural, historic, and cultural resources.
- Chapter 4, Methodology—Description of the methodology used to assess hazard risk and the status of local data.
- Chapter 5, Hazards of Concern Identification—Documentation of the process of identifying the natural hazards of concern for further profiling and evaluation.
- Chapters 6-15—Hazard profiles and findings of the risk assessment (estimates of the impact of hazard events on life, safety, and health; general building stock; critical facilities; the economy, and natural, historic, and cultural resources).
- Chapter 16, Hazard Ranking—Description and summary of the hazard ranking process.
- Chapter 17, Capability Assessment—A summary and description of the existing plans, programs, and regulatory mechanisms at all levels of government (federal, state, county, local) that support hazard mitigation within the County.
- Chapter 18, Mitigation Strategy—Information regarding the mitigation goals and objectives identified in response to priority hazards of concern, and the process by which mitigation strategies were developed for each Planning Partner.
- Chapter 19, Plan Maintenance Procedures—A system to continue to monitor, evaluate, maintain, and update the plan.

Volume 2 consists of annexes for each participating jurisdiction. Each annex summarizes the jurisdiction’s planning, regulatory, and fiscal capabilities; evaluates vulnerabilities to hazards; describes the status of past mitigation actions; and provides a specific mitigation strategy. The annexes provide each jurisdiction with an expedient resource for implementing mitigation projects and maximizing future grant opportunities.

Appendices provide additional detail about general information discussed in the MJHMP.

2. Planning Process

This chapter describes how the planning process used to update the Placer County MJHMP was prepared, who participated in the process, and how the public was involved. The goal of the planning process was for the updated MJHMP to be all of the following:

- A multi-jurisdictional plan covering municipalities and districts throughout the County
- A plan that other entities can easily join later as part of the next 5-year plan update process
- A plan that considers all natural hazards that pose a risk to the planning area
- A plan that follows FEMA regulations and prevailing FEMA and state guidance
- A plan that meets criteria for the National Flood Insurance Program (NFIP) Community Rating System (CRS) and the Flood Mitigation Assistance (FMA) programs

Placer County invited all jurisdictions in the County to join in the planning process. Five of six local municipal governments participated, as well as 31 special districts :

- Placer County
- City of Auburn
- City of Colfax
- City of Lincoln
- City of Rocklin
- Town of Loomis
- Ackerman Charter School District
- Alpine Springs County Water District
- Alta Fire Protection District
- Auburn Recreation & Park District
- Auburn Union School District
- Colfax Elementary School District
- Donner Summit Public Utility District
- Eureka Union School District
- Foresthill Fire Protection District
- Foresthill Union School District
- Heather Glen Community Services District
- Nevada Irrigation District
- Newcastle Fire District
- North Tahoe Fire Protection District
- North Tahoe Public Utility District
- Northstar Community Services District
- Olympic Valley Public Service District
- Penryn Fire District
- Placer County Air Pollution Control District
- Placer County Flood Control District
- Placer County Resource Conservation District
- Placer County Water Agency
- Placer Hills Fire District
- Placer Mosquito Vector Control District
- Rocklin Unified School District
- Roseville City School District
- San Juan Water District
- Sierra Joint Community College District
- South Placer Fire District
- Tahoe City Public Utility District
- Truckee Donner Public Utility District

While the City of Roseville is not a participating jurisdiction to be covered by the updated MJHMP, the City was fully engaged as a stakeholder by attending meetings, completing surveys, reviewing the draft plan, and promoting the MJHMP to its residents. In addition, the vulnerability assessments in this

MJHMP include Roseville, in order to promote a whole-county approach to hazard mitigation planning. Roseville maintains its own hazard mitigation plan, last updated in 2023 (City of Roseville 2023).

2.1 General Mitigation Planning Approach

This hazard mitigation plan was prepared in accordance with the following regulations and guidance:

- FEMA Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards, January 2013
- FEMA Integrating Hazard Mitigation into Local Planning, March 1, 2013
- FEMA Plan Integration: Linking Local Planning Efforts, July 2015
- FEMA Local Mitigation Planning Policy Guide, April 2025
- FEMA Local Mitigation Planning Handbook, June 2025
- DMA (Public Law 106-390, October 30, 2000)
- 44 CFR 201 and 206 (February 26, 2002 through September 13, 2004)
- Cal OES Local Hazard Mitigation Planning Fact Sheet, 2023
- Cal OES California State Hazard Mitigation Plan, 2023

Placer County applied for and was awarded a multi-jurisdictional planning grant under the Hazard Mitigation Grant Program (DR-4683-0015-P), which supported the development of this MJHMP. Grant administration was the responsibility of the Placer County Office of Emergency Services (OES).

2.2 Planning Process Participants

2.2.1 Project Management and Planning Consultant

Project management was the responsibility of Placer County OES. A contract planning consultant (Tetra Tech) was tasked with the following:

- Assisting with the organization of a Hazard Mitigation Planning Committee and the Planning Partnership
- Assisting with the development and implementation of a public and stakeholder outreach program
- Collecting data
- Facilitating and attending meetings
- Reviewing and updating the hazards of concern
- Creating hazard profiles
- Performing the risk assessment
- Assisting with the review and update of mitigation planning goals and objectives
- Assisting with the review of past mitigation strategy progress
- Assisting with the screening of mitigation actions and the identification of appropriate actions

- Assisting with the prioritization of mitigation actions
- Authoring the draft and final plan documents

2.2.2 Core Planning Team

Key departments from Placer County were invited to join Placer County OES and Tetra Tech to form a Core Planning Team to guide the update of the MJHMP. This ensured coordination among concurrent planning efforts by multiple County departments. The Core Planning Team met bi-weekly at the beginning of the project and monthly at the end of the project to determine meeting content, timeline adjustments, and outreach strategies. Members are listed in Table 2-1.

Table 2-1. Core Planning Team Members

Affiliation	Name	Title
Placer County Office of Emergency Services	Brandy Dunkel	Staff Services Manager
Placer County Office of Emergency Services	David Atkinson	Assistant Director
Placer County Office of Planning	Angel Green	Senior Planner
Placer County Department of Public Works	Elena Szlemp	Associate Civil Engineer, Floodplain Management
Placer County Department of Health and Human Services	Chris Hazen	Staff Services Manager
Placer County Department of Agriculture, Parks and Natural Resources	Kerri Timmer	Principal Management Analyst
Placer County Fire Department	Ryan Woessner	Assistant Chief
Placer County Sheriff's Office	Jason Welsh	Sheriff's Lieutenant
Tetra Tech	Bart Spencer	Project Manager
Tetra Tech	Sasha Jones	Lead Planner

2.2.3 Planning Partnership

In June 2023, the County notified all municipalities and special districts in the County of the pending planning process and invited them to formally participate. Jurisdictions were asked to formally notify the County of their intent to participate via a letter of intent and to identify planning points of contact to facilitate their participation and represent the interests of their communities. All participating jurisdictions, including the County, are recognized as Planning Partners and belong to the Planning Partnership for this MJHMP. Planning Partner representatives were charged with the following:

- Representing their jurisdiction throughout the planning process
- Ensuring participation of all departments and functions within their jurisdiction that have a stake in mitigation (e.g., planning, code enforcement, police, emergency services, public works)
- Assisting in gathering information for inclusion in the MJHMP update, including previously developed reports and data
- Promoting the involvement of stakeholders and the public

- Reporting on the progress of mitigation actions identified in the 2021 Placer County LHMP
- Identifying, developing, and prioritizing mitigation actions for the updated MJHMP
- Reporting on progress of integration of prior or existing HMPs into other planning processes and municipal operations
- Supporting the development of a jurisdictional annex
- Reviewing, amending, and approving all sections of the plan update
- Adopting, implementing, and maintaining the plan update

Table 2-2 lists the members of the Planning Partnership. Each member listed below attended meetings, completed surveys, conducted public outreach, developed plan sections, or reviewed draft sections of the plan.

Table 2-2. Planning Partnership Members

Planning Partner	Primary Contact	Title	Secondary Contact	Title
Placer County	Brandy Dunkel	Staff Services Manager	David Atkinson	Assistant Director
City of Auburn	John Rogers	Fire Chief	Tia Klumpp	Planning Director
City of Colfax	Ron Walker	City Manager	Kathy Pease	Planning Consultant
City of Lincoln	Anthony Mejia	Deputy Fire Chief	Sean Scully	City Manager
City of Rocklin	Reginald Williams	Fire Chief	Ryan Brayton	Deputy Fire Chief – Fire Marshal
Town of Loomis	Richard Ly-Lee	Town Engineer	Christy Consolini	Planning Director
Ackerman Charter School District	Kristin Wells	Superintendent	Ian Byerrum	Assistant Principal
Alpine Springs County Water District	Joe Mueller	General Manager	Laurie Axell	Office Manager
Alta Fire Protection District	Zach Calvert	Chairman—Board of Directors	Lori Calvert	Clerk
Auburn Recreation & Park District	Kahl Muscott	District Administrator	Jesse Williams	Facilities and Grounds Manager
Auburn Union School District	Jeremy McReynolds	Chief Business Officer	Jennifer Patrick	Administrative Assistant
Colfax Elementary School District	Andrew Giannini	Superintendent		
Donner Summit Public Utility District	Steve Palmer	General Manager	Jim King	Operations Manager
Eureka Union School District	Tom Janis	Superintendent	Melissa Mercado	Assistant Superintendent of Business Services
Foresthill Fire Protection District	Dennis Martin	Fire Chief	Dean Martin	Assistant Fire Chief
Foresthill Union School District	Camille Taylor	Superintendent	Suzy Jennings	District Executive Assistant
Heather Glen Community Services District	Cheryl Madden	Board Member	Rachel Rose	General Manager

Planning Partner	Primary Contact	Title	Secondary Contact	Title
Nevada Irrigation District	Greg Jones	Assistant General Manager	Chip Close	Director of Water Operations
Newcastle Fire Protection District	Mark D'Ambrogi	Fire Chief	John Williamson	Chief
North Tahoe Fire Protection District	Michael Haran	Community Specialist	Brent Armstrong	Division Chief
North Tahoe Public Utility District	Suzi Gibbons	Manager	Joe Pomroy	Engineering and Operations Manager
Northstar Community Services District	Eric Martin	Director of Public Works	Mike Geary	General Manager
Olympic Valley Public Service District	Brad Chisholm	Manager	Hans Walde	Captain
Penryn Fire Protection District	Mark D'Ambrogi	Fire Chief	John Williamson	Chief
Placer County Air Pollution Control District	Adam Baughman	Deputy Air Pollution Control Officer		
Placer County Flood Control District	Eric Griffin	District Manager	Brad Brewer	District Manager
Placer County Resource Conservation District	Sarah Jones	Executive Director	Kate Espinola	Administration and Finance Manager
Placer County Water Agency	Laura Rodarte	Strategic Affairs Manager	Kyle Dushane	Chief Dam Safety Engineer
Placer Hills Fire Protection District	Mark D'Ambrogi	Fire Chief	John Williamson	Chief
Placer Mosquito Vector Control District	Jake Hartle	Assistant Manager	Julie Prayter	Public Information Officer
Rocklin Unified School District	Roger Stock	Superintendent	Rain Kernytsky	Interim Senior Director of Facilities and Maintenance
Roseville City School District	Derek Garcia	Superintendent	Justin Barrett	Director of Facilities
San Juan Water District	Sophanra Castanar	Safety, Regulatory and Compliance Coordinator	Tony Barela	Director of Operations
Sierra Joint Community College District	Zachary Jones	Safety and Emergency Preparedness Coordinator		
South Placer Fire District	Jeff Ingolia	Division Chief	Mark Duerr	Fire Chief
Tahoe City Public Utility District	Francisco Gonzalez	Utilities Superintendent	Dan Lewis	Director of Utilities
Truckee Donner Public Utility District	Scott Botn	Risk Manager	Steven Poncelet	Public Information Officer

Note: Newcastle and Penryn Fire Protection Districts have a contract with Placer Hills Fire Protection District for Administration and Command and Control; therefore, the points of contact were the same person.

For participating municipalities that also participate in the NFIP, the designated local floodplain administrator was identified as part of the municipality's hazard mitigation planning team (see the jurisdictional annexes in Volume 2). Local floodplain administrators were informed of the planning process, reviewed the plan documents, and provided direct input to the plan update.

Jurisdictions in Placer County have differing levels of capabilities and resources available to apply to the MJHMP update process, as well as differing levels of vulnerability to and impacts from the natural hazards being considered in this plan. It was Placer County's intent to encourage participation by all jurisdictions, and to accommodate their specific needs and limitations while still meeting the intent and purpose of plan update participation. Such accommodations included engaging a contract consultant to assume certain elements of the plan update process on behalf of the jurisdictions, establishing a Hazard Mitigation Planning Committee, and providing alternative mechanisms for plan participation.

Ultimately, jurisdictional participation is evidenced by a completed annex for the MJHMP, wherein jurisdictions individually identify their planning points of contact, evaluate their risk from the hazards of concern, identify their capabilities to effect mitigation in their community, identify and prioritize a suite of actions to mitigate their hazard risk, and adopt the updated plan via resolution. Annexes are included in Volume 2 of this MJHMP.

After completion of the plan, implementation and ongoing maintenance will become a function of the Planning Partnership as described in Chapter 19. The Planning Partnership will be responsible for reviewing the draft plan and soliciting public comment as part of an annual review and as part of the five-year mitigation plan updates.

2.2.4 Hazard Mitigation Planning Committee

Placer County developed a Hazard Mitigation Planning Committee (HMPC) to guide the MJHMP update effort and to ensure that the resulting document will be embraced by local government leaders and all who live and work within the planning area. HMPC members were charged with the following:

- Providing guidance and oversight of the planning process on behalf of the general Planning Partnership
- Attending and participating in HMPC meetings
- Assisting with the development and completion of certain planning elements, including:
  - Reviewing and updating the hazards of concern
  - Developing a public and stakeholder outreach program
  - Ensuring that the data and information used in the plan update process is the best available
  - Reviewing and updating the hazard mitigation goals
  - Identifying and screening appropriate mitigation strategies and activities
- Reviewing and commenting on plan documents prior to submission to Cal OES and FEMA.

To emphasize a whole community approach to planning, the HMPC represented a mix of County departments, neighboring communities, stakeholder organizations, and the public. Table 2-3 lists the members of the HMPC. The composition of the HMPC meets the requirements for full credit in Steps

1b and 2a of CRS Activity 510. Placer County Community Development Resource Agency, the office responsible for the community's land use and comprehensive planning, was actively involved throughout the planning process.

Table 2-3. Hazard Mitigation Planning Committee Members

Affiliation	Name	Title	Alternate	Activity 510 Role
Placer County Office of Emergency Services	David Atkinson, PE	Assistant Director, HMPC Chair	Brandy Dunkel	Emergency Management
Placer County Community Development Resource Agency	Randall Befort	Building Services Manager		Building Department and Code Enforcement
Placer County Conservation Plan	Sadie Caldas	Planner – Senior		Land Use Planning
Placer County Department of Public Works-Floodplain Management	Elena Szlemp	Associate Civil Engineer	Mary Keller	Engineering
Placer County Community Development Resource Agency	Angel Green	Planner-Senior	Lucy Rollins	Land Use Planning
Placer County Department of Public Works	Derek Gade	Director	Kevin Bell	Public Works
Placer County Public Information	Chris Gray-Garcia	Communications and Public Affairs Deputy Director		Public Information
Placer County Health & Human Services-Environmental Health	Craig Paul	Health & Human Services Assistant Program Director		
Placer County Health and Human Services-Public Health	Chris Hazen	Staff Services Manager		Public Health
Placer County Department of Agriculture Parks and Natural Resources	Darryl Mitati	Deputy Agricultural Commissioner/Sealer		Parks and Recreation
Placer County Executive Office	Jeff Merriman	Deputy County Executive Officer	Sarah Poindexter	County Executive Office
Placer County Executive Office	Nikki Streegan	Principal Planner		Economic Development and Housing
Placer County Office of Education	Gib Benthin	Coordinator, Maintenance & Operations		Education
City of Auburn	John Rogers	Fire Chief	Tia Klumpp	Stakeholder
City of Roseville	Joe Anderson	HMP Project Lead	Brian Walker	Stakeholder
Community Member at Large	Ron Dolinsek	N/A		Public
Community Member at Large	Tim Balarie	N/A		Public
Community Member at Large	Mike Garabedian	N/A		Public
Connecting Point	Anne Rarick	Director, HMPC Vice Chair	None	Stakeholder
Greater Auburn Area Fire Safe Council	Tim Monroe	Fire Council Chair	Kathy Baxter	Stakeholder
Latino Leadership Counsel	Elisa Herrera	Executive Director		Stakeholder

Affiliation	Name	Title	Alternate	Activity 510 Role
Nevada County OES	Paul Cummings	Program Manager	AJ Zekanoski	Stakeholder
North Tahoe Fire Protection District	Brent Armstrong	Division Chief	Michael Haran	Stakeholder
Placer County Transportation Planning Agency	David Melko	Principal Transportation Planner	Cory Peterson	Stakeholder
San Juan Water District	Sophanra Castanar	Safety, Regulatory & Compliance Coordinator	None	Stakeholder
Sierra Business Council	Kaela Frank	Project Coordinator	Kaeleigh Reynolds	Stakeholder
Town of Truckee	James Blattler	Emergency Manager	None	Stakeholder
University of California Agriculture and Natural Resource	Katie Low	Statewide Coordinator		Stakeholder

On August 19, 2025, the Placer County Board of Supervisors affirmed its commitment to supporting multi-agency coordination to reduce the impact of natural hazards on Placer County's people, infrastructure, environment, and economy by formally recognizing the HMPC.

2.3 Planning Activities

Members of the Planning Partnership (individually and as a whole), as well as key stakeholders, met and communicated as needed to share information. This included workshops to identify hazards, assess risks, update inventories of critical facilities, and assist in updating mitigation goals and strategies. All members of the Planning Partnership reviewed the draft plan, supported interaction with other stakeholders, and assisted with public involvement efforts. These activities provided continuity through the process to ensure that natural hazard vulnerability information and appropriate mitigation strategies were incorporated.

Table 2-4 summarizes meetings and other planning activities conducted during the development of the plan. Documentation of meetings (agendas, sign-in sheets, minutes, etc.) may be found in Appendix D. In addition to the activities listed in the table, there was a great deal of communication between Planning Partnership members and the consultant through individual local meetings, phone, and email.

2.4 Stakeholder Outreach and Involvement

Stakeholders are the individuals and entities that have a stake in managing hazard risk and mitigation. The Placer County MJHMP update was written using the best available information from stakeholders with specific knowledge of natural hazards and local capabilities. Information was obtained from municipal and regional agencies and staff as well as federal and state agencies, non-governmental organizations, and County residents. Their information and input is included throughout the MJHMP.

Stakeholder outreach throughout the planning process ensured broad regional, county, and local participation in the plan's development. A comprehensive list of stakeholders—developed with the support of the HMPC and Planning Partnership—was invited to attend HMPC meetings, and key stakeholders were requested to be members of the HMPC. The full list of stakeholders invited to participate in this plan is included in Appendix C.

The following sections list stakeholders who contributed to the planning process and how they participated. Many stakeholders in addition to those listed were aware of or contributed to the MJHMP through formal and informal communication with Planning Partners throughout plan development.

Table 2-4. Summary of Mitigation Planning Activities

Date	Description of Activity	Participants
August 2023	Municipalities and special districts were invited to participate in the planning process.	Placer County OES
May 15, 2025	County Kickoff Meeting: Overview of the project timeline and scope of work	Placer County, Planning Partners
May 22, 2025	Project Start Up Meeting: Discuss proposed planning process and scope of work including documenting participation, schedule, and public and stakeholder outreach and involvement.	Core Planning Team
June 17, 2025	Public project website developed: https://engage.placer.ca.gov/Hazard-Mitigation-Plan-2026	Placer County OES
June 18, 2025	County and Municipality Planning Partners Meeting: Overview of specific responsibilities and assignments for participating government agencies	County and Municipal Planning Partners
June 19, 2025	Special District Planning Partners Meeting: Overview of specific responsibilities and assignments for participating special districts	Special District Planning Partners
June 19, 2025	GIS data collection meeting	Placer County OES, Placer County GIS Operations, Tetra Tech
June 26, 2025	Online Public Hazard Preparedness and Mitigation survey developed and deployed	Core Planning Team
June 26, 2025	Online Stakeholder Hazard Mitigation survey developed and deployed	Core Planning Team
June 26, 2025	Online Neighboring County Mitigation survey developed and deployed	Core Planning Team
July 10, 2025	HMPC Meeting: Overview of the planning process, timeline, and participant responsibilities	HMPC
July 17, 2025	Public Meeting: Overview of the project timeline and scope of work, opportunities for public involvement	Public and Stakeholders
September 9, 2025	HMPC Meeting: Capabilities discussion and Strengths, Weaknesses, Obstacles, and Opportunities exercise	HMPC
October 28, 2025	Mitigation Strategy Workshops	Planning Partners
November 13, 2025	HMPC Meeting: Overview of the results of the risk assessment and surveys	HMPC

Date	Description of Activity	Participants
March 16, 2026	HMPC Meeting: Overview of draft plan outline, public comment period, and plan maintenance procedures	HMPC
March 19, 2026	Public Meeting: Overview of draft plan outline, public comment period, and plan maintenance procedures	Public and Stakeholders
March 23, 2026	Draft Plan posted to Engage Placer website	Public and Stakeholders
March 23 to April 21, 2026	Public Comment Period	Public and Stakeholders
TBD	Final plan submitted to Cal OES and FEMA	Cal OES, FEMA
Upon plan's approval by FEMA	Plan adoption by resolution by the governing bodies of all participating municipalities	All plan participants

2.4.1 Federal and State Agencies

The federal and state agencies listed in Table 2-5 participated in the planning process.

Table 2-5. Participation of Federal and State Agencies

Agency	Participation
• **FEMA Region 9**	Provided updated planning guidance; provided information on previous federal disasters; conducted plan review.
• **National Centers for Environmental Information (NCEI)** • **National Oceanic and Atmospheric Administration (NOAA)** • **National Weather Service (NWS)** • **Storm Prediction Center (SPC)** • **U.S. Army Corps of Engineers (USACE)** • **U.S. Census Bureau** • **U.S. Geological Survey (USGS)** • **California Department of Conservation** • **California Natural Resources Agency**	Information regarding hazard identification and the risk assessment for this MJHMP update was requested and received or incorporated by reference.
• **California Governor's Office of Emergency Services**	Provided information on state emergency proclamations; administered planning grant and facilitated FEMA review; provided updated planning guidance; provided review of draft and final plan.
• **CAL FIRE** • **California Department of Water Resources**	Information regarding hazard identification and the risk assessment for this MJHMP update was requested and received or incorporated by reference; attended meetings.

2.4.2 Local and Regional Agencies

The county and regional agencies listed in Table 2-6 participated in the planning process.

Table 2-6. Stakeholder Participation Activities

Agency	Attended HMPC Meetings	Updated Mitigation Strategy	Reviewed Draft Plan
Placer County Community Development Resource Agency	☒	☒	☒
Placer County Department of Agriculture, Parks, and Natural Resources	☒	☒	☒
Placer County Department of Public Works	☒	☒	☒
Placer County Executive Office	☒	☒	☒
Placer County Fire Department	☒	☒	☒
Placer County Health & Human Services	☒	☒	☒
Placer County Office of Education	☒	☒	☒
Placer County Office of Emergency Services	☒	☒	☒
Placer County Sheriff's Office	☒	☒	☒

2.4.3 Dam Owners

In order to address high-hazard-potential dams, outreach was conducted to dam owners and the regional dam safety representative at the California Department of Water Resources. The following information was requested from those individuals:

- Information, data, or resources regarding the risk of dam failure as a result of deficiencies or exposure to hazards such as flooding, geologic events, and severe storms
- Concerns with dam safety due to changing climate conditions
- Concerns with emergency action plan deficiencies including warning time, evacuation needs, etc.
- Completed or in-progress repairs/improvements to dams
- Potential new mitigation actions that should be considered for inclusion in the MJHMP

2.4.4 Stakeholder Hazard Mitigation Survey

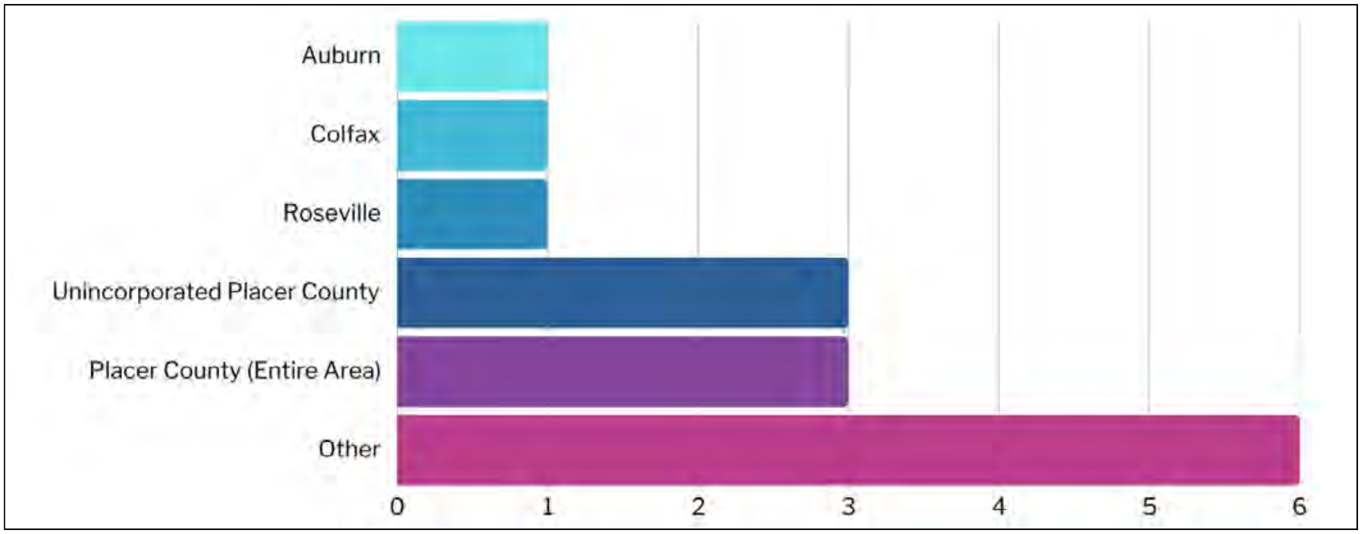
This section summarizes the results and feedback received by those who completed the stakeholder survey. Feedback was reviewed by the HMPC and integrated where appropriate in the plan. The full survey results are available in Appendix E.

RESPONDENT CHARACTERISTICS

The stakeholder survey was designed to identify general needs for hazard mitigation and resiliency within Placer County from the perspective of stakeholders, as well as to identify specific projects that may be included in the mitigation plan. It was distributed to identified stakeholders, including county and municipal departments and agencies. The 15 organizations that completed the survey include school districts, businesses, fire agencies, and utility districts.

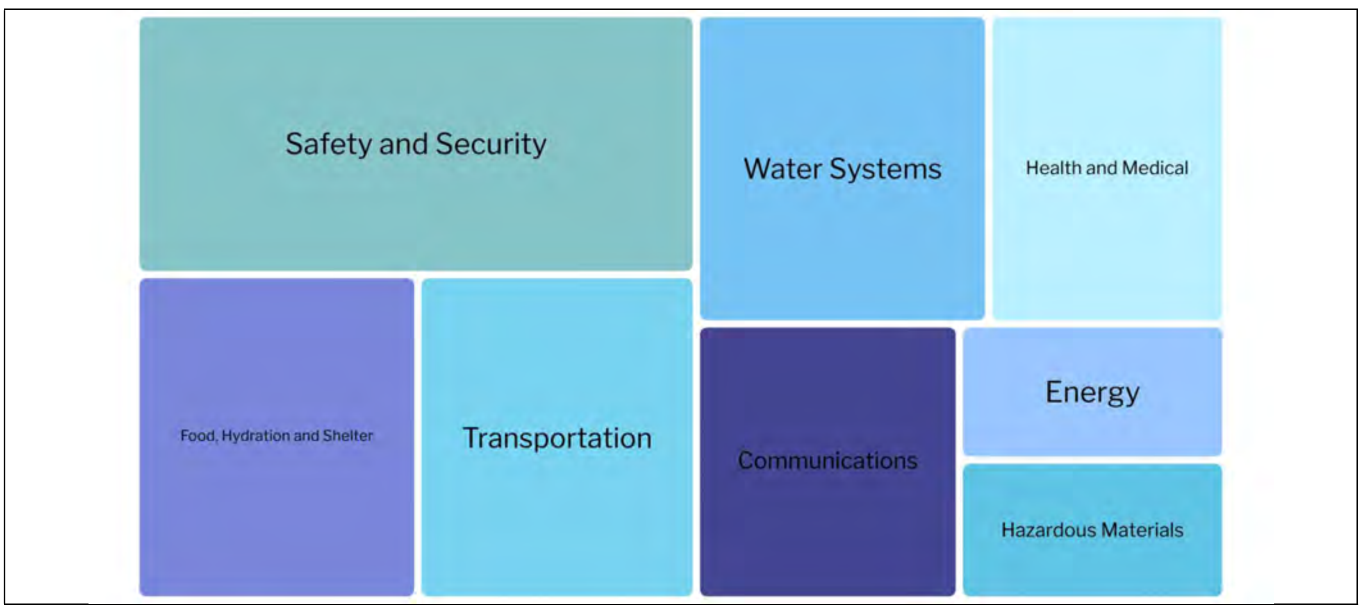
Respondents were asked where their primary service area occurs—in a municipality, in the unincorporated county, or over the entire County. Six respondents chose "other." Figure 2-1 shows the full results for respondents' primary service areas.

Figure 2-1. Stakeholder Survey—Primary Service Area



Stakeholders were asked to identify the community lifeline category their operations are most closely associated with. The most popular response was "safety and security" with eight organizations, followed by "transportation" and "food, hydration, and shelter," with five organizations each. Lifelines least represented in the survey are "energy" and "hazardous materials," with two organizations each. Figure 2-2 shows the relationship between responses to this question, with larger boxes representing more responses and smaller boxes representing fewer responses.

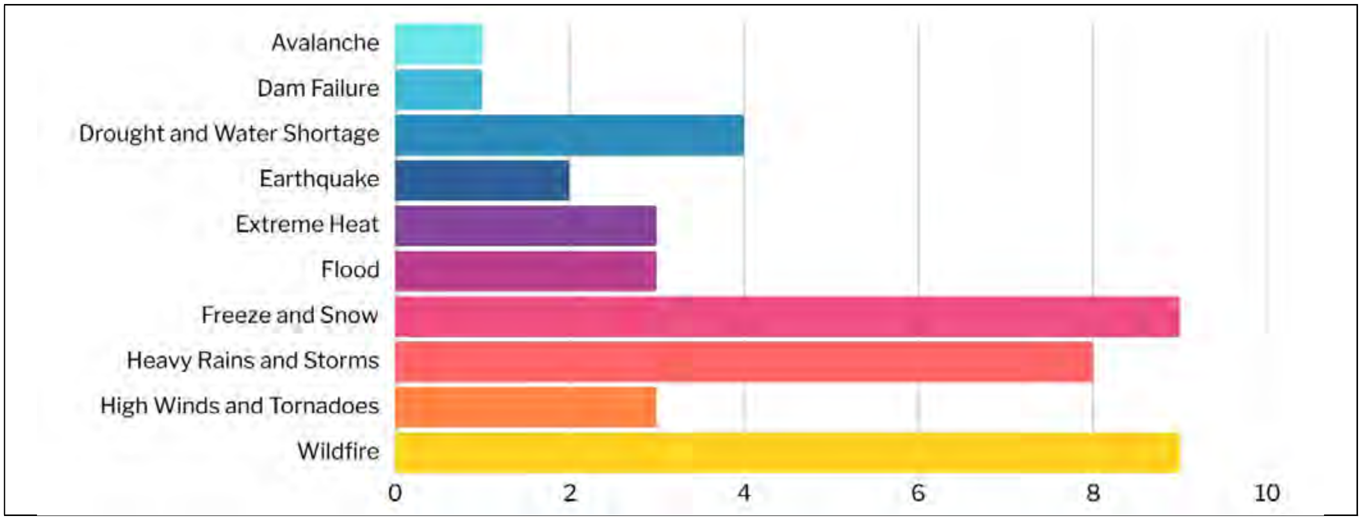
Figure 2-2. Stakeholder Survey—Community Lifelines



HAZARD AND DAMAGE IDENTIFICATION

Among survey respondents, 93.3 percent indicated that buildings, facilities, or structures their organization is involved with have been impacted by a natural hazard. The hazards most commonly reported were “freeze and snow,” “wildfire,” and “heavy rains and storms.” Figure 2-3 shows the full range of hazards reported to have been experienced by survey respondents.

Figure 2-3. Stakeholder Survey—Hazards Experienced



When asked to describe specific hazard issues or conditions that impacted their operations, stakeholders mentioned the following:

- River Fire in 2021 closed facilities and damaged infrastructure
- Primary evacuation routes are not treated or mitigated
- Flood waters destroyed bridges along the Truckee River
- During windstorms, lose power to sewer and water pumping facilities
- School closures to remove snow from the roofs and to repair damage due to falling snow
- Wildfire smoke

Asked about their primary concern regarding natural hazards, the greatest number of respondents indicated that they are concerned about response capabilities (see Figure 2-4). This reflects the general community concern about the sudden and intense impact of wildfire in California.

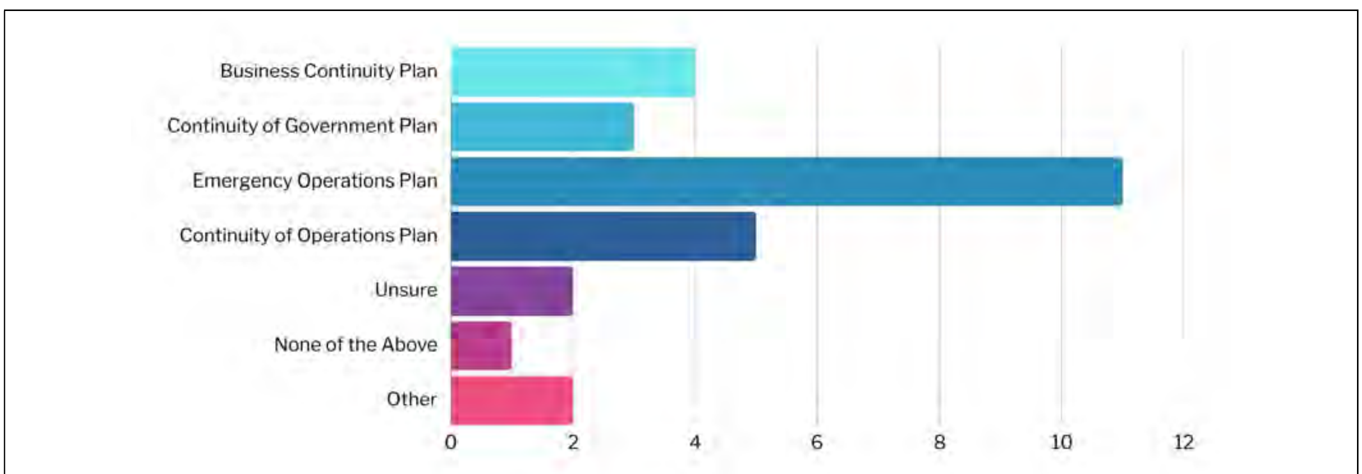
Figure 2-4. Stakeholder Survey—Primary Concerns

When asked about specific challenges and barriers to reducing hazard vulnerability in Placer County, 46.7 percent of respondents included "funding" in their answer. Specific challenges included environmental policies, qualified contractors, effective communication with homeowners, competing priorities, limited tax base, multi-agency coordination, fire mitigation on federal and private land, and meeting state regulations.

COMMUNITY PREPAREDNESS

The survey asked whether respondents have specific disaster plans in place. Of all respondents, 73.3 percent reported having an emergency operations plan, 33.3 percent reported having a continuity of operations plan, and 26.7 percent reported having a business continuity plan. Figure 2-5 shows the full results.

Figure 2-5. Stakeholder Survey—Plans and Strategies



The survey asked about specific community vulnerabilities that increase the risk to natural hazards. Potential vulnerabilities mentioned include the following:

- Homeowners being unaware of wildfire risk
- Community service delivery in rural areas
- Populations dependent on public transportation
- Remotely fed utilities
- Aging infrastructure
- Older population that requires help during and after an emergency
- Cost of hazard insurance, home hardening, and fuel reduction
- Ingress and egress access during an emergency
- Language barriers
- Limited public transportation or broadband access
- Lack of understanding of public programs

2.5 Public Outreach

Public information activities conducted throughout the planning process included virtual outreach, printed materials, and in-person engagement. All Planning Partners conducted their own outreach to the public and stakeholders. A summary of county efforts is presented below; the strategy by other plan participants is available in Volume 2.

Two in-person public meetings were held for the public to learn about the MJHMP, participate in the planning process, and review the draft plan. Sign-in sheets and meeting materials are available in Appendix D. Additionally, all HMPC Planning Meetings were noticed and open to the public and meeting recordings were posted on Engage Placer. A public survey was developed to capture public knowledge about natural hazards and gauge personal preparedness. The full survey results are available in Appendix E. Finally, a 30-day public comment period was held to obtain feedback from the public on the draft plan.

2.5.1 Public Information Activities

The public was informed of MJHMP update commencement through press releases, news articles, and public service announcements. The County announced the initiation of the MJHMP update cycle through a press release on July 8, 2025, which contained information about the MJHMP, link to the project webpage, link to the public survey, and information about upcoming virtual and in-person public meetings. Figure 2-6 shows the press release.

Figure 2-6. Press Release

Home › Government › Communications & Public Information › News Releases › 2025 › July › 2026 hazard mitigation plan

Placer County invites public input on 2026 hazard mitigation plan

Published on July 8, 2025

Placer County and its partner jurisdictions are working to update the FEMA-required Multi-Jurisdictional Hazard Mitigation Plan, an essential roadmap to reduce risks and improve public safety from natural and human-caused hazards.

Community participation is vital to ensure the plan reflects local priorities and concerns.

Virtual planning committee meeting July 10

A virtual meeting of the Hazard Mitigation Planning Committee will be held at 1 p.m. on July 10, via Microsoft Teams. Community members are invited to learn about the planning process, review draft materials and provide input. Registration is available at https://events.teams.microsoft.com/event/93a435d7-29ec-459e-bd79-978f6e07da2f@a40fe4ba-abc7-48fe-8792-b43889936400.

Public informational meeting July 17

A public informational meeting will be held at 6 p.m. on July 17 at the Placer County Health and Human Services Center, 11434 B Ave., Auburn. The meeting will also be available online, here. Attendees will receive an overview of the plan, ask questions and learn how it will help protect lives, property and infrastructure countywide.

Public survey open through Sept. 30

Residents are encouraged to complete an online survey to share their experiences and suggestions regarding hazards in their communities. The survey will remain open through Sept. 30 and is available at https://forms.office.com/r/0PcirqWyWH.

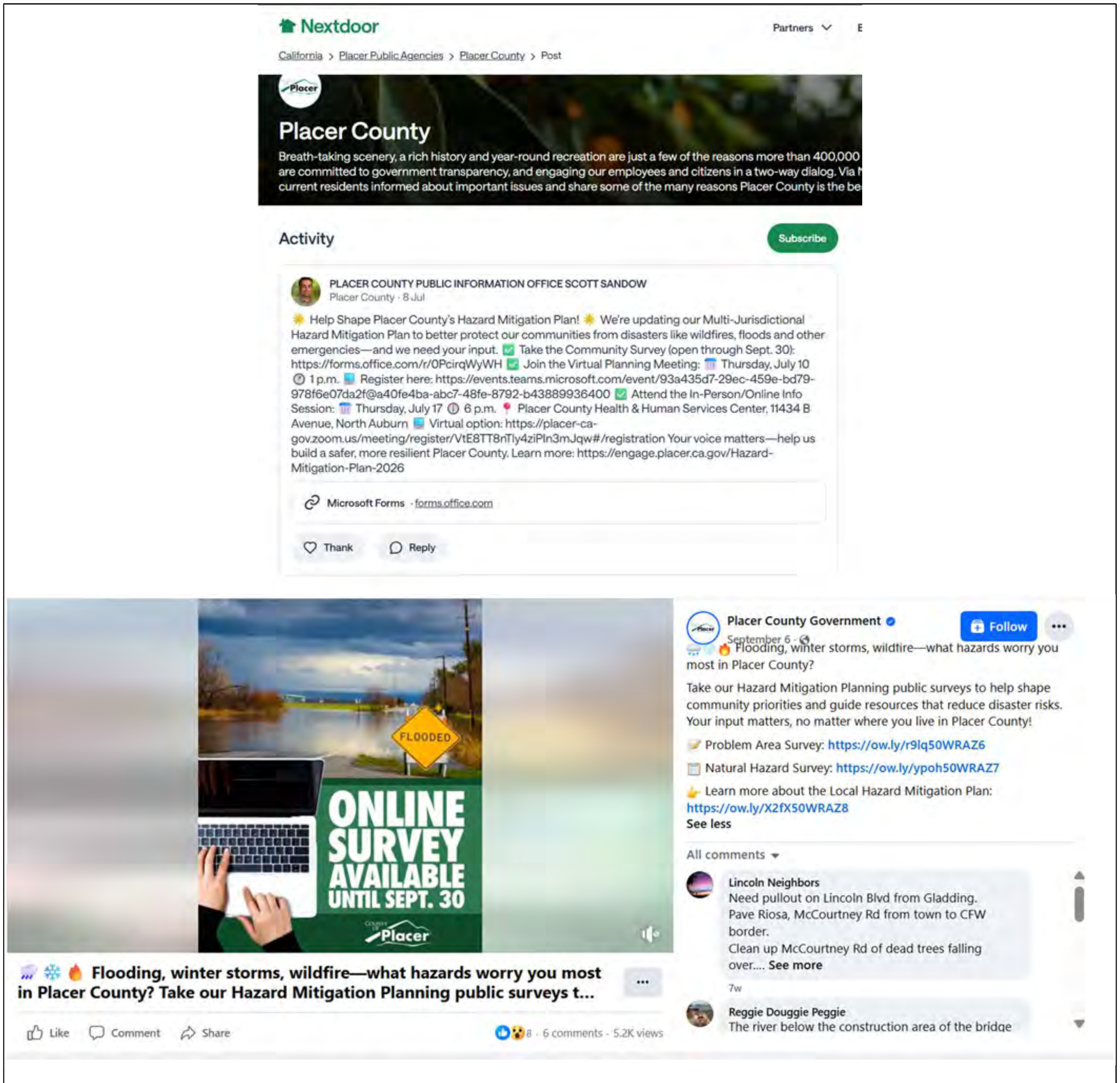
For details, visit https://engage.placer.ca.gov/Hazard-Mitigation-Plan-2026 or contact Zach Alesci with the Placer County Office of Emergency Services at 530-886-3473 or fireready@placer.ca.gov.

Information about the MJHMP was available on the Engage Placer website throughout the life of the project. All public meeting notices and several meeting recordings were posted to this website, as well as a detailed project timeline, frequently asked questions, public survey link, and project contact information. Figure 2-7 shows the Engage Placer MJHMP webpage.

All participating jurisdictions were encouraged to distribute press releases, the project webpage, and citizen and stakeholder surveys to relevant partners and stakeholders. Placer County posted planning process milestones and meetings on the County Facebook, Instagram, and NextDoor pages. Examples of social media posts are available in Figure 2-8.

Figure 2-7. Placer County MJHMP Webpage

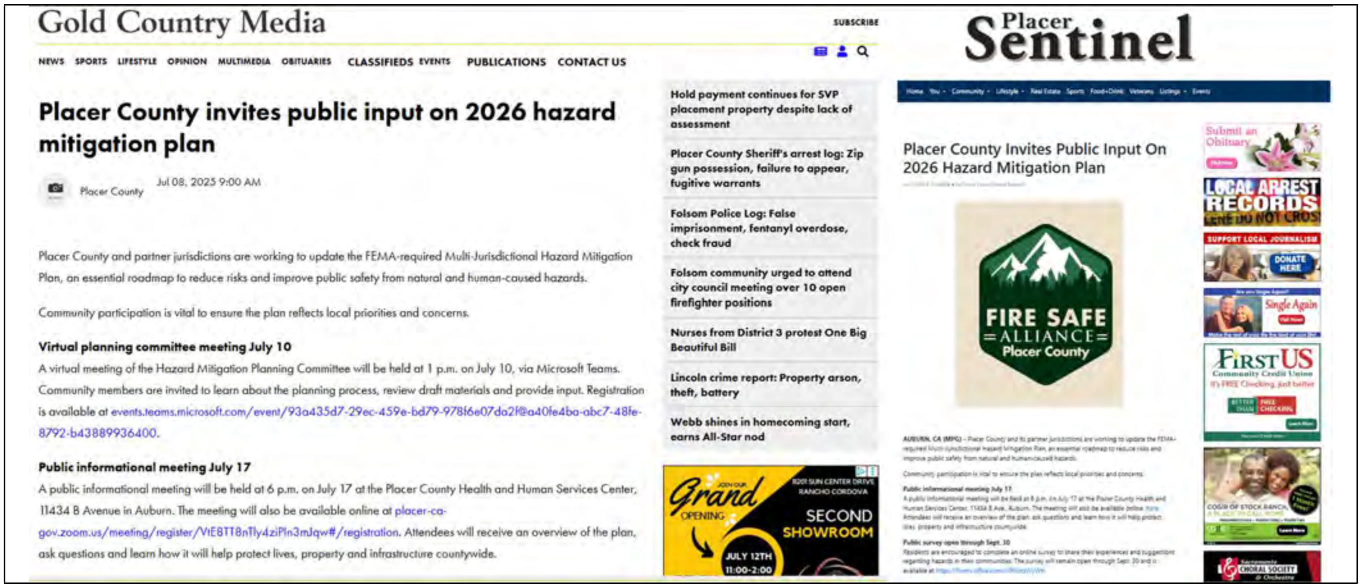
Figure 2-8. Social Media and Virtual Outreach



The County informed local media outlets about the MJHMP update. Local news outlets such as Gold Country Media and the Placer Sentinel published updates released by the county. Figure 2-9 shows selected media articles.

In addition, Placer County met the community at public events and shared information about the MJHMP planning process (see Figure 2-10). These events included the Placer County Fair, Wildfire Preparedness Expo, Auburn Chamber of Commerce, Tahoe City Farmers Market, and Placer County Pet Adoption Day.

Figure 2-9. News Articles


Gold Country Media

NEWS SPORTS LIFESTYLE OPINION MULTIMEDIA OBITUARIES CLASSIFIEDS EVENTS PUBLICATIONS CONTACT US

SUBSCRIBE

Placer County invites public input on 2026 hazard mitigation plan

Placer County Jul 08, 2025 9:00 AM

Placer County and partner jurisdictions are working to update the FEMA-required Multi-Jurisdictional Hazard Mitigation Plan, an essential roadmap to reduce risks and improve public safety from natural and human-caused hazards.

Community participation is vital to ensure the plan reflects local priorities and concerns.

Virtual planning committee meeting July 10

A virtual meeting of the Hazard Mitigation Planning Committee will be held at 1 p.m. on July 10, via Microsoft Teams. Community members are invited to learn about the planning process, review draft materials and provide input. Registration is available at events.teams.microsoft.com/event/93a435d7-29ec-459e-bd79-978f6e07da2f@a40fe4ba-abc7-48fe-8792-b43889936400.

Public informational meeting July 17

A public informational meeting will be held at 6 p.m. on July 17 at the Placer County Health and Human Services Center, 11434 B Avenue in Auburn. The meeting will also be available online at placer-ca-gov.zoom.us/meeting/register/VtE8T18nTly4ziPln3mJqw#/registration. Attendees will receive an overview of the plan, ask questions and learn how it will help protect lives, property and infrastructure countywide.

Hold payment continues for SVP placement property despite lack of assessment

Placer County Sheriff's arrest log: Zip gun possession, failure to appear, fugitive warrants

Folsom Police Log: False imprisonment, fentanyl overdose, check fraud

Folsom community urged to attend city council meeting over 10 open firefighter positions

Nurses from District 3 protest One Big Beautiful Bill

Lincoln crime report: Property arson, theft, battery

Webb shines in homecoming start, earns All-Star nod

Join our Grand Opening
SECOND SHOWROOM
JULY 12TH 11:00-2:00

Placer Sentinel

Placer County Invites Public Input On 2026 Hazard Mitigation Plan

Submit an Obituary
LOCAL ARREST RECORDS
SUPPORT LOCAL JOURNALISM
DONATE HERE
Single Again
FIRST US Community Credit Union

Figure 2-10. MJHMP Materials at Public Outreach Events

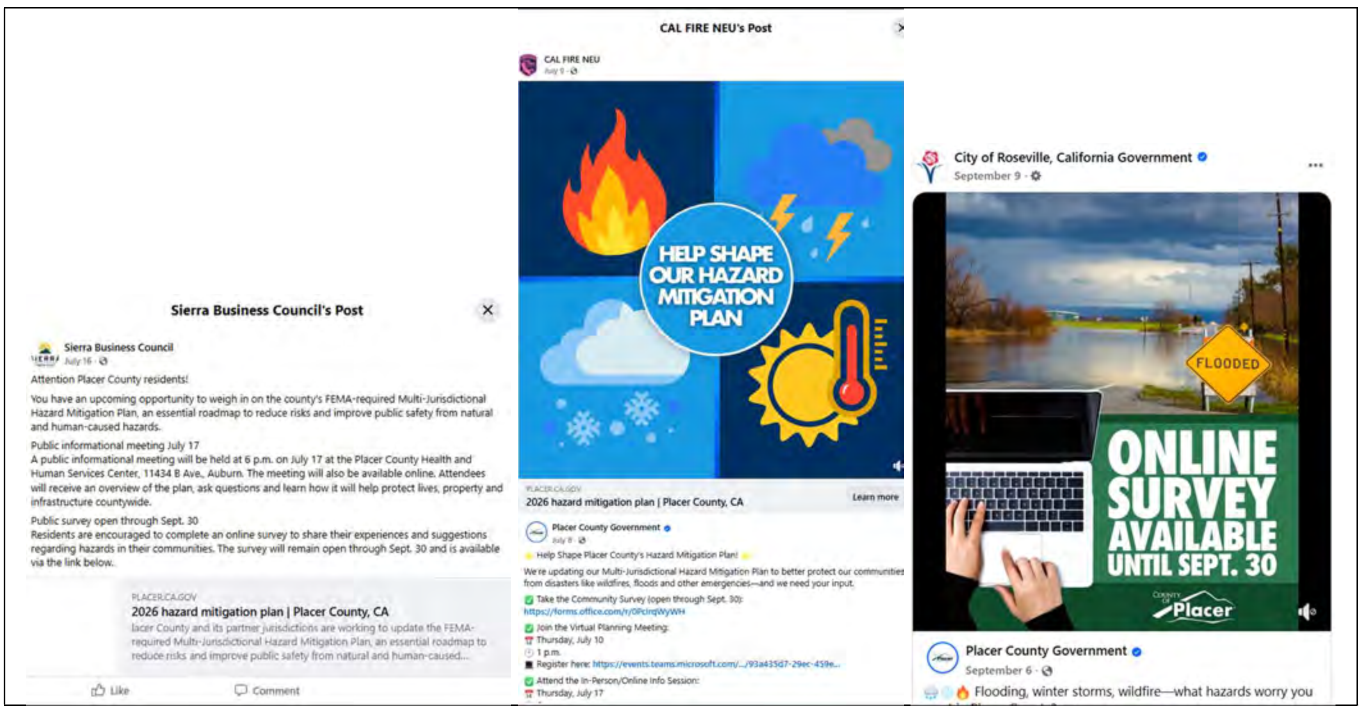
The Draft Plan was posted to the public website on March 23, 2026 for public review and comment. All public comments were directed to the Placer County OES for collection and review by the Core Planning Team. All public comments received were forwarded to the appropriate jurisdiction and/or agency and incorporated into the final plan as appropriate. Figure 2-11 shows the County press release and the draft plan posted on the Engage Placer website.

Figure 2-11. Public Posting of Draft Plan

INSERT IMAGE

Finally, members of the HMPC amplified Placer County's public engagement efforts by promoting the MJHMP to their audiences on social media. In this way, critical stakeholders, including Sierra Business Council, CAL FIRE, and the City of Roseville, supported Placer County's efforts and expanded the reach of the messaging. Figure 2-12 shows stakeholder message amplification.

Figure 2-12. Stakeholder Public Promotion



2.5.2 Public Meetings

On July 17, 2025, Placer County hosted an in-person public meeting at the Placer County Health and Human Services Center in Auburn. The meeting provided an overview of the MJHMP planning process and described how the public can provide input on natural hazard problems and potential solutions. It presented an opportunity for the community to learn about Placer County's efforts to prepare for natural disasters and participate in creating a resilient community. To facilitate inter-group coordination and communication, this presentation occurred during the monthly Placer County Fire Safe Alliance. In addition to the MJHMP, attendees received an update on the county's Drought and Water Shortage Plan. The meeting was streamed virtually for interested parties who were not available to attend in person. Figure 2-13 shows images from the meeting.

Figure 2-13. July Public Meeting

On March 19, 2026, Placer County hosted a second in-person public meeting at the Placer County Health and Human Services Center in Auburn. The meeting provided an overview of the draft plan, a recap of the planning process, and an in-depth discussion of the public comment period. Once again, this presentation was part of the monthly Placer County Fire Safe Alliance meetings. In addition to the MJHMP project updates, CAL FIRE provided an educational overview of the lifecycle of Placer County's vegetation and the role that fire plays in the native landscape. The meeting was streamed virtually for interested parties who were not available to attend in person.

2.5.3 Public Surveys

PUBLIC HAZARD MITIGATION SURVEY

The public hazard mitigation survey assessed the general public's level of knowledge about tools and techniques to assist in reducing risk and loss associated with hazards. It asked questions about citizen perception of risk, knowledge about mitigation, and support for community programs. The County advertised the survey through press release, County website and social media, and printed materials. The survey was available from June 16 to September 30, 2025, and received 298 responses.

Survey respondents represented all six municipalities in Placer County, with 36.9 percent of responses coming from the unincorporated County, as shown on Figure 2-14.

Overall, the results indicated that respondents were older adults who had lived in Placer County for a significant period. Nearly half of respondents (44.9 percent) reported having lived in the County for 20 years or more; 22.3 percent reported having lived in the County for 10 to 19 years; and 21.6 percent reported having lived in the County for 1 to 5 years. More than half of respondents (56.0 percent) were over age 61. Figure 2-15 shows the full results for respondents' age and time living in Placer County.

Figure 2-14. Public Survey—Respondent Location

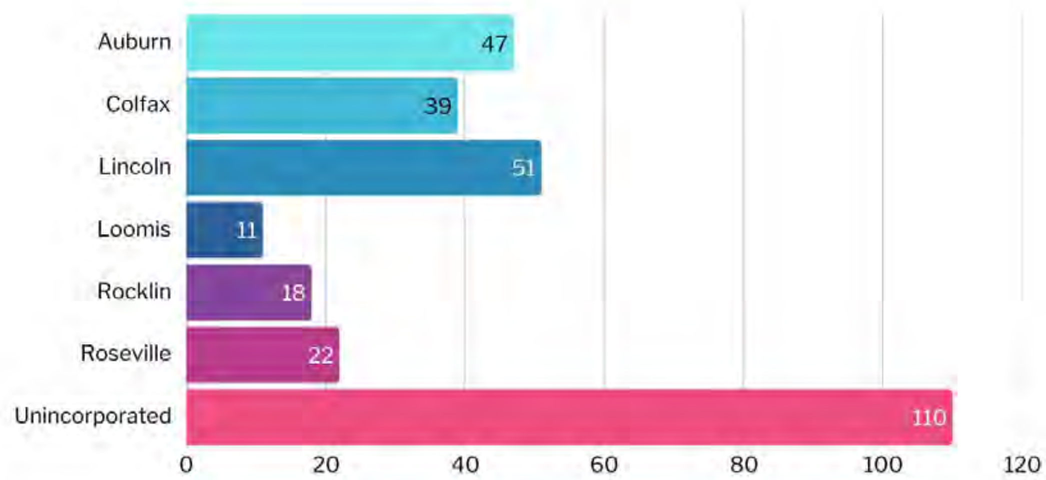
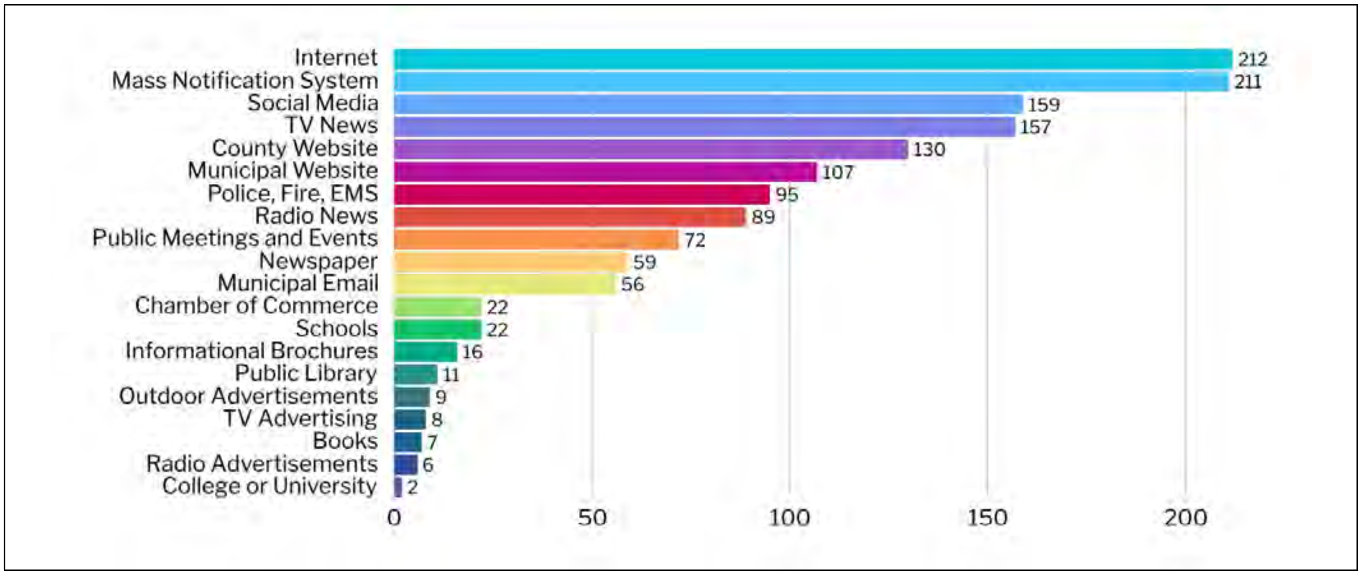


Figure 2-15. Public Survey—Length of Time in County and Age

Only 11 respondents (3.7 percent of the total) indicated that their property is located in a designated floodplain and only 2 of those indicated their home is covered by flood insurance. An additional 11 respondents who do not live in a floodplain indicated that they have flood insurance.

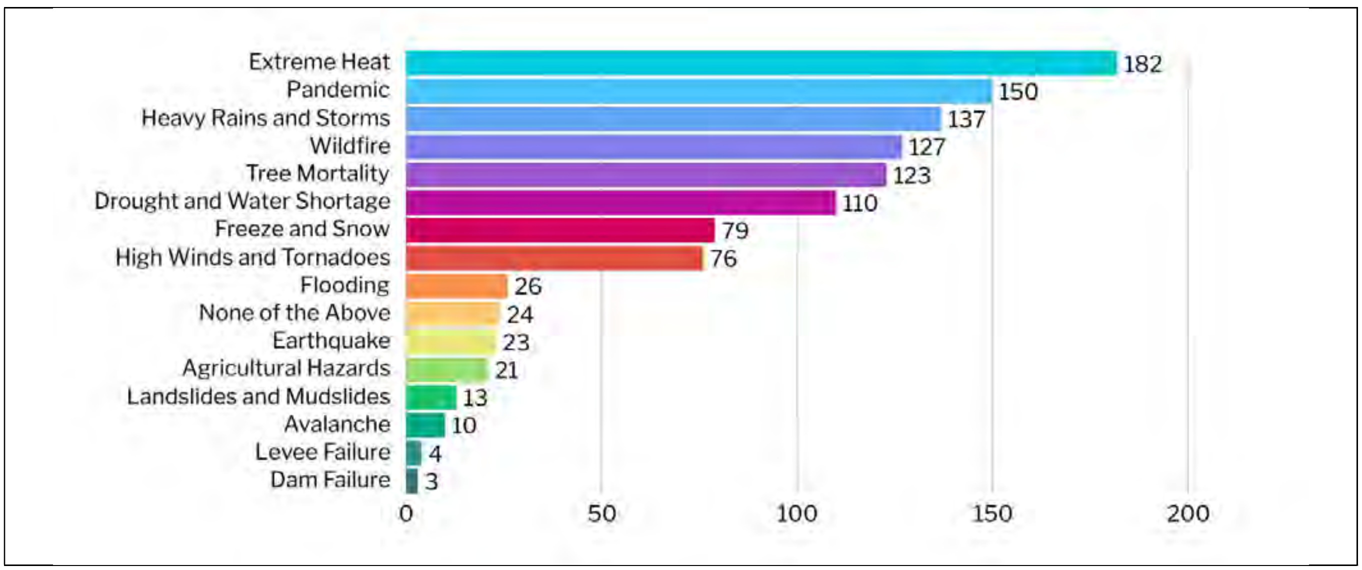
Respondents were asked how they receive information about disasters. While internet and phone-based options were most popular, many residents reported receiving information from television, radio, public meetings, and newspapers. Figure 2-16 shows the full results regarding disaster information sources.

Figure 2-16. Public Survey—Disaster Information



Survey respondents were asked to identify natural hazards that they had experienced over the past five years in Placer County. Of the hazards profiled in this plan, “heavy rains and storms” was the most common answer, followed by “wildfire” and “drought and water shortage.” Figure 2-17 shows the full results of the question about hazards experienced by the public in the past five years.

Figure 2-17. Public Survey—Hazards Experienced Within Past 5 Years



The survey also asked respondents which hazards they are most concerned about. Wildfire was the highest concern, with 73.7 percent of respondents being very concerned or extremely concerned about wildfires. The next highest concerns were extreme heat, with 46.6 percent, and drought and water shortage, with 42.1 percent.

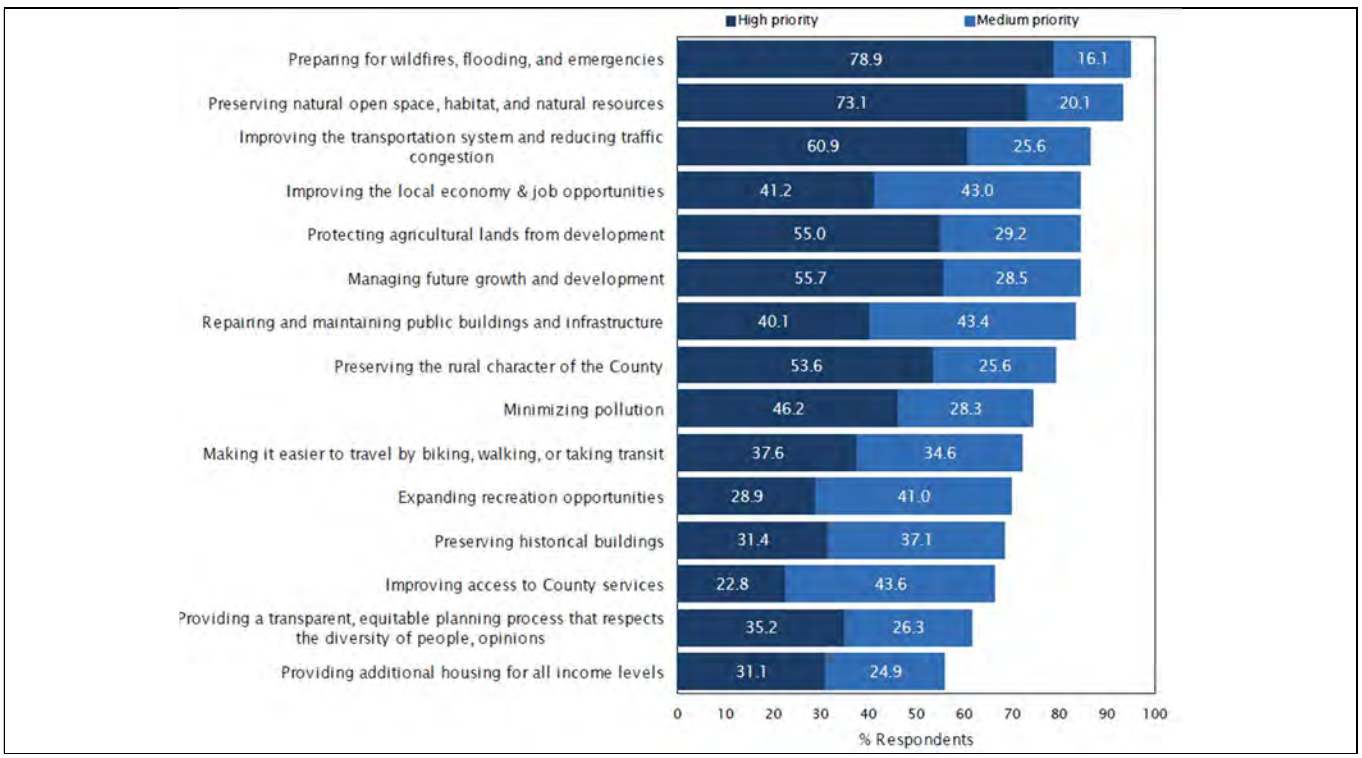
Refer to Appendix E the full list of survey questions and responses. Jurisdiction-specific responses can be found in Volume 2.

GENERAL PLAN SURVEY

Earlier in 2025, Placer County conducted a survey to inform residents about the update of the County's General Plan. The survey asked residents' opinions on key issues addressed in the General Plan, such as quality of life, land use and housing, transportation and mobility, sustainability and resilience, and community, culture, and recreation. The survey was administered January 24-31, 2025, to a random sample of 1,126 adults who reside in Placer County.

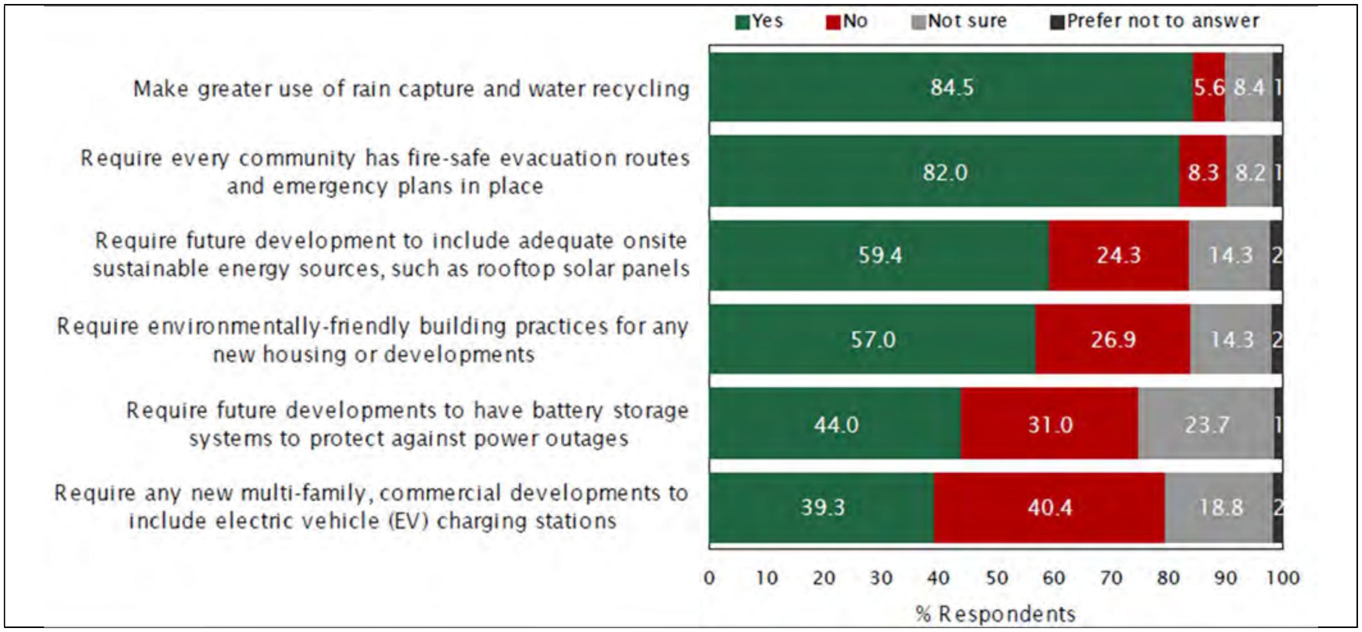
A key finding of this survey was that residents thought preparing for wildfires, flooding, and emergencies should be the *highest* priority when designing Placer County's future. For this question, survey respondents were asked to rate potential goals and objectives for Placer County's future as high priority, medium priority, or low priority. Ninety-five percent of respondents ranked preparing for wildfires, flooding, and emergencies as high or medium priority, including 78.9 percent who rated it as high priority. This was prioritized ahead of preserving natural open space, improving the transportation system, improving the local economy, and many other community goals. Figure 2-18 shows the full list of potential goals and their rankings.

Figure 2-18. General Plan Priority Responses



The survey also asked about requirements that the County could enforce. A high percentage of respondents (82.0 percent) thought Placer County should require every community to have fire-safe evacuation routes and emergency plans in place. Figure 2-19 shows the results related to mandates.

Figure 2-19. General Plan Future Sustainability and Resilience



More information about the Placer County General Plan update is available at https://www.placer.ca.gov/9618/General-Plan-2050.

2.5.4 Public Comment Period

On March 23, 2026, Placer County invited the public to review the draft plan posted on the Engage Placer website, with public comments to be accepted through April 21, 2026. The County received XX public comments. Placer County reviewed the comments and made updates to the draft MJHMP, as appropriate. Common themes expressed in the comments included the importance of:

-

2.6 Outreach to Neighboring Communities

The County kept surrounding jurisdictions apprised of the MJHMP update, invited them to complete a neighboring community survey, and requested their review of the draft plan. Three neighboring communities participated in the HMPC: Nevada County, City of Roseville, and Town of Truckee. The full list of jurisdictional representatives invited to provide input is available in Appendix C.

2.6.1 Neighboring Community Survey

The neighboring community survey was sent to counties and municipalities that border Placer County, with the understanding that the effects of hazard events that impact Placer County would be similar to those affecting neighbors. The survey consisted of five sections: emergency operations and continuity of operations planning; risk and vulnerability; evacuation and sheltering; information sharing; and projects, grants, education and outreach.

Three jurisdictions submitted responses to the survey (Nevada County, Town of Truckee, and Washoe County, NV). The following sections summarize the responses; full results are available in Appendix E.

EMERGENCY OPERATIONS AND CONTINUITY OF OPERATIONS PLANNING RISK AND VULNERABILITY

Respondents noted that there are not any shared service or mutual aid agreements in place between their jurisdiction and Placer County. However, when asked whether Placer County participates in cross-jurisdictional emergency operations planning, two of the three jurisdictions responded yes. When asked to describe the planning coordination, respondents said:

- "Placer County is a member of the Tahoe Emergency Managers Group. This group shares plans, coordinates cross-border training, and exercises together."
- "Placer County is an incredible partner in training, planning, and responding to emergencies that impact our region."

When asked how Emergency Operations Center and Continuity of Operations Plan activations are communicated between the communities and Placer County, respondents noted existing communications channels such as a Tahoe emergency management chat, email, text messages, and public information communications. In addition, all jurisdictions noted that community risk and vulnerability assessments are shared between jurisdictions.

EVACUATION AND SHELTERING

All respondents indicated that they currently collaborate with Placer County on establishing evacuation routes and alternative evacuation routes. When asked to describe where this collaboration occurs, responses included:

- "North Lake Blvd and I-80 (though this is Nevada County as it enters the state of Nevada)"
- "Highways 89 and 267, Sierra Meadows and Donner Lake Neighborhoods."

In addition, all three respondents indicated that they currently consult with Placer County before making evacuation decisions that would impact Placer County, such as recommended evacuation routes or cross-jurisdictional evacuation orders. It was noted that this coordination occurs through the Placer County OES and Placer County Sheriff's Office.

Two of three respondents indicated that they collaborate with Placer County when establishing emergency shelters. Mass care teams are involved in the Tahoe Emergency Managers Group for this purpose. All three respondents indicated that they consult with one another when making sheltering decisions.

PROJECTS AND GRANTS

When asked about hazards that have the potential to impact both Placer County and neighboring jurisdictions at the same time, wildfire was mentioned by all three respondents. In addition, respondents mentioned avalanche, hazardous materials spills, transportation incidents, severe weather, earthquake, flooding, and dam failure. Respondents were also asked to identify specific projects and plans that require cross-collaboration between jurisdictions. Responses included:

- "Impacts to I-80 and SR-28 have been shared by Nevada Department of Transportation and Caltrans. Alert and warning information and preparedness has been shared with the public in a coordinated effort. The Swift Exit: Safe Outcomes evacuation study efforts have been shared with Placer."
- "Highways 89 and 267, Truckee River Watershed, Vegetation Management Projects, Emergency Alerting."

In summary, Placer County has strong communication, collaboration, and coordination with its neighboring jurisdictions.

2.7 SWOO Results

A Strengths, Weaknesses, Obstacles, and Opportunities (SWOO) assessment was conducted during the second meeting of the HMPC. Full results are presented in Appendix F and summarized as follows:

- **Strengths** identified included strong regional coordination through groups such as the Sierra Business Council and Tahoe Regional Planning Agency, strong planning capabilities through recent updates of key county plans, engaged community organizations such as Firewise Communities and Fire Safe Councils, strong relationships with community-based organizations through Placer Community Foundation, and the Placer Alert mass notification system.
- **Weaknesses** identified included mountainous terrain in the eastern part of the County, training about emergency management processes for partners and stakeholders, the need for bi-lingual staff to communicate with the public, a limited road network, and significant populations of socially vulnerable people, such as those with low or fixed income, older adults, and isolated residences.
- Funding was the major **obstacle** identified by several participants. In addition, federal grant programs can be confusing, there is a lack of natural hazards education for new residents, the state faces unique challenges related to environmental regulations, and Placer County's public includes both suburban populations to the west and very rural populations to the east.
- **Opportunities** identified include state funded grant programs, lessons learned from the Mosquito Fire, partnerships to meet multiple objectives, collaboration with non-governmental organizations, and the use of emerging technology to characterize Placer County's unique attributes.

2.8 Incorporation of Existing Plans, Studies, Reports and Technical Information

The Placer County MJHMP uses the best available information to support hazard profiling, risk assessment, evaluation of mitigation capabilities, and the development and prioritization of mitigation strategies. The update takes into consideration planning and zoning codes, ordinances, and recent land use planning decisions. Plans, reports, and other technical information were identified and accessed online through independent research by the planning consultant or provided directly by the County, participating jurisdictions, and stakeholders involved in the planning effort. The following regulations, codes, ordinances, and plans were reviewed to develop mitigation goals and objectives and mitigation strategies that are consistent across local and regional planning and regulatory mechanisms:

- General plans
- Building codes
- Zoning and subdivision ordinances
- Flood insurance studies
- Flood insurance rate maps
- NFIP flood damage prevention ordinances
- Site plan requirements
- Community wildfire protection plans
- Stormwater management plans
- Emergency management and response plans
- Land use and open space plans
- Capital improvement plans
- Community Rating System activity scoresheets
- California State Hazard Mitigation Plan, 2023
- Placer County Sustainability Plan, 2020
- Statewide action plans

The County and participating jurisdictions provided jurisdiction-specific planning and regulatory documents that were reviewed to identify the following:

- Existing jurisdictional capabilities.
- Needs and opportunities to develop or enhance capabilities, which may be identified in the County or local mitigation strategies, as well as in Appendix F.
- Mitigation-related goals or objectives, considered in the review and update of the overall goals and objectives listed in the Mitigation Strategy (Chapter 18).
- Proposed, in-progress, or potential mitigation actions to be incorporated into the Planning Partners' updated mitigation strategies.

To assess their current planning and regulatory capabilities, participating jurisdictions reviewed relevant plans contributing to their capability to integrate mitigation efforts into their daily activities. This review is reflected in the capability assessment table in each annex in Volume 2. These tables list plan types, names, and dates, as well as a summary of how each plan supports mitigation and resilience.

The asset inventory data used for the risk assessment is presented in Chapter 3. Details of the source of this data, along with technical information on how the data was used to develop the risk assessment, are presented in Chapter 4, as well as throughout the hazard profiles in this MJHMP. Detailed sources of technical data and information used are listed in the References section.

2.9 Integration with Existing Planning Mechanisms and Programs

Effective mitigation is achieved when hazard awareness and risk management approaches and strategies become an integral part of public activities and decision-making. Many existing plans and programs support hazard mitigation in the County. It is critical that this MJHMP integrates, coordinates with, and complements, those existing plans and programs.

The capability assessment presented in Chapter 17 provides a summary and description of the existing plans, programs, and regulatory mechanisms at all levels of government (federal, state, county and local) that support hazard mitigation in the County. In the jurisdictional annexes in Volume 2, each participating jurisdiction identifies how it has already integrated hazard mitigation into its planning, regulatory and administrative framework and how it intends to promote this integration.

Further information on ongoing integration of hazard mitigation is presented in Plan Maintenance and Implementation Procedures (Chapter 19).

2.10 Plan Adoption and Approval

Formal adoption of the MJHMP by each Planning Partner’s governing body provides the following benefits (FEMA 2003):

- It lends authority to the plan to serve as a guiding document for all local and state government officials
- It gives legal status to the plan in the event it is challenged in court
- It certifies to program and grant administrators that the plan’s recommendations have been properly considered and approved by the jurisdictions’ governing authority and citizens
- It helps to ensure the continuity of mitigation programs and policies over time because elected officials, staff, and other community decision-makers can refer to the official document when making decisions about the community’s future

Adoption by the local governing bodies of each participating jurisdiction demonstrates the commitment of the Planning Partners to fulfill the mitigation goals and strategies outlined in this MJHMP. Adoption via a municipal resolution legitimizes the MJHMP and authorizes responsible agencies to execute their responsibilities.

All participating jurisdictions will proceed with formal adoption proceedings. Each jurisdiction must submit a copy of its formal adoption resolution or other legal instrument to the Placer County MJHMP Coordinator. Placer County will forward the executed resolutions to Cal OES, after which they will be forwarded to FEMA for the record. FEMA allows two options for submitting adoption resolutions:

- **Submittal of adoption resolutions with plan**—All participating jurisdictions provide documentation of plan adoption when the plan is initially submitted to the state for review. After receiving the draft plan from the state, FEMA conducts its review and will approve the plan if it meets all requirements.
- **Approvable pending adoption**—A draft MJHMP is submitted to the state and FEMA for approval prior to adoption by the jurisdictions. When FEMA determines that the plan meets all requirements except adoption as a whole and for each participating jurisdiction, FEMA will inform the state that the plan is “approvable pending adoption” (APA). After that, once FEMA receives documentation of adoption resolutions from at least one jurisdiction, the status is changed from APA to approved for the entire plan and for that jurisdiction. Other jurisdictions that participated in the planning process then receive approval once they pass their own adoption resolutions. A jurisdiction with a plan in APA status does not meet the requirement for an approved mitigation plan to apply for and receive funding assistance.

FEMA will transmit acknowledgement of verification of formal plan adoption and the official approval of the plan to the Placer County MJHMP Coordinator. The plan approval date begins the five-year approval period and sets the expiration date for the plan. All participating jurisdictions will have the same expiration date regardless of their own jurisdiction’s adoption date. The date indicated on FEMA’s approval letter is the official approval date.

The resolutions issued by each jurisdiction to support adoption of this MJHMP are included in Appendix A.

3. County Profile

This chapter presents general information about the land, people, and assets of Placer County. The planning area for this MJHMP is the entirety of Placer County, as shown in Figure 3-1.

3.1 Location

Placer County is in northern California, extending from the Sacramento Valley into the Sierra Nevada mountains. It lies northeast of Sacramento and is part of the Greater Sacramento metropolitan area. The county stretches from flat agricultural lands in the west to mountainous terrain and forested areas in the east, with diverse landscapes that include foothills, rivers, and lakes. Its location provides a blend of urban amenities and natural areas, positioned conveniently near major transportation routes including Interstate 80, which connects the San Francisco Bay Area to Lake Tahoe and Nevada.

3.2 Jurisdictions and Communities Within the County

These are the six incorporated cities and towns in the county, representing 103.7 square miles of the County's 1407.2-square-mile total area. Table 3-1 shows the sizes of the incorporated cities and towns in Placer County. Auburn is the county seat, and Roseville is the largest incorporated community.

