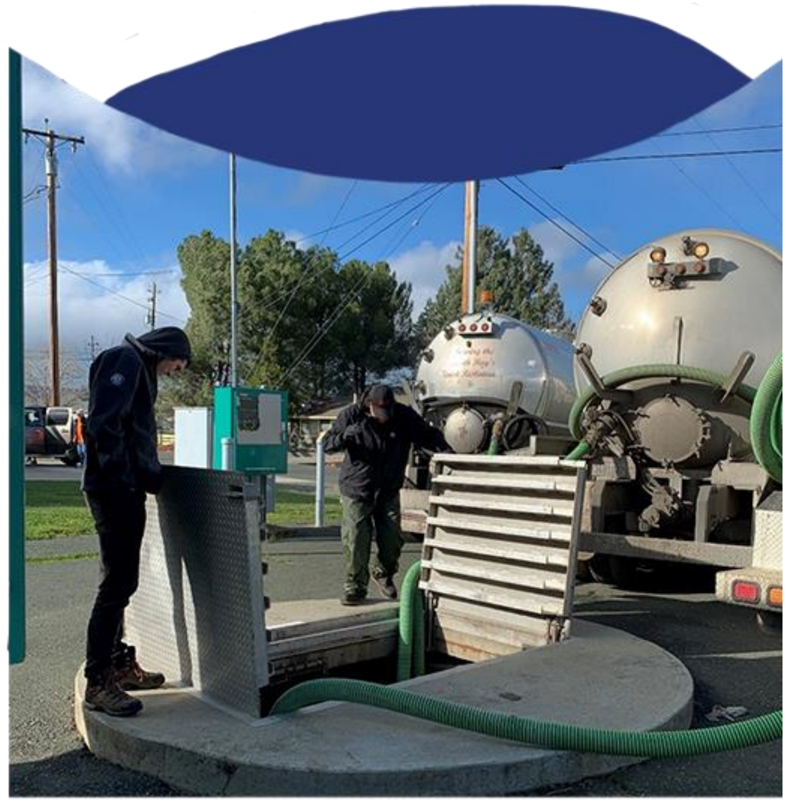
Hidden Valley Lake Community Services District
Local Hazard Mitigation Plan Update
December 2024 Public Review Draft



FOSTER MORRISON
CONSULTING

Executive Summary

The Hidden Valley Lake Community Services District (HVLCSD or District) prepared this 2025 Local Hazard Mitigation Plan (LHMP) Update to guide hazard mitigation planning to better protect the people and property of the HVLCSD from the effects of hazard events. The purpose of this Plan is to update the District's 2020 LHMP. This LHMP Update demonstrates the HVLCSD's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This LHMP Update was also developed so the District can be eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program, Building Resilient Infrastructure and Communities (BRIC) program, and the Flood Mitigation Assistance (FMA) program.

Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated. The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards.

LHMP Plan Development Process

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. This LHMP documents the hazard mitigation planning process and identifies relevant hazards, risks and vulnerabilities, and strategies the District will use to decrease vulnerability and increase resiliency and sustainability in the community.

This LHMP was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390), the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007, and the latest FEMA LHMP guidance effective April 2023. The District followed a planning process prescribed by FEMA as detailed in Table ES-1.

Table ES-1 Local Hazard Mitigation Planning Process

DMA Process	Modified CRS Process
1) Organize Resources	
201.6(c)(1)	1) Organize the Planning Effort
201.6(b)(1)	2) Involve the Public
201.6(b)(2) and (3)	3) Coordinate with Other Departments and Agencies

DMA Process	Modified CRS Process
2) Assess Risks	
201.6(c)(2)(i)	4) Identify the Hazards
201.6(c)(2)(ii)	5) Assess the Risks
3) Develop the Mitigation Plan	
201.6(c)(3)(i)	6) Set Goals
201.6(c)(3)(ii)	7) Review Possible Activities
201.6(c)(3)(iii)	8) Draft an Action Plan
4) Implement the Plan and Monitor Progress	
201.6(c)(5)	9) Adopt the Plan
201.6(c)(4)	10) Implement, Evaluate, and Revise the Plan

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

Risk Assessment

A risk assessment was conducted that identified and profiled hazards that pose a risk to the District, assessed the vulnerability of the HVLCSD Planning Area to these hazards, and examined the existing capabilities to mitigate them.

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

Table ES-2 HVLCSD Hazard Identification Assessment

Hazard*	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Climate Change	Extensive	Highly Likely	Limited - Critical	Medium	–
Dam Failure	Extensive	Unlikely	Catastrophic	High	Medium
Drought & Water shortage (w/tree mortality)	Extensive	Highly Likely / Occasional	Critical	High	High
Earthquake	Extensive	Occasional	Catastrophic	High	Low
Floods: 1%/0.2% annual chance	Significant	Occasional / Likely	Critical	High	Medium
Floods: Localized Stormwater	Significant	Highly Likely	Critical	Medium	Medium
Levee Failure	Significant	Unlikely	Critical	High	Medium
Severe Weather: Extreme Cold and Freeze	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)	Extensive	Highly Likely	Critical	Medium	Medium
Wildfire (w/smoke and air quality)	Extensive	Highly Likely	Catastrophic	High	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Likelihood of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic: More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical: 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited: 10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible: Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: Minimal potential impact
Medium: Moderate potential impact
High: Widespread potential impact

Climate Change Influence
Low: Minimal potential impact
Medium: Moderate potential impact
High: Widespread potential impact

Mitigation Strategy

Based on the results of the risk assessment, the District in conjunction with the HMPC developed a mitigation strategy for reducing the District's risk and vulnerability to hazards. The resulting Mitigation Strategy for the HVLCSD is comprised of LHMP goals and objectives and a mitigation action plan which includes a series of mitigation action projects and implementation measures. Based on the risk assessment, the HMPC identified goals and objectives for reducing the HVLCSD's vulnerability to hazards. The goals and objectives of this multi-hazard mitigation plan are:

HVLCSD Mission Statement: To provide, maintain, and protect our community's water

HVLCSD Vision Statement: To provide innovative and reliable service in an environmentally conscious manner that produces a high level of ratepayer satisfaction

Goal 1: Minimize risk and vulnerability of HVLCSD to natural hazards and protect lives, enhance public safety, and prevent losses to property and the environment

- Ensure the public health and safety of employees and community
- As stewards of natural resources, provide protection measures to ensure the sustainability of natural resources vital to the local ecology
- Protect, maintain, and provide safe drinking water and sewer services for existing and future development within the HVLCSD Service area
- Improve inclusion activities that fortify the strength of the whole community by education and consensus

Goal 2: Ensure HVLCSD's Water and Wastewater Infrastructure Reliability and Resiliency

- Provide protection and reduce damages to District infrastructure and services and minimize disruptions
- Protect and harden water and sewer infrastructure from extreme conditions and to withstand a higher level of damage from natural disasters
- Provide water and wastewater services in accordance with codes and regulations, with ratepayers and the environment as the highest priority

Goal 3: Improve HVLCSD's capabilities to plan for/prevent/mitigate hazard-related losses and to be prepared for, respond to, and recover from a disaster event

- Maintain and enhance current service levels at affordable rates
- Ensure financial stability
- Attract and protect the most qualified workforce who are dedicated to District goals and mission statement
- Ensure the ongoing ability to deliver high quality water and sewer services, before, during, and after a disaster
- Establish and maximize cross-functional and multi-agency cooperation and use of shared resources
- Update and maintain disaster and emergency plans, with a long-term focus to address changing District and community needs to prevent, minimize, and recover from disasters

Goal 4: Increase HVLCSD and community outreach, education, and awareness of risk and vulnerability to hazards and promote preparedness and self-responsibility to reduce hazard-related losses

- Enhance communication between HVLCSD, HVLA, other Agencies, and the Community
- Ensure planning for the whole community to support equity and inclusion in mitigation planning and implementation
- Enhance hazard mitigation and preparedness education and outreach programs
- Inform and educate HVLCSD staff and service area residents and businesses about all hazards they are exposed to, where they occur, what they can do to mitigate exposure or damages

Goal 5: Increase and maintain wildfire prevention and protection

- Reduce the wildfire risk and vulnerability to HVLCSD
- Improve communication and coordination of wildfire mitigation efforts

Goal 6: Improve HVLCSD resiliency to flooding

- Determine ownership of the levee
- Protect the HVLCSD and reduce losses from localized, stormwater flooding, 1% and 0.2% annual chance flood events, and dam and levee flooding
- Improve and maintain HVLCSD stormwater system to improve system reliability and to reduce losses and extend existing life
- Evaluate, implement, and improve flood control within the HVLCSD
- Minimize risk and vulnerability to life and critical facilities and infrastructure from a levee failure event

Goal 7: Maintain FEMA Eligibility for Grant Funding

- Position HVLCSD to apply for and obtain grant funds to reduce losses from priority hazards
- Identify and pursue FEMA and other hazard mitigation funding sources

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

Table ES-3 HVLCSD Mitigation Actions

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Multi-Hazard Actions					
Action 1. Public Awareness Program	Previous Action	X	X	X	Public Information
Action 2. Generator projects for all critical facilities and infrastructure	Previous Action	X	X		Emergency Services Property Protection Natural Resource Protection
Action 3. Improve the SCADA system	Previous Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 4. Update Water Master Plan	Previous Action	X	X		Prevention
Action 5. Establish additional well(s)	Previous Action	X	X		Structural Projects Property Protection Natural Resource Protection
Action 6. Water Storage and Materials	Previous Action	X	X		Structural Projects Property Protection Natural Resource Protection
Action 7. Water Distribution System Reliability	Previous Action	X	X		Structural Projects Property Protection Natural Resource Protection
Climate Change, Drought, and Severe Weather: Extreme Heat Actions					
Action 8. Develop a Groundwater Sustainability Plan	New Action	X	X		Prevention
Dam Failure, Flood, Localized Flood, Levee Failure, Severe Weather: Heavy Rains and Storms Actions					
Action 9. Chlorine Analyzers	Previous Action	X	X	X	Prevention Property Protection
Action 10. Establish Cross Functional Committee and Address Levee & Stream Issues	Previous Action	X	X	X	Prevention
Action 11. Update and Implement Stormwater Master Plan/Stormwater Mitigation	Previous Action	X	X	X	Prevention Property Protection Natural Resource Protection
Earthquake Actions					
Action 12. Earthquake Vulnerability Assessment and Retrofit	Previous Action	X	X		Property Protection Structural Projects

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 13. I/I Program and Sewer System Rehabilitation	Previous Action	X	X		Structural Projects Property Protection Natural Resource Protection
Wildfire Actions					
Action 14. Fuel Mitigation/Defensive Space	Previous Action	X	X		Property Protection Natural Resource Protection
Action 15. Add/Improve/Fortify Fire Hydrants	Previous Action	X	X		Property Protection Natural Resource Protection

Table of Contents

Chapters

1 INTRODUCTION 1-1
1.1 Purpose 1-1
1.2 Background and Scope 1-1
1.3 HVLCSD Profile 1-3
1.3.1. History 1-10
1.3.2. Geography and Climate 1-10
1.3.3. Population and Demographics 1-11
1.4 Plan Organization 1-12
2 COMMUNITY PROFILE 2-1
2.1 What's New in the Plan Update 2-1
2.2 Summary of Significant Changes to Current Conditions, Planning Area Vulnerability, and Hazard Mitigation Priorities 2-3
2.3 2020 LHMP Mitigation Strategy Successes and Status 2-3
2.3.1. Success Stories 2-5
2.3.2. 2020 Mitigation Strategy Update 2-10
3 PLANNING PROCESS 3-1
3.1 Local Government Participation 3-2
3.2 The 10-Step Planning Process 3-3
3.2.1 Phase 1: Organize Resources 3-4
3.2.2 Phase 2: Assess Risks 3-12
3.2.3 Phase 3: Develop the Mitigation Plan 3-12
3.2.4 Phase 4: Implement the Plan and Monitor Progress 3-13
4 RISK ASSESSMENT 4-1
4.1 Hazard Identification 4-2
4.1.1. Results and Methodology 4-2
4.1.2. Disaster Declaration History 4-6
4.2 HVLCSD Asset Inventory and Growth and Development Trends 4-10
4.2.1. Assets Inventory 4-11
4.2.2. Growth and Development Trends 4-42
4.3 Hazard Profiles and Vulnerability Assessment 4-48
4.3.1. Severe Weather: General 4-61
4.3.2. Severe Weather: Extreme Cold and Freeze 4-62
4.3.3. Severe Weather: Extreme Heat 4-72
4.3.4. Severe Weather: Heavy Rains and Storms 4-83

