El Dorado County

Local Hazard Mitigation Plan

EL DORADO COUNTY SHERIFF

OFFICE OF EMERGENCY SERVICES

July 2018

Adopted by FEMA, March 2019
EDC Board Of Supervisor's Adoption,

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Executive Summary

The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. El Dorado County developed this Local Hazard Mitigation Plan (LHMP) update to make the County and its residents less vulnerable to future hazard events. This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 so that El Dorado County would be eligible for the Federal Emergency Management Agency's (FEMA) Pre-Disaster Mitigation and Hazard Mitigation Grant programs.

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

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

Goal 1: Minimize risk and vulnerability of El Dorado County to the impacts of natural hazards and protect lives and reduce damages and losses to property, economy, public health and safety, and the environment.

- Minimize economic and resource impacts and promote long-term viability and sustainability of County resources
- Minimize impacts to both existing and future development from all hazards (through well-planned communities)
- Minimize impacts to natural and cultural resources
- Minimize impacts from climate change
- Minimize impacts to watersheds/Promote watershed health
- Prevent and reduce wildland fire risk and related losses
- Prevent and reduce flood risk and related damages, with a focus on repetitive loss structures and infrastructure

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

- Provide protection for critical infrastructure from the wildland fires, floods, and severe storms/weather (e.g., repeaters, cell towers, waters tanks, utilities)
- Improve infrastructure/system reliability for critical lifeline utilities, including stormwater systems, roadways (evacuation routes, emergency services and supplies); rail lines, and pipelines.
- Minimize risk of loss of life and injury to At-risk Populations

Goal 3: Improve public awareness, education, and preparedness for all hazards.

- Enhance public outreach, education, and preparedness program to include all hazards of concern (e.g. fire restrictions, water conservation measures, hazardous vegetation, air and water quality issues)
- Increase public knowledge of the risk and vulnerability to identified hazards and their recommended responses to disaster events to reduce losses
- Educate general public on evacuation planning and sheltering options for all hazard types and to encompass all groups (e.g., residents, visitors, second homeowners, vulnerable populations, animals)
- Increase community awareness and participation in hazard mitigation activities to include defensible space, hazardous vegetation abatement projects, and forest management projects and practices to reduce flood risk on private property
- Utilize multiple public outreach avenues such as schools, new technologies, and social media
- Coordination with other regional jurisdictions to facilitate (consistent/coordinated) public information function prior to, during and after an event (e.g., facebook, twitter, everbridge, web, tv, radio)

Goal 4: Increase communities' capabilities to mitigate losses and to be prepared for, respond to, and recover from a disaster event.

- Continued enhancements to Emergency Services capabilities integrating new technologies to reduce losses and save lives
- Improve interagency (local, state, federal) emergency coordination, planning, training, exercising, and communication to ensure effective community preparedness, response and recovery
- Improve interagency coordination with respect to implementation of mitigation activities such as fuels reduction and other multi-jurisdictional wildland fire projects
- Enhance the use of shared resources/Develop a strong mutual aid support system
- Maintain current service levels/provide for enhanced service levels
- Increase first responders awareness of vulnerable populations and other priority needs during a hazard event;(use of technology to pre-identify and communicate)
- Utilize lessons learned (debriefing) to improve response capabilities
- Promote efficient recovery from incidents to minimize impacts to lives, environment, and economy

Goal 5: Maintain FEMA Eligibility/Position the communities for grant funding.
Continued compliance with the NFIP/enhancement of floodplain management program through participation in the NFIP.

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Chapter 1 Introduction

Purpose

El Dorado County prepared this Local Hazard Mitigation Plan (LHMP) update to the 2012 Federal Emergency Management Agency (FEMA) approved El Dorado County Multi-Hazard Mitigation Plan. The purpose of this plan update is to guide hazard mitigation planning to better protect the people and property of the County from the effects of hazard events. This plan demonstrates the community's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This plan was also developed, among other things, to ensure El Dorado County and participating jurisdictions' continued eligibility for certain federal disaster assistance: specifically, the FEMA Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Program (PDM), and the Flood Mitigation Assistance Program (FMA).

Background and Scope

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

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

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

The El Dorado County LHMP update is a multi-jurisdictional plan that geographically covers the entire area within El Dorado County's jurisdictional boundaries. The following jurisdictions participated in the planning process and are seeking approval of the LHMP plan update:

- El Dorado County
- El Dorado County Office of Education and all school districts in El Dorado County
- El Dorado Irrigation District
- South Lake Tahoe Public Utility District (STPUD)

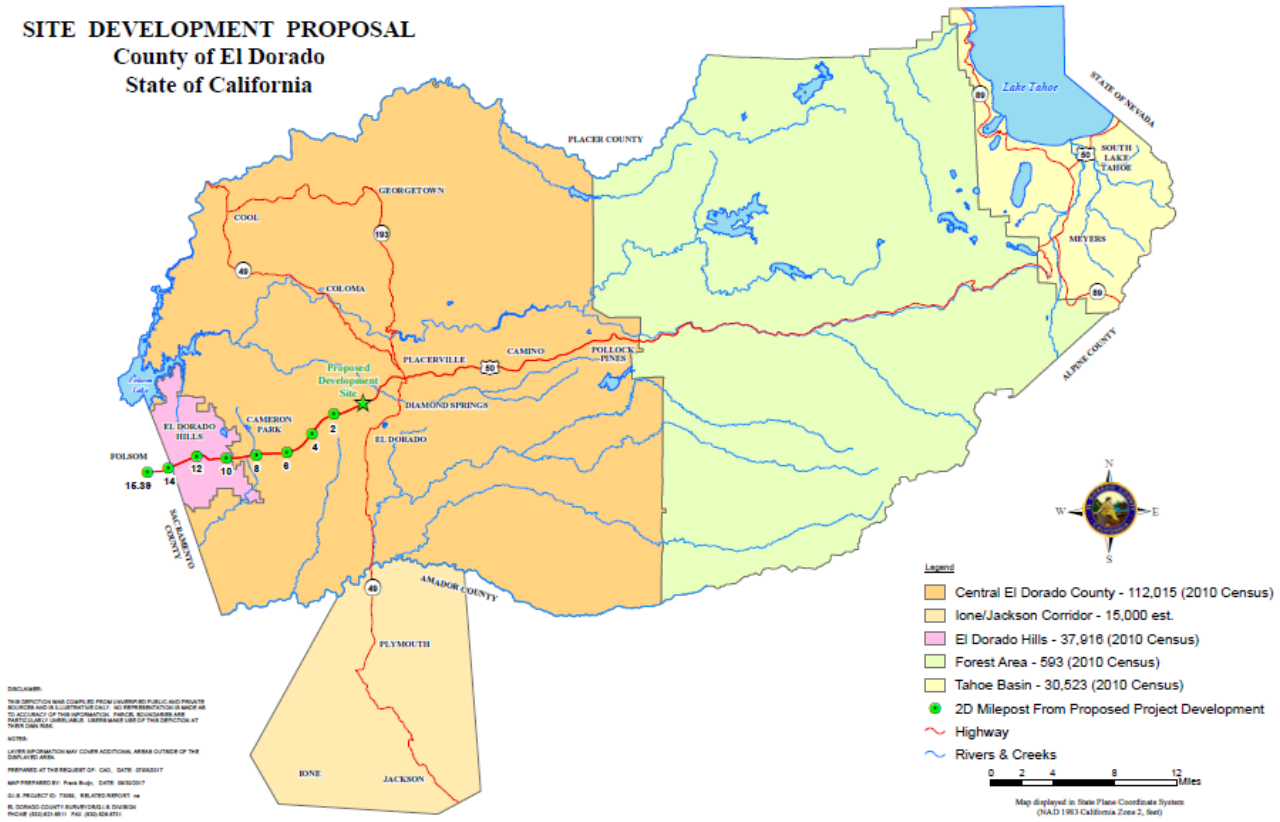
This plan update was prepared pursuant to the requirements and associated guidance of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act (DMA) or DMA 2000.) While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). Because El Dorado County is subject to many kinds of hazards, access to these programs is vital.

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

Community Profile

El Dorado County is located in northern California and stretches from Sacramento County to Lake Tahoe and the Nevada border. The Counties of Sacramento, Placer, Amador and Alpine counties border El Dorado County. Regional access to the County is provided via Highway 50, which runs east-west through the entire County. El Dorado County includes the incorporated cities of Placerville and South Lake Tahoe and the unincorporated communities of Cameron Park, El Dorado Hills, Shingle Springs and Pollock Pines. El Dorado County is illustrated in Figure 1-1.

Figure 1-1 El Dorado County Base Map



History

According to history books, the Miwok & Maidu Indian tribes split the southwestern portion of what is now El Dorado County. The Maidu tribe had vast territories to the north, their 74 villages stretched roughly from the Nevada state line, over the mountains and down into the foothills of El Dorado County, while the Miwok went south with a small band along the Pacific coast, west of El Dorado County. The County's indigenous peoples, the Central Sierra Maidu arrived between 2000 and 600 years ago. The most visible remnants of the County's past are found in its Gold Rush Era buildings and artifacts dating from 1848, however the County's rich heritage also is well-grounded in its lumber, railroad, and transportation development past.

With this rich heritage, the County is, like many Central Sierra counties, home to numerous resources which are both concentrated along old, historic Main Streets and scattered throughout the hills, valleys, mountains and waterways of the County's public and private lands. The following graphic list shows some of the areas in El Dorado County that contain a significant number of historic structures, most occupied and used for residences, businesses and offices. Access to all of these historic sites is dependent upon the transportation infrastructure of El Dorado County.

Geography and Climate

El Dorado County, spanning the eastern part of the Central Valley of California, increases in elevation from urban Western El Dorado to the High Sierras of South Lake Tahoe, and the Nevada state line. Located on an area of over 1,786 square miles, 78 square miles of which are comprised of water, the County is generally divided into two geographically distinct areas: the West Slope – El Dorado Hills to Strawberry and the East Slope – Strawberry to South Lake Tahoe.

The County’s topography is characterized by sweeping foothills areas, high mountains (Sierra Nevada) and the South Lake Tahoe Basin. Elevations range from 700 feet above mean sea level to more than 10,800 feet in the Sierra Nevada. Water resources within El Dorado County include the American River, Lake Tahoe and several mountain lakes.

The climate varies throughout the County, 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, winters vary from short and mild with moderate snowfall to moderately severe

with frequent snowfall. Most of the seasonal precipitation throughout the County occurs between October and April. More specific information about El Dorado County's climate can be found in Chapter 3 Risk Assessment.

Population

The July 1, 2017 United States Census estimates for the County and incorporated jurisdictions are shown on Table 1-1.

Table 1-1 El Dorado County Population Estimates – January 1, 2017

Jurisdiction	2017
Placerville (City of)	10,936
South Lake Tahoe (City of)	21,978
El Dorado County (Unincorporated)	156,073
Total Population	**188,987**

Source: U.S. Census Bureau

Plan Organization

This El Dorado County 2018 LHMP update is a multi-jurisdictional plan that geographically covers the entire area within El Dorado County's jurisdictional boundaries (i.e., the planning area). Participating jurisdictions within the El Dorado County Planning Area include: Unincorporated El Dorado County and the following agencies: El Dorado County Office of Education and all school districts in El Dorado County, El Dorado Irrigation District, and South Lake Tahoe Public Utility District.

- Chapter 2: Planning Process
- Chapter 3: Risk Assessment and Vulnerability Assessment
- Chapter 4: Mitigation Strategy
- Chapter 5: Plan Adoption
- Chapter 6: Plan Implementation and Maintenance
- Annexes
- Appendices

The Base Plan provides the overall framework for this multi-jurisdictional LHMP. It is the umbrella document that includes the planning process, methodologies, and procedural requirements for all participating jurisdictions (i.e., unincorporated County and all Annexes). As such, Chapters 1-6 of the Base Plan apply to the unincorporated County, the two incorporated communities and all special districts as participants to this LHMP update seeking FEMA approval of the plan. Because this is a multi-jurisdictional plan, the Base Plan addresses the LHMP hazard mitigation planning elements for all participating jurisdictions and includes data, information, and analysis specific to: The El Dorado County Planning Area (which includes all participating jurisdictions and the entire geographic boundary of El Dorado County) and Unincorporated El Dorado County.

The Annexes detail the hazard mitigation planning elements specific to the each participating jurisdiction to this 2018 El Dorado County LHMP Update. Each Annex is not intended to be a standalone document, but appends to, supplements, and incorporates by reference the information contained in the Base Plan document. As such, all Chapters 1-6 of the Base Plan, including the planning process and other procedural requirements and planning elements apply to and were met by each participant. The Annexes provide additional information specific to the each participant, with a focus on providing additional details on the risk assessment and mitigation strategy.

The Appendices provide additional information, data, and planning process documentation that applies to all participants to this El Dorado County 2018 LHMP Update.

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Chapter 2 Planning Process

Requirements §201.6(b) and §201.6(c)(1): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

1. **An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;**
2. **An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process; and**
3. **Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.**

The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Local Hazard Mitigation Committee

The Hazard Mitigation Committee's role was to:

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

Local Government Participation

The DMA planning regulations and guidance stress that each local government seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

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

For the El Dorado County Planning Area's HMPC, "participation" meant the following:

- Providing facilities for meetings;
- Attending and participating in the HMPC meetings;
- Collecting and providing other requested data (as available);
- Managing administrative details;
- Making decisions on plan process and content;
- Identifying mitigation actions for the plan;
- Reviewing and providing comments on plan drafts; including annexes
- Informing the public, local officials, and other interested stakeholders about the planning process and providing opportunity for them to comment on the plan;
- Coordinating, and participating in the public input process; and
- Coordinating the formal adoption of the plan by the governing boards.

The County and all participants with annexes to this plan seeking FEMA approval met all of these participation requirements. In most cases one or more representatives for each participating agency attended the HMPC meetings described in Table 2-1 and also brought together a local planning team to help collect data, identify mitigation actions and implementation strategies, and review and provide data on plan drafts. Appendix A provides additional information and documentation of the planning process.

Table 2-1 El Dorado County Hazard Mitigation Planning Committee

Name	Position	Agency /Community
James Byers	Lieutenant	EDC Sheriff's Office of Emergency Services
Moke Auwae	Sergeant	EDC Sheriff's Office of Emergency Services
Todd Crawford	Deputy	EDC Sheriff's Office of Emergency Services
Leslie Schlag	Deputy	EDC Sheriff's Office of Emergency Services
Anne Novotny	Planner	EDC CDA Long Range Planning
Lillian MacLeod	Planner	EDC CDA Development Services Division
Jose Crummett	Manager	EDC GIS
Alex Gole	GIS Specialist	EDC GIS
Kristine Guth	Program Manager	EDC Health & Human Services Preparedness
John Edwards	Maintenance Supervisor	EDC CDA Department of Transportation
Charlene Carveth	Agriculture Commissioner	EDC Agriculture
Mark Moss	Hazardous Materials Supervisor	EDC CDA Environmental Management
Kathy Daniels	Director of Facilities	EDC Office of Education, Facilities
Greg Schwab	Chief	Georgetown Fire
Grant Ingram	Chief	Pioneer Fire
Michael Lilienthal	Battalion Chief	El Dorado Hills Fire
David Merino	Captain	El Dorado Hills Fire
Mike Webb	Division Chief	CAL FIRE / Cameron Park Fire
Tom Tinsley	Battalion Chief	CAL FIRE, AEU
Darin McFarlin	Captain	CAL FIRE, AEU
Bob Counts	Captain	CAL FIRE / Cameron Park CSD

Name	Position	Agency /Community
Steve Willis	Vice Chairperson	EDC Fire Safe Council
Pat Dywer	Chairperson	EDC Fire Safe Council
Randy Hackbarth	General Manager	Nashville Trail CSD
Katrina Jackson	Director	El Dorado Hills CSD
Chaney Hicks	General Manager	Rolling Hills CSD
Gordon Fawkes	Director	Rolling Hills CSD
Jodi Lauther	General Manager	Grizzly Flats CSD
Ron Kilburg	Safety and Security Manager	El Dorado Irrigation District, Safety & Security
Don Nizolek	Operations Manager	El Dorado Irrigation District, Operations
Greg Hawkins	Parks & Recreation Manager	El Dorado Irrigation District, P&R
Kim Sackman	Emergency Management Specialist	Sacramento Municipal Utility District, EM
Shannon Cotulla	Assistant General Manager	South Tahoe Public Utility District
Valerie Cox	Captain	Los Rios Community College PD, El Dorado Center
Richard Rodriguez	Senior Public Safety Specialist	PG&E, Public Safety Specialist
Kim Nielson	Emergency Services Coordinator	Cal OES, Inland Reg.

Specific individuals representing El Dorado County Departments, Fire Districts, Law Enforcement, Public Utilities, Community Service Districts, Cities, Hospitals, Schools, Tribal, Emergency Management, and other key stakeholders were invited to participate in the HMPC process and are identified in Appendix A.

An HMPC kick off meeting was completed on October 25, 2016 and another follow up meeting on December 7, 2016. Notifications were made to the public for review and comment on the draft LHMP plan through social media reaching 5,790 people. Public meetings were held in South Lake

Tahoe on January 24, 2017 and in Placerville on January 26, 2017. Agendas and sign in sheets for the meetings can also be found in Appendix A.

The Planning Process

El Dorado County OES utilized the process recommended by the California Office of Emergency Services (Cal OES) to develop this LHMP. Participants were asked to consider Social, Technical, Administrative, Political, Legal, Economic and Environmental (STAPLEE) criterion as they identified hazards, vulnerabilities, and mitigation strategies. A LHMP Planning Team was also established to research past disaster events that have occurred in or near the county, research new technologies that have been developed to address mitigation, analyze the information gathered and assemble that information into this plan.

Following a thorough hazard, risk and vulnerability analysis by all who have participated in this effort, mitigation strategies were then developed to eliminate, and/or mitigate the dangers that exist to life and property. When participants (Community members, first responders, Disaster Council, LHMP Planning Team) were asked to identify and rate in priority the hazards they had identified, there was a very clear consensus that wildfire was number one (1), with flooding number two (2), threats from avalanche and rock slides being number three (3), and acts of terrorism number four (4). The prioritization of mitigation actions followed this list of priorities. There was little interest from those involved in the plan update to address in the Mitigation Action Plan those hazards that have a low frequency of occurrence and low/high level of impact potential. By establishing achievable goals and objectives the various groups involved in the LHMP update planning process can see that their efforts are making a difference and involvement in other mitigation efforts can be achieved. The process included the following steps, listed in order in which they were undertaken:

1. Hazard Identification and Analysis
2. Community Vulnerability Assessment
3. Mitigation Capabilities Assessment
4. Mitigation Strategy
5. Mitigation Action Plan and Implementation Program

Step 1: Hazard Identification and Analysis, describes and analyzes the natural hazards present in El Dorado County that can threaten human life and damage property. It includes historical data of past occurrences, events that have occurred in other similar jurisdictions, and input from public and

private agencies, and the community at large.

Step 2: The Community Vulnerability Assessment, was completed through investigative research, community outreach for input, and GIS data and data received through research studies. It includes tabular and narrative descriptions on community characteristics, such as El Dorado County's geographic, economic and demographic profiles, and discusses future development trends and implications for hazard vulnerability. To graphically depict hazard vulnerability, this section also includes community vulnerability assessment maps. Also included is a qualitative risk index based upon hazard frequency, magnitude and impact. Including the demographic within El Dorado County that includes citizens within the community with Access and Functional Needs (AFN). Conclusions of both the quantitative and qualitative nature of risk and vulnerability form the basic foundation for concentrating and prioritizing mitigation planning and efforts.

Step 3: The Mitigation Capabilities Assessment, provides a comprehensive examination of El Dorado County's capacity to implement meaningful mitigation strategies, and identifies existing opportunities for program enhancement. Capabilities addressed in this section include staff and organizational capability, technical capability, policy and program capability, fiscal capability, legal authority and political willpower. The purpose of this assessment is to identify any existing gaps, weaknesses or conflicts in local programs/activities that may hinder mitigation efforts, or to identify those local activities that can be built upon in establishing a successful community hazard mitigation program. Community members were asked to provide insight on mitigation strategies to prevent, and or mitigate the hazards and vulnerabilities they had identified.

Step 4: The Mitigation Strategy, at the conclusion of these three background studies results in the formation of community goal statements and sets the stage for developing, adopting and implementing a meaningful Hazard Mitigation strategy for El Dorado County.

Step 5: The Mitigation Action Plan and Implementation Plan, these two steps help make the Plan strategic and functional for implementation purposes, and ultimately are the "action" components of the plan. El Dorado County concentrated on designing measures to ensure the Plan's ultimate implementation, and adopted evaluation and enhancement procedures to ensure the Plan is routinely updated.

Phase 1: Organize Resources

Planning Step 1: Organize the Planning Effort

With El Dorado County's and participant's commitment to participate in the DMA planning process and the CRS program, the County's Office of Emergency Services (OES) to established the framework and organization for development of the plan. An initial meeting was held with key community representatives to discuss the organizational and process aspects of this plan update process.

The initial kick-off meetings were held on October 25, 2016 and December 7, 2016. Invitations to these kickoff meetings were extended to key county departments, the two incorporated communities, special districts located within the planning area, as well as to other federal, state, and local stakeholders, including representatives from the public, that might have an interest in participating in the planning process. Representatives from participating jurisdictions and HMPC members to the 2011 and 2015 plans were used as a starting point for the invite list, with additional invitations extended as appropriate throughout the planning process. Public comment was solicited through press release and social media on January 16, 2018. A meeting was held in South Lake Tahoe January 24, 2017. A final public meeting was held in Placerville on January 26, 2017 in which stakeholders and the community had an opportunity to comment on the draft plan.

El Dorado County

- Agricultural Commissioner
- Community Development Agency, Building Services Division
- Community Development Agency, Department of Transportation
- Community Development Agency, Development Services
- Community Development Agency, Environmental Management
- Community Development Agency, GIS
- Community Development Agency, Planning Services Division
- Disaster Council
- Emergency Medical Health Agency
- Fire Safe Council
- Health and Human Services, Emergency Preparedness Group
- Information Technology
- Mental Health

- Office of Education
- Office of Emergency Services
- Public Health
- Public Information Officer
- Sheriff

A list of participating HMPC representatives for each jurisdiction is included in Appendix A. This list details all HMPC members that attended one or more HMPC meetings. Each jurisdiction also utilized the support of many other support staff in order to collect and provide requested data and to conduct timely reviews of the draft documents as further detailed in each annex to this plan. Note that the above list of HMPC members also includes several other government and stakeholder representatives that were invited to participate and contributed to the planning process.

During the planning process, the HMPC communicated through face-to-face meetings, email and telephone conversations. The HMPC met formally twice during the planning period (October 2016 – January 2017) which adequately covers the four phases of DMA. Agendas and sign-in sheets for each of the meetings are included in Appendix A.

Where appropriate, stakeholder and public comments and recommendations were incorporated into the final plan, including the sections that address mitigation goals and strategies. Written public comments were provided by only two members of the public, with several agency stakeholders providing input and comments on the draft plan and other related data throughout the plan development process. All social media and public outreach efforts are on file with the El Dorado County OES and are included in Appendix A.

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

- Cal OES
- Cal Fire AEU
- Fire Safe Councils
- El Dorado Irrigation Districts
- Georgetown Public Utility District
- South Tahoe Public Utility District
- Tahoe City Public Utility District
- Sacramento Public Utility District
- Arroyo Vista CSD
- Audubon Hills CSD
- Cameron Estates CSD
- Cameron Park CSD
- Connie Lane CSD
- Cosumnes River CSD
- East China Hill CSD
- El Dorado Hills CSD
- Fallen Leaf Lake CSD
- Garden Valley Ranch CSD
- Golden West CSD
- Greenstone Country CSD
- Grizzly Flats CSD
- Hickok Road CSD
- Hillwood CSD
- Holiday Lake CSD
- Knolls Property Owners CSD
- Lakeview CSD
- Marble Mountain CSD
- Mortara Circle CSD
- Nashville Trail CSD
- Rising Hill CSD
- Rolling Hills CSD
- Showcase CSD
- Sierra Oaks CSD
- West El Largo CSD
- United States Forest Service
- Cameron Park Fire District
- Diamond Springs/El Dorado Fire District
- El Dorado County Fire District
- El Dorado Hills Fire District
- Fallen Leaf Lake Fire District
- Garden Valley Fire District
- Georgetown Fire District
- Lake Valley Fire District
- Meeks Bay Fire District
- Mosquito Fire District
- Pioneer Fire District
- Rescue Fire District
- Tahoe Paradise Resort Improvement District
- Cameron Park Airport District
- Georgetown Divide Recreation
- El Dorado County Resource Conservation District
- Georgetown Divide Resource Conservation District
- Tahoe Resource Conservation District
- City of Placerville
- City of South Lake Tahoe
- Marshal Hospital
- Barton Hospital
- Shingle Springs Rancheria
- Los Rios College, El Dorado Center
- Lake Tahoe Community College

- Pacific Gas and Electric
- Sacramento Municipal Utility District

Coordination with key agencies, organizations, and advisory groups throughout the planning process allowed the HMPC to review common problems, development policies, and mitigation strategies as well as identifying any conflicts or inconsistencies with regional mitigation policies, plans, programs and regulations. Coordination involved contacting these agencies through a variety of mechanisms and informing them on how to participate in the plan update process and if they had any expertise or assistance they could lend to the planning process or specific mitigation strategies. Coordination with these groups included, holding face-to-face meetings, sending outreach e-mails, some with follow up phone calls; and making phone calls alone to out of area agencies. All of these groups and agencies were solicited asking for their assistance and input, telling them how to become involved in the plan update process, and inviting them to HMPC meetings.

Several opportunities were provided for the groups listed above to participate in the planning process. At the beginning of the planning process, invitations were extended to many of these groups to actively participate on the HMPC. Further as part of the public outreach process, all groups were invited to attend the public meetings and to review and comment on the plan prior to submittal to CAL OES and FEMA.

Other Community Planning Efforts and Hazard Mitigation Activities

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

- El Dorado County General Plan
- El Dorado County General Plan Technical Background Report

- El Dorado County Emergency Operations Plan
- El Dorado County Flood Insurance Study
- El Dorado County Flood Control & Water Conservation District Storm-water Management Manual
- El Dorado County Housing Element
- California State Hazard Mitigation Plan
- California State Drought Contingency Plan
- State of California Department of Conservation Farmland Mapping and Monitoring Program
- USDA Census of Agriculture
- El Dorado County Agricultural Commissioner Reports
- California Department of Food and Agriculture Invasive Species Report
- Community Wildfire Protection Plans

These and other documents were reviewed and considered, as appropriate, during the collection of data to support planning, which include the hazard identification, vulnerability assessment, and capability assessment. Data from these plans and ordinances were incorporated into the risk assessment and hazard vulnerability sections of the plan. Where the data from the existing studies and reports is used in this plan update, the source document is referenced throughout this plan update. The data was also used in determining the capability of the community in being able to implement certain mitigation strategies. Appendix B References provides a detailed list of references used in the preparation of this plan update.

Phase 2: Assess Risks

HMPC led the effort to identify, document, and profile all the hazards that have, or could have, an impact the planning area. Starting with the 2012 plan, natural hazards of concern were added, deleted, and modified for this LHMP Update. Data collection worksheets and participant annexes were developed and used in this effort to aid in determining hazards and vulnerabilities and where the risk varies across the planning area. Geographic information systems (GIS) were used to display, analyze, and quantify hazards and vulnerabilities.

The HMPC also conducted a capability assessment to review and document the planning area's current capabilities to mitigate risk from and vulnerability to hazards. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the HMPC

could assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. A more detailed description of the risk assessment process, methodologies, and results are included in Chapter 3 Risk Assessment.

Phase 3: Develop the Mitigation Plan

HMPC facilitated brainstorming and discussion sessions that described the purpose and process of developing planning goals and objectives, a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. This information is included in Chapter 4 Mitigation Strategy.

Based on input from the HMPC regarding the draft risk assessment and the goals and activities identified, a complete first draft of the plan was developed. This complete draft was provided for HMPC review and comment. Other agencies were invited to comment on this draft as well. HMPC and agency comments were integrated into the second public review draft, which was advertised and distributed to collect public input and comments. The HMPC integrated comments and issues from the public, as appropriate, along with additional internal review comments and produced a final draft for the CAL OES and FEMA Region IX to review and approve, contingent upon final adoption by the governing boards of each participant.

Phase 4: Implement the Plan and Monitor Progress

In order to secure buy-in and officially implement the plan, the plan was adopted by the governing boards of each participant using the sample resolution contained in Appendix C. The true worth of any mitigation plan is in the effectiveness of its implementation. Up to this point in the planning process, all of the HMPC's efforts have been directed at researching data, coordinating input from participating entities, and developing appropriate mitigation actions. Each recommended action includes key descriptors, such as a lead manager and possible funding sources, to help initiate implementation. An overall implementation strategy is described in Chapter 6 Plan Implementation and Maintenance.

Finally, there are numerous organizations within the El Dorado County Planning Area whose goals and interests interface with hazard mitigation. Coordination with these other planning efforts is paramount to the implementation and ongoing success of this plan and mitigation in El Dorado County and is addressed further in Chapter 6.

Implementation and Maintenance Process: 2012

The 2012 El Dorado County, California Local Hazard Mitigation Plan Update included a process for plan maintenance and implementation of the mitigation strategy as well as formal updates to the plan document. The 2012 process called for a formal plan update as required by DMA regulations every 5 years. El Dorado County Office of Emergency Services conducted informal reviews in an annual basis and conducted formal documented reviews when necessary.

As stated, documented reviews of the 2012 plan took place on an as needed basis by the County and participating jurisdictions, and the 2012 LHMP was integrated into many other planning mechanisms in the County. The entire LHMP was adopted and incorporated by reference into the El Dorado County General Plan Safety Element as part of their General Plan Update Process. The risk assessment portion of the 2012 LHMP was relied on and further integrated into other planning mechanisms. Table 2-2 lists the planning mechanism the 2012 LHMP was integrated into by El Dorado County.

Table 2-2 Incorporation of El Dorado County LHMP into Other Planning Mechanisms

Planning Mechanism 2012 LHMP Was Incorporated/Implemented Through	Details
2004 General Plan – Safety Element and other sections	2012 LHMP fully incorporated by reference into Safety Element of the most
2014 Emergency Operations Plan	LHMP risk assessment data incorporated into the Base EOP; other LHMP data use
Updates of El Dorado County Community Wildfire Protection Plans	LHMP risk assessment data and mitigation projects, specific to wildfires are used and considered in the CWPP
Capital Improvement Plans and Budgets	Mitigation projects are considered and included in annual CIPs as feasible

The plan implementation and maintenance process as set forth in the 2012 plan has been updated for this LHMP update. The revised update implementation and maintenance process for the El Dorado County 2018 LHMP update is set forth in Chapter 6 of this plan document.

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Chapter 3 Risk Assessment

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

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

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

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

- Identify Hazards;
- Profile Hazard Events;
- Inventory Assets; and
- Estimate Losses.

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

- Section 3.1: Hazard Identification: Natural Hazards identifies the natural hazards that threaten the planning area and describes why some hazards have been omitted from further consideration.
- Section 3.2: Hazard Profiles discusses the threat to the planning area and describes previous occurrences of hazard events and the likelihood of future occurrences.
- Section 3.3: Vulnerability Assessment assesses the planning areas' exposure to natural hazards; considering assets at risk, critical facilities, future development trends, and, where

possible, estimates potential hazard losses.

- Section 3.4: Capability Assessment inventories existing mitigation activities and policies, regulations, plans, and projects that pertain to mitigation and can affect net vulnerability.

This risk assessment covers the entire geographical extent of El Dorado County, including the incorporated communities and other participants. Since this plan covers multiple participants, the Hazard Mitigation Planning Committee (HMPC) is required to evaluate how the hazards and risks vary from participant to participant. While these differences are noted in this chapter, they are expanded upon in the annexes of the participants. If no additional data is provided in an annex, it should be assumed that the risk and potential impacts to the affected jurisdiction are similar to those described here for El Dorado County.

This LHMP update involved a comprehensive review and update of each section of the risk assessment. As part of the risk assessment update, new data was used, where available, and new analyses were conducted. Where data from existing studies and reports was used, the source is referenced throughout this risk assessment. Refinements, changes, and new methodologies used in the development of this risk assessment update are detailed in this Risk Assessment portion of the plan.

3.1 Hazard Identification: Natural Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

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

3.1.1 Results and Methodology

Using existing natural hazards data and input gained through planning meetings, the HMPC agreed upon a list of natural hazards that could affect El Dorado County. Hazards data from El Dorado County, California Office of Emergency Services (Cal OES), FEMA, California Department of Water Resources, the National Oceanic and Atmospheric Administration (NOAA), and many other sources were examined to assess the significance of these hazards to the operational area. Significance was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries, as well as property and economic damage. The natural hazards evaluated as part of this plan include those that have occurred historically or have the potential to cause significant human and/or monetary losses in the future. Only the more significant (or priority) hazards have a more detailed hazard profile and are analyzed further in Section 3.3 Vulnerability Assessment.

The following hazards in Table 3-1, listed alphabetically were identified and investigated for this plan update. As a starting point, the updated California State Hazard Mitigation Plan was consulted to evaluate the applicability of new hazards of concern to El Dorado County. Building upon this effort, hazards from the past plan were also identified, and comments explain how hazards were updated from the previous plan. All hazards from the 2012 plan were profiled in this plan.

Table 3-1 County Hazard Identification and Comparison

2017 Hazards	2012 Hazards	Comment
Avalanche	Avalanche	Similar analysis was performed.
Dam/Levee Failure	Damn Inundation	Updated dam data from Cal OES and Cal DWR was added.
Drought/Extreme Heat/Tree Mortality	-	Water shortage was added to this hazard and a greater emphasis placed on the hazard as a whole
Earthquake and Debris Flow	Earthquake, Sinkholes and Landslides	Similar analysis was performed.
Erosion	Erosion	The new DFIRM layer was intersected with the newest parcel and assessor's data.
Floods	Floods	Similar analysis was performed.
Seiche Wave	Seiche	Similar analysis was performed.
Severe Storms	Winter/Seasonal Storms	Similar analysis was performed.
Severe Thunderstorms and Tornadoes	Winter/Seasonal Storms	Severe Thunderstorms and Tornadoes were separated out and less emphasis placed at the hazard
Wildfire	Wildfire	Further analysis was performed using the most recent CAL FIRE data.

Table 3-2 was completed by the County and HMPC to identify, profile, and rate the significance of identified hazards. Only the more significant (or priority) hazards have a more detailed hazard profile and are analyzed further in Section 3.3 Vulnerability Assessment. Table 3-20 in Section 3.2.16 Natural Hazards Summary provides an overview of these significant hazards.

Table 3-2 El Dorado County Hazard Mitigation Worksheet

Hazard	Geographic Extent	Probability of Future Occurrence	Magnitude/Severity	Significance
Avalanche	Limited	Likely	Limited	Low
Dam Failure	Significant	Occasional	Critical	High
Drought	Extensive	Likely	Critical	High
Earthquake	Significant	Occasional	Critical	Medium
Erosion	Limited	Occasional	Limited	Low
Flood (Localized)	Limited	Occasional/Highly Likely	Limited	Medium
Seiche (Lake Tsunami)	Limited	Unlikely	Limited	High
Severe Weather	Extensive	Highly Likely	Limited	Low
Severe Weather: Thunderstorms / Tornadoes	Extensive	Highly Likely	Critical	High
Wildfire	Extensive	Highly Likely	Critical	High

Geographic Extent

- Limited: Less than 10% of planning area
  Significant: 10-50% of planning area shutdown of facilities for more than 30 days; and/or multiple deaths
  Extensive: 50-100% of planning area
  Catastrophic: More than 50 percent of property severely damaged

Probability of Future Occurrences

- Occasional: Occurs every set number of years.
- Likely: Between 10 and 100% chance of facilities for more than a week; and/or injuries/illnesses treatable do occurrence in next year, or has a recurrence not result in permanent disability interval of 10 years or less.
- Highly Likely: Near 100% chance of in permanent disability occurrence in next year, or happens every year.

Magnitude/Severity

- Negligible: Less than 10 percent of property severely damaged
- Limited: 10-25 percent of property severely damaged;
- Critical: 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result

Significance

- Low: minimal potential impact in next 100 years, or has a recurrence interval
- Medium: moderate potential impact of greater than every 100 years.
- High: widespread potential impact.

3.1.2 Disaster Declaration History

One method the HMPC used to identify hazards was the researching of past events that triggered federal and/or state emergency or disaster declarations in the Planning Area. Federal and/or state disaster declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state governments' capacities are exceeded; a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors.

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

Details on federal and state disaster declarations were obtained by the HMPC, FEMA, and Cal OES and compiled in chronological order in Table 3-3. A review of state declared disasters indicates that El Dorado County received 25 state declarations between 1950 and 2017. Of the 25 state declarations: 18 were associated with severe winter storms, heavy rains, or flooding; 4 were for wildfires; 1 was for freeze and severe weather conditions; 1 was for drought; 1 was for an energy emergency. A review of federal disasters shows ten (10) federal disaster declarations in the past 20 years.

Table 3-3 El Dorado County State and Federal Disasters Declaration, 1997-2017

Hazard	Disaster #	Year	State Declaration	Federal Declaration	Location
Winter Storms	DR-1155	1997	Yes	N/A	El Dorado County
Hollow Fire	FM-2532	2004	Yes	N/A	El Dorado County
2005/06 Winter Storms	DR-1628	2005-2006	Yes	Yes	El Dorado County
2006 Spring Storms	DR-1646	2006	Yes	Yes	El Dorado County
Angora Fire	FM-2700	2007	Yes	Yes	Meyers, South Lake Tahoe
January Storms	2008-01	2008	Yes	N/A	El Dorado County
King Fire	FM-5081	2014	Yes	Yes	Pollock Pines/Camino
January 2017 Storms	DR-4301	2017	Yes	Yes	El Dorado County
Late January 2017 Storms	DR-4305	2017	Yes	Yes	El Dorado County
February 2017 Storms	DR-4308	2017	Yes	Yes	El Dorado County

Source: Cal OES, FEMA

This disaster history (combined FEMA and state) suggests that El Dorado County experiences events that are worthy of disaster declaration on average every two years.

3.2 Hazard Profiles

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

The hazards identified in Section 3.1 Hazard Identification Natural Hazards, are profiled individually in this section. In general, information provided by planning team members is integrated into this section with information from other data sources. These profiles set the stage for Section 3.3 Vulnerability Assessment, where the vulnerability is quantified for each of the priority hazards.

Each hazard is profiled in the following format:

- Hazard/Problem Description—This section gives a description of the hazard and associated issues followed by details on the hazard specific to El Dorado County. Where known, this includes information on the hazard extent, area, seasonal patterns, speed of onset/duration, and magnitude and/or any secondary effects.
- Past Occurrences—This section contains information on historical incidents, including impacts where known. The extent or location of the hazard within or near El Dorado County is also included here. Historical incident worksheets were used to capture information from participating jurisdictions on past occurrences.
- Frequency/Likelihood of Future Occurrence—The frequency of past events is used in this section to gauge the likelihood of future occurrences. Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100. This gives the percent chance of the event happening in any given year (e.g., three droughts over a 30-year period equates to a 10 percent chance of a experiencing a drought in any given year). The likelihood of future occurrences is categorized into one of the following classifications:
    - Highly Likely—Near 100 percent chance of occurrence in next year or happens every year
    - Likely—Between 10 and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less
    - Occasional—Between 1 and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years
    - Unlikely—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

Section 3.2.16 Natural Hazards Summary provides an initial assessment of the profiles and assigns a level of significance or priority to each hazard. Those hazards determined to be of high or medium significance were characterized as priority hazards that required further evaluation in Section 3.3 Vulnerability Assessment. Those hazards that occur infrequently or have little or no impact on the Planning Area were determined to be of low significance and not considered a priority hazard. Significance was determined based on the hazard profile, focusing on key criteria such as frequency and resulting damage, including deaths/injuries and property, crop, and economic damage. The ability of a community to reduce losses through implementation of existing and new mitigation measures was also considered as to the significance of a hazard. This assessment was used by the HMPC to prioritize those hazards of greatest significance to El Dorado County, enabling the County to focus resources where they are most needed.

The following sections provide profiles of the natural hazards that the HMPC identified in Section 3.1 Hazard Identification. The severe weather hazards are discussed first because it is the secondary hazards generated by severe weather (e.g., flood and wildfire) that can result in the most significant losses. The other hazards follow alphabetically.

3.2.1 Severe Weather

Severe weather is generally any destructive weather event, but usually occurs in all areas of El Dorado County as storms that bring heavy rain, hail, lightning, and strong winds. While the storms may be localized, they can be extensive in their damage and impact.

The National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC) has been tracking severe weather since 1950. Their Storm Events Database contains data on the following: all weather events from 1993 to current (except from 6/1993-7/1993); and additional data from the Storm Prediction Center, which includes tornadoes (1950-1992), thunderstorm winds (1955-1992), and hail (1955-1992). This database contains 549 severe weather events that occurred in El Dorado County (El Dorado County is included in the following zones: Southern Sacramento Valley, Motherlode, West Slope Northern Sierra Nevada, Greater Lake Tahoe Area) between July 1, 2009, and December 31, 2017. Table 3-4 summarizes these events.

Table 3-4 NCDC Severe Weather Events for El Dorado County 7/1/2009 – 12/31/2017*

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Avalanche	8	5	0	0	0	$0	$0
Blizzard	1	0	0	0	0	$0	$0
Debris Flows	9	0	0	0	0	$6,540,000	$0
Dense Fog	11	0	3	0	0	$200,000	$0
Dense Smoke	2	0	0	0	0	$0	$0
Drought	45	0	0	0	0	$0	$0
Excessive Heat	4	6	2	1	0	$0	$0
Extreme	1	0	0	0	0	$0	$0
Flood	7	0	0	0	0	$1,750,000	$0
Frost/Freeze	2	0	0	0	0	$0	$0
Hail	10	0	0	0	0	$1,000	$0
Heat	3	15	0	0	0	$0	$0
Heavy Rain	72	0	1	0	0	$0	$0
Heavy Snow	173	1	3	0	1	$25,000	$0
High Wind	20	1	0	1	0	$1,480,000	$0
Strong Wind	36	1	2	2	1	$3,857,000	$0
Tornado	3	0	0	0	0	$1,002,000	$0
Wildfire	11	0	0	17	0	$500,225,000	$0
Winter Storm	80	1	2	0	0	$400,000	$0
Winter Weather	45	1	0	0	0	$0	$0
Total	**549**	**34**	**43**	**4**	**2**	**$515,480,000.**	**$0.00**

Source: NCDC (https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=ALL&beginDate_mm=07&beginDate_dd=01&beginDate_yyyy=2009&endDate_mm=12&endDate_dd=31&endDate_yyyy=2017&county=EL%2BDORADO%3A17&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=6%2CCALIFORNIA#)

*Note: Losses reflect totals for all impacted areas

The NCDC table above summarizes severe weather events that occurred in El Dorado County. Only a few of the events actually resulted in state and federal disaster declarations. It is further interesting to note that different data sources capture different events during the same time period,

and often display different information specific to the same events. While the HMPC recognizes these inconsistencies, they see the value this data provides in depicting the County's "big picture" hazard environment. As previously mentioned, most all of El Dorado County's state and federal disaster declarations have been a result of wildfires and severe weather. For this plan, Thunderstorms/Tornadoes are discussed in a separate section.

Due to size of the County and changes in elevation (i.e., from approximately 760 feet to more than 10,886 feet above mean sea level (msl) and climate, weather conditions can vary greatly across the County. For purposes of this hazard profile, the County will be divided into two distinct sections, as applicable: western El Dorado County, which is predominantly below an elevation of 4,000 feet above msl, is generally below the snowfall line (although snow has fallen at lower elevations), and includes the community of Camino and all land to the west (including all incorporated cities and towns); and eastern slope of El Dorado County, which is generally above 4,000 feet above msl, receives snowfall, and includes all of the County east of Pollock Pines. The profiles that follow provide information, where possible, from two weather stations located in these two different parts of the County: Placerville (elevation: 1,860 feet above msl) in west El Dorado County and the City of South Lake Tahoe (elevation: 6,230 feet above msl), in east El Dorado County.

Severe Weather and Climate Change

Climate change refers to any distinct change in measures of climate lasting for a long period of time, more specifically major changes in temperature, rainfall, snow, or wind patterns. Climate change may be limited to a specific region, or may occur across the whole Earth. Climate change may result from:

- Natural factors (e.g., changes in the Sun's energy or slow changes in the Earth's orbit around the Sun);
- Natural processes within the climate system (e.g., changes in ocean circulation); and
- Human activities that change the atmosphere's make-up (e.g., burning fossil fuels) and the land surface (e.g., cutting down forests, planting trees, building developments in cities and suburbs, etc.).

Climate change is a natural occurrence in which the earth has warmed and cooled periodically over geologic-time. The recent and rapid warming of the earth over the past century has been cause for concern, as this warming has been associated with the accumulation of human-caused greenhouse gases such as CO2, in the atmosphere. This warming has taken place almost everywhere over the

continents which strongly suggest that there is a global cause, rather than a mere coincidence of weather patterns that would result in patches of warming and cooling. The effects of climate change are varied: warmer and more varied weather patterns, melting ice caps, and poor air quality, for example.

The 2013 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. Extreme temperatures (hot) are often found in the Western part of El Dorado County (El Dorado Hills, Cameron Park, Placerville) and extreme temperatures (cold) are often found in east of Camino/Pollock Pines and in the Tahoe Basin. El Dorado County uses the National Weather Service's heat index to measure the extent and duration of heat events. El Dorado County uses the National Weather Service's forecast, advisories, watches and warnings to prepare for and respond to extreme cold and heat events. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

Climate change can have direct implications on almost every hazard addressed in the plan, with earthquake and hazardous materials being possible exceptions. Climate Change has the potential to alter the nature and frequency of most hazards. The potential for climate change influences on hazards are further noted in each of the hazard discussions.

3.2.2. Severe Weather: Thunderstorms/Tornadoes

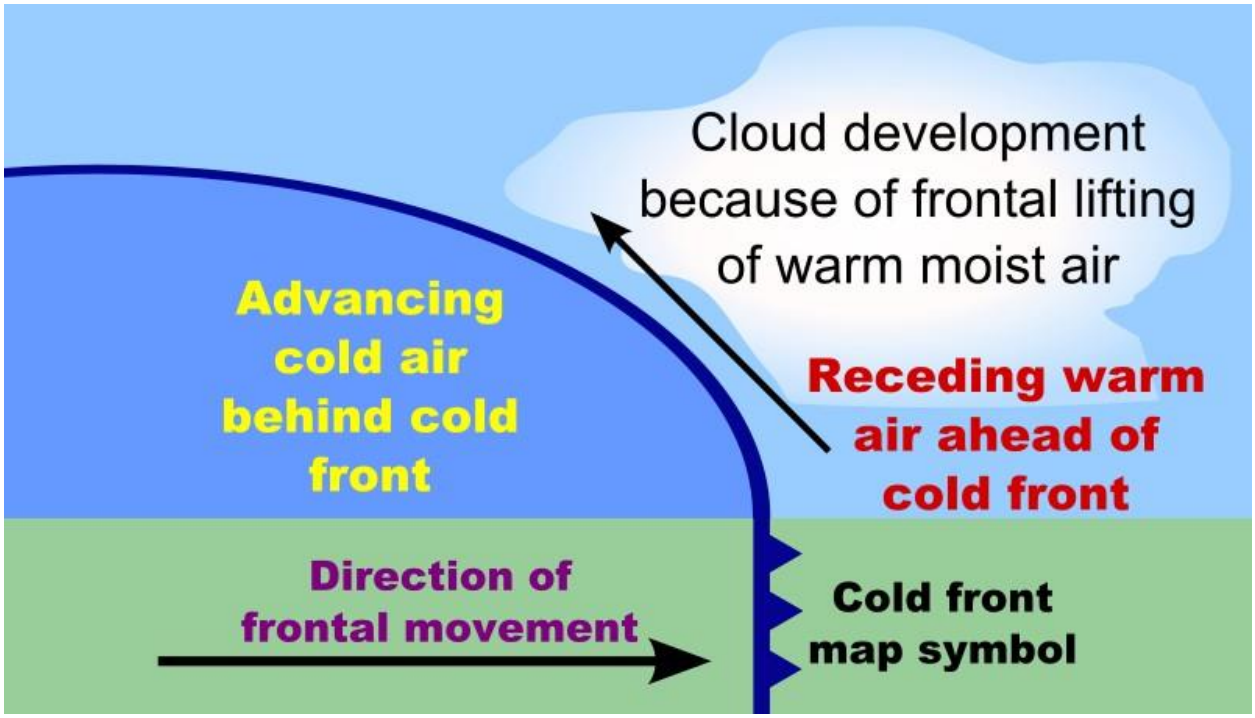
Hazard/Problem Description

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

Heavy Rain and Thunderstorms

The NWS reports that thunderstorms result from the rapid upward movement of warm, moist air (see Figure 3-3). They can occur inside warm, moist air masses and at fronts. As the warm, moist air moves upward, it cools, condenses, and forms cumulonimbus clouds that can reach heights of greater than 35,000 ft. As the rising air reaches its dew point, water droplets and ice form and begin falling the long distance through the clouds towards earth's surface. As the droplets fall, they collide with other droplets and become larger. The falling droplets create a downdraft of air that spreads out at Earth's surface and causes strong winds associated with thunderstorms.