Table 3-1. Jurisdiction Sizes

Jurisdiction	Area in Acres	Area in Square Miles
City of Auburn	4,554.0	7.1
City of Colfax	900.6	1.4
City of Lincoln	15,357.6	24.0
Town of Loomis	4,695.4	7.3
City of Rocklin	12,597.6	19.7
City of Roseville	28,261.0	44.2
Unincorporated County	834,228.9	1,303.5
Placer County (Total)	**900,595.2**	**1,407.2**

Source: Source: Placer County 2025; California State Geoportal; CDFW 2023
Note: Excludes areas designated as water

Sixteen small communities in the unincorporated county are Census Designated Places, as shown in Figure 3-2. Additional small communities include the following:

- Alpine Meadows
- Applegate
- Bowman
- Emigrant Gap
- Gold Run
- Homewood
- Iowa Hill
- Newcastle
- Olympic Valley
- Weimar

Figure 3-1. Placer County Hazard Mitigation Planning Area

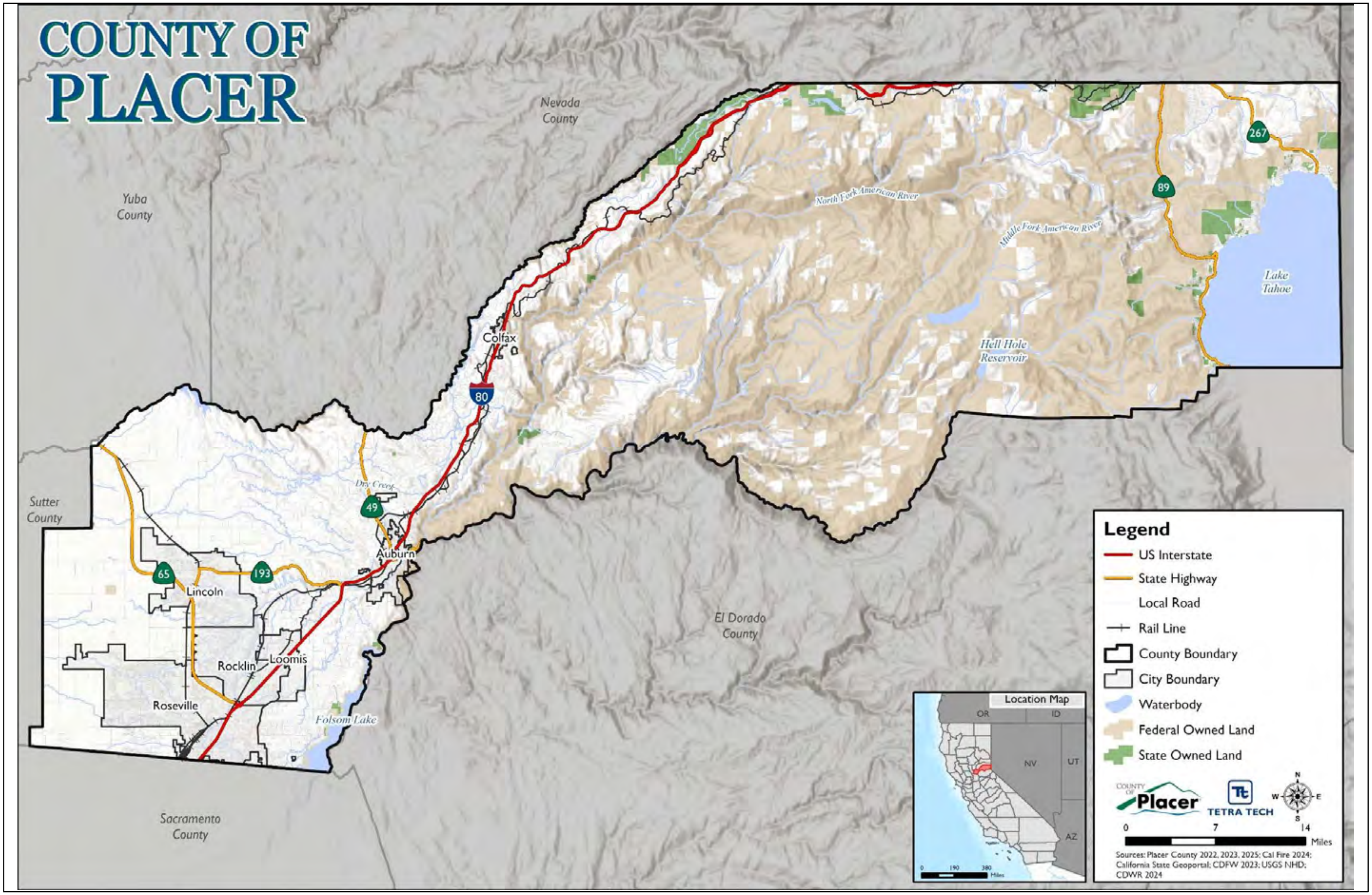
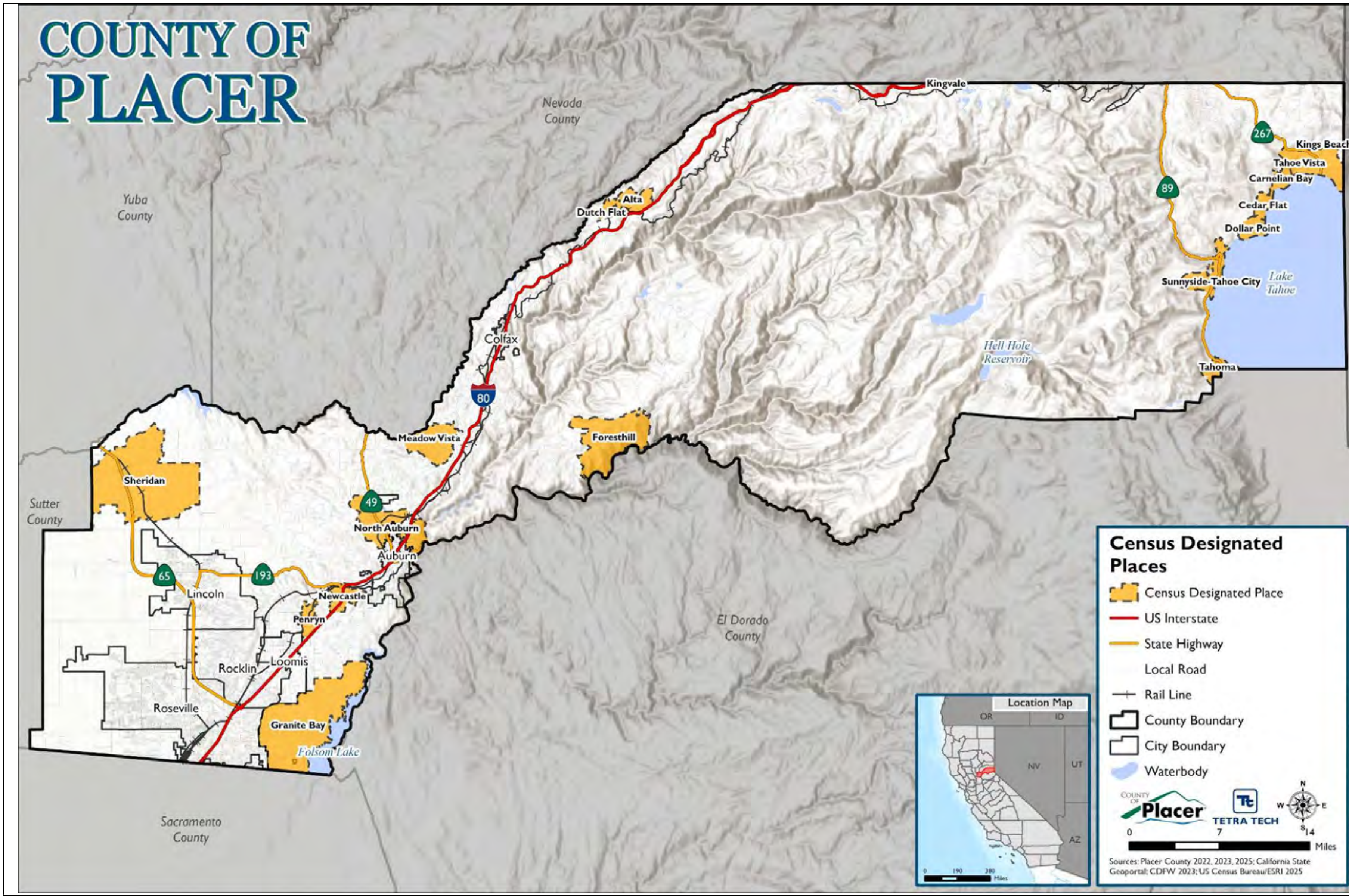


Figure 3-2. Census Designated Places in Placer County



There are 37 independent special districts that provide a wide array of services to the communities of Placer County, including cemetery, water and sewer services, fire protection, hospital services, recreation and parks, airport operations, road maintenance, conservation efforts, and pest control.

Of all the county's jurisdictions, communities, and special districts, the following are participants in this plan update:

- Placer County
- City of Auburn
- City of Colfax
- City of Lincoln
- City of Rocklin
- Town of Loomis
- Ackerman Charter School District
- Alpine Springs County Water District
- Alta Fire Protection District
- Auburn Recreation & Park District
- Colfax Elementary School District
- Donner Summit Public Utility District
- Eureka Union School District
- Foresthill Fire Protection District
- Foresthill Union School District
- Heather Glen Community Services District
- Nevada Irrigation District
- Newcastle Fire District
- North Tahoe Fire District
- North Tahoe Public Utility District
- Northstar Community Services District
- Olympic Valley Public Service District
- Penryn Fire District
- Placer County Air Pollution Control District
- Placer County Flood Control District
- Placer County Resource Conservation District
- Placer County Water Agency
- Placer Hills Fire District
- Placer Mosquito Vector Control District
- Rocklin Unified School District
- Roseville City School District
- San Juan Water District
- Sierra Joint Community College District
- South Placer Fire District
- Tahoe City Public Utility District
- Truckee Donner Public Utility District

3.3 History

Placer County was established in 1851 during the early years of California's statehood. It was named for the placer mining activities that were central to the area during the California Gold Rush. The county's history is deeply tied to the discovery of gold along the American River and its tributaries, which attracted a surge of miners and settlers. Over time, Placer County developed from a mining-centric region into a diversified economy including agriculture, timber, and later suburban communities, particularly as it became part of the greater Sacramento metropolitan area. The county seat of Auburn is a historic center reflecting Placer County's Gold Rush heritage.

3.4 Physical Setting

3.4.1 Topography

Placer County's topography (Figure 3-3) is diverse. The western portion of the county lies within the Sacramento Valley, featuring gently sloping terrain and fertile soils that support extensive agriculture. Moving eastward, the land quickly rises into rolling foothills characterized by oak woodlands and chaparral vegetation. Further east, the terrain becomes mountainous, with elevations exceeding 9,000 feet, including parts of the Tahoe National Forest and the Sierra Nevada crest. These higher elevations feature steep slopes, rocky outcrops, and alpine meadows.

3.4.2 Geology

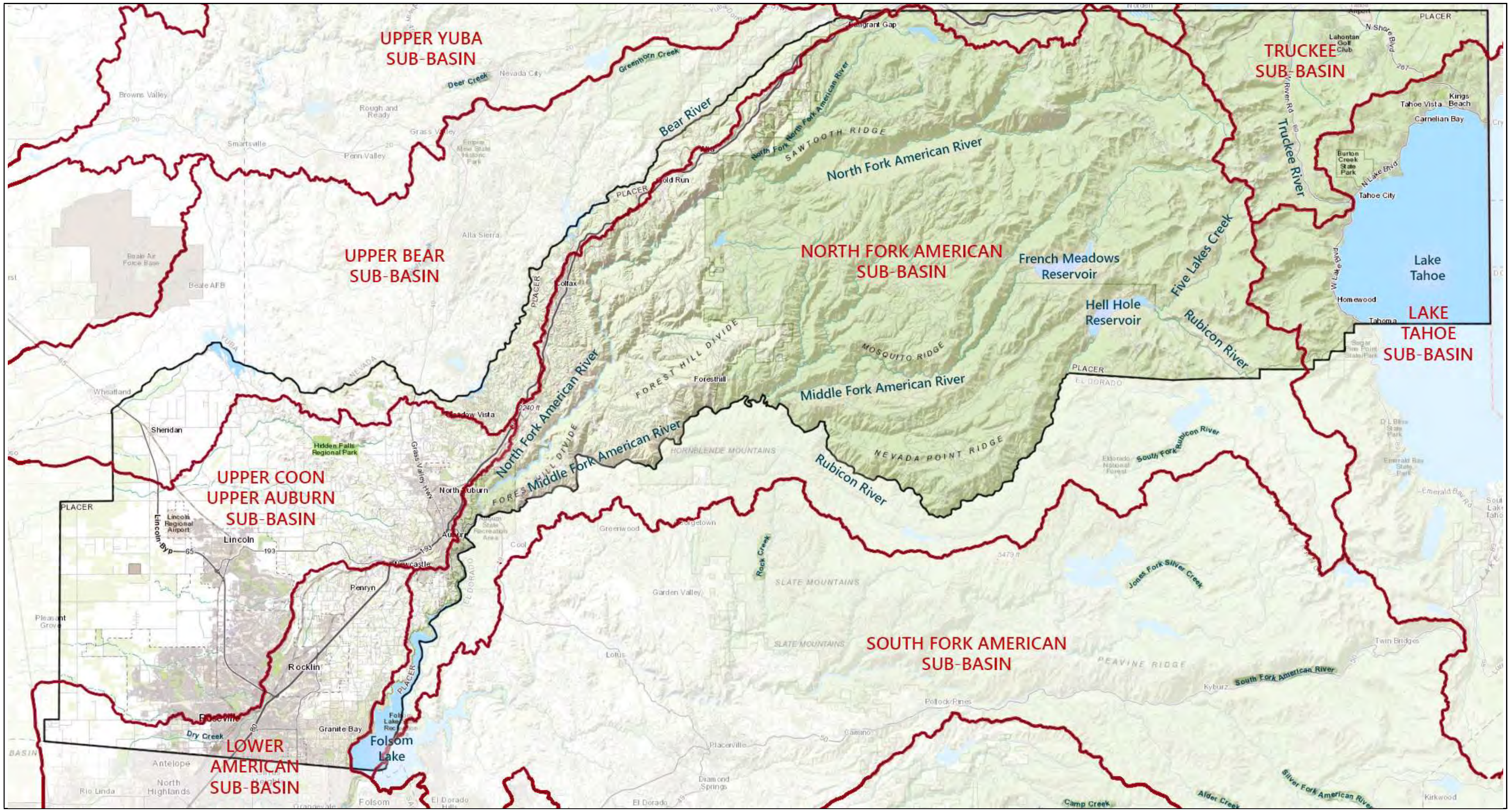
Geologically, the county's western valleys are underlain by alluvial deposits of sand, silt, and clay, which have been laid down by rivers and streams over thousands of years. These sediments create productive agricultural soils. In contrast, the Sierra Nevada portion of the county is dominated by granitic bedrock formed during the Mesozoic Era, shaped by tectonic uplift and glacial activity. The foothills contain a mix of volcanic and metamorphic rocks, providing a complex geological mosaic. This geology influences not only the landscape but also natural resources and hazards such as landslides and seismic activity.

3.4.3 Water Resources

The North Fork American River is one of Placer County's major waterways, flowing westward through the foothills and into Folsom Lake. Other significant rivers are the Bear River, which makes up part of the county's northern border, the Middle Fork American River, which crosses the eastern county and then forms part of the southern border, and the Rubicon River, which makes up part of the southern border before joining the Middle Fork American River. In addition to Lake Tahoe, a major water body in the region, and Folsom Lake, a large reservoir that provides water supply, flood control, and recreational opportunities, significant water bodies include the French Meadows Reservoir and Hell Hole Reservoir. These surface waters support local agriculture, municipal water systems, and diverse fish and wildlife habitats. Figure 3-3 shows major surface waters in the county, along with the HUC-8 subbasins of the county's major rivers (HUC-8 refers to 8-digit hydrologic unit codes, as defined by the U.S. Geological Survey).

Placer County also benefits from groundwater resources found in the valley and foothill aquifers. These groundwater supplies are essential for irrigation, especially in agricultural areas where surface water may be limited during dry periods. The county's water infrastructure includes dams, canals, and treatment facilities that manage and distribute water to urban and rural communities. Conservation efforts and watershed management programs aim to protect water quality and maintain sustainable supplies amid growing demand and climate variability.

Figure 3-3 Placer County Topography, Surface Waters, and HUC-8 Subbasin Boundaries



Source: (Wyoming GISC 2024)

3.4.4 Climate

Climate variation across Placer County is primarily based on elevation. Summers are longer, relatively hot, and dry in the lower elevations and are relatively cooler in the higher elevations of the Sierra Nevada. There is little precipitation in the County during the summer. Winters in the lower elevations are shorter and precipitation is primarily in the form of rain. In the higher elevations of the Sierra Nevada, the climate shifts to a more alpine or subalpine regime, with winters varying from short and mild with moderate snowfall to moderately severe with frequent snowfall. The varying climate zones within the county contribute to its ecological diversity, supporting species adapted to everything from valley grasslands to mountain forests.

Figure 3-4 shows the average monthly temperature and precipitation for Auburn. In this part of the County, average temperatures reach a high of 78.1 ºF in July and a low of 46.5 ºF in December. Average monthly precipitation ranges from 0.01 inches in July to 6.80 inches in December. Most of the seasonal precipitation throughout the County occurs between October and April.

Figure 3-5 shows the average monthly temperature and precipitation for Tahoe City. In this part of the County, average temperatures reach a high of 62.0 ºF in July and a low of 30.1 ºF in January. Average monthly precipitation ranges from 0.17 inches in July to 6.21 inches in January.

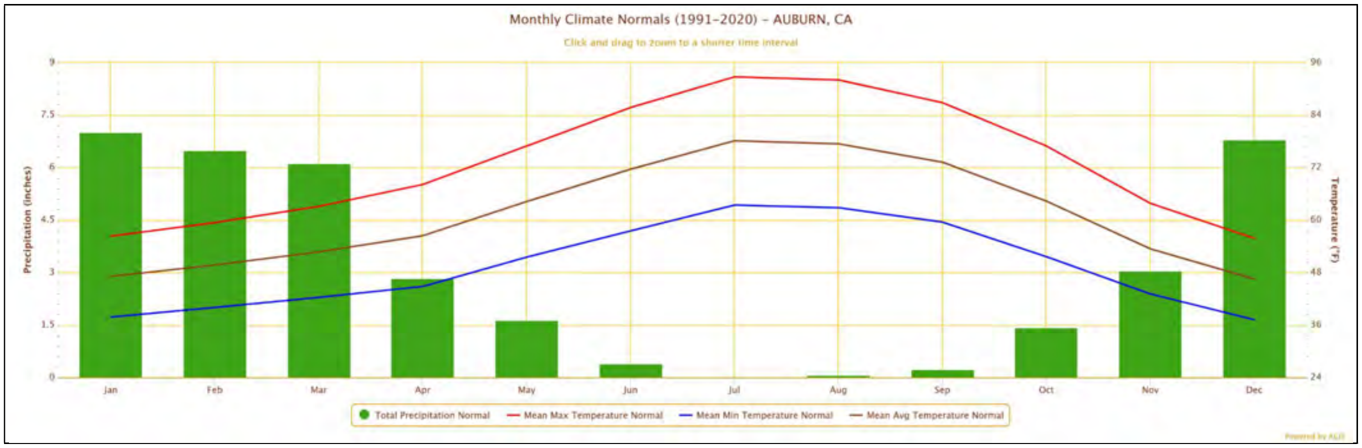
3.4.5 Land Cover

Placer County covers about 1,501 square miles including land and water bodies. Land cover in the county reflects its broad range of environments, from urbanized areas to natural and agricultural lands. The western valley floor is heavily developed with cities such as Roseville, Lincoln, and Auburn, featuring residential neighborhoods, commercial centers, and transportation infrastructure. Surrounding these urban areas, agricultural lands dominate, with crops including orchards, vineyards, and field crops benefiting from fertile soils and irrigation.

Moving eastward, land cover transitions to more natural and semi-natural landscapes. The foothills are covered by oak woodlands, grasslands, and chaparral, with scattered rural homes and ranches. In the mountainous regions, dense coniferous forests—including pine, fir, and cedar—cover large tracts of land, much of which is protected within national and state forests, parks, and wilderness areas. These forested lands provide critical habitat for wildlife, recreational opportunities, and ecosystem services such as water filtration and carbon storage. Conservation efforts and land-use planning aim to balance development pressures with the preservation of these natural landscapes.

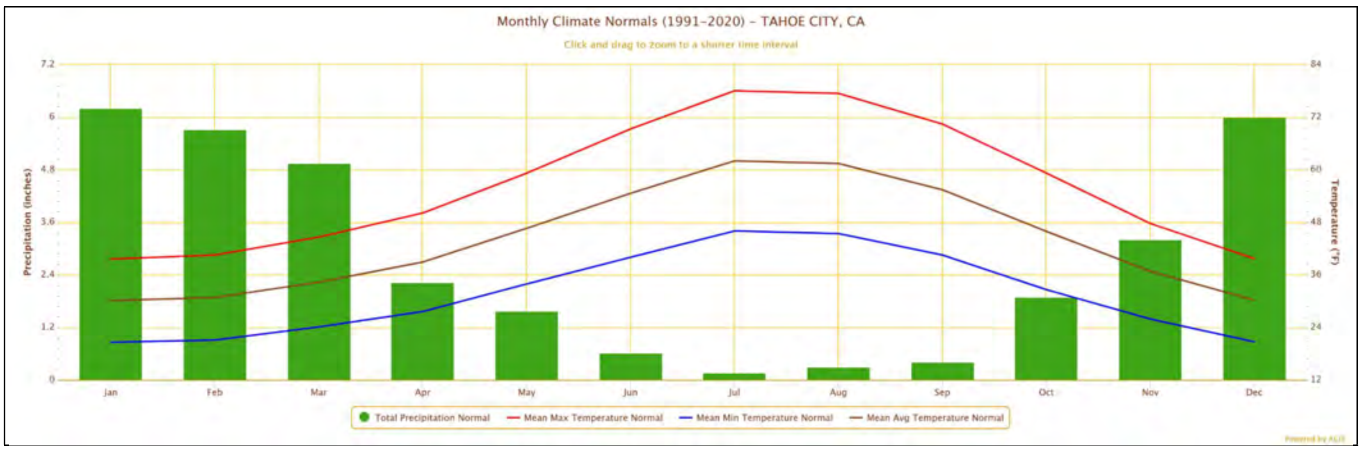
Table 3-2 summarizes total land cover by type in Placer County. Figure 3-6 shows the distribution of land cover across the County.

Figure 3-4. Monthly Temperature and Precipitation for Auburn



(NOAA 2023)

Figure 3-5. Monthly Temperature and Precipitation for Tahoe City



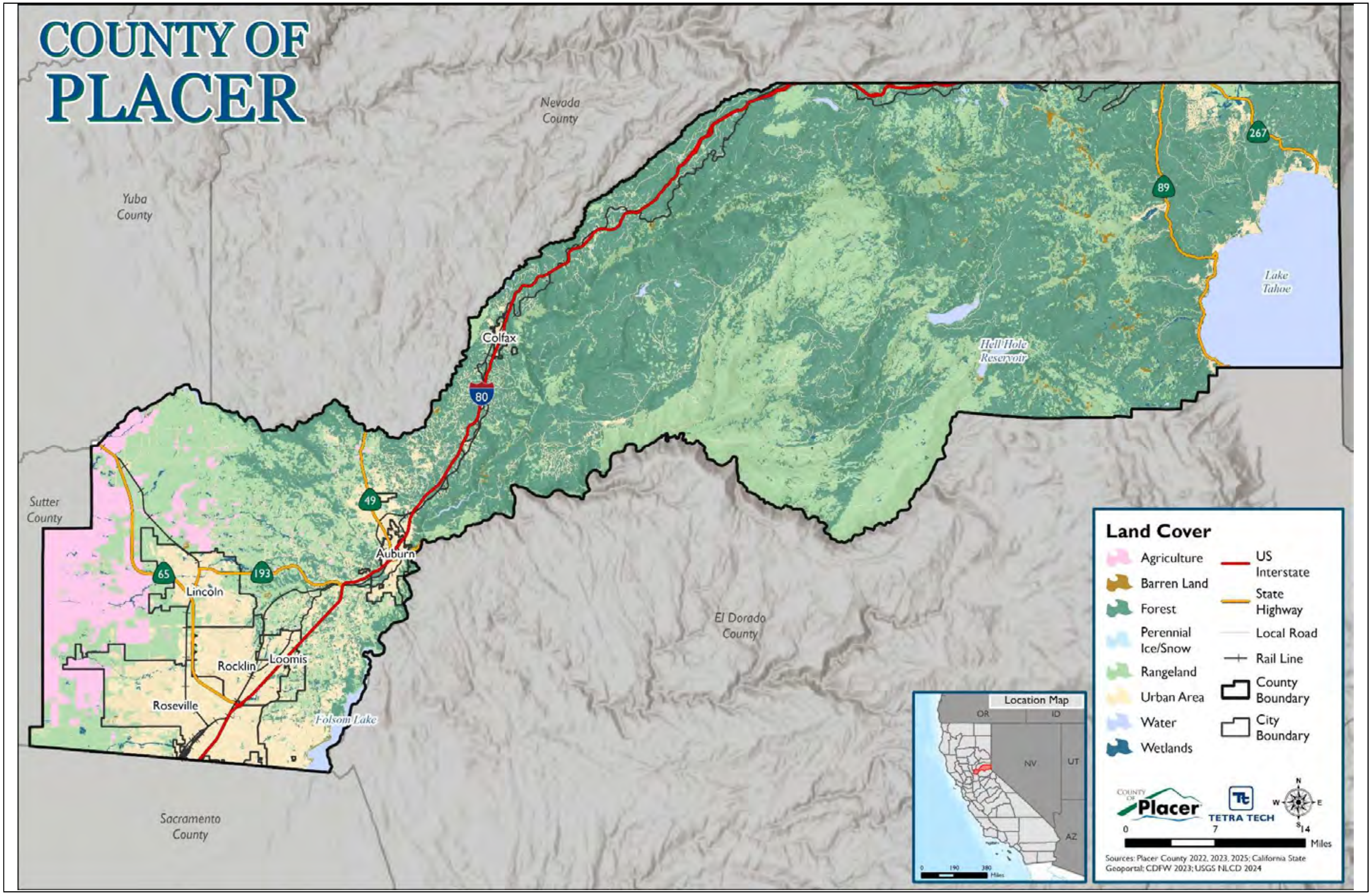
Source: (NOAA 2023)

Table 3-2. Land Cover in Placer County

Land Cover Category	Acreage	% of County
Agriculture	41,522	4.3%
Barren Land	3,462	0.4%
Forest	446,617	46.5%
Perennial Ice/Snow	1	<0.1%
Rangeland	282,090	29.4%
Urban Area	122,336	12.7%
Water	58,476	6.1%
Wetland	6,445	0.7%
Placer County (Total)	**960,949**	**100.0%**

Source: USGS/NLCD 2024

Figure 3-6. Land Cover



3.5 Land Use

3.5.1 Current Land Use

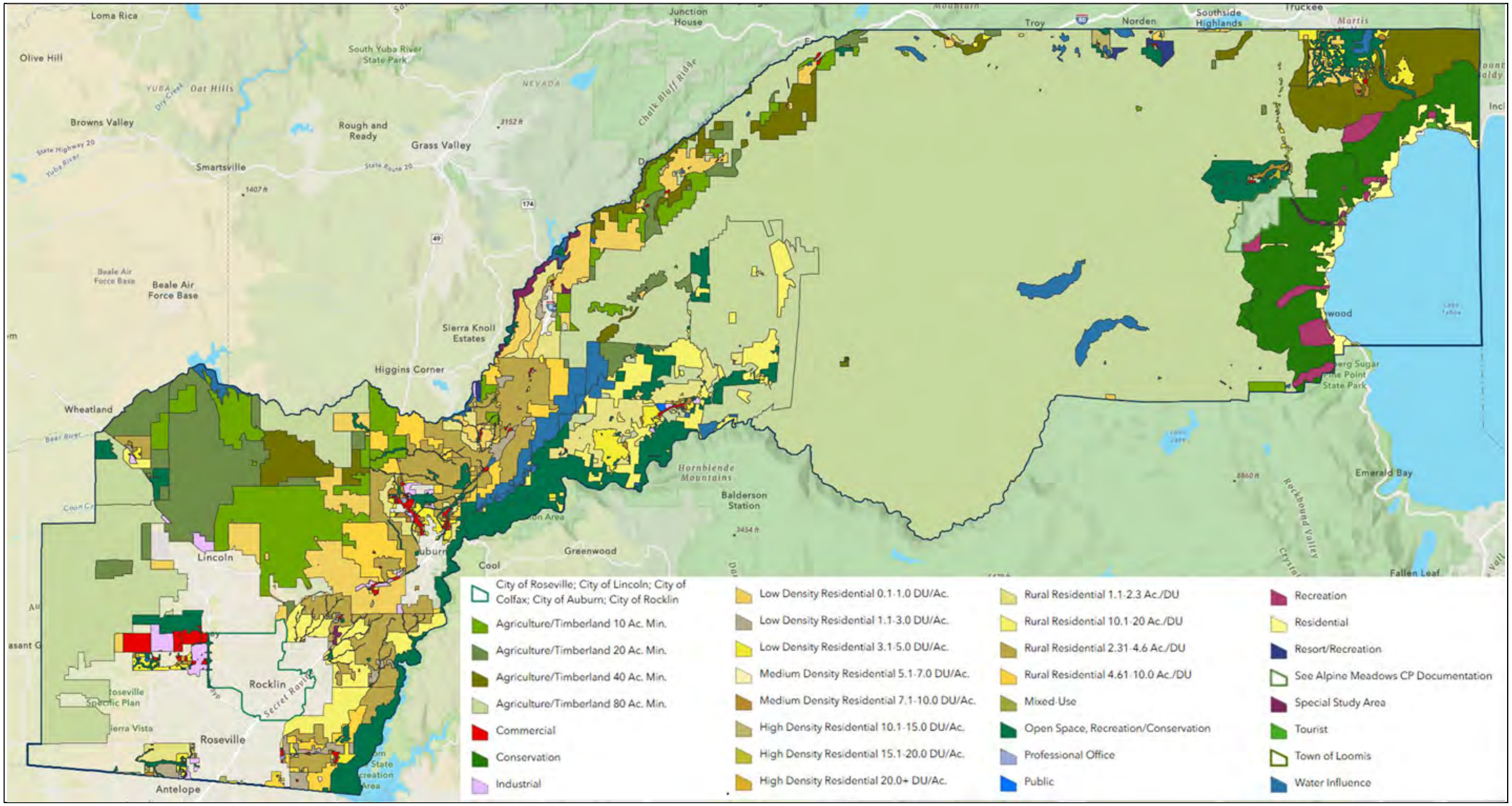
Land use is governed by the Placer County General Plan. Figure 3-7 shows the current land use in the unincorporated county. The land use map portrays overall land use patterns throughout the unincorporated areas of the county rather than precisely defining specific land uses for each parcel. The land use policies and standards of the General Plan are implemented on a day-to-day basis through zoning, which imposes specific development standards on any proposed land use.

3.5.2 Land Use Trends

Placer County has experienced significant land use changes over recent decades, largely driven by population growth and suburban expansion, especially in the western portion of the county within the Sacramento metropolitan area. The cities of Roseville, Lincoln, and Rocklin have seen rapid residential and commercial development, transforming former agricultural and open lands into vibrant suburban communities. This growth reflects broader regional trends as people seek housing outside of central Sacramento, leading to increased demand for infrastructure, schools, and services. The expansion of residential subdivisions, shopping centers, and industrial parks has been a hallmark of this trend, particularly along major transportation corridors such as Interstate 80 and Highway 65.

Despite urban growth, Placer County continues to prioritize the preservation of agricultural lands and natural open spaces, especially in the foothills and eastern mountainous areas. The county has implemented land use policies and zoning regulations aimed at protecting prime farmland from urban sprawl and encouraging sustainable agricultural practices. Additionally, significant portions of the county’s forested and mountainous lands remain under public ownership as part of national forests, state parks, and conservation easements, limiting development and preserving recreational and ecological values. Balancing growth with conservation remains a key challenge for Placer County as it navigates pressures for housing, economic development, and environmental stewardship.

Figure 3-7 Placer County Land Use Map



Source: (Placer County n.d.)

3.6 Population and Demographics

3.6.1 Historical and Current Population

Table 3-3 shows the population of Placer County and incorporated jurisdictions from 1970 to 2020. Over this period, the total county population grew more than 500 percent. The Cities of Lincoln, Rocklin, and Roseville especially experienced rapid growth during this time, with Lincoln growing by 1,500 percent and Rocklin growing by 2,300 percent.

Table 3-3. Historical Population

Placer County	1970	1980	1990	2000	2010	2020
City of Auburn	6,570	7,540	10,500	12,462	13,330	13,776
City of Colfax	798	981	1,310	1,520	1,963	1,995
City of Lincoln	3,176	4,132	7,125	11,205	42,819	49,757
Town of Loomis	*a*	*a*	5,675	6,260	6,430	6,836
City of Rocklin	3,039	7,344	18,200	36,330	56,974	71,601
City of Roseville	18,221	24,347	43,700	79,921	118,788	147,773
Unincorporated County	45,828	72,903	83,600	100,701	108,128	113,001
Placer County (Total)	**77,632**	**117,247**	**170,100**	**248,399**	**348,432**	**404,739**

Source: (Finance, E-4 Historical Population Estimates for Cities, Counties and the State n.d.)

a. The Town of Loomis was not incorporated until after 1980.

The risk assessment for this MJHMP uses the U.S. Census Bureau's 2023 5-year American Community Survey (ACS) population estimates. Table 3-4 shows these estimates for Placer County and incorporated jurisdictions. The population is concentrated in the western side of the county, as shown in Figure 3-8.

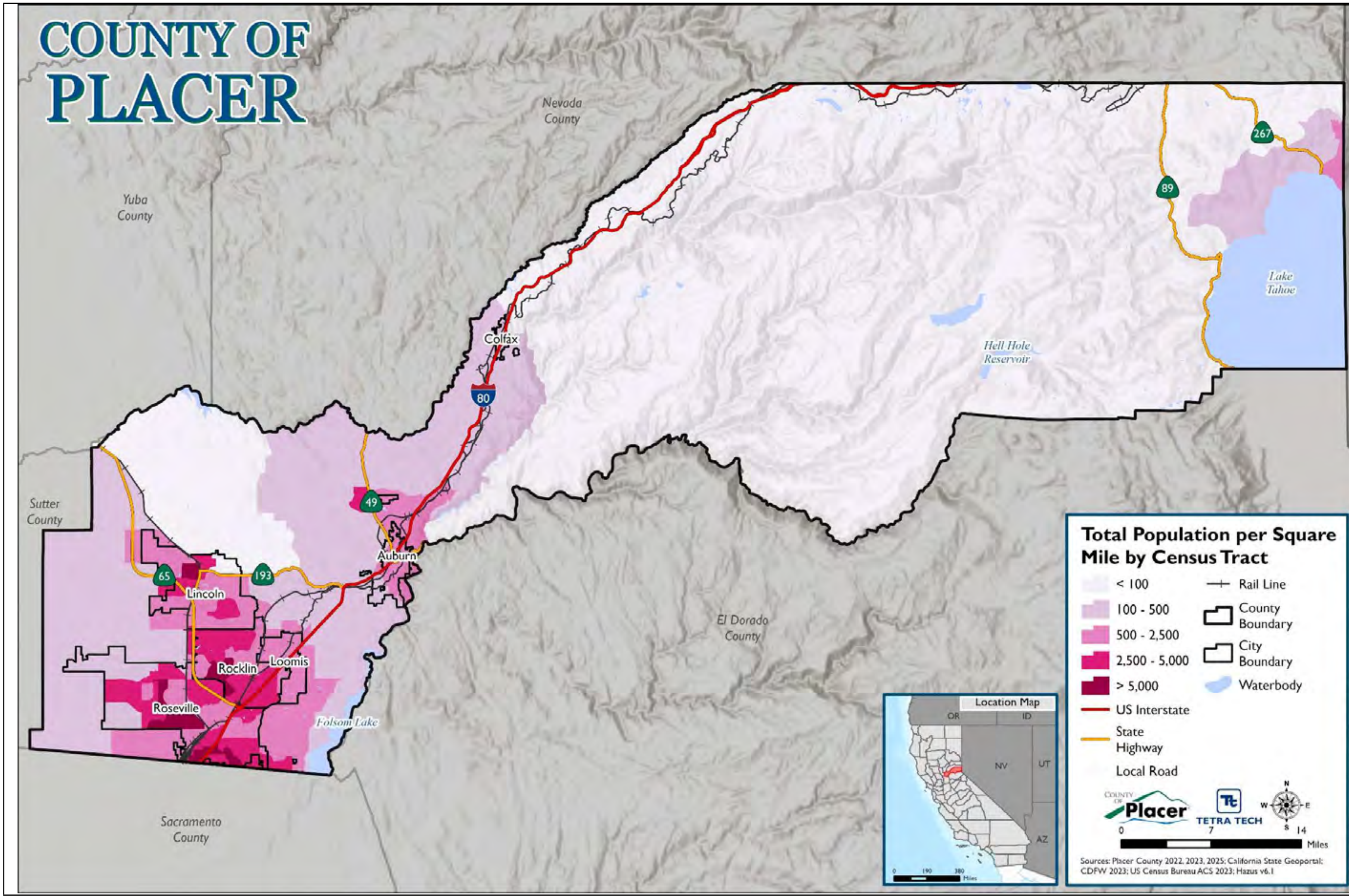
Table 3-4. 2023 Population

Jurisdiction	2023 ACS 5-Year Estimates	% of County Total
City of Auburn	13,758	3.3%
City of Colfax	2,095	0.5%
City of Lincoln	51,629	12.5%
Town of Loomis	6,809	1.7%
City of Rocklin	72,340	17.5%
City of Roseville	152,438	37.0%
Unincorporated County[a]	113,366	27.5%
Placer County (Total)	**412,435**	**100.0%**

Source: U.S. Census Bureau 2023 ACS Vulnerable Population Totals

a. Unincorporated county data was calculated by subtracting city and town data from the Placer County total.

Figure 3-8. Population per Square Mile



3.6.2 Projected Future Population

Placer County's population is expected to continue to grow over the coming decades. Estimates from the California Department of Finance indicate that the population could top 600,000 people by 2070. Table 3-5 shows the projected population growth for Placer County through 2070.

Table 3-5. Projected Population Growth

Year	Projected Placer County Population
2020	405,794
2030	438,332
2040	485,505
2050	530,159
2060	567,821
2070	604,705

Source: (Finance, P-2 County Population Projections (2020-2070) n.d.)

The central region, anchored around Auburn and its nearby areas, is expected to absorb overflow demand from the west as housing and development costs rise closer to urban cores. Eastern Placer County, including resort and tourism driven communities, is likely to continue growing more slowly. Demographically, the county is expected to remain relatively older on average, compared to regional peers, with households maintaining higher owner-occupancy and family composition in western and central subareas; but income and educational attainment disparities may persist (or even widen) between subregions. These projected shifts suggest that future growth will be unevenly distributed, reinforcing the need for land-use, infrastructure, and service planning that anticipates infrastructure capacity, transportation demands, housing affordability, and hazard risks across distinct subregions.

3.6.3 Socially Vulnerable Populations

Some populations are more susceptible to hazard events due to limiting physical or social factors. This MJHMP considers the following socially vulnerable population groups: people over the age of 65; people under the age of five; non-English speakers; people with disabilities; people living below the poverty level (as defined by the U.S. Census Bureau); people with no broadband internet; and people without access to a vehicle. The Census data on non-English speakers and populations without broadband internet or vehicle access are counted in households rather than individuals. For this MJHMP, the data were converted to people counts assuming 2.62 persons per household.

Table 3-6 shows the number of residents in Placer County who are over the age of 65 or under the age of five. The County has a higher percentage of people over 65 than state and national averages. In the Cities of Auburn and Lincoln, more than a quarter of the population is older than 65.

Table 3-7 shows the number of non-English speakers, people with disabilities, and people living below the poverty level in Placer County. In all jurisdictions except the Town of Loomis, people with disabilities account for 10 percent or more of the total population. The City of Colfax has the highest percentage of population with a disability, at 18.7 percent. In the Cities of Auburn and Colfax and the Town of Loomis, people below the poverty level account for 10 percent or more of the total population.

Table 3-8 shows the number of Placer County residents who do not have broadband internet and those who do not have access to a vehicle. People without access to broadband internet may not receive emergency alerts or evacuation notices. People without access to a vehicle may be unable to evacuate during an emergency. In the City of Colfax almost 15 percent of the population does not have access to broadband internet, indicating they may not receive evacuation alerts if a disaster occurs.

Table 3-6. Population Over 65 and Under Five

Jurisdiction	Population Over 65	People Over 65 as % of Total Population	Population Under 5	People Under 5 as a % of Total Population
City of Auburn	3,685	26.8%	514	3.7%
City of Colfax	269	12.8%	59	2.8%
City of Lincoln	14,030	27.2%	2,801	5.4%
Town of Loomis	1,431	21.0%	249	3.7%
City of Rocklin	10,400	14.4%	4,134	5.7%
City of Roseville	26,149	17.2%	8,968	5.9%
Unincorporated County[a]	27,272	24.1%	4,013	3.5%
Placer County (Total)	**83,236**	**20.2%**	**20,738**	**5.0%**

Source: U.S. Census Bureau 2023 ACS Vulnerable Population Totals

a. *Unincorporated county data was calculated by subtracting city and town data from the Placer County total.*

Table 3-7. Non-English Speaking, Disabled, and Below Poverty Level Populations

Jurisdiction	Non-English Speaking Population	Non-English Speakers as % of Total Population	Population with Disability	People with Disability as % of Total Population	Population Below Poverty Level	People in Poverty as % of Total Population
City of Auburn	472	3.4%	1,695	12.3%	1,725	12.5%
City of Colfax	79	3.8%	392	18.7%	261	12.5%
City of Lincoln	760	1.5%	6,901	13.4%	3,972	7.7%
Town of Loomis	26	0.4%	555	8.2%	731	10.7%
City of Rocklin	1,842	2.5%	7,235	10.0%	3,629	5.0%
City of Roseville	3,555	2.3%	17,127	11.2%	9,024	5.9%
Unincorporated County[a]	1,745	1.5%	12,742	11.2%	8,077	7.1%
Placer County (Total)	**8,479**	**2.1%**	**46,647**	**11.3%**	**27,419**	**6.6%**

Source: U.S. Census Bureau 2023 ACS Vulnerable Population Totals

a. *Unincorporated county data was calculated by subtracting city and town data from the Placer County total.*

Table 3-8. Populations Without Internet or Vehicle Access

Jurisdiction	Population With No Broadband Internet	People Without Broadband as % of Total Population	Population With No Vehicle Access	People Without Vehicle as % of Total Population
City of Auburn	1,734	12.6%	796	5.8%
City of Colfax	309	14.7%	97	4.6%
City of Lincoln	3,660	7.1%	865	1.7%
Town of Loomis	362	5.3%	233	3.4%
City of Rocklin	2,602	3.6%	2,182	3.0%
City of Roseville	8,093	5.3%	8,284	5.4%
Unincorporated County[a]	9,453	8.3%	3,506	3.1%
Placer County (Total)	**26,213**	**6.4%**	**15,963**	**3.9%**

Source: U.S. Census Bureau 2023 ACS Vulnerable Population Totals

a. Unincorporated county data was calculated by subtracting city and town data from the Placer County total.

Figure 3-9 shows the density of socially vulnerable populations across Placer County. Note that the data shown indicate socially vulnerable populations per square mile, not as a percentage of total population. In rural areas, the socially vulnerable population as a percentage of total population may be high even if the population density per square mile is low.

3.7 Economy

3.7.1 Major Institutions

Placer County is home to a variety of significant institutions contributing to the local economy. Sierra College is a community college with campuses in Rocklin and other locations, offering academic and vocational programs catering to local students and workforce needs. Western Governors University has a presence serving distance learners in the area. Sutter Health and Kaiser Permanente operate hospitals and clinics throughout the county. Cultural and recreational institutions, including libraries, museums, and parks, contribute to community life and tourism, supported by organizations such as the Placer County Arts Council and regional parks departments. Positioned along the western slopes of the Sierra Nevada, Placer County supports outdoor recreational facilities for activities such as skiing, hiking, and boating.

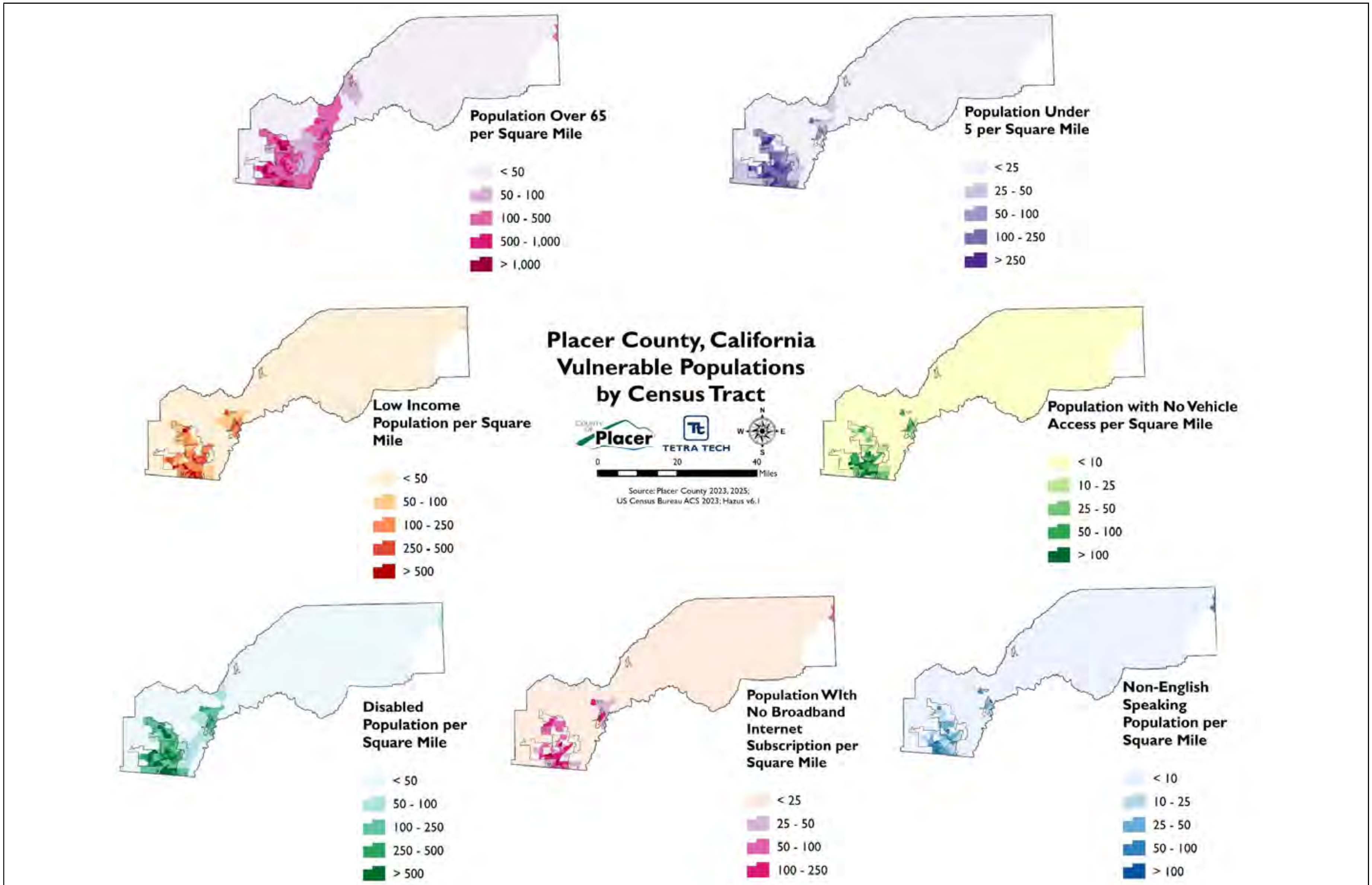
3.7.2 Employment

Placer County has a diverse and expanding labor market with strengths in financial services and real estate, natural resources and construction, retail trade, other services, and health care. The county has experienced labor market growth at a rate faster than the state of California, with payrolls increasing by 2.1 percent from 2022 to 2023, compared to California's 0.5 percent growth for the same period. This expansion is particularly notable in the western part of the county, supported by a relatively large number of highly educated residents, especially in Rocklin and Roseville. Health care remains a top-performing industry in terms of both employment and job openings (Beacon Economics 2025).

3.7.3 Wages and Income

Average annual wages paid by businesses in Placer County reached $70,069 in the fourth quarter of 2023, marking a modest 0.3 percent increase from the previous year. Wages paid in the county remain 21.3 percent below the state average, partly due to the county's industry composition, which includes sectors that generally pay lower wages (e.g., retail trade, natural resources and construction, leisure and hospitality, health care, and other services) than those prevalent in coastal markets (e.g., information and professional services). Despite this, the median household income in Placer County is 14.6 percent higher than the state median, as many high-earning county residents earn income outside the county (Beacon Economics 2025).

Figure 3-9. Density of Socially Vulnerable Populations per Square Mile



Placer County exhibits wide disparities in advertised wages by industry, from $107,000 in utilities to about $40,000 in arts, entertainment, and recreation. Wage growth across industries has been mixed, with the information sector showing the highest increase at 8.0 percent, followed by natural resources and construction (3.7 percent), other services (3.4 percent), and financial services and real estate (2.0 percent). Some sectors, including transportation, wholesale trade, retail trade, and professional services, have seen wage declines, likely due to a shift toward part-time employment (Beacon Economics 2025).

3.7.4 Economic Trends

Placer County's economy has evolved from its historical roots in agriculture and mining to a more diversified modern economy driven by sectors such as technology, health care, retail, and professional services. The western part of the county, particularly around Roseville and Rocklin, has become a hub for retail and commercial development, featuring regional shopping centers, office parks, and industrial facilities. This area benefits from proximity to Sacramento and good transportation infrastructure, attracting businesses and commuters.

The county's economic growth has been supported by a rising population and expanding housing market, which fuels construction and related industries. Health care and education are among the largest employment sectors, reflecting the county's growing community needs. Additionally, tourism and outdoor recreation play an important role, especially in the mountainous eastern areas with access to ski resorts, hiking trails, and lakes. Agricultural activities, while diminished in economic share compared to urban sectors, remain vital in the valley and foothills, producing crops such as wine grapes, tree fruits, and nursery products. Overall, Placer County's economy is characterized by steady growth, increasing diversification, and a balance between urban development and preservation of natural and agricultural resources.

3.8 General Building Stock

3.8.1 Existing Development

The western part of Placer County has experienced substantial residential and commercial development, reflecting its role as a suburban extension of the Sacramento metropolitan area. Housing growth in these areas has been robust, driven by demand for suburban living with proximity to urban amenities and transportation corridors like Interstate 80. The housing stock includes a mix of single-family homes, townhouses, and apartment complexes, with ongoing new subdivisions and infill development. Table 3-9 presents the total number of buildings in each jurisdiction and the replacement cost value of structures and contents.

Table 3-9. Building Stock Count and Replacement Cost Value

Jurisdiction	Number of Buildings	Replacement Cost Value—Structures	Replacement Cost Value—Contents	Replacement Cost Value—Total
City of Auburn	6,393	$3,586,678,514	$2,545,278,904	$6,131,957,418
City of Colfax	981	$430,439,903	$335,025,435	$765,465,338
City of Lincoln	23,172	$12,587,623,738	$7,521,360,178	$20,108,983,916
Town of Loomis	3,953	$2,076,155,460	$1,506,429,660	$3,582,585,120
City of Rocklin	24,911	$14,414,546,136	$9,233,573,139	$23,648,119,275
City of Roseville	53,743	$34,066,820,917	$23,612,178,830	$57,678,999,747
Unincorporated County	82,945	$37,610,802,898	$25,129,894,075	$62,740,696,973
Placer County (Total)	**196,098**	**$104,773,067,566**	**$69,883,740,221**	**$174,656,807,787**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024

For this MJHMP, structures in the general building stock inventory were sorted into four categories: residential; commercial; industrial; and other (government, religious, agricultural, and education). The following sections summarize the distribution of the inventoried building stock into these categories.

RESIDENTIAL

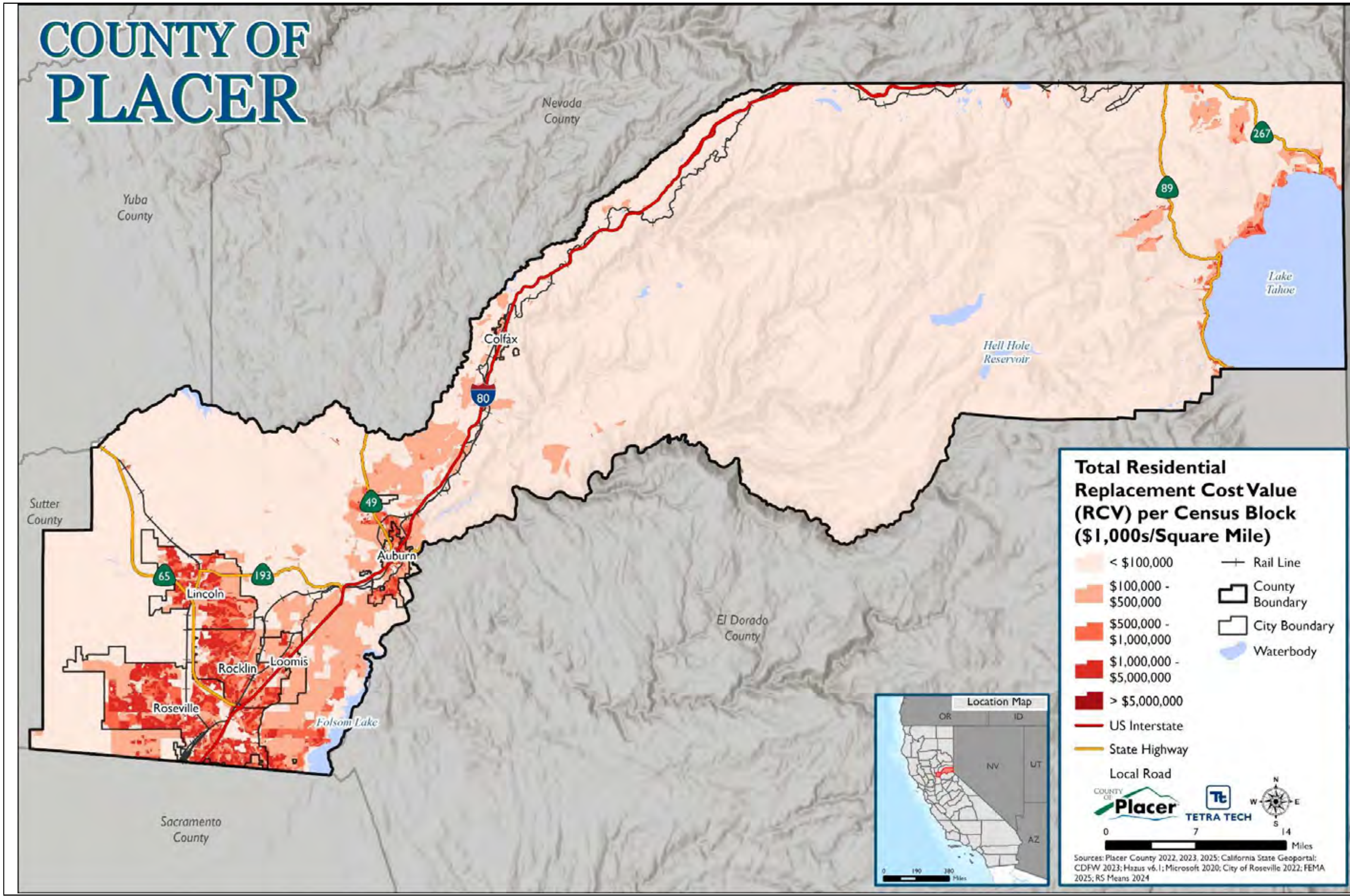
Residential buildings represent 82.0 percent of the total number of buildings in Placer County and 64.5 percent of the total building stock replacement cost value. Table 3-10 lists the distribution and total replacement cost value of residential buildings in the planning area. Figure 3-10 shows the value density of residential buildings across Placer County. Value density is the dollar value of structures per unit area, including building content value. The densities are shown in units of $1,000 per square mile.

Table 3-10. Residential Replacement Cost Value

Jurisdiction	Building Count	Total Replacement Cost Value
City of Auburn	4,990	$3,391,132,381
City of Colfax	687	$345,273,736
City of Lincoln	21,548	$15,763,585,340
Town of Loomis	2,578	$1,934,213,518
City of Rocklin	21,662	$16,375,915,682
City of Roseville	51,443	$35,191,256,110
Unincorporated County	57,974	$39,691,368,382
Placer County (Total)	**160,882**	**$112,692,745,149**

Source: Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024

Figure 3-10. Distribution of Residential Building Stock and Value Density in Placer County



COMMERCIAL

Commercial buildings make up 16.9 percent of the total number of buildings and represent 27.9 percent of the total building stock replacement cost. Table 3-11 lists the distribution and total replacement cost value of commercial buildings in the planning area. Figure 3-11 shows the value density of commercial buildings across Placer County.

Table 3-11. Commercial Replacement Cost Value

Jurisdiction	Building Count	Total Replacement Cost Value
City of Auburn	1,329	$2,224,439,547
City of Colfax	256	$282,204,326
City of Lincoln	1,533	$3,343,076,163
Town of Loomis	1,230	$1,143,274,832
City of Rocklin	3,041	$5,659,055,892
City of Roseville	1,793	$17,484,584,428
Unincorporated County	24,076	$18,720,407,781
Placer County (Total)	**33,258**	**$48,857,042,969**

Source: Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024

INDUSTRIAL

Table 3-12 lists the distribution and total replacement cost value of industrial buildings in the planning area. Figure 3-12 shows the value density of industrial buildings in Placer County.

Table 3-12. Industrial Replacement Cost Value

Jurisdiction	Building Count	Total Replacement Cost Value
City of Auburn	23	$216,806,611
City of Colfax	25	$93,049,070
City of Lincoln	38	$627,009,535
Town of Loomis	116	$334,126,234
City of Rocklin	149	$847,907,867
City of Roseville	343	$2,178,654,785
Unincorporated County	423	$2,574,633,554
Placer County (Total)	**1,117**	**$6,872,187,656**

Source: Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024

Figure 3-11. Distribution of Commercial Building Stock and Value Density in Placer County

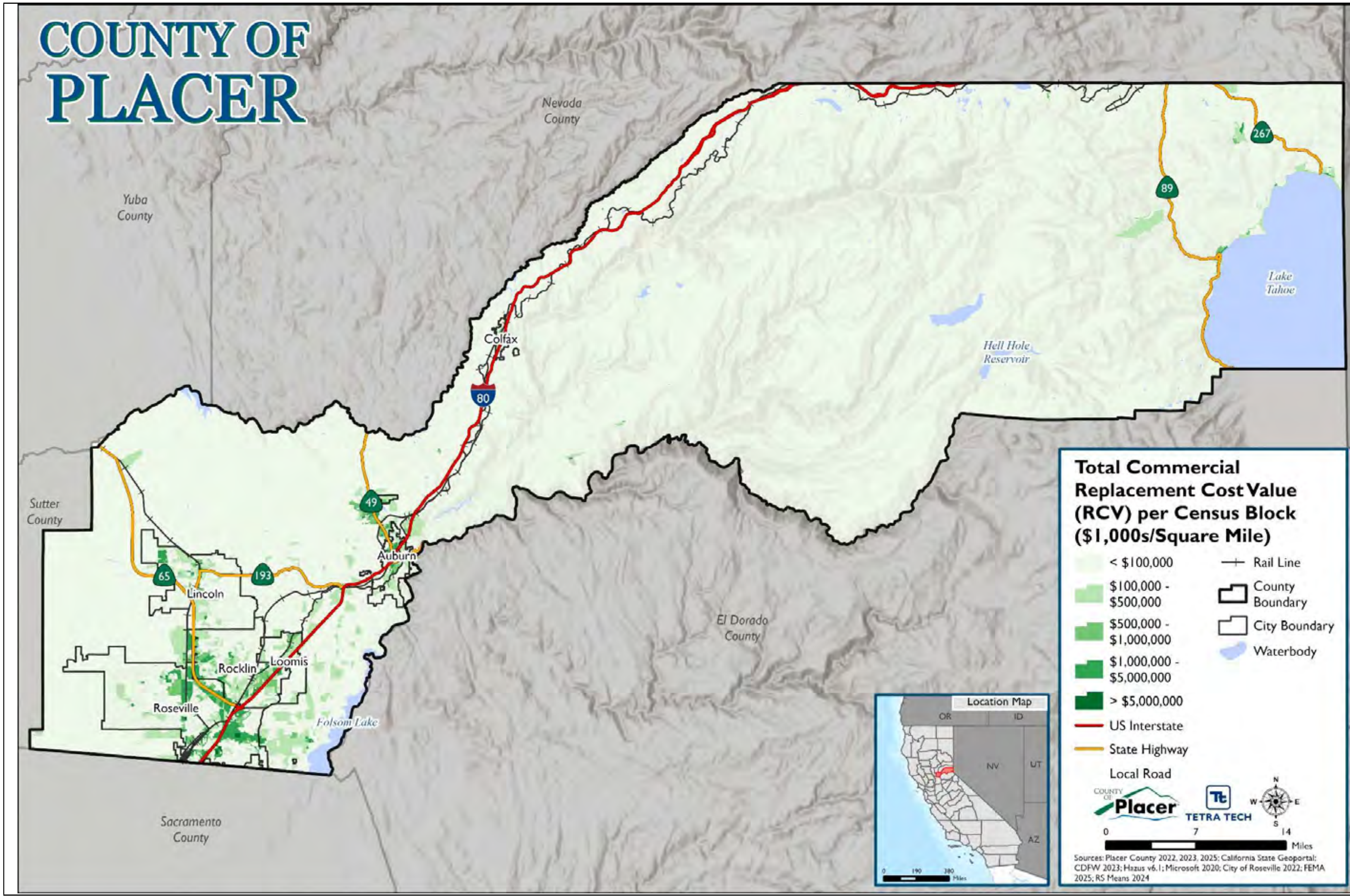
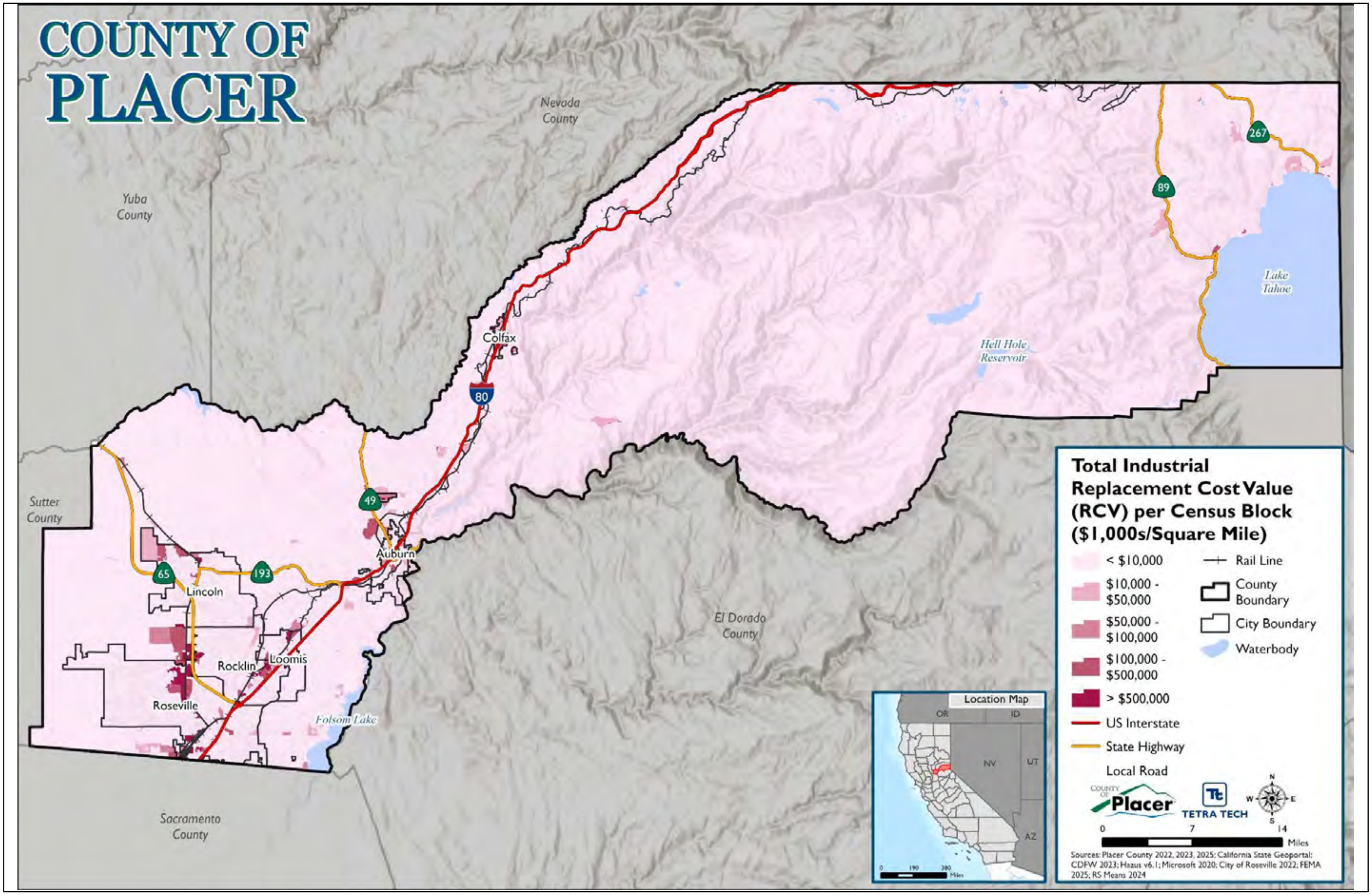


Figure 3-12. Distribution of Industrial Building Stock and Value Density in Placer County



OTHER

Table 3-13 lists the distribution and total replacement cost value of other buildings (government, religious, agriculture, and education) in the planning area. Figure 3-13 shows the value density of other buildings across Placer County.

Table 3-13. Other Replacement Cost Value

Jurisdiction	Building Count	Total Replacement Cost Value
City of Auburn	51	$299,578,879
City of Colfax	13	$44,938,207
City of Lincoln	53	$375,312,878
Town of Loomis	29	$170,970,536
City of Rocklin	59	$765,239,834
City of Roseville	164	$2,824,504,424
Unincorporated County	472	$1,754,287,256
Placer County (Total)	**841**	**$6,234,832,013**

Source: Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024

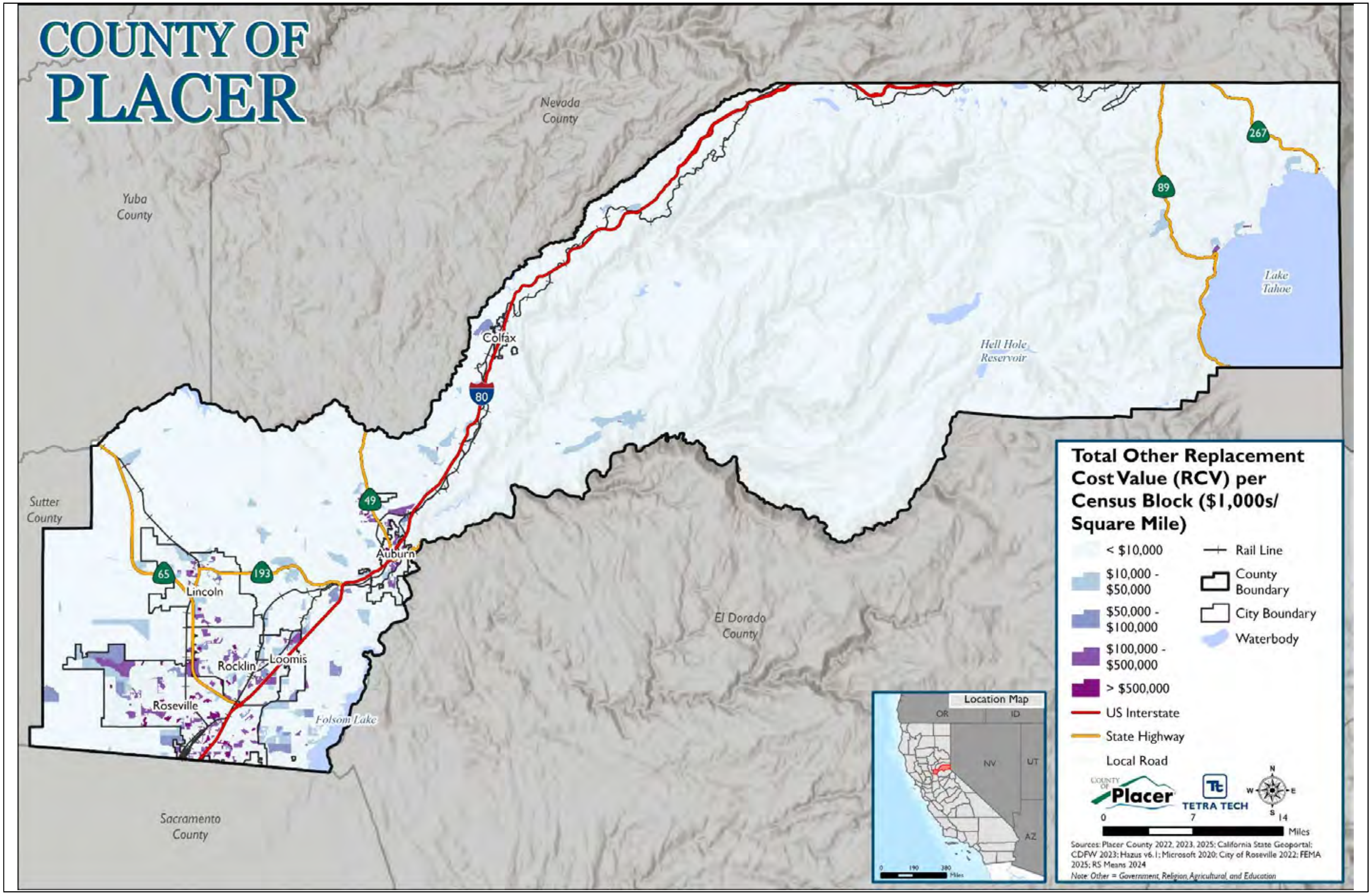
3.8.2 New Development

Placer County is experiencing dynamic new development, particularly in the cities of Roseville (highlighted in Roseville's HMP), Rocklin, Lincoln, and Auburn. These areas have seen a surge in residential subdivisions, commercial centers, and mixed-use developments responding to growing population demand and economic expansion. The county's strategic location near Sacramento, combined with accessible transportation routes such as Interstate 80 and Highway 65, make it attractive for residents and businesses relocating or expanding in the region. New residential developments are focused on single-family homes but increasingly include townhomes and multi-family apartment complexes to address diverse housing needs and affordability concerns.

Rocklin has witnessed robust residential growth, with numerous new housing projects catering to families and young professionals. The City promotes mixed-use developments that blend residential, retail, and office spaces to create vibrant community centers. Infrastructure upgrades, including road improvements, expanded public utilities, and enhanced public safety facilities, accompany this growth to support the rising population.

Lincoln, historically more rural, is rapidly transitioning with a wave of new housing subdivisions and commercial developments, transforming it into a more suburban community. Large-scale projects to serve the expanding population include new schools, shopping centers, and recreational facilities. The City's development plans often incorporate green spaces and open areas to maintain quality of life amid growth.

Figure 3-13. Distribution of Other Building Stock and Value Density in Placer County



In the foothills and Sierra Nevada portions of Placer County, new development is more limited due to topography, environmental constraints, and land use regulations. However, there are ongoing projects involving resort expansions, vacation home developments, and small-scale residential communities that cater to second-home buyers and tourists. These developments often emphasize preservation of natural landscapes and access to outdoor recreational opportunities such as skiing, hiking, and boating.

Placer County's planning agencies actively manage new development through land use policies, zoning ordinances, and growth management strategies. These efforts aim to balance economic growth and housing needs with environmental conservation, agricultural preservation, and infrastructure capacity. For example, urban growth boundaries and agricultural buffers are used to prevent sprawl into prime farmland and sensitive ecological areas. Additionally, new developments are increasingly incorporating sustainable design principles, including low-impact development techniques, renewable energy integration, and enhanced stormwater management systems.

The County supports affordable housing initiatives to address the regional housing affordability crisis. Recent developments include projects with dedicated affordable units, accessory dwelling units, and partnerships with nonprofit housing organizations. These efforts seek to provide housing options for a diverse population, including essential workers, seniors, and low- to moderate-income families.

Commercial and industrial development in Placer County is evolving to meet future economic trends. Technology and data-related industries are expanding, supported by the county's growing skilled workforce and proximity to Sacramento's tech ecosystem. Logistics and distribution centers are also increasing due to Placer County's strategic location along major transportation corridors connecting the Bay Area, Sacramento, and Nevada. This has led to new warehousing and light manufacturing facilities, often situated in business parks designed for clean and efficient operations.

Table 3-14 shows the anticipated major development projects in Placer County over the next five years. Smaller development projects for each municipality are detailed in the annexes in Volume 2.

Table 3-14. Anticipated Major Development

Name of Development	Type of Development	Number of Units/Structures	Jurisdiction
Palisades Tahoe	Mixed Use	1,493	Unincorporated Placer County
Hope Way Apartments	Residential	240	Unincorporated Placer County
Everline Resort	Commercial	221	Unincorporated Placer County
Plumpjack Squaw Valley Inn	Mixed Use	94	Unincorporated Placer County
Collins Drive Subdivision	Residential	65	City of Auburn

Overall, new development in Placer County reflects a blend of suburban expansion, economic diversification, and sustainable growth management. The County aims to continue its trajectory of balanced development that meets the needs of a growing population while preserving the natural and agricultural character that defines the region. Planning for infrastructure, environmental stewardship, and housing affordability remain key priorities as the county navigates its challenges and opportunities.

3.9 Community Lifelines

Facilities that are essential to the health and welfare of the population and that maintain essential and emergency functions are designated as critical facilities. These typically include police and fire stations, schools, emergency operations centers, and infrastructure such as roads, bridges and utilities that provide water, electricity, and communications. Facilities that use or store hazardous materials are designated as critical facilities as well. All of these facilities are especially important after any hazard event (FEMA 1997).

FEMA defines some types of critical facilities, as well as public services or activities, as “community lifelines.” Community lifelines provide the fundamental services in a community that, when stabilized, enable all other aspects of society. Following a disaster, intervention is required to stabilize lifelines. FEMA defines eight categories of community lifelines as summarized in Table 3-15.

Table 3-15. FEMA-Defined Categories of Community Lifelines

Category	Types of Facilities and Services Included
Safety and security	Law enforcement/security, fire service, search and rescue, government service, community safety
Food, hydration, shelter	Food, hydration, shelter, agriculture
Health and medical	Medical care, public health, patient movement, medical supply chain, fatality management
Energy	Power grid, fuel
Communications	Infrastructure, responder communications, alerts warnings and messages, finance, 911 and dispatch
Transportation	Highway/roadway/motor vehicle, mass transit, railway, aviation, maritime
Hazardous materials	Facilities, hazmat, pollutants, contaminants
Water systems	Potable water infrastructure, wastewater management

Source: FEMA 2023

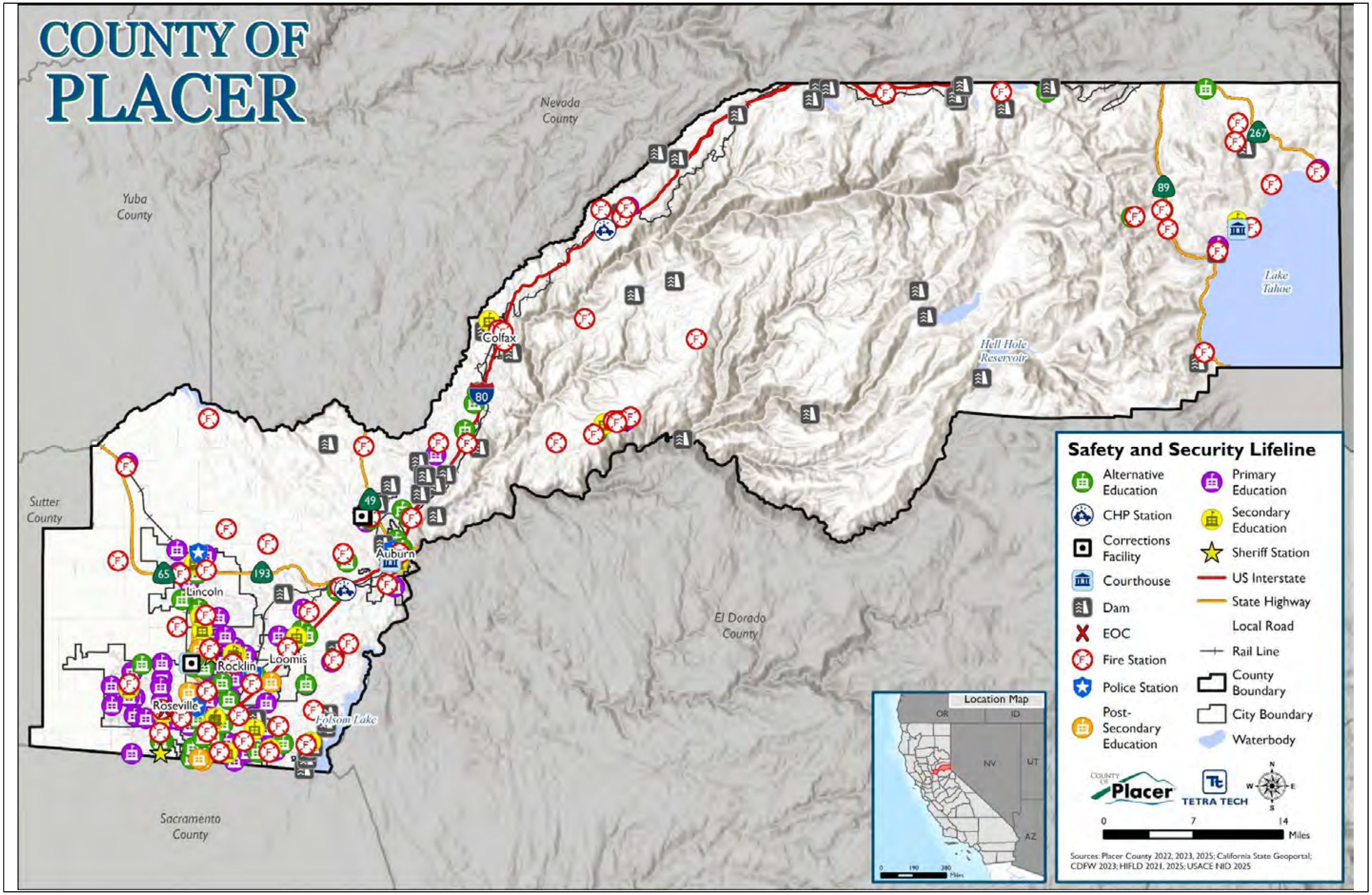
A comprehensive inventory of community lifelines in Placer County was developed from various sources, including input from the Hazard Mitigation Planning Committee and Planning Partnership. The following sections describe the inventory of community lifelines that was used for the Risk Assessment in this MJHMP. Although many lifeline facilities could fall within numerous categories, each lifeline facility identified for this planning effort was categorized according to its primary function.

3.9.1 Safety and Security

Figure 3-14 shows the location of safety and security facilities included in the lifelines inventory. Key facilities and services considered for the inventory under this category include the following:

- California Highway Patrol stations
- Corrections facilities
- Courthouses
- Dams
- Education facilities
- Emergency operations centers
- Fire stations
- Police stations
- Placer County Sheriff stations

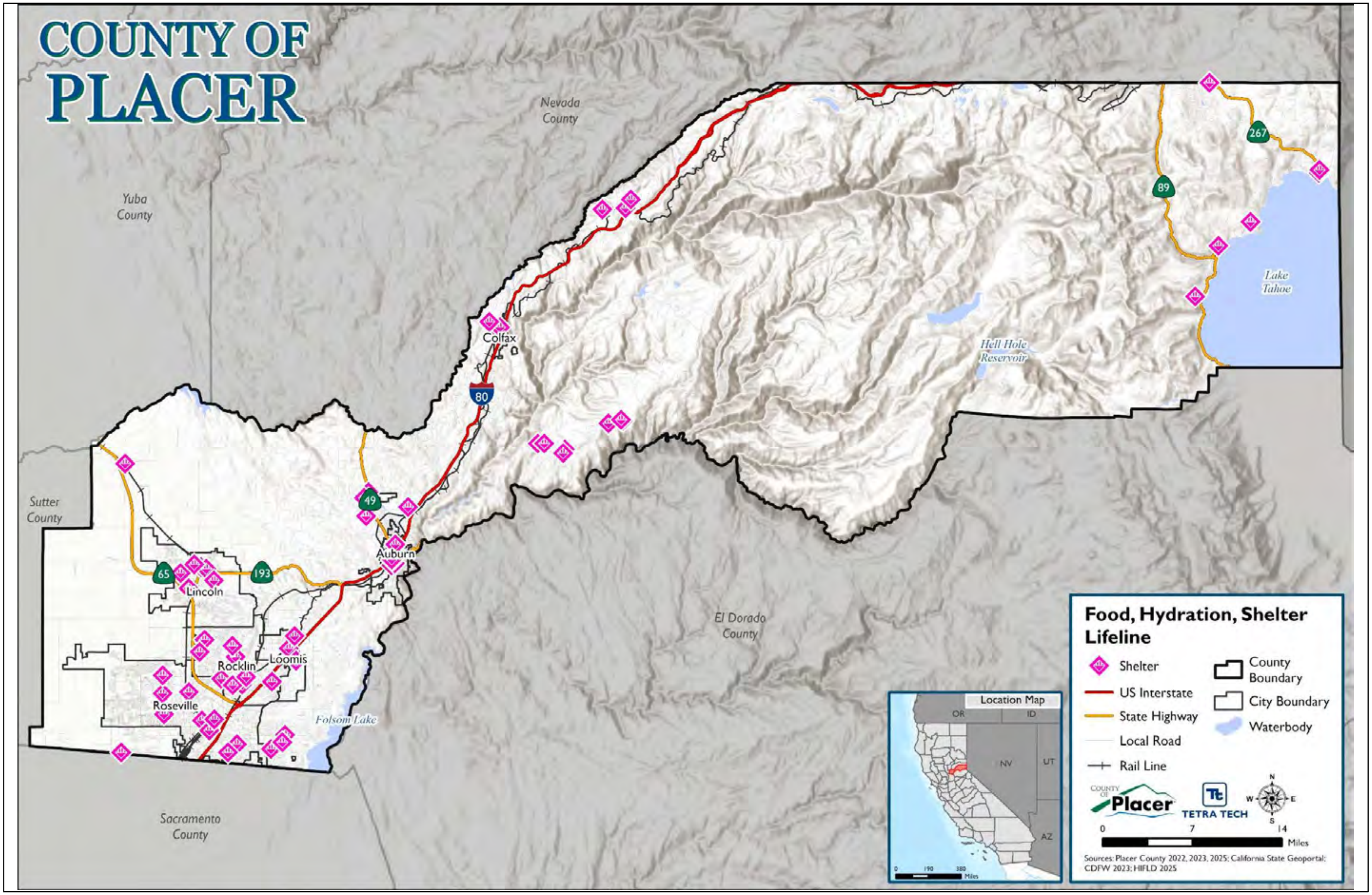
Figure 3-14. Safety and Security Facilities In Placer County



3.9.2 Food, Hydration, Shelter

Figure 3-15 shows the location of food, hydration, and shelter facilities included in the lifelines inventory. The key facilities and services considered for the inventory under this category are emergency shelters.

