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El Dorado Irrigation District

2024 Local Hazard Mitigation Plan

EL DORADO IRRIGATION DISTRICT
2024 LOCAL HAZARD MITIGATION PLAN

FEMA REGION IX APPROVAL APRIL 24, 2024

If you have questions regarding this document, please contact the District's Safety and Security Officer, Daniel Newsom at DNewsom@EID.org.

Version Control Document

#	Date	Author	Summary of Changes Made

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LIST OF ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
2024 LHMP	El Dorado Irrigation District 2024 LHMP
ACWA JPIA	Association of California Water Agencies Joint Powers Insurance Authority
BRIC	Building Resilient Infrastructure and Communities
CAL FIRE	California Department of Forestry and Fire Protection
Cal OES	California Office of Emergency Services
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CGS	California Geological Survey
CIP	Capital Improvement Plan
CO_2	carbon dioxide
DFIRM	Digital Flood Insurance Rate Map
DMA 2000	Disaster Mitigation Act of 2000
DR	Major Disaster Declaration
DRT	Drought Response Team
DSOD	Division of Safety of Dams
EAP	Emergency Action Plan
EID	El Dorado Irrigation District
EM	Emergency Declaration
EOP	Emergency Operations Plan
FEMA	Federal Emergency Management Agency
FCC	Facility Capacity Charges
FHSZ	Fire Hazard Severity Zone
GIS	Geographic Information
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
IPUMS	Integrated Public Use Microdata Series
LHMP	Local Hazard Mitigation Plan
LRA	local responsibility area
M	magnitude
NFIP	National Flood Insurance Program
NOI	Notice of Intent
RFFC	Regional Forest and Fire Capacity Program
SFHA	Special Flood Hazard Area
SOI	Sphere of Influence
SRA	state responsibility area
State	State of California
UC	University of California
USFS	U.S. Forest Service

1.0 INTRODUCTION

1.1 HAZARD MITIGATION PLANNING

As defined in Title 44 Code of Federal Regulations (CFR) Subpart M, Section 206.401, hazard mitigation is "any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards." As such, hazard mitigation is any work to minimize the impacts of any type of hazard event before it occurs. Hazard mitigation aims to reduce losses from future disasters. It is a process that identifies and profiles hazards, analyzes the people and facilities at risk, and develops mitigation actions to reduce or eliminate hazard risk. The implementation of the mitigation actions—which includes short- and long-term strategies that may involve planning, policy changes, programs, projects, and other activities—is the end result of this process.

Over the past two decades, local hazard mitigation planning has been driven by a federal law, known as the Disaster Mitigation Act of 2000 (DMA 2000). On October 30, 2000, Congress passed the DMA 2000 (Public Law 106-390), which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Title 42 United States Code Section 5121 et seq.) by repealing the act's previous mitigation planning section (409) and replacing it with a new mitigation planning section (322). This new section emphasized the need for state, tribal, and local entities to closely coordinate mitigation planning and implementation efforts. This new section also provided the legal basis for the Federal Emergency Management Agency's (FEMA's) mitigation plan requirements for the Hazard Mitigation Assistance (HMA) grant programs.

1.2 2024 HAZARD MITIGATION PLAN SYNOPSIS

To meet the requirements of the DMA 2000, the El Dorado Irrigation District (EID) has updated its Local Hazard Mitigation Plan (LHMP) known as the El Dorado Irrigation District 2024 LHMP (hereon referred to as the 2024 LHMP). The goal of the planning process is to profile the major hazards in the EID service area, determine the impacts of those hazards on EID major infrastructure and land, and develop strategies to mitigate future disasters.

The 2024 LHMP is organized to follow FEMA's 2022 Local Mitigation Plan Review Tool (Appendix A), which demonstrates how hazard mitigation plans meet the DMA 2000 regulations. As such, the specific planning elements of this review tool are discussed in their appropriate plan sections.

After this introduction, the 2024 LHMP consists of the following sections:

- Section 2, Planning Process, provides an overview of the planning process, starting with a timeline. It identifies planning team members and describes their involvement. This section also details stakeholder involvement and public outreach. In addition, it provides an overview of the existing plans and reports, describing how those documents were incorporated into the 2024 LHMP. Documentation that supports the planning process is provided in Appendix B.
- Section 3, Prologue, describes EID, the planning area (the EID service area), and demographics and development trends.
- Section 4, Risk Assessment, describes each of the eight hazards addressed in this plan. Hazard figures are provided in Appendix C. This section also describes the District's vulnerability to each hazard, and supporting vulnerability tables are provided in Appendix D. In addition, this section includes hazard impact tables as well as a discussion around the National Flood Insurance Program (NFIP). It
- Section 5, Mitigation Strategy, provides a hazard-mitigation-specific capability assessment. It also describes the mitigation goals, the recommended mitigation actions, the prioritized

mitigation action plan, and the process to integrate the 2024 LHMP into other planning mechanisms. Documentation that supports the mitigation strategy is provided in Appendix E.

- Section 6, Plan Maintenance, describes continued public participation and outlines how the plan will be implemented, integrated into other documents, and updated in 5 years.
- Section 7, Plan Update, describes the changes in development and changes in priorities, and provides an update on mitigation actions identified in the 2019 LHMP and how the 2019 LHMP was integrated into other planning documents.
- Section 8, Plan Adoption, contains scanned copies of the adoption resolutions.
- Appendices include Appendix A – Local Mitigation Plan Review Tool, Appendix B – Planning Process, Appendix C – Figures, Appendix D – Vulnerability Tables, and Appendix E – Mitigation Actions and Prioritization Process.

2.0 PLANNING PROCESS

This section addresses Element A: Planning Process of the Local Mitigation Plan Regulation Checklist.

Element A: Planning Process	
A1.	Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))
A1-a.	Does the plan document how the plan was prepared, including the schedule or time frame and activities that made up the plan's development, as well as who was involved?
A1-b.	Does the plan list the jurisdiction(s) participating in the plan that seek approval, and describe how they participated in the planning process?
A2.	A2. Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))
A2-a.	Does the plan identify all stakeholders involved or given an opportunity to be involved in the planning process, and how each stakeholder was presented with this opportunity?
A3.	Does the plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))
A3-a.	Does the plan document how the public was given the opportunity to be involved in the planning process and how their feedback was included in the plan?
A4.	A4. Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))
A4-a.	A4-a. Does the plan document what existing plans, studies, reports and technical information were reviewed for the development of the plan, as well as how they were incorporated into the document?

2.1 OVERVIEW OF THE 2024 LHMP PLANNING PROCESS

The development of the 2024 LHMP was a collaborative effort between EID and their consultant, AECOM. EID's safety and security officer served as the project manager for the 2024 LHMP. The planning process officially kicked off in October 2023. The planning process took a little more than 3 months. A timeline of the major planning tasks and milestones by month, including the three times the planning team met virtually, is provided in Table 2-1. A list of the planning team members and how they contributed to the development of the plan is provided in Table 2-2.

Table 2-1: LHMP Timeline

Date	Tasks	People Involved
October 2023	Held first planning team meeting to kick off the planning process (October 11, 2023). Acquired Geographic Information System (GIS) datasets from EID. Crafted and posted public outreach messages on EID's website and Facebook page. Identified initial list of stakeholders and emailed the stakeholders. Created draft hazard profiles and draft hazard maps. Reviewed and provided status updates from mitigation actions identified in the 2019 LHMP.	LHMP project manager, planning team, and AECOM
November 2023	Conducted an overlay analysis of major EID infrastructure in hazard areas and determined which assets are at risk. Developed list of draft mitigation actions. Held second planning team meeting to review draft vulnerability analysis and discuss potential mitigation strategies (November 15, 2023). Finalized mitigation strategy and prepared Internal Draft 2024 LHMP.	LHMP project manager, planning team, and AECOM
December 2023	Review of the Internal Draft 2024 LHMP. Created the Public Draft 2024 LHMP. Review of the Public Draft 2024 LHMP by the public and stakeholders.	LHMP project manager, planning team, and AECOM
January 2023	Review of the Public Draft 2024 LHMP by the public and stakeholders. Created the Final Draft 2024 LHMP and submitted it to California Office of Emergency Services (Cal OES) and FEMA for review.	LHMP project manager, AECOM, Cal OES, and FEMA
April 2024	Final Draft 2024 LHMP approved by FEMA.	LHMP project manager, AECOM, Cal OES, and FEMA Region IX
April 2024	Final 2024 LHMP adopted by the EID Board of Directors.	EID Board of Directors
May 2024	Held third planning team meeting to go over plan maintenance procedures and FEMA grants. Closed out project.	LHMP project manager, AECOM, and planning team

Notes:
Cal OES = California Office of Emergency Services
EID = El Dorado Irrigation District
FEMA = Federal Emergency Management Agency
GIS = Geographic Information System
LHMP = Local Hazard Mitigation Plan

Table 2-2: Planning Team

Name	Title and Agency	Contribution
Daniel Newsom	Safety and Security Officer, EID	Served as the 2024 LHMP project manager; conducted stakeholder outreach; provided relevant plans and reports; and reviewed the Internal Draft 2024 LHMP.
Emily Bertram	Parks and Recreation Manager, EID	Participated in the planning team calls; provided status updates for 2019 LHMP mitigation actions; assisted with recreation area mitigation project ideas; and reviewed the Internal Draft 2024 LHMP.
Karen Cross	Communication Technician, EID	Participated in the planning team calls; provided input on stakeholder list; conducted public outreach efforts; and reviewed the Internal Draft 2024 LHMP.
Jenny Downey	Customer Service Manager, EID	Participated in the planning team calls; provided input regarding underserved and vulnerable populations; and reviewed the stakeholder and public outreach strategy as well as the Internal Draft 2024 LHMP.
Tracey Eden-Bishop	Senior Civil Engineer, EID	Participated in the planning team calls; assisted with drought mitigation project ideas; reviewed GIS datasets and provided additional major infrastructure data to be included; and reviewed the Internal Draft 2024 LHMP.
Madeline Kelsch	Associate Civil Engineer, EID	Participated in the planning team calls; provided status updates for 2019 LHMP mitigation actions; assisted with mitigation project ideas; and reviewed the Internal Draft 2024 LHMP.
Jan Wolf	GIS Analyst, EID	Participated in the planning team calls; provided EID GIS datasets; and reviewed the Internal Draft 2024 LHMP.

Notes:
EID = El Dorado Irrigation District
LHMP = Local Hazard Mitigation Plan

2.2 OPPORTUNITIES FOR STAKEHOLDERS

On October 30, 2023, the LHMP project manager reached out to stakeholders via email about the 2024 LHMP and invited them to participate in the planning process. A stakeholder from the El Dorado County Water Agency responded and asked to be invited to any meetings and/or review any work products. The stakeholder was invited to and attended planning team meeting 2.

The LHMP project manager reached out to the stakeholders again via email on December 20, 2023, inviting them to review and provide comments on the Public Draft 2024 LHMP. EID did not receive any stakeholder comments during the public review period.

Stakeholders included the following:

- Neighboring communities: Alpine County, Amdor County, El Dorado County, Placer County, Sacramento County, and the City of Placerville
- State of California partners: California Department of Forestry and Fire Protection (CAL FIRE) Amdor - El Dorado Unit, California Department of Transportation District 3, California Department of Water Resources, California State Parks, California Water Resources Control Board, and the Sierra Nevada Conservancy

- Federal Partners: U.S. Bureau of Reclamation - Central California Area Office and U.S. Forest Service (USFS) - El Dorado National Forest Supervisor's Office
- Agencies that have the authority to regulate development: El Dorado County Planning Services and City of Placerville Development Services
- Local and regional agencies involved in hazard mitigation: El Dorado County Fire Protection District and the El Dorado County Fire Safe Council
- Representatives of businesses, academia, and other private sectors: El Dorado County Chamber of Commerce and Pacific Gas and Electric
- Special districts: El Dorado Water Agency, South Tahoe Public Utility District, Amdor Water Agency, Placer County Water Agency, Pioneer Community Energy, Georgetown Public Utility District, Cameron Park Community Services District, and Grizzly Flats Community Services District
- Representatives of underserved and vulnerable populations: El Dorado County Health and Human Services Agency and El Dorado Community Foundation

Copies of emails to the stakeholders as well as contact information for each stakeholder is included in Appendix B.

2.3 PUBLIC INVOLVEMENT

Also on October 30, 2023, EID's communication technician posted the 2024 LHMP kickoff announcement on the District's Facebook page and X (formerly Twitter). The Facebook post received five likes, one share, and two comments thanking the District for the notification.

On December 20, 2023, EID's communication technician posted a news release and copy of the Public Draft 2024 LHMP to EID's website along with contact information. Community members were also notified about the draft and public review process on the District's social media sites on the same day. The Facebook post receive three likes. No public comments were received.

Links to EID's website, Facebook page, and X (formerly Twitter) are provided below (screenshots are provided in Appendix B):

- Facebook: https://www.facebook.com/ElDoradoIrrigationDistrict/
- X (formerly Twitter): https://twitter.com/ElDoIrrigation/
- Website: https://www.eid.org/

2.4 OUTREACH TO UNDERSERVED AND VULNERABLE POPULATIONS

For this plan, vulnerable and underserved populations include low-income individuals and households. In unincorporated areas, communities with a median household income of 80 percent or less of the statewide median household income are referred to a disadvantaged unincorporated community. There are several disadvantaged unincorporated communities located fully or partially within the EID service area. Three of these communities are considered severely disadvantaged communities, which is defined as an area with a median household income of 60 percent or less of the state average. They are in the Perks Corner – Diamond Springs area (pop. 2,654), Placerville – Apex area (pop. 1,454), and Cedar Grove – Pollock Pines area (pop. 1,789) and are included in the vulnerability analysis (Section 4.2, Overall Summary of Vulnerability).

In 2018, EID implemented a low-income assistance program for residential wastewater service customers, known as the Residential Wastewater Assistance Program. EID administers this program and offers up to 1,500 income-eligible customers who currently receive a discounted rate through Pacific Gas and Electric's California Alternate Rates for Energy program an opportunity to receive $25 off their bimonthly wastewater bill. In addition to the Residential Wastewater Assistance Program, the District is enrolled in the federal

Low Income Household Water Assistance Program. The program is administered through the California Department of Community Services and Development, and applications can be made through El Dorado County Health and Human Services.

The LHMP project manager invited El Dorado County Health and Human Services Agency and the El Dorado Community Foundation to participate in the planning process as stakeholders representing vulnerable and underserved populations in the county. In addition, the EID low-income assistance program manager was a member of the planning team.

2.5 REVIEW AND INCORPORATION OF EXISTING PLANS AND REPORTS

A list of the relevant existing major plans and reports reviewed and incorporated into the 2024 LHMP is provided in Table 2-3. In addition, these sources of information are referenced throughout the plan.

Table 2-3: Existing Plans and Reports

Plans and Reports	Information to Be Incorporated into the 2024 LHMP
EID Capital Improvement Plan (CIP) 2024–2028 (EID 2023)	The CIP was used to identify projects to include in the mitigation strategy (Appendix E, Mitigation Actions).
Western El Dorado County Community Wildfire Plan Update (El Dorado County Fire Safe Council 2022)	Topography, climate, and vegetation information were used to develop the wildfire profile in Section 4.1, Hazard Identification.
EID Drought Action Plan Update 2021 (EID 2021)	EID's capabilities during droughts were incorporated into Section 5.1, Authorities, Policies, Programs, and Resources.
EID Annual Comprehensive Financial Report 2021 (EID 2021)	Operating information was used to explain development trends in the EID service area over the past 5 years in Section 7.1, Changes in Development.
Climate Change Vulnerability and Adaptation for Infrastructure and Recreation in the Sierra Nevada General Technical Report (USFS 2021)	This scientific assessment of the climate threats to the Sierra Nevada Region was incorporated into Section 4.1, Hazard Profiles, and Section 4.3, Potential Hazard Impacts.
Final Municipal Service Review Update and Sphere of Influence Update for the El Dorado Local Agency Formation Commission (Swale, Inc., 2020)	Sphere of Influence information was used to address future growth for EID in Section 3.3, Demographics and Development Trends, and Appendix D, Vulnerability Tables.
2019 EID Local Hazard Mitigation Plan	EID general information was incorporated into Section 3.0 Prologue. Historical hazard information was incorporated into Section 4.1, Hazard Profiles. Mitigation actions were reviewed for consideration for Section 5.4, Draft Mitigation Action List.
2004 El Dorado County General Plan (El Dorado County, Amended December 2019)	General Plan and Land Use Element information was incorporated into Section 5.1, Authorities, Policies, Programs, and Resources.
California's Fourth Climate Change Assessment, Sierra Nevada Region Report (California Energy Commission 2018)	This scientific assessment of the climate threats to the Sierra Nevada Region was incorporated into Section 4.1, Hazard Profiles, and Section 4.3, Potential Hazard Impacts.
EID Emergency Operations Plan (EOP), (EID 2018)	The EOP's Basic Plan was incorporated into Section 5.1, Authorities, Policies, Programs, and Resources.

Climate Change in the Sierra Nevada: California's Water Future (UCLA Center for Climate Science 2018)	This scientific assessment of the climate threats to the Sierra Nevada Region was incorporated into Section 4.1, Hazard Profiles, and Section 4.3, Potential Hazard Impacts.
Flood Insurance Study for El Dorado County and Incorporated Areas (FEMA 2012)	Flood sources and flood history were incorporated into the flood hazard profile in Section 4.1, Hazard Identification.

Notes:
2024 LHMP = El Dorado Irrigation District 2024 LHMP
CIP = Capital Improvement Plan
EID = El Dorado Irrigation District
EOP = Emergency Operations Plan

3.0 PROLOGUE

This section provides an overview of EID, the District service area, and demographic and development trends.

3.1 EL DORADO IRRIGATION DISTRICT

The EID was formed in 1925 to provide water to El Dorado County and was created to secure water supplies, keep irrigation rates reasonable, and increase the value of agricultural lands. The District serves approximately 220 square miles on the western slope of the Sierra Nevada Mountains in El Dorado County (Figure C-1). The service area is generally bounded by Sacramento County to the west and the Pollock Pines/Sly Park area to the east and ranges from 500 feet to more than 4,000 feet in elevation. The area north of Coloma and Lotus establishes the northernmost part of the service area, while the communities of Pleasant Valley and South Shingle Springs establish the southern boundary. The District also has two satellite water systems, one each in the Strawberry and Outingdale communities.

The EID service area (Figure C-2) is primarily located in two major watersheds, the South Fork American River in the north and the North Fork of the Cosumnes River in the south; the District is hydrologically split by the Placerville Ridge and Highway 50 between these two drainage watersheds. Although the rivers drain east to west, the minor streams mostly travel northwest toward the American River and southwest toward the Cosumnes River. The ridges generally trend in a west to east direction. As of October 2023, the District's physical boundaries include 232.27 square miles, including 10 noncontiguous areas. For this plan, 231.97 square miles are included in the analysis. Figure C-1 illustrates the location of the District's service area.

The District serves a combination of agricultural and traditional municipal customers throughout El Dorado County. Land uses in the District's service are primarily residential along with agriculture, commercial, and retail. The District's growth prospects are predominantly defined by the County's General Plan, with variances to that plan from periodic General Plan amendments and specific development plans, several of which have recently been brought before the District requesting water supply assessments.

The District is an essential support element for firefighting on the western slope of El Dorado County. USFS has identified 18 communities within El Dorado County that are at greatest risk for disaster level fire storms for which the District provides the key sources of water for fighting and mitigating these wildland fires.

3.2 EL DORADO IRRIGATION DISTRICT SERVICES

3.2.1 Water Services

The District's water supply system draws most of its water from Jenkinson Lake, Folsom Reservoir, and Forebay Reservoir, which is supplied with various District water assets associated with Project 184. These sources feed its water treatment plants and related delivery systems, including 1,200 miles of pipelines and 27 miles of ditches.

3.2.2 Recycled Water Services

In addition to a potable water system, the District operates a recycled water system that provides tertiary treated recycled water from the Deer Creek and El Dorado Hills wastewater treatment plants to serve the western portions of the service area that are plumbed for recycled water. The water from both plants meets California State Water Resources Control Board Division of Drinking Water Title 22 requirements.

The recycled water produced at El Dorado Hills has been used for industrial purposes and golf course irrigation since 1979. Similarly, the Deer Creek water has been used for road median irrigation in addition to industrial purposes and golf course irrigation. In 1997, the distribution systems of both plants were connected, allowing recycled water to be transferred between systems. The District has expanded the available use of recycled water to now include commercial and residential irrigation use.

3.2.3 Wastewater Services

The District has four permitted wastewater collection systems: El Dorado Hills Wastewater Collection System; Deer Creek Wastewater Collection System; Camino Heights Wastewater Collection System; and Gold Ridge Forest Wastewater Collection System. The District's two largest wastewater collection systems are the El Dorado Hills Wastewater Treatment Plant, which serves the community of El Dorado Hills, and the Deer Creek Wastewater Treatment Plant, which serves the communities of Cameron Park, Shingle Springs, and Diamond Springs. The District's two remaining collection systems are smaller systems serving the communities of Camino Heights and Gold Ridge Forest.

3.2.4 Hydroelectric Services – El Dorado Hydroelectric Project 184

El Dorado Hydroelectric Project 184 is located on the South Fork of the American River and its tributaries, and on Echo Creek, a tributary to the Upper Truckee River, in the counties of El Dorado, Alpine, and Amador, California.

EID's hydroelectric division was established in 1999 when Pacific Gas and Electric transferred ownership of the 20-megawatt powerhouse to EID. With the transfer came 15,080 acre-feet of water rights from the South Fork of the American River and from water that is stored and released from four high-Sierra lakes and reservoirs—Caples, Silver, Echo, and Aloha. The system is operated under Federal Energy Regulatory Commission License No. 184 (Project 184). Project 184 also provides recreation opportunities at Silver Lake and Caples Lake located along Highway 88, and at Forebay Reservoir in Pollock Pines.

The hydroelectric division operates and maintains 22 miles of water conveyance facilities including canal, flumes, tunnels, siphons, and penstock. EID's hydroelectric division is also responsible for operating the Project 184 dams and powerhouse. Most of the Project 184 facilities are in remote areas that are only accessible with hiking, snowshoeing in the winter, off-road vehicles or equipment, or by helicopter. The recreation hydroelectric facilities are maintained by EID's recreation operations division.

3.2.5 Recreation

The District also owns and operates Sly Park Recreation Area and its main reservoir, Jenkinson Lake. Located in a heavily wooded area, it is popular for both day visits and overnight camping. The park includes 600 surface acres for water activities, 10 picnic areas, nine miles of shoreline, two boat ramps, Boy Scout Hill, and 191 individual campsites along the north shore. There are five group camping areas, an Event Center, and an equestrian campground along the south shore. There are also 9 miles of hiking and equestrian trails and a Native American/historical museum that includes a self-guided, half-mile trail for those who enjoy nature and wildlife viewing. In addition to Sly Park Recreation Area, EID also operates Caples Lake Boat Launch, Silver Lake West Campground, and the Forebay Day Use Area.

3.3 DEMOGRAPHICS AND DEVELOPMENT TRENDS

EID's service area boundaries encompass mostly unincorporated land which has been developed over the years with small unincorporated subdivisions and rural neighborhoods. As noted above, the population served by the EID includes a mix of users and user classes, ranging from residential and commercial, to agricultural (receiving both potable and raw water supplies) and public customers (for instance schools, governmental facilities, and fire stations). Summarized 2020 U.S. Census Bureau population data prepared by the Integrated Public Use Microdata Series (IPUMS) National Historical Geographic Information

System shows that there are 126,527 people living in the EID service area boundaries (Steven Manson, Jonathan Schroeder, David Van Riper, Katherine Knowles, Tracy Kugler, Finn Roberts, and Steven Ruggles. IPUMS National Historical Geographic Information System: Version 18.0 [dataset]. Minneapolis, MN: IPUMS. 2023).

As shown in Figure C-3, EID's sphere of influence (SOI) identifies the the most appropriate areas for an agency to provide services in the probable future. EID's current SOI boundaries include 600.82 square miles, with 369.47 square miles located outside the EID service area. However, the District anticipates that most future growth will occur in areas that can be served by existing utility infrastructure such as water and highway access; therefore, most of the anticipated growth will be within the EID service area. Extension of service to SOI areas outside of the EID service area will be evaluated on a case-by-case basis as the need arises and as the District's infrastructure allows. In addition, the El Dorado County General Plan includes development patterns and areas of growth in existing Community Regions and Rural Regions, establishing urban limit lines where urban and semi-urban lands will be developed. These urban limit lines can only be modified through the General Plan amendment process, thereby controlling the ability of existing rural areas to be developed. The General Plan designates medium- and high-density residential development through 2040 in El Dorado Hills, Cameron Park, Shingle Springs, Diamond Springs, and Pollock Pines. The El Dorado County General Plan projects incremental growth in housing units on the West Slope until 2035 based upon a 1.03 percent annual growth rate. EID's data and reports indicate it can serve projected County General Plan growth through the year 2045.

4.0 RISK ASSESSMENT

This section addresses Element B: Risk Assessment of the Local Mitigation Plan Regulation Checklist.

Element B: Risk Assessment	
B1.	Does the plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement § 201.6(c)(2)(ii))
B1-a.	Does the plan describe all natural hazards that can affect the jurisdiction(s) in the planning area, and does it provide the rationale if omitting any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area?
B1-b.	Does the plan include information on the location of each identified hazard?
B1-c.	Does the plan describe the extent for each identified hazard?
B1-d.	Does the plan include the history of previous hazard events for each identified hazard?
B1-e.	Does the plan include the probability of Future events for each identified hazard? Does the plan describe the effects of future conditions, including climate change (e.g., long-term weather patterns, average temperature, and sea levels), on the type, location and range of anticipated intensities of identified hazards?
B1-f.	For participating jurisdictions in a multi-jurisdictional plan, does the plan describe any hazards that are unique to and/or vary from those affecting the overall planning area?
B2.	Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address National Flood Insurance Program (NFIP)-insured structures that have been repetitively damaged by floods? (Requirement 44 CFR § 201.6(c)(2)(ii))
B2-a.	Does the plan provide an overall summary of each jurisdiction's vulnerability to the identified hazards?
B2-b.	For each participating jurisdiction, does the plan describe the potential impacts of each of the identified hazards on each participating jurisdiction?
B2-c.	Does the plan address NFIP-insured structures within each jurisdiction that have been repetitively damaged by floods?

4.1 HAZARD IDENTIFICATION

During the planning team kickoff conference call, the LHMP project manager, consultant, and planning team discussed potential hazards to include in the 2024 LHMP based on recent disaster declarations; known probabilities and vulnerabilities; and regional, State, and federal plans and reports. It was determined that the 2024 LHMP should focus on the "big three" hazards in California, earthquake, flood, and fire, as well as hazards with recent disaster declarations in El Dorado County, including drought (2022–2023), landslide (2019, 2022–2023), and winter storm (2019, 2022–2023), and one disaster in Northern California (dam failure, 2017). Finally, per FEMA requirements, the plan also addresses climate change.

For each hazard identified, the nature, the disaster history, the locations of historical hazard events, their extent/severity, and the probability of future hazard are described. The hazards profiled for the 2024 LHMP are discussed in alphabetical order, not in the order suggested in *Comprehensive Preparedness Guide 201: Threat and Hazard Identification and Risk Classification*. The order of discussion of the hazards in this 2024 LHMP does not signify level of risk.