4.3.5. Climate Change ... 4-108
4.3.6. Dam Failure ... 4-118
4.3.7. Drought and Water Shortage ... 4-141
4.3.8. Earthquake ... 4-164
4.3.9. Flood: 1%/0.2% Annual Chance ... 4-197
4.3.10. Flood: Localized Flooding ... 4-231
4.3.11. Levee Failure ... 4-249
4.3.12. Wildfire ... 4-260
4.4 Capability Assessment ... 4-289
4.4.1. HVLCSD's Regulatory Mitigation Capabilities ... 4-290
4.4.2. HVLCSD's Administrative/Technical Mitigation Capabilities ... 4-294
4.4.3. HVLCSD's Fiscal Mitigation Capabilities ... 4-295
4.4.4. HVLCSD's Mitigation Education, Outreach, and Partnerships ... 4-296
4.4.5. Other Mitigation Efforts ... 4-297
4.5 Natural Hazards Summary ... 4-297

5 MITIGATION STRATEGY ... 5-1

5.1 Mitigation Strategy: Overview ... 5-1
5.1.1 Continued Compliance with NFIP ... 5-1
5.1.2 Integration of Mitigation with Post Disaster Recovery and Mitigation Strategy Funding Opportunities ... 5-2
5.2 Goals and Objectives ... 5-3
5.3 Identification and Analysis of Mitigation Actions ... 5-7
5.4 Mitigation Action Plan ... 5-8
5.4.1 Prioritization Process ... 5-12

6 PLAN ADOPTION ... 6-1

7 PLAN IMPLEMENTATION AND MAINTENANCE ... 7-1

7.1 Implementation ... 7-1
7.1.1 Role of Hazard Mitigation Planning Committee in Implementation and Maintenance ... 7-2
7.2 Maintenance ... 7-3
7.2.1 Maintenance Schedule ... 7-3
7.2.2 Maintenance Evaluation Process ... 7-3
7.2.3 Incorporation into Existing Planning Mechanisms ... 7-5
7.2.4 Continued Public Involvement ... 7-6

Appendices

Appendix A: Planning Process

Appendix B: References

Appendix C: Mitigation Strategy

Appendix D: Adoption Resolution

Appendix E: Detailed Hazard Tables

Appendix F: CREAT Report

Appendix G: FEMA National Risk Index Report

Abbreviations and Acronyms

Acronym	Definition
APG	California Adaptation Planning Guide
ATSDR	Agency for Toxic Substances and Disease Registry
AWIA	2018 American's Water Infrastructure Act
BAM	Best Available Map
BLM	Bureau of Land Management
BMP	Best Management Practices
CA	California
CAC	Community Assistance Contact
CAISO	California Independent System Operator
CAL-DWR	California Department of Water Resources
CalEPA	California Environmental Protection Agency
Cal OES	California Office of Emergency Services
CAS	Climate Adaptation Strategy
CCHPR	Climate Change and Health Profile Report
CCSM3	Community Climate System Model 3
CDC	Center for Disease Control
CDC SVI	Center for Disease Control Social Vulnerability Index
CDFW	California Department of Fish and Wildlife
CEJST	Climate and Economic Justice Screening Tool
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CGS	California Geologic Survey
CIP	Capital Improvements Plan

Acronym	Definition
CNRA	California Natural Resource Agency
CREAT	Climate Resilience Evaluation and Awareness Tool
CRV	Content Replacement Values
CSO	Combined Sewer Overflows
CSZ	Cascadia Subduction Zone
CVP	Central Valley Project
CWPP	Community Wildfire Protection Plan
DAC	Disadvantaged Community
DFRIM	Digital Flood Insurance Rate Maps
DSOD	Division of Safety of Dams
ENP	Emergency Notification Plan
EPA	Environmental Protection Agency
EPSS	Enhanced Powerline Safety Settings
ESPM	Department of Environmental Science, Policy, and Management
EQ	Equalization basin
ERP	Emergency Response Plan
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zone
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FRA	Federal Responsibility Area
FRAP	Fire and Resource Assessment Program
FWS	US Fish and Wildlife Service
GFDL	Geophysical Fluid Dynamics Laboratory
GHG	Greenhouse Gases
GIS	Geographic Information Systems
GRASP	Geospatial Research, Analysis & Services Program
HMGP	Hazard Mitigation Grant Program
HMPC	Hazard Mitigation Planning Committee
HVLA	Hidden Valley Lake Association
HVLCSD	Hidden Valley Lake Community Services District
I/I	Infiltration and Inflow
IPCC	Intergovernmental Panel on Climate Change
LAFCo	Local Agency Formation Commission
LHMP	Local Hazard Mitigation Plan
LOCA	Local Constructed Analogs
LOMA	Letter of Map Amendment
LOMR	Letter of Map Revision
LRA	Local Responsibility Area

Acronym	Definition
MHI	Median Household Income
MMI	Modified Mercalli Intensity Scale
MSR	Municipal Services Review
MS4	Municipal Separate Storm Sewer System
MW	Megawatts
NASA	National Aerospace and Science Agency
NAVD 88	North America Vertical Datum 1988
NCDC	National Climactic Data Center
NDMC	National Drought Mitigation Center
NED	National Elevation Dataset
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHRAP	Natural Hazards Risk Assessment Program
NIDIS	National Integrated Drought Information System
NLD	National Levee Database
NOAA	National Oceanic and Atmospheric Administration
NPDP	National Performance of Dams Program
NPS	National Park Service
NWS	National Weather Service
OHP	Office of Historic Preservation
PM	Particulate Matter
POTW	Publicly Owned Treatment Works
PSPS	Public Safety Power Shutdowns
RCP	Representative Concentration Pathway
RL	Repetitive Loss
RM	River Mile
RRP	Risk and Resilience Plan
SAC-JC	Sacramento-San Joaquin
SB	Senate Bill
SBA	Small Business Administration
SCADA	Supervisory Control and Data Acquisition
SMWC	Stonehouse Mutual Water Company
SOI	Sphere of Influence
SOP	Standardized Operations Procedures
SRA	State Responsibility Area
SRWCB	State Water Resources Control Board
SSO	Sanitary Sewer Overflows
SVI	Sludge volume index
SWP	State Water Project

Acronym	Definition
SWRCB	State Water Resources Control Board
UCERF	Uniform California Earthquake Rupture Forecast
USACE	US Army Corp of Engineers
USGS	United States Geologic Survey
USDA	United States Department of Agriculture
WRCC	Western Regional Climate Center
WUI	Wildland Urban Interface
WWTP	Wastewater Treatment Plant

Chapter 1 Introduction

1.1 Purpose

The Hidden Valley Lake Community Services District (HVLCSD or District) prepared this Local Hazard Mitigation Plan (LHMP) Update to guide hazard mitigation planning to better protect the people and property of the HVLCSD from the effects of hazard events. The purpose of this plan is to update the District's 2020 LHMP. This LHMP Update demonstrates the HVLCSD's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This LHMP Update was also developed so the District can be eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program, Building Resilient Infrastructure and Communities (BRIC) program, and the Flood Mitigation Assistance (FMA) program.

1.2 Background and Scope

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

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of $6 in avoided future losses in addition to saving lives and preventing injuries (see Figure 1-1).

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

National Institute of BUILDING SCIENCES	ADOPT CODE	ABOVE CODE	BUILDING RETROFIT	LIFELINE RETROFIT	FEDERAL GRANTS
Overall Benefit-Cost Ratio	11:1	4:1	4:1	4:1	6:1
Cost ($ billion)	$1/year	$4/year	$520	$0.6	$27
Benefit ($ billion)	$13/year	$16/year	$2200	$2.5	$160
Riverine Flood	6:1	5:1	6:1	8:1	7:1
Hurricane Surge	not applicable	7:1	not applicable	not applicable	not applicable
Wind	10:1	5:1	6:1	7:1	5:1
Earthquake	12:1	4:1	13:1	3:1	3:1
Wildland-Urban Interface Fire	not applicable	4:1	2:1	not applicable	3:1

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

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

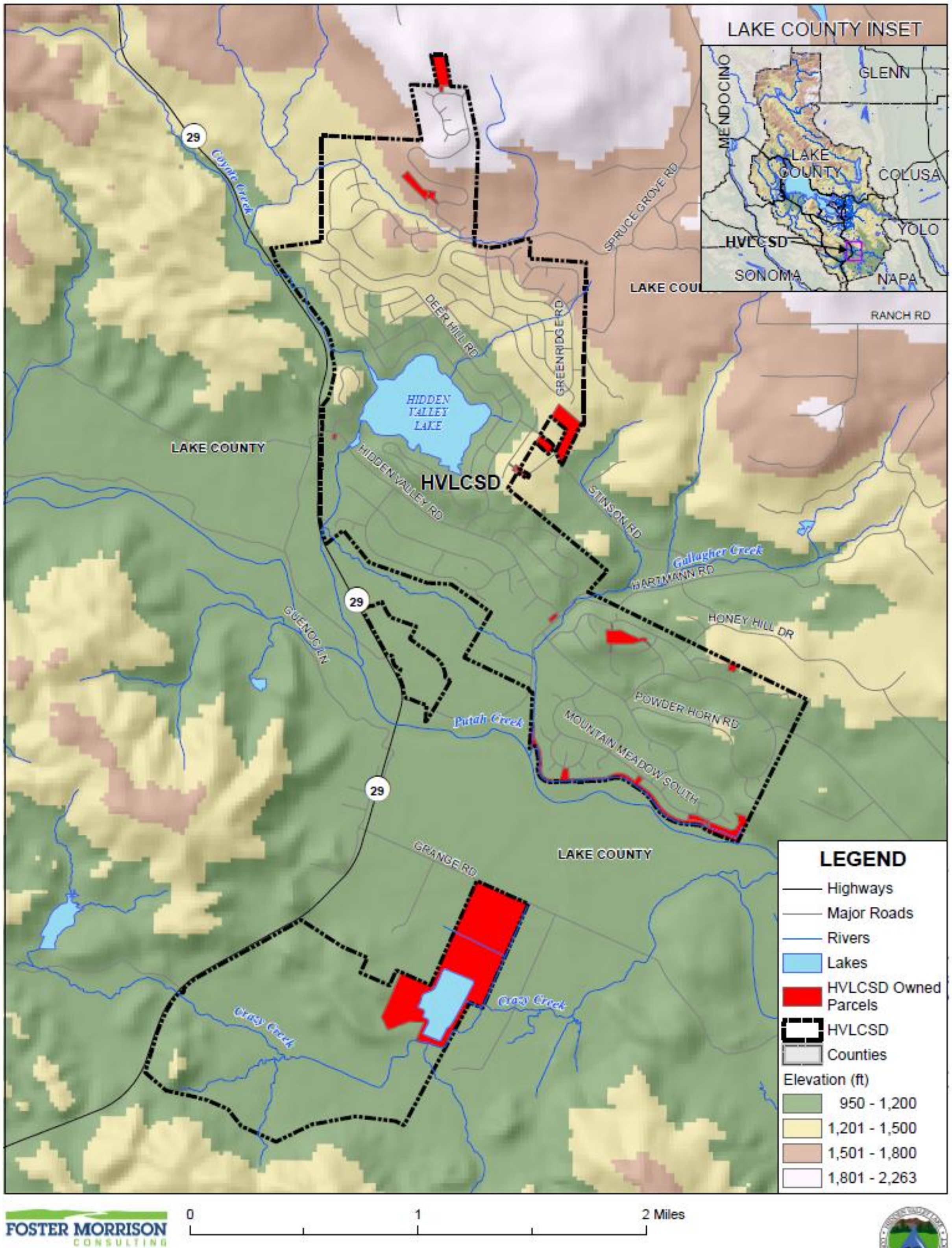
The 2025 HVLCSD LHMP is a single jurisdictional Plan Update that geographically covers the entire area within the District's boundaries. This Plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act (DMA) or DMA 2000.) This planning effort also follows FEMA's most current Plan Preparation and Review Guidance. While DMA 2000 emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). Because the District is subject to many kinds of hazards, access to these programs is vital.

Information in this LHMP Update will be used to help guide and coordinate mitigation activities and decisions for District growth and expansion in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to the District and the communities they serve by protecting critical facilities and infrastructure, reducing liability exposure, and minimizing overall District and community impacts and disruptions. HVLCSD has been affected by hazards in the past and is thus committed to reducing future impacts from hazard events and maintaining eligibility for mitigation-related federal funding.

1.3 HVLCSD Profile

Hidden Valley Lake is a census-designated place and gated subdivision located in rural, southern Lake County, in northern California. Today, it is a Common Interest Development known as Hidden Valley Lake Association (HVLA). HVLCSD services this area with water, wastewater, and reclaimed water services. The HVLCSD boundaries and owned parcels can be seen on Figure 1-2 below.