Figure 3-15. Food, Hydration, and Shelter Facilities in Placer County

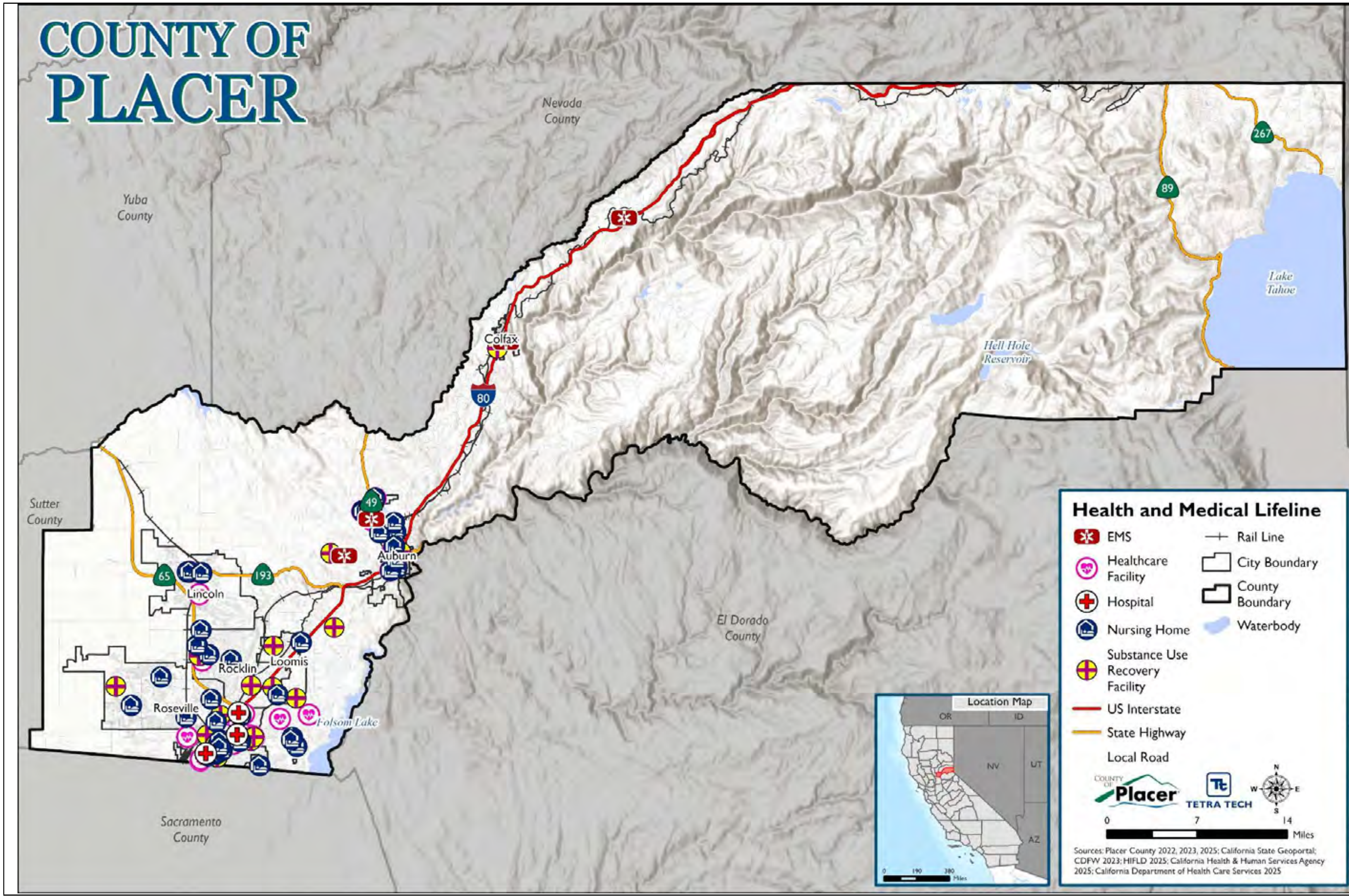


3.9.3 Health and Medical

Figure 3-16 shows the location of health and medical facilities included in the lifelines inventory. Key facilities and services considered for the inventory under this category include the following:

- Emergency medical services
- Health care facilities
- Hospitals
- Nursing homes
- Substance use recovery facilities

Figure 3-16. Health and Medical Facilities in Placer County

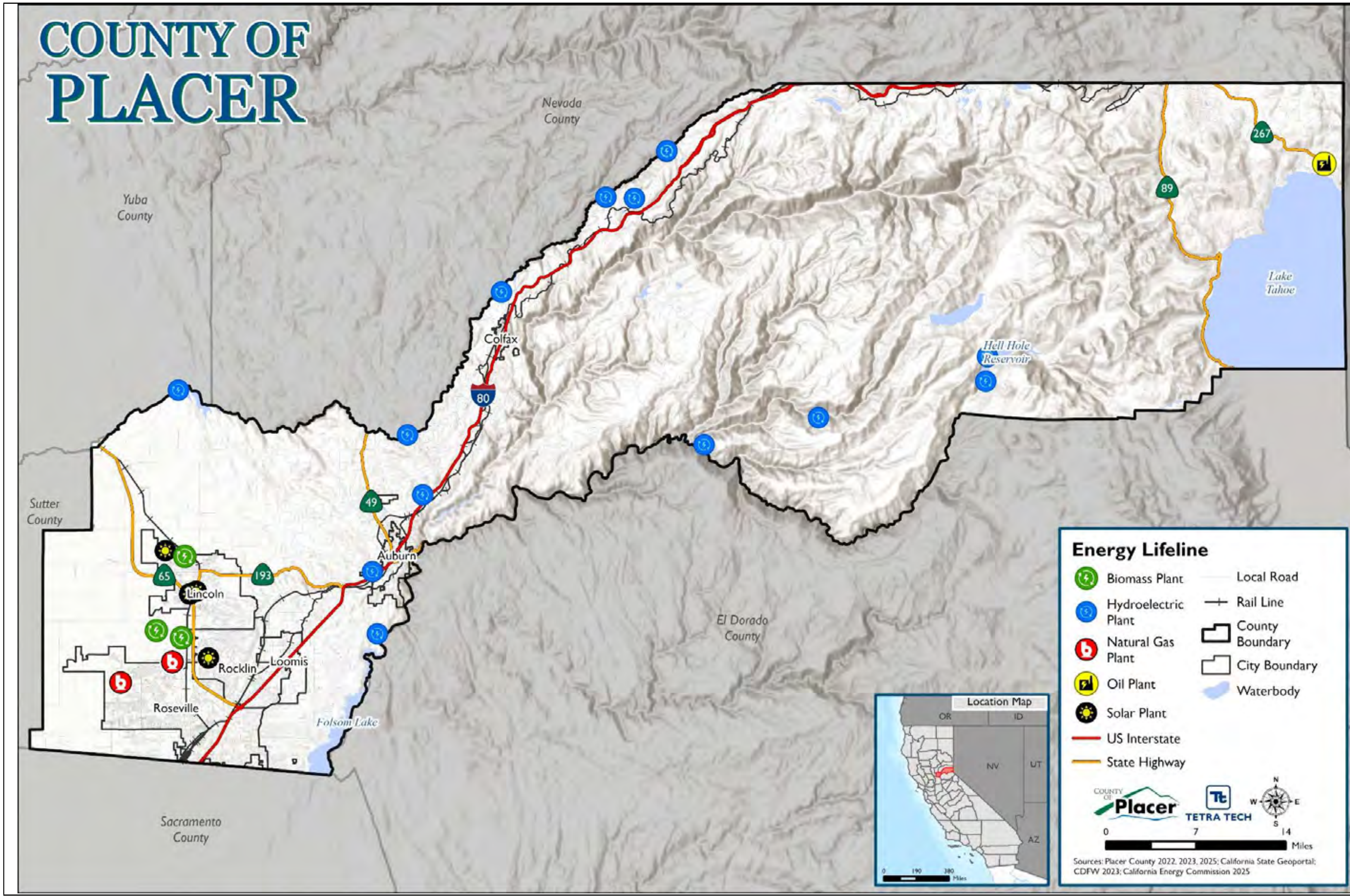


3.9.4 Energy

Figure 3-17 shows the location of energy facilities included in the lifelines inventory. Key facilities and services considered for the inventory under this category include the following:

- Biomass plants
- Hydroelectric plants
- Oil plants
- Solar plants

Figure 3-17. Energy Facilities in Placer County

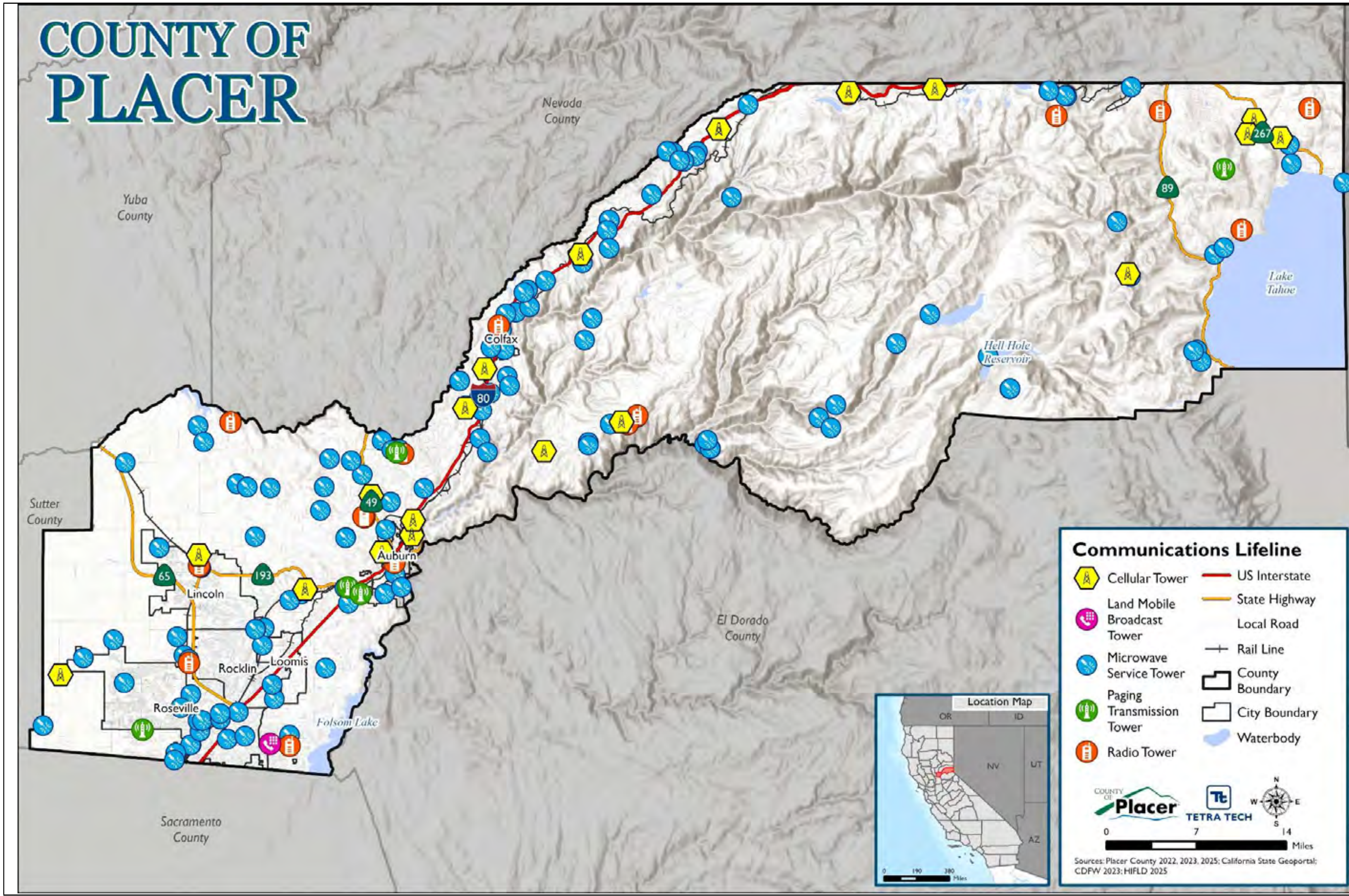


3.9.5 Communications

Figure 3-18 shows the location of communications facilities included in the lifelines inventory. Key facilities and services considered for the inventory under this category include the following:

- Cellular towers
- Land mobile broadcast towers
- Microwave service towers
- Paging transmission towers
- Radio towers

Figure 3-18. Communications Facilities in Placer County

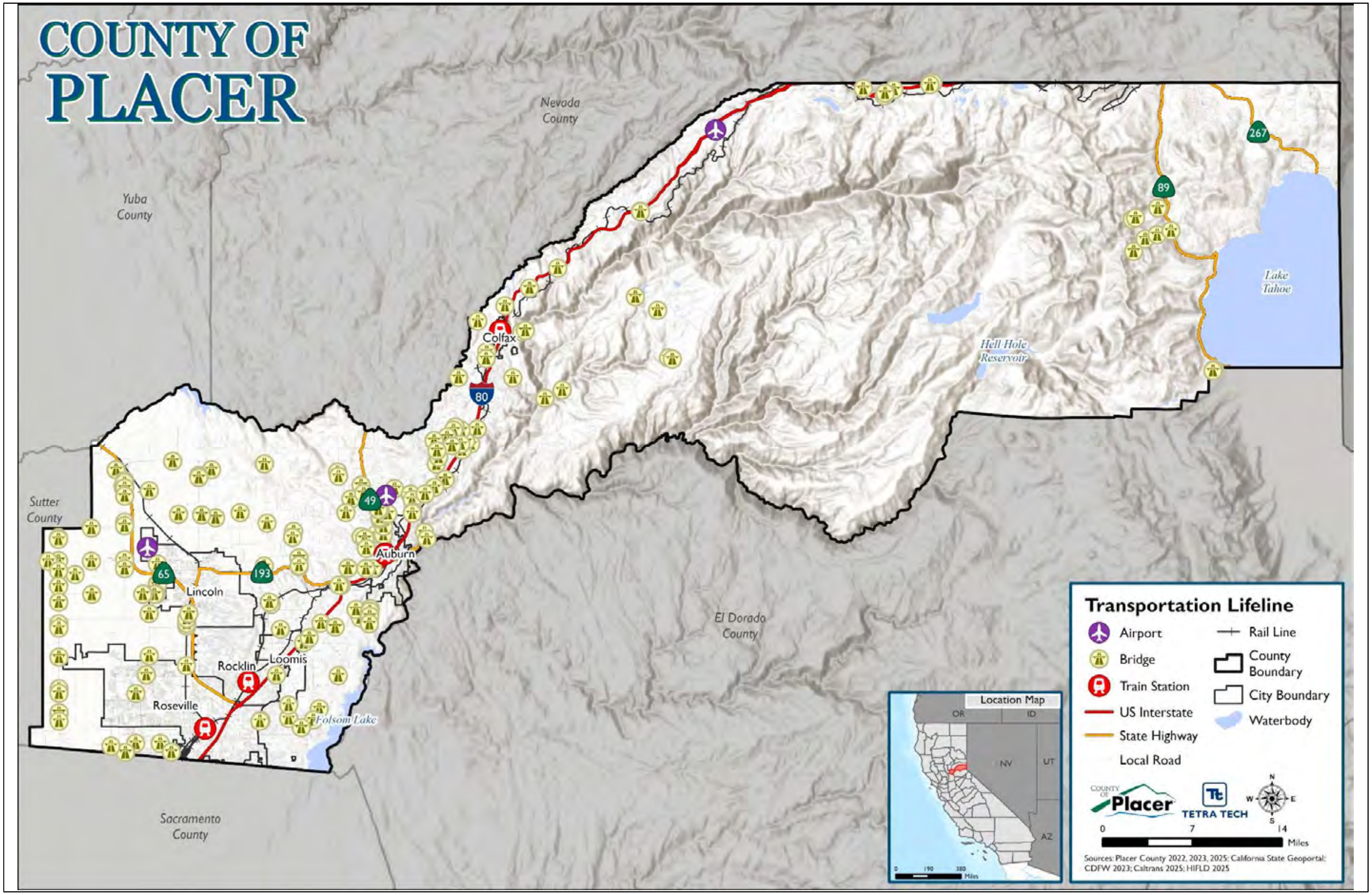


3.9.6 Transportation

Figure 3-19 shows the location of transportation facilities included in the lifelines inventory. Key facilities and services considered for the inventory under this category include the following:

- Airports
- Bridges
- Train stations

Figure 3-19. Transportation Facilities in Placer County

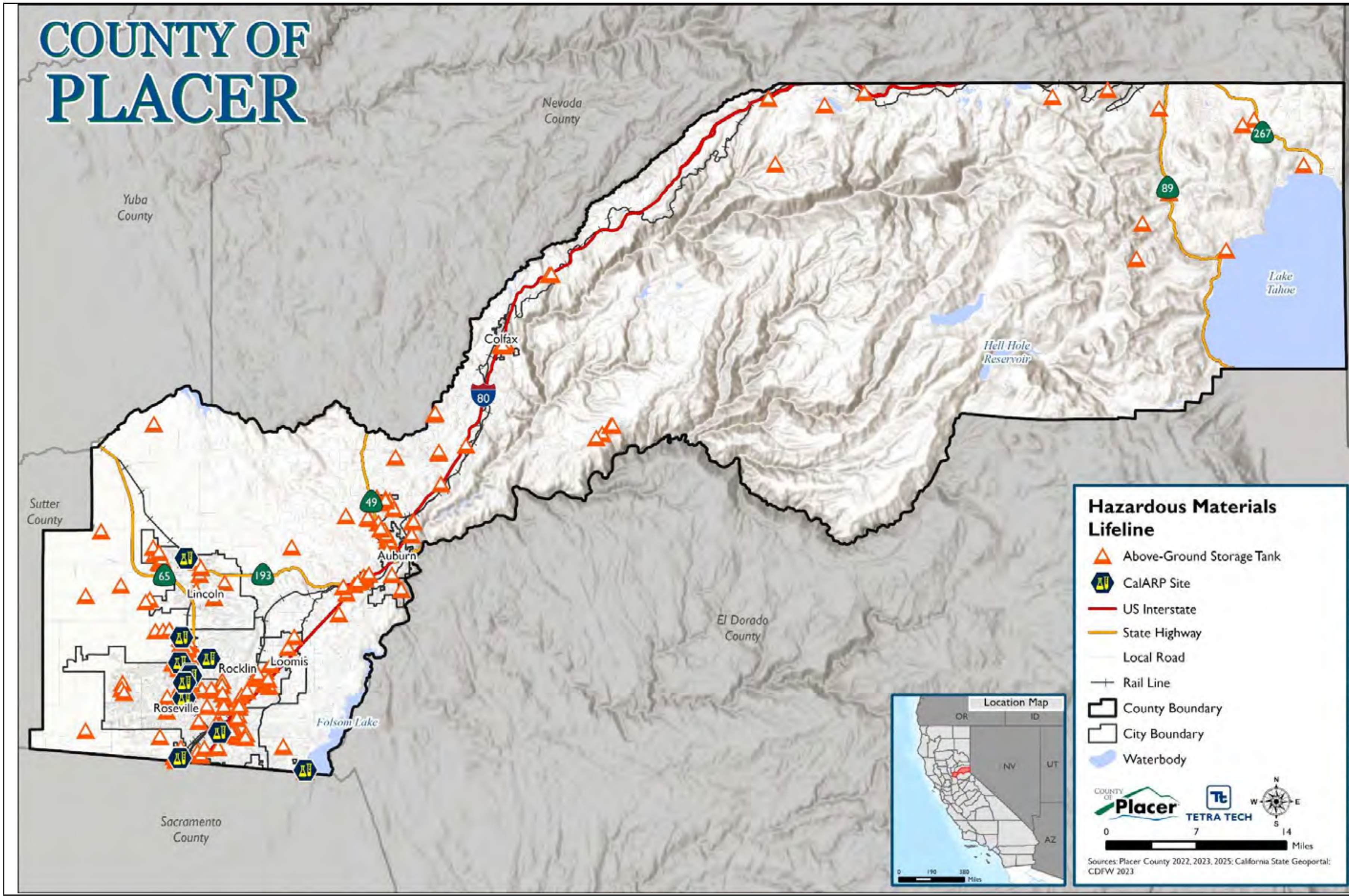


3.9.7 Hazardous Materials

Figure 3-20 shows the location of hazardous materials facilities included in the lifelines inventory. Key facilities and services considered for the inventory under this category include the following:

- Above ground storage tanks
- California Accidental Release Prevention (CalARP) sites

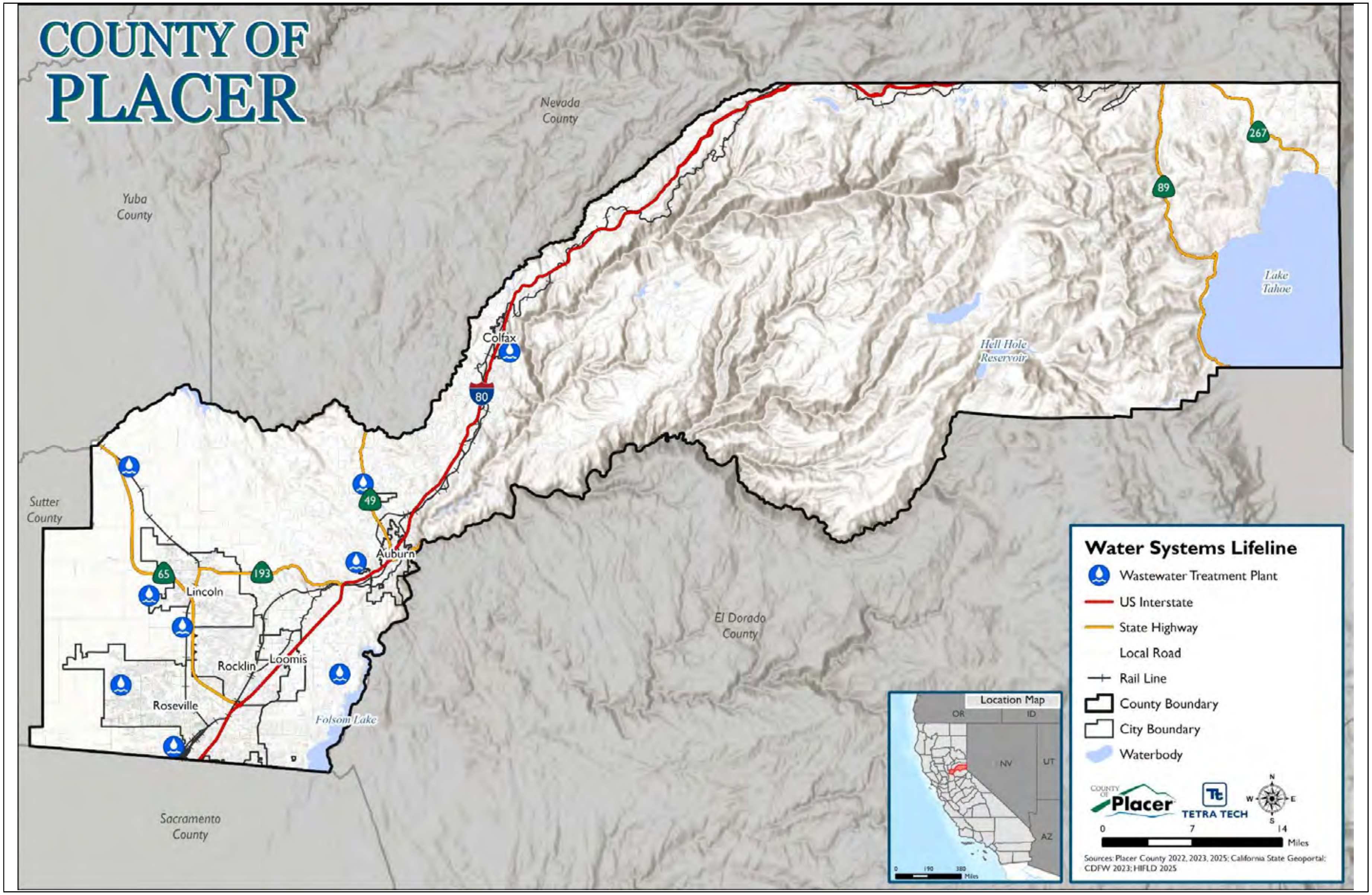
Figure 3-20.Hazardous Material Lifelines in Placer County



3.9.8 Water Systems

Figure 3-21 shows the location of water system facilities included in the lifelines inventory. The key facilities and services considered for the inventory under this category are wastewater treatment plants.

Figure 3-21. Water Systems Lifelines in Placer County

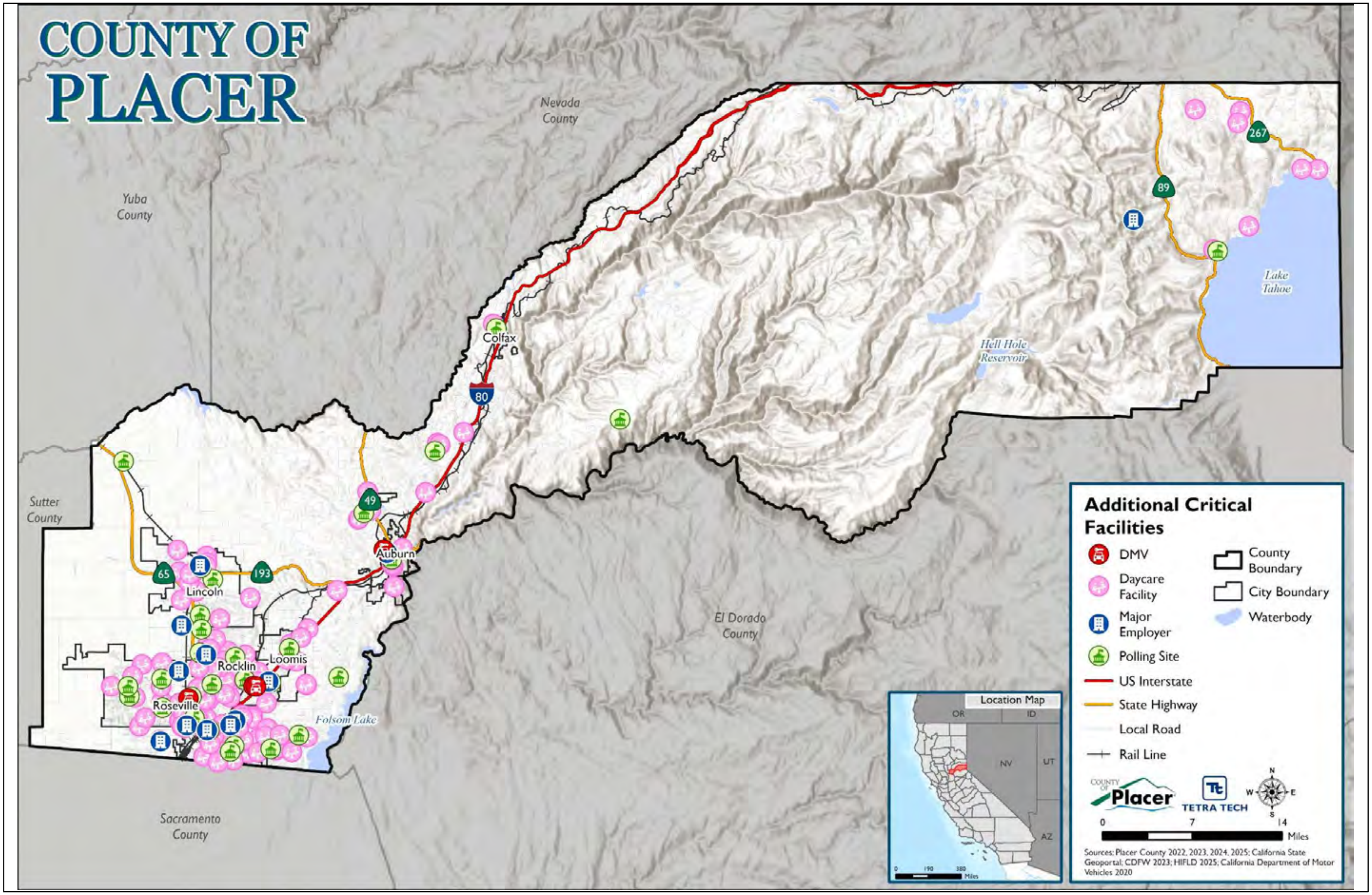


3.10 Other Critical facilities

Figure 3-22 shows the location of other critical facilities included in the lifelines inventory. These facilities do not meet the definition of a community lifeline but were determined by the community to be of importance. Key facilities and services considered for the inventory under this category include the following:

- Daycare
- Department of Motor Vehicle (DMV) offices
- Major employers
- Polling sites

Figure 3-22. Other Critical Facilities in Placer County



3.11 Natural Resources

Placer County's diverse natural resources extend from the Sacramento Valley to the Sierra Nevada mountains. The county's significant water resources include major rivers such as the American and Bear Rivers, lakes and reservoirs such as Folsom Lake, and extensive groundwater aquifers that support agriculture, urban needs, and ecosystems. The county's topography and geology create habitats ranging from oak woodlands and grasslands in the foothills to dense coniferous forests in the higher elevations. These natural areas provide critical ecosystem services, recreational opportunities, and wildlife habitats. Protected lands include portions of the Tahoe National Forest and numerous state parks, which help conserve biodiversity and maintain water quality. Key natural resources are listed in Table 3-16.

Table 3-16. Natural Resources in Placer County

Natural Resource	Type	Description
Lake Tahoe	Alpine Lake and Watershed	Western shore and basin in Placer County; extremely clear, deep alpine lake. Critical for regional water supply, recreation, and sensitive aquatic ecosystems.
Truckee River	River	Drains Lake Tahoe east through Truckee; important for irrigation, recreation (rafting, fishing), aquatic habitat, and downstream water rights.
American River (Middle & North Forks)	River System and Watershed	Originates in Placer County mountains; deep canyons, whitewater recreation, historic Gold Rush sites, and aquatic habitat.
Bear River	River	Flows from Sierra foothills toward Sacramento Valley; includes reservoirs/wetlands supporting irrigation, wildlife habitat and recreation.
Rubicon River & Rubicon Watershed	High-Elevation River and Watershed	Granite canyons and scenic river corridors in the high Sierra; backcountry hiking and trout fishing.
Donner Lake & Donner Summit / Donner Memorial State Park	Lake and Historic Montane Corridor	Mountain lake and historic pass area; recreation, winter sports, and significant transport corridor.
Tahoe National Forest	National Forest	Extensive forested public land in high Sierra and foothills; timber, watershed protection, wildlife habitat, trails and campgrounds.
Granite Chief Wilderness	Wilderness Area	Located within Tahoe National Forest. Rugged granite peaks, alpine lakes, subalpine meadows; important for biodiversity, watershed protection, and backcountry recreation.
Auburn State Recreation Area	River Canyon and Recreation Area	Long corridor along Middle/North Forks of the American River—rafting/whitewater, gold-rush history, trails and rock climbing.
Folsom Lake State Recreation Area	Reservoir and Recreation Area	Major reservoir on the American River; northern shoreline/tributaries extend into Placer; boating, fishing, and shoreline habitat.
Sierra Nevada Foothills	Terrestrial Ecosystems	Blue/valley oak woodlands, grasslands and chaparral in foothills; rangelands, pollinator habitat and wildlife (deer, raptors).
Historic Gold Country Landscapes	Mining Legacy	Placer and lode mining sites and hydraulic mining scars; historic features that influence soils, hydrology and cultural values.

3.12 Historic Resources

Placer County has a wealth of historic resources recognized in local, state, and national registers. Government data from the Placer County Historical Society and the California Office of Historic Preservation highlight numerous historic landmarks, districts, and structures dating back to the Gold Rush era and early settlement periods. Auburn, the county seat, is known for its well-preserved downtown historic district featuring Gold Rush-era architecture, museums, and sites such as the Old Jail and historic railroad facilities. Other historic resources include pioneer cemeteries, historic bridges, and Native American archaeological sites. These resources are protected through local ordinances and state preservation programs to maintain the county’s heritage and support educational and tourism activities. Table 3-17 lists the historic places in Placer County that are listed on the National Register of Historic Places.

3.13 Cultural Resources

Placer County’s cultural resources reflect the rich heritage of its diverse communities, including Native American tribes, early settlers, and modern populations. The county’s government and cultural organizations document and promote these resources through museums, arts councils, and cultural centers. Key cultural features include Native American heritage sites linked to the Nisenan and other indigenous peoples, as well as community festivals, art galleries, and performing arts venues that celebrate local traditions and contemporary culture. Public libraries and historic districts also serve as cultural hubs, providing educational programming and preserving local identity. The county’s efforts to support cultural resources are aligned with California state programs that encourage heritage tourism and cultural preservation. Table 3-18 lists annual community events that occur in Placer County.

Table 3-17. Listed Historic Resources in Placer County

Property Name	Location	Listed Date
Auburn City Hall and Fire House	Auburn	12/19/2012
Auburn Fire House No. 1	Auburn	12/19/2011
Auburn Fire House No. 2	Auburn	12/19/2011
Auburn Grammar School	Auburn	3/12/2012
Auburn Masonic Temple	Auburn	12/19/2011
Auburn Public Library	Auburn	3/31/2011
Burns, Irene, House	Auburn	4/9/2013
California Granite Company	Rocklin	7/3/2012
Carnegie Library	Roseville	4/10/2009
Chapel of the Transfiguration	Tahoe City	8/18/2011
Colfax Freight Depot	Colfax	12/17/1999
Colfax Passenger Depot	Colfax	1/15/1999
Crabbe, Earl, Gymnasium	Auburn	7/31/2017
DeWitt General Hospital	Auburn	2/12/2016
Dutch Flat Historic District	Dutch Flat	3/28/1973
El Toyon	Auburn	3/31/2010
Fiddyment Ranch Main Complex	Roseville	7/26/2010
Griffith House	Penryn	12/19/1978
Griffith Quarry	Penryn	10/20/1977
Haman House	Roseville	11/17/1976
Lake Tahoe Dam	Tahoe City	3/25/1981
Lincoln Public Library	Lincoln	12/10/1990
Michigan Bluff-Last Chance Trail	Michigan Bluff	6/26/1992
Mountain Quarries Bridge	Auburn	2/11/2004
Newcastle Portuguese Hall	Newcastle	3/25/1982
Oddfellows Hall	Auburn	12/19/2011
Old Auburn Historic District	Auburn	12/29/1970
Outlet Gates and Gatekeeper’s Cabin	Tahoe City	12/13/1972
Placer County Bank	Auburn	12/19/2011
Stevens Trail	Colfax	11/20/2002
Strap Ravine Nisenan Maidu Indian Site	Roseville	1/8/1973
Summit Soda Springs	Soda Springs	12/15/1978
Watson Log Cabin	Tahoe City	8/24/1979
Woman’s Club of Lincoln	Lincoln	5/30/2001

Source: (National Park Service n.d.)

Table 3-18. Cultural Events in Placer County

Event	Location	Season	Description
Placer County Fair	Roseville	Summer	County fair format with livestock & 4-H exhibits, carnival rides, live music, food competitions and vendor midway.
Gold Country Fair	Auburn	Labor Day Weekend	Long-running foothill fair featuring livestock shows, local artisans, carnival and regional Gold Country traditions.
Gold Country Pro Rodeo	Auburn	Spring	Professional rodeo events (bull/bronco riding, barrel racing) at McCann Stadium with family entertainment.
Roseville Strawberry / BerryFest	Roseville	Spring	Berry-themed festival with strawberry foods, desserts, family activities, arts & crafts vendors.
North Lake Tahoe SNOWFEST	Tahoe City	Winter	Winter celebration with parades, fireworks over the lake, vintage ski activities, sled races and charity events.
Meadow Vista Pioneer Day	Meadow Vista	Early June	Small-town celebration with parade, kids' zone, 5K run, vendor booths and volunteer-run activities.
Auburn Independence Day Fireworks	Auburn	July 4	Community fireworks display at/near the fairgrounds.
Gold Country Rotary Oktoberfest	Auburn	Autumn	Rotary fundraiser with German food, music, beer, dance and community philanthropy.
Tahoe Polar Plunge / Polar Bear Swim	Lake Tahoe	Winter	Community winter plunge into Lake Tahoe (often a festive/charity event and local tradition).

4. Risk Assessment Methodology and Tools

A risk assessment is the process of evaluating the potential loss of life, personal injury, and economic and property damage that could result from identified hazards. Identifying potential hazards and vulnerable assets allows planning personnel to address and reduce hazard impacts and allows emergency management personnel to establish early response priorities. Results of the risk assessment are used in subsequent mitigation planning processes, including determining and prioritizing mitigation actions that reduce each jurisdiction's risk from each hazard. The process focuses on the following elements:

- **Identify Hazards of Concern**—Use all available information to determine what types of hazards may affect a jurisdiction.
- **Profile Each Hazard**—Understand each hazard in terms of:
    - Description—The common causes of the hazard, hazard behavior, and significant impacts
    - Location—Geographic area most likely to be affected by the hazard
    - Extent—The potential severity of the hazard within the planning area
    - Previous occurrences
    - Probability of future hazard events
- **Assess Vulnerability and Impacts**—Use all available information to estimate to what extent people and assets may be adversely affected by a hazard now and in the future:
    - Determine vulnerability—Estimate the total number of assets in the jurisdiction that are likely to experience a hazard event if it occurs by overlaying hazard maps with the asset inventories
    - Estimate potential impacts/losses—Assess the impact of hazard events on the people, property, economy, and lands of the region, including estimates of the losses associated with potential damage or cost that can be avoided by mitigation
    - Evaluate future changes that may affect vulnerability and impacts—Analyze how demographic changes, projected development, and climate change impacts can alter current vulnerability and potential impacts

4.1 Data Collection

4.1.1 Previous Events

Based on records of previous hazard events and consideration of potential future changes that could affect the frequency of future events, the risk assessment for each hazard assigns a rating for the probability of occurrence of that hazard in the future. The following were the primary sources for identifying previous occurrences:

- **FEMA disaster declarations**—The president of the United States has the authority to issue disaster declarations for hazard events that cause more damage than state and local governments can manage without assistance from the federal government. The declaration triggers funding for emergency and recovery efforts led by FEMA. The first federal disaster declaration was issued in 1953. Initially, declarations applied to entire states. Beginning in 1969, the process was refined to specify individual affected counties. Federal disaster declarations are classified as major disaster (DR), emergency declaration (EM), or fire management assistance (FM).

- **California governor's emergency proclamations—**The governor of California is authorized to proclaim an emergency statewide or at local levels. Such proclamations trigger emergency powers and assistance programs. The governor can issue an emergency proclamation when a state of emergency exists, defined in state code as conditions of disaster or extreme peril to people and property that are of a magnitude to be beyond the control of individual local governments. Emergency proclamations are a prerequisite when requesting a federal disaster declaration (Cal OES 2024).
- **U.S. Department of Agriculture disaster declarations**—The U.S. secretary of agriculture is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and in contiguous counties.
- **Hazard-specific databases**—Sources that provide records of specific types of hazard events include the National Centers for Environmental Information's Storm Events Database, the National Integrated Drought Information System's U.S. Drought Monitor, and the U.S. Geological Survey's Earthquake Catalog.
- **News reports and previously published planning documents** such as the California State Hazard Mitigation Plan and the previous Placer County LHMP.

4.1.2 Asset Inventories

Placer County assets were identified to assess potential vulnerability and impacts associated with the hazards of concern. The MJHMP update assesses vulnerability and potential hazard impacts for the following types of assets: population, buildings, critical facilities, community lifelines, the environment, and new development. Each asset type is described below. To protect individual privacy and the security of critical facilities, information on properties assessed is presented in aggregate, without details about specific individual properties.

POPULATION

Statistics from the 2020 Decennial Census population estimate and 2019-2023 American Community Survey (ACS) 5-year estimate were used to estimate the vulnerability of and potential impacts on the County's population. Socially vulnerable populations included in the risk assessment are people under 5 years old or over 65 years old, non-English speaking individuals, people with a disability, people living below the poverty level, people with no broadband internet, and people with no vehicle access.

The population statistics were averaged among the residential structures in the county to estimate the population at the structure level. This methodology was taken to provide a more accurate representation for population counts at the various participating district levels. The estimate allows for a more precise distribution of population across the county compared to only using the Census block or Census tract boundaries.

To estimate potential impacts on people (shelter requirements and potential deaths and injuries) from flood, dam failure, and seismic hazards, the risk assessment used the Hazus v6.1 model, which incorporates the 2020 Decennial Population statistics.

BUILDINGS

The general building stock was updated countywide with a custom-building inventory using the most current parcel data provided by Placer County (2025), building footprint data sourced from FEMA (2025) and Microsoft (2020), National Structure Inventory data obtained from USACE (2022), and building information from the City of Roseville (2022). The centroid of each building footprint was used to estimate the building location.

Attributes provided in the data files were used to further define each structure, such as year built, number of stories, basement type, occupancy class, and square footage. Buildings were assigned to occupancy classes defined in Hazus. The Hazus classes were condensed into the categories of residential (including multi-family and single-family), commercial, industrial, and other (agricultural, religious, governmental, and educational).

Structural and content replacement cost values (RCV) were calculated for each building using the available assessor data, building points, and RSMeans 2024 values. RCV is the current cost of returning a destroyed asset to its pre-damaged condition using present-day cost of labor and materials. Total RCV consists of both the structural cost to replace a building and the estimated value of building. A regional location factor was applied to the RCV estimates based on the first three digits of the individual block stock's zip code as follows:

- Zip codes beginning in 956-957 (Sacramento)
  - Location factor for residential buildings = 1.16
  - Location factor for non-residential buildings = 1.11
- Zip codes beginning in 959 (Marysville)
  - Location factor for residential buildings = 1.16
  - Location factor for non-residential buildings = 1.12
- Zip codes beginning in 961 (Susanville)
  - Location factor for residential buildings = 1.18
  - Location factor for non-residential buildings = 1.18

CRITICAL FACILITIES AND COMMUNITY LIFELINES

A critical facility inventory, which includes essential facilities, utilities, transportation features and user-defined facilities, was created using data from Placer County (2022, 2024, 2025); California State Geoportal (2025); California Energy Commission (2025); California Health & Human Services Agency

(2025); California Department of Health Care Services (2025); Caltrans (2025); California Department of Motor Vehicles (2020); USACE NID (2025); and HIFLD (2021, 2025) and reviewed for accuracy by Placer County. The inventory of critical facilities was updated and reviewed by the Planning Partnership and County departments. The development involved a review for accuracy, additions, or deletions of new or moved critical assets, identification of backup power for each asset (if known) and whether the critical facility is considered a lifeline as described in Section 3.9. Critical facility and building inventories were formatted to be compatible with the Hazus Comprehensive Data Management System.

LAND COVER

National land cover data created by the U.S. Geological Survey (USGS) in 2024 was converted from a raster to a vector polygon to define areas of urban and non-urban land cover. Urban areas include developed open space and low, medium, and high intensity locations. Non-urban areas include agricultural, barren land, forest, rangeland, water, and wetlands land use categories.

NEW DEVELOPMENT

New development in the planning area was defined as development that occurred over the last 5 years and development that is expected to occur over the next 5 years. Each jurisdiction was asked to provide a list by address of major development that has taken place within these timeframes. The location of new development projects was submitted via ArcGIS Survey123. A geographic information system (GIS) analysis was conducted to determine hazard exposure of these development sites. Results are presented in the jurisdictional annexes in Volume 2.

4.2 Determining Probability of Occurrence

Based on records of previous hazard events and consideration of potential future changes that could affect the frequency of future events, the risk assessment for each hazard assigns a rating for the probability of occurrence of that hazard in the future. These ratings were assigned as follows:

- **Unlikely**—Hazard event has less than a 1 percent annual probability of occurring
- **Rare**—Hazard event has an annual probability 1 percent or more but less than 10 percent
- **Occasional**—Hazard event has an annual probability of 10 percent or more but less than 100 percent
- **Frequent**—Hazard event is likely to occur multiple times per year (100 percent annual probability)

4.3 Vulnerability and Impact Evaluation Approach

4.3.1 Levels of Analysis

Placer County used standardized tools, combined with local, state, and federal data and expertise to assess potential vulnerability and losses associated with hazards of concern. Three levels of analysis were used, depending upon the data available for each hazard:

- **Qualitative Review—**This analysis includes an examination of historical impacts to understand potential impacts of future events of similar size. Potential impacts and losses are discussed qualitatively using best-available data and professional judgment.
- **Vulnerability Analysis—**This analysis involves overlaying available spatial hazard layers, for hazards with defined locations, on asset mapping in GIS to determine which assets are located in the hazard area.
- **Loss Estimation**—The FEMA Hazus modeling software was used to estimate impact in terms of potential losses for the following hazards: flood, earthquake, and hurricane.

Table 4-1 summarizes the type of analysis conducted by hazard of concern.

Table 4-1. Summary of Risk Assessment Analyses

Hazard	Population	General Building Stock	Critical Facilities	New Development
Avalanche	V	V	V	V
Dam and Levee Failure	V, L	V, L	V, L	V
Drought and Water Shortage	Q	Q	Q	Q
Earthquake	V, L	V, L	V, L	V
Flood	V, L	V, L	V, L	V
Freeze and Snow	Q	Q	Q	Q
Heavy Rains and Storm	Q	Q	Q	Q
High Wind and Tornado	Q	Q	Q	Q
Landslide, Mudslide, and Debris Flow	L	L	L	L
Wildfire	L	L	L	L

Note: V = vulnerability analysis; L = loss estimation; Q = qualitative review

4.3.2 Hazus Model

FEMA’s Hazus model is a GIS-based software tool that uses engineering and scientific risk calculations to estimate damage and loss. Its use is accepted by FEMA and provides a consistent framework for assessing risk across a variety of hazards. Hazus uses GIS technology to produce detailed maps and analytical reports that estimate direct physical damage to building stock, critical facilities, transportation systems and utility systems.

Hazus provides default data for inventory, vulnerability, and hazards; this default data can be supplemented with local data to provide a more refined analysis. Analyses that use the default Hazus data are called basic analyses, and those that update the Hazus default with current local data are called advanced analyses.

Hazus damage reports can include induced damage (inundation, fire, threats posed by hazardous materials and debris) and direct economic and social losses (casualties, shelter requirements, and economic impact) depending on the hazard and available local data. Hazus' open data architecture can be used to manage community GIS data in a central location. The use of this software also promotes consistency of data output now and in the future and standardization of data collection and storage.

For this MJHMP, losses were estimated in Hazus using depth grids for the flood and dam failure analyses and probabilistic (mean return period) analyses for seismic hazards. The probabilistic model generates estimated damage and losses for specified return periods (e.g., 500- and 2,500-year).

4.3.3 Hazard-Specific Data Sources and Approaches

AVALANCHE

A vulnerability analysis was conducted to determine the county's exposure to the avalanche hazard using a slope map derived from the 1-meter digital elevation model as obtained from the U.S. Geological Survey (U.S. Geological Survey 2024). Elevations greater than 7,000 feet with a slope between 30 and 50 degrees were extracted to analyze the avalanche hazard. Assets with their centroid located in these areas were totaled to estimate the numbers and values at risk from the avalanche hazard.

In addition, a 1993 County parcel survey was used to identify the total number of parcels vulnerable to avalanche hazards.

DAM AND LEVEE FAILURE

The county's high-hazard and extremely-high-hazard dam inundation areas were examined to evaluate the risk from dam failure. Leveed areas were analyzed to understand the risk from levee failure. The following data were used to evaluate vulnerability and determine potential future losses for this plan update:

- The dam inundation information was obtained from the California Division of Water Resources (2025).
- Leveed areas were obtained from the USACE National Inventory of Dams (2025).
- A depth grid was created from the combined high-hazard dam inundation areas and the 1-meter digital elevation model obtained from the U.S. Geological Survey (2019, 2025).

Vulnerability Analysis

To estimate vulnerability to the dam failure event, the high-hazard dam inundation boundaries were overlaid on the maps of inventoried assets. Centroids within the dam inundation boundaries were totaled to estimate the building RCV and population vulnerable to dam failure.

To estimate vulnerability to the levee failure event, leveed area boundaries were overlaid on the maps of inventoried assets. Centroids within the leveed area boundaries were totaled to estimate the building RCV and population vulnerable to levee failure.

Loss Estimation

The Hazus riverine flood model was run to estimate potential losses in Placer County for the dam failure event. An advanced analysis was performed for the building stock. Buildings located within the floodplain were imported as user-defined facilities to estimate potential losses at the structural level. Hazus calculated the estimated potential impacts on the population (default 2020 U.S. Census data), potential damage to the general building stock, and potential damage to critical facilities based on the depth grid and the default damage functions in the Hazus flood model.

DROUGHT AND WATER SHORTAGE

All of Placer County is at risk from the impacts of drought events. A qualitative analysis was conducted to assess the county's vulnerability to this hazard of concern. Concurrent to this plan update, the County developed a detailed Drought and Water Shortage Risk Assessment, which is available on the County website: https://www.placer.ca.gov/10176/County-Drought-Resilience-Plan.

EARTHQUAKE

Vulnerability Analysis

Ground shaking is the primary cause of earthquake damage to structures, and soft soils amplify ground shaking. One contributor to the site amplification is the velocity at which the rock or soil transmits shear waves (S-waves). The National Earthquake Hazard Reductions Program (NEHRP) has developed five soil classifications defined by their shear-wave velocity that impact the severity of an earthquake. The soil classification system ranges from A to E, where A represents hard rock that reduces ground motions from an earthquake and E represents soft soils that amplify and magnify ground shaking and increase building damage and losses.

A vulnerability analysis was conducted for the county's assets using NEHRP soil data provided by Cal OES. The vulnerability analysis defined the hazard area as all areas with Class D soil types. Assets with their centroid in the hazard areas were totaled to estimate the numbers and values vulnerable to earthquake shaking.

Loss Estimation

A probabilistic assessment was conducted for the 500- and 2,500-year mean return period earthquake events through an advanced analysis in Hazus. The probabilistic method uses information from historical earthquakes and inferred faults, locations, and magnitudes to compute probable ground shaking levels, by census tract, for a seismic event of a selected recurrence period.

The default assumption is a magnitude 7.0 earthquake for all return periods. Although damage is estimated at the census tract level, results were presented at the municipal level. Because there are multiple census tracts that contain more than one jurisdiction, an area analysis was used to extract the percentage of each tract that falls within individual jurisdictions. The percentage was multiplied against the results calculated for each tract and summed for each jurisdiction.

Loss estimates were calculated for damage to buildings (structural and non-structural) and contents. Structural building losses include load-carrying components of the structure. Non-structural building losses include architectural, mechanical, and electrical components of the structure, such as nonbearing walls, veneer and finishes, heating and ventilation systems, or boilers.

FLOOD

The 1 percent and 0.2 percent annual chance flood events were examined to evaluate the county's risk from the flood hazard. The following data were used:

- The Placer County FEMA Preliminary Digital Flood Insurance Rate Map (DFIRM) as of 2025, where available.
- The Placer County FEMA Effective DFIRM in areas where the Preliminary information was not available, with an effective date of November 2, 2018, and the latest letter of map revision dated December 22, 2023.
- A depth grid created from the aggregated 2025 preliminary and 2018 effective DFIRM and the 1-meter digital elevation model obtained from the U.S. Geological Survey (2019, 2025).

Vulnerability Analysis

To estimate vulnerability to the 1 percent and 0.2 percent annual chance flood events, the aggregated 2025 preliminary and 2018 effective FEMA DFIRM flood boundaries were overlaid on the maps of inventoried assets. Centroids within the flood boundaries were totaled to estimate the building RCV and population vulnerable to the flood inundation areas.

Loss Estimation

The depth grid generated using the aggregated DFIRM and 1-meter digital elevation model was integrated into the Hazus riverine flood model and used to estimate potential losses for the 1 percent annual chance flood event. An advanced assessment was performed for the building stock. Buildings located within the floodplain were imported as user-defined facilities to estimate potential losses at the structural level. Hazus calculated the estimated potential impacts on the population (default 2020 U.S. Census data), potential damage to the general building stock, and potential damage to critical facilities based on the depth grids generated and the default damage functions in the Hazus flood model.

LANDSLIDE, MUDSLIDE, AND DEBRIS FLOW

A vulnerability analysis was conducted using deep-seated landslide susceptibility data from the California Department of Conservation in conjunction with the California Geological Survey (2023) to determine the county's risk to the landslide hazard. The county's assets were examined to determine if they are located in the moderate, high, or very high landslide susceptibility hazard areas. Assets with their centroid located in these areas were totaled to estimate the numbers and values at risk from landslides.

FREEZE AND SNOW

All of Placer County is exposed and vulnerable to the winter storm hazard. In general, structural impacts include damage to roofs and building frames, rather than building content. Current modeling tools are not available to estimate specific losses for this hazard. A qualitative analysis was conducted to assess the county's vulnerability to this hazard of concern.

HEAVY RAIN AND STORM

All of Placer County is at risk from the impacts of heavy rains and storms. A qualitative analysis was conducted to assess the county's vulnerability to this hazard of concern.

HIGH WIND AND TORNADO

All of Placer County is at risk from the impacts of high wind events. A qualitative analysis was conducted to assess the county's vulnerability to this hazard of concern.

WILDFIRE

A vulnerability analysis was conducted using wildfire hazard data obtained from CAL FIRE (2024, 2025) and provided by incorporated cities within Placer County, where available, to determine the risk from the wildfire hazard. The cities of Auburn, Rocklin, and Lincoln provided Local Responsibility Area (LRA) information. The remaining incorporated cities defaulted to the recommended LRAs as made available by CAL FIRE in 2025. For unincorporated areas, the State Responsibility Area was analyzed.

The county's assets were examined to determine if they are built in areas of the moderate, high, and very high fire hazard severity zones. Assets with their centroid located in the hazard area were totaled to estimate the numbers and values at risk from the impacts of wildfire.

4.4 Data Source Summary

Table 4-2 summarizes the data sources used for the risk assessment for this plan.

4.5 Limitations

Loss estimates, vulnerability analyses, and hazard-specific impact evaluations rely on the best-available data and methodologies. Uncertainties are inherent in any loss estimation methodology and arise in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment.

Table 4-2. Risk Assessment Data Documentation

Data	Source	Date*	Format
Population data	U.S. Census Bureau Decennial	2020	Digital (GIS)
	American Community Survey 5-Year Estimates	2023	
Building Inventory	Placer County	2025	Digital (GIS)
	FEMA	2025	
	Microsoft	2020	
	National Structure Inventory	2022	
	City of Roseville	2022	
	RS Means	2024	
Critical Facilities and Lifelines	Placer County	2022	Digital (GIS)
	California State Geoportal	2024	
	California Energy Commission	2025	
	California Health & Human Services Agency	2025	
	California Department of Health Care Services	2025	
	Caltrans	2025	
	California Department of Motor Vehicles	2025	
	USACE National Inventory of Dams	2021	
	Homeland Infrastructure Foundation Level Data	2025	
Land Cover	USGS National Land Cover Database	2024	Digital (GIS)
Digitized FIRM maps	FEMA Preliminary	2025	Digital (GIS)
	FEMA Effective	2018	
1-Meter Digital Elevation Model	USGS	2019, 2025	TIFF
Avalanche Hazard Data	USGS	2019, 2025	Digital (GIS)
Dam Inundation Area	California Department of Water Resources	2025	Digital (GIS)
Landslide Hazard Data	California Department of Conservation, California Geological Survey	2023	Digital (GIS)
Leveed Areas	USACE NID	2025	Digital (GIS)
NEHRP Soils	Cal OES	n.d.	Digital (GIS)
New Development Data	Placer County Planning Partnership and County Jurisdictions	2025	Digital (GIS)
Wildfire Hazard Data	CAL FIRE	2024, 2025	Digital (CSV)
	Placer County	2025	
Drought Hazard Data	US Drought Monitor	2025	Digital
Weather Events	NOAA Storm Event Database	2025	Digital (CSV)
NFIP CRS Data	NFIP Community Status Book	2025	Digital (PDF)

**Multiple dates indicate multiple references to provide complete resource coverage*

Uncertainties also result from the following:

- Approximations and simplifications necessary to conduct such a study
- Incomplete or dated inventory, demographic, or economic parameter data
- The unique nature, geographic extent, and severity of each hazard
- Mitigation measures already employed by the participating jurisdictions
- The amount of advance notice residents have to prepare for a specific hazard event
- Uncertainty of climate change projections

These factors can result in a range of uncertainty in loss estimates, possibly by a factor of two or more. Therefore, potential vulnerability and loss estimates are approximate. These results do not predict precise results and should be used to understand relative risk. Over the long term, Placer County will collect additional data and update and refine existing inventories to assist in estimating potential losses.

Potential economic loss is based on the present value of the general building stock using best-available data. The county acknowledges significant impacts may occur to critical facilities and infrastructure as a result of these hazard events causing great economic loss. However, monetized damage estimates to critical facilities and infrastructure, and economic impacts were not quantified and require more detailed loss analyses. In addition, economic impacts on industry such as tourism and the real-estate market were not analyzed.

4.6 Considerations for Mitigation and Next Steps

The following items are to be discussed for considerations for the next plan update to enhance the risk assessment:

- All hazards
  - Create an updated user-defined general building stock dataset using up-to-date parcels, footprints, and RS Means values.
  - Utilize updated and current demographic data.
- Avalanche
  - Run updated vulnerability analyses based on new slope parameters.
  - Coordinate with participating jurisdictions located in the avalanche hazard area to collect risk assessment data.
- Dam and levee failure
  - Obtain the most current dam inundation hazard areas in order to support vulnerability and loss estimation analyses.
- Drought and water shortage
  - Use the results of the Drought and Water Shortage Risk Assessment to inform drought vulnerability and exposure.

- Earthquake
  - Identify unreinforced masonry in critical facilities and privately owned buildings (i.e., residences) by accessing local knowledge, tax assessor information, and/or pictometry/orthophotos. These buildings may not withstand earthquakes of certain magnitudes and plans to provide emergency response or recovery efforts at these properties can be developed.
  - Consider running additional Hazus probabilistic analyses and/or adding deterministic scenarios based on certain earthquake events.
- Flood
  - The general building stock inventory can be updated to include attributes regarding first floor elevation and foundation type (basement, slab on grade, etc.) to enhance loss estimates.
  - Conduct a Hazus loss analysis for more frequent flood events (e.g., 10- and 50-year flood events).
  - Conduct a repetitive loss area analysis.
  - Continue to expand and update urban flood areas to further inform mitigation.
  - As more current FEMA floodplain data become available (i.e., DFIRMs), update the vulnerability analysis and generate a more detailed flood depth grid that can be integrated into the current Hazus version.
- Landslide, mudslide, and debris flow
  - Run updated vulnerability analyses as new landslide data becomes available.
- Wildfire
  - General building stock inventory can be updated to include attributes such as roofing material, fire detection equipment, or distance to fuels as another measure of vulnerability.
  - Critical facility inventory can be expanded to include natural resources such as headwaters areas that provide water and utility generation/distribution systems, most of which are vulnerable to disruption by wildfire and/or sediment from post-fire sedimentation.

5. Identification of Hazards of Concern

Hazards of concern are the hazards that are considered most likely to impact a community based on available data and local knowledge. This chapter provides an overview of the process that Placer County followed to identify the hazards of concern for profiling and evaluation.

5.1 Resources Reviewed

To provide a strong foundation for mitigation actions in this plan, Placer County considered a full range of hazards that could impact the area and then identified and ranked those that present the greatest concern. The Hazard Mitigation Planning Committee reviewed the following resources:

- 2023 California State Hazard Mitigation Plan (SHMP)
- FEMA disaster declarations and historic events
- Survey input on hazards in Placer County

5.1.1 2023 SHMP

The California 2023 SHMP lists the following hazards of concern for the state:

- Air pollution
- Civil disorder
- Cyber threats
- Dam failure
- Drought
- Earthquake
- Electromagnetic pulse attack
- Energy shortage
- Epidemic, pandemic, vector-borne disease
- Extreme cold or freeze
- Extreme heat
- Geomagnetic storm (space weather)
- Hazardous materials release
- Invasive and nuisance species
- Landslide, debris flow, and other mass movements
- Levee failure
- Natural gas pipeline hazards
- Oil spills
- Other potential causes of long-term electrical outage
- Public safety power shutoff
- Radiological accidents
- Riverine, stream and alluvial flood
- Sea-level rise, coastal flooding and erosion
- Severe wind, weather, and storms
- Snow avalanche
- Subsidence
- Terrorism
- Transportation accidents resulting in explosions or toxic releases
- Tree mortality
- Tsunami and seiche
- Urban structural fire
- Volcano
- Well stimulation and hydraulic fracturing
- Wildfire

5.1.2 Federal Disaster Declarations

Table 5-1 summarizes federal disaster declarations for Placer County.

Table 5-1. FEMA Disaster Declarations for the Placer County Planning Area

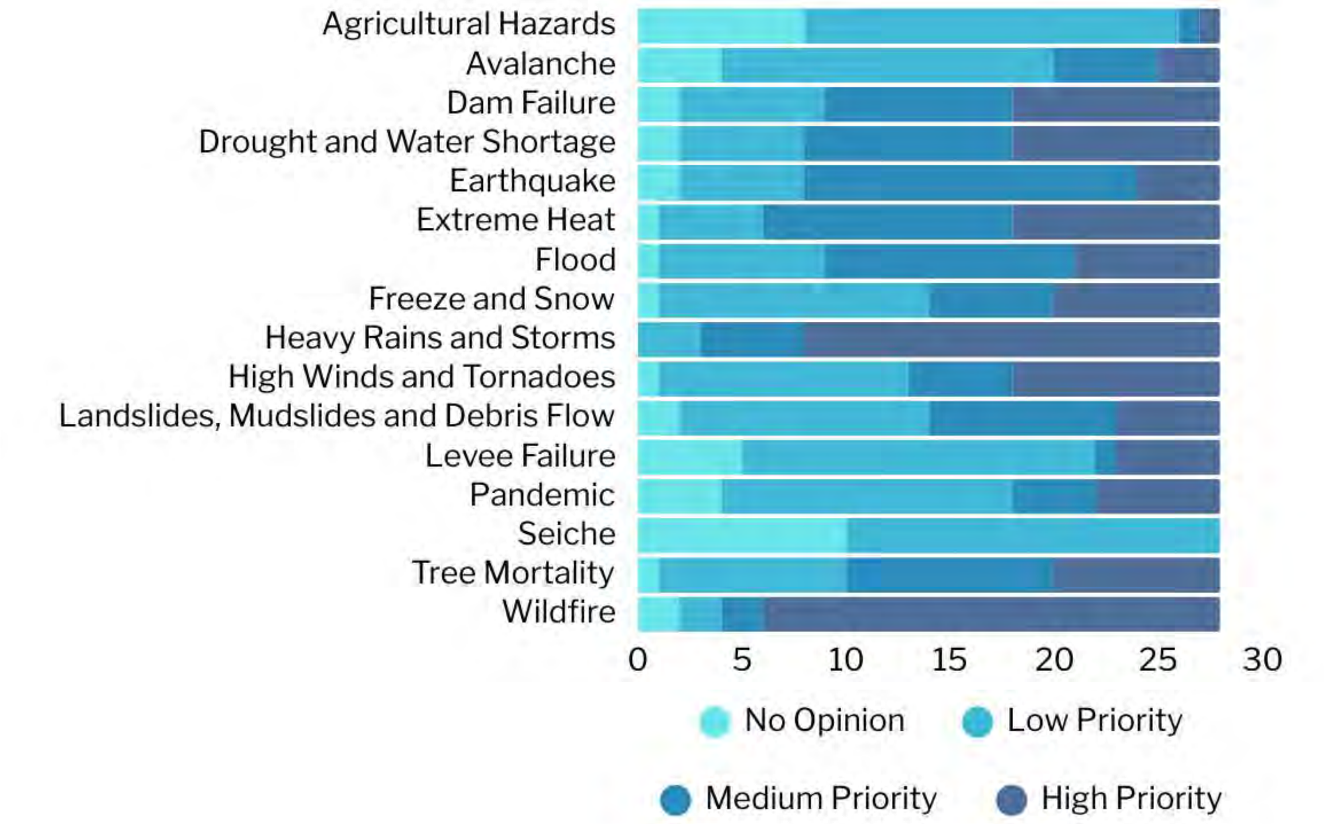
Declaration Number	Declaration Date	Incident Type	Disaster Name
DR-183	December 24, 1964	Flood	Heavy Rains & Flooding
DR-253	January 26, 1969	Flood	Severe Storms & Flooding
EM-3023	January 20, 1977	Drought	Drought
DR-677	February 9, 1983	Coastal Storm	Coastal Storms, Floods, Slides & Tornadoes
DR-758	February 21, 1986	Flood	Severe Storms & Flooding
DR-1044	January 10, 1995	Severe Storm	Severe Winter Storms, Flooding, Landslides, Mud Flows
DR-1046	March 12, 1995	Severe Storm	Severe Winter Storms, Flooding Landslides, Mud Flow
DR-1155	January 4, 1997	Severe Storm	Severe Storms, Flooding, Mud and Landslides
FM-2463	September 19, 2002	Fire	Sierra Fire
FM-2541	August 8, 2004	Fire	Ca-Stevens Fire-08--8-2004
EM-3248	September 13, 2005	Hurricane	Hurricane Katrina Evacuation
DR-1628	February 3, 2006	Severe Storm	Severe Storms, Flooding, Mudslides, and Landslides
DR-1646	June 5, 2006	Severe Storm	Severe Storms, Flooding, Landslides, and Mudslides
FM-2786	September 2, 2008	Fire	Gladding Fire
FM-2832	August 31, 2009	Fire	49 Fire
FM-5082	October 8, 2014	Fire	Applegate Fire
DR-4301	February 14, 2017	Severe Storm	Severe Winter Storms, Flooding, and Mudslides
EM-3428	March 13, 2020	Biological	Covid-19
DR-4482	March 22, 2020	Biological	Covid-19 Pandemic
FM-5405	August 5, 2021	Fire	River Fire
DR-4610	August 24, 2021	Fire	Wildfires
EM-3571	September 1, 2021	Fire	Caldor Fire
FM-5453	September 9, 2022	Fire	Mosquito Fire
EM-3591	January 9, 2023	Flood	Severe Winter Storms, Flooding, and Mudslides
DR-4683	January 14, 2023	Flood	Severe Winter Storms, Flooding, Landslides, and Mudslides
EM-3592	March 10, 2023	Flood	Severe Winter Storms, Flooding, Landslides, and Mudslides

Source: (FEMA 2025b)

5.1.3 Survey Input

A virtual survey was distributed to the Planning Partnership and the HMPC for the purpose of identifying which hazards are considered high, medium, or low priority. A total of 28 responses were received. Figure 5-1 shows the results of the survey. Wildfires and heavy rains and storms were identified as high priority by almost all respondents. Hazards that received a majority low priority or no opinion ranking were evaluated further by the Core Planning Team.

Figure 5-1. Hazard Priority Survey Results



5.2 Selection of Hazards of Concern for This MJHMP

At its meeting on July 10, 2025, after a thorough review of available data, the HMPC identified the following 10 hazards of concern for Placer County:

- Avalanche
- Dam and levee failure
- Drought and water shortage
- Earthquake
- Flood
- Freeze and snow
- Heavy rain and storm
- High wind and tornado
- Landslide, mudslide, and debris flow
- Wildfire

More localized natural hazards are identified in jurisdictional annexes in Volume 2.

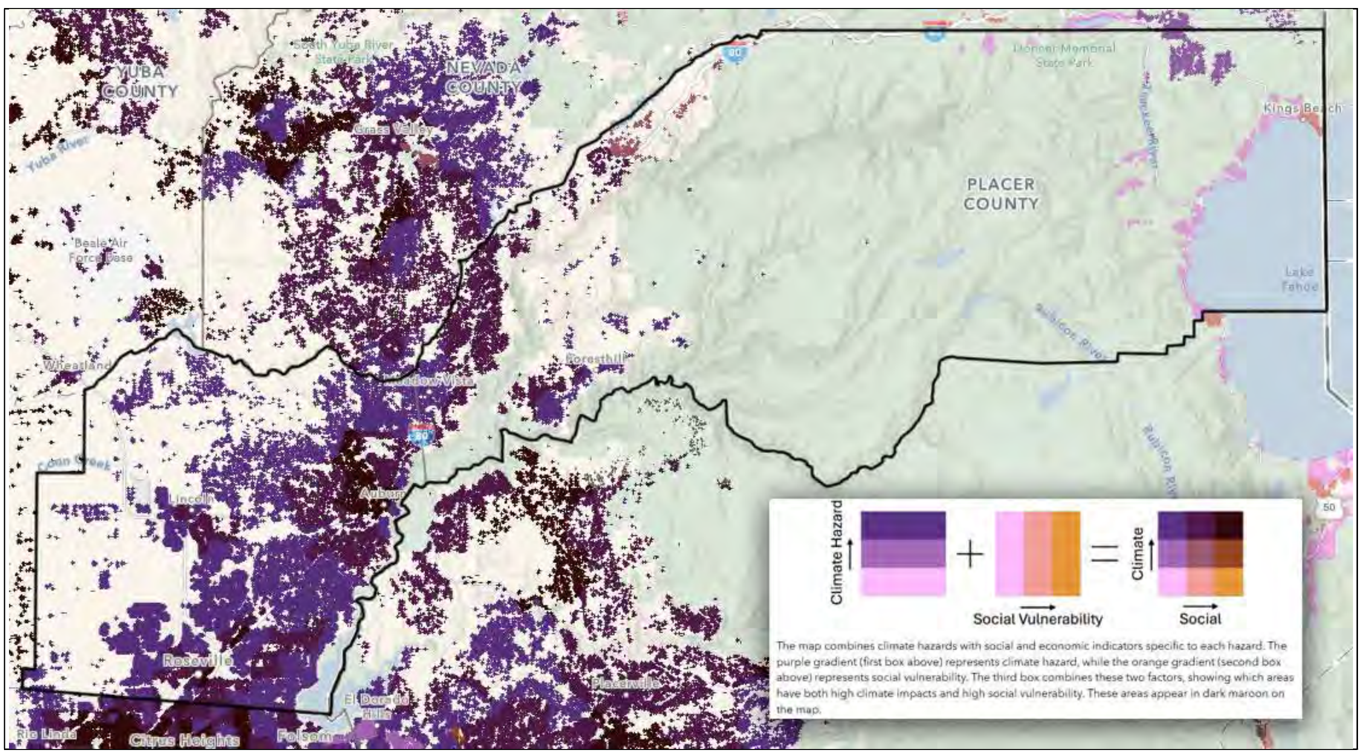
5.3 Reasons for Omitting Other Hazards Reviewed

The remaining hazards profiled in the California SHMP that are not included in this plan are not included for one or more of the following reasons:

- The hazard is considered a cascading impact of the identified hazards of concern.
- The hazard has a low potential to occur.
- The hazard is addressed by other planning mechanisms.
- Occurrences of the hazard would not result in significant impacts within the County.

Throughout the planning process, the hazard most reported to have been experienced by the public was extreme heat. While extreme heat does occur in the western part of the County, as shown in Figure 5-2, jurisdictions have ongoing mitigation measures in place to reduce the impacts on affected populations. These mitigation measures include cooling centers, information about the hazard on their websites, and addressing extreme heat in the health and safety elements of general plans. In discussions with participating jurisdictions, it was determined that identifying a new mitigation action for extreme heat would be a challenge for many participating jurisdictions. Therefore, extreme heat was not selected as a hazard of concern for this MJHMP.

Figure 5-2. Vulnerable Communities Platform—Extreme Heat



Source: (Vulnerable Communities Platform 2025)

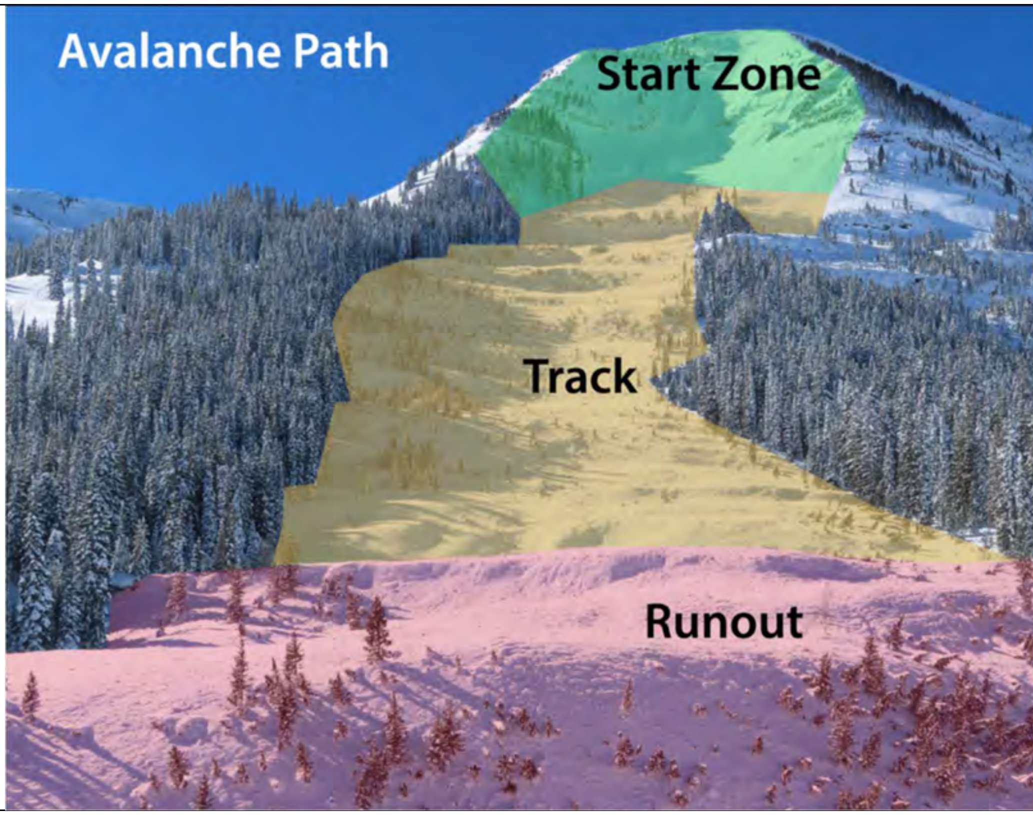
6. Avalanche

6.1 Hazard Profile

6.1.1 Hazard Description

An avalanche is a rapid flow of snow, ice, and debris down a hill or mountainside, typically consisting of three parts, as shown in Figure 6-1: the start zone, where the snow or ice breaks away; the track, which is the channel or slope the material follows; and the runout zone, where debris comes to rest (National Avalanche Center n.d.).

Figure 6-1. Avalanche Path



Source: (National Avalanche Center n.d.)

An avalanche occurs when the stress of gravity trying to pull snow downhill exceeds the snow cover strength created by bonds between snow grains. This can occur when new snow accumulates on a slope more quickly than the snowpack can strengthen. Avalanches can be triggered by ground shaking, human and animal activity, or, in rare cases, loud noises or explosions, but these triggers typically act only when a slope is already unstable. Avalanche activity is primarily influenced by two factors (National Avalanche Center n.d.):

- Weather—Intense and frequent winter storms deposit large amounts of snow on steep slopes, creating conditions favorable for avalanches. Additional elements that affect slope stability include total snowpack depth, rate of snow accumulation, moisture content, wind speed and direction, and the formation of specific snow crystal types.
- Terrain—Slopes ranging from 34 to 45 degrees present the highest risk for avalanches; slopes less than 30 degrees are generally less prone to avalanche activity. At slope angles of 50 degrees or more, avalanches typically manifest as small sluffs or loose snow slides, which account for only a minor percentage of annual avalanche-related fatalities and property damage. Most avalanches occur at elevations above 8,000 feet.

Avalanches occur with little warning. They can happen at any time on any steep slope, but certain times of the year and types of locations are naturally more dangerous. Steeper terrain and areas where wind-blown snow accumulates are especially prone to critical stress build-up. Most events take place during or immediately following storms, most commonly from January through March.

Areas prone to avalanche hazards include hard-to-access areas deep in the backcountry. This hazard tends to impact smaller groups of people, such as skiers, snowboarders, and hikers who travel into backcountry areas during or after storms. Beyond personal risk, avalanches can lead to road and highway closures, damage to buildings, and destruction of forested areas.

6.1.2 Location

Figure 6-2 shows avalanche hazard areas in Placer County, defined as areas above 7,000 feet with slope angles of 30 to 50 degrees.

6.1.3 Extent

Table 6-1 describes the standardized avalanche danger scale for North America. In Placer County, the full range of this scale may be observed, depending on weather and snowpack conditions. At lower elevations and in more developed areas, avalanches are rare, and conditions generally remain at the low and moderate levels. Higher elevation backcountry terrain in the Sierra Nevada may experience considerable, high, or even extreme avalanche danger during major storm cycles.

Table 6-2 describes the scale for rating avalanches based on destructive potential, which is a function of the mass, speed, and density of avalanche debris, paired with the length, depth, and width of the avalanche path. D1 avalanches are harmless, D2 avalanches can injure or kill people, D3 avalanches can destroy a house or car, D4 avalanches can destroy mature forests, and D5 avalanches can gouge the landscape.

Observers can further reference guidance defining mass, deposit volumes, impact pressures, and lengths to rate destructive size. Avalanche length is the easiest to quantify in the field but is the least reliable measure of size. An avalanche of a given destructive size has a wide range of potential runout lengths, depending on the width and thickness of the avalanche and the characteristics of the terrain.

Figure 6-2. Placer County Avalanche Hazard Areas

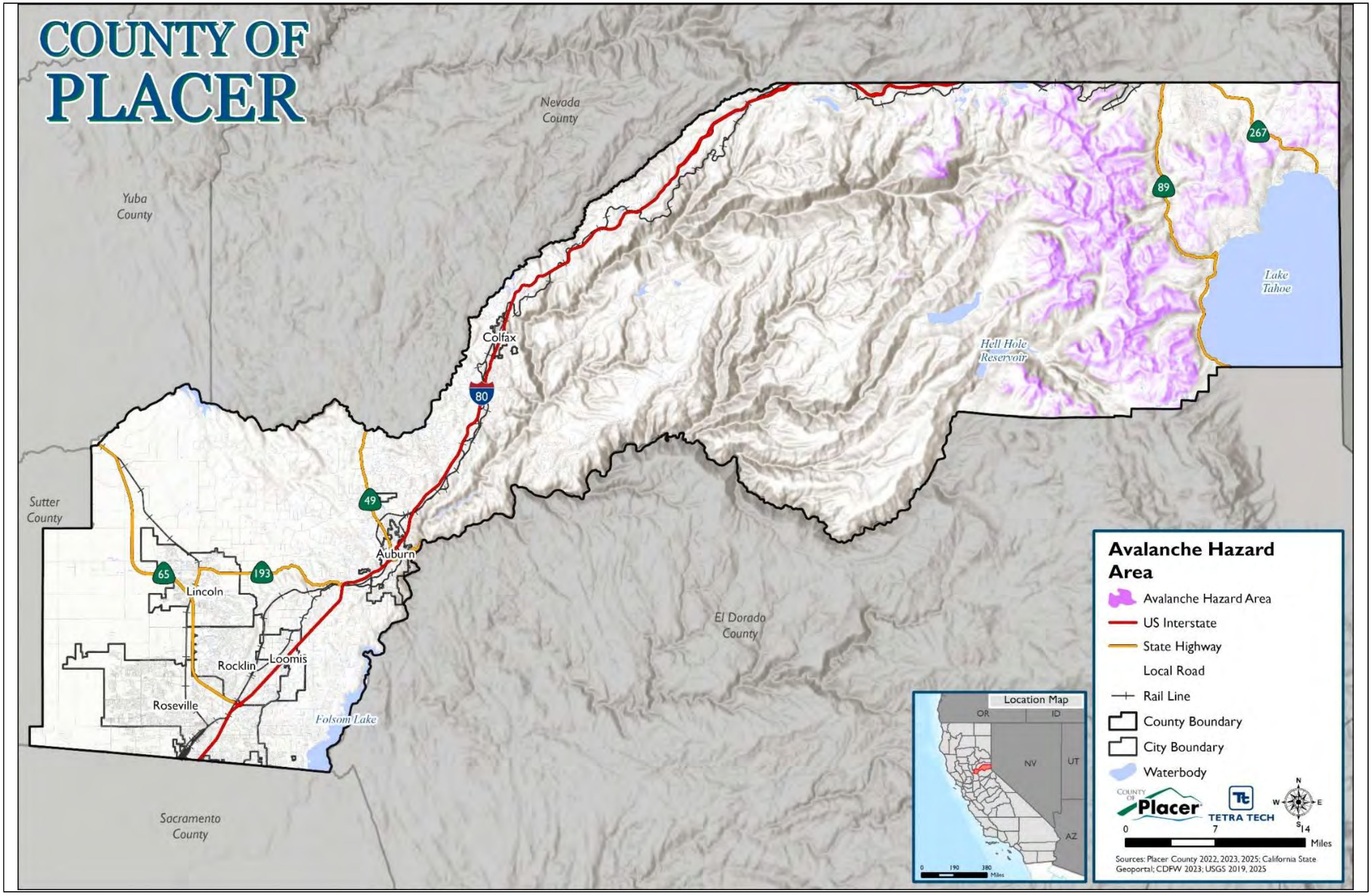


Table 6-1. North American Public Avalanche Danger Scale

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 n.d.)