Table 4-1: Climate Change Profile

Profile	Description
Nature	Climate change is defined as the average statistics of weather, which includes temperature, precipitation, and seasonal patterns in a particular region. Climate change refers to the long-term and irrevocable shift in these weather-related patterns, either regionally or globally. The Earth and its natural ecosystem are very closely tied to the climate, and any permanent climate change will lead to an imbalance in the existing ecosystem, which impacts the way people live, the food they grow, their health, the wildlife, the availability of water, and much more. Research indicates that much of this warming is due to human activities—primarily the burning of fossil fuels and the clearing of forests—that release carbon dioxide (CO_2) and other gases into the atmosphere, which trap heat that would otherwise escape into space. Once in the atmosphere, these heat-trapping emissions remain there for many years (for example, CO_2 lasts about 100 years). If left unchecked, by the end of the century CO_2 concentrations could reach levels three times higher than in pre-industrial times. According to most climatologists, the planet is starting to experience shifts in climate patterns and an increased frequency of extreme weather events at both the global level and the local level. Over the next century, increasing atmospheric greenhouse gas concentrations are expected to cause a variety of changes to local climate conditions, including sea level rise and storm surge in coastal areas, increased riverine flooding, and stormwater inundation; and more frequent and prolonged higher temperatures (leading to extreme heat events and wildfires)—particularly inland—that decrease air quality and cause extended periods of drought. The social and economic impacts expected as a result of climate change include energy shortages, heat-related mortality and illnesses, failing infrastructure, and food and water insecurity, to name a few. Key climate impacts on the EID service area include temperature, precipitation, snowpack, climate water deficit, runoff, and wildfire. This section will mainly address increased precipitation and increased air temperatures as it relates to climate change. Other climate change impacts are discussed as follows: droughts are addressed in Table 4-3, floods are addressed in Table 4-5, wildfires are addressed in Table 4-7, and winter storms are addressed in Table 4-8.
Location	Climate change is now affecting all of the Sierra Nevada, including all of the EID service area.
History	California's Fourth Climate Change Assessment notes that warming of nighttime temperatures, transitioning of precipitation from snow dominated to rain dominated, and changes in the timing of snowfed streamflow have been occurring since about 1950 in response to increasing greenhouse gas concentrations in the atmosphere. More specifically, during this period, the Sierra Nevada maximum nighttime and daily average temperatures have risen by 3.0°F and 2.7°F, respectively (Geophysical Research Letter, 2021), while the snowmelt-derived peak streamflow has occurred 10–30 days earlier in the springtime (USFS 2021).
Extent / severity	Climate change projections are likely to vary across the Sierra Nevada, including the EID service area, due to elevation and topographic influences, but under the "business as usual" scenario where emissions are not curbed, warming air temperature for the region will increase 6.0°F to 10.0°F by the end of the century and raise the divide between rain and snow during a storm by about 1,500 to 3,000 feet. According to the USFS Pacific Southwest Research Station, projections for precipitation in the region (including the EID service area) are more uncertain than those for temperature. Future precipitation is expected to change less than temperature, by about -5 percent to +10 percent depending on location in the Sierra Nevada.
Future events	According to University of California, Los Angeles' Center for Climate Science, climate probabilities in Northern California (including the EID service area) by the year 2100 show more weather extremes, including the following:

	• Extreme dry years will occur 1.8 times more frequently than the 1895 to 2017 frequency rate of one time every 100 years. • Dry-to-wet whiplash will occur 1.25 times more frequently than the 1895 to 2017 frequency rate of four times every 100 years. • Extreme wet years will occur 2.25 times more frequently than the 1895 to 2017 frequency rate of four times every 100 years. • Severe storm sequences will occur five times more frequently than the 1895 to 2017 frequency rate of one every 200 years.

Notes:
°F = degrees Fahrenheit
CO_2 = carbon dioxide
EID = El Dorado Irrigation District
USFS = U.S. Forest Service

Table 4-2: Dam Failure Profile

Profile	Description
Nature	Dam failure, also known as a dam breach, is the structural collapse of a dam that releases the water stored in the reservoir behind the dam. A dam failure is usually the result of the age of the structure, inadequate spillway capacity used in construction, or structural damage caused by an earthquake or flood. When a dam fails, a large quantity of water is suddenly released with a great potential to cause human casualties, economic loss, and environmental damage. This type of disaster is especially dangerous because it can occur suddenly, providing little warning or evacuation time for the people living downstream. The flows resulting from dam failure are generally much larger than the capacity of the downstream channels and therefore lead to extensive flooding. Flood damage occurs because of the momentum of the flood caused by the sediment-laden water flooding over the channel banks and the impact of the debris carried by the flow.
Location	In California, any dam with a height of more than 6 feet and impounding 50 acre-feet or more of water or any dam that is 25 feet or higher and impounds more than 15 acre-feet of water is under the State's jurisdictional oversight, unless exempted. As shown on Figure C-4, according to the California Department of Water Resources, Division of Safety of Dams (DSOD), as of August 2023, there are 22 jurisdictional dams located throughout the EID service area, including: Cameron Park, Weber, Blakely, New Bass Lake, El Dorado Hills, Echo Lake, El Dorado Forebay, Medley Lakes, Sly Park, Slab Creek, Holiday Lake, Indian Creek, Barnett, Cross Creek Ranch, Gastaldi, Schubin, Crystal Lake, Patterson, Shaffer, Fay Gunby, Finnon Lake, and Jacobs Creek. EID owns Echo Lake, El Dorado Forebay, El Dorado Hills, Medley Lakes, Sly Park, and Weber.
History	There is no history of a dam failure event within the EID service area.
Extent / severity	The Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures (FEMA P-946, July 2013) defines the downstream hazards for dam incidents, not the probability of failure. The downstream hazards are based "solely on the potential downstream impacts to life and property should the dam fail when operating with a full reservoir." FEMA has developed three categories of increasing severity for downstream hazards: Low, Significant, and High. DSOD adds a fourth category of Extremely High. High hazard potential dams are expected to cause the loss of at least one human life if they fail. Dams that are classified as Extremely High hazard potential dams are expected to cause loss of human life or have an inundation area with a population of 1,000 or more. According to DSOD, there are 13 dams classified as High or Extremely High hazard potential dams, including the following: • High downstream hazard potential: Cameron Park, Weber, New Bass Lake, El Dorado Hills, El Dorado Forebay, Medley Lakes, Slab Creek, Indian Creek, Patterson, and Fay Gunby • Extremely high downstream hazard potential: Echo Lake, Sly Park, and Crystal Lake A dam breach inundation map shows the downstream flooding that could result from a hypothetical failure of the dam or its critical appurtenant structure. In 2017, the California legislature passed a law requiring all owners of State jurisdictional dams—except for owners of Low hazard potential dams—to develop inundation maps approved by DSOD and emergency action plans approved by Cal OES. The approved Extremely High and High hazard potential dam breach inundation maps are shown on Figure C-4, which shows that a total of 10.88 square miles (4.69 percent) of mapped dam breach inundation area is located within the EID service area.

Future events	Dams fail for a variety of reasons, including substandard construction materials/techniques, spillway design error, geological instability, poor maintenance, intense rainfall, flow regulation, or earthquakes. Therefore, recurrence probabilities are unknown. State-jurisdictional dams are regulated by the DSOD, and each dam undergoes an annual inspection to ensure that it is safe, performing as intended, and not developing safety issues. According to the DSOD, dams have been designed to withstand storms so massive that they happen only once every 1,000 years (i.e., a 0.1 percent chance). In recent years, there has been growing concern about extreme precipitation events pushing aging dams beyond what they were designed to handle. Water flowing over the top of a dam is considered among the worst possible failures, as it puts pressure on the structure and increases the odds of a complete collapse. According to the Climate Change Vulnerability Assessment of Infrastructure Systems in the Lake Tahoe Basin (Energetics 2019), climate projections for flooding show a modest increase in the intensity of extreme flood events by mid-century in the eastern portion of El Dorado County, such as in EID's service area boundaries that include Echo Lake and Medley Lake dams.

Notes:
Cal OES = California Office of Emergency Services
DSOD = Division of Safety of Dams
EID = El Dorado Irrigation District
FEMA = Federal Emergency Management Agency

Table 4-3: Drought Profile

Profile	Description
Description	Drought is a normal, recurrent feature of virtually all climatic zones, including areas of both high and low rainfall, though the characteristics of droughts will vary significantly from one region to another. Drought differs from normal aridity, which is a permanent feature of the climate in areas of low rainfall. Drought is the result of a natural decline in the expected precipitation over an extended period, typically one or more seasons. Other climatic characteristics impact the severity of drought conditions, including high temperatures, high winds, and low relative humidities. Four common definitions for drought are as follows: • Meteorological drought is defined solely on the degree of dryness, expressed as a departure from actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales. • Hydrological drought is related to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels. • Agricultural drought is defined principally in terms of soil moisture deficiencies relative to the water demands of plant life, usually crops. • Socioeconomic drought associates the supply and demand of economic goods or services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall. It may also be referred to as a water management drought. A drought's severity depends on numerous factors, including duration, intensity, geographic extent, and regional water supply demands by humans and vegetation.
Location	The occurrence of drought is regional in nature and scope, which holds true for the foothills of the Sierra Nevada, which includes the EID service area.
History	Drought is a cyclic part of the climate of California, occurring in both summer and winter, with an average recurrence interval of 3 to 10 years. The driest year to date (since record keeping began in 1895) occurred in 2022. The droughts that have occurred in the foothills of the Sierra Nevada the past 100 years are listed below: • 1917–1921, statewide, except for central Sierra Nevada and north coast • 1922–1926, statewide, except for central Sierra Nevada • 1928–1937, statewide • 1943–1951, statewide • 1959–1962, statewide • 1976–1977, statewide, except for southwestern deserts • 1987–1992, statewide • 2007–2009, statewide, particularly the central coast • 2012–2016, statewide • 2021–2023, statewide In recent years, drought state emergencies were issued by the California governor from January 17, 2014 – April 7, 2017 (Executive Order B-17-2014) and April 12, 2021/May l 0, 2021/July 8, 2021/October 19, 2021 – February 1, 2023 (Executive Order N-7-22).
Extent / severity	The National Drought Mitigation Center produces drought monitor maps for the United States. It classifies droughts into five categories from least severe to most severe as follows: • D0 (abnormally dry) • D1 (moderate drought) • D2 (severe drought) • D3 (extreme drought) • D4 (exceptional drought)

	These maps are updated every Thursday and provide expert-based best judgment on regional-scale drought conditions based on recent precipitation totals across the country compared to their long-term averages as well as variables including temperatures, soil moisture, water levels in streams and lakes, snow cover, and meltwater runoff and drought impacts such as water shortages and business interruptions. The EID service area been classified in drought categories D0 – D3 over the past five years, including: • February 2018 – June 2018, D1 moderate drought to D0 abnormally dry • November 2019 – November 2020, D0 abnormally dry to D1 moderate drought • December 2020 – February 2021, D2 severe drought to D1 moderate drought • April 2021 – November 2022, D2 severe drought to D3 extreme drought • December 2022 – February 2023, D2 severe drought to D0 abnormally dry
Future events	Drought in the Sierra Neveda, including the EID service area, is a common occurrence that can last for multiple years. However, according to University of California, Los Angeles' Center for Climate Science, climate probabilities in Northern California (including the EID service area) by the year 2100 show that extreme dry years will occur 1.8 times more frequently than the 1895 to 2017 frequency rate of one time every 100 years.

Notes:
EID = El Dorado Irrigation District
LHMP = Local Hazard Mitigation Plan

Table 4-4: Earthquake Profile

Profile	Description
Nature	An earthquake is a sudden motion or trembling caused by the release of strain accumulated in or along the edge of Earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. Earthquakes usually occur without warning and can cause massive damage and extensive casualties in a few seconds. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure. Ground motion is the vibration or shaking of the ground during an earthquake. Seismic waves radiate when a fault ruptures, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter. Soft soils can amplify ground motions. In addition to ground motion, several secondary natural hazards can occur from earthquakes, including the following: • Surface faulting: Surface faulting is the differential movement of two sides of a fault at the Earth's surface. Displacement along faults varies in terms of both length and width but can be significant (e.g., up to 20 feet), as can the length of the surface rupture (e.g., up to 200 miles). Surface faulting can cause severe damage to infrastructure, including railways, highways, pipelines, tunnels, and dams. • Liquefaction: Liquefaction occurs when seismic waves pass through saturated granular soil, distorting its granular structure and causing some of the empty spaces between granules to collapse. Liquefaction causes lateral spreads (i.e., horizontal movements of 10 to 15 feet most commonly but up to 100 feet), flow failures (i.e., massive flows of soil, typically hundreds of feet but up to 12 miles), and loss of bearing strength (i.e., soil deformations causing structures to settle or tip). Liquefaction can cause severe damage to property. • Landslides / debris flows: Landslides and debris flows occur as a result of horizontal seismic inertia forces induced in slopes by ground shaking. The most common earthquake-induced landslides include shallow, disrupted landslides such as rockfalls, rockslides, and soil slides. Debris flows are created when surface soil on steep slopes becomes completely saturated with water. Once the soil liquefies, it loses its ability to hold together and can flow downhill at very high speeds, taking vegetation and/or structures with it. Slide risks increase during a wet winter after an earthquake. The most common measure of earthquake intensity used in the United States is the Modified Mercalli Intensity (MMI) Scale, which measures felt intensity, peak ground acceleration, and instrumental intensity by quantifying how hard the earth shakes in each location. The MMI Scale ranges from an intensity of I to X with the lower numbers of the intensity scale generally dealing with the "manner in which the earthquake is felt by people while the higher numbers on the scale are based on "observed structural damage." The MMI Scale includes: • Intensity I, no shaking felt. • Intensity II – III, weak shaking, felt by only a few people (mainly those indoors). • Intensity IV, light shaking, felt noticeably by people indoors and outdoors by a few. • Intensity V, moderate shaking, felt by nearly everyone. • Intensity VI, strong shaking, felt by all (many frightened). • Intensity VII, very strong shaking, damage negligible in buildings of good design. • Intensity VIII, severe shaking, damage considerable in buildings of good design. • Intensity IX, violent shaking, damage great in buildings of good design. • Intensity X, extreme shaking, some buildings of good design destroyed.
Location	According to the California Geological Survey (CGS) and as shown on Figure C-5, there is one fault system—the Foothill fault system—that extends into the north-central part of the EID service area. According to the U.S. Geological Survey, the Foothill fault system is a large fault system that is the dominant structural feature of the western Sierra Nevada. It includes steeply

	dipping to vertical component faults that trend northwestward through an area of about 200 miles long and 30 miles wide.
History	Per the California Geological Survey Historic Online Database, two M 5.0 or greater earthquakes have been recorded in El Dorado County from 1769–2015 including an M 5.0 on July 10, 1877 (Lake Tahoe), and an M 5.0 on March 22, 1953 (south of the City of South Lake Tahoe). There have been no recorded significant earthquake events or disaster emergencies or declarations in the EID service area.
Extent / severity	The CGS has developed probabilistic seismic hazard maps for earthquake shaking potential for California. The maps refer to an estimate of the probability of exceeding a certain amount of ground shaking or ground motion in 50 years, which is the same as the level of ground-shaking with about a 2500-year average repeat time. The hazard depends on the magnitudes and locations of likely earthquakes, how often they occur, and the properties of the rocks and sediments that the earthquake waves travel through. Regions near major, active faults are shown in orange, red, and pink and experience stronger earthquake shaking more frequently (MMI Scale VII – VIII). Regions that are distant from known, active faults are shown in green and yellow; these areas experience lower levels of shaking and do so less frequently (MMI Scale V-VI). A probabilistic seismic hazard map depicting a 2 percent probability of exceedance in 50 years is shown on Figure C-5. Nearly the entire EID service area (231.95 square miles, 99.99 percent) will experience low levels of earthquake shaking less frequently. Only 0.01 square mile (0.00 percent) of the EID service area is in areas that will experience stronger shaking, more frequently.
Future events	According to CGS, the Foothills fault system has a maximum moment magnitude of 6.5 and a characteristic return interval of 974 years.

Notes:
CGS = California Geological Survey
EID = El Dorado Irrigation District
M = Magnitude

Table 4-5: Flood Profile

Profile	Description
Nature	A flood occurs when the existing channel of a stream, river, canyon, or other watercourse cannot contain excess runoff from rainfall or snowmelt, resulting in overflow onto adjacent lands. Secondary hazards from floods can include the following: • Erosion or scouring of stream banks, roadway embankments, foundations, footings for bridge piers, and other features. • Impact damage to structures, roads, bridges, culverts, and other features from high-velocity flow and debris carried by floodwaters. Such debris may also accumulate on bridge piers and in culverts, increasing loads on these features or causing overtopping or backwater effects. • Destruction of crops, erosion of topsoil, and deposition of debris and sediment on croplands. • Release of sewage and hazardous or toxic materials when wastewater treatment plants are inundated, storage tanks are damaged, and pipelines are severed. Atmospheric rivers are strongly linked to extreme winter precipitation events in the western United States, accounting for 80 percent of extreme floods in the Sierra Nevada and surrounding lowlands.
Location	In El Dorado County and the EID service area, three main types of flooding are known to occur in the following areas: • Riverine flooding: Also known as stream flooding or overbank flooding, riverine flooding occurs in narrow, confined channels in the steep valleys of hilly and mountainous regions to wide and flat areas in plains and coastal regions. The amount of water in the floodplain is a function of the size and topography of the contributing watershed, the regional and local climate, and the land use characteristics. Riverine flooding is generally caused from large-scale weather systems generating prolonged rainfall. However, it can also be caused by snowmelt. According to the Flood Insurance Study for El Dorado County and Incorporated Areas (FEMA 2012), flooding sources in El Dorado County include: Angora Creek, Angora Creek Tributary, Bijou Creek, Cedar Ravine, Cold Creek, Governor Drive Tributary, Hangtown Creek, Hangtown Creek Tributary, and Heavenly Valley Creek. • Flash flooding: Flash floods are “a rapid and extreme flow of high water into a normally dry area, or a rapid rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event” (National Weather Service 2022). Flash floods are characterized by a rapid rise in water, high velocities, and large amounts of debris. Flash floods can occur in or near burn scar areas, small creeks, and steep terrain. Recent burn scar areas in and near the EID service area include the Caldor Fire burn scar area. • Localized flooding: Localized flooding may occur outside of recognized drainage channels or delineated floodplains due to a combination of locally heavy precipitation, increased surface runoff, and inadequate facilities for drainage and stormwater conveyance. Modeling the location of localized flood hazard areas is extremely complex due to the presence of various human-built structures such as culverts, channels, and drains. Localized flooding is known to occur in and around El Dorado, Cameron Park, and Placerville where there has been development in low-lying areas and the floodplain.
History	According to the National Oceanic and Atmospheric Administration Storm Events Database, from January 1, 1950, to September 1, 2023, there were 29 days of flood events, 2 days of flash flood events, and 78 days of heavy rain events in El Dorado County. Most recently, a series of severe winter storms and atmospheric rivers that started at the end of 2022 and lasted through March 2023 flooded El Dorado County, including Placerville and the EID service area.

	From 1953–current, the Federal Government made the following Major Disaster Declarations (DRs) and Emergency Declarations (EMs) for heavy rain, flood, and severe storm events for El Dorado County: • 1964, Heavy Rains and Flooding (DR 183) • 1969, Severe Storms and Flooding (DR 253) • 1986, Severe Storms and Flooding (DR 758) • 1995, Severe Winter Storms, Flooding, Landslides, and Mudflows (DRs 1044 and 1046) • 1997, Severe Winter Storms, Flooding, Landslides, and Mudflows (DR 1155) • 2006, Severe Winter Storms, Flooding, Landslides, and Mudflows (DRs 1628 and 1646) • 2017, Severe Winter Storms, Flooding, and Mudslides (DRs 4301, 4305 and 4308) • 2019, Severe Winter Storms, Flooding, Landslides, and Mudflows (DR 4434) • 2022–2023, Severe Winter Storms, Flooding, Landslides, and Mudslides (DRs 4683 and 4699) • 2023, Severe Winter Storms, Flooding, Landslides, and Mudslides (EMs 3591 and 3592)
Extent / severity	The magnitude of flooding that is used as the standard for floodplain management in the United States is a flood with a probability of occurrence of 1 percent in any given year. This flood is also known as the 100-year flood (i.e., the base flood). The 100-year flood (1-percent annual chance flood) and the 500-year flood (0.2-percent annual chance flood) are areas with high and moderate-low flood risks, respectively, and are identified on FEMA's Digital Flood Insurance Rate Maps (DFIRMs). As shown in Figure C-6, the DFIRM for El Dorado County identifies 2.33 square miles (1.00 percent) with a 1.0 percent annual chance of flooding or high risk to flooding in the EID service area. Also, the DFIRM for El Dorado County identifies 0.8 square miles (0.03 percent) in the EID service area with a 0.2 percent annual chance of flooding or moderate risk to flooding. DFIRMs aren't designed to account for flooding caused by intense rainfall. Therefore, these maps likely understate vulnerable areas prone to intense precipitation caused by climate change. According to California's Fourth Climate Change Assessment, Sierra Nevada Region Report (California Energy Commission 2018), the amount of precipitation from the largest storms (maximum annual 3-day precipitation totals) is projected to increase by 5 percent to 30 percent from historical norms by the end of the century. In fact, a recently published mega-storm study (Science Advances 2022) projects that "end-of-the-century storms will generate 200 percent to 400 percent more runoff in the Sierra Nevada due to increased precipitation and more precipitation falling as rain, not snow."
Future events	Floods can occur at any time in the EID service area but are currently most common during annual winter storms packed with subtropical moisture. Based on historical norms, severe flooding is most likely to occur during strong El Niño events, which generally occur every 2 to 7 years. However, according to the Climate Change Vulnerability Assessment of Infrastructure Systems in the Lake Tahoe Basin (Energetics 2019), climate projections for flooding show a modest increase in the intensity of these extreme flood events event by mid-century in the eastern portion of El Dorado County, including the EID service area. Additionally, University of California, Los Angeles' Center for Climate Science reports that by the year 2100, extreme wet years will occur 2.25 times more frequently than the 1895 to 2017 frequency rate of four times in every 100 years in Northern California (including the EID service area).

Notes:
DFIRM = Digital Flood Insurance Rate Map
DR = Major Disaster Declaration
EID = El Dorado Irrigation District
EM = Emergency Declaration
FEMA = Federal Emergency Management Agency

Table 4-6: Landslide Profile

Profile	Description
Nature	Landslide is a general term for the dislodging and fall of a mass of soil or rocks along a sloped surface or for the dislodged mass itself. The term is used for varying phenomena, including mudflows, mudslides, debris flows, rockfalls, rockslides, debris avalanches, debris slides, and slump-earth flows. Landslides may result from a wide range of combinations of natural rock, soil, or artificial fill. The susceptibility of hilly areas to landslides depends on variations in geology, topography, vegetation, and weather. Landslides may also occur because of indiscriminate development of sloping ground or the creation of cut-and-fill slopes in areas of unstable or inadequately stabilized geologic conditions. In California, landslides range from small, shallow landslides that may mobilize into rapidly moving deadly debris flows to larger, deep-seated landslides that can move entire houses and infrastructure downslope. Cliff collapses and cliff erosion are also concerns along the coast of Northern California and, more recently, debris flows from burned areas after wildfires.
Location	In 2011, CGS created a deep-seated landslide grip map to show the relative likelihood of deep-seated landslides in California. The map combines landslide inventory, geology, rock strength, slope, average annual rainfall, and layers with earthquake shaking potential to create classes of landslide susceptibility (Figure C-7). According to CGS, "these classes express the generalization that on very low slopes, landslide susceptibility is low even in weak materials, and that landslide susceptibility increases with slope and in weaker rocks. Very high landslide susceptibility, classes VIII, IX, and X, includes very steep slopes in hard rocks and moderate to very steep slopes in weak rocks." Land that is most susceptible to landsliding is predominately on the eastern side of the service area, but also to the south and east of Placerville.
History	The Federal Government has declared the following DRs and EMs for mudslides and landslides associated with winter storms in El Dorado County over the past 30 years: • 1995, Severe Winter Storms, Flooding, Landslides, and Mudflows (DRs 1044 and 1046) • 1997, Severe Winter Storms, Flooding, Landslides, and Mudflows (DR 1155) • 2006, Severe Winter Storms, Flooding, Landslides, and Mudflows (DRs 1628 and 1646) • 2017, Severe Winter Storms, Flooding, and Mudslides (DR 4301) • 2019, Severe Winter Storms, Flooding, Landslides, and Mudflows (DR 4434) • 2022–2023, Severe Winter Storms, Flooding, Landslides, and Mudslides (DR 4683) • 2023, Severe Winter Storms, Flooding, Landslides, and Mudslides (EMs 3591 and 3592) In addition, according to the California Department of Conservation's Reported Landslide Database, California Department of Transportation, the National Weather Service - Sacramento and California Highway Patrol reported the following landslides in and around the EID service area during winter 2022–2023: • Boulders blocking on lane of U.S. Route 50 near Kyburz on December 31, 2022 • Mud and rocks on State Route 193 at Rock Creek Road on December 31, 2022 • Debris covering Mosquito Road on December 31, 2022 • Mudslide into a Placerville area residential building on December 31, 2022 • Mud, dirt, and rock covered the southbound lane on State Route 49, approximately 1.5 miles north of State Route 193 on March 14, 2023 • Mud and snow slide into U.S. Route 50 at Bridal Veil Falls on March 15, 2023
Extent / severity	Shallow landslides are generally those that are less than 10 to 15 feet deep. When shallow landslides are sufficiently wet, they may move rapidly and can be highly mobile over long distances. Deep-seated landslides are hundreds to thousands of feet long or wide and only move fractions of an inch per year; however, during heavy rainfall events, a landslide can move several yards a minute or faster. In these areas, rocks have been weakened through faulting and fracturing, uplift, and saturated soils due to heavy or prolonged rainfall. In addition, these slippages can be

	exacerbated by the temperature fluctuation, known as the freeze-thaw cycle, and by ongoing drought conditions, which cause soil-water repellency. As shown on Figure C-7, there are 27.97 square miles (12.06 percent) of land classified as classes VIII, IX, or X that are deep-seated very high landslide susceptibility areas in the EID service area.
Future events	Shallow landslides can occur at any time during the winter but are more likely to happen when the ground is nearly saturated, which typically occurs after the first few storms in November and December. However, deep-seated landslides are generally triggered by deep infiltration of rainfall (which can take weeks or months to occur) and therefore tend to occur toward the end of the winter season in March or April. Every federally declared landslide event reported in El Dorado County has followed a major winter storm/rain event; therefore, it is assumed that the probability of a future landslide event will be highly tied to winter storm/rain events. Based on historical occurrences, severe winter storm conditions are likely in the Sierra Nevada foothills every 2 to 7 years. As reported by the University of California, Los Angeles' Center for Climate Science, an increase in the frequency of intense rainfall/precipitation due to climate change will mean that extreme wet years will occur 2.25 times more frequently than the 1895 to 2017 frequency rate of four times every 100 years, while severe storm sequences will occur five times more frequently than the 1895 to 2017 frequency rate of one time every 200 years. Additionally, NASA researchers have found that landslides move on average faster and farther downhill during rainy periods compared to drought years (NASA 2022). However, researchers are still trying to better understand why landslides react the way that they do from both increased rainfall and increased drought, with the exception that existing landslide-prone areas (including eastern side of the EID service area and to the south and east of Placerville) move faster and farther during rainy periods.

Notes:
CGS = California Geological Survey
DR = Major Disaster Declaration
EID = El Dorado Irrigation District
EM = Emergency Declaration

Table 4-7: Wildfire Profile

Profile	Description
Nature	Wildfires spread by consuming flammable vegetation. This type of fire often begins unnoticed, spreads quickly, and is usually signaled by dense smoke that may be visible from miles away. Wildfires can be caused by human activities (e.g., unattended burns, campfires, or off-road vehicles without spark-arresting mufflers) or by natural events such as lightning. Wildfires often occur in forests or other highly vegetated areas. In addition, wildfires can be classified as forest, urban, interface or intermix, and prescribed burns. The following three factors (topography, fuel, and weather) contribute significantly to wildfire behavior and can be used to identify wildfire hazard areas: • Topography describes slope increases, which influence wildfire spread rate increases. South-facing slopes are subject to more solar radiation than slopes facing other directions, so south-facing slopes tend to be drier and thereby intensify wildfire behavior. However, ridge tops may mark the end of wildfire spread because fire spreads more slowly (or may even be unable to spread) downhill. • Fuel refers to the type and condition of vegetation; fuel plays a significant role in wildfire spread. Certain plant types are more susceptible to burning or will burn with greater intensity. Dense or overgrown vegetation increases the amount of combustible material available as fire fuel (referred to as the "fuel load"). The living-to-dead plant matter ratio is also important. Certain climate changes may increase wildfire risk significantly during prolonged drought periods because the moisture content of both living and dead plant matter decreases. Both the horizontal and vertical fuel load continuity is also an important factor. • Weather is the most variable factor affecting wildfire behavior. Temperature, humidity, wind, and lightning can affect ignition opportunities and fire spread rate. Extreme weather (such as high temperatures and low humidity) can lead to extreme wildfire activity. Climate change increases the susceptibility of vegetation to ignition due to longer dry seasons. By contrast, cooling temperatures and higher humidities often signal reduced wildfire occurrence and easier containment. Wildfire frequency and severity sometimes result from other hazard impacts such as lightning, drought, and infestations. If not promptly controlled, wildfires may grow into an emergency or disaster. Even small fires can threaten lives and resources and destroy improved properties. In addition to affecting people, wildfires may severely affect livestock and pets. Such events may require emergency water/food, evacuation, and shelter. Indirect wildfire effects can be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and exacerbate river and stream siltation, thereby increasing flood potential, harming aquatic life, and degrading water quality. Vegetation-stripped lands are also more susceptible to increased debris flow hazards.
Location	CAL FIRE's Fire Resource and Assessment Program provides vital data on California's forests and rangelands through a variety of mapping tools, including fire threats and Fire Hazard Severity Zones (FHSZs). Figure C-8 represents the relative "likelihood of a 'damaging' or difficult to control wildfire occurring for a given area" based on fuel conditions and fire potential in the ecosystem. These fire threat areas are represented in five classes from low to extreme. As shown on Figure C-8, on the west slope of the Sierra Nevada, fire threats are greatest where vegetation ranges from chaparral and foothill woodlands and mixed-conifer forests at mid elevations. The fire threat is reduced in subalpine forests at high elevations and the alpine vegetation above the tree line. Most developed areas are not assigned a fire threat. In the EID service area, there are 153.10 square miles (66.00 percent) that are in high and very high fire threat areas.