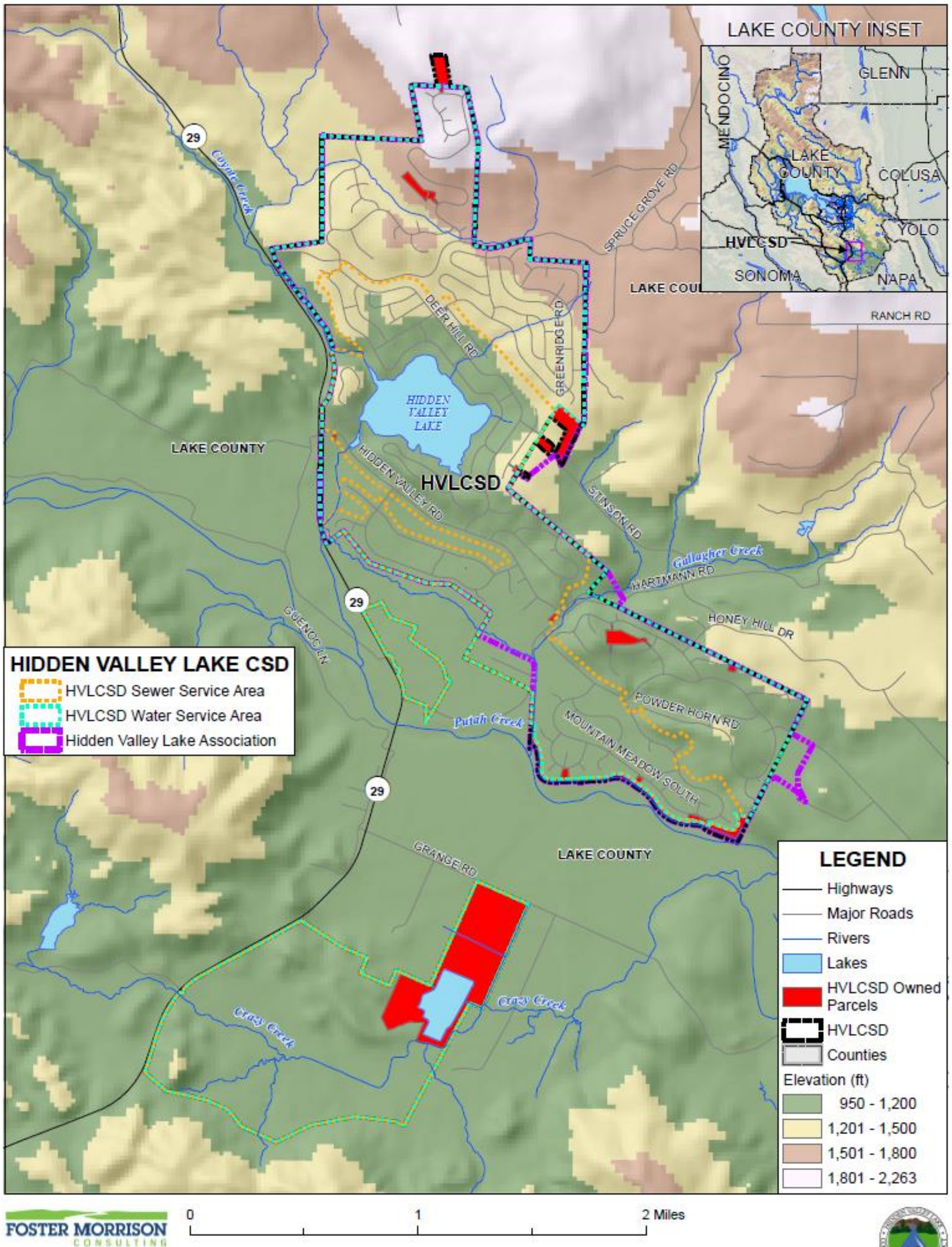
Figure 1-2 Hidden Valley Lake Community Services District



Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/7/2024.

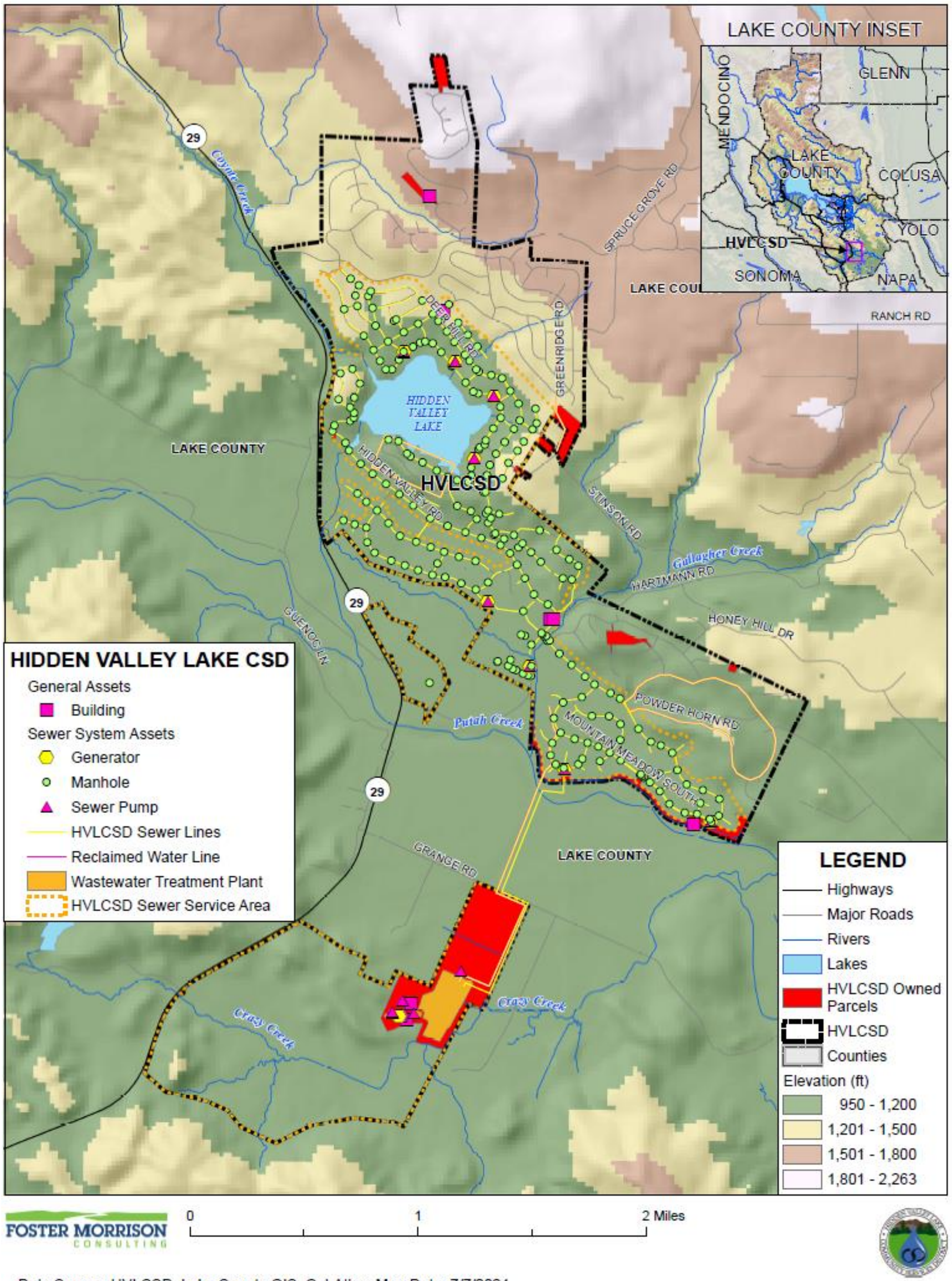
The District provides services to 1,506 wastewater (sewer) connections and 2,518 water connections. The District's overall sewer and water service areas can be seen on Figure 1-3. The sewer service area, with asset details, is shown in Figure 1-4. The water service area, with asset details is shown in Figure 1-5. Figure 1-6 shows additional information for the water service area and includes tank locations and pressure zones.

Figure 1-3 HVLCSD – Overall Service Area



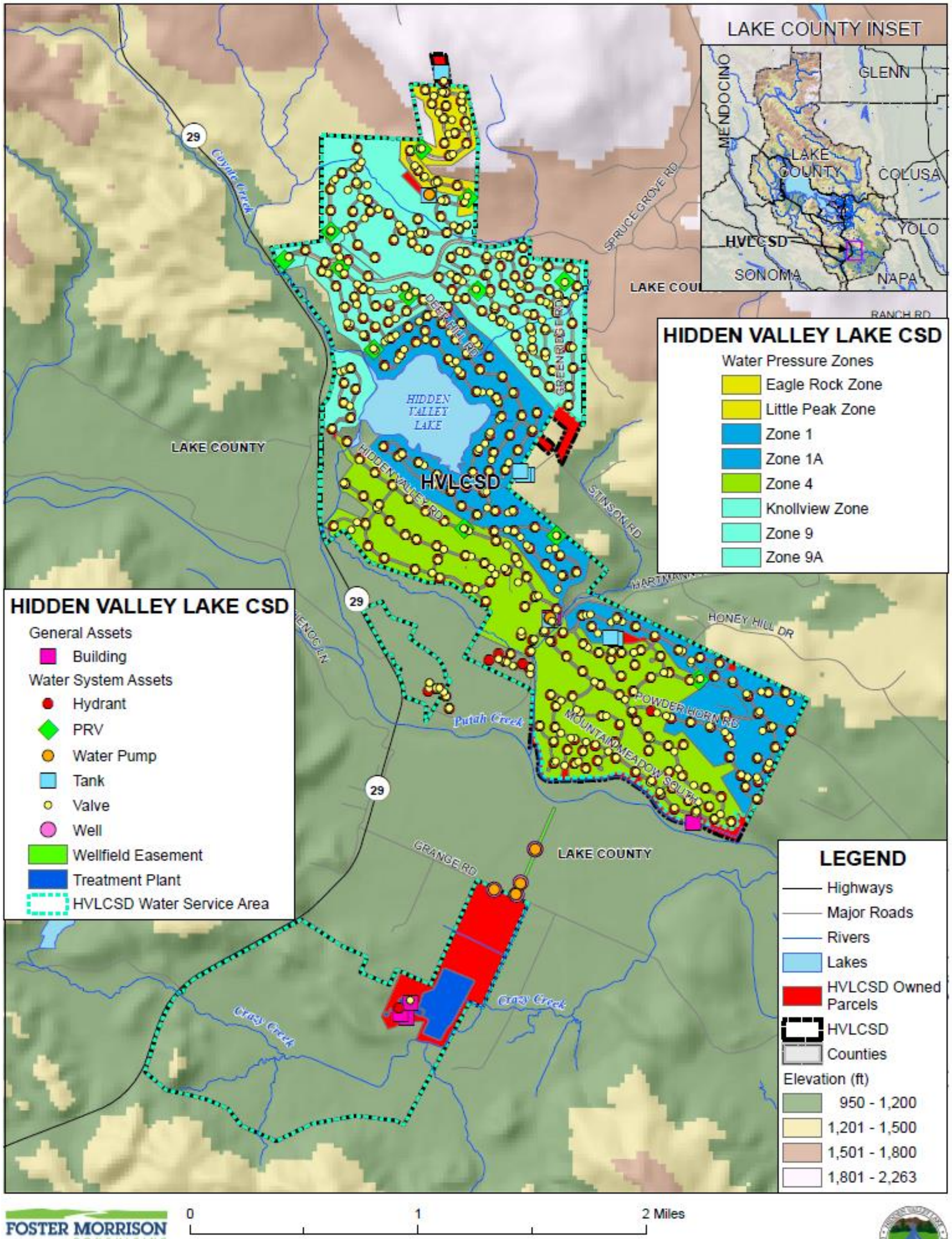
Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/7/2024.