Table 6-2. Avalanche Destructive Potential

Size	Destructive Potential	Typical Length	Typical Deposit Volume
D1	Relatively harmless to people	Bus	Average apartment, 3 feet deep or less
D2	Injure, bury, or kill a person	Football field	Floor of a large house, around 6 feet deep
D3	Bury or destroy a car or house	0.5 miles	Hockey rink, 4 to 6 feet deep
D4	Destroy a large truck of 10 acres of forest	1 – 1.5 miles	Four hockey rinks, 12 feet deep
D5	Destroy a village or 100 acres of forest	1.5 – 2 miles	5+ football fields, 25 feet deep

Source: (National Avalanche Center n.d.)

WARNING TIME

Although forecasts can provide information regarding when avalanches are more likely to occur, an avalanche can occur with little or no warning. The time of an avalanche release depends on the condition of the snowpack, which can change rapidly during a day, particularly during rainfall. The Sierra Avalanche Center monitors avalanche conditions in the Sierra Nevada Mountains and issues daily avalanche advisories from fall through spring (Sierra Avalanche Center n.d.).

6.1.4 Previous Occurrences

FEMA DISASTER DECLARATIONS

Placer County has not been included in any major disaster (DR) or emergency (EM) declarations for avalanche-related events (FEMA 2025b).

STATE EMERGENCY PROCLAMATIONS

Table 6-3 lists all avalanche-related state emergency proclamations from 2020 to 2024 that included Placer County. For events prior to 2020, refer to the 2021 Placer County LHMP.

Table 6-3. State Emergency Proclamations for Avalanche Events in Placer County (2020 to 2024)

State Proclamation Date	State Disaster Name	Description
March 8, 2023	February-March 2023 Storms	On March 8, 2023, the governor expanded an emergency proclamation issued March 1 to include Placer County. A winter storm and atmospheric river system brough freeze warnings, frost advisories, heavy rain, snow, and gusty winds to the state. While the Sierra Avalanche Center recorded two D2 avalanches on March 24, 2024, no injuries or damage were reported in the Twin Peak and Little Alaska areas.

Source: (Cal OES 2025)

ALL RECENT EVENTS

For the 2023-2024 avalanche season, the Sierra Avalanche Center observed around 20 D2 avalanches in the Olympic Valley and Alpine Meadows region from January to March. Table 6-4 lists major avalanche-related events recorded in the NOAA Storm Events Database that impacted Placer County since 2020. For events prior to 2020, refer to the 2021 Placer County LHMP.

Table 6-4. Avalanche Events in Placer County (2020 to 2024)

Date Begin	Hazard	Event Narrative
January 17, 2020	Avalanche	The Sierra Avalanche Center reported an avalanche along the north side of Independence Lake with a crown 10 to 48 inches deep and about 100 feet wide. The slide went from an elevation of about 8,400 feet down to 7,400 feet.
February 28, 2023	Avalanche	Law enforcement reported an avalanche struck an occupied three-story apartment building in Olympic valley. Fortunately, all occupants were uninjured and able to evacuate the building with help from fire crews. The avalanche was approximately 200 yards wide and 25 feet deep and engulfed the bottom 2 stories of the building.

Source: (NOAA n.d.)

6.1.5 Probability of Future Occurrences

Table 6-5 lists the number of avalanche events in the NOAA Storm Events Database over the 30-year period from 1995 to 2025, which is the most complete period of record for all sources reviewed. Based on these records and input from the Hazard Mitigation Planning Committee, the probability of occurrence for avalanche in the County is considered “occasional.”

Table 6-5. Probability of Future Hazard Events in Placer County

Hazard Type	Number of Occurrences Between 1995 and 2025	Percent Chance of Occurring in Any Given Year
Avalanche	19	63.3%

Source: (NOAA n.d.)

6.1.6 Cascading Impacts on Other Hazards

Avalanches can significantly influence the effects of freezing and snow events in Placer County by compounding transportation and infrastructure challenges. Large avalanches may deposit snow, ice, and debris onto roads and highways, making critical roads and mountain passes impassable for extended periods. These blockages disrupt emergency response, commerce, and daily travel during hazardous winter weather. Avalanches can also damage power lines, buildings, and forested areas, further intensifying the impacts of heavy snowfall. In addition, debris deposited in a river or stream because of avalanches might alter its flow and contribute to flooding later.

6.2 Vulnerability and Impact Assessment

For the avalanche risk assessment, the hazard area was defined as all areas with elevations above 7,000 feet and slopes between 30 and 50 degrees. These areas are shown in Figure 6-2.

6.2.1 Life, Health, and Safety

OVERALL POPULATION

Because avalanches tend to occur at higher elevations, there is minimal population exposed to direct impact of an avalanche. The total residential population in the avalanche hazard zone in Placer County is 19, all within the unincorporated county. A Placer County assessment from 1993 identified 244 property parcels with high exposure to avalanches. In either case, the population living in the avalanche hazard area is low compared to other hazard areas. The population vulnerable to avalanche also includes the transient population at commercial ski resorts, which is counted in Census data.

SOCIALLY VULNERABLE POPULATION

Those who might be vulnerable to an avalanche include those with limited mobility who might have difficulty escaping the rapidly moving snow, including young children, the elderly, and people with disabilities or access and functional needs. The GIS risk assessment counts the following socially vulnerable persons living in the hazard area: four persons over the age of 65 years, two persons with a disability, one person living below the poverty level, and one person without broadband internet.

6.2.2 General Building Stock

Areas of snow avalanche susceptibility are typically not well suited to development due to the steepness of slope in these areas. The runout areas down-slope are more likely to see development. Most lands identified as susceptible to snow avalanches are either state or national forest or have existing uses associated with winter recreation.

According to the GIS risk assessment, there are 17 buildings in the avalanche hazard area (residential, commercial, and other) representing less than 0.1 percent of the County's total general building stock and less than 0.1 percent of the County's replacement cost value.

6.2.3 Community Lifelines and Other Critical Facilities

Critical infrastructure such as roads are more likely to be exposed. Impacts on these lifelines could isolate populations and interrupt commodity flows. The only critical facilities inventoried for this MJHMP within the mapped avalanche hazard area are five communications facilities (radio towers and microwave service towers).

6.2.4 Economy

An avalanche can result in economic losses by disrupting recreational facilities, obstructing transportation routes, and occasionally destroying property. Damage to critical infrastructure such as roads, bridges, and buildings can require extensive repair and reconstruction costs. An avalanche may disrupt local businesses that rely on tourism and may deter visitors from traveling to the area for winter activities. All economic losses from this hazard would be associated with limitations on activities in avalanche risk areas.

6.2.5 Natural Resources

A large avalanche can knock down many trees and kill the wildlife that lives in them. In spring, this loss of vegetation on the mountains may weaken the soil, causing landslides and mudflows.

6.2.6 Historic and Cultural Resources

Placer County is a known destination for winter sports and hosted the 1960 Winter Olympics. An avalanche may disrupt the trails and slopes that was featured in the Olympic Games.

6.3 Future Changes That May Affect Risk

6.3.1 Land Use and Development

Placer County is experiencing rapid population growth, but most development is occurring in areas outside of the avalanche hazard areas. Growth within avalanche hazard areas, if any, would be minimal.

6.3.2 Projected Changes in Population Patterns

As noted in Chapter 3, Placer County's population is projected to continue growing in the coming decades, with notable shifts in both density and distribution. Much of this growth is expected to occur in the western portion of the county, particularly within incorporated cities and suburban communities along major transportation corridors, where infrastructure and services can support higher density development. The population of the avalanche hazard area is not expected to grow significantly and any new growth will be subject to local snow design building standards.

6.3.3 Climate Change

Climate change is likely to cause more intense winter storms, including heavy snowfalls (e.g., during atmospheric river events), although warmer temperatures are likely to cause a greater percentage of precipitation in the county to fall as rain instead of snow, compared to historical precipitation patterns. Warmer conditions can cause more rapid melting of snow, which may destabilize snow on hillsides, causing more avalanches in Placer County. As climate change causes a loss of trees due to drought and wildfires, remaining trees may be less able to stabilize snowpack or to reduce wind-blown snow accumulation.

7. Dam and Levee Failure

7.1 Hazard Profile

7.1.1 Hazard Description

Populations, critical facilities, and economic assets within areas protected by a dam or levee are vulnerable to flooding, erosion, and high-water velocities associated with any failure or overtopping of the dam or levee structure.

DAMS

Dam failure is any malfunction or abnormality outside of a dam's design that adversely affects the dam's primary function of impounding water, leading to a sudden, rapid, and uncontrolled release of water. Such failures can cause catastrophic flooding impacts in downstream areas (ASDSO n.d.-a, ASDSO n.d.-b).

California dams and reservoirs support agriculture, municipal water supply, flood management, hydroelectric power generation, and recreation. Reservoir storage capacities range from only a few thousand acre-feet to more than 5 million acre-feet. Failure of these structures has the potential to impact downstream communities, infrastructure, and natural systems.

Potential Causes of Failure

Dam failures are usually associated with intense rainfall and prolonged flood conditions. Significant rainfall can cause floodwaters to overwhelm a reservoir. If the spillway of the dam cannot safely pass the resulting flows, water will begin flowing in areas not designed for such flows, and a failure may occur. Dam breaks also may occur during dry periods as a result of progressive erosion of an embankment. This is referred to as a "sunny day" failure. Dam failures in the United States typically occur in one of four ways (ASDSO 2024):

- Overtopping of the primary dam structure, which accounts for 34 percent of all dam failures, can occur due to inadequate spillway design, settlement of the dam crest, blockage of spillways, and other factors.
- Foundation defects due to differential settlement, slides, slope instability, uplift pressures, and foundation seepage can cause dam failure. These account for 30 percent of all dam failures.
- Failure due to piping and seepage accounts for 20 percent of all failures. Piping and seepage can be associated with internal erosion, erosion along hydraulic structures such as spillways, erosion due to animal burrows, or cracks in the dam structure.
- Failure due to problems with conduits or valves, caused by the piping of embankment material into conduits through joints or cracks, constitutes 10 percent of all failures.

The remaining 6 percent of U.S. dam failures are due to miscellaneous causes. Many dam failures in the United States have been secondary results of other disasters such as earthquakes, landslides, extreme storms, or massive snowmelt. Failures also can result from equipment malfunction, structural damage, foundation failures, or sabotage.

Regulatory Oversight of Dams

California Department of Water Resources, Division of Safety of Dams

In California, dams are regulated by the State of California Division of Safety of Dams (DSOD). The California Water Code (Division 3) defines a regulated dam as any artificial barrier, together with appurtenant works, that does or may impound or divert water, and that either:

- It has a height of more than 6 feet and impounds 50 acre-feet or more of water, or
- It has a height of 25 feet or higher and impounds more than 15 acre-feet of water.

The California Water Code (section 6161) requires all state-regulated dams, except those rated as low-hazard dams, to develop inundation maps and emergency action plans (EAPs). The EAPs must include the following:

- Emergency notification flow charts
- Information on a four-step response process
- Description of agencies' roles and actions in response to an emergency incident
- Description of actions to be taken in advance of an emergency
- Inundation maps
- Additional information such as revision records and distribution lists

The law requires dam owners to send their state-approved EAPs to relevant stakeholders. Local public agencies can then adopt emergency procedures that incorporate the information in the EAP in a manner that conforms to local needs and includes methods and procedures for alerting and warning the public and other response and preparedness related items.

Inundation maps for extremely high, high, and significant hazard dams are prepared by licensed engineers and submitted by dam owners for review and approval by the DSOD. DSOD has made inundation mapping available online for extremely high, high, and significant hazard dams.

National Dam Safety Program

The National Dam Safety Act established the National Dam Safety Program, a partnership among states, federal agencies, and other stakeholders that encourages individual and community responsibility for dam safety. Under the program, state assistance funds allow participating states to improve their programs through increased inspections, emergency action planning, and purchases of needed equipment. Grant assistance from FEMA provides support for improvement of dam safety programs that regulate most dams in the United States (FEMA 2024).

U.S. Army Corps of Engineers Dam Safety Program

USACE is responsible for safety inspections of federal and non-federal dams that meet size and storage limitations specified in the National Dam Safety Act, including the dams identified in the USACE National Inventory of Dams (NID). USACE has inventoried dams and has surveyed each state and federal agency's capabilities, practices, and regulations regarding design, construction, operation, and maintenance of dams. USACE has also developed guidelines for inspection and evaluation of dam safety (USACE 2014).

Federal Energy Regulatory Commission Dam Safety Program

The Federal Energy Regulatory Commission (FERC) has the largest dam safety program in the United States. FERC cooperates with federal and state agencies to ensure dam safety and homeland security. FERC staff inspect hydroelectric projects on an unscheduled basis to investigate the following (FERC 2020):

- Potential dam safety problems
- Complaints about constructing and operating a project
- Safety concerns related to natural disasters
- Issues concerning compliance with terms and conditions of a license

Every five years, an independent FERC-approved consulting engineer must inspect and evaluate projects with dams higher than 32.8 feet (10 meters) or with total storage capacity of more than 2,000 acre-feet (FERC 2020).

FERC monitors and evaluates seismic research in geographic areas where seismic activity is a concern. This information is applied to investigate and analyze structures of hydroelectric projects within these areas. FERC also evaluates the effects of large floods on dam safety. FERC staff visit dams and licensed projects during and after floods, assess extents of damage, and direct any studies or remedial measures the licensee must undertake (FERC 2020).

FERC requires licensees to prepare EAPs and conducts training sessions on developing and testing these plans. The plans outline an early warning system in the event of an actual or potential sudden release of water from a dam failure. The plans include operational procedures that may be implemented during regulatory measures, such as reducing reservoir levels and downstream flows, as well as procedures for notifying affected residents and agencies responsible for emergency management. These plans are frequently updated and tested to ensure that all applicable parties are informed of the proper procedures in emergencies (FERC 2020).

State and Federal Hazard Ratings

The NID categorizes dams as low, significant, or high hazard. The DSOD has developed a hazard potential classification system for state-jurisdiction dams that adds a fourth hazard classification of "extremely high," as shown in Table 7-1. Dams classified as extremely high hazard may impact highly populated areas or critical infrastructure or have short evacuation warning times.

Table 7-1. State of California Downstream Hazard Potential Classification

Hazard Classification	Potential Downstream Impacts on Life and Property
Low	No probable loss of human life and low economic and environmental losses. Losses are expected to be principally limited to the owner's property.
Significant	No probable loss of human life but can cause economic loss, environmental damage, impacts on community lifelines, or other significant impacts.
High	Expected to cause loss of at least one human life.
Extremely High	Expected to cause loss of at least one human life and one of the following: result in an inundation area with a population of 1,000 or more; or result in the inundation of facilities or infrastructure, the inundation of which poses a significant threat to public safety as determined by the DSOD on a case-by-case basis

Source: (Division of Safety of Dams, California Department of Water Resources 2021)

Dam hazard rating systems are based on the potential consequences of a dam failure; they do not consider the probability of a failure occurring. Therefore, the classification has no relationship to a dam's condition, structural integrity, operational status, or flood storage capability.

LEVEES

A levee is an elevated structure constructed along the banks of a river, stream, or canal to reinforce channel boundaries and reduce flood risk by confining higher flows within the main channel. Levees may be naturally formed or human-built. While they provide an important measure of flood protection, levees are not failsafe. They are designed for a specific level of protection and can be overtopped during severe weather events or dam failures. As a result, they reduce but do not eliminate flood risk to people and property located behind them. A levee cannot protect against events larger than its design capacity.

Potential Causes of Failure

Levee systems may fail or be compromised in several ways. Under-seepage occurs when water flows beneath the levee through foundation materials, emerging at or beyond the landside toe of the levee. Through-seepage refers to water flowing directly through the levee prism, often surfacing along the landside slope. Both conditions can weaken the structure and cause failure through mechanisms such as excessive pore water pressures leading to foundation heave or slope instability, internal erosion, or piping that causes slumping. Additional threats include erosion, which can gradually wear away levee materials, and animal burrowing, as rodents can tunnel into levees and compromise their integrity.

Potential Impacts of Failure

A levee failure or breach causes flooding in landward areas adjacent to the structure. Large volumes of water may be moving at high velocities, potentially causing severe damage to populations, homes, businesses, and transportation corridors. In addition, severe erosion is likely; such erosion can negatively impact local ecosystems.

A levee system failure or overtopping can result in significant flooding with fast-moving waters. By narrowing the flow path, levees can increase the velocity of water. Because of this, if a levee fails, damage to the area beyond the levee could be more significant than if the levee were not present.

7.1.2 Location

Areas located downstream of major reservoirs and behind levee systems represent the greatest exposure to dam or levee failure. The risk is most significant where development has expanded into floodplains protected by these structures.

DAMS

Dams are located throughout the Placer County region and vary in size, storage capacity, and function. The highest concentrations of dams are generally associated with larger river systems and tributaries, where they provide critical water management and storage.

The USACE NID lists 49 dams in Placer County: 33 rated as high-hazard, 4 rated as significant-hazard, and 12 rated as low-hazard. One of the NID high-hazard dams, PG&E's Rock Creek Dam, just south of the Auburn Municipal Airport, is rated as extremely high hazard by the DSOD. The dams are listed in Table 7-2, which also indicates dam condition and the latest EAP revision date for dams that require EAPs. Figure 7-1 shows the locations of these dams, with their ratings as listed in the NID.

DSOD mapping of inundation areas for dams that require it is shown in Figure 7-2. The aggregated inundation areas for all these dams represent the defined hazard area for the dam failure risk assessment in this MJHMP. In addition to the inundation areas for dams in Placer County, it includes the Placer County portion of the inundation area for Camp Far West Dam, which is in neighboring Yuba County.

LEVEES

Levees are typically located along rivers, streams, and canals in low-lying areas prone to flooding. They are most common in areas with intensive agricultural use, developed floodplains, or critical infrastructure.

The National Levee Database (NLD) lists 10 levees in Placer County: four are located in Roseville; one in Lincoln; three in Wheatland on the Bear River; and two extend from Sutter County or Yuba County into Placer County. The levees located solely in Placer County are quite small, with none of them longer than a half-mile. However, the two levees that extend from other counties are both more than 16 miles long and represent major efforts to direct the Bear River. Figure 7-3 shows the areas protected by the levees in Placer County. The aggregated areas protected by all these levees represent the defined hazard area for the levee failure risk assessment in this MJHMP.

Table 7-2. NID-Listed Dams in Placer County

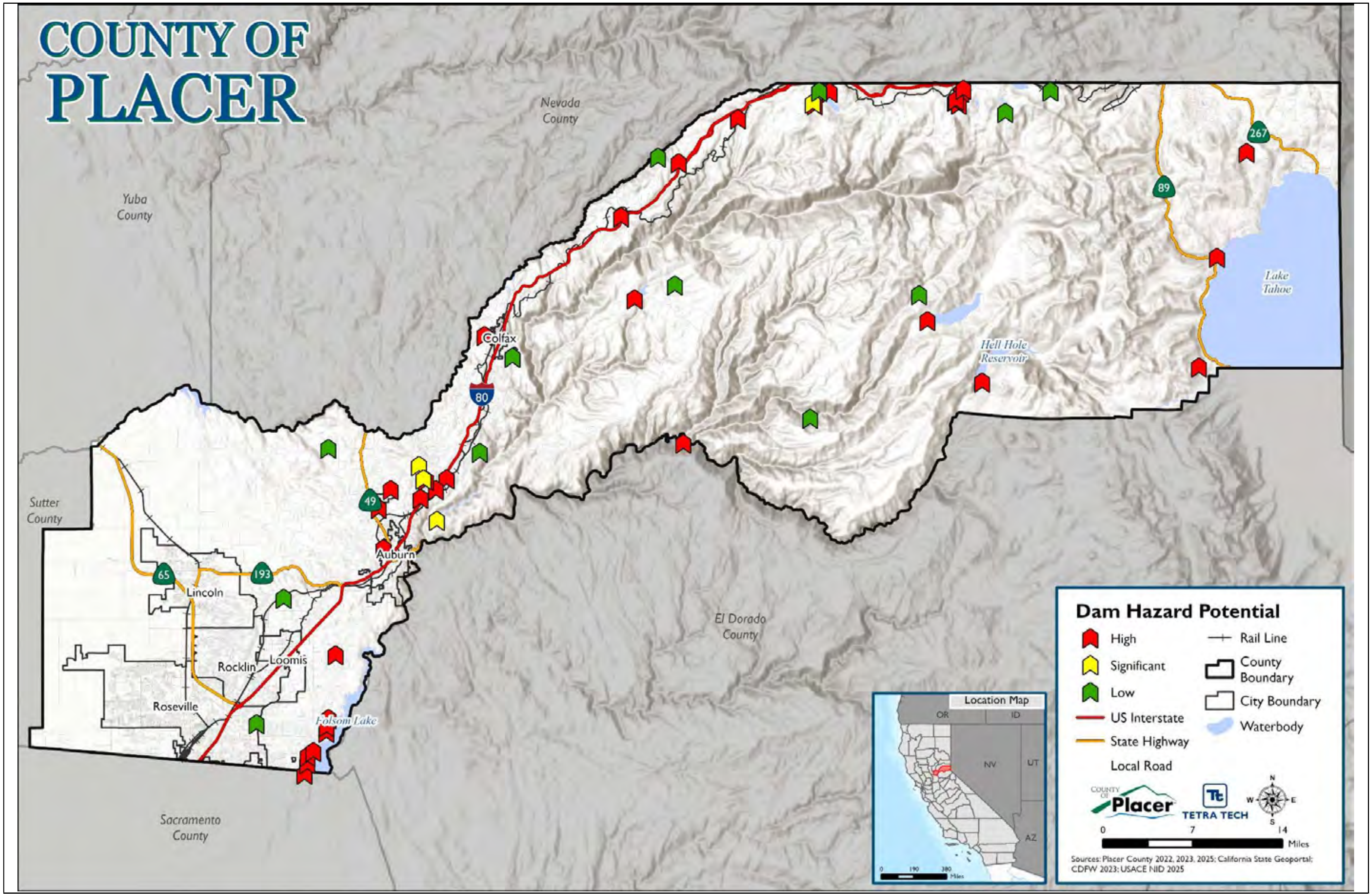
Dam Name	Owner Names	Hazard Rating	State Regulated	Federally Regulated	Condition Assessment	EAP Last Revised
Auburn Valley Country Club #3	Lloyd Harvego	Low	Yes	No	Satisfactory	N/A
Boole	Our Lady of the Oaks	Low	Yes	No	Satisfactory	N/A
Clover Valley	Placer County Water Agency	Low	Yes	No	Satisfactory	N/A
Drum Afterbay	Pacific Gas and Electric Company	Low	Yes	Yes	Satisfactory	December 23, 2021
Drum Forebay	Pacific Gas and Electric Company	High	Yes	Yes	Satisfactory	December 30, 2022
Duncan Creek Diversion	Placer County Water Agency	Low	No	Yes	Satisfactory	December 20, 2022
Folsom Dike 1	US Bureau of Reclamation	High	No	Yes	Not Available	November 30, 2021
Folsom Dike 2	US Bureau of Reclamation	High	No	Yes	Not Available	November 30, 2021
Folsom Dike 3	US Bureau of Reclamation	High	No	Yes	Not Available	November 30, 2021
Folsom Dike 4	US Bureau of Reclamation	High	No	Yes	Not Available	November 30, 2021
Folsom Dike 5	US Bureau of Reclamation	High	No	Yes	Not Available	November 30, 2021
Folsom Dike 6	US Bureau of Reclamation	High	No	Yes	Not Available	November 30, 2021
Halsey Afterbay	Pacific Gas and Electric Company	High	Yes	Yes	Satisfactory	December 30, 2022
Halsey Forebay No. 1	Pacific Gas and Electric Company	High	Yes	Yes	Satisfactory	December 30, 2022
Halsey Forebay No. 2	Pacific Gas and Electric Company	Significan t	No	Yes	Satisfactory	December 30, 2022
Hell Hole	Placer County Water Agency	High	Yes	Yes	Fair	December 20, 2022
Hinkle	San Juan Water District	High	Yes	No	Satisfactory	August 12, 2024
Ice Lakes	Sierra Lakes County Water District	Low	Yes	No	Satisfactory	N/A
Kelly Lake	Pacific Gas and Electric Company	High	Yes	Yes	Satisfactory	December 30, 2022
Kidd Lake Auxiliary	Pacific Gas and Electric Company	High	No	Yes	Satisfactory	December 30, 2022
Kidd Lake Main	Pacific Gas and Electric Company	High	Yes	Yes	Satisfactory	December 30, 2022
L. L. Anderson	Placer County Water Agency	High	Yes	Yes	Satisfactory	December 20, 2022
Lake Alta	Placer County Water Agency	High	Yes	No	Fair	December 12, 2022
Lake Arthur	Placer County Water Agency	High	Yes	No	Satisfactory	February 8, 2023
Lake Mary	Sugar Bowl Corporation	Low	Yes	No	Satisfactory	N/A
Lake Tahoe Dam	US Bureau of Reclamation	High	No	Yes	Not Available	November 1, 2021
Lake Theodore	Placer County Water Agency	High	Yes	No	Satisfactory	February 8, 2023
Lake Valley Auxiliary	Pacific Gas and Electric Company	Significan t	No	Yes	Satisfactory	December 30, 2022
Lake Valley Main	Pacific Gas and Electric Company	High	Yes	Yes	Satisfactory	December 30, 2022

Dam Name	Owner Names	Hazard Rating	State Regulated	Federally Regulated	Condition Assessment	EAP Last Revised
Lakewood	Max Yurtsan	High	Yes	No	Poor	N/A
Lower Peak Lake Auxiliary	Pacific Gas and Electric Company	High	No	Yes	Satisfactory	December 30, 2022
Lower Peak Lake Main	Pacific Gas and Electric Company	High	Yes	Yes	Satisfactory	December 30, 2022
Mammoth Reservoir	Placer County Water Agency	High	Yes	No	Satisfactory	October 22, 2020
Middle Fork Interbay	Placer County Water Agency	Low	Yes	Yes	Satisfactory	December 20, 2022
Miners Ravine Detention	Placer County Flood Control and Water Conservation District	Low	Yes	No	Satisfactory	N/A
Morning Star	De Anza Placer Gold Mining Company	Low	Yes	No	Satisfactory	N/A
North Fork Dam	USACE - Sacramento District	Significan t	No	Yes	Not Available	September 5, 2025
Putts Lake	40 Acre Conservation League	High	Yes	No	Satisfactory	June 24, 2022
Quail Lake Dam	USDA FS	High	No	No	Not Rated	N/A
Ralston Afterbay	Placer County Water Agency	High	Yes	Yes	Fair	December 20, 2022
Reservoir A	Northstar Community Services District	High	Yes	No	Satisfactory	April 2, 2021
Rock Creek	Pacific Gas and Electric Company	High[a]	Yes	Yes	Satisfactory	December 30, 2022
Snowflower	Equity Lifestyle Properties	Low	Yes	No	Satisfactory	N/A
Spring Valley Ranch	Spring Valley Dam Homeowner's Association	High	Yes	No	Satisfactory	December 31, 2020
Sugar Pine	Foresthill Public Utility District	High	Yes	No	Satisfactory	July 29, 2022
Upper Peak Lake	Pacific Gas and Electric Company	High	Yes	Yes	Satisfactory	December 30, 2022
Wastewater Storage	City of Colfax	Low	Yes	No	Satisfactory	N/A
Winchester	Winchester R.E.O., LLC	Significan t	Yes	No	Satisfactory	N/A
Wise Forebay	Pacific Gas and Electric Company	High	No	Yes	Satisfactory	December 30, 2022

Source: (USACE n.d.)

a. Rock Creek Dam is listed as Extremely High Hazard by the California DSOD.

Figure 7-1. NID-Listed Dams in Placer County



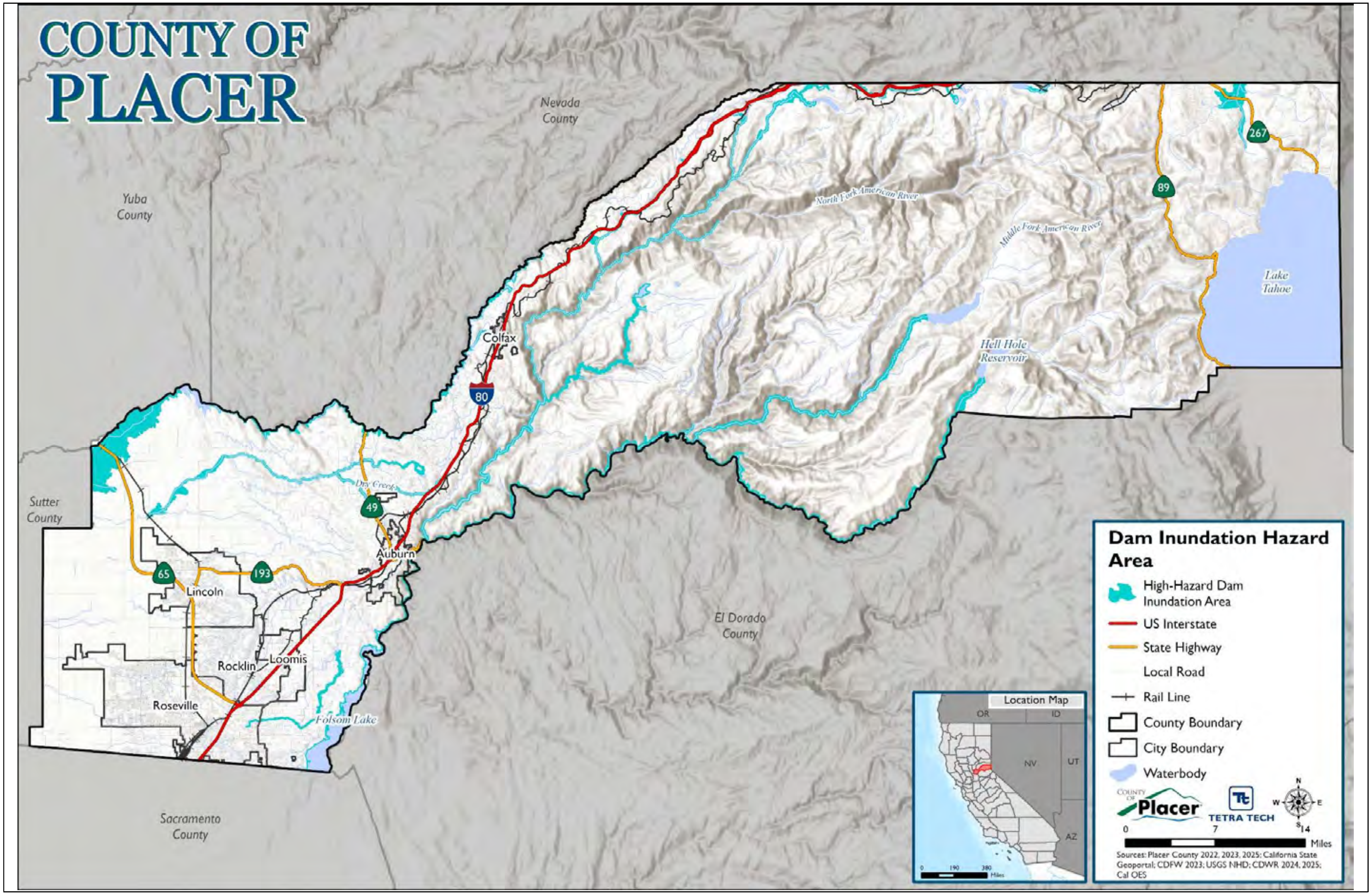
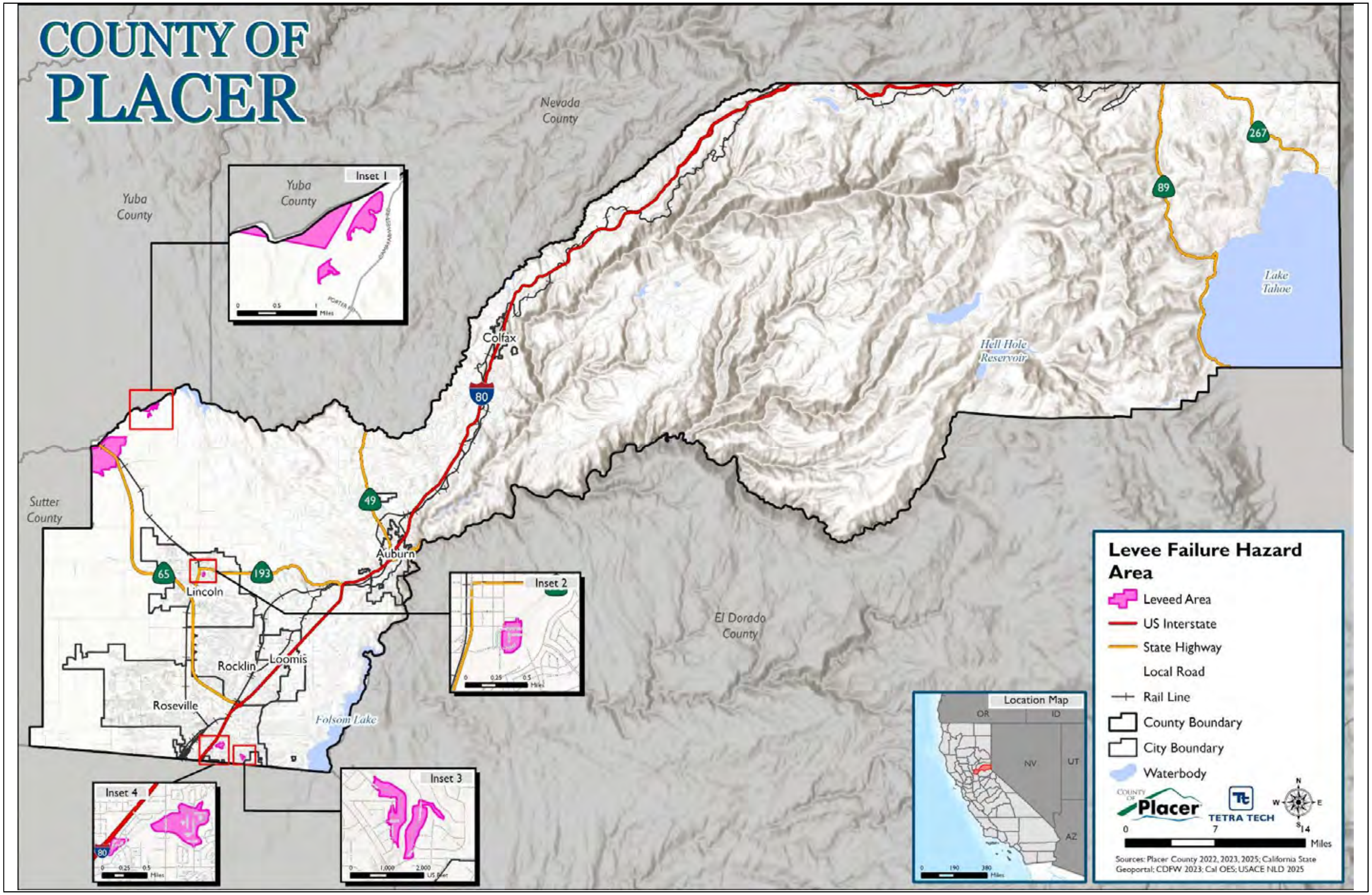


Figure 7-2. DSOD Dam-Failure Inundation Area Mapping for Placer County

Figure 7-3. Placer County Levee Failure Hazard Area



7.1.3 Extent

DAMS

The magnitude of a dam failure event is indicated by the dam's classification. Dams are classified according to the downstream damage that would result if the structure were to fail. The extent of the dam-failure hazard for Placer County is defined by the dam hazard ratings listed in Table 7-2.

LEVEES

The worst-case scenario for a levee failure in Placer County would be the complete failure of any of the levee systems in the County. If this occurred during a flood with a 1 percent annual chance of occurrence, the failure would lead to flood effects consistent with those described in Chapter 10.

Levees can fail if they are allowed to decay or deteriorate, so regular maintenance of levees is critical. It is noted that the average age of levees in the County is 63 years, according to the NLD.

WARNING TIME

Dam and levee failures are generally worse when they occur with little warning and result in deep, fast-moving water through highly developed areas. The potential for casualties is linked to the capacity and availability of evacuation routes, the speed of onset, and the warning time available to at-risk populations. Warning time depends on the cause of the failure. In the event of a structural failure due to earthquake, there may be no warning time. Events of extreme precipitation or snowmelt can be predicted, allowing time to plan for evacuations. When dam operators need to release water to relieve pressure from a dam, with potential for flooding downstream, advance warning can be provided.

A dam or levee's structural type affects how quickly a failure occurs. A failure can sometimes occur within hours of the first signs of breaching. Other failures can take days or weeks, as a result of debris jams, melting snow, or buildup of water pressure after days of heavy rain.

7.1.4 Previous Occurrences

FEMA DISASTER DECLARATIONS

Placer County has not been included in any major disaster (DR) or emergency (EM) declarations for events related to dam or levee failure (FEMA 2025b).

STATE EMERGENCY PROCLAMATIONS

Placer County has not been included in any state emergency proclamations related to dam or levee failure since the previous hazard mitigation plan.

ALL RECENT EVENTS

Between 2020 and 2024, Placer County was not affected by any dam or levee failure related disaster events.

HISTORICAL EVENTS

According to the HMPC, there have been five historical dam failure events that affected the County, as described below.

Hell Hole Dam

In 1964, construction of the Hell Hole dam was underway and the contractor had stopped operations for the winter. A major rain event in December 1964 caused the Hell Hole Reservoir to fill and since the dam was not completed, it failed, sending 30,000 acre-feet of water toward Auburn. The water washed out a bridge on Highway 49 over the American River at the confluence of the North and Middle Forks and flooded a quarry. Under the terms of the construction contract, the contractor was obliged to rebuild the dam at its own expense. So, Placer County incurred no costs related to this event.

Auburn Coffer Dam

As a result of area flooding in 1986, the Coffer Dam at Auburn breached and partially washed away. The U.S. Bureau of Reclamation had designed the Coffer Dam for a controlled failure by building a soft earthen plug into the dam for this purpose. It appears the dam failed as designed.

Ralston Dam Release Gate Break

A broken release gate on Ralston Dam on the Middle Fork of the American River prompted the National Weather Service to issue a flash flood warning for Placer County in August 2004. The gate near the Ralston Powerhouse failed, and the sudden release of water from Ralston Reservoir south of Auburn sent a wall of water 3 to 4 feet high down the river. About 800 to 1,000 acre-feet of water was released. Sheriff's deputies and California Highway Patrol officers alerted campers in the Auburn State Recreation Area to move to higher ground. There were no immediate reports of injuries or damage along the river, which is popular with rafters, kayakers and residents.

Cottonwood Dam

A privately owned and constructed dam within the Hidden Valley Estates subdivision failed in August 2009 and leached flows and sediment into Miners Ravine. A temporary fix (notch) in the concrete portion of the dam was approved and made while the homeowners association and interested agencies determined next steps. A dam removal project with creek restoration has been proposed.

Oroville Spillway

The Oroville Spillway in Butte County was at threat of collapse in February 2017, and the emergency operation center was opened. Evacuation and mutual aid support to Butte County and other affected nearby counties was supplied by Placer County. No damage was sustained in Placer County.

7.1.5 Probability of Future Occurrences

Dam and levee failure events in Placer County have been too few to develop an accurate quantitative estimate of the probability of future occurrence of such events. Based on the limited record and input from the Hazard Mitigation Planning Committee, the probability of occurrence for dam and levee failure in the County is considered “unlikely.”

7.1.6 Cascading Impacts on Other Hazards

Dam and levee failures are often triggered by other natural hazard events, including earthquakes, landslides, and extreme precipitation, which both reduce predictability and compound overall risk. Earthquake shaking can compromise dam or levee integrity and may lead to structural failure. Landslides can directly damage a dam, destabilize surrounding ground on which the dam is built, or fall into the impoundment, generating a wave that impacts the dam face. Similarly, prolonged or extreme precipitation can overwhelm upstream capacity, significantly raising reservoir levels and increasing the likelihood of overtopping or upstream flooding. Prolonged high-water conditions on rivers increase the risk of levee seepage, internal erosion, or piping.

The cascading impacts of dam or levee failure can be severe, including widespread flooding of protected lands, isolation of communities, damage to transportation networks, disruption of commodity flows, and potential contamination of water supplies. In agricultural areas, levee failure may result in long-term economic losses due to crop damage and soil erosion.

7.2 Vulnerability and Impact Assessment

The effects of a dam or levee failure can resemble those of a major flood event. The associated inundation can displace residents, damage homes and businesses, and endanger lives. Breaches or overtopping can result in sudden and severe flooding, stranding residents and limiting evacuation options. In rural areas, such failures may isolate agricultural communities and damage farmsteads, while in more developed settings, they can flood neighborhoods, hospitals, schools, and other essential facilities. Cascading impacts include disruption of emergency response, long-term displacement of populations, and heightened public health risks due to contaminated floodwaters and damaged infrastructure.

Hazard vulnerability and potential impacts were quantitatively evaluated for the aggregated dam failure inundation area shown in Figure 7-2 and the aggregated levee protection area shown in Figure 7-3.

7.2.1 Life, Health, and Safety

OVERALL POPULATION

As shown in Table 7-3, there are 477 persons living in the aggregated dam inundation area in Placer County, all of them in unincorporated Placer County.

Table 7-3. Population in the Aggregated Dam Inundation Hazard Area

Jurisdiction	Total Population 2023 ACS	Number of Persons in Hazard Area	% of Jurisdiction Total
City of Auburn	13,758	0	0.0%
City of Colfax	2,095	0	0.0%
City of Lincoln	51,629	0	0.0%
Town of Loomis	6,809	0	0.0%
City of Rocklin	72,340	0	0.0%
City of Roseville	152,438	0	0.0%
Unincorporated County	113,366	477	0.4%
Placer County (Total)	**412,435**	**477**	**0.1%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; California DWR 2025

As shown in Table 7-4, here are 911 persons living in the aggregated levee inundation area in Placer County. The City of Roseville has the highest population in the levee inundation area at 779 people, or 0.5 percent of the City's population.

Table 7-4. Population within Leveed Areas

Jurisdiction	Total Population 2023 ACS	Number of Persons	% of Jurisdiction Total
City of Auburn	13,758	0	0.0%
City of Colfax	2,095	0	0.0%
City of Lincoln	51,629	117	0.2%
Town of Loomis	6,809	0	0.0%
City of Rocklin	72,340	0	0.0%
City of Roseville	152,438	779	0.5%
Unincorporated County	113,366	15	<0.1%
Placer County (Total)	**412,435**	**911**	**0.2%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; USACE NLD 2025

The sudden release of water resulting from a dam failure can force residents to evacuate their homes to avoid life-threatening conditions. Displaced individuals often seek shelter in designated emergency shelters, which are set up by local authorities and relief organizations. These shelters provide a safe haven, offering essential services such as food, water, medical care, and temporary accommodation. In some cases, residents may also seek refuge with family or friends in safer locations. Table 7-5 presents the number of individuals who would be displaced or require short-term shelter in the event of a dam failure, categorized by jurisdiction.

Table 7-5. Persons Displaced or Seeking Short-Term Shelter Due to Dam Failure

Jurisdiction	Total Population 2023 ACS	Population Displaced by Dam Failure	Persons Seeking Short-Term Shelter Due to Dam Failure
City of Auburn	13,758	2	1
City of Colfax	2,095	0	0
City of Lincoln	51,629	0	0
Town of Loomis	6,809	0	0
City of Rocklin	72,340	0	0
City of Roseville	152,438	1	1
Unincorporated County	113,366	459	108
Placer County (Total)	**412,435**	**462**	**110**

SOCIALLY VULNERABLE POPULATION

Older adults, children, individuals with disabilities, access, or functional needs, and economically disadvantaged individuals may be unable to get themselves out of the inundation area or may require additional time and resources to recover. The vulnerable population also includes individuals who would not have adequate warning from the emergency warning system due to limited access to technology or limited English proficiency. Table 7-6 presents the estimated socially vulnerable populations living in the aggregated dam inundation area. Table 7-7 shows the estimated socially vulnerable populations living within leveed areas.

7.2.2 General Building Stock

As shown in Table 7-8, there are 434 buildings in the aggregated dam inundation area, all of them in unincorporated Placer County. These account for 0.2 percent of the County's total general building stock and 0.5 percent of the building stock in the unincorporated areas. The replacement cost value for these buildings is $256.7 million, which is 0.1 percent of the County total and 0.4 percent of the unincorporated area total. Table 7-9 shows buildings within leveed areas.

Table 7-10 categorizes buildings in the aggregated dam inundation hazard area by general occupancy class. Table 7-11 categorizes buildings in the leveed area by general occupancy class.

Table 7-12 summarizes the potential building losses from dam failure for the aggregated inundation area. The level of damage depends on the depth and velocity of the flooding. Properties closest to the dam have the greatest potential to experience the largest, most destructive surge of water.

Table 7-6. Vulnerable Persons Living in the Aggregated Dam Failure Inundation Hazard Area

Jurisdiction	Population Over 65	% of Total	Population Under 5	% of Total	Non-English Speaking Population	% of Total	Population with Disability	% of Total	Population Below Poverty Level	% of Total
City of Auburn	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City of Colfax	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City of Lincoln	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Town of Loomis	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City of Rocklin	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City of Roseville	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Unincorporated County	114	0.4%	16	0.4%	7	0.4%	53	0.4%	33	0.4%
Placer County (Total)	**114**	**0.1%**	**16**	**0.1%**	**7**	**0.1%**	**53**	**0.1%**	**33**	**0.1%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; California DWR 2025

Table 7-7. Vulnerable Persons Living in Levee-Protected Areas

Jurisdiction	Population Over 65	% of Total	Population Under 5	% of Total	Non-English Speaking Population	% of Total	Population with Disability	% of Total	Population Below Poverty Level	% of Total
City of Auburn	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City of Colfax	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City of Lincoln	31	0.2%	6	0.2%	1	0.1%	15	0.2%	9	0.2%
Town of Loomis	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City of Rocklin	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City of Roseville	133	0.5%	45	0.5%	18	0.5%	87	0.5%	46	0.5%
Unincorporated County	3	<0.1%	0	0.0%	0	0.0%	1	<0.1%	1	<0.1%
Placer County (Total)	**167**	**0.2%**	**51**	**0.2%**	**19**	**0.2%**	**103**	**0.2%**	**56**	**0.2%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; USACE NLD 2025

Table 7-8. Buildings in the Aggregated Dam Inundation Hazard Area

Jurisdiction	Number of Buildings in Hazard Area	% of Jurisdiction Total	Replacement Cost Value	% of Jurisdiction Total
City of Auburn	0	0.0%	$0	0.0%
City of Colfax	0	0.0%	$0	0.0%
City of Lincoln	0	0.0%	$0	0.0%
Town of Loomis	0	0.0%	$0	0.0%
City of Rocklin	0	0.0%	$0	0.0%
City of Roseville	0	0.0%	$0	0.0%
Unincorporated County	434	0.5%	$256,690,969	0.4%
Placer County (Total)	**434**	**0.2%**	**$256,690,969**	**0.1%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; California DWR 2025
Note: See Table 3-9 for total building counts and replacement cost value in each jurisdiction and countywide

Table 7-9. Buildings within Leveed Areas

Jurisdiction	Number of Buildings within Leveed Area	% of Jurisdiction Total	Replacement Cost Value	% of Jurisdiction Total
City of Auburn	0	0.0%	$0	0.0%
City of Colfax	0	0.0%	$0	0.0%
City of Lincoln	52	0.2%	$33,271,268	0.2%
Town of Loomis	0	0.0%	$0	0.0%
City of Rocklin	0	0.0%	$0	0.0%
City of Roseville	328	0.6%	$438,035,413	0.8%
Unincorporated County	15	<0.1%	$8,808,385	<0.1%
Placer County (Total)	**395**	**0.2%**	**$480,115,066**	**0.3%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; USACE NLD 2025
Note: See Table 3-9 for total building counts and replacement cost value in each jurisdiction and countywide

Table 7-10. Buildings in the Aggregated Dam Inundation Hazard Area by Occupancy Class

Jurisdiction	Residential	Commercial	Industrial	Other
City of Auburn	0	0	0	0
City of Colfax	0	0	0	0
City of Lincoln	0	0	0	0
Town of Loomis	0	0	0	0
City of Rocklin	0	0	0	0
City of Roseville	0	0	0	0
Unincorporated County	244	174	4	12
Placer County (Total)	**244**	**174**	**4**	**12**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; California DWR 2025
Note: Other = Government, Religion, Agricultural, and Education

Table 7-11. Buildings within Leveed Areas by Occupancy Class

Jurisdiction	Residential	Commercial	Industrial	Other
City of Auburn	0	0	0	0
City of Colfax	0	0	0	0
City of Lincoln	49	3	0	0
Town of Loomis	0	0	0	0
City of Rocklin	0	0	0	0
City of Roseville	263	63	0	2
Unincorporated County	8	6	0	1
Placer County (Total)	**320**	**72**	**0**	**3**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; USACE NLD 2025
Note: Other = Government, Religion, Agricultural, and Education

Table 7-12. Dam Failure Impacts on Buildings

Jurisdiction	Estimated Loss for All Occupancies	Percent of Total[a]	Estimated Loss for Residential Properties	Estimated Loss for Commercial Properties	Estimated Loss for Industrial Properties	Estimated Loss for All Other Occupancies[b]
City of Auburn	$0	0.0%	$0	$0	$0	$0
City of Colfax	$0	0.0%	$0	$0	$0	$0
City of Lincoln	$0	0.0%	$0	$0	$0	$0
Town of Loomis	$0	0.0%	$0	$0	$0	$0
City of Rocklin	$0	0.0%	$0	$0	$0	$0
City of Roseville	$0	0.0%	$0	$0	$0	$0
Unincorporated County	$37,729,558	0.1%	$16,791,598	$15,817,510	$2,045,654	$3,074,796
Placer County (Total)	**$37,729,558**	**<0.1%**	**$16,791,598**	**$15,817,510**	**$2,045,654**	**$3,074,796**

Source: Hazus v6.1; Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; California DWR 2025; USGS 2019, 2025
a. See Table 3-9 for total replacement cost value in each jurisdiction and countywide
b. Other = Government, Religion, Agricultural, and Education

7.2.3 Community Lifelines and Other Critical Facilities

Table 7-13 summarizes the number of community lifeline and other critical facilities in the aggregated dam failure inundation hazard area. This hazard area contains 54 critical facilities. Communications accounts for the largest share with 30 sites, followed by safety and security. All of these facilities are located in unincorporated Placer County. Table 7-14 provides the number of community lifelines located in leveed areas. Power outages and communication failures are common consequences of dam or levee failure, and drinking water or wastewater treatment facilities may be temporarily offline.

Table 7-13. Facilities in Dam Inundation Hazard Area, by Lifeline Category

Jurisdiction	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Total Facilities in Hazard Area	% of Jurisdiction Total
City of Auburn	0	0	0	0	0	0	0	0	0	0	0.0%
City of Colfax	0	0	0	0	0	0	0	0	0	0	0.0%
City of Lincoln	0	0	0	0	0	0	0	0	0	0	0.0%
Town of Loomis	0	0	0	0	0	0	0	0	0	0	0.0%
City of Rocklin	0	0	0	0	0	0	0	0	0	0	0.0%
City of Roseville	0	0	0	0	0	0	0	0	0	0	0.0%
Unincorporated County	2	4	0	3	0	14	30	1	0	54	7.4%
Placer County (Total)	**2**	**4**	**0**	**3**	**0**	**14**	**30**	**1**	**0**	**54**	**4.1%**

Source: Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025; California DWR 2025

Table 7-14. Facilities in Leveed Areas, by Lifeline Category

Jurisdiction	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Total Facilities in Hazard Area	% of Jurisdiction Total
City of Auburn	0	0	0	0	0	0	0	0	0	0	0.0%
City of Colfax	0	0	0	0	0	0	0	0	0	0	0.0%
City of Lincoln	0	0	0	0	0	0	0	0	0	0	0.0%
Town of Loomis	0	0	0	0	0	0	0	0	0	0	0.0%
City of Rocklin	0	0	0	0	0	0	0	0	0	0	0.0%
City of Roseville	0	0	0	0	3	0	0	0	0	3	1.0%
Unincorporated County	0	0	0	0	0	0	0	0	0	0	0.0%
Placer County (Total)	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**3**	**0.2%**

Source: Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025; USACE NLD 2025

7.2.4 Economy

Economic impacts from dam or levee failure are associated with the cost of repairing widespread structural damage to homes, businesses, and public utilities. Breaches or overtopping can inundate large tracts of residential, commercial, and agricultural land, damaging structures, destroying crops, and disrupting transportation corridors. Costs are also associated with disruption of essential services. Failures can overwhelm local drainage and utility networks, leaving communities without power, potable water, or functioning wastewater systems. A dam or levee failure can significantly hinder response and recovery efforts, increase financial burdens on residents and governments, and prolong community displacement.

Debris from damaged structures can lead to costly cleanup and disposal needs. Hazus estimates the amount of debris generated from the aggregated dam-failure inundation hazard event in three categories: finishes (drywall, insulation, etc.); structural (wood, brick, etc.) and foundations (concrete slab and block, rebar, etc.). The distinction is made because of the different types of equipment needed to handle the debris. Table 7-15 summarizes the debris Hazus estimates for these events.

Table 7-15. Estimated Debris Created During a Dam Failure Event

Jurisdiction	Total (tons)	Finish (tons)	Structure (tons)	Foundation (tons)
City of Auburn	85.7	10.8	37.4	37.5
City of Colfax	0.0	0.0	0.0	0.0
City of Lincoln	0.0	0.0	0.0	0.0
Town of Loomis	0.0	0.0	0.0	0.0
City of Rocklin	0.0	0.0	0.0	0.0
City of Roseville	0.0	0.0	0.0	0.0
Unincorporated County	1,109.6	392.6	344.8	372.2
Placer County (Total)	**1,195.5**	**403.6**	**382.4**	**409.9**

Source: Hazus v6.1; Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; California DWR 2025; USGS 2019, 2025

7.2.5 Natural Resources

The environmental consequences of a dam or levee failure can be severe and long-lasting. Such events can result in cascading ecological impacts, degrading water resources, damaging habitats, and requiring costly remediation efforts long after the initial flood event.

Floodwaters may carry large quantities of debris and sediment, creating significant disposal and water-quality challenges. Extensive erosion can alter stream channels, destabilize banks, and disrupt sensitive ecosystems. Floodwaters can also back up sanitary sewer systems and overwhelm wastewater treatment plants, resulting in raw sewage contaminating homes, businesses, and waterways. Additionally, unsecured containers of oil, fertilizers, pesticides, and other hazardous chemicals may be swept into floodwaters, leading to widespread contamination across the floodplain. Following the receding of floodwaters, flood-damaged building materials, contaminated sediment, and debris require careful removal and disposal to prevent ongoing environmental risks.

Levee breaches often inundate agricultural lands, where fertilizers, pesticides, herbicides, and animal waste can be mobilized into surrounding waterways. Flooding may also deposit contaminated sediment in natural habitats, degrading soil quality and harming wildlife. Prolonged flooding behind levees can create stagnant water conditions, further affecting water quality, promoting mosquito breeding, and increasing the potential for waterborne disease.

7.2.6 Historic and Cultural Resources

Cultural resources include “moveable heritage,” such as collections of artifacts, artwork, statuary, and archival documents, as well as immovable assets like historic buildings, monuments, sites, and districts. These resources are often safeguarded in libraries, museums, archives, and other repositories, or preserved within historically significant properties. Flooding caused by a dam or levee failure has the potential to damage or destroy these irreplaceable resources, leading to the permanent loss of cultural and historic assets.

Inundation can compromise the structural integrity of historic properties, erode archaeological sites, and cause irreparable harm to archives or artifacts housed in flood-prone repositories. The loss of cultural resources extends beyond physical damage, erasing valuable historical context and diminishing community identity.

7.3 Future Changes That May Affect Risk

7.3.1 Land Use and Development

Development in the dam inundation area will continue to occur, given the limited potential of total dam failure and the large area that a dam failure would affect. With limited levees in the unincorporated County, future development will likely not be affected by this hazard. Should new levees be built, future development in the levee-protected areas would be subject to the building standards in the Placer County Floodplain Ordinance.

7.3.2 Projected Changes in Population Patterns

The County experienced an increase in population between the 2020 Census (404,739) and the 2023 American Community Survey estimated population of 412,435. As noted in Chapter 3, the population is expected to continue to increase over the next few years. This may expose more people to the hazard of dam and levee failure.

7.3.3 Climate Change

Future precipitation is likely to slightly increase due to climate change, and precipitation extremes (both as high and low) are projected to increase markedly at the same time. Dams are designed using a hydrograph to assess whether the reservoir inflow peak discharge is likely to exceed the maximum spillway capacity, whether the reservoir has surcharge storage, and whether the reservoir has dedicated flood control space. The hydrographs are based on historical events, and changes from the historical pattern may result in flows exceeding those for which the dam was designed. 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 Placer County.

Increased risks to levees is a potential consequence of climate change, associated with more extreme precipitation events and shifts in the seasonal timing of river flows. The additional force exerted upon the levees by rising river flows is equivalent to the square of the water level rise.

8. Drought and Water Shortage

8.1 Hazard Profile

8.1.1 Hazard Description

A drought is a period of moisture deficiency that is extensive in both space and time. It results from a natural reduction in precipitation over an extended period, usually lasting a season or more. It diminishes natural stream flow and depletes soil moisture, leading to social, cultural, environmental, and economic consequences. The National Centers for Environmental Information (NCEI) describes drought as a phenomenon that impacts many sectors of the economy and operates on many different time scales (NCEI 2025).

A water shortage is a condition in which demand for water exceeds the available supply (i.e., not all water demands can be met). Drought and water shortage are often used interchangeably, but the water shortage is generally a result or an impact of drought conditions. Increases in demand for water (such as during heat waves, wildfires, or due to changes in development) can also cause water shortage even without a naturally-occurring drought, or it can exacerbate any existing drought conditions.

Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or wildfires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, often over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends.

Drought is a normal occurrence in virtually all climatic regions, regardless of average rainfall. Lack of rainfall is not the only factor contributing to the impacts of drought. High temperatures, high winds, and low humidity can intensify drought conditions, as can human actions and water demand. Both natural events and human activities, such as expanding populations, irrigation, and environmental needs, put pressure on water supplies. The combination of insufficient rainfall and societal demands on water systems and supplies exacerbates drought impacts.

Drought Types

The National Drought Mitigation Center (NDMC) has categorized droughts as described in Table 8-1.

Table 8-1. National Drought Mitigation Center Drought Types

Drought Type	Description
Meteorological Drought	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales. (Dry weather patterns dominate an area; can begin/end rapidly).
Hydrological Drought	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels. (Low water supply is evident; conditions take longer to develop and then recover.)
Agricultural Drought	Soil moisture deficiencies relative to water demands of plant life, usually crops. (Crops significantly affected).
Socioeconomic Drought	The effect of demands for water exceeding the supply because of a weather-related supply shortfall.
Ecological Drought	A prolonged and widespread deficit in naturally available water supplies — including changes in natural and managed hydrology — that creates multiple stresses across ecosystems.

Source: (NDMC 2025)

Drought Indices

The National Weather Service (NWS) has developed the following indices to measure drought impacts and severity and to map their extent and locations (NWS 2024):

- The ***Palmer Crop Moisture Index*** measures short-term drought weekly to assess impacts on agriculture.
- The ***Palmer Z Index*** measures short-term drought on a monthly scale.
- The ***Palmer Drought Index*** is based on long-term weather patterns. The intensity of drought in a given month is dependent on current weather plus the cumulative patterns of previous months. Weather patterns can change quickly, and the Palmer Drought Severity Index can respond fairly rapidly.
- The ***Palmer Hydrological Drought Index*** quantifies hydrological effects (reservoir levels, groundwater levels, etc.), which take longer to develop and last longer. This index responds more slowly to changing conditions than the Palmer Drought Index.
- The ***Standardized Precipitation Index*** considers only precipitation. A value of zero indicates the median precipitation amount; the index is negative for drought and positive for wet conditions. The Standardized Precipitation Index is computed for time scales ranging from one month to 24 months.

Maps of these indices show drought conditions nationwide at a given point in time. They are not necessarily indicators of any given area's long-term susceptibility to drought.

8.1.2 Location

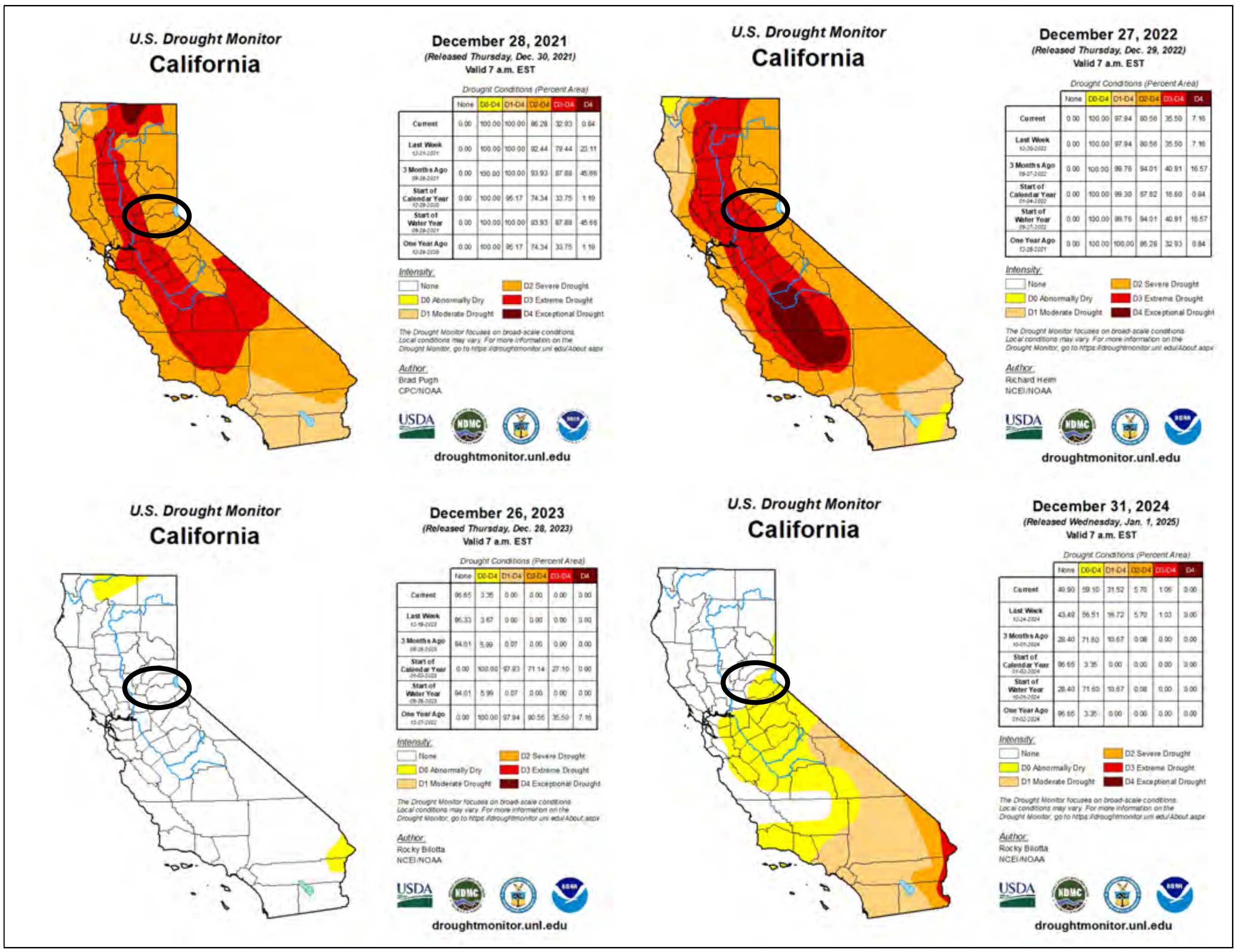
Drought is a regional phenomenon that has the potential to impact the entire planning area. A drought affects all aspects of the environment and the community simultaneously and has the potential to impact every person in the planning area directly or indirectly, as well as adversely affecting the local economy.

The entire County of Placer is vulnerable to drought, although the conditions of drought at any given time may not be uniform across the County. Figure 8-1 shows the history of drought conditions in California during the final week of the year from 2021 to 2024; Placer County is circled. As shown in the drought maps, West Placer County was in extreme drought conditions in 2021 and 2022, while East Placer County experienced abnormally dry conditions in 2024.

8.1.3 Extent

The severity of a drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. The longer the duration of the drought and the larger the area impacted, the more severe the potential impacts. Vulnerability of an activity to drought depends on its water demand and the water supplies available to meet the demand.

Figure 8-1. California Drought Conditions, 2021 to 2024



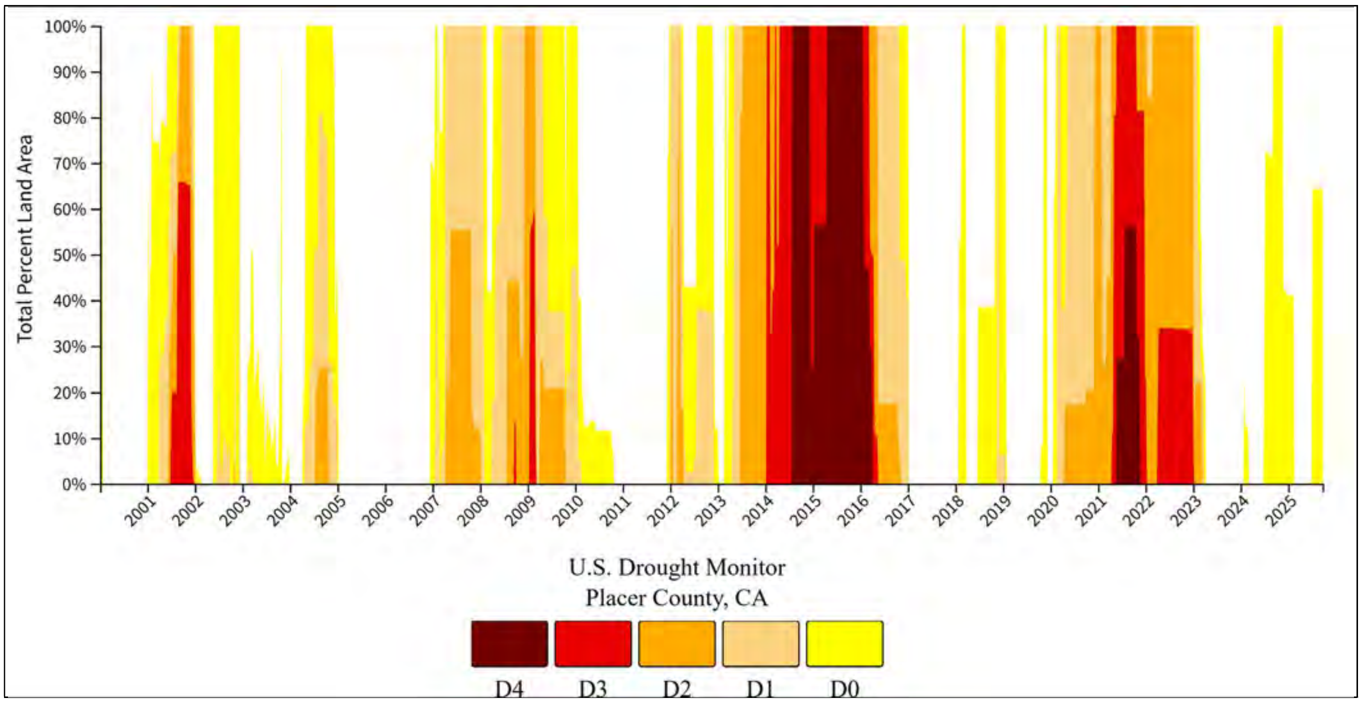
Source: (NDMC 2025)

The U.S. Drought Monitor (USDM) is a map that has been updated weekly since 2000 to show the location and intensity of drought across the country, including Placer County. The USDM measures variables including temperature, soil moisture, water levels in streams and lakes, snow cover, and meltwater runoff. It uses the following scale to measure drought intensity:

- None
- D0—Abnormally Dry
- D1—Moderate Drought
- D2—Severe Drought
- D3—Extreme Drought
- D4—Exceptional Drought

Figure 8-2 shows the history of USDM drought ratings in Placer County since 2000.

Figure 8-2. Historical Conditions for Placer County



Source: (U.S. Drought Mintor n.d.)

Placer County has historically had sufficient groundwater and surface water supplies to withstand severe droughts. However, this may not remain the case indefinitely. Recent studies across California indicate that in many areas groundwater is being pumped at rates faster than natural recharge can replenish it, leading to long-term declines in aquifer levels. While Placer County benefits from access to both groundwater and extensive surface water from the Sierra Nevada, climate change, reduced snowpack, and increased demand from local growth could strain these resources in the future.

8.1.4 Previous Occurrences

FEMA DISASTER DECLARATIONS

Table 8-2 lists all drought or water shortage-related major disaster (DR) or emergency (EM) declarations that have included Placer County.

Table 8-2. FEMA Disaster Declarations for Drought Events in Placer County

Declaration Date	Declaration Number	Incident Type	Disaster Name
January 20, 1977	EM-3023	Drought	Drought

Source: (FEMA 2025b)

USDA DECLARATIONS

Table 8-3 lists drought-related USDA agricultural disaster declarations that included Placer County between 2020 through 2024. For events prior to 2020, refer to the 2021 Placer County LHMP.

Table 8-3. USDA Declarations for Drought Events in Placer County (2020 to 2024)

Approval Date	USDA Declaration Number	Description
March 11, 2020	S4656	Drought
June 16, 2020	S4697	Drought
August 26, 2020	S4765	Drought

Source: (USDA 2024)

STATE EMERGENCY PROCLAMATIONS

Placer County has not been included in any state emergency proclamations related to drought or water shortage since the previous hazard mitigation plan.

ALL RECENT EVENTS

The U.S. Drought Monitor (USDM) and USDA documented drought conditions between 2020 and 2024, as indicated in Figure 8-1 and Table 8-3. For events prior to 2020, refer to the 2021 Placer County LHMP.

8.1.5 Probability of Future Occurrences

Table 8-4 lists the number of drought and water shortage events reported by various sources over the 30-year period from 1995 to 2025, which is the most complete period of record for all sources reviewed. Based on these records and input from the Hazard Mitigation Planning Committee, the probability of occurrence for drought in the County is considered “frequent.”

Table 8-4. Probability of Future Drought Events in Placer County

Hazard Type	Number of Occurrences Between 1995 and 2025	Percent Chance of Occurring in Any Given Year
Drought and Water Shortage	44	100%

Source: NCDC
Note: 100% probability indicates that it is statistically likely for an event to occur every year. It does not indicate that the occurrence of an event is a certainty in any given year.

Recent historical data for water shortage indicates that Placer County may 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. Water supply has not been a significant issue in Placer County in years past, due to the extensive surface and groundwater supplies in the region, the County's senior water rights, and their ability to maximize water resources.

8.1.6 Cascading Impacts on Other Hazards

Drought has a strong connection with wildfire risk. With lower humidity and more dry vegetation, any ignition will be more likely to spread fire. Dry periods, especially multi-year dry periods, which become more likely with climate change, can increase tree mortality. This is due in part to the lack of water, and in part because thirsty trees are less able to fend off invasive pests and diseases. Dead trees become further fuel for wildfires. With living trees' roots also helping to hold soil, loss of trees destabilizes slopes, increasing the chance of landslides. The dead trees can then become debris themselves in a landslide.

Hydropower stations that are powered by streams and reservoirs in Placer County are at risk of reduced output during dry times. This increases the chance of energy insufficiency or a need for other power sources, increasing energy costs. Alternating wet and dry periods can also cause stress to earthen levees, increasing their chance of failure.

Agriculture is often the primary sector affected by drought. During extended periods of drought, agricultural producers may have difficulty sustaining their operations, which can have its own cascading social and economic effects on other sectors and on local communities.

8.2 Vulnerability and Impact Assessment

All of Placer County is vulnerable to drought events. The following subsections provide a qualitative discussion of Placer County's vulnerability to the drought hazard.

8.2.1 Life, Health, and Safety

OVERALL POPULATION

Drought can affect public health and safety, including reduced local firefighting capabilities, health problems related to low water flows and poor water quality, and health problems related to dust. Short-term or long-term health effects from drought include heat-related illnesses, waterborne illnesses, recreational risks, limited food availability, and reduced air quality or sanitation. If droughts are severe enough, these health problems can lead to loss of human life.

Other possible impacts include recreational risks; effects on air quality; diminished living conditions related to energy, air quality, and sanitation and hygiene; compromised food and nutrition; and increased incidence of illness and disease.

SOCIALLY VULNERABLE POPULATION

Socially vulnerable populations are susceptible to drought events based on their physical and financial ability to react or respond during a drought. Vulnerable populations can be particularly susceptible due to age, health conditions, and limited ability to mobilize to facilities with shelter, cooling, or medical resources. Vulnerable populations include homeless persons, people over 65 years old, low income or linguistically isolated populations, people with life-threatening illnesses, and residents that may struggle to evacuate.

8.2.2 General Building Stock

No structures are anticipated to be directly affected by a drought event. However, droughts contribute to conditions conducive to wildfires and reduce fire-fighting capabilities.

8.2.3 Community Lifelines and Other Critical Facilities

Drought events generally do not impact buildings; however, droughts have the potential to impact agriculture-related facilities and critical facilities that are associated with water supplies, such as water used with fire-fighting services.

Drought affects groundwater sources, but generally not as quickly as surface water supplies. Groundwater supplies generally take longer to recover. Reduced precipitation during a drought means that groundwater supplies are not replenished at a normal rate. This can lead to a reduction in groundwater levels and problems such as reduced pumping capacity or wells going dry. Shallow wells are more susceptible than deep wells.

8.2.4 Economy

Agriculture is highly vulnerable to reductions in water availability. Crop losses, reduced yields, and fallowed fields can lead to financial hardship for farmers and agricultural workers, as well as supply chain impacts for related industries such as food processing, transportation, and retail. Declines in agricultural productivity also reduce sales tax and property tax revenues, affecting the broader local economy.

Water shortages can increase operational costs for businesses and public utilities, as communities face higher expenses for water procurement, distribution, and conservation measures. Hydroelectric generation may decline during drought years, leading to higher energy costs and potential shortages. Tourism, an important sector of Placer County's economy, can also be affected, as water-dependent recreation such as boating, fishing, and skiing experiences diminished participation due to low reservoir levels, poor water quality, or wildfire closures linked to dry conditions.

Collectively, these impacts create ripple effects throughout the regional economy, including business interruptions, job losses, reduced consumer spending, and long-term financial strain on households, governments, and industries.

8.2.5 Natural Resources

Drought and water shortages place significant stress on Placer County's natural environments. Reduced stream flows, depleted groundwater, and diminished wetland and riparian systems can lead to habitat loss, declining biodiversity, and stressed forest ecosystems. Vegetation die-off weakens ecosystem resilience and elevates wildfire risk, while dry conditions contribute to soil erosion and degraded water quality in rivers and streams. These changes threaten the long-term health and sustainability of the County's natural landscapes.

8.2.6 Historic and Cultural Resources

Prolonged drought can affect Placer County's historic and cultural resources. Agricultural lands, which reflect the County's rural heritage, may experience reduced productivity or be left fallow, disrupting traditional practices that are part of the cultural landscape. Heritage parks, gardens, and historic sites may deteriorate without sufficient water for preservation or upkeep. In some cases, archaeological sites and historic structures are further threatened by drought-related subsidence or by wildfires fueled by prolonged dry conditions. These impacts compromise the preservation of the County's history and cultural identity.

8.3 Future Changes That May Affect Risk

8.3.1 Land Use and Development

Any increases in development in the County would increase the overall risk from the drought hazard as development is likely to require additional water resources for drinking water, landscaping, and other uses.

8.3.2 Projected Changes in Population Patterns

As noted in Chapter 3, projections indicate that Placer County will see continued population and household growth through 2070. The urban, western portion remains the primary source of expansion and this will increase the demand on municipal water systems over the coming decades.

8.3.3 Climate Change

Climate change is expected to further intensify the frequency and severity of droughts in the region. While temporary declines in precipitation are anticipated, these reductions are variable from year to year. Precipitation may decline mid-century under some scenarios, however, the Argonne National Lab's ClimRR web site projects that most of Placer County could see increased annual total precipitation by the end of century. California's Fourth California Climate Change Assessment (CCCA4) shows the western portion of the county seeing a smaller increase, if any, while the eastern portion may see a 15 percent increase by end of century.

This increase in total precipitation, however, is expected to be accompanied by more droughts, because, as the CCCA4 states, a warmer atmosphere can hold more water vapor. Winter storms will generally carry more rain because of this, but on the other hand, it will take more atmospheric forcing to cause a precipitation event. Longer dry periods will be punctuated by more intense rainfall, keeping averages about the same over the years, but with much more variability.

In addition to these longer dry stretches, the warmer atmosphere will also increase the drying out of soils and evaporation of vapor from water bodies, including reservoirs. Dry years are likely to become even drier, while wet years will become even wetter in the next several decades. The impacts on agriculture could be significant.

As rainfall becomes more intense, without necessarily a strong increase in total precipitation, groundwater recharge is expected to decrease, while surface runoff increases. Underground water supplies may thus be strained, unable to replenish at their historical rates. The vulnerability will vary geographically, with foothill and valley areas more sensitive to groundwater supply fluctuations and the Sierra Nevada portion more exposed to snowpack loss.

Because of higher temperatures in the mountains, snowpack may melt earlier in the year or more often in the winter, changing the timing of stream flow from historical trends. Combined with the potential for reduced snowpack, this may significantly reduce summertime stream flow from the Sierras, making water storage capacity more important. Reservoir storage managers in Placer County will have to balance the need for increased water reserves to last through the summer and fall with the need for flood mitigation capacity for increasingly likely heavy precipitation events. This is an inherent difficulty of reservoir management, but it becomes increasingly complex with climate change.

9. Earthquake

9.1 Hazard Profile

9.1.1 Hazard Description

An earthquake is the shaking of the earth's surface by energy waves emitted from the movement of tectonic plates or a volcanic eruption (FEMA 2023b). The slip of one block of rock over another inside the earth releases energy that makes the ground vibrate. That vibration pushes the adjoining piece of ground and causes it to vibrate, and thus the energy travels out in waves from the initial point of movement (called the earthquake epicenter). Most earthquakes occur at the boundaries where the earth's tectonic plates meet (faults); fewer than 10 percent occur within plate interiors (USGS 2016).

California's high seismic activity is the result of its position along the boundary between two tectonic plates: the Pacific Plate and the North American Plate. Most of the state, including areas east of the San Andreas Fault, sits on the North American Plate. Meanwhile, cities such as Monterey, Santa Barbara, Los Angeles, and San Diego are located on the Pacific Plate, which moves northwest at a rate of about 2 inches per year relative to the North American Plate. The San Andreas Fault serves as the main boundary between the plates, though additional strain is distributed across faults extending as far as east as central Utah.

Earthquake-quake caused ground motion can damage buildings, infrastructure, and natural environments. Earthquakes can also include secondary hazards such as ground rupture, landslides, liquefaction, and structural settlement. 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.

GROUND SHAKING

Ground shaking is the motion that occurs as a result of energy released during faulting. The damage or collapse of buildings and other structures caused by ground shaking is among the most serious seismic hazards (USGS 2012). Damage to structures from this vibration 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 epicenter location, the duration of ground motion, general topography, and groundwater.

Ground shaking generally has a much greater impact over a greater geographical area than ground breakage. Actual ground breakage generally affects only those buildings directly over or near the fault.