Figure 3-3 Formation of a Thunderstorm



Source: NASA. http://rst.gsfc.nasa.gov/Sect14/Sect14_1c.html

According to the HMPC, short-term, heavy storms can cause both widespread flooding as well as extensive localized drainage issues. With the increased growth of the area, the lack of adequate drainage systems has become an increasingly important issue. In addition to the flooding that often occurs during these storms, strong winds, when combined with saturated ground conditions, can down very mature trees.

El Dorado County—West (Placerville Weather Station, Period of Record 1915 to 2010)
https://wrcc.dri.edu/Climate/comp_table_state_show.php?stype=ppt_extreme_annual_avg&sstate=ca&stitle=Annual+Precipitation+Averages+and+Extremes&sparent=a-l

According to the WRCC, average annual precipitation in the western side of El Dorado County (Placerville) is 38.27 inches per year. The highest recorded annual precipitation is 74.55 inches in 1983; the highest recorded precipitation for a 24-hour period is 6.22 inches on February 14, 2000. The lowest recorded annual precipitation was 11.85 inches in 1976.

El Dorado County—East (Tahoe Weather Station, Period of Record 1914 to 2010)
https://wrcc.dri.edu/Climate/comp_table_state_show.php?stype=ppt_extreme_annual_avg&sstate=ca&stitle=Annual+Precipitation+Averages+and+Extremes&sparent=a-l

According to the WRCC, average annual precipitation in the eastern portion of El Dorado County is 31.63 inches per year. The highest recorded annual precipitation is 66.41 inches in 1996; the highest recorded precipitation for a 24-hour period is 9.34 inches on December 23, 1964. The lowest recorded annual precipitation is 9.34 inches in 1976.

Hail

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

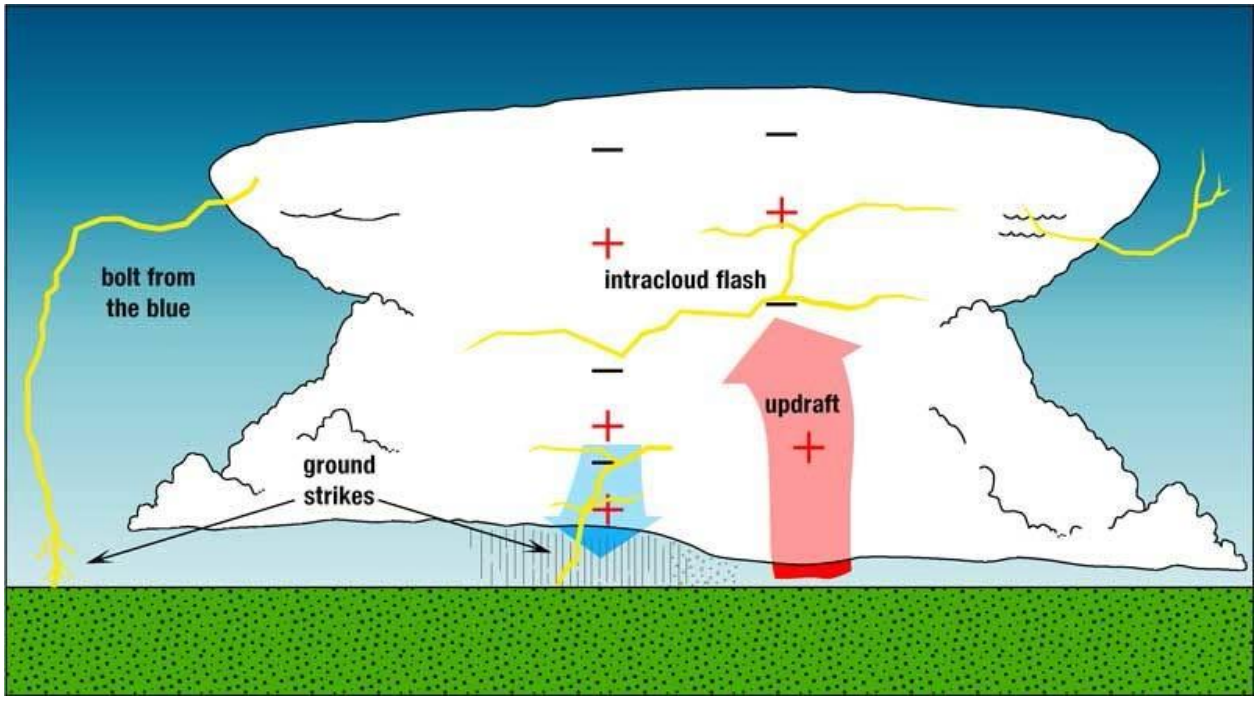
Lightning

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

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

Cloud-to-ground lightning is the most damaging and dangerous type of lightning, though it is also less common. Most flashes originate near the lower-negative charge center and deliver negative charge to earth. However, a large minority of flashes carry positive charge to earth. These positive flashes often occur during the dissipating stage of a thunderstorm's life. Positive flashes are also more common as a percentage of total ground strikes during the winter months. This type of lightning is particularly dangerous for several reasons. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike as far as 5 or 10 miles from the storm in areas that most people do not consider to be a threat (see Figure 3-4). Positive lightning also has a longer duration, so fires are more easily ignited. And, when positive lightning strikes, it usually carries a high peak electrical current, potentially resulting in greater damage.

Figure 3-4 Cloud to Ground Lightning



Source: National Weather Service

Winds

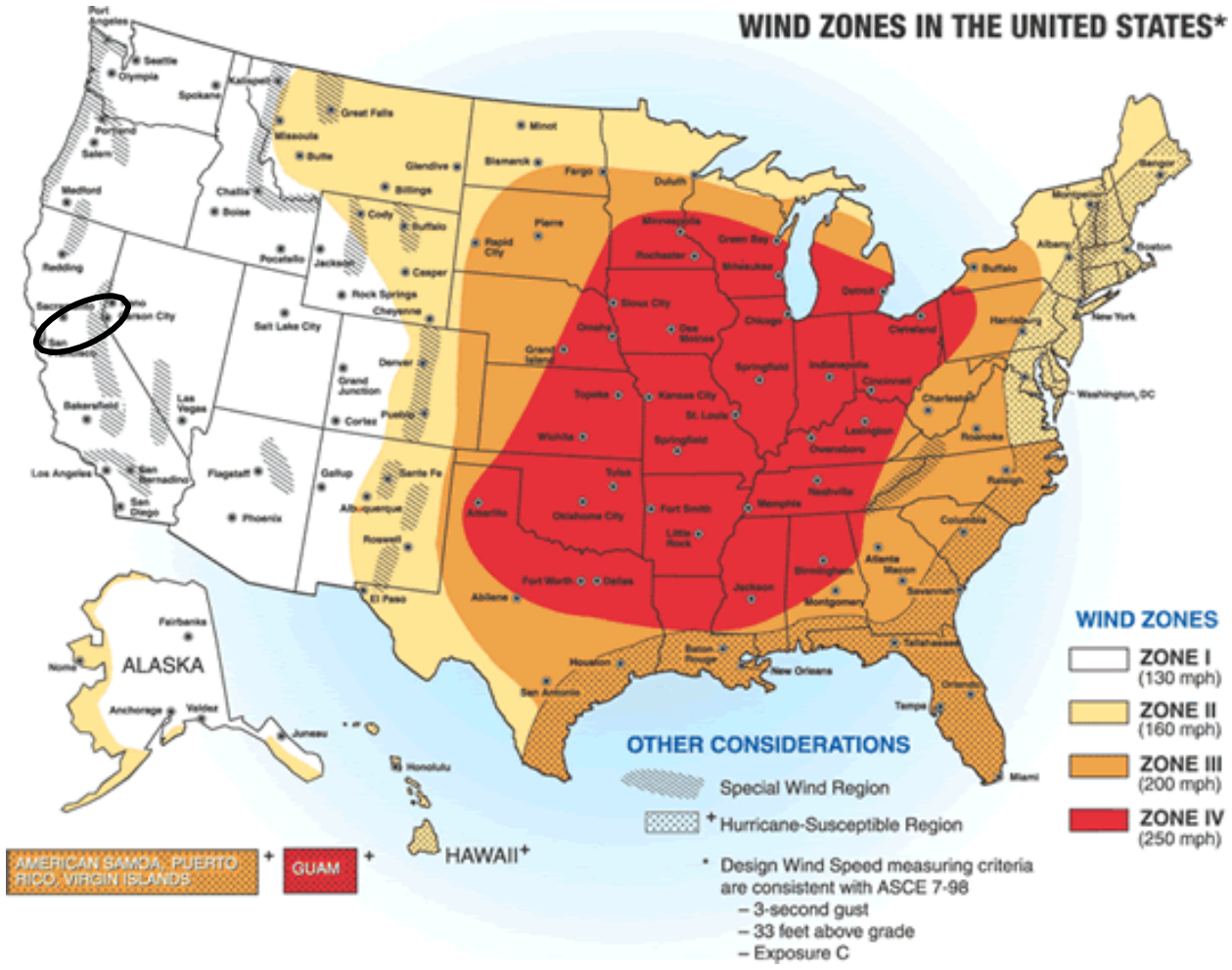
High winds, often accompanying severe thunderstorms, can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss.

El Dorado County is subject to significant, non-tornadic (straight-line), winds. High winds, as defined by the NWS glossary, are sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration. These winds may occur as part of a seasonal climate pattern or in relation to other severe weather events such as thunderstorms. Straight-line winds may also exacerbate existing weather conditions by increasing the effect on temperature and decreasing visibility due to the movement of particulate matters through the air, as in dust and snow storms. The winds may also exacerbate fire conditions by drying out the ground cover, propelling fuel around the region, and increasing the ferocity of exiting fires. These winds may damage crops, push automobiles off roads, damage roofs and structures, and cause secondary damage due to flying debris.

Figure 3-5 depicts wind zones for the United States. The map denotes that El Dorado County falls

into Zone I, which is characterized by high winds of up to 130 mph. Portions of the County also fall into a Special Wind Region.

Figure 3-5 Wind Zones in the United States



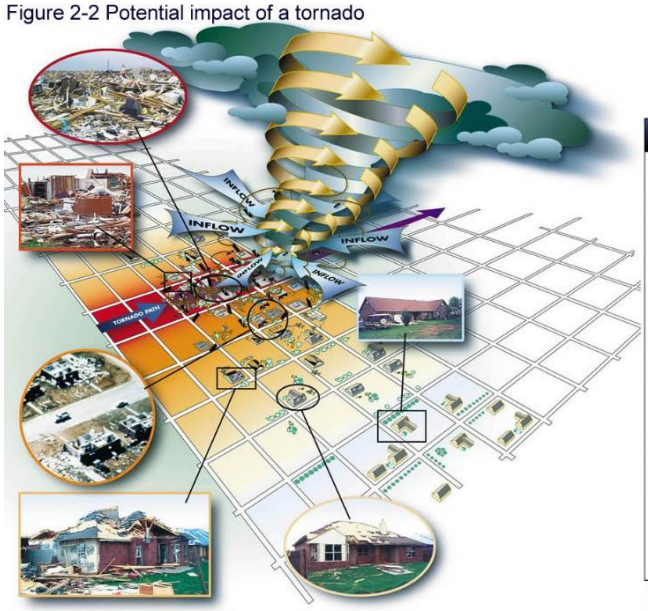
Source: Federal Emergency Management Agency

Tornadoes

Tornadoes and funnel clouds can also occur during these types of storms. Tornadoes are another severe weather hazard that can affect the El Dorado County Planning Area, primarily during the rainy season in the late fall and early spring. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes are the most powerful storms that exist. They can have the same pressure differential across a path only 300 yards wide or less as 300 mile wide hurricanes. Figure 3-6 illustrates the potential impact and damage from a tornado.

Figure 3-6 Potential Impact and Damage from a Tornado

Figure 2-2 Potential impact of a tornado



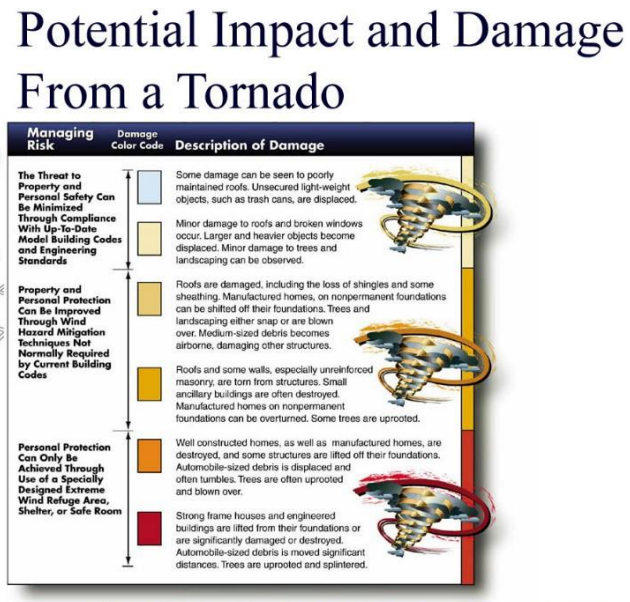


Figure 2-2 Potential damage table for impact of a tornado

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

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between damage and wind speed. It is also more precise because it takes into account the materials affected and the construction of structures damaged by a tornado. Table 3-7shows the wind speeds associated with the Enhanced Fujita Scale ratings.

Table 3-7 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

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.

Past Occurrences

Disaster Declaration History

A search of FEMA and Cal OES disaster declarations turned up multiple events. State disaster declarations occurred in 1958 (twice), 1964 (twice), 1969, 1973, 1983, 1986, 1993, 1997, 2006 (twice), and 2008. Federal disaster declarations occurred in 1958, 1964, 1969, 1983, 1986, 1995 (twice), 1997, twice in 2006 and three times in 2017.

NCDC Events

The NCDC data recorded 189 hail, heavy rain, wind, and tornado incidents for El Dorado County since 2004. A summary of these events are shown in Table 3-8 Specific events in the NCDC database showing damages, deaths, or injuries are detailed below the table. HMPC details are captured below the table as well.

Table 3-8 NCDC Severe Weather Events in El Dorado County 01/01/2004-06/30/2018

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Hail	10	0	0	0	0	$1,000	$0
Heavy Rain	83	0	1	0	0	$0	$0
High Wind	51	1	1	1	0	$10,790,000	$11,000
Strong Wind	42	1	1	2	2	$4,022,600	$0
Thunderstorm Wind	0	0	0	0	0	$0	$0
Tornado	3	0	0	0	0	$1,002,0000	$0
Total	**189**	**2**	**3**	**3**	**2**	**$15,815,600**	**$11,000**

Source: NCDC https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Tornado&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=2004&endDate_mm=06&endDate_dd=30&endDate_yyyy=2018&county=EL%2BDORADO%3A17&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=6%2CCALIFORNIA

- December 9, 1996 – Damage was observed in South Lake Tahoe from strong gusty winds during the morning hours. Trees fell on a couple of homes, causing $50,000 in damage. From surrounding data, winds were estimated in the 55 to 65 mph range. No deaths or injuries were reported.
- November 7, 2002 – Wind gusts estimated at over 80 mph blew down trees in the South Lake Tahoe, CA area. Falling trees severely damaged one home and two vehicles. Tree limbs damaged four other homes and downed several power lines, causing scattered power outages. Sparking electric lines caused two brush fires, the largest of which scorched 30 acres. No injuries or deaths were reported. Damages of $300,000 were reported.
- December 14, 2002 – strong cold front moving through northern California on December 14 brought near-record high winds to northeast California and western Nevada. Wind gusts reports in the 60-80 mph range were common throughout the day across the entire region, with a few gusts near 100 mph. Remote wind sensors along the Sierra Crest measured wind gusts in excess of 130 mph. The strongest winds occurred just before the cold front

moved into the area at about 5:30 p.m. Hundreds of trees and thousands of tree limbs were blown down across the region. In addition, there was widespread damage to roofs, fences, commercial billboards and signs, and power lines. Numerous power outages occurred, some lasting for several days after the event in rural areas. A few relatively minor traffic accidents resulted from the low visibilities. From these, a few minor injuries were reported but fortunately no serious injuries or deaths were reported. The regional electric utility lost 140 power poles and 18 transmission line due to the strong winds, with damages and repair costs estimated at over $3M. Total regional wind damage costs were estimated at ~$10M.

- December 26, 2006 – A wind gust estimated at 61 knots (70 mph) knocked over a 6-ft diameter pine tree in South Lake Tahoe. The high winds also took down power lines across the area.
- August 18, 2010 – South-southwest to southwest winds on Lake Tahoe were sustained between 20 to 25 mph from late morning to early evening on the 18th. The winds (and waves it generated) were sufficient to sink 3 boats. $100,000 in damages were reported.
- December 11, 2014 – Winds gusted to 60 and 70 mph at the Truckee and South Lake Tahoe airports, respectively, on the morning of the 11th. Over the Sierra ridges, winds gusted as high as 135 mph. Numerous trees and power lines were downed, along with damage to several homes and vehicles due to fallen trees. The power outages, some lasting up to 2 days, caused South Lake Tahoe schools to be closed through the 12th. Finally, winds downed a tree which caused the death of a teenager in a heavily wooded area. Damages from this event were estimated at $700,000.

Likelihood of Future Occurrence

Highly Likely – Based on NCDC data and HMPC input, 189 heavy rain, hail, lightning, and thunderstorm wind incidents over a 14-year period (2004-2018) equates to over ten severe storm events every year and a 100 percent chance of a severe storm in any given year. This database doesn't report all heavy rain, hail, lightning, and wind events. Severe weather is a well-documented seasonal occurrence that will continue to occur annually in El Dorado County. The topography and climate of El Dorado County makes it more vulnerable to severe thunderstorms. It's very likely to see thunderstorms east of Placerville into the Tahoe Basin year-round.

Climate Change and Heavy Rains and Storms

According to the CAS, while average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. This may bring stronger

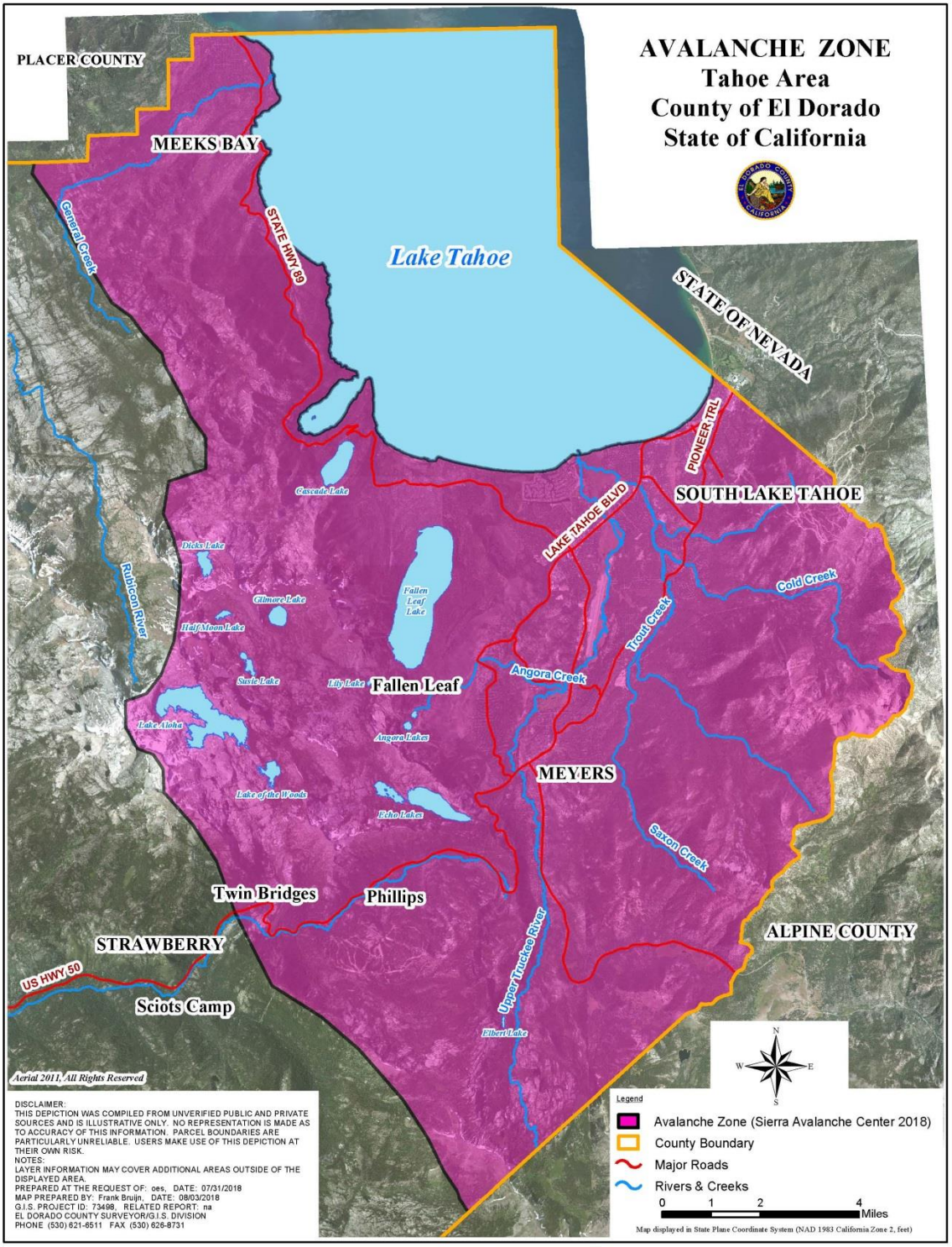
thunderstorm winds. It is unlikely that hail will become more common in the County. The amount of lightning and tornadoes is not projected to change.

3.2.3. Avalanche

Hazard/Problem Description

Avalanches occur when loading of new snow increases stress at a rate faster than strength develops, and the slope fails. Critical stresses develop more quickly on steeper slopes and where deposition of wind- transported snow is common. The vast majority of avalanches occur during or shortly after storms. This hazard generally affects a small number of people, such as snowboarders, skiers, and hikers, who venture into backcountry areas during or after winter storms. Roads and highway closures, damaged structures, and destruction of forests are also a direct result of avalanches. The combination of steep slopes, abundant snow, weather, snowpack, and an impetus to cause movement creates avalanches. Areas prone to avalanche hazards include hard to access areas deep in the backcountry. Avalanche hazards exist in eastern El Dorado County where combinations of the above criteria occur. This is shown on Figure 3-7.

Figure 3-7 El Dorado County – Avalanche Hazard Areas



Past Occurrences

Disaster Declaration History

There have been no disasters related to avalanche in El Dorado County.

NCDC Events

The Sierra Avalanche Center has recorded the following avalanche events in El Dorado County. Table 3-12 provides an overview of avalanche events and their locations.

Table 3-12 El Dorado County Avalanche Events

Year	Avalanche Location
2009	Angora Peak
2010	Angora Peak
2010	Mini Halls Chute – Indian Cliff Chutes
2010	Mini Hall Couloir
2010	Becker Peak
2010	Ralston
2011	Ralston Peak
2015	Echo Peak
2016	Tallac Corkscrew bowl
2017	Mt. Tallac-The Cross
2017	Porcupine Ridge

Sierra Avalanche Center, https://www.sierraavalanchecenter.org/incidents-map-archive

HMPC Events

Historically, avalanches occur within the County between the months of December and March, following snowstorms. Although avalanches have occurred on slopes of many angles, they most often occur on slopes ranging between 30 degrees and 45 degrees. Therefore ski resorts, residences, roads, businesses, and other structures and activities in these areas are vulnerable. Areas where the potential for avalanches to exist are zoned as moderate or high avalanche hazard zones and have been identified. Moderate hazard zones are usually on shallow slopes and located

immediately downhill of high zones. According to the 2004 El Dorado County Operational Area, Emergency Operations Plan, areas of particular concern include:

- Mt. Tallac;
- Heavenly Ski Resort;
- Echo Summit;
- Sierra Ski Resort;
- Kyburz;
- White Hall;
- Highway 50 Corridor
- Desolation Wilderness;

Likelihood of Future Occurrence

Likely—Injuries and loss of life from an avalanche are usually due to people recreating in remote areas at the wrong time. Given the topography and amount of snow falling on an annual basis in eastern El Dorado County, avalanches and resulting damages, including injuries and loss of life, will continue to occur.

Climate Change and Avalanche

According to the CAS, climate change may exacerbate the avalanche hazard in the County. Avalanches stemming from a weather pattern of heavy snowfalls followed by thawing may increase – a dangerous combination that can be expected with climate change.

3.2.7. Dam Failure

Hazard/Problem Description

Dams are manmade structures built for a variety of uses including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they are usually engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped and fail. Overtopping is the primary cause of earthen dam failure in the United States.

Dam failures can also result from any one or a combination of the following causes:

- Earthquake;
- Inadequate spillway capacity resulting in excess overtopping flows;
- Internal erosion caused by embankment or foundation leakage, or piping or rodent activity;
- Improper design;
- Improper maintenance;
- Negligent operation; and/or
- Failure of upstream dams on the same waterway.

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Electric generating facilities and transmission lines could also be damaged and affect life support systems in communities outside the immediate hazard area. Associated water supply, water quality and health concerns could also be an issue. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

In general, there are three types of dams: concrete arch or hydraulic fill, earth and rock-fill, and concrete gravity. Each type of dam has different failure characteristics. A concrete arch or hydraulic fill dam can fail almost instantaneously; the flood wave builds up rapidly to a peak then gradually declines. An earth- rockfill dam fails gradually due to erosion of the breach; a flood wave will build

gradually to a peak and then decline until the reservoir is empty. And, a concrete gravity dam can fail instantaneously or gradually with a corresponding buildup and decline of the flood wave.

Dams and reservoirs have been built throughout California to supply water for agriculture and domestic use, to provide capacity for flood management, as a source of hydroelectric power, and to serve as recreational facilities. The largest reservoir in El Dorado County is Folsom Lake. Folsom Lake was built by the U.S. Army Corps of Engineers and it is now operated by the U.S. Bureau of Reclamation. It has a capacity of 976,000 acre-feet and it surface extends into both Placer and Sacramento Counties. Folsom Lake is contained by and series of dams and dikes. Failure of some of the dikes could pose a hazard to areas in El Dorado County.

The California Department of Water Resources Division of Safety of Dams has jurisdiction over impoundments that meet certain capacity and height criteria. Embankments that are less than six feet high and impoundments that can store less than 15 acre-feet are non-jurisdictional. Additionally, dams that are less than 25 feet high can impound up to 50 acre-feet without being jurisdictional. The California Department of Water Resources (Cal DWR) Division of Safety of Dams assigns hazard ratings to large dams within the State. The following two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. Dams are classified in three categories that identify the potential hazard to life and property:

High hazard indicates that a failure would most probably result in the loss of life
Significant hazard indicates that a failure could result in appreciable property damage
Low hazard indicates that failure would result in only minimal property damage and loss of life is unlikely

According to data provided by the California Department of Water Resources (DWR) and the El Dorado County General Plan (last amended March 20, 2018), there are multiple dams in El Dorado County constructed for flood control, storage, electrical generation, and recreational purposes. DWR identified 49 dams in El Dorado County. The El Dorado County General Plan has dam failure inundation zone maps for 11 of these dams.

Table 3-13 identifies the 12 dams, most with dam failure inundation maps Figure 3-8.

Table 3-13 El Dorado County Dam Failure Inundation Maps

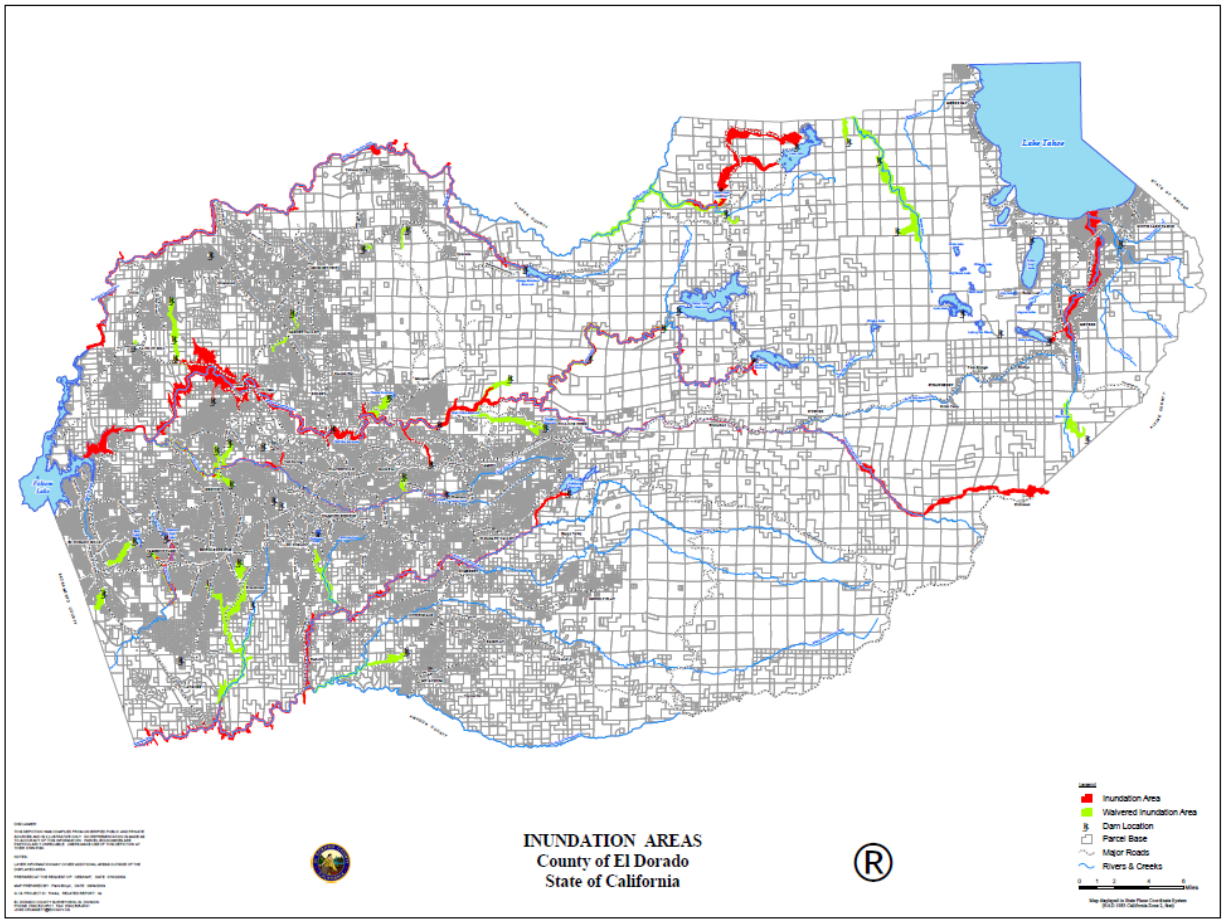
Name	Significance	Owner	River	Nearest City/Area	Map	Structural Height (ft)	Maximum Storage (acre-ft)
Blakely Dam	Low	Walker Land Company	N/A	Camino	Y	19	152
Cameron Park Lake Dam	Low	Cameron Park Community Services District (CSD)	N/A	Cameron Park	Y	29	480
Caples Lake Dam (located in Alpine County)	Significant	El Dorado Irrigation District (EID)	N/A	N/A	Y	71	21,580
Chili Bar	High	Pacific Gas & Electric (PG&E)	American River	Placerville	Y	111	3700
Echo Lake Dam	Extremely High	EID		Meyers	Y	14	1,900
Forebay Dam	High	EID		Pollock Pines	N	91	361
Ice House Dam	Extremely High	SMUD		Coloma Lotus	Y	150	37,120
Loon Lake Dam	Extremely High	SMUD		Coloma Lotus	Y	108	76,500
Slab Creek	Significant	SMUD		Coloma Lotus	Y	233	16,600
Sly Park	Extremely High	EID		Pollock Pines	N	182	41,000
Union Valley Dam	Extremely High	SMUD		Coloma Lotus	N	453	230,000
Stumpy Meadows Dam	Significant	Unk		Georgetown	Y	-	-
Weber Creek	High	EID		Placerville	Y	92	1,100

Source: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Division-

of-safety-of-dams/Files/Publications/Dams-Within-Jurisdiction-of-the-State-of-California-Alphabetically-by-County.pdf *One Acre Foot=326,000 gallons

Inundation Maps Data Source:
https://www.edcgov.us/Government/planning/Pages/adopted_general_plan.aspx

Figure 3-8 El Dorado County Dam Inundation Areas



There are several dams, which, if they fail, may impact the people and resources of El Dorado County. Eleven dams in El Dorado County are at least 100 feet tall or have a capacity of 10,000 acre-feet of water. Failure of any one of these dams would flood downstream areas and could cause loss of life and property. Both unincorporated and incorporated areas of the County are identified on dam failure inundation maps prepared for the County. The inundation areas for each dam are generally downstream and include large rural and populated areas below the dams.

Past Occurrences

Disaster Declaration History

There have been no disasters declarations related to dam failure in El Dorado County.

NCDC Events

There have been no NCDC dam failure events in El Dorado County.

HMPC Events

According to the HMPC, there have been no dam failure events in El Dorado County.

Likelihood of Future Occurrence

Jurisdictional Dams: Unlikely/Smaller, non-jurisdictional Dams: Occasional—The County remains at risk to dam breaches/failures from numerous dams under a variety of ownership and control and of varying ages and conditions. Given the number and types of dams in the County and the history of past uncontrolled releases to dams, the potential exists for future dam issues in El Dorado County.

Climate Change and Dam Failure

Increases in both precipitation and heat causing snow melt could increase the potential for dam failure and uncontrolled releases in El Dorado County.

3.2.8. Drought and Water Shortage

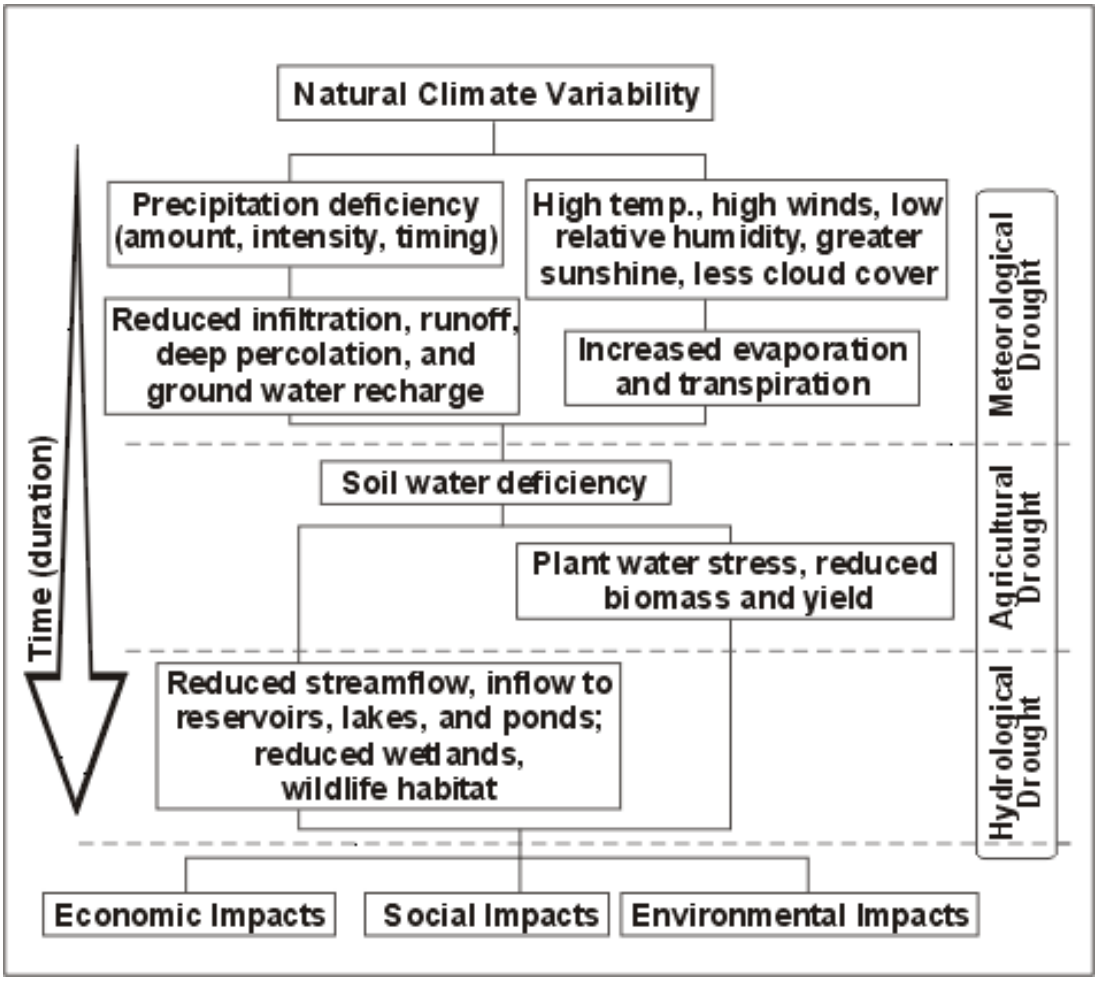
Hazard/Problem Description

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

Drought is a complex issue involving (see figure 3-9) many factors—it occurs when a normal amount of precipitation and snow is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects:

Meteorological drought is usually defined by a period of below average water supply.
Agricultural drought occurs when there is an inadequate water supply to meet the needs of the state's crops and other agricultural operations such as livestock.
Hydrological drought is defined as deficiencies in surface and subsurface water supplies. It is generally measured as streamflow, snowpack, and as lake, reservoir, and groundwater levels.
Socioeconomic drought occurs when a drought impacts health, well-being, and quality of life, or when a drought starts to have an adverse economic impact on a region.

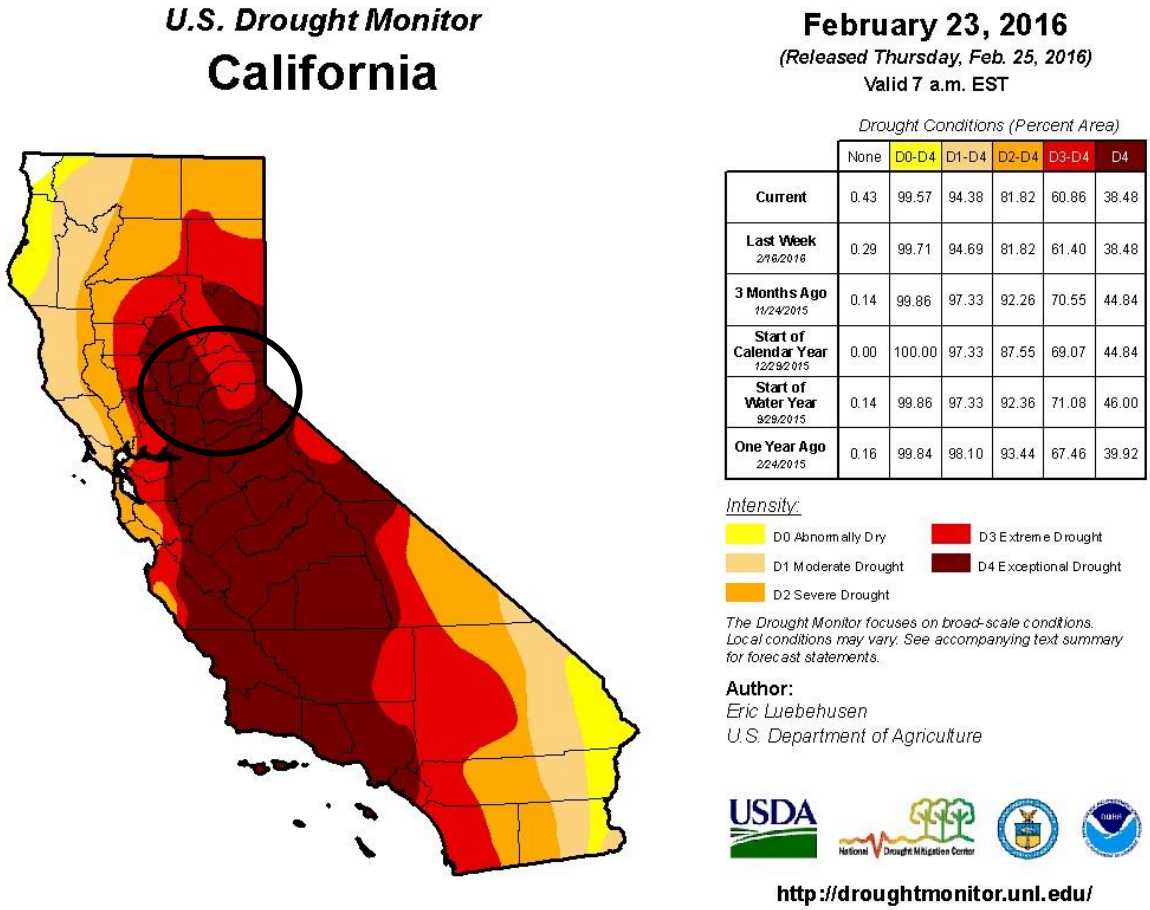
Figure 3-9 Causes and Impact of Drought



Source: National Drought Mitigation Center

Drought in the United States is monitored by the National Integrated Drought Information System (NIDIS). A major component of this portal is the U.S. Drought Monitor. The Drought Monitor concept was developed jointly by the NOAA's Climate Prediction Center, the NDMC, and the USDA's Joint Agricultural Weather Facility in the late 1990s as a process that synthesizes multiple indices, outlooks and local impacts, into an assessment that best represents current drought conditions. The final outcome of each Drought Monitor is a consensus of federal, state, and academic scientists who are intimately familiar with the conditions in their respective regions. A snapshot of the drought conditions in California El Dorado County can be found in Figure 3-10.

Figure 3-10 2016 Drought Status of El Dorado County



Source: US Drought Monitor

The California Department of Water Resources (DWR) says the following about drought:

> One dry year does not normally constitute a drought in California. California's extensive system of water supply infrastructure—its reservoirs, groundwater basins, and inter-regional conveyance facilities—mitigates the effect of short-term dry periods for most water users. Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions.

The drought issue in California is further compounded by water rights. Water is a commodity possessed under a variety of legal doctrines. The prioritization of water rights between farming and federally protected fish habitats in California contributes to this issue

Drought is not initially recognized as a problem because it normally originates in what is considered good weather, which typically includes a dry late spring and summer in Mediterranean climates, such as in California. This is particularly true in Northern California where drought impacts are delayed for most of the population by the wealth of stored surface and ground water. The drought complications normally appear more than a year after a drought begins. In most areas of California, ranchers that rely on rainfall to support forage for their livestock are the earliest and most affected by drought. Even below normal water years could affect ranchers depending on the timing and duration of precipitation events. It is difficult to quantitatively assess drought impacts to El Dorado County because not many county-specific studies have been conducted. Some factors to consider include the impacts of fallowed agricultural land, habitat loss and associated effects on wildlife, and the drawdown of the groundwater table. The most direct and likely most difficult drought impact to quantify is to local economies, especially agricultural economies. The State has conducted some empirical studies on the economic effects of fallowed lands with regard to water purchased by the State's Water Bank; but these studies do not quantitatively address the situation in El Dorado County. It can be assumed, however, that the loss of production in one sector of the economy would affect other sectors.

The drawdown of the groundwater table is one factor that has been recognized to occur during repeated dry years. Lowering of groundwater levels results in the need to deepen wells, which subsequently lead to increased pumping costs. These costs are a major consideration for residents relying on domestic wells and agricultural producers that irrigate with groundwater and/or use it for frost protection. Some communities in higher elevations with shallow bedrock do not have a significant source of groundwater.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought in El Dorado County are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Also, during a drought, allocations go down and water costs increase, which results in reduced water availability. Voluntary conservation measures are a normal and ongoing part of system operations and actively implemented during extended droughts. A

reduction of electric power generation and water quality deterioration are also potential problems. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding and erosion.

Water Shortage

Northern Sacramento Valley counties, including El Dorado County, generally have sufficient groundwater and surface water supplies to mitigate even the severest droughts of the past century. Many other areas of the State, however, also place demands on these water resources during severe drought. For example, Northern California agencies, including those from El Dorado County, were major participants in the Governor's Drought Water Bank of 1991, 1992 and 1994. Climate change, decreased groundwater supplies and decreased precipitation make El Dorado County vulnerable to drought and drought conditions on an annual basis. El Dorado County routinely monitors drought and precipitation conditions, including snow pack and groundwater supply using information provided by the Department of Water Resources, NOAA and NWS.

Past Occurrences

Disaster Declaration History

There has been several state disasters related to drought and water shortage in El Dorado County issued between 2012 – 2016. The community of Outingdale was largely impacted drought during this time.

NCDC Events

There were been 27 NCDC drought events in El Dorado County between 2012 – 2018, but no damages, injuries, or losses were reported in the NCDC database.

HMPC Events

Historically, California has experienced multiple severe droughts. According to the DWR, droughts exceeding three years are relatively rare in Northern California, the source of much of the State's developed water supply. The 1929-34 drought established the criteria commonly used in designing storage capacity and yield of large northern California reservoirs. Table 3-14 compares the 1929-34 drought in the Sacramento and San Joaquin Valleys to the 1976-77, 1987-92, and 2007-09 droughts. Figure 3-11 depicts California's Multi-Year Historical Dry Periods, 1850-2000.

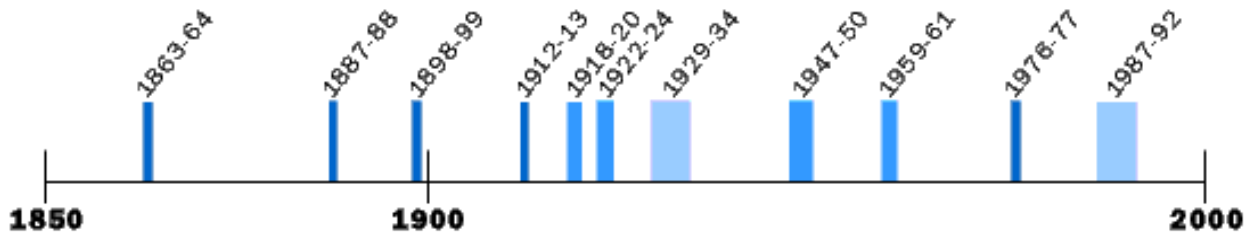
Table 3-14 Severity of Extreme Droughts in the Sacramento and San Joaquin Valleys

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

Source: California's Drought of 2007-2009, An Overview. State of California Natural Resources Agency, California Department of Water Resources. Available at: http://www.water.ca.gov/drought/docs/DroughtReport2010.pdf

*maf=million acre feet

Figure 3-11 California's Multi-Year Historical Dry Periods, 1850-2000



Source: California Department of Water Resources, www.water.ca.gov/

Notes: Dry periods prior to 1900 estimated from limited data; covers dry periods of statewide or major regional extent.