Figure 1-4 HVLCSD – Sewer Service Area



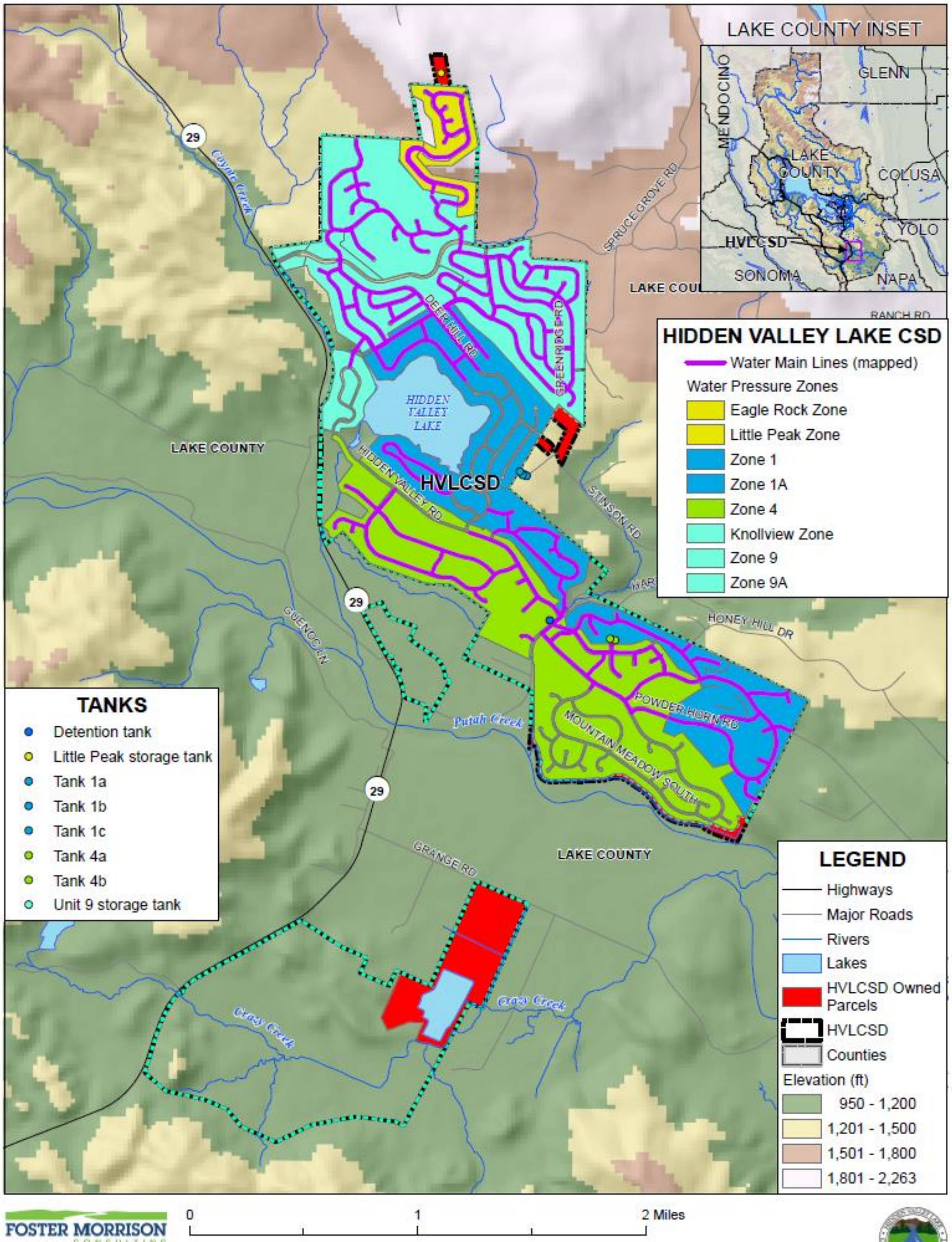
Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/7/2024.

Figure 1-5 HVLCSD – Water Service Area



Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/7/2024.

Figure 1-6 HVLCSD – Water Service Area with Tanks and Pressure Zones



Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 12/19/2024.

1.3.1. History

The Hidden Valley Lake Subdivision (the Subdivision) is located in southern Lake County, approximately 4 miles north of the unincorporated community of Middletown, California, along State Highway 29. The U.S. Land Company originally held title to the Subdivision; the Land Company started development of the Subdivision in 1968. The Land Company sold the property to Boise Cascade Corporation, prior to completing the subdivision improvements. Boise Cascade completed the development in 1973. In its final development certificates, Boise Cascade dedicated responsibility for some subdivision drainage to the County of Lake. Remaining drainage and all roadway responsibilities were dedicated to the HVLA and responsibility for water and limited sewer service were dedicated to Stonehouse Mutual Water Company (Stonehouse Mutual). Responsibility for a small stormwater pump station, located at the southeast end of the Subdivision, was also dedicated to Stonehouse Mutual.

In 1984, under the provisions of the Cortese-Knox Local Government Reorganization Act, the voters of the Subdivision elected to form a Community Services District. The HVLCSD is an independent special district with 5 locally elected directors. Community Services Districts, by state law, have very broad latent powers. This type of special district may provide water, sewer, stormwater, recreation, police, fire and transportation services. The original formation documents of the District granted it the authority to provide sanitary sewer service throughout the whole of the subdivision. In 1992, after passage of special legislation and another election by the voters in the Subdivision, the District merged with Stonehouse Mutual. The District now provides all water and sewer service within the Subdivision. The District also has some interest in storm drainage, as it inherited the stormwater pump station originally dedicated to Stonehouse Mutual.

Since the merger in 1992, the District has constructed and operates sewer collection facilities, provides water system improvements, repaved roadways and made improvements to the irrigation system on the community Golf Course.

1.3.2. Geography and Climate

Bordered on the west by State Route 29, the HVLCSD service territory is located approximately 80 miles northeast of San Francisco and 14 miles to the south of the City of Clearlake. Elevation in the HVLCSD varies from 950 to almost 2,300 feet of elevation. The south side of the Lake is almost completely forested, and the north side is a mixture of woods and open lands.

The climate of the HVLCSD area is classified as temperate and semiarid. Summers are dry and warm, and winters are wet and mild. Average monthly temperatures vary from the 80°F range in July to the 40°F range in January. Annual precipitation averages 25 inches; more than 50 percent of the annual precipitation normally occurs from December through February. The area’s economy is based primarily on agriculture and water-oriented recreation.

1.3.3. Population and Demographics

According to 2020 US Census Bureau estimates, the population of the Hidden Valley Lake census designated place is 6,235. This represents an increase in population from the 2010 and 2000 US Census, which estimated the population at 5,579 and 3,777 respectively. It should be noted that this information is related to the area the District services, and not to the actual District itself. The District estimates that the 2024 population is larger than the 2020 estimate and operates with the assumption that it serves 7,500 people. Select social and economic information for the District Service Area is shown in Table 1-1.

Table 1-1 Hidden Valley Lake Community Services District Service Area– Select Social and Economic Statistics

Statistic	Number
Populations	
Population under 5	3.7%
Population over 65	28.3%
Median Age	44.4
Racial Makeup	
White	85.5%
Black or African American	0.5%
American Indian or Alaska Native	0.0%
Asian	0.4%
Native Hawaiian or Pacific Islander	0.0%
Other Races	6.2%
Two or more races	7.4%
Income and Poverty	
Median income	$82,673
Mean Income	$99,094
Poverty rate	
All families	8.1%
All people	6.9%

Source: 2020 US Census, 2022 US Census American Community Survey

The US Census Bureau tracks economic statistics for the Hidden Valley Lake census designated place. These are shown in Table 1-2.

Table 1-2 Hidden Valley Lake Community Services District Service Area Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	20	1.0%
Construction	283	13.8%
Manufacturing	98	4.8%
Wholesale trade	50	2.4%
Retail trade	296	14.5%

Industry	Estimated Employment	Percent
Transportation and warehousing, and utilities	105	5.1%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	119	5.8%
Professional, scientific, and management, and administrative and waste management services	275	13.4%
Educational services, and health care and social assistance	232	11.3%
Arts, entertainment, and recreation, and accommodation and food services	278	13.5%
Other services, except public administration	118	5.7%
Public administration	179	8.7%

Source: US Census Bureau American Community Survey 2022 Estimates

1.4 Plan Organization

HVLCSD's Local Hazard Mitigation Plan is organized as follows:

Chapters

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

Appendices

- Appendix A: Planning Process
- Appendix B: References
- Appendix C: Mitigation Strategy
- Appendix D: Adoption Resolution
- Appendix E: Detailed Extent Tables
- Appendix F: EPA CREAT Tool Report
- Appendix G: FEMA National Risk Index Report

Chapter 2 What's New

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

The 2020 Local Hazard Mitigation Plan (LHMP), being updated as part of this 2025 Hidden Valley Lake Community Services District (HVLCSD or District) LHMP Update, contains descriptions of planning processes, the risk assessments of identified hazards, and mitigation strategies for reducing the risk and vulnerability from hazards of concern. Since approval of the 2020 LHMP by the Federal Emergency Management Agency (FEMA), progress has been made on implementation of many of the 2020 mitigation strategies, by HVLCSD. As part of this LHMP Update, a thorough review and update of the 2020 LHMP was conducted to ensure that this 2025 HVLCSD LHMP Update reflects current conditions and priorities in order to realign the updated mitigation strategy for the forthcoming five-year planning period. This section of this LHMP Update includes the following:

- **What's New in the LHMP Update**. Section 2.1 provides an overview of the approach to updating the 2020 LHMP and identifies new analyses, data and information included in this LHMP Update to reflect current HVLCSD and community conditions. This includes a summary of new hazard and risk assessment data as it relates to the HVLCSD Planning Area as well as information on current and future development trends affecting hazard vulnerability and related issues. The actual updated data, discussions, and associated analyses are contained in their respected sections within this LHMP Update.
- **Summary of Significant Changes to Current Conditions, Planning Area Vulnerability, and Hazard Mitigation Program Priorities**. Section provides a summary of significant changes in current conditions, changes in hazard vulnerability, and any resulting modifications to the HVLCSD hazard mitigation program priorities.
- **2020 Mitigation Strategy Status and Successes**. Section 2.3 provides a description of the status of mitigation actions from the 2020 LHMP and also indicates whether a project is no longer relevant or is recommended for inclusion in the updated mitigation strategy. This section also highlights key mitigation success stories since the 2020 LHMP.

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

2.1 What's New in the Plan Update

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

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

- Consider changes in vulnerability due to action implementation of mitigation actions;
- Document success stories where mitigation actions have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to inventories; and
- Incorporate new recommended mitigation actions or changes in the prioritization of mitigation actions.

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

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

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

- Disaster declarations were updated, including federal, state, and United States Department of Agriculture (USDA) disaster declarations. National Climactic Data Center (NCDC) Storm Events and past historic hazard occurrences since the previous plans were added for each jurisdiction.
- A Local Concerns section was added to each jurisdiction's vulnerability assessment to capture local issues and to support the resulting mitigation strategy.
- Incorporation and analysis of the updated US Census population data was utilized for this LHMP Update.
- A detailed discussion of socially vulnerable and underserved populations was added.
- An updated critical facility GIS layer was provided by the District. This allowed for an updated analysis of critical facilities for each mapped hazard in HVLCSD.
- Community lifelines were added to all hazard discussions.
- Development since the last plan was analyzed.
- Future development was analyzed for the District.
- A new section on Power Shortage/Failure was added. Public Safety Power Shutoff events were also added.

- Each section of the hazard profiles and vulnerability assessment looked at how at risk, underserved, and socially vulnerable populations could be affected by each hazard.
- Impacts of climate change, changes in population patterns, and changes in land use and development was reviewed and discussed for each hazard.
- Cal-Adapt and other state and local climate change data was added to the climate change section, as well as to other hazards that are exacerbated by climate change.
- New dam data provided by Cal OES was used for the dam inventory and analysis. This data included an updated hazard classification for identified dams and updated inundation mapping. Assets at risk to dam inundation was analyzed. Critical facilities at risk to dams were tabulated.
- Additional Hazus runs were performed on four separate earthquake shake scenarios for the HVLCSD planning area.
- New FEMA Digital Flood Insurance Rate Map (DFIRM) data was used as it became available during this LHMP Update.
- Levee failure was analyzed based on new data. Using National Levee Database data, the risk to the HVLCSD and surrounding area was delineated.
- Economic assets and community activities of value discussions were added to the vulnerability assessment of all hazards.
- To better meet the revised FEMA plan review tool, a more extensive analysis of the extents to identified hazards was conducted and included in this LHMP Update.
- A greater study of HVLCSD's mitigation capabilities was added.
- Public outreach efforts were expanded to include an enhanced focus on education and outreach to vulnerable and underserved populations.
- All previous mitigation actions were updated, and new actions were added to this LHMP Update, including mitigation actions to address issues related to mitigation planning for vulnerable and underserved populations.

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

This section provides a summary by hazard of significant changes in current conditions, HVLCSD vulnerability, and resulting modifications to HVLCSD's mitigation program priorities since the 2020 LHMP. As a result of this analysis of factors resulting in changes in risk and vulnerability since the last plans, mitigation planning priorities were modified by the District as reflected in HVLCSD's updated lists of priority hazards of concern, updated LHMP goals and objectives, and an updated list and prioritization of mitigation actions and projects.

PLACE AFTER FINAL MEETING

2.3 2020 LHMP Mitigation Strategy Successes and Status

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

Goal 1: Minimize risk and vulnerability of HVLCSD to hazards and protect lives and prevent losses to property and the environment

- Improve sustainability and resiliency of HVLCSD
- Provide protection and reduce damages to HVLCSD critical infrastructure and services and minimize disruption
- Protect, maintain, and provide safe drinking water and sewer services for existing and future development within the HVLCSD Service area
- Ensure adequate and reliable sewer and water infrastructure that can withstand a higher level of damage from natural disasters
- Continued improvements to infrastructure, equipment, facilities, etc.