History	Per CAL FIRE records, El Dorado County has experienced 46 wildfires of greater than 1,000 acres over the past 100 years (1922–2022). Of these fires, 13 burned in the Amdor – El Dorado Unit of CAL FIRE, 27 burned in the El Dorado National Forest, and the remaining six fires burned in the Lake Tahoe area. The Federal Government has declared the following DRs for wildfires for El Dorado County over the past 20 years: • 2004, CA-Hollow Fire 07-14-2004 (DR 2532) • 2007, Angora Fire (DR 2700) • 2021, Caldor Fire (DRs 3571 and 5413) • 2021, Wildfires (DR 4619) • 2022, Mosquito Fire (DR 5453) One of the most destructive fires in the Sierra Nevada foothills in recent history was the Caldor Fire (DRs 3571 and 5413). On August 14, 2021, the Caldor Fire broke out in the community of Grizzly Flats. The fire overtook the community and advanced northerly into the District's service area, eventually encompassing more than 220,000 acres. Fire crews and District staff were able to protect all of EID's major infrastructure with the exception of some sections of the El Dorado Canal, specifically Flumes 4, 5, 6 and 30, which were destroyed. Replacement of the flumes began in September 2021 and were completed in May 2022.
Extent/ Severity	Figure C-9 shows the likelihood and nature of vegetation fire exposure to new construction and the potential for wildfire hazards to cause ignitions to these buildings. The maps, called the Fire Hazard Severity Zone (FHSZ), are modeled using data on development patterns, estimated fire behavior characteristics based on potential fuels over a 30–50-year time horizon. The FHSZ areas are represented as moderate, high, or very high. The maps are divided into local responsibility areas (LRA) and state responsibility areas (SRAs). LRA fire protection is typically provided by city fire departments, fire protection districts, counties, and by CAL FIRE under contract to the local government. SRA is a legal term defining the area where the state has financial responsibility for wildfire protection. As shown on Figure C-9, there are 115.59 square miles (49.83 percent) in the EID service area that are in a high and very high (SRA and LRA) FHSV. It is important to note that the CAL FIRE FHSZ maps do not include FHSZs for Federal Responsibility Areas. Although the Federal Responsibility Area lands are not designated, they are assumed to carry the same designation as neighboring SRA designations due to their proximity. Over the past few years, CAL FIRE has been creating a new FHSZ model to more accurately reflect areas susceptible to wildfire. The updated model considers new climate data and improved assessment modeling, such as fire intensity scores based on the most extreme fire weather at a given location, temperature, humidity, and wind speed. According to CAL FIRE, since 2007, very high FHSZ in the SRA have increased in El Dorado County by 22 percent.
Future events	Based on historical occurrences, EID can expect to experience a wildfire within the El Dorado National Forest and/or Amdor – El Dorado Unit of CAL FIRE of 1,000 acres or greater about every 2–2.5 years. Recent projections by UC Merced's Sierra Nevada Research Institute suggests that the risk of large fires will increase by 12–53 percent across California by the end of the century and that the annual average area burned in parts of the Sierra Nevada may double or quadruple during that time. And according to Cal-Adapt, the areas that will experience the most increase of these large wildfires in El Dorado County will be in the foothills (mainly the eastern portion of the EID service area) and mid-elevation areas around Placerville, Cameron Park, Coloma, El Dorado Hills, Cold Springs, Shingle Springs, and Diamond Springs.

Notes:
CAL FIRE = California Department of Forestry and Fire Protection
EID = El Dorado Irrigation District
FHSZ = Fire Hazard Severity Zone
SRA = state responsibility area
UC = University of California

Table 4-8: Winter Storm Profile

Profile	Description
Nature	In a winter storm event, snow, sleet, and/or freezing rain may be accompanied by high winds and cold temperatures. A winter storm can range from moderate snowfall over a few hours to blizzard conditions with blinding, wind-driven snow that lasts several days. Some winter storms may be large enough to affect several states, though others may affect only a single community. In more temperate continental climates such as California, these storms are not necessarily restricted to the winter season and may bring wind, rain, and even snow in late autumn and early spring as well.
Location	All of the EID service areas are susceptible to the hazards of a winter storm. The higher elevations of the Sierra Nevada on the eastern side of the EID service area are most susceptible to snowfall because of the orographic lifting that occurs as Pacific storms move from lower elevations in the west to higher elevations in the east.
History	According to the National Oceanic and Atmospheric Administration Storm Events Database, from January 1, 1950, to September 1, 2023, there were 187 days of winter storm events in El Dorado County and 120 days of winter weather events. During this period, the National Oceanic and Atmospheric Administration Storm Events Database also recorded 17 avalanche day events for El Dorado County. Most of the winter storm, winter weather, and avalanche events occurred in the Greater Lake Tahoe Area and West Northern Sierra Nevada areas of the county, which includes the eastern portion of the EID service area. The database cannot handle large queries, so the query timeframe for heavy snow events was limited from January 1, 2013, to September 1, 2023. Over this period, 132 heavy snow day events were recorded for El Dorado County. Since 1995, the Federal Government has declared the following DRs and EMs for El Dorado County: • 1995, Severe Winter Storms, Flooding, Landslides, and Mudflows (DRs 1044 and 1046) • 1997, Severe Winter Storms, Flooding, Landslides, and Mudflows (DR 1155) • 2006, Severe Winter Storms, Flooding, Landslides, and Mudflows (DRs 1628 and 1646) • 2017, Severe Winter Storms, Flooding, and Mudslides (DRs 4301, 4305, and 4308) • 2019, Severe Winter Storms, Flooding, Landslides, and Mudflows (DR 4434) • 2022–2023, Severe Winter Storms, Flooding, Landslides, and Mudslides (DRs 4683 and 4699) • 2023, Severe Winter Storms, Flooding, Landslides, and Mudslides (EMs 3591 and 3592 • During the severe winter storms of 2022–2023, EID crews had to use snowcats and even snowshoes to reach the canals and the surrounding walkways to remove snow and debris.
Extent / severity	The National Weather Service winter storm warnings for the Sierra Nevada, including the EID service area, are generally issued for heavy snow (1 to 2 inches per hour) and gale force winds (sustained winds or frequent gusts between 39 and 54 miles per hour, with ridgetop winds sometimes reaching over 100 miles per hour). Often, winter storm warnings also include an urban and small stream flood advisory for low-lying and poor drainage areas where the snow may turn quickly into freezing rain or rain. Over the past five years (January 1, 2018 – December 13, 2023), the National Weather Service has identified 109 storm events that meet the above criteria for the Sierra Nevada.

Future events	Based on historical occurrences, EID can expect to experience on average three winter storm day events in El Dorado County annually. According to University of California, Los Angeles' Center for Climate Science, climate probabilities in Northern California (including the EID service area) by the year 2100 show more weather extremes, including the following: • Dry-to-wet whiplash will occur 1.25 times more frequently than the 1895 to 2017 frequency rate of four times every 100 years. • Extreme wet years will occur 2.25 times more frequently than the 1895 to 2017 frequency rate of four times every 100 years. • Severe storm sequences will occur five times more frequently than the 1895 to 2017 frequency rate of one every 200 years. In addition to more extreme weather events, climate-driven effects on winters in the Sierra Nevada by the twenty-first century will also include less desirable snow conditions, fewer days with below-freezing temperatures, decreasing snowpack, snowline rising to higher elevations, and low-to-no snow winters (Energetics 2019). The most destructive climate-induced winter storms for the Sierra Nevada, including all the EID service area, will continue to be rain-on-snow events.

Notes:
CAL FIRE = California Department of Forestry and Fire Protection
DR = Major Disaster Declaration
EID = El Dorado Irrigation District
EM = Emergency Declaration

4.2 OVERALL SUMMARY OF VULNERABILITY

A vulnerability analysis evaluates the potential vulnerability of a "place" against a broad range of identified hazards, helping identify what is at risk and why. For the 2024 LHMP, a hazard overlay analysis was conducted to show each EID-defined asset within or within proximity to a hazard area.

Hazards included in this analysis are identified in Section 4.1 and include:

- climate change: increased temperature and extreme precipitation
- dam failure: mapped dam breach inundation zones
- drought: meteorological and hydrological drought
- Earthquake: stronger earthquake shaking, more frequently (MMI Scale VII – VIII) and lower earthquake shaking, less frequently (MMI Scale V-VI)
- flood: high-risk flood zones (1-percent annual chance flood) and moderate-risk flood zones (0.2-percent annual chance flood)
- landslide: very high deep-seated landslide susceptibility (classes VIII, IX, and X)
- wildfire: high and very high fire threat and high and very high FHSZ
- winter storm: snow, sleet, freezing rain, high winds, and cold temperatures

Assets included in this analysis include:

- EID service area (current boundary area)
- SOI (potential growth boundary area)
- population (2020 U.S. Census population)
- severely disadvantaged communities (areas with a median household income of 60 percent or less of the state average according to the 2016 American Community Survey)
- current and future major EID infrastructure (Table 4-9)

For the EID service area, SOI, and Sly Park Recreation Area, the analyses show the number of square miles of a hazard area within a geographical boundary. For population, a proportional analysis shows the number of people within a Census block living in a hazard area. For severely disadvantaged communities, if any portion of a hazard area was located within a community boundary (by Census block), the entire community was considered at risk. Finally, for major EID infrastructure, a 500-meter buffer was placed around major EID infrastructure point location to identify if a geographic feature was found within or near a hazard area. Known and/or available estimated costs or insured values for EID major infrastructure are provided in Table 4-9. Summarized estimates costs and insured values are not tallied as not every asset has a known estimated cost or insured value and therefore summarized results would result in under-reporting of estimated costs and/or insured values at risk.

The overall results of this vulnerability analysis are shown in table format in Appendix D, Tables D-1 through D-29. In addition, they are summarized in text in Table 4-10 and Table 4-11 below.

Table 4-9: Major EID Infrastructure

Service	Type	Number	Estimated Cost or Insured Value
Administration	Headquarters	1	$16,884,715
	Storage facility (future)	1	$1,725,000
	Fleet maintenance building	1	(included in Headquarters cost)
Water	Water treatment plant	5	$6,811,929 (El Dorado Hills) $4,880,489 (Reservoir A) $3,983,418 (Reservoir 1) $971,716 (Outingdale) $719,199 (Strawberry)
	Water pumping station	45	Not available
	Water storage reservoir	36	Not available
	Main Ditch	17.73 (miles)	Not available
	North Crawford Ditch	7.48 (miles)	Not available
	Gold Hill Ditch	15.12 (miles)	Not available
	Tunnels	2	Not available
	Folsom Lake Intake	1	Not available
Recycled water	Recycled water treatment plant	2	$19,954,333 (Deer Creek) $28,930,645 (El Dorado Hills)
	Recycled water pumping station	3	Not available
	Recycled water storage reservoir	4	Not available
Wastewater	Wastewater treatment plant	4	$19,954,333 (Deer Creek) $28,930,645 (El Dorado Hills) $759,933 (Camino Heights) $2,741,695 (Latrobe)
	Wastewater lift station	60	To be completed
	Solar plant	2	$9,800,000 (total)
Project 184	Reservoir	4	To be completed
	Dam	5	To be completed
	El Dorado Powerhouse	1	$49,099,395
	El Dorado Penstock	1	To be completed
	Camp	2	$261,925 (camp 1) $2,306,490 (camp 5)
	El Dorado Canal	21.25 (miles)	Not available
Recreation	Sly Park Recreation Area	2.82 (square miles)	$2,884,831
	Day-Use Area	4	$2,884,831 (Sly Park), $12,845 (Forebay Reservoir), 438,566 (Silver Lake) $1,755,169 (Caples Lake)

4.3 POTENTIAL HAZARD IMPACTS

A hazard impact statement describes the social, economic, and environmental influence hazards can have on society. Hazard impact statements have been prepared for EID and the EID service area (Table 4-10), the current population, including vulnerable populations, in the EID service area (Table 4-11), and future development, population growth, and additional EID services in the SOI (Table 4-12). Finally, climate induced impacts on each hazard are discussed (Table 4-13).

Table 4-10: Hazard Impacts on EID and the EID Service Area

Hazard	
Climate change	• All the EID service area is vulnerable to climate impacts including increased temperature and extreme precipitation. • Oppressive temperatures may cause higher electricity demands thereby resulting in rolling blackouts and widespread power loss, including to major EID infrastructure. • Less snowpack will likely mean less water stored for hydropower through the later parts of summer, and all the while, increased temperatures/more heat waves will lead to increased demand for electricity from hydroelectric power (Northwest River Partners 2023). • Extreme precipitation may flood low-lying water treatment plants and overwhelm wastewater systems, causing overflows and damaging equipment and structures. It could also send an unprecedented amount of water runoff that would require the accelerated release of water downstream causing damage to EID's powerhouse and canals.
Dam failure	• Nearly 11.00 square miles of the northern and northwestern boundaries of the EID service area are in a dam breach inundation area. • Dam failure may inundate 48 major EID infrastructure as well as 0.02 miles of ditches, and 0.56 miles of canals are in or near dam breach inundation areas, causing overflows and damaging equipment and structures. Dam inundation might wash out access roads leading to EID's major infrastructure, too.
Drought	• All the EID service area is vulnerable to drought. • Under a drought scenario, it is possible that available water supplies from Jenkinson Lake and Folsom Reservoir would diminish each successive year and the Forebay supply yield may be reduced. • It is anticipated that the water shortage contingency plan would be triggered in the second year of any future drought. • Reduced stream and river flows may increase the concentration of pollutants in reservoirs and cause stagnation of water (Center for Disease Control 2020). • Drought would likely cause declining groundwater levels, and subsidence associated with drought may damage major EID infrastructure and access roads. • EID may have to enforce water restrictions as outlined in the EID Drought Action Plan. • Tree mortality may increase resulting in tree falls impacting EID's canal system and add fuel for wildfire.
Earthquake	• Nearly the entire EID service area (231.95 square miles) is located within a moderate shaking potential area, including all but one major EID infrastructure. According to USGS, structural engineers usually do not contribute information for assigning intensity values for moderate shaking (MMI Scale V-VI).

	• Of the EID service area, less than 0.01 mile is located within a strong and very strong shaking potential area (MMI Scale VII – VIII). EID only has one major infrastructure (Echo Lake Reservoir) in this hazard area. According to USGS, in areas with strong and very strong shaking, damage will be negligible to major EID infrastructure of good design and construction; slight to moderate in well-built ordinary structures; and considerable to older and outdated structures. • Strong and very strong earthquake shaking (most likely to occur along the West Tahoe – Dollar Point fault zone located outside of the EID service area) may trigger landslides, debris flows, rockfalls, and other associated hazards. Two of EID's reservoirs, Lake Aloha and Echo Lake, as well as access roads to these reservoirs, are approximately 5 miles southwest of this fault zone.
Flood	• Within the high-risk flood zone, there are 14 major EID infrastructure, 0.26 miles of ditches, and 2.41 square miles of the EID service area. However, because Digital Flood Insurance Rate Maps aren't designed to account for flooding caused by intense rainfall, the physical area of the EID service area at risk of flooding is likely much greater. Mapped areas that show a risk to flooding within the EID service area include Cameron Park, Placerville, Pollock Pines, and the El Dorado Hills area. • Floods may overwhelm wastewater systems and damage water equipment and structures, resulting in the District's services being out for an extended period to make emergency repairs. • Floods may also send an unprecedented amount of water runoff that requires the accelerated release of water downstream, causing damage to EID's powerhouse and canals. • Floods can also cause significant erosion, undermining major EID infrastructure such as water and wastewater lines.
Landslide	• Approximately 28 square miles of the EID service area and 95 major EID infrastructure, 6.09 miles of ditches, and 5.53 miles of canals are in or near a very high deep-seated landslide susceptibility area. Land that is most susceptible to landsliding is predominately on the eastern side of the service area, but also to the south and east of Placerville. • Landslides, debris flows, rockfalls, and other associated hazards may damage major EID infrastructure. This may result in the District's services being out for an extended period to make emergency repairs. Landslides could block access roads leading to EID's major infrastructure, too.
Wildfire	• Approximately 153 square miles of the EID service area and 176 major EID infrastructure, 26.83 miles of ditches, and 20.71 miles of canals are in or near a high and very high fire threat areas. Areas at greatest risk are in the eastern and western portions of the service area. • 115.59 square miles of the EID service area and 108 major EID infrastructure, 21.91 miles of ditches, and 7.38 miles of canals are in or near a high and very high FHSZ area for local and state areas (FHSZ mapping does not account for land in Federal areas), including the eastern, southwestern, and northwestern areas of the EID service area and Placerville. • Wildfire damage to ground level and underground structures can lead to water contamination and malfunction of water and wastewater systems. • Burnt debris and trees may fall directly on major EID infrastructure, causing physical damage to them, which may take long periods of time to recover fully. • Wildfire ash and contaminants associated with ash can settle in streams, lakes, and water reservoirs, threatening drinking water (U.S. EPA 2019). Post-fire storms or debris flows can transport ash, sediment, nutrients, and contaminants into streams, rivers, and downstream reservoirs, also threatening drinking water requiring treatment process changes and/or operational changes (U.S. EPA 2019). • Post-fire debris flows can threaten the integrity and stability of EID infrastructure.

	• Wildfires and/or secondary hazards associated with wildfires such as reduced air quality may close EID's recreation areas and can also destroy recreation infrastructure and trails.
Winter storm	• All the EID service area is vulnerable to winter storms, including snow, sleet, and/or freezing rain that may be accompanied by high winds and cold temperatures. These storms cause different conditions based on elevations, generally bringing rain to the lower elevations and snow to the higher elevations of the EID service area. • Pipes may break throughout the distribution system due to freeze/thaw cycles. • Extreme precipitation associated with winter storms may flood low-lying water treatment plants and overwhelm wastewater systems, causing overflows and damaging equipment and structures. It can also send an unprecedented amount of water runoff that requires the accelerated release of water downstream, causing damage to EID's powerhouse, canals, and pipelines. • Heavy snow can cause damage and/or collapse of elevated pipelines and flumes.

Notes:
EID = El Dorado Irrigation District
FHSZ = Fire Hazard Severity Zone

Table 4-11: Hazard Impacts on the Current Population and Vulnerable Population within the EID Service Area

Hazard	
Climate change	• Population: All the population living in the EID service area will likely be impacted by climate change. Rising temperatures will be most noticeable in parts of the EID service area that lack sufficient tree canopy and/or have large amounts of impervious and dark surfaces, such as the higher density areas of El Dorado Hills, Cameron Park, Shingle Springs, Diamond Springs, Pollock Pines, and Placerville. Increases and decreases in frequency and magnitude of river flood events generally coincide with increases and decreases in the frequency of heavy rainfall events. People living downstream, in areas of flash flooding, and in areas susceptible to localized flooding will continue to be at risk or greater risk of climate-induced flooding. In addition, changes in streamflow, the timing of snowmelt, and the amount of snowpack that accumulates in the winter can also affect flood patterns and flood areas that haven't experienced flooding. • Vulnerable population: Extreme heat can trigger a variety of heat stress conditions for people such as heat stroke. Higher temperatures can also contribute to the build-up of harmful pollutants and cause respiratory issues. Those that are most vulnerable to heat stress in the EID service area include the elderly and low-income individuals as they are often in poorer health and may lack air-conditioning and/or access to other heat adaptations.
Dam failure	• Population: There are approximately 900 people living in a dam breach inundation area in the EID service area that may be susceptible to flooding, significant damage to property and livelihoods, as well as injuries and loss of life for people. However, the potential loss of life, injuries, and damage to homes, businesses, and critical assets due to a dam failure depends on several variables, including depth and velocity of water released, number of people residing in the inundation area, warning time, and public perception of the hazard. • Vulnerable population: According to the 2012–2016 American Community Survey, people with medical problems or disabilities, those that live at, below, or near the federal poverty line, and/or those who identify as a minority disproportionally live in a dam breach inundation area. Two of the three severely disadvantaged communities in the EID service area are at risk of this hazard.

Drought	• Population: Everyone within the EID service area could be impacted by drought. The EID Drought Action Plans call for various water reduction stages that become more restrictive and mandatory measures including water rationing to achieve water reduction goals for health and safety purposes. The loss of landscaping due to volunteer and mandated water use reduction may result in the loss of landscaping places a financial burden on EID customers for replacement cost. • Vulnerable population: During the drought, low-income individuals and households within the EID service area may have a more difficult time paying for small bill increases (to offset lower demands and pay for increased water saving technology) to afford the water they need as they often have less water flexibility to reduce water consumption (Stanford University 2023).
Earthquake	• Population: According to California Geological Survey probabilistic seismic hazard maps for earthquake shaking potential, 100 percent of the population in EID's service area could experience lower levels of earthquake shaking, less often. The current map shows that all people in the EID service area will experience moderate shaking with slight to moderate damage in well-built ordinary structures. • Vulnerable population: Older and outdated structures within the EID service area may be at risk to considerable damage, and therefore, those living in them may be at greater risk to harm.
Flood	• Population: Approximately 5,500 people in the EID service area live in a moderate and high-risk flood zone. Mapped areas that show a risk of flooding within the EID service area include areas in and around Cameron Park, Placerville, Pollock Pines, and the El Dorado Hills. Digital Flood Insurance Rate Maps aren't designed to account for flooding caused by intense rainfall and, as such, the number of people in the EID service area at risk of flooding is likely much greater. Floods can cause power, water, and gas outages; disrupt transportation routes; pollute drinking water systems and overwhelm wastewater systems; damage residential and commercial buildings; and cause secondary hazards including landslides and mudslides. • Vulnerable population: According to "The social correlates of flood risk: variation along the US urban-rural continuum" (Population and Environment 2021), those living in poverty have fewer relative resources to prepare for floods (purchase food insurance), evacuate during floods, and recover from floods (fewest resources to rebuild, relocate, or access mental health services). In the EID service area, areas and therefore vulnerable population in and around Cameron Park, Placerville, Pollock Pines, and the El Dorado Hills are vulnerable to the impacts of flooding.
Landslide	• Population: There are about 12,000 people living in a high and very high deep-seated landslide susceptibility area in the EID service area. Populated areas at greatest risk to slides include the Pollock Pines area and those living to the east and south of Placerville. People that live in landslide-prone areas are more vulnerable to rapidly moving water and debris that can cause trauma or death. Landslides can also cause damage to buildings including moving them off their foundations. Finally, landslides can cause damage to and impact critical infrastructure, including water, sewers, and roadways. • Vulnerable population: According to "Human Vulnerability to Landslides" (Geohealth 2020), people impacted by landslides are not stratified by gender or age, but rather, simple actions taken before a landslide (communitywide preparedness programs), during a landslide (moving to a higher floor), and after a landslide (training both the general population and first responders to search for landslide survivors efficiently) increase the odds of survival by a factor of 12. As such, vulnerable populations in the EID service area that live in landslide hazard-prone areas (Pollock Pines and south of Placerville) that may not have access to a higher floor, may not be able to participate/understand community messaging, and may not have close neighbors to help may be most impacted by a landslide event.

Wildfire	• Population: 81,663 people live within a high and very high fire threat area within the EID service area. Only the central part of the service area is mapped as a moderate fire threat. Nearly 49,000 people (38.68 percent) live in high and very high FHSZs within the EID service area, including Placerville east to Pollock Pines, Cameron Park, and areas northeast of El Dorado Hills. o USFS's Wildfire Risk to Communities assumes all structures that encounter wildfire will be damaged, and the degree of damage is directly related to wildfire intensity. However, it does not consider "homes that may have been mitigated and does not measure other important resources that may be damaged by a wildfire such as infrastructure, watersheds, or forest health." o Most wildfires contribute to air contamination from the fire plume, contamination from water runoff containing toxic products, and other environmental discharges or releases from burned materials (National Fire Protection Association 2023) o Health effects caused by wildfires can range from eye and respiratory tract irritation to more serious disorders, including reduced lung function, bronchitis, exacerbation of asthma and heart failure, and premature death. Children, pregnant women, and the elderly are especially vulnerable to smoke exposure. • Vulnerable population: Low-income individuals and households who live within a high and very high fire threat area and/or high and very high FHSZ within the EID service area and are without the means to harden homes and create defensible space are particularly vulnerable to wildfires. In addition, so are individuals who do not have transportation to evacuate.
Winter storm	• Population: Everyone living in the EID service area is vulnerable to winter storms. A storm may flood low-lying areas, knock down trees and powerlines, cause roofs to collapse, and lead to dangerous driving conditions causing drivers to be stranded. It can cause serious health problems including frostbite, hypothermia, and even death for those that work outside or find themselves outside as well as those without electricity. • Vulnerable populations: People that are at greater risk to winter storms include low-income individuals and households throughout the EID service area that may experience housing instability or have trouble paying for increased energy bills associated with colder weather. In addition, people living in the Special Flood Hazard Area and/or in low-lying areas without sufficient drainage may be at increased risk.