The HMPC identified the following droughts as having significant impacts on El Dorado County:

- 1977 – A federal disaster declaration was declared as a result of a drought affecting El Dorado County and other surrounding counties. The restrictions included a 50 percent reduction in water usage by customers and rate increases. This shortage lasted until January 1978 when the board terminated the water shortage restrictions.
- 1988 – The next water shortage occurred in 1988. Again El Dorado County passed a resolution declaring a water emergency. All customers had their water use reduced by 25 percent and rates were again increased for excessive usage. The countywide emergency prohibited washing of sidewalks, driveways, parking lots and other hard surfaces, restricted

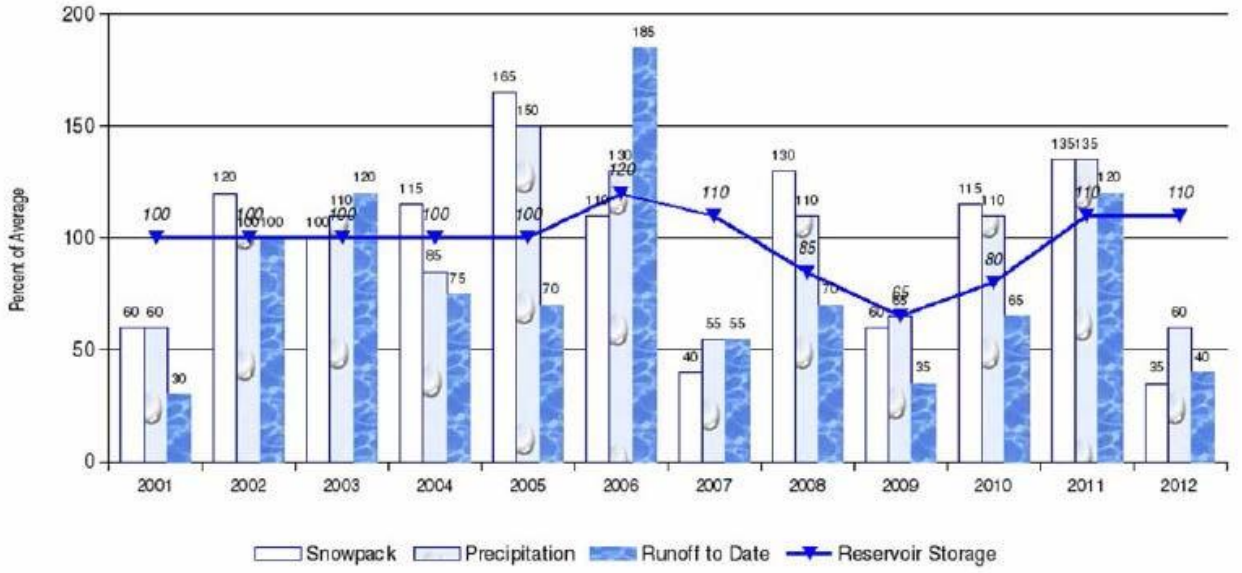
the washing of vehicles, airplanes, and trailers to 3 gallons of water, prohibited fire hydrant flushing and drills, prohibited filling of pools, and prohibited new agricultural land irrigation.

- 1991 – The most recent drought emergency declared by El Dorado County was in February 1991. Raw water customers had their water usage reduced by 50 percent annually and by 25 percent seasonally. Treated water users were given most of the same restrictions and prohibitions as in 1988. Due to a very late storm season, the emergency was lifted by April 1991.
- 2008 – The Governor of California declared a drought on June 4, 2008. As of July 2009, EID and STUPD report that they are implementing normal ongoing conservation measures. As a result of these drought conditions, it is anticipated that Lake Tahoe's water level will drop to near its natural rim. The last time it dropped below its natural rim was in 2004.
- 2014 – On January 17, 2014 the governor declared a State of Emergency for drought throughout California. This declaration came on the heels of a report that stated that California had the least amount of rainfall in its 163 year history. Californians were asked to voluntarily reduce their water consumption by 20 percent. Drought conditions worsened through 2014 and into 2015. On April 1, 2015, following the lowest snowpack ever recorded, Governor Brown announced actions that will save water, increase enforcement to prevent wasteful water use, streamline the State's drought response, and invest in new technologies that will make California more drought resilient. The governor directed the State Water Resources Control Board to implement mandatory water reductions in cities and towns across California to reduce water usage by 25 percent. This savings amounts to approximately 1.5 million acre-feet of water through the end of 2015.

Water Shortage

Figure 3-12 illustrates several indicators commonly used to evaluate water conditions in California. The percent of average values are determined by measurements made in each of the ten major hydrologic regions. The chart describes water conditions in California between 2001 and 2012. The chart illustrates the cyclical nature of weather patterns in California. Snow pack and precipitation increased between 2005 and 2006, began decreasing in late 2006, and began to show signs of recovery in 2009.

Figure 3-12 Water Supply Conditions, 2001 to 2012



Source: 2013 State of California Hazard Mitigation Plan

Since 2012, snowpack levels in California have dropped dramatically. 2015 estimates place snowpack as 5 percent of normal levels. Snowpack measurements have been kept in California since 1950 and nothing in the historic record comes close to 2015's severely depleted level. The previous record for the lowest snowpack level in California, 25 percent of normal, was set both in 1976-77 and 2013-2014. In "normal" years, the snowpack supplies about 30 percent of California's water needs, according to the California Department of Water Resources.

With a reduction in water, water supply issues based on water rights becomes more evident. Some agricultural uses, such as grapes and walnuts, are severely impacted through limited water supply. Drought and water supply issues will continue to be a concern to El Dorado County. Irrigation of agricultural lands continues to be a concern in El Dorado County.

Likelihood of Future Occurrence

Drought

Likely—Historical drought data for El Dorado County and region indicate there have been 5 significant droughts in the last several decades. However, based on this data and given the multi-year length of droughts, the HMPC determined that future drought occurrence in El Dorado County is likely.

Water Shortage

Occasional — Recent historical data for water shortage indicates that El Dorado County may at some time be at risk to both short and prolonged periods of water shortage. Based on this it is possible that water shortages will affect the County in the future should extreme drought conditions continue.

Climate Change and Drought and Water Shortage

Climate scientists studying California find that drought conditions are likely to become more frequent and persistent over the 21st century due to climate change. The experiences of California during recent years underscore the need to examine more closely the state's water storage, distribution, management, conservation, and use policies. The Climate Adaptation Strategy (CAS) stresses the need for public policy development addressing long term climate change impacts on water supplies.

3.2.9. Earthquake

Hazard/Problem Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake's magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales. One of the first was the Richter Scale, developed in 1932 by the late Dr. Charles F. Richter of the California Institute of Technology. The Richter Magnitude Scale is used to quantify the magnitude or strength of the seismic energy released by an earthquake. Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface (see Table 3-15). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Table 3-15 Richter Scale

Richter Scale of Earthquake Energy:

Each level is 10 time stronger than the previous level

	Description	Occurrence	In Population	Movement
1	Small	Daily	Every minute	Small
2	Small	Daily	Every hour	Small
3	Small	Daily	Every day	Small
4	Small	Daily	Every week	Moderate sudden
5	Moderate	Monthly	Every 10 years	Strong Sudden
6	Moderate	Monthly	Every 30 years	Strong Sudden
7	Major	Monthly	Every 50 years	Severe Sudden
8	Great	Yearly	Every 100 years	Very Severe
9	Great	Yearly	Every 300 years	Very Severe
10	Super	Rarely	Every 1.000 years	Extreme

Source: sms-tsunami-warning.com, 2017

California is seismically active because it sits on the boundary between two of the earth's tectonic plates. Most of the state - everything east of the San Andreas Fault - is on the North American Plate. The cities of Monterey, Santa Barbara, Los Angeles, and San Diego are on the Pacific Plate, which is constantly moving northwest past the North American Plate. The relative rate of movement is about two inches per year. The San Andreas Fault is considered the boundary between the two plates, although some of the motion is taken up on faults as far away as central Utah.

Faults

A fault is defined as "a fracture or fracture zone in the earth's crust along which there has been displacement of the sides relative to one another." For the purpose of planning there are two types of faults, active and inactive. Active faults have experienced displacement in historic time, suggesting that future displacement may be expected. Inactive faults show no evidence of movement in recent geologic time, suggesting that these faults are dormant. This does not mean, however, that faults having no evidence of surface displacement within the last 11,000 years are necessarily inactive. For example, the 1975 Oroville earthquake, the 1983 Coalinga earthquake, and the 1987 Whittier Narrows earthquake occurred on faults not previously recognized as active. Potentially active faults are those that have shown displacement within the last 1.6 million years (Quaternary). An inactive fault shows no evidence of movement in historic (last 200 years) or geologic time, suggesting that these faults are dormant.

Two types of fault movement represent possible hazards to structures in the immediate vicinity of the fault: fault creep and sudden fault displacement. Fault creep, a slow movement of one side of a fault relative to the other, can cause cracking and buckling of sidewalks and foundations even without perceptible ground shaking. Sudden fault displacement occurs during an earthquake event and may result in the collapse of buildings or other structures that are found along the fault zone when fault displacement exceeds an inch or two. The only protection against damage caused directly by fault displacement is to prohibit construction in the fault zone.

El Dorado County lies between two seismically active regions in the western United States. Tectonic stresses associated with the North American-Pacific Plate boundary can generate damaging earthquakes along faults 30 to 100 miles to the west of the County. Eastern El Dorado County borders the Basin and Range province that entails most of Nevada and western Utah. This area is riddled with active faults that are responsible for and form the boundary between each basin or valley and the neighboring mountain range.

El Dorado County itself is traversed by a series of northwest-trending faults, called the Foothill Fault Zone, that are related to the Sierra Nevada uplift. This was the source of Oroville's 1975 earthquake (and an earlier event in the 1940s). Subsequent research of these events led to the identification and naming of the zone and questions about the siting and design of the proposed Auburn Dam. Earthquakes on nearby fault segments in the zone could be the source of ground shaking in El Dorado County.

The closest recently active fault in the western Sierra Nevada foothills is the Cleveland Hills fault, which is situated approximately 36 miles northwest of Auburn. Another potential earthquake source is the Midland Fault Zone on the western side of the Sacramento Valley. This was the source of the 1892 Vacaville-Winters earthquake.

Additionally, western El Dorado County may experience ground shaking from distant major to great earthquakes on faults to the west and east. For example, to the west, both the San Andreas Fault (source of the 8.0 estimated Richter magnitude San Francisco earthquake that caused damage in Sacramento in 1906, including the State Capitol, the full extent of which was not discovered until the mid-1970s) and the closer Hayward fault have the potential for experiencing major to great events. The US Geological Survey recently (February 2004) estimated that there is a 62 percent probability of at least one 6.7 or greater magnitude earthquake occurring that could cause widespread damage in the greater San Francisco Bay area before 2032.

Earthquake Hazards

Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, seiches, hazmat incidents, fires, avalanches, and landslides. The degree of damage depends on many interrelated factors. Among these are: the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction. This section briefly discusses issues related to types of seismic hazards.

Ground Shaking

Groundshaking is motion that occurs as a result of energy released during faulting. The damage or

collapse of buildings and other structures caused by groundshaking is among the most serious seismic hazards. Damage to structures from this vibration, or groundshaking, is caused by the transmission of earthquake vibrations from the ground to the structure. The intensity of shaking and its potential impact on buildings is determined by the physical characteristics of the underlying soil and rock, building materials and workmanship, earthquake magnitude and location of epicenter, and the character and duration of ground motion. Much of the County is located on alluvium which increases the amplitude of the earthquake wave. Ground motion lasts longer and waves are amplified on loose, water-saturated materials than on solid rock. As a result, structures located on alluvium typically suffer greater damage than those located on solid rock.

Seismic Structural Safety

Older buildings constructed before building codes were established, and even newer buildings constructed before earthquake-resistance provisions were included in the codes, are the most likely to be damaged during an earthquake. Buildings one or two stories high of wood-frame construction are considered to be the most structurally resistant to earthquake damage. Older masonry buildings without seismic reinforcement (unreinforced masonry) are the most susceptible to the type of structural failure that causes injury or death.

The susceptibility of a structure to damage from ground shaking is also related to the underlying foundation material. A foundation of rock or very firm material can intensify short-period motions which affect low- rise buildings more than tall, flexible ones. A deep layer of water-logged soft alluvium can cushion low- rise buildings, but it can also accentuate the motion in tall buildings. The amplified motion resulting from softer alluvial soils can also severely damage older masonry buildings.

Other potentially dangerous conditions include, but are not limited to: building architectural features that are not firmly anchored, such as parapets and cornices; roadways, including column and pile bents and abutments for bridges and overcrossings; and above-ground storage tanks and their mounting devices. Such features could be damaged or destroyed during strong or sustained ground shaking.

Liquefaction Potential

Liquefaction is a process whereby soil is temporarily transformed to a fluid form during intense and prolonged ground shaking. Areas most prone to liquefaction are those that are water saturated

(e.g., where the water table is less than 30 feet below the surface) and consist of relatively uniform sands that are loose to medium density. In addition to necessary soil conditions, the ground acceleration and duration of the earthquake must be of sufficient energy to induce liquefaction. Liquefaction during major earthquakes has caused severe damage to structures on level ground as a result of settling, titling, or floating. Such damage occurred in San Francisco on bay-filled areas during the 1989 Loma Prieta earthquake, even though the epicenter was several miles away. If liquefaction occurs in or under a sloping soil mass, the entire mass may flow toward a lower elevation. Also of particular concern in terms of developed and newly developing areas are fill areas that have been poorly compacted.

Settlement

Settlement can occur in poorly consolidated soils during ground shaking. During settlement, the soil materials are physically rearranged by the shaking to result in a less stable alignment of the individual minerals. Settlement of sufficient magnitude to cause significant structural damage is normally associated with rapidly deposited alluvial soils or improperly founded or poorly compacted fill. These areas are known to undergo extensive settling with the addition of irrigation water, but evidence due to ground shaking is not available.

Other Hazards

Earthquakes can also cause seiches, landslides, and dam failures. A seiche is a periodic oscillation of a body of water resulting from seismic shaking or other factors that could cause flooding. Earthquakes may cause landslides, particularly during the wet season, in areas of high water or saturated soils. Finally, earthquakes can cause dams to fail.

Past Occurrences

Disaster Declaration History

There have been no disaster declarations in the County.

NCDC Events

Earthquake events are not tracked by the NCDC database.

USGS Events

The USGS National Earthquake Information Center database contains data on earthquakes in El

Dorado County. The USGS database was searched for magnitude 5.0 or greater on the Richter Scale within 90 miles of the City of Placerville in El Dorado County. These results are detailed in Table 3-16.

Table 3-16 Magnitude 5.0 Earthquakes within 90 Miles of El Dorado County*

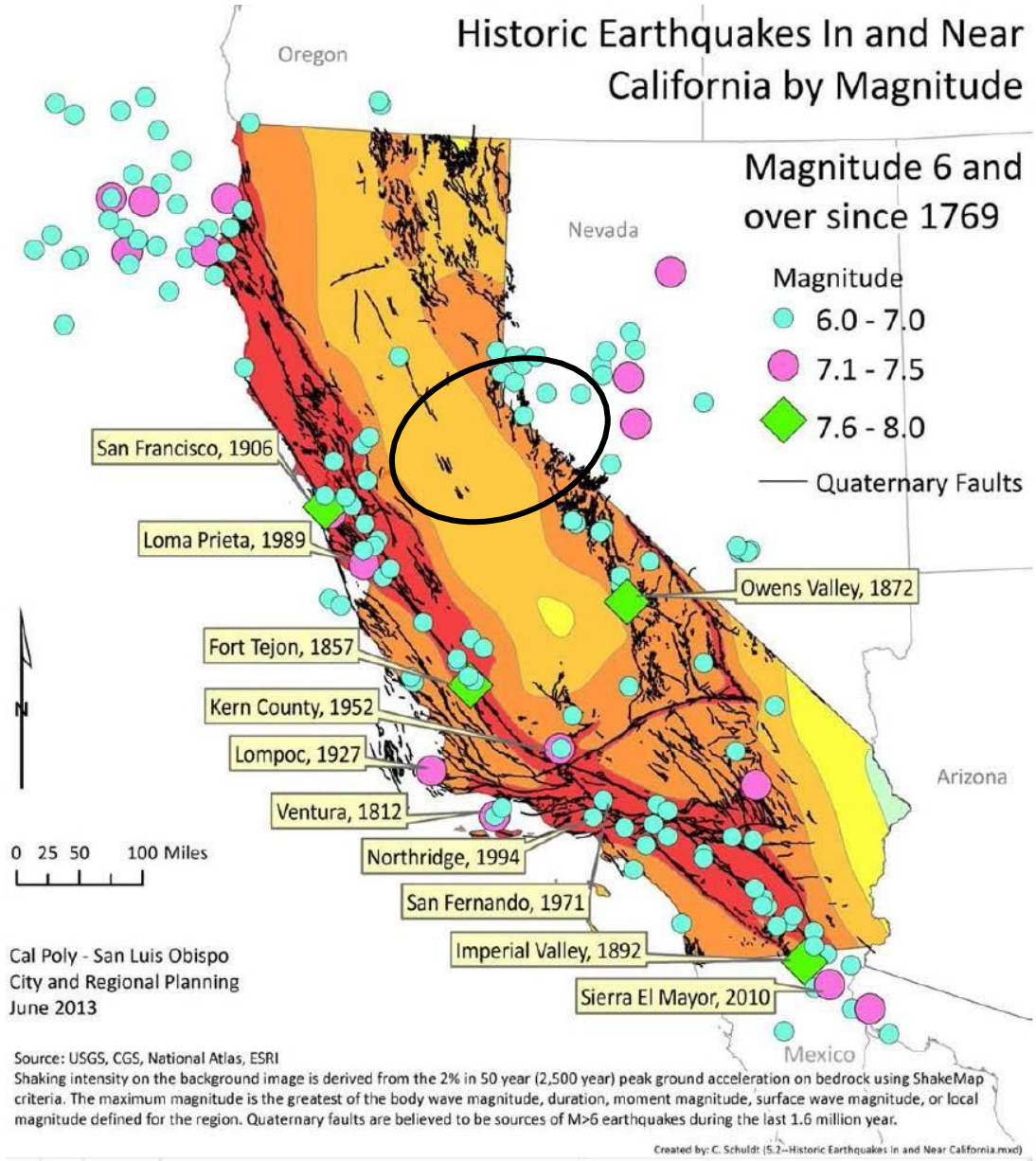
Date	Richter Magnitude	Location
8/24/2014	6.0	6km NW of American Canyon, California
5/24/2013	5.7	10km WNW of Greenville, California
4/26/2008	5	Nevada
8/10/2001	5.2	Northern California
9/3/2000	5	Northern California

Source: USGS

*Search dates 2000-2016

Figure 3-13 shows major historical earthquakes in California from 1769 to 2010.

Figure 3-13 Historic Earthquakes in California and El Dorado County



MMI	Damage	Effects
X	Very Heavy	Some well-built, wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
IX	Heavy	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
VIII	Moderate to Heavy	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
VII	Moderate	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly-built or badly designed structures; some chimneys broken.
VI	Light	Felt by all, many frightened. Some heavy furniture moved; a few instance of fallen plaster. Damage slight.
V	Very Light	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.

Source: 2013 State of California Multi-Hazard Mitigation Plan

HMPC Events

Historically, major earthquakes have not been an issue for El Dorado County. However, minor earthquakes have occurred in the County in the past. The HMPC has identified several earthquakes that were felt by area residents and/or caused damaging shaking in El Dorado County. Details on some of these events follow.

- 1908 – An estimated 4.0+ Richter magnitude earthquake occurred between Auburn and Folsom with an epicenter possibly associated with the Bear Mountain fault.
- 1975 – The Cleveland Hills fault was the source of the Oroville earthquake (Richter Magnitude: 5.7), which was felt in El Dorado County and neighboring areas.
- 2003/2004 – Volcanic magma (molten rock) migrating about 20 miles below the surface of the Sierra Nevada mountains caused a swarm of about 1,600 small earthquakes in late 2003 and early 2004. The 20 mile depth is about twice as deep as earthquakes caused by normal faulting in the region measured during the last 30 years. El Dorado County did not report any damages associated with these small earthquakes.
- 2008, 2013, 2014 – There were earthquakes in the El Dorado County vicinity in these years. No significant issues were reported in the County. Groundshaking was the primary concern.

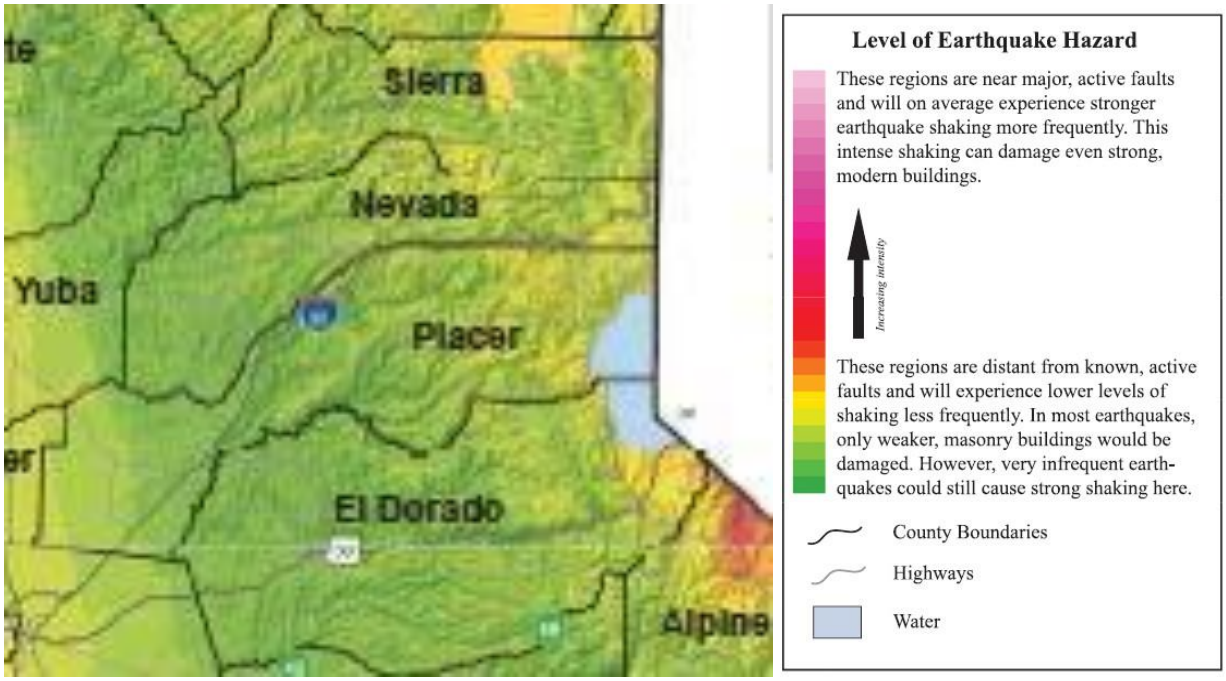
Likelihood of Future Occurrence

Occasional—No major earthquakes have been recorded within the county; although the county has felt ground shaking from earthquakes with epicenters located elsewhere. Based on historical data and the location of El Dorado County relative to active and potentially active faults, the County will experience a significantly damaging earthquake occasionally.

Mapping of Future Occurrences

Maps indicating the maximum expectable intensity of groundshaking for the County are available through several sources. Figure 3-14, prepared by the California Division of Mines and Geology, shows the expected relative intensity of ground shaking and damage in California from anticipated future earthquakes. The shaking potential is calculated as the level of ground motion that has a 2% chance of being exceeded in 50 years, which is the same as the level of ground-shaking with about a 2,500 year average repeat time. Although the greatest hazard is in areas of highest intensity as shown on the map, no region is immune from potential earthquake damage.

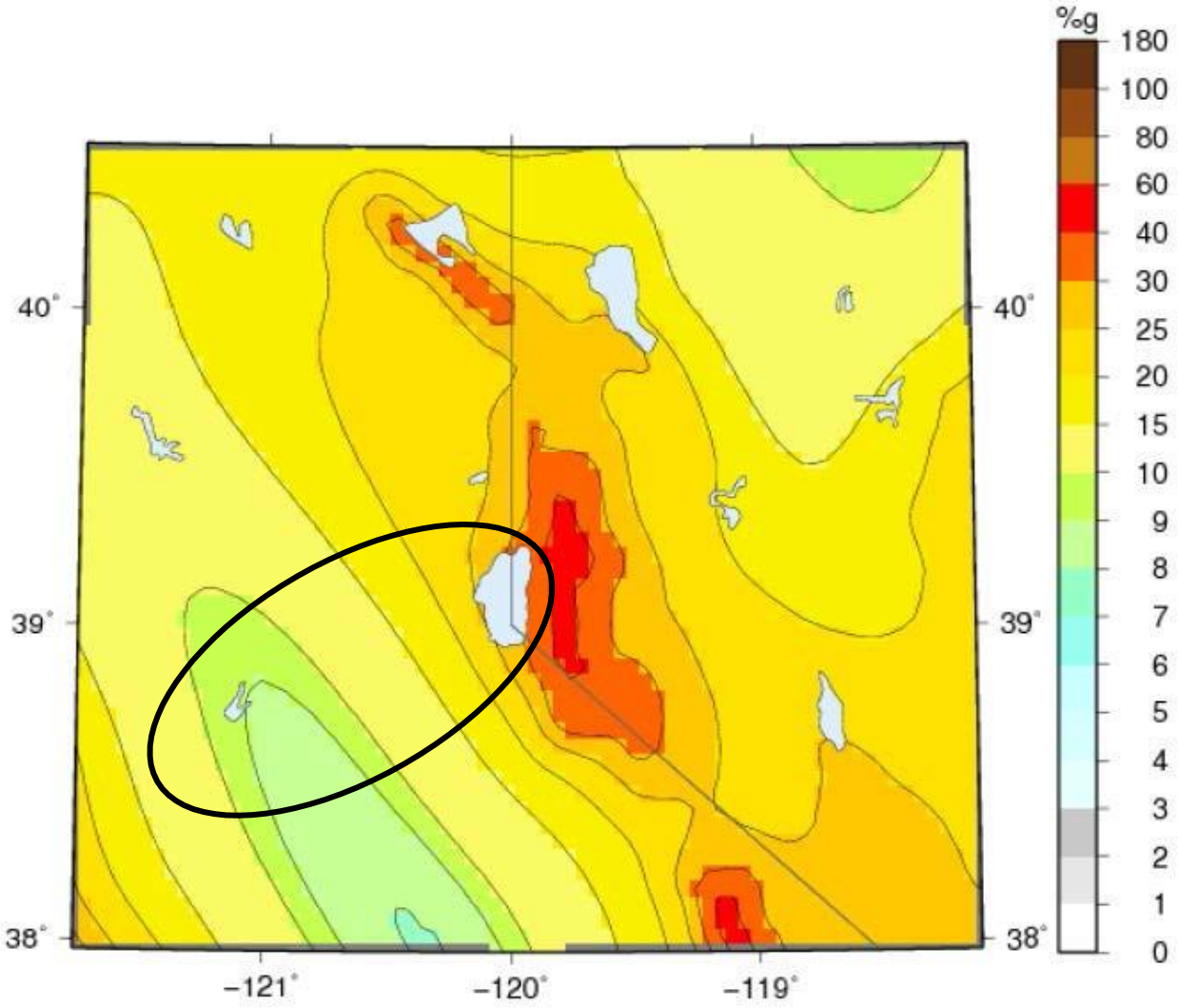
Figure 3-14 Maximum Expectable Earthquake Intensity



Source: California Division of Mines and Geology

The U.S. Geological Survey (USGS) issues National Seismic Hazard Maps as reports every few years. These maps provide various acceleration and probabilities for time periods. Figure 3-15 depicts the peak horizontal acceleration (%g) with 10% probability of exceedance in 50 years (a 500-year event) for the planning region. The figure demonstrates that the County falls in the 9%g (light green) in the west, 20%g (darker yellow) in the central, and in the 30%g area (tan) in the extreme eastern portion of the County. This data indicates that the expected severity of earthquakes in the region is somewhat limited, as damage from earthquakes typically occurs at peak accelerations of 30%g or greater.

Figure 3-15 Peak Horizontal Acceleration with 10% Probability of Occurrence in 50 Years



Source: USGS National Seismic Hazard Maps

Climate Change and Earthquake

Climate changes is unknown to increase earthquake frequency or strength.

3.2.10. Erosion

Hazard/Problem Description

Any flowing body of water (brook, creek, stream, river) is a stream. Stream flow is expressed as volume per unit time, usually cubic meters per second, cubic feet per second, sometimes cubic kilometers per second, or acre-feet per second or day. Stream flow varies tremendously with time. Short term controls include rainfall, snowmelt, and evaporation conditions. Long term controls include land use, soil, groundwater state, and rock type.

Streams erode by a combination of direct stream processes, like down cutting and lateral erosion, and indirect processes, like mass-wasting accompanied by transportation. When the channel bends, water on the outside of the bend (the cut-bank) flows faster and water on the inside of the bend (the point) flows slower. This distribution of velocity results in erosion occurring on the outside of the bend (cut) and deposition occurring on the inside of the bend.

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. Stream bank erosion processes, although complex, are driven by two major components: stream bank characteristics (erodibility) and hydraulic/gravitational forces. Many land use activities can affect both of these components and lead to accelerated bank erosion. The vegetation rooting characteristics can protect banks from fluvial entrainment and collapse, and also provide internal bank strength. When riparian vegetation is changed from woody species to annual grasses and/or forbs, the internal strength is weakened, causing acceleration of mass wasting processes. Stream bank aggradation or degradation is often a response to stream channel instability. Since bank erosion is often a symptom of a larger, more complex problem, the long-term solutions often involve much more than just bank stabilization. Numerous studies have demonstrated that stream bank erosion contributes a large portion of the annual sediment yield.

Erosion in El Dorado County

As farmers settled the valleys, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more “efficient” methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. Hydraulic gold mining in the northern Sierra Nevada foothills produced 1.1 billion cubic meters of sediment. As a result, the enormous amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. These low-lying, unconsolidated deposits reside below all dams and

reservoirs and are largely between modern levees. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment.

Swiftly moving floodwaters cause rapid local erosion as the water carries away earth materials. This is especially problematic in leveed areas. Severe erosion removes the earth from beneath bridges, roads and foundations of structures adjacent to streams. By undercutting it can lead to increased rockfall and landslide hazard. The deposition of material can block culverts, aggravate flooding, destroy crops and lawns by burying them, and reduce the capacity of water reservoirs as the deposited materials displace water. Erosion increases the sediment that a stream must carry, results in the loss of fertile bottomland and causes a decline in the quality of habitat on land and in the stream. High velocity flows can erode material from the streambank. Erosion can occur at once or over time as a function of the storm cycle and the scale of the peak storms.

Erosion in El Dorado County

The American and Consumes Rivers flow through El Dorado County. Parts of Highway 50 (near Bridal Veil Falls) and County roads (Happy Valley) have eroded due to high velocity flows from storms.

Disaster Declaration History

There have been no disasters declarations in El Dorado County specifically for erosion activity. Erosion issues in El Dorado County have been a result of other hazards.

NCDC Events

The NCDC does not track erosion events.

HMPC Events

Members of the HMPC noted erosion problems along Highway 50 near Bridal Veil Falls, Happy Valley in the Mt. Aukum area and Ft. Jim Road in the Placerville area.

Likelihood of Future Occurrence

Occasional – Due to the number of linear feet of stream banks and drainages, the likelihood of future occurrences of erosion in El Dorado County is somewhat likely. Climate Change may affect flooding and erosion in El Dorado County. While average annual rainfall may increase or decrease

slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is possible that average soil moisture and runoff could decline, however, due to increasing temperature, evapotranspiration rates, and spacing between rainfall events.

3.2.11. Flood: 100/500 year

Hazard/Problem Description

Flooding is the rising and overflowing of a body of water onto normally dry land. History clearly highlights floods as one of the most frequent natural hazards impacting El Dorado County. Floods are among the most costly natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. A car will float in less than two feet of moving water and can be swept downstream into deeper waters. This is one reason floods kill more people trapped in vehicles than anywhere else. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs.

Floodwaters can transport large objects downstream which can damage or remove stationary structures, such as dam spillways. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to crops, roads, foundations, and electrical circuits. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts from any type of flooding.

Health Hazards from Flooding

Certain health hazards are also common to flood events. While such problems are often not reported, three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where cattle and hogs are kept or their wastes are stored can contribute polluted waters to the receiving streams.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e. coli and other disease causing agents.

The second type of health problem arises after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health hazard, especially for small children and the elderly.

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If a city or county water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

The third problem is the long-term psychological impact of having been through a flood and seeing one's home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

Warning and Evacuation Procedures

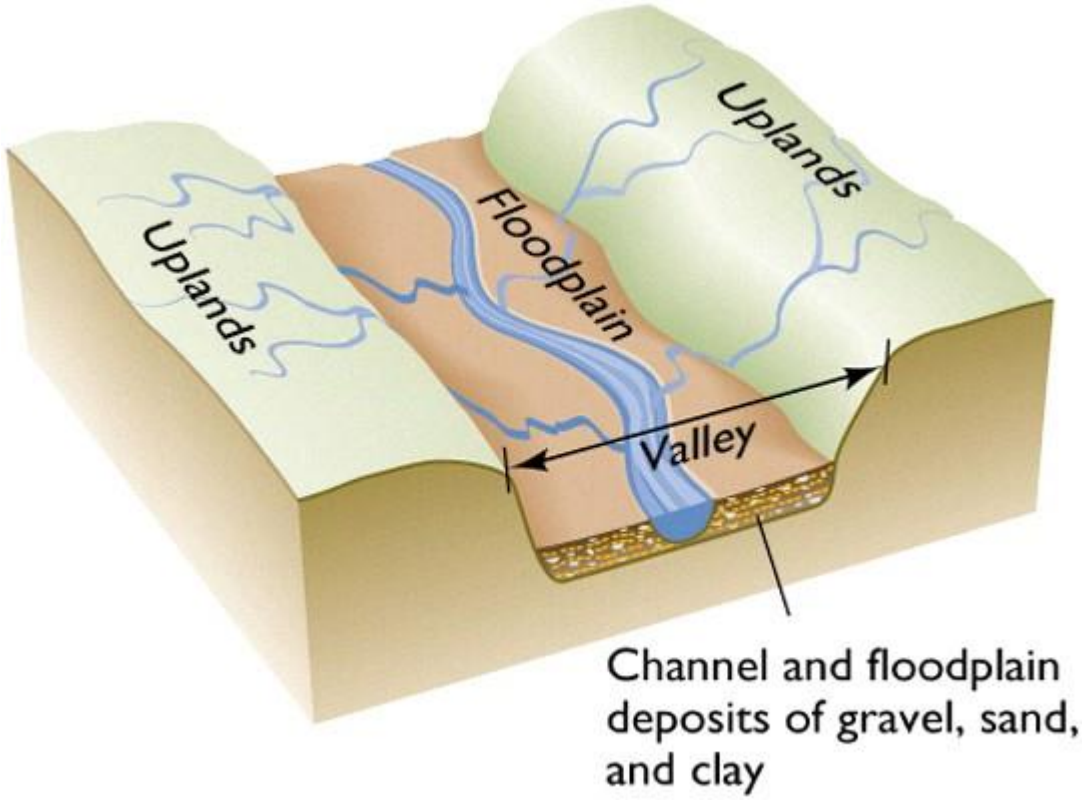
El Dorado County and its incorporated communities have a variety of systems and procedures established to protect its residents and visitors to plan for, avoid, and respond to a hazard event including those associated with floods and wildfires. This includes Pre-Disaster Public Awareness and Education information which is major component in successfully reducing loss of life and property in a community when faced with a potentially catastrophic incident. Much of this information is not specific to a given hazard event and is always accessible to the public on local County and City websites. Specific warning and evacuation systems and procedures include information relative to: Warning Systems, Code Red alert system, dam protocols, evacuation recommendations, and sheltering in place. Additional information on these warning and evacuation recommendations as well as post-disaster mitigation policies and procedures can be found in Section 3.4, Capabilities, of this Risk Assessment.

Floodplains

The area adjacent to a channel is the floodplain (see Figure 3-16). Floodplains are illustrated on inundation maps, which show areas of potential flooding and water depths. In its common usage,

the floodplain most often refers to that area that is inundated by the 100-year flood, the flood that has a one percent chance in any given year of being equaled or exceeded. The 100-year flood is the national minimum standard to which communities regulate their floodplains through the National Flood Insurance Program. The 500-year flood is the flood that has a 0.2 percent chance of being equaled or exceeded in any given year. The potential for flooding can change and increase through various land use changes and changes to land surface, which result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

Figure 3-16 Floodplain Schematic



Source: FEMA

El Dorado County is susceptible to various types of flood events as described below.

- Riverine flooding – Riverine flooding, defined as when a watercourse exceeds its "bank-full" capacity, generally occurs as a result of prolonged rainfall, or rainfall that is combined with already saturated soils from previous rain events. This type of flood occurs in river systems whose tributaries may drain large geographic areas and include one or more independent river basins. The onset and duration of riverine floods may vary from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation amount, intensity and distribution, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization. In El Dorado County, riverine flooding is largely caused by heavy and continued rains, often combined with snowmelt, increased outflows from upstream dams, and heavy flow from tributary streams. These intense storms can overwhelm the local waterways as well as the integrity of flood control structures. The warning time associated with slow rise floods assists in life and property protection.
- Flash flooding – Flash flooding describes localized floods of great volume and short duration. This type of flood usually results from a heavy rainfall on a relatively small drainage area. Precipitation of this sort usually occurs in the winter and spring. Flash floods often require immediate evacuation within the hour and thus early threat identification and warning is critical for saving lives.
- Localized/Stormwater flooding – Localized flooding problems are often caused by flash flooding, severe weather, or an unusual amount of rainfall. Flooding from these intense weather events usually occurs in areas experiencing an increase in runoff from impervious surfaces associated with development and urbanization as well as inadequate storm drainage systems.
- Dam failure flooding – Flooding from failure of one or more upstream dams is also a concern to El Dorado County. A catastrophic dam failure could easily overwhelm local response capabilities and require mass evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result, and there could be associated health concerns as well as problems with the identification and burial of the deceased. Dam failure is further addressed in Section 3.2.7 Dam Failure.

El Dorado County encompasses multiple rivers, streams, creeks, and associated watersheds. The County is situated in a region that dramatically drops in elevation from the eastern portion (Sierra Nevada) to the western portion, where excess rain on snow can contribute to downstream flooding. Flood flows generally follow defined stream channels, drainages, and watersheds. Because flows within many of the creeks and rivers within El Dorado County can vary substantially from one another, the estimate for the average depth of the 100-year floodplain also varies and ranges anywhere from 1 foot to as high as 15 to 20 feet depending on numerous criteria.

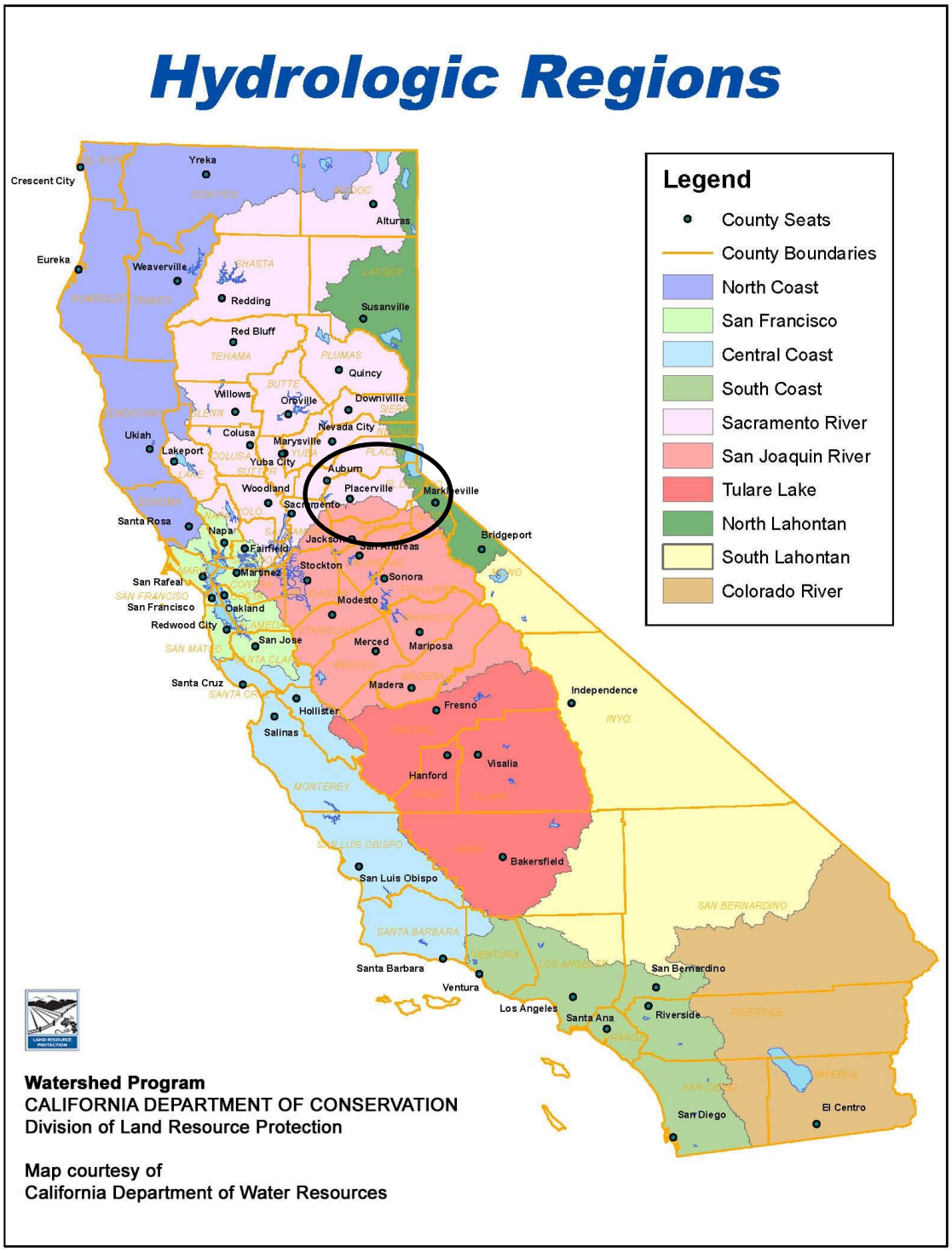
Various flood protection measures are either in place or planned to protect El Dorado County from future flood events. Existing flood protection measures include a comprehensive system of dams, levees, overflow weirs, pumping plants, channel improvements, floodway bypasses, detention and retention structures, and other improvements.

Major Sources of Flooding

California has 10 hydrologic regions. El Dorado County sits in the Sacramento hydrologic region. The Sacramento River hydrologic region covers approximately 17.4 million acres (27,200 square miles). The region includes all or large portions of Modoc, Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Butte, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Solano, Lake, and Napa counties. Small areas of Alpine and Amador counties are also within the region. Geographically, the region extends south from the Modoc Plateau and Cascade Range at the Oregon border, to the Sacramento-San Joaquin Delta. The Sacramento Valley, which forms the core of the region, is bounded to the east by the crest of the Sierra Nevada and southern Cascades and to the west by the crest of the Coast Range and Klamath Mountains. The Sacramento metropolitan area and surrounding communities form the major population center of the region. With the exception of Redding, cities and towns to the north, while steadily increasing in size, are more rural than urban in nature, being based in major agricultural areas.

A map of the California's hydrological regions is provided in Figure 3-17.

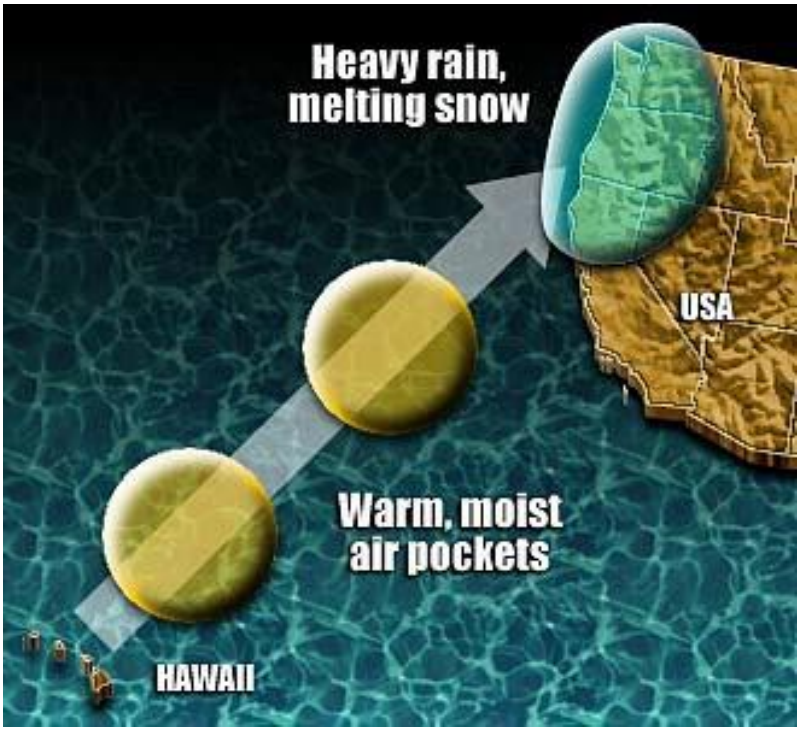
Figure 3-17 California Hydrologic Regions



Source: California Department of Water Resources

A weather pattern called the “Pineapple Express” contributes to the flooding potential of the area. A pineapple express brings warm air and rain to West. A relatively common weather pattern brings southwest winds to the Pacific Northwest or California, along with warm, moist air. The moisture sometimes produces many days of heavy rain, which can cause extensive flooding. The warm air also can melt the snow pack in the mountains, which further aggravates the flooding potential. In the colder parts of the year, the warm air can be cooled enough to produce heavy, upslope snow as it rises into the higher elevations of the Sierra Nevada or Cascades. Forecasters and others on the West Coast often refer to this warm, moist air as the “Pineapple Express” because it comes from around Hawaii where pineapples are grown. This is shown in Figure 3-18.

Figure 3-18 Pineapple Express Weather Pattern



Source: USA TODAY research by Chad Palmer http://www.usatoday.com/weatherwpinappl.htm

The El Dorado County Waterway System

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

Figure 3-19 El Dorado County Watershed Map

https://www.theamericanriver.com/rivers/american-river-watershed/

El Dorado County Flood Mapping Efforts

As part of the County's ongoing efforts to identify and manage their flood prone areas, El Dorado County relies on a variety of different mapping efforts. What follows is a brief description of FEMA and DWR mapping efforts covering El Dorado County.

Flood Hazard Awareness Maps

Flood Hazard Maps have been created by the El Dorado County Surveyor's Office for the purposes of identifying areas of the county where flood hazards from local creeks are known to exist. The maps delineate the established FEMA 100-year and 500-year floodplains (where established) including a 250 foot setback limit from the 100-year floodplain. The setback limit was selected to assist emergency responders and planners in identifying local flood hazard areas, but is not a regulatory limit. Critical emergency response facilities including police and fire stations are shown as are other facilities which may be useful during a flooding event including hospitals, schools, churches and miscellaneous public facilities. Street crossings potentially impacted by flooding are also highlighted in red and the locations of sand bags for flood fighting purposes are also shown. The County updates these maps periodically as new information becomes available. Figure 4-40 through Figure 4-44 depict the flood hazard maps.