Goal 2: Improve HVLCSD's capabilities to plan for/prevent/mitigate hazard-related losses and to be prepared for, respond to, and recover from a disaster event

- Improve local HVLCSD capacity to prepare for disasters
- Ensure the ongoing ability to deliver high quality water and sewer services, before, during, and after a disaster
- Establish and maximize cross-functional and multi-agency cooperation and use of shared resources
- Update and maintain disaster and emergency plans, with a long-term focus to address changing community needs to prevent, minimize, and recover from disasters

Goal 3: Increase HVLCSD and community outreach, education, and awareness of risk and vulnerability to hazards and promote preparedness and self-responsibility to reduce hazard-related losses

- Enhance hazard mitigation and preparedness education and outreach programs
- Inform and educate HVLCSD staff and service area residents and businesses about all hazards they are exposed to, where they occur, what they can do to mitigate exposure or damages.

Goal 4: Increase and maintain wildfire prevention and protection

- Reduce the wildfire risk and vulnerability to HVLCSD
- Improve communication and coordination of wildfire mitigation efforts

Goa1 5: Improve HVLCSD resiliency to flooding

- Protect the HVLCSD and reduce losses from both localized, stormwater flooding and 0.1% and 0.2% annual chance flood events
- Improve and maintain HVL stormwater system to improve system reliability and to reduce losses and extend existing life
- Evaluate, implement, and improve flood control within the HVL
- Minimize risk and vulnerability to life and critical facilities and infrastructure from a levee failure event

Goa1 6: Maintain FEMA Eligibility for Grant Funding

- Identify and pursue FEMA and other hazard mitigation funding sources

2.3.1. Success Stories

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

HMGP Grant Projects

Fire Resistant Construction

This HVLCSD project includes the reduction of combustible vegetative materials in four distinct project areas, replacement of redwood water tanks with steel tanks, and the covering of two groundwater wells with an ignition resistant structure to provide better protection from wildfires. The project is being implemented in phases.

HVLCSD Water Distribution System Reliability

The HVLCSD is working to identify critically vulnerable infrastructure within the HVLCSD potable water transmission and distribution system that is susceptible to water service disruption resulting from seismic events. The project will result in a complete water distribution system reliability project that will reduce the risk of water service interruption to the entire community of Hidden Valley Lake in the case of seismic events and subsequent flooding or wildfires that may manifest from an earthquake.

Generators

The HVLCSD is installing power generators at two water delivery pump stations at Greenridge Pump Station and the Water Treatment Plant.

Tank 9 Replacement

The HVLCSD is replacing its existing Unit 9 redwood 150,000 gallon water storage tank with two 250,000 gallon bolted steel tanks at 16393 Eagle Rock Road. To provide defensible space around the tanks, 23 trees will be removed, and fuel reduction activities will extend 100 feet from the structures. More information is shown below.

Water Projects

A proposed $5M (net) revenue bond, secured by future District water sales revenue is being used to facilitate the local cost share required to support the unprecedented District obligations resulting from four water reliability projects being awarded grant funding simultaneously. These are detailed below.

Disaster Mitigation

SCADA. This project is designed to mitigate against disaster by fortifying the District's Supervisory Control and Data Acquisition (SCADA) system. Funding is split between both the sewer and water fund as this system supports both. The SCADA Master Plan adopted in 2022 is now being leveraged to develop and execute an implementation plan.

Reliable Water Supply

Unit 4 Tank. Funding awarded in 2022 has assisted in the progress of designing the tank replacement known as area 4. Along with water storage, this project aims to build wildfire resilience by implementing the defensive space principles of NFPA 1144.

AMI. The final phase of equipment procurement, this final expenditure will provide staff with the tools to eliminate the costly tasks of monthly manual meter reading.

Mainlines. Funding awarded in 2022 has assisted in the progress of developing a plan to improve underground water infrastructure.

Generators. Funding awarded in 2022 has assisted in the progress of establishing stationary backup generators at water booster pump stations.

Unit 9 Tank. Funding awarded in 2022 has assisted in the progress of designing two tanks that will replace the single redwood water storage tank. This can be seen in the following images. This is part of the Tank 9 replacement project described above.

Figure 2-1 Tank 9 Replacement Project - Groundbreaking Ceremony with Redwood Tank in Background

Source: HVLCSD

Figure 2-2 Tank 9 Replacement Project - Sign Showing Funding

Figure 2-3 Tank 9 Replacement Project - Completed Steel Tank

Source: HVLCSD

Wastewater Projects

Disaster Mitigation

SCADA. This project, also included in the water project descriptions above, is designed to mitigate against disaster by fortifying the District's Supervisory Control and Data Acquisition (SCADA) system. Funding is split between both the sewer and water fund as this system supports both. The SCADA Master Plan adopted in 2022 is now being leveraged to develop and execute an implementation plan.

Risk Management

Chlorine Tank Shut-Off Valve. An improvement opportunity was identified in the Chlorine Risk Management Plan. This project will involve the addition of an auto shut-off capability in the chlorine tank room.

Regulatory Compliance

Manhole Lids. Manhole lid replacements are being undertaken to reduce/eliminate Sewer System Overflows (SSOs) by replacing manhole lids with airtight, composite lids.

2.3.2. 2020 Mitigation Strategy Update

The 2020 LHMP contained 22 separate mitigation actions for the HVLCSD (as shown on Table 2-1). Of these, 2 are complete, 1 has elements that are complete but elements that are ongoing, 11 are ongoing, and 8 have not been started. 20 actions have been identified for inclusion in this LHMP Update and have been carried forward in Chapter 5. Of the 2 actions not carried forward, 1 was completed, and the other was not a priority for the District going forward. Table 2-1 provides a status summary of the mitigation action projects from the 2020 LHMP. Following the table is a description of the status of each project.

Table 2-1 2020 HVLCSD LHMP: Mitigation Action Status Summary

Action Title	Complete	Ongoing	Not Yet Started	In 2025 Plan Update*
Multi-Hazard Mitigation Actions				
Action 1. Water Distribution System Reliability		X		Y
Action 2. Generator Projects for all Critical Facilities and Infrastructure		X		Y
Action 3. Establish Fully Functioning GIS Capabilities		X		Y
Action 4. Water Storage and Materials		X		Y
Action 5. Establish Additional Well(s)		X		Y
Action 6. Chlorine Automatic Shut-off Valve			X	Y
Action 7. Develop Risk and Resilience Plan (RRP), and Emergency Response Plan (ERP)	X			N
Action 8. Improve the SCADA system		X		N
Action 9. Public Awareness Program	X	X		Y

Action Title	Complete	Ongoing	Not Yet Started	In 2025 Plan Update*
Action 10. Wastewater Treatment Plant Improvements			X	Y
Action 11. Update Water Master Plan			X	Y
Climate Change Actions				
Action 12. Develop HVLCSD Climate Action Plan			X	Y
Dam Failure, Flood, Localized Flood, Levee Failure Actions				
Action 13. I & I Program		X		Y
Action 14. Update and Implement Stormwater Master Plan		X		Y
Action 15. Establish Cross Functional Committee and Address Levee & Stream Issues			X	Y
Action 16. Chlorine Analyzers			X	Y
Action 17. Dam Inundation Mitigation			X	Y
Drought Actions				
Action 18. Rescind the Water Moratorium	X			N
Action 19. Hexavalent Chromium		X		Y
Earthquake Actions				
Action 20. Earthquake Vulnerability Assessment and Retrofit			X	Y
Wildfire Actions				
Action 21. Fuel Mitigation		X		Y
Action 22. Add/Improve/Fortify Fire Hydrants			X	Y

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

Multi-Hazard Mitigation Actions

Action 1. Water Distribution System Reliability

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Planning project has begun to prioritize mitigation needs. Completed project will include an analysis of loss avoidance on prioritized projects

Action 2. Generator Projects for all Critical Facilities and Infrastructure

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project has begun for implementation at key vulnerable locations. Completion scheduled early 2025.

Action 3. Establish Fully Functioning GIS Capabilities

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Staff have completed comprehensive mapping of all infrastructure. Additional field investigations are required to verify additional assets. To follow will be technical corrections in the GIS software.

Action 4. Water Storage and Materials

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project for one tank site (tank site 9) replacement has begun. Completion expected early 2025. Construction of another tank site (tank site 4) replacement is expected in 2025

Action 5. Establish Additional Well(s)

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The FLASHES project includes the establishment of a new well. A funding application was submitted on 7/1/24 and awarded on 10/31/24. A final grant agreement is under review.

Action 6. Chlorine Automatic Shut-off Valve

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project not implemented due to insufficient enterprise funding.

Action 7. Develop Risk and Resilience Plan (RRP), and Emergency Response Plan (ERP)

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project completed. Project provided staff training on District vulnerabilities and proper response.

Action 8. Improve the SCADA system

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project on-going. Master plan and implementation plan complete. Initial funding application for mitigation submitted Q2 24, response expected Q4 24.

Action 9. Public Awareness Program

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project recommendations have been implemented into regular operations. Staff publish a quarterly newsletter that provides information on District activities and news to ratepayers. Staff also provide mitigation suggestions and related updates on monthly bills.

Action 10. Wastewater Treatment Plant Improvements

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project not started due to staff capacity limitations.

Action 11. Update Water Master Plan

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project not started due to staff capacity limitations.

Climate Change Actions

Action 12. Develop HVLCSD Climate Action Plan

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project not started due to staff capacity limitations.

Dam Failure, Flood, Localized Flood, Levee Failure Actions

Action 13. I & I Program

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project on-going. This includes manhole lid replacements and rootball intrusion mitigation.

Action 14. Update and Implement Stormwater Master Plan

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project on-going. An implementation strategy is being developed.

Action 15. Establish Cross Functional Committee and Address Levee & Stream Issues

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project on-going. An implementation strategy is being developed.

Action 16. Chlorine Analyzers

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project not started due to staff capacity limitations.

Action 17. Dam Inundation Mitigation

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project not started due to staff capacity limitations.

Drought Actions

Action 18. Rescind the Water Moratorium

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project complete. The moratorium was rescinded 7/27/20.

Action 19. Hexavalent Chromium

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project on-going. The District will participate in an appeals process for recent legislation.

Earthquake Actions

Action 20. Earthquake Vulnerability Assessment and Retrofit

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project not started due to staff capacity limitations.

Wildfire Actions

Action 21. Fuel Mitigation

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project on-going. Fuels reduction at Tank 9 and Little Peak tank site locations. Vegetation management scheduled for Tank 4 site in Q3 25.

Action 22. Add/Improve/Fortify Fire Hydrants

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project not started due to staff and funding capacity limitations.

Chapter 3 Planning Process

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

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

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

3.1 Local Government Participation

The HVLCSD made a commitment to this 2025 HVLCSD LHMP Update. The DMA planning regulations and guidance stress that each local government (participating jurisdiction) seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process as part of the HMPC;
- Detail where within the HVLCSD Planning Area the risk varies across the Planning Area;
- Identify potential mitigation actions; and
- Formally adopt the Plan.

For the HVLCSD, “participation” means the following:

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

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

HVLCSD individuals representing various departments and other District representatives were actively involved throughout the Plan Update process as identified in Appendix A in the sign-in sheets for the meetings and as evident through the data, information and input provided by HMPC representatives for the development of this LHMP Update. This Chapter 3 and Appendix A provides additional information and documentation of the planning process and District participation, including members of the HMPC and the process that was followed in updating the 2020 LHMP.

3.2 The 10-Step Planning Process

Foster Morrison established the planning process for updating the 2020 HVLCSD LHMP using the DMA planning requirements and FEMA’s associated guidance. Specifically, the LHMP was developed pursuant to the requirements of DMA 2000, published at 44 CFR 201.6 and new FEMA LHMP guidance, LHMP Policy Guide FP 206-21-0002 effective April 19, 2023. This guidance is structured around a four-phase process:

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

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

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

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

DMA Process	Modified NFIP/CRS Process
1) Organize Resources	
201.6(c)(1)	1) Organize the Planning Effort
201.6(b)(1)	2) Involve the Public
201.6(b)(2) and (3)	3) Coordinate with Other Departments and Agencies
2) Assess Risks	
201.6(c)(2)(i)	4) Identify the Hazards
201.6(c)(2)(ii)	5) Assess the Risks
3) Develop the Mitigation Plan	
201.6(c)(3)(i)	6) Set Goals
201.6(c)(3)(ii)	7) Review Possible Activities
201.6(c)(3)(iii)	8) Draft an Action Plan
4) Implement the Plan and Monitor Progress	
201.6(c)(5)	9) Adopt the Plan
201.6(c)(4)	10) Implement, Evaluate, and Revise the Plan

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

3.2.1. Phase 1: Organize Resources

Planning Step 1: Organize the Planning Effort

With the HVLCSD's commitment to participate in the DMA planning process, Foster Morrison worked with the HVLCSD project lead to establish the framework and organization for development of this LHMP Update. An initial internal kick-off meeting was held with HVLCSD on March 5, 2024, to discuss the organizational and process aspects of this 2025 LHMP Update.