Notes:
CGS = California Geological Survey
EID = El Dorado Irrigation District
FEMA = Federal Emergency Management Agency
FHSZ = Fire Hazard Severity Zone
USFS = U.S. Forest Service

Table 4-12: Hazard Impacts on Development, Population Growth, and Future EID Services

Hazard	
Climate change	• Development: 100 percent of the SOI will be impacted by climate change. Like the EID service area, rising temperatures will be most noticeable in parts of the SOI that lack sufficient tree canopy. However, since growth and development is expected to occur mainly within the existing EID service area, it can be assumed that the most impacted areas from increased temperatures will continue to be the more densely developed areas of El Dorado Hills, Cameron Park, Placerville, Shingle Springs, Diamond Springs, and Pollock Pines. • Population growth: Heat stress conditions for all future residents will continue or even become more pronounced. Higher temperatures will continue to contribute to the build-up of harmful pollutants and cause respiratory issues. Those vulnerable to

	heat stress will continue to include the elderly and low-income individuals as they are will likely remain in poorer health and lack air-conditioning and/or access to other heat adaptations. • Future EID services: Despite increased temperatures that may decrease water supply at times, the District states that it has sufficient water supplies to meet future development anticipated over the next 20 years.
Dam failure	• Development: 33.08 square miles of the SOI are in a dam breach inundation area, an increase of 0.82 percent of land area in a dam breach inundation area compared to the EID service area alone. However, since growth and development are expected to occur mainly within the existing EID service area, it can be assumed that the most impacted areas from dam failure will continue to be in the central, northern, and northwestern boundaries of EID service area boundaries. • Population growth: As noted in Table 4-11, the potential loss of life, injuries, and damage to homes, businesses, and critical assets due to a dam failure depend on several variables, including depth and velocity of water released, number of people residing in the inundation area, warning time, and public perception of the hazard. Those with medical problems or disabilities, those that live at, below, or near the federal poverty line, and/or those who identify as a minority disproportionally live in a dam breach inundation area will likely continue to be at risk of dam failure. • Future EID services: EID indicates that they have adequate physical infrastructure in place to meet current and future capabilities through 2045. As such, the only additional future EID infrastructure at risk of dam failure would be extended water and wastewater lines for new development.
Drought	• Development: 100 percent of the SOI will be impacted by drought. Drought may cause declining groundwater levels, and subsidence associated with drought could damage new development anywhere in the EID service area and SOI boundaries. • Population growth: Since growth is expected to occur mainly within the existing EID service area, future residents will put pressure on existing water supply, and increased drought will do the same. During periods of drought, restrictive and mandatory measures to achieve water reduction goals for health and safety purposes will likely be in effect. Low-income individuals and households within the EID service area that may have a more difficult time paying for small bill increases associated with drought will likely remain the most impacted by drought. • Future EID services: EID states that under a multiple dry year scenario, even though EID's existing and planned supplies will be cut back or reduced due to hydrologic factors, they will be adequate to meet forecasted demand anticipated to 2045.
Earthquake	• Development: Like the EID service area, nearly 100 percent of the SOI is in a moderate shaking potential area. As such, future development anywhere within the EID service area and SOI will be impacted by moderate shaking with slight to moderate damage in well-built ordinary structures. • Population growth: All future population within the EID service area and SOI will feel moderate shaking with little damage to no damage to their homes. While newer structures will likely be at minimal risk to earthquake damage, older and outdated structures will likely remain at risk to considerable damage, and therefore, those living in them (including vulnerable populations) will likely remain at greater risk to harm. • Future EID services: It is unlikely that any new, modern built major EID infrastructure in this hazard area will be damaged from moderate shaking.
Flood	• Development: 7.75 square miles of the SOI is in a SFHA. Development in the SFHA is regulated by both county and city flood damage prevention ordinances. However, as noted above, properties outside of the SFHA are not risk free. As DFIRMs aren't designed to account for flooding caused by intense rainfall, the number of properties at risk is likely much greater. Mapped SFHAs that show a risk of flooding within the

	EID service area include areas in and around Cameron Park, Placerville, Pollock Pines, and the El Dorado Hills. However, additional areas likely susceptible to flooding include low-lying properties and properties near riverbanks. • Population growth: Population growth within the EID service area of the SOI puts more people at risk of extreme precipitation and increased rain-on-snow events associated with climate change. People living in mapped SFHAs, low-lying areas, and areas along and/or near riverbanks are particularly prone to flooding. Future floods events will likely continue to cause utility outages; disrupt transportation routes; pollute drinking water systems; overwhelm wastewater systems; damage residential and commercial buildings; and cause secondary hazards including landslides and mudslides. Vulnerable population in and around Cameron Park, Placerville, Pollock Pines, and the El Dorado Hills will likely remain the most vulnerable to the impacts of flooding. • Future EID services: Increased flooding will likely continue to overwhelm EID's systems, resulting in damage and emergency repairs. Increased flooding can also lead to significant erosion, undermining major EID infrastructure.
Landslide	• Development: 84.81 square miles of the SOI are susceptible to very high deep-seated landslides. Land that is most susceptible to landsliding is predominately on the eastern side of the SOI, to the south and east of Placerville, to the north of Shingle Springs, and to the northeast of El Dorado Hills. • Population growth: Since growth is expected to occur mainly within the existing EID service area, it can be assumed that the most impacted areas from a landslide will continue to be in and around Pollock Pines and to the south and east of Placerville. People that live in these areas will continue to be vulnerable to rapidly moving water and debris that can cause trauma or death. Landslides can also cause damage to buildings including moving them off their foundations. Vulnerable populations in the EID service area that live in landslide hazard-prone areas (Pollock Pines and south of Placerville) that may not have access to a higher floor, may not be able to participate/understand community messaging, and may not have close neighbors to help will likely remain most impacted by a landslide event. • Future EID services: Extended water and wastewater lines for new development in and/or near landslide prone areas may be at risk to breaking due to landsliding events.
Wildfire	• Development: 481.18 square miles of the SOI are in a high and very high fire threat area, while 296.59 square miles of the SOI is in a high and very high FHSZ. The southwestern, northeastern, and southeastern areas of the SOI have the greatest wildfire threats. • Population growth: Since growth is expected to occur mainly within the existing EID service area, it can be assumed that those, particularly vulnerable populations, residing in Placerville east to Pollock Pines, Cameron Park, and areas northeast of El Dorado Hills are at increased risk to wildfires. • Future EID services: Extended water and wastewater lines for new development (especially in Placerville east to Pollock Pines, Cameron Park, and areas northeast of El Dorado Hills) could be at risk to wildfires as these components are near the surface, making them more vulnerable to damage from extreme heat.
Winter storm	• Development: All the SOI is vulnerable to winter storms, including snow, sleet, and/or freezing rain that may be accompanied by high winds and cold temperatures. These storms cause different conditions based on elevations, generally bringing rain to the lower elevations and snow to the higher elevations of the SOI. • Population growth: Since growth is expected to occur mainly within the existing EID service area, it can be assumed that everyone will continue to be impacted by winter storms, including by downed trees and powerlines, roof collapse, dangerous driving conditions, and serious health problems including frostbite and hypothermia. People that experience housing instability, have trouble paying for increased energy bills

	associated with colder weather, or live in known flood-prone areas, will likely remain most vulnerable to winter storm events. • Future EID services: Extended water and wastewater lines for new development may be at risk to erosion caused by flooding or damage caused by freeze/thaw cycles.

Notes:
DFIRM = Digital Flood Insurance Rate Map
EID = El Dorado Irrigation District
FHSZ = Fire Hazard Severity Zone
SFHA = Special Flood Hazard Area
SOI = Sphere of Influence

Table 4-13: Climate Driven Impacts on Each Hazard

Hazard	
Dam failure	• Overview: There has been growing concern about extreme precipitation events pushing aging dams beyond what they were designed to handle. Water flowing over the top of a dam is considered among the worst possible failures, as it puts pressure on the structure and increases the odds of a complete collapse. • Impact on EID service area: Dam breach inundation maps already show the downstream flooding that could result from a hypothetical failure of the dam or its critical appurtenant structure. As such, climate driven dam failures likely wouldn't increase the size of the mapped inundation areas, which in the EID service area is 10.88 square miles. • Impact on major EID infrastructure: EID major infrastructure in mapped inundation areas (Appendix D, Vulnerability Tables) will continue to be at risk of inundation caused by dam failure and climate-induced dam failure. • Impact on population and development: As development/growth is expected to occur in Cameron Park, Shingle Springs, Diamond Springs, and Pollock Pines, more people could be at risk of potential dam failure if growth and development occurs within mapped dam breach inundation areas. Additional future EID infrastructure at risk of climate-indued dam failure would be extended water and wastewater lines to accommodate this new development/growth. The two severely disadvantaged communities will remain at risk and, as such, growth along with extended EID water and wastewater lines to service growth in these communities could be at risk too.
Drought	• Overview: Climate-induced warmer temperatures will enhance evaporation, thereby reducing snowpack and surface water and drying out soil and vegetation. Climate change will also alter the timing of water availability, decreasing spring precipitation and leading to longer dry spells. • Impact on EID service area: All the EID service area will continue to be vulnerable to and impacted by drought, especially as extreme dry years are expected to occur 1.8 times more frequently than previously. • Impact on major EID infrastructure: EID states that under a multiple dry year scenario, even though EID's existing and planned supplies will be cut back or reduced due to hydrologic factors, they will be adequate to meet forecasted demand anticipated to 2045. • Impact on population and development: Since growth is expected to occur mainly within the existing EID service area, future residents, including vulnerable people, will put pressure on existing water supply and increased drought will do the same. However, during periods of climate-induced drought, restrictive and mandatory measures to achieve water reduction goals for health and safety purposes will likely be in effect.

Earthquake	• Overview: There is no way of knowing at this point if and where climate-related stress could promote earthquakes (National Aeronautics and Space Administration 2019).
Flood	• Overview: Soils already saturated with rainwater might not be able to absorb any more and lead to more floods. Rivers and streams already swollen after one storm could overflow. In the high mountains, rain could fall on snow, melting it and causing water to cascade toward communities below. • Impact on EID service area: As noted previously, Digital Flood Insurance Rate Maps aren't designed to account for flooding caused by intense rainfall and, as such, the EID service area at risk of flooding, erosion (scouring), landslides, and mudslides is likely much greater than identified in Figure C-6. Intense rainfall will likely increase the frequency and size of riverine flooding as well as flash flooding and localized flooding. • Impact on major EID infrastructure: Extreme precipitation will put more major EID infrastructure at risk of flooding than likely much greater than what is shown in Appendix D, Vulnerability Tables. In addition, fast moving floodwaters will likely result in secondary hazards such as erosion (scouring), mudslides, and landslides. • Impact on population and development: As development/growth is expected to occur in urban areas that already experience flooding, such as Cameron Park, El Dorado Hills, and Placerville, more people, including vulnerable populations, will likely be at greater risk of flooding. In addition, it is possible that areas (and growth in these areas) that previously haven't experienced flooding will experience flooding caused by extreme rainfall events. As such, additional future EID infrastructure at risk of flooding, erosion, mudslides, and landslides would be extended water and wastewater lines in both the Special Flood Hazard Area as well as low-lying properties outside of the mapped floodplain to accommodate new development/growth.
Landslide	• Overview: Studies have shown that the impacts of climate change (extreme precipitation) on landslides include changes in the stability conditions, location, abundance, frequency, and type of landslides (USGS 2018). NASA researchers found that landslides move on average faster and farther downhill during rainy periods compared to drought years (NASA 2022). • Impact on EID service area: Researchers are still trying to better understand why landslides react the way that they do from both rainfall and drought with the exception that existing landslide-prone areas move faster and farther during rainy periods. • Impact on major EID infrastructure: EID infrastructure in existing very high deep-seated landslide hazard areas (Appendix D, Vulnerability Tables) would likely remain at risk to climate-induced landsliding. In addition, given that these known landslides may move farther, any EID infrastructure within proximity to these mapped areas would likely also be at risk. • Impact on population and development: Growth and development, particularly in the Pollock Pines area and those living to the east and south of Placerville, would likely put more people, including vulnerable populations, at risk of landslide events. Additional future EID infrastructure at risk of landslides would be extended water and wastewater lines to accommodate new development/growth.
Wildfire	• Overview: Warmer spring and summer conditions will continue to lead to increased evapotranspiration, soil and fuel moisture, and longer and more intense fire seasons (Westerling 2016). • Impact on EID service area: According to CAL FIRE, since 2007, very high FHSZs in the state responsibility area have increased in El Dorado County by 22 percent, especially around the areas east-northeast of El Dorado Hills to Coloma area. • Impact on major EID infrastructure: Based on the 2022 CAL FIRE FHSZ map (currently in regulatory review), water and wastewater infrastructure to the east and

	northeast of El Dorado Hills and water infrastructure (including Gold Hill Ditch) in the Coloma area are more vulnerable to climate-induced wildfires. • Impact on population and development: Since growth is expected to occur mainly within the existing EID service area, it can be assumed that those (including vulnerable populations) living in current and forthcoming mapped high and very high FHSZs, including Placerville east to Pollock Pines, Cameron Park, and areas east and northeast of El Dorado Hills to Coloma, will be at greater risk of climate-induced wildfires. Additional future EID infrastructure at risk of wildfire would be extended water and wastewater lines to accommodate new development/growth in these areas.
Winter storm	• Overview: In addition to more extreme weather events, climate-driven effects on winters in the Sierra Nevada by the twenty-first century will also include less desirable snow conditions, fewer days with below-freezing temperatures, decreasing snowpack, snowline rising to higher elevations, and low-to-no snow winters (Energetics 2019). The most destructive climate-induced winter storms for the Sierra Nevada are rain-on-snow events when rivers are already running high and soils are saturated. • Impact on EID service area: Substantial snowfall, rainfall or rain-on-snow events will likely result in an unprecedented amount of water runoff that inundates streams, lakes, rivers and low-lying areas. • Impact on major EID infrastructure: Climate-induced winter storm events will put more major EID infrastructure at risk of flooding than what is currently mapped in the Special Flood Hazard Area as these maps do not account for projected increases in precipitation extremes and winter rainfall from increased rain-on-snow occurrences. Fast moving floodwaters from these events will likely result in secondary hazards such as erosion (scouring), mudslides, and landslides that could damage additional EID infrastructure. In addition, heavy snow can cause damage and/or collapse of elevated pipelines and flumes. • Impact on population and development: As development/growth is expected to occur in urban areas that already experience flooding, such as Cameron Park, El Dorado Hills, and Placerville, more people, including vulnerable populations, will likely be at greater risk of flooding due to increased rain-on-snow flood risks. In addition, it is possible that areas (and growth in these areas) that previously haven't experienced flooding will experience flooding caused by these events. As such, additional future EID infrastructure at risk of flooding associated with extreme winter storm events would be extended water and wastewater lines in both the Special Flood Hazard Area as well as low-lying properties outside of the mapped floodplain to accommodate new development/growth.

Notes:
CAL FIRE = California Department of Forestry and Fire Protection
EID = El Dorado Irrigation District
FHSZ = Fire Hazard Severity Zone

4.4 NATIONAL FLOOD INSURANCE PROGRAM

As noted in Section 4.3, approximately 5,500 people (4.31 percent) in the EID service area live in a SFHA. However, EID is not eligible to participate as a local community in the NFIP, and as such, it does not have any NFIP-insured structures including Repetitive Loss properties. EID insures its facilities through the Association of California Water Agencies Joint Powers Insurance Authority (ACWA JPIA). Formed in 1979, ACWA JPIA is a partnership of California water agencies that is "dedicated to providing peace of mind and a safer work environment for water agencies across California by offering a risk-sharing pool, local agencies save their customers money by avoiding the high costs of commercial insurance."

EID became part of ACWA JPIA on April 1, 2019. Through ACWA JPIA, EID carries insurance for its major infrastructure including flumes, canals, powerhouse, water and wastewater plants, tanks, lift stations, pump stations, fleet vehicles and equipment, recreation assets, supervisory control and data acquisition equipment, headquarters buildings and contents. EID has not filed a flood insurance claim to date.

5.0 MITIGATION STRATEGY

This section addresses Element C – Mitigation Strategy of the Local Mitigation Plan Regulation Checklist.

Element C: Mitigation Strategy	
C1.	Does the plan document each participant's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement 44 CFR § 201.6(c)(3))
C1-a.	Does the plan describe how the existing capabilities of each participant are available to support the mitigation strategy? Does this include a discussion of the existing building codes and land use and development ordinances or regulations?
C1-b.	Does the plan describe each participant's ability to expand and improve the identified capabilities to achieve mitigation?
C2.	Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))
C2-a.	Does the plan contain a narrative description or a table/list of their participation activities?
C3.	Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement 44 CFR § 201.6(c)(3)(i))
C3.-a.	Does the plan include goals to reduce the risk from the hazards identified in the plan?
C4.	Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement 44 CFR § 201.6(c)(3)(ii))
C4-a.	Does the plan include an analysis of a comprehensive range of actions/projects that each jurisdiction considered to reduce the impacts of hazards identified in the risk assessment?
C4-b.	Does the plan include one or more action(s) per jurisdiction for each of the hazards as identified within the plan's risk assessment?
C5.	Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction? (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))
C5-a.	Does the plan describe the criteria used for prioritizing actions?
C5-b.	Does the plan provide the position, office, department or agency responsible for implementing/administrating the identified mitigation actions, as well as potential funding sources and expected time frame?

5.1 AUTHORITIES, POLICIES, PROGRAMS, AND RESOURCES

EID's existing authorities, policies, programs, and financial resources available for hazard mitigation are provided in Tables 5-1 through 5-3. Table 5-4 also identifies EID's ability to expand and improve on its hazard mitigation capabilities, when possible.

In California, the State delegates most local land use and development authorities and decisions to cities and counties (not Districts), and as such, EID can only determine the availability of water and sewer capacity to serve potential customers. Population growth in the EID service area is dependent upon land use, General Plan designations, and property zoning established by El Dorado County. El Dorado County plans for its future growth through its General Plan, which is a long-term comprehensive framework to

guide physical, social, and economic development within the community's planning area. In July 2004, the El Dorado County Board of Supervisors adopted a new General Plan. The Land Use Element of the General Plan (most recently amended in August 2019) designates the general distribution and intensity of all present and future uses of land in the community for community regions, rural centers, rural regions, and planned communities. The El Dorado County Building Services oversees building codes and policies. As of January 1, 2023, the 2022 California Building Standards Code (California Code of Regulations, Title 24) became effective on a statewide basis.

Table 5-1: Human and Technical Resources for Hazard Mitigation

Department / Program	Principal Activities Related to Hazard Mitigation
Communications	The Communications Department is responsible for the District's public information, community outreach, and media relations functions. This department is responsible for the design and maintenance of the District's website and social media accounts; publishes the bi-monthly EID customer newsletter, *The Waterfront;* and authors and distributes news releases and feature stories to a broad audience across the county and the wider region. Maintaining informative and effective communications with customers, the public, and other stakeholders throughout EID's service areas and the wider region is a primary function of this department.
Engineering	The Engineering Department is divided into five divisions, including the following: • The Engineering/GIS Division is responsible for the planning, design, and construction of public works projects to maintain and improve the reliability of the District's water, wastewater, recycled water, and hydroelectric facilities. Engineering staff manage a variety of projects and are primarily responsible for implementation of the District's CIP, including establishing and prioritizing the CIP, and ensuring that the components of the program are managed in a fiscally responsible manner that meets or exceeds all applicable state and federal standards. The Division is also responsible for management of the dam safety program, development and maintenance of the GIS, and right-of-way services. • The two Environmental Divisions assist in District operations and engineering project compliance with both the California Environmental Quality Act and its federal counterpart, the National Environmental Policy Act, facilitating the acquisition of approvals and compliance with environmental permits. They also assist Operations Department staff in meeting regulatory requirements for standards related to drinking water quality, recycled water program compliance, industrial pretreatment, and Project 184's hydroelectric licensing requirements. Other responsibilities include participation and support in water marketing and water rights initiatives. • Development Services Division staff work with developers, builders, residential customers, and property owners who wish to obtain or expand District services. Development Services also works with Local Agency Formation Committee on annexations. The Construction Inspection Division inspects all new utility construction, including District capital improvement projects and developer constructed and funded subdivisions.
Finance	The Finance Department is responsible for managing EID's financial resources, including financial control, accounting, customer services, utility billing, meter services, water efficiency, treasury, purchasing, warehousing, fleet planning, and maintenance.

Information Technology	The Information Technology Department is responsible for managing the District's information resources, including secure computer and communications networks, databases, and applications that link employees, processes, and facilities to information required to fulfill the District's mission.
Operations	EID's Operations departments include Water and Irrigation, Wastewater and Recycled Water, Hydropower Generation, and Parks and Recreation. Detailed information about these departments/services are discussed in Section 3.2.
Drought Response Team	EID's Drought Response Team (DRT) is an inter-department drought management group responsible for monitoring the activities of the District with regard to general drought management, including issues of timing, policy, public relations, financial solvency, customer education, facility operations, environmental considerations, and public health. The DRT should meet periodically during normal water supply conditions to discuss updates and other important ongoing considerations. Another important component of the DRT function during the early stages of drought is to make preparations for subsequent stages, including an examination of staff levels, financial resources, water waste enforcement staff resources, and areas of collaboration among other agencies in the region.

Notes:
DRT= Drought Response Team
CIP = Capital Improvement Plan
EID = El Dorado Irrigation District
GIS = Geographic Information Systems

Table 5-2: Financial Resources for Hazard Mitigation

Name	Purpose
EID operating and non-operating revenues	EID's sources of operating revenues include water sales and services revenues, wastewater sales and services revenues, recycled water sales, water transfer sales, Facility Capacity Charges (FCC), hydroelectric sales, and recreation revenue. The District's sources of non-operating revenues include surcharges, voter approved taxes, property taxes, interest income, and other income.
California Department of Conservation Regional Forest and Fire Capacity Program (RFFC)	The RFFC makes available block grants to support regional leadership to "build local and regional capacity and develop, prioritize, and implement strategies and projects that create fire adapted communities and landscapes by improving ecosystem health, community wildfire preparedness, and fire resilience." RFFC block grants support partner capacity, project readiness, implementation of demonstration projects, and regional priority planning to achieve landscape-level and community wildfire resilience.
California Department of Fish and Wildlife (CDFW) Watershed Restoration Grant Programs	The Watershed Restoration Grants Branch delivers "science informed grants for restoration of ecological function and conservation and assesses the success of those efforts at a large-scale" (CDFW 2023). As it relates to EID, Proposition 1 of the CDFW Watershed Restoration Grant Program funds projects to implement more reliable water supplies and sustainably managed water resources systems (water supply, water quality, flood protection, and environment) that can better withstand inevitable and unforeseen pressures in the coming decades. Starting in Fiscal Year 22–23, CDFW has over $200 million dedicated to restoration, including funding for grants for new initiatives under nature-based solutions, drought, and climate resiliency. CDFW will accept proposals on a continual basis to fund hazard-related projects that address urgent degrading water and habitat conditions due to climate change impacts and restore mountain meadows and non-coastal wetlands.
CAL FIRE Forest Health Grant Program	The Forest Health Grant Program provides financial assistance for forest restoration projects that restore forest resilience from catastrophic disturbance. Eligible activities include forest fuels reduction, fire reintroduction, reforestation, and utilization of forest

	biomass. Funding for 2023 is $120 million with an additional $50 million available for post-fire reforestation.
CAL FIRE Wildfire Prevention Grants Program	The Wildfire Prevention Grants Program offers financial assistance for local projects in and near fire-threatened communities that focus on increasing the protection of people, structures, and communities. Qualified activities include hazardous fuels reduction, wildfire prevention planning, and wildfire prevention education with an emphasis on improving public health and safety while reducing greenhouse gas emissions. Funding for 2023 was up to $120 million. In 2019, EID was awarded three CAL FIRE Wildfire Prevent Grants Program totaling $1,963,005 for vegetation management activities on approximately 522 acres at four EID facilities.
California Department of Water Resources Urban and Multibenefit Drought Relief Grant Program	The Urban and Multibenefit Drought Relief Program offers financial assistance to address drought impacts for local and tribal governments/special Districts "facing the loss or contamination of their water supplies due to the drought to address immediate drought impacts on human health and safety, and to protect fish and wildlife resources plus other public benefits, such as ecosystem improvements." The District was awarded $10 million from California Department of Water Resources' Urban and Multibenefit Drought Relief Grant Program for the replacement of the Sly Park Intertie. The timing of construction is anticipated to occur between 2024–2026.
FEMA HMA Grants	The HMA grant program provides technical and financial assistance to help mitigate hazards through the following grants: Building Resilient Infrastructure and Communities (BRIC): BRIC is an annual competitive pass-through grant program that focuses on reducing the nation's risk by funding public infrastructure projects that increase a community's resilience before a disaster affects an area. BRIC was created in 2020 as part of the Disaster Recovery Reform Act of 2018 and replaces FEMA's legacy Pre-Disaster Mitigation grant program. BRIC funds a wide variety of mitigation activities, including microgrids, flood control, wetland restoration, community relocation/buyouts, seismic retrofits, and nature-based solutions. BRIC Direct Technical Assistance is a non-financial assistance grant program for: local hazard mitigation plan development initial support, identifying solutions for specific hazards, assisting with hazard mitigation project planning, requesting application development support, demonstrating cost-effectiveness of a BRIC sub-application submission, and understanding hazard mitigation grant management. In August of 2023, EID was tentatively awarded a $7 million BRIC grant to convert Flume 45 section 3 from a wooden flume to a more fire-resistant concrete flume. EID is still in the preliminary design phase right now with construction estimated to start in June 2025. Hazard Mitigation Grant Program (HMGP): HMGP is a pass-through grant program that supports pre- and post-disaster mitigation plans and projects for state and local agencies and federally recognized tribal governments. HMGP funding is authorized with a Presidential Major Disaster Declaration. A governor or tribal chief executive may request HMGP funding when submitting a disaster declaration. The amount of funding made available to the applicant is generally 15 percent of the total federal assistance amount provided for recovery from the Presidential Major Disaster Declaration. In 2022, EID applied for and was granted HMGP funding of $256,347 to provide a federal cost share for emergency backup generator installations at 22 remote District facilities. HMGP–Post Fire: HMGP Post Fire is a pass-through grant program that provides funding for state and local agencies and federally recognized tribal governments to reduce wildfire risks. Funded projects include (but are not limited to) defensible space initiatives, ignition-resistant construction, hazardous fuels reduction, erosion control measures, slope failure prevention measures, and flash flooding prevention. HMGP–Post Fire grants are available to eligible states and territories that receive Fire Management Assistance declarations and to federally recognized tribal governments that have land burned within a designated area. A Post Fire Presidential Disaster Declaration is not

	required to activate funding. Funding amounts are determined by FEMA and are based on a national aggregate calculation of historical Fire Management Assistance Grant declarations over the past 10 years.
Sierra Nevada Conservancy Watershed Improvement Program	The Sierra Nevada Conservancy is a state agency established through bipartisan legislation to "initiate, encourage, and support efforts that improve the environmental, economic, and social well-being of California's Sierra Nevada-Cascade region, its communities, and the people of California." The Sierra Nevada Conservancy's Watershed Improvement Program funds projects that restore, protect, and enhance watersheds and communities in California's Sierra Nevada-Cascade region. These grants are awarded through grant programs under four regional goals: Forest & Watershed Health, Strategic Land Conservation, Vibrant Recreation & Tourism, and Resilient Communities. On December 8, 2016, the Sierra Nevada Conservancy governing board awarded EID a $476,709 grant to pay for all EID staff costs and a portion of USFS costs to implement the Caples Creek Watershed Ecological Restoration Project.
State of California Prop. 84 is the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006	Prop. 84 contains $5.38 billion spread over eight broad project areas: water quality; protection of rivers, lakes, and streams; flood control/flood subventions; sustainable communities and climate change reduction; protection of beaches, bays, and coastal waters; parks and natural education facilities; forest and wildlife conservation; and statewide water planning. In 2016, EID was awarded $160,000 in Prop. 84 grant funding to install a new pump station with two low lift pumps, a sand separator and settling tank, and two high lift pumps to lift water to the treatment plant for the Outingdale water system.
U.S. Bureau of Reclamation: WaterSMART Cooperative Watershed Management Program	The WaterSMART Cooperative Watershed Management Program provides funding to develop collaborative solutions to address water management needs. Funding is provided for the support of watershed groups on a competitive basis for the development of watershed groups, watershed restoration planning, and watershed management project design. In 2019, EID was awarded a $1 million WaterSmart grant for the installation of a new 42-inch pipeline on the Upper Main Ditch to replace the existing open ditch conveyance and installation of a new inlet control structure. The new pipeline conveyance saved an average of 1,800 acre-feet of water per year that was lost due to seepage and evapotranspiration in the ditch, and improved source water quality to the treatment plant.
U.S. Department of Agriculture: Natural Resources Conservation Service Watershed Programs	The Natural Resources Conservation Service Watershed Programs provide technical and financial assistance to help implement conservation practices that address watershed resource concerns through the following grant programs: Emergency Watershed Protection Program: The Emergency Watershed Protection Program offers technical and financial assistance to help relieve imminent threats to life and property caused by floods, fires, windstorms, and other natural disasters that impair a watershed. Emergency Watershed Protection Program grants are available to local agencies, conservation districts, federally recognized tribal governments, and interested public and private landowners that have a sponsor. Watershed Protection and Flood Prevention Program: The Watershed Protection and Flood Prevention Program provides technical and financial assistance to help plan and implement watershed programs, including flood prevention. It is available to state and local agencies and federally recognized tribal governments and for watersheds that are 250,000 acres and smaller.
U.S. EPA Midsize and Large Drinking Water System Infrastructure Resilience and	The Safe Drinking Water Act Resilience Grants help public water utilities increase their resilience to natural hazards and extreme weather events. Projects that may receive funding include but are not limited to those that conserve water or enhance water use

Sustainability Program	efficiency, improve drinking water infrastructure, or enhance water supply through watershed management and source water protection.
USFS: Community Wildfire Defense Grant	The Community Wildfire Defense Grant, funded through the Bipartisan Infrastructure Law, is intended to help at-risk local communities and tribes reduce the risk against wildfire. The grant provides funding for two types of projects: the development and revision of community wildfire protection plans and the implementation of projects described in community wildfire protection plans that were written less than 10 years ago. Priority is given to at-risk communities in an area identified as having high or very high wildfire hazard potential, are low-income, and/or have been impacted by a severe disaster.