FEMA Floodplain Mapping

FEMA established standards for floodplain mapping studies as part of the National Flood Insurance Program (NFIP). The NFIP makes flood insurance available to property owners in participating communities adopting FEMA-approved local floodplain studies, maps, and regulations. Floodplain studies that may be approved by FEMA include federally funded studies; studies developed by state, city, and regional public agencies; and technical studies generated by private interests as part of property annexation and land development efforts. Such studies may include entire stream reaches or limited stream sections depending on the nature and scope of a study. A general overview of floodplain mapping is provided in the following paragraphs. Details on the NFIP and mapping specific to the County and participating jurisdictions are in Section 4.3 Vulnerability Assessment and in the jurisdictional annexes.

Other Floodplain Maps and Analyses: Department of Water Resources

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

DWR Flood Awareness Maps

The Flood Awareness Maps are designed to identify all pertinent flood hazard areas by 2015 for areas that are not mapped under the FEMA NFIP and to provide the community and residents an additional tool in understanding potential flood hazards.

Past Occurrences

Disaster Declaration History

A search of FEMA and Cal OES disaster declarations turned up multiple events. Recent State disaster declarations occurred in 1995, 1997, 2006, 2008, and 2017. Recent Federal disaster declarations occurred in 1955, 1962, 1963, 1997, 2005, 2006, and 2017. Many disasters in the Severe Weather: Heavy Rains profile in Section 4.2.5 also resulted in flood declarations.

NCDC Events

The NCDC tracks flooding events for the County. Table 3-17 shows events in El Dorado County since 1996. The total property damage and crop damage includes all areas impacted.

Table 3-17 NCDC Flood Events in El Dorado County 1993 to 12/31/2014

Date	Event	Deaths (direct)	Injuries (direct)	Property Damage	Crop Damage	Injuries (indirect)	Deaths (indirect)
1/01/1997	Flash Flood	0	0	$10,000,000	$0	0	0
1/24/1997	Flash Flood	0	0	$5,000,000	$0	0	0
2/02/1998	Flood	0	0	$4,300,000	$7,800,000	0	0
7/18/2002	Flash Flood	0	0	$0	$0	0	0
12/31/2005	Flood	0	0	$1,000,000	$0	0	0
1/01/2006	Flood	0	0	$3,200,000	$0	0	0
12/3/2014	Flood	0	0	$0	$0	0	0
6/05/2015	Flood	0	0	$0	$0	0	0
6/05/2015	Flood	0	0	$0	$0	0	0
1/03/2017	Flood	0	0	$0	$0	0	0
2/08/2017	Flood	0	0	$1,000,000	$0	0	0
2/08/2017	Flood	0	0	$250,000	$0	0	0
2/17/2017	Flood	0	0	$500,000	$0	0	0
3/21/2018	Flood	0	0	$100,000	$0	0	0
3/21/2018	Flood	0	0	$100,000	$0	0	0
3/22/2018	Flood	0	0	$0	$0	0	0
4/06/2018	Flood	0	0	$20,000	$0	0	0
4/06/2018	Flood	0	0	$0	$0	0	0
4/6/2018	Flood	0	0	$0	$0	0	0
TOTAL		**0**	**0**	**$25,470,000**	**$7,800,000**	**0**	**0**

HMPC Events

Historically, portions of El Dorado County have always been at risk to flooding because of its high annual percentage of rainfall, heavy snowfall in the winter, and the number of watercourses that traverse the County. Flooding events have caused severe damage in the all portions of the County. Existing watershed reports confirm that under existing conditions, flooding will continue to occur. Localized stormwater flooding also continues to be a problem throughout El Dorado County.

The HMPC provided additional information on the following historical flood events in the County.

- February 1986 – This flood was classified as an approximate 70-year event. Flooding was significant in in several areas of the county. Nearly all bridges and culverts were overtopped, with 30 sustaining embankment damage.
- January 1997 – A significant amount of rainfall and snowmelt runoff poured out of the Sierra Nevada from December 30, 1996 to January 1997. This was a very warm system and rain was falling at the 9,000 foot elevation.
- December 31, 2005 to January 1, 2006 – A series of warm winter storms brought heavy rain, mudslides, flooding, and high winds to Northern California. Localized flooding was reported across El Dorado County. US Highway 50 between Sacramento and South Lake Tahoe, was closed in both directions for multiple days due to a massive mudslide.
- January and February, 2017– After several years of drought, record rainfall led to localized flooding and infrastructure damage throughout El Dorado County. Several culverts, roads and Highway 50 at Bridal Veil Falls eroded and washed out. States of emergencies were declared for 2017 storms.

Likelihood of Future Occurrence

100-Year Flood

Occasional—The term “100-year flood” is misleading. It is not the flood that will occur once every 100 years. Rather, it is the flood that has a 1- percent chance of being equaled or exceeded in any given year. Thus, the 100-year flood could occur more than once in a relatively short period of time.

500-Year Flood

Unlikely—The 500 year flood is the flood that has a 0.2 percent chance of being equaled or exceeded in any given year.

Localized Flooding

Highly Likely—Based on historical data, localized flooding events occur frequently during periods of heavy rains.

Climate Change and Flood

According to the CAS, climate change may affect flooding in El Dorado County. While average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is possible that average soil moisture and runoff could decline, however, due to increasing temperature, evapotranspiration rates, and spacing between rainfall events.

3.2.12. Debris Flows (Landslide)

Hazard/Problem Description

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

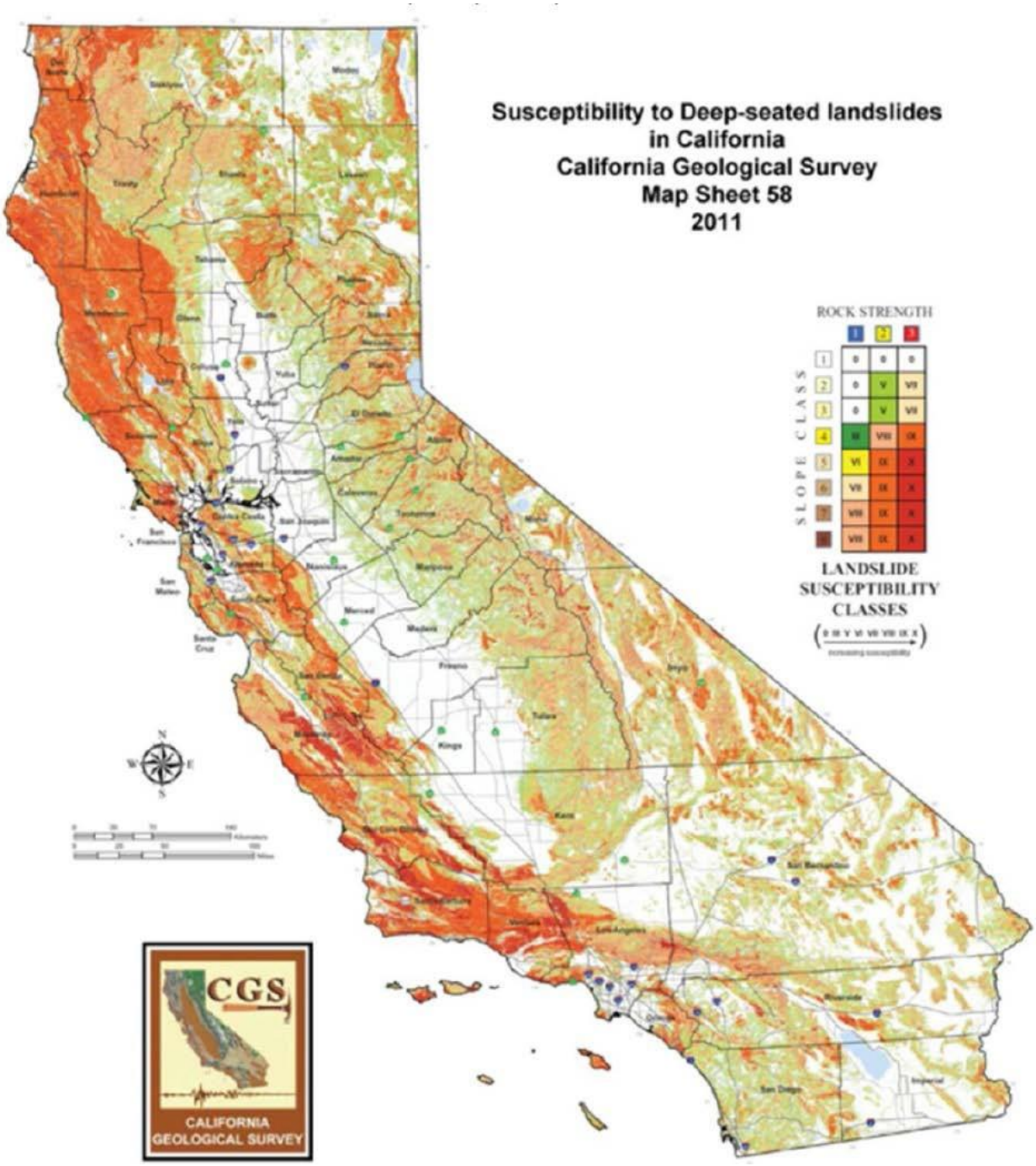
The susceptibility of an area to debris flows depends on many variables including steepness of slope, type of slope material, structure and physical properties of materials, water content, amount of vegetation, and proximity to areas undergoing rapid erosion or changes caused by human activities. These activities include mining, construction, and changes to surface drainage areas.

Debris flows often accompany other natural hazard events, such as floods, wildfires, or earthquakes. Debris flows can occur slowly or very suddenly and can damage and destroy structures, roads, utilities, and forested areas, and can cause injuries and death.

There are areas in El Dorado County that are particularly prone to debris flows. Slope instability and debris flow hazards are generally found in areas of eastern El Dorado County, as seen in active and inactive landslide deposits. Historical and potential debris flow areas identified by the HMPC include Highway 50 east of Pollock Pines and State Route 49 north of Cool.

Figure 3-20 was developed for the 2013 State of California Multi-Hazard Mitigation Plan. It indicates that most areas throughout El Dorado County are at low to moderate risk for landslides and an area in the eastern portion of the County is at high risk for landslides.

Figure 3-20 Debris Flow Risk Zones



Source: 2013 State of California Multi-Hazard Mitigation Plan

Past Occurrences

Disaster Declaration History

There has been one disaster declaration associated with debris flows in El Dorado County.

NCDC Events

The NCDC contains 10 records of debris flows in the County. Table 3-17 outlines debris flow events in El Dorado County

Table 3-17 NCDC Flood Events in El Dorado County 1993 to 12/31/2014

Date	Event	Deaths (direct)	Injuries (direct)	Property Damage	Crop Damage	Injuries (indirect)	Deaths (indirect)
2/23/1998	Debris Flow	0	0	$0	$0	0	0
12/22/2005	Debris Flow	0	0	$0	$0	0	0
12/22/2005	Debris Flow	0	0	$2,000	$0	0	0
12/2/2012	Debris Flow	0	0	$0	$0	0	0
9/25/2014	Debris Flow	0	0	$0	$0	0	0
9/27/2014	Debris Flow	0	0	$0	$0	0	0
12/22/2015	Debris Flow	0	0	$0	$0	0	0
1/9/2017	Debris Flow	0	0	$2,000	$0	0	0
1/10/2017	Debris Flow	0	0	$2,000	$0	0	0
1/10/2017	Debris Flow	0	0	$0	$0	0	0
2/21/2017	Debris Flow	0	0	$6,500,000	$0	0	0
6/8/2017	Debris Flow	0	0	$0	$0	0	0
TOTAL		**0**	**0**	**$6,504,000**	**$0**	**0**	**0**

HMPC Events

Notable debris flows of record include the following debris flows along the Highway 50 corridor in the Whitehall, Kyburz, Pollock Pines, Fresh Pond, Pacific House/Bridal Veil Falls area and off of Highway 49 in the Chili Bar area:

- White Hall Debris Flow – Following the Cleveland Fire, The Wayne Road Landslide was the most significant of the three landslides. The Wayne Road Landslide is actually the result of two separate failures occurring in separate drainages. The drainages meet just upslope of the impacted area directly west of the intersection of Sandy Way and Wayne Road. Based on information provided by local residents and El Dorado County personnel, the homes in the area were also impacted by debris flows in 1982 and in 1986. The 1982 event was larger than the 1986 event. El Dorado County personnel stated that, following the 1986 landslide, several small sedimentation basins were constructed north of Sandy Way in an attempt to contain future slide debris. These sedimentation basins were obliterated by slide debris during the 1997 event. Slide debris consisted of saturated, loose, silty sand and sandy silt with rock ranging in size from gravel to boulders up to 4 feet in diameter. The debris plugged existing culverts and several feet of slide debris were deposited against the sides of several residences.
- Bridal Veil Falls/Pacific House – The Sandy Way Landslide occurred approximately one-quarter mile west of the Wayne Road Landslide, originating just west of Squaw Summit Road, and deposited significant debris upslope of several residences on Sandy Way.

With heavy rain events, debris flows/mudslides may occur, causing road closures for hours and days at a time in some areas. Highway 50 and Highway 49 are areas of recent landslides. Also post fire conditions especially in the King and Cleveland Fires burn scar areas are a concern during El Nino winters, with debris flows occurring and also contributing to sediment and debris loads in the American River tributaries. El Dorado County has monitored debris conditions in the post fire area and have incurred mobilization and other expenses as a result.

Figure 3-21 depicts the debris flow areas described above.

Figure 3-21 El Dorado County Potential Debris Flow Areas (Highway 50 Corridor)

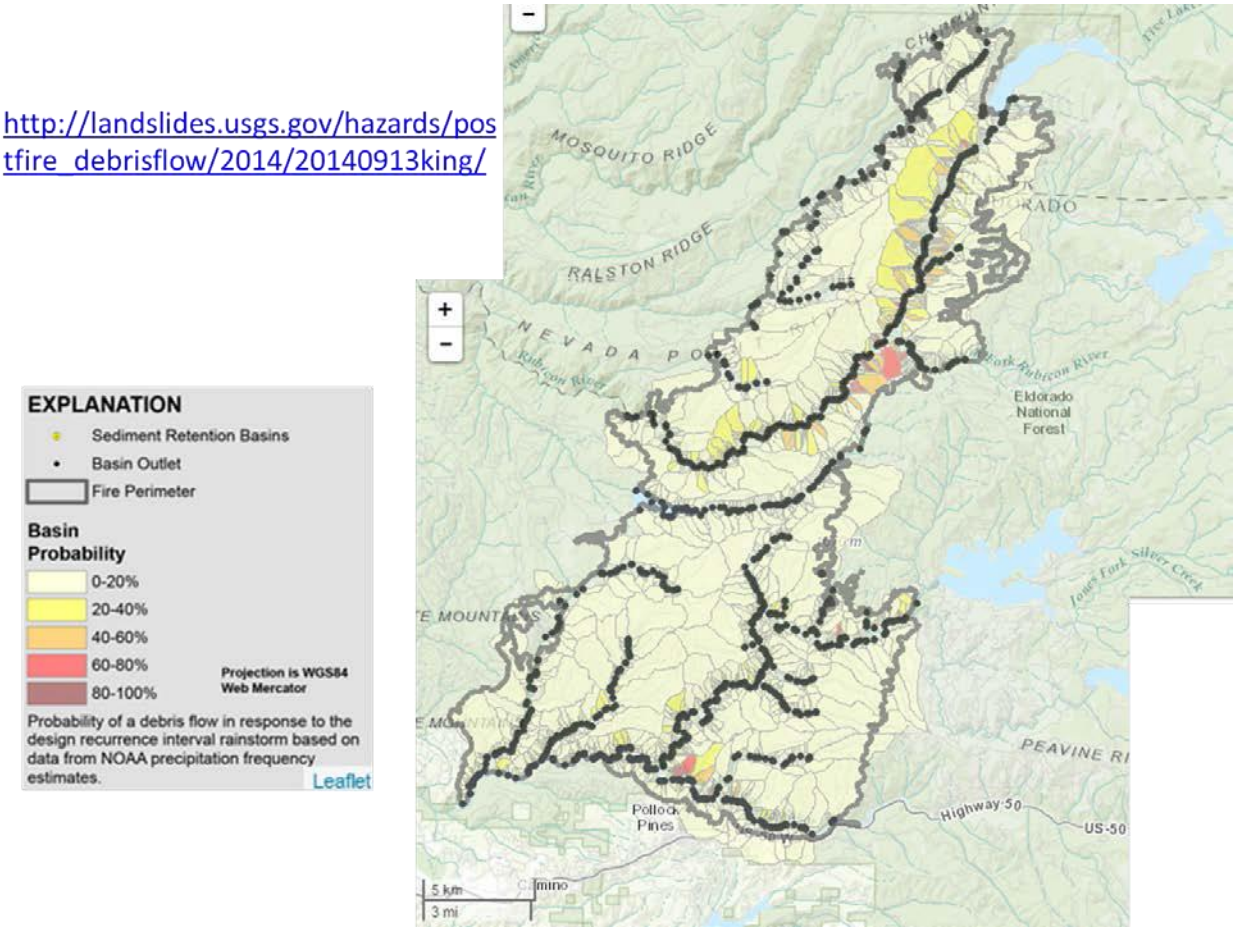
Likelihood of Future Occurrence

Likely—Based on data provided by the HMPC, minor debris flows have occurred in the past, probably over the last several hundred years, as evidenced both by past deposits exposed in erosion gullies and recent landslide events. With significant rainfall, additional failures are likely to occur within the identified landslide hazard areas. Given the nature of localized problems identified within the County, minor landslides will likely continue to impact the area when heavy precipitation occurs, as they have in the past.

In addition, areas affected by recent fires show an increased area of landslide risk. The King Fire in 2014 burned a large area of the County. The USGS put together debris flow probabilities in the burn scar area. Future occurrences for this area are shown on Figure 3-22.

Figure 3-22 Future Landslide Probability in the King Fire Burn Scar

http://landslides.usgs.gov/hazards/postfire_debrisflow/2014/20140913king/



Source: USGS

Climate Change and Landslide and Debris Flows

According to the CAS, climate change may result in precipitation extremes (i.e., wetter wet periods and drier dry periods). While total average annual rainfall may decrease only slightly, rainfall is predicted to occur in fewer, more intense precipitation events. The combination of a generally drier climate in the future, which will increase the chance of drought and wildfires, and the occasional extreme downpour is likely to cause more mudslides and landslides.

3.2.13. Seiche (Lake Tsunami)

Hazard/Problem Description

U.S. Army Corps of Engineers defines seiche as:

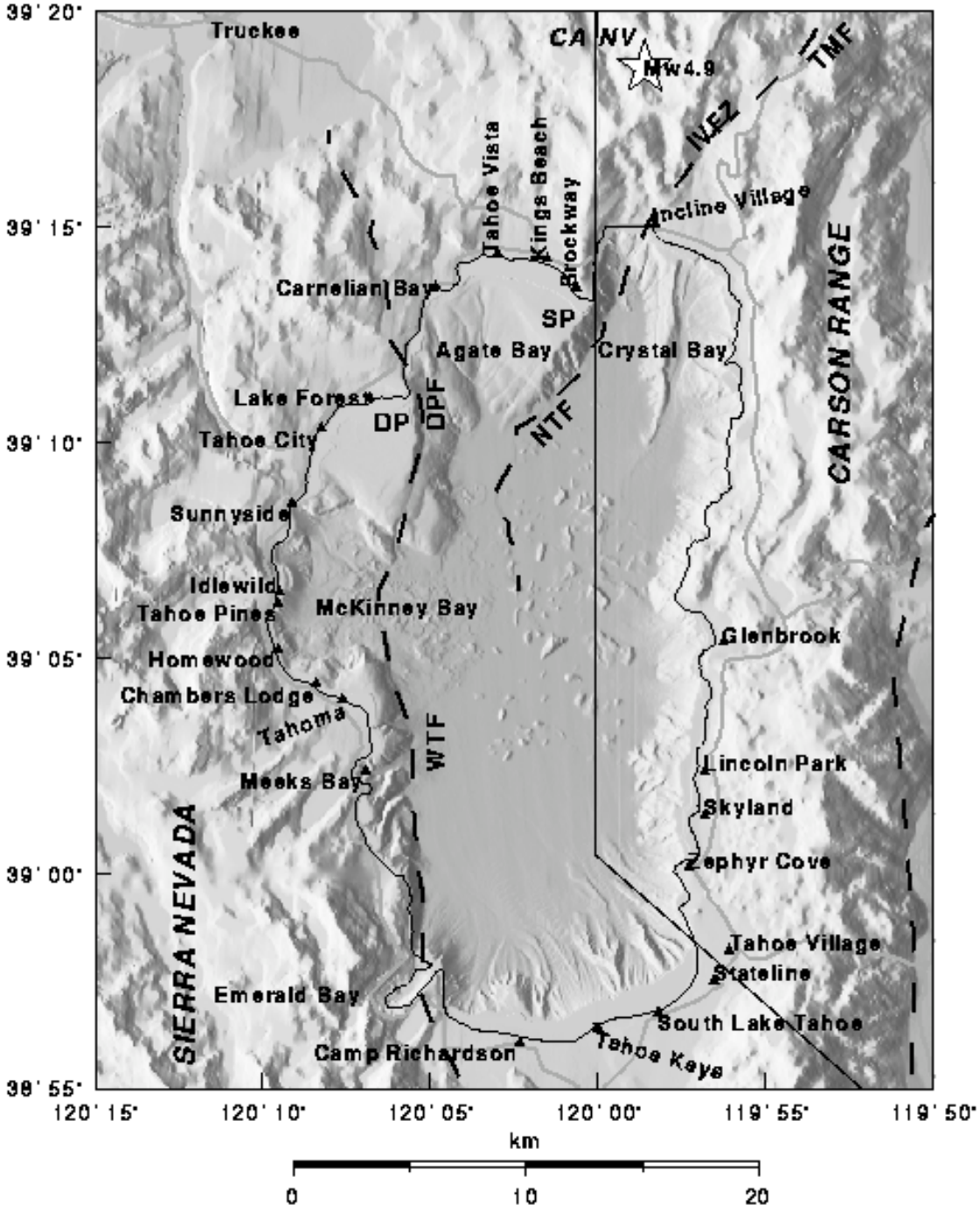
> A standing wave oscillation of an enclosed water body that continues, pendulum fashion, after the cessation of the originating force, which may have been either seismic or atmospheric. An oscillation of a fluid body in response to a disturbing force having the same frequency as the natural frequency of the fluid system. Tides are now considered to be seiches induced primarily by the periodic forces caused by the sun and moon.
> In the Great Lakes area, any sudden rise in the water of a harbor or a lake whether or not it is oscillatory (although inaccurate in a strict sense, this usage is well established in the Great Lakes area).

Seiches can be generated when the water is subject to changes in wind or atmospheric pressure gradients or, in the case of semi-enclosed basins, by the oscillation of adjacent connected water bodies having a periodicity close to that of the seiche or of one of its harmonics. Other, less frequent causes of seiches include heavy precipitation over a portion of the lake, flood discharge from rivers, seismic disturbances, submarine mudslides or slumps, and tides. The most dramatic seiches have been observed after earthquakes.

Another way a seiche can occur is a sudden land tilt or drop as a result of fault rupture or other seismic activity. Computer modeling by a group at the University of Nevada at Reno working with a Japanese tsunami expert showed ruptures along either fault could lift or drop the bottom the lake and possibly generate a tsunami. The tsunami in turn could trigger seiche waves within seconds that could crisscross the lake, reach heights of 30 feet or more, and persist for hours.

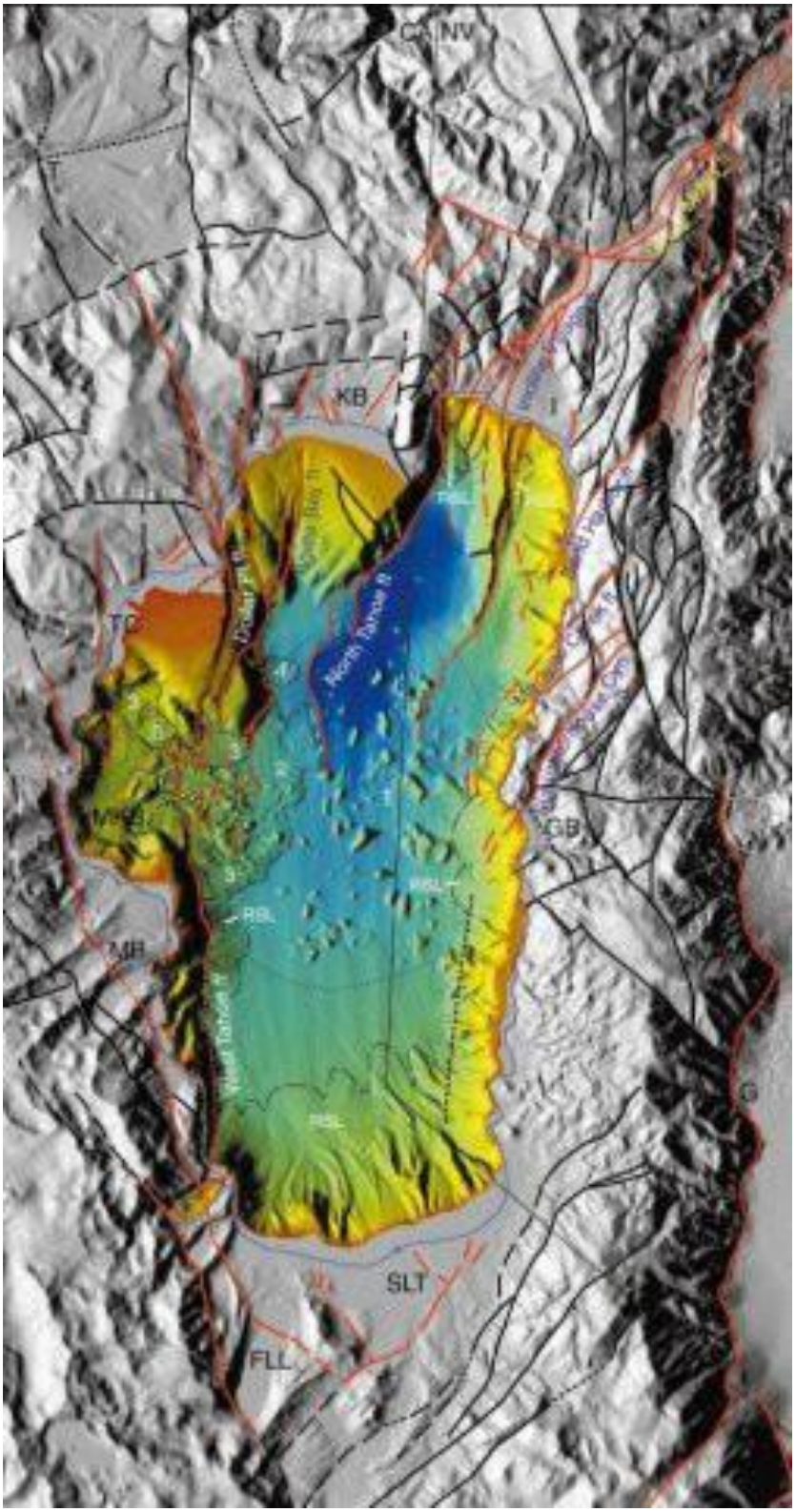
Within El Dorado County, locations with the highest probability of impact are shore areas of Lake Tahoe from 0 to 30 feet above mean lake water level. Japanese scientist Kenji Satake had created computer models that suggest the largest waves of a seiche event could hit Sugar Pine Point, Rubicon Point, and the casinos in South Lake Tahoe. Figure 3-23shows the topography of the Lake Tahoe Basin. Figure 3-24shows lake bathymetry, while Figure 3-25 shows fault locations.

Figure 3-23 Lake Tahoe Basin Topography



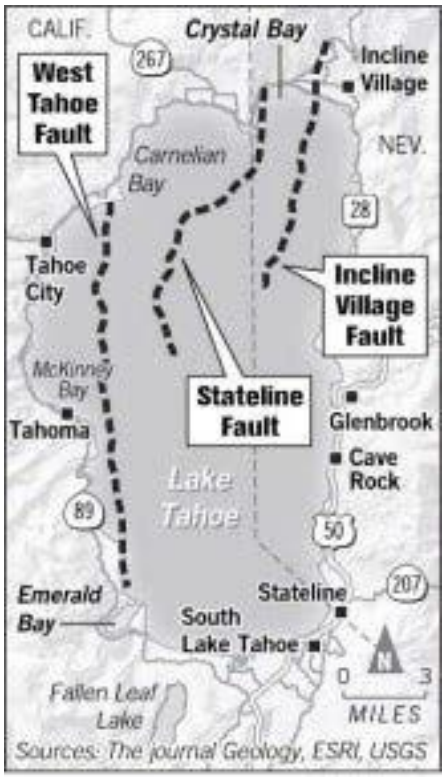
Source: The Potential Hazard from Tsunami and Seiche Waves Generated by Future Large Earthquakes within the Lake Tahoe Basin, California-Nevada, 1999-2000; Gene A. Ichinose, Kenji Satake, John G. Anderson, Rich A. Schweickert, and Mary M. Lahren; Nevada Seismological Laboratory; University of Nevada; (University of Nevada 2000 study)

Figure 3-24 Lake Tahoe Bathymetry



Source: University of Nevada Seismic Laboratory, (Schweickert); USGS

Figure 3-25 Lake Tahoe Fault Locations



Source: ESRI, USGS

Research from the University of Nevada estimates that an earthquake must be at least a magnitude 6.5 to cause a damaging seiche at Lake Tahoe. The three faults directly underneath the lake are considered capable of generating magnitude 7.0 or larger earthquakes. Computer models of seiche activity at Lake Tahoe prepared by the University of Nevada research team estimate that waves as high as 30 feet could strike the shore. These projections suggest largest waves might hit Sugar Pine Point, Rubicon Point, and the casinos in South Lake Tahoe.

In the event of a magnitude 7 earthquake occurring on either of two major faults under the lake, the lake bottom could drop as much as 4 meters. Water supported by the lake floor could drop a corresponding distance and generate waves that heavily impact the shoreline.

Figure 3-26 below shows three potential vertical displacement (uplift or subsidence) scenarios that could be caused by magnitude 7+ earthquakes along the three discrete fault systems in the Lake Tahoe region. These scenarios were done prior to the 2006 finding of the Stateline fault that

traverses Lake Tahoe. It was not included in these scenarios.
Scenario A represents an earthquake event along the North Tahoe-Incline Village Fault Zone (NT-IVFZ). This scenario projects significant subsidence (0.5-4.0 meters) to the east of the fault in the vicinity of Incline Village and across Crystal Bay and moderate uplift (0.25-1.0 meter) to the west and away from the lake. Shoreline areas near the fault rupture would be inundated due to permanent ground subsidence. Other shoreline areas would be temporarily inundated by tsunami and seiche waves. Seiche wave heights could exceed 3 meters within shallow bays and shores between Incline Village and Carnelian Bay, and exceed 6 meters at some locations in the South Lake area.

Scenario B represents an earthquake event along the West Tahoe-Dollar Point Fault Zone (WTFZ). This scenario projects significant subsidence (0.5-4.0 meters) across the lake bottom to the east of the fault and moderate uplift (0.25-1.0 meter) to the west across McKinney Bay and away from the lake. Scenario B projects a similar pattern of seiche wave heights as Scenario A except that wave heights in some areas could be as high as 10 meters.

Scenario C represents an earthquake event along the Genoa Fault Zone (GFZ) 7-10 miles east of the lake shore. This scenario projects minor to moderate uplift (0.25-0.75 meter) to the southwest of the lake. Scenario C produces waves with average heights of 0.5 meters, indicating that magnitude 7 earthquakes along faults outside of the lake are not likely to create a large seiche event.

Figure 3-26 Contours of Vertical Component Ground and Lake Bottom Displacements

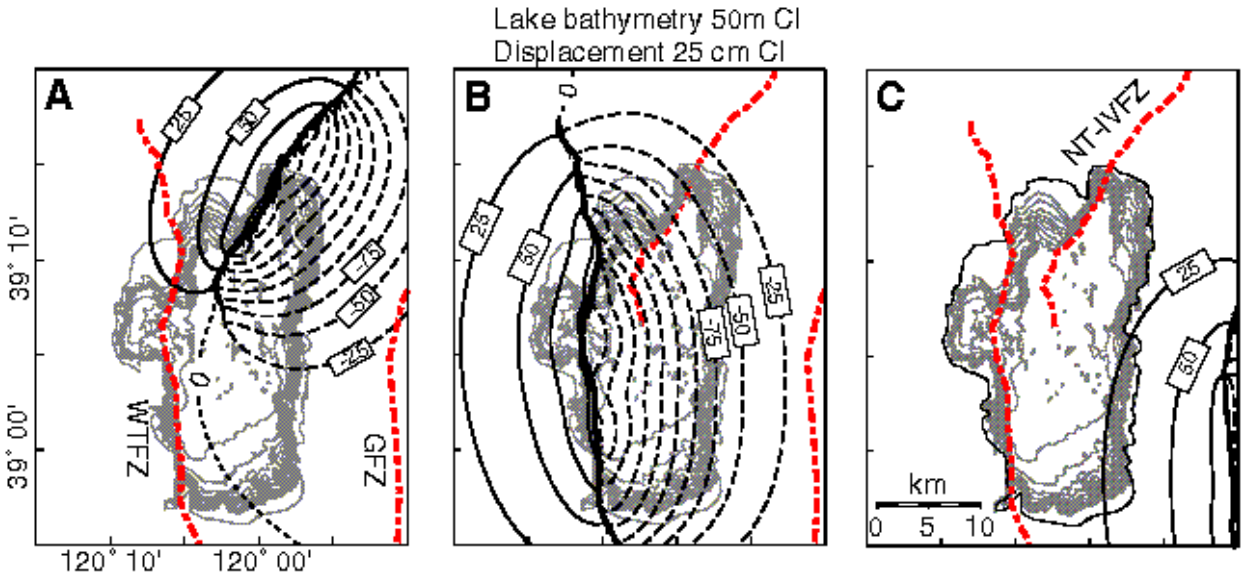


Figure 2. Contours of vertical component ground and lake bottom displacements for scenarios "A", "B" and "C". The dashed contours represent subsidence and solid uplift. The contour interval is 25 cm and only the first few contours are labeled. The thick dash-dotted lines are the three fault traces used in the scenarios: North Tahoe-Incline Village fault zone (NT-IVFZ), West Tahoe-Dollar Point fault zone (WTF) and Genoa fault zone (GFZ). All of the scenarios are Mw 7+ normal faulting earthquakes with a maximum slip of 4 meters tapered to zero at the ends of the fault with a trapazoid function.

Source: The Potential Hazard from Tsunami and Seiche Waves Generated by Future Large Earthquakes within the Lake Tahoe Basin, California-Nevada, 1999-2000; Gene A. Ichinose, Kenji Satake, John G. Anderson, Rich A. Schweickert, and Mary M. Lahren; Nevada Seismological Laboratory; University of Nevada; (University of Nevada 2000 study)

Past Occurrences

Disaster Declaration History

There have been no disasters declarations in El Dorado County for seiche activity.

NCDC Events

The NCDC does not track seiche events.

HMPC Events

There have been no occurrences of major seiche activity at Lake Tahoe in recent years. University of Nevada geologists have found deposits that extend for 10 miles along the McKinney Bay shore from Sunnyside through Tahoma. These deposits indicate a tsunami or seiche with 30-foot-high

waves occurred approximately 7,000 years ago.

Research performed by the Scripps Institute of Oceanography in 2005 using acoustic trenching to research the lake's topography indicates that McKinney Bay was formed when a massive landslide slipped into Lake Tahoe which likely caused major seiche activity at that time. Research from the University of Nevada shows evidence of a massive landslide that tumbled from Homewood on the Nevada side.

In 1955, a debris flow occurred in Emerald Bay. Seiche activity occurred. Evidence of the debris flow can still be seen on the hillside near Emerald Bay.

Recent occurrences of potential causal factors include a magnitude 4.9 earthquake near Incline Village in 1998.

Likelihood of Future Occurrences

Unlikely—There have been no occurrences of major seiche activity at Lake Tahoe in recent years. Based on past occurrences, the likelihood of future occurrence in the near future is unlikely. However, given the evidence of past historical events and the location of faults within the Tahoe area, a future seiche event at Lake Tahoe is a possibility.

Climate Change and Seiche

Climate change is unlikely to affect earthquake caused seiche; however, landslide caused seiche may be affected by climate change. A discussion on climate change and landslide can be found in Section 4.2.12.

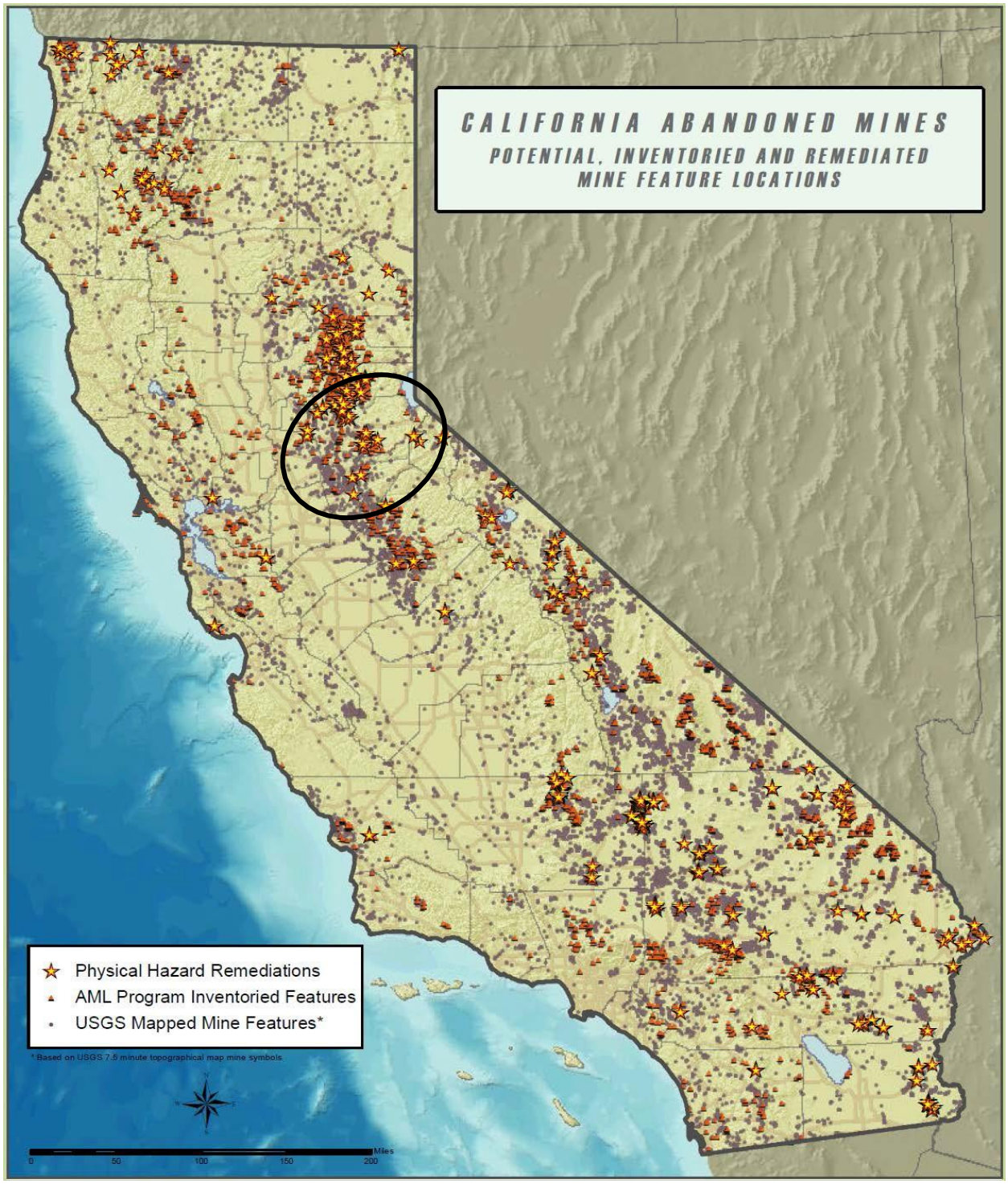
3.2.14. Subsidence

Hazard/Problem Description

Land subsidence is defined as the sinking of the land over man-made or natural underground voids. Subsidence can result in serious structural damage to buildings, roads, irrigation ditches, underground utilities, and pipelines. It can disrupt and alter the flow of surface or underground water. Weight, including surface developments such as roads, reservoirs, and buildings and manmade vibrations from such activities as blasting or heavy truck or train traffic can accelerate the natural processes of subsidence. Fluctuations in the level of underground water caused by pumping or by injecting fluids into the earth can initiate sinking to fill the empty space previously occupied by water or soluble minerals. The consequences of improper use of land subject to ground subsidence can be excessive economic losses, including the high costs of repair and maintenance for buildings, irrigation works, highways, utilities, and other structures. This results in direct economic losses to citizens as well as indirect economic losses through increased taxes and decreased property values.

In El Dorado County, the type of subsidence of greatest concern is the settling of the ground over abandoned mine workings. Past mining activities have created surface subsidence in some areas and have created the potential for subsidence in other areas. El Dorado County is home to many abandoned mines. El Dorado County's vulnerability to subsidence rests with abandon mines and culverts. Most of these abandoned mines are located west of Pollock Pines with several located in the Placerville, Coloma, Diamond Springs, Georgetown, Cool, Swansboro, Somerset, Grizzly Flats, Mt. Aukum, Shingle Springs, Rescue and Cameron Park. Figure 3-27 shows the extent of the abandoned mines in El Dorado County.

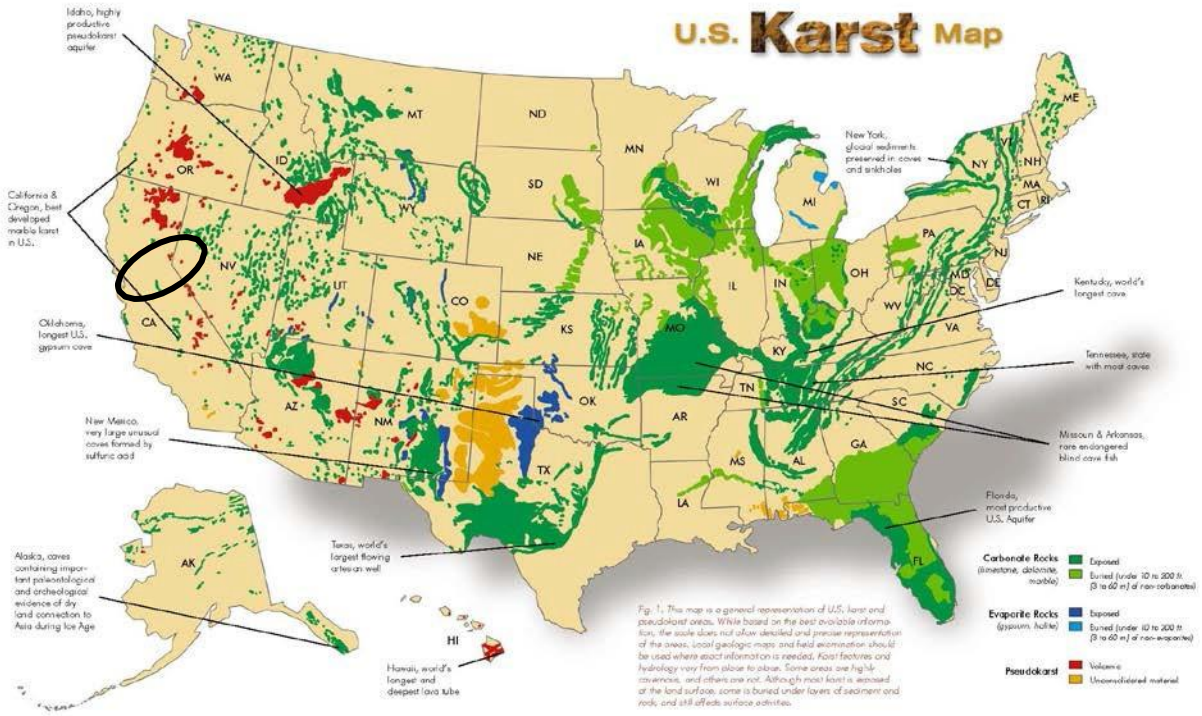
Figure 3-27 Abandoned Mines in El Dorado County



Source: California Department of Conservation, Office of Mine Reclamation

In addition to mines, El Dorado County is at risk to subsidence from karst. Distinctive surficial and subterranean features developed by solution of carbonate and other rocks and characterized by closed depressions, sinking streams, and cavern openings are commonly referred to as karst. Originally the term defined surface features derived by solution of carbonate rocks, but subsequent use has broadened the definition to include sulfates, halides, and other soluble rocks. The term has been expanded also to cover interrelated forms derived by solution on the surface in the subsurface. Most of the problems created by karst pertain to subterranean karst and pseudokarst features that affect foundations, tunnels, reservoir tightness, and diversion of surface drainage. A map of karst in the United States and El Dorado County is provided in Figure 3-28. Areas in the eastern portion of the County show a risk to karst.

Figure 3-28 US Karst Map



Source: USGS

Past Occurrences

Disaster Declaration History

There have been no disaster declarations related to subsidence in El Dorado County.

NCDC Events

The NCDC database does not track subsidence.

HMPC Events

There have been no documented events of land subsidence in El Dorado County. However, given the history of mining activity, the potential for subsidence to occur exits,

Likelihood of Future Occurrence

Unlikely—Historically, land subsidence issues in the County have been minimal. However, given the history of mining activity within El Dorado County, the potential exists for subsidence to occur.

Climate Change and Subsidence

Climate change is unlikely to change the effects of subsidence (abandoned mines and karst) in the County. However, data is showing that the groundwater table is lowering causing subsidence in California which can be caused by the changes in precipitation and periods of drought.

3.2.15. Wildfire

Hazard/Problem Description

California is recognized as one of the most fire-prone and consequently fire-adapted landscapes in the world. The combination of complex terrain, Mediterranean climate, and productive natural plant communities, along with ample natural and aboriginal ignition sources, has created conditions for extensive wildfires. Wildland fire is an ongoing concern for El Dorado County. Generally, the fire season extends from early spring through late fall of each year during the hotter, dryer months. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, an accumulation of vegetation, and high winds.

Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities.

Economic losses could also result. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

Wildland Urban Interface

Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the ecosystem. While wildfire risk is predominantly associated with wildland urban interface (WUI) areas, significant wildfires can also occur in heavily populated areas. The wildland urban interface is a general term that applies to development adjacent to landscapes that support wildland fire. The WUI defines the community development into the foothills and mountainous areas of California. The WUI describes those communities that are mixed in with grass, brush and timbered covered lands (wildland). These are areas where wildland fire once burned only vegetation but now burns homes as well. The WUI for El Dorado County consists of communities at risk as well as the area around the communities that pose a fire threat.