GROUND ACCELERATION

The ground experiences acceleration when it shakes during an earthquake. The peak ground acceleration (PGA) is the largest increase in velocity recorded at a particular location during an earthquake. PGA is a measure of how hard the earth shakes in a given geographic area. It is measured in “g” (the acceleration due to gravity) or expressed as a percentage of the acceleration of gravity (%g). Estimates are developed of the probability that a given ground motion acceleration will be exceeded over a defined period of time.

Maps of PGA values form the basis of seismic zone maps that are included in building codes such as the International Building Code. Building codes that include seismic provisions specify the horizontal force due to lateral acceleration that a building should be able to withstand during an earthquake. PGA values are directly related to these lateral forces that could damage “short period structures” (e.g., single-family dwellings). Longer period response components determine the lateral forces that damage larger structures with longer natural periods (apartment buildings, factories, high-rises, bridges).

SEISMIC STRUCTURAL DAMAGE

The structural safety of buildings during an earthquake depends largely on their age, design, and construction materials. Older buildings built prior to modern seismic codes are most at risk of serious damage or collapse. In contrast, low-rise wood-frame buildings generally perform better during earthquakes.

A structure’s vulnerability is also influenced by its foundation conditions. Buildings founded on rock or other very firm materials may experience intensified short period ground motions, which place greater stress on low-rise buildings. 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.

LIQUEFACTION POTENTIAL

Liquefaction occurs when strong ground shaking causes water-saturated, sandy soils or artificial fill with shallow groundwater (generally within 50 feet of the surface) to lose strength and behave like a liquid. When this happens, the ground can no longer support structures, leading to tilting, sinking, or severe damage to foundations. Evidence of liquefaction may be observed in "sand boils,” which are expulsions of sand and water from below the surface due to increased pressure below the surface.

SETTLEMENT

Settlement can occur in poorly consolidated soils during ground shaking. When this happens, soil particles are rearranged into a less stable configuration, reducing the ground’s ability to support structures. 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.

SEICHE

Seismic waves may rock an enclosed body of water, creating an oscillating wave referred to as a "seiche." Although not a common cause of damage, there is a potential for large, forceful waves similar to a tsunami to be generated on large bodies of water, such as Lake Tahoe. These earthquake-generated waves could impact shoreline development and may lead to downstream flash flooding.

9.1.2 Location

Figure 9-1 shows earthquake faults within the planning area. Figure 9-2 shows the locations of historic earthquakes in Placer County.

NEHRP SOIL CLASSIFICATION

The National Earthquake Hazard Reduction Program (NEHRP) developed five soil classifications that affect the severity of an earthquake, based on how quickly earthquake-caused energy waves travel through the soil. The classifications are listed in Table 9-1.

Table 9-1. NEHRP Soil Classification System

NEHRP Soil Type	Description
A	Hard Rock
B	Firm to Hard Rock
C	Dense Soil/Soft Rock
D	Stiff Soil
E	Soft Clays

Source: (FEMA n.d.)

NEHRP soil types help define the locations that will be significantly affected by an earthquake. Class A soils (hard rock) reduce ground motion from an earthquake, and Class E soils (soft soils) amplify and magnify ground shaking and increase building damage. NEHRP Soils B and C typically can sustain an earthquake with little ground shaking. The areas that are commonly most affected by ground shaking and liquefaction have NEHRP Soils D and E.

The majority of Placer County is classified as Class A, B, or C soils (rock or dense soil). Areas of Class D soils (stiff soil) are shown in Figure 9-3, and are largely located in the Lake Tahoe area, across northeastern Placer County, and along streambeds in southwestern Placer County.

9.1.3 Extent

Earthquakes are typically classified by the amount of energy released (magnitude) or by the impact on people and structures (intensity).

Figure 9-1. USGS Earthquake Faults in Placer County

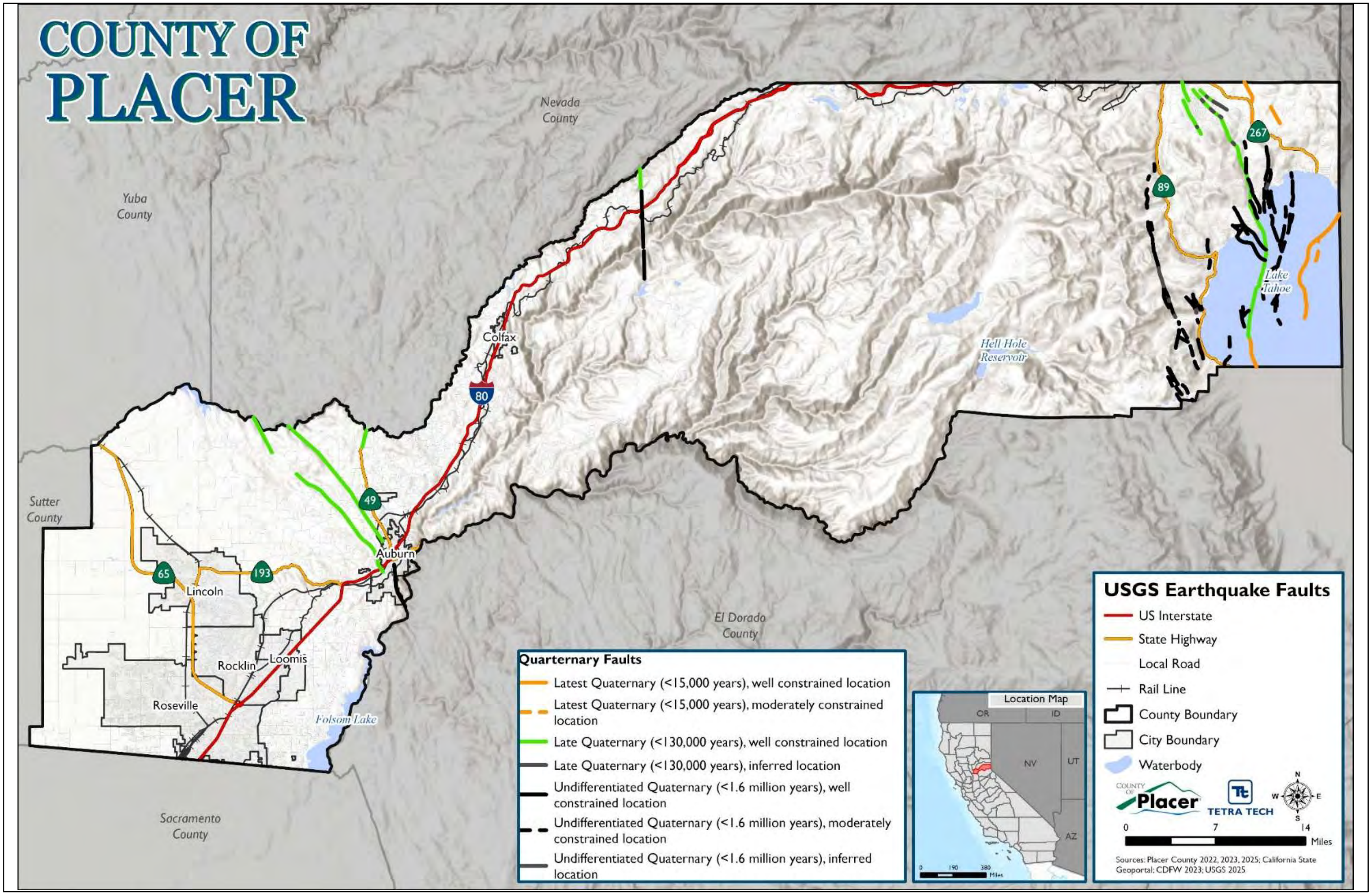


Figure 9-2. Historical Earthquakes

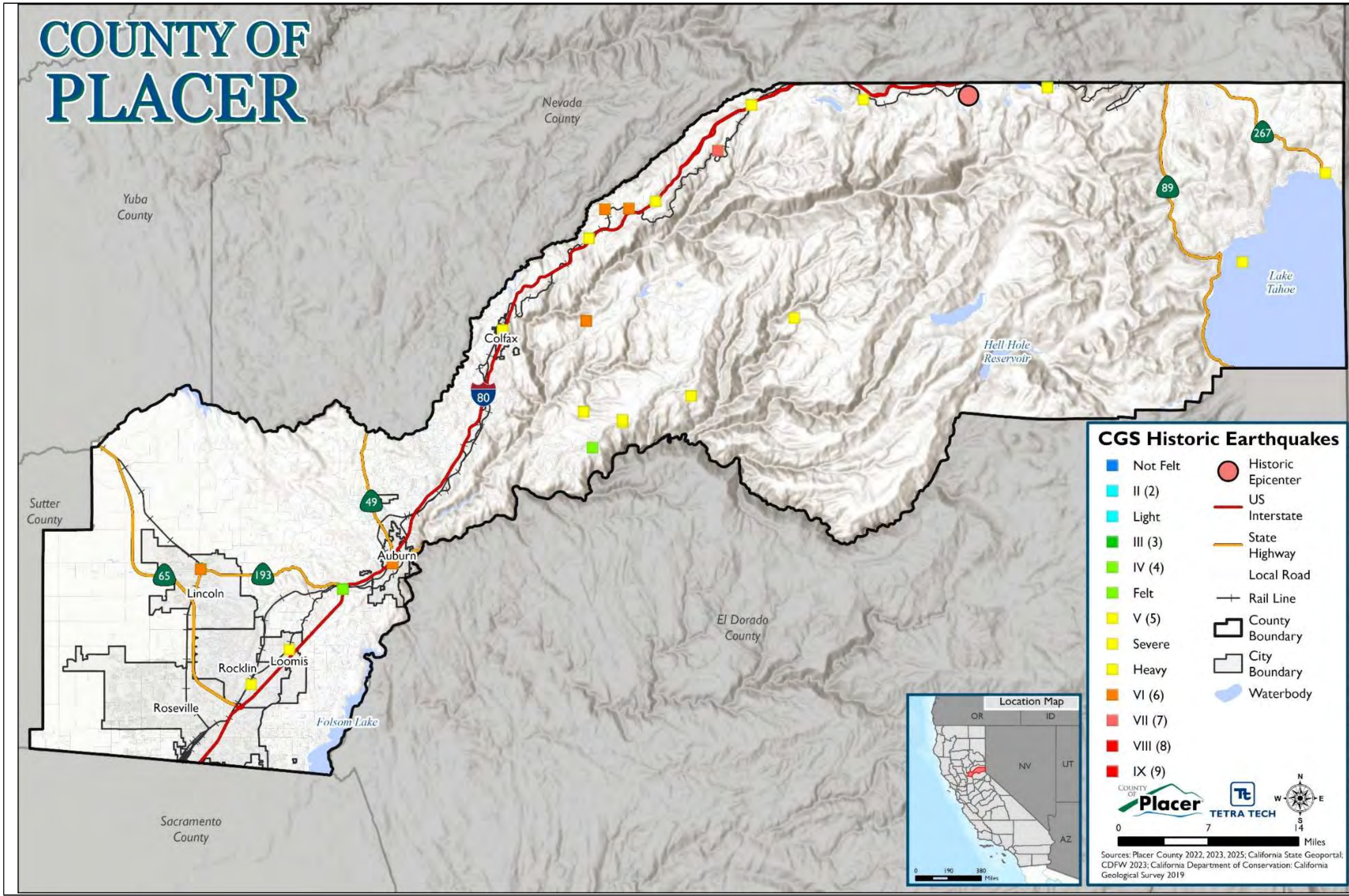
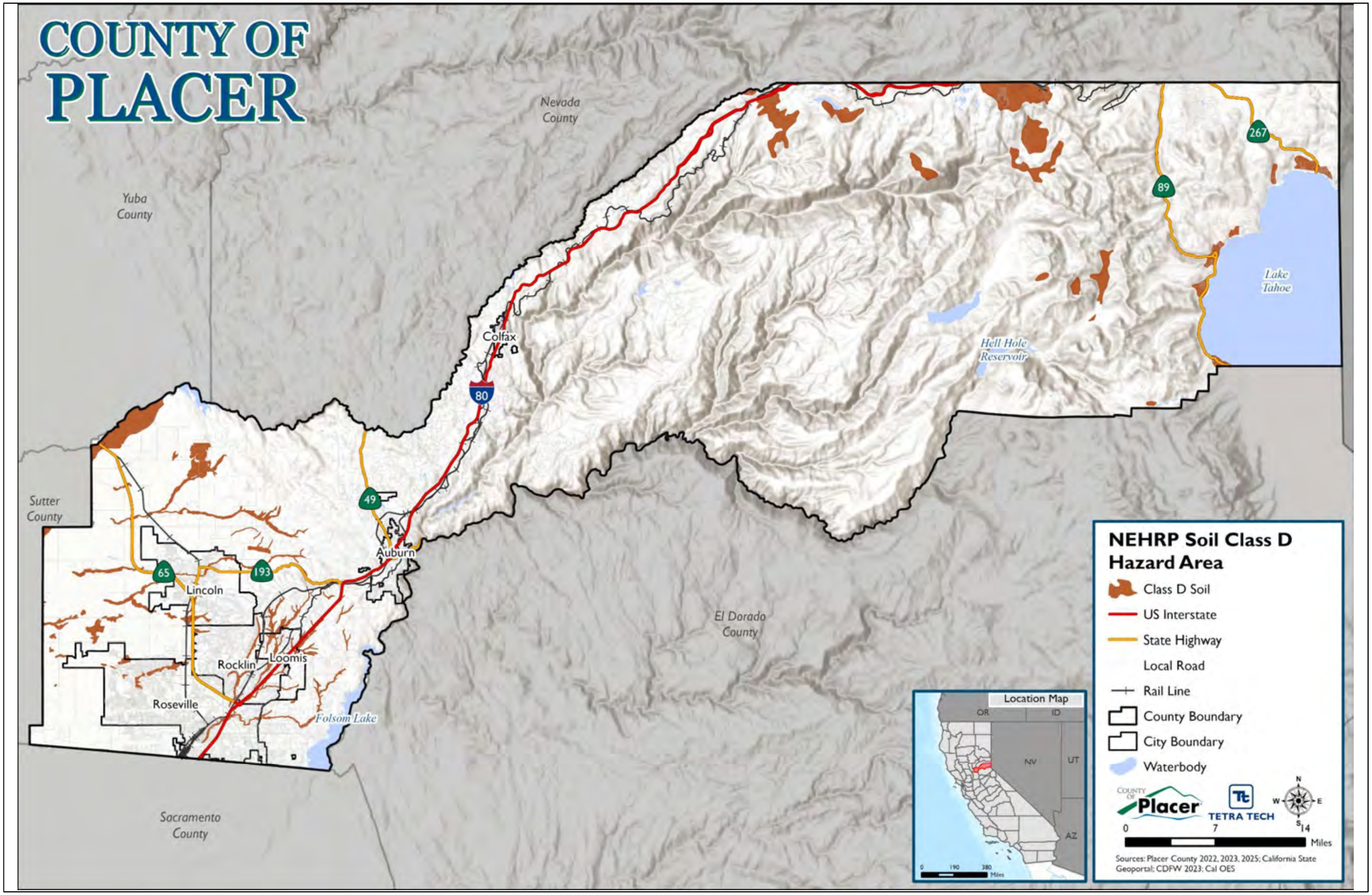


Figure 9-3. NEHRP Soil Class D Hazard Areas in Placer County



MAGNITUDE

An earthquake's magnitude is a measure of the energy released at the source of the earthquake. Magnitude is commonly expressed by ratings on the moment magnitude scale (Mw). This scale is based on the total moment release of the earthquake (the product of the distance a fault moved and the force required to move it). The scale is shown in Table 9-2.

Table 9-2. Moment Magnitude (Mw) Scale

Classification	Mw Scale
Great	Greater than 8
Major	7.0 to 7.9
Strong	6.0 to 6.9
Moderate	5.0 to 5.9
Light	4.0 to 4.9
Minor	3.0 to 3.9
Micro	Less than 3.0

Source: (USGS 2021)

Placer County has seen five earthquakes with magnitudes between 4.5 and 5.1 since 1947, mostly in the northeastern part of the county. Higher magnitudes are possible, although they are statistically rarer the more powerful they are.

INTENSITY

The most commonly used intensity scale is the modified Mercalli intensity scale. Ratings of the scale as well as the perceived shaking and damage potential for structures are shown below in Table 9-3. The modified Mercalli intensity scale is generally represented visually using maps that show the expected ground shaking at any given location produced by an earthquake with a specified magnitude and epicenter.

Past earthquake intensity in Placer County has been as high as Class VII (see Figure 9-2). Earthquakes of higher intensity are possible, but most earthquakes affecting the county are on the weaker side of the scale (MMI Classes I to IV). A 5.1 magnitude earthquake near Kingvale in 1980 produced intensities estimated around Class VI on the Modified Mercalli Scale, as did a 2005 earthquake near Tahoe Vista.

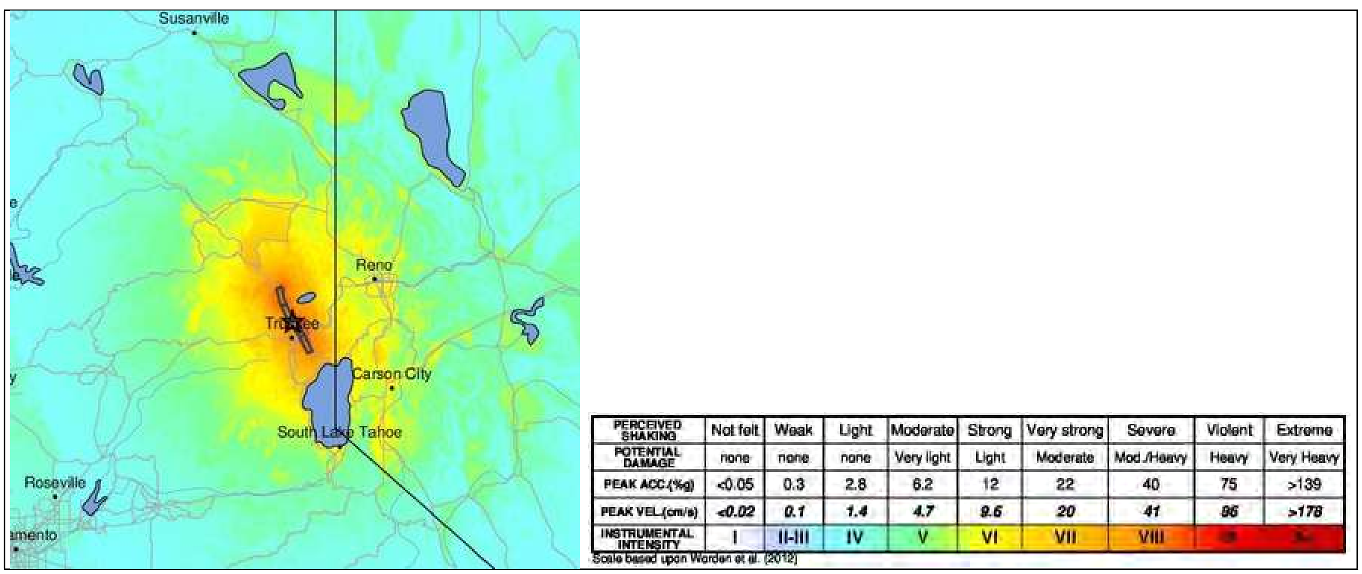
USGS also produces maps of earthquake scenarios (including actual and hypothetical events), known as ShakeMaps. A hypothetical 6.8 magnitude earthquake scenario with an epicenter near Truckee in neighboring Nevada County shows an estimated intensity of Class IX near the epicenter, with strong, very strong, or severe shaking in the Lake Tahoe region, and most of Placer County experiencing at least Class IV. This scenario is known as the Polaris scenario and is shown in Figure 9-4.

Table 9-3. Mercalli Scale and Peak Ground Acceleration Comparison

Mercalli Intensity	Shaking	Description
I	Not Felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very Strong	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.
VIII	Severe	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.
IX	Violent	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.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Source: (USGS n.d.)

Figure 9-4. Polaris ShakeMap Scenario for 6.8 Mw Earthquake



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	[illegible]	[illegible]

(USGS 2017)

9.1.4 Previous Occurrences

FEMA DISASTER DECLARATIONS

Placer County has not been included in any major disaster (DR) or emergency (EM) declarations for earthquake-related events (FEMA 2025b).

STATE EMERGENCY PROCLAMATIONS

Placer County has not been included in any state emergency proclamations related to earthquake since the previous hazard mitigation plan (Cal OES 2025).

ALL RECENT EVENTS

Between 2020 and 2024, Placer County was not included in any earthquake-related disaster events, nor were any significant earthquakes (>5.0 Mw) recorded, but many smaller earthquakes over 2.5 Mw have occurred in that time, as listed in Table 9-4. For events prior to 2020, refer to the 2021 Placer County LHMP.

Table 9-4. Earthquakes Greater than 2.5 Magnitude Near Placer County, 2020 – 2024

Time	Epicenter Location
2024-11-28, 17:13:14	2.72 magnitude 21 km WNW of Sunnyside-Tahoe City
2024-11-26, 23:53:37	2.55 magnitude 4 km E of Truckee
2024-07-21, 03:56:34	2.89 magnitude 8 km SSE of Dollar Point
2024-07-21, 03:19:19	2.94 magnitude 8 km SSE of Dollar Point
2024-07-21, 03:02:12	3.29 magnitude 8 km SSE of Dollar Point
2024-07-20, 14:19:55	2.72 magnitude 8 km SSE of Dollar Point
2024-05-18, 23:39:41	2.75 magnitude 11 km WSW of Lincoln
2024-02-10, 09:46:37	3.2 magnitude 8 km NNE of Truckee
2023-09-18, 08:04:48	2.51 magnitude 4 km N of Dollar Point
2023-09-18, 04:17:37	3.22 magnitude 4 km N of Dollar Point
2023-04-12, 00:12:37	2.67 magnitude 21 km WNW of Sunnyside-Tahoe City
2022-04-26, 13:51:05	2.74 magnitude 4 km E of Truckee
2021-06-23, 08:25:36	3.3 magnitude 24 km WNW of Truckee
2021-06-19, 13:26:17	2.85 magnitude 10 km SE of Dollar Point
2021-05-28, 17:05:34	2.68 magnitude 10 km SE of Dollar Point
2021-05-28, 16:22:58	2.74 magnitude 9 km SE of Dollar Point
2021-05-28, 16:04:54	3.11 magnitude 9 km SE of Dollar Point
2021-05-28, 15:46:36	2.61 magnitude 9 km SE of Dollar Point
2021-05-28, 15:25:21	4.15 magnitude 10 km SE of Dollar Point
2021-05-28, 11:59:10	2.9 magnitude 10 km SE of Dollar Point
2021-05-17, 19:49:55	2.83 magnitude 9 km SE of Dollar Point

Time	Epicenter Location
2021-05-17, 19:24:39	3.35 magnitude 9 km SE of Dollar Point
2021-05-07, 23:59:43	2.64 magnitude 9 km SE of Dollar Point
2021-05-06, 13:18:34	2.52 magnitude 9 km SE of Dollar Point
2021-04-26, 12:37:11	3.23 magnitude 9 km SE of Dollar Point
2021-04-25, 15:54:52	2.51 magnitude 9 km SE of Dollar Point
2021-04-25, 15:44:58	2.92 magnitude 9 km SE of Dollar Point
2021-04-25, 15:35:48	2.77 magnitude 9 km SE of Dollar Point
2021-04-25, 15:33:23	3.7 magnitude 8 km SE of Dollar Point
2021-04-02, 03:24:00	2.62 magnitude 4 km W of Tahoe Vista
2021-01-11, 02:20:52	2.63 magnitude 8 km N of Truckee
2020-12-26, 05:54:55	3 magnitude 9 km S of Truckee
2020-07-21, 11:42:54	2.62 magnitude 15 km NW of Truckee
2020-06-11, 17:05:04	2.75 magnitude 15 km NW of Truckee
2020-05-13, 10:57:25	2.53 magnitude 16 km W of Truckee
2020-05-02, 05:20:46	2.79 magnitude 25 km W of Sunnyside-Tahoe City
2020-02-19, 08:08:45	2.68 magnitude 4 km N of Dollar Point

Source: (USGS 2025)

9.1.5 Probability of Future Occurrences

With the exception of a 5.1 Mw earthquake near Kingsvale in 1980, no major earthquakes have been recorded I Placer County, although the County has felt ground shaking from earthquakes with epicenters located elsewhere. Based on historical data and the location of the Placer County planning area relative to active and potentially active faults, the probability of a future significantly damaging earthquake in Placer County is considered to be “unlikely.”

9.1.6 Cascading Impacts on Other Hazards

An earthquake hazard is anything associated with an earthquake that may affect people’s normal activities. Earthquake hazards include the following:

- **Surface Faulting**—Displacement that reaches the earth’s surface during slip along a fault. Commonly occurs with shallow earthquakes (those with an epicenter less than 20 kilometers).
- **Tectonic Deformation**—A change in the original shape of a material due to stresses.
- **Liquefaction**—A process by which water-saturated sediment temporarily loses strength and acts as a fluid. Earthquake shaking can cause this effect.
- **Landslide**—Earthquakes can cause large and sometimes disastrous landslides and mudslides. Any steep slope is vulnerable to slope failure, often as a result of loss of cohesion in clay-rich soils.

Unless properly secured, hazardous materials can be released during an earthquake, causing significant damage to the environment and people. Structures storing these materials could rupture and leak into the surrounding area or an adjacent waterway. Transportation corridors can be disrupted, leading to the release of materials carried by moving vehicles. Pipes carrying hazardous liquids and gases such as petroleum and methane can also rupture.

Earthen dams and levees are highly susceptible to seismic events, and their failures can be considered secondary risks for earthquakes. The most common mode of earthquake-induced dam failure is slumping or settlement of earth-fill dams where the fill has not been properly compacted. If the slumping occurs when the dam is full, then overtopping of the dam, with rapid erosion leading to dam failure is possible. Dam failure is also possible if strong ground motions heavily damage concrete dams. Earthquake-induced landslides into reservoirs have also caused dam failures.

9.2 Vulnerability and Impact Assessment

The mapping of Class D NEHRP soils shown in Figure 9-3 was used to assess vulnerability to the earthquake hazard. A probabilistic Hazus assessment was conducted for the 500- and 2,500-year mean return periods (MRP) to estimate potential damage.

9.2.1 Life, Health, and Safety

OVERALL POPULATION

The entire population of Placer County is vulnerable to the earthquake hazard. Table 9-5 summarizes the number of people living in areas with seismically sensitive NEHRP Class D soils.

Table 9-5. Population Living on NEHRP Class D Soils, Placer County

Jurisdiction	Total Population 2023 ACS	Number of Persons in Hazard Area	% of Jurisdiction Total
City of Auburn	13,758	0	0.0%
City of Colfax	2,095	0	0.0%
City of Lincoln	51,629	16	<0.1%
Town of Loomis	6,809	588	8.6%
City of Rocklin	72,340	2,130	2.9%
City of Roseville	152,438	829	0.5%
Unincorporated County	113,366	7,649	6.7%
Placer County (Total)	**412,435**	**11,212**	**2.7%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; Cal OES

As a result of an earthquake event, residents may be displaced or require temporary long-term shelter. The number of people requiring shelter is generally less than the number displaced as some displaced persons use hotels or stay with family or friends following a disaster event. Table 9-6 and Table 9-7 show Hazus estimates of displacement and shelter needs in Placer County. The 500-year MRP event could result in 93 displaced households and 42 individuals requiring short-term shelter. The 2,500-year MRP event could displace 669 households and lead to 309 individuals seeking shelter.

Table 9-6. Populations Affected by the 500-Year MRP Earthquake Event

Jurisdiction	Total Population	Displaced Households	Persons Seeking Short-Term Shelter
City of Auburn	13,758	0	0
City of Colfax	2,095	0	0
City of Lincoln	51,629	5	2
Town of Loomis	6,809	0	0
City of Rocklin	72,340	7	3
City of Roseville	152,438	28	14
Unincorporated County	113,366	53	23
Placer County (Total)	**412,435**	**93**	**42**

Source: *Hazus v6.1; U.S. Census 2020, American Community Survey 5-Year Estimates 2023*

Table 9-7. Populations Affected by the 2,500-Year MRP Earthquake Event

Jurisdiction	Total Population	Displaced Households	Persons Seeking Short-Term Shelter
City of Auburn	13,758	11	5
City of Colfax	2,095	1	0
City of Lincoln	51,629	43	22
Town of Loomis	6,809	2	1
City of Rocklin	72,340	67	32
City of Roseville	152,438	178	88
Unincorporated County	113,366	367	161
Placer County (Total)	**412,435**	**669**	**309**

Source: Hazus v6.1; U.S. Census 2020, American Community Survey 5-Year Estimates 2023

Hazus provides casualty estimates for three times of day that represent the periods of the day that different sectors of the community are at their peak occupancy loads:

- The 2:00 AM estimate represents the maximum residential occupancy load.
- The 2:00 PM estimate represents the maximum educational, commercial, and industrial sector loads.
- The 5:00 PM estimate represents peak commute time.

Table 9-8 shows that casualties increase significantly from the 500-year MRP event to the 2,500-year MRP event. The estimates for 2:00 PM show the highest numbers of casualties.

Table 9-8. Estimated Casualties for the 500-Year and 2,500-Year MRP Earthquake Events

Level of Severity	2:00 AM	2:00 PM	5:00 PM
500-Year MRP Earthquake Event			
Non-hospitalized injuries	74	143	92
Hospitalizations	6	27	16
Fatalities	0	5	3
2,500-Year MRP Earthquake Event			
Non-hospitalized injuries	261	581	365
Hospitalizations	34	148	90
Fatalities	3	35	20

The degree of impact from earthquakes is dependent on the age and construction type of the structures that people live in and the soil types on which their homes are constructed. The people most likely to be impacted by earthquakes include those who are in or near buildings at the time of the event, particularly buildings of unreinforced masonry construction.

SOCIALLY VULNERABLE POPULATION

Socially vulnerable populations, including the elderly (persons over age 65) and individuals living below the poverty threshold, are most susceptible to earthquakes. Factors leading to this higher susceptibility include decreased mobility and financial ability to react or respond during a hazard, and the location and construction quality of their housing. Table 9-9 presents the estimated socially vulnerable populations living in the NEHRP Class D Soils hazard area.

9.2.2 General Building Stock

The entire general building stock of the county is exposed to the earthquake hazard. Buildings on NEHRP Class D soil have an increased risk of damage from an earthquake. Table 9-10 lists the number of buildings on NEHRP Class D soils and the replacement cost value of those buildings. Table 9-11 categorizes these buildings by occupancy class. There are an estimated 6,405 buildings on NEHRP Class D soils, representing 3.3 percent of the County's total general building stock. Unincorporated Placer County has the greatest number of buildings in this hazard area—4,998 buildings or 6.0 percent of its total building stock.

Table 9-12 summarizes the estimated damage from the 500-year MRP earthquake: $1.1 billion in residential damage, $65.1 million in commercial damage, $90.6 million in industrial damage, and $59.5 million in damage to all other occupancy types. Unincorporated Placer County is estimated to lose over $903.6 billion (1.4 percent) of its total building and contents from a 500-year MRP earthquake event, which is the most out of all the jurisdictions. Table 9-13 summarizes the estimated damage from the 2,500-year MRP earthquake.

Table 9-9. Vulnerable Persons Living in NEHRP Class D Soils Hazard Area

Jurisdiction	Population Over 65	% of Total	Population Under 5	% of Total	Non-English Speaking Population	% of Total	Population with Disability	% of Total	Population Below Poverty Level	% of Total
City of Auburn	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City of Colfax	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City of Lincoln	4	<0.1%	0	0.0%	0	0.0%	2	<0.1%	1	<0.1%
Town of Loomis	123	8.6%	21	8.4%	2	7.7%	48	8.6%	63	8.6%
City of Rocklin	306	2.9%	121	2.9%	54	2.9%	213	2.9%	106	2.9%
City of Roseville	142	0.5%	48	0.5%	19	0.5%	93	0.5%	49	0.5%
Unincorporated County	1,840	6.7%	270	6.7%	117	6.7%	859	6.7%	545	6.7%
Placer County (Total)	**2,415**	**2.9%**	**460**	**2.2%**	**192**	**2.3%**	**1,215**	**2.6%**	**764**	**2.8%**

Source: *Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; Cal OES*

Table 9-10. Building Stock and Replacement Costs in NEHRP Class D Hazard Area

Jurisdiction	Number of Buildings in Hazard Area	% of Jurisdiction Total	Replacement Cost Value	% of Jurisdiction Total
City of Auburn	0	0.0%	$0	0.0%
City of Colfax	0	0.0%	$0	0.0%
City of Lincoln	22	0.1%	$17,245,345	0.1%
Town of Loomis	305	7.7%	$210,890,478	5.9%
City of Rocklin	769	3.1%	$784,095,719	3.3%
City of Roseville	311	0.6%	$366,450,077	0.6%
Unincorporated County	4,998	6.0%	$2,697,311,686	4.3%
Placer County (Total)	**6,405**	**3.3%**	**$4,075,993,305**	**2.3%**

Source: *Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; Cal OES*
Note: See Table 3-9 for total building counts and replacement cost value in each jurisdiction and countywide

Table 9-11. Buildings in NEHRP Class D Soils Hazard Area, By Occupancy Class

Jurisdiction	Residential	Commercial	Industrial	Other
City of Auburn	0	0	0	0
City of Colfax	0	0	0	0
City of Lincoln	7	15	0	0
Town of Loomis	223	81	1	0
City of Rocklin	638	119	12	0
City of Roseville	280	24	1	6
Unincorporated County	3,912	1,039	25	22
Placer County (Total)	**5,060**	**1,278**	**39**	**28**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; Cal OES
Note: Other = Government, Religion, Agricultural, and Education

Table 9-12. Estimated Damage For 500-Year MRP Earthquake

Jurisdiction	Estimated Total Damage	% of Total Building and Contents Replacement Cost Value[a]	Estimated Residential Damage	Estimated Commercial Damage	Estimated Industrial Damage	Estimated Damage Other Occupancies[b]
City of Auburn	$26,792,150	0.4%	$11,730,788	$12,511,291	$843,507	$1,706,563
City of Colfax	$4,827,590	0.6%	$2,332,593	$2,058,083	$263,064	$173,850
City of Lincoln	$201,391,103	1.0%	$124,711,374	$57,287,314	$15,948,975	$3,443,439
Town of Loomis	$16,519,762	0.5%	$6,724,597	$7,279,403	$1,916,366	$599,396
City of Rocklin	$199,225,772	0.8%	$104,211,787	$72,526,162	$15,831,262	$6,656,561
City of Roseville	$465,550,594	0.8%	$261,454,814	$147,940,937	$30,677,040	$25,477,804
Unincorporated County	$903,629,564	1.4%	$591,425,960	$265,586,979	$25,122,859	$21,493,766
Placer County (Total)	**$1,817,936,536**	**1.0%**	**$1,102,591,913**	**$565,190,169**	**$90,603,073**	**$59,551,380**

Source: Hazus v6.1; Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024

a. See Table 3-9 for total replacement cost value in each jurisdiction and countywide

b. Other = Government, Religion, Agricultural, and Education

Table 9-13. Estimated Damage For 2,500-Year MRP Earthquake

Jurisdiction	Estimated Total Damage	% of Total Building and Contents Replacement Cost Value[a]	Estimated Residential Damage	Estimated Commercial Damage	Estimated Industrial Damage	Estimated Damage Other Occupancies[b]
City of Auburn	$123,788,916	2.0%	$58,591,976	$53,949,632	$3,532,861	$7,714,447
City of Colfax	$18,951,502	2.5%	$10,042,908	$7,298,664	$917,665	$692,265
City of Lincoln	$632,563,971	3.1%	$407,631,822	$162,556,474	$51,354,694	$11,020,981
Town of Loomis	$65,983,051	1.8%	$28,571,303	$27,430,896	$7,597,243	$2,383,610
City of Rocklin	$640,576,331	2.7%	$361,491,818	$212,506,171	$44,860,001	$21,718,341
City of Roseville	$1,484,424,639	2.6%	$817,709,536	$485,827,402	$89,134,626	$91,753,075
Unincorporated County	$2,686,275,081	4.3%	$1,748,965,440	$799,614,582	$73,508,397	$64,186,661
Placer County (Total)	**$5,652,563,491**	**3.2%**	**$3,433,004,803**	**$1,749,183,821**	**$270,905,487**	**$199,469,380**

Source: Hazus v6.1; Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024

a. See Table 3-9 for total replacement cost value in each jurisdiction and countywide

b. Other = Government, Religion, Agricultural, and Education

A building's construction determines how well it can withstand the force of an earthquake. Unreinforced masonry buildings are most at risk during an earthquake because the walls are prone to collapse outward, whereas steel and wood buildings absorb more of the earthquake's energy. Additional attributes that affect a building's capability to withstand an earthquake's force include its age, number of stories, and quality of construction. Hazus considers building construction and age of building as part of the analysis. Because a custom general building stock was used for this analysis, the building ages and building types from the inventory were incorporated into the Hazus model.

Potential building damage was evaluated by Hazus across the following damage categories (none, slight, moderate, extensive, and complete). Table 9-14 provides definitions of these five categories of damage for a light wood-framed building; definitions for other building types are included in Hazus technical manual documentation.

Table 9-14. Structural Damage Definitions for a Light Wood-Framed Building

Damage Category	Description
Slight	Small plaster or gypsum-board cracks at corners of door and window openings and wall-ceiling intersections; small cracks in masonry chimneys and masonry veneer.
Moderate	Large plaster or gypsum-board cracks at corners of door and window openings; small diagonal cracks across shear wall panels exhibited by small cracks in stucco and gypsum wall panels; large cracks in brick chimneys; toppling of tall masonry chimneys.
Extensive	Large diagonal cracks across shear wall panels or large cracks at plywood joints; permanent lateral movement of floors and roof; toppling of most brick chimneys; cracks in foundations; splitting of wood sill plates and/or slippage of structure over foundations; partial collapse of room-over-garage or other soft-story configurations.
Complete	Structure may have large permanent lateral displacement, may collapse, or be in imminent danger of collapse due to cripple wall failure or the failure of the lateral load resisting system; some structures may slip and fall off the foundations; large foundation cracks.

Source: HAZUS Technical Manual

Hazus estimated building damage as a result of the 500- and 2,500-year MRP earthquake events. Results are shown in Table 9-15 through Table 9-18 for the 500-year MRP event and Table 9-19 through Table 9-22 for the 2,500-year MRP event. Damage loss estimates include structural and non-structural damage to the building and loss of contents. All building occupancy classes are likely to experience all levels of damage severity as a result of the 500-year and 2,500-year MRP events.

For the 500-year MRP event, Hazus estimates complete damage to 81 residential buildings, 83 commercial buildings, 3 industrial buildings, and 1 government, religious, agricultural, or educational structure. For the 2,500-year MRP event, Hazus estimates complete damage to 615 residential buildings, 523 commercial buildings, 21 industrial buildings, and 6 government, religious, agricultural, or educational structures.

Table 9-15. Predicted Level of Residential Damage From the 500-Year MRP Earthquake

Severity of Expected Damage	Building Count	Percent Buildings in Occupancy Class
None	126,537	78.7%
Slight	27,648	17.2%
Moderate	6,227	3.9%
Extensive	389	0.2%
Completed	81	0.1%

Source: Hazus v6.1; Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022

Table 9-16. Predicted Level of Commercial Damage From the 500-Year MRP Earthquake

Severity of Expected Damage	Building Count	Percent Buildings in Occupancy Class
None	24,488	73.6%
Slight	4,780	14.4%
Moderate	3,278	9.9%
Extensive	628	1.9%
Completed	83	0.3%

Source: Hazus v6.1; Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022

Table 9-17. Predicted Level of Industrial Damage From the 500-Year MRP Earthquake

Severity of Expected Damage	Building Count	Percent Buildings in Occupancy Class
None	782	70.0%
Slight	176	15.8%
Moderate	129	11.5%
Extensive	26	2.4%
Completed	3	0.3%

Source: Hazus v6.1; Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022

Table 9-18. Predicted Level of Other Damage From the 500-Year MRP Earthquake

Severity of Expected Damage	Building Count	Percent Buildings in Occupancy Class
None	658	78.2%
Slight	129	15.3%
Moderate	45	5.4%
Extensive	8	1.0%
Completed	1	0.1%

Source: Hazus v6.1; Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022

Table 9-19. Predicted Level of Residential Damage From the 2,500-Year MRP Earthquake

Severity of Expected Damage	Building Count	Percent Buildings in Occupancy Class
None	87,610	54.5%
Slight	51,157	31.8%
Moderate	19,282	12.0%
Extensive	2,217	1.4%
Completed	615	0.4%

Source: Hazus v6.1; Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022

Table 9-20. Predicted Level of Commercial Damage From the 2,500-Year MRP Earthquake

Severity of Expected Damage	Building Count	Percent Buildings in Occupancy Class
None	15,882	47.8%
Slight	7,258	21.8%
Moderate	7,312	22.0%
Extensive	2,283	6.9%
Completed	523	1.6%

Source: Hazus v6.1; Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022

Table 9-21. Predicted Level of Industrial Damage From the 2,500-Year MRP Earthquake

Severity of Expected Damage	Building Count	Percent Buildings in Occupancy Class
None	481	43.0%
Slight	255	22.8%
Moderate	272	24.3%
Extensive	89	8.0%
Completed	21	1.9%

Source: Hazus v6.1; Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022

Table 9-22. Predicted Level of Other Damage From the 2,500-Year MRP Earthquake

Severity of Expected Damage	Building Count	Percent Buildings in Occupancy Class
None	447	53.1%
Slight	230	27.4%
Moderate	124	14.7%
Extensive	34	4.1%
Completed	6	0.7%

Source: Hazus v6.1; Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022

9.2.3 Community Lifelines and Other Critical Facilities

All community lifelines in Placer County are exposed to the earthquake hazard. Earthquake events can significantly affect bridges, many of which provide the only access to certain neighborhoods. Because softer soil generally follows floodplain boundaries, bridges that cross watercourses are considered vulnerable.

Table 9-23 shows the number of critical facilities located in the NEHRP Class D soils hazard area for Placer County. A total of 69 facilities are located in this hazard area, with the highest number among the transportation lifeline (39). Unincorporated Placer County has the highest number of critical facilities (56) in the NEHRP Class D soil hazard area.

For earthquake analysis, Hazus provides estimates for each community lifeline of the probability that it will sustain each of the levels of damage defined in Table 9-14, as well as an assessment of how quickly damaged facilities can be returned to full functionality after an earthquake event.

- Table 9-24 shows the average probability of each level of damage for each community lifeline category as a result of a 500-year MRP earthquake.
- Table 9-25 shows the average for all facilities in each community lifeline category of the functionality that would be achieved 1, 7, 30, and 90 days after a 500-year MRP earthquake.
- Table 9-26 shows the average probability of each level of damage for each community lifeline category as a result of a 2,500-year MRP earthquake.
- Table 9-27 shows the average for all facilities in each community lifeline category of the functionality that would be achieved 1, 7, 30, and 90 days after a 2,500-year MRP earthquake.

9.2.4 Economy

Earthquakes can have significant economic impacts on Placer County by disrupting businesses, damaging infrastructure, and reducing property values. A major seismic event could cause structural damage to commercial centers, industrial facilities, and critical transportation corridors such as Interstate 80 and rail lines, interrupting the flow of goods and services both within the county and across the region. Prolonged power outages or water service disruptions would further hinder local commerce and tourism, particularly in recreation-driven areas like Lake Tahoe.

Additionally, the costs of repairing public infrastructure, schools, and health care facilities would place strain on local government budgets. Even moderate earthquakes can lower investor confidence, discourage new development, and create long-term financial burdens for households and small businesses recovering from damages.

Table 9-23. Facilities in the NEHRP Class D Hazard Area, By Lifeline Category

Jurisdiction	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Total Facilities in Hazard Area	% of Jurisdiction Total
City of Auburn	0	0	0	0	0	0	0	0	0	**0**	0.0%
City of Colfax	0	0	0	0	0	0	0	0	0	**0**	0.0%
City of Lincoln	0	0	0	0	0	0	3	0	0	**3**	3.4%
Town of Loomis	0	0	0	0	0	0	0	0	0	**0**	0.0%
City of Rocklin	0	0	0	1	0	0	1	0	2	**4**	3.3%
City of Roseville	0	0	1	0	0	1	2	0	2	**6**	2.0%
Unincorporated County	3	0	2	3	0	9	33	1	5	**56**	7.7%
Placer County (Total)	**3**	**0**	**3**	**4**	**0**	**10**	**39**	**1**	**9**	**69**	**5.2%**

Source: Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025; Cal OES

Table 9-24. Community Lifeline Average Probability of Sustaining Defined Damage Levels, 500-Year MRP Earthquake

Lifeline	Average Probability of Sustaining No Damage	Average Probability of Sustaining Slight Damage	Average Probability of Sustaining Moderate Damage	Average Probability of Sustaining Extensive Damage	Average Probability of Sustaining Complete Damage
Communications	57.8%	20.0%	15.3%	5.3%	1.4%
Energy	57.1%	21.1%	15.6%	5.0%	1.2%
Food, Hydration, Shelter	60.4%	19.3%	14.1%	4.8%	1.4%
Hazardous Materials	61.1%	19.9%	13.8%	4.2%	0.9%
Health and Medical	85.2%	12.1%	2.5%	0.1%	0.0%
Safety and Security	72.7%	14.2%	10.0%	2.6%	0.5%
Transportation	98.1%	1.2%	0.5%	0.2%	<0.1%
Water Systems	62.2%	20.1%	13.4%	3.7%	0.6%

Source: *Hazus v6.1; : Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025*

Table 9-25. Community Lifeline Average Percent Functionality, 500-Year MRP Earthquake

Lifeline	Average Percent Functionality Day 1	Average Percent Functionality Day 7	Average Percent Functionality Day 30	Average Percent Functionality Day 90
Communications	57.8%	77.8%	93.2%	98.5%
Energy	57.1%	78.1%	93.8%	98.8%
Food, Hydration, Shelter	60.4%	79.6%	93.8%	98.6%
Hazardous Materials	61.1%	80.9%	94.8%	99.0%
Health and Medical	85.2%	97.1%	99.8%	99.9%
Safety and Security	72.7%	86.6%	96.8%	98.7%
Transportation	98.8%	99.5%	99.7%	99.8%
Water Systems	62.1%	82.2%	95.6%	99.3%

Source: *Hazus v6.1; : Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025*

Table 9-26. Community Lifeline Average Probability of Sustaining Defined Damage Levels, 2,500-Year MRP Earthquake

Lifeline	Average Probability of Sustaining No Damage	Average Probability of Sustaining Slight Damage	Average Probability of Sustaining Moderate Damage	Average Probability of Sustaining Extensive Damage	Average Probability of Sustaining Complete Damage
Communications	26.8%	22.7%	27.4%	15.3%	7.8%
Energy	24.7%	23.4%	28.9%	15.9%	7.1%
Food, Hydration, Shelter	28.5%	23.1%	26.6%	14.3%	7.5%
Hazardous Materials	28.2%	23.8%	27.6%	14.2%	6.1%
Health and Medical	59.8%	28.3%	10.9%	0.9%	<0.1%
Safety and Security	48.0%	20.7%	20.6%	8.1%	2.6%
Transportation	91.8%	4.2%	2.1%	1.4%	0.5%
Water Systems	27.6%	24.0%	28.3%	14.5%	5.6%

Source: *Hazus v6.1; : Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025*

Table 9-27. Community Lifeline Average Percent Functionality, 2,500-Year MRP Earthquake

Lifeline	Average Percent Functionality Day 1	Average Percent Functionality Day 7	Average Percent Functionality Day 30	Average Percent Functionality Day 90
Communications	26.8%	49.4%	76.9%	92.2%
Energy	24.6%	47.9%	76.9%	92.8%
Food, Hydration, Shelter	28.5%	51.5%	78.2%	92.5%
Hazardous Materials	28.2%	51.9%	79.6%	93.8%
Health and Medical	59.8%	87.4%	99.0%	99.5%
Safety and Security	47.9%	68.2%	89.2%	94.7%
Transportation	95.2%	97.5%	98.3%	99.1%
Water Systems	27.5%	51.5%	79.9%	94.4%

Source: *Hazus v6.1; : Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025*

9.2.5 Natural Resources

Earthquakes can trigger landslides, rockfalls, and ground subsidence in Placer County's mountainous terrain, damaging forests, watersheds, and wildlife habitats. Shaking may also alter river channels, affect reservoirs, and degrade recreational areas that support both ecological health and the local economy.

9.2.6 Historic and Cultural Resources

Older buildings, particularly unreinforced masonry structures in historic towns like Auburn, are especially vulnerable to earthquake damage. Severe damage to these landmarks would erase important architectural and historical features that embody the county's past.

Cultural sites connected to tribal communities and local heritage could be harmed or destroyed by seismic activity, resulting in the loss of places with deep cultural and spiritual significance. Damage to these resources not only erodes community identity but also diminishes opportunities for cultural education and tourism.

9.3 Future Changes That May Affect Risk

9.3.1 Land Use and Development

As population and housing expand outward, especially into unincorporated foothill and mountain zones, the risk footprint of earthquakes grows, because development occurs in locations with softer soils or steep slopes more susceptible to shaking amplification or ground failure. The conversion of open land, grading, and alteration of natural drainage can exacerbate seismic ground deformation risks.

In these contexts, land use decisions should prioritize locating critical infrastructure, schools, hospitals, and high-occupancy buildings away from mapped seismic hazard zones, enforce strict geotechnical standards and retrofit requirements, and use clustering rather than sprawl into the highest hazard terrain. Incorporating seismic hazard mapping into zoning, requiring site-specific geotechnical and seismic design reviews, and limiting development in areas with known liquefaction or unstable soils will reduce the vulnerability of future development to earthquake impacts.

9.3.2 Projected Changes in Population Patterns

As noted in Chapter 3, Placer County is projected to add tens of thousands of new residents and households by 2050. Much of the growth will be concentrated in the western incorporated areas and surrounding unincorporated lands, with some overflow into central foothill regions. As population pressure in the west intensifies, development is likely to push uphill and outward, bringing new residents into foothill and transitional zones that may have more complex soil and geological conditions.

As newer growth extends across diverse sub-geographies, more of the county's population and infrastructure will be exposed to a broader range of seismic hazard zones. This projected demographic shift highlights the importance of integrating seismic hazard mapping, enforcing seismic design standards in new construction, and discouraging growth in the highest-risk zones to ensure future population centers are more resilient to earthquakes.

9.3.3 Climate Change

The impacts of climate-related changes on earthquake probability are unknown. Some scientists suggest that melting glaciers could induce tectonic activity. As ice melts and water runs off, tremendous amounts of weight are shifted on the earth's crust. As newly freed crust returns to its original, pre-glacier shape, it could cause seismic plates to slip and stimulate volcanic activity, according to research into prehistoric earthquakes and volcanic activity. National Aeronautics and Space Administration (NASA) and USGS scientists found that retreating glaciers in southern Alaska might be opening the way for future earthquakes (NASA, USGS 2023).

Secondary impacts of earthquakes could be magnified by environmental factors. Soils saturated by repetitive storms could undergo liquefaction during seismic activity due to increased saturation. Dams storing increased volumes of water could fail during seismic events. No current models are available to estimate these impacts.

10. Flood

10.1 Hazard Profile

10.1.1 Hazard Description

Flooding is the inundation with water of areas that are typically dry (NOAA 2024). Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide.

FLOOD TYPES

The Placer County Planning Area is susceptible to various types of flood events:

- **Riverine flooding**—Riverine flooding occurs when a watercourse exceeds its “bank-full” capacity, generally as a result of prolonged rainfall. These intense storms can overwhelm the local waterways as well as the integrity of flood control structures. This type of flood occurs in small watersheds as well as on river systems whose tributaries drain large geographic areas that 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, snow melt rate, and water-resistance of the surface due to urbanization. The warning time associated with slow rise floods assists in life and property protection.
- **Flash flooding**—Flash floods are localized floods of great volume and short duration. This type of flood usually results from a heavy rainfall on a relatively small drainage area. Such precipitation usually occurs in winter and spring. Flash floods often require immediate evacuation within the hour, so early threat identification and warning is critical for saving lives.
- **Localized/Stormwater flooding**—This flooding can result from intense weather events in areas experiencing an increase in runoff due to impervious surfaces associated with development and urbanization, as well as inadequate storm drainage systems.

STREAMBANK EROSION

While erosion is a natural process, it can be accelerated during periods of high water or flooding, leading to excessive sediment supply, stream channel instability, land loss, habitat degradation, and other adverse impacts. Research has shown that streambank erosion can account for a substantial portion of annual sediment yield in a watershed. Because erosion is frequently a symptom of larger watershed issues, long-term solutions require more than localized stabilization efforts.

Erosion may occur suddenly during major storm events or progress gradually over multiple storm cycles, depending on flow velocity, storm frequency, and watershed conditions. Addressing the problem effectively requires an integrated understanding of stream dynamics, watershed processes, and the importance of maintaining healthy streamside vegetation.

Causes

Streambank degradation or aggradation (the opposite of erosion/degradation) often reflects broader channel instability. As streams naturally adjust to changes in flow or sediment load, erosion often increases until a stable form is re-established. Identifying the root causes of accelerated erosion—such as stream straightening, widening, or the removal of stabilizing vegetation—is an essential step toward mitigation.

Streambank erosion is influenced by two main factors: the physical characteristics of the streambank (its erodibility) and the hydraulic and gravitational forces acting on it. Human land-use practices often affect both of these components, contributing to accelerated erosion. Land use changes, such as agricultural clearing or urban development, can intensify runoff and destabilize channels.

Riparian vegetation plays a critical role in stabilizing banks. Deep-rooted woody species provide protection against collapse and add internal strength to the bank. When such vegetation is replaced by shallow-rooted grasses or forbs, the ability of the bank to resist erosion diminishes, leading to accelerated mass wasting.

Impacts

The impacts of streambank erosion are wide-ranging: it increases sediment loads carried by streams, reduces fertile bottomland, and diminishes habitat quality in waterways and along their margins. A degrading streambed can create higher, unstable banks prone to failure, while rapidly flowing floodwaters can undercut bridges, roads, and building foundations, increasing the risk of rockfalls and landslides. Sediment deposition presents additional hazards, including the blockage of culverts, reduction of reservoir storage capacity, burial of crops and lawns, and localized flooding.

Erosion may also occur on the outboard or waterside levees, which may lead to instability and failure. The Bear River is highly incised so it takes a large flow to actually erode the levees in Placer County.

10.1.2 Location

The Placer County Planning Area has always been at risk of flooding because of its high annual amount of rainfall, the watercourses that bound the County, and the location of development adjacent to flood-prone areas. Drainage and stormwater runoff, in addition to natural and manmade waterways, all contribute to potential flooding in the Placer County planning area.

The County encompasses multiple rivers, streams, creeks, and associated watersheds. It is situated in a region that dramatically rises in elevation from west to east (Sierra Nevada), where excess rain on snow can contribute to downstream flooding. Damaging floods in Placer County occur primarily in the developed areas of the County extending westward from Colfax to Sacramento and Sutter Counties. Flood flows generally follow defined stream channels, drainages, and watersheds.

Figure 10-1 shows the FEMA flood hazard area for Placer County. This mapping does not account for future flood conditions related to climate-driven precipitation changes. As a result, it may underestimate true flood risk, and the public may likewise underestimate their exposure to flooding.

10.1.3 Extent

Flood extents are usually measured in depths of flooding or geographical extent of the floodplain. Geographical flood extents in Placer County from the FEMA DFIRMs are shown in Table 10-1. Expected flood depths are not well defined. Because flows within many of the creeks and rivers in Placer County can vary substantially from one another, the estimate for the average depth of the 1 percent annual chance floodplain also varies, ranging from 1 foot to 20 feet.

Table 10-1. Placer County Planning Area Geographical Flood Hazard Extents in FEMA DFIRM Flood Zones

Jurisdiction	Total Land Area (Acres)	1-Percent Annual Chance Total Area (Acres)	% of Jurisdiction Total	0.2-Percent Annual Chance Total Area (Acres)	% of Jurisdiction Total
City of Auburn	4,554	75	1.7%	75	1.7%
City of Colfax	901	0	0.0%	0	0.0%
City of Lincoln	15,358	1,350	8.8%	1,701	11.1%
Town of Loomis	4,695	247	5.3%	280	6.0%
City of Rocklin	12,598	603	4.8%	641	5.1%
City of Roseville	28,261	1,945	6.9%	2,145	7.6%
Unincorporated Placer County	834,229	28,968	3.5%	30,421	3.6%
Placer County (Total)	**900,595**	**33,189**	**3.7%**	**35,264**	**3.9%**

Source: Placer County 2025; California State Geoportal; CDFW 2023; FEMA 2018, 2025

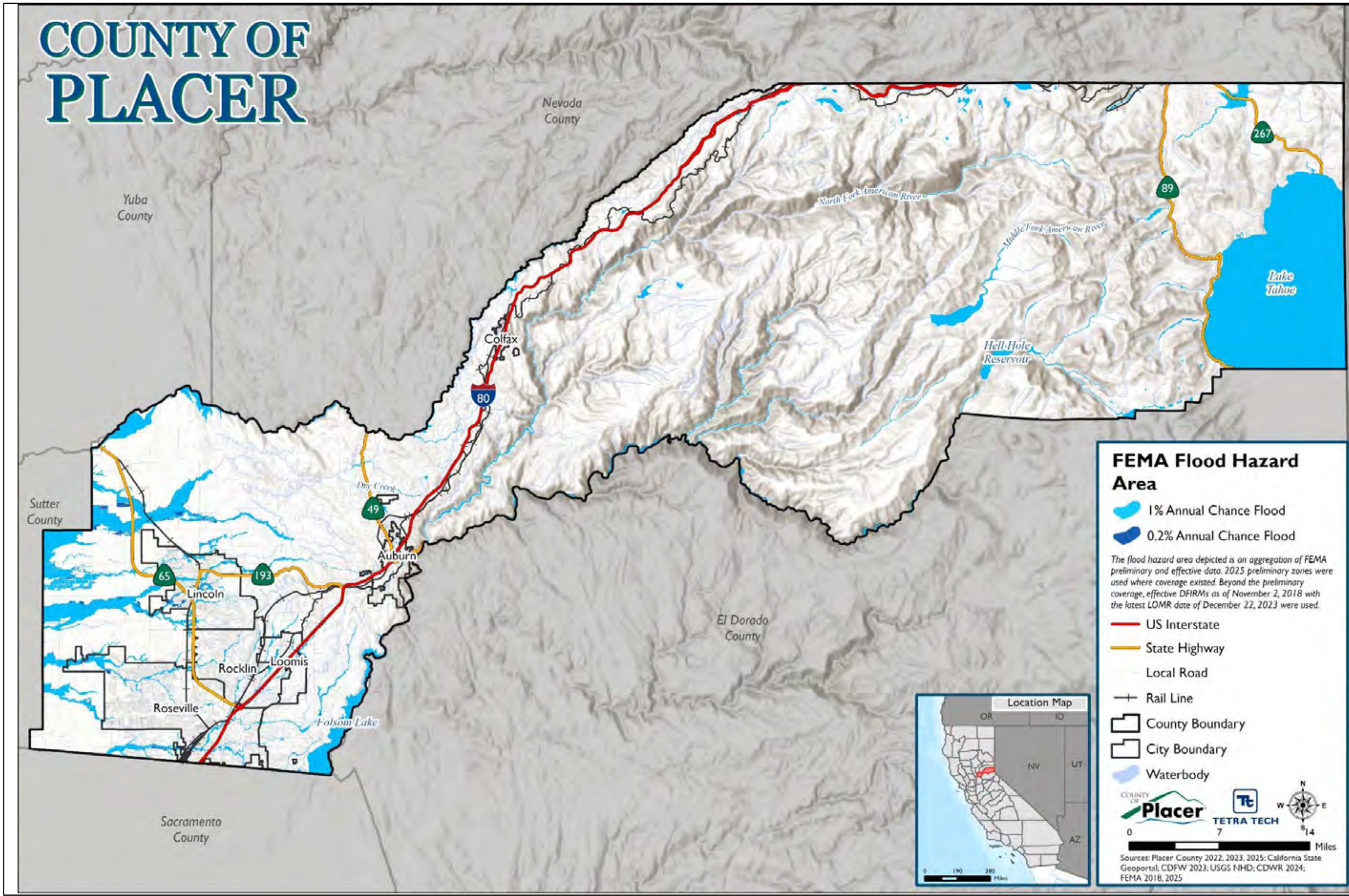
Flood durations in Placer County tend to be short to medium term—until either the storm drainage system can catch up or floodwaters move downstream.

Various flood protection measures are either in place or planned to protect Placer County from future flood events. Existing flood protection measures include a comprehensive system of dams, levees, overflow weirs, pumping plants, channel improvements, floodway bypasses, detention and retention structures, and other improvements. Yuba County is completing a setback levee on the Bear River that will help with future flood events.

WARNING TIME

Both the Placer County Flood Control and Water Conservation District and the City of Roseville maintain a system of ALERT Flood Warning gages, including multiple precipitation gages and stream level gages throughout western Placer County to provide real time monitoring information on current flood conditions. This gives the County the ability to activate flood control measures and warn citizens of impending riverine floods. Warning may also come from the National Weather Service when heavy precipitation is expected to cause flash flooding, sometimes with a day's notice or more.

Figure 10-1. FEMA Flood Hazard Area



10.1.4 Previous Occurrences

FEMA DISASTER DECLARATIONS

Table 10-2 lists all flood-related major disaster (DR) or emergency (EM) declarations that have included Placer County.

Table 10-2. FEMA Disaster Declarations for Flood Events in Placer County

Declaration Date	Declaration Number	Incident Type	Disaster Name
December 24, 1964	DR-183	Flood	Heavy Rains & Flooding
January 26, 1969	DR-253	Flood	Severe Storms & Flooding
February 9, 1983	DR-677	Coastal Storm	Coastal Storms, Floods, Slides & Tornadoes
February 21, 1986	DR-758	Flood	Severe Storms & Flooding
January 10, 1995	DR-1044	Severe Storm	Severe Winter Storms, Flooding, Landslides, Mud Flows
March 12, 1995	DR-1046	Severe Storm	Severe Winter Storms, Flooding Landslides, Mud Flow
January 4, 1997	DR-1155	Severe Storm	Severe Storms, Flooding, Mud and Landslides
February 3, 2006	DR-1628	Severe Storm	Severe Storms, Flooding, Mudslides, and Landslides
June 5, 2006	DR-1646	Severe Storm	Severe Storms, Flooding, Landslides, and Mudslides
February 14, 2017	DR-4301	Severe Storm	Severe Winter Storms, Flooding, and Mudslides
January 9, 2023	EM-3591	Flood	Severe Winter Storms, Flooding, and Mudslides
January 14, 2023	DR-4683	Flood	Severe Winter Storms, Flooding, Landslides, and Mudslides
March 10, 2023	EM-3592	Flood	Severe Winter Storms, Flooding, Landslides, and Mudslides

Source: (FEMA 2025b)

STATE EMERGENCY PROCLAMATIONS

Table 10-3 lists all flood-related state emergency proclamations from 2020 to 2024 that included Placer County. For events prior to 2020, refer to the 2021 Placer County LHMP.

Table 10-3. State Emergency Proclamations for Flood Events in Placer County (2020 to 2024)

State Proclamation Date	State Disaster Name	Description
March 1, 2023	February-March 2023 Storms	Starting in late February 2023, California was struck by a series of intense winter storms. These storms were part of a broader sequence that also caused flooding.
October 21, 2021	October 2021 Storms	Record-breaking rainfall triggered flooding, erosion, and debris flows. In response, the Governor declared a state of emergency in several counties, including Placer County.

ALL RECENT EVENTS

Table 10-4 lists major recorded flood-related events that impacted Placer County since the 2021 LHMP was developed. For earlier events, refer to the previous plan.

Table 10-4. Flood Events in Placer County (2020 to 2025)

Date	Hazard	Event Narrative
12/31/2022	Flood, High Wind	A strong and very wet atmospheric storm brought precipitation totals around 1-3 inches for the Central Valley, 3-6 inches in the foothills, and 5-8 inches of liquid equivalent in the mountains. Widespread flooding included flooding on the Cosumnes River around Wilton due to multiple levee breaks, resulting in the area being evacuated and area highways and roads being closed, including SR-99. River flooding was reported along the Mokelumne River near Benson's Ferry and Mormon Slough at Bellota. Flooding of streams closed many roads across Northern California, and several small communities were evacuated. Highway 50 was closed in El Dorado County due to a combination of flooding and snow. Flooding continued into January, with several fatalities reported due to drowning and wind-downed trees.
2/4 – 5/2024	High Wind, Flood	A major winter storm brought heavy rain, strong winds, thunderstorms and heavy mountain snow. Flooding and strong winds resulted in multiple fatalities. Heavy rain brought nuisance flooding on roads and urban areas and rises to rivers, creeks and streams, with generally 1 to 3 inches of storm total rain reported across the Valley and foothills. The City of Sacramento estimated $350,000 total combined cost for storm damage. Yolo County OES reported over 4,000 power outages, school closures, and downed trees. California Highway Patrol and Placer County OES reported a fatality of a driver that drove through standing water on a flooded road, lost control, and flipped the vehicle, coming to a rest in standing water on Nicolaus Road near Marcum Road.
11/23 – 25/2024	Flood	A weather system brought continued periods of widespread rain with flooding impacts, and gusty winds. Placer County Sheriff reported a group of three men went to fish in the North Fork American River, north of Folsom Lake. One of them was swept away by strong currents and another tried to help but was also pulled into the current. Both men drowned, and their bodies were recovered downstream.
12/14/2024	Strong Wind	Active weather brought periods of heavy mountain snow, rain and gusty winds. The strongest storm 2 to 3 inches of rain, over 2 feet of heavy snow above 5000 feet, and southerly wind gusts of 35 to 65 mph. Roadway flooding occurred in the Central Valley.

10.1.5 Probability of Future Occurrences

Table 10-5 lists the number of flood events reported by various sources over the 75-year period from 1950 to 2025, which is the most complete period of record for all sources reviewed. Based on these records and input from the HMPC, the probability of occurrence for flood in the County is considered "frequent."

Table 10-5. Probability of Future Flood Events in Placer County

Hazard Type	Number of Occurrences Between 1950 and 2025	Percent Chance of Occurring in Any Given Year
Flood / Flash Flood	74	99%

Source: (NOAA-NCEI 2025)

10.1.6 Cascading Impacts on Other Hazards

EROSION

Riverine flooding often results in bank erosion. This is especially true in the upper courses of rivers with steep gradients, where floodwaters may pass quickly and without much property damage, but scour the banks, edging properties closer to the floodplain or causing them to fall in. Flooding is also responsible for hazards such as landslides when high flows over-saturate soils on steep slopes, causing them to fail.

PUBLIC HEALTH

Cascading impacts may also include exposure to pathogens such as mold. After flood events, excess moisture and standing water contribute to the growth of mold in buildings. Mold may present a health risk to building occupants, especially those with already compromised immune systems such as infants, children, the elderly and pregnant women. The degree of impact will vary and is not strictly measurable. Mold spores can grow in as short a period as 24-48 hours in wet and damaged areas of buildings that have not been properly cleaned. Very small mold spores can easily be inhaled, creating the potential for allergic reactions, asthma episodes, and other respiratory problems. Buildings should be properly cleaned and dried out to safely prevent mold growth **Invalid source specified.**.

Molds and mildews are not the only public health risk associated with flooding. Floodwaters can be contaminated by pollutants such as sewage, human and animal feces, pesticides, fertilizers, oil, asbestos, and rusting building materials. Common public health risks associated with flood events also include **Invalid source specified.**:

- Unsafe food
- Contaminated drinking and washing water and poor sanitation
- Mosquitos and animals
- Carbon monoxide poisoning
- Secondary hazards associated with re-entering/cleaning flooded structures
- Mental stress and fatigue

Current loss estimation models such as Hazus are not equipped to measure public health impacts. The best level of mitigation for these impacts is to be aware that they can occur, educate the public on prevention, and be prepared to deal with these vulnerabilities in responding to flood events.

UTILITY DISRUPTION

Floods of any type have the potential to impact water and power utilities which may impact public and private use, as well as cause disruption to critical infrastructure. Refer to the list below to view flooding's harmful effects on the water supply**Invalid source specified.**:

- **Water Supply Contamination:** Excess floodwater can contaminate private drinking water sources, such as wells and springs. Floodwater picks up debris, increasing the number of bacteria, sewage, and other industrial waste and chemicals into the water source or leaky pipes. Excess water also makes it more difficult for water treatment plants to treat the water efficiently and effectively. If there is a contamination at any step of the water flow process, this puts consumers at risk of exposure to dangerous toxins that could result in serious harm, such as wound infections, skin rashes, gastrointestinal illnesses, and tetanus; in extreme cases, death may occur.

- **Disruption to Clean Drinking and Cooking Water:** In the event of only having access to contaminated water, consumers are unable to cook or clean in their home the water is certified as safe. Depending on the severity of the flood and the storm, this could take days, weeks, months and in some cases even years. Without access to clean drinking and cooking water, consumers ultimately become reliant on bottled water. In impoverished communities, this reality is even more detrimental because those affected may not have the economic means to “stock up” on bottled water. Moreover, in a flood, retail locations are often inaccessible and/or low on water supply.

Floodwaters can also cause damage to power utilities. In particular, flooded buildings may have the utilities disrupted if the service panel, generator, meter, etc. are not elevated above the flood protection level. Oversaturated soils from periods of heavy rain and flooding may cause utility poles to tip over or fall completely, interrupting the power grid for a potentially large area, especially if the transformer is impacted.

DAM FAILURE

Heavy rain and storms, which are often a precursor to flooding events, can result in large quantities of rain upstream of a dam that will ultimately be impounded by the dam, which could raise water levels behind the dam, resulting in overtopping of the dam or flooding of properties upstream of the dam. Should the flooding result in a dam failure, the water behind the dam, including flood waters, may inundate jurisdictions downstream of the dam. More information on Dam Failure can be found in Chapter 7.

10.2 Vulnerability and Impact Assessment

The 1 percent and 0.2 percent annual chance flood boundaries shown in Figure 10-1 were examined to evaluate Placer County’s flood risk. The 1 percent annual chance flood depth grid was imported into FEMA’s Hazus model and a riverine analysis was processed to estimate potential losses.

10.2.1 Life, Health, and Safety

OVERALL POPULATION

Table 10-6 summarizes the population exposed to the flood hazard by jurisdiction for the 1 percent annual chance flood. Based on the spatial analysis, there are 1,792 residents living in the 1 percent annual chance floodplain, or 0.4 percent of the County’s total population. Unincorporated Placer County has the greatest number of residents living in the 1 percent annual chance flood hazard area with 893 residents, or 0.8 percent of the unincorporated county total. Table 10-7 summarizes the population exposed to the 0.2 percent annual chance flood.

Flood events can lead to the displacement of residents and the need for emergency shelter. Table 10-8 provides an overview of the 1 percent annual chance flood impacts on individuals displaced or needing shelter. It is projected that flooding will displace 3,259 individuals, with 1,277 of them requiring short-term shelter. The City of Roseville is expected to have the highest number of displaced persons, totaling 1,037. It also has the highest number of individuals seeking short-term shelter, with an estimated 403.

Table 10-6. Estimated Population Exposed to the 1 Percent Annual Chance Flood Hazard Area

Jurisdiction	Total Population 2023 ACS	Population in the 1 Percent Annual Chance Flood Hazard Area	
		Number of Persons	% of Jurisdiction Total
City of Auburn	13,758	38	0.3%
City of Colfax	2,095	0	0.0%
City of Lincoln	51,629	189	0.4%
Town of Loomis	6,809	190	2.8%
City of Rocklin	72,340	180	0.2%
City of Roseville	152,438	302	0.2%
Unincorporated County	113,366	893	0.8%
Placer County (Total)	**412,435**	**1,792**	**0.4%**

Source: *Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; FEMA 2018, 2025*

Table 10-7. Estimated Population Exposed to the 0.2 Percent Annual Chance Flood Hazard Area

Jurisdiction	Total Population 2023 ACS	Population in the 0.2 Percent Annual Chance Flood Hazard Area	
		Number of Persons	% of Jurisdiction Total
City of Auburn	13,758	38	0.3%
City of Colfax	2,095	0	0.0%
City of Lincoln	51,629	448	0.9%
Town of Loomis	6,809	253	3.7%
City of Rocklin	72,340	230	0.3%
City of Roseville	152,438	488	0.3%
Unincorporated County	113,366	1,073	0.9%
Placer County (Total)	**412,435**	**2,530**	**0.6%**

Source: *Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; FEMA 2018, 2025*

Table 10-8. Persons Displaced or Seeking Short-Term Sheltering Due to 1 Percent Annual Chance Flood

Jurisdiction	Total Population 2023 ACS	1 Percent Annual Chance Flood Impacts on People	
		Displaced Population	Persons Seeking Short-Term Shelter
City of Auburn	13,758	80	60
City of Colfax	2,095	0	0
City of Lincoln	51,629	276	130
Town of Loomis	6,809	183	124
City of Rocklin	72,340	779	259
City of Roseville	152,438	1,037	403
Unincorporated County	113,366	904	251
Placer County (Total)	**412,435**	**3,259**	**1,227**

Source: *Hazus v6.1; U.S. Census 2020, American Community Survey 5-Year Estimates 2023; FEMA 2018, 2025; USGS 2019, 2025*

SOCIALLY VULNERABLE POPULATION

Socially vulnerable populations may experience more severe impacts and longer recovery times when affected by flooding, due to factors such as physical and financial limitations that hinder their ability to respond effectively during a disaster. Economically disadvantaged populations may lack the financial resources to evacuate promptly. Older adults are more likely to require medical attention, which may be inaccessible during a flood due to isolation, and they may face greater challenges in evacuating safely. Table 10-9 and Table 10-10 present the estimated socially vulnerable populations living in the 1 and 0.2 percent annual chance flood hazard areas by jurisdiction.

Table 10-9. Estimated Vulnerable Populations in the 1 Percent Annual Change Flood Hazard Area

Jurisdiction	Vulnerable Persons Living in the 1 Percent Annual Chance Flood Hazard Area													
	Population Over 65		Population Under 5		Non-English Speaking Population		Population with Disability		Population Below Poverty Level		Population With No Broadband Internet Subscription		Population With No Vehicle Access	
	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total
City of Auburn	10	0.3%	1	0.2%	1	0.2%	4	0.2%	4	0.2%	4	0.2%	2	0.3%
City of Colfax	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City of Lincoln	51	0.4%	10	0.4%	2	0.3%	25	0.4%	14	0.4%	13	0.4%	3	0.3%
Town of Loomis	39	2.7%	6	2.4%	0	0.0%	15	2.7%	20	2.7%	10	2.8%	6	2.6%
City of Rocklin	25	0.2%	10	0.2%	4	0.2%	18	0.2%	9	0.2%	6	0.2%	5	0.2%
City of Roseville	51	0.2%	17	0.2%	7	0.2%	33	0.2%	17	0.2%	16	0.2%	16	0.2%
Unincorporated County	214	0.8%	31	0.8%	13	0.7%	100	0.8%	63	0.8%	74	0.8%	27	0.8%
Placer County (Total)	**390**	**0.5%**	**75**	**0.4%**	**27**	**0.3%**	**195**	**0.4%**	**127**	**0.5%**	**123**	**0.5%**	**59**	**0.4%**

Source: *Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; FEMA 2018, 2025*

Table 10-10. Estimated Vulnerable Populations in the 0.2 Percent Annual Chance Flood Hazard Area

Jurisdiction	Vulnerable Persons Living in the 0.2 Percent Annual Chance Flood Hazard Area													
	Population Over 65		Population Under 5		Non-English Speaking Population		Population with Disability		Population Below Poverty Level		Population With No Broadband Internet Subscription		Population With No Vehicle Access	
	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total
City of Auburn	10	0.3%	1	0.2%	1	0.2%	4	0.2%	4	0.2%	4	0.2%	2	0.3%
City of Colfax	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City of Lincoln	121	0.9%	24	0.9%	6	0.8%	59	0.9%	34	0.9%	31	0.8%	7	0.8%
Town of Loomis	53	3.7%	9	3.6%	0	0.0%	20	3.6%	27	3.7%	13	3.6%	8	3.4%
City of Rocklin	33	0.3%	13	0.3%	5	0.3%	23	0.3%	11	0.3%	8	0.3%	6	0.3%
City of Roseville	83	0.3%	28	0.3%	11	0.3%	54	0.3%	28	0.3%	25	0.3%	26	0.3%
Unincorporated County	258	0.9%	38	0.9%	16	0.9%	120	0.9%	76	0.9%	89	0.9%	33	0.9%
Placer County (Total)	**558**	**0.7%**	**113**	**0.5%**	**39**	**0.5%**	**280**	**0.6%**	**180**	**0.7%**	**170**	**0.6%**	**82**	**0.5%**

Source: *Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; FEMA 2018, 2025*

10.2.2 General Building Stock

Table 10-11 summarizes the buildings within the 1 percent annual chance flood hazard area—1,505 buildings are at risk, representing 0.8 percent of the County's total building inventory, with an estimated replacement cost value of $1.6 billion. Under the 0.2 percent annual chance flood scenario, shown in Table 10-12, 1,940 buildings (1 percent of the inventory) are exposed, with an estimated $2.1 billion in replacement cost value, or 1.2 percent of the County total. Table 10-13 and Table 10-14 show the distribution of the buildings in the flood hazard areas by general occupancy type.

Table 10-11. Buildings in the 1 Percent Annual Chance Flood Hazard Area

	Number of Buildings		Replacement Cost Value	
Jurisdiction	**Count**	**% of Jurisdiction Total**	**Value**	**% of Jurisdiction Total**
City of Auburn	24	0.4%	$24,366,662	0.4%
City of Colfax	0	0.0%	$0	0.0%
City of Lincoln	113	0.5%	$207,055,108	1.0%
Town of Loomis	99	2.5%	$65,852,281	1.8%
City of Rocklin	156	0.6%	$244,152,786	1.0%
City of Roseville	148	0.3%	$562,879,796	1.0%
Unincorporated County	965	1.2%	$503,522,424	0.8%
Placer County (Total)	**1,505**	**0.8%**	**$1,607,829,056**	**0.9%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; FEMA 2018, 2025
Note: See Table 3-9 for total building counts and replacement cost value in each jurisdiction and countywide

Table 10-12. Buildings in the 0.2 Percent Annual Chance Flood Hazard Area

	Buildings in the 0.2 Percent Annual Chance Flood Hazard Area			
	Number of Buildings		**Replacement Cost Value**	
Jurisdiction	**Count**	**% of Jurisdiction Total**	**Value**	**% of Jurisdiction Total**
City of Auburn	24	0.4%	$24,366,662	0.4%
City of Colfax	0	0.0%	$0	0.0%
City of Lincoln	249	1.1%	$404,428,891	2.0%
Town of Loomis	140	3.5%	$90,750,635	2.5%
City of Rocklin	181	0.7%	$260,866,787	1.1%
City of Roseville	226	0.4%	$715,338,117	1.2%
Unincorporated County	1,120	1.4%	$608,227,971	1.0%
Placer County (Total)	**1,940**	**1.0%**	**$2,103,979,063**	**1.2%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; FEMA 2018, 2025
Note: See Table 3-9 for total building counts and replacement cost value in each jurisdiction and countywide

Table 10-13. Buildings in the 1 Percent Annual Chance Flood Hazard Area by General Occupancy Class

Jurisdiction	Buildings in the 1 Percent Annual Chance Flood Hazard Area by General Occupancy Class			
	Residential	Commercial	Industrial	Other
City of Auburn	14	10	0	0
City of Colfax	0	0	0	0
City of Lincoln	79	31	2	1
Town of Loomis	72	27	0	0
City of Rocklin	54	96	6	0
City of Roseville	102	34	2	10
Unincorporated County	457	480	11	17
Placer County (Total)	**778**	**678**	**21**	**28**

Source: *Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; FEMA 2018, 2025*
Note*: Other = Government, Religion, Agricultural, and Education*

Table 10-14. Buildings in the 0.2 Percent Annual Chance Flood Hazard Area by General Occupancy Class

Jurisdiction	Buildings in the 0.2 Percent Annual Chance Flood Hazard Area by General Occupancy Class			
	Residential	Commercial	Industrial	Other
City of Auburn	14	10	0	0
City of Colfax	0	0	0	0
City of Lincoln	187	59	2	1
Town of Loomis	96	44	0	0
City of Rocklin	69	105	7	0
City of Roseville	165	41	9	11
Unincorporated County	549	542	11	18
Placer County (Total)	**1,080**	**801**	**29**	**30**

Source: *Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; FEMA 2018, 2025*
Note*: Other = Government, Religion, Agricultural, and Education*

Table 10-15 presents Hazus-estimated building losses in Placer County, totaling $133.9 million across all occupancy types, representing 0.1 percent of the County's total replacement cost value. The City of Roseville accounts for the largest share, with an estimated $81 million in losses.