The project kick-off meeting was held on March 26, 2024. Invitations to the kickoff meeting were extended to key District staff, County departments and special districts, as well as to other federal, state, and local stakeholders, including representatives from the public, which might have an interest in participating in the planning process. Representatives from the HMPC to the 2020 LHMP and other identified stakeholders were used as a starting point for the invite list, with additional invitations extended as appropriate throughout the planning process. The list of invitees is included in Appendix A.

Hazard Mitigation Planning Committee

The HMPC was established as a result of these initial meetings, as well as through interest generated through the initial public meeting and outreach conducted for this project as detailed later in this chapter. The HMPC, comprised of key district, county, and other government and stakeholder representatives and the public, developed the Plan with leadership from the HVLCSD project lead and facilitation by Foster Morrison. This list includes all HMPC members that were active participants in the Plan development process as evidenced through their attendance at one or more HMPC meetings, as well as those who provided key input into the Plan development process. The following individuals participated on the HMPC:

Table 3-2 HVLCSD Hazard Mitigation Planning Committee

TO BE PLACED

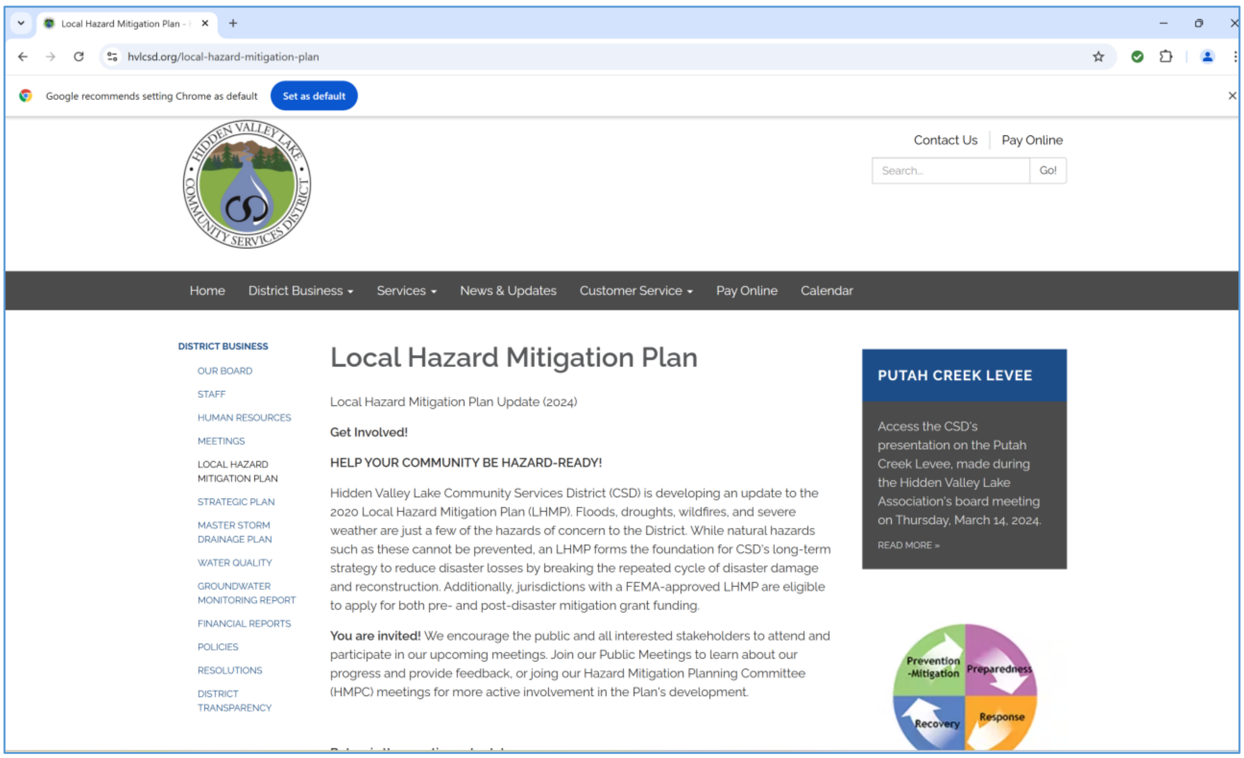
Meetings

The planning process officially began with a kick-off meeting held on March 26, 2024, followed by a public kick-off meeting held the same day at 5:30 pm. The meetings covered the scope of work and an introduction to the DMA requirements. During the HMPC meetings, participants were provided with data collection worksheets to facilitate the collection of information necessary to support development of the Plan Update. Using FEMA guidance, these worksheets were designed to capture information on past hazard events, identify hazards of concern to the District, identify values at risk to identified hazards, inventory existing capabilities, record possible mitigation actions, and to capture information on the status of mitigation action items from the 2020 LHMP. A copy of the worksheets for this project are included in Appendix A. The HVLCSD, seeking FEMA approval of this LHMP Update, completed and returned the worksheets to Foster Morrison for incorporation into this 2025 LHMP Update.

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

The HVLCSD LHMP website (as shown on Figure 3-1) can be accessed online at: https://www.hvlcsd.org/local-hazard-mitigation-plan.

Figure 3-1 HVLCSD Local Hazard Mitigation Plan Update Website



Source: HVLCSD LHMP Website

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

Table 3-3 HVLCSD Key Internal and HMPC Meetings

Meeting Type	Meeting Topic	Meeting Date	Meeting Location(s)
HVLCSD Internal Kickoff Meeting	1) Overview of LHMP plan development process 2) Initial identification of District staff, HMPC members, and public and private stakeholders 3) Discussion of GIS and other LHMP data needs	March 5, 2024	Virtual Zoom Meeting

Meeting Type	Meeting Topic	Meeting Date	Meeting Location(s)
HMPC #1 Kick-off Meeting	1) Introduction to DMA and the planning process 2) Overview of current LHMP; 3) Organize Resources (CRS Steps 1,2&3): the role of the Planning Committee, planning for public involvement, coordinating with other agencies/stakeholders 4) Introduction to Hazard Identification	March 26, 2024	HVLCSD District Conference Room Hidden Valley Lake, CA
HMPC #2	1) Risk assessment overview and work session -CRS Step 4: Assess the Hazard -CRS Step 5: Assess the Problem	July 11, 2024	HLCSD District Conference Room Hidden Valley Lake, CA
HMPC #3	1) Review of risk assessment summary 2) Review and update of mitigation goals 3) Intro to Mitigation Action Strategy -CRS Step 6: Set Goals -CRS Step 7: Review possible activities	September 18, 2024	HVLCSD District Conference Room Hidden Valley Lake, CA
HMPC #4	1) Review of mitigation alternatives 2) Review and update of mitigation actions from the 2020 LHMP 3) Identify updated list of mitigation actions by hazard 4) Review of mitigation selection criteria 5) Update and prioritize mitigation actions 6) Mitigation Action Strategy Implementation and Draft Action Development -CRS Step 7: Review possible activities -CRS Step 8: Draft an Action Plan	September 19, 2024	HVLCSD District Conference Room Hidden Valley Lake, CA
HMPC #5	1) Review of final HMPC, jurisdictional and public comments and input to Plan 2) Review and documentation of changed conditions, vulnerabilities, and mitigation priorities 3) CRS Step 8: Draft an Action Plan 4) CRS Step 9 & 10: Plan Maintenance and Implementation Procedures	January 16, 2025	HVLCSD District Conference Room Hidden Valley Lake, CA

Planning Step 2: Involve the Public

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

Early Public Outreach Activities

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

- Development of a HVLCSD 2025 LHMP Update webpage
- HVLCSD March 13, 2024, Press Release on the HMPC and Public Kickoff meetings sent to Lake County Record-Bee where it was published in the Lake County News as an article and also included in the paper's Calendar section
- Outreach post on HVLCSD Facebook site, March 12, 2024
- Outreach post on HVLCSD Facebook site, March 20, 2024
- Public Outreach Flyer posted on community bulletin board at the Hardester's grocery store
- Public Outreach Flyer posted at the Hartmann Rd. Mailboxes
- Public Outreach Flyer posted at the Hidden Valley Rd. Mailboxes
- Public Outreach Flyer posted at the Ravenhill Park Mailboxes
- Public Outreach Flyer posted at the Spruce Grove Rd. Mailboxes
- Public Outreach Flyer posted at the HVLCSD front lobby window

These early outreach efforts, targeting public, private and other interested stakeholders, focused on announcing the LHMP Update project and how to get involved in the process. The outreach also invited the public and other stakeholders to the HMPC and/or the public meetings for the project. Supporting documentation on these outreach efforts can be seen in Appendix A to this LHMP.

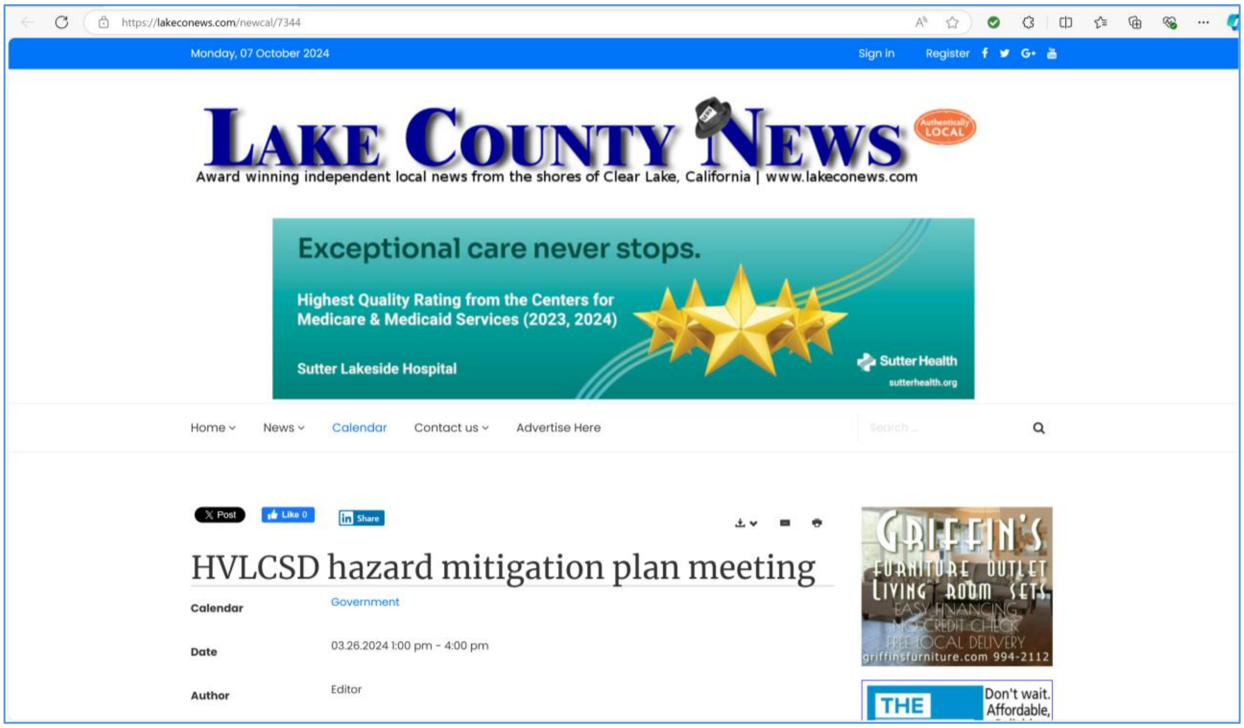
Public Meetings

Two public meetings were planned for this LHMP Update project, during key times of the LHMP development process as discussed below.

Public Meeting #1: LHMP Kickoff

Public outreach for this LHMP Update began at the beginning of the Plan development process with the early public outreach activities to inform the public of the purpose of the DMA and the hazard mitigation planning process for HVLCSD. The press release issued at the beginning of the project invited the public to attend either the public meeting or HMPC meetings at their convenience. Figure 3-2 captures the Lake County News article that was published as a result of this press release.