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

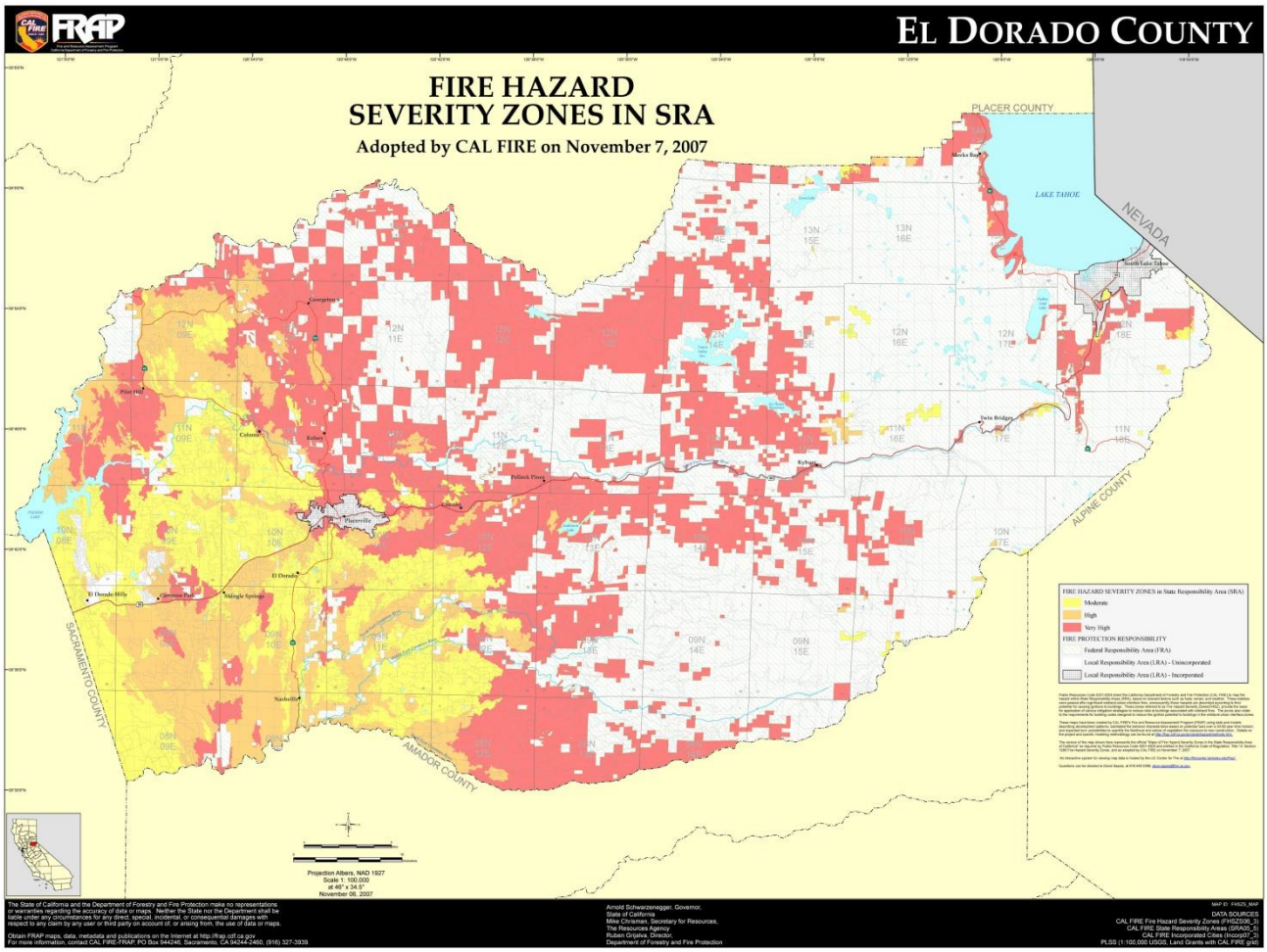
they are sprawling communities over a large geographical area with wild fuels throughout. This profile makes access, structure protection, and fire control difficult as fire can freely run through the community.

WUI fires are the most damaging. WUI fires occur where the natural and urban development intersect. Even relatively small acreage fires may result in disastrous damages. WUI fires occur where the natural forested landscape and urban-built environment meet or intermix. The damages are primarily reported as damage to infrastructure, built environment, loss of socio-economic values and injuries to people.

The pattern of increased damages is directly related to increased urban spread into historical forested areas that have wildfire as part of the natural ecosystem. Many WUI fire areas have long histories of wildland fires that burned only vegetation in the past. However, with new development, a wildland fire following a historical pattern now burns developed areas. WUI fires can occur where there is a distinct boundary between the built and natural areas or where development or infrastructure has encroached or is intermixed in the natural area. WUI fires may include fires that occur in remote areas that have critical infrastructure easements through them, including electrical transmission towers, railroads, water reservoirs, communications relay sites or other infrastructure assets. Human impact on wildland areas has made it much more difficult to protect life and property during a wildland fire. This home construction has created a new fuel load within the wildland and shifted firefighting tactics to life safety and structure protection.

El Dorado County Wildfires

Wildland fires affect grass, forest, and brush lands, as well as any structures located within them. 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 carelessness and historical fire management practices. Within the County, the area starting in the foothills just east of El Dorado Hills and extending east, as well as north and south to the County lines is most vulnerable and prone to wildfire due to the climate, topography, and vegetation. The Fire Hazard Severity Zone Map (California Department of Forestry and Fire Protection) outlines the areas most vulnerable to wildfire and the extent of wildfire in El Dorado County.



http://www.fire.ca.gov/fire_prevention/fhsz_maps_eldorado

Wildfires may occur in all areas of El Dorado County, including the most populated areas of El Dorado Hills, Cameron Park/Shingle Springs, Placerville, Camino/Pollock Pines and South Lake Tahoe. El Dorado County also has a large area of National Forest Service land that is also vulnerable to wildfire. The Community Wildfire Protection Plan (CWPP) outlines the vulnerability and extent of wildfire in El Dorado County. El Dorado County uses National Weather Service red flag warmings, advisories and watches to address planning for wildfire in collaboration with Fire Prevention agencies and Fire Safe Councils.

Generally, there are four major factors that sustain wildfires and allow for predictions of a given area's potential to burn. These factors include fuel, topography, weather, and human actions.

Fuel – Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree

leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source are manmade structures, such as homes and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Fuel is the only factor that is under human control. As a result of effective fire suppression since the 1930s, vegetation throughout the county has continued to grow and accumulate, and hazardous fuels have increased. As such, certain areas in and surrounding El Dorado County are extremely vulnerable to fires as a result of dense vegetation combined with a growing number of structures being built near and within rural lands. These high fuel hazards, coupled with a greater potential for ignitions, increases the susceptibility of the County to a catastrophic wildfire.

Topography – An area's terrain and land slopes affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.

Weather – Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out fuels that feed wildfires, creating a situation where fuel will ignite more readily and burn more intensely. Thus, during periods of drought, the threat of wildfire increases. Wind is the most treacherous weather factor. The greater a wind, the faster a fire will spread and the more intense it will be. Winds can be significant at times in El Dorado County. North winds in El Dorado County are especially conducive to hot, dry conditions, which can lead to "red flag" days indicating extreme fire danger. In addition to wind speed, wind shifts can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. Lightning also ignites wildfires, often in difficult to reach terrain for firefighters.

Human Actions – Most wildfires are ignited by human action, the result of direct acts of arson, carelessness, or accidents. Many fires originate in populated areas along roads and around homes, and are often the result of arson or careless acts such as the disposal of cigarettes, use of equipment or debris burning. Recreation areas that are located in high fire hazard areas also result in increased human activity that can increase the potential for wildfires to occur. Electrical hazards have also been known to ignite wildfires.

Factors contributing to the wildfire risk in El Dorado 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;
- Nature and frequency of lightning ignitions; and
- Increasing population density leading to more ignitions.
- Power transmission and distribution lines run throughout the county

CAL FIRE has mapped fuel hazards in the County based on vegetation, fire history, and slope, with the hazards ranked as medium, high or very high. All of the above factors create the potential for very active to severe fire behavior in the El Dorado County.

Consequently, wildland fires that burn in natural settings with little or no development are part of a natural ecological cycle and may actually be beneficial to the landscape. Century old policies of fire exclusion and aggressive suppression have given way to better understanding of the importance fire plays in the natural cycle of certain forest types.

Past Occurrences

Disaster Declaration History

A search of FEMA and Cal OES disaster declarations turned up multiple events. State disaster declarations occurred in 2007, 2014. Federal disaster declarations occurred in 2007 and 2014.

NCDC Events

The NCDC has tracked wildfire events in the County dating back to 1990. Significant Events in El Dorado County are shown in Table 3-18.

Table 3-18 NCDC Wildfire Events in El Dorado County 1992 to 2016

Date	Event	Injuries (direct)	Deaths (direct)	Property Damage
9/29/1992	Wildfire	2	2	$240,207,000
9/17/2006	Wildfire	0	0	$13,100,000
6/24/2007	Wildfire	0	0	$153,000,000
7/25/2014	Wildfire	0	0	$13,000,000
9/13/2014	Wildfire	12	0	$162,500,000
6/28/2016	Wildfire	3	0	$4,500,000
10/14/2016	Wildfire	0	0	$327,000
TOTAL		**17**	**2**	**$586,634,000**

Source: NCDC

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

HMPC Events

The HMPC also provided the following information on historical fires in El Dorado County.

- September 1992 Cleveland Fire – The Cleveland Fire was a large arson fire that started just north of Hwy 50 off Ice House Road. On the third day of the fire, an Air Tanker crash claimed the lives of two pilots. 41 structures were destroyed, millions of dollars of private Sierra Pacific Industry timber were destroyed, Hwy 50 was closed for over a week, and the El Dorado Canal (water supply for Pollock Pines and Camino) was severely damaged. A total of 22,485 acres were destroyed.
- September 2006 Ralston Fire – The Ralston Fire was a large wildland fire in the area of the North Fork of the Middle Fork of the American River. Approximately 8,400 acres burned.
- June 2007 Angora Fire –The Angora fire (in the Lake Tahoe Basin) burned 3,100 acres of forest and wooded subdivisions and destroyed more than 250 homes as well as 75

commercial and other structures.

- July 2014 Sand Fire – On July 25, the Sand Fire was ignited five miles north of the Amador County town of Plymouth by a vehicle driving over dry vegetation. A total of 4,240 acres were burned, claiming 19 residences and 47 outbuildings.
- September 2014 King Fire–The King Fire started in Pollock Pines and eventually crossed into Placer County. 97,717 acres were estimated to have burned. 12 residences were destroyed, as well as 68 other minor structures. 12 injuries occurred that can be attributed to the fire. The burn area from the fire is shown in Figure 3-29.
- 2016 Trailhead Fire – On June 28, the Trailhead Fire was ignited in the Middle Form American River canyon in both Placer and El Dorado Counties.
- 2016 Emerald Fire– The Emerald Fire started October 14, near the Cascade Lake area and Emerald Bay off Highway 89. Wind gusts and sustained wind contributed to the spread of this fire.

Figure 3-29 Fire Perimeter from the King Fire

Source: NOAA/NWS

Likelihood of Future Occurrence

Highly Likely — From May to October of each year, El Dorado County faces a serious wildland fire threat. Fires will continue to occur on an annual basis in El Dorado County. The threat of wildfire and potential losses are constantly increasing as human development and population increase and the wildland urban interface areas expand. Due to its high fuel load and long, dry summers, most of El Dorado County continues to be at risk from wildfire.

Climate Change and Wildfire

Warmer temperature can exacerbate drought conditions. Drought often kills plants, which serve as fuel for wildfires. Warmer temperatures could increase the number of wildfires and pest outbreaks, such as the western pine beetle.

3.2.16. Natural Hazards Summary

Table 3-20 summarizes the results of the hazard identification and hazard profile for the El Dorado County Planning Area based on the hazard identification data and input from the HMPC. For each hazard profiled in Section 3.2, this table includes the likelihood of future occurrence and whether the hazard is considered a priority hazard for the El Dorado County Planning Area.

Table 3-20 Hazard Identification/Profile Summary and Determination of Priority Hazard: El Dorado County Planning Area

Hazard	Likelihood of Future	Priority Hazard
Avalanche	Likely	N
Dam Failure	Unlikely; Occasional	Y
Drought and Water Shortage	Likely: Occasional	Y
Earthquake	Occasional	Y
Flood: 100/500 year	Occasional; Unlikely	Y
Flood: Localized Stormwater Flooding	Highly Likely	Y
Landslides and Debris Flows	Likely	N
Seiche (Lake Tsunami)	Unlikely	Y
Severe Weather: Extreme Heat	Highly Likely	N
Severe Weather: Heavy Rains, Snow and Storms (Thunderstorms/Hail, Lightning/Wind/Tornadoes)	Highly Likely	Y
Soil Bank Erosion	Highly Likely	N
Wildfire	Highly Likely	Y

3.3 Vulnerability Assessment

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

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

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

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

El Dorado County Vulnerability to Specific Hazards

The Disaster Mitigation Act regulations require that the HMPC evaluate the risks associated with each of the hazards identified in the planning process. This section summarizes the possible impacts and quantifies, where data permits, the El Dorado County Planning Area's vulnerability to each of the hazards identified as a priority hazard in the Natural Hazards Summary. Where specific hazards vary across the County, additional information can be found in the jurisdictional annexes. Based on information developed for the hazard profiles, the priority hazards evaluated further as part of this vulnerability assessment include:

- Avalanche
- Dam Failure
- Drought
- Earthquake/Debris Flow
- Erosion
- Flood: 100/200/500-year
- Flood: Localized/Stormwater Flooding
- Seiche Wave
- Severe Weather: Extreme Temperatures
- Severe Weather: Heavy Rain and Storms
- Wildfire

An estimate of the vulnerability of the Planning Area and Unincorporated County to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- Extremely Low—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- Low—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- Medium—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- High—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- Extremely High—Very widespread with catastrophic impact.

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

Avalanche Vulnerability Assessment

General Avalanche Hazard from National Perspective

An avalanche is a rapid flow of snow down a slope, from either natural triggers or human activity. Typically occurring in mountainous terrain, an avalanche can mix air and water with the descending snow. Powerful avalanches have the capability to entrain ice, rocks, trees, and other material on the slope; however avalanches are always initiated in snow, are primarily composed of flowing snow, and are distinct from mudslides, rock slides, rock avalanches, and serac collapses from an icefall. In mountainous terrain avalanches are among the most serious objective hazards to life and

property, with their destructive capability resulting from their potential to carry an enormous mass of snow rapidly over large distances.

In the United States, 514 avalanche fatalities have been reported in 15 states from 1950 to 1997. Each year, avalanches claim more than 150 lives worldwide, a number that has been increasing over the past few decades. Thousands more are caught in avalanches, partly buried or injured. One of the major reasons for increasing avalanche fatalities is the boom in mountain industries and recreation. Skiing, hiking and other winter sports draw millions of people to the mountains. To support these activities, more roads, buildings, and towns are forced into avalanche prone areas.

Although avalanches can occur on any slope given the right conditions, in the United States certain times of the year and certain locations are naturally more dangerous than others. Wintertime, particularly from December to April, is when most avalanches will "run" (slide down a slope). However, avalanche fatalities have been recorded for every month of the year.

A large avalanche in North America might release 300,000 cubic yards of snow, the equivalent of 20 football fields filled 10 feet deep with snow. Slab avalanches are the most common and most deadly avalanches, where layers of a snowpack fail and slide down the slope. Since 1950, 235 people in the U.S. have been killed in slab avalanches.

Several factors may affect the likelihood of an avalanche, including weather, temperature, slope steepness, slope orientation (whether the slope is facing north or south), wind direction, terrain, vegetation and general snowpack conditions. Different combinations of these factors can create low, moderate or extreme avalanche conditions.

Avalanches are most likely to run either during or immediately after a storm where there has been significant snowfall. The 24 hours following a heavy snowstorm are the most critical. The extra weight of new snow alone can cause a slab to break off and fall down the slope. Snowfall amounts of one foot or more (frequent in mountainous areas) create the most hazardous situations, producing avalanches that are often large enough to block highways and cause major destruction. Snow amounts of six to twelve inches pose some threat, particularly to skiers and recreationists. Snow amounts less than six inches seldom produce avalanches.

Perhaps the most significant factor (but not the only one) is how the snowpack has developed over

the season. Only the surface and maybe the top few layers of snow are visible, but layers of snow several feet deep may ultimately determine whether the slope will fail.

Snowpack conditions are extremely important because many layers of snow build up over the winter season. Each layer is built up under different weather conditions and will bond differently to the subsequent layers. Snowflakes, or snow crystals, within the snowpack eventually become more rounded due to melting/re-freezing and settlement. This metamorphism allows them to compress and generally form stronger bonds.

Between snows, the temperature may rise and melt the exposed surface layers, which when they re-freeze create a smoother, less stable surface for the next snowfall. Failure is much more likely to occur during or after the next few snowfalls. Rain between snows creates a slicker surface as well, and can weaken the bonds between snow layers.

Most avalanches occur on slopes between 30 and 45 degrees, but can occur on any slope angles given the right conditions. Very wet snow will be well lubricated with water, meaning it might avalanche on a slope of only 10 to 25 degrees.

Avalanche Hazard in El Dorado County

Typically limited to the steeper slopes of the Sierra Nevada Mountains, the majority of the land in this “avalanche zone” is owned by the Federal Government. Private ownership development, when allowed, is done only after carefully considering appropriate setbacks from the known avalanche starting zones, tracks and runout zones. Generally the roadways running through this “avalanche zone” are also privately owned and therefore not a significant hazard for El Dorado County.

The above discussion concerning areas with potential avalanche hazard is limited to certain areas along the Eastern edge of the County in the higher elevations. There have been reported incidents of avalanches in isolated portions of the County, but this is a very uncommon occurrence with no defined history of significant damages. Although the above discussion shows that small portions of privately owned and potentially developable land and therefore roads of El Dorado County can include areas where avalanche could occur, it is not common to most areas.

Avalanche control along the mountain passes of Highway 50, the main east-west roadway through El Dorado County, is a 24-hour a day, seven-day a week job for Caltrans from November, when the

first snow normally falls, until Spring. Caltrans monitors slope conditions determining when any particular slope is ripe for an avalanche. By triggering smaller, controlled avalanches, Caltrans reduces the potential for a large wall of snow from cascading down onto the highway, trapping motorists and causing injuries or deaths. These controlled "mini" avalanches are triggered by a projectile fired into the suspect slope from a LoCAT, a compressed air launcher, sending the unstable snow down the slope where Caltrans teams wait to clear the highway.

Dam Failure Vulnerability Assessment

Likelihood of Future Occurrence
Jurisdictional Dams – Unlikely
Non-jurisdictional Dams – Occasional
Vulnerability—High

Dam failure flooding can occur as the result of partial or complete collapse of an impoundment. Dam failures often result from prolonged rainfall and flooding. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam.

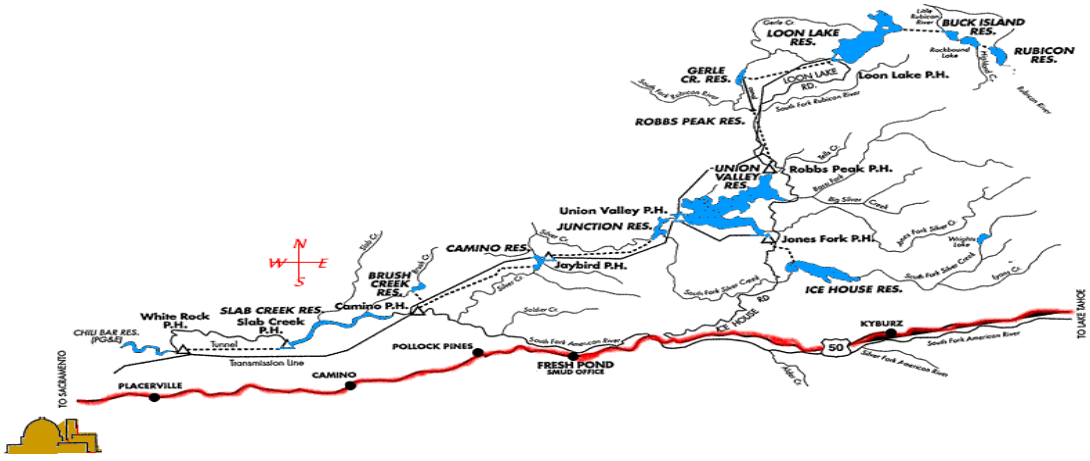
A dam failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to dam failures is confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions.

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Based on the risk assessment, it is apparent that a major dam failure could have a devastating impact on the Planning Area. Dam failure flooding presents a threat to life and property, including buildings, their contents, and their use. Large flood events can affect crops and livestock as well as lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, and the local and regional economies.

There are 59 known dams in El Dorado County. These range from dams creating large reservoirs intended to provide sources for irrigation, water supply, or power generation, to smaller impoundments which are part of water distribution or treatment systems or intended to provide a recreational amenity for visitors or residents. The following Figure 4-74 shows the distribution of all

of the larger impoundments found in El Dorado County and many of the smaller dams as well. The failure of any of these dams would cause downstream flooding and would likely result in loss of life and property. The potential magnitude of a dam failure depends on the time of year and the base flow of the river when the failure occurs. During the winter months, when river flows are higher, the impact to the area would be much greater and evacuation times much less. According to the California Department of Water Resources (DWR), El Dorado County does not have a history of major dam failure. Nine dams located within the County have been identified as having the potential of inundating habitable portions of the County in the unlikely event of dam failure. These nine dams are Echo Lake Dam (El Dorado Irrigation District [EID]), Union Valley Dam (Sacramento Municipal Utility District [SMUD]), Ice House Dam (SMUD), Chili Bar Reservoir (Pacific Gas and Electric Company [PG&E]), Stumpy Meadows Dam (Georgetown Divide Public Utility District [GDPUD]), Weber Creek Dam (EID), Slab Creek Dam (SMUD), Loon Lake Auxiliary Dam (SMUD), and Blakely Dam (EID). In addition to these nine dams, the Caples Lake Dam (EID) and the Cameron Park Lake/Warren Hollister Dam (EID) have been identified by the County as having considerable potential to inundate inhabited areas in the unlikely event of dam failure. The maps showing the locations and inundation areas of these dams can be found at the County Office of Emergency Services

Figure 3-30 Location of: Larger Impoundments in El Dorado County



Future Development

Flood Damage Prevention Ordinance (1986)

The County has enacted a floodplain ordinance that is compatible with FEMA guidelines in order to regulate development within the 100-year floodplain. This ordinance is applied in conjunction with the County's Zoning Ordinance. Under the Flood Damage Prevention Ordinance, development within the 100-year floodplain may occur; however, certain engineering and zoning standards apply in order to reduce injury and loss of life, to reduce structural damage caused by flooding, and to reduce public expenditures for additional flood control structures. Development within the floodway is also prevented unless no increase in flood elevation would result from the development.

Drought/Tree Mortality Vulnerability Assessment

Likelihood of Future Occurrence

Drought – Likely

Tree Mortality - Likely

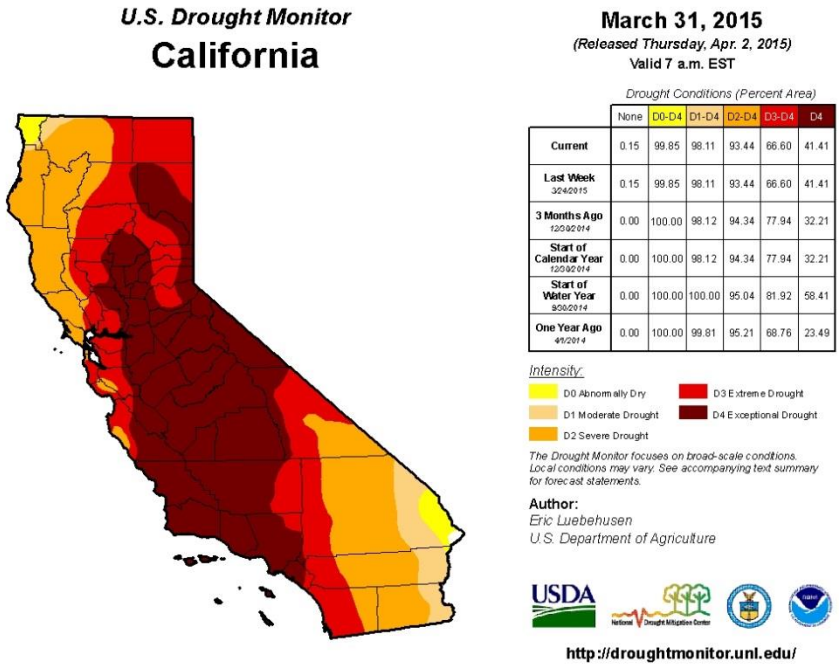
Vulnerability—Extremely High

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue for agricultural, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the County continues to grow, so will the demand for water.

Based on historical information, the occurrence of drought in California, including El Dorado County, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. The vulnerability of El Dorado County to drought is countywide, but impacts may vary and include reduction in water supply, agricultural losses, and an increase in dry fuels.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. Tracking drought impacts can be difficult. The U.S Drought Monitor is a useful reference tool that compiles reported drought impacts nationwide. Figure 4-75 shows drought conditions for the El Dorado County Planning Area as of March 31, 2015.

Figure 3-31 U.S. Drought Monitor for California, 2015



Source: National Drought Mitigation Center

The most significant qualitative impacts associated with drought in the Planning Area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Mandatory conservation measures are typically implemented during extended droughts. A reduction of electric power generation and water quality deterioration are also potential problems. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

It is difficult to quantitatively assess drought impacts to El Dorado County because not many county-specific studies have been conducted. Some factors to consider include: the impacts of fallowed agricultural land, habitat loss and associated effects on wildlife, and the drawdown of the groundwater table. The most direct and likely most difficult drought impact to quantify is to local economies, especially agricultural economies. The State has conducted some empirical studies on the economic effects of fallowed lands with regard to water purchased by the State's Water Bank; but these studies do not quantitatively address the situation in El Dorado County. It can be assumed, however, that the loss of production in one sector of the economy would affect other sectors. This is especially true of agriculture in El Dorado County, which is highly vulnerable to

drought conditions. It is estimated that the impact of agriculture and livestock to the County of El Dorado's economy totaled approximately $441 million in 2013 and tourism accounting for a $224 million impact to the economy in the year 2008. In 2014, the King Fire burned over 97,000 acres of drought stressed land in El Dorado and Placer Counties and suppression efforts totaled over $90 million.

The drawdown of the groundwater table is one factor that has been recognized to occur during repeated dry years. Lowering of groundwater levels results in the need to deepen wells, which subsequently lead to increased pumping costs. These costs are a major consideration for residents relying on domestic wells and agricultural producers that irrigate with groundwater and/or use it for frost protection. Land subsidence can also occur when the groundwater table is depleted.

The impacts of drought in El Dorado County can be reduced by traditional mitigations practices such as reduced municipal and agriculture usage and increased water storage.

Drought, Tree Mortality, and Bark Beetles

In October 2015, Governor Brown proclaimed a State of Emergency due to unprecedented tree mortality caused by extreme drought and drought-related bark beetle infestations. The Governor's Proclamation contains 18 distinct actions that direct state agencies, utilities and local governments to remove dead or dying trees in high hazard areas across the entire State of California. On March 28, 2016, the El Dorado County Board of Supervisors declared a state of emergency due to pervasive tree mortality in the County.

The trees that die due to bark beetles and the drought create an increased fuel load in the forest. This fuel load creates for a high risk for wildfire. In addition, the dead trees also create a hazard due to their likelihood of falling. Data collected by State and Federal agencies demonstrates that drought conditions and bark beetle infestation have killed over 102 million trees in the State of California and that tens of millions more are likely to die over the next five to six years. Surveys conducted by the U.S. Forest Service in May estimate that new mortality (between October 2015 and May 2016) in El Dorado County has affected an estimated 177,000 conifer trees. In total, it is estimated by the National Forest Service that El Dorado County has 512,000 dead trees, according to a 2016 overflight of the County. Many of these trees are located in the Eldorado National Forest or on private land. However, some of these trees endanger County infrastructure (e.g. County roads and County buildings).

Figure 3-32 Tree Mortality in El Dorado County

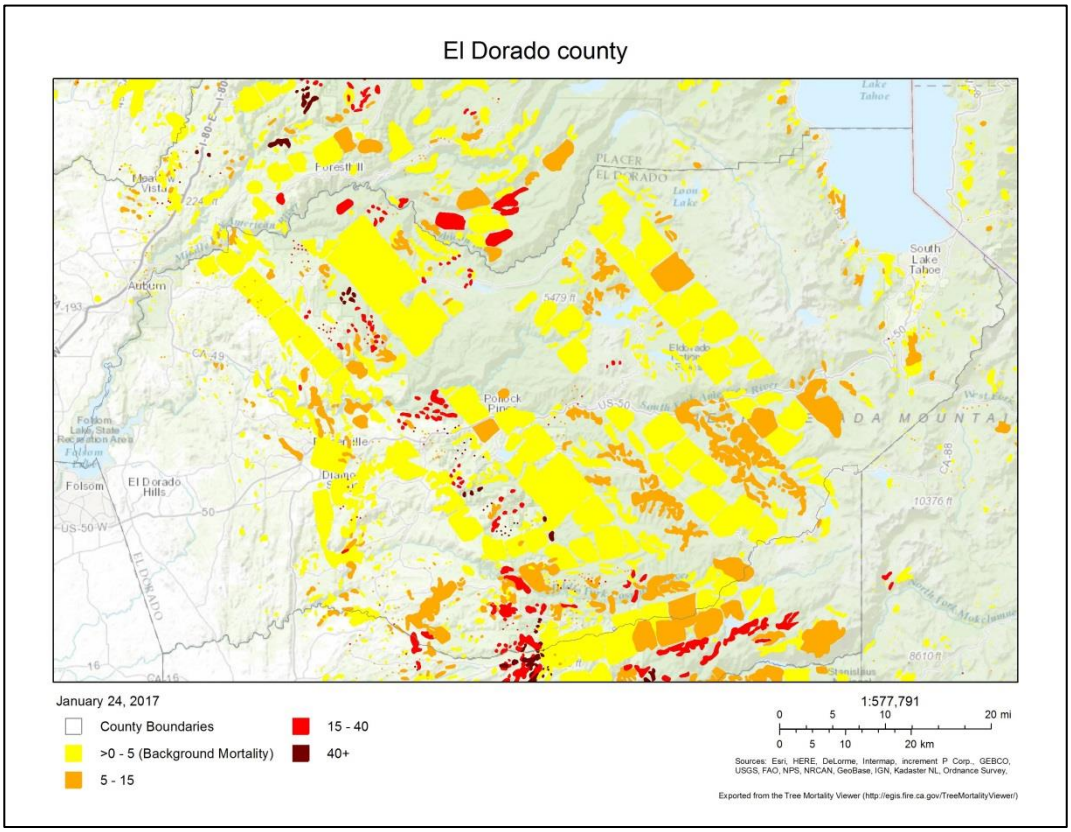


Image provided by the Tree Mortality Viewer, http://egis.fire.ca.gov/TreeMortalityViewer/

Earthquake Vulnerability Assessment

Likelihood of Future Occurrence - Occasional

Vulnerability—Medium

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable. Ground shaking is the primary earthquake hazard. Many factors affect the survivability of structures and systems from earthquake-caused ground motions. These factors include proximity to the fault, direction of rupture, epicentral location and depth, magnitude, local geologic and soils conditions, types and quality of construction, building configurations and heights, and comparable factors that relate to utility, transportation, and other network systems. Ground motions become structurally damaging when average peak accelerations reach 10 to 15 percent of gravity, average peak velocities reach 8 to 12 centimeters per second, and when the Modified Mercalli Intensity Scale is about VII (18-34 percent peak ground acceleration), which is considered to be very strong (general

alarm; walls crack; plaster falls).

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault. In general, newer construction is more earthquake resistant than older construction because of improved building codes and their enforcement. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry, as was seen in the Oroville, Coalinga, Santa Cruz, and Paso Robles earthquakes.

Common impacts from earthquakes include damage to infrastructure and buildings (e.g., crumbling of unreinforced masonry, failure of architectural facades, rupturing of underground utilities, and road closures). Earthquakes also frequently trigger secondary hazards, such as dam failures, landslides and rock falls, explosions, and fires that can become disasters themselves.

Estimating Potential Losses

Earthquake losses will vary across the El Dorado County Planning Area depending on the source and magnitude of the event. The law requires the State Geologist to establish regulatory zones (known as Earthquake Fault Zones) around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for their use in planning and controlling new or renewed construction. That list does not include El Dorado County, due to its location being relatively distant from any known faults that meet the criteria of the mapping program. There is one fault zone on land under the County's jurisdiction, the Rescue Lineament Bear Mountain fault zone. This fault zone cuts across the western end of the County trending north to south. However, there has been no appreciable movement in this fault and no record of damages sustained.

Erosion Vulnerability Assessment

Likelihood of Future Occurrence—Occasional
Vulnerability—Limited

The American and Consumes Rivers flow through El Dorado County. Parts of Highway 50 (near Bridal Veil Falls) and County roads (Happy Valley) have eroded due to high velocity flows from storms.

Debris Flow Vulnerability Assessment

Likelihood of Future Occurrence—Likely
Vulnerability—Medium

Debris flow is the downward and outward movement of slope-forming soil, rock, and vegetation, which is driven by gravity. Debris flows may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction or erosion, earthquakes, volcanic eruptions, changes in groundwater levels, and deforestation caused by wildland fires.

There are several types of debris flow: rock falls, rock topple, slides, and flows. Rock falls are rapid movements of bedrock, which result in bouncing or rolling. A topple is a section or block of rock that rotates or tilts before falling to the slope below. Slides are movements of soil or rock along a distinct surface of rupture, which separates the slide material from the more stable underlying material. Mudflows, sometimes referred to as mudslides, mudflows, lahars or debris avalanches, are fast-moving rivers of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground, such as heavy rainfall or rapid snowmelt, changing the soil into a flowing river of mud or "slurry." Slurry can flow rapidly down slopes or through channels, and can strike with little or no warning at avalanche speeds. Slurry can travel several miles from its source, growing in size as it picks up trees, cars, and other materials along the way. As the flows reach flatter ground, the mudflow spreads over a broad area where it can accumulate in thick deposits.

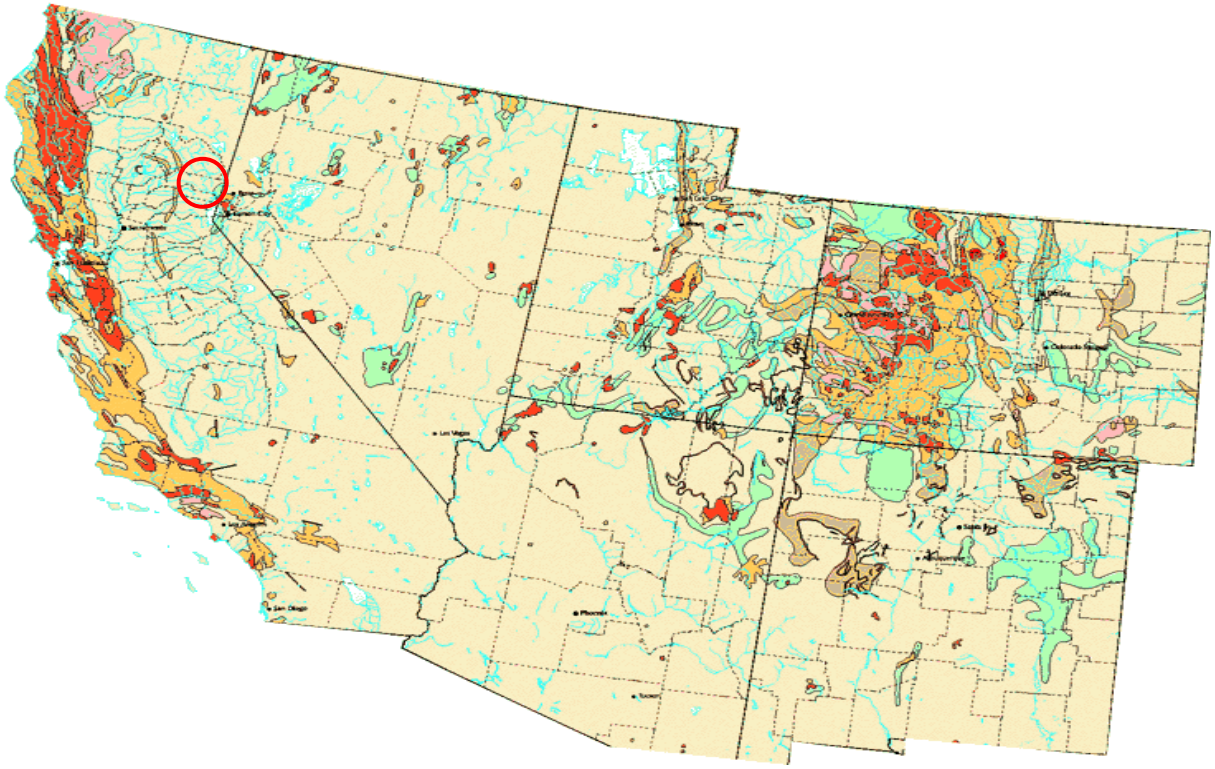
Debris Flows are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effects of flooding that often accompany these events. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Some debris flows move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly.

Among the most destructive types of debris flows are those that accompany volcanic eruptions. A spectacular example in the United States was a massive debris flow resulting from the 1980 eruptions of Mount St. Helens, Washington. Areas near the bases of many volcanoes in the Cascade Mountain Range of California, Oregon and Washington are at risk from the same types of

flows during future volcanic eruptions.

Areas that are generally prone to debris flow hazards include previous debris flow areas, the bases of steep slopes, the bases of drainage channels, and developed hillsides where leach-field septic systems are used. Areas that are typically considered safe from debris flows include areas that have not moved in the past, relatively flat-lying areas away from sudden changes in slope, and areas at the top or along ridges which are set back from the tops of slopes. In the United States, it is estimated that debris flows cause up to $2 billion in damages and from 25 to 50 deaths annually. Globally, debris flows cause billions of dollars in damage and thousands of deaths and injuries each year. Figure 3-33 identifies areas where large numbers of debris flows have occurred and areas which are susceptible to debris flows in the southwestern United States.

Figure 3-33 Debris Flow Overview Map of the Southwestern United States



EXPLANATION

LANDSLIDE INCIDENCE

- Low (less than 1.5% of area involved)
- Moderate (1.5%-15% of area involved)
- High (greater than 15% of area involved)

LANDSLIDE SUSCEPTIBILITY/INCIDENCE

- Moderate susceptibility/low incidence
- High susceptibility/low incidence
- High susceptibility/moderate incidence

Susceptibility not indicated where same or lower than incidence. Susceptibility to landsliding was defined as the probable degree of response of [the areal] rocks and soils to natural or artificial cutting or loading of slopes, or to anomalously high precipitation. High, moderate, and low susceptibility are delimited by the same percentages used in classifying the incidence of landsliding. Some generalization was necessary at this scale, and several small areas of high incidence and susceptibility were slightly exaggerated.

Debris Flow Hazard in El Dorado County

The topography of El Dorado County displays a wide range of landforms ranging from vertical cliffs to gently undulating foothills. Combined with often times complex underlying geology that gives rise to a wide range of surficial soil types, native topography can provide a challenging environment for safe development.

In general, the greater the existing slope the greater the overall threat of debris flow. The El Dorado County Geohazards Maps indicate general areas of the developable properties that has slopes in excess of 30%. It is to be expected that areas of greater than 30% slope will exist outside the delineated areas as will areas of less than 30% slope exist inside the delineated areas due to constraints imposed by the general nature of the USGS topographic maps that were used in the compilation of slopes. Local mapping of project areas is recommended in conjunction with geologic interpretation prior to the development of slopes in excess of 30%.

The diverse geology of El Dorado County includes areas underlain by serpentine. This generic rock type is particularly prone to slope failure as evidenced by native slope failures and failure of man-made slopes such as those experienced along the Highway 50 Corridor in the vicinity between Riverton and Strawberry. Slope failure of the steep slopes along the American River have littered the adjacent slopes with boulders and other debris. Typically limited to the slopes along the upper American River, development in this area should be done only after carefully considering appropriate setbacks from the break point where the topography dramatically changes. It is important to note that slope failure along Highway 50, as evidenced in January of 1997 even though within the boundaries of El Dorado County fell under Caltrans jurisdiction.

Downslope development on relatively flat land at the base of steep cliffs should occur only after the potential for rockfall is evaluated. Surface mapping of rock exposures along with observation of conditions in the local area of a project assists in the determination of site-specific areas subject to rockfall damage.

The above discussion concerning areas with potential debris flow hazard is limited to certain areas near cliff-like features or on very steep slopes, none of which are often subject to development. There have been reported incidents of debris flows and general slope failure in isolated portions of the County, but this is a very uncommon occurrence with no defined history of significant damages. Although the above discussion shows that portions of the privately owned and potentially

developable land of El Dorado County can include areas where debris flows could occur, it is not common to most areas. Overall, the hazard is much less than can be expected to occur in much of the more densely developed portions of the State (see Figure 4-77), where the geologic conditions are much more prone to landslide and general instability.

Flood: 100/500 year Vulnerability Assessment

Likelihood of Future Occurrence

100-year – Occasional

500-year - Unlikely

Vulnerability—High

Flooding is a significant problem in El Dorado County. Historically, the El Dorado County Planning Area has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred both within the 100- and 500-year floodplains and in other localized areas.

Historically, much of the growth in the County has occurred adjacent to streams, resulting in significant damages to property, and losses from disruption of community activities when the streams overflow. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in storm water runoff. Other problems connected with flooding and storm water runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Flood Hazard Assessment

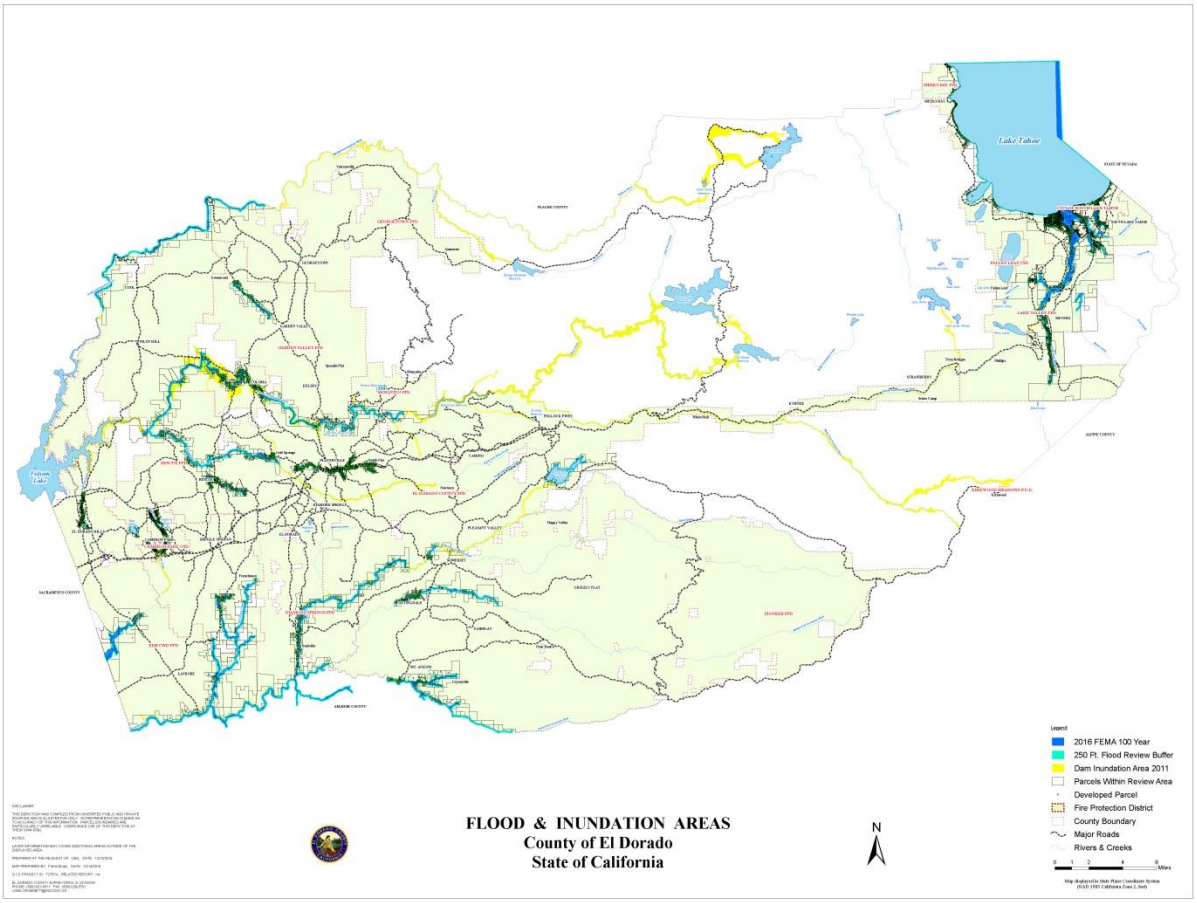
El Dorado County's flood potential is strongly affected by the physical geography of the County. Located on the western slope of the Sierra Nevada Mountain Range and in an area of moderate seasonal rainfall, the runoff characteristics of the watersheds strongly determine the possibility of flooding. The western areas of the county are made up mostly of rolling foothills. The eastern areas of the County are at higher elevations. The City of Placerville, the County Seat, is at about 2,000 feet above sea level, while the City of South Lake Tahoe is at about 6,500 feet elevation. Some mountain peaks in El Dorado County reach in excess of 10,000 feet. The elevation range for

the county is 200 to 10,881 feet above sea level. Due to the elevation of much of the watersheds of El Dorado County, much of the precipitation is in the form of snowfall, which melts over a long duration with snow prevailing at the higher elevations long into the summer. The overall slope of the watersheds is relatively steep, and most of the higher elevations of the County is owned or controlled by Federal agencies, and therefore not subject to private ownership or development. The seven watersheds that form El Dorado County are Lake Tahoe, the upper Carson River, lower American River, and North & South Forks of the American River, the upper Mokelumne River and the upper Cosumnes River. Most are dammed in the lower elevations along much of the stream courses, and are mostly contained within government or special district ownership. .

Therefore, except for a few tributaries, the larger rivers and the immediate environs are not in areas where much private development can occur. In addition, due to the overall gradient of the streams and rivers, they reside within relatively steep canyons or valleys, where very little floodplain has been formed. The Federal Emergency Management Agency (FEMA) has published Flood Information Rate Maps (FIRM), which are available to local jurisdictions to indicate where modeling has shown the 100-year floodplains to be

The following graphic, Figure 3-34 indicates where the 100-year floodplains exist in El Dorado County.

Figure 3-34, 100 year Floodplain in El Dorado County



Flood & Inundation Areas, County of El Dorado, Revised 12-14-16 by EDC GIS, Project ID# GI0072757A (https://edcapps.edcgov.us/maplibrary/html/gi0072757a.html)

Because of a lack of extensive low-lying areas and a great deal of upland areas, the majority of El Dorado County is not subject to flooding. The primary flood-prone areas on the west slope of the County are the following: South Fork, American River from Kyburz to Riverton and below Chili Bar Dam; Coloma Canyon Creek between Greenwood and Garden Valley; Weber Creek from Placerville to the American River, including Cold Springs, Dry; Creek, and Spring Creek tributaries; Shingle Creek from Shingle Springs to the Amador County line; Deer Creek from Cameron Park to Sacramento County line; Big Canyon Creek from El Dorado to the Cosumnes River, including the Slate, Little; Indian, and French Creek tributaries; New York Creek; Middle Fork of the Cosumnes River within the Somerset - Fair Play vicinity, and its confluence with the North Fork of the Cosumnes River; Cedar Creek from Omo Ranch to the Cosumnes River (FEMA 1996; Maurer, pers. comm., 2003).

Insurance Coverage, Claims Paid, and Repetitive Losses

In the past five years, since the previous publication of the 2012 LHMP, the State of California has experience drought conditions statewide. During the revision of the 2017 LHMP approximately 50 counties suffered major damages from strong winter storms and strong atmospheric river storms. The devastating storm conditions continued for approximately 1 ½ months causing major damages within the county and state. Public and private infrastructure was damaged in El Dorado County from large amounts of rain and snow melt causing slides, numerous road slippages, and flooding. El Dorado County proclaimed a local emergency for the whole time period and requested State and Federal assistance. At the time of the revision, a Federal Declaration was approved for the first of four damaging storms. Numerous affected counties are urging the state to ask for a Federal Declaration that covers all of storms that did significant damage. El Dorado County Operational Area alone has suffered damages from these storms in the area of $38,500,000.00 (based on IDE's).