Notes:
BRIC = Building Resilient Infrastructure and Communities
CAL FIRE = California Department of Forestry and Fire Protection
CDFW = California Department of Fish and Wildlife
EID = El Dorado Irrigation District
FEMA = Federal Emergency Management AgencyHMA = Hazard Mitigation Assistance
HMGP = Hazard Mitigation Grant Program
RFFC = Regional Forest and Fire Capacity Program
U.S. EPA = U.S. Environmental Protection Agency
USFS = U.S. Forest Service

Table 5-3: Planning, Policy, Program, and Public Outreach Resources for Hazard Mitigation

Name	Description
EID CIP 2024–2028	EID's CIP outlines comprehensive investments focusing on lifecycle asset replacements, health and safety enhancements and meeting legal and regulatory mandates. The EID CIP 2024-2028 identifies approximately $321 million for investment in EID's hydroelectric, water, and wastewater systems needed over the next 5 years to maintain and improve the District's services. Most of the projects identified will rehabilitate aging infrastructure. The EID CIP is updated annually.
EID Drought Action Plan 2021	In 2014, EID prepared its first Drought Action Plan, which serves as a detailed work plan for EID staff during drought conditions and includes specific actions for management of the District's water supply and demand; addresses the impacts associated with drought; and facilitates the timely implementation of effective drought responses. As described in EID's Drought Action Plan 2021, during times of water shortage, there are actions the District may take that are not solely based upon internal policies and regulations. Several California Water Code Sections and California Codes of Regulation grant authority to or mandate that the water purveyor declare drought conditions and implement drought stages, including the following: • Title 23, California Code of Regulation, Section 864 – End-User Requirements in Promotion of Water Conservation • Title 23, California Code of Regulation, Section 865 – Mandatory Actions by Water Suppliers • California Water Code, Section 350 – Declaration of water shortage emergency condition • California Water Code, Section 353 – Regulations and restrictions on delivery of water and consumption • California Water Code, Section 354 – Priorities in use of water • California Water Code, Section 356 – Right to deny applications for new or additional service connections

2018 EID EOP	This EOP outlines EID's policies and procedures for preparing for, responding to, and recovering from emergency situations that could adversely affect business continuity and the capacity to safely provide water, wastewater, and recycled water services to its customers. The Plan is designed to support operational functions during the recovery process, provide policy guidance to the District during and immediately following an emergency incident, and to include the District as part of a wider emergency management operational area if necessary, such as an El Dorado County managed incident.
EID Operational Emergency Action Plans (EAPs)	EID's Operational EAPs are developed in accordance with the District's EOP Concept of Emergency Operation and applicable regulatory requirements. Operational EAPs address potential and specific hazards scenarios and/or regulatory response planning criteria, provide guidance to initial incident responders, and define conditions when the Incident Command System and EOPs are activated to assist with emergency management and provision emergency response resources. Operational EAPs have been developed for the following: Caples Lake; Silver Lake; Echo Lake; Sly Park/Jenkinson Lake Dam; Weber Dam; Drinking Water Operations; Active Shooter Response; Sly Park Recreation Area; Highway 88 EID Recreation; Hydroelectric Operations; Wastewater Operations; Network and Cyber Operations; and Industrial Control Systems.
El Dorado Irrigation District Integrated Water Resources Master Plan 2013	EID's Integrated Water Resources Master Plan provides a comprehensive program that optimizes the use of the District's potable water and recycled water resources. This plan provides a roadmap for the development of future infrastructure and maintenance of existing EID water and recycled water facilities.
Website, media, and *The Waterfront*	In addition to designing and maintaining the District's website and social media accounts, the Communications department produces *The Waterfront* which contains feature EID stories and other relevant information. These newsletters are mailed six times a year to customers along with their bills or electronically for those signed up for online bill pay.

Notes:
CIP = Capital Improvement Plan
EAP = Emergency Action Plan
EID = El Dorado Irrigation District
EOP – Emergency Operations Plan

Table 5-4: Ability to Improve On / Expand Resources

Capability	Type/Description	Expansion
Financial	HMGP Notice of Intent (NOI)	Cal OES Hazard Mitigation accepts NOIs on an ongoing basis for future HMGP funding opportunities. According to Cal OES, an NOI is intended to provide an opportunity for eligible sub-applicants to propose well-defined mitigation actions that reduce risk to life and property from future natural hazards. Prepare HMGP NOIs for select mitigation projects identified in the 2024 LHMP.
Planning, policy, program, and public outreach	Sacramento Regional Groundwater Bank	Participate in the Sacramento Groundwater Regional Bank through membership in the Regional Water Authority. The Sacramento Regional Water Bank is a system of groundwater wells, pumps, and pipelines that allow local water providers to pump out and refill underground water reserves to serve local water customers.

Planning, policy, program, and public outreach	2024 LHMP outreach	Include information about the 2024 LHMP, such as summary of the 2024 LHMP and current grant funded mitigation projects, in *The Waterfront.*

Notes:
2024 LHMP = El Dorado Irrigation District 2024 LHMP
Cal OES = California Office of Emergency Services
HMA = Hazard Mitigation Assistance
HMGP = Hazard Mitigation Grant Program
NOI = Notice of Intent

5.2 NATIONAL FLOOD INSURANCE PROGRAM PARTICIPATION

The NFIP aims to reduce the impact of flooding on residential and nonresidential buildings by providing insurance to property owners and encouraging communities to adopt and enforce floodplain management regulations. Participation in the NFIP is based on an agreement between local communities and the Federal Government. As noted in Section 4.2, EID is not eligible to participate in the NFIP. El Dorado County joined the NFIP on April 9, 1986. Its current Digital Flood Insurance Rate Map was prepared on April 03, 2012. The City of Placerville joined the NFIP on September 30, 1983. Its current Digital Flood Insurance Rate Map is September 26, 2008. EID's participation in the ACWA JPIA is discussed in Section 4.2.

5.3 MITIGATION GOALS

Mitigation goals are defined as general guidelines that explain what EID wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing a community-wide vision. The 2024 LHMP goals are based on EID's mission and guiding principles and include the following:

- Create resilient recreation and water, wastewater, recycled water, and hydropower systems to prepare for/mitigate from hazards identified in this plan, including climate change, dam failure, drought, earthquake, flood, landslide, wildfire, and winter storm.
- Upgrade existing infrastructure and protect the EID service area and its customers from hazards identified in this plan, including climate change, dam failure, drought, earthquake, flood, landslides, wildfire, and winter storms.

5.4 DRAFT MITIGATION ACTION LIST

Mitigation actions—also known as mitigation projects—help achieve the goals of the 2024 LHMP. Mitigation actions can include plans and programs, structure and infrastructure projects, and natural systems protection.

Table E-1 in Appendix E includes the draft mitigation action list developed by the planning team for the 2024 LHMP. These actions are based on the plan's risk assessment, assessments from recent disasters, FEMA success stories and best management practices, FEMA job aids, EID Capital Improvement Plan (CIP) 2024–2028 projects, and input from the planning team and other relevant practitioners. At least one mitigation action has been developed to address each hazard profiled in this plan. As shown in Table E-1, for each mitigation action, an overview of the project, the hazards it addresses, the type of building and infrastructure it protects, and the associated benefits and costs are provided.

Table E-1 also assigns a priority to each mitigation action. The priority is based on a method to rank or rate the relative importance of a project based on factors such as protection of health and safety, legal requirements, increasing service levels, and project benefits and costs as defined in Table E-2. The priority levels listed in Table E-2 include level 1 (mandatory), level 2 (necessary), and level 3 (discretionary). This is the same process used for the EID CIP 2024–2028, and CIP projects incorporated into this 2024 LHMP retain the same priority level as previously assigned. The planning team followed these prioritization

guidelines to assign priorities for mitigation actions not identified in the EID CIP 2024-2028 but included in this plan.

5.5 FINALIZED MITIGATION ACTION PLAN

The prioritized mitigation actions listed in Appendix E, Table E-1, are displayed as a finalized mitigation action plan below. Table 5-5 lists each mitigation action that the EID would like to implement over the next 5 years and for each mitigation action included the priority level, potential funding sources, project lead, and implementation timelines. The implementation of this action plan is the end result of this planning process.

Table 5-5: Finalized Mitigation Action Plan

Priority	Project Name	Hazard Addressed	Potential Funding Source	Project Lead	Time (Year)
Level 1 (Mandatory)	Water Facility Generators	Climate change and wildfire	EID water rates and/or HMGP	Engineering Director	2024
	Wastewater Facility Generators	Climate change and wildfire	EID wastewater rates and/or HMGP	Engineering Director	2024
	Sly Park Spillway Improvements	Dam failure	EID water rates and/or BRIC	Engineering Director	2024–2025
Level 2 (Necessary)	Reservoir 1 Storage Replacement	Wildfire	EID water rates, water FCCs, and HMGP and/or BRIC	Engineering Director	2024–2026
	Reservoir 1 Water Treatment Plant Generator Replacement	Climate change and wildfire	EID water rates and/or HMGP	Engineering Director	2024
	Flume 48 Replacement	Earthquake, flood, landslide, wildfire, and winter storm	EID water rates, water FCCs, and/or HMGP	Engineering Director	2024–2027
	Flumes 45A, 46A, 47A, and 47B Replacement	Earthquake, flood, landslide, wildfire, and winter storm	EID water rates, water FCCs, and/or HMGP	Engineering Director	2028
	Flume 4 Replacement	Earthquake, flood, landslide, wildfire, and winter storm	EID water rates and water FCCs	Engineering Director	2025–2026
	Transmission Slope Stabilization	Flood, landslide, and winter storm	EID water rates and/or HMGP	Engineering Director	2025–2026
	Echo Conduit Rehabilitation	Flood, landslide, and winter storm	EID water rates	Engineering Director	2024
	Penstock Stabilization	Flood and landslide	EID water rates	Engineering Director	2024–2026
	Recycled Water Seasonal Storage	Climate change and drought	BRIC and HMGP	Engineering Director	2024–2029

	Watershed Restoration	Climate change, drought, flood, and wildfire	Sierra Nevada Conservancy Watershed Improvement Program and CDFW Watershed Restoration Grant Programs	Engineering Director	2024–2029
	Recreation Area Vegetation Management / Defensible Space	Climate change, drought, and wildfire	BRIC, HMGP, CAL FIRE Forest Health Grant Program, CAL FIRE Wildfire Prevention Grants Program, and U.S. Department of Agriculture Natural Resources Conservation Service Watershed Programs	Operations Director	2024–2029
	Comprehensive EID Infrastructure and Hazards Database	All	EID operating and non-operating revenues	Information Technology Director	2024–2025
	Short- and Long-Term Water Quality Risk Reduction Measures	Climate change and wildfire	Midsize and Large Drinking Water System Infrastructure Resilience and Sustainability Program	Engineering Director	2024–2029

Notes:
BRIC = Building Resilient Infrastructure and Communities
CAL FIRE = California Department of Forestry and Fire Protection
CDFW = California Department of Fish and Wildlife
EID = El Dorado Irrigation District
FCC = Facility Capacity Charges
HMGP = Hazard Mitigation Grant Program

6.0 PLAN MAINTENANCE

This section addresses Element D – Plan Maintenance of the Local Mitigation Plan Regulation Checklist.

Element D: Plan Maintenance	
D1.	Is there discussion of how each community will continue public participation in the plan maintenance process? (Requirement 44 CFR § 201.6(c)(4)(iii))
D1-a.	Does the plan describe how communities will continue to seek future public participation after the plan has been approved?
D2.	Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a five-year cycle)? (Requirement 44 CFR § 201.6(c)(4)(i))
D2-a.	Does the plan describe the process that will be followed to track the progress/status of the mitigation actions identified within the Mitigation Strategy, along with when this process will occur and who will be responsible for the process?
D2-b.	Does the plan describe the process that will be followed to evaluate the plan for effectiveness? This process must identify the criteria that will be used to evaluate the information in the plan, along with when this process will occur and who will be responsible
D2-c.	Does the plan describe the process that will be followed to update the plan, along with when this process will occur and who will be responsible for the process?
D3.	Does the plan describe a process by which each community will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement 44 CFR § 201.6(c)(4)(ii))
D3-a.	Does the plan describe the process the community will follow to integrate the ideas, information and strategy of the mitigation plan into other planning mechanisms?
D3-b.	Does the plan identify the planning mechanisms for each plan participant into which the ideas, information and strategy from the mitigation plan may be integrated?
D3-c.	For multi-jurisdictional plans, does the plan describe each participant's individual process for integrating information from the mitigation strategy into their identified planning mechanisms?

6.1 CONTINUED PUBLIC PARTICIPATION

A copy of the 2024 LHMP will be available on the EID website, along with contact information for the LHMP project manager. Additionally, the LHMP project manager will use the EID website and social media accounts to notify the public of, and seek input on, any changes or updates to the 2024 LHMP, including the implementation of the mitigation action plans and the 2029 LHMP kickoff. The LHMP project manager will also specifically reach out to agencies and organizations representing EID vulnerable and underserved communities to notify them of any changes or updates to the 2024 LHMP as well as announcing the 2029 LHMP kick-off.

6.2 PLAN EVALUATION PROCESS, UPDATE METHOD AND SCHEDULE

Every January, the HMP project manager will send out the Annual Review Tracker to the planning team and ask each member to complete the tracker. Specifically, the Annual Review Tracker will document disasters that have occurred, EID infrastructure that has been damaged, mitigation actions that have been implemented, new studies/reports that have been published, public outreach that has been conducted, and

changes made and/or that need to be made to the 2024 LHMP. The LHMP project manager will summarize the findings into Table 6-1 below.

In addition to the Annual Review Tracker, the HMP project manager will collect any FEMA Mitigation Progress Reports (or other similar forms) from the previous year and attach them to the summarized Annual Review Tracker. The HMP project manager will email these documents to each member of the planning team for review. The HMP project manager will subsequently hold a planning team meeting in the first quarter of each year to determine, based on the findings from the Annual Review Tracker and FEMA Mitigation Progress Reports, if the actions undertaken the previous year are helping achieve the plan's mitigation goals.

Finally, the HMP project manager will kick off the 2029 LHMP in the summer of 2028 with the following activities:

- The LHMP project manager will reconvene the planning team and update membership.
- The planning team will review Table 6-1, which provides annual summaries of the disasters that have occurred; new permanent information that has become available; implementation measures; and public outreach and response to determine the hazards and other related information to be included in the 2029 LHMP.
- The LHMP project manager will develop a new work plan.
- The LHMP project manager—with support from the planning team—will begin the plan update process, which is expected to take up to 6 months.

Table 6-1: Annual Review Tracker

Review Period	Disasters That Occurred / EID Infrastructure Damaged	Mitigation Actions Implemented	New Relevant Studies/Reports to Include in 2029 LLHMP	Public Outreach Conducted	Changes Made to 2024 LHMP and/or Changes Needed to be Made to the 2029 LHMP
Review of 2024					
Review of 2025					
Review of 2026					
Review of 2027					

6.3 PLAN INTEGRATION

Identification of how the 2024 LHMP will be integrated into EID-specific relevant plans and programs moving forward is also provided in Table 6-2 below.

Table 6-2: Integration of 2024 LHMP

LHMP Section	Existing Plan/Policy/Program	Process / Timeframe
Section 4 Risk Assessment	2018 EID Emergency Operations Plan	Swap out the 2018 EID's EOP Enclosure 1.0 Hazard Summaries with hazard identification, vulnerability, and impact information from Section 4 Risk Assessment of the 2024 LHMP once the 2024 LHMP is approved and adopted.
Section 5 Mitigation Strategy	EID CIP 2024–2028	Incorporate the 2024 LHMP mitigation actions that are not included in the EID CIP 2024-2028 into future versions of the EID CIP during the next plan update which occurs on an annual basis in August and September.
Section 5 Mitigation Strategy	EID Drought Action Plan 2021	Incorporate 2024 LHMP drought mitigation actions into the EID Drought Action Plan: Section 3 Ongoing Activities during the next plan update.

Notes:
2024 LHMP = El Dorado Irrigation District 2024 LHMP
CIP = Capital Improvement Plan
EID = El Dorado Irrigation District
EOP = Emergency Operations Plan

7.0 PLAN UPDATE

This section addresses Element E – Plan Update of the Local Mitigation Plan Regulation Checklist.

Element E: Plan Update	
E1.	Was the plan revised to reflect changes in development? (Requirement 44 CFR § 201.6(d)(3))
E2.	Was the plan revised to reflect changes in priorities and progress in local mitigation efforts? (Requirement 44 CFR § 201.6(d)(3))
E2-a.	Does the plan describe how it was revised due to changes in community priorities?
E2-b.	Does the plan include a status update for all mitigation actions identified in the previous mitigation plan?
E2-c.	Does the plan describe how jurisdictions integrated the mitigation plan, when appropriate, into other planning mechanisms?

7.1 CHANGES IN DEVELOPMENT

The only annexation to occur to the EID service area within the SOI since the 2019 LHMP was the development of one single-family home on a 60-acre parcel near the unincorporated community of Coloma. The property is vulnerable to climate change, drought, winter storm, and moderate earthquake shaking, and it is located within one-half mile of a high and very high fire threat area, high and very high FHSZ, very high deep-seated landslide susceptibility, and dam breach inundation area. The 2024 LHMP reflects the most recent EID service area boundaries which includes this annexation.

Within the EID service area, 901 new residential constructions finals and 34 new commercial finals were issued by El Dorado County in 2020 and 2021 (most recent data available). Since the El Dorado County General Plan designates medium- and high-density residential development through 2040 in El Dorado Hills, Cameron Park, Shingle Springs, Diamond Springs, and Pollock Pines, it can be assumed that much of the development that occurred in the EID service area (during that timeframe occurred in or around these communities as well as Placerville. As such, development over the past five years in the EID service area may be vulnerable to:

- Rising temperatures, particularly for development in areas that lack sufficient tree canopy and/or have large amounts of impervious and dark surfaces, such as the higher density areas of El Dorado Hills, Cameron Park, Shingle Springs, Diamond Springs, Pollock Pines, and Placerville.
- Prolonged drought, which will affect all the EID service area.
- Increased risk of flooding, particularly for development in mapped SFHAs, including in and around El Dorado Hills, Cameron Park, Placerville, and Pollock Pines, and low-lying areas and areas along and/or near riverbanks.
- Increased risk of wildfires, particularly for development in areas of current and forthcoming mapped high and very high FHSZs, including areas in and around El Dorado Hills, Cameron Park, Shingle Springs, Diamond Springs, Placerville, and Pollock Pines.
- Increased risk of winter storms (especially rain-on-snow events), particularly for development in the mapped SFHAs, low-lying areas, and areas along and/or near riverbanks.

It should be noted that according to the 2023 National Preparedness Report (FEMA, 2023), buildings that are constructed under new building codes are better able to withstand flooding, wildfires and winter storms.

7.2 CHANGES IN PRIORITIES

There were several changes in priorities made to the 2024 LHMP, including:

- The hazards addressed in the 2019 LHMP were revised in the 2024 LHMP to better focus and prioritize on hazards of immediate concern for the district and larger community. These hazards include the "big three" hazards in California (earthquake, flood, and fire), hazards with recent disaster declarations in El Dorado County including drought (2022–2023), landslide (2019, 2022–2023), and winter storm (2019, 2022–2023), hazards with recent disaster declaration in Northern California (dam failure, 2017), and hazards that focus on the new LHMP planning requirements (climate change).
- The mitigation goals that were originally created by the El Dorado County Hazard Mitigation Plan Committee for the 2015 and 2019 El Dorado County Multi-Jurisdictional Hazard Mitigation Plan were revised in the 2024 LHMP to better align with EID's own mission and guiding principles listed here: https://www.eid.org/about-us/mission-and-guiding-principles.
- The 2024 LHMP mitigation strategy was revised to also include mitigation projects that were not listed in the EID CIP 2024–2028. Previous versions of the LHMP had only included projects identified in the District's CIP. However, the planning team determined that there were relevant projects in other EID plans as well as additional community need projects such as such as recycled water seasonal storage, watershed restoration, and vegetation for recreational areas, that should be included in the 2024 LHMP. The prioritization process itself used to prioritize projects in the 2024 LHMP remained the same as previous prioritization process efforts in in the 2015 and 2019 LHMP.

7.3 2019 LHMP'S MITIGATION ACTION STATUS

The planning team reviewed the mitigation actions included in the 2019 LHMP, documented the progress of each action, and determined the inclusion of each action in the 2024 LHMP (Table 7-1).

Table 7-1: 2019 LHMP Mitigation Action Status

Mitigation Action	Inclusion in the 2024 LHMP / Project Status
Vegetation Management / Defensible Space	Yes – project is ongoing and therefore included in the 2024 LHMP.
Sly Park Vegetation Management Project	No – project has been completed.
Camp 5/Flume 46 Vegetation Management Project	No – project has been completed.
Weber Lake Vegetation Management Project	No – project has been completed.
Loss of Power – Public Safety Power Shutdown	Yes – the project is ongoing. While generators are being installed systematically at critical sites (15 generators to be installed in 2024 as part of a HMGP grant), many additional generators are required to ensure reliability during Public Safety Power Shutoff. As such, this action is included as "generators" for 2024 LHMP.
Flume Section Replacement & Canal Conversion	Yes – while some projects mentioned have been completed, program is still in place. The 5-year planning period for 2024–2028 includes Flume 48, 45A, 45 section 3, 46A,47A, 47B.

Annual Canal and Flume Assessment Program	No – while the program is still in place with $1,625,000 budgeted for 2024–2028, it is considered more of an inspection and maintenance program and not mitigation.
Main Ditch Improvement – Forebay to Reservoir 1	No – project has been completed.
Sly Park Intertie Improvements	Yes – project is currently in the design phase (and the design has been modified since the 2019 LHMP) and construction is planned for 2024–2025.
Outingdale Water Intake Replacement	No – project has been completed.
Waterline Replacement Program	Yes – while the projects have been completed, the overall program is still in place. $8,150,000 is budgeted for 2024–2028.
Cyber Security Improvements	No – Cyber security is not addressed as a hazard in the 2024 LHMP. In addition, a standalone cybersecurity project is not an eligible mitigation activity for HMA funding.
Wastewater Supervisory Control and Data Acquisition Reliability and Automation Improvements Program	No – project has been completed and is no longer in the EID CIP.
Wastewater Supervisory Control and Data Acquisition System Reliability Program	No – project was closed out in 2018 (CIP #12021).

Notes:
2024 LHMP = El Dorado Irrigation District 2024 LHMP
CIP = Capital Improvement Plan
EID = El Dorado Irrigation District

HMA = Hazard Mitigation Assistance
HMGP = Hazard Mitigation Grant Program
LHMP = Local Hazard Mitigation Plan

7.4 INTEGRATION OF THE 2019 LHMP INTO OTHER PLANNING MECHANISMS

The 2019 LHMP was not integrated into other EID planning documents over the past 5 years. The 2019 LHMP did not include any drought mitigation actions to be incorporated into the EID Drought Action Plan update that occurred in 2021. In addition, the 2019 LHMP did not include any mitigation actions that were not already included in the District's CIP, so there was no ability for integration into more recent versions of the CIP.

Integration of the 2024 LHMP into other EID documents, including the future version of the EID Drought Action Plan, EID CIP, and EID Emergency Operations Plan, moving forward are discussed in Section 6.3.

8.0 PLAN ADOPTION

This section addresses Element F – Plan Adoption of the Local Mitigation Plan Regulation Checklist.

Element F: Plan Adoption	
F1.	For single-jurisdictional plans, has the governing body of the jurisdiction formally adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))
F1-a.	Does the participant include documentation of adoption?
F2.	For multi-jurisdictional plans, has the governing body of each jurisdiction officially adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))
F2-a.	Did each participant adopt the plan and provide documentation of that adoption?

8.1 FORMAL ADOPTION

The 2024 LHMP was adopted by the EID Board of Directors on March 11, 2024. A copy of the adoption resolution is kept on file with EID, Cal OES and FEMA Region IX.

APPENDIX A—LOCAL MITIGATION PLAN REVIEW TOOL

Local Mitigation Plan Review Tool

Cover Page

The Local Mitigation Plan Review Tool (PRT) demonstrates how the local mitigation plan meets the regulation in 44 CFR § 201.6 and offers states and FEMA Mitigation Planners an opportunity to provide feedback to the local governments, including special districts.

1. The Multi-Jurisdictional Summary Sheet is a worksheet that is used to document how each jurisdiction met the requirements of the plan elements (Planning Process; Risk Assessment; Mitigation Strategy; Plan Maintenance; Plan Update; and Plan Adoption).
2. The Plan Review Checklist summarizes FEMA's evaluation of whether the plan has addressed all requirements.

For greater clarification of the elements in the Plan Review Checklist, please see Section 4 of this guide. Definitions of the terms and phrases used in the PRT can be found in Appendix E of this guide.

Plan Information	
Jurisdiction(s)	El Dorado Irrigation District
Title of Plan	El Dorado Irrigation District 2024 Local Hazard Mitigation Plan
New Plan or Update	Update
Single- or Multi-Jurisdiction	Single-jurisdiction
Date of Plan	1/8/2024
Local Point of Contact	
Title	Daniel Newsom, Safety and Security Officer
Agency	El Dorado Irrigation District
Address	2890 Mosquito Rd, Placerville, CA 95667
Phone Number	530-642-4186
Email	dnewsom@eid.org

Additional Point of Contact	
Title	Anna Davis, Senior Planner
Agency	AECOM
Address	300 Lakeside Dr., Ste 400, Oakland, CA 94612
Phone Number	415-994-5157
Email	anna.davis@aecom.com

Review Information	
State Review	
State Reviewer(s) and Title	Click or tap here to enter text.
State Review Date	Click or tap to enter a date.
FEMA Review	
FEMA Reviewer(s) and Title	Click or tap here to enter text.
Date Received in FEMA Region	Click or tap to enter a date.
Plan Not Approved	Click or tap to enter a date.
Plan Approvable Pending Adoption	Click or tap to enter a date.
Plan Approved	Click or tap to enter a date.

Multi-Jurisdictional Summary Sheet

In the boxes for each element, mark if the element is met (Y) or not met (N).

#	Jurisdiction Name	A. Planning Process	B. Risk Assessment	C. Mitigation Strategy	D. Plan Maintenance	E. Plan Update	F. Plan Adoption	G. State Requirements
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Plan Review Checklist

The Plan Review Checklist is completed by FEMA. States and local governments are encouraged, but not required, to use the PRT as a checklist to ensure all requirements have been met prior to submitting the plan for review and approval. The purpose of the checklist is to identify the location of relevant or applicable content in the plan by element/sub-element and to determine if each requirement has been "met" or "not met." FEMA completes the "required revisions" summary at the bottom of each element to clearly explain the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is "not met." Sub-elements in each summary should be referenced using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each element and sub-element are described in detail in Section 4: Local Plan Requirements of this guide.

Plan updates must include information from the current planning process.

If some elements of the plan do not require an update, due to minimal or no changes between updates, the plan must document the reasons for that.

Multi-jurisdictional elements must cover information unique to all participating jurisdictions.

Element A: Planning Process

Element A Requirements	Location in Plan (section and/or page number)	Met / Not Met
A1. Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))		
A1-a. Does the plan document how the plan was prepared, including the schedule or time frame and activities that made up the plan's development, as well as who was involved?	Section 2.1	Choose an item.
A1-b. Does the plan list the jurisdiction(s) participating in the plan that seek approval, and describe how they participated in the planning process?	Section 1.2	Choose an item.

Element A Requirements	Location in Plan (section and/or page number)	Met / Not Met
A2. Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process? (Requirement 44 CFR § 201.6(b)(2))		
A2-a. Does the plan identify all stakeholders involved or given an opportunity to be involved in the planning process, and how each stakeholder was presented with this opportunity?	Section 2.2 and Appendix B	Choose an item.
A3. Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval? (Requirement 44 CFR § 201.6(b)(1))		
A3-a. Does the plan document how the public was given the opportunity to be involved in the planning process and how their feedback was included in the plan?	Sections 2.3 – 2.4	Choose an item.
A4. Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement 44 CFR § 201.6(b)(3))		
A4-a. Does the plan document what existing plans, studies, reports and technical information were reviewed for the development of the plan, as well as how they were incorporated into the document?	Section 2.5	Choose an item.
ELEMENT A REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element B: Risk Assessment

Element B Requirements	Location in Plan (section and/or page number)	Met / Not Met
B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on previous occurrences of hazard events and on the probability of future hazard events? (Requirement 44 CFR § 201.6(c)(2)(i))		
B1-a. Does the plan describe all natural hazards that can affect the jurisdiction(s) in the planning area, and does it provide the rationale if omitting any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area?	Section 4.1	Choose an item.
B1-b. Does the plan include information on the location of each identified hazard?	See "location" within each hazard profile table (Section4: tables 4-1 through 4-8).	Choose an item.
B1-c. Does the plan describe the extent for each identified hazard?	See "extent/severity" within each hazard profile table (Section 4: tables 4-1 through 4-8).	Choose an item.
B1-d. Does the plan include the history of previous hazard events for each identified hazard?	See "history" within each hazard profile table (Section 4: tables 4-1 through 4-8).	Choose an item.
B1-e. Does the plan include the probability of future events for each identified hazard? Does the plan describe the effects of future conditions, including climate change (e.g., long-term weather patterns, average temperature and sea levels), on the type, location and range of anticipated intensities of identified hazards?	See "future events" within each hazard profile table (Section 4: tables 4-1 trough 4-8).	Choose an item.
B1-f. For participating jurisdictions in a multi-jurisdictional plan, does the plan describe any hazards that are unique to and/or vary from those affecting the overall planning area?	Not applicable.	Choose an item.

Element B Requirements	Location in Plan (section and/or page number)	Met / Not Met
B2. Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP-insured structures that have been repetitively damaged by floods? (Requirement 44 CFR § 201.6(c)(2)(ii))		
B2-a. Does the plan provide an overall summary of each jurisdiction's vulnerability to the identified hazards?	Section 4.2 and Appendix D	Choose an item.
B2-b. For each participating jurisdiction, does the plan describe the potential impacts of each of the identified hazards on each participating jurisdiction?	Section 4.3	Choose an item.
B2-c. Does the plan address NFIP-insured structures within each jurisdiction that have been repetitively damaged by floods?	Section 4.4	Choose an item.
ELEMENT B REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element C: Mitigation Strategy

Element C Requirements	Location in Plan (section and/or page number)	Met / Not Met
C1. Does the plan document each participant's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement 44 CFR § 201.6(c)(3))		
C1-a. Does the plan describe how the existing capabilities of each participant are available to support the mitigation strategy? Does this include a discussion of the existing building codes and land use and development ordinances or regulations?	Section 5.1	Choose an item.
C1-b. Does the plan describe each participant's ability to expand and improve the identified capabilities to achieve mitigation?	Section 5.1	Choose an item.