Figure 3-2 LHMP Public and Stakeholder Outreach Lake County News Article



Source: Lake County News

Public Meeting #2: On the Draft LHMP

The first draft of the LHMP Update was provided to the HMPC in November 2024, with a public review draft provided in December 2024. A public meeting was held on January 15, 2025, to present the draft LHMP and to collect public comments on the public review draft prior to finalization and submittal to Cal OES/FEMA. The public meeting was advertised in a variety of ways to maximize outreach efforts to both targeted groups and to the public at large and included a press release inviting the public to attend either the formal public meeting or the HMPC meeting at their convenience. The press release included information on the date, location and time of the meeting, where the draft Plan could be accessed in the community, and how to provide comments on the draft LHMP Update. In addition to a copy of the public review draft being placed on the HVLCSD LHMP website in advance of these meetings, a hard copy of the draft Plan was made available at the HVLCSD offices. Documentation to support the final public meeting, including meeting outreach, can be found in Appendix A.

In addition to the advertisement for public participation, notices of meetings were sent directly to all persons on the HMPC contact list and also to other agency and key stakeholders (including the public) with an interest in the HVLCSD Planning Area. The majority of these people reside in the HVLCSD Planning Area or in surrounding communities. Additional outreach for review of the Draft LHMP and final meetings included:

- Updated HVLCSD LHMP Webpage to announce the final meetings and to publish the Public Review Draft

- Outreach via a public meeting press release and published article for the Lake County News on the final meetings and review and comments on the Public Review Draft
- Outreach on the HVLCSD social media site, Facebook.

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

Table 3-4 Schedule of Public and Stakeholder Meetings

Meeting Type	Meeting Topic	Meeting Date	Meeting Locations
Early Public Kickoff Meeting #1	1) Intro to DMA and mitigation planning 2) 2025 LHMP Update Process	March 26, 2024	HVLCSD District Conference Room Hidden Valley Lake, CA
Final Public Meeting #2	1) Presentation of Draft LHMP and solicitation of public and stakeholder comments	January 15, 2025	HVLCSD District Conference Room Hidden Valley Lake, CA

Where appropriate, stakeholder and public comments and recommendations were incorporated into the final LHMP throughout the Plan development process, including the sections that address the risk assessment and mitigation goals and strategies. Public comments were solicited throughout the planning process and prior to LHMP submittal to Cal OES and FEMA. With key stakeholders and public members being part of the HMPC and plan development process, associated input was integrated as part of the plan development process by the HMPC. Public comments received are included in Appendix A in Section A.5.20. No additional comments were received on the Draft Plan prior to submittal to Cal OES and FEMA. All press releases, newspaper advertisements and articles, website postings, and public outreach efforts are on file with the HVLCSD and are included in Appendix A. The draft Plan is currently available online on the HVLCSD LHMP webpage at: https://www.hvlcsd.org/local-hazard-mitigation-plan.

Planning Step 3: Coordinate with Other Departments and Agencies

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

- TO BE ADDED AT THE END

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

Other Community Planning Efforts and Hazard Mitigation Activities

Coordination with other community planning efforts is also paramount to the success of this LHMP Update. Hazard mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability to hazards. The HVLCSD uses a variety of comprehensive planning mechanisms, to guide District operations including growth and development activities. Integrating existing planning efforts and mitigation policies and action strategies into this LHMP Update establishes a credible and comprehensive Plan that ties into and supports other District programs. The development of this LHMP Update incorporated information from the following existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities and other jurisdictions. This section provides a general overall list of plans, studies, and reports. More can be found in Appendix B to this Plan Update.

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

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

Coordination with Underserved Communities and Socially Vulnerable Populations

As detailed in FEMA's new 2023 LHMP guidance, the LHMP development process should utilize the Whole Community approach to hazard mitigation planning. Engagement and coordination with a variety of community-based organizations that work directly with or provide support to underserved communities and socially vulnerable populations, including individuals with disabilities and access and functional needs, is a critical component in addressing equity and diversity in mitigation planning and implementation. For this LHMP project, significant efforts were made to identify and engage the appropriate community members and groups to support the Plan development process. Starting with the Lake County Department of Human Services, the following organizations were identified and contacted seeking their participation and input into the HVLCSD's LHMP Update Project.

- **Lake County Human Services** –Lake County's Department of Human Services provides residents in the County with a variety of services to improve health, promote overall well being, and help all residents to be productive and independent contributors to the community. As part of the HVLCSD LHMP Update, staff from the Department of Human Services were outreached to be on the HMPC and to provide input into the Plan development process.
- **Listos California** – Anchored at the Governor's Office of Emergency Services (Cal OES) since 2019, Listos California engages a statewide network of community-based organizations, Tribal Governments, and Community Emergency Response Teams across the state to boost resiliency, provide accessible in-language information and advance a new culture of disaster preparedness. The managing director of Listos indicated that they are not allowed to give out any local names/subgrantees to anyone and to look at their website to see a list of participating groups.
- **Community Groups** – HVLCSD community organizations that support underserved and vulnerable populations were also identified, contacted and invited to attend either HMPC or Public meetings, provide input into the Plan development process, and comment on the Plan drafts. These groups were also invited to the final meetings on the LHMP Update Draft Plan. These community groups included the following organizations:
  - ✓ Middletown Senior Center. The director of the Middletown Senior Center was contacted and opportunities for outreach and participation in the HVLCSD LHMP Update were discussed. A public outreach flyer was posted at the center, and an interview was conducted with the Senior Center director to identify key vulnerable senior populations, issues, and concerns to support the District's Plan Update.
  - ✓ HVLA community. The HLVA community is the primary area served by the District. Several HVLA representatives were contacted and interviewed to identify vulnerable HVLA populations and to gather input on hazard related issues and concerns relative to the District's LHMP Update. The HVLA vulnerable populations groups primarily include seniors, children, and those with lack of or limited mobility. The concept of the HVLCSD's service area being vulnerable due to its location and status as a small, rural, and remote community was determined to be a major descriptor of the HVLCSD's underserved and vulnerable populations.

3.2.2. Phase 2: Assess Risks

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

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

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

NFIP Participation

Also as required by FEMA guidance is an assessment of the HVLCSD's, as the single participating jurisdiction to this LHMP Update, floodplain management program and participation in the NFIP. However, these FEMA requirements only apply to eligible NFIP communities. The HVLCSD, as a special district, is not an eligible jurisdiction for purposes of the NFIP, nor do they regulate land use and development for properties located within their service area. Lake County, where the HVLCSD is located, is the responsible entity for floodplain management and land use development within its County boundaries.

3.2.3. Phase 3: Develop the Mitigation Plan

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

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

Planning Step 8: Draft an Action Plan

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

3.2.4. Phase 4: Implement the Plan and Monitor Progress

Planning Step 9: Adopt the Plan

In order to secure buy-in and officially implement the LHMP Update, the Plan was adopted by the HVLCSD Board using the sample resolution contained in Appendix D.

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

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

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

Implementation and Maintenance Process: 2020 HVLCSD LHMP

The previous 2020 LHMP included a process for Plan maintenance and implementation of the mitigation strategy as well as formal updates to the LHMP. The 2020 process called for annual reviews, including a review of the status of mitigation strategy implementation. In addition, the 2020 process called for a formal plan update as required by DMA regulations every 5 years. With respect to the 2020 LHMP, regular reviews were conducted by the District. As part of these reviews, the LHMP was utilized to inform and develop the 2023 Strategic Plan and to review and prioritize the implementation of identified mitigation actions. This 2025 LHMP Update, once approved and adopted, will meet the DMA formal 5-year update requirement for the HVLCSD.

In addition, the 2020 LHMP was relied on and integrated into other HVLCSD planning mechanisms. Table 3-5 lists the planning mechanism the 2020 LHMP was integrated into by HVLCSD.

Table 3-5 HVLCSD - Incorporation of 2020 HVLCSD LHMP into Other Planning Mechanisms

Planning Mechanism 2020 LHMP Was Incorporated or Implemented Through	Details
2023 Strategic Plan	The LHMP was viewed for its list of hazard mitigation goals and used to inform goals in the Strategic Plan related to actions to be taken before and after a disaster
Risk Management Plans	Mitigation actions from the LHMP were used to inform the Risk Management Plans related to risk reduction measures to better prepare for and reduce the effects of a hazard events and disasters
2023 Water Shortage Contingency Plan	Data and information from the drought and water shortage sections were used to inform water shortage contingency measures
FEMA HMGP and Other Grants	Hazard risk and vulnerability data from the 2020 LHMP was used in the development of HMPG grant applications

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

Chapter 4 Risk Assessment

Requirement 44 CFR §201.6(c)(2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

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

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

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

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

Data for the Hidden Valley Lake Community Services District (HVLCSD or District) collected through this process has been incorporated into the following sections of this chapter:

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

lifelines; natural, historic, and cultural resources; economic assets and community activities of value; and future development trends, and where possible, estimates potential hazard losses.

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

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

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

4.1 Hazard Identification

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

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

Data Sources

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

- National Climatic Data Center Storm Events Database
- FEMA Disaster Declaration Database
- FEMA's National Risk Index
- 2020 HVLCSD Local Hazard Mitigation Plan
- 2023 Lake County Hazard Mitigation Plan
- 2023 State of California Hazard Mitigation Plan
- HMPC input

4.1.1. Results and Methodology

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

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

The following hazards in Table 4-1, listed alphabetically, were identified and investigated for this LHMP Update. As a starting point, the 2023 California State Hazard Mitigation Plan was consulted to evaluate the applicability of new hazards of concern to the State to the HVLCSD. Building upon this effort, hazards from the past plan were also identified, and comments explain how hazards were updated from the previous plan. Most hazards from the 2020 plan were profiled in this LHMP Update. Aquatic biological hazards and landslide were dropped from consideration. Winds were moved into the heavy rains and storms sections.

Table 4-1 HVLCSD Hazard Identification and Comparison from 2020 LHMP

2024 Hazards	2019 Hazards	Comment
–	Aquatic Biological Hazards: quagga mussel	This hazard was dropped due to its low significance in the District.
Climate Change	Climate Change	This hazard is the same in 2025 as in 2020.
Dam Failure	Dam Failure	This hazard is the same in 2025 as in 2020.
Drought & Water shortage (w/tree mortality)	Drought and Water Shortage	Tree mortality discussions have been added to this hazard.
Earthquake	Earthquake	This hazard is the same in 2025 as in 2020.
Floods: 1%/0.2% annual chance	Flood: 1%/0.2% Annual Chance	This hazard is the same in 2025 as in 2020.
Floods: Localized Stormwater	Flood: Localized/Stormwater	This hazard is the same in 2025 as in 2020.
–	Landslide and Debris Flows	This hazard was dropped due to its low significance in the District.
Levee Failure	Levee Failure	This hazard is the same in 2025 as in 2020.
Severe Weather: Extreme Cold and Freeze	Severe Weather: Extreme Cold and Freeze	This hazard is the same in 2025 as in 2020.
Severe Weather: Extreme Heat	Severe Weather: Extreme Heat	This hazard is the same in 2025 as in 2020.
Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)	Severe Weather: Heavy Rains, Snow, and Storms	This hazard is the same in 2025 as in 2020.
–	Severe Weather: High Winds	High winds were considered in the severe weather hazard of heavy rains and storms.
Wildfire (w/smoke and air quality)	Wildfire	Greater emphasis on smoke and air quality were added to this hazard.

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

Table 4-2 HVLCSD – Excluded Hazards

Hazard Excluded	Why Excluded
Tsunami and Seiche	The District is not on the coast.
Hurricane	The District is not on the coast or in an inland area at risk to hurricane.
Landslide	The District sees little area of landslide risk and has little ability to mitigate should it occur.
Snow Avalanches	The District does not have sufficient snowfall in populated areas to have avalanche as a hazard.
Sea Level Rise, Coastal Flooding, and Erosion	The District is not on the coast.
Volcano	The probability is low of volcanic eruption impacting the Planning Area.

Table 4-3 was completed by the District to identify, profile, and rate the significance of identified hazards.

Defining Significance (Priority) of a Hazard

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

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

Table 4-3 HVLCSD Hazard Identification and Assessment

Hazard*	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Climate Change	Extensive	Highly Likely	Limited - Critical	Medium	–
Dam Failure	Extensive	Unlikely	Catastrophic	High	Medium
Drought & Water shortage (w/tree mortality)	Extensive	Highly Likely / Occasional	Critical	High	High
Earthquake	Extensive	Occasional	Catastrophic	High	Low
Floods: 1%/0.2% annual chance	Significant	Occasional / Likely	Critical	High	Medium
Floods: Localized Stormwater	Significant	Highly Likely	Critical	Medium	Medium
Levee Failure	Significant	Unlikely	Critical	High	Medium
Severe Weather: Extreme Cold and Freeze	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)	Extensive	Highly Likely	Critical	Medium	Medium
Wildfire (w/smoke and air quality)	Extensive	Highly Likely	Catastrophic	High	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Likelihood of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic: More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical: 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited: 10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible: Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: Minimal potential impact
Medium: Moderate potential impact
High: Widespread potential impact

Climate Change Influence
Low: Minimal potential impact
Medium: Moderate potential impact
High: Widespread potential impact

*Power Outages/PSPS will be discussed as a vulnerability of all hazards.