In the past, specific areas in El Dorado County have been identified and/or experienced infrastructure damage including public, commercial, and residential buildings, roadways, utility delivery systems, and other infrastructure damage and associated costs due to flooding and severe winter storms. These areas include:

2005 - Approximate dollar value loss $100,000:

- City of South Lake Tahoe
- South Lake Tahoe Basin
- Myers
- Mosquito
- El Dorado
- Coloma

2006 - Approximate dollar value loss 1.5 million dollars:

- City of South Lake Tahoe
- City of Placerville
- Meeks Bay
- El Dorado
- Deer Creek

- Latrobe
- Georgetown
- Cameron Park
- Nashville
- Mount Aukum
- Sly Park (EID Campground)
- Rancho Ponderosa
- Camino Heights
- Pollock Pines
- Cool
- Garden Valley
- El Dorado Irrigation facilities and distribution systems

2007 - No flood/winter storm damage reported.

2008 - Approximate dollar value loss $525,000*:

- City of South Lake Tahoe
- City of Placerville
- South Lake Tahoe Basin
- Myers
- Camino
- Garden Valley
- Pollock Pines
- Grizzly Flat
- Omo Ranch
- Cameron Park
- Georgetown

*In addition to dollar value loss, there was loss of human life of a utility worker while engaged in restoring power to the Georgetown area as a direct result of winter storm damage in 2008.

2017 – Approximate dollar amount of $38,500,000:

- City of Placerville

- City of South Lake Tahoe
- Meyers
- Nashville
- Pollock Pines
- Cameron Park
- Sacramento Municipal Utility District
- El Dorado Irrigation District
- CalTrans
- EDC Department of Transportation
- EDC Parks and Recreation

Repetitive Losses- There have been 3 properties in El Dorado County that have experienced repetitive losses due to flooding during the listed years:

• Residence #1, Cameron Park, CA	1995 / 1997	$8,398.25
• Residence #2, Somerset, CA	1996 / 2005	$204,472.17
• Residence #3, El Dorado, CA	2017/2017	Approx. $75,000.00

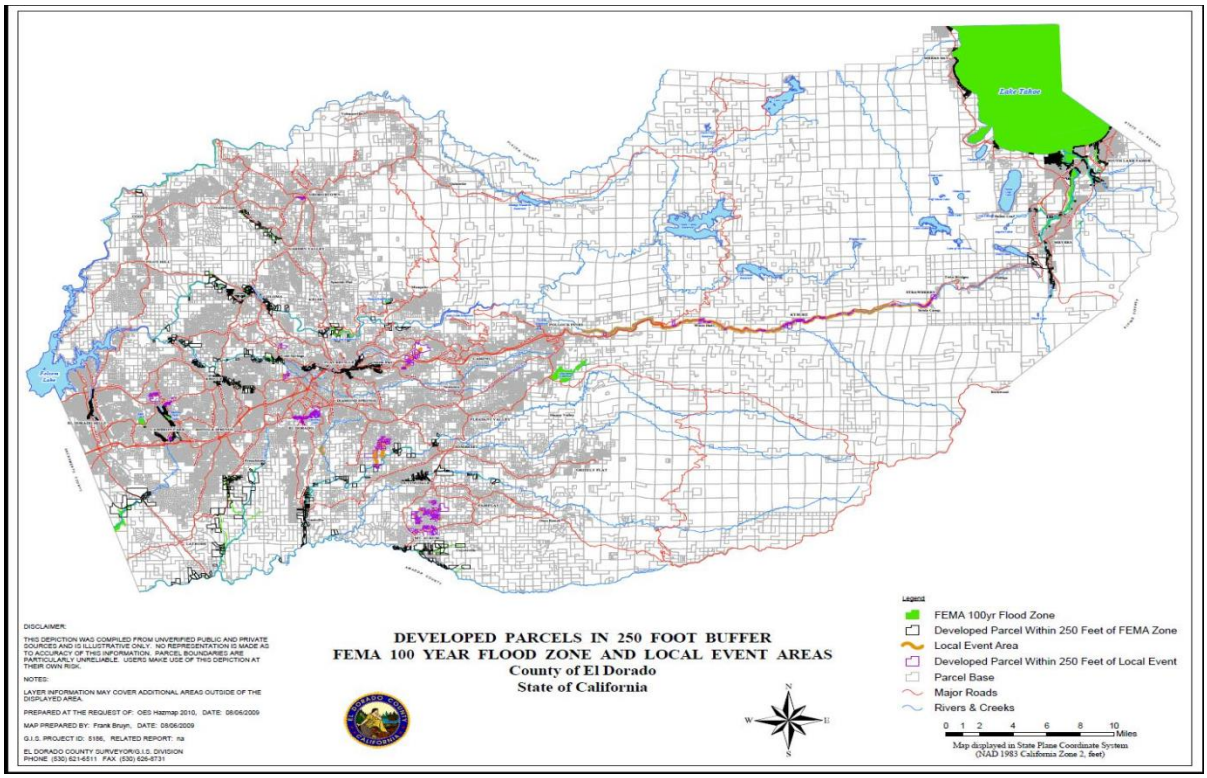
The current FEMA Flood Areas Map of El Dorado County (2016) has been compared to data documented from prior flooding events in order to assess potential property damage. These additional areas, which are not currently on the FEMA Flood Areas Map, have been noted on the El Dorado County GIS map Project # 5186 map titled, “Developed Parcels in 250 Foot Buffer FEMA 100 Year Flood Zone and Local Event Areas”. This data was used in conjunction with the FEMA Flood Area Map to identify El Dorado County’s flood vulnerability and risk assessment. As part of El Dorado County’s zoning requirements, a 250 foot buffer zone is used to assemble potential flood zones. All of the developed parcels and critical infrastructure that could be impacted by these flood zones have been identified utilizing Assessor records for value of property and experts on potential critical infrastructure. It is estimated El Dorado County’s total dollar loss would be approximately $1.7 billion for these identified areas.

El Dorado County does participate in the National Flood Insurance Program and a certificate is currently on file within El Dorado County Planning Department.

The following graphic, Figure 3-35 (Developed Parcels In 250 Foot Buffer FEMA 100 Year Flood

Zone & Local Event Areas, County of El Dorado, State of California, 8-06-09, GIS project #5186, El Dorado County Surveyor /G.I.S.) identifies the updated areas.

Figure 3-35



Overall Community Impact

Floods and their impacts vary by location and severity of any given flood event and will likely only affect certain areas of the County during specific times. Based on the risk assessment, it is evident that floods will continue to have potentially devastating economic impacts to certain areas of the County. However, many of the floods in the County are minor, localized flood events that are more of a nuisance than a disaster. Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure and services;
- Health hazards associated with mold and mildew, contamination of drinking water, etc.;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community;
- Negative impact on commercial and residential property values; and

- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.
- Impact on the overall mental/behavioral health of the community.

Future Development and Future Flood Conditions

Flood: Localized Stormwater Flooding Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Physical Environment:

Drainage Basins:
The west slope of El Dorado County contains three major watersheds, each of which drains into one of these major rivers: the Middle Fork American River, the South Fork American River, and the Cosumnes River. These watersheds are further divided into smaller drainage basins that feed the tributaries of these three major rivers. Developed drainage infrastructure exists in many of the drainage basins, particularly in the following nine drainage basins (Spiegelberg, pers. comm., 2003): Coloma Canyon between Greenwood and Garden Valley (7.5 square miles); Finnon Reservoir drainage (4 square miles); Weber Creek from the Pollock Pines area to the American River, including the Cold Springs, Dry Creek, and Spring Creek tributaries (40 square miles); Deer Creek from Cameron Park to the Sacramento County line (72 square miles); Big Canyon Creek from El Dorado to the Cosumnes River, including the Slate, Little Indian, and French Creek tributaries (36 square miles); Middle Fork of the Cosumnes River within the Somerset/Fair Play vicinity (23 square miles); Cedar Creek from Omo Ranch to the Cosumnes River (37 square miles); Jenkinson Reservoir drainage (18 square miles); New York Creek (2.6 square miles); and Allegheny Creek (1.9 square miles).

Storm Water Hazards
Flooding is the primary hazard related to storm water runoff. Urban development generally increases the amount of impervious surfaces. When rainfall or snowmelt exceeds the ground infiltration rate (i.e., the ability of the ground to absorb water), storm water runs off and collects in drainage facilities, which may be in the form of roadways, storm drains, and natural creeks and

rivers. The net effects of additional impervious surfaces are increases in the flow rate and volume of water in the drainage channels during and after a storm event. When the volume of water exceeds the capacity of the drainage channel to convey it, flooding can result. Hazards associated with localized flooding include the overtopping of roadways, inundation of areas near the drainage channels, and structural damage. Storm water runoff may also contribute to regional flooding.

Other problems connected with increased stormwater runoff include erosion, sedimentation, and degradation of water quality. Stormwater can become polluted by eroded soil, pesticides, paint, fertilizers, animal waste, litter, oil and other automotive fluids, and household chemicals. Increased stormwater runoff can increase erosion and facilitate the movement of pollutants and soils into bodies of water. Increased sedimentation may be a detriment to aquatic wildlife habitats, and the use of downstream water bodies for beneficial uses (e.g., recreation, irrigation, water consumption) may be impaired (EMD 2002a).

Regulatory/Planning Environment

Federal Programs

National Flood Insurance Program

El Dorado County participates in the National Flood Insurance Program (NFIP), a federal program administered by the Federal Emergency Management Agency (FEMA). Under the NFIP, the County is required to regulate for 100-year flood protection. A 100-year flood is considered a severe flood with a reasonable possibility of occurrence for purposes of land use planning, property protection, and human safety. The U.S. Army Corps of Engineers (USACE), under contract to FEMA, prepared a flood insurance study report and a series of Flood Insurance Rate Maps (FIRMs) for numerous county waterways. The study and maps depict the location of calculated 100-year flood zones, flood elevations, floodways, 500-year flood boundaries, and flood insurance rate zones. The County participates in the NFIP by reviewing specific development proposals to ensure that structures that may be in a 100-year floodplain are protected from flood damage and that any changes in the floodplain do not cause unacceptable increases in the elevation of the 100-year water surface (HDR Engineering 1995).

National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) permit program was established by the Clean Water Act of 1972 to regulate municipal and industrial discharges to surface waters of

the United States. The discharge of wastewater to surface waters is prohibited unless an NPDES permit allowing that discharge has been issued. The NPDES permit program is overseen by the U.S. Environmental Protection Agency's (EPA's) stormwater program; the State of California is authorized to administer the NPDES program within California. Starting in 1990, Phase I of EPA's stormwater program required NPDES permits for stormwater runoff from all of the following (EPA 2002): "medium" and "large" municipal separate storm sewer systems (MS4s) generally serving populations of 100,000 or greater and denoted by EPA as MS4s; construction activity disturbing 5 acres of land or greater, and ten categories of industrial activity.

Phase II of the NPDES permit program was the next step in EPA's effort to protect water resources from polluted stormwater runoff. The Phase II program expands the Phase I program by requiring smaller operators of MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted stormwater runoff (EPA 2002). The County submitted an application for the NPDES Phase II permit and participated in the voluntary project which resulted in a Draft report of "Voluntary Domestic Well Assessment Project". (http://www.waterboards.ca.gov/gama/docs/edc_draft120905version.pdf)

State Regulations

Subdivision Map Act (1907)

One of the powers granted to local jurisdictions by the Subdivision Map Act is the authority to impose drainage improvements or drainage fees and assessments. Specifically, local jurisdictions may require the provision of drainage facilities, proper grading and erosion control, dedication of land for drainage easements, or payment of fees needed for construction of drainage improvements. The types and applicable standards of the improvements may be specified in the local ordinance.

El Dorado County Regulation and Programs

County Grading, Erosion, and Sediment Control Ordinance

The County Grading, Erosion, and Sediment Control Ordinance (Grading Ordinance) (Chapter 15.14 of the County Code) establishes provisions for public safety and environmental protection associated with grading activities on private property. Section 15.14.090 of the Grading Ordinance, which has incorporated the recommended standards for drainage Best Management Practices (BMPs) from the High Sierra Resource Conservation and Development Council BMP guidelines handbook, prohibits grading activities that would cause flooding where it would not otherwise occur

or would aggravate existing flooding conditions. The Grading Ordinance also requires all drainage facilities, aside from those in subdivisions that are regulated by the County's Subdivision Ordinance, be approved by the County Department of Transportation. Pursuant to the ordinance, the design of the drainage facilities in the County must comply with the County of El Dorado Drainage Manual, as described below.

El Dorado County Subdivision Ordinance

The County's Subdivision Ordinance (El Dorado County Code Title 16) requires the submission of drainage plans prior to the approval of tentative maps for proposed subdivision projects. The drainage plans must include an analysis of upstream, onsite, and downstream facilities and pertinent details, and details of any necessary offsite drainage facilities. The tentative map must include data on the location and size of proposed drainage structures. In addition, drainage culverts consistent with the drainage plan may be required in all existing drainage courses, including roads.

El Dorado County Department of Transportation Drainage Program

The County Department of Transportation has an ongoing drainage program with a goal of developing a Capital Improvement Program and funding mechanism for the construction of essential drainage infrastructure and to repair and/or replace inadequate drainage facilities throughout the county. The first phase of the drainage program, development of standard procedures for drainage system designs, was completed with the adoption of the County of El Dorado Drainage Manual in 1995.

The second phase of the drainage program involves updating FEMA mapping of four specific drainage basins in the county: Deer Creek in Cameron Park, New York Creek in El Dorado Hills, Carson Creek in the El Dorado Hills Business Park, and the El Dorado Townsite. Three of these basin studies have been completed and are discussed below. These basin studies provide area-specific analysis and identify areas where drainage improvements are required. The third phase of the drainage program is the development of funding mechanisms to address drainage problems in the study areas. With funding mechanisms in place, capital improvement and maintenance programs can be implemented. The capital improvement program may establish methods of prioritizing existing and future drainage deficiencies and requirements with respect to potential damage, risk, and cost.

County of El Dorado Design and Improvement Standards Manual

The County's Design and Improvement Standards Manual was adopted in 1990 and provides required erosion and sediment control measures that are applicable to subdivisions, roadways, and other types of developments.

County of El Dorado Drainage Manual

The County of El Dorado Drainage Manual provides standard procedures for future designs of drainage improvements. The Drainage Manual supercedes the stormwater drainage system design standards in the County's Design Improvements Standards Manual. The Drainage Manual requires that a hydrologic and hydraulic analysis be submitted for all proposed drainage facilities. The analysis must include an introduction/background, location map/description, catchment description/delineation, hydrologic analysis, hydraulic and structural analysis, risk assessment/impacts discussion, unusual or special conditions, conclusions, and technical appendices. This analysis is usually required on projects undergoing discretionary review. However, under the Building Code and Grading Ordinance, the County also reviews ministerial development, including required drainage plans, to ensure that appropriate runoff design and controls are in place.

Drainage Basin Studies

Three regional drainage studies have been completed on the west slope. A study of the El Dorado townsite has not been completed.

Carson Creek Regional Drainage Study

The Final Report of the Carson Creek Regional Drainage Study (Bottorff 1996) was completed in 1996 for the 15-square-mile Carson Creek watershed, most of which is located in the southwestern portion of El Dorado County. The purpose of this drainage study is to provide a unified plan for stormwater management in the El Dorado County portion of the watershed. The study recognizes the drainage needs of individual projects, assesses the impacts of the proposed drainage improvements on the entire catchment area, and satisfies the requirements of the County of El Dorado Drainage Manual.

The Carson Creek Regional Drainage Study uses results from previous drainage studies within the watershed, as well as land use information and drainage improvements included in the previous studies, to develop a regional drainage model. The drainage study was based on the maximum

development allowed by the 1996 General Plan, and development projects that were proposed at that time. The study assumes that the portion of the watershed in Sacramento County would remain as open space. The study concluded that runoff for the 100-year storm would result in minor downstream impacts in Sacramento County and that the increase in existing flood inundation areas would be negligible. The study recommended that future drainage improvements be designed and analyzed in context of the regional drainage model. Specific drainage improvements, such as culvert upgrades, channel improvements, and construction of a regional detention storage facility were also recommended. (Bottorff 1996.)

New York Creek Basin Drainage Study

The New York Creek Basin Drainage Study (Ensign & Buckley 1995) analyzes the watershed of New York Creek and its Governor Drive tributary. Assumptions for future land uses within the watershed were based on data from the El Dorado Hills Specific Plan and the El Dorado Hills/Salmon Falls Area Plan. The study concluded that in order to minimize the overtopping of roadways during the 100-year peak flow condition, improvements would be required at eight roadway crossings across New York Creek and the Governor Drive tributary. Even with the construction of these improvements and regular maintenance activities (e.g., channel clearing), flooding and overtopping may occur at roadway crossings. This drainage study also included cost estimates for the recommended improvements.

Cameron Park Drainage Study

The Cameron Park Drainage Study analyzed the flooding potential of a 72-square-mile area in the upper reaches of Deer Creek in order to identify needed drainage channel improvements. The option of using detention to reduce peak flow was not analyzed. The General Plan land use map available during the preparation of the drainage study in 1995 was the source of future land use data in the Cameron Park Drainage Study, the hydrologic and hydraulic analyses of which were based on the full build out of the watershed consistent with the land use designations. The study concluded that 16 roadway crossings at the build out of the 1995 draft General Plan may experience overtopping during a 100-year storm event if culvert or detention improvements were not implemented. The study included recommended culvert improvements while also recommending further studies regarding using detention to reduce the peak flow. This drainage study also included cost estimates for the recommended culvert improvements (Psomas and Associates 1995). In practice, the potential for flooding may be less than identified by the study. The drainage study was based on the draft General Plan in 1995, which was similar to the 1996

General Plan. Discretionary developments in the study area subsequent to the drainage study have constructed detention improvements as required by the County's Drainage Manual (Pesses, pers. comm., 2003). Furthermore, some of the projects in the drainage study area have been built at lower densities than the maximum allowed; thereby decreasing the potential for flooding conditions (Spiegelberg, pers. comm., 2003).

El Dorado County Special Districts

California Government Code §25210 allows for the formation of county service areas in unincorporated areas, providing an alternative method of furnishing extended governmental services and the levy of taxes to pay for the extended services. The County has established Drainage Zones of Benefit, as well as Road and Drainage Zones of Benefit, that are managed by the County's General Services Department for the purpose of generating funding for the construction of community drainage facilities.

Worldwide interest in dam and levee safety has risen significantly in recent years. Aging infrastructure, new hydrologic information, and population growth in floodplain areas downstream from dams and near levees have resulted in an increased emphasis on safety, operation and maintenance.

Seiche Wave Vulnerability Assessment

Likelihood of Future Occurrence—Unlikely
Vulnerability—High

A Seiche wave (pronounced "saysh") is a standing wave in an enclosed or partially enclosed body of water. Seiches and seiche-related phenomena have been observed on lakes, reservoirs, swimming pools, bays and seas. The key requirement for formation of a seiche is that the body of water be at least partially bounded, allowing the formation of the standing wave. The term was promoted by the Swiss hydrologist François-Alphonse Forel in 1890, who was the first to make scientific observations of the effect in Lake Geneva, Switzerland. The word originates in a Swiss French dialect word that means "to sway back and forth", which had apparently long been used in the region to describe oscillations in alpine lakes. The Great Lakes of North America have seen Sieche wave activity within the past 20 years ranging from one foot to ten feet waves with noted injuries and some deaths. Lakes in seismically active areas, such as Lake Tahoe in California/Nevada, are significantly at risk from seiches. Geological evidence indicates that the shores of Lake Tahoe may have been hit by seiches and tsunamis as much as 10 m (33 feet) high in prehistoric times, and local researchers have called for the risk to be factored into emergency plans for the region.

Risk for a Seiche wave for the area, as well as potential losses due to a Seiche Wave impact, is considered to be low relative to much of California. As indicated by the seismic activity map, Figure 111-12, the region of the state where El Dorado County is located, just east of Lake Tahoe, seldom suffers the effects of even a 2.5 magnitude earthquake. Given the fact that there are not many homes built at the current lake level or on the immediate shores of Lake Tahoe, a Seiche Wave would cause little damage to homes in the Un-incorporated areas of El Dorado County. There would be substantial damage to infrastructure such as county roads and two state highways that run through El Dorado County, Highway 50 and Highway 89.

Given this recognized area vulnerability, the State of California hosted a Functional Exercise involving a Seiche Wave (called Golden Guardian 2008) that impacted the South shore of Lake Tahoe. The exercise evaluated numerous local and state government agencies in response to such an event. The exercise details and detailed After Action report for Golden Guardian 2008 were reviewed and considered in this vulnerability assessment.

Since there has not been a Seiche Wave on record in the Lake Tahoe area, it would be difficult to get an accurate estimate of damages such an event would cause. Some of the damages to infrastructure in this type of event would include repair and/or replace infrastructure such as roadways which would include manpower hours and resources to make the repairs. The size of the Seiche Wave would also dictate the amount of the debris removal cost to the County and/or State would incur.

A small (0.4-foot) wave surge was reported in Lake Tahoe during the 1966 Truckee earthquake, which had a Richter Scale magnitude of between 6.0 and 6.9.

Future Development

Development in areas located around the lake in potential seiche impact areas consist of primarily infill and redevelopment of both residential and commercial areas.

Severe Weather: Freeze and Snow Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Freeze and snow events happen in El Dorado County each year. Winter weather and freeze can occasionally be accompanied by high winds, which can cause downed trees and power lines, power outages, accidents, and road closures. Transportation networks, communications, and utilities infrastructure are the most vulnerable physical assets to impacts of severe winter weather in the County. The ability for the County to continue to operate during periods of winter storm and freeze is paramount. Vulnerable populations to winter weather and freeze include:

- Homeless
- Infants and children under age five
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals with impaired mobility

In addition to vulnerable populations, pets and livestock are at risk to freeze and cold. However many residents of El Dorado County are self-sufficient and accustomed to rural living and the climate extremes that are part of the territory. The residents of nursing homes and elder care facilities are especially vulnerable to extreme temperature events. It is encouraged that such facilities have emergency plans or backup power to address power failure during times of extreme cold and heavy snows.

The varying elevations in the County, in part, determine the extent to which a given area is affected by freeze and snow. The agricultural industry is especially vulnerable to extreme temperatures. Freezing temperatures can cause significant loss to crops, and excessive heat can cause high levels of mortality among livestock as well as damage to crops. Historically, extreme temperatures have caused large losses to agricultural crops and have resulted in several USDA disaster declarations.

Other impacts to the County as a result of winter snow storms include damage to infrastructure, frozen pipes, utility outages, road closures, traffic accidents, and interruption in business and school activities. Also of concern is the impact to populations with special needs such as the elderly

and those requiring the use of medical equipment. Delays in emergency response services can be of significant concern. Further, there are economic impacts associated with areas prone to heavy snow. Although the eastern portion of the county is the most vulnerable to the effects of snow, snowfall occurring in the lower elevations can create significant issues, as residents working and living in those areas may not be as prepared for snowfall.

Future Development

Future development built to code (for those areas with building codes) should be able to withstand snow loads from severe winter storms. Pipes at risk of freezing should be mitigated be either burying or insulating them from freeze as new facilities are improved or added. Current County codes provide such provisions for new construction. Vulnerability to extreme cold will increase as the average age of the population in the County shifts. Greater numbers of future senior citizens will result from the large number of baby boomers in the Planning Area. However, as previously mentioned, many of the residents of El Dorado County are self-sufficient and accustomed to rural living. An updated snow removal plan including an assessment of available snow removal equipment will be important as development occurs in more remote areas of the County.

Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning/Wind/Tornadoes) Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely

Vulnerability—High

According to historical hazard data, severe weather is an annual occurrence in El Dorado County. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrences in the County. Wind and lightning often accompany these storms and have caused damage in the past. However, actual damage associated with the primary effects of severe weather have been limited. It is the secondary hazards caused by weather, such as floods, fire, and agricultural losses that have had the greatest impact on the County. The risk and vulnerability associated with these secondary hazards are discussed in other sections of this plan (Section 3.3.10 Flood: 100/500-year, Section 3.3.11 Flood: Localized Stormwater, and Section 3.3.5 Dam Failure).

Future Development

New critical facilities should be built to withstand hail damage, lightning, and thunderstorm winds. While minimal damages have occurred to critical facilities in the past due to lightning, hail, or high winds and tornadoes, there still remains future risk. With development occurring in the region, future losses to new development may occur.

Wildfire Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Extremely High

Any fire occurring in vegetation areas regardless of ignition sources. A wildfire responds to the weather, topography, and fuels in its environment. Under extreme burning conditions, the behavior of a wildfire can be so powerful and unpredictable that fire protection agencies can only wait until conditions moderate before suppression actions can be taken. Since the fire itself, weather and topography cannot be mitigated that leaves us with the fuel to mitigate. Wildland fire fuel can be anything from the forest, to residential structures and fortunately they can be modified to mitigate the wildland fire hazard.

Wildfire is our greatest concern as these disaster events have impacted our county on numerous occasions, and as recently as 2014 with two separate devastating fires. The Sand fire in South County burned 4,240 acres of land, destroyed 19 homes, and 47 outbuildings before it was contained. The King fire was in the Pollock Pines area burning 97,717 acres of forest, destroying 15 homes, and 86 outbuildings including 2 historical cabins. Our wildland fire threat is so severe we devoted an entire section of this plan to that one specific hazard.

See section titled “Wildland Fire Hazard Mitigation Plan” submitted by the El Dorado County Fire Safe Council and AEU CAL FIRE for a comprehensive discussion of this hazard.

Future Development

Development in areas identified as high wildfire risk areas should planned appropriately and considered given previous occurrences of fire and fire behavior in the State. Planning for evacuation routes should be considered with any new developments.

Capability Assessment

Thus far, the planning process has identified the natural hazards posing a threat to the Planning Area and described, in general, the vulnerability of the County to these risks. The next step is to assess what loss prevention mechanisms are already in place. This part of the planning process is the mitigation capability assessment. Combining the risk assessment with the mitigation capability assessment results in the County’s net vulnerability to disasters, and more accurately focuses the goals, objectives, and proposed actions of this plan.

El Dorado County General Plan (July 19, 2004)

A general plan is a legal document, required by state law, that serves as a community's "constitution" for land use and development. The plan must be a comprehensive, long-term document, detailing proposals for the "physical development of the county or city, and of any land outside its boundaries which in the planning agency's judgment bears relation to its planning" (Government Code §65300 et seq.). Time horizons vary, but the typical general plan looks 10 to 20 years into the future. The law specifically requires that the general plan address seven topics or "elements." These are land use, circulation (transportation), housing, conservation, open space, noise, and safety. The plan must analyze issues of importance to the community, set forth policies in text and diagrams for conservation and development, and outline specific programs for implementing these policies. Goals and policies related to mitigation from the General Plan are the following:

Public Facilities Element

GOAL 5.4: STORM DRAINAGE Manage and control storm water runoff to prevent flooding, protect soils from erosion, prevent contamination of surface waters, and minimize impacts to existing drainage infrastructure.

OBJECTIVE 5.4.1: DRAINAGE AND FLOOD MANAGEMENT PROGRAM

Initiate a County-wide drainage and flood management program to prevent flooding, protect soils from erosion, and minimize impacts on existing drainage facilities.

Policy 5.4.1.1: Require storm drainage systems for discretionary development that protect public health and safety, preserve natural resources, prevent erosion of adjacent and downstream lands, prevent the increase in potential for flood hazard or damage on either adjacent, upstream or downstream properties, minimize impacts to existing facilities, meet the National Pollution Discharge Elimination System (NPDES) requirements, and preserve natural resources such as wetlands and riparian areas.

Policy 5.4.1.2: Discretionary development shall protect natural drainage patterns, minimize erosion, and ensure existing facilities are not adversely impacted while retaining the aesthetic qualities of the drainage way.

Policy 5.4.1.3: The County will evaluate the funding requirements for a maintenance, operation, and infrastructure replacement program for regionally effective storm water drainage management.

GOAL 5.7: EMERGENCY SERVICES

Adequate and comprehensive emergency services, including fire protection, law enforcement, and emergency medical services.

OBJECTIVE 5.7.1: FIRE PROTECTION (COMMUNITY REGIONS)

Ensure sufficient emergency water supply, storage, and conveyance facilities are available, and that adequate access is provided for, concurrent with development.

Policy 5.7.1.1: Prior to approval of new development, the applicant will be required to demonstrate that adequate emergency water supply, storage, conveyance facilities, and access for fire protection either are or will be provided concurrent with development.

OBJECTIVE 5.7.2: FIRE PROTECTION (RURAL REGIONS AND RURAL CENTERS)

Sufficient emergency water supply, storage, and conveyance facilities for fire protection, together with adequate access are available, or are provided for, concurrent with development.

Policy 5.7.2.1: Prior to approval of new development, the responsible fire protection district shall be requested to review all applications to determine the ability of the district to provide protection services. The ability to provide fire protection to existing development shall not be reduced below acceptable levels as a consequence of new development. El Dorado County General Plan Public Services and Utilities Element July 2004 (Amended December 2015) Page 101 Recommendations such as the need for additional equipment, facilities, and adequate access may be incorporated as conditions of approval.

OBJECTIVE 5.7.3: LAW ENFORCEMENT

An adequate, comprehensive, coordinated law enforcement system consistent with the needs of the community.

Policy 5.7.3.1: Prior to approval of new development, the Sheriff's Department shall be requested to review all applications to determine the ability of the department to provide protection services. The ability to provide protection to existing development shall not be reduced below acceptable levels as a consequence of new development. Recommendations such as the need for additional equipment, facilities, and adequate access may be incorporated as conditions of approval.

OBJECTIVE 5.7.4: MEDICAL EMERGENCY SERVICES

Adequate medical emergency services available to serve existing and new development recognizing that levels of service may differ between Community Regions, and Rural Centers and Regions.

Policy 5.7.4.1: Prior to approval of new development, the applicant shall be required to demonstrate that adequate medical emergency services are available and that adequate emergency vehicle access will be provided concurrent with development.

Policy 5.7.4.2: Prior to approval of new development, the Emergency Medical Services Agency shall be requested to review all applications to determine the ability of the department to provide protection services. The ability to provide protection to existing development shall not be reduced below acceptable levels as a consequence of new development. Recommendations such as the need for additional equipment, facilities, and adequate access may be incorporated as conditions of approval.

Conservation and Open Space Element

GOAL 7.1: SOIL CONSERVATION Conserve and protect the County's soil resources.

OBJECTIVE 7.1.1: SOILS Long-term soil productivity.

Policy 7.1.1.1: Conserve and maintain important agricultural soils for existing and potential agricultural and forest uses by limiting non-agricultural/non-forestry development on those soils.

OBJECTIVE 7.1.2: EROSION/SEDIMENTATION Minimize soil erosion and sedimentation.

Policy 7.1.2.1: Development or disturbance of slopes over 30% shall be restricted. Standards for implementation of this policy, including but not limited to exceptions for access, reasonable use of the parcel, and agricultural uses shall be incorporated into the Zoning Ordinance

Policy 7.1.2.2: Discretionary and ministerial projects that require earthwork and grading, including cut and fill for roads, shall be required to minimize erosion and sedimentation, conform to natural contours, maintain natural drainage patterns, minimize impervious surfaces, and maximize the retention of natural vegetation. Specific standards for minimizing erosion and sedimentation shall be incorporated into the Zoning Ordinance.

Policy 7.1.2.3: Enforce Grading Ordinance provisions for erosion control on all development projects and adopt provisions for ongoing, applicant-funded monitoring of project grading.

Policy 7.1.2.4: Cooperate with and encourage the activities of the three Resource Conservation Districts in identifying critical soil erosion problems and pursuing funding sources to resolve such problems.

Policy 7.1.2.5: The Department of Transportation, in conjunction with the Resource Conservation Districts and Soil Conservation District, shall develop a road-side maintenance program to manage roads in a manner that maintains drainage and protects surface waters while reducing road-side weed problems.

Policy 7.1.2.6: The County shall encourage the Soil Conservation Service to update the 1974 Soil Survey and to digitize all soils mapping units on the Geographic Information System (GIS).

Policy 7.1.2.7: The County shall require agricultural grading activities that convert one acre or more of undisturbed vegetation to agricultural cropland to obtain an agricultural permit through the Agricultural Commissioner's office which may require approval of the Agricultural Commission. All erosion control measures included in the agricultural permit would be implemented. All agricultural practices, including fuel reduction and fire protection, that do not change the natural contour of the land and that use "best management practices" as recommended by the County Agricultural Commission and adopted by the Board of Supervisors shall be exempt from this policy.

GOAL 7.3: WATER QUALITY AND QUANTITY

Conserve, enhance, and manage water resources and protect their quality from

degradation.

OBJECTIVE 7.3.1: WATER RESOURCE PROTECTION Preserve and protect the supply and quality of the County's water resources including the protection of critical watersheds, riparian

zones, and aquifers.
Policy 7.3.1.1: Encourage the use of Best Management Practices, as identified by the Soil Conservation Service, in watershed lands as a means to prevent erosion, siltation, and flooding.

Policy 7.3.1.2: Establish water conservation programs that include both drought tolerant landscaping and efficient building design requirements as well as incentives for the conservation and wise use of water.

Policy 7.3.1.3: The County shall develop the criteria and draft an ordinance to allow and encourage the use of domestic gray water for landscape irrigation purposes. (See Title 22 of the State Water Code and the Graywater Regulations of the Uniform Plumbing Code).

OBJECTIVE 7.3.3: WETLANDS Protection of natural and man-made wetlands, vernal pools, wet meadows, and riparian areas from impacts related to development for their importance to wildlife habitat, water purification, scenic values, and unique and sensitive plant life.

Policy 7.3.3.1: For projects that would result in the discharge of material to or that may affect the function and value of river, stream, lake, pond, or wetland features, the application shall include a delineation of all such features. For wetlands, the delineation shall be conducted using the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual

Policy 7.3.3.3: The County shall develop a database of important surface water features, including lake, river, stream, pond, and wetland resources.

Policy 7.3.3.4: The Zoning Ordinance shall be amended to provide buffers and special setbacks for the protection of riparian areas and wetlands. The County shall encourage the incorporation of protected areas into conservation easements or natural resource protection areas. Exceptions to riparian and wetland buffer and setback requirements shall be provided to permit necessary road and bridge repair and construction, trail construction, and other recreational access structures such as docks and piers, or where such buffers deny reasonable use of the property, but only when appropriate mitigation measures and Best Management Practices are incorporated into the project. Exceptions shall also be provided for horticultural and grazing activities on agriculturally zoned lands that utilize “best management practices (BMPs)” as recommended by the County Agricultural Commission and adopted by the Board of Supervisors. Until standards for buffers and special setbacks are established in the Zoning Ordinance, the County shall apply a minimum setback of 100 feet from all perennial streams, rivers, lakes, and 50 feet from intermittent streams and wetlands. These interim standards may be modified in a particular instance if more detailed information relating to slope, soil stability, vegetation, habitat, or other site- or project-specific conditions supplied as part of the review for a specific project demonstrates that a different setback is necessary or would be sufficient to protect the particular riparian area at issue. For projects where the County allows an exception to wetland and riparian buffers, development in or immediately adjacent to such features shall be planned so that impacts on the resources are minimized. If avoidance and minimization are not feasible, the County shall make findings, based on documentation provided by the project proponent, that avoidance and minimization are infeasible.

Policy 7.3.3.5: Rivers, streams, lakes and ponds, and wetlands shall be integrated into new development in such a way that they enhance the aesthetic and natural character of the site while disturbance to the resource is avoided or minimized and fragmentation is limited.

OBJECTIVE 7.3.4: DRAINAGE Protection and utilization of natural drainage patterns.

Policy 7.3.4.1: Natural watercourses shall be integrated into new development in such a way that they enhance the aesthetic and natural character of the site without disturbance.

Policy 7.3.4.2: Modification of natural stream beds and flow shall be regulated to ensure that adequate mitigation measures are utilized.

OBJECTIVE 7.3.5: WATER CONSERVATION Conservation of water resources, encouragement of water conservation, and construction of wastewater disposal systems designed to reclaim and re-use treated wastewater on agricultural crops and for other irrigation and wildlife enhancement projects.

Policy 7.3.5.1: Drought-tolerant plant species, where feasible, shall be used for landscaping of commercial development. Where the use of drought tolerant native plant species is feasible, they should be used instead of non-native plant species.

Policy 7.3.5.2: A list of appropriate local indigenous drought tolerant plant materials shall be maintained by the County Planning Department and made available to the public.

Policy 7.3.5.3: The County Parks and Recreation Division shall use drought tolerant landscaping for all new parks and park improvement projects.

Policy 7.3.5.4: Require efficient water conveyance systems in new construction. Establish a program of ongoing conversion of open ditch systems shall be considered for conversion to closed conduits, reclaimed water supplies, or both, as circumstances permit.

Policy 7.3.5.5: Encourage water reuse programs to conserve raw or potable water supplies consistent with State Law.

Safety Element

GOAL 6.1: COORDINATION

A coordinated approach to hazard and disaster response planning.

OBJECTIVE 6.1.1: EL DORADO COUNTY MULTI-JURISDICTIONAL LOCAL

HAZARD MITIGATION PLAN The El Dorado County Multi-Jurisdictional Local Hazard Mitigation Plan shall serve as the implementation program for this Goal.

Policy 6.1.1.1: The El Dorado County Multi-jurisdictional Local Hazard Mitigation Plan (LHMP) shall serve as the implementation program for the coordination of hazard planning and disaster response efforts within the County and is incorporated by reference to this Element. The County will ensure that the

LHMP is updated on a regular basis to keep pace with the growing population.

GOAL 6.2: FIRE HAZARDS

Minimize fire hazards and risks in both wildland and developed areas.

OBJECTIVE 6.2.1: DEFENSIBLE SPACE

All new development and structures shall meet “defensible space” requirements and adhere to fire code building requirements to minimize wildland fire hazards.

Policy 6.2.1.1: Implement Fire Safe ordinance to attain and maintain defensible space through conditioning of tentative maps and in new development at the final map and/or building permit stage.

Policy 6.2.1.2: Coordinate with the local Fire Safe Councils, California Department of Forestry and Fire Protection, and federal and state agencies having land use jurisdiction in El Dorado County in the development of a countywide fuels management strategy.

OBJECTIVE 6.2.2: LIMITATIONS TO DEVELOPMENT

Regulate development in areas of high and very high fire hazard as designated by the California Department of Forestry and Fire Prevention Fire Hazard Severity Zone Maps.

Policy 6.2.2.1: Fire Hazard Severity Zone Maps shall be consulted in the review of all projects so that standards and mitigation measures appropriate to each hazard classification can be applied. Land use densities and intensities shall be determined by mitigation measures in areas designated as high or very high fire hazard.

Policy 6.2.2.2: The County shall preclude development in areas of high and very high wildland fire hazard or in areas identified as “urban wildland interface communities within the vicinity of Federal lands that are a high risk for wildfire,” as listed in the Federal Register of August 17, 2001, unless such development can be adequately protected from wildland fire hazard, as demonstrated in a Fire Safe Plan prepared by a Registered Professional Forester (RPF) and approved by the local Fire Protection District and/or California Department of Forestry and Fire Protection.

OBJECTIVE 6.2.3: ADEQUATE FIRE PROTECTION

Application of uniform fire protection standards to development projects by fire districts.

Policy 6.2.3.1: As a requirement for approving new development, the County must find, based on information provided by the applicant and the responsible fire protection district that, concurrent with development, adequate emergency water flow, fire access, and firefighting personnel and equipment will be available in accordance with applicable State and local fire district standards.

Policy 6.2.3.2: As a requirement of new development, the applicant must demonstrate that adequate access exists, or can be provided to ensure that emergency vehicles can access the site and private vehicles can evacuate the area.

Policy 6.2.3.3: Day care centers shall be subject to conformance with all applicable sections of Title 19 of the Fire Code.

Policy 6.2.3.4: All new development and public works projects shall be consistent with applicable State Wildland Fire Standards and other relevant State and federal fire requirements.

OBJECTIVE 6.2.4: AREA-WIDE FUEL MANAGEMENT PROGRAM

Reduce fire hazard through cooperative fuel management activities.

Policy 6.2.4.1: Discretionary development within high and very high fire hazard areas shall be conditioned to designate fuel break zones that comply with fire safe requirements to benefit the new and, where possible, existing development.

Policy 6.2.4.2: The County shall cooperate with the California Department of Forestry and Fire Protection and local fire protection districts to identify opportunities for fuel breaks in zones of high and very high fire hazard either prior to or as a component of project review.

OBJECTIVE 6.2.5: FIRE PREVENTION EDUCATION

Inform and educate homeowners regarding fire safety and prevention.

Policy 6.2.5.1: The County shall cooperate with the U.S. Forest Service, California Department of Forestry and Fire Protection, and local fire districts in fire prevention education programs.

GOAL 6.3: GEOLOGIC AND SEISMIC HAZARDS

Minimize the threat to life and property from seismic and geologic hazards.

OBJECTIVE 6.3.1: BUILDING AND SITE STANDARDS

Adopt and enforce development regulations, including building and site standards, to protect against seismic and geologic hazards.

Policy 6.3.1.1: The County shall require that all discretionary projects and all projects requiring a grading permit, or a building permit that would result in earth disturbance, that are located in areas likely to contain naturally occurring asbestos (based on mapping developed by the California Department of Conservation [DOC]) have a California-registered geologist knowledgeable about asbestos-containing formations inspect the project area for the presence of asbestos using appropriate test methods. The County shall amend the Erosion and Sediment Control Ordinance to include a section that addresses the reduction of thresholds to an appropriate level for grading permits in areas likely to contain naturally occurring asbestos (based on mapping developed by the DOC). The Department of Transportation and the County Air Quality Management District shall consider the requirement of posting a warning sign at the work site in areas likely to contain naturally occurring asbestos based on the mapping developed by the DOC.

Policy 6.3.1.2: The County shall establish a mandatory disclosure program, where potential buyers and sellers of real property in all areas likely to contain naturally occurring asbestos (based on

mapping developed by the California Department of Conservation [DOC]) are provided information regarding the potential presence of asbestos subject to sale. Information shall include potential for exposure from access roads and from disturbance activities (e.g., landscaping).

Policy 6.3.1.3: The County Environmental Management Department shall report annually to the Board of Supervisors regarding new information on asbestos and design an information outreach program.

OBJECTIVE 6.3.2: COUNTY-WIDE SEISMIC HAZARDS

Continue to evaluate seismic related hazards such as liquefaction, landslides, and avalanche, particularly in the Tahoe Basin.

Policy 6.3.2.1: The County shall maintain updated geologic, seismic and avalanche hazard maps, and other hazard inventory information in cooperation with the State Office of Emergency Services, California Department of Conservation--Division of Mines and Geology, U.S. Forest Service, Caltrans, Tahoe Regional Planning Agency, and other agencies as this information is made available. This information shall be incorporated into the El Dorado County Operational Area Multi-Hazard Functional Emergency Operations Plans.

Policy 6.3.2.2: Future subdivision in the area around Fallen Leaf Lake shall be precluded.

Policy 6.3.2.3: An avalanche overlay zone shall be established and applied to all residential areas subject to avalanche. All new structures located within avalanche susceptible areas shall be designed to withstand the expected forces of such an event.

Policy 6.3.2.5: Applications for development of habitable structures shall be reviewed for potential hazards associated with steep or unstable slopes, areas susceptible to high erosion, and avalanche risk. Geotechnical studies shall be required when development may be subject to geological hazards. If hazards are identified, applicants shall be required to mitigate or avoid identified hazards as a condition of approval. If no mitigation is feasible, the project will not be approved.

GOAL 6.4: FLOOD HAZARDS Protect the residents of El Dorado County from flood hazards.

OBJECTIVE 6.4.1: DEVELOPMENT REGULATIONS

Minimize loss of life and property by regulating development in areas subject to flooding in accordance with Federal Emergency Management Agency (FEMA) guidelines, California law, and the El Dorado County Flood Damage Prevention Ordinance.

Policy 6.4.1.1: The County shall continue participation in the National Flood Insurance Program and application of flood plain zoning regulations.

Policy 6.4.1.2: The County shall identify and delineate flood prone study areas discovered during the completion of the master drainage studies or plans.

Policy 6.4.1.3: No new critical or high occupancy structures (e.g., schools, hospitals) shall be located in the 100-year floodplain of any river, stream, or other body of water.

Policy 6.4.1.4: Creation of new parcels which lie entirely within the 100-year floodplain as identified on the most current version of the flood insurance rate maps provided by FEMA or dam failure inundation areas as delineated in dam failure emergency response plans maintained by the County shall be prohibited.

Policy 6.4.1.5: New parcels which are partially within the 100-year floodplain or dam failure inundation areas as delineated in dam failure emergency response plans maintained by the County must have sufficient land available outside the FEMA or County designated 100-year floodplain or the dam inundation areas for construction of dwelling units, accessory structures, and septic systems. Discretionary applications shall be required to determine the location of the designated 100-year Floodplain and identified dam failure inundation areas on the subject property.

OBJECTIVE 6.4.2: DAM FAILURE INUNDATION

Protect life and property of County residents below dams.

Policy 6.4.2.1: Apply a zoning overlay for areas located within dam failure inundation zones as identified by the State Department of Water Resources Division of Safety of Dams.

Policy 6.4.2.2: No new critical or high occupancy structures (e.g., schools, hospitals) should be located within the inundation area resulting from failure of dams identified by the State Department of Water Resources Division of Safety of Dams.

El Dorado County Ordinances

The El Dorado County General Plan provides policy direction for land use, development, open space protection, and environmental quality; however, this policy direction must be carried out through numerous ordinances, programs, and agreements. The following ordinances are among the most important tools for implementing the General Plan and/or are critical to the mitigation of hazards identified in this plan.

Emergency Organizations and Functions (Chapter 2.21)

Sec. 2.21.010. - Purpose.

The declared purposes of this chapter are to provide for the preparation and carrying out of plans for the protection of persons and property within the County in the event of an emergency and to provide for the coordination of the emergency functions of the County with any incorporated city within the County (currently the City of Placerville and the City of South Lake Tahoe) and all other affected public agencies, corporations and organizations within the County in compliance with the California Emergency Services Act.

Sec. 2.21.020. - Definitions.

As used in this chapter, "emergency" is defined as the actual or threatened existence of conditions of disaster or of extreme peril to the safety of persons or property within the county caused by such conditions as fire, flood, storm, earthquake, drought, air pollution, epidemic, riot, sudden or severe energy shortage or other conditions including conditions resulting from war or imminent threat of war, which conditions are or are likely to be beyond the control of the services, personnel, equipment, and facilities of the county, requiring the combined forces of other political subdivisions to combat or mitigate.

Sec. 2.21.030. - Office of Emergency Services, Director of the Office of Emergency Services—Office created.

A. There is hereby created the County of El Dorado Office of Emergency Services.

B. The Director (hereinafter referred to as "Director") of the Office of Emergency Services shall be the Sheriff.

Sec. 2.21.040. - Director—Powers and duties.

A. The Director shall coordinate the efforts of the emergency organization of the County, as defined in Section 2.21.100, for the accomplishment of the purposes of this chapter in compliance with the California Emergency Services Act.

B. The Director is responsible for the coordination of services and staff of the emergency organization of the County; and may resolve questions of authority and responsibility that may arise between them.

C. The Director shall represent the County in all dealings with public or private agencies on matters pertaining to emergencies as defined in this chapter.

D. The Director shall designate the order of succession to that office, to take effect in the event the Director is unavailable to attend meetings and otherwise perform his or her duties during an emergency. The order of succession, and any subsequent changes thereto, shall be stated in the County Emergency Operations Plan and approved by the Board of Supervisors.

E. The Director is authorized to request the Board of Supervisors to proclaim the existence of a local emergency. The Director may proclaim the existence of a local emergency if the Board of Supervisors is not in session. Whenever a local emergency is proclaimed by the Director, the Board of Supervisors shall take action to ratify the proclamation within seven days thereafter or the proclamation shall have no further force or effect.