Element C Requirements	Location in Plan (section and/or page number)	Met / Not Met
C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))		
C2-a. Does the plan contain a narrative description or a table/list of their participation activities?	Section 5.2	Choose an item.
C3. Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement 44 CFR § 201.6(c)(3)(i))		
C3-a. Does the plan include goals to reduce the risk from the hazards identified in the plan?	Section 5.3	Choose an item.
C4. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement 44 CFR § 201.6(c)(3)(ii))		
C4-a. Does the plan include an analysis of a comprehensive range of actions/projects that each jurisdiction considered to reduce the impacts of hazards identified in the risk assessment?	Section 5.4 and Appendix E (Table	Choose an item.
C4-b. Does the plan include one or more action(s) per jurisdiction for each of the hazards as identified within the plan's risk assessment?	Section 5.4 and Appendix E (Table E-1)	Choose an item.
C5. Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction? (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))		
C5-a. Does the plan describe the criteria used for prioritizing actions?	Section 5.4 and Appendix E (Table E-2)	Choose an item.
C5-b. Does the plan provide the position, office, department or agency responsible for implementing/administrating the identified mitigation actions, as well as potential funding sources and expected time frame?	Section 5.5	Choose an item.

ELEMENT C REQUIRED REVISIONS
Required Revision**:** Click or tap here to enter text.

Element D: Plan Maintenance

Element D Requirements	Location in Plan (section and/or page number)	Met / Not Met
D1. Is there discussion of how each community will continue public participation in the plan maintenance process? (Requirement 44 CFR § 201.6(c)(4)(iii))		
D1-a. Does the plan describe how communities will continue to seek future public participation after the plan has been approved?	Section 6.1	Choose an item.
D2. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a five-year cycle)? (Requirement 44 CFR § 201.6(c)(4)(i))		
D2-a. Does the plan describe the process that will be followed to track the progress/status of the mitigation actions identified within the Mitigation Strategy, along with when this process will occur and who will be responsible for the process?	Section 6.2	Choose an item.
D2-b. Does the plan describe the process that will be followed to evaluate the plan for effectiveness? This process must identify the criteria that will be used to evaluate the information in the plan, along with when this process will occur and who will be responsible.	Section 6.2	Choose an item.
D2-c. Does the plan describe the process that will be followed to update the plan, along with when this process will occur and who will be responsible for the process?	Section 6.2	Choose an item.
D3. Does the plan describe a process by which each community will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement 44 CFR § 201.6(c)(4)(ii))		
D3-a. Does the plan describe the process the community will follow to integrate the ideas, information and strategy of the mitigation plan into other planning mechanisms?	Section 6.3	Choose an item.
D3-b. Does the plan identify the planning mechanisms for each plan participant into which the ideas, information and strategy from the mitigation plan may be integrated?	Section 6.3	Choose an item.
D3-c. For multi-jurisdictional plans, does the plan describe each participant's individual process for integrating information from the mitigation strategy into their identified planning mechanisms?	Not applicable.	Choose an item.

ELEMENT D REQUIRED REVISIONS
Required Revision: Click or tap here to enter text.

Element E: Plan Update

Element E Requirements	Location in Plan (section and/or page number)	Met / Not Met
E1. Was the plan revised to reflect changes in development? (Requirement 44 CFR § 201.6(d)(3))		
E1-a. Does the plan describe the changes in development that have occurred in hazard-prone areas that have increased or decreased each community's vulnerability since the previous plan was approved?	Section 7.1	Choose an item.
E2. Was the plan revised to reflect changes in priorities and progress in local mitigation efforts? (Requirement 44 CFR § 201.6(d)(3))		
E2-a. Does the plan describe how it was revised due to changes in community priorities?	Section 7.2	Choose an item.
E2-b. Does the plan include a status update for all mitigation actions identified in the previous mitigation plan?	Section 7.3	Choose an item.
E2-c. Does the plan describe how jurisdictions integrated the mitigation plan, when appropriate, into other planning mechanisms?	Section 7.4	Choose an item.

ELEMENT E REQUIRED REVISIONS
Required Revision: Click or tap here to enter text.

Element F: Plan Adoption

Element F Requirements	Location in Plan (section and/or page number)	Met / Not Met
F1. For single-jurisdictional plans, has the governing body of the jurisdiction formally adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))		
F1-a. Does the participant include documentation of adoption?	To be completed once plan is adopted.	Choose an item.
F2. For multi-jurisdictional plans, has the governing body of each jurisdiction officially adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))		
F2-a. Did each participant adopt the plan and provide documentation of that adoption?	Not applicable.	Choose an item.
ELEMENT F REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element G: High Hazard Potential Dams (Optional)

HHPD Requirements	Location in Plan (section and/or page number)	Met / Not Met
HHPD1. Did the plan describe the incorporation of existing plans, studies, reports and technical information for HHPDs?		
HHPD1-a. Does the plan describe how the local government worked with local dam owners and/or the state dam safety agency?	Click or tap here to enter text.	Choose an item.
HHPD1-b. Does the plan incorporate information shared by the state and/or local dam owners?	Click or tap here to enter text.	Choose an item.
HHPD2. Did the plan address HHPDs in the risk assessment?		
HHPD2-a. Does the plan describe the risks and vulnerabilities to and from HHPDs?	Click or tap here to enter text.	Choose an item.

HHPD Requirements	Location in Plan (section and/or page number)	Met / Not Met
HHPD2-b. Does the plan document the limitations and describe how to address deficiencies?	Click or tap here to enter text.	Choose an item.
HHPD3. Did the plan include mitigation goals to reduce long-term vulnerabilities from HHPDs?		
HHPD3-a. Does the plan address how to reduce vulnerabilities to and from HHPDs as part of its own goals or with other long-term strategies?	Click or tap here to enter text.	Choose an item.
HHPD3-b. Does the plan link proposed actions to reducing long-term vulnerabilities that are consistent with its goals?	Click or tap here to enter text.	Choose an item.
HHPD4-a. Did the plan include actions that address HHPDs and prioritize mitigation actions to reduce vulnerabilities from HHPDs?		
HHPD4-a. Does the plan describe specific actions to address HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD4-b. Does the plan describe the criteria used to prioritize actions related to HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD4-c. Does the plan identify the position, office, department or agency responsible for implementing and administering the action to mitigate hazards to or from HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD Required Revisions		
Required Revision**:** Click or tap here to enter text.		

Element H: Additional State Requirements (Optional)

Element H Requirements	Location in Plan (section and/or page number)	Met / Not Met
This space is for the State to include additional requirements.		
Click or tap here to enter text.	Click or tap here to enter text.	Choose an item.

Plan Assessment

These comments can be used to help guide your annual/regularly scheduled updates and the next plan update.

Element A. Planning Process

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element B. Risk Assessment

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element C. Mitigation Strategy

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element D. Plan Maintenance

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element E. Plan Update

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element G. HHPD Requirements (Optional)

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element H. Additional State Requirements (Optional)

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

APPENDIX B—PLANNING PROCESS

2024 EID Local Hazard Mitigation Plan

Newsom, Daniel <dnewsom@eid.org>

Mon 10/30/2023 11:06 AM

To:Newsom, Daniel <dnewsom@eid.org>

Good Morning,

The El Dorado Irrigation District is updating its hazard mitigation plan (HMP). By the end of this year, we will have identified and profiled hazards, analyzed risks and developed mitigation actions to reduce or eliminate these risks. The implementation of the mitigation actions, which include short- and long-term strategies, will be the end result of this process.

To learn more about hazard mitigation planning, please visit: https://www.fema.gov/emergency-managers/risk-management/hazard-mitigation-planning

To learn more about our plan, please follow our Facebook page: https://www.facebook.com/ElDoradoIrrigationDistrict/ or X (Twitter) posts: https://twitter.com/ElDoIrrigation

If you would like to participate in our planning process or have questions about our HMP, please feel free to contact me. I will send out a follow-up email when our Public Draft is available for review and comment.

Thanks,

Daniel Newsom, CSP
Safety and Security Officer
El Dorado Irrigation District
530-642-4186 Direct
DNewsom@EID.org

EID Draft Local Hazard Mitigation (LHMP) Plan

Newsom, Daniel <dnewsom@eid.org>

Wed 12/20/2023 4:59 PM

To:Newsom, Daniel <dnewsom@eid.org>

Good afternoon,

The El Dorado Irrigation District (EID) has updated its Local Hazard Mitigation Plan (LHMP). A LHMP is required by a federal law, known as the Disaster Mitigation Act of 2000 (DMA 2000), to receive certain types of FEMA grant funding.

The planning process took three months to complete. The plan addresses climate change, dam failure, drought, earthquake, flood, landslide, wildfire, and winter storm. For each hazard identified, short- and long-term strategies were developed to reduce or eliminate the hazard impact on EID. Strategies are based on the plan's risk assessment, assessments from recent disasters, FEMA success stories and best management practices, FEMA job aids, EID Capital Improvement Plan (CIP) 2024–2028 projects, and input from the planning team and other relevant practitioners.

The plan was organized to follow FEMA's Local Mitigation Planning Policy Guide, which demonstrates how hazard mitigation plans meet the DMA 2000 regulations. A copy of the guide can be found here:
https://www.fema.gov/sites/default/files/documents/fema_local-mitigation-planning-policy-guide_042022.pdf

The draft plan is online and available for review and comment through January 5, 2024. It can be found here:
https://www.eid.org/home/showpublisheddocument/16701/638386867564861500

If you have any questions about the plan or the planning process, please contact me via email.

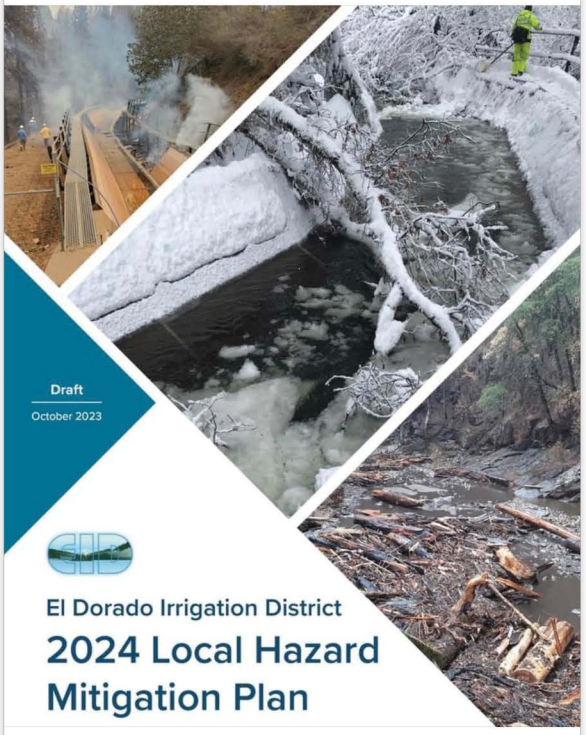
Thanks,

Daniel Newsom, CSP

Table B-1: Stakeholders

Agency / Organization	Name, Title
Alpine County	Clint Celio, Wildfire Project Coordinator
Amdor County	Sergeant Jeff Bellotti, Office of Emergency Services Coordinator
El Dorado County	Kristine Oase Guth, Emergency Preparedness and Response Program Manager Kyle Ericson, Water Agency
Placer County	Young Rodriguez, Emergency Services Coordinator
Sacramento County	George Booth, Senior Civil Engineer
City of Placerville	Dave Warren, Assistant City Manager
CAL FIRE Amdor - El Dorado Unit	Mike Blankenheim, Unit Chief
California Water Resources Control Board	Austin Peterson, Specialist
California DWR	TBD
Caltrans District 3	Steve Nelson, Chief Public Information Officer
California State Parks	Rich Adams, Acting Sierra District Senior Environmental Scientist
Sierra Nevada Conservancy	Chis Dallas, Central Area Representative
U.S. Forest Service - El Dorado National Forest Supervisor's Office	Joe Stout, Forest Supervisor
U.S. Bureau of Reclamation - Central California Area Office	Drew Lessard, Area Manager
El Dorado County Planning Services	Brendan Ferry, Principal Planner
City of Placerville Development Services, Planning Division	TBD, City Planner
El Dorado Community Foundation	William Roby, Executive Director
El Dorado County Fire Safe Council	TBD
El Dorado County Fire Protection District	Kathleen Freeman, Administrative Assistant and Board Clerk
El Dorado County Chamber of Commerce	Sylvia Rubio, Information Specialist
PG&E	Herbert Gong, Customer Relationship Manager
El Dorado Water Agency	Rebecca Guo, General Manager
South Tahoe Public Utility District	Shelly Barnes Thomsen, Director of Public and Legislative Affairs
Amdor Water Agency	Karen Gish, Risk Management Manager
Placer County Water Agency	Ben Ransom, Senior Environmental Scientist
Pioneer Community Energy	Gina Stasse-Vanacore, Director of Public Affairs, Marketing, and Programs
Georgetown Public Utility District	Adam Brown, Operations Manager
Cameron Park Community Services District	Jill Ritzen, General Manager
Grizzly Flats Community Services District	TBD
El Dorado County Health & Human Services Agency - Community Services	Timalynn Jaynes, Deputy Director

www.EID.org



El Dorado Irrigation District

2024 Local Hazard Mitigation Plan

Like Comment Share

5

1 Share

Most relevant

Denny Radford · Follow
Thank you so much for the communication.
2d Like Reply 1

Gay Willyard
Thanks
2d Like Reply

El Dorado Irrigation District
Monday at 5:45 PM ·

EID is beginning the process of updating its Hazard Mitigation Plan (HMP). We plan, by the end of this year, to identify and profile potential hazards, analyze risks and develop mitigation actions to reduce or eliminate these risks.

Please follow us here on Facebook where we will post our website link to the draft plan when it is released, and include information on the public review and comment period. Questions can be emailed to DNewsom@EID.org subject HMP.

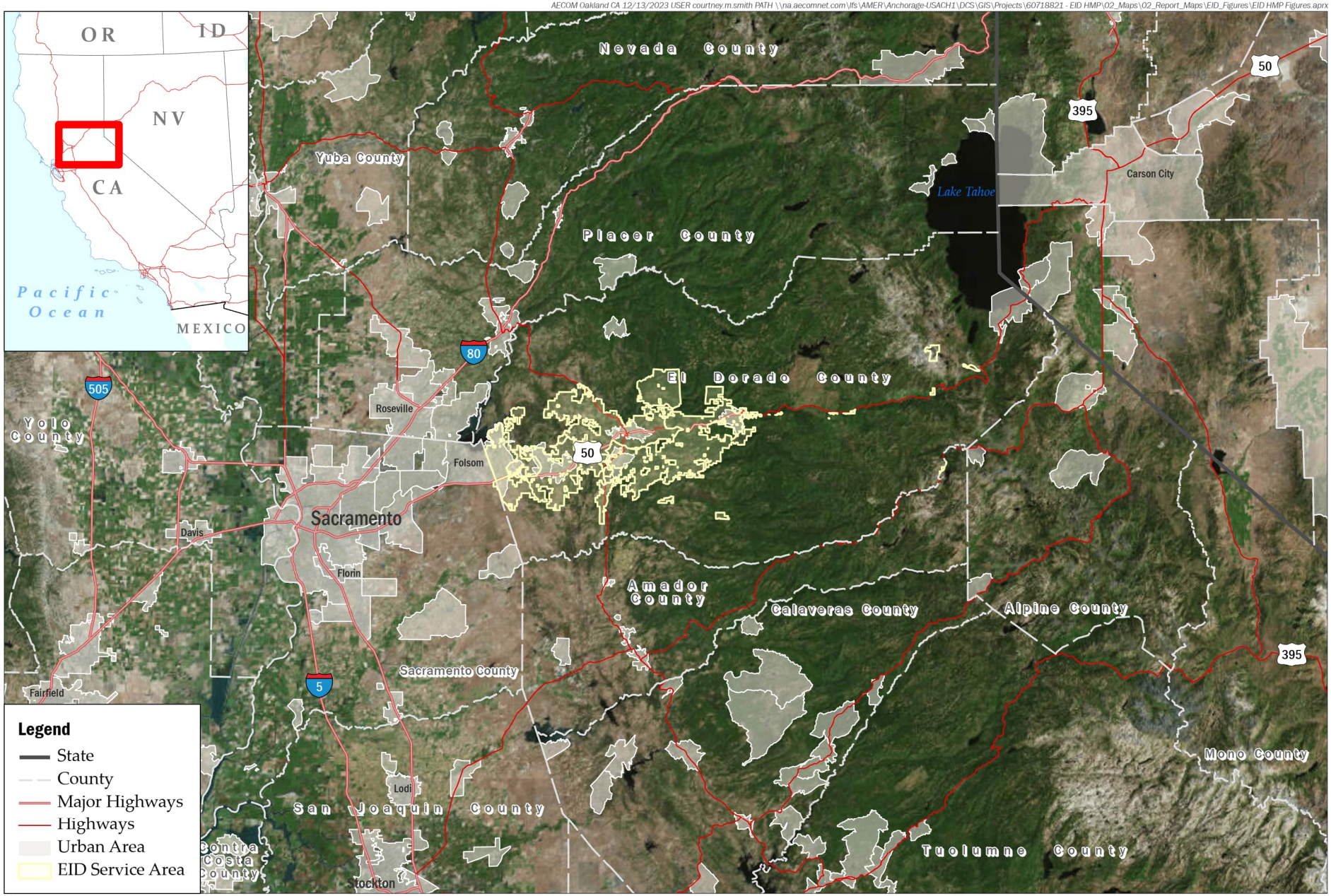
www.EID.org

X › ElDoIrrigation

El Dorado Irrigation District

EID is beginning the process of updating its Hazard Mitigation Plan (HMP). The link to the draft plan and public review/comment period will be posted when it is released. Questions can be emailed to DNewsom@EID.org subject HMP.
www.EID.org

APPENDIX C—FIGURES



U.S. Census Bureau Tiger/LINE 2016
Basemap: World Imagery (Clarity): Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community

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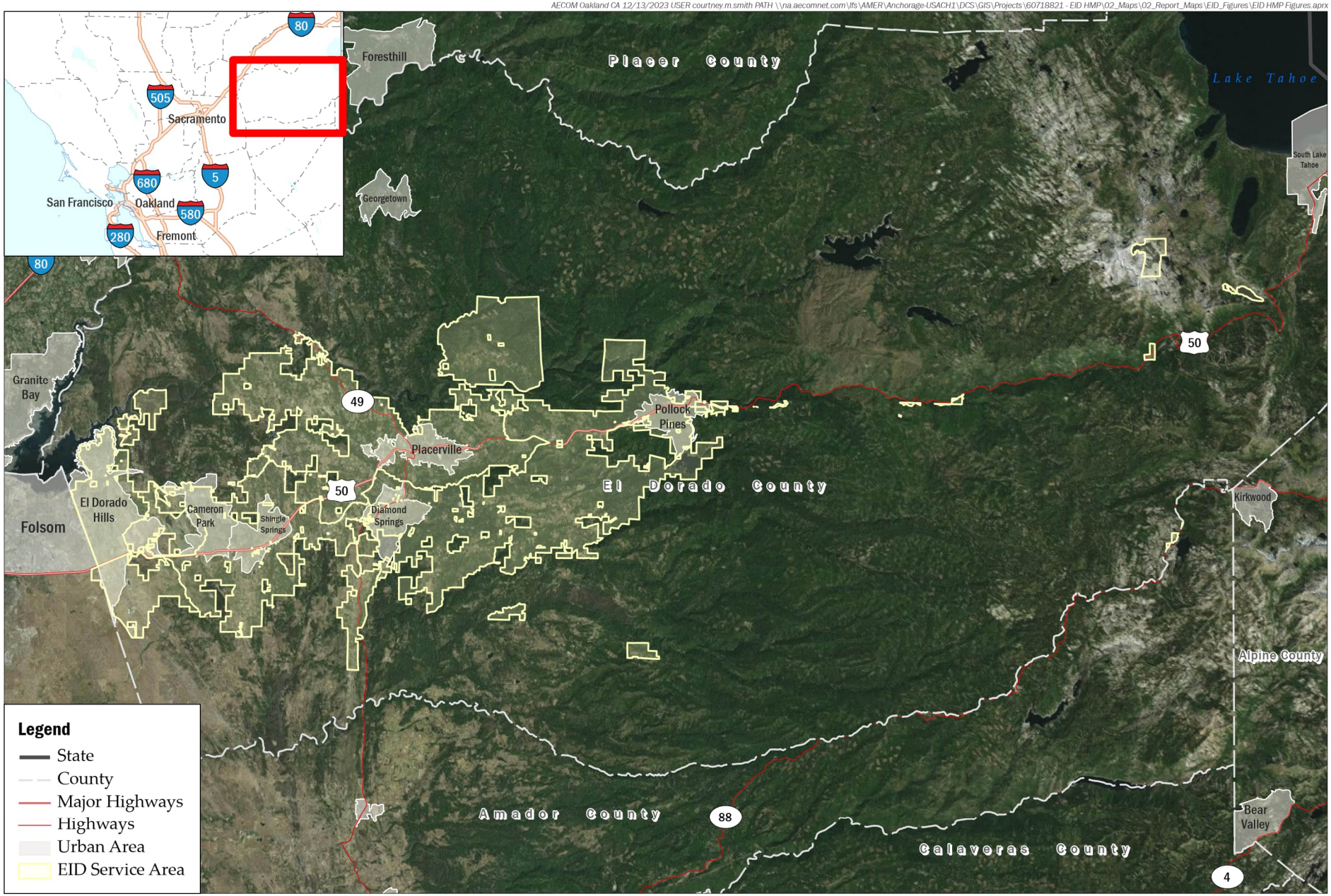
El Dorado Irrigation District 2024 Local Hazard Mitigation Plan

OVERVIEW MAP

Figure C-1



El Dorado Irrigation District 2023
Basemap: World Imagery (Clarity): Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community

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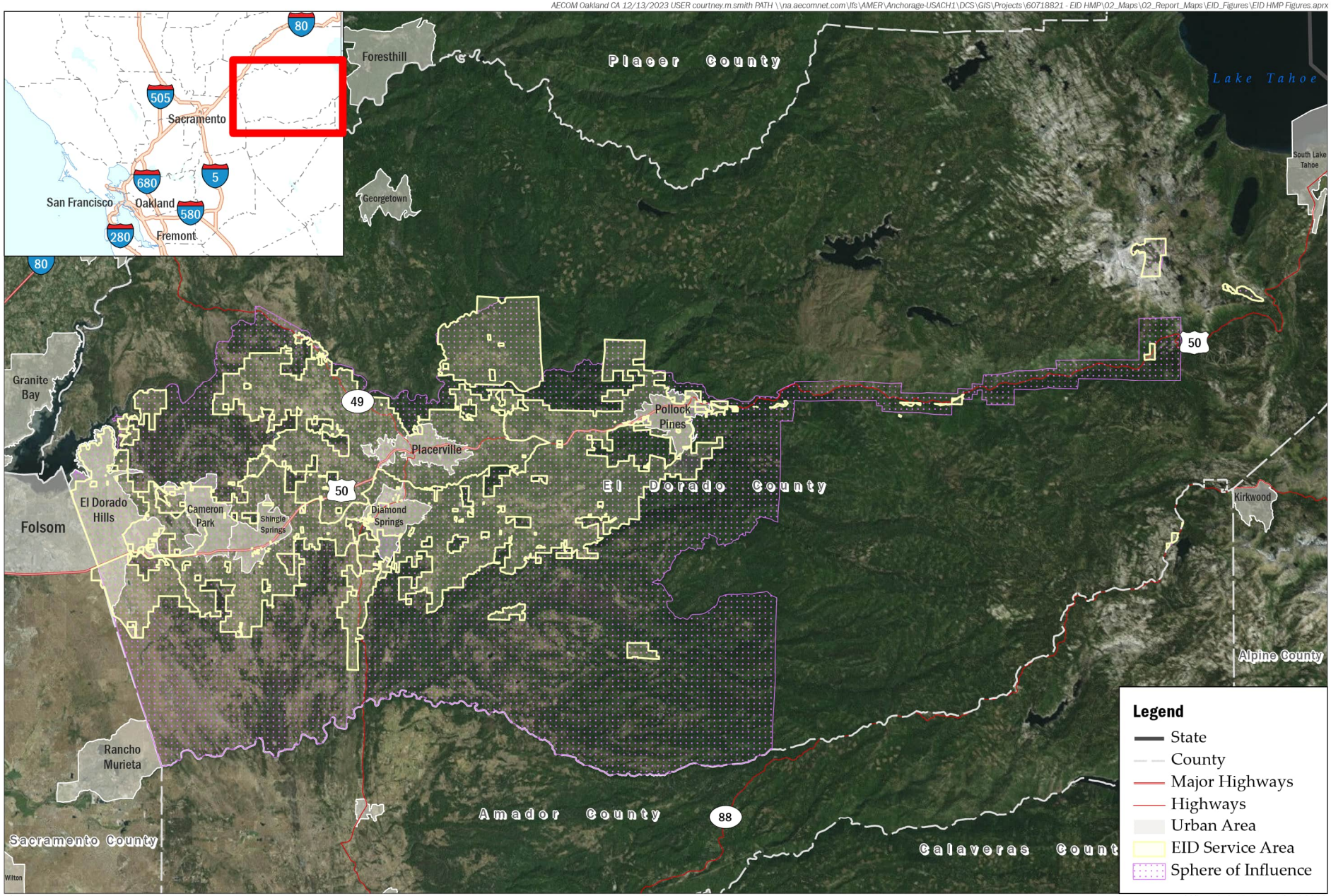
EID SERVICE AREA

Figure C-2



El Dorado Irrigation District 2023
Basemap: World Imagery (Clarity): Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community

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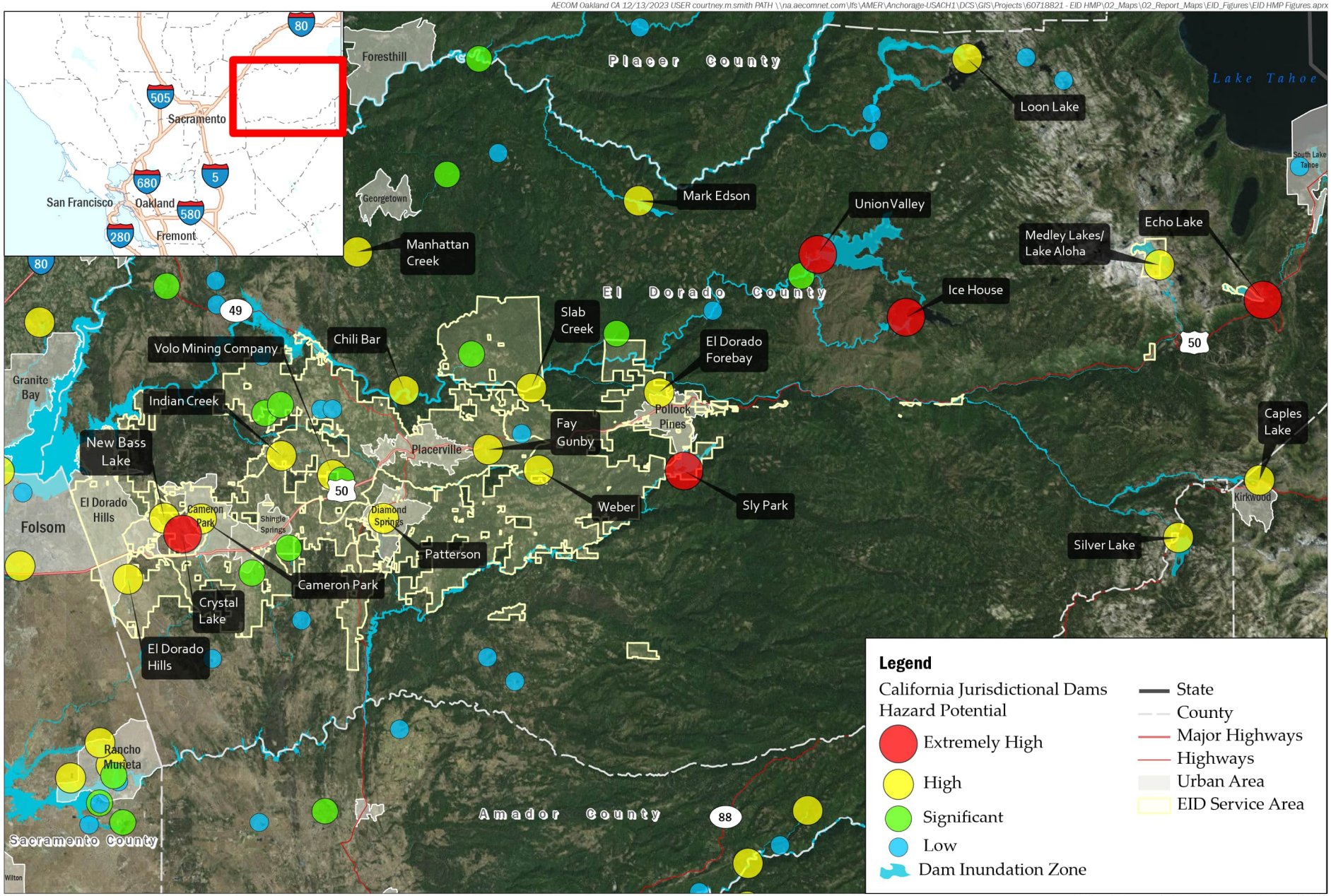
El Dorado Irrigation District 2024 Local Hazard Mitigation Plan