Table 10-15. 1 Percent Annual Chance Flood Impacts on Buildings

Jurisdiction	1 Percent Annual Chance Flood Impacts on Buildings					
	Estimated Loss for All Occupancies	Percent of Total[a]	Estimated Loss for Residential Properties	Estimated Loss for Commercial Properties	Estimated Loss for Industrial Properties	Estimated Loss for All Other Occupancies[b]
City of Auburn	$1,296,488	<0.1%	$330,160	$966,328	$0	$0
City of Colfax	$0	0.0%	$0	$0	$0	$0
City of Lincoln	$1,989,510	<0.1%	$201,818	$1,760,330	$27,362	$0
Town of Loomis	$429,922	<0.1%	$83,134	$346,788	$0	$0
City of Rocklin	$20,215,096	0.1%	$26,270	$11,940,815	$8,248,011	$0
City of Roseville	$81,189,009	0.1%	$5,511,667	$35,156,617	$399	$40,520,326
Unincorporated County	$28,828,424	<0.1%	$14,109,080	$13,105,402	$1,119,206	$494,736
Placer County (Total)	**$133,948,449**	**0.1%**	**$20,262,130**	**$63,276,280**	**$9,394,978**	**$41,015,061**

Source: Hazus v6.1; Placer County 2025; FEMA 2018, 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; USGS 2019, 2025

a. *See Table 3-9 for total replacement cost value in each jurisdiction and countywide*

b. *Other = Government, Religion, Agricultural, and Education*

NFIP STATISTICS

The risk assessment for flood included a review of FEMA Region 9 data on flood policies, claims, and repetitive loss (RL) properties. The data summarizes losses reported by individuals with flood insurance through the federal government. A property is considered a repetitive loss property when there are two or more losses reported since 1978 that were paid more than $1,000 each within 10 years of each other and at least 10 days apart. Only losses that are closed are counted.

Placer County has three severe repetitive loss (SRL) properties, defined as a residential property covered under an NFIP flood insurance policy, and satisfying either conditions 1 and 2, as well as condition 3:

1. At least four NFIP claim payments for the property (including building and contents) over $5,000 each have occurred, and the cumulative amount of such claims payments exceeded $20,000.
2. At least two separate claims payments for the property (building payments only) have occurred, and the cumulative amount of the building portion of such claims exceeded the market value of the building.
3. For either of the above, at least two of the referenced claims must have occurred within any 10-year period and must have occurred more than 10 days apart.

Table 10-16 summarizes NFIP policies, claims, and repetitive loss statistics for Placer County as of November 2023. Most of the RL properties are single-family residences. Further detail is included in the municipality annexes in Volume 2.

Table 10-16. NFIP Statistics in Placer County

Municipality	# Policies	# Claims	Total Loss Payments	# NFIP RL Properties	# NFIP SRL Properties
City of Auburn	18	31	$598,072.00	2	2
City of Colfax	0	0	$0.00	0	0
City of Lincoln	64	8	$65,572.00	1	0
Town of Loomis	49	14	$365,984.00	2	0
City of Rocklin	102	27	$250,461.00	2	0
City of Roseville	112	109	$4,105,724.00	6	1
Unincorporated County	466	235	$4,756,173.00	13	0
Placer County (Total)	**811**	**424**	**$9,812,586**	**26**	**3**

Source: NFIP 2023

10.2.3 Community Lifelines and Other Critical Facilities

Table 10-17 and Table 10-18 summarize the number of community lifelines exposed to the 1 and 0.2 percent annual chance flood hazard area by jurisdiction. Of the 106 facilities in the 1 percent flood hazard area, the majority are transportation-related (76), with unincorporated Placer County accounting for the highest number (87). In the 0.2 percent flood hazard area, a total of 112 facilities are exposed, again led by transportation (76 facilities), with unincorporated Placer County having the most at-risk facilities (88).

The 1 percent annual chance flood event is expected to cause varying levels of damage to lifeline facilities in Placer County. Communications, energy and safety and security are among the most affected lifeline categories, with at least one facility in each of those categories expected to sustain damage of 50 percent or greater. See Table 10-19 for additional information on damages by lifeline.

Potential flood impacts on community lifelines and other critical facilities are numerous:

- Oversaturated soils from periods of heavy rain and flooding may cause utility poles to tip over or fall, interrupting the power grid for a potentially large area, especially if a transformer is impacted.
- Excess water makes it more difficult for water treatment plants to treat water effectively.
- Floodwater picks up bacteria, sewage, and other industrial waste and chemicals that it conveys into public and private drinking water sources. Contamination at any step of the water flow process puts consumers at risk of exposure to toxins that could result in serious harm, such as infections, rashes, gastrointestinal illnesses, and tetanus; in extreme cases, death may occur.
- Isolation can be caused by bridges being washed out or blocked by floods or debris.

Mitigation planning should consider measures to reduce flood impacts on critical facilities and ensure sufficient emergency and school services remain when a significant event occurs. If short-term functionality is impacted, facilities of neighboring municipalities may need to increase support.

Table 10-17. Facilities in the 1 Percent Annual Chance Flood Hazard Area, By Lifeline Category

Jurisdiction	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Total Facilities in Hazard Area	% of Jurisdiction Total
City of Auburn	0	0	0	0	0	1	0	0	0	1	1.7%
City of Colfax	0	0	0	0	0	0	0	0	0	0	0.0%
City of Lincoln	0	0	0	4	0	0	5	0	0	9	10.3%
Town of Loomis	0	0	0	0	0	0	0	0	0	0	0.0%
City of Rocklin	0	0	0	0	0	0	1	0	0	1	0.8%
City of Roseville	0	0	1	0	2	0	3	1	1	8	2.7%
Unincorporated County	2	3	0	2	0	13	67	0	0	87	12.0%
Placer County (Total)	**2**	**3**	**1**	**6**	**2**	**14**	**76**	**1**	**1**	**106**	**8.0%**

Source: Placer County 2022, 2024, 2025; California Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025; FEMA 2019, 2025

Table 10-18. Facilities in the 0.2 Percent Annual Chance Flood Hazard Area, By Lifeline Category

Jurisdiction	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Total Facilities in Hazard Area	% of Jurisdiction Total
City of Auburn	0	0	0	0	0	1	0	0	0	1	1.7%
City of Colfax	0	0	0	0	0	0	0	0	0	0	0.0%
City of Lincoln	0	1	0	5	0	1	5	0	1	13	14.9%
Town of Loomis	0	0	0	0	0	0	0	0	0	0	0.0%
City of Rocklin	0	0	0	0	0	0	1	0	0	1	0.8%
City of Roseville	0	0	1	0	2	1	3	1	1	9	3.0%
Unincorporated County	2	3	0	3	0	13	67	0	0	88	12.1%
Placer County (Total)	**2**	**4**	**1**	**8**	**2**	**16**	**76**	**1**	**2**	**112**	**8.4%**

Source: *Placer County 2022, 2024, 2025; California Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025; FEMA 2019, 2025*

Table 10-19. Facilities Experiencing Damage Due to the 1 Percent Annual Chance Flood Event

Lifeline	Number of Facilities Experiencing Damage Due to the 1 Percent Annual Chance Flood Event				
	<5% Damage	5 – 19% Damage	20 – 39% Damage	40 – 49% Damage	50% or Greater Damage
Communications	0	0	0	0	1
Energy	0	1	0	0	2
Food, Hydration, Shelter	0	0	0	0	0
Hazardous Materials	0	0	1	0	0
Health and Medical	0	0	0	0	0
Safety and Security	2	3	0	0	1
Transportation	0	0	0	0	0
Water Systems	0	0	0	1	0

Source: Hazus v6.1; : Placer County 2022, 2024, 2025; California Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025; FEMA 2018, 2025; USGS 2019, 2025

10.2.4 Economy

Flooding can have significant impacts on the local and regional economy. Damage to the general building stock often results in reduced property values and a loss of tax revenue, while disruptions to businesses contribute to economic instability and long-term recovery challenges. Inundation of commercial and industrial areas may require extensive renovations, interrupting services and causing functional downtime. Tourism, an important economic driver in many communities, can also decline due to damaged infrastructure, closures, or negative perceptions of safety.

Flood events frequently affect utilities and critical infrastructure, compounding economic losses. Damage to public utilities can disrupt service delivery, with potential loss of power, communications, and temporary shutdowns of drinking water and wastewater treatment facilities. These cascading impacts not only slow community recovery but can also hinder regional economic activity and strain government resources through decreased tax revenues.

10.2.5 Natural Resources

Floodwaters can transport pollutants from roadways—including oil, chemicals, and other hazardous materials—onto adjacent soils, rendering them unsuitable for agricultural use. Flooding also alters landscapes by eroding riverbanks, sometimes causing them to collapse. As this material is carried away, suspended sediment accumulates in the water, degrading water quality and contributing to conditions that may promote harmful algal blooms. When the suspended sediment eventually settles, it can clog riverbeds and streams, smother aquatic life, and destroy critical habitats. These impacts are particularly damaging in ecosystems that are already stressed, degraded, or heavily modified, where erosion and sedimentation further diminish ecological resilience.

10.2.6 Historic and Cultural Resources

Historic places, cultural institutions, parks and open spaces, community facilities, and religious institutions are all vulnerable to impacts from flooding. Venues such as museums and historic buildings are subject to structural damage during flood events, with additional risk of damage to important cultural artifacts housed within. Historic structures often are not built to modern building code requirements, including design flood elevation and construction standards. Historic resources and structures were often built close to waterways, increasing their flood risk. Parks, recreation, and community space closures due to flood events can disrupt residents' lives and hinder access to critical community services. Although parks and recreational areas located near waterways are exposed to flooding, they are often developed with flooding in mind. Many parks are considered as open space to disallow development.

10.3 Future Changes That May Affect Risk

10.3.1 Land Use and Development

Over recent decades, Placer County's growth has concentrated in the western and more accessible portions of the county, where floodplain lands, especially along major rivers, creeks, and low-lying valley bottoms, have become increasingly attractive for residential, commercial, and infrastructure development.

10.3.2 Projected Changes in Population Patterns

As noted in Chapter 3, Placer County's population is expected to increase over the coming decades. As more households locate in or near floodplains, the demographic exposure to flood risk increases, particularly for vulnerable populations (e.g. lower income, elderly) who may reside in more flood-prone land due to affordability. In the future, if demographic and development trends continue without strong mitigation, more people and structures could lie within FEMA flood zone or future regulatory floodplain expansions.

10.3.3 Climate Change

Flood risks are expected to intensify within and downstream of the Sierra Nevada as climate change drives stronger storms and higher temperatures. Global climate change affects precipitation by increasing the atmosphere's capacity to hold water vapor, so winter storms generally carry more rain. However, precise projections of changes in flood characteristics—such as frequency, magnitude, duration, and seasonal timing—remain uncertain (State of California 2018).

Long-term changes in total precipitation may be relatively modest, projected at only ±10 to 15 percent of current averages (with higher increases to the east side of the county and smaller increases on the west). More rainfall is expected to occur in shorter, more intense bursts, raising the risk of flash flooding, erosion, and infrastructure damage. Warmer temperatures, projected to rise by 6 to 9 °F by the end of the century, will push the rain-snow boundary upward by approximately 1,500 to 3,000 feet. This will result in more rain-on-snow events and increased winter stream flows, both of which heighten flood risks (State of California 2018). These changes will vary by elevation, with higher elevations experiencing faster warming and more pronounced shifts in precipitation patterns, potentially leading to stronger thunderstorms.

The Sacramento Valley is expected to have about the same average annual precipitation or a small increase, but it will include more dry periods punctuated by intense rainfall. Extreme storms increase the likelihood of great flood event like that of 1862, when, a 300-mile-long area of the Sacramento Valley and San Joaquin Valley was inundated for months after snow-melting high temperatures and a series of atmospheric rivers.

By the end of this century, high and low precipitation extremes are projected to increase markedly and simultaneously. The amount of change varies with elevation, with quicker warming trends and precipitation changes at highest elevations (State of California 2018). Loss of snowpack and overall drying will lead to increased winter stream flows and floods, and to reductions in warm-season flows. Increased incidence of winter rainfall, cool season snowmelt episodes, and rain-on-snow events are projected to increase winter flooding and the average winter stream flow rates.

Indirect effects of climate change may also increase flooding in Placer County due to the expected increase in the frequency and severity of droughts, which cause soil to dry out and become hard. When precipitation does return, more water runs off the surface rather than being absorbed into the ground, leading to floods. Wildfires, which are also expected to become more frequent due to climate change, cause a similar effect by baking the surface of the ground into a harder and less penetrable layer. Trees and other vegetation help slow water down, which lets the water absorb into the soil and prevents the water from turning into runoff. The loss of trees and other plants from wildfires, pests, diseases, or other climate-related exposures can also increase flooding risk.

11. Freeze and Snow

11.1 Hazard Profile

11.1.1 Hazard Description

Extreme cold events occur when temperatures drop well below normal in an area. For example, near-freezing temperatures are considered extreme cold in regions relatively unaccustomed to winter weather, such as West Placer County. Conversely, extreme cold might refer to temperatures below 0ºF in regions that are subjected to temperatures below freezing on a regular basis, such as East Placer County. Extensive exposure to extreme cold temperatures can cause frostbite or hypothermia and can become life-threatening.

11.1.2 Location

Freeze and snow events occur on a regional scale, with extreme cold possible in all areas of the county. Extreme cold is defined relative to typical local conditions rather than by a single temperature threshold. In the higher-elevation eastern portion of the county, where freezing temperatures and snow are common, extreme cold refers to temperatures much lower than 32ºF and sustained over longer periods. In contrast, in the lower-elevation, western portion of the county, even brief episodes of near-freezing temperatures may be considered extreme since such conditions are less common and can still cause significant impacts. Freeze events generally develop slowly and can often be forecast in advance, providing some opportunity for preparedness. These events may last only a few hours, such as during a single cold night, or persist for several days to weeks under sustained cold conditions.

Snowfall in the Sierra Nevada depends on elevation. The lower foothills rarely experience measurable snow, while mid-elevation zones typically receive a mix of rain and snow. Above 6,000 feet, most precipitation falls as snow, and accumulations of ten feet or more on the ground for extended periods are not uncommon.

Snowfall in northern and eastern Placer County can occur rapidly and, once on the ground, may remain for months, particularly between November and March. Winter storms in these areas often include heavy snow, strong winds, and blizzard conditions, which can cause localized utility outages, road closures, and disruptions to schools, businesses, and nonessential government operations. In the western portion of the County, snowfall is rare and not typically seasonal.

11.1.3 Extent

The National Weather Service (NWS) uses a Wind Chill Temperature Index (Figure 11-1) to represent the discomfort and danger posed by combined wind and temperature effects. Windchill is calculated based on the rate of heat loss from exposed skin due to wind and cold air. As wind speeds increase, heat is drawn from the body more rapidly, lowering skin temperature and eventually internal body temperature, which can create dangerous conditions for exposed individuals.

In Placer County, windchill is particularly relevant during freeze and snow events in the eastern, higher-elevation Sierra Nevada areas, where strong winter winds and subfreezing temperatures commonly co-occur. In these areas, windchill values can drop well below 0°F during severe winter storms, with extreme events producing windchill readings of -10°F to -20°F, creating dangerous conditions for residents, travelers, and recreationists. In contrast, the western portion of the county, with its lower elevations and milder winter climate, rarely experiences windchill values approaching those extremes. Here, windchill may lower perceived temperatures into the 20s or 30s (°F) during occasional cold fronts, which, while less severe, can still pose risks to agriculture, infrastructure, and vulnerable populations not accustomed to such cold.

Figure 11-1. Wind Chill Temperature Chart

	Temperature (°F)																	
Wind (mph) / Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes; 10 minutes; 5 minutes

Source: (NWS 2021)

The extent of snowfall is typically measured by depth, total accumulation, and speed of accumulation. The range of possible snowfall accumulation across the county varies by location but can accumulate to depths of over ten feet in higher elevations. Snowfall in the County can begin quickly and can remain on the ground for months. During more severe events, greater amounts of snow accumulate over a shorter period of time, hampering jurisdictions' ability to keep up with the snowfall.

11.1.4 Previous Occurrences

FEMA DISASTER DECLARATIONS

Table 11-1 lists all freeze and snow-related major disaster (DR) or emergency (EM) declarations that have included Placer County.

Table 11-1. FEMA Disaster Declarations for Freeze and Snow Events in Placer County

Declaration Date	Declaration Number	Incident Type	Disaster Name
March 12, 1995	DR-1046	Severe Storm	Severe Winter Storms, Flooding Landslides, Mud Flow
January 10, 1995	DR-1044	Severe Storm	Severe Winter Storms, Flooding, Landslides, Mud Flows
January 4, 1997	DR-1155	Severe Storm	Severe Storms, Flooding, Mud and Landslides
February 14, 2017	DR-4301	Severe Storm	Severe Winter Storms, Flooding, and Mudslides
January 14, 2023	DR-4683	Flood	Severe Winter Storms, Flooding, Landslides, and Mudslides
March 10, 2023	EM-3592	Flood	Severe Winter Storms, Flooding, Landslides, and Mudslides
January 9, 2023	EM-3591	Flood	Severe Winter Storms, Flooding, and Mudslides

Source: (FEMA 2025b)

STATE EMERGENCY PROCLAMATIONS

Table 11-2 lists all freeze and snow-related state emergency proclamations from 2020 to 2024 that included Placer County. For events prior to 2020, refer to the 2021 Placer County LHMP.

Table 11-2. State Emergency Proclamations for Freeze and Snow Events in Placer County (2020 to 2024)

State Proclamation Date	State Disaster Name	Description
December 30, 2021	December 2021 Storms	Beginning on December 10, 2021, a series of winter storm systems struck California, bringing substantial precipitation, including record-breaking snowfall, damaging winds, and flooding. The storms affected communications and other critical infrastructure, resulted in power outages, and caused tree limbs to fall, obstructing major highways and local roads. The storms forced the closure of primary corridors in the Tahoe Basin.
January 4, 2023	December 2022-January 2023 Storms	Beginning December 27, 2022, severe winter storms related to a series of atmospheric rivers struck California, bringing high winds, substantial precipitation, and river and urban flooding, and resulting in a statewide emergency proclamation.
March 8, 2023	February-March 2023 Storms	On March 8, 2023, the Governor expanded an emergency proclamation, originally issued March 1, to include Placer County. A winter storm and atmospheric river system brought freeze warnings, frost advisories, heavy rain, snow, and gusty winds to the state. There was concern that avalanches and floods could result from the storm.

Source: (Cal OES 2025)

ALL RECENT EVENTS

Table 11-3 lists major recorded freeze and snow-related events that impacted Placer County since the 2021 LHMP was developed. For earlier events, refer to the previous plan.

Table 11-3. Freeze and Snow-Related Events in Placer County (2020 to 2024)

Date Begin	Date End	Hazard	Event Narrative
1/22/2021	1/22/2021	Winter Weather	A cold, dry, and fast upper-level trough tracked across northern California. Snow levels with this system were forecast to hover around 4,500 feet; however, with the timing, convective nature, and associated cold air, snow levels had the opportunity to drop down to 3,000 to 3,500 feet during the afternoon. The media reported that two people were seriously injured on January 22 due to a vehicular accident. Two cars initially collided and got out of the car to exchange information. A third party stopped to see if they were ok and shortly after a big rig came around the corner and lost traction. They ended up hitting their breaks and jack-knifing, which would result in two serious injuries and colliding with six other vehicles.
12/13/2021	12/13/2021	High Wind, Winter Storm	A weather system brought winter weather to the Sierra Nevada and southern Cascades. Reports of 52 to 66 inches of new snow were received. Low elevation snow also occurred with snow accumulation reported down to approximately 2,500 feet in elevation in the western foothills of the Sierra Nevada. Chain controls were in place on Interstate 80 and Highway 50 during the event. I-80 was closed to through traffic for 34 minutes on the 13th due to downed powerlines. Power outages were also reported across the region. Several counties opened warming centers for the cold temperatures. Caltrans reported approximately 4.75 feet of new snow at their Kingvale location.
12/21/2021	12/28/2021	Strong Wind	Several high impact winter storms impacted the region around the Christmas holiday. Widespread precipitation, low snow levels of 500 to 2500 feet, and strong and damaging winds resulted. Impacts ranged from fallen trees, downed power and phone lines, with widespread and extended outages, treacherous driving conditions including chain controls and extended highway closures due to wind and/or snow, multiple accidents and spin outs due to snow, damaged property due to snow and wind. Governor Gavin Newsom declared a state of emergency in 20 California counties due to the impacts from the series of storms. The affected areas include: El Dorado, Nevada, Placer, Sacramento and Yuba counties, but also Los Angeles and parts of the Bay Area. Warming centers were opened across the region for those impacted by the stormy weather. Caltrans reported that winds in combination with rain and snow caused downed trees and power lines, which led to closed and impassible roadways, hazardous driving conditions and extended power outages. Cal OES estimated $22.2 million in damages to roadway infrastructure. Tens of thousands of people were left without power in winter weather conditions, many for more than three days.

Date Begin	Date End	Hazard	Event Narrative
1/7/2023	1/7/2023	Strong Wind	A major winter storm brought strong winds with moderate to heavy rain, causing renewed flooding in already elevated waterways. Snow fell at and above 4000 feet elevation, and areas above 6000 feet elevation got three to five feet of snowfall, causing dangerous mountain travel conditions. In the mountains, wind gusts of 80 to 115 mph coupled with heavy snow to bring white-out conditions. Trees fell across the area, blocking roads and causing numerous power outages. California Highway Patrol reported a sparking transformer that caused a small fire in a tree. The California Highway Patrol reported a tree down on Virginiatown Road near Lost River Road, and a tree down on Gladding Road near Fleming Road.
2/26/2023	2/28/2023	Heavy Snow	A major winter storm brought heavy mountain and low elevation snow with blizzard conditions in the Sierra, where five to seven feet of storm total snow was reported, with locally higher amounts. Citizen weather observers reported 29.4 inches near Nevada City, 15.6 inches near Volcano, 10.4 inches near Camino, 26.3 inches near Grass Valley, and 5 inches in Placerville. The storm caused power outages, school closures, and road closures. One fatality occurred from a collapsed porch due to heavy snow loading. Broadcast media reported the roof collapse of a church in Foresthill due to snow load, with no injuries reported.
3/4/2023	3/7/2023	Winter Weather	A powerful system with heavy snow and gusty winds created whiteout conditions. Snow amounts of three to five feet were reported in the mountains. Heavy snow fell into the foothills impacting travel. Numerous schools were closed or delayed due to the snow. The winds and snow combined to cause dangerous travel conditions with an extended closure of Interstate 80. Accumulating snow fell into the Motherlode foothills, Grass Valley, Sonora, Volcano and Camino. Schools and businesses were reported closed. Numerous power outages were reported, including continued outages from previous storms. Several storage units collapsed in Grass Valley due to heavy snow load. No injuries reported.
3/7/2023	3/9/2023	Heavy Snow	A cold winter storm brought low snow levels, with accumulating snow extending into the northern Sacramento Valley and the foothills. This caused disruption to travel, including the city of Redding and Interstate 5, which was closed north of Fawndale. Accumulated heavy snow from a series of storms caused the roof of a school in Nevada City to collapse. There were 3.6 inches of snow reported near Nevada City on March 8, but this was in addition to previous snow and road from earlier storms.

Date Begin	Date End	Hazard	Event Narrative
3/27/2023	3/29/2023	Heavy Snow	A strong winter storm brought moderate to heavy rain with flooding of roadways, streams and creeks, with mudslides also reported. Snowfall totals reached one to three feet above 5000 feet elevation. In the mountains wind gusts reached 50 to 70 mph, which coupled with heavy snow, brought whiteout conditions. The were numerous road closures, including Interstate 80, Interstate 5 north of Fawndale, as well as State Routes 88, 89 and 299. Widespread trees down across the area blocked roads and caused power outages. Ski resorts reported storm total snow amounts of 23 inches at Kirkwood, 19 inches at Sugar Bowl, and 17 inches at Sierra at Tahoe. Caltrans District 3 reported storm total snow amounts of 23.5 inches at Kingvale, 21 inches at Soda Springs, and 18 inches at Eagle Lakes. The National Operational Hydrological Remote Sensing Center's gridded snowfall analysis estimated 6 to 30 inches over the west slope northern Sierra Nevada over 72 hours. In addition to mountain snowfall, the storm brought snowfall to areas around 2000 feet elevation, and locally as low as 1000 feet elevation in Shasta County. One death was reported by broadcast media in Alta, CA where a man died from a collapsed snowbank, trapping him next to a generator and exposing him to carbon monoxide.
12/14/2024	12/14/2024	Strong Wind	Active weather brought periods of heavy mountain snow, rain and gusty winds from December 12 through December 17 as multiple storms moved through the area. The strongest storm occurred December 13-14 and brought two to three inches of rain, over two feet of heavy snow above 5000 feet elevation, and gusty southerly wind gusts of 35 to 65 mph. Numerous downed trees and thousands of power outages were reported during this time, along with mountain highway closures and chain restrictions, and roadway flooding in the Central Valley.

Source: (NOAA-NCEI 2025)

11.1.5 Probability of Future Occurrences

Table 11-4 lists the number of freeze and snow events reported by various sources over the 30-year period from 1995 to 2025, which is the most complete period of record for all sources reviewed. Based on these records and input from the HMPC, the probability of occurrence for freeze and snow in the County is considered "frequent."

Table 11-4. Probability of Future Freeze and Snow Events in Placer County

Hazard Type	Number of Occurrences Between 1995 and 2025	Percent Chance of Occurring in Any Given Year
Freeze	11	36.7%
Snow	500+	100%

Source: (NOAA-NCEI 2025)

Note: 100% probability indicates that it is statistically likely for an event to occur every year. It does not indicate that the occurrence of an event is a certainty in any given year. Multiple events can occur on a single day and may be seen as single events together. The NCEI database shows over 200 individual days on which snow events (including blizzard and heavy snow) occurred across 30 years, still putting the annual percent chance at 100%.

11.1.6 Cascading Impacts on Other Hazards

Heavy snow events increase the risk of avalanches in steep terrain and can lead to flooding or landslides during the spring if the snowpack melts too quickly. Rapidly melting snow combined with heavy rain can overwhelm both natural and constructed drainage systems, causing overflow and property destruction.

Winter storm events bringing freeze and snow can cause utility failure. Ice and snow accumulation and high winds damage utilities through falling tree branches, often breaching power lines and disconnecting the utility systems. Winter storms can also result in dangerous driving conditions and result in traffic accidents. Severe events often result in road closures. Road closures caused by snow can restrict the movement of people and goods.

Heavy snow may accumulate on rooftops, which increases the risk of roof failure. People may be exposed to cold temperatures after roof collapse. Roads, parking lots, and sidewalks may be treated with chlorides (salts), which are an environmental pollutant that degrades infrastructure, vehicles and equipment, soil, and water supply.

Ice jams, where ice accumulates in streams and rivers, can prevent water flow, causing upstream flooding. Ice jams can also suddenly burst, causing downstream flooding.

11.2 Vulnerability and Impact Assessment

11.2.1 Life, Health, and Safety

OVERALL POPULATION

For the purposes of this MJHMP, the entire population of Placer County is exposed to freeze and snow events. The following health hazards are related to extreme cold temperatures (CDC 2023):

- Windchill measures how wind and cold feel on exposed skin. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature.
- Frostbite is damage to body tissue caused by extreme cold. A wind chill of -20 °F will cause frostbite in 30 minutes. Frostbite can cause a loss of feeling and a white or pale appearance in extremities.
- Hypothermia is a condition brought on when the body temperature drops to less than 95°F, and it can be deadly. Warning signs of hypothermia include uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness, and apparent exhaustion.

Extreme cold can cause emergencies in susceptible populations, such as those without shelter, those who are stranded, or those who live in a home that is poorly insulated or without heat (such as mobile homes).

Periods of heavy snow lead to increased traffic accidents, isolation of residents in homes or vehicles, and limited access to essential services.

SOCIALLY VULNERABLE POPULATION

Populations most at risk from freeze and snow include the elderly, who are less able to withstand cold temperatures due to health conditions and limited mobility to access shelters; infants and young children; individuals with chronic medical conditions (e.g., heart disease, high blood pressure); and low income persons who cannot afford adequate heating (CDC 2022, CDC 2005). Infants and the elderly are most susceptible to the effects of extreme changes in temperatures and are particularly at risk (CDC 2012).

Those experiencing homelessness are particularly likely to experience the impacts of freezing temperatures. The cumulative effects over several days of continuous exposure to cold temperatures, without relief, pose additional risks for the homeless, especially those with underlying medical conditions.

11.2.2 General Building Stock

All the building stock in Placer County is exposed to the freeze and snow hazard. Freezing temperature can damage buildings through freezing/bursting pipes and freeze/thaw cycles, as well as increasing vulnerability to home fires. Additionally, manufactured or mobile homes and old or poorly constructed facilities can have inadequate capabilities to withstand extreme freeze events. Proper strategies help safeguard buildings and their contents as well as minimize dramatic fluctuations in heating or cooling.

11.2.3 Community Lifelines and Other Critical Facilities

All critical facilities in the County are exposed to the freeze and snow hazard. Impacts on lifelines and critical facilities are the same as described for general building stock. It is essential that critical facilities remain operational during natural hazard events.

Deep snowpack presents ongoing challenges for emergency responders. In higher elevation areas near Lake Tahoe, snow frequently buries fire hydrants and street signs. With approximately 2,500 hydrants in the district, it may take weeks to uncover them, and county plowing operations often re-bury hydrants during subsequent storms. Inaccessible hydrants or delayed emergency responses pose significant risks to life and property.

11.2.4 Economy

Impacts of freeze and snow events on the economy include business closures and inventory damage or loss. Business owners may face increased financial burdens due to unexpected repairs, unexpectedly high utility bills, or business interruption due to infrastructure failure (i.e., loss of electricity or telecommunications due to downed power lines). Extreme cold events can have a large impact on the agriculture industry, resulting in economic losses. Snow removal operations can place a considerable burden on municipal budgets.

11.2.5 Natural Resources

Freeze and snow events are natural parts of the ecosystem in Placer County, and while such events can make life more difficult for plants and animals, they are generally well-adapted to current freeze and snow patterns.

11.2.6 Historic and Cultural Resources

Historic and cultural resources are vulnerable to freeze and thaw cycles and rapid wetting and drying cycles. Cultural landscapes may experience declines in vegetation species and faster deterioration of constructed landscape features (e.g., corrosion, decay, desiccation) due to increased freeze and thaw cycles. Furthermore, buildings, facilities, and structures are susceptible to extreme cold, resulting in surface cracking, flaking, and sugaring of building stone, as well as spalling of brick due to wet frost.

11.3 Future Changes That May Affect Risk

11.3.1 Land Use and Development

As demographic trends project continued growth and development into the central and eastern portions of Placer County, land use patterns are shifting into higher-elevation areas where freeze and snow hazards are more pronounced. The Placer County Demographic Trends Report notes that growth pressures from the western county may push demand into foothill and mountain zones in the central and eastern sub-geographies. In these colder, high-altitude settings, new residential, recreational, and infrastructure development must contend with snow loads, ice accumulation, freeze-thaw cycles, and limited access during storms. Roadways, driveways, and utility lines in remote or upland sites may be more vulnerable to winter closures and damage, while steep terrain and clearing of vegetation can exacerbate snowmelt runoff and localized flooding. Thoughtful land use planning is therefore critical: limiting development on the most exposed slopes, ensuring safe all-weather access, requiring building designs that can withstand snow loads and freeze stress, and preserving natural vegetation buffers that moderate microclimates. Without these considerations, expansion into the higher-elevation zones could lead to increased maintenance burdens, hazards to life and property, and compromised resilience in winter weather events.

11.3.2 Projected Changes in Population Patterns

As noted in Chapter 3, Placer County is projected to add between 47,000 and 84,000 new residents from 2025 to 2050. Most growth is expected to be concentrated within the incorporated cities, but a nontrivial portion (roughly 14,000 to 24,000 people) is expected to settle in unincorporated areas. As housing pressures in the western and central portions intensify, there is an increased likelihood that development will expand into foothill and mountainous zones, where freeze and snow hazards are more significant. In the higher-elevation eastern county, which already hosts resort and seasonal communities with regular snowfall, slower but steady demographic growth may lead to greater year-round occupancy, infrastructure expansions, and demand for permanent services. As more households establish residence in snow-prone zones, exposure to winter weather impacts such as road closures, power outages, and structural stresses from snow and ice may rise. This projected pattern highlights the need to incorporate freeze and snow resilience into future land use, infrastructure design, and emergency planning for those parts of the county increasingly populated at altitude.

11.3.3 Climate Change

Overall, climate change is expected to increase average temperatures, so the total number of days with cooler temperatures is expected to drop. However, climate change may increase the number of severe storms affecting Placer County. These intense storm systems could create severe winter weather conditions, including heavy snow, in the Sierra Nevada and more severe winter weather events in the area.

12. Heavy Rain and Storm

12.1 Hazard Profile

12.1.1 Hazard Description

Storms in the Placer County Planning Area are generally characterized by heavy rain, often accompanied by strong winds and sometimes lightning and hail. In the upper elevations, these storms can drop large amounts of snow (discussed in Chapter 11). Heavy precipitation in the Placer County area falls mainly in the fall, winter, and spring months.

The NWS explains 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 more than 35,000 ft. As the rising air reaches its dew point, water droplets and ice form and begin falling 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. As storms continue to increase in intensity, limited drainage infrastructure has become an increasing problem. In addition to the flooding that often occurs during these storms, strong winds, when combined with saturated ground conditions, can down mature trees and cause power outages.

Cloudburst storms usually occur in the spring, summer, and fall. Cloudburst storms, sometimes lasting as long as 6 hours, are high-intensity storms that can produce floods characterized by short duration, high peak flows and relatively small total runoff volume.

Hail can occur in Placer County 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. 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.

Lightning can also occur throughout the County both during and outside of storm events. Lightning is defined by the NWS as any form of visible electrical discharge caused by thunderstorms. Thunderstorms and lightning are usually (but not always) accompanied by rain. 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 outside 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. Cloud-to-ground lightning can result in damage, injury, or death by direct or indirect means. People or objects can be struck directly, which may result in an explosion or burn. Or damage may be indirect when the current passes through or near an object, which generally results in less damage. Lightning is also a concern in Placer County due to the number of fires that are started by lightning strikes.

Most flashes originate near the lower-negative charge center and deliver negative charge to earth. However, some flashes carry positive charge to earth. These positive flashes often occur during the dissipating stage of a thunderstorm's life. Positive flashes are more common during winter. This type of lightning is particularly dangerous. It frequently strikes away from the rain core, as far as five to ten miles from the storm, in areas that most people do not consider to be at risk. Positive lightning has a longer duration, so fires are more easily ignited. It usually carries a high peak electrical current, potentially resulting in greater damage.

12.1.2 Location

Heavy rain in Placer County varies both by season and by location, influencing how different parts of the county experience storm impacts. Seasonal events refer to events that occur when heavy rainfall is most common, typically the late fall through early spring (November through March), when atmospheric river systems bring prolonged, high-intensity storms across the region. These seasonal storms tend to affect the county broadly, with western valley areas experiencing widespread flooding as stormwater collects along low-lying corridors such as Auburn Ravine, Dry Creek, and Pleasant Grove Creek, while foothill and mountain areas face increased runoff, erosion, and debris flows due to steep terrain.

In contrast, episodic events are irregular or isolated storms that may occur outside the typical rainy season, often triggered by unusual weather patterns or remnant tropical systems. Episodic heavy rains can cause highly localized flooding or slope instability in specific watersheds such as Bear River or Miners Ravine, even when surrounding areas receive little impact. Thus, while most of Placer County's heavy rain hazard is tied to the seasonal storm cycle, all parts of the county are also at risk to episodic events depending on storm track, intensity, and local topography.

12.1.3 Extent

There is no primary scale by which heavy rains and storms are measured. Usually, heavy rain is measured in rainfall amounts or damages. Table 12-1 shows the top five highest one-month precipitation total recorded in Placer County since records began in 1895.

Table 12-1. Top 5 Highest One-Month Precipitation Totals, 1895 to 2025

Month, Year	Precipitation (inches)
December 1955	29.96”
January 1911	29.71”

Month, Year	Precipitation (inches)
January 1909	29.48”
December 1964	25.46”
January 2017	25.03”

Source: (NCEI 2024)

Heavy rains can begin quickly, but accurate weather forecasting often let the public know of upcoming events. Thunderstorms in California are often short, ranging from minutes to hours.

12.1.4 Previous Occurrences

FEMA DISASTER DECLARATIONS

Table 12-2 lists all heavy rain and storm-related major disaster (DR) or emergency (EM) declarations that have included Placer County.

Table 12-2. FEMA Disaster Declarations for Heavy Rain and Storm Events in Placer County

Declaration Date	Declaration Number	Incident Type	Disaster Name
December 24, 1964	DR-183	Flood	Heavy Rains & Flooding
January 26, 1969	DR-253	Flood	Severe Storms & Flooding
February 9, 1983	DR-677	Coastal Storm	Coastal Storms, Floods, Slides & Tornadoes
February 21, 1986	DR-758	Flood	Severe Storms & Flooding
March 12, 1995	DR-1046	Severe Storm	Severe Winter Storms, Flooding Landslides, Mud Flow
January 10, 1995	DR-1044	Severe Storm	Severe Winter Storms, Flooding, Landslides, Mud Flows
January 4, 1997	DR-1155	Severe Storm	Severe Storms, Flooding, Mud and Landslides
June 5, 2006	DR-1646	Severe Storm	Severe Storms, Flooding, Landslides, and Mudslides
February 3, 2006	DR-1628	Severe Storm	Severe Storms, Flooding, Mudslides, and Landslides
February 14, 2017	DR-4301	Severe Storm	Severe Winter Storms, Flooding, and Mudslides
January 14, 2023	DR-4683	Flood	Severe Winter Storms, Flooding, Landslides, and Mudslides
March 10, 2023	EM-3592	Flood	Severe Winter Storms, Flooding, Landslides, and Mudslides
January 9, 2023	EM-3591	Flood	Severe Winter Storms, Flooding, and Mudslides

Source: (FEMA 2025b)

STATE EMERGENCY PROCLAMATIONS

Table 12-3 lists all heavy rain and storm-related state emergency proclamations from 2020 to 2024 that included Placer County. For events prior to 2020, refer to the 2021 Placer County LHMP.

Table 12-3. State Emergency Proclamations for Heavy Rain and Storm Events in Placer County (2020 to 2024)

State Proclamation Date	State Disaster Name	Description
March 23, 2022	October 2021 Storms	Beginning on or about October 21, 2021, and continuing for approximately one week, a series of strong atmospheric river storm systems struck California resulting in record-breaking rainfall, flooding, erosion, and debris flows. These storms caused widespread damage to roads and other infrastructure across significant portions of the state.
January 4, 2023	December 2022-January 2023 Storms	Beginning December 27, 2022, severe winter storms related to a series of atmospheric rivers struck California, bringing high winds, substantial precipitation, and river and urban flooding, and resulting in a statewide emergency proclamation.
March 8, 2023	February-March 2023 Storms	On March 8, 2023, the Governor expanded an emergency proclamation issued March 1 to include Placer County. A winter storm and atmospheric river system brough freeze warnings, frost advisories, heavy rain, snow, and gusty winds to the state. There was concern that avalanches and floods could result from the storm.

Source: (Cal OES 2025)

ALL RECENT EVENTS

Table 12-4 lists major recorded heavy rain and storm-related events that impacted Placer County since the 2021 LHMP was developed. For earlier events, refer to the previous plan.

Table 12-4. Heavy Rain and Storm Events in Placer County (2020 to 2024)

Date Begin	Date End	Hazard	Event Narrative
8/18/2020	8/23/2020	Excessive Heat	In addition to lingering heat, a renewed chance of thunderstorms and fire weather concerns were forecast for August 23 and 24. This generated a lot of media attention as the state just suffered from a widespread lightning event and similar conditions were in place. However, the system did not produce as nearly much lightning. Strikes generally remained confined, but not limited to, the west slopes of the Sierra.
12/31/2022	12/31/2022	Flood, High Wind	A strong and very wet atmospheric storm brought extended periods of moderate to heavy rain and periods of strong winds to much of the region, along with heavy high-elevation snow. Precipitation totals were around 1-3 inches for the Central Valley, 3-6 inches in the foothills, and snow equivalent to 5-8 inches of rain in the mountains. The rain brought widespread flooding to the region. This included significant river flooding on the Cosumnes River around Wilton due to multiple levee breaks, resulting in the area being evacuated and area highways and roads being closed, including SR-99. Many local roads were closed to down trees blocking them. Trees were also reported to have fallen on homes and automobiles. The storm and flooding continued into January, with several fatalities reported due to drowning and wind-downed trees.

Date Begin	Date End	Hazard	Event Narrative
1/4/2023	1/4/2023	High Wind	A powerful atmospheric river brought very strong winds with moderate to heavy rain and renewed flooding of the already elevated waterways. Rainfall amounts were 1 to 3 inches in the Central Valley and 2 to 6 inches in the foothills and mountains.
1/7/2023	1/7/2023	Strong Wind	A major winter storm brought strong winds with moderate to heavy rain bringing renewed flooding of already elevated waterways. There was flooding of roadways, urban areas, rivers, streams and creeks, with rockslides and mudslides also reported.
1/31/2024	1/31/2024	Strong Wind	An active weather pattern brought gusty winds with downed trees, heavy rain and mountain snow with mountain travel delays and chain restrictions, and isolated thunderstorms to end the month of January, and continued into early February. California Highway Patrol reported multiple large branches down on eastbound Interstate 80.
2/4/2024	2/5/2024	High Wind, Flood	A major winter storm moved in from the south on February 4, bringing heavy rain, strong winds, thunderstorms and heavy mountain snow through February 7. Heavy rain brought nuisance flooding on roads and urban areas and rises to rivers, creeks and streams, with generally 1 to 3 inches of storm total rain reported across the Valley and foothills.
5/4/2024	5/4/2024	Lightning	A late season storm brings heavy snow to the Sierra with widespread rain and scattered thunderstorms in the Valley. There was a lightning-strike fire which destroyed a mobile home in Newcastle. A lightning strike resulted in a mobile home fire in the Castle City Mobile Home Park. The mobile home was destroyed. There were no injuries.

Source: (NOAA-NCEI 2025)

12.1.5 Probability of Future Occurrences

Table 12-5 lists the number of heavy rain and storm events reported by various sources over the 70-year period from 1955 to 2025, which is the most complete period of record for all sources reviewed. Based on these records and input from the HMPC, the probability of occurrence for heavy rain and storms in the County is considered “frequent.”

Table 12-5. Probability of Future Hazard Events in Placer County

Hazard Type	Number of Occurrences Between 1955 and 2025	Percent Chance of Occurring in Any Given Year
Heavy Rain and Storms	102	100%

Source: (NOAA-NCEI 2025)

Note: 100% probability indicates that it is statistically likely for an event to occur every year. It does not indicate that the occurrence of an event is a certainty in any given year.

12.1.6 Cascading Impacts on Other Hazards

Heavy rain and storm events can escalate the impacts of flooding and utility failure. Heavy rain can damage the functionality of utilities by breaching power lines and disconnecting other systems. More information about flooding can be found in Chapter 10 of this MJHMP.

12.2 Vulnerability and Impact Assessment

12.2.1 Life, Health, and Safety

OVERALL POPULATION

Heavy rain and storm events can significantly impact the entire population of Placer County in several ways. Storms pose direct threats to the safety of residents, including the risk of injury from flying debris, falling trees, and structural damage to homes and buildings. These events can also lead to power outages and damage to communication lines, affecting essential services such as electricity, water supply, and telecommunications, disrupting daily activities and hindering emergency response efforts. Additionally, the uncertainty and potential damage caused by heavy rain and storm events can increase stress and anxiety among residents, with repeated exposure having long-term psychological effects.

SOCIALLY VULNERABLE POPULATION

Socially vulnerable populations are particularly susceptible to heavy rains and storms. These populations include individuals over the age of 65, children under the age of 5, non-English speaking individuals, people with disabilities, and residents living below the poverty line. Additionally, those living in areas isolated from major roads are also considered socially vulnerable.

Socially vulnerable populations are often at greater at risk of direct and secondary effects of heavy rains and storms. These populations may have less physical and financial ability to protect themselves and their housing. Location and construction quality of their housing increases risk for some socially vulnerable populations. After storm events, they may be displaced or require temporary or long-term sheltering. Isolation during and after a storm event can disproportionately affect socially vulnerable populations. Power outages from heavy rains and storms can be life-threatening to those dependent on electricity for life support.

12.2.2 General Building Stock

All current and future buildings in Placer County, including critical facilities, are at risk from heavy rains and storms. When estimating the potential impact of heavy rains and storms on individual structures, factors such as structural integrity, mitigation measures, building construction, and date of construction should be considered. Residential structures are generally more susceptible to wind damage than commercial and industrial structures due to differences in construction. Wood and masonry buildings, regardless of occupancy class, tend to experience more damage than concrete or steel buildings..

12.2.3 Community Lifelines and Other Critical Facilities

All critical facilities and community lifelines in Placer County are vulnerable to heavy rains and storms. Facilities without backup power are especially at risk during outages, which are common when storms damage power transmission lines, particularly in areas with complex terrain. Communication systems can also be disrupted when power to landline infrastructure is lost. Facilities located near trees or overhead power lines face additional risk from falling debris. In the event of a tornado or other high-wind event, facilities in the direct path are especially vulnerable. Transportation infrastructure may also be impacted, with roads blocked by downed trees or debris, hindering emergency response and recovery efforts.

12.2.4 Economy

Impacts from heavy rains and storms include damages to property and infrastructure, including downed trees; damaged utility structures and infrastructures; power outages; road damage and blockages; hail damage to crops, buildings, and automobiles; and lightning damages to homes, critical infrastructure, and people. Most economic impacts arise from secondary hazards caused by severe weather, such as floods, fire, and agricultural losses.

12.2.5 Natural Resources

Prolonged precipitation often leads to soil saturation, erosion, and sedimentation, which can degrade water quality, damage wetlands, and disrupt sensitive habitats. Heavy rainfall may also contribute to the uprooting of vegetation, weaken tree stands, and contribute to long-term forest health decline in places not adapted to this weather.

12.2.6 Historic and Cultural Resources

Historic buildings, landmarks, and cultural sites are particularly vulnerable, as intense rains can accelerate structural deterioration, cause roof and foundation damage, and increase the risk of flooding in older structures not designed for modern drainage standards. Inundation of archives, museums, and historic properties can lead to the irreversible loss of irreplaceable documents, artifacts, and cultural heritage.

12.3 Future Changes That May Affect Risk

12.3.1 Land Use and Development

Land use and development patterns in Placer County directly influence the community’s vulnerability to heavy rains and storm events. As population growth continues, particularly in the western urbanized areas and foothill communities, development often extends into locations with greater exposure to stormwater impacts—such as floodplains, creek corridors, and areas with limited drainage infrastructure. Increased impervious surfaces from residential, commercial, and roadway construction reduce natural absorption and intensify runoff, which can overwhelm stormwater systems and heighten flood risks. In foothill and rural areas, development on steep terrain may also increase erosion, slope instability, and localized flooding during severe storm events. These land use trends highlight the importance of incorporating stormwater management, green infrastructure, and hazard aware zoning into future development decisions. Balancing growth with the preservation of open space and natural drainage systems will be essential to reducing storm-related risks and maintaining community resilience as demographic pressures drive continued expansion across the county.

12.3.2 Projected Changes in Population Patterns

Placer County's population growth, especially in the western incorporated cities and spillover into central foothill areas, will expose more people to increasing risks of heavy rainfall, storm runoff, and associated hazards. As noted in Chapter 3, forecasted growth through 2050 will cause additional households to reside on steep slopes, in floodplains, along creeks, or in drainage zones where stormwater capacity is limited. These shifting population patterns suggest that stormwater management, flood mitigation, and resilient infrastructure will become ever more critical. Without careful land use planning—such as avoiding development in areas prone to washouts, ensuring adequate storm drainage, and preserving natural buffers—storms could lead to increased flooding, erosion, and damage to property and infrastructure. In short, projected population growth magnifies exposure to heavy rain hazards unless proactive policy, regulation, and design keep pace with where and how people are living in the county.

12.3.3 Climate Change

Climate change affects storms and rainfall by "increasing the atmosphere's capacity to 'hold' water vapor," according to California's Fourth Climate Change Assessment (CCCA4) (OPR, CNRA, CEC 2018). Climate change is expected to intensify precipitation extremes in the Sierra Nevada region, increasing the frequency and severity of heavy rain events. More rainfall is expected to occur in shorter, more intense bursts, raising the risk of flash flooding, erosion, and infrastructure damage. These extreme storms, according to the CCCA4, increase the likelihood of an 1862-type "Great Flood" event, to the point that it might be expected in the next 40 years. During the Great Flood, a 300-mile-long area spanning the Sacramento Valley and San Joaquin Valley was inundated for months after snow-melting high temperatures and a series of atmospheric rivers.

In addition, other climate drivers will affect the severity of storms and rainfall. Warmer temperatures, projected to rise by 6 to 9 degrees Fahrenheit (°F) by the end of the century, will push the rain-snow boundary upward by approximately 1,500 to 3,000 feet. This shift will result in more rain-on-snow events and increased winter stream flows, both of which heighten flood risks (OPR, CNRA, CEC 2018). These changes will vary by elevation. Higher elevations will experience faster warming and more pronounced shifts in precipitation patterns, potentially leading to stronger thunderstorms and more frequent hail events. In addition, heat in thunderstorms increases the strength of updrafts, making larger hailstones more likely.

Despite anticipated increases in storm severity and impact, the CCCA4 anticipates about the same average annual precipitation in the Sacramento Valley or modest fluctuations because of accompanying growth in dry spells. Eastern portions of the county in the Sierras may see more growth in total annual precipitation, projected at around ±10-15 percent in the long term, but this also is an average that does not reflect the increase in dry spells and extreme precipitation.

13. High Wind and Tornado

13.1 Hazard Profile

13.1.1 Hazard Description

High Winds

High winds, which frequently accompany severe storms and thunderstorms, can cause extensive damage to property and crops, pose threats to public safety, and generate economic losses through business disruptions and power outages. According to the National Weather Service (NWS), high winds are defined as sustained wind speeds of 40 mph or greater lasting for one hour or longer, or wind gusts of 58 mph or greater for any duration. These events may occur as part of seasonal climate patterns or in association with other severe weather phenomena such as thunderstorms.

Straight-line winds can amplify hazardous conditions by lowering visibility through the movement of dust, snow, or other particulates, and by intensifying the effects of temperature extremes. They can also worsen wildfire risk by rapidly drying ground cover, spreading fuels, and increasing fire intensity. Impacts from high winds may include crop losses, vehicles pushed off roadways, roof and structural damage, and widespread secondary impacts from airborne debris.

Tornadoes

Tornadoes and funnel clouds can also occur during severe storms. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud. Tornadoes form when cool, dry air sits on top of warm, moist air. They spin 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 as 300-mile-wide hurricanes across a path only 300 yards wide or less. 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.

13.1.2 Location

The entire Placer County Planning Area is subject to significant high winds and non-tornadic, straight-line winds. Tornadoes, though rare, can also occur, primarily during the rainy season in late fall and early spring. Tornadoes can occur anywhere within the Placer County Planning Area but historically, they have occurred in the flatter, western portion of the county.

13.1.3 Extent

Magnitude of winds is often measured in speed and damages. These events are often part of heavy rain and storm events but can occur outside of storms. Onset of high 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, with gusts usually lasting only seconds.

The Beaufort wind force scale is an empirical measure that relates wind speed to observed conditions at sea or on land. Table 13-1 shows the Beaufort wind scale. The Placer County Planning Area can experience gusts of straight-line wind at the high end of this scale, but wind speeds tend to be on the lower end of the scale.

Table 13-1. Beaufort Wind Force Scale

Beaufort Number	Speed (mph)	Terminology	Description
0	0	Calm	Calm. Smoke rises vertically.
1	1-3	Light air	Wind motion visible in smoke.
2	4-7	Light breeze	Wind felt on exposed skin. Leaves rustle.
3	8-12	Gentle breeze	Leaves and smaller twigs in constant motion.
4	13-18	Moderate breeze	Dust and loose paper is raised. Small branches begin to move.
5	19-24	Fresh breeze	Smaller trees sway
6	25-31	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use is difficult.
7	32-38	Near gale	Whole trees in motion. Some difficulty when walking into the wind.
8	39-46	Gale	Twigs broken from trees. Cars veer on road.
9	47-54	Sever gale	Light structure damage.
10	55-63	Storm	Trees uprooted. Considerable structural damage.
11	64-73	Violent storm	Widespread structural damage.
12	74-95	Hurricane	Considerable and widespread damage to structures.

Source: (NWS 2024)

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita (EF) scale. Both scales measure wind estimates, not measurements, based on damage. The new scale provides additional damage indicators 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 material of damaged objects or buildings as well as the construction characteristics of damaged structures. Table 13-2 shows the wind speeds associated with the original Fujita scale ratings and the damage that could result at different levels of intensity. Table 13-3 shows the wind speeds associated with the Enhanced Fujita Scale ratings.

Table 13-2. Original Fujita Scale

Fujita (F) Scale	Fujita Scale Wind Estimate (mph)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown, and large missiles generated
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: (NOAA n.d.)

Table 13-3. 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

While more intense tornadoes are theoretically possible in Placer County, historically tornadoes in Placer County have been EF0 or EF1. Effects of climate change on tornado occurrence and intensity remain uncertain. Thus, the anticipated range of tornado intensity remains EF0 or EF1.

13.1.4 Previous Occurrences

FEMA DISASTER DECLARATIONS

Table 13-4 lists all high wind and tornado-related major disaster (DR) or emergency (EM) declarations that have included Placer County.

Table 13-4. FEMA Disaster Declarations for High Wind and Tornado Events in Placer County

Declaration Date	Declaration Number	Incident Type	Disaster Name
January 26, 1969	DR-253	Flood	Severe Storms and Flooding
February 9, 1983	DR-677	Coastal Storm	Coastal Storms, Floods, Slides & Tornadoes
February 21, 1986	DR-758	Flood	Severe Storms and Flooding
June 5, 2006	DR-1646	Severe Storm	Severe Storms, Flooding, Landslides, and Mudslides
February 3, 2006	DR-1628	Severe Storm	Severe Storms, Flooding, Mudslides, and Landslides

Source: (FEMA 2025b)

STATE EMERGENCY PROCLAMATIONS

Placer County has not been included in any state emergency proclamations related to high wind or tornado since the previous hazard mitigation plan.

ALL RECENT EVENTS

Table 13-5 lists major recorded high wind and tornado-related events that impacted Placer County since the 2021 LHMP was developed. For earlier events, refer to the previous plan.

Table 13-5. High Wind and Tornado Events in Placer County (2020 to 2024)

Date Begin	Date End	Hazard	Event Narrative
February 9, 2020	February 9, 2020	Strong Wind	An area of low pressure slid down the Sierra Nevada while high pressure built over the region to the east. This allowed for strong northerly winds to set up across much of northern California with gusts ranging from 30 to 65 miles per hour. Various media outlets and members of the public reported wind damage including but not limited to uprooted trees, downed power lines, blown over fences, and loose and unsecured objects tossed around.
September 7, 2020	September 9, 2020	Strong Wind	Gusty winds led to 83 reports of wind related damage or hazards to a utility company across northern California, including areas served by NWS Eureka and NWS Monterey. Gusty winds also wreaked havoc on the North Complex. A utility company reported 15 reports of wind related damage or hazards in zone 67 spanning, Sierra, Nevada, Placer, El Dorado, Amador, and Tuolumne counties. Mesonet stations reported peak wind gusts around 50 mph.
September 26, 2020	September 18, 2020	Strong Wind	A round of critical fire weather conditions occurred from September 26 through September 28 due to a trough sliding into the Rockies and ridge building behind it. Gusty north to east winds generally ranged from 25 to 50 mph, however, some of the highest elevations along the Sierra Crest reported gusts up to 76 mph. This led to the Zogg Fire and 11 reports of wind related damage or hazards to a utility company across all of northern California, 10 of which occurred in along the west slopes of the northern Sierra. A utility company reported eight instances of wind related damage or hazards in zone 67 spanning Nevada, Placer, El Dorado, Amador, and Calaveras counties. Mesonet stations reported peak wind gusts between 30 and 50 mph, locally higher at higher elevations.

Date Begin	Date End	Hazard	Event Narrative
October 25, 2020	October 27, 2020	High Wind	A powerful offshore wind event unfolded from October 24 through October 27th as an upper-level trough slid into the Great Basin area and high pressure filled in its wake. This led to a tight pressure gradient developing over much of northern California which would lead to strong and damaging winds. In combination with the winds, low relative humidity values and dry fuels would lead to extreme weather conditions during this time frame. Most of the damage reports from this event came from the foothill and mountain locations via a utility company. They noted that there were 126 instances of wind related damage or hazards across northern California. Forty-nine of them were estimated to be within NWS Sacramento's county warning area. Peak wind gusts across the Valley were generally in the 35 to 50 mph range. Mesonet stations across zone 69 reported peak wind gusts between 45 and 73 mph; however, stronger gusts up to 119 mph were observed at elevations above 8000 feet. Additionally, a local utility company reported 22 instances of wind related damage or hazards within the zone.
January 18, 2021	January 20, 2021	High Wind	Upper-level ridging combined with a series of troughs led to the tightening of pressure gradients over interior northern California. Strong and damaging winds developed across interior northern California resulting in power outages, downed trees, downed power lines, and several small wildfires. Peak gusts ranged from 30 to 60 mph in the Valley, and generally between 40 and 80 mph for the mountains and foothills. Stronger winds were observed along the Sierra Crest. Wind reports across the area include Sacramento International, Sacramento Executive, and Davis airports reporting peak wind gusts of 41, 43, and 37 mph, respectively. Additional peak wind gust reports around Sacramento County varied from 30 to 43 mph and around Yolo County they varied from 35 to 59 mph.
December 10, 2022	December 10, 2022	Strong Wind	A weekend storm delivered widespread rain, mountain snow and gusty winds to interior Northern California. Sacramento International Airport reported a maximum gust of 52 mph. California Highway Patrol reported multiple downed trees and power lines across the Sacramento Area, resulting in 32,431 customers across the Sacramento region without power according to broadcast media. California Highway Patrol reported numerous downed trees across the motherlode area due to strong winds.
December 31, 2022	December 31, 2022	Flood, High Wind	A strong and very wet atmospheric storm brought extended periods of moderate to heavy rain and periods of strong winds to much of the region, along with heavy high-elevation snow. High winds gusting 50-65 mph in the Central Valley caused large numbers of trees to fall, bringing widespread power failures across the area, with hundreds of thousands of customers impacted. Many local roads were closed to downed trees blocking them. Trees were also reported to have fallen on homes and automobiles.
January 4, 2023	January 4, 2023	High Wind	A powerful atmospheric river brought very strong winds with moderate to heavy rain and renewed flooding of already elevated waterways. Winds gusted up to 50-60 mph in the Valley, with gusts up to 70 to 100 mph in the mountains. There were widespread trees down, blocking roads and causing numerous power outages across the area.
January 7, 2023	January 7, 2023	Strong Wind	A major winter storm brought strong winds with moderate to heavy rain bringing renewed flooding of already elevated waterways. Winds gusted up to 60-70 mph in the Central Valley. In the mountains there were gusts up to 80 to 115 mph, which coupled with heavy snow, brought whiteout conditions. There were widespread trees down across the area, blocking roads and causing numerous power outages. There were thunderstorms on January 10 with a tornado in Calaveras County and straight line wind damage and small hail reported in the northern San Joaquin Valley.

Date Begin	Date End	Hazard	Event Narrative
January 31, 2024	January 31, 2024	Strong Wind	An active weather pattern brought gusty winds with downed trees, heavy rain and mountain snow with mountain travel delays and chain restrictions, and isolated thunderstorms to end the month of January, and continued into early February. California Highway Patrol reported multiple large branches down on eastbound Interstate 80. Davis Airport reported gusts to 40 mph, Sacramento Executive Airport reported gusts to 36 mph, and Sacramento International Airport reported gusts to 46 mph. Auburn Municipal Airport reported a max gust of 41 mph.
February 4, 2024	February 5, 2024	High Wind, Flood	A major winter storm moved in from the south on February 4, bringing heavy rain, strong winds, thunderstorms and heavy mountain snow through February 7. Damaging winds brought down trees and caused widespread power outages. Flooding and strong winds resulted in multiple fatalities. Mather Field Airport reported a wind gust of 68 mph. Sacramento International Airport reported a wind gust of 64 mph. McClellan Airfield reported sustained winds of 43 mph with gusts to 59 mph, and a max gust of 66 mph. Vacaville Nut Tree Airport reported a gust of 59 mph. A station in Placerville recorded a max gust of 64 mph. Numerous reports of downed power lines and trees across the area, closing roads and damaging cars.
March 13, 2024	March 15, 2024	High Wind	Damaging northeast winds brought down trees and power lines in the mountains March 13 through 15, leading to thousands of customers without power across the area. Blue Canyon-Nyack Airport measured a gust of 66 mph. Duncan RAWS measured a 78 mph gust. A station at Leek Spring Hill measured a gust of 83 mph. California Highway Patrol reported numerous downed trees and power lines across the area. Traffic was held on Highway 50 for multiple hours due to downed power lines. The utility company, PGE, reported that thousands of customers without power due to the strong winds.
December 14, 2024	December 14, 2024	Strong Wind	Active weather brought periods of heavy mountain snow, rain and gusty winds December 12 through December 17 as multiple storms moved through the area. The strongest storm moved through December 13 through 14 and brought two to three inches of rain, over two feet of heavy snow above 5000 feet, and gusty southerly wind gusts of 35 to 65 mph. Numerous downed trees and thousands of power outages were reported during this time, along with mountain highway closures and chain restrictions, with roadway flooding in the Central Valley.

Source: (NOAA-NCEI 2025)

Since 1972, the NCEI reports six total tornadoes in Placer County: three F0, one F1, and since switching to the EF system, two EF0 tornadoes. The exact location was not recorded prior to the 2014 event. Table 13-6 lists the tornado event details.

Table 13-6. Tornadoes in Placer County

Location	Date	Time	Time Zone	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
PLACER CO.	10/15/1972	14:26	CST	F0	0	0	$0	$0
PLACER CO.	3/3/1983	19:15	CST	F0	0	0	$30	$0
PLACER CO.	3/22/1983	16:12	CST	F1	0	0	$250,000	$0
PLACER CO.	4/23/1990	17:30	CST	F0	0	0	$2,500	$0
RIEGO	3/26/2014	17:10	PST-8	EF0	0	0	$0	$0
LINCOLN	1/9/2017	14:00	PST-8	EF0	0	0	$0	$0

Location	Date	Time	Time Zone	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Total	**-**	**-**	**-**	**-**	**0**	**0**	**$252.530**	**$0**

Source: (NOAA-NCEI 2025)

13.1.5 Probability of Future Occurrences

Table 13-7 lists the number of high wind and tornado events reported by various sources over the 70-year period from 1955 to 2025, which is the most complete period of record for all sources reviewed. Based on these records and input from the HMPC, the probability of occurrence for high wind and tornado in the County is considered "frequent."

Table 13-7. Probability of Future High Wind and Tornado Events in Placer County

Hazard Type	Number of Occurrences Between 1995 and 2025	Percent Chance of Occurring in Any Given Year
High Winds and Tornadoes	281	100%

Source: (NOAA-NCEI 2025)

Note: 100% probability indicates that it is statistically likely for an event to occur every year. It does not indicate that the occurrence of an event is a certainty in any given year.

13.1.6 Cascading Impacts on Other Hazards

High winds and tornadoes can have several cascading impacts. Debris can cause transportation problems, which can affect emergency management and utilities. Downed power lines can complicate response and recovery by blocking roads and causing communication and power outages. In some cases, downed power lines result in fires. If combined with extreme temperatures, power outages from high winds can result in additional difficulty regulating indoor temperatures, potentially leading to death and injury. High winds are a contributing factor to stronger wildfires that spread rapidly and are difficult to contain (McFarland, et al. 2025).

13.2 Vulnerability Assessment

13.2.1 Life, Health, and Safety

OVERALL POPULATION

High winds and tornadoes can affect the overall population by causing injuries, fatalities, structural damage to homes and businesses, widespread power outages, and disruptions to transportation and communications. Residents in mobile homes and poorly constructed buildings face higher physical risk. Indirect impacts include temporary displacement, loss of essential services such as electricity, water, medical care, and economic hardship from property loss and business interruption.

SOCIALLY VULNERABLE POPULATION

Socially vulnerable groups including older adults, people with disabilities, low-income households, and those without reliable transportation are disproportionately affected due to limited resources to prepare for, evacuate from, or recover after high wind and tornado events. Vulnerability is influenced by several factors, including physical and financial ability to react or respond during a hazard, as well as the location and construction quality of their housing. Many socially vulnerable populations are more at risk for secondary effects from high wind hazards. For example, power outages from extreme winds can be life-threatening to those dependent on electricity for life support. Senior citizens are more likely to live in isolation, which may limit their ability to access resources for high wind or tornado preparation and response.

13.2.2 General Building Stock

High winds and tornadoes can cause severe damage across the building stock, ranging from roof and window loss to partial or complete structural collapse. Lightweight and poorly anchored structures such as mobile homes, unreinforced masonry, older buildings, and accessory structures (sheds, carports, garages) are especially vulnerable. Damage is often concentrated on roofs, exterior cladding, doors, and glazed openings, and flying debris can penetrate interiors and compromise structural framing. Critical facilities and commercial buildings may suffer operational disruption from roof damages, broken utilities, and debris-blocked access. Secondary effects include water intrusion, mold growth, and prolonged exposure of interior systems to the elements, which increase repair costs and recovery time. Overall, high wind events can produce widespread physical damage, render buildings unsafe or uninhabitable, and create significant economic and service interruptions.

13.2.3 Community Lifelines and Other Critical Facilities

High winds and tornadoes can significantly disrupt community lifelines such as safety and security, energy, water and wastewater, communications, transportation, and health care by damaging physical infrastructure, interrupting services, and degrading response capacity. Power lines, substations, and fuel supplies are vulnerable to downed trees and debris, causing outages that affect homes, hospitals, and emergency operations. Water and wastewater systems can lose pumping and treatment capability from damaged electrical service or facility impacts, reducing potable water availability and sanitation. Communications networks may be degraded by damaged towers and power loss, hindering warnings and coordination. Transportation routes and bridges may be blocked by debris or structurally impaired, delaying response and supply delivery. Healthcare facilities, emergency operations centers, shelters, and critical municipal buildings can sustain direct structural or utility damage that limits their functionality when demand for services is highest. These combined impacts amplify public safety risks, slow recovery, and require surge capacity, mutual aid, and rapid restoration to reestablish essential services.

13.2.4 Economy

High winds and tornadoes can have notable economic consequences in Placer County. Strong wind events can damage homes, businesses, agricultural lands, and public infrastructure, leading to costly repairs and loss of productivity. Power outages and utility disruptions caused by downed lines can halt business operations, interrupt supply chains, and increase recovery costs for both public and private sectors. Agricultural impacts may include crop losses, orchard damage, and harm to livestock, which reduce farm revenues and strain the County's agricultural economy. Tornadoes, while uncommon, have the potential to cause concentrated and severe destruction to communities.

13.2.5 Natural Resources

Strong winds may uproot or damage large stands of trees, leading to habitat loss, soil erosion, and long-term changes to forest composition. Wildlife may be displaced as nesting areas, riparian corridors, and sensitive ecosystems are damaged. Tornadoes, though rare in the region, have the potential to cause concentrated destruction to natural areas and agricultural lands, including the loss of orchards and crops that contribute to the County's rural character.

13.2.6 Historic and Cultural Resources

Historic resources are also vulnerable, as older buildings, monuments, and cultural landmarks may not be designed to withstand high wind loads. High winds may damage roofs, compromise structures, and contribute to the loss of irreplaceable architectural features or artifacts, threatening the County's cultural heritage. The combined effect of these hazards could erode the historical fabric of Placer County.

13.3 Future Changes That May Affect Risk

13.3.1 Land Use and Development

Land use and development trends in Placer County play a significant role in shaping exposure to high winds and, though rare, tornado events. As population growth continues in the western portion of the county and expands into foothill communities, new housing, commercial centers, and infrastructure introduce more assets at risk of wind-related damage. Expanding residential subdivisions and large retail developments often create clusters of vulnerable structures, particularly where building codes and retrofitting practices do not fully address high wind hazards. In rural and agricultural areas, scattered development and critical facilities such as power lines, barns, and storage structures are also susceptible to wind damage, which can lead to secondary impacts like extended power outages and economic losses. Increased impervious surfaces and taller building profiles associated with urban growth can amplify wind effects, while sprawling development into open terrain may leave homes and facilities more directly exposed. These patterns underscore the importance of integrating wind-resilient construction standards, vegetation management, and infrastructure hardening into land use planning and future development decisions to reduce community vulnerability.

13.3.2 Projected Changes in Population Patterns

Projected changes in population patterns will increase exposure to high risk and tornadoes. With the forecasted population and household growth in Placer County through 2050 described in Chapter 3, more people will move into the western unincorporated and incorporated areas, as well as central foothill zones around Auburn. As more development occurs in these growing areas, the number of homes, businesses, and critical infrastructure exposed to high winds (and potentially, in rare cases, tornadoes) will increase. Particularly in western and central sub-geographies with higher densities, clusters of structures could face amplified wind loads, while in foothill and rural peripheral areas, more dispersed households may have less redundancy in sheltering, evacuation, and emergency services. Additionally, as younger, higher income households seek more space and move into newer subdivisions with taller building profiles or features like large windows, exposed ridgelines, or tree cover, the risk of wind damage vulnerability may rise. These projected demographic shifts indicate that wind-resistance in building codes, siting new development away from exposed ridges, and planning for resilient utility and communication networks will become increasingly important to reduce risk.

13.3.3 Climate Change

Climate change is not expected to increase the frequency, severity, or duration of high winds in Placer County. However, high winds are a significant factor in the frequency, severity, and duration of wildfires, which are expected to increase with climate change-driven drought and high heat.

14. Landslide, Mudslide, and Debris Flow

14.1 Hazard Profile

14.1.1 Hazard 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 flow, mudslide, 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. Landslides often accompany or follow other natural hazard events, such as floods, wildfires, or earthquakes. They can occur slowly or very suddenly and can damage and destroy structures, roads, utilities, and forested areas, and can cause injuries and death.

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 range by composition, speed, and cause. For example, a debris flow is a fast-moving slurry of water, rock, soil, vegetation, boulders, and trees. Debris flows are triggered by short, intense periods of rainfall or rapid snowmelt (California Department of Conservation 2024a), when near-surface soil on steep slopes becomes saturated and begins to flow downslope. Post-wildfire burn areas are often prone to debris flows. A rockfall is dry, fast occurrence when boulders and rocks fall from cliffs or steep slopes, driven by primarily by gravity and sometimes as a result of destabilizing forces like weather or earthquakes. Mudslides involve the downhill movement of heavily water-saturated soils and other debris, and they typically occur in winter and spring after heavy rainfall. A debris flow typically travels at about 10 mph but can exceed 35 mph in extreme cases (USGS 2022).

Landslides are similar to soil erosion occurring at a more abrupt and rapid pace, and they share many of the same impacts. Erosion risk is a function of soil type, slope, rainfall intensity, and groundcover. Erosion causes the loss of valuable soil, looks unattractive, and drives the accumulation of soil or sediment in a process known as sedimentation. Sediment is considered a pollutant, and it also 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.

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.

14.1.2 Location

Landslides can occur anywhere in Placer County with a slope or unstable soil. Mountainous or hilly areas are especially prone, along with tracks of land that recently burned in wildfire. Geology, rainfall, excavation, and seismic activity can all contribute to landslide occurrence.

The Placer County General Plan describes areas in Placer County that are particularly prone to landslides. Slope instability and landslide hazards are generally found in areas of eastern Placer County, as seen in active and inactive landslide deposits. The General Plan Background Report identifies two specific rick units as active landslide areas), the Valley Springs Tuff, located at Alta and Interstate 80, and Metavolcanic Flows, located in the canyons of the North Fork of the American River. The inactive landslide deposit areas in Placer County include the metavolcanic flow rock units along the canyon slopes of the North and Middle Forks of the American River, and along the Truckee River. Although these landslide areas are no longer active, they could be reactivated by either natural erosion or human activities. Other potential landslide areas include Interstate 80 east of Colfax and State Route 49 south of Auburn.

LOCATIONS OF RECENT EVENTS

With heavy rain events, landslides may occur, causing road closures for hours and days at a time in some areas. Foresthill road, Old Foresthill road, and Iowa Hill road are areas of recent landslides. The HMPC identified the following recent landslide areas of concern:

- Alpine Meadows Road
- Alta Forestry Road
- Casa Loma Road
- Foresthill Road
- Norton Grade Road
- Old Foresthill Road
- Ophir Road (two sites): near Stonehouse Road and near Wise Road
- Rollins Lake Road
- Yankee Jim's Road
- Middle Fork American River / North Fork American River / Rubicon River canyons

California Geological Survey (CGS) lists 22 landslides in Placer County from 2017 to 2024 in its Reported Landslides database, as presented in Table 14-1. These events have been reported almost exclusively on roadways, and other rockfalls, mudslides, landslides, and debris flows may have occurred outside of roadways without being reported. The locations of these incidents are shown in Figure 14-1.

BURN AREAS

Fires burn vegetation and soil, which can trigger landslides and debris flows into waterways and downstream assets such as electric powerhouses and water treatment facilities. Following the 2022 Mosquito Fire in central Placer County, USGS assessed burned areas for their susceptibility to post-fire debris flows, based on soil properties, burn severity, topography, and rainfall characteristics. Figure 14-2 identifies burned areas and the likelihood of debris flow following a rain event with a precipitation rate of 24mm per hour.

Table 14-1. CGS Reported Landslides, 2017 to 2024

Date	Nearest Place	Damage Description
1/10/2017	2.2 kilometers northeast of the intersection of Highway 49 and Old Foresthill Road.	Mud and rock covered Old Foresthill Road resulting in closure.
2/10/2017	800 meters east of Baxter, CA	Mud and trees covered all lanes of I-80. I-80 closed for over 24 hours
5/28/2018	91.5 meters from intersection of Alpine Meadows Rd and Deer Park Dr. (Alpine Meadows)	Alpine Meadows Rd covered by over a meter of rock and mud.
1/27/2019	7.2 kilometers east-southeast of Foresthill, CA	Blacksmith Flat Road rendered impassible. Closed throughout the summer months.
12/26/2021	Old Foresthill Road, east of confluence of American River North and Middle Forks	Rockslide onto Old Foresthill Road causes lengthy traffic hazard.
12/31/2022	Clementine Lake	Debris covering Clementine Road.
1/6/2023	Ophir Road and Wise Road	Entire roadway closed due to rocks covering road.
1/9/2023	Mosquito Ridge Road southwest of Big Oak Flat, Placer County	Debris flow into Middle Fork American River.
1/10/2023	Old Foresthill Road	Rocks covering roadway
1/10/2023	Mosquito Ridge Road southwest of Big Oak Flat, Placer County	Debris flow into Middle Fork American River.
1/11/2023	Old Foresthill Road and Foresthill Road	Rockslide blocking Old Foresthill Road.
1/13/2023	North Fork and Middle Fork American River Confluence, Placer County	Both directions of HWY 49 were closed to rockslide at northbound Highway 49, just north of the NFS ranger station.
1/14/2023	Applegate Road and Hidden Meadow Way	Debris on roadway.
1/14/2023	Intersection of Taylor Road and Buena Vista Avenue, Placer County	Placer County Sheriff reports boulder in roadway on Taylor Road between Old State Highway and Hwy 293, right by the tunnel
1/14/2023	El Dorado Street and Lincoln Way	CHP reports rockslide blocking roadway.
1/14/2023	Mosquito Ridge Road and Gorman Ranch Road	Hillside erosion compromising road integrity. Mosquito Ridge Road shut down.
1/14/2023	Magra Road and Secret Town Road	Magra Road blocked by mud, dirt, and rocks.
1/16/2023	Old Auburn Foresthill Road above Mammoth Bar	Debris on roadway.
3/12/2023	Rollins Lake Rd and You Bet Rd	YubaNet reports debris flow across Rollins Lake Rd at You Bet Rd; one lane completely blocked.
3/14/2023	Murderers Bar	CHP reports mudslide in roadway. At time of reporting landslide was still "coming down".
3/15/2023	Colfax, Placer County	CalFire reported a landslide on Ben Taylor Road that impacted a residence, resulting in the evacuation of the impacted home and 20 additional residences.
1/18/2024	Old Foresthill Road and Mammoth Bar	A rockfall covered both lanes of Old Foresthill Road and damaged a passing vehicle.

Source: (California Geological Survey 2025)

Figure 14-1. CGS Reported Landslides

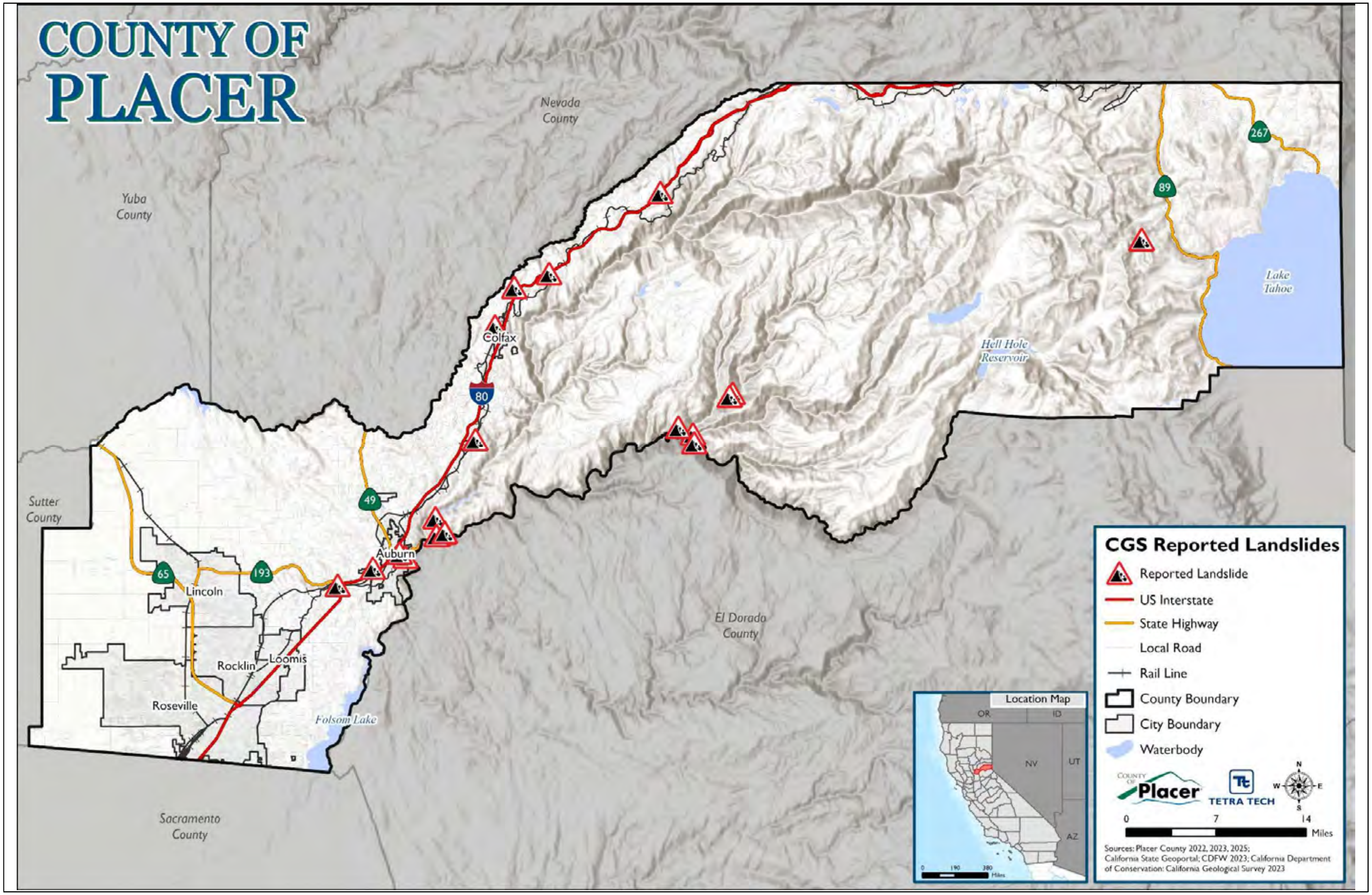
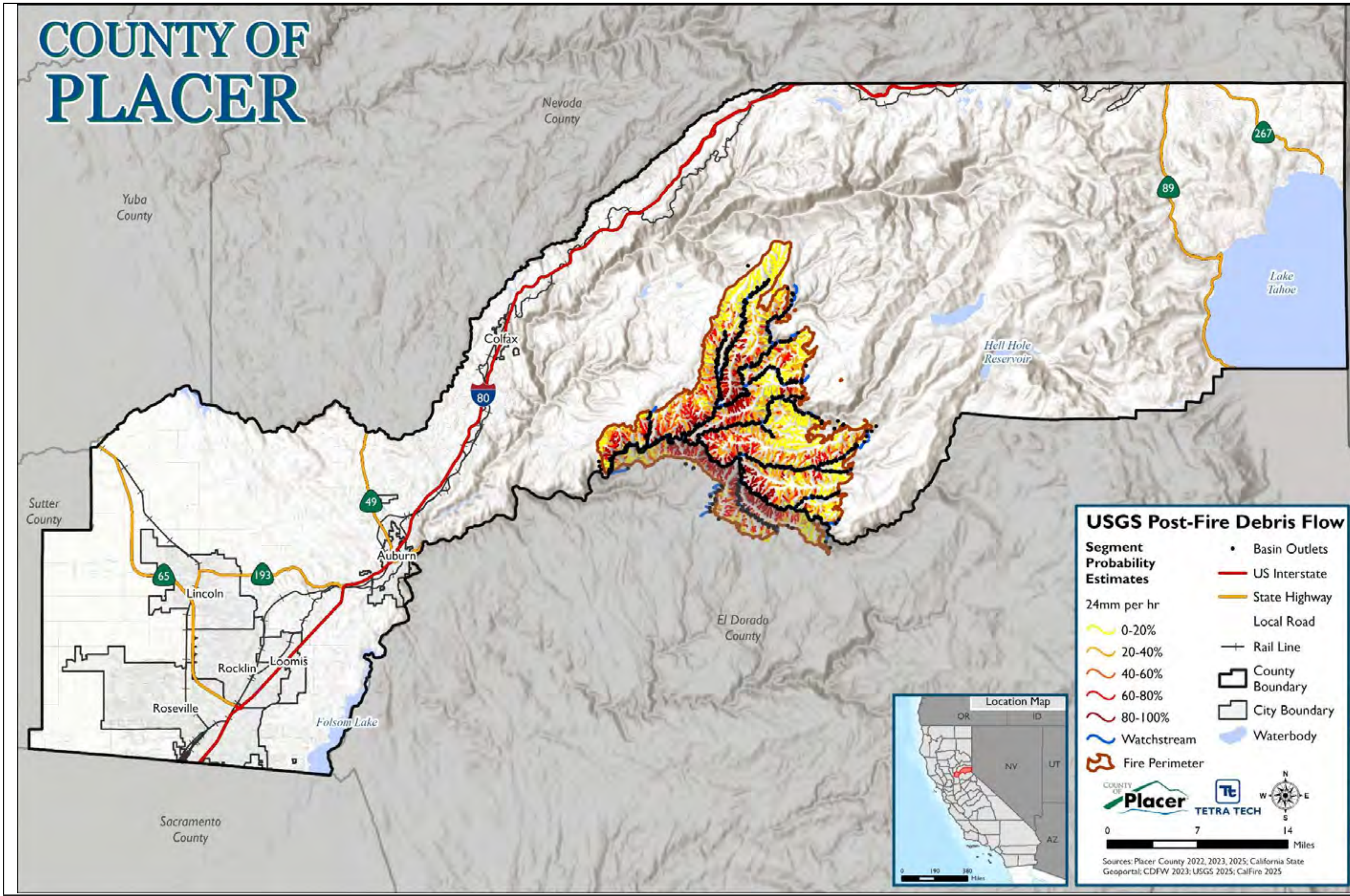


Figure 14-2. USGS Post-Fire Debris Flow Probability



MAPPED LANDSLIDE SUSCEPTIBILITY AREAS

The California Department of Conservation has mapped susceptibility to deep-seated landslides based on regional estimates of rock strength and steepness of slopes. Generally, weak rocks and steep slopes are most likely to generate landslides. The map uses information on the location of past landslides, the location and relative strength of rock units, and steepness of slope to estimate susceptibility to deep-seated landsliding (California Department of Conservation 2020). Figure 14-3 shows the areas mapped as having moderate, high, or very high susceptibility.