F. In the event of the proclamation of a state of emergency by the Governor, or the Director of California Office of Emergency Services (Cal OES), the existence of a state of war emergency, or when a local emergency as defined in Section 2.21.020 has been proclaimed to exist, the Director is empowered:

1. To make and issue rules and regulations on matters reasonably related to the protection of life and property as affected by the emergency; provided, however, the rules and regulations must be confirmed at the earliest practicable time by the Board of Supervisors.

2. To obtain vital supplies, equipment and such other properties found lacking and needed for the protection of life and property and to bind the County for the fair value thereof and, if required immediately, to commandeer them for public use.

3. To require the emergency services of any County officer or employee and, in the event of the proclamation of a state of emergency, to command the aid of as many citizens of the County as he or she deems necessary in execution of his or her duties. Such persons shall be entitled to all privileges, benefits, and immunities as are provided by state law for registered disaster service workers.

4. To requisition necessary personnel or material of any County department or agency.

5. To execute all of his or her ordinary power as Sheriff and all of the special powers conferred upon him or her by this statute, by any agreement approved by the Board of Supervisors, and by any other lawful authority.

Sec. 2.21.060. - Disaster Council—Created.

There is created the County of El Dorado Disaster Council.

State Law reference— Disaster Councils, Government Code § 8610.

Sec. 2.21.070. - Disaster Council—Membership.

Membership on the Disaster Council shall consist of the following:

A. The Director of the Office of Emergency Services or designee shall be Chair.

B. The El Dorado County Operational Area Fire and Rescue Coordinator or designee shall be Vice Chair. This position is appointed by the El Dorado County Fire Chiefs Association.

C. One representative or designee from each incorporated city within the County, to be appointed by the respective City Managers.

D. The Chief Administrative Officer of the County, or designee.

Sec. 2.21.080. - Disaster Council—Powers and duties.

The Disaster Council shall have the duty and the authority, and is so empowered to develop, review and recommend for adoption by the Board of Supervisors, emergency services plans and agreements. The Council shall also be responsible for recommendations of plans that pertain to state and local emergencies; it shall recommend revisions and updates to the County Emergency Operation Plan, Emergency and Mutual Aid Plan and agreements and recommending ordinances or resolutions which are necessary for the implementation of such plans and agreements. The Disaster Council shall also facilitate the exchange of information between emergency first responders and emergency planning personnel.

Fire Prevention (Chapter 8.08)

Section 020, Fire Hazards

This fire hazards ordinance requires all structures to maintain a fire break or clearing for a distance of 30 feet from the structure and keep the roofs free from all flammable debris. This part also sets requirements for burning permits, smoking restrictions in fire danger areas, and for the use and possession of fireworks.

Landscaping Standards (Chapter 130.33)

This Chapter identifies the use types which require the submittal of landscape plans, subject to the adopted Landscaping and Irrigation Standards (Resolution 198-2015), prior to the issuance of a building permit. Additionally, the Chapter contains landscaping standards to comply with the Water Conservation in Landscaping Act: Model Water Efficient Landscape Ordinance (California Government Code 65591—65599).

Development Impact Mitigation Fees for Special Districts (Chapter 13.20)

This chapter sets forth the requirements for the establishment and administration of development impact mitigation fees collected by the County on behalf of a Special District within the County. For purposes of this chapter, "Special District" includes a fire improvement district, a community services district, a recreation and park district, or any other public agency authorized by law to provide fire protection, public recreation, or any other community service. A Special District may request the establishment and administration of a development impact mitigation fee under this chapter only if the Special District lacks statutory authority to independently impose a development impact mitigation fee.

Grading, Erosion, and Sediment Control (Chapter 110.14)

The ordinance from which this chapter is derived is enacted for the purpose of regulating grading within the unincorporated area of the County to safeguard life, limb, health, property and public welfare; to avoid pollution of watercourses; and to ensure that the intended use of a graded site is consistent with the County general plan, any specific plans adopted thereto, the adopted stormwater management plan, State fire safe standards and applicable County ordinances including the zoning regulations set forth in Title 130 and the California Building Code.

This chapter establishes the administrative procedures for issuance of permits; and provides for approval of plans and inspection of grading construction. This chapter is not intended to supersede or otherwise preempt any applicable local, State, or Federal law or regulation. Where conflicts may occur between this chapter and such laws or regulations, the most restrictive shall apply.

Flood Damage Prevention Regulations (Chapter 130.32)

This Chapter implements General Plan Policy 6.4.1.1 requiring continued participation in the National Flood Insurance Program in order to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas. This Chapter serves to provide legally enforceable regulations applied uniformly throughout the community to all publicly and privately owned land within flood prone areas. These regulations are designed to:

1. Protect human life and health;

2. Minimize expenditure of public money for costly flood-control projects;

3. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

4. Minimize prolonged business interruptions;

5. Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in areas of special flood hazard;

6. Help maintain a stable tax base by providing for the sound use and development of special flood hazard areas so as to minimize future blighted areas caused by flood damage;

7. Ensure that potential buyers are notified that property is in a special flood hazard area;

8. Ensure that those who occupy the special flood hazard areas assume responsibility for their actions.

In order to accomplish its purposes, this Chapter includes regulations to:

1. Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion, or in flood heights or velocities;

2. Require that uses vulnerable to floods, including facilities that serve such uses, be protected against flood damage at the time of initial construction;

3. Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;

4. Control the filling, grading, dredging, and other development which may increase flood damage; and

5. Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

Subdivisions: Design Standards and Improvements (Chapter 120.04)

El Dorado County's subdivision ordinance regulates the design and improvement of land divisions and the dedication of public improvements needed in connection with land divisions. The ordinance includes provisions for the following hazard-related issues: erosion control, flooding and drainage, water supply, and fire suppression.

Zoning Ordinance (Chapter 130.10)

The purpose of the zoning ordinance is to classify and regulate the best use of buildings, structures, and land in the unincorporated area of El Dorado County in a manner consistent with the El Dorado County General Plan. This ordinance is designed to ensure management of land use in a manner that will assure the orderly development and beneficial use of the unincorporated areas of El Dorado County for residential, commercial, industrial, agricultural, forestry, open space and other purposes. To further these objectives, this ordinance includes requirements for reducing hazards to the public resulting from the inappropriate location, use or design of buildings and land uses in relation to natural and built hazards.

Building and Construction Codes Adopted (Title 110, Chapter 110.16)

The 2010 edition of the California Building Standards Code, known as the California Code of Regulations, Title 24, incorporating the following model codes, is adopted by reference with the general amendments set forth in Sections 110.16.020 through 110.16.170 and the amendments specific to each model code as noted:

- International Building Code, 2009 edition, published by the International Code Council including those sections of Appendix Chapter 1, Administration, not included above, with the additions, deletions and amendments set forth in Sections 110.16.020 through 110.16.140;
- Uniform Mechanical Code, 2009 edition, published by the International Association of Plumbing and Mechanical Officials with amendments set forth in Sections 110.16.150 and 110.16.160;
- Uniform Plumbing Code, 2009 edition, published by the International Association of Plumbing and Mechanical Officials with amendments set forth in Section 110.16.170;
- California Existing Building Code, 2007 edition, Appendix Chapter 1A Seismic Strengthening Provisions for Unreinforced Masonry Bearing Wall Buildings;

- International Fire Code, 2009 edition, published by the International Code Council;
- National Electrical Code, 2008 edition, published by the National Fire Protection Association;
- International Existing Building Code, 2006 edition, published by the International Code Council.

State and Federal Programs

In El Dorado County, a number of state and federal programs exist to provide technical and financial assistance to local communities for hazard mitigation. Some of the primary agencies/departments that are closely involved with local governments in the administration of these programs include:

- California Governor's Office of Emergency Services
- State of California Multi-Hazard Mitigation Plan
- California Department of Water Resources
- California Department of Forestry and Fire Protection (CAL FIRE)*
- California Environmental Protection Agency
- California Department of Fish and Game*
- California State Parks and Recreation Department*
- California State Lands Commission*
- Federal Emergency Management Agency (Region IX)
- U.S. Army Corps of Engineers*
- Bureau of Reclamation*
- USDA Forest Service*
- National Parks Service*
- USDA Natural Resources Conservation Service*
- U.S. Environmental Protection Agency (Region IX); and
- American Red Cross

*Owns and/or manages land and/or facilities (or has some sort of administrative role, e.g., fire protection) in the County; potential partner for mitigation activities

El Dorado County Sheriff's Office of Emergency Services

The El Dorado County Sheriff's Office of Emergency Services (OES) is the emergency management agency for El Dorado County. El Dorado County OES is headquartered in Placerville, the County seat. The office provides service countywide, in cooperation with cities and special districts, such as the fire department and law agencies.

OES' responsibilities include:

- Managing the County's overall response to natural and human-caused disasters;
- Assigning emergency responsibilities to the various departments of the County;
- Coordinating the response and recovery efforts of governmental and non-governmental agencies during disasters;
- Managing the County's Emergency Operations Center; and
- Conducting emergency drills and simulations.

OES also provides updated emergency-related information to the public on the County's website. This site provides weather and flooding information, which includes guidance on protecting your home from winter storms, where to get sandbags, preparation for what to do before, during and after floods, etc. Also provided are links to national, state, and local information on fires, earthquakes, highway and road information, and general federal and state emergency information.

NIMS Compliance

The Board of Supervisors officially adopted NIMS Compliance requirement for the County in 2005, which makes El Dorado County in compliance with federal guidance. El Dorado County OES also participates in annual NIMSCAST to update progress. The county has adopted and has used ICS since the late 1990s. As ICS is a core component of the NIMS compliance this contributed significantly to meeting the requirement.

Surveyor's Office and Geographic Information Systems (GIS)

The Surveyor's Office and GIS provides surveying review/oversight for private development projects within the unincorporated areas of El Dorado County. This office also assigns road names and addresses. The GIS system helps manage and integrate data with maps. They are responsible for maintaining computerized maps of parcels, roads, and political jurisdictions in El Dorado County.

El Dorado County Building Department

To help assure building safety, the Building Department works with local residents, builders, and developers to be sure residential and commercial building in the unincorporated area of the County meets County building codes. The department:

- Issues building permits for commercial and residential building
- Conducts building plan checks and inspections, including a third-party plan review option; and
- Assists the public with building concerns, and code enforcement issues.

El Dorado County Planning Department

The El Dorado County Planning Department provides information on land development, zoning, reviews and makes recommendations on land development applications, helps the Board of Supervisors and Planning Commission plan for growth by providing professional and technical expertise, leads the preparation of Community Plans as well as Countywide plans which set the guidelines for future growth, and enforces Chapter 17 (Zoning Ordinance) of the County Code. The department is also responsible for floodplain administration and administers the National Flood Insurance Program (NFIP) for unincorporated areas of the County. The NFIP is a FEMA program that makes flood insurance available to communities that have enacted local ordinances restricting development within the 100-year floodplain.

El Dorado County Department of Transportation

The Department of Transportation (DOT) is responsible for the funding, planning, designing, building, operating and maintaining the County Road System (CRS). The County Road System currently consists of approximately 1083 centerline miles of paved roadway, 76 bridges, a multitude of storm drainage systems and related transportation facilities. DOT is also responsible for management of the tree mortality program. The primary priorities of the Department of Transportation are:

1. Public safety - ensuring that our roads are safe for public use with due care in a manner in which it is reasonably foreseeable that they will be used.

2. Preservation of infrastructure - preserving and maintaining the public's multi-billion dollar investment in our roads, bridges and other facilities associated with the CRS.

El Dorado County Environmental Management Department

The Environmental Management Department maintains and oversees wastewater and solid waste issues for the County. The Division maintains sewer lines, cleans sewers, and operates and maintains wastewater treatment plants (WWTPs) operated by the County. The WWTPs fall under the regulatory oversight of the State and Regional Water boards. Facility permits limit the amount of wastewater processed and quality of treated discharged water. The Division also administers the countywide solid waste management program. The facilities fall under the regulatory oversight of the California Department of Resource Recycling and Recovery (CalRecycle) and the State and Regional Water Boards.

In a disaster, the CIWMB permitting regulations allow for an Emergency Waivers of Standards as allowed under Title 14, California Code of Regulations (14 CCR), Division 7, Chapter 3, Article 3, Section 17210 et seq. Specifically, the waiver enables an operator of an existing permitted solid waste facility to accept disaster debris and other non-hazardous wastes, in a manner not consistent with the terms and conditions of the relevant solid waste facility permit, during the recovery phase of a state of emergency or local emergency. Under emergency conditions, the normal processing and disposal options may not be feasible or sufficient to handle the overwhelming amount of debris left after a disaster.

Special Districts

There are numerous special districts that provide a variety of public services in El Dorado County. Special districts can provide one or more types of public services, facilities, or infrastructure within a prescribed boundary, and they play an important role in growth management because the availability of their services can encourage or discourage new development. Special districts can tax the properties within their boundaries to pay for the services they provide. Monthly fees may also be assessed. Some of the special districts that provide mitigation-related services in El Dorado County are presented below.

El Dorado County Fire Protection Districts

Fire protection districts provide a variety of services, which may include fire protection, rescue, emergency medical, hazardous material emergency response, and ambulance services.

El Dorado County Irrigation District (EID), South Tahoe Public Utility District (STPUD), Georgetown Public Utility District (GPUD) and other Public Utility Districts

Irrigation districts provide water for irrigation to users within their boundaries. They may also use water under their control for other beneficial purposes and provide flood protection measures.

El Dorado County Water Districts

Water districts' powers may include the acquisition and operation of works for the production, storage, transmission, and distribution of water for irrigation, domestic, industrial, and municipal purposes as well as any related drainage or reclamation works.

El Dorado County Resource Conservation Districts

Resource conservation districts address a wide variety of conservation issues such as forest fuel management, water and air quality, wildlife habitat restoration, soil erosion control, conservation education, and much more.

El Dorado County Community Service Districts

Several communities have organized into community service districts. They serve as independent local government use to provide services in unincorporated areas of the county.

El Dorado County Office of Education (EDCOE)

The El Dorado County Office of Education is supports the diverse educational needs of El Dorado County's student population not only in schools but throughout the community. EDCOE facilitates collaboration that maximizes resources for school districts and the county alike.

Other County Associations/Groups

American River Conservancy

The American River Conservancy serves our communities by ensuring healthy ecosystems within the Upper American and upper Cosumnes River Watersheds through land conservation, stewardship and education.

South Fork American River Cohesive Strategy Group (SOFAR)

Through the open and transparent collaboration among a dedicated group of diverse members, and using the best-available science, the Collaborative will promote a healthy, productive forest ecosystem across all lands. On a watershed scale, we will work to create a fire-resilient ecosystem that supports viable populations of all native species, sustainable fisheries, functioning and restored watersheds and water quality, protected cultural resources, and diverse recreational opportunities.

The Collaborative will make steady progress towards the three primary goals of the National Cohesive Strategy: Restoring and maintaining resilient landscapes, creating fire-adaptive communities, and responding to wildfires.

El Dorado County Fire Chief's Association

The El Dorado County Fire Chiefs' Association is comprised of fire chiefs located in El Dorado County. A primary purpose of the group is to develop the administrative abilities of fire chiefs of El Dorado County, and to act as an advisory association to all governmental agencies as it pertains to fire protection and emergency services in El Dorado County. As part of their efforts, they provide aid in the training, preparation, and coordination, prior to, during, and after a catastrophic emergency.

Lake Tahoe Regional Fire Chiefs' Association

Similar to the El Dorado County Fire Chiefs' Association, this association is comprised of fire chiefs located in the Lake Tahoe basin area.

El Dorado County Fire Safe Council

Their mission is "to protect the people of El Dorado County and their property from the effects of catastrophic wildfire through education, cooperation, innovation, and action." The council was organized in September 2001 and currently has over 150 individuals from the public and private sectors on our Council Communication Network who are committed to making El Dorado County more fire safe. Through community outreach and public education, we endeavor to make residents of the County aware of the risks of living within a Wildland Urban Interface and what they do to protect their home and property from wildfire. The Council and its partners have implemented many fire safe projects in the County, including the chipper program, defensible space inspections, and vegetation reduction projects.

Local Fire Safe Councils

Local Fire Safe Councils assist in educating Californians to protect their homes, communities, and environments from wildfire. These councils serve as forums for stakeholders to share and validate fire safety and fire planning information. There are fifteen active Fire Safe Councils in El Dorado County:

- Auburn Lake Trails FSC;
- Coloma-Lotus FSC;
- Cool-Pilot Hill FSC;
- Georgetown FSC;
- Grizzly Flats FSC;
- Lakehills FSC;
- Logtown FSC;
- Mosquito FSC;
- Patterson Ranch FSC;
- Pleasant Valley-Grange FSC;
- Pollock Pines-Camino FSC;
- Royal Equestrian FSC;
- Sandridge-Nashville FSC;
- Sierra Springs FSC, and;
- Volcanoville FSC.

El Dorado County Water Agency

El Dorado County Water Agency is the trusted, county-wide leader on water-resource issues, representing the long-term interest of our community, purveyors and residents through a dedicated team of professionals, responsive and accountable to the public we serve.

The establishment of the El Dorado County Water Agency allows the agency to develop a countywide water plan and to participate in statewide water planning. The agency is empowered to negotiate contracts with the Department of Water Resources, the U.S. Bureau of Reclamation and other local, state and federal agencies for water management and facility construction.

El Dorado County and Georgetown Divide Resource Conservation District (RCD)

Resource Conservation Districts are grassroots government organizations that advise and assist individual landowners and public agencies in planning and implementation of conservation practices for the protection, restoration, or development of land, water, and related natural resources.

The El Dorado County Resource Conservation District (1940) and the Georgetown Divide Resource Conservation District (1953) - (RCD's) are local, independent, non-enforcement, non-regulatory, self-governed districts organized under Division 9 of the Public Resources Code. Each District has a five member board of directors who serve without compensation for a four year term period.

Each RCD advises and assists individual landowners and public agencies in planning and implementation of conservation practices for the protection, restoration, or development of land, water, and related natural resources.

Tahoe Regional Planning Agency

Lake Tahoe is a magnificent blue body of water that is threatened by environmental degradation. Its famed clarity has steadily been declining due to human impact. The Tahoe Regional Planning Agency (TRPA) is charged with protecting this national treasure for the benefit of current and future generations. Its vision is to have a lake and environment that is clean, healthy, and sustainable for the community and future generations.

TRPA core values include environmental protection, public service and professionalism, teamwork and collaboration, communication, and management. TRPA worked with the Nevada Fire Safe Council, University of Nevada Cooperative Extension, and local fire districts to produce a guide to creating defensible space in Lake Tahoe's fragile environment.

The TRPA operates under the authority of the states of California and Nevada and the federal government through the Bi-State Compact, which was ratified by Congress and signed by the President of the United States. To implement the direction of the Compact, TRPA uses two main tools to protect and restore Lake Tahoe:

- An Environmental Improvement Program that implements restoration projects to heal past damage to the ecosystem
- A regulatory program that works to minimize the impact of developed properties on the watershed

Although the Compact designates TRPA as the leader of environmental standards in the Basin, we work in cooperative partnership with other organizations, agencies, and many private property owners to implement the programs above. Programs such as Aquatic Invasive Species and Forest Fuel Reduction are good examples of how partnerships in the Tahoe Basin are driving public safety improvements, environmental protection and restoration.

TRPA receives direction on decisions from a 15-member Governing Board, a 21-member Advisory Planning Commission as well as many stakeholders and members of the public like you. The Agency also reports on our activities regularly to the Nevada and California state legislatures.

Agricultural Commissioner

The Agricultural Commissioner is dedicated to assisting the residents of El Dorado County through our various programs and services, including, but not limited to: pesticide registration and regulation, nursery inspections and compliance, organic production, pest detection, weed abatement, crop statistics, wildlife services, land use information, and consumer and business protection through our weights and measures program.

El Dorado County Planning Commission

The Planning Commission is the Board's advisor on land use planning. The Commission reviews matters related to planning and development (e.g., specific plans, rezoning, use permits, and subdivisions). Depending upon provisions in the County Code, the Commission either approves/denies or makes recommendations to the Board regarding land use proposals.

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Chapter 4 Mitigation Strategy

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

This section describes the mitigation strategy process and mitigation action plan for the El Dorado County Local Hazard Mitigation Plan Update.

Mitigation strategies are supported by state government and federal programs, in line with the Disaster Mitigation Act. The need for hazard mitigation has become more recognized over the past few years due to the large number of natural hazards which have occurred in the U.S. and the increase in the costs to achieve post disaster recovery. Money spent prior to a hazardous event to reduce the impacts of a disaster can result in substantial savings in life and property following the event. The benefits of implementing a mitigation program usually far outweigh the costs. Because of this, the Federal Emergency Management Agency (FEMA) and the states have developed national and state Mitigation strategies and funding is becoming increasingly more available to support hazard mitigation efforts.

The advantages of developing a local LHMP program are numerous and include:

- Guidance in developing pre and post mitigation plans;
- Identifying priority projects and programs for funding; and
- Increasing the likelihood of State and Federal funding for pre- and post-hazard mitigation projects.

PLANNING and PRIORITIZATION PROCESS:

The data used to build the mitigation strategies and priorities was acquired through several sources and they include:

- Collecting data from previous disaster events that have occurred here and in similar jurisdictions;
- Actively engaging community members, and public agency representatives at scheduled-publicized meetings to identify and prioritize the hazards that exist, and what can, and should be done to eliminate, and or minimize these hazards; and
- An analysis of mitigation strategies that have proven to be cost effective in eliminating, and

or mitigating the effects of disaster events.

- Participation in our regularly scheduled multi-agency/disciplinary Disaster Council meetings where this subject has been an ongoing matter for discussion.
- Participation in the Bi-State Governor's Commission on the Angora Fire in South Lake Tahoe.
- Creation of a Multi-agency-disciplinary LHMP Planning Team.

Following a thorough hazard, risk and vulnerability analysis by all who have participated in this effort, mitigation strategies were then developed to eliminate, and/or mitigate the dangers that exist to life and property. When participants (Community members, first responders, Disaster Council, LHMP Planning Team) were asked to identify and rate in priority the hazards they had identified, there was a very clear consensus that wildfire was number one (1), with flooding number two (2), threats from avalanche and rock slides being number three (3)

Mitigation Strategy: Overview

The results of the planning process, the risk assessment, the goal setting, the identification of mitigation actions, and the hard work of the HMPC led to the mitigation strategy and mitigation action plan for this LHMP Update. As part of the plan update process, a comprehensive review and update of the mitigation strategy portion of the plan was conducted by the HMPC. Some of the initial goals and objectives from the 2012 plan were refined and reaffirmed, and others were added. The end result was a new set of goals, reorganized to reflect the status of 2012 actions, the updated risk assessment and the new priorities of this Plan Update. To support the new LHMP goals, the mitigation actions from 2012 were reviewed and assessed for their value in reducing risk and vulnerability to the planning area from identified hazards and evaluated for their inclusion in this Plan Update. The sections below identify the new goals and objectives of this Plan Update and detail the new mitigation action plan.

Taking all of the above into consideration, the HMPC developed the following umbrella mitigation strategy for this LHMP Update:

Communicate the hazard information collected and analyzed through this planning process as well as HMPC success stories so that the community better understands what can happen where and what they themselves can do to be better prepared.

- Implement the action plan recommendations of this plan.

- Use existing rules, regulations, policies, and procedures already in existence.
- Monitor multi-objective management opportunities so that funding opportunities may be shared and packaged and broader constituent support may be garnered.

Continued Compliance with NFIP

Given the flood hazard in the planning area, an emphasis will be placed on continued compliance with the National Flood Insurance Program (NFIP) by all communities and participation by El Dorado County and others, as appropriate, in the Community Rating System (CRS). Detailed below is a description of El Dorado County's flood management program to ensure continued compliance with the NFIP. Also to be considered are the numerous flood mitigation actions contained in this LHMP that support the ongoing efforts by the county to minimize the risk and vulnerability of the community to the flood hazard and to enhance their overall floodplain management program. A summary of the flood management programs and continued compliance with the NFIP for the incorporated communities are detailed in their jurisdictional annexes.

El Dorado County's Flood Management Program

El Dorado County is participated in the NFIP. Since then, the County has administered floodplain management regulations that meet the minimum requirements of the NFIP. Under that arrangement, residents and businesses paid the same flood insurance premium rates as most other communities in the country.

The County will continue to manage their floodplains in continued compliance with the NFIP. An overview of the County's NFIP status and floodplain management program are discussed on Table 4-1.

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	Not Applicable to El Dorado County – Non-jurisdictional
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	Not Applicable to El Dorado County – Non-jurisdictional

How many structures are exposed to flood risk within the community?	Unknown
Describe any areas of flood risk with limited NFIP policy coverage	Not Applicable to El Dorado County – Non-jurisdictional
Is the Community Floodplain Administrator or NFIP Coordinator certified?	Not at this time, but the County is pursuing certification for at least one Planning staff.
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	In El Dorado County, the Planning Director is the Flood Zone Administrator. Planning staff, through the power of delegation from the Planning Director, implement the Flood Zone Ordinance, Chapter 130.32 (Flood Damage Prevention) of Title 130 of the El Dorado County Code of Ordinances. The flood ordinance offers multiple remedies to document, identify, and mitigate potential flood impacts when a Special Flood Hazard Area (SFHA)/Flood Zone is in the vicinity of a proposed project, whether ministerial or discretionary. Parcels are flagged in multiple databases for the potential SFHA/Flood Zone review. The first test of flood review is to determine whether a parcel is actually in a SFHA. Should insufficient information exist to make a determination of whether the project is in or out of a SFHA/Flood Zone flood, a Flood Elevation Certificate (FEC) is generally required, although under the ordinance, other forms of documentation/mitigations may be acceptable. If a FEC is required, one must be received prior to building permit issuance and prior to finalizing.

	Multiple databases contain SFHA/Flood Zone information but they are all based upon GIS data from FEMA. Selected studies have been done in limited areas that supplement this information (e.g., Cameron Park Drainage Studies). Inspections are done by building inspectors in the field as determined by the flood review mitigations from the building permit application's approval. Under the Flood Ordinance, BMPs under Building Codes can be used to mitigate required flood proofing/flood resistance. Historically, SFHA/ Flood Zone work/documentation was inconsistent at best. However, within the past 6-10 years, the County has begun to keep better records of flood correspondence/flood information to facilitate/assist citizens for/on past SFHA/Flood Zone work.
What are the barriers to running an effective NFIP program in the community, if any?	Community resistance to the NFIP requirements.
Compliance History	
Is the community in good standing with the NFIP?	Unknown
Are there any outstanding compliance issues (i.e., current violations)?	None that we are aware of at this time.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	The last CAV was August 13, 2014.
Is a CAV or CAC scheduled or needed?	The County has not been notified of the need to schedule a CAV or CAC.

Regulation	
When did the community enter the NFIP?	Unknown
Are the FIRMs digital or paper?	Digital – FEMA provides an interactive mapping service which is accessible from the County's website: http://gem.edcgov.us/ugotnet/ [Layer List, select FEMA NFHL, NFHL Availability, FIRM Panels]; also available on the FEMA website; paper is limited to non-digitized historical maps
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Meet FEMA and the State's minimum requirements.
Provide an explanation of the permitting process.	When a parcel is flagged for SFHA/Flood Zone review, the first test of flood review is to determine whether a parcel is actually in a SFHA/Flood Zone. If insufficient information is available to remove the proposed project from the SFHA/Flood Zone, a FEC is generally required. If the FEC confirms the project is in a SFHA/Flood Zone, mitigations are required to be shown in the building permit application. If a FEC is required, as part of mitigations or to demonstrate the project being outside the SFHA/Flood Zone, one must be received prior to building permit issuance & prior to finaling. Inspections are done by building inspectors in the field as determined by the flood review mitigations from the building permit application's approval.

Community Rating System	
Does the community participate in CRS?	No
What is the community's CRS Class Ranking?	Not Applicable
What categories and activities provide CRS points and how can the class be improved?	Not Applicable
Does the plan include CRS planning requirements?	Not Applicable

Source: FEMA/El Dorado County

Goals and Objectives

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

Up to this point in the planning process, the HMPC has organized resources, assessed hazards and risks, and documented mitigation capabilities. The resulting goals, objectives, and mitigation actions were developed based on these tasks.

During the initial goal-setting meeting, the HMPC reviewed the results of the hazard identification, vulnerability assessment, and capability assessment. This analysis of the risk assessment identified areas where improvements could be made and provided the framework for the HMPC to formulate planning goals and objectives and to develop the mitigation strategy for the El Dorado County Planning Area.

Goals were defined for the purpose of this mitigation plan as broad-based public policy statements that:

- Represent basic desires of the community;
- Encompass all aspects of community, public and private;
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
- Are future-oriented, in that they are achievable in the future; and
- A time-independent, in that they are not scheduled events.

Goals are stated without regard to implementation. Implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. Goal statements form the basis for objectives and actions that will be used as means to achieve the goals. Objectives define strategies to attain the goals and are more specific and measurable.

HMPC members were provided with the list of goals from the 2012 plan as well as a list of other sample goals to consider. New goals from the HMPC were discussed until the team came to consensus. Some of the statements were determined to be better suited as objectives or actual mitigation actions and were set aside for later use. Next, the HMPC developed objectives that summarized strategies to achieve each goal.

Based on the risk assessment review and goal setting process, the HMPC identified the following goals and objectives, which provide the direction for reducing future hazard-related losses within the El Dorado County Planning Area.

Goal 1: Minimize risk and vulnerability of El Dorado County to the impacts of natural hazards; protect lives, public health and safety; and, reduce damages and losses to property, economy, and the environment.

- Minimize economic and resource impacts and promote long-term viability and sustainability of County resources
- Minimize impacts to both existing and future development from all hazards (through well-planned communities)
- Minimize impacts to natural and cultural resources
- Minimize impacts from climate change
- Minimize impacts to watersheds/Promote watershed health
- Reduce wildland fire risk and related losses
- Reduce flood risk and related damages, with a focus on repetitive loss structures and infrastructure

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

- Provide protection for critical infrastructure from the wildland fires, floods, and severe storms/weather (e.g., repeaters, cell towers, waters tanks, utilities)
- Improve infrastructure/system reliability for critical lifeline utilities, including storm water systems, roadways (evacuation routes, emergency services and supplies); rail lines, and pipelines
- Minimize risk of loss of life and injury to At-risk Populations

Goal 3: Improve public awareness, education, and preparedness for all hazards.

- Enhance public outreach, education, and preparedness program to include all hazards of concern (e.g. fire restrictions, water conservation measures, hazardous vegetation, air and water quality issues)
- Increase public knowledge of the risk and vulnerability to identified hazards and their

recommended responses to disaster events to reduce losses

- Educate general public on evacuation planning and sheltering options for all hazard types and to encompass all groups (e.g., residents, visitors, second homeowners, vulnerable populations, animals)
- Increase community awareness and participation in hazard mitigation activities to include defensible space, hazardous vegetation abatement projects, and forest management projects and practices to reduce flood risk on private property
- Utilize multiple public outreach avenues such as schools, new technologies, and social media
- Coordination with other regional jurisdictions to facilitate (consistent/coordinated) public information function prior to, during and after an event (e.g., facebook, twitter, web, tv, radio)

Goal 4: Increase communities' capabilities to mitigate losses and to be prepared for, respond to, and recover from a disaster event.

- Continued enhancements to Emergency Services capabilities integrating new technologies to reduce losses and save lives
- Improve interagency (local, state, federal) emergency coordination, planning, training, exercising, and communication to ensure effective community preparedness, response and recovery
- Improve interagency coordination with respect to implementation of mitigation activities such as fuels reduction and other multi-jurisdictional wildland fire projects
- Enhance the use of shared resources/Develop a strong mutual aid support system
- Maintain current service levels/provide for enhanced service levels
- Increase first responders awareness of vulnerable populations and other priority needs during a hazard event;(use of technology to pre-identify and communicate)
- Utilize lessons learned (debriefing) to improve response capabilities
- Promote efficient recovery from incidents to minimize impacts to lives, environment, and economy

Goal 5: Maintain FEMA Eligibility/Position the communities for grant funding.

- Continued compliance with the NFIP/enhancement of floodplain management program through participation in the NFIP’s Community Rating System (CRS) where feasible.

Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

In order to identify and select mitigation actions to support the mitigation goals, each hazard identified was evaluated. Only those hazards that were determined to be a priority hazard were considered further in the development of hazard-specific mitigation actions.

These priority hazards (in alphabetical order) are:

- Avalanche
- Dam Failure
- Debris Flow
- Drought
- Earthquake
- Erosion
- Flood: 100/500 year
- Flood: Localized Stormwater Flooding
- Seiche (Lake Tsunami)
- Severe Weather
- Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning/Wind/Tornadoes)
- Wildfire

It is important to note, however, that all the hazards addressed in this plan are included in the countywide multi-hazard public awareness mitigation action as well as in other multi-hazard, emergency management actions.

The HMPC was provided with examples of potential mitigation actions for each of the above categories. The HMPC was also instructed to consider both future and existing buildings in considering possible mitigation actions. Also utilized in the review of possible mitigation measures is FEMA's publication on Mitigation Ideas, by hazard type. Prevention type mitigation alternatives were discussed for each of the priority hazards. This was followed by a brainstorming session that

generated a list of preferred mitigation actions by hazard.

Prioritization Process

Once the mitigation actions were identified, the HMPC was provided with several decision-making tools, including FEMA's recommended prioritization criteria, STAPLEE sustainable disaster recovery criteria; Smart Growth principles; and others, to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another. STAPLEE stands for the following:

- **Social**: Does the measure treat people fairly? (e.g., different groups, different generations)
- **Technical**: Is the action technically feasible? Does it solve the problem?
- **Administrative**: Are there adequate staffing, funding, and other capabilities to implement the project?
- **Political**: Who are the stakeholders? Will there be adequate political and public support for the project?
- **Legal**: Does the jurisdiction have the legal authority to implement the action? Is it legal?
- **Economic**: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- **Environmental**: Does the action comply with environmental regulations? Will there be negative environmental consequences from the action?

In accordance with the DMA requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority. Other criteria used to assist in evaluating the benefit-cost of a mitigation action includes:

- Contribution of the action to save life or property
- Availability of funding and perceived cost-effectiveness
- Available resources for implementation
- Ability of the action to address the problem

In addition to reviewing and incorporating the actions from the 2012 plan, the committee also considered and defined several new actions.

Benefit-cost was also considered in greater detail in the development of the Mitigation Action Plan detailed below. The cost-effectiveness of any mitigation alternative will be considered in greater

detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this plan.

Recognizing the limitations in prioritizing actions from multiple jurisdictions and departments and the regulatory requirement to prioritize by benefit-cost to ensure cost-effectiveness, the HMPC decided to pursue actions that contributed to saving lives and property as first and foremost, with additional consideration given to the benefit-cost aspect of a project. This process drove the development of a determination of a high, medium, or low priority for each mitigation action, and a comprehensive prioritized action plan for the El Dorado County Planning Area.

Mitigation Action Plan

Requirement §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

This action plan was developed to present the recommendations developed by the HMPC for how the El Dorado County Planning Area can reduce the risk and vulnerability of people, property, infrastructure, and natural and cultural resources to future disaster losses. Emphasis was placed on both future and existing development. The action plan summarizes who is responsible for implementing each of the prioritized actions as well as when and how the actions will be implemented. Each action summary also includes a discussion of the benefit-cost review conducted to meet the regulatory requirements of the Disaster Mitigation Act.

Table 4-1 identifies the mitigation actions and lead jurisdiction for each action. In general, those actions where the County is the lead jurisdiction are detailed further in this section. Actions specific to other participants, or where other participants are taking the lead, are detailed in each respective participants' annex to this plan.

The action plan detailed below contains both new action items developed for this Plan Update as well as old actions that were yet to be completed from the 2012 plan. Table 4-1 indicates whether the action is new or from the 2012 plan.

It is important to note that El Dorado County and the participants have numerous existing, detailed action descriptions, which include benefit-cost estimates, in other planning documents, such as community wildfire protection plans/fire plans, storm water plans and capital improvement budgets and reports. These actions are considered to be part of this plan, and the details, to avoid duplication, should be referenced in their original source document. The HMPC also realizes that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions, as necessary, as long as they conform to the overall goals of this plan.

Further, it should be clarified that the actions included in this mitigation strategy are subject to

further review and refinement; alternatives analyses; and reprioritization due to funding availability and/or other criteria. The participants are not obligated by this document to implement any or all of these projects. Rather this mitigation strategy represents the desires of the community to mitigate the risks and vulnerabilities from identified hazards. The actual selection, prioritization, and implementation of these actions will also be further evaluated in accordance with the

It should be noted that the projects submitted by each jurisdiction in Table 4-1 benefit all participants whether or not they are the lead agency. Further, many of these mitigation efforts are collaborative efforts among multiple local, state, and federal agencies. In addition, the public outreach action, as well as many of the emergency services actions, apply to all hazards regardless of hazard priority.

Table 4-1 El Dorado County Planning Area's Mitigation Actions

El Dorado County Multi-Hazard Actions						
Action Title	Lead Jurisdiction	New Action/ 2012 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Multi-Hazard Actions						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	El Dorado County	New action	X	X		Prevention Public Information
Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	El Dorado County and all jurisdictions	New Action	X	X	X	Public Information
Debris Management Plan	El Dorado County	2012 Action	X	X	X	Prevention Emergency Services
Avalanche Actions						
Map Community Risk	El Dorado County	New action	X	X		Property Protection Natural Resource Protection
Dam Actions						
Map Community Risk	El Dorado County	2012 action	X	X	X	Property Protection Natural Resource Protection
Drought Actions						
Retrofit of High Water Use Landscape & Irrigation	El Dorado County	New action	X	X		Property Protection Natural Resource Protection
Drought Public Education and Outreach	El Dorado County	New action	X	X		Public Information

Action Title	Lead Jurisdiction	New Action/ 2012 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Earthquake Actions						
Incorporate Earthquake Mitigation into Local Planning	El Dorado County	2012 Action	X	X		Prevention Property Protection
Erosion Actions						
Stabilize Erosion Hazard Areas (e.g. Highway 50, Happy Valley, Rock Creek Road, etc.)	El Dorado County	New action	X	X	X	Property Protection Natural Resource Protection
Flood Actions						
Enhance Flood Mitigation through Local Planning	El Dorado County	2012 Action	X	X	X	Property Protection Natural Resource Protection
Limit or Restrict Development in Flood Plain Areas	El Dorado County	New action	X	X	X	Property Protection Natural Resource Protection

Action Title	Lead Jurisdiction	New Action/ 2012 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Seiche						
Map and Assess Vulnerability to Seiche	El Dorado County	2012 Action	X	X		Prevention Property Protection Natural Resource Protection
Severe Weather/Extreme Temperatures						
Increase Awareness of Extreme Temperature Risk and Safety	El Dorado County	2012 Action	X	X		Public Information
Severe Weather/Thunderstorms						
Protect Critical Facilities and Equipment	El Dorado County	2012 Action	X	X		Prevention Property Protection Natural Resource Protection

Action Title	Lead Jurisdiction	New Action/ 2012 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Wildfire Actions						
Wildfire Public Education	El Dorado County	2012 Action	X	X		Public Information
Defensible Space Programs	El Dorado County	2012 Action	X	X		Prevention Property Protection
Large Strategic Fuel Breaks	El Dorado County	2012 Action	X	X		Prevention Property Protection Natural Resource Protection
Fuel Breaks in the Wildland Urban Interface (WUI)	El Dorado County	2012 Action	X	X		Prevention Property Protection Natural Resource Protection
Subsidence Actions						
Map and Assess Vulnerability to Subsidence	El Dorado County	New	X	X		Prevention Property Protection Natural Resource Protection

Multi-Hazard Actions

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan. To remain in compliance with AB 2140, the LHMP will be integrated into El Dorado County's General Plan. Meetings and planning sessions with the Planning Department will occur to ensure compliance.

Hazards Addressed: All hazards

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140). Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan

Responsible Office: El Dorado County Planning Department, Board of Supervisors

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Priority (H, M, L): High

Cost Estimate: Jurisdictional board/staff time

Potential Funding: Local budgets

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: As soon as possible

Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness

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Hazards Addressed: All hazards with hazard-specific actions

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: El Dorado County, its incorporated jurisdictions, and special districts are participating jurisdictions to the El Dorado County Local Hazard Mitigation Plan Update. Each jurisdiction plays a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of natural hazards. A comprehensive multi-hazard public education program will better inform the community of natural hazards of concern and actions the public can take to be better prepared for the next natural disaster event.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The County, cities, and special districts will work with other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of natural hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will consider:

- Using a variety of information outlets, including social media, websites, local radio stations, news media, schools, and local, public sponsored events;
- Developing public-private partnerships and incentives to support public education activities.

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing County, City, and other special district outreach programs will be reviewed for effectiveness and leveraged and expanded upon to reach the broader region.

Responsible Office: El Dorado County, Cities, and all other participating jurisdictions

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Priority (H, M, L): High

Cost Estimate: Annual costs to be determined, and will depend on the scope and frequency of activities and events as well as volunteer participation

Benefits (Losses Avoided): Increase residents' knowledge of potential hazards and activities required to mitigate hazards and be better prepared. Protect lives and reduce damages, relatively low cost to implement.

Potential Funding: Local budgets, grant funds

Schedule: Ongoing/Annual public awareness campaign

Action 3. Debris Management Plan. El Dorado County has a debris management plan that will be revised based on information learned from recent fires and disasters.

Hazards Addressed: Multi Hazard

Goals Addressed: 3, 4, 5

Issue/Background: El Dorado County has experienced wildfires and flooding in which debris is an issue that needs to be addressed.

Other Alternatives: None.

Existing Planning Mechanism(s) through which Action Will Be Implemented: El Dorado County has a disaster debris management plan from the Angora, Sand and King fires.

Responsible Office/Partners: El Dorado County, Environmental Management, HazMat

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Project Priority: High

Cost Estimate: $125,000

Benefits (Losses Avoided): Decrease emergency response time in public open space areas. Educate trail users in hazard avoidance and readiness planning.

Potential Funding: Local Budgets, Grants, Development Fees, other

Timeline: 2020 through 2022

Avalanche Actions

Action 4. Assess Critical Infrastructure Risk. El Dorado County will work with Cal Trans and County Departments to assess and map avalanche vulnerabilities along the Highway 50 corridor.

Hazards Addressed: Avalanche

Goals Addressed: 1, 2, 3, 5

Issue/Background: Avalanche hazards do exist each winter in the upper elevations of eastern El Dorado County. The majority of the El Dorado Irrigation District's (EID) water and wastewater treatment facilities, pump station, storage tanks, and reservoirs are all in the lower elevation on flatter terrain where the potential of avalanche damage is negligible to non-existent. However, EID's hydro-water conveyance system, for consumptive water, firefighting and power generation purposes, includes 17,000 linear feet of above grade wooden and concrete flumes, much of which is located on steep slopes in the higher elevations of the Sierras and susceptible to avalanche hazards and damage. 13 sections of flume along with a section of above grade pipeline located below Echo Lake have been identified as susceptible to hazard.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: EID Capital Improvement Plan

Responsible Office/Partners: El Dorado County Irrigation District

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Project Priority: High

Cost Estimate: $136,000,000.00

Benefits (Losses Avoided):

Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Emergency Management Performance Grant Program, El Dorado Irrigation District.

Timeline: Ongoing.

Dam Actions
Action 5a. Map Community Risk

Hazards Addressed: Dam Inundation

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Damn inundation hazards have been identified as a low frequency event that can have both a low and a high impact potential.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Continue to incorporate into the County's General Plan Enforcement of Objective 6.4.2 Dam Inundation to identify and mitigate hazards, and utilize the Code Red System technology to warn vulnerable populations.

Responsible Office/Partners: El Dorado County, SMUD, and EID

Project Priority: Low to medium

Cost Estimate: Staff time to identify hazards and plan for mitigation strategies. The cost of the Code Red System is approximately ten thousand dollars per year.

Benefits (Losses Avoided): Protect underground utilities and public road.

Potential Funding: County, Special Districts Budgets, public and private owners of dams. Some of these costs may be eligible for reimbursement through the Emergency Management Performance Grants.

Timeline: Ongoing

Drought Actions
Action 5b. Retrofit of High Water Use Landscape & Irrigation

Hazards Addressed: Drought, Fire Risk

Goals Addressed: 1, 2, 4

Issue/Background: El Dorado County maintains acres of landscaped grounds in addition to playable turf areas. Much of that acreage consists of ornamental lawn and other high water use plantings or outdated inefficient irrigation. Retrofit of these areas will be prioritized and completed on a site by site basis as funding becomes available. Other local agencies and districts within El Dorado County face a similar water usage situation.

Other Alternatives: Continue unsightly 'brown-out' conditions of existing landscape (leading to increased fire risk) during drought conditions. Currently implementing low water landscape standards for all new development.

Existing Planning Mechanism(s) through which Action Will Be Implemented: A selection process for an irrigation and landscape retrofit development team has been completed.

Responsible Office/Partners: El Dorado County Department Facilities and Parks, Incorporated Cities, Special Districts who maintain landscape areas

Project Priority: Medium

Cost Estimate: $15,000,000

Benefits (Losses Avoided): Decreased water usage. Fire risk reduction during drought.

Potential Funding: Grants, General Funds, Assessments, other

Timeline: Ongoing

Action 6. Drought Public Education and Outreach (Public Information)

Hazard Addressed: Drought

Goals Addressed: 1, 3, 4, 5

Issue/Background: The project involves public outreach and education the small community of Outingdale, CA served by wells and has experienced water shortages. The ongoing drought has had numerous impacts on the County. In addition, the state was in a State of Emergency due to the drought. One key method to conserve groundwater is to reduce water uses in homes and landscaping.

Other Alternatives: No outreached or education to water customers on how to conserve.

Responsible Office: El Dorado County, Cities, EID, and SMUD.

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Priority (High, Medium, Low): Medium

Cost Estimate: $5,000 – 10,000 annually during drought years

Benefits (avoided Losses): Reduces the environmental and economic impacts of drought.

Potential funding: Local budgets, potential grant funding.

Schedule: Annually during drought years.

Earthquake Actions

Action 7. Incorporate Earthquake Mitigation into Local Planning. El Dorado County will adopt and enforce updated building code provisions to reduce earthquake damage.

Hazards Addressed: Earthquake

Goals Addressed: 1, 2, 4, 5

Issue/Background: Seismic and geologic hazards have been identified as a low frequency event that can have both a low and high impact potential.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Continue to incorporate into local hazard mitigation planning and the County's General Plan enforcement of Objective 6.3.1 Building and Site Standards and enforce regulations that protect against seismic (through Code Enforcement, as necessary) and geologic hazards.

Responsible Office/Partners: El Dorado County, cities, fire districts, community service districts, public/private partners in public safety.

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Project Priority: Low

Cost Estimate: Staff time

Benefits (Losses Avoided): Potentially lifesaving given the preventive nature of the planning and enforcement actions taken.

Potential Funding: Competitive federal and grant funding

Timeline: Ongoing

Erosion Actions
Action 8. Stabilize Erosion Hazard Areas

Hazards Addressed: Erosion

Goals Addressed: 1, 2, 4, 5

Issue/Background: Many existing El Dorado County roads, culverts, hillsides, etc. are susceptible to erosion – the wearing away of land - that can destroy buildings and infrastructure.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing condition assessments.

Responsible Office/Partners: El Dorado County, Cities, DOT, CalTrans

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Project Priority: High

Cost Estimate: Determined by project.

Benefits (Losses Avoided): Critical infrastructure is able to be used in an emergency.

Potential Funding: Local budgets, Unidentified.

Timeline: 1-10 years

Flood Actions (100/500 Year and Localized)
Action 9. Enhance Flood Mitigation through Local Planning

Hazards Addressed: Flooding (100/500 year and Localized)

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: The County's General Plan sets the foundation for recognizing flood disaster potential and establishing through regulations, ordinances and building codes a strategy for protecting populations, new and existing development and economic sustainability.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Continue to incorporate into local hazard mitigation planning and the County's General Plan enforcement (through Code Enforcement) of Objective 7.3.1 Water Resource Protection to protect watersheds, riparian zones and aquifers, Objective 2.2.5 Future Rezoning, and Objective 5.4.1 Drainage and Flood Management Program.