SPHERE OF INFLUENCE

Figure C-3

AECOM Oakland CA 12/13/2023 USER courtney.m.smith PATH \\na.aecomnet.com\lfs\AMER\Anchorage-USACH1\DCS\GIS\Projects\60718821 - EID HMP\02_Maps\02_Report_Maps\EID_Figures\EID HMP Figures.aprx



California Governor's Office of Emergency Services (2020)
California Department of Water Resources (2023)
Basemap: World Imagery (Clarity): Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community

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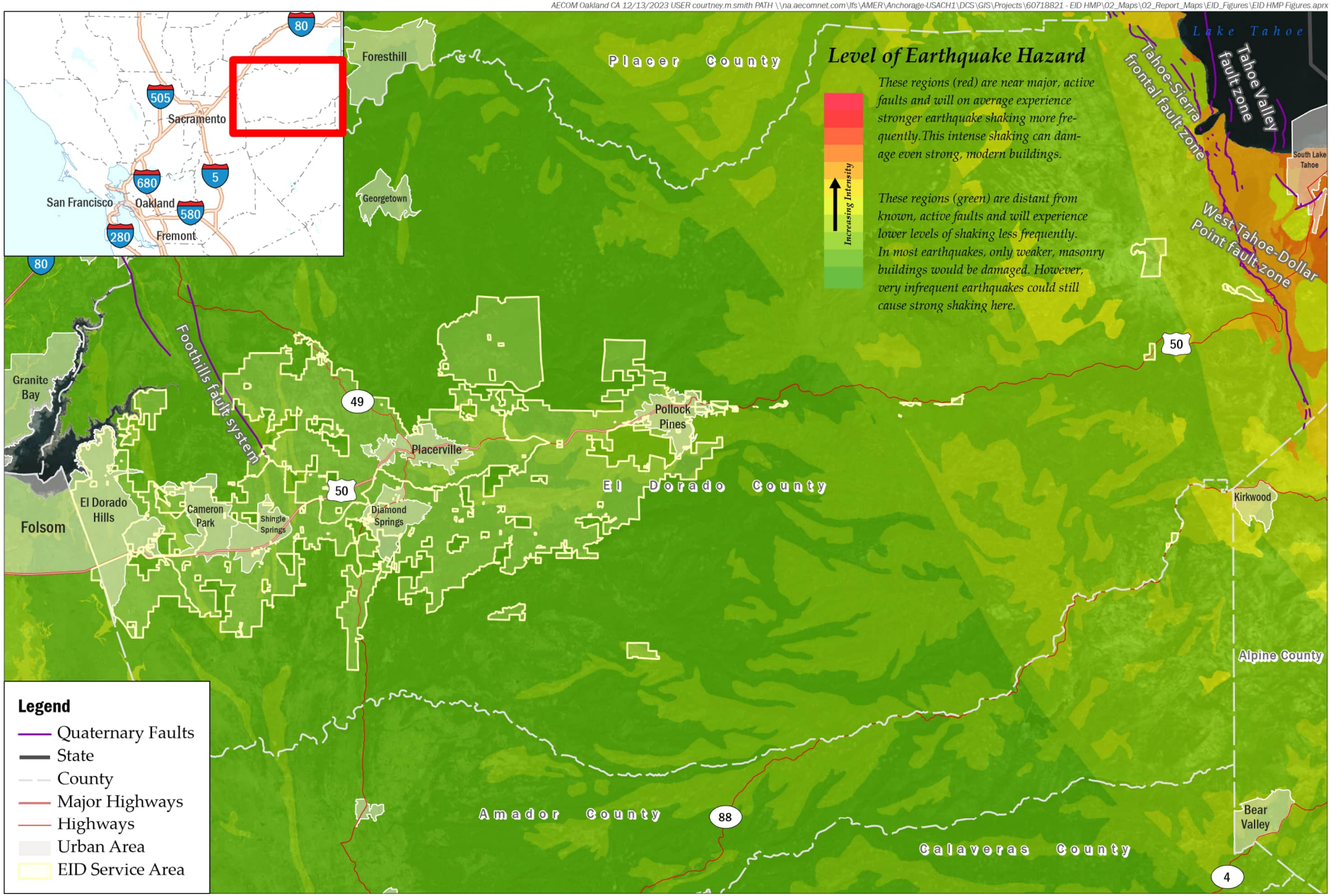
DAM BREACH INUNDATION AREAS

Figure C-4



USGS (2022) California Geological Survey (2016)
Basemap: World Imagery (Clarity): Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community
MS48_ShakingPotential: D. Branum, R. Chen, C. Wills (California Geological Survey); M. Petersen (United States Geological Survey).

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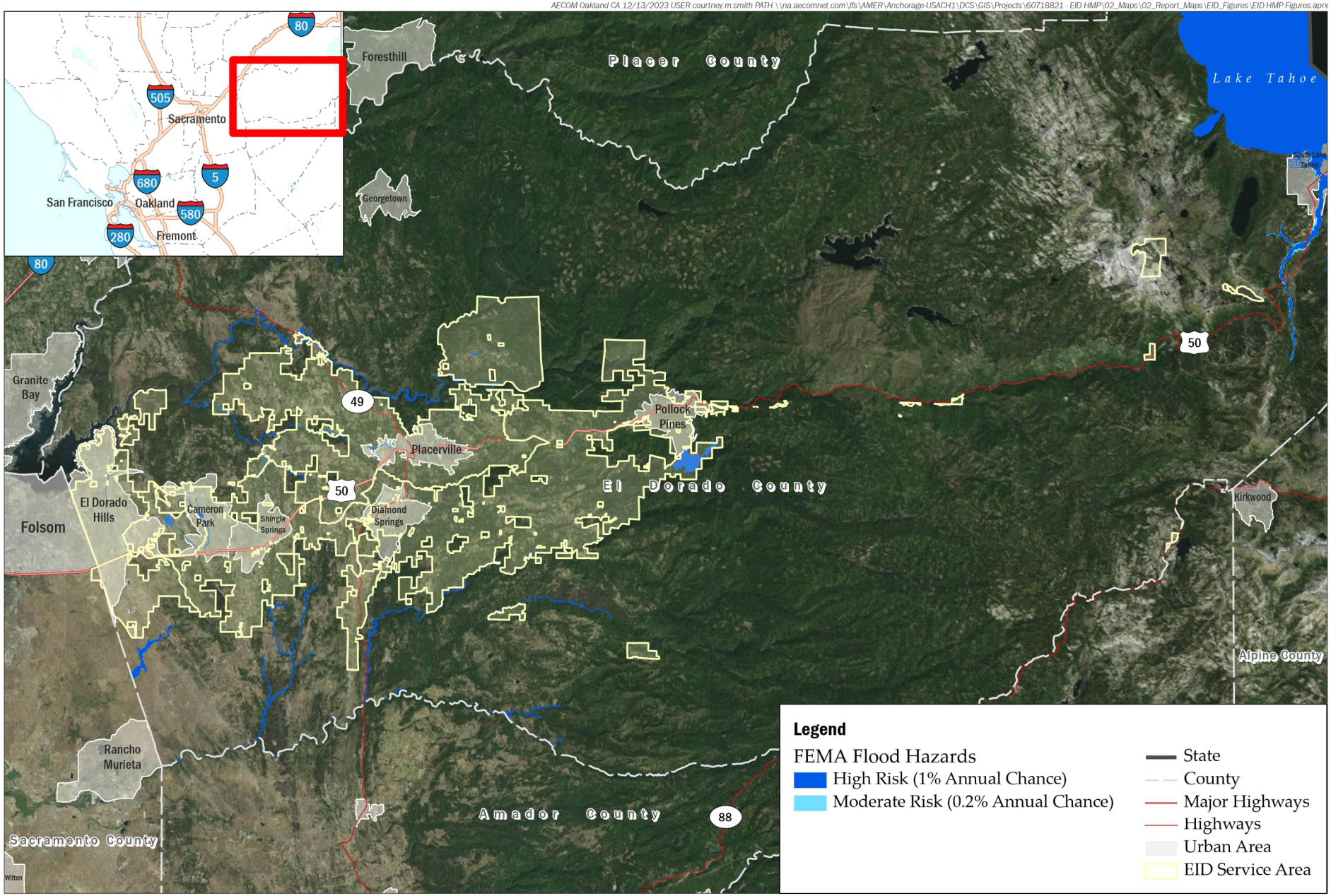
EARTHQUAKE SHAKING POTENTIAL

Figure C-5



FEMA Digital Flood Insurance Rate Map (2022)
Basemap: World Imagery (Clarity): Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community

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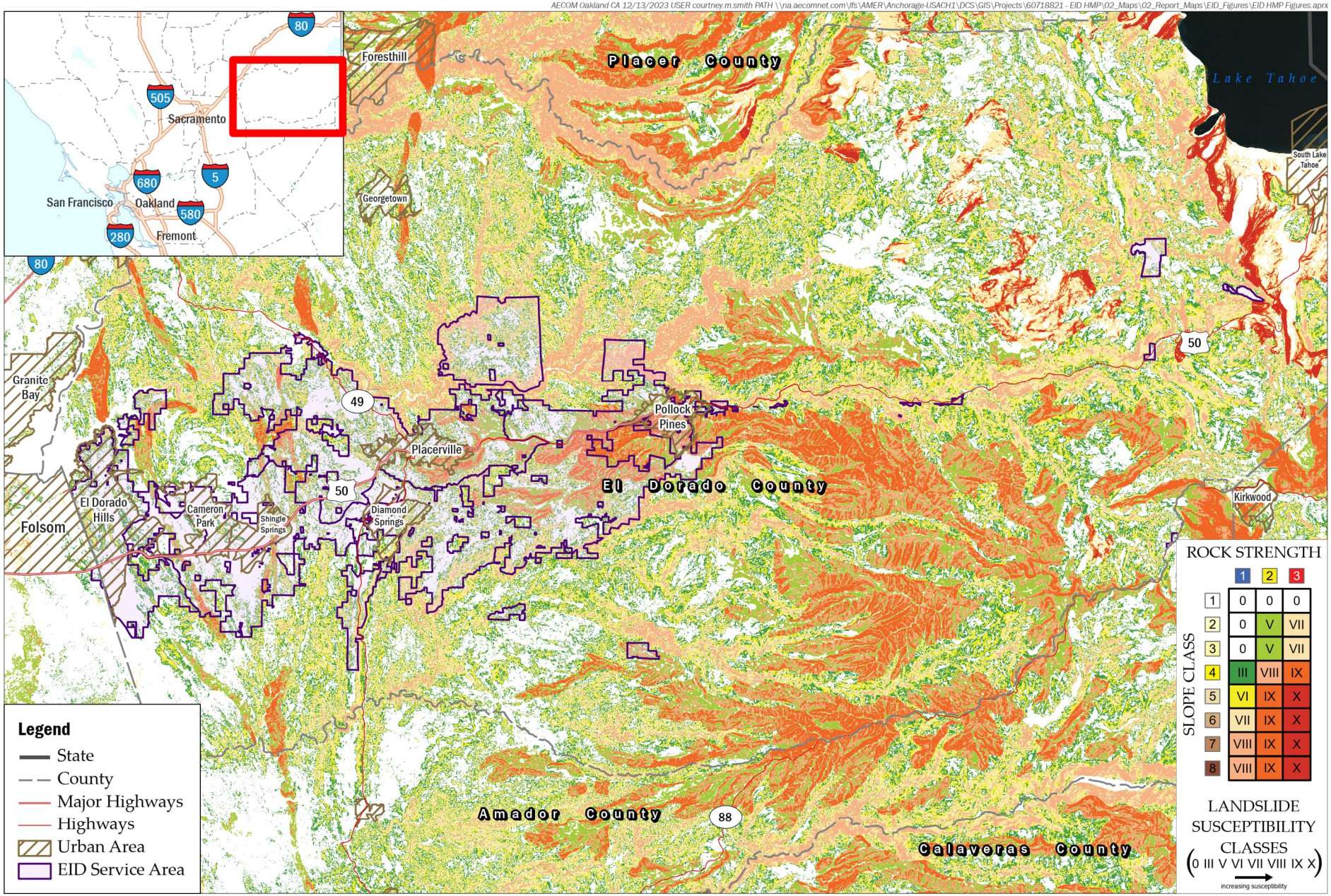
SPECIAL FLOOD HAZARD AREAS

Figure C-6



California Geological Survey (2011)

Basemap: World Imagery (Clarity): Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community

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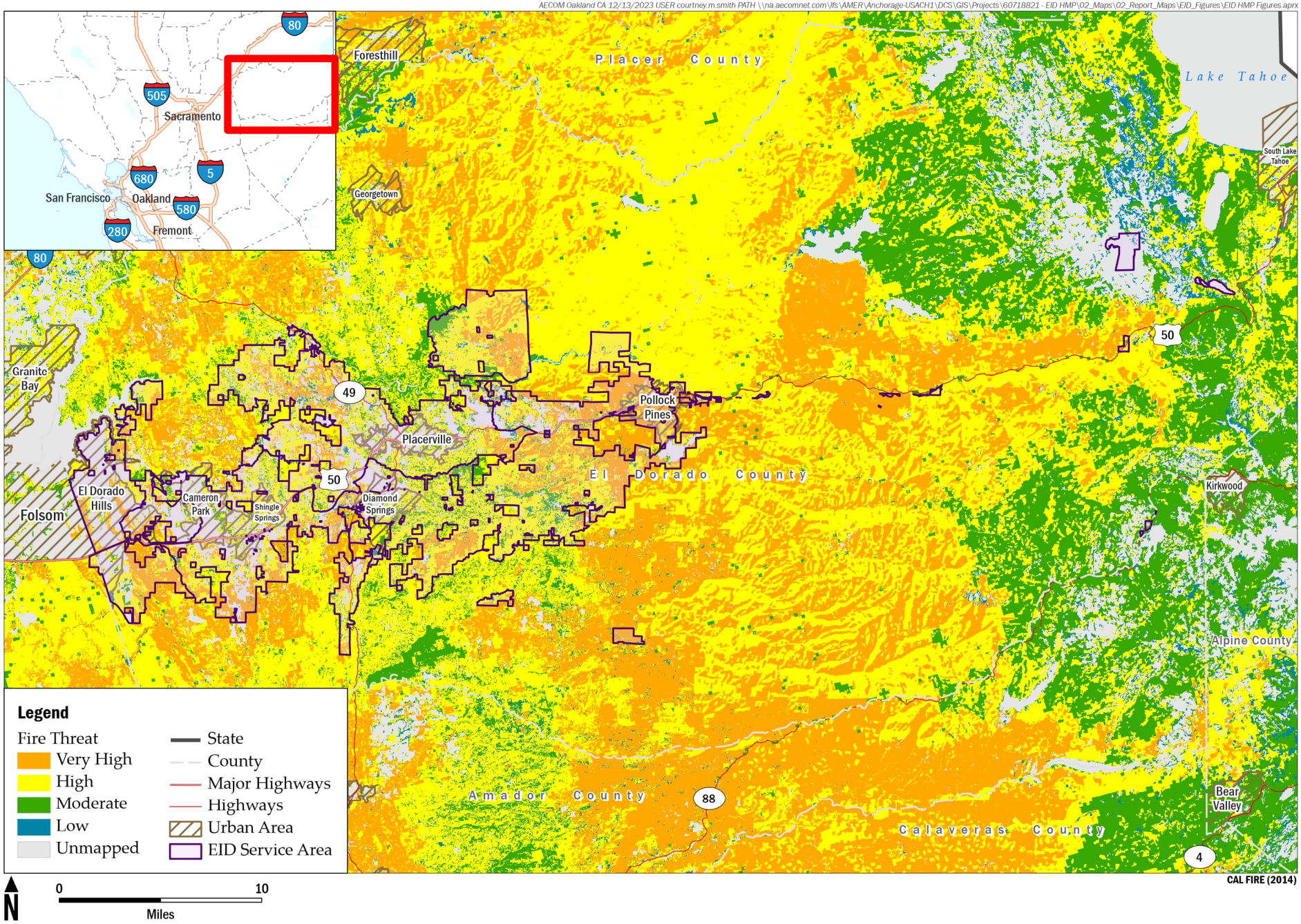
DEEP-SEATED LANDSLIDE SUSCEPTIBILITY

Figure C-7



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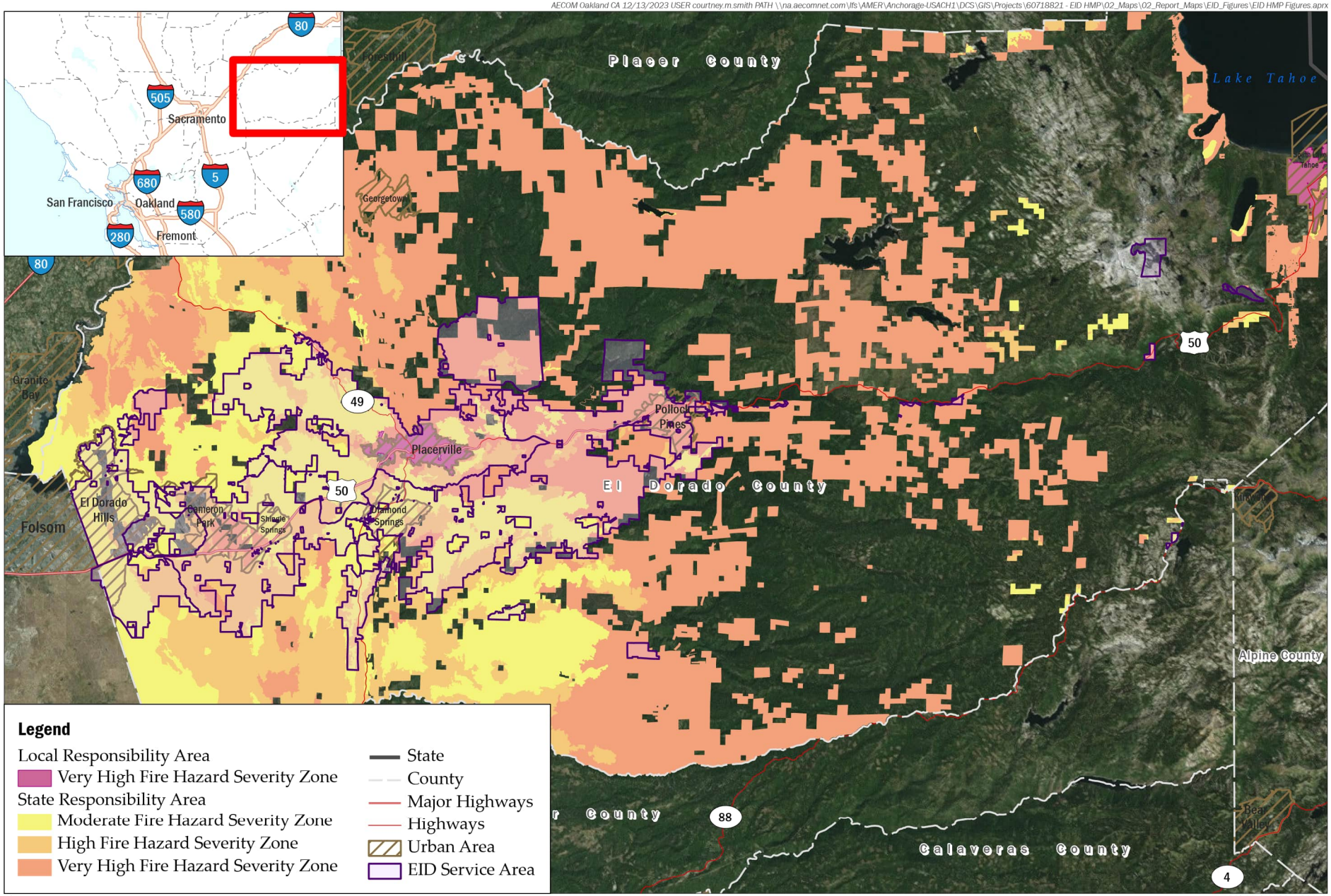
DRAFT

FIRE THREAT

Figure C-8



CAL FIRE (2007, 2008)
Basemap: World Imagery (Clarity): Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community

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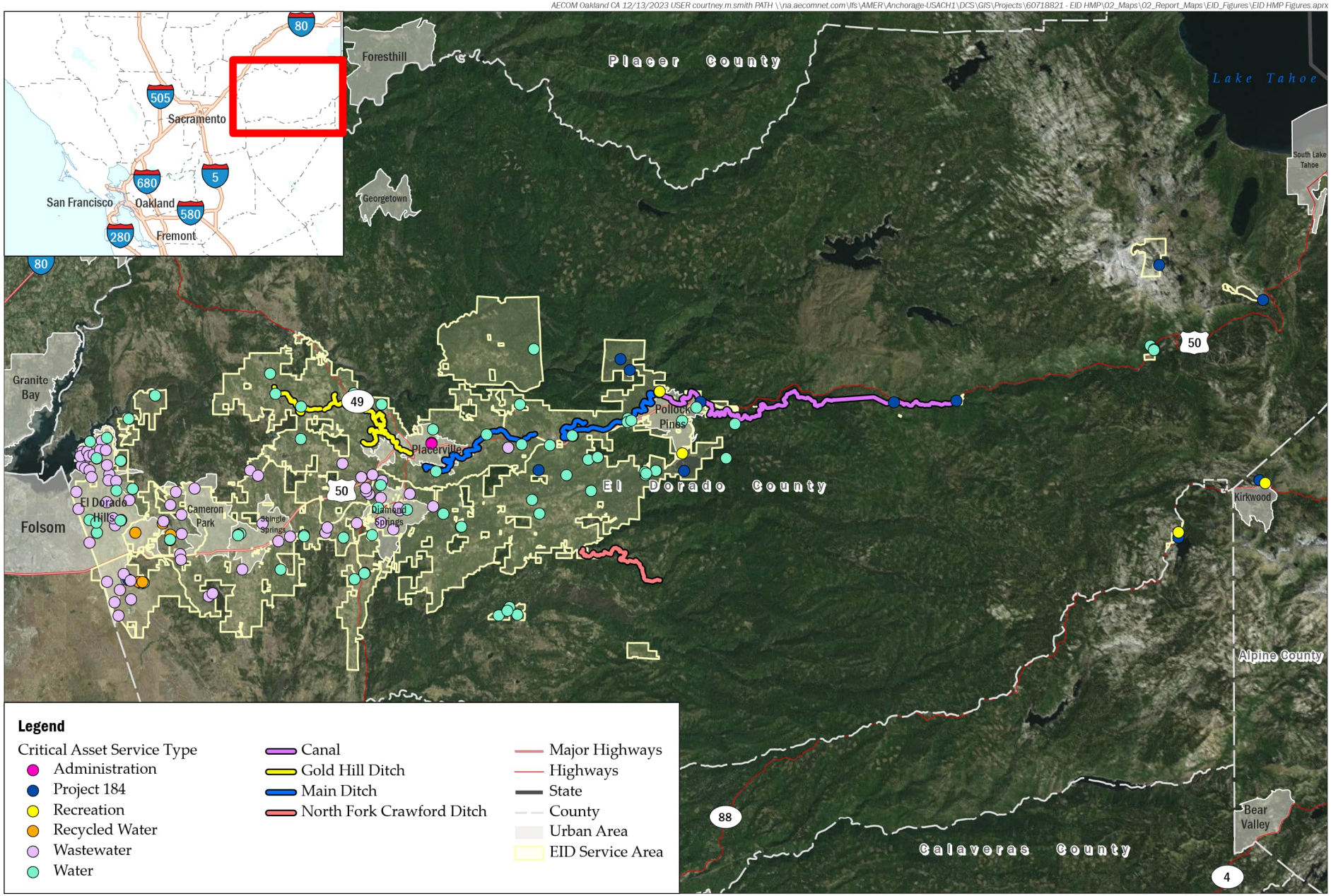
El Dorado Irrigation District 2024 Local Hazard Mitigation Plan

FIRE HAZARD SEVERITY ZONES

Figure C-9



El Dorado Irrigation District 2023
Basemap: World Imagery (Clarity): Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community

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MAJOR EID INFRASTRUCTURE

Figure C-10

APPENDIX D—VULNERABILITY TABLES

Table D-1: EID Service Area Hazard Vulnerability

EID Service Area (231.97 Sq. Miles)			
Hazard	**Hazard Area**	**Miles in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	231.97	100.00
Dam failure	Dam breach inundation zone	10.88	4.69
Drought	Meteorological and hydrological drought	231.97	100.00
Earthquake	Stronger earthquake shaking, more frequently	0.01	0.00
	Lower earthquake shaking, less frequently	231.95	99.99
Flood	High-risk flood zone	2.33	1.00
	Moderate-risk flood zone	0.08	0.03
Landslide	Very high deep-seated landslide susceptibility	27.97	12.06
Wildfire	High and very high fire threat	153.10	66.00
	High and very high FHSZ	115.59	49.83
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	231.97	100.00

Table D-2: Sphere of Influence

Sphere of Influence (600.82 Sq. Miles)			
Hazard	**Hazard Area**	**Miles in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	600.82	100.00
Dam failure	Dam breach inundation zone	33.08	5.51
Drought	Meteorological and hydrological drought	600.82	100.00
Earthquake	Stronger earthquake shaking, more frequently	0.01	00.00
	Lower earthquake shaking, less frequently	600.79	100.00
Flood	High-risk flood zone	7.67	1.28
	Moderate-risk flood zone	0.08	0.01
Landslide	Very high deep-seated landslide susceptibility	84.81	14.12
Wildfire	High and very high fire threat	481.18	80.09
	High and very high FHSZ	296.59	49.36
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	600.82	100.00

Table D-3: 2020 EID Service Area Population Hazard Vulnerability

2020 EID Service Area Population (126,527)			
Hazard	**Hazard Area**	**People in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	126,527	100.00
Dam failure	Dam breach inundation zone	912	0.72
Drought	Meteorological and hydrological drought	126,527	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	126,527	100.00
Flood	High-risk flood zone	5,451	4.31
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	12,612	9.97
Wildfire	High and very high fire threat	81,663	64.54
	High and very high FHSZ	48,939	38.68
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	126,527	100.00

Table D-4: Severely Disadvantaged Communities

Severely Disadvantaged Communities (3)			
Hazard	**Hazard Area**	**Communities in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	3	100.00
Dam failure	Dam breach inundation zone	2	66.67
Drought	Meteorological and hydrological drought	3	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	3	100.00
Flood	High-risk flood zone	1	33.33
	Moderate-risk flood zone	1	33.33
Landslide	Very high deep-seated landslide susceptibility	3	100.00
Wildfire	High and very high fire threat	3	100.00
	High and very high FHSZ	3	100.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	3	100.00

Table D-5: Headquarters Hazard Vulnerability

Headquarters (1)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	1	100.00
Dam failure	Dam breach inundation zone	0	0.00
Drought	Meteorological and hydrological drought	1	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	1	100.00
Flood	High-risk flood zone	1	100.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	0	0.00
Wildfire	High and very high fire threat	1	100.00
	High and very high FHSZ	1	100.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	1	100.00

Table D-6: Storage Building Hazard Vulnerability

Storage Building (1)*			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	1	100.00
Dam failure	Dam breach inundation zone	0	0.00
Drought	Meteorological and hydrological drought	1	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	1	100.00
Flood	High-risk flood zone	1	100.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	0	0.00
Wildfire	High and very high fire threat	1	100.00
	High and very high FHSZ	1	100.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	1	100.00

* Notes: Future

Table D-7: Fleet Maintenance Building Hazard Vulnerability

Fleet Maintenance Building (1)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	1	100.00
Dam failure	Dam breach inundation zone	0	0
Drought	Meteorological and hydrological drought	1	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	1	100.00
Flood	High-risk flood zone	1	100.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	1	100.00
Wildfire	High and very high fire threat	1	100.00
	High and very high FHSZ	1	100.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	1	100.00