14.1.3 Extent

The extent of landslide in Placer County varies widely. Severe landslides entail larger quantities of moving material, up to thousands of tons of debris. Landslides vary from a few square yards up to a mile across. The slide may occur slowly or as fast as 100 mph.

The level of damage that has resulted from recent landslides in Placer County is described in Table 14-1.

14.1.4 Previous Occurrences

FEMA DISASTER DECLARATIONS

Table 14-2 lists all landslide, mudslide, and debris flow-related major disaster (DR) or emergency (EM) declarations that have included Placer County.

STATE EMERGENCY PROCLAMATIONS

Table 14-3 lists all landslide, mudslide, and debris flow-related state emergency proclamations from 2020 to 2024 that included Placer County. For events prior to 2020, refer to the 2021 Placer County LHMP.

ALL RECENT EVENTS

Table 14-4 lists additional major recorded landslides, mudslides, and debris flow-related events that impacted Placer County since the 2021 LHMP was developed. For earlier events, refer to the previous plan.

Figure 14-3. Deep-Seated Landslide Susceptibility

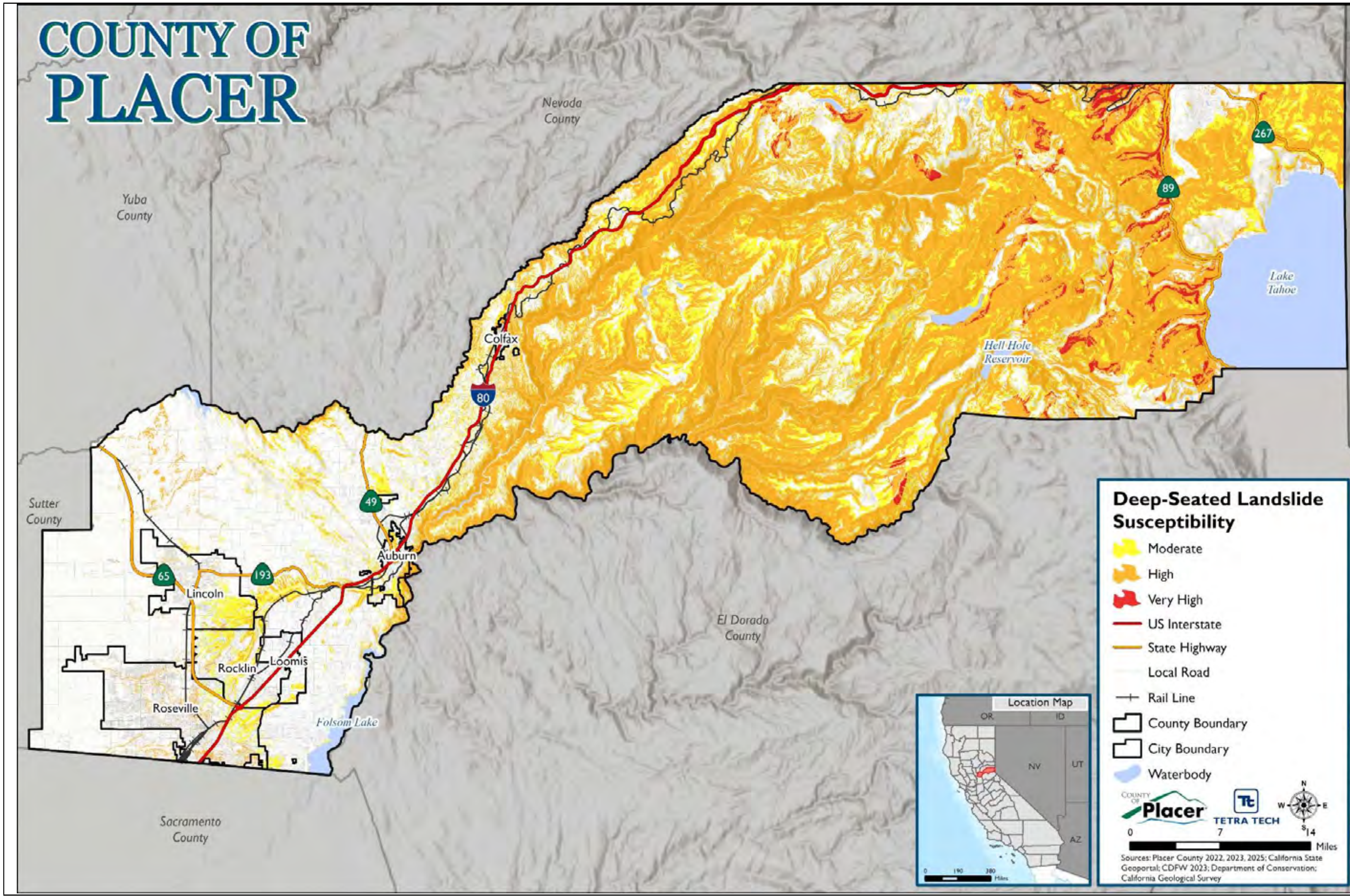


Table 14-2. FEMA Disaster Declarations for Landslides, Mudslides, and Debris Flow Events in Placer County

Declaration Date	Declaration Number	Incident Type	Disaster Name
February 9, 1983	DR-677	Coastal Storm	Coastal Storms, Floods, Slides & Tornadoes
March 12, 1995	DR-1046	Severe Storm	Severe Winter Storms, Flooding Landslides, Mud Flow
January 10, 1995	DR-1044	Severe Storm	Severe Winter Storms, Flooding, Landslides, Mud Flows
January 4, 1997	DR-1155	Severe Storm	Severe Storms, Flooding, Mud and Landslides
June 5, 2006	DR-1646	Severe Storm	Severe Storms, Flooding, Landslides, and Mudslides
February 3, 2006	DR-1628	Severe Storm	Severe Storms, Flooding, Mudslides, and Landslides
February 14, 2017	DR-4301	Severe Storm	Severe Winter Storms, Flooding, and Mudslides
January 14, 2023	DR-4683	Flood	Severe Winter Storms, Flooding, Landslides, and Mudslides
March 10, 2023	EM-3592	Flood	Severe Winter Storms, Flooding, Landslides, and Mudslides
January 9, 2023	EM-3591	Flood	Severe Winter Storms, Flooding, and Mudslides

Source: (FEMA 2025b)

Table 14-3. State Emergency Proclamations for Landslides, Mudslides, and Debris Flow Events in Placer County (2020 to 2024)

State Proclamation Date	State Disaster Name	Description
March 23, 2022	October 2021 Storms	Beginning on or about October 21, 2021, and continuing for approximately one week, a series of strong atmospheric River storm systems struck California resulting in record-breaking rainfall, flooding, erosion, and debris flows. These storms caused widespread damage to roads and other infrastructure across significant portions of the state.

Source: (Cal OES 2025)

Table 14-4. Landslides, Mudslides, and Debris Flow Events in Placer County (2020 to 2024)

Date	Hazard	Event Narrative
January 7, 2023	Strong Wind	A major winter storm brought strong winds with moderate to heavy rain. There was flooding of roadways, urban areas, rivers, streams and creeks, with rockslides and mudslides also reported.
March 27-29, 2023	Heavy Snow	A strong winter storm brought moderate to heavy rain with flooding of roadways, streams and creeks, with mudslides also reported. There was continued river flooding along the already elevated Sacramento, San Joaquin, Cosumnes, Mokelumne, and Tuolumne rivers. There was a fatality reported in Alta, CA where a man died from a collapsed snowbank, trapping him next to a generator and exposing him to carbon monoxide.

Source: (NOAA-NCEI 2025)

Note: The NCEI database includes only events under the title "Debris Flow," which might not account for all landslide and mudslide events. Because landslides can occur in remote, mountainous areas, it is also possible that the incidence is higher than reported.

14.1.5 Probability of Future Occurrences

Table 14-5 lists the number of landslide, mudslide, and debris flow events reported by various sources over the 8-year period from 2017 to 2025, which is the most complete period of record for all sources reviewed. Based on these records and input from the HMPC, the probability of occurrence for landslides, mudslides, and debris flow in the County is considered “frequent.”

Table 14-5. Probability of Future Landslides, Mudslides, and Debris Flows in Placer County

Hazard Type	Number of Occurrences Between 2017 and 2025	Percent Chance of Occurring in Any Given Year
Landslides, Mudslides, and Debris Flow	24	100%

Source: (NOAA-NCEI 2025)

Note: 100% probability indicates that it is statistically likely for an event to occur every year. It does not indicate that the occurrence of an event is a certainty in any given year.

14.1.6 Cascading Impacts on Other Hazards

Mudslides, debris flows, and landslides can trigger a range of cascading Impacts, depending on the terrain, infrastructure, and environmental conditions where they occur. They can destroy transportation networks, isolating communities and delaying emergency response, including wildfire suppression. Landslides can sever power lines, water mains, and gas pipelines, leading to secondary hazards like fires or water shortages. In addition, landslides can block rivers, forming landslide dams (also called “earth dams”). Flooding from landslide dams can contaminate drinking water sources, increasing disease risk. Landslide dams can also fail suddenly, causing catastrophic downstream flooding. Debris flows can deposit large amounts of sediment in rivers and reservoirs, reducing water quality and storage capacity.

Landslides can strip vegetation, leaving slopes more vulnerable to wildfires, especially in dry seasons. They may also move fuel such as trees and brush to areas where it did not previously pose a risk.

14.2 Vulnerability and Impact Assessment

The vulnerability assessment for the landslide hazard used the mapping of deep-seated landslide susceptibility shown in Figure 14-3.

14.2.1 Life, Health, and Safety

OVERALL POPULATION

Landslide poses a risk of injury and fatality to individuals in the path of any fast-moving slide. The population downslope of high landslide incidence hazard areas are particularly vulnerable. In addition to direct harm, landslides can displace residents, block off major roadways and inhibit travel. Generally, impacts of a landslide event are limited to population within the immediate area, unless a major transportation corridor is impacted.

Placer County's population is distributed across various landslide susceptibility zones, as shown in Table 14-6 through Table 14-8. The estimated population at risk is 52,391 in the moderate hazard area (12.7 percent of the County's total population), 33,667 in the high hazard area (8.2 percent of the County's total population), and 840 in the very high hazard area (0.2 percent of the County's total population).

Table 14-6. Population in the Moderate Landslide Susceptibility Hazard Area

Jurisdiction	Total Population	Population in Hazard Area	% of Jurisdiction
City of Auburn	13,758	3,085	22.4%
City of Colfax	2,095	137	6.5%
City of Lincoln	51,629	10,262	19.9%
Town of Loomis	6,809	182	2.7%
City of Rocklin	72,340	17,839	24.7%
City of Roseville	152,438	6,954	4.6%
Unincorporated County	113,366	13,932	12.3%
Placer County (Total)	**412,435**	**52,391**	**12.7%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; California Department of Conservation, California Geological Survey 2023

Table 14-7. Population in the High Landslide Susceptibility Hazard Area

Jurisdiction	Total Population	Population in Hazard Area	% of Jurisdiction
City of Auburn	13,758	1,055	7.7%
City of Colfax	2,095	216	10.3%
City of Lincoln	51,629	1,348	2.6%
Town of Loomis	6,809	21	0.3%
City of Rocklin	72,340	3,376	4.7%
City of Roseville	152,438	12,890	8.5%
Unincorporated County	113,366	14,761	13.0%
Placer County (Total)	**412,435**	**33,667**	**8.2%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; California Department of Conservation, California Geological Survey 2023

Table 14-8. Population in the Very High Landslide Susceptibility Hazard Area

Jurisdiction	Total Population	Population in Hazard Area	% of Jurisdiction
City of Auburn	13,758	0	0.0%
City of Colfax	2,095	0	0.0%
City of Lincoln	51,629	2	<0.1%
Town of Loomis	6,809	0	0.0%
City of Rocklin	72,340	0	0.0%
City of Roseville	152,438	0	0.0%
Unincorporated County	113,366	838	0.7%

Jurisdiction	Total Population	Population in Hazard Area	% of Jurisdiction
Placer County (Total)	**412,435**	**840**	**0.2%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; California Department of Conservation, California Geological Survey 2023

SOCIALLY VULNERABLE POPULATION

Populations with access and functional needs, as well as elderly populations and the very young, may be unable to evacuate quickly enough to avoid a landslide. Other vulnerable groups are those experiencing homelessness or people whose primary language is not English. Table 14-9 through Table 14-15 presents the estimated socially vulnerable populations in areas with landslide susceptibility in Placer County.

Table 14-9. Population Over 65 in Landslide Susceptibility Hazard Areas

Jurisdiction	Moderate Landslide Susceptibility Hazard Area	% of Total	High Landslide Susceptibility Hazard Area	% of Total	Very High Landslide Susceptibility Hazard Area	% of Total
City of Auburn	826	22.4%	282	7.7%	0	0.0%
City of Colfax	17	6.3%	27	10.0%	0	0.0%
City of Lincoln	2,788	19.9%	366	2.6%	0	0.0%
Town of Loomis	38	2.7%	4	0.3%	0	0.0%
City of Rocklin	2,564	24.7%	485	4.7%	0	0.0%
City of Roseville	1,193	4.6%	2,211	8.5%	0	0.0%
Unincorporated County	3,351	12.3%	3,551	13.0%	201	0.7%
Placer County (Total)	**10,777**	**12.9%**	**6,926**	**8.3%**	**201**	**0.2%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; California Department of Conservation, California Geological Survey 2023

Table 14-10. Population Under 5 in Landslide Susceptibility Hazard Areas

Jurisdiction	Moderate Landslide Susceptibility Hazard Area	% of Total	High Landslide Susceptibility Hazard Area	% of Total	Very High Landslide Susceptibility Hazard Area	% of Total
City of Auburn	115	22.4%	39	7.6%	0	0.0%
City of Colfax	3	5.1%	6	10.2%	0	0.0%
City of Lincoln	556	19.9%	73	2.6%	0	0.0%
Town of Loomis	6	2.4%	0	0.0%	0	0.0%
City of Rocklin	1,019	24.6%	192	4.6%	0	0.0%
City of Roseville	409	4.6%	758	8.5%	0	0.0%
Unincorporated County	493	12.3%	522	13.0%	29	0.7%
Placer County (Total)	**2,601**	**12.5%**	**1,590**	**7.7%**	**29**	**0.1%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; California Department of Conservation, California Geological Survey 2023

Table 14-11. Non-English Speaking Population in Landslide Susceptibility Hazard Areas

Jurisdiction	Moderate Landslide Susceptibility Hazard Area	% of Total	High Landslide Susceptibility Hazard Area	% of Total	Very High Landslide Susceptibility Hazard Area	% of Total
City of Auburn	105	22.2%	36	7.6%	0	0.0%
City of Colfax	5	6.3%	8	10.1%	0	0.0%
City of Lincoln	151	19.9%	19	2.5%	0	0.0%
Town of Loomis	0	0.0%	0	0.0%	0	0.0%
City of Rocklin	454	24.6%	85	4.6%	0	0.0%
City of Roseville	162	4.6%	300	8.4%	0	0.0%
Unincorporated County	214	12.3%	227	13.0%	12	0.7%
Placer County (Total)	**1,091**	**12.9%**	**675**	**8.0%**	**12**	**0.1%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; California Department of Conservation, California Geological Survey 2023

Table 14-12. Population with Disability in Landslide Susceptibility Hazard Areas

Jurisdiction	Moderate Landslide Susceptibility Hazard Area	% of Total	High Landslide Susceptibility Hazard Area	% of Total	Very High Landslide Susceptibility Hazard Area	% of Total
City of Auburn	380	22.4%	130	7.7%	0	0.0%
City of Colfax	25	6.4%	40	10.2%	0	0.0%
City of Lincoln	1,371	19.9%	180	2.6%	0	0.0%
Town of Loomis	14	2.5%	1	0.2%	0	0.0%
City of Rocklin	1,784	24.7%	337	4.7%	0	0.0%
City of Roseville	781	4.6%	1,448	8.5%	0	0.0%
Unincorporated County	1,565	12.3%	1,659	13.0%	94	0.7%
Placer County (Total)	**5,920**	**12.7%**	**3,795**	**8.1%**	**94**	**0.2%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; California Department of Conservation, California Geological Survey 2023

Table 14-13. Population Below Poverty Level in Landslide Susceptibility Hazard Areas

Jurisdiction	Moderate Landslide Susceptibility Hazard Area	% of Total	High Landslide Susceptibility Hazard Area	% of Total	Very High Landslide Susceptibility Hazard Area	% of Total
City of Auburn	386	22.4%	132	7.7%	0	0.0%
City of Colfax	17	6.5%	26	10.0%	0	0.0%
City of Lincoln	789	19.9%	103	2.6%	0	0.0%
Town of Loomis	19	2.6%	2	0.3%	0	0.0%
City of Rocklin	894	24.6%	169	4.7%	0	0.0%
City of Roseville	411	4.6%	763	8.5%	0	0.0%
Unincorporated County	992	12.3%	1,051	13.0%	59	0.7%
Placer County (Total)	**3,508**	**12.8%**	**2,246**	**8.2%**	**59**	**0.2%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; California Department of Conservation, California Geological Survey 2023

Table 14-14. Population with No Broadband Internet in Landslide Susceptibility Hazard Areas

Jurisdiction	Moderate Landslide Susceptibility Hazard Area	% of Total	High Landslide Susceptibility Hazard Area	% of Total	Very High Landslide Susceptibility Hazard Area	% of Total
City of Auburn	388	22.4%	133	7.7%	0	0.0%
City of Colfax	20	6.5%	31	10.0%	0	0.0%
City of Lincoln	727	19.9%	95	2.6%	0	0.0%
Town of Loomis	9	2.5%	1	0.3%	0	0.0%
City of Rocklin	641	24.6%	121	4.7%	0	0.0%
City of Roseville	369	4.6%	684	8.5%	0	0.0%
Unincorporated County	1,161	12.3%	1,230	13.0%	69	0.7%
Placer County (Total)	**3,315**	**12.6%**	**2,295**	**8.8%**	**69**	**0.3%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; California Department of Conservation, California Geological Survey 2023

Table 14-15. Population with No Vehicle Access in Landslide Susceptibility Hazard Areas

Jurisdiction	Moderate Landslide Susceptibility Hazard Area	% of Total	High Landslide Susceptibility Hazard Area	% of Total	Very High Landslide Susceptibility Hazard Area	% of Total
City of Auburn	178	22.4%	61	7.7%	0	0.0%
City of Colfax	6	6.2%	10	10.3%	0	0.0%
City of Lincoln	171	19.8%	22	2.5%	0	0.0%
Town of Loomis	6	2.6%	0	0.0%	0	0.0%
City of Rocklin	538	24.7%	101	4.6%	0	0.0%
City of Roseville	377	4.6%	700	8.5%	0	0.0%
Unincorporated County	430	12.3%	456	13.0%	25	0.7%
Placer County (Total)	**1,706**	**10.7%**	**1,350**	**8.5%**	**25**	**0.2%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; California Department of Conservation, California Geological Survey 2023

14.2.2 General Building Stock

Landslides can damage structures with the physical impact of debris moving downslope or by foundation damage due to ground deformation. A water-saturated, fast-moving debris flow can collapse walls and shift structures off their foundations. Even a less severe landslide can generate an uneven ground surface, causing structures and foundations to settle, crack, and tilt. This can occur slowly over years or rapidly within days or hours.

Table 14-16 summarizes buildings within Placer County's moderate landslide susceptibility hazard areas. There are 23,030 buildings in this hazard area, valued at $21.6 billion. Unincorporated Placer County accounts for the largest share in this category, with 8,315 buildings, representing 10.7 percent of its total building stock, and an estimated replacement cost value of $6 billion.

Table 14-16. Buildings in Moderate Landslide Susceptibility Hazard Area

Jurisdiction	Number of Buildings in Moderate Landslide Area	% of Jurisdiction Total	Replacement Cost Value	% of Jurisdiction Total
City of Auburn	1,265	19.8%	$1,111,089,688	18.1%
City of Colfax	68	6.9%	$52,200,612	6.8%
City of Lincoln	4,413	19.0%	$3,884,013,274	19.3%
Town of Loomis	115	2.9%	$124,086,027	3.5%
City of Rocklin	5,687	22.8%	$4,667,996,383	19.7%
City of Roseville	2,567	4.8%	$5,828,991,681	10.1%
Unincorporated County	8,915	10.7%	$6,005,604,039	9.6%
Placer County (Total)	**23,030**	**11.7%**	**$21,673,981,705**	**12.4%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; California Department of Conservation, California Geological Survey 2023

Note: See Table 3-9 for total building counts and replacement cost value in each jurisdiction and countywide

Table 14-17 provides an overview of buildings in high landslide susceptibility hazard areas. There are 15,818 buildings with a total estimated replacement cost value of $11.2 billion.

Table 14-17. Buildings in High Landslide Susceptibility Hazard Area

Jurisdiction	Number of Buildings in High Landslide Area	% of Jurisdiction Total	Replacement Cost Value	% of Jurisdiction Total
City of Auburn	428	6.7%	$299,578,676	4.9%
City of Colfax	93	9.5%	$50,046,338	6.5%
City of Lincoln	620	2.7%	$536,806,353	2.7%
Town of Loomis	18	0.5%	$11,704,697	0.3%
City of Rocklin	1,115	4.5%	$974,117,168	4.1%
City of Roseville	4,548	8.5%	$4,393,626,371	7.6%
Unincorporated County	8,996	10.8%	$5,008,857,644	8.0%
Placer County (Total)	**15,818**	**8.1%**	**$11,274,737,246**	**6.5%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; California Department of Conservation, California Geological Survey 2023

Note: See Table 3-9 for total building counts and replacement cost value in each jurisdiction and countywide

Table 14-18 provides an overview of buildings in very high landslide susceptibility hazard areas. There are 485 buildings with a total estimated replacement cost value of $275 million.

Table 14-19 through Table 14-21 summarizes the number of buildings by occupancy class within landslide hazard areas.

Table 14-18. Buildings in Very High Landslide Susceptibility Hazard Area

Jurisdiction	Number of Buildings in Very High Landslide Area	% of Jurisdiction Total	Replacement Cost Value	% of Jurisdiction Total
City of Auburn	0	0.0%	$0	0.0%
City of Colfax	0	0.0%	$0	0.0%
City of Lincoln	1	<0.1%	$903,492	<0.1%
Town of Loomis	0	0.0%	$0	0.0%
City of Rocklin	0	0.0%	$0	0.0%
City of Roseville	0	0.0%	$0	0.0%
Unincorporated County	484	0.6%	$273,753,784	0.4%
Placer County (Total)	**485**	**0.2%**	**$274,657,276**	**0.2%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; California Department of Conservation, California Geological Survey 2023

Note: See Table 3-9 for total building counts and replacement cost value in each jurisdiction and countywide

Table 14-19. Buildings in Moderate Landslide Susceptibility Hazard Area by Occupancy Class

Jurisdiction	Residential	Commercial	Industrial	Other
City of Auburn	383	44	1	0
City of Colfax	71	14	6	2
City of Lincoln	563	56	1	0
Town of Loomis	8	10	0	0
City of Rocklin	1,011	102	2	0
City of Roseville	4,350	122	51	25
Unincorporated County	7,549	1,353	44	50
Placer County (Total)	**13,935**	**1,701**	**105**	**77**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; California Department of Conservation, California Geological Survey 2023

Note: Other = Government, Religion, Agricultural, and Education

Table 14-20. Buildings in High Landslide Susceptibility Hazard Area by Occupancy Class

Jurisdiction	Residential	Commercial	Industrial	Other
City of Auburn	383	44	1	0
City of Colfax	71	14	6	2
City of Lincoln	563	56	1	0
Town of Loomis	8	10	0	0
City of Rocklin	1,011	102	2	0
City of Roseville	4,350	122	51	25
Unincorporated County	7,549	1,353	44	50
Placer County (Total)	**13,935**	**1,701**	**105**	**77**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; California Department of Conservation, California Geological Survey 2023

Note: Other = Government, Religion, Agricultural, and Education

Table 14-21. Buildings in Very High Landslide Susceptibility Hazard Area by Occupancy Class

	Residential	Commercial	Industrial	Other
City of Auburn	0	0	0	0
City of Colfax	0	0	0	0
City of Lincoln	1	0	0	0
Town of Loomis	0	0	0	0
City of Rocklin	0	0	0	0
City of Roseville	0	0	0	0
Unincorporated County	429	46	6	3
Placer County (Total)	**430**	**46**	**6**	**3**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; California Department of Conservation, California Geological Survey 2023

Note: Other = Government, Religion, Agricultural, and Education

14.2.3 Community Lifelines and Other Critical Facilities

Highly susceptible areas of the county feature mountain and shoreline roads and transportation infrastructure. All infrastructure and transportation corridors identified as vulnerable to landslide occurrence are considered susceptible to potential landslide impacts. While some landslide-exposed critical facilities have implemented mitigation measures, a site-specific analysis would be needed to determine if any particular facility would likely withstand those impacts.

Table 14-22 lists the number of facilities in the moderate hazard area by lifeline. A total of 141 facilities are located in this hazard area with the highest number among communications (38). Unincorporated Placer County has the highest number of critical facilities (79) located in this hazard area.

Table 14-23 and Table 14-24 summarize the number of facilities located in the high, and very high landslide susceptibility hazard areas, categorized by lifeline type. A total of 149 facilities are located in the high hazard area, and two in the very high hazard area.

14.2.4 Economy

The direct costs of landslides, mudslides, and debris flows include damage to buildings, private property, transportation corridors, utility and energy infrastructure, and communication systems. These events can bury homes, roads, and farmlands, causing extensive structural damage and loss of function. Agricultural lands can be buried under mud and debris, rendering them unusable for extended periods. Indirect costs may also be significant, including cleanup expenses, business interruption, reduced property values, loss of tax revenue, and decreased productivity. Building and infrastructure losses directly affect the local tax base and economy. Furthermore, landslides, mudslides, and debris flows that block or damage roadways can isolate residents and businesses, hinder emergency response, and delay the movement of goods and services.

Table 14-22. Facilities in the Moderate Landslide Susceptibility Hazard Area, by Lifeline

Jurisdiction	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Total Facilities in Hazard Area	% of Jurisdiction Total
City of Auburn	2	0	1	0	3	1	0	0	1	8	13.3%
City of Colfax	1	0	0	0	0	0	0	0	0	1	6.7%
City of Lincoln	0	0	0	0	0	1	0	0	1	2	2.3%
Town of Loomis	1	0	0	0	1	0	0	0	0	2	10.0%
City of Rocklin	0	0	4	1	2	5	0	0	6	18	14.6%
City of Roseville	1	0	0	7	12	4	0	0	7	31	10.3%
Unincorporated County	33	1	6	7	2	20	5	1	4	79	10.9%
Placer County (Total)	**38**	**1**	**11**	**15**	**20**	**31**	**5**	**1**	**19**	**141**	**10.6%**

Source: Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025; California Department of Conservation, California Geological Survey 2023

Table 14-23. Facilities in the High Landslide Susceptibility Hazard Area, by Lifeline

Jurisdiction	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Total Facilities in Hazard Area	% of Jurisdiction Total
City of Auburn	0	0	0	1	1	0	0	0	0	2	3.3%
City of Colfax	1	0	1	0	0	1	0	0	1	4	26.7%
City of Lincoln	0	0	0	0	0	0	0	0	0	0	0.0%
Town of Loomis	0	0	0	0	0	0	0	0	0	0	0.0%
City of Rocklin	1	0	0	0	0	1	0	0	4	6	4.9%
City of Roseville	2	0	0	4	7	5	2	0	8	28	9.3%
Unincorporated County	51	4	1	9	1	20	17	0	6	109	15.0%
Placer County (Total)	**55**	**4**	**2**	**14**	**9**	**27**	**19**	**0**	**19**	**149**	**11.2%**

Source: Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025; California Department of Conservation, California Geological Survey 2023

Table 14-24. Facilities in the Very High Landslide Susceptibility Hazard Area, by Lifeline

Jurisdiction	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Total Facilities in Hazard Area	% of Jurisdiction Total
City of Auburn	0	0	0	0	0	0	0	0	0	0	0.0%
City of Colfax	0	0	0	0	0	0	0	0	0	0	0.0%
City of Lincoln	0	0	0	0	0	0	0	0	0	0	0.0%
Town of Loomis	0	0	0	0	0	0	0	0	0	0	0.0%
City of Rocklin	0	0	0	0	0	0	0	0	0	0	0.0%
City of Roseville	0	0	0	0	0	0	0	0	0	0	0.0%
Unincorporated County	0	0	0	1	0	1	0	0	0	2	0.3%
Placer County (Total)	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**2**	**0.2%**

Source: Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025; California Department of Conservation, California Geological Survey 2023

14.2.5 Natural Resources

Natural environments are often degraded as slope failures strip vegetation, destabilize soils, and deposit large volumes of sediment into waterways, reducing water quality, smothering aquatic habitats, and altering riparian ecosystems. Forested areas may experience long-term loss of habitat.

14.2.6 Historic and Cultural Resources

Landslides and debris flows can damage or destroy historic structures, archaeological sites, monuments, and cultural landmarks, particularly those located along unstable slopes or river valleys. Inundation or burial of museums, archives, and repositories can lead to the permanent loss of irreplaceable documents, artifacts, and cultural materials. These impacts diminish the County's historical legacy and cultural identity.

14.3 Future Changes That May Affect Risk

14.3.1 Land Use and Development

Placer County's evolving land use and development patterns increase exposure to landslides, mudslides, and debris flow hazards, especially in the foothill and mountainous portions of the county. The County's Demographic Trends Report anticipates that growth pressures in the western incorporated areas will, over time, push residential and supporting development further into the central and eastern unincorporated zones where topography is steeper and natural slope stability is more tenuous. As development advances into hillside lots, ridge slopes, and terrain with complex geology, activities such as grading, vegetation removal, road cuts, and drainage changes can destabilize slopes, making them more susceptible to failure under heavy rainfall or following wildfire. In these higher-risk zones, the fragmentation and dispersion of development can hinder coordinated stormwater control and geotechnical mitigation, while critical roads, utilities, and emergency access routes may themselves cross or abut unstable terrain. To reduce vulnerability, land use decisions should integrate slope hazard mapping, enforce setbacks from unstable slopes, require geotechnical review, and promote clustering of development in safer zones rather than sprawl into hazard-prone hillside areas.

14.3.2 Projected Changes in Population Patterns

As noted in Chapter 3, Placer County's population is projected to continue growing in the coming decades, with notable shifts in both density and distribution. Much of this growth is expected to occur in the western portion of the county, particularly within incorporated cities and suburban communities along major transportation corridors, where infrastructure and services can support higher density development. At the same time, rural and foothill areas are also experiencing incremental population increases, which may heighten vulnerability to landslides, mudslides, and debris flows. An increase in population on the western side of the county may also lead to more people traveling to the mountainous eastern side of the county for recreation, putting more people in landslide-prone areas. Changing demographics, including an aging population, increased cultural diversity, and varying levels of income and housing affordability, will also influence community needs and resilience. These projected shifts in population patterns underscore the importance of integrating hazard mitigation into land use planning, ensuring that future growth does not exacerbate exposure to natural hazards, and that socially vulnerable populations are supported through equitable mitigation and preparedness strategies.

14.3.3 Climate Change

Climate change is expected to cause an increase in intense levels of precipitation, and heavy rainfall or snowfall could increase the number of landslides or make landslides larger than normal. Vegetation, which helps to hold the material of a hillside together, can be stripped away by climate exposures such as increased wildfires, droughts, or disease/pest infestations. Without vegetation to help stabilize the slope, hills may be more likely to slide. Increased post-wildfire debris flow is a serious potential consequence of climate change, especially as ash and other material can contaminate water supplies.

15. Wildfire

15.1 Hazard Profile

15.1.1 Hazard Description

A wildfire is an uncontrolled fire that burns vegetation in wildland or rural areas, that can spread into communities or developed areas, and that requires fire suppression. Wildfires can be ignited by natural forces such as lightning, or by human activity such as powerlines, smoking, campfires, equipment use, and arson. Wildfire poses risk of significant damage to life and property in wildland/urban interface (WUI) areas, where development is adjacent to or intermixed with vegetated areas.

California is recognized as one of the most fire-prone regions in the world due to the combination of complex terrain, climate, fire-adapted ecosystem, history of fire suppression, and community development patterns, all of which have contributed to extensive wildfires. Flammable expanses of brush, diseased timberland, overstocked forests, hot and dry summers, extreme topography, intense wind events, summer lightning storms, WUI communities, and human acts all contribute to California's wildfire threat.

Wildland fire is an ongoing concern for Placer County. Generally, the fire season extends from June through October of each year during the hot, dry months; however, recently the fire season has been nearly year around. Fire conditions arise from a combination of high temperatures, an accumulation of vegetation, low humidity, and high winds. 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. However, many ecosystems have evolved to best accommodate multi-decadal intervals between fires, or to be best able to survive surface fires. This means that more intense crown fires and fires that occur too frequently can cause great harm to ecosystems.

15.1.2 Location

Wildfires affect grass, forest, and brushlands, as well as any structures, infrastructure, or important features located within them or adjacent to them, but they can occur anywhere in the county. Where there is human access to wildland areas, such as the Sierra Nevada and foothills areas, the risk of fire increases due to a greater chance for human ignition sources and historical fire management practices.

Wildfire risk in Placer County varies by location. According to the HMPC, within the County, the middle and upper elevations of the County are the primary concern when considering the wildland fire hazard, with their limited access, steep terrain and remote location. Factors contributing to the wildfire risk in Placer County include:

- Overstocked forests, severely overgrown vegetation, and lack of defensible space around structures;

- Excessive vegetation along roadsides and hanging over roads, fire engine access, and evacuation routes;
- Drought and overstocked forests with increased beetle infestation or kill in weakened and stressed trees;
- Narrow and often one-lane and/or dead-end roads complicating evacuation and emergency response as well as the many subdivisions that have only one means of ingress/egress;
- Inadequate or missing street signs on private roads and house address signs;
- Lack of facilities to dispose of excess vegetation, resulting in vegetation being left on the ground as fuel;
- Nature and frequency of lightning ignitions; and
- Increasing population density leading to more ignitions.

CAL FIRE measures fire hazard severity across California. The map in Figure 15-1 shows the locations of Fire Hazard Severity Zones (FHSZs) in Placer County. The highest severity exists in the central portion of the county, especially along the Interstate 80 corridor and the valley surrounding North Fork of the American River. Rural areas tend to have higher severity ratings, but all cities and unincorporated communities in Placer County have areas with at least a moderate level of fire risk. A large portion of Loomis has a high severity rating, and Auburn and Colfax have areas with very high severity ratings.

15.1.3 Extent

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. The NCEI database reports 46 injuries and five deaths from wildfire events in Placer County since 2007, ranging from zero casualties to up to 10 injuries and up to two deaths in single events. Historically, several very large fires have affected Placer County, including the 2022 Mosquito Fire (76,771 acres), 2014 King Fire (97,685 acres), 2013 American Fire (27,431 acres), 1960 Volcano Fire (42,596 acres), and the 1936 McKenzie Mill Fire (21,288 acres) (CAL FIRE 2025). Future fires could be larger than past fires. Over two-thirds of the land area in Placer County is in a “very high” Fire Hazard Severity Zone. Geographical extents of Fire Hazard Severity Zones in the County can be found on Table 15-1.

Figure 15-1. Fire Hazard Severity Zone in Placer County

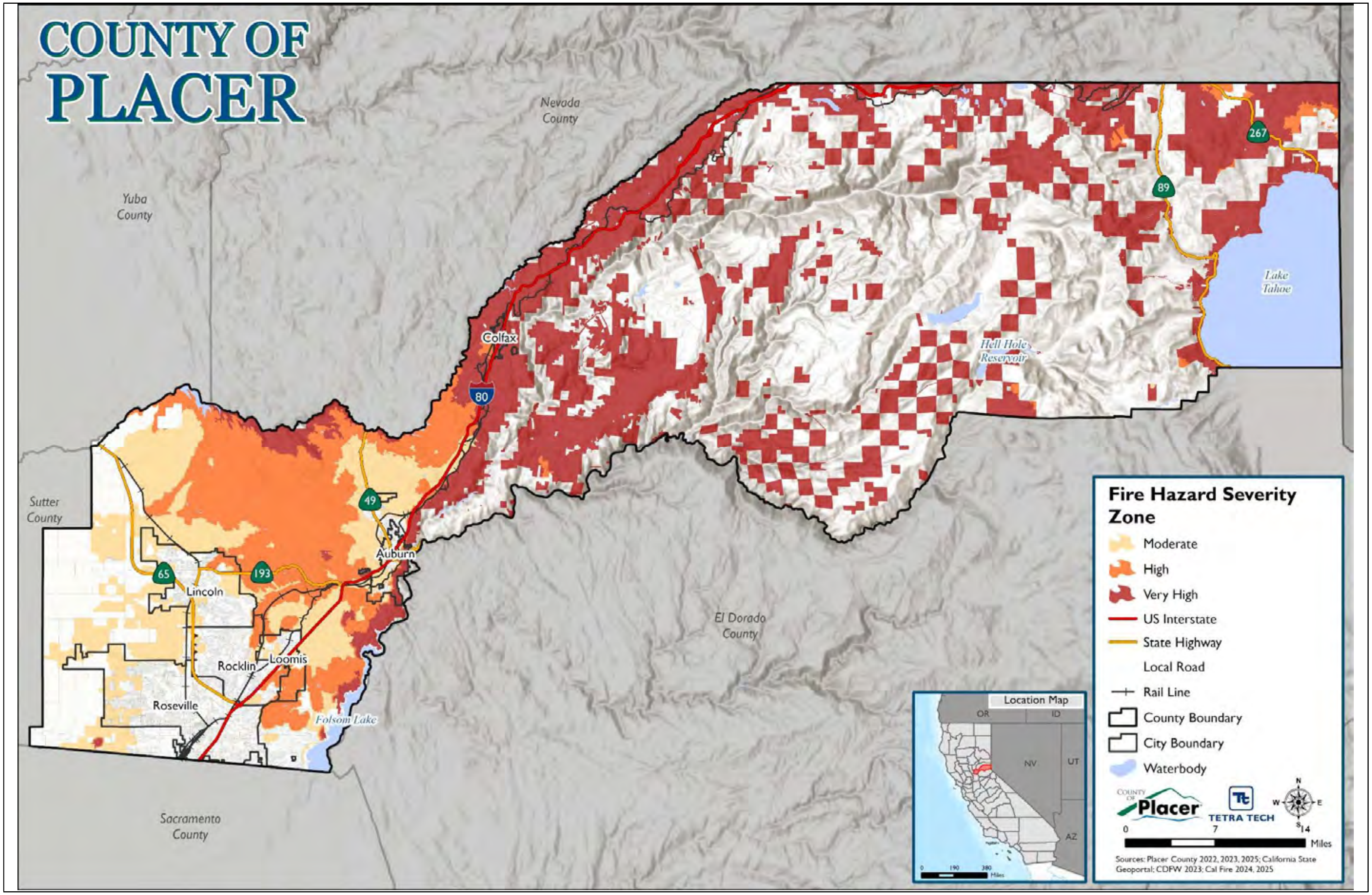


Table 15-1. Size of Fire Hazard Severity Zones in Placer County

Fire Hazard Severity Zone	Very High	High	Moderate	Non-Wildland/ Non-Urban	Urban Unzoned	Placer County Total
Total Acres	616,198	39,675	179,849	44,309	19,134	**899,164**
% of Total Acres*	68.5%	4.4%	20.0%	4.9%	2.1%	**100.0%**
Improved Acres	47,276	7,394	94,466	19,367	11,567	**180,070**
% of Total Improved Acres*	26.3%	4.1%	52.5%	10.8%	6.4%	**100.0%**
Unimproved Acres	568,921	32,281	85,383	29,942	7,567	**719,094**
% of Total Unimproved Acres	79.1%	4.5%	11.9%	3.5%	1.1%	**100.0%**

Source: (CAL FIRE 2025)

15.1.4 Previous Occurrences

FEMA DISASTER DECLARATIONS

Table 15-2 lists all wildfire-related major disaster (DR), fire management assistance (FM), or emergency (EM) declarations that have included Placer County.

Table 15-2. FEMA Disaster Declarations for Wildfire Events in Placer County

Declaration Date	Declaration Number	Incident Type	Disaster Name
September 19, 2002	FM-2463	Fire	Sierra Fire
August 8, 2004	FM-2541	Fire	California Stevens Fire
September 2, 2008	FM-2786	Fire	Gladding Fire
August 31, 2009	FM-2832	Fire	49 Fire
October 8, 2014	FM-5082	Fire	Applegate Fire
August 5, 2021	FM-5405	Fire	River Fire
August 24, 2021	DR-4610	Fire	Wildfires
September 1, 2021	EM-3571	Fire	Caldor Fire
September 9, 2022	FM-5453	Fire	Mosquito Fire

Source: (FEMA 2025b)

STATE EMERGENCY PROCLAMATIONS

Table 15-3 lists all wildfire-related state emergency proclamations from 2020 to 2024 that included Placer County. For events prior to 2020, refer to the 2021 Placer County LHMP.

Table 15-3. State Emergency Proclamations for Wildfire Events in Placer County (2020 to 2024)

State Proclamation Date	State Disaster Name	Description
August 5, 2021	River Fire	On August 4, 2021, the River Fire began burning in Nevada and Placer counties, threatening homes and residents. The fires forced the closure of major roadways and damaged critical infrastructure.
August 30, 2021	Caldor Fire	The governor expanded the emergency proclamation issue on August 17, 2021, to include Placer County on August 30 as the Caldor fire continues to threaten homes and residents in the Lake Tahoe region.
September 8, 2022	Fairview and Mosquito Fires	On September 6, 2022, the Mosquito Fire began burning in Placer County near Oxbow Reservoir. Extreme drought conditions, high temperatures, and dry fuels increased the intensity and spread of the wildfire.

Source: (Cal OES 2025)

ALL RECENT EVENTS

Table 15-4 lists major recorded wildfire-related events that impacted Placer County since the 2021 LHMP was developed. For earlier events, refer to the previous plan.

Table 15-4. Wildfire Events in Placer County (2020 to 2024)

Date Begin	Date End	Hazard	Event Narrative
9/7/2022	9/30/2022	Wildfire	The Mosquito Fire began in Placer County 4 miles east of Foresthill near Mosquito Ridge Road, CA, and close to Oxbow Reservoir the evening of September 6, 2022, at 6:27 PM PDT and later spread into El Dorado County, CA. The fire started in extreme heat and very low humidity, in an area with drought conditions with exceptionally dry vegetation. The Mosquito Fire started on September 6th, which had all-time record high temperatures in the area and extremely low humidity. Extreme fire behavior was observed due to the very dry humidity and fuels, with the fire developing large plumes that radar indicated extended up to 40,000 feet. In the first few days, the fire saw rapid growth at 5,705 acres by 7 pm PDT on the 7th and 13,705 acres by 8 pm PDT on the 8th. More than 11,000 people were evacuated and 9,000 structures were threatened. The fire included areas in both the Tahoe and Eldorado National Forests. The fire burned a total of 76,788 acres and caused road closures throughout the area. Two firefighters were injured during the fire. A total of 78 structures were destroyed and an additional 13 buildings were damaged in the towns of Foresthill, Volcanoville, and Michigan Bar. Periods of moderate to heavy rain from September 18-21 largely halted fire growth, but the fire was not considered fully contained until October 22.

Source: (NOAA-NCEI 2025)

15.1.5 Probability of Future Occurrences

Table 15-5 lists the number of wildfire events reported by various sources from 2007 to 2025, which is the most complete period of record for all sources reviewed. Based on these records and input from the HMPC, the probability of occurrence for wildfire in the County is considered "frequent."

Table 15-5. Probability of Future Hazard Events in Placer County

Hazard Type	Number of Occurrences Between 2007 and 2025	Percent Chance of Occurring in Any Given Year
Wildfire	48	100%

Source: (NOAA-NCEI 2025)
Note: 100% probability indicates that it is statistically likely for an event to occur every year. It does not indicate that the occurrence of an event is a certainty in any given year.

15.1.6 Cascading Impacts on Other Hazards

Wildfires can generate a range of secondary effects, which in some cases may cause more widespread and prolonged damage than the fire itself. Wildfires strip slopes of vegetation, exposing them to greater amounts of runoff. This in turn can weaken soils and cause landslides on slopes, sometimes several years after a wildfire. Wildfire can also cause the buildup of silt in waterways, which can contribute to flooding and contaminate reservoirs and other waterways.

Wildfires can have a significant effect on air quality, especially with prolonged periods of burning combined with climatic conditions.

15.2 Vulnerability and Impact Assessment

The vulnerability assessment for wildfire used the Fire Hazard Severity Zones mapping shown in Figure 15-1.

15.2.1 Life, Health, and Safety

OVERALL POPULATION

Wildfires pose serious health and life safety risks to residents and responders. Residents who live near the interface between the built environment and the wildland environment are particualrly vulnerable. First responders are exposed to direct dangers from wildfire as well as risk of smoke inhalation and heat stroke.

Smoke generated by wildfire consists of visible and invisible emissions that contain particulate matter (soot, tar, water vapor, and minerals), gases (carbon monoxide, carbon dioxide, nitrogen oxides), and toxics (formaldehyde, benzene). Emissions from wildfires depend on the type of fuel, the moisture content of the fuel, the efficiency (or temperature) of combustion, and the weather. Public health impacts associated with wildfire smoke include difficulty in breathing, exacerbation of asthma and chronic obstructive pulmonary disease (COPD), cardiovascular distress and premature death.

Table 15-6 summarizes the estimated population exposed to wildfire hazards by jurisdiction. Approximately 46,235 residents, 11.2 percent of Placer County’s population, live in areas with moderate wildfire risk. An additional 28,779 people (7.0 percent) reside in high-risk areas, while 57,170 individuals (13.9 percent) are in very high-risk zones.

Table 15-6. Population in Fire Hazard Severity Zones

Jurisdiction	Population in Moderate FHSZ	% of Jurisdiction Total[a]	Population in High FHSZ	% of Jurisdiction Total[a]	Population in Very High FHSZ	% of Jurisdiction Total[a]
City of Auburn	2,842	20.7%	2,084	15.1%	3,021	22.0%
City of Colfax	0	0.0%	353	16.8%	1,741	83.1%
City of Lincoln	5,621	10.9%	1,097	2.1%	0	0.0%
Town of Loomis	1,022	15.0%	1,236	18.2%	0	0.0%
City of Rocklin	3,870	5.3%	3,302	4.6%	0	0.0%
City of Roseville	11,992	7.9%	204	0.1%	0	0.0%
Unincorporated County	20,888	18.4%	20,503	18.1%	52,408	46.2%
Placer County (Total)	**46,235**	**11.2%**	**28,779**	**7.0%**	**57,170**	**13.9%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; CAL FIRE 2024, 2025

a. See Table 3-4 for total population for each jurisdiction

SOCIALLY VULNERABLE POPULATION

People with access and functional needs, the elderly, and the very young are especially vulnerable to wildfire due to difficulties with evacuation. Smoke and air pollution from wildfires can affect people inside and outside of high-risk areas, especially sensitive populations including children, the elderly, and those with respiratory and cardiovascular diseases.

Table 15-7 through Table 15-13 present the estimated socially vulnerable populations living in moderate, high and very high wildfire risk hazard areas. Of the 83,236 people over the age of 65 living in Placer County, 36.5 percent (30,380) live in a moderate, high, or very high Fire Hazard Severity Zone. In addition, there are 309 people in the City of Colfax without a broadband internet subscription, vulnerable due to potential communications limitations, and an estimated 308 of them live in high or very high Fire Hazard Severity Zones. Finally, of the 15,963 people with no vehicle access in Placer County, 28.3 percent (4,518) live in a moderate, high, or very high Fire Hazard Severity Zone.

Table 15-7. Population Over 65 in Fire Hazard Severity Zones

Jurisdiction	Population in Moderate FHSZ	% of Jurisdiction Total[a]	Population in High FHSZ	% of Jurisdiction Total[a]	Population in Very High FHSZ	% of Jurisdiction Total[a]
City of Auburn	761	20.7%	558	15.1%	809	22.0%
City of Colfax	0	0.0%	45	16.7%	223	82.9%
City of Lincoln	1,527	10.9%	298	2.1%	0	0.0%
Town of Loomis	214	15.0%	259	18.1%	0	0.0%
City of Rocklin	556	5.3%	474	4.6%	0	0.0%

Jurisdiction	Population in Moderate FHSZ	% of Jurisdiction Total[a]	Population in High FHSZ	% of Jurisdiction Total[a]	Population in Very High FHSZ	% of Jurisdiction Total[a]
City of Roseville	2,057	7.9%	35	0.1%	0	0.0%
Unincorporated County	5,025	18.4%	4,932	18.1%	12,607	46.2%
Placer County (Total)	**10,140**	**12.2%**	**6,601**	**7.9%**	**13,639**	**16.4%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; CAL FIRE 2024

a. See Table 3-4 for total population for each jurisdiction

Table 15-8. Population Under 5 in Fire Hazard Severity Zones

Jurisdiction	Population in Moderate FHSZ	% of Jurisdiction Total[a]	Population in High FHSZ	% of Jurisdiction Total[a]	Population in Very High FHSZ	% of Jurisdiction Total[a]
City of Auburn	106	20.6%	77	15.0%	112	21.8%
City of Colfax	0	0.0%	9	15.3%	49	83.1%
City of Lincoln	304	10.9%	59	2.1%	0	0.0%
Town of Loomis	37	14.9%	45	18.1%	0	0.0%
City of Rocklin	221	5.3%	188	4.5%	0	0.0%
City of Roseville	705	7.9%	12	0.1%	0	0.0%
Unincorporated County	739	18.4%	725	18.1%	1,855	46.2%
Placer County (Total)	**2,112**	**10.2%**	**1,115**	**5.4%**	**2,016**	**9.7%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; CAL FIRE 2024

a. See Table 3-4 for total population for each jurisdiction

Table 15-9. Non-English Speaking Population in Fire Hazard Severity Zones

Jurisdiction	Population in Moderate FHSZ	% of Jurisdiction Total[a]	Population in High FHSZ	% of Jurisdiction Total[a]	Population in Very High FHSZ	% of Jurisdiction Total[a]
City of Auburn	97	20.6%	71	15.0%	103	21.8%
City of Colfax	0	0.0%	13	16.5%	65	82.3%
City of Lincoln	82	10.8%	16	2.1%	0	0.0%
Town of Loomis	3	11.5%	4	15.4%	0	0.0%
City of Rocklin	98	5.3%	84	4.6%	0	0.0%
City of Roseville	279	7.8%	4	0.1%	0	0.0%
Unincorporated County	321	18.4%	315	18.1%	806	46.2%
Placer County (Total)	**880**	**10.4%**	**507**	**6.0%**	**974**	**11.5%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; CAL FIRE 2024

a. See Table 3-4 for total population for each jurisdiction

Table 15-10. Population with Disability in Fire Hazard Severity Zones

Jurisdiction	Population in Moderate FHSZ	% of Jurisdiction Total[a]	Population in High FHSZ	% of Jurisdiction Total[a]	Population in Very High FHSZ	% of Jurisdiction Total[a]
City of Auburn	350	20.6%	256	15.1%	372	21.9%
City of Colfax	0	0.0%	66	16.8%	325	82.9%
City of Lincoln	751	10.9%	146	2.1%	0	0.0%
Town of Loomis	83	15.0%	100	18.0%	0	0.0%
City of Rocklin	387	5.3%	330	4.6%	0	0.0%
City of Roseville	1,347	7.9%	22	0.1%	0	0.0%
Unincorporated County	2,347	18.4%	2,304	18.1%	5,890	46.2%
Placer County (Total)	**5,265**	**11.3%**	**3,224**	**6.9%**	**6,587**	**14.1%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; CAL FIRE 2024

a. See Table 3-4 for total population for each jurisdiction

Table 15-11. Population Below Poverty Level in Fire Hazard Severity Zones

Jurisdiction	Population in Moderate FHSZ	% of Jurisdiction Total[a]	Population in High FHSZ	% of Jurisdiction Total[a]	Population in Very High FHSZ	% of Jurisdiction Total[a]
City of Auburn	356	20.6%	261	15.1%	378	21.9%
City of Colfax	0	0.0%	44	16.9%	216	82.8%
City of Lincoln	432	10.9%	84	2.1%	0	0.0%
Town of Loomis	109	14.9%	132	18.1%	0	0.0%
City of Rocklin	194	5.3%	165	4.5%	0	0.0%
City of Roseville	709	7.9%	12	0.1%	0	0.0%
Unincorporated County	1,488	18.4%	1,460	18.1%	3,733	46.2%
Placer County (Total)	**3,288**	**12.0%**	**2,158**	**7.9%**	**4,327**	**15.8%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; CAL FIRE 2024

a. See Table 3-4 for total population for each jurisdiction

Table 15-12. Population With No Broadband Internet Subscription in Fire Hazard Severity Zones

Jurisdiction	Population in Moderate FHSZ	% of Jurisdiction Total[a]	Population in High FHSZ	% of Jurisdiction Total[a]	Population in Very High FHSZ	% of Jurisdiction Total[a]
City of Auburn	358	20.6%	262	15.1%	380	21.9%
City of Colfax	0	0.0%	52	16.8%	256	82.8%
City of Lincoln	398	10.9%	77	2.1%	0	0.0%
Town of Loomis	54	14.9%	65	18.0%	0	0.0%
City of Rocklin	139	5.3%	118	4.5%	0	0.0%
City of Roseville	636	7.9%	10	0.1%	0	0.0%
Unincorporated County	1,741	18.4%	1,709	18.1%	4,370	46.2%
Placer County (Total)	**3,326**	**12.7%**	**2,293**	**8.7%**	**5,006**	**19.1%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; CAL FIRE 2024

a. See Table 3-4 for total population for each jurisdiction

Table 15-13. Population With No Vehicle Access in Fire Hazard Severity Zones

Jurisdiction	Population in Moderate FHSZ	% of Jurisdiction Total[a]	Population in High FHSZ	% of Jurisdiction Total[a]	Population in Very High FHSZ	% of Jurisdiction Total[a]
City of Auburn	164	20.6%	120	15.1%	174	21.9%
City of Colfax	0	0.0%	16	16.5%	80	82.5%
City of Lincoln	94	10.9%	18	2.1%	0	0.0%
Town of Loomis	34	14.6%	42	18.0%	0	0.0%
City of Rocklin	116	5.3%	99	4.5%	0	0.0%
City of Roseville	651	7.9%	11	0.1%	0	0.0%
Unincorporated County	645	18.4%	634	18.1%	1,620	46.2%
Placer County (Total)	**1,704**	**10.7%**	**940**	**5.9%**	**1,874**	**11.7%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; U.S. Census, American Community Survey 5-Year Estimates 2023; CAL FIRE 2024

a. See Table 3-4 for total population for each jurisdiction

15.2.2 General Building Stock

Table 15-16 summarizes the estimated building stock inventory located in the defined wildfire hazard areas by jurisdiction. There are 29,967 buildings (13.8 percent of the total building stock) located in the moderate wildfire risk hazard area with an estimated $24.1 billion of replacement cost value (building and content replacement costs). There are 21,648 buildings (11.0 percent of the total building stock) located in the high wildfire risk hazard area with an estimated $16.3 billion of replacement cost value. In the very high wildfire risk hazard area, there are 35,511 buildings (18.1 percent of the total building stock) with an estimated $21.1 billion of replacement cost value. Table 15-17 through Table 15-19 provides a summary of buildings in the wildfire risk hazard areas by occupancy class. Buildings constructed of wood or vinyl siding are generally more likely to be impacted by fire hazard than buildings constructed of brick or concrete.

Table 15-14. Building Stock and Replacement Cost in the Moderate Fire Risk Hazard Areas

Jurisdiction	Number of Buildings	% of Jurisdiction Total[a]	Replacement Cost Value	% of Jurisdiction Total[a]
City of Auburn	1,398	21.9%	$1,605,425,868	26.2%
City of Colfax	0	0.0%	$0	0.0%
City of Lincoln	2,521	10.9%	$2,384,188,206	11.9%
Town of Loomis	628	15.9%	$493,608,579	13.8%
City of Rocklin	1,334	5.4%	$1,723,571,836	7.3%
City of Roseville	4,074	7.6%	$3,709,237,671	6.4%
Unincorporated County	17,012	20.5%	$14,216,517,268	22.7%
Placer County (Total)	**26,967**	**13.8%**	**$24,132,549,428**	**13.8%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; CAL FIRE 2024

a. See Table 3-9 for total building counts and replacement cost value in each jurisdiction and countywide

Table 15-15. Building Stock and Replacement Cost in the High Fire Risk Hazard Areas

Jurisdiction	Number of Buildings	% of Jurisdiction Total[a]	Replacement Cost Value	% of Jurisdiction Total[a]
City of Auburn	927	14.5%	$796,653,405	13.0%
City of Colfax	159	16.2%	$138,615,875	18.1%
City of Lincoln	523	2.3%	$336,089,253	1.7%
Town of Loomis	776	19.6%	$712,586,313	19.9%
City of Rocklin	1,216	4.9%	$1,519,966,743	6.4%
City of Roseville	69	0.1%	$44,583,935	0.1%
Unincorporated County	17,978	21.7%	$12,790,335,543	20.4%
Placer County (Total)	**21,648**	**11.0%**	**$16,338,831,067**	**9.4%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; CAL FIRE 2024

a. See Table 3-9 for total building counts and replacement cost value in each jurisdiction and countywide

Table 15-16. Building Stock and Replacement Cost in the High Fire Risk Hazard Areas

Jurisdiction	Number of Buildings	% of Jurisdiction Total[a]	Replacement Cost Value	% of Jurisdiction Total[a]
City of Auburn	1,313	20.5%	$942,407,259	15.4%
City of Colfax	822	83.8%	$626,849,464	81.9%
City of Lincoln	0	0.0%	$0	0.0%
Town of Loomis	0	0.0%	$0	0.0%
City of Rocklin	0	0.0%	$0	0.0%

Jurisdiction	Number of Buildings	% of Jurisdiction Total[a]	Replacement Cost Value	% of Jurisdiction Total[a]
City of Roseville	0	0.0%	$0	0.0%
Unincorporated County	33,376	40.2%	$19,564,230,663	31.2%
Placer County (Total)	**35,511**	**18.1%**	**$21,133,487,386**	**12.1%**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; RS Means 2024; CAL FIRE 2024
a. See Table 3-9 for total building counts and replacement cost value in each jurisdiction and countywide

Table 15-17. Buildings in the Moderate Fire Hazard Zone, by General Occupancy Class

Jurisdiction	Residential	Commercial	Industrial	Other
City of Auburn	1,031	347	8	12
City of Colfax	0	0	0	0
City of Lincoln	2,346	154	11	10
Town of Loomis	387	238	2	1
City of Rocklin	1,159	158	10	7
City of Roseville	4,047	11	8	8
Unincorporated County	10,682	6,100	126	104
Placer County (Total)	**19,652**	**7,008**	**165**	**142**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; CAL FIRE 2024
Note: Other = Government, Religion, Agricultural, and Education

Table 15-18. Buildings in the High Fire Hazard Zone, by General Occupancy Class

Jurisdiction	Residential	Commercial	Industrial	Other
City of Auburn	756	163	3	5
City of Colfax	116	35	6	2
City of Lincoln	458	61	2	2
Town of Loomis	468	304	1	3
City of Rocklin	989	216	5	6
City of Roseville	69	0	0	0
Unincorporated County	10,485	7,339	33	121
Placer County (Total)	**13,341**	**8,118**	**50**	**139**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; CAL FIRE 2024
Note: Other = Government, Religion, Agricultural, and Education

Table 15-19. Buildings in the Very High Fire Hazard Zone, by General Occupancy Class

Jurisdiction	Residential	Commercial	Industrial	Other
City of Auburn	1,096	206	8	3
City of Colfax	571	221	19	11
City of Lincoln	0	0	0	0

Jurisdiction	Residential	Commercial	Industrial	Other
Town of Loomis	0	0	0	0
City of Rocklin	0	0	0	0
City of Roseville	0	0	0	0
Unincorporated County	26,801	6,324	121	130
Placer County (Total)	**28,468**	**6,751**	**148**	**144**

Source: Placer County 2025; FEMA 2025; Microsoft 2020; City of Roseville 2022; CAL FIRE 2024
Note: Other = Government, Religion, Agricultural, and Education

15.2.3 Community Lifelines and Other Critical Facilities

Table 15-20 through Table 15-22 summarizes the number of critical facilities exposed to the wildfire risk hazard areas by lifeline category:

- In the moderate hazard area, there are 213 critical facilities, with the Transportation sector making up the largest portion (59 facilities). Unincorporated Placer County contains the highest number of critical facilities in this hazard area, totaling 151.
- In the high-risk hazard area, Placer County has 152 critical facilities, with the Transportation sector having the most (47 facilities). Unincorporated Placer County leads all jurisdictions with 129 facilities.
- For the very high-risk hazard area, Placer County has a total of 265 critical facilities, with the Communications sector accounting for 99 of these. Unincorporated Placer County has the highest number of critical facilities in this hazard area, totaling 248

Critical facilities are particularly vulnerable during wildfires. Excessive heat can cause hazardous materials and fuel storage to rupture, fueling the fire and causing rapid spreading. Communication facilities may become inoperable, exacerbating communication difficulties, and compromised fire stations can hinder fire suppression and support services. Utility lines, roads, and bridges are also at risk. Damage to utility lines can compromise the functionality of water, sewer, gas, and electricity systems. Due to their geographic extent, roads and utility lines have a higher chance of being impacted by wildfires. If any section of a road or utility line is damaged, the entire system may be affected. For instance, a wildfire that makes one area of a road or bridge impassable can block access to other roads or locations. Many roads may have segments within wildfire risk areas rather than the entire road being within a risk area.

15.2.4 Economy

Wildfires can significantly impact Placer County's economy in various ways. The destruction of homes, businesses, and infrastructure leads to substantial financial losses for property owners and the local economy. Additionally, the costs associated with reducing wildfire risk, firefighting, debris cleanup, and rebuilding can strain local government budgets and resources. Health impacts from smoke and air pollution increase health care costs and reduce productivity, further disrupting economic stability and growth in Placer County. Aesthetic impacts include odors and reduction in visibility.

15.2.5 Natural Resources

Intense wildfires can burn and kill plant and animal life. Intense fire can also heat narrow and shallow waterways, resulting in damage to aquatic systems. Post-fire runoff polluted with debris and contaminants can be harmful to terrestrial ecosystems and aquatic life. Intense wildfire events that destroy existing ecosystems can cause an increase in invasive species that move into an area with a lack of natural competitors.

Table 15-20. Facilities in the Moderate Wildfire Risk Hazard Area by Lifeline Category

Jurisdiction	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Total Facilities in Hazard Area	% of Jurisdiction Total
City of Auburn	2	0	0	5	1	4	1	0	1	14	23.3%
City of Colfax	0	0	0	0	0	0	0	0	0	0	0.0%
City of Lincoln	2	0	1	7	1	3	7	2	3	26	29.9%
Town of Loomis	1	0	0	0	0	0	0	0	2	3	15.0%
City of Rocklin	1	0	1	2	2	2	0	0	1	9	7.3%
City of Roseville	1	1	0	2	1	2	2	0	1	10	3.3%
Unincorporated County	14	4	5	29	11	28	49	3	8	151	20.8%
Placer County (Total)	**21**	**5**	**7**	**45**	**16**	**39**	**59**	**5**	**16**	**213**	**16.0%**

Source: Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025; CAL FIRE 2024, 2025

Table 15-21. Facilities in the High Wildfire Risk Hazard Area by Lifeline Category

Jurisdiction	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Total Facilities in Hazard Area	% of Jurisdiction Total
City of Auburn	1	0	0	1	0	1	0	0	1	4	6.7%
City of Colfax	0	0	0	0	0	0	1	0	0	1	6.7%
City of Lincoln	0	0	0	0	0	0	0	0	1	1	1.1%
Town of Loomis	0	0	0	0	1	0	0	0	0	1	5.0%
City of Rocklin	5	0	1	3	0	2	1	0	4	16	13.0%
City of Roseville	0	0	0	0	0	0	0	0	0	0	0.0%
Unincorporated County	34	3	1	11	3	20	45	2	10	129	17.8%
Placer County (Total)	**40**	**3**	**2**	**15**	**4**	**23**	**47**	**2**	**16**	**152**	**11.4%**

Source: Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025; CAL FIRE 2024, 2025

Table 15-22. Facilities in the Very High Wildfire Risk Hazard Area by Lifeline Category

Jurisdiction	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Total Facilities in Hazard Area	% of Jurisdiction Total
City of Auburn	0	0	0	0	0	2	0	0	1	3	5.0%
City of Colfax	3	0	2	2	2	4	0	0	1	14	93.3%
City of Lincoln	0	0	0	0	0	0	0	0	0	0	0.0%
Town of Loomis	0	0	0	0	0	0	0	0	0	0	0.0%
City of Rocklin	0	0	0	0	0	0	0	0	0	0	0.0%
City of Roseville	0	0	0	0	0	0	0	0	0	0	0.0%
Unincorporated County	96	7	18	23	3	60	28	1	12	248	34.2%
Placer County (Total)	**99**	**7**	**20**	**25**	**5**	**66**	**28**	**1**	**14**	**265**	**19.9%**

Source: Placer County 2022, 2024, 2025; California State Geoportal 2025; California Energy Commission 2025; California Health & Human Services Agency 2025; California Department of Health Care Services 2025, Caltrans 2025; California Department of Motor Vehicles 2020; USACE NID 2025; HIFLD 2021, 2025; CAL FIRE 2024, 2025

15.2.6 Historic and Cultural Resources

Wildfires pose a significant threat to historic resources, with the potential to cause extensive damage or even complete destruction. The impact on historic infrastructure from wildfires is largely dependent on the construction materials used. Many historic structures are constructed from wood, a highly flammable material. Furthermore, these structures were often built before the implementation of strict building codes and without a modern understanding of wildfire risks. In addition, outdoor cultural events may be postponed or cancelled as the result of wildfire conditions and smoke.

15.3 Future Changes That May Affect Risk

15.3.1 Land Use and Development

The California Building Code includes minimum standards related to the design and construction of buildings in fire hazard severity zones. Any newly permitted buildings in these areas must conform to standards that remove flammable materials from around the building and construct buildings from fire resistant material. However, any future development within the County could be potentially impacted by the wildfire hazard if located within the hazard areas.

15.3.2 Projected Changes in Population Patterns

As noted in Chapter 3, Placer County's population is expected to grow steadily through 2070. While most new residents will move into the more urban western part of the county, some growth will occur in foothill and rural areas where wildfire risk is highest. These areas, known as the wildland-urban interface (WUI), have dense vegetation and steep terrain that make them especially prone to wildfire. As more homes, roads, and infrastructure are built in these zones, the number of people exposed to wildfire will increase.

15.3.3 Climate Change

Numerous climate drivers will increase wildfire risk across the state and throughout Placer County. According to California's Fourth Climate Change Assessment (CCCA4) (OPR, CNRA, CEC 2018), California is likely to see a 50 percent increase in fires larger than 25,000 acres as well as a 77 percent increase in average area burned by 2100. The CCCA4 notes that several studies predict a 300 percent increase in wildfire area in the Sierras and other forested areas of Northern California.

Climate drivers influencing wildfire risk include changes in temperature and precipitation. Higher temperatures mean that the air will be better able to dry out vegetation, creating more fuel for wildfires. Fire season will be extended as warmth lasts longer in the year. Longer, more frequent, or more intense periods of drought contribute to the dryness of vegetation, which also increases wildfire risk. Increased drought combined with increased heat weakens trees to the point that they are susceptible to pests and diseases, as seen with a bark beetle outbreak during the 2012-2016 drought. The expansion of warm regions can also cause pests and diseases to spread where they previously could not.

Although many of California's ecosystems are adapted to occasional surface fires, the larger, more frequent, and more intense fires expected with climate change will have a detrimental impact on those ecosystems. As forests and shrublands are cleared out, either by fire or pests and disease, the land may become prone to invasive species that could be more flammable, denser, or burn more intensely (making it even more difficult for local ecosystems of plants and animals to recover).

As heat-fueled thunderstorms increase, the potential for lightning-ignited wildfire increases as well. Even as these systems bring rain, it may not be enough to dampen the dry vegetation or suppress fires. Wind speed and duration are significant factors in the spread of wildfires, but the effect of climate change on wind is uncertain.

16. Hazard Ranking

Hazard rankings have been used as one of the bases for identifying the jurisdictional hazard mitigation strategies included in Volume 2. These rankings may vary among the jurisdictions. For example, a hazard may be ranked low in one municipality but high for the County or another municipality due to differences in vulnerability and impact. Jurisdictional ranking results are presented in each jurisdictional annex in in Volume 2.

16.1 Hazard Ranking Methodology

Each jurisdiction participating in this MJHMP has differing levels of vulnerability to and potential impacts from each of the hazards assessed in this plan. Each jurisdiction needs to recognize the hazards that pose the greatest risk to its community and direct its attention and resources accordingly to manage risk and reduce losses. To achieve this, the hazards of concern were ranked using methodologies promoted by FEMA's hazard mitigation planning guidance and input from all participating jurisdictions.

16.1.1 Categories Used in Ranking

The ranking methodology is based on four risk assessment categories (probability of occurrence, consequence, adaptive capacity, and climate change), with the following scoring parameters defined for each category:

- **Level**—The level is a qualitative description of how each hazard rates in each category (such as low to high, or unlikely to frequent)
- **Benchmark value**—The benchmark values are clearly determinable quantities or descriptions that define which level should apply to each hazard
- **Numeric value**—The numeric value is the hazard's score in each category, based on the assigned level
- **Weighting**—The weighting is a multiplier applied to each hazard's numeric value in each category, to represent the relative importance of the category (the higher the weighting, the more important the category)

The following sections describe the categories and their associated scoring parameters.

PROBABILITY OF OCCURRENCE

For some hazards, probability of occurrence was based on the likelihood that an event scenario of a specified magnitude (such as a 1 percent annual chance flood or a M7.2 earthquake) would occur in any given year. When no scenario was available for quantitative assessment, judgment and an examination of the historical record were used to estimate the probability of occurrence of an event that will impact the County. Probability accounts for 30 percent of the total hazard ranking. Table 16-1 presents the scoring parameters for probability of occurrence.

Table 16-1. Values and Weights for Probability of Occurrence

Level	Benchmark Value	Numeric Value
Unlikely	Hazard event has less than a 1 percent annual probability of occurring.	0
Rare	Hazard event has an annual probability 1 percent or more but less than 10 percent	1
Occasional	Hazard event has an annual probability 10 percent or more but less than 100 percent	2
Frequent	Hazard event is likely to occur multiple times per year (100 percent annual probability)	3

CONSEQUENCE

Consequence represents the expected vulnerability and impact associated with the hazard. This is rated for three subcategories: vulnerability of people; vulnerability of property; and economic impacts on the community. A numeric value based on defined benchmarks is assigned for each subcategory, and a factor is applied to those values representing the relative importance of each subcategory. The total numeric value for consequence is the sum of the factored numeric values for each subcategory. Consequence accounts for 30 percent of the total hazard ranking. The scoring parameters for consequence are presented in Table 16-2 through Table 16-4.

Table 16-2. Values for Population Consequence

Level	Population Benchmark Value	Numeric Value	Factor
None	No population vulnerable to the hazard	0	3
Low	14 percent or less of population is exposed to a hazard with potential for measurable life-safety impact due to its extent and location.	1	3
Medium	15 to 29 percent of population is exposed to a hazard with potential for measurable life-safety impact due to its extent and location.	2	3
High	30 percent or more of population is exposed to a hazard with potential for measurable life-safety impact, due to its extent and location.	3	3

Table 16-3. Values for Property Consequence

Level	Property Benchmark Value	Numeric Value	Factor
None	No property vulnerable to the hazard	0	2
Low	Property vulnerability is 14 percent or less of the total number of structures for the community.	1	2
Medium	Property vulnerability is 15 to 29 percent of the total number of structures for the community.	2	2
High	Property vulnerability is 30 percent or more of the total number of structures for the community.	3	2

Table 16-4. Values for Economic Consequence

Level	Economic Benchmark Value	Numeric Value	Factor
None	No estimated loss due to the hazard	0	1
Low	Estimated loss is 9 percent or less of the total replacement cost for the community.	1	1
Medium	Estimated loss is 10 to 19 percent of the total replacement cost for the community.	2	1
High	Estimated loss is 20 percent or more of the total replacement cost for the community.	3	1

ADAPTIVE CAPACITY

Adaptive capacity describes a jurisdiction's administrative, technical, planning/regulatory and financial ability to protect against or withstand a hazard event. Mitigation measures that can increase a jurisdiction's capacity to withstand and rebound from events include codes or ordinances with higher standards to withstand hazards due to design or location; deployable resources; or plans and procedures for responding to an event.

A rating of "weak" for adaptive capacity means a jurisdiction does not have the capability to effectively respond, which increases vulnerability. A "strong" adaptive capacity means the jurisdiction does have the capability to effectively respond, which decreases vulnerability. These ratings were assigned using the results of the core capability assessment, with input from each jurisdiction. Adaptive capacity accounts for 30 percent of the total hazard ranking. Table 16-5 summarizes the scoring parameters for adaptive capacity.

Table 16-5. Values and Weights for Adaptive Capacity

Level	Benchmark Value	Numeric Value
Weak	Weak, outdated, or inconsistent plans, policies, codes, or ordinances in place; no redundancies; limited to no deployable resources; limited capabilities to respond; long recovery.	1
Moderate	Plans, policies, codes/ordinances in place and meet minimum requirements; mitigation strategies identified but not implemented on a widespread scale; jurisdiction can recover but needs outside resources.	0
Strong	Plans, policies, codes/ordinances in place that exceed minimum requirements; mitigation/protective measures in place; jurisdiction has ability to recover quickly because resources are readily available, and capabilities are high.	-1

CLIMATE CHANGE

The hazard ranking addresses climate change in order to help guide and prioritize the mitigation strategy as a long-term future vision for mitigating the hazards of concern. Current climate change projections were evaluated as part of the hazard ranking to account for potential increases in severity or frequency of the hazard. The potential impacts that climate change may have on each hazard of concern are discussed in the risk assessment chapters for each hazard. Climate change accounts for 10 percent of the hazard ranking. Table 16-6 summarizes the scoring parameters for climate change.

Table 16-6. Values and Weights for Climate Change

Level	Benchmark Value	Numeric Value
Low	No local data are available; modeling projects are uncertain on whether there is increased future risk; confidence level is low (inconclusive evidence).	1
Medium	Studies and modeling projections indicate a potential for exacerbated conditions due to climate change; confidence level is medium to high (moderate evidence).	2
High	Studies and modeling projections indicate exacerbated conditions and increased future risk due to climate change; very high confidence level (strong evidence, well documented, and acceptable methods).	3

16.1.2 Total Ranking Score

The total ranking score based on the categories described above is calculated as follows:

Ranking Score= [(Consequence on Population x 3) + (Consequence on Property x 2) + (Consequence on Economy x 1) x 0.3] + [Adaptive Capacity x 0.3] + [Climate Change x 0.1] + [Probability of Occurrence x 0.3]

Using this equation, the highest possible ranking score is 6.9. The higher the number, the greater the relative risk. Based on the score for each hazard, a hazard ranking is assigned to each hazard of concern as follows:

- Low = Values less than 3.9
- Medium = Values between 3.9 and 4.9
- High = Values greater than 4.9.

All Planning Partners applied the same methodology to develop the hazard rankings to ensure consistency in the overall ranking of risk. However, each jurisdiction had the ability to alter rankings based on local knowledge and experience in handling each hazard.

16.2 Hazard Ranking Results

The ranking of the identified hazards of concern was determined for each Planning Partner. The ranking for each jurisdiction is included in the annexes in Volume 2. The ranking for Placer County is detailed in the following tables:

- Table 16-7 shows the unweighted numeric values assigned for the probability of occurrence for each hazard.
- Table 16-8 shows the numeric values assigned for each subcategory of consequence for each hazard.
- Table 16-9 shows the unweighted numeric values assigned for adaptive capacity and climate change for each hazard.
- Table 16-10 shows the total weighted hazard ranking scores for each hazard of concern.

Table 16-7. Probability of Occurrence for Hazards of Concern for Placer County

Hazard of Concern	Probability	Numeric Value
Avalanche	Occasional	2
Dam and Levee Failure	Unlikely	0
Drought and Water Shortage	Frequent	3
Earthquake	Unlikely	0
Flood	Frequent	3
Freeze and Snow	Frequent	3
Heavy Rain and Storm	Frequent	3
High Wind and Tornado	Frequent	3
Landslide, Mudslide, and Debris Flow	Frequent	3
Wildfire	Frequent	3

Table 16-8. Consequence Rating for Hazards of Concern for Placer County

Hazard of Concern	Population Consequence	Numeric Value	Multiplied by Factor (3)	Property Consequence	Numeric Value	Multiplied by Factor (2)	Economy Consequence	Numeric Value	Multiplied by Factor (1)	Total Impact Rating (Population + Property + Economy)
Avalanche	Low	1	3	Low	1	2	Low	1	1	6
Dam and Levee Failure	Low	1	3	Low	1	2	Low	1	1	6
Drought and Water Shortage	Low	1	3	Low	1	2	Low	1	1	6
Earthquake	Low	1	3	Low	1	2	Low	1	1	6
Flood	Low	1	3	Low	1	2	Low	1	1	6
Freeze and Snow	Low	1	3	Low	1	2	Low	1	1	6
Heavy Rain and Storm	Low	1	3	Low	1	2	Low	1	1	6
High Wind and Tornado	Low	1	3	Low	1	2	Low	1	1	6
Landslide, Mudslide, and Debris Flow	Low	1	3	Low	1	2	Medium	2	2	7
Wildfire	High	3	9	High	3	6	High	3	3	18

Table 16-9. Adaptive Capacity and Climate Change Ratings for Hazards of Concern for Placer County

Hazard of Concern	Adaptive Capacity Level	Numeric Value	Climate Change Level	Numeric Value
Avalanche	Moderate	0	Medium	2
Dam and Levee Failure	Moderate	0	Medium	2
Drought and Water Shortage	Moderate	0	High	3
Earthquake	Moderate	0	Low	1
Flood	Moderate	0	High	3
Freeze and Snow	Moderate	0	Medium	2
Heavy Rain and Storm	Moderate	0	Medium	2
High Wind and Tornado	Moderate	0	Low	1
Landslide, Mudslide, and Debris Flow	Moderate	0	High	3
Wildfire	Moderate	0	High	3

Table 16-10. Total Hazard Ranking Scores for the Hazards of Concern for Placer County

Hazard of Concern	Total Hazard Ranking Score	Overall Hazard Ranking
Avalanche	2.0	Low
Dam and Levee Failure	2.0	Low
Drought and Water Shortage	3.0	Low
Earthquake	1.9	Low
Flood	3.0	Low
Freeze and Snow	2.9	Low
Heavy Rain and Storm	2.9	Low
High Wind and Tornado	2.8	Low
Landslide, Mudslide, and Debris Flow	3.3	Low
Wildfire	6.6	High

Note: Low (yellow) = Values less than 3.9; Medium (orange) = Values between 3.9 and 4.9; High (red) = Values greater than 4.9

17. Capability Assessment

A capability assessment is an inventory of a community's missions, programs, and policies and an analysis of its capacity to carry them out (FEMA 2003). This integral part of the planning process analyzes current governmental programs, policies, regulations, and funding that could either facilitate or hinder mitigation. Through assessing its capabilities, a jurisdiction learns whether it can implement certain mitigation actions by determining the following:

- The range of local and/or state administrative, programmatic, regulatory, financial, and technical resources available to assist in implementing mitigation actions
- Types of mitigation actions that may be technically, legally, administratively, politically, or fiscally challenging or infeasible because they are outside of current capabilities
- Opportunities to enhance local capabilities to support long-term mitigation and risk reduction

This chapter summarizes existing capabilities at all levels of government (federal, state, county) for supporting hazard mitigation within the planning area. These capabilities are presented in three categories:

- Planning and regulatory capabilities
- Administrative and technical capabilities
- Fiscal capabilities

On September 9, 2025, the Hazard Mitigation Planning Committee met to discuss their local capabilities. Worksheets were then distributed for a more detailed assessment. Each Planning Partner's annex in Volume 2 also includes a capability assessment specific to those jurisdictions. In addition to the above categories, the annexes review capabilities in the more localized categories of adaptive capacity and education and outreach. Participating jurisdictions evaluated the effectiveness of their capabilities for supporting hazard mitigation and identified opportunities to enhance those capabilities. Each jurisdiction identified how it has integrated hazard mitigation into its existing planning, regulatory, and operational/administrative framework and how it intends to promote ongoing integration.