Responsible Office/Partners: El Dorado County, cities, community service districts, public/private partners in water resource protection.

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Project Priority: Medium

Cost Estimate: Staff time

Benefits (Losses Avoided): Reduce and/or eliminate the impacts of flooding on existing structures to safeguard life and property.

Potential Funding: County, cities and special districts budgets

Timeline: Ongoing

Seiche Actions
Action 10. Map and Assess Vulnerability to Seiche

Hazards Addressed: Seiche

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: A seiche is a standing wave in an enclosed or partially enclosed body of water. Lake Tahoe has been identified as an area susceptible to seiche activity. There would be substantial damage to infrastructure such as county roads and two state highways that run through El Dorado County (highway 50 and Highway 89).

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: As funding allows, map and assess vulnerability to seiche.

Responsible Office/Partners: El Dorado County, GIS, University Nevada at Reno

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Project Priority: Low

Cost Estimate: Staff time

Benefits (Losses Avoided): Minimize flood damage to public roads and private property.

Potential Funding: Local budgets, potential grant funds

Timeline: Ongoing

Severe Weather/Extreme Temperatures

Action 11. Increase Awareness of Extreme Temperature Risk and Safety. Through public education campaigns, El Dorado County will work with agencies that serve vulnerable populations to prepare for extreme temperatures.

Hazards Addressed: Severe Weather/Extreme Temperature

Goals Addressed: 1, 2, 3, 4

Issue/Background: Continue to raise awareness and planning regarding extreme temperatures and addressing needs of vulnerable populations.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Funding through public health preparedness grants.

Responsible Office/Partners: El Dorado County, healthcare facilities

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Project Priority: Medium

Cost Estimate: Staff time, grant funds

Benefits (Losses Avoided): Reduce impact to health and safety of residents and vulnerable populations due to extreme temperatures

Potential Funding: Grant Programs

Timeline: Ongoing

Severe Weather/Thunderstorms

Action 12. Protect Critical Facilities and Equipment. El Dorado County will work with public and private partners to harden critical facilities and equipment. One way this will occur is through tree clearing along power lines and roadways.

Hazards Addressed: Severe Weather/Thunderstorms

Goals Addressed: 1, 2, 4, 5

Issue/Background: Severe winter storms can down trees, cause widespread power outages, flooding, damage property and cause fatalities and injuries.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Operations Plan

Responsible Office/Partners: El Dorado County, cities, DOT, CalTrans, community service districts, fire agencies, utility companies

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Project Priority: High

Cost Estimate: Determined by event

Benefits (Losses Avoided): Minimize critical infrastructure damage and loss

Potential Funding: Local budget, General Fund

Timeline: Ongoing

Wildfire Actions
Action 13. Public Education

Hazards Addressed: Wildfire

Goals Addressed: 1, 3

Issue/Background: Public education through community outreach is a must in El Dorado County. This is an ongoing strategy and included in all mitigation efforts. El Dorado County, fire agencies, Animal Services, FireSafe councils and other stakeholders work with as many residents as possible to provide information on defensible space and living with fire.

Other Alternatives: Each property owner or land manager needs to manage properties and infrastructure within their responsibility. While public service messages and media helps tell the public of their responsibility for defensible space and fire mitigation, specific and direct communications and training information increases the chance of reaching the public.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Work with the current property owner or land manager to implement fuels management and fire prevention projects identified in the Western Slope CWPP WUI area. Apply for local, State, or Federal funding to implement these plans.

Project Priority: High

Responsible Office: El Dorado County, fire agencies, animal services, cities, fire safe councils, special districts, community service districts, public/private partners in fire safety.

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Cost Estimate: Staff time

Benefits (Losses Avoided): Provide the tools and resources to develop, purchase, and maintain needed public education material to educate El Dorado County residents on wildfire prevention and Firewise Community techniques.

Potential Funding: County, State, and Federal funding.

Schedule: Ongoing

Action 14. Defensible Space Programs

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: These projects address the ongoing need to manage fuels in and around privately owned homes, businesses and communities, freeways and roadways, and "Assets at Risk" in El Dorado County. Small communities, individual property owners and infrastructure assets can be impacted by roadside fire starts and fire starts moving into or out of private property.

When complete, these projects will protect Assets at Risk and projects the communities have identified in the CWPP.

The El Dorado County Fire Safe Councils have worked with County, State, and individual property owners to identify areas within their jurisdictions to provide fuels management projects to reduce the risk of wildfire starts and spread along roadways and into or out of individual properties.

Other Alternatives: Each property owner or land manager needs to manage properties and infrastructure within their responsibility. Spread from fire starts within their property can only be prevented or contained by the fire prevention and fuel management work done by the owner.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Work with the current property owner or land manager to implement fuels management and fire prevention projects identified in the Western Slope CWPP WUI area. Apply for local, State, or Federal funding to implement these plans.

Project Priority: High

Responsible Office: El Dorado County, fire agencies, cities, fire safe councils, special districts, community service districts, public/private partners in fire safety.

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Cost Estimate: Dependent on project.

Benefits (Losses Avoided): Reduced risk of loss of life and property from catastrophic wildfire in developed communities, towns, and city's within the County. Loss of assets at risk can have significant impact on those outside of the County. Communication links and interstate transportation can be significantly impact by wildfire along the Highway 50 corridor.

Potential Funding: County, State, and Federal funding

Schedule: Ongoing

Action 15. Large Strategic Fuel Break

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 4

Issue/Background: Large Strategic Fuel Break projects will provide landscape scale community protection in our area. When complete, these projects will help protect the communities identified as “Communities at Risk from Wildfire” listed in the National Fire Plan.

This practice applies to all communities where protection from wildfire is needed. These Strategic Fuel breaks are planned and located on the landscape as part of a conservation management system for a land unit where there is a need to control the risk of the spread of fire into our communities as well as to protect watersheds, critical infrastructure, and commerce traveling on our freeways and railways. Typically, they break up large, continuous tracts of dense natural fuels, thus limiting uncontrolled spread of fire, and are commonly associated with firebreaks (permanent or temporary strips of bare or vegetated land planned to retard fire). For our purposes, a strategic fuel break is typically placed to protect the communities identified in the Western Slope CWPP for that specific Fire Safe Council area.

The El Dorado County Fire Safe Councils have worked with County, State, and Federal agencies to identify areas within their jurisdictions to develop large strategic fuel breaks to protect specific communities and watersheds within the County.

Other Alternatives: Rely on the individual property owner or land managers to develop strategic fuel breaks to protect resources and assets that may be outside of their ownership or responsibility.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Work with the current property owner or land manager to implement strategic fuel breaks identified in the Western Slope CWPP. Apply for local, State, or Federal funding to implement these plans.

Project Priority: High

Responsible Office: El Dorado County, fire agencies, cities, fire safe councils, special districts, community service districts, public/private partners in fire safety.

Partners: Cities of Placerville and South Lake Tahoe, El Dorado County Office of Education, El Dorado Irrigation District, South Tahoe Public Utility District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Cost Estimate: Dependent on project.

Benefits (Losses Avoided): Reduced risk of loss of life and property from catastrophic wildfire in developed communities, towns, and city’s within the County.

Potential Funding: County, State, and Federal funding

Schedule: Ongoing.

Action 16. Fuel Breaks in the Wildland Urban Interface (WUI)

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 4,

Issue/Background: The purpose of a Shaded Fuel Break within the WUI is to minimize destruction to communities from wildfire and to protect and enhance natural resources, watershed and habitat of western El Dorado County. When complete, these projects will help protect the community's identified as "Communities at Risk from Wildfire" and identified as communities with the WUI, listed in the CWPP.

This practice applies to all communities within the WUI where protection from wildfire is needed. These Shaded Fuel breaks are planned thinning of dense vegetation in an area approximately 300 feet wide where fire does not easily move from the ground into the overhead tree canopy and to allow fire resources to utilize such a location to increase probability of success during fire suppression activities. Fuel break width will be dependent upon the fuels and topography in any given area.

For our purposes, a strategic fuel break is typically placed to protect the communities identified in the Western Slope CWPP WUI, for that specific Fire Safe Council.

The El Dorado County Fire Safe Councils have worked with County, State, and Federal agencies to identify areas within their jurisdictions to develop shaded fuel breaks to protect specific communities and watersheds within the WUI.

Other Alternatives: Rely on the individual property owner or land managers within the WUI to develop fuel breaks to protect resources and assets from fire that may spread from the wildland into urban areas.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Work with the current property owner or land manager to implement shaded fuel breaks identified in the Western Slope CWPP WUI area. Apply for local, State, or Federal funding to implement these plans.

Project Priority: High

Responsible Office: El Dorado County, fire agencies, cities, fire safe councils, special districts, community service districts, public/private partners in fire safety.

Cost Estimate: Dependent on project.

Benefits (Losses Avoided): Reduced risk of loss of life and property from catastrophic wildfire in developed communities, towns, and city's within the County.

Potential Funding: County, State, and Federal funding

Schedule: Ongoing

Subsidence Actions
Action 17. Map and Assess Vulnerability to Subsidence

Hazards Addressed: Subsidence

Goals Addressed: 1, 2, 3, 4, 5

Issue/Background: Abandoned mines and culverts throughout the county, and primarily on the Western Slope, make El Dorado County vulnerable to subsidence.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: As funding allows, map and assess vulnerability to subsidence.

Responsible Office/Partners: El Dorado County, GIS

Partners: Cities of Placerville, El Dorado Irrigation District, Fire Prevention Districts, Fire Safe Councils, Georgetown Public Utility District, Community Service Districts and Other Special Districts

Project Priority: Low

Cost Estimate: Staff time

Benefits (Losses Avoided): Minimize subsidence to public roads and private property.

Potential Funding: Local budgets, potential grant funds

Timeline: Ongoing

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Chapter 5 Plan Adoption

Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, county commissioner, Tribal Council).

The purpose of formally adopting this plan is to secure buy-in from El Dorado County and participating jurisdictions, raise awareness of the plan, and formalize the plan's implementation. The adoption of this plan establishes compliance with AB 2140 requiring adoption by reference or incorporation into the safety element of the general plan. The governing board for each participating jurisdiction has adopted this Local Hazard Mitigation Plan by passing a resolution. A copy of the generic resolution and the executed copies are included in Appendix D: Adoption Resolutions.

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Chapter 6 Plan Implementation and Maintenance

Requirement §201.6(c)(4): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

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

Chapter 2 Planning Process includes information on the implementation and maintenance process since the 2012 Plan was adopted. This section includes information on the implementation and maintenance process for this plan update.

Implementation

Once adopted, the plan faces the truest test of its worth: implementation. While this plan contains many worthwhile actions, the participants will need to decide which action(s) to undertake first. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans and mechanisms, such as the general plans and Community Wildfire Protection Plans (CWPPs) for El Dorado County and participants. The County and participants already implement policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. Implementation will be accomplished by adhering to the schedules identified for each action and through constant, pervasive, and energetic efforts to network and

highlight the multi-objective, win-win benefits to each program and the El Dorado County community and its stakeholders. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of programs for coordination and multi- objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This will include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available; the participants will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal earmarked funds, benefit assessments, and other grant programs, including those that can serve or support multi-objective applications.

Responsibility for Implementation of Goals and Activities

The elected officials and officials appointed to head each department within the County are charged with implementation of various activities in the plan. During the annual reviews as described later in this section, an assessment of progress on each of the goals and activities in the plan will be determined and noted. At that time, recommendations can be made to modify timeframes for completion of activities, funding resources, and responsible entities. On an annual basis, the priority standing of various activities may also be changed. Some activities that are found not to be doable may be deleted from the plan entirely and activities addressing problems unforeseen during plan development may be added.

Role of Hazard Mitigation Planning Committee in Implementation and Maintenance

With adoption of this plan, the participants will be responsible for the plan implementation and maintenance. The HMPC Steering Committee identified in Appendix A (or a similar committee) will reconvene bi-annually each year to ensure mitigation strategies are being implemented. As such, El Dorado County and participants agree to continue its relationship with the HMPC Steering Committee and:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Ensure hazard mitigation remains a consideration for community decision makers;

- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Report on plan progress and recommended changes to the various governing boards or councils of all participants; and
- Inform and solicit input from the public.

The primary duty of the participants is to see the plan successfully carried out and to report to their community governing boards and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the County website (and others as appropriate).

Maintenance

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized.

Maintenance Schedule

The El Dorado County Sheriff's OES is responsible for initiating plan reviews and consulting with the other participants. In order to monitor progress and update the mitigation strategies identified in the action plan, El Dorado County Sheriff's OES and the individual participants will revisit this plan annually and/or following a hazard event. The HMPC will meet bi-annually to review progress on plan implementation and will provide annual evaluation reports for each participants. The El Dorado County Sheriff's OES will also submit a five-year written update to the State and FEMA Region IX, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. With this plan update anticipated to be fully approved and adopted in 2018, the next plan update for the El Dorado County Planning Area will occur in 2023.

Maintenance Evaluation Process

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

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

Updates to this plan will:

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

Changes will be made to the plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or funding resources. All mitigation actions will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation.

Updating of the plan will be by written changes and submissions, as the El Dorado County Sheriff's OES deems appropriate and necessary, and as approved by the appropriate governing boards or councils of the other participating jurisdictions. In keeping with the five-year update process, the El Dorado County Sheriff's OES will convene public meetings to solicit public input on the plan and its routine maintenance and the final product will be adopted by the governing boards or councils.

Annual Plan Review Process

For the 2018 hazard mitigation plan update review process, the El Dorado County Sheriff's OES will be responsible for facilitating, coordinating, and scheduling reviews and maintenance of the plan. The review of the Hazard Mitigation Plan will normally occur on a bi-annual basis each year and will be conducted by the El Dorado County Sheriff's OES as follows:

- The El Dorado County Sheriff's OES will use social media, press release or similar public communication advising the public of the date, time, and place for the annual review of the plan and will be responsible for leading the meeting to review the plan.
- Notification will be sent to the members of the federal, state, and local agencies, non-profit groups, local planning agencies, and representatives of business interests, neighboring communities, and others advising them of the date, time, and place for the review.
- County/City/District officials will be noticed by email, telephone or personal visit and urged to participate.

- Prior to the review, department heads and others tasked with implementation of the various activities will be queried concerning progress on each activity in their area of responsibility and asked to present a report at the review meeting.
- After the review meeting, minutes of the meeting and an annual report will be prepared by the El Dorado County Sheriff's OES and made available upon request.
- The report will also be presented to the County/City/participating jurisdictions' governing boards for review, and a request will be made that the Board take action to recognize and adopt any changes resulting from the review.

Criteria for Annual Reviews

The criteria recommended in 44 CFR 201 and 206 will be utilized in reviewing and updating the plan. More specifically, the annual reviews will include the following information:

- Community growth or change in the past quarter.
- The number of substantially damaged or substantially improved structures by flood zone.
- The renovations to public infrastructure including water, sewer, drainage, roads, bridges, gas lines, and buildings.
- Natural hazard occurrences that required activation of the Emergency Operations Center (EOC) and whether or not the event resulted in a presidential disaster declaration.
- Natural hazard occurrences that were not of a magnitude to warrant activation of the EOC or a federal disaster declaration but were severe enough to cause damage in the community or closure of businesses, schools, or public services.
- The dates of hazard events descriptions.
- Documented damages due to the event.
- Closures of places of employment or schools and the number of days closed.
- Road or bridge closures due to the hazard and the length of time closed.
- Assessment of the number of private and public buildings damaged and whether the damage was minor, substantial, major, or if buildings were destroyed. The assessment will include residences, mobile homes, commercial structures, industrial structures, and public buildings, such as schools and public safety buildings.
- Review of any changes in federal, state, and local policies to determine the impact of these policies on the community and how and if the policy changes can or should be incorporated into the Hazard Mitigation Plan. Review of the status of implementation of projects (mitigation strategies) including projects completed will be noted. Projects behind schedule

will include a reason for delay of implementation.

Incorporation into Existing Planning Mechanisms

Another important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other County and City plans and mechanisms. Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. As previously stated in this plan, mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. The point is re-emphasized here. As described in this plan's capability assessment, the County and participating jurisdictions already implement policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. These existing mechanisms include:

- County and City general and master plans
- County and City Emergency Operations Plans
- County and City ordinances
- Flood/master plans
- Community Wildfire Protection plans
- Capital improvement plans and budgets
- Other plans and policies outlined in the capability assessments in the participant annexes
- Other plans, regulations, and practices with a mitigation focus

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

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

As recommended by Assembly Bill 2140, each community should adopt (by reference or incorporation) this LHMP into the Safety Element of their General Plan(s). Evidence of such adoption (by formal, certified resolution) shall be provided to CAL OES and FEMA.

Integration of wildfire actions identified in this mitigation strategy with the actions and implementation priorities established in existing Community Wildfire Protection Plans (CWPPs).

This is already in process. Key people responsible for development of planning area CWPPs participated in the development of this LHMP. They identified key projects in the CWPPs and integrated them into the Mitigation Strategy of this LHMP. Likewise, actual implementation of these wildfire projects will likely occur through the CWPP implementation process through the efforts of the Fire Safe Councils. Use the risk assessment information to update the hazard analysis in the El Dorado County Emergency Operations Plan.

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

Continued Public Involvement

Continued public involvement is imperative to the overall success of the plan's implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stores from the plan implementation and seek additional public comment. The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings and press releases.

Public Involvement Process for Bi-Annual Reviews

The public will be noticed by social media and/or press releases specifying the date and time for the review and inviting public participation. The El Dorado County Sheriff's OES, local, state, and regional agencies will be notified and invited to attend and participate.

Public Involvement for Five-year Update

When the El Dorado County Sheriff's OES reconvenes for the update, they will coordinate with all stakeholders participating in the planning process—including those that joined this process since the planning process began—to update and revise the plan. As part of this effort, public meetings will be held and public comments will be solicited on the plan update draft.

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A.1 El Dorado County Step 1: Organize to Update a Plan

(a). Involvement of Community Land Use and Comprehensive Planning

In addition to attending meetings, providing draft text for inclusion in the plan, reviewing plan documents, and coordinating input from other departments and stakeholders, El Dorado County planners also provided information on development since the last plan, mapping and details on future development areas, input on current mitigation capabilities, coordination with other planning mechanisms, and in-progress modifications to the General Plan and associated documents specific to El Dorado County.

El Dorado County Planner

- El Dorado County Sheriff's Office of Emergency Services - Todd Crawford, Leslie Schlag

Also in supporting roles are additional supporters and planners. Kristine Oase-Guth and Michelle Patterson - EDC Health and Human Services Agency, Steve Willis - El Dorado County Fire Safe Council, Mike Webb – CAL FIRE, Anne Novotny and Lillian MacLeod - EDC Community Development Agency Long Range Planning, and Greg Schwab - Georgetown Fire District.

(b). Staff of Community Departments on HMPC with Expertise on CRS Step 7 Activities

In order to promote the integration of CRS into this planning process, the representatives from the County were selected based on their areas of expertise relative to the CRS mitigation categories as detailed in Table A-1.

Table A-1 El Dorado County Staff Capability with Six Mitigation Categories

El Dorado County Departments/Staff	Prevention	Property Protection	Natural Resource Protection	Emergency Services	Structural Flood Control Projects	Public Information	Other
Community Development Agency /Planning and Building Department – Anne Novotny and Lillian MacLeod	X	X	X			X	X
Office of Emergency Services – Jim Byers, Moke Auwae, Todd Crawford, and Leslie Schlag	X	X	X	X	X	X	X

El Dorado County Departments/Staff	Prevention	Property Protection	Natural Resource Protection	Emergency Services	Structural Flood Control Projects	Public Information	Other
Community Development Agency - Public Works - John Edwards	X	X	X		X		X
El Dorado County GIS - Information Technology – Jose Crummett & Alex Gole	X					X	X

A.1.1. HMPC and Steering Committee Initial Invitation List

AGENCY / CSD	NAME	EMAIL	PHONE
EDC Office of Emergency Services	Jim Byers	byersj@edso.org	642-4707
EDC Office of Emergency Services	Todd Hammitt	hammittt@edso.org	621-5170
EDC Office of Emergency Services	Todd Crawford	crawfordt@edso.org	621-7660
EDC Office of Emergency Services	Leslie Schlag	schlagl@edso.org	621-5131
EDC Dept of Transportation	Don Spear	speard@edcgov.us	642-4908
EDC Community Development Agency	Steve Pedretti	steve.pedretti@edcgov.us	621-5914
EDC Office of Education	Kathy Daniels	Kdaniels@edcoe.org	295-2205
EDC Mental Health	Robert Price	robert.price@edcgov.us	621-6357
EDC Public Health	Michelle Patterson	michelle.patterson@edcgov.us	621-7581
EDC Public Health	Kristine Guth	kristine.guth@edcgov.us	621-7582
EDC Environmental Management	Greg Stanton	greg.stanton@edcgov.us	621-6658
EDC GIS	Jose Crummett	jose.crummett@edcgov.us	621-6511
EDC Emergency Medical Services Agency	Rich Todd	richard.todd@edcgov.us	621-6505
EDC Agriculture Commision	Charlene Carveth	charlene.carveth@edcgov.us	621-5522
EDC Disaster Council	Scott Heller	sheller@cityofplacerville.org	642-5210
EDC Fire Safe Council	Pat Dwyer	board@edcfiresafe.org	647-1700
Cameron Park Fire District	Bob Counts	Bob.Counts@fire.ca.gov	677-6190
Diamond Springs / El Dorado Fire District	Bryan Ransdell	bransdell@diamondfire.org	626-3190
EDC Fire District	Mike Hardy	hardym@eldoradocountyfire.com	644-9630
El Dorado Hills Fire District	Mike Lilienthal	mlilienthal@edhfire.com	916-933-6623 x1029
Fallen Leaf Lake Fire District	Gary Gerren	ggerren@fllcsd.org	544-3300
Garden Valley Fire District	Clive Savacool	clivesavacool@gardenvalley.org	333-1240
Georgetown Fire District	Greg Schwab	gschwab@georgetownfiredepartment.com	333-4111
Lake Valley Fire District	Gareth Harris	harris@caltahoefire.net	577-3737
Meeks Bay Fire District	Tim Alameda	alameda@ntfire.net	525-7548
Mosquito Fire District	Mike Hazlett	info@mfpd.us	626-9017
Pioneer Fire District	Grant Ingram	gingram@pioneerfire.org	620-4444
Rescue Fire District	Tom Keating	chief@rescuefiredepartment.org	677-1868
CALFIRE AEU	Mike Kaslin	mike.kaslin@fire.ca.gov	644-2345
El Dorado Irrigation District	Jim Abercrombie	jabercrombie@eid.org	642-4055
Georgetown PUD	Wendell Wall	wwall@gd-pud.org	333-4356
South Tahoe PUD	Richard Solbrig	rsolbrig@stpud.dst.ca.us	544-6474

Tahoe City PUD	Cindy Gustafson	cgustafson@tcpud.org	580-6052
Sacramento Municipal Utility District	Jeff Briggs	jeff.briggs@smud.org	916-732-5708
Arroyo Vista CSD	Bill Welty	wmwelty@gmail.com	916-933-0530
Audubon Hills CSD	Gene Blackmun	geneblackmun@comcast.net	644-4153
Cameron Estates CSD	Angela Johnson	cecsd@att.net	677-5889
Cameron Park CSD	Mary Cahill	mcahill@cameronpark.org	350-4651
Connie Lane CSD	Beth Drago	bethbyer@yahoo.com	677-9060
Cosumnes River CSD	Jim LoFranco	CosumnesRiverCSD@gmail.com	334-6441
East China Hill CSD	Stuart Macy	none listed	626-7751 BAD#
El Dorado Hills CSD	Kevin Loewen	kloewen@edhcsd.org	916-614-3237
Fallen Leaf Lake CSD	Gary Gerren	ggerren@fllcsd.org	544-3300
Garden Valley Ranch CSD	Jerry Griffin	kdg90dee@hotmail.com	916-990-2510
Golden West CSD	Edwin White	oneenigma@att.net	620-6844
Greenstone Country CSD	George Amo	greenstoncomm@att.net	622-6120
Grizzly Flats CSD	Jodi Lauther	bod@grizzlyflatscsd.com	622-9626
Hickok Road CSD	Janna Buwalda	jsbuwalda@sbcglobal.net	916-933-8891
Hillwood CSD	Ron Kuch	hcsdboard@hillwodocsd.org	677-3850
Holiday Lake CSD	Paul Cowdery	holidaylakecsd@yahoo.com	677-9458
Knolls Property Owners CSD	Kate Campbell-Craven	kcampbellcraven@gmail.com	642-0908
Lakeview CSD	John Larsen	none listed	676-9593
Marble Mountain CSD	Mattias Bergman	mvbergman@gmail.com	916-651-3282
Mortara Circle CSD	Phyllis Wild	pabatewild@golyon.com	409-5878
Nashville Trail CSD	Randy Hackbarth	trlryder@pacbell.net	626-0571
Rising Hill Road CSD	Ginny Borkowski	ginny.rhrcsd@gmail.com	308-4225
Rolling Hills CSD	Chaney Hicks	chaney@rollinghillscsd.org	916-220-2737
Showcase CSD	Lee Hodge	hodgeleea@yahoo.com	409-4929
Sierra Oaks CSD	Jack Tillman	none listed	642-9947
West El Largo CSD	Don Uelmen	tspdon@cwo.com	642-8385
Tahoe Paradise Resort Improvement Dist	Steve Dunn	none listed	577-9881
Cameron Park Airport District	Gary Millsaps	manager@cameronparkairport.com	676-8316
Georgetown Divide Recreation	Carl Clark	cclark@gdrg.org	823-9090

El Dorado County Resource Conservation Di	Mark Egbert	mark.egbert@ca.usds.gov	295-5630
Georgetown Divide Resource Conservation	Mark Egbert	mark.egbert@ca.usds.gov	295-5630
Tahoe Resource Conservation District	Tori Walton	twalton@tahoercd.org	543-1501x117
City of Placerville	Scott Heller	sheller@cityofplacerville.org	642-5210
City of South Lake Tahoe	Brian Uhler	buhler@cityofslt.us	542-6100
Marshall Hospital	Candace Revaz	crevaz@marshallmedical.org	903-6309
Barton Hospital	Doug Dame	ddame@bartonhealth.org	307-0939
Ca OES	Kim Nielsen	kim.nielsen@caloes.ca.gov	916-657-9372
Shingle Springs Rancheria	Ernest Vargas	evargas@ssband.org	387-4970
United States Forest Service	Laurence Crabtree	lcrabtree@fs.fed.us	622-5061
Lois Rios College El Dorado Center	Dale van Dam	vandamd@flc.losrios.edu	642-5615
Lake Tahoe Community College	Lisa Shafer	shaferl@ltcc.edu	541-4660 x210
PG&E	Richard Rodriquez	RCRU@pge.com	916-386-5361
PG&E	Pam Perdue	psp6@pge.com	916-764-7546

Kickoff Meeting Agenda

EL DORADO COUNTY SHERIFF'S OFFICE

OFFICE OF EMERGENCY SERVICES

2016 Hazard Mitigation Plan Update Meeting

EID Headquarters

10/25/16, 1000-1200 hrs

AGENDA

1. Introductions

2. Hazard Mitigation & Disaster Mitigation Act Planning Requirements
    a. Stakeholder Plan Review & Update, Public Mtg's, Adoption of Plan

3. Role of the Hazard Mitigation Planning Committee/Steering Committee
    a. Review Hazards & Rankings (add Cyber, Tree Mortality, Climate & Drought, Sustained Power Disruption)
    b. Planned Developments?? Locations? Hazards?

4. Coordinating with Other Agencies
    a. Outside County / Adjacent Counties & State

5. Hazard Identification

6. Mitigation Strategy

7. Data Needs

8. Schedule
    a. 12/5-9/16 (Final Draft)
    b. Placerville & Tahoe Mtg's

9. Questions and Answers

Kickoff Meeting Sign-in Sheets

El Dorado County Sheriff's Office of Emergency Services
LHMP Update Stakeholders Meeting

AGENCY / GROUP / CSD	LAST NAME	FIRST	EMAIL
El Dorado Hills CSD	FAWKES	GORDON	gfawkes@me.com
~~Kim Nielsen~~ - Cal OES	Nielsen	Kim	Kim.Nielsen@caloes.ca.gov
El Dorado County Fire C.	~~Steve~~ Willis	Steve	scwillis@comcast.net
EID Parks & Rec Mgr	Hawkins	Grey	ghawkins@eid.org
EDSO / OES	Schley	Leslie	Schley/cd edso.org
SMUD	Sackman	Kim	Kim.Sackman@smud.org
EL Dorado Co. DOT	EDWARDS	JOHN	john.edwards@edcgov.us
El Dorado Co Office of Ed	Daniels	Kathy	kdaniels@edcoe.org
EDSO/OES	BYERS	JAMES	byersj@edso.org
EDC Ag Dep	Carveth	Charlene	charlene.carveth@edcgov.us
DSD-Planning Service	MacLeod	Lillian	lillian.macleod@edcgov.us
EDC HHSA	Patterson	Michelle	michelle.patterson@edcgov.us
EDC HHSA	Guth	Kristine	kristine.guth@edcgov.us
EDC GIS	GOLT	Alec	Alec.golt@EDCGOV.US
EDC GIS	CRUMMETT	JOSE	JOSE.CRUMMETT@EDCGOV.US
South Tahoe PUD	Cotulla	Shannon	SCOTULLA@STPUD.DST.CA.US
Grizzly Flats CSD	Lauther	Jodi	gfbill@sbcglobal.net

EID 10/25/2016 1000-1200 hrs

Email Group Updated 10/31/16

El Dorado County Sheriff's Office of Emergency Services

LHMP Update Stakeholders Meeting

AGENCY / GROUP / CSD	LAST NAME	FIRST	EMAIL
~~El Dorado Hills Fire~~	Lilienthal	Michael	mlilienthal@edhfire.com
"	Mercino	David	dmercino@edhfire.com
ROLLING HILLS CSD	HICKS	CHANEY	CHANEY@ROLLINGHILLSCSD.ORG
EID	Kilburg	Ron	cell. rkilburg@eid.org
Pioneer Fire Dist	Ingram	Grant	Gingram@pioneerfire.org
Nizolek Consulting / EID	Nizolek	Don	Dnizolek@aol.com
EDC COA	MOSS	MARK	MARK.MOSS@EDCGOV.US
EDC Community Dev Agency Cons/Ranch/Hagg	NOVOTNY	ANNE	anne.novotny@edcgov.us
Los Rios PD/ El Dorado Center	Cox	Valerie	Valerie.Cox@losrios.edu
~~GEORGETOWN FIRE~~	Seltwaes	GREG	GSELTWAES@GEORGETOWNFIREDEPARTMENT.COM
Nashville Trail CSD	Hackbarth	Randy	trlryder@pacbell.net
~~Richard E. Rodriguez~~ PG&E - GAS SAFETY	Rodriguez	Richard	rerv@pge.com
Charlene Cimbrook for Katrina Jackson	Jackson	Katrina	Kjacksona@edhcsd.org
EDC SHERIFF OES	CRAWFORD	TODD	CRAWFORDT@EDSO.ORG

EID 10/25/2016 1000-1200 hrs EMAIL GROUP UPDATED 10/26/16

10

EL DORADO COUNTY SHERIFF'S OFFICE

OFFICE OF EMERGENCY SERVICES

2017 Hazard Mitigation Plan Update Meeting

EID Headquarters

12/7/16, 0900-1100 hrs

AGENDA

1. Introductions

2. Review, Updates, & Comments on Plan
    a. Overall Plan
    b. Section II - Hazard Identification & Analysis
        i. Any Hazards not Identified
            1. Energy Shortage/Resilience
            2. Cyber Threats
            3. Tree Mortality
    c. Section III – Community Vulnerability Assessment
        i. Hazard Risks (Section III-23)
        ii. Hazard Risk Ratings (Section III-24)
    d. Section IV – Hazard Mitigation Goals & Policies
        i. Goals (Section IV-6)
        ii. Specific Hazards & Mitigation Measure Review by Disciplines (Sec IV-12)
        iii. Planned Developments?? Locations? Hazards?
3. Public Meetings
    a. Tahoe & Placerville

4. Questions?

El Dorado County Sheriff's Office of Emergency Services

LHMP Update Stakeholders Meeting

AGENCY / GROUP / CSD	LAST NAME	FIRST	EMAIL
EID	Kilborg	Ron	rkilborg@eid.org
Cal OES	Nielsen	Kim	Kim.Nielsen@caloes.ca.gov
SMUD	SACKMAN	Kim	Kim.sackman@smud.org
EDC Fire Safe Council	Willis	Steve	scwillis@comcast.net
EDC COA EMA	MOSS	MARK	MARK.MOSS@EDCGOV.US
~~El Dorado Co Office of Ed~~	Daniels	Katy	kdaniels@edcoe.org
~~Don Nizolek~~ EID	~~Don~~ Nizolek	DON	Dnizolek@aol.com
EID	HAWKINS	GREG	ghawkins@eid.org
El Dorado County Community Development Agency, Long Range Planning	NOVOTNY	ANNE	anne.novotny@edcgov.us
EDHCSD	Jackson	Katrina	Kjacksonedhcsd.org
GEORGETOWN FIRE	SCHWAB	GREG	GSCHWAB@GEORGETOWNFIREDEPARTMENT.COM
CAMERON PARK CSD	COUNTS	Rob	bob.counts@fire.ca.gov

EID 12/7/2016 0900-1100 hrs

El Dorado County Sheriff's Office of Emergency Services

LHMP Update Stakeholders Meeting

AGENCY / GROUP / CSD	LAST NAME	FIRST	EMAIL
ELDOCO DOT	EDWARDS	JOHN	john.edwards@eldcgov.us
CDA-Dev Services	MacLeod	Lillian	lillian.macleod@edcgov.us
CALFIRE	WEBB	MIKE	
EDC SO OES	CRAWFORD	TODD	

EID 12/7/2016 0900-1100 hrs

HMPC Meeting (Public Meeting/West Slope) 01-26-17

Post Details

Reported stats may be delayed from what appears on posts

El Dorado County Sheriff's Office Like Page
January 16 at 11:38am ·

PUBLIC MEETING NOTICE

The El Dorado County Sheriff's Office, Office of Emergency Services is in the process of updating the El Dorado County Local Hazard Mitigation Plan. We will be holding two public meetings to gather input from our residents on the draft version of the updated plan.
Please share the following information and we hope to see you at one of the meetings:

South Lake Tahoe area
Ca. Conservation Corps, Tahoe Center
Multi Purpose Room
1949 Apache Ave.
S. Lake Tahoe, Ca. 96150
1/24/17 @ 6 PM

Placerville area
EDC Community Development Agency
Planning Commision Meeting Room
2850 Fair Lane Crt.
Placerville, Ca. 95667
1/26/17 @ 6 PM

Please Share
L429

Get More Likes, Comments and Shares
Boost this post for $5 to reach up to 1,400 people.

5,790 people reached Boost Post

Hans Grabau, Michelle Kezer and 25 others 6 Comments 21 Shares

Like Comment Share Chronological

Ben Reynolds Sharing
Like · Reply · Message · January 16 at 11:50am

El Dorado County Sheriff's Office Thanks Ben! L429
Like · Reply · 1 · January 16 at 12:43pm

Randy Carpadus what type of hazards?
Like · Reply · Message · January 16 at 12:25pm

El Dorado County Sheriff's Office Good question Randy. We strive for "all hazards", and have quite the extensive list. There are the obvious fire and flood, but we also address drought, climate change, tree mortality, and more. Come to a meeting and see what we have. L429
Like · Reply · 4 · January 16 at 12:42pm

Scott Moore Tourist motor hazard? Is it possible to put a motorized vehicle "capacity" within city limits? That is my solution to reduce emissions, "keep tahoe blue", and reduce "tourist motor hazard".
Like · Reply · Message · 2 · January 16 at 1:13pm · Edited
1 Reply

Jeremy Lorenzo Laura Lorenzo we should go to this
Like · Reply · Message · January 16 at 11:02pm
1 Reply

Jonathan Carstensen I look forward to joining.

5,790 People Reached

78 Reactions, Comments & Shares

42 Like	**27** On Post	**15** On Shares
1 Wow	**0** On Post	**1** On Shares
1 Sad	**0** On Post	**1** On Shares
11 Comments	**9** On Post	**2** On Shares
23 Shares	**21** On Post	**2** On Shares

629 Post Clicks

4 Photo Views	**0** Link Clicks	**625** Other Clicks

NEGATIVE FEEDBACK

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El Dorado County Sheriff's Office of Emergency Services

LHMP Placerville Area Public Meeting

FIRST NAME	LAST NAME	ADDRESS
Rick	Ferriera	3780 COTTON TAIL RD PLV. CA
Susan	Frederick	Disaster Council Dist 3 rep.
Ernest	Hartley	PO Box 1167, El Dorado, CA 95623
Don	Nizolek	895 Phillip Ct. El Dorado Hills CA 95762
Kristine	Orth	4214 Canyon Valley Rd, Diamond Springs 95619
Lesley	COOVELIS	2900 Fair Lane Ct., PLACERVILLE CA
[illegible]	Stewart	Cedar Ridge Fire, P.O. Box 470, 95684
Amanda	Williams	3846 Terri Lane Placerville 95667
Todd	Crawford	EDSO OES

EDC Planning Commission Room 1/26/17 1800hrs

HMPC Meeting (Public Meeting/East Slope) 01-24-17

El Dorado County Sheriff's Office of Emergency Services

LHMP SLT Area Public Meeting

FIRST NAME	LAST NAME	ADDRESS
BRAD	ZLENNICK	LAKE VALLEY FIRE 2211 KEETAK ST SLT, CA 95150
TIM	Alameda	LAKE Valley FPD - (530) 577-3737
JAMES	BYERS	EDSO OES
TODD	CRAWFORD	EDSO OES
GREG ALMOS	ALMOS	EDSO SLT OES

Ca CCC MP Room 1/24/17 1800hrs

El Dorado County: Involve the Public

Efforts were made to engage the public during the creation of this plan to communicate and invite participation in the LHMP update project. A key element of public participation is including members of the public and other public-type stakeholders on the Hazard Mitigation Planning Committee as part of the Steering Committee to the HMPC.

a) List of Steering Committee Members

Community/Representative	Department/Organization	Citizen	Stakeholder
El Dorado County			
Leslie Schlag	Office of Emergency Services		X
Todd Crawford	Office of Emergency Services		X
Mike Webb	Cal Fire		X
Greg Schwab	Georgetown Fire		X
Anne Novotny	Community Development Agency-Planning		X
Bob Counts	Cameron Park CSD / CAL FIRE		X
Steve Wills	El Dorado County Fire Safe		X
Lillian MacLeod	Community Development Agency-Planning		X
Kristine Oase-Guth	Health and Human Services		X
Michelle Patterson	Health and Human Services		X
City of South Lake Tahoe			
Brian Uhler	Police Chief		X
Jeff Meston	Fire Chief		X
City of Placerville			
Scott Heller	Police Chief		X

b) and c) Public Meetings

Meeting Topic	Meeting Date	Meeting Locations
1) Intro to DMA and mitigation planning 2) LHMP plan overview and public comments	01-26-2017	El Dorado County Planning Commission Room West Slope.
1) Intro to DMA and mitigation planning 2) LHMP plan overview and public comments	01-24-2017	CCC Meeting Room, East Slope, Meyers.

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Appendix B References

Assessment Roll Values, El Dorado County Assessor's Office

CAL FIRE, Amador / El Dorado Unit

California Building Code, 2016 California Department of Conservation

California Department of Finance

California Department of Fish and Game

California Department of Forestry and Fire Protection

California Department of Parks and Recreation Office of Historic Preservation

California Department of Public Health

California Department of Water Resources

California Office of Emergency Services

California Employment Development Department

California Environmental Quality Act

California Geological Survey

California Highway Patrol

California Historical Landmarks

California Natural Diversity Database

California Points of Historical Interest

California Register of Historic Places

California Volcanoes and Volcanics, U.S. Geological Survey, Cascades Volcano

Observatory California Weed Mapper, Cal-IPC

CalTrans, Truck Networks on California State Highways, 2018

Cameron Park Airport District

Cameron Park Fire District

Census 2010, U.S. Census Bureau

Cities/Counties Ranked by Size, Numeric, and Percent Change, State of California Dept. of Finance, 2017

City of Placerville

City of South Lake Tahoe

Communities at Risk, California Fire Alliance

Community Rating System, Federal Emergency Management Agency National Flood Insurance Program

Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies, Federal Emergency Management Agency, FEMA 386-3, 2003

Diamond Springs / El Dorado Fire District

Disease Maps 2018, CDC

El Dorado County

El Dorado County Agriculture Commission

El Dorado County Assessor's Office

El Dorado County Behavioral Health

El Dorado County Community Development Agency

El Dorado County Community Wildfire Protection Plan, 2017

El Dorado County Department of Transportation

El Dorado County Disaster Council

El Dorado County Emergency Medical Services Agency

El Dorado County Emergency Operations Plan, 2014

El Dorado County Environmental Management

El Dorado County Fire Chief's Association

El Dorado County Fire District

El Dorado County Fire Safe Councils

El Dorado County Flood Insurance Study

El Dorado County General Plan Amendments, 2006 – 2018

El Dorado County General Plan. 2004

El Dorado County Geographic Information System

El Dorado County Health and Human Services Agency

El Dorado County Housing Element, 2013-2021, El Dorado

El Dorado County Office of Education

El Dorado County Public Health

El Dorado County Resource Conservation

El Dorado County Sheriff's Office of Emergency Services

El Dorado Hills Fire District

El Dorado Irrigation District

Enhanced Fujita Scale, National Oceanic and Atmospheric Administration Storm Prediction Center, 2007

Fallen Leaf Lake Fire District

Federal Emergency Management Agency

FEMA Region IX

Fire occurrence in the Lake Tahoe Basin, Lake Tahoe Watershed Assessment, 2000

Future Eruptions in California's Long Valley Area—What's Likely? U.S. Geological Survey, Fact Sheet 073-97, 1998

Garden Valley Fire District

Georgetown Divide Conservation

Georgetown Divide Recreation

Georgetown Fire District

Georgetown Public Utility District

Getting Started: Building Support for Mitigation Planning, Federal Emergency Management Agency, FEMA 386-1, 2002

Hazard Mitigation Planning and Hazard Mitigation Grant Program, Federal Register, Interim Final Rule, February 26, 2002

HAZUS-MH MR3, Federal Emergency Management Agency, 2007

Integrating Manmade Hazards into Mitigation Planning, Federal Emergency Management Agency, FEMA 386-7. 2003

Introduction to Hazard Mitigation, Federal Emergency Management Agency, FEMA IS-393.A 2006

Lake Tahoe Watershed Assessment

Lake Tahoe Community College

Lake Valley Fire District

Los Rios Community College

Meeks Bay Fire District

Mosquito Fire District

Multi-Hazard Identification and Risk Assessment, Federal Emergency Management Agency,

1997 National Climatic Data Center Storm Events Database

National Environmental Policy Act

National Flood Insurance Program, Federal Emergency Management Agency

National Institute of Building Science, Multi-Hazard Mitigation Council

National Inventory of Dams

National Oceanic and Atmospheric Administration

National Climatic Data Center

National Register Information System

National Register of Historic Places

National Resource Conservation Service

National Response Center

National Weather Service

Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities. National Institute of Building Science Multi-Hazard Mitigation Council, 2005

Original Fujita Scale, National Oceanic and Atmospheric Administration Storm Prediction

Center

Pacific Gas & Electric

PandemicFlu.gov, U.S. Department of Health and Human Services

Pioneer Fire District

Population, Housing Units, Area, and Density: 2010 (GCT-PH1), U.S. Census Bureau, 2010

Probabilistic Seismic Hazard Assessment for the State of California, California Geological Survey, Open- File Report 96-08, 1996

Rescue Fire District

Robert T. Stafford Disaster Relief and Emergency Act, Public Law 93-288, as amended, 42 U.S.C. 5121- 5207, June 2007

Sacramento Municipal Utility District

SHELDUS, Hazards Research Lab, University of South

Carolina Sierra Nevada Photos

Shingle Springs Rancheria

South Tahoe Public Utility District

Spatial Hazard Events and Losses Database for the United States, University of South Carolina Hazards Research Lab

State of California Department of Conservation Farmland Mapping and Monitoring Program

State of California Multi-Hazard Mitigation Plan, California Office of Emergency Services,

2013/2018

Storm Events Database, National Climatic Data Center

Tahoe City Public Utilities District

Tahoe City Public Utility District

Tahoe Paradise Resort Improvement District

Tahoe Resource Conservation District

The Online Tornado FAQ, National Oceanic and Atmospheric Administration Storm Prediction Center

The Potential Hazard from Tsunami and Seiche Waves Generated by Future Large Earthquakes within the Lake Tahoe Basin, California-Nevada, 1999-2000; Gene A. Ichinose, Kenji Satake, John G. Anderson, Rich A. Schweickert, and Mary M. Lahren; Nevada Seismological Laboratory; University of Nevada; (University of Nevada 2000 study)

U.S. Army Corps of Engineers

U.S. Bureau of Land Management

U.S. Bureau of Reclamation. Press Release: "Reclamation Commissioner Connor Announces Contract for Dam Safety Work of Folsom Reservoir's Dikes 4 and 6." August 19, 2009.

U.S. Drought Monitor. University of Nebraska-Lincoln National Drought Mitigation Center

U.S. Fish and Wildlife Service

U.S. Forestry Service

U.S. Geological Survey

Understanding Your Risks: Identifying Hazards and Estimating Losses, Federal Emergency Management Agency, FEMA 386-2. 2001

University of Nevada Seismic Laboratory, (Schweickert). USGS

University of Nevada, Reno

Western Regional Climate Center

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Appendix C Adoption Resolution

Note to Reviewers: When this plan has been reviewed and approved pending adoption by FEMA Region IX, the adoption resolutions will be signed by the participating jurisdictions and added to this appendix. A model resolution is provided below.

RESOLUTION NO.

OF THE BOARD OF SUPERVISORS OF THE COUNTY OF EL DORADO
ADOPTION RESOLUTION
EL DORADO COUNTY LOCAL HAZARD MITIGATION PLAN

WHEREAS, El Dorado County recognizes the threat that natural hazards pose to people and property withing our community; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

WHEREAS, the U.S. Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

WHEREAS, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments;

WHEREAS, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS, El Dorado County fully participated in the FEMA-prescribed mitigation planning process to prepare this local hazard mitigation plan; and

WHEREAS, the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials have reviewed the El Dorado County Local Hazard Mitigation Plan and approved it contingent upon this official adoption of the participating governing body;

WHEREAS, the El Dorado County Board of Supervisors desires to comply with requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the El Dorado County Local Hazard Mitigation Plan;

WHEREAS, adoption by the governing body for El Dorado County demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this Local Hazard Mitigation Plan.

WHEREAS, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

NOW, THEREFORE, BE IT RESOLVED that the El Dorado County Board of Supervisors adopts the El Dorado County Local Hazard Mitigation Plan as an official plan; and

BE IT RESOLVED, that the El Dorado County Board of Supervisors adopts the El Dorado County Local Hazard Mitigation Plan by reference into the safety element of their general plan in accordance with the requirements of AB 2140, and

BE IT FURTHER RESOLVED, El Dorado County will submit this adoption resolution to the California Office of Emergency Services and FEMA Region IX officials to enable the plan's final approval in accordance with the requirements of the Disaster Mitigation Act of 2000 and to establish conformance with requiremnts of AB 2140.

PASSED AND ADOPTED by the Board of Supervisors of the County of El Dorado at a regular meeting of said Board, held the _____ day of _____, 20__, by the following vote of said Board:

Ayes:
Attest: Noes:
Absent:

_____
Clerk of the Board of Supervisors

By: _____ _____
Deputy Clerk Chair, Board of Supervisors