Table D-8: Water Treatment Plants Hazard Vulnerability

Water Treatment Plants (5)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	5	100.00
Dam failure	Dam breach inundation zone	1	20.00
Drought	Meteorological and hydrological drought	5	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	5	100.00
Flood	High-risk flood zone	1	20.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	3	60.00
Wildfire	High and very high fire threat	4	80.00
	High and very high FHSZ	3	60.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	5	100.00

Table D-9: Water Pumping Stations Hazard Vulnerability

Water Pumping Stations (45)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	45	100.00
Dam failure	Dam breach inundation zone	6	13.33
Drought	Meteorological and hydrological drought	45	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	45	100.00
Flood	High-risk flood zone	3	6.67
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	28	62.22
Wildfire	High and very high fire threat	44	97.78
	High and very high FHSZ	31	68.89
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	45	100.00

Table D-10: Water Storage Reservoirs Hazard Vulnerability

Water Storage Reservoirs (36)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	36	100.00
Dam failure	Dam breach inundation zone	2	5.56
Drought	Meteorological and hydrological drought	36	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	36	100.00
Flood	High-risk flood zone	1	2.78
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	25	69.44
Wildfire	High and very high fire threat	36	100.00
	High and very high FHSZ	27	75.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	36	100.00

Table D-11: Main Ditch Vulnerability

EID Main Ditch (17.73 miles)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	17.73	100.00
Dam failure	Dam breach inundation zone	0.02	0.11
Drought	Meteorological and hydrological drought	17.73	100.00
Earthquake	Stronger earthquake shaking, more frequently	0.00	0.00
	Lower earthquake shaking, less frequently	17.73	100.00
Flood	High-risk flood zone	0.00	0.00
	Moderate-risk flood zone	0.00	0.00
Landslide	Very high deep-seated landslide susceptibility	5.81	32.77
Wildfire	High and very high fire threat	10.83	61.08
	High and very high FHSZ	16.33	92.10
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	17.73	100.00

Table D-12: North Fork Crawford Ditch Vulnerability

North Fork Crawford Ditch (7.48 miles)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	7.48	100.00
Dam failure	Dam breach inundation zone	0.00	0.00
Drought	Meteorological and hydrological drought	7.48	100.00
Earthquake	Stronger earthquake shaking, more frequently	0.00	0.00
	Lower earthquake shaking, less frequently	7.48	100.00
Flood	High-risk flood zone	0.00	0.00
	Moderate-risk flood zone	0.00	0.00
Landslide	Very high deep-seated landslide susceptibility	0.20	2.67
Wildfire	High and very high fire threat	7.11	95.05
	High and very high FHSZ	1.49	19.92
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	7.48	100.00

Table D-13: Gold Hill Ditch Vulnerability

Gold Hill Ditch (15.12 miles)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	15.12	100.00
Dam failure	Dam breach inundation zone	0.00	0.00
Drought	Meteorological and hydrological drought	15.12	100.00
Earthquake	Stronger earthquake shaking, more frequently	0.00	0.00
	Lower earthquake shaking, less frequently	15.12	100.00
Flood	High-risk flood zone	0.26	1.72
	Moderate-risk flood zone	0.00	0.00
Landslide	Very high deep-seated landslide susceptibility	0.08	0.53
Wildfire	High and very high fire threat	8.89	58.80
	High and very high FHSZ	4.09	27.05
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	15.12	100.00

Table D-14: Tunnels Hazard Vulnerability

Tunnels (2)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	2	100.00
Dam failure	Dam breach inundation zone	0	0.00
Drought	Meteorological and hydrological drought	2	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	2	100.00
Flood	High-risk flood zone	0	0.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	2	100.00
Wildfire	High and very high fire threat	2	100.00
	High and very high FHSZ	2	100.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	2	100.00

Table D-15: Folsom Lake Intake Hazard Vulnerability

Folsom Lake Intake (1)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	1	100.00
Dam failure	Dam breach inundation zone	1	100.00
Drought	Meteorological and hydrological drought	1	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	1	100.00
Flood	High-risk flood zone	0	0.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	0	0.00
Wildfire	High and very high fire threat	1	100.00
	High and very high FHSZ	0	0.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	1	100.00

Table D-16: Recycled Water Treatment Plants Hazard Vulnerability

Recycled Water Treatment Plants (2)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	2	100.00
Dam failure	Dam breach inundation zone	2	100.00
Drought	Meteorological and hydrological drought	2	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	2	100.00
Flood	High-risk flood zone	0	0.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	1	50.00
Wildfire	High and very high fire threat	2	100.00
	High and very high FHSZ	1	50.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	2	100.00

Table D-17: Recycled Water Pumping Stations Hazard Vulnerability

Recycled Water Pumping Stations (3)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	3	100.00
Dam failure	Dam breach inundation zone	1	33.33
Drought	Meteorological and hydrological drought	3	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	3	100.00
Flood	High-risk flood zone	1	33.33
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	1	33.33
Wildfire	High and very high fire threat	3	100.00
	High and very high FHSZ	1	33.33
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	3	100.00

Table D-18: Recycled Water Storage Reservoirs Hazard Vulnerability

Recycled Water Storage Reservoirs (4)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	4	100.00
Dam failure	Dam breach inundation zone	0	0.00
Drought	Meteorological and hydrological drought	4	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	4	100.00
Flood	High-risk flood zone	0	0.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	1	25.00
Wildfire	High and very high fire threat	4	100.00
	High and very high FHSZ	2	50.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	4	100.00

Table D-19: Wastewater Treatment Plants Hazard Vulnerability

Wastewater Treatment Plants (4)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	4	100.00
Dam failure	Dam breach inundation zone	3	75.00
Drought	Meteorological and hydrological drought	4	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	4	100.00
Flood	High-risk flood zone	1	25.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	3	75.00
Wildfire	High and very high fire threat	4	100.00
	High and very high FHSZ	2	50.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	4	100.00

Table D-20: Wastewater Lift Stations Hazard Vulnerability

Wastewater Lift Stations (60)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	60	100.00
Dam failure	Dam breach inundation zone	15	25.00
Drought	Meteorological and hydrological drought	60	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	60	100.00
Flood	High-risk flood zone	5	8.33
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	19	31.67
Wildfire	High and very high fire threat	60	100.00
	High and very high FHSZ	27	45.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	60	100.00

Table D-21: Solar Plants Hazard Vulnerability

Solar Plants (2)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	2	100.00
Dam failure	Dam breach inundation zone	2	100.00
Drought	Meteorological and hydrological drought	2	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	2	100.00
Flood	High-risk flood zone	0	0.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	1	50.00
Wildfire	High and very high fire threat	2	100.00
	High and very high FHSZ	2	100.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	2	100.00

Table D-22: Project 184 Reservoirs Hazard Vulnerability

Reservoirs (4)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	4	100.00
Dam failure	Dam breach inundation zone	4	100.00
Drought	Meteorological and hydrological drought	4	100.00
Earthquake	Stronger earthquake shaking, more frequently	1	25.00
	Lower earthquake shaking, less frequently	3	75.00
Flood	High-risk flood zone	0	0.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	2	50.00
Wildfire	High and very high fire threat	2	50.00
	High and very high FHSZ	0	0.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	4	100.00

Table D-23: Project 184 Dams Hazard Vulnerability

Dams (5)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	5	100.00
Dam failure	Dam breach inundation zone	5	100.00
Drought	Meteorological and hydrological drought	5	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	5	100.00
Flood	High-risk flood zone	1	20.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	4	80.00
Wildfire	High and very high fire threat	5	100.00
	High and very high FHSZ	4	80.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	5	100.00

Table D-24: El Dorado Powerhouse Hazard Vulnerability

El Dorado Powerhouse (1)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	1	100.00
Dam failure	Dam breach inundation zone	1	100.00
Drought	Meteorological and hydrological drought	1	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	1	100.00
Flood	High-risk flood zone	0	0.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	1	100.00
Wildfire	High and very high fire threat	1	100.00
	High and very high FHSZ	0	0.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	1	100.00

Table D-25: El Dorado Penstock Hazard Vulnerability

El Dorado Penstock (1)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	1	100.00
Dam failure	Dam breach inundation zone	0	0.00
Drought	Meteorological and hydrological drought	1	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	1	100.00
Flood	High-risk flood zone	0	0.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	1	100.00
Wildfire	High and very high fire threat	1	100.00
	High and very high FHSZ	1	100.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	1	100.00

Table D-26: Project 184 Camps Hazard Vulnerability

Camps (2)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	2	100.00
Dam failure	Dam breach inundation zone	1	50.00
Drought	Meteorological and hydrological drought	2	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	2	100.00
Flood	High-risk flood zone	0	0.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	2	100.00
Wildfire	High and very high fire threat	2	100.00
	High and very high FHSZ	2	100.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	2	100.00

Table D-27: El Dorado Canal Vulnerability

El Dorado Canal (21.25 miles)			
Hazard	**Hazard Area**	**Miles in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	21.25	100.00
Dam failure	Dam breach inundation zone	0.56	2.64
Drought	Meteorological and hydrological drought	21.25	100.00
Earthquake	Stronger earthquake shaking, more frequently	0.00	0.00
	Lower earthquake shaking, less frequently	21.25	100.00
Flood	High-risk flood zone	0.00	0.00
	Moderate-risk flood zone	0.00	0.00
Landslide	Very high deep-seated landslide susceptibility	5.53	26.02
Wildfire	High and very high fire threat	20.71	97.46
	High and very high FHSZ	7.38	34.73
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	21.25	100.00

Table D-28: Sly Park Recreation Area / Jenkinson's Lake Hazard Vulnerability

Sly Park Recreation Area (2.82 Sq. Miles)			
Hazard	**Hazard Area**	**Miles in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	2.82	100.00
Dam failure	Dam breach inundation zone	1.03	36.52
Drought	Meteorological and hydrological drought	2.82	100.00
Earthquake	Stronger earthquake shaking, more frequently	0.00	0.00
	Lower earthquake shaking, less frequently	2.82	100.00
Flood	High-risk flood zone	1.07	37.94
	Moderate-risk flood zone	0.00	0.00
Landslide	Very high deep-seated landslide susceptibility	1.00	35.46
Wildfire	High and very high fire threat	1.59	56.38
	High and very high FHSZ	1.57	55.67
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	2.82	100.00

Table D-29: Day-Use Area Hazard Vulnerability

Day-Use Area (4)			
Hazard	**Hazard Area**	**# in Hazard Area**	**% in Hazard Area**
Climate change	Increased temperature and extreme precipitation	4	100.00
Dam failure	Dam breach inundation zone	4	100.00
Drought	Meteorological and hydrological drought	4	100.00
Earthquake	Stronger earthquake shaking, more frequently	0	0.00
	Lower earthquake shaking, less frequently	4	100.00
Flood	High-risk flood zone	1	20.00
	Moderate-risk flood zone	0	0.00
Landslide	Very high deep-seated landslide susceptibility	2	50.00
Wildfire	High and very high fire threat	3	75.00
	High and very high FHSZ	2	50.00
Winter storm	Snow, sleet, freezing rain, high winds, and cold temperatures	4	100.00

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APPENDIX E—MITIGATION ACTIONS AND PRIORITIZATION PROCESS

Table E-1: Draft Mitigation Action List

Water Facility Generators	
Description	Purchase and install generators for eight water pump stations (priority for Gold County and Valley View pump stations) to provide continual power during utility power outages.
Hazard(s)	Climate change and wildfire
Building / infrastructure	Existing
Benefits / costs	The project will provide continual power for critical infrastructure. The district successfully applied for HMGP to provide a federal cost share for emergency backup generator installations at 15 remote district facilities. Total project estimate: $764,307 Additional funding required: $457,959
Priority	EID CIP 2024–2028 priority: 1
Reservoir 1 Storage Replacement	
Description	Replace the District's hypalon covers which have exceeded their useful life and are vulnerable to wildfire, as demonstrated by the loss of several hypalon covers.
Hazard(s)	Wildfire
Building / infrastructure	Existing
Benefits / costs	The project will increase service reliability. The Basis of Design Report will be complete in early 2024. Design will start in late 2024, to be complete in early 2025. Construction is expected to be completed in 2026. This project is for constructing Reservoir 1 regardless of the grant. If the District obtains the grant to also replace the Pollock Pines reservoir. Total project estimate: $9,252,762 Additional funding required: $8,996,337
Priority	EID CIP 2024–2028 priority: 2
Reservoir 1 Water Treatment Plant Generator Replacement	
Description	Purchase a new generator to replace the generator at Reservoir 1. It is difficult to get parts for the generator as the unit is obsolete and past its life expectancy, in fact the district can no longer purchase parts for the generator, which means that any repairs to the generator require a custom repair. In addition, the generator did not pass the load bank test in 2022.
Hazard(s)	Climate change and wildfire
Building / infrastructure	Existing

Benefits / costs	The district depends on this generator to keep the Reservoir 1 Water Treatment Plant operating during planned and unplanned power outages. Total project estimate: $525,000 Additional funding required: $490,000
Priority	EID CIP 2024–2028 priority: 2
Wastewater Facility Generators	
Description	Purchase and install generators for seven wastewater lift stations (priority for Meadow Wood, Marina Hills, Marina Woods, Pioneer Place, and Bass Lake Village lift stations) to provide continual power during utility power outages.
Hazard(s)	Climate change and wildfire
Building / infrastructure	Existing
Benefits / costs	The project will provide continual power for critical infrastructure. The district successfully applied for HMGP to provide a federal cost share for emergency backup generator installations at 15 remote district facilities. Total project estimate: $472,284 Additional funding required: $165,937
Priority	EID CIP 2024–2028 priority: 1
Flume 48 Replacement	
Description	Evaluate two replacement alternatives for this degraded flume. District crews have been performing extensive maintenance work of the asset to extend the service life of the critically degraded structure until full replacement can occur. Alternative 1 is to stabilize the hand-stacked rock bench utilizing stabilization measures developed and employed at Flume 41, and the degraded wood flume would be replaced with steel reinforced precast flume. Alternative 2 would be to construct a 500-foot tunnel between Flume 48 and Highway 50 and abandon approximately 700 feet of canal and 448 feet of elevated wood flume. Alternative 2, if feasible, could result in significantly lower construction costs but would require acquisition of an easement on an adjacent parcel and a Federal Energy Regulatory Commission boundary adjustment. The district was able to purchase the parcel on which most of the tunnel would be placed in 2018. This parcel will also be used as a staging area whether the tunnel option is feasible.
Hazard(s)	Earthquake, flood, landslide, wildfire, and winter storm
Building / infrastructure	New
Benefits / costs	The flumes will continue to deteriorate potentially causing flume failures that would result in significant impacts to the public, Highway 50, and the South Fork of the American River. Additionally, water supply would be out of service for an extended period to make emergency repairs resulting in interruption of the reliable delivery of water for consumption use and hydroelectric power generation. Wooden flumes are highly susceptible to catastrophic damage resulting from floods, landslides, wildfires, and winter storms.

	A geotechnical study was conducted in 2019 and determined that Option 2 is feasible. During the design process the costs of Options 1 and 2 will be determined. Design and construction costs are unknown at this time and will be updated in 2023 after further alternatives analysis. Construction costs are shown from the 30 percent design and will be updated as the design progresses. Funding will be timed with a future bond issuance that is yet to be determined. Total project estimate: $1,157,224 Additional funding required: $695,312
Priority	EID CIP 2024–2028 priority: 2
Flumes 45A, 46A, 47A, and 47B Replacement	
Description	Seek design services for Flume 45A, 46A, 47A, and 47B. These four flumes are similar in nature in that they are between 128–200-foot-long elevated flumes located on previous landslide locations.
Hazard(s)	Earthquake, flood, landslide, wildfire, and winter storm
Building / infrastructure	Existing and new
Benefits / costs	The flumes will continue to deteriorate potentially causing flume failures that would result in significant impacts to the public, Highway 50, and the South Fork of the American River. Additionally, one-third of the district's water supply would be out of service for an extended period to make emergency repairs resulting in interruption of the reliable delivery of water for consumptive use and hydroelectric power generation. Since these flumes are similar in nature (wood flume with timber support) it is believed that one general design can be done for all four flumes and reap a cost savings on the design process. Total project estimate: $2,386,802 Additional funding required: $1,833,534
Priority	EID CIP 2024–2028 priority: 2
Flume 4 Replacement	
Description	Replace Flume 4, which is an elevated section of the El Dorado Canal that could not be quickly replaced after the Caldor Fire and thus underwent repairs. Flume 4 is approximately 200 feet in length. Flume 4 is an elevated flume that spans a steep portion of the forest. The wood substructure was constructed in 1993, and the wood members are currently undersized. In addition to the elevated section, there is just upstream of Flume 4 a section of canal that has a rock cribbed wall that experienced a failure in 2022. This cribbed wall would be replaced with a mechanically stabilized earth wall and have the drainage system upgraded.
Hazard(s)	Earthquake, flood, landslide, wildfire, and winter storm
Building / infrastructure	New
Benefits / costs	Flume 4 will continue to deteriorate, potentially causing flume failures that would result in significant impacts to the public and the South Fork of the American River. Additionally, one-third of the District's water supply would be out of service for an extended period to make emergency repairs, resulting in interruption of the reliable delivery of water for consumptive use and hydroelectric power generation.

	Funding is to initiate design in 2024. No construction costs are indicated. Total project estimate: $550,000 Additional funding required: $550,000
Priority	EID CIP 2024–2028 priority: 2
Sly Park Spillway Improvements	
Description	Implement recommendations from Sly Park Spillway condition assessment. These include: 1) Designing and installing a more durable surface on the invert of the flip bucket near the end of the spillway chute where concrete erosion and exposure of steel reinforcement has been occurring (2023 planned construction); and 2) Reviewing spillway hydraulics, and based on the spillway rated capacity, develop plans for raising the height of sidewalls in the vicinity of the flip bucket where historic photos show a water stain reaching the top of the walls from previous spills much less than the design capacity. Because there is a risk of spill water overtopping the sidewalls, there is the potential for erosion of soil and rock outside the chute that could then undermine the structure and cause it to fail (as occurred at Oroville). In addition, the right bank of the channel downstream of the concrete spillway chute needs erosion protection. The exposed soil bank is oversteepened and not durable to the high velocity flows that can discharge from the spillway. If left untreated, it could compromise the spillway structure.
Hazard(s)	Dam failure
Building / infrastructure	Existing
Benefits / costs	The project is in compliance with DSOD dam safety program requirements. Total project estimate: $320,000 Additional funding required: $320,000
Priority	EID CIP 2024–2028 priority: 1
Transmission Slope Stabilization	
Description	Implement slope stabilization measures to protect not only the District’s pipelines but the District's access to them for future maintenance and repairs. These facilities typically are exposed to higher velocities in an effort to provide water during high flow events. Additionally, many of these facilities were constructed across rugged terrain prior to major roadways being available in the ‘50s, ‘60s, and ‘70s. Due to the location of these pipelines the potential for slope failure is greatly increased. This program will consist of completing slope stabilization designs, access improvements where possible, bidding, and construction of all necessary repairs. Actual slope stabilization project costs for each individual pipeline will be brought to the Board for specific approval.
Hazard(s)	Flood, landslide, and winter storm
Building / infrastructure	Existing
Benefits / costs	Slope stabilization for transmission pipelines due to slides causing damage to pipe benches and access roads to the facilities. The District owns and maintains various transmission mains across the District to be able to provide large volumes of water from 4,000 feet to 700 feet in elevation.

	During the storms of 2017 there were two major slides that occurred, one on El Dorado Main #2 and one on Moose Hall Transmission. Total project estimate: $675,000 Additional funding required: $675,000
Priority	EID CIP 2024–2028 priority: 2
Echo Conduit Rehabilitation	
Description	Replace the degraded and misshaped pipe from snow load and rock fall as it is not a candidate for slip lining. The current plans include considering a 2-year phased approach for pipeline replacement based on access limitations, including replacement of the canal section with pipeline. Converting canal section to pipeline effectively improves capacity over the entire range of operating conditions, leading to fuller utilization of storage during the normal 3-week drawdown period between Labor Day and annual outage season starting in October. Typically, over 1,500 acre-feet of water is drawn from storage or directly diverted annually from Echo Lake for water supply and power generation.
Hazard(s)	Flood, landslide, and winter storm
Building / infrastructure	Existing
Benefits / costs	Maintaining operability of Echo Conduit provides the district continued use of this pre-1914 water right for consumptive water supply and power generation. Replacing the conduit restores diminished capacity as has occurred over time and improves the district's ability to utilize its storage and direct diversion water rights. If the pipeline were to rupture, it could cause significant environmental damage and affect traffic safety on Highway 50. Conceptual engineering for the foundation, elevated section, pipeline, and consideration of constructability was completed in 2021. Detailed design and supplemental biological and cultural resource surveys are planned for 2026, and environmental review/permitting for 2027. Construction is planned over 2 summer seasons during 2028 and 2029. Total project estimate: $166,579 Additional funding required: $66,579
Priority	EID CIP 2024–2028 priority: 2
Penstock Stabilization	
Description	Implement recommendations from the Penstock condition assessment including: 1) Stabilizing the bench and slopes above and below the penstock downstream of the penstock tunnel section where rockfall and landslide potential exists - planned for 2024; 2) Performing drainage improvements to the high-pressure penstock section where a channel continues to erode including around saddles and anchor blocks - planned for 2024.
Hazard(s)	Flood and landslide
Building / infrastructure	Existing
Benefits / costs	The project is to maintain penstock stabilization and service reliability. The ability for the District to receive an average $4 million annually in power generation revenues depends on the reliability of the penstock.

	An updated geotechnical assessment and the design were initiated in 2021 and will continue into early 2023. Concurrently, the district will conduct environmental review/permitting such that stabilization and drainage improvements can be constructed in 2024. Total project estimate: $940,840 Additional funding required: $540,229
Priority	EID CIP 2024–2028 priority: 2
Recycled Water Seasonal Storage	
Description	Explore seasonal storage alternatives to store water available during the wet season for groundwater recharge and increased pumping during the dry season. Most involve the collection of natural runoffs from the surrounding watershed. Except for subterranean storage, most involve the construction of an aboveground dam and reservoir.
Hazard(s)	Climate change and drought
Building / infrastructure	New
Benefits / costs	Due to the seasonal variability of recycled water demand, EID may have an excess of recycled water supply during the winter months, and these excess flows could be stored for use during high demand periods during the summer months. There are several permits that may be required to construct each project site which can add to project cost and difficulty of implementation. The recycled water will be sitting in storage for several months which presents potential water quality concerns. Project qualifies for HMA funding (FEMA Drought Mitigation Policy Aid 2023)
Priority	Planning team priority: 2
Watershed Restoration	
Description	Develop and implement projects to improve water quality and quantity, reduce catastrophic wildfire risk, and improve forage and wildlife habitat through hazardous fuel reduction projects, removal of invasive species, installation of a poly tank guzzler system, reclamation of infrastructure that is no longer needed, and the stabilization and restoration of areas after wildfire.
Hazard(s)	Climate change, drought, flood, and wildfire
Building / infrastructure	Existing
Benefits / costs	Healthy watersheds serve as water filtration and storage, air filtration, carbon storage, nutrient cycling, soil formation, and recreation. Investing in the maintenance of healthy watersheds can significantly lower costs associated with water treatment and flooding. A study of 27 U.S. drinking water suppliers revealed that protecting forested watersheds used for drinking water sources can reduce capital, operational, and maintenance costs for drinking water treatment (U.S. EPA 2012). Healthy watersheds that maintain protected riparian corridors are expected to be more resilient to the anticipated effects of climate change (U.S. EPA 2012). Project qualifies for HMA funding (FEMA Drought Mitigation Policy Aid 2023)

Priority	Planning team priority: 2
Recreation Area Vegetation Management / Defensible Space	
Description	Reduce wildfire risk in EID's recreation areas by treating overgrown and/or noxious vegetation. Vegetation management proposed by EID is designed to protect recreational facilities and other EID critical infrastructure located in a high and very high fire hazard severity zone while also serving to reduce fuel loads and create defensible space for neighboring communities located in the wildland urban interface. Vegetation management activities that would be carried out under the project may include prescribed burns, tree and brush pruning and removal, and forest mastication to inhibit fire spread.
Hazard(s)	Climate change, drought, and wildfire
Building / infrastructure	New and existing
Benefits / costs	Property owners benefit from vegetation management on their properties, and the benefits extend to others as well. When a property owner maintains vegetation / defensible space, their property is less likely to ignite other nearby structures, overwhelm firefighters, and threaten surrounding communities from wildfires (California Local Analyst's Office Report 2021). California Public Resource Code 4291 and local fire codes already require property owners in high to extreme fire severity zones to maintain vegetation / defensible space around all structures. FEMA Region 9 has previously determined the apparent efficacy of this type of project.
Priority	Planning team priority: 2
Comprehensive EID Infrastructure and Hazards Database	
Description	Develop a database to be able to quickly identify EID major infrastructure. Include information such as facility name, facility type, service type, operational status, latitude and longitude, infrastructure repair/replacement/mitigation projects, etc. Include historical hazard event mapping and interactive hazard mapping within the database.
Hazard(s)	All
Building / infrastructure	New and existing
Benefits / costs	Data acquisition, operational and maintenance expenses
Priority	Planning team priority: 2
Short- and Long-Term Water Quality Risk Reduction Measures	
Description	Explore and implement ways to reduce the short- and long-term risks to EID reservoirs and other EID water storage facilities from wildfires by: Eliminating risk through design: Incorporate seasonal treatment systems (i.e., carbon filters and ultraviolet/ozone generators) that adjust treatment based on the varying quality of the influent water; incorporate processes that can alter operations on demand; plan for contaminants that are regulated as hazardous to public health; add additional phases of treatment for fine particulates; and develop automated valving systems that operate based on water quality monitoring results (NPS 2023).

	Mitigating risk through material changes: Upgrade to concrete masonry unit structures, metal roofing, and heat-resistant pipes (NPS 2023). Lowing risk through maintenance: Test water quality more frequently and clear fire-prone vegetation 200 feet around infrastructure (NPS 2023).
Hazard(s)	Climate change and wildfire
Building / infrastructure	New and existing
Benefits / costs	Wildfires can affect drinking water sources for days, months, and years afterwards. Wildfires can change water temperature, change acid-alkaline balance, and affect turbidity (NPS 2023). Elevated nutrients, contaminated ash, and fire-retardant chemicals in the reservoirs and water treatment plants after a wildfire can pose serious health effects (NPS 2023). Water treatment plants are designed for a narrow range of turbidity and cannot manage the increased levels caused by wildfires. In addition, fine particle matters such as ash are difficult to filter and treat in water treatment plants (NPS 2023).
Priority	Planning team priority: 2

Notes:
CIP = Capital Improvement Plan
DSOD = Division of Safety of Dams
EID – El Dorado Irrigation District
HMA = Hazard Mitigation Assistance
HMGP = Hazard Mitigation Grant Program

Table E-2: Priority Levels

Priority	Description
Level 1 (Mandatory)	These are the highest priority capital projects. They include projects already under construction and those required by legislation, regulation, contract, or for protecting health and safety. Projects are ranked priority Level 1 if they meet one or more of the following criteria: • Project is required for health and safety. This includes projects needed to protect and preserve the health and safety of customers, employees, and the public. • Project is required by law, regulation, contract, agreement, or license. This includes projects required to meet requirements imposed by federal, State, or local governments. This also includes relocation of District facilities necessitated by State or county road improvements. • Project is under construction. This includes projects that are currently underway and have met a Priority Level 1 or 2 previously.
Level 2 (Necessary)	These are projects that provide measurable progress toward achieving the District's goals, but over which the District has a moderate level of control as to when they should be performed. Projects, including portions of phased projects, are ranked priority Level 2 if they meet all of the following criteria: • Projects that maintain or enhance existing assets. This includes projects such as life-cycle replacement of pump stations, pipelines, flumes, canals, and other assets. • Projects that provide for increased revenues and/or reduced costs, with a favorable return on investment and acceptable cash flow consequences. This analysis should take into account funding by applicants or outside sources, including grants. • Projects for meeting demands of increased growth within the District's service area or its internal organization. This includes projects whose purpose is to provide for expansion of services made necessary by new development. • Projects that increase water supply reliability. • Project has a defined scope and provides measurable progress toward achieving the District's goals. • The District has a moderate level of control over the schedule.
Level 3 (Discretionary)	Projects not meeting the criteria for priority Level 1 or 2 are ranked as priority Level 3. These are projects that are anticipated to be needed, but may not yet have defined scopes, schedules, or funding sources. These are projects in which the District has a significant level of control over schedule. • Projects that maintain or increase service levels or improve efficiency and reliability. • Projects with aesthetic or community benefit. • Projects not mandated by regulation. • Pilot projects to test a concept, method, material, or equipment.

El Dorado Irrigation District

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