17.1 Planning and Regulatory Capabilities

Planning and regulatory capabilities are based on ordinances, policies, local laws, state statutes, plans, and programs that relate to managing growth and development. Planning and regulatory capabilities refer not only to current plans and regulations, but also to the jurisdiction's ability to change and improve those plans and regulations as needed. This section summarizes planning and regulatory capabilities for Placer County. Further information is provided in the jurisdictional annexes in Volume 2.

17.1.1 Federal

NATIONAL FLOOD INSURANCE PROGRAM

The U.S. Congress established the National Flood Insurance Program (NFIP) with the passage of the National Flood Insurance Act of 1968. The NFIP is a federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages. The flood hazard profile in Chapter 10 provides further information on the NFIP as implemented in Placer County.

There are three components to the NFIP: flood insurance, floodplain management, and flood hazard mapping. Communities participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities. Community participation in the NFIP is voluntary. Flood insurance is designed to provide an alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. Flood damage in the U.S. is reduced by nearly $1 billion each year through communities implementing sound floodplain management requirements and property owners purchasing flood insurance. Additionally, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance (FEMA 2023a).

All municipalities in Placer County actively participate in the NFIP and are compliant with NFIP requirements. Municipal compliance with the NFIP is described in each of the jurisdictional annexes in Volume 2. In the County, there are 26 NFIP Repetitive Loss (RL) properties, defined by FEMA as properties that have made more than one claim of at least $1,000 within a 10-year period. Further details on the County's flood vulnerability may be found in the flood hazard profile in Chapter 10.

To enhance flood damage prevention and ensure compliance with the NFIP in the future, Placer County's mitigation strategy includes an action to maintain compliance with NFIP requirements. Additional information on the NFIP program and its implementation throughout the County may be found in the jurisdictional annexes in Volume 2.

NFIP COMMUNITY RATING SYSTEM

As an additional component of the NFIP, the 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: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

While the jurisdictions of Auburn, Colfax, Lincoln, Rocklin, Loomis, and Placer County are all NFIP participants, only Placer County participates in the CRS program. As of July 2025, the current class of Placer County is CRS 5, receiving a 25 percent NFIP premium discount for residents. Placer County is exploring the program requirements of the Community Rating System (CRS) through technical expertise and assistance to guide interested municipalities through the application process, as well as help maintain and enhance their participation in the program.

U.S. ARMY CORPS OF ENGINEERS

Under Section 404(e) of the Clean Water Act, the U.S. Army Corps of Engineers (USACE) must authorize activities that discharge dredge or fill into waterways. Discharging materials into waterways can affect flood risk. USACE can issue three types of permits: standard, nationwide, and regional.

Standard permits are individual permits that involve full public interest review of an individual permit application. They include the issuance of a public notice for any project that does not meet the terms and conditions of a nationwide permit or a Letter of Permission.

USACE nationwide permits authorize activities that have only minimal individual and cumulative adverse environmental effects. A nationwide permit authorizes activities across the country unless a district or division commander revokes the nationwide permit in a state or other geographic region. There are 57 nationwide permits, and they authorize a wide variety of activities, including linear transportation projects, bank stabilization activities, residential development, commercial and industrial developments, aids to navigation and certain maintenance activities (USACE 2021). On October 12, 2021, the California State Water Resources Control Board (SWRCB) conditionally granted certification for 15 nationwide permits and denied certification for 28 nationwide permits for activities on non-tribal lands in the State of California (USACE 2021). Conditional approvals and denials may change the regulatory processes required for a proposed activity.

Regional general permits (RGPs) are for small, specialized projects. RGP 10, Wildfire Mitigation Activities, authorizes activities involving the discharge of dredge or fill material into waters of the United States for the purpose of wildfire protection, prevention, response, clean-up, and recovery. The California SWRCB issued a certification order for RGP 10 on July 7, 2023 (SWRCB 2023).

17.1.2 State

Table 17-1 lists state regulations that impact hazard mitigation activities in California.

Table 17-1. State Regulations Impacting Hazard Mitigation

Plan or Regulation	Relevance
AB 70: Flood Liability	A city or county may be required to partially compensate for property damage caused by a flood if it unreasonably approves new development in areas protected by a state flood control project.
AB 162: Flood Planning	Cities and counties must address flood-related matters in the land use, conservation, and safety and housing elements of their general plans.
AB 747: General Plans—Safety Element	The safety elements of cities' and counties' general plans must address evacuation routes and include any new information on flood and fire hazards and climate adaptation and resiliency strategies.
AB 1409: Planning and Zoning, General Plan—Safety Element	This bill requires the safety element to be reviewed and updated to identify evacuation locations.
AB 2140: General Plans—Safety Element	This bill enables state and federal disaster assistance and mitigation funding to communities with compliant hazard mitigation plans.
AB 2800: Climate Change—Infrastructure Planning	This act requires state agencies to take into account the effects of climate change when developing state infrastructure.
Alquist-Priolo Earthquake Fault Zoning Act	This act restricts construction of buildings used for human occupancy on the surface trace of active faults.
California Environmental Quality Act	This act establishes a protocol of analysis and public disclosure of the potential environmental impacts of development projects. Any project action identified in this plan will seek full California Environmental Quality Act compliance upon implementation.
California General Planning Law	This law requires every county and city to adopt a comprehensive long-range plan for community development, and related laws call for integration of hazard mitigation plans with general plans.
California Health and Safety Code	This code establishes regulations applied to public health and safety resources and services in California. Hazard resistant provisions include Division 32—Seismic Safety Building Rehabilitation Loans.
California Multi-Hazard Mitigation Plan	Local hazard mitigation plans must be consistent with their state's hazard mitigation plan.
California State Building Code	This code establishes the regulations applied to construction in California. Hazard-resistant provisions include flood and soil provisions. Local communities must adopt and enforce building codes, which include measures to improve buildings' ability to withstand hazard events. Chapter A3 prescribes provisions for seismic strengthening of cripple walls and sill plate anchorage of light, wood frame residential buildings. Hazard resistant provisions include codes for the voluntary retrofit of single-family residences that are wood-framed and have a raised foundation.
California Water Code	This code establishes regulations applied to water resources and water service providers in California. Hazard resistant provisions include Division 5—Flood Control and Division 14—California Water Storage District Law.
Division of the State Architect's AB 300 List of Seismically At-Risk Schools	The Division of the State Architect recommends that local school districts conduct detailed seismic evaluations of seismically at-risk schools identified in the inventory that was required by AB 300.
Senate Bill (SB) 32	This bill requires the California State Air Resources Board to ensure the state's greenhouse gas emissions are reduced to 40 percent below 1990 levels by 2030.
SB 92: Public Resources Portion of Biennial Budget Bill	This bill requires dams (except for low-risk dams) to have emergency action plans that are updated every 10 years and inundation maps updated every 10 years, or sooner if specific circumstances change.

Plan or Regulation	Relevance
SB 97: Guidelines for Greenhouse Gas Emissions	This bill establishes that greenhouse gas emissions and the effects of greenhouse gas emissions are appropriate subjects for California Environmental Quality Act analysis.
SB 99: General Plans: Safety Element: Emergency Evacuation Routes	This bill requires that safety elements include information to identify residential developments in hazard areas that do not have at least two emergency evacuation routes.
SB 379: General Plans: Safety Element—Climate Adaptation	This bill requires cities and counties to include climate adaptation and resiliency strategies in the safety element of their general plans.
SB 1000: General Plan Amendments—Safety and Environmental Justice Elements	Under this bill, review and revision of general plan safety elements are required to address only flooding and fires (not climate adaptation and resilience), and environmental justice is required to be included in general plans.
SB 1035: Fire, Flood, and Adaptation Safety Element Updates	This bill clarifies that revisions to the safety element to address fire hazards, flood hazards, and climate adaptation and resilience strategies all must occur upon each revision to a housing element or local hazard mitigation program.
SB 1241: Fire Hazards	This bill requires the safety element to be reviewed and updated as necessary to address the risk of fire in state responsibility areas and very high Fire Hazard Severity Zones, taking into account the most recent version of the Office of Planning and Research's "Fire Hazard Planning" document.
Standardized Emergency Management System	Local governments must use this system to be eligible for state funding of response-related personnel costs.

CALIFORNIA CLIMATE ADAPTATION STRATEGY

The California Climate Adaptation Strategy is a comprehensive plan that aims to enhance the state's resilience to climate change impacts. It focuses on coordinating efforts across various regions and sectors, aligning state agency actions with key climate resilience priorities, and building upon previous successes and lessons learned. The six climate resilience priorities are:

- Strengthen protections for climate vulnerable communities
- Bolster public health and safety to protect against increasing climate risks
- Build a climate resilient economy
- Accelerate nature-based climate solutions and strengthen climate resilience of natural systems
- Make decisions based on the best available climate science
- Partners and collaborate to leverage resources

The California Natural Resources Agency is required by law to update the Climate Adaptation Strategy every three years. This ensures that the plan remains current and responsive to evolving climate challenges.

CALIFORNIA'S FOURTH CLIMATE CHANGE ASSESSMENT

California's Fourth Climate Change Assessment provides practical, science-based information to help state and local decision-makers address climate change impacts. It includes detailed regional climate projections for California, tools to incorporate climate data into planning, and recommendations for adapting key sectors like energy, water, and agriculture to climate impacts. The Fourth Assessment includes a statewide report, nine regional reports, and dozens of technical reports. Placer County is split between two regions used for regional reports: the Sacramento Valley, which covers the western part of the county, and the Sierra Nevada, which covers the eastern part. Highlights from the Sacramento Valley and Sierra Nevada regional reports include:

- The Sacramento Valley is experiencing more frequent and intense heat waves with fewer cooling degree days because of global temperature increases
- Water storage and flood control systems are not built for projected future precipitation patterns, which could include very dry years with reduced snowpack to feed streams, and very wet years causing extensive flooding across the Sacramento Valley.
- Temperatures in the Sierra Nevada warming by 6 to 9ºF on average by the end of the 21st century, “enough to raise the transition from rain to snow during a storm by about 1,500 to 3,000 feet.” Snowpack below 6000 feet will likely disappear and be significantly reduced across the Sierra Nevada.
- Precipitation extremes (heavy rain, flooding, and drought) in the Sierra Nevada are expected to increase, even as long-term changes are no more than 10 or 15 percent more or less than historical averages.
- Changed timing of streamflows as snowpack decreases, more precipitation falls as rain, and flood events increase
- Stressed vegetation due to drought may have cascading impacts, such as wildfire and landslide risk

The Fifth Climate Assessment was underway at the same time as this MJHMP Update and is projected to be completed in 2026.

CALIFORNIA’S WATER SUPPLY STRATEGY: ADAPTING TO A HOTTER, DRIER FUTURE

California’s Water Supply Strategy is a comprehensive plan developed by state agencies to address the critical challenges of water management in a changing climate. As temperatures rise, the state anticipates potentially losing 10 percent of its water supplies over the next two decades. The strategy focuses primarily on protecting and stabilizing water systems for urban, suburban, and agricultural communities. While its core objectives center on water security for human needs, the plan also encompasses broader environmental and social goals. This includes ongoing efforts to ensure safe drinking water for all Californians and protect ecological systems, demonstrating a holistic approach to water resource management in an increasingly unpredictable climate. Key actions from the strategy include:

- Developing new water supplies through recycling and desalination
- Capturing and saving more stormwater
- Reducing the use of water in cities and on farms
- Improving all water management actions with better data, forecasting, conveyance, and administration of water rights

CALIFORNIA WILDFIRE AND FOREST RESILIENCE ACTION PLAN

The 2021 California Wildfire and Forest Resilience Task Force's Action Plan serves as a comprehensive roadmap for managing the state's forests and rangelands. This plan implements the Agreement for Shared Stewardship between California and the US Forest Service, while also aligning efforts across federal, local, tribal, regional, and private organizations. In executing this plan, the responsible entities are dedicated to advancing California's broader goals of achieving carbon neutrality, enhancing climate resilience, promoting equity, and fostering economic growth. This integrated approach ensures that forest management strategies not only address wildfire risks but also contribute to the state's environmental, social, and economic objectives. The four priorities of the plan are:

1. Increase the pace and scale of forest health projects
2. Strengthen protection of communities
3. Manage forests to achieve the state's economic and environmental goals
4. Drive innovation and measure progress

PROTECTING CALIFORNIANS FROM EXTREME HEAT: A STATE ACTION PLAN TO BUILD COMMUNITY RESILIENCE

The California Natural Resources Agency released a comprehensive 2022 action plan addressing the state's approach to mitigating the impacts of rising temperatures and heat waves. This plan outlines a coordinated, government-wide strategy to tackle the health, economic, cultural, ecological, and social challenges posed by increasing average temperatures. Building upon a 2013 report jointly developed by the California Department of Public Health and the California Environmental Protection Agency, the new action plan incorporates updated climate projections and expands on previous recommendations. It represents California's latest effort to proactively address the multifaceted risks associated with extreme heat and climate change. Key action tracks include:

1. Build public awareness and notification
2. Strengthen community services and response
3. Increase resilience of our built environment
4. Utilize nature based solutions

CALIFORNIA STATE EMERGENCY PLAN

The California State Emergency Plan, maintained by Cal OES, describes the methods for conducting emergency operations, rendering mutual aid, emergency response capabilities of state agencies, resource mobilization, public information, and continuity of government during an emergency or disaster.

17.1.3 County

Jurisdictions in California have the ability to develop policies and programs and to implement rules and regulations to protect and serve residents. Local policies are typically identified in a variety of community plans, implemented via a local ordinance, and enforced through a governmental body. A summary of County planning and regulatory capabilities is provided below. Detailed information on each participating jurisdiction's planning and regulatory capabilities is provided in Volume 2.

ORDINANCES

Placer County enforces targeted ordinances such as the Hazardous Vegetation and Combustible Material Ordinance, effective since May 2020, which requires property owners to maintain a defensible space of 100 feet around structures by removing or managing hazardous vegetation and combustible materials. This ordinance aligns with state and local fire codes and aims to reduce wildfire risk by minimizing fuel sources near buildings. Additionally, the county's zoning and building codes include regulations that restrict development in high-risk hazard zones and promote fire-resistant construction standards to enhance community safety against natural disasters.

THE GENERAL PLAN

The Placer County General Plan serves as the overarching policy document guiding land use, development, and resource management within the county. It integrates hazard mitigation principles by referencing and incorporating the Multi-Jurisdictional Hazard Mitigation Plan, thereby embedding risk reduction strategies into land use decisions and long-term community planning. Through this integration, the General Plan ensures that hazard considerations, such as flood zones and wildfire risk areas, are addressed proactively in permitting, development standards, and conservation efforts, promoting resilient growth and safety for residents and property.

HEALTH AND SAFETY ELEMENT UPDATE

The 2021 update to Placer County's Health and Safety Element was undertaken to comply with California Government Code Section 65302(g) and incorporate relevant state legislation, including Senate Bills 1241, 379, and 1035. This update aligns county policies with the most current hazard mitigation frameworks by embedding strategies from the Multi-Jurisdictional Hazard Mitigation Plan directly into the county's General Plan. It emphasizes reducing vulnerability to natural hazards such as wildfires, floods, and drought through enhanced planning policies, emergency preparedness, and community resilience measures, thereby strengthening the county's regulatory foundation for protecting public health and safety.

AVALANCHE MANAGEMENT AREAS

Article 12.40 of the Placer County Code outlines regulations for building and development in areas prone to avalanches, focusing on safety and requiring expert certification for construction in potential hazard zones, with specific sections covering purpose, scope, boundary identification, notice requirements, signage, construction rules (including architect/engineer certification for snow loads), and penalties for violations, all aimed at protecting life and property from avalanche risk.

17.2 Administrative and Technical Capabilities

This section summarizes administrative and technical capabilities in Placer County. Further information is provided in the jurisdictional annexes in Volume 2.

17.2.1 Federal

FEDERAL EMERGENCY MANAGEMENT AGENCY

The Federal Emergency Management Agency (FEMA) is responsible for providing assistance before, during, and after disasters. FEMA is the federal reviewer of hazard mitigation plans and sets federal standards for local and state hazard mitigation plans.

NATIONAL DAM SAFETY PROGRAM

The National Dam Safety Program is a partnership of state and federal agencies and other stakeholders that encourages individual and community responsibility for dam safety to protect people from dam failures. It is administered through the Department of Homeland Security and FEMA. The program improves safety and security around dams by providing grants to state dam safety agencies to assist them in improving their regulatory programs; producing educational materials for dam owners; funding research to enhance technical expertise as dams are built and rehabilitated; establishing training programs for dam safety inspectors; and creating the National Inventory of Dams (FEMA 2023c).

NATIONAL WEATHER SERVICE

The National Weather Service (NWS) monitors weather and delivers weather forecasting. Placer County is serviced by the Sacramento weather forecast office (NWS n.d.).

The NWS also operates the StormReady program, which provides emergency managers with guidelines on how to improve their communities' hazardous weather operations. To be recognized by the program, a community must establish a 24-hour warning point and emergency operations center; have more than one way to receive severe weather warnings and forecasts and to alert the public; create a system that monitors weather conditions locally; promote the importance of public readiness through community seminars; and develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises (NWS n.d.). Placer County is a county level participant in the program.

U.S. ARMY CORPS OF ENGINEERS

The U.S. Army Corps of Engineers (USACE) builds and maintains public infrastructure. Projects include dredging, storm damage reduction, and ecosystem restoration in and near waterways. The USACE Dam Safety Program is responsible for safety inspections of dams that meet size and storage limitations specified in the National Dam Safety Act and maintains the National Inventory of Dams.

17.2.2 State

Table 17-2 identifies administrative and technical capabilities available at the state level in California.

Table 17-2. State Administrative and Technical Capabilities

Agency, Program or Regulation	Relevance to Hazard Mitigation
California Department of Parks and Recreation (State Parks)	State Parks Resources Management Division has wildfire protection resources available to suppress fires on State Park lands.
California Department of Water Resources (DWR)	This department is the state coordinating agency for floodplain management. DWR, on behalf of FEMA, provides individual technical assistance to California communities participating in the NFIP by conducting Community Assistance Visits and Community Assistance Contacts. DWR provides statewide NFIP workshops that are designed to interpret and explain the NFIP regulations and to give an overview of the need for community-based floodplain management (Cal OES 2023a).
California Division of Safety of Dams (DSOD)	This division of DWR monitors the dam safety program at the State level and maintains a working list of dams in California.
California Office of the State Fire Marshal (CAL FIRE)	CAL FIRE has responsibility for wildfires in areas that are not under the jurisdiction of the U.S. Forest Service or a local fire organization.
Cal OES	Cal OES serves as the state's leadership hub during all major emergencies and disasters. This includes responding, directing, and coordinating state and federal resources and mutual aid assets. Cal OES also supports local jurisdictions and communities through planning and preparedness activities, training, and facilitating the immediate response to an emergency through the longer-term recovery phase. During this process, Cal OES serves as the state's overall coordinator and agent to secure federal government resources through FEMA (Cal OES 2024).
California Fire Alliance	The alliance works with communities at risk from wildfires to facilitate the development of community fire loss mitigation plans.
California Fire Safe Council	This council facilitates the distribution of National Fire Plan grants for wildfire risk reduction and education.

17.2.3 County

Table 17-3 lists the administrative bodies in Placer County that are available to support hazard mitigation initiatives. Local municipalities have similar departments.

Table 17-3. Placer County Administrative and Technical Capabilities

Admin Department	Relevance to Hazard Mitigation
Agriculture / Weights & Measures	Regulates pesticide use, ensures safe agricultural practices to prevent environmental hazards, supports food supply resilience.
Assessor's Office	Provides property data and valuation useful for risk assessment and disaster recovery planning.
Auditor-Controller	Manages county finances and budgeting for mitigation project funding and grants.
Board of Supervisors	Governing body approving hazard mitigation policies and funding allocations.
Clerk of the Board	Records and disseminates official hazard mitigation plans and public notices.
Planning Division	Leads land use and development planning, and environmental review to reduce hazard risk.
Building Services Division	Enforces building codes to ensure structures resist hazards like earthquakes and floods.
Code Enforcement	Enforces compliance with zoning and safety regulations to reduce vulnerability.
Engineering & Surveying Division	Provides technical expertise for infrastructure resilience, flood control, and hazard mapping.
Geographic Information Systems (GIS)	Develops hazard maps, risk assessments, and supports spatial analysis for mitigation planning.
County Counsel	Provides legal guidance for mitigation plan implementation and compliance with regulations.
County Executive Office	Coordinates overall county policy and interdepartmental hazard mitigation efforts.
Placer County OES	Leads emergency preparedness, response, and mitigation coordination activities.
Procurement Services	Manages contracts and purchasing for mitigation projects and disaster recovery operations.
Communications and Public Affairs	Handles public information, community outreach, and education on hazard mitigation.
Risk Management	Identifies and manages county liability and exposure to hazards, promotes risk reduction strategies.
Economic Development & Housing	Supports community resilience through sustainable development and housing hazard mitigation.
Facilities Management	Maintains county buildings to ensure safety and continuity of operations during hazards.
Placer County Fire	Provides fire prevention, inspections, and emergency response capabilities.
Environmental Health	Inspects and regulates environmental hazards including water quality and hazardous materials.
Human Services	Provides social services support to vulnerable populations during hazard events.
Public Health	Conducts disease surveillance, immunization programs, and health education to mitigate biological hazards.
Information Technology	Maintains critical IT infrastructure and communication systems for emergency operations.
Parks, Trails and Open Spaces	Manages open spaces that can serve as evacuation routes and natural buffers to hazards.
Probation Department	Supports community safety and continuity during hazard events, including juvenile facilities.

Admin Department	Relevance to Hazard Mitigation
Public Works	Oversees county infrastructure maintenance, road repair, flood control, and debris removal.
Transportation Planning	Plans for transportation system resilience and evacuation route management.
Sheriff-Coroner-Marshal	Provides law enforcement, search and rescue, and public safety during hazard events.

17.3 Fiscal Capabilities

This section summarizes fiscal capabilities in Placer County. Further information is provided in the jurisdictional annexes in Volume 2. Appendix O of the 2023 California State Hazard Mitigation Plan describes additional resources and mitigation-related funding available to eligible jurisdictions to fund mitigation actions.

17.3.1 Federal Hazard Mitigation Funding Opportunities

FEMA HAZARD MITIGATION ASSISTANCE GRANTS

As noted on the FEMA hazard mitigation assistance website, FEMA administers four programs that provide funding for eligible mitigation planning and projects that reduce disaster losses and protect life and property from future disaster damages. The programs are the Hazard Mitigation Grant Program (HMGP), the HMGP Post Fire Grant, Flood Mitigation Assistance (FMA) Program, and Safeguarding Tomorrow Revolving Loan Fund (RLF) program. As of August 2025, both the Pre-Disaster Mitigation (PDM) program and Building Resilient Infrastructure and Communities (BRIC) program have been retired.

Federal mitigation grant funding is available to all communities with a current hazard mitigation plan (this plan); however, most of these grants require a “local share” in the range of 10-25 percent of the total grant amount.

Table 17-4 provides an overview of program funding eligibility and cost share.

Table 17-4. FEMA HMA Grant Cost Share Requirements

Programs	Cost Share (Percent of Federal / Non-Federal Share)
HMGP	75 / 25
HMGP Post Fire	75 / 25
FMA (community flood mitigation, project scoping, individual mitigation of insured properties, and planning grants)	75 / 25
FMA—repetitive loss property(2)	90 / 10
FMA—severe repetitive loss property(2)	100 / 0
Safeguarding Tomorrow Revolving Loan Fund (RLF)	Loan (but could be used as Cost Share for HMA grant)

Source: FEMA 2023; FEMA 2023

Sub-applicants should consult their State Hazard Mitigation Officer (SHMO) for the percentage of HMGP subrecipient management cost funding their State has determined to be passed through subrecipients.
To be eligible for an increased federal cost share, a FEMA-approved state or tribal (standard or enhanced) mitigation plan that addressed repetitive loss properties must be in effect at the time of award, and the property is being submitted for consideration must be a repetitive loss property.

HMGP assists in implementing long-term hazard mitigation planning and projects following a Presidential major disaster declaration. FMA provides funds on an annual basis for planning and projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP).

HMGP funding is generally 15 percent of the total amount of Federal assistance provided to a State, Territory, or federally recognized tribe following a major disaster declaration. For states with enhanced state hazard mitigation plans, like California, HMGP is 20 percent of assistance provided. FMA funding depends on the amount congress appropriates each year for the program.

Individual homeowners and business owners may not apply directly to FEMA. Eligible local governments may apply on their behalf (FEMA 2023d). For additional information on the individual HMA programs, see: https://www.fema.gov/grants/mitigation/state-local-territorial-governments.

REHABILITATION OF HIGH HAZARD POTENTIAL DAMS PROGRAM

The Rehabilitation of High Hazard Potential Dams (HHPD) grant program provides technical, planning, design, and construction assistance for eligible rehabilitation activities that reduce dam risk and increase community preparedness.

The HHPD Grant Program will provide assistance for technical, planning, design, and construction activities toward:

- Repair
- Removal
- Structural/nonstructural rehabilitation of eligible high hazard potential dams

For additional information, see: https://www.fema.gov/emergency-managers/risk-management/dam-safety/rehabilitation-high-hazard-potential-dams.

17.3.2 Federal Disaster and Recovery Assistance Programs

Following a disaster, various types of assistance may be made available by local, state, and federal governments. The types and levels of disaster assistance depend on the severity of the damage and the declarations that result from the disaster event. Among the general types of assistance that may be provided should the President of the United States declare the event a major disaster includes the following:

INDIVIDUAL ASSISTANCE

Individual Assistance (IA) provides help for homeowners, renters, and some nonprofit entities after disasters occur. FEMA may provide money and other services to help individuals recover from losses caused by a presidentially declared disaster, such as damage to their home, car, and other personal items. IA programs include housing assistance, serious needs assistance, mass care and emergency assistance, crisis counseling assistance, disaster case management, disaster legal services, and disaster unemployment assistance. The IA housing assistance includes eligible home mitigation activities to help homeowners repair or rebuild stronger, more durable homes.

For additional information, see: https://www.fema.gov/individual-disaster-assistance.

PUBLIC ASSISTANCE

Public Assistance (PA) provides cost reimbursement aid to local governments (state, county, local, municipal authorities, and school districts) and certain nonprofit agencies that were involved in disaster response and recovery programs or that suffered loss or damage to facilities or property used to deliver government-like services. This program is largely funded by FEMA with both local and state matching contributions required.

For additional information, see: https://www.fema.gov/public-assistance-local-state-tribal-and-non-profit.

SMALL BUSINESS ADMINISTRATION LOANS

The Small Business Administration (SBA) provides low-interest disaster loans to homeowners, renters, business of all sizes, and most private nonprofit organizations. SBA disaster loans can be used to repair or replace the following items damaged or destroyed in a declared disaster: real estate, personal property, machinery and equipment, and inventory and business assets.

Homeowners may apply for up to $200,000 to replace or repair their primary residence. Renters and homeowners may borrow up to $40,000 to replace or repair personal property (such as clothing, furniture, cars, and appliances) damaged or destroyed in a disaster. Physical disaster loans of up to $2 million are available to qualified businesses or most private nonprofit organizations. An Economic Injury Disaster Loan provides necessary working capital until normal operations resume after a physical disaster.

For additional information, see: https://www.sba.gov/managing-business/running-business/emergency-preparedness/disaster-assistance.

COMMUNITY DEVELOPMENT BLOCK GRANTS

Community Development Block Grants (CDBG) are federal funds intended to provide low and moderate-income households with viable communities, including decent housing, as suitable living environment, and expanded economic opportunities. Eligible activities include community facilities and improvements, roads and infrastructure, housing rehabilitation and preservation, development activities, public services, economic development, planning, and administration. Public improvements may include flood and drainage improvements. In limited instances, and during the times of “urgent need” (e.g., post-disaster) as defined by the CDBG National Objectives, CDBG funding may be used to acquire a property located in a floodplain that was severely damaged by a recent flood, demolish a structure severely damaged by an earthquake, or repair a public facility severely damaged by a hazard event.

For additional information, see: https://www.hudexchange.info/programs/cdbg-entitlement/.

U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

The U.S. Economic Development Administration (USEDA) is an agency of the U.S. Department of Commerce that supports regional economic development in communities around the country. It provides funding to support comprehensive planning and makes strategic investments that foster employment creation and attract private investment in economically distressed areas of the United States. Through its Public Works Program, USEDA invests in key public infrastructure, such as in traditional public works projects, including water and sewer systems improvements, expansion of port and harbor facilities, brownfields, multitenant manufacturing and other facilities, business and industrial parks, business incubator facilities, redevelopment technology-based facilities, telecommunications, and development facilities. Through its Economic Adjustment Program, USEDA administers its Revolving Loan Fund (RLF) Program, which supplies small businesses and entrepreneurs with the gap financing needed to start or expand their business, in areas that have experienced or are under threat of serious structural damage to the underlying economic base. The USEDA may receive a disaster supplemental allocation following a presidentially-declared disaster for a wide variety of activities related to disaster recovery, including economic recovery strategic planning grants, and public works construction assistance.

For additional information, see: https://www.eda.gov/strategic-initiatives/disaster-recovery/supplemental.

FEDERAL HIGHWAY ADMINISTRATION EMERGENCY RELIEF

Federal Highway Administration Emergency Relief (FHWA-ER) is a grant program that may be used for repair or reconstruction of Federal-aid highways and roads on Federal lands which have suffered serious damage as a result of a disaster.

For additional information, see: https://www.fhwa.dot.gov/bipartisan-infrastructure-law/er_fact_sheet.cfm.

FEDERAL TRANSIT ADMINISTRATION EMERGENCY RELIEF

Federal Transit Administration Emergency Relief (FTA-E) is a grant program that funds capital projects to protect, repair, reconstruct, or replace equipment and facilities of public transportation systems. Administered by the Federal Transit Authority at the U.S. Department of Transportation and directly allocated to metropolitan transit authorities (MTA) and port authorities, this transportation-specific fund was created as an alternative to FEMA PA.

For additional information, see: https://www.transit.dot.gov/funding/grant-programs/emergency-relief-program.

17.3.3 State Hazard Mitigation Funding Opportunities

CAL FIRE Grants

CAL FIRE grant programs provide funding for fire prevention activities, to improve forest health, and to enhance community resilience. Additional benefits to communities include workforce development in rural and tribal communities, business innovation, and new recreation opportunities.

For additional information, see: https://www.fire.ca.gov/what-we-do/grants.

California Earthquake Authority Earthquake Brace + Bolt Program

The California Earthquake Authority (CEA) Earthquake Brace + Bolt (EBB) Program helps homeowners strengthen their homes against earthquakes by offering a grant of up to $3,000 toward a seismic retrofit for qualifying houses.

For additional information, see: https://www.californiaresidentialmitigationprogram.com/our-seismic-retrofit-programs/the-retrofits/ebb-retrofit.

CALIFORNIA DEPARTMENT OF WATER RESOURCES PROPOSITION 84

Proposition 84 authorizes general obligation bonds to fund safe drinking water, water quality and supply, flood control, waterway and natural resource protection, water pollution and contamination control, state and local park improvements, public access to natural resources, and water conservation efforts.

For additional information, see: https://bondaccountability.resources.ca.gov/p84.aspx.

DWR SMALL COMMUNITIES FLOOD RISK REDUCTION PROGRAM

The Small Communities Flood Risk Reduction Program is a local assistance program whose objective is to reduce flood risk for small communities protected by State Plan of Flood Control facilities, as well as for legacy communities.

For additional information, see: https://water.ca.gov/Work-With-Us/Grants-And-Loans/Small-Communities-Flood-Risk-Reduction.

DWR FLOOD CONTROL SUBVENTIONS PROGRAM

The Flood Control Subventions Program provides financial assistance to local agencies cooperating in the construction of federally authorized flood control projects.

For additional information, see: https://water.ca.gov/Work-With-Us/Grants-And-Loans/Flood-Control-Subventions-Program.

DWR INTEGRATED REGIONAL WATER MANAGEMENT GRANT PROGRAMS

The Integrated Regional Water Management Grant Programs are a collaborative effort to manage all aspects of water resources in a region. The grant programs fund planning, implementation, and disadvantaged community and tribal involvement.

For additional information, see: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Work-With-Us/Grants-And-Loans/IRWM-Grants/Files/Prop-1-Implementation/Round-2/2022-Integrated-Regional-Water-Management-Grant-Program-Guidelines.pdf.

17.3.4 County and Local

Placer County and individual jurisdictions are (legally, not necessarily practically) able to fund mitigation projects though existing local budgets, local appropriations (including referendums and bonding), and a variety of federal and state loan and grant programs. Many jurisdictions noted throughout the planning process that they are faced with increasing fiscal constraints, including decreasing revenues, budget constraints, and tax caps. In an effort to overcome these fiscal challenges, jurisdictions have continued to leverage the sharing of resources and combining available funding with grants and other sources and note that plans and interjurisdictional cooperation are beneficial in obtaining grants.

18. Mitigation Strategy

A mitigation strategy is a long-term blueprint for reducing the potential for hazard-related losses. The core of a mitigation strategy is a set of mitigation actions, which are projects, plans, or other activities that address a range of potential hazard impacts on the population, property, economy, and environment of a community. Communities use mitigation actions to achieve defined mitigation goals.

This chapter describes the process used to identify mitigation goals and actions and create mitigation strategies for each jurisdiction participating in the MJHMP. Planning Partners reviewed the risk assessment and capability assessment to develop these mitigation strategies.

18.1 Past Mitigation Accomplishments

Placer County, through previous and ongoing hazard mitigation activities, has demonstrated that it is proactive in protecting its physical assets and citizens against losses from natural hazards. Examples of previous and ongoing actions within the County include the following:

- The County facilitated the development of the original Placer County hazard mitigation plan and subsequent updates on a five-year cycle.
- Placer County OES supports programs that promote hazard mitigation in the community, including the Defensible Space Fuels Reduction Program, Fire Safe Alliance, Fire Safe Councils, Firewise USA Community Program, and Residential Chipper Program.
- All municipalities participating in this MJHMP update are participants in the National Flood Insurance Program (NFIP), which requires the adoption of FEMA floodplain mapping and minimum standards for building within the floodplain.
- Reports, plans, and studies relating to hazards affecting the county have been reviewed and incorporated into this plan update as appropriate, as discussed in Chapter 2.

18.2 Mitigation Goals and Objectives

For the purposes of this plan, goals and objectives are defined as follows:

- **Goals** are general guidelines that explain what is to be achieved. They are usually broad, long-term, policy-type statements and represent global visions. Goals help define the benefits that the plan is trying to achieve. The success of the plan, once implemented, should be measured by the degree to which its goals have been met (that is, by the actual benefits in terms of hazard mitigation).
- **Objectives** are short-term aims that form a strategy or course of action to meet a goal. Objectives are stand-alone measurements of the effectiveness of a mitigation action. The objectives also are

used to help establish priorities. Broadly defined mitigation objectives were eliminated from the updated strategy unless accompanied by discrete actions.

The HMPC reviewed the 2021 goals and objectives and made revisions for the 2026 update based on the following considerations:

- Hazard events and losses since the 2021 LHMP
- The updated hazard profiles and risk assessment
- The Planning Partnership's interests in integrating this plan with other planning mechanisms, including Placer County and local risk management plans
- Direct input from the HMPC, stakeholders, and the public on how the participating jurisdictions need to move forward to best manage their hazard risk
- Discussions and research on existing authorities, policies, programs, resources
- Support for mitigation through the protection of natural systems

As a result of this review process, the goals and objectives for the 2026 update were updated to the following:

- **Goal 1—Significantly reduce risk to life, community lifelines, the environment, property, and infrastructure by planning and implementing whole-community risk reduction and resilience strategies.**
  - Objective 1.1—Foster active participation and collaboration among local government, non-profit organizations, businesses, and residents to ensure that risk reduction and resilience strategies reflect the diverse needs and priorities of the entire community
  - Objective 1.2—Create tailored mitigation actions that address specific community risks, focusing on natural hazards, environmental sustainability, economic resilience, and infrastructure resilience to minimize impacts on life and property
  - Objective 1.3—Develop a plan for ongoing monitoring and evaluation of mitigation actions, using data to assess their effectiveness and adjust for continuous improvement
- **Goal 2—Enhance disaster resilience among underserved populations and communities disproportionately impacted by disasters by building capacity and incorporating equity metrics, tools, and strategies into all mitigation planning, policy, funding, outreach, and implementation efforts.**
  - Objective 2.1—Develop mitigation actions that include underserved populations to enhance their ability to prepare for, respond to, and recover from disasters, ensuring equitable access to resources
  - Objective 2.2—Implement proactive outreach strategies that involve the whole community in the disaster resilience planning process to ensure a variety of voices and experiences are reflected in decision-making
- **Goal 3—Apply the best available science and authoritative data to design, implement, and prioritize mitigation actions that maximize co-benefits and enhance resilience to natural hazards and climate change impacts.**

  - Objective 3.1—Use updated research and authoritative data to inform the development of evidence-based mitigation actions
  - Objective 3.2—Create a framework for prioritizing mitigation actions based on risk assessments and data analysis, allowing for the efficient allocation of resources
- **Goal 4—Integrate mitigation principles into laws, regulations, policies, and guidance to support equitable outcomes to benefit the whole community.**
  - Objective 4.1—Assess and update codes, regulations, and policies to incorporate mitigation principles that promote equitable outcomes, ensuring that all community members benefit
- **Goal 5—Enhance community resilience by improving the safety and reliability of critical infrastructure to withstand natural hazards and protect natural systems.**
  - Objective 5.1—Identify existing critical infrastructure based on impacts to community lifelines with potential for relocation or retrofit within the next three years to enhance their resilience against natural hazards, including flood and wildfire
- **Goal 6—Maintain FEMA eligibility and position the communities for grant funding.**
  - Objective 6.1—Ensure the Mult-Jurisdictional Hazard Mitigation Plan is updated every five years to maintain relevance and effectiveness
  - Objective 6.2—Expand the number of participating jurisdictions in future MJHMP updates to enhance eligibility for mitigation funding and other funding sources
  - Objective 6.3—Achieve ongoing compliance with the National Flood Insurance Program (NFIP) and enhance floodplain management by participating in the NFIP's Community Rating System (CRS)

18.3 Mitigation Strategy Development

Beginning in October 2025, members of the Core Planning Team worked directly with each jurisdiction (by phone, email, or virtual meetings) to update their annex with mitigation strategies that focus on well-defined, implementable projects that meet the definition or characteristics of mitigation. Mitigation actions were selected with a careful consideration of benefits (risk reduction, losses avoided), costs, and possible funding sources (including mitigation grant programs).

The mitigation strategies developed for the 2026 MJHMP include actions that are seen by the community as the most effective approaches to advance local mitigation goals within the Planning Partners' capabilities. The strategies are action-oriented and achievable.

18.3.1 Mitigation Strategy Workshops

Two mitigation strategy workshops were conducted for all participating jurisdictions on October 28, 2025, to foster collaboration between neighboring jurisdictions for mitigation actions, discuss actions that involve cooperation between the County and jurisdictions, and identify steps needed to complete the jurisdictional annexes. The workshops supported the development of focused mitigation strategies and problem statements based on the potential local impacts of natural hazards.

The problem statements are included in the mitigation strategies in the jurisdictional annexes. They form a bridge between the hazard risk assessment, which quantifies impacts on each community, and the development of actionable mitigation strategies. The Problem Statement Worksheet is available in Appendix G.

18.3.2 Review of Previous Actions

To evaluate progress on local mitigation actions, each planning partner received a Mitigation Action Update Worksheet, pre-populated with the actions identified for their jurisdiction in the 2021 LHMP. The Planning Partners were asked to indicate the status of each action. Mitigation actions identified as "Complete" were removed from the Planning Partners' mitigation strategies. Actions identified as "Not Complete" were carried forward in the 2026 mitigation strategies. Planning Partners were asked to provide additional details for these actions to describe the projects, identify benefits and costs, and improve implementation. The results of this activity are available in the Mitigation Action Updates section of the jurisdictional annexes.

In some cases, jurisdictions chose to discontinue a project from their previous mitigation strategy. Discontinuing a project may be required when community priorities change, jurisdictional boundaries are adjusted, or the jurisdiction obtains new facilities or equipment. Continuous or ongoing actions from the previous plan that represent programs that are now fully integrated into the normal operational and administrative framework of the community are identified in the capabilities assessment of each annex and removed from the updated mitigation strategy.

18.3.3 Identification of New Actions

Throughout the planning process, the Planning Partners were prompted to think about new mitigation actions that could be included in their mitigation strategies at key planning milestones, such as the hazards of concern survey, capabilities assessment, public survey closure, and risk assessment results meeting. Identifying new actions was emphasized during this plan update because 14 Planning Partners were participating in the MJHMP for the first time and would be designing their first ever mitigation strategies.

Throughout the course of the plan update process, additional regional and county-level mitigation actions were identified by the following processes:

- Review of the results and findings of the updated risk assessment
- Review of available regional and County plans, reports, and studies
- Direct input from County departments and other regional agencies
- Input received through the public and stakeholder outreach process

The sections below describe the focus of the process followed to identify new mitigation actions.

CONSIDERING DIVERSE SOURCES OF POTENTIAL ACTIONS

To assist the Planning Partners in identifying potential mitigation actions, the following resources were distributed:

- FEMA Mitigation Ideas, 2013
- FEMA Mitigation Action Portfolio, 2020
- Public Survey Results
- Stakeholder Survey Results
- Problem Areas Survey Results
- Risk Assessment Results
- Capabilities Report
- Mitigation Action Catalog

The Capabilities Report and Mitigation Action Catalog were developed for this plan and present a comprehensive range of specific mitigation actions and projects to be considered for use in the mitigation strategies, in compliance with 44 CFR Section 201.6(c)(3)(ii). The Mitigation Action Catalog presents mitigation actions for each hazard of concern, categorized as follows:

- Manipulating the hazard—Actions to prevent hazard events from occurring.
- Reducing exposure and vulnerability—Actions to safeguard people, property, and the environment from the impacts of the hazard.
- Building local capacity—Actions to improve abilities to mitigate and respond to hazard events.

The Mitigation Action Catalog is included in Appendix G.

ADDRESSING KNOWN VULNERABILITIES

To help support the selection of an appropriate risk-based mitigation strategy, each annex includes a summary of hazard vulnerabilities. These were identified during the plan update process by Planning Partner representatives, through review of available plans and reports, or through the hazard profiling and risk assessment process.

PROTECTING CRITICAL FACILITIES

Mitigation actions that address vulnerable critical facilities have been proposed in consideration of protection against worst-case scenarios. For projects funded through federal mitigation programs, the level of protection may be influenced by cost-effectiveness as determined through a formal benefit-cost analysis. For locally self-funded projects, local jurisdiction discretion must be recognized. It must be recognized that the County and jurisdictions have limited authority with regard to mitigation at any level of protection over privately owned critical facilities.

INCORPORATING A RANGE OF ACTION TYPES

Concerted efforts were made to ensure that Planning Partners develop updated mitigation strategies that cover the range of mitigation action types described in FEMA's current Local Mitigation Planning Handbook (FEMA 2025c):

- **Local Plans and Regulations**—These actions include government authorities, policies or codes that influence the way land and buildings are developed and built.
- **Structure and Infrastructure Project**—These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as community lifelines and other critical facilities. This type of action also involves projects to construct structures to reduce the impact of hazards.
- **Natural Systems Protection**—These are actions that minimize damage and losses to natural systems and preserve or restore their functions.
- **Education and Awareness Programs**—These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as the National Flood Insurance Program, Community Rating System, StormReady (NOAA), and Firewise USA Community Program (NFPA).

To facilitate this analysis, a Mitigation Action Matrix was distributed at the Mitigation Strategy Workshops. The Mitigation Action Matrix is available in Appendix G.

Efforts were also made to develop mitigation strategies that cover the range of mitigation action types described in the Community Rating System Coordinator's Manual (FEMA 2025a):

- **Preventative Measures**—Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, local floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
- **Property Protection**—These actions include public activities to reduce hazard losses or actions that involve modification of existing buildings or structures to protect them from a hazard or removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Information**—Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- **Natural Resource Protection**—Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

- **Structural Flood Control Projects**—Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- **Emergency Services**—Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

18.4 Mitigation Strategy Prioritization

Section 201.c.3.iii of 44 CFR establishes how mitigation strategies are to be prioritized, implemented, and administered by local jurisdictions. For this plan update, each mitigation action was prioritized using suitable criteria for evaluating hazard mitigation. This method provided a systematic approach that considered the opportunities and constraints of implementing each mitigation action.

18.4.1 Benefit/Cost Review

Section 201.6.c.3iii of 44 CFR requires the prioritization of the mitigation strategy to emphasize a benefit/cost comparison of the proposed actions. For all actions identified in the mitigation strategy, the County identified the associated costs and benefits as follows:

- **Costs** presented include the total project estimation. This can include administrative, construction (engineering, design, and permitting), and maintenance costs.
- **Benefits** are the savings from losses avoided through project implementation. These can include life safety, structure and infrastructure damage, loss of service or function, and economic and environmental damage and losses.

When possible, actual or estimated dollar costs and associated benefits were developed. Where estimates of costs and benefits were available, the ratings were defined follows:

Low < = $10,000 Medium = $10,000 to $100,000 High > = $100,000

Where numerical costs or benefits could not be quantified, cost-effectiveness was evaluated using qualitative high, medium, and low ratings based on the following definitions:

- Costs
  - High—Existing funding levels are not adequate to cover the costs of the proposed project, and implementation would require an increase in revenue through an alternative source (e.g., bonds, grants, and fee increases).
  - Medium—The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
  - Low—The project could be funded under the existing budget. The project is part of or can be part of an existing, ongoing program.

- Benefits
  - High—Project will have an immediate impact on the reduction of risk exposure to life and property.
  - Medium—Project will have a long-term impact on the reduction of risk exposure to life and property or will provide an immediate reduction in the risk exposure to property.
  - Low—Long-term benefits of the project are difficult to quantify in the short-term.

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-effective.

For some of the mitigation actions identified, the Planning Partnership may seek financial assistance under FEMA's Hazard Mitigation Assistance (HMA) programs. These programs require detailed benefit/cost analysis as part of the application process. The benefit/cost review for the prioritization of actions in this update did not include the level of detail required by FEMA for project grant eligibility under HMA grant programs. These analyses will be performed when funding applications are prepared, using FEMA's Benefit-Cost Analysis model.

The Planning Partnership is committed to implementing mitigation strategies with benefits that exceed costs. For projects not seeking financial assistance from grant programs that require this sort of analysis, the Planning Partnership reserves the right to define benefits according to parameters that meet their needs and the goals and objectives of this plan.

18.4.2 Prioritization Scoring

Each mitigation action was assigned a priority based on the scoring system shown in Table 18-1 and the following equation:

Priority = (Costs) + (Benefits) + (Objectives Met) + (Time Frame)

Table 18-1. Scoring System for Prioritizing Mitigation Actions

Criteria	Score
Costs	
High	1 point
Medium	2 points
Low	3 points
Benefits	
High	3 points
Medium	2 points
Low	1 point
Number of Objectives Met	
Each Objective	0.25 points, up to 3 points
Implementation Time Frame	
1-5 Years	2 points
1-10 Years	1 point

18.4.3 Implementation Priority

The priority for implementing each action was assigned based on the following definitions:

- High Priority (Greater than 8 points)—An action that meets multiple objectives, has benefits that exceed costs, and has a secured source of funding. Action can be completed in the short term (1 to 5 years).
- Medium Priority (6 to 8 points)—An action that meets multiple objectives, has benefits that exceed costs, and is eligible for funding though no funding has yet been secured for it. Action can be completed in the short term (1 to 5 years) once funding is secured. Medium-priority actions become high-priority actions once funding is secured.
- Low Priority (Less than 6 points)—An action that will mitigate the risk of a hazard, has benefits that do not exceed the costs or are difficult to quantify, has no secured source of funding, and is not eligible for any known grant funding. Action can be completed in the long term (1 to 10 years). Low-priority actions are generally “wish-list” actions. They may be eligible for grant funding from programs that have not yet been identified.

19. Plan Maintenance and Implementation

This chapter details the formal process that will ensure that the hazard mitigation plan remains an active and relevant document and that the Planning Partnership maintains its eligibility for applicable funding sources. The plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing an updated plan every five years. In addition, this chapter describes how public participation will be integrated throughout the plan maintenance and implementation process. It explains how the mitigation strategies outlined in this plan update will be incorporated into existing planning mechanisms and programs, such as comprehensive land use planning processes, capital improvement planning, and building code enforcement and implementation.

19.1 MJHMP Coordinator and Jurisdiction Points of Contact

The MJHMP Coordinator, or a designee, is assigned to manage the maintenance and update of the plan during its approval period (the five-year period between FEMA's approval of the plan and its expiration), with the following responsibilities:

- Convene the Planning Partnership
- Be the prime point of contact for questions regarding the plan and its implementation
- Coordinate the incorporation of additional information into the plan
- Manage the monitoring, evaluation, and updating responsibilities identified in this section

Currently, the Placer County MJHMP Coordinator is designated as:

Brandy Dunkel, Staff Services Manager
Placer County Office of Emergency Services
2968 Richardson Dr.
Auburn, CA 95603
530-308-3555
Email: bdunkel@placer.ca.gov

Primary and secondary mitigation planning representatives (points of contact) are identified in each jurisdictional annex in Volume 2. It will be the responsibility of each jurisdiction and its representatives to inform the MJHMP Coordinator of any changes in representation.

19.2 Maintenance and Implementation Tasks

The plan maintenance matrix shown in Table 19-1 provides a synopsis of responsibilities for plan monitoring, integration, evaluation, and update, which are discussed in further detail in the sections below.

Table 19-1. Plan Maintenance Matrix

Task	Approach	Timeline	Lead Responsibility	Support Responsibility
Monitoring	Planning Partners to recommend update of mitigation strategies, progress toward implementation of actions, identification of new actions, and update of information on funding opportunities.	Each June or after the occurrence of a federally declared disaster	Jurisdictional points of contact identified in Volume 2	MJHMP Coordinator
Integrating	Distribute the Safe Growth Checklist (see Table 19-2) for annual review and update by all participating jurisdictions.	June each year with interim email reminders to address integration in county and municipal activities	MJHMP Coordinator and jurisdictional points of contact identified in Volume 2	County and municipal departments
Evaluating	Review the status of previous actions, as submitted by the monitoring task lead, and assess the effectiveness of the plan; compile and finalize update of mitigation strategy.	Updated progress report completed by September 30 of each year	Jurisdictional points of contact identified in Volume 2	Alternate jurisdictional points of contact identified in Volume 2
Updating	Reconvene the Planning Partners to guide a comprehensive update to review and revise the plan.	Every 5 years or upon major update to Comprehensive Plan or after the occurrence of a major disaster	MJHMP Coordinator	Jurisdictional points of contacts identified in Volume 2
Grant Monitoring	Notify lead agencies about grant opportunities, maintain a list of eligible jurisdiction-specific projects for funding consideration, and notify lead agencies of fiscal year mitigation priorities.	Continuously and as grant opportunities are identified	MJHMP Coordinator	Jurisdictional points of contacts identified in Volume 2
Public Involvement	Inform the public of hazard events via social media outlets, promote educational workshops on hazard topics, and track and file public comments received regarding the MJHMP.	Continuously and as events are identified	County PIO	Jurisdictional points of contacts identified in Volume 2

19.2.1 Monitoring

Monitoring means tracking the implementation of the plan over time. For example, monitoring may include a system for tracking the status of the identified hazard mitigation actions. The Planning Partnership will be responsible for monitoring and documenting annual progress on the plan. Each year, beginning one year after plan development, Planning Partnership representatives will collect and process information from the persons responsible for initiating or overseeing the mitigation projects in each department, agency, and organization involved in implementing mitigation actions identified in their jurisdictional annexes. The information will be discussed among the Planning Partnership at the annual plan review meeting.

In the first year of the approval period, this will be accomplished using an online performance progress reporting system (the MAPT^{SM}), which will enable each Planning Partner to:

- Directly access mitigation actions

- Easily update the status of each project
- Document successes or obstacles to implementation
- Add or delete projects to maintain mitigation strategy implementation

Participating partners will be prompted by the tool to update progress on a quarterly basis, encouraging them to refresh their mitigation strategies and to continue implementation of actions. This reporting system facilitates the sorting and prioritization of projects and will support the submittal of an increased number of project grant fund applications. Planning Partnership representatives are expected to document the following:

- Progress on the implementation of mitigation actions
- Obstacles or impediments to implementation of actions
- Any grant applications filed on behalf of any of the participating jurisdictions
- Hazard events and losses occurring in their jurisdiction
- Additional mitigation actions believed to be appropriate and feasible
- Public and stakeholder input

Plan monitoring for years 2 through 4 of the approval period will be addressed via the MAPT℠ or manually.

19.2.2 Integrating the MJHMP into Municipal Planning Mechanisms

Integrating hazard mitigation into a community's existing plans, policies, codes, and programs leads to development patterns or redevelopment that reduce risk from known hazards. The Planning Partnership was tasked with identifying how hazard mitigation is integrated into existing planning mechanisms. The jurisdictional annexes in Volume 2 describe how this is done for each Planning Partner. During this process, many partners recognized the importance and benefits of incorporating hazard mitigation into future local planning and regulatory processes.

Effective mitigation is achieved when hazard awareness and risk management approaches and strategies become an integral part of public activities and decision-making. Within the County, there are many existing plans and programs that support hazard risk management, and it is critical that this MJHMP integrate, coordinate with, and complement those existing plans and programs.

The Capability Assessment provides a summary and description of the existing plans, programs, and regulatory mechanisms at all levels of government (federal, state, county, and local) that support hazard mitigation within the County. In the jurisdictional annexes in Volume 2, each Planning Partner identified how it has integrated hazard risk management into its existing planning, regulatory, and administrative framework and how they intend to promote this integration further.

It is the intention of Planning Partnership representatives to incorporate mitigation planning as an integral component of daily government operations. Planning Partnership representatives will work with local government officials to integrate the newly adopted hazard mitigation goals and actions into the general operations of government and partner organizations. The jurisdictional adoption resolutions will include an item stating the intent of the local governing body to incorporate mitigation planning as an integral component of government and partner operations. By doing so, the Planning Partnership anticipates that:

- Hazard mitigation planning will be formally recognized as an integral part of overall emergency management efforts
- The MJHMP, comprehensive plans, emergency management plans and other relevant planning mechanisms will become mutually supportive documents that work in concert to meet the goals and needs of county residents

Other planning processes and programs to be coordinated with the recommendations of the MJHMP include the following:

- Emergency response plans
- Training and exercise of emergency response plans
- Debris management plans
- Recovery plans
- Capital improvement programs
- County and municipal codes
- Community design guidelines
- Water-efficient landscape design guidelines
- Stormwater management programs
- Water system vulnerability assessments
- Community wildfire protection plans
- Comprehensive flood hazard management plans
- Resiliency plans
- Community Development Block Grant Disaster Recovery action plans
- Public information and improved public participation
- Educational programs
- Continued interagency coordination

Prior to the MJHMP annual plan review meeting, participating jurisdictions will be asked to document how they are utilizing and incorporating the MJHMP into their day-to-day operations and planning and regulatory processes. Each municipality will identify additional policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions and include these findings and recommendations in the annual MJHMP progress report. The checklist in Table 19-2 will help a community analyze how hazard mitigation is integrated into local plans, ordinances, regulations, and policies. Completing the checklist will help jurisdictions identify areas that currently integrate hazard mitigation and where to make improvements and reduce vulnerability to future development.

Table 19-2. Safe Growth Checklist

Planning Mechanisms	Yes	No	How is it being done or how will this be utilized in the future?
Operating, Municipal, and Capital Improvement Program Budgets			
When constructing upcoming budgets, are hazard mitigation actions funded as budget allows?			
Are construction projects evaluated to see if they meet the hazard mitigation goals?			
Does the municipality review mitigation actions when allocating funding during annual budget adoption processes?			
Do budgets limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?			
Do infrastructure policies limit extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards?			
Do budgets provide funding for hazard mitigation projects identified in the MJHMP?			
Human Resource Manual			
Do any job descriptions specifically include identifying and/or implementing mitigation projects/actions or other efforts to reduce natural hazard risk?			
Building and Zoning Ordinances			
Prior to zoning changes or development permitting, does the municipality review the MJHMP and other hazard analyses to ensure consistent and compatible land use?			
Does the zoning ordinance discourage development or redevelopment within natural areas, including wetlands, floodways, and floodplains?			
Does the zoning ordinance contain natural overlay zones that set conditions			
Does the zoning ordinance require developers to take additional actions to mitigate natural hazard risk?			
Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use?			
Does the zoning ordinance prohibit development within or filling of wetlands, floodways, and floodplains?			
Subdivision Regulations			
Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?			
Do the regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?			
Do the regulations allow density transfers where hazard areas exist?			
Comprehensive Plan			
Are the goals and policies of the plan related to those of the MJHMP?			

Planning Mechanisms	Yes	No	How is it being done or how will this be utilized in the future?
Does the future land use map clearly identify natural hazard areas?			
Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?			
Land Use			
Does the future land use map clearly identify natural hazard areas?			
Do the land use policies discourage development or redevelopment in natural hazard areas?			
Transportation Plan			
Does the transportation plan limit access to hazard areas?			
Is transportation policy used to guide growth to safe locations?			
Are transportation systems designed to function under disaster conditions (e.g., evacuation)?			
Environmental Management			
Are environmental systems that protect development from hazards identified and mapped?			
Do environmental policies maintain and restore protective ecosystems?			
Do environmental policies provide incentives to development located outside protective ecosystems?			
Grant Applications			
Are data and maps used as supporting documentation in grant applications?			
Municipal Ordinances			
Is hazard mitigation a priority when updating municipal ordinances?			
Economic Development			
Does the local economic development group take into account information regarding identified hazard areas when assisting new businesses in finding a location?			
Public Education and Outreach			
Does the municipality have any public outreach mechanisms/ programs in place to inform residents on natural hazards, risk, and ways to protect themselves during such events?			

19.2.3 Evaluating

Evaluation of the mitigation plan is an assessment of whether the planning process and actions have been effective, whether the MJHMP goals are being achieved, and whether changes are needed. The MJHMP Coordinator will consult with the Planning Partnership members to evaluate the effectiveness of the plan implementation and to reflect changes that could affect mitigation priorities or available funding.

The status of the MJHMP will be discussed and documented at an annual plan review meeting of the Planning Partnership to be held either in person or via teleconference approximately one year from the date of local adoption of this update and successively thereafter. The MJHMP Coordinator will be responsible for contacting participants, coordinating the annual plan review meeting, and soliciting input regarding progress toward meeting plan goals and objectives. At least two weeks before the annual plan review meeting, the MJHMP Coordinator will advise Planning Partnership members of the meeting date, agenda, and expectations of the members. These evaluations will assess whether:

- Goals and objectives address current and expected conditions
- The nature or magnitude of the risks has changed
- Current resources are appropriate for implementing the MJHMP and if different or additional resources are now available
- Actions were cost effective
- Schedules and budgets are feasible
- Implementation problems are present, such as technical, political, legal, or coordination issues with other agencies
- Outcomes have occurred as expected
- Changes in local resources impacted plan implementation (e.g., funding, personnel, and equipment)
- New agencies, departments, and staff are included, involving other local governments as defined under 44 CFR 201.6.

Specifically, the Planning Partnership will review the mitigation goals, objectives, and activities using performance-based indicators, including:

- New agencies/departments
- Project completion
- Underspending/overspending
- Achievement of the goals and objectives
- Resource allocation
- Timeframes
- Budgets
- Lead/support agency commitment
- Resources
- Feasibility

Finally, the Planning Partnership will evaluate how other programs and policies have conflicted with or augmented planned or implemented mitigation actions and will identify policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions. Other programs and policies can include those that address:

- Economic development
- Environmental preservation
- Historic preservation
- Redevelopment
- Health and safety
- Recreation
- Land use and zoning
- Public education and outreach
- Transportation

The Planning Partnership should refer to evaluation forms in the FEMA 386-4 guidance document to assist in the evaluation process. Further, the Planning Partnership should refer to any process and plan review deliverables developed by the County or participating jurisdictions as a part of the plan review processes established for prior or existing local HMPs within the county.

The MJHMP Coordinator will be responsible for preparing an annual MJHMP progress report for each year of the approval period based on the information provided by the Planning Partners and other information as appropriate. These annual reports will provide data for the five-year update of this MJHMP and will assist in pinpointing any implementation challenges. By monitoring the implementation of the MJHMP, the Planning Partnership will be able to assess which actions are completed, which are no longer feasible, and which require additional funding.

Following any major disasters, the MJHMP will be evaluated and revised to determine if the recommended actions remain relevant and appropriate. The risk assessment will also be revisited to see if any changes are necessary based on the pattern of disaster damage or if data listed in the hazard profiles of this plan has been collected to facilitate the risk assessment. This is an opportunity to increase the community's disaster resistance and build a better and stronger community.

19.2.4 Updating

44 CFR 201.6.d.3 requires that local hazard mitigation plans be reviewed, revised as appropriate, and resubmitted for approval to remain eligible for benefits awarded under DMA 2000. It is the intent of the Placer County MJHMP Planning Partnership to update this plan on a five-year cycle from the date of initial plan adoption.

To facilitate the update process, the MJHMP Coordinator, with support of the Planning Partnership, will use the second annual plan review meeting to develop and commence the implementation of a detailed plan update program. Prior to the five-year update, the MJHMP Coordinator will invite representatives from Cal OES to provide guidance on plan update procedures. At a minimum, this will establish who will be responsible for managing and completing the plan update effort, items that need to be included in the updated plan, and a detailed timeline with milestones to ensure that the update is completed according to regulatory requirements. At this meeting, the project team will determine what resources will be needed to complete the update and seek to secure these resources.

Following each 5-year update of the MJHMP, the updated plan will be distributed for public comment. After all comments are addressed, the MJHMP will be revised and distributed to all Planning Partners.

19.2.5 Grant Monitoring and Coordination

Placer County intends to be a resource to the Planning Partnership in the support of project grant writing and development. The degree of this support will depend on the level of assistance requested by the Planning Partners during openings for grant applications. As part of grant monitoring and coordination, Placer County intends to provide the following:

- Notification to Planning Partners about impending grant opportunities
- A current list of eligible, jurisdiction-specific projects for funding pursuit consideration
- Notification about mitigation priorities for the fiscal year to assist the Planning Partners in the selection of appropriate projects

19.2.6 Continued Public Involvement

The Planning Partners are committed to the continued involvement of the public in the hazard mitigation process. This MJHMP update will continue to be posted online at the following link: https://www.placer.ca.gov/1381/Local-Hazard-Mitigation-Plan. In addition, public outreach and dissemination of the MJHMP will include the following:

- Links to the plan on local websites of each jurisdiction with capability
- Continued utilization of existing social media outlets (Facebook, X) to inform the public of natural hazard events, such as floods and severe storms; the public can be educated via the jurisdictional websites on how these applications can be used in an emergency situation
- Promotion of articles or workshops on hazards to educate the public and keep them aware of the dangers of hazards

The MJHMP Coordinator will be responsible for receiving, tracking, and filing public comments regarding this MJHMP. The public will have an opportunity to comment on the plan via the hazard mitigation website at any time. The MJHMP Coordinator will ensure that:

- Public and stakeholder comments and input on the plan, and hazard mitigation in general, are collected, recorded, and addressed as appropriate
- The Placer County MJHMP website is maintained and updated as appropriate
- Copies of the latest approved plan are available for review at appropriate county facilities, along with instructions to facilitate public input and comment on the plan
- Public notices, including media releases, are made (as appropriate) to inform the public of the availability of the plan, particularly during plan update cycles

After completion of this plan, implementation and ongoing maintenance will continue to be a function of the Planning Partnership. The Planning Partnership will review the plan and accept public comment as part of an annual review and as part of five-year mitigation plan updates.

References

ASDSO. 2024. *Dam Failures and Incidents.* Association of State Dam Safety Officials. https://damsafety.org/dam-failures.

—. n.d.-a. *Dam Failures and Incidents.* Association of State Dam Safety Officials. Accessed November 22, 2025. https://damsafety.org/dam-failures.

—. n.d.-b. "Important Terms Defined for Media Coverage." *Association of State Dam Safety Officials.* Accessed November 22, 2025. https://damsafety.org/important-terms.

Beacon Economics. 2025. "Placer County Employment Profile." Prepared for the County of Placer. February 2025. Accessed 2025. https://www.placer.ca.gov/DocumentCenter/View/86108/Placer-County-Employment-Profile-Report-.

CAL FIRE. 2025. *Historical Fire Perimeters.* Accessed October 2025. https://www.fire.ca.gov/what-we-do/fire-resource-assessment-program/fire-perimeters.

Cal OES. 2023a. "2023 California State Hazard Mitigation Plan." California Governor's Office of Emergency Services. https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1-Part-5_11.10.2023.pdf.

—. 2024. *About Cal OES.* https://www.caloes.ca.gov/cal-oes/about-cal-oes/.

—. 2024. *Emergency Proclamations.* October. Accessed October 7, 2024. https://www.caloes.ca.gov/office-of-the-director/policy-administration/legal-affairs/emergency-proclamations/.

—. 2025. *Emergency Proclamations.* July 11. Accessed July 11, 2025. https://www.caloes.ca.gov/office-of-the-director/policy-administration/legal-affairs/emergency-proclamation.

—. 2025. *Open State of Emergency Proclamations.* California Governor's Office of Emergency Services. Accessed 2025. https://www.caloes.ca.gov/office-of-the-director/policy-administration/legal-affairs/emergency-proclamations/.

California Department of Conservation. 2024a. *Post-Wildfire Debris Flows.* Accessed 2024. https://www.conservation.ca.gov/cgs/landslides/debris-flows#:~:text=A%20debris%20flow%20is%20a,damage%20and%20loss%20of%20life.

California Geological Survey. 2025. *Reported California Landslides.* Accessed October 2025. https://cadoc.maps.arcgis.com/apps/webappviewer/index.html?id=bc48ad40e3504134a1fc8f3909659041&_gl.

CDC. 2005. *Extreme Cold.* March 22. Accessed September 1, 2023. https://www.cdc.gov/disasters/winter/pdf/extreme-cold-guide.pdf.

—. 2022. *Extreme Heat.* June 17. Accessed September 1, 2023. https://www.cdc.gov/disasters/extremeheat/index.html.

—. 2012. "Natural Disasters and Severe Weather." *Center for Disease Control and Protection.* December 03. Accessed August 22, 2022. https://www.cdc.gov/disasters/winter/guide.html.

—. 2023. *Prevent Hypothermia and Frostbite.* https://www.cdc.gov/disasters/winter/staysafe/hypothermia.html.

City of Roseville. 2023. *Multi-Hazard Mitigation Plan: 2023 Update.* Prepared for the City of Roseville. December 2023, Oakland, California: Tetra Tech, 490. https://cdnsm5-hosted.civiclive.com/UserFiles/Servers/Server_7964838/File/Government/Departments/Fire%20 Dept/Emergency%20Preparedness/Multi%20Hazard%20Mitigation%20Plan/2023%20Roseville HMP_Final_2023-12-16.pdf.

Division of Safety of Dams, California Department of Water Resources. 2021. *Definitions for Downstream Hazard and Condition Assessment.* September. Accessed November 2025. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Division-of-Safety-of-Dams/Files/Publications/Division-of-Safety-of-Dams-Definitions-for-Downstream-Hazard-and-Condition-Assessment.pdf.

EPA. 2023. *Climate Adaptation and EPA's Role.* U.S. Environmental Protection Agency. September 6. Accessed December 2023. https://www.epa.gov/climate-adaptation/climate-adaptation-and-epas-role.

FEMA. 2023a. *Answers to Questions About the NFIP.* FEMA. https://agents.floodsmart.gov/sites/default/files/media/document/2025-07/fema-answers-to-questions-about-nfip-brochure-06-2023.pdf.

FEMA. 2025a. *Coordinator's Manual; National Flood Insurance Program Community Rating System.* FIA-15/2025, Federal Emergency Management Agency. https://www.fema.gov/sites/default/files/documents/fema_crs_coordinators-manual_082025.pdf.

—. 2024. *Dam Safety: Grant Assistance to States.* https://www.fema.gov/emergency-managers/risk-management/dam-safety/grants.

—. 2025b. *Disaster Declarations for States and Counties.* Accessed 2025. https://www.fema.gov/data-visualization/disaster-declarations-states-and-counties.

—. 2023b. *Earthquake.* https://hazards.fema.gov/nri/earthquake.

FEMA. 2025c. *Local Mitigation Planning Handbook.* Federal Emergency Management Agency. Accessed June 2025. https://www.fema.gov/sites/default/files/documents/fema_hmd_2025-local-mitigation-planning-handbook_06122025.pdf.

FEMA. 2022. *Local Mitigation Planning Policy Guide.* OMB Collection #1660-0062, Federal Emergency Management Agency. Accessed December 2023. https://www.fema.gov/sites/default/files/documents/fema_local-mitigation-planning-policy-guide_042022.pdf.

FEMA. 1997. *Multi Hazard Identification and Risk Assessment.* Technical, FEMA. http://www.fema.gov/library/viewRecord.do?id=2214.

—. 2023c. *National Dam Safety Program Strategic Plan.* June. https://www.fema.gov/sites/default/files/documents/fema_ndsp-strategic-plan-fy24-29.pdf#:~:text=The%20National%20Dam%20Safety%20Program%20%28NDSP%29%20is%20a,property%2C%20and%20the%20environment%20from%20dam%20related%20hazards.

—. n.d. "Soil and Rock Types." Accessed June 13, 2024. https://training.fema.gov/emiweb/earthquake/neh0102360.htm.

FEMA. 2003. *State and Local Mitigation Planning how-to guide: Developing the Mitigation Plan; identifying mitigation actions and implementation strategies.* Federal Emergency Management Agency. https://mitigation.eeri.org/wp-content/uploads/FEMA_386_3.pdf.

—. 2023d. *Summary of FEMA Hazard Mitigation Assistance (HMA) Programs.* https://www.fema.gov/fact-sheet/summary-fema-hazard-mitigation-assistance-hma-programs.

FERC. 2020. *Dam Safety Program.* July 10. Accessed August 16, 2023. https://staging.ferc.gov/industries-data/hydropower/dam-safety-and-inspections/dam-safety-program.

Finance, California Department of. n.d. "E-4 Historical Population Estimates for Cities, Counties and the State." *California Department of Finance.* Accessed November 14, 2025. https://dof.ca.gov/forecasting/demographics/estimates/.

—. n.d. "P-2 County Population Projections (2020-2070)." *California Department of Finance.* Accessed November 14, 2025. https://dof.ca.gov/forecasting/demographics/projections/.

McFarland, R. Jessica, D. Jonathan Coop, A. Jared Balik, C. Kyle Rodman, A. Sean Parks, and S. Camille Stevens-Rumann. 2025. "Extreme Fire Spread Events Burn More Severely and Homogenize Postfire Landscapes in the Southwestern United States." *Global Change Biology.* https://www.fs.usda.gov/rm/pubs_journals/2025/rmrs_2025_mcfarland_j001.pdf.

NASA, USGS. 2023. *Glaciers Spur Alaskan Earthquakes.* National Aeronautics and Space Administration and United States Geological Survey. Accessed December 11, 2023. https://svs.gsfc.nasa.gov/2969/.

National Academies of Sciences, Engineering, and Medicine. 2022. *Resilience for Compounding and Cascading Events.* Washington, DC: : The National Academies Press. Accessed December 2023. https://nap.nationalacademies.org/read/26659/chapter/3.

National Avalanche Center. n.d. "Destructive Force (D-Scale)." *National Avalanche Center.* Accessed October 20, 2025. https://avalanche.org/avalanche-encyclopedia/avalanche/avalanche-problems/avalanche-size/destructive-force-d-scale.

—. n.d. "Elevation." *National Avalanche Center.* Accessed November 22, 2025. https://avalanche.org/avalanche-encyclopedia/#elevation.

—. n.d. "North American Public Avalanche Danger Scale." *National Avalanche Center.* Accessed November 22, 2025. https://avalanche.org/avalanche-encyclopedia/#north-american-public-avalanche-danger-scale.

—. n.d. "Runout Zone." *National Avalanche Center.* Accessed November 22, 2025. https://avalanche.org/avalanche-encyclopedia/terrain/avalanche-terrain-exposure/avalanche-path/runout-zone/.

—. n.d. "Slope Angle." *National Avalanche Center.* Accessed November 22, 2025. https://avalanche.org/avalanche-encyclopedia/terrain/slope-characteristics/slope-angle/.

National Park Service. n.d. *National Register Database and Research.* Accessed August 7, 2025. https://www.nps.gov/subjects/nationalregister/database-research.htm.

NCEI. 2024. *Climate at a Glance Time Series.* December. Accessed January 2, 2025. https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series/CA-015/pcp/ytd/0/1895-2024.

—. 2025. *Definition of Drought.* Accessed 2025. https://www.ncei.noaa.gov/access/monitoring/dyk/drought-definition#:~:text=Drought%2C%20on%20the%20other%20hand,on%20many%20different%20time%20scales.

NDMC. 2025. *Types of Drought.* https://drought.unl.edu/Education/DroughtIn-depth/TypesofDrought.aspx.

NOAA. n.d. *Fujita Tornado Damage Scale.* Accessed November 2025. https://www.spc.noaa.gov/faq/tornado/f-scale.html.

—. 2023. "NOAA Northeast Regional Climate Center." *SC ACIS.* November 7. Accessed November 15, 2025. https://scacis.rcc-acis.org/.

—. 2024. *Severe Weather 101: Flood Basics.* Accessed October 2, 2024. https://www.nssl.noaa.gov/education/svrwx101/floods/.

—. n.d. "Storm Events Database." *National Centers for Environmental Information.* Accessed November 22, 2025. https://www.ncei.noaa.gov/stormevents/.

NOAA-NCEI. 2025. *Storm Events Database.* Accessed 2025. https://www.ncei.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Flash+Flood&eventType=%28Z%29+Flood&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=1950&endDate_mm=09&endDate_dd=29&endDate_yyyy=2025&county=PLACER%3A61&hailfilter=0.00&tornfilter=0&wi.

—. 2025. *Storm Events Database.* Accessed 2025. https://www.ncei.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Heavy+Snow&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=1950&endDate_mm=09&endDate_dd=29&endDate_yyyy=2025&county=PLACER%3A61&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&subm.

—. 2025. *Storm Events Database.* Accessed 2025. https://www.ncei.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Heavy+Rain&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=1950&endDate_mm=09&endDate_dd=29&endDate_yyyy=2025&county=PLACER%3A61&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&subm.

—. 2025. *Storm Events Database.* Accessed 2025. https://www.ncei.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Debris+Flow&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=1950&endDate_mm=09&endDate_dd=29&endDate_yyyy=2025&county=PLACER%3A61&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&sub.

—. 2025. *Storm Events Database.* Accessed 2025.

—. 2025. *Storm Events Database.* Accessed 2025. https://www.ncei.noaa.gov/stormevents/choosedates.jsp?statefips=6%2CCALIFORNIA#.

NWS. 2024. *Beaufort Wind Scale.* Accessed October 15, 2024. https://www.weather.gov/mfl/beaufort.

—. n.d. *Cold Weather Safety.* National Weather Service. Accessed August 22, 2022. https://www.weather.gov/safety/cold.

—. 2024. *Drought Information.* National Weather Service. Accessed January 24, 2024. https://www.cpc.ncep.noaa.gov/products/Drought/.

—. n.d. *NWS Forecast Office Sacramento, CA.* Accessed August 3127, 2025. https://www.weather.gov/sto/#.

—. n.d. *NWS StormReady Program.* Accessed July 27, 2025. https://www.weather.gov/stormready/.

—. 2021. *Wind Chill Chart.* 06 01. Accessed 2021. https://www.weather.gov/safety/cold-wind-chill-chart.

OPR, CNRA, CEC. 2018. *California's Fourth Climate Change Assessment.* California Governor's Office of Planning and Research; California Natural Resources Agency; California Energy Commission. Accessed October 11, 2023. https://climateassessment.ca.gov/.

Placer County. n.d. "Land Information Search." *Placer County Community Development Resource Agency.* Accessed November 15, 2025. https://experience.arcgis.com/experience/a29d510f9e9d4a98ac2158fca49aecbc.

Sierra Avalanche Center. n.d. "Observations." *Sierra Avalanche Center.* Accessed October 20, 2025. https://www.sierraavalanchecenter.org/observations#/view/observations.

SWRCB. 2023. *WATER QUALITY ORDER NO. WQ 2023-XXXX-DWQ CLEAN WATER ACT.* California Water Boards. https://www.spn.usace.army.mil/Portals/68/docs/regulatory/RGP/4_2023.07.07-SWRCB-401-WQC-RGP10.pdf.

n.d. *U.S. Drought Mintor.* Accessed september 15, 2025. https://www.placer.ca.gov/DocumentCenter/View/55481/Chapter-4-Risk-Assessment.

U.S. Geological Survey. 2024. *USGS.* Accessed 11 24, 2025. https://data.usgs.gov/datacatalog/data/USGS:77ae0551-c61e-4979-aedd-d797abdcde0e.

USACE. n.d. "National Inventory of Dams." *US Army Corps of Engineers.* Accessed October 20, 2025. https://nid.sec.usace.army.mil/nid/#/dams/search/sy=@countyState:Placer,%20California&viewType=map&resultsType=dams&advanced=false&hideList=false&eventSystem=false.

—. 2021. *Nationwide Permits.* U.S. Army Corps of Engineers. December 27. Accessed November 19, 2024. https://www.spk.usace.army.mil/missions/regulatory/permitting/nationwide-permits/.

—. 2014. *SAFETY OF DAMS – POLICY AND PROCEDURES.* March 13. Accessed August 16, 2023. https://www.publications.usace.army.mil/Portals/76/Users/182/86/2486/ER_1110-2-1156.pdf?ver=2020-01-29-103920-173.

USGS. 2012. "Earthquake Glossary." *USGS.* http://earthquake.usgs.gov/learn/glossary/.

—. 2021. *Earthquake Magnitude, Energy Release, and Shaking Intensity.* Accessed October 7, 2024. https://www.usgs.gov/natural-hazards/earthquake-hazards/science/earthquake-magnitude-energy-release-and-shaking-intensity?qt-science_center_objects=0#qt-science_center_objects.

—. 2021. *Earthquake Magnitude, Energy Release, and Shaking Intensity.* Accessed April 6, 2022. https://www.usgs.gov/natural-hazards/earthquake-hazards/science/earthquake-magnitude-energy-release-and-shaking-intensity?qt-science_center_objects=0#qt-science_center_objects.

—. 2022. *Landslide 101.* https://www.usgs.gov/programs/landslide-hazards/landslides-101.

—. 2017. *M 6.8 Scenario Earthquake - Polaris.*

—. n.d. *The Modified Mercalli Intensity Scale.* Accessed August 20, 2025. https://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale.

—. 2025. *The Modified Mercalli Intensity Scale.* Accessed 2025. https://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale.

—. n.d. "US Geological Survey." *The National Map.* Accessed November 14, 2025. https://apps.nationalmap.gov/viewer/.

—. 2019. *USGS.* Accessed 2025. https://data.usgs.gov/datacatalog/data/USGS:77ae0551-c61e-4979-aedd-d797abdcde0e.

—. 2016. *Where Earthquakes Occur.* November 30. Accessed October 1, 2024. https://pubs.usgs.gov/gip/earthq1/where.html.

Vulnerable Communities Platform. 2025. "Climate Vulnerability Map." *Governor's Office of Land Use and Climate Innovation.* Accessed November 19, 2025. https://experience.arcgis.com/experience/652c6def7040429bafe23c38966f8f73/page/Sierra-Nevada-?views=Extreme-Heat------------------.

Wyoming GISC. 2024. *Wyoming Wate and Climate Explorer.* Vers. V3.0. Wyoming Geographic Information Science Center. October 18. Accessed December 30, 2025. https://www.wrds.uwyo.edu/wace/wace.html.