4.1.2. Disaster Declaration History

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

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

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

Based on the disaster declaration history provided in Table 4-4, Lake County is among the many counties in California susceptible to disaster. Details on state and federal disaster declarations were obtained by the HMPC, FEMA, and Cal OES and compiled in chronological order in Table 4-4. A review of federal disasters shows 37 federal disaster declarations. Of these 37 federal declarations: 19 were associated with severe winter storms, heavy rains, or flooding; 14 for wildfire; 2 were from pandemic; 1 for drought; and 1 was for hurricane (a nationwide declaration for Katrina evacuations). A review of state declared disasters indicates that Lake County received 38 state declarations between 1950 and 2024. Of the 38 state declarations: 23 were associated with severe winter storms, heavy rains, or flooding; 7 were from wildfire, 2 were for freeze and severe weather conditions; 2 were for pandemic; 2 were from economic disasters; 1 was from road damage, and 1 was from drought. A summary of these events by disaster type is shown in Table 4-5.

Table 4-4 Lake County State and Federal Disaster Declarations, 1950-2024

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration Date	Federal Declaration Date
2023	California Severe Winter Storms, Straight-line Winds, Flooding, Landslides, and Mudslides	Storms	Storms	DR-4699	–	4/3/2023
2023	California Severe Winter Storms, Flooding, Landslides, and Mudslides	Storms	Storms	EM-3592	3/1/2023 3/8/2023	3/10/2023
2023	California Severe Winter Storms, Flooding, and Mudslides	Storms	Storms	EM-3591 2022-09	1/4/2023	1/9/2023
2021	Caldor Fire and Cache Fire	Fire	Fire	DR-4619 2021-06	8/17/2021 9/1/2021	9/12/2021
2020	California Wildfires	Fire	Fire	DR-4558 2020-06	8/18/2020	8/22/2020
2020	California Lnu Lightning Fire Complex	Fire	Fire	FM-5331	–	8/18/2020
2020	California Covid 19 Pandemic	Biological	Pandemic	DR-4482	3/4/2020	3/22/2020
2020	California Covid 19	Biological	Pandemic	EM-3428	3/4/2020	3/13/2020
2019	California Severe Winter Storms, Flooding, Landslides, And Mudslides	Storms	Storms	DR-4434 2019-03	5/18/2019	5/18/2019
2018	Summer 2018 California Wildfires and High Winds	Fire	Fire	2018-06	7/29/2018/ 11/30/2018	–
2018	Mendocino Complex Fires	Fire	Fire	DR-4382	–	8/4/2018
2018	Mendocino Complex Fires	Fire	Fire	FM-5262	7/28/2018	7/28/2018

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration Date	Federal Declaration Date
2018	Pawnee Fire	Fire	Fire	FM-5244 2018-03	06/25/2018	6/24/2018
2017	California Wildfires	Fire	Fire	DR-4344	–	10/10/2017
2017	Sulphur Fire	Fire	Fire	FM-5221	–	10/9/2017
2017	California Severe Winter Storms, Flooding, Mudslides	Flood	Storms	DR-4308 2017-03	3/7/2017	4/1/2017
2017	California Severe Winter Storms, Flooding, Mudslides	Flood	Storms	DR-4301 (2017-01)	1/23/2017	2/14/2017
2016	Clayton Fire (also called Chimney Fire)	Fire	Fire	FM-5145	–	8/14/2016
2015	Valley Fire and Butte Fire	Fire	Fire	DR-4240 (2015-03)	8/27/2015	8/22/2015
2015	Valley Fire	Fire	Fire	FM-5112	–	9/12/2015
2015	Rocky Fire	Fire	Fire	FM-5093	–	7/29/2015
2014	California Drought	Drought	Drought	GP 2014-13	1/17/2014	–
2014	December 2014 Storms	Flood	Storms	2014-07	3/2/2015	–
2012	Wye Fire	Fire	Fire	FM-5004	–	8/13/2012
2006	2006 June Storms	Flood	Storms	DR 1646 2006-03	4/10/2006	6/5/2006
2005/2006	2005/06 Winter Storms	Flood	Storms	DR-1628 2006-01	1/12/2006	2/3/2006
2005	Hurricane Katrina Evacuations	Economic	Hurricane	EM-3248 2005	–	9/13/2005
2003	State Road Damage	Road Damage	Flood	GP 2003	1/1/2003	–
2001	Energy Emergency	Economic	Greed	GP 2001	1/1/2001	–
1998	1998 El Nino Floods	Flood	Storms	DR-1203 98-01	2/19/1998	2/19/1998
1997	1997 January Floods	Flood	Storms	DR-1155 97-01	1/2/97-1/31/97	1/4/1997

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration Date	Federal Declaration Date
1996	Lake County Fire	Fire	Fire	96-03	8/1/1996	–
1995	California Severe Winter Storms, Flooding, Landslides, Mud Flows	Flood	Storms	DR-1046 95-03, 95-04	3/24/95	3/12/1995
1995	1995 Severe Winter Storms	Flood	Storms	DR-1044 95-01, 95-02, 95-03, 95-04	1/6/95-3/14/95	1/13/1995
1987	1987 Fires	Fire	Fire	GP	9/10/87, 9/3/87	–
1986	1986 Storms	Flood	Storms	DR-758 86-01	2/18-86-3/12/86	2/18/1986
1985	Hidden Valley Lake Fire	Fire	Fire	FM-2055	–	7/11/1985
1983	Winter Storms	Flood	Flood	DR-677 82-18	12/8/82-3/21/83	2/9/1983
1980	April Storms	Flood	Storms	80-01 – 80-25	4/1/1980	–
1979	Gasoline Shortage	Economic	OPEC	–	5/8/1979-11/13/79	–
1977	1977 Drought	Drought	Drought	EM-3023	–	1/20/1977
1972	1972 Freeze	Freeze	Freeze	–	7/13/1972	–
1970	1970 Freeze	Freeze	Freeze	–	5/1/70, 5/19/70, 6/8/70, 6/10/70, 7/24/70	–
1970	1970 Northern California Flooding	Flood	Flood	DR 283	1/27/1970 - 3/2/1970	2/16/1970
1964	1964 Late Winter Storms	Flood	Storms	DR-183	–	12/24/1964
1963	1963 Floods and Rains	Flood	Storms	DR-145	2/7/63, 2/26/63, 2/29/63, & 4/22/63	2/25/63
1963	1963 Floods	Flood	Storms	–	2/14/1964	–
1958	1958 April Storms and Floods	Flood	Storms	DR-52	4/5/1958	4/4/1958

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration Date	Federal Declaration Date
1958	1958 February Storms and Floods	Flood	Storms	CDO 58-03	2/26/1958	–
1955	1955 Floods	Flood	Flood	DR-47	12/22/1955	12/23/1955
1950	1950 Floods	Flood	Flood	OCD 50-01	11/21/1950	–

Source: Cal OES, FEMA. Retrieved June 2024.

Table 4-5 Lake County – State and Federal Disaster Declarations Summary 1950-2024

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Drought	1	2014	1	1977
Economic	2	1979, 2001	0	–
Fire	7	1987, 1996, 2015, 2018 (twice), 2020, 2021	14	1985, 2012, 2015 (three), 2016, 2017 (twice), 2018 (three), 2020 (twice), 2021
Flood (including heavy rains and storms)	23	1950, 1955, 1958 (twice), 1963, 1964 (twice), 1970, 1980, 1983, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2014, 2017 (twice), 2019, 2023 (twice)	19	1955, 1958, 1963, 1964, 1970, 1983, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019, 2023 (three)
Freeze	2	1970, 1972	0	–
Hurricane	0	–	1	2005
Pandemic	2	2020 (twice)	2	2020 (twice)
Road Damage	1	2003	0	–
Totals	**38**	–	**37**	**–**

Source: Cal OES, FEMA. Retrieved June 2024.

Lake County Disasters since 2019 LHMP

- 2023 Floods (two state and three federal)
- 2021 Fire (one state and one federal)
- 2020 Fires (one state and two federal)
- 2020 Pandemic (two federal and two state)

4.2 HVLCSD Asset Inventory and Growth and Development Trends

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

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

Data Sources

- 2020 US Census Bureau
- California Department of Parks and Recreation Office of Historic Preservation
- California Department of Water Resources Special Populations and Disadvantaged Community Mapping
- California Environmental Protection Agency Disadvantaged Communities
- California Environmental Quality Act
- California Natural Diversity Database
- Center for Disease Control Social Vulnerability Index
- Data USA
- FEMA National Risk Index
- Hazus 6.1
- HVLCSD GIS
- Justice 40 Initiative
- Lake County 2023 Parcel/Assessor Data
- Lake County GIS
- National Environmental Policy Act
- Office of Environmental Health Hazard Assessment
- US Fish and Wildlife National Wetlands Inventory

4.2.1. Assets Inventory

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

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

People and Populations

Life safety is a priority issue for hazard mitigation planning. The people that live, work, and recreate in the District are potentially at risk during a natural hazard event. The 2020 US Census Bureau population estimate for Hidden Valley Lake (a census designated place) was 6,235. This is up from 5,579 at the 2010 census, and from 3,777 at the 2000 census.

The District noted that the population estimates above are likely low. According to the District, 7,500 individuals reside in households in the District. With 2,404 residences in the District (according to Lake County 2023 Parcel/Assessor Data) this equates to an average household size of 3.12.

Vulnerable and Underserved Populations

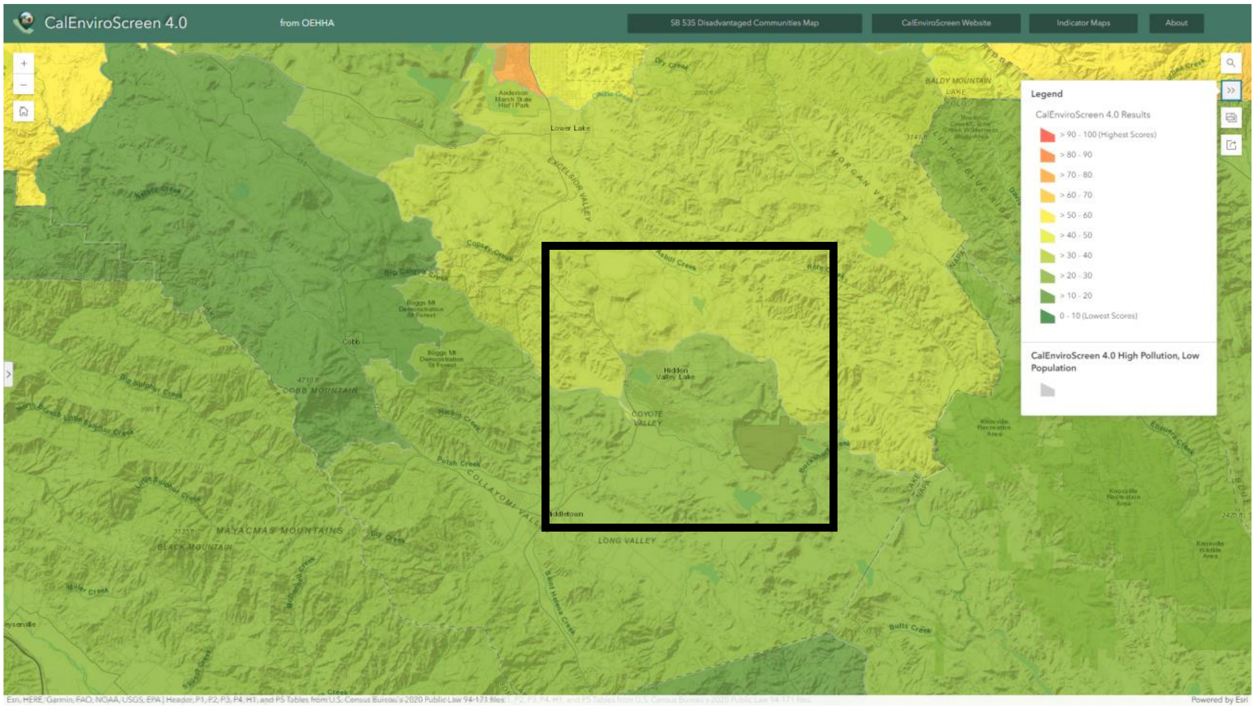
Vulnerable and underserved populations include those who may need additional help or accommodation during a hazard event. The vulnerable and underserved populations discussion is based on the following sources:

- California Environmental Protection Agency (CalEPA) Disadvantaged Communities
- Center for Disease Control (CDC) Social Vulnerability Index
- Justice 40 Initiative
- California Department of Water Resources (CA DWR) Special Populations and Disadvantaged Community Mapping
- FEMA National Risk Index
- Local Input

CalEPA Disadvantaged Communities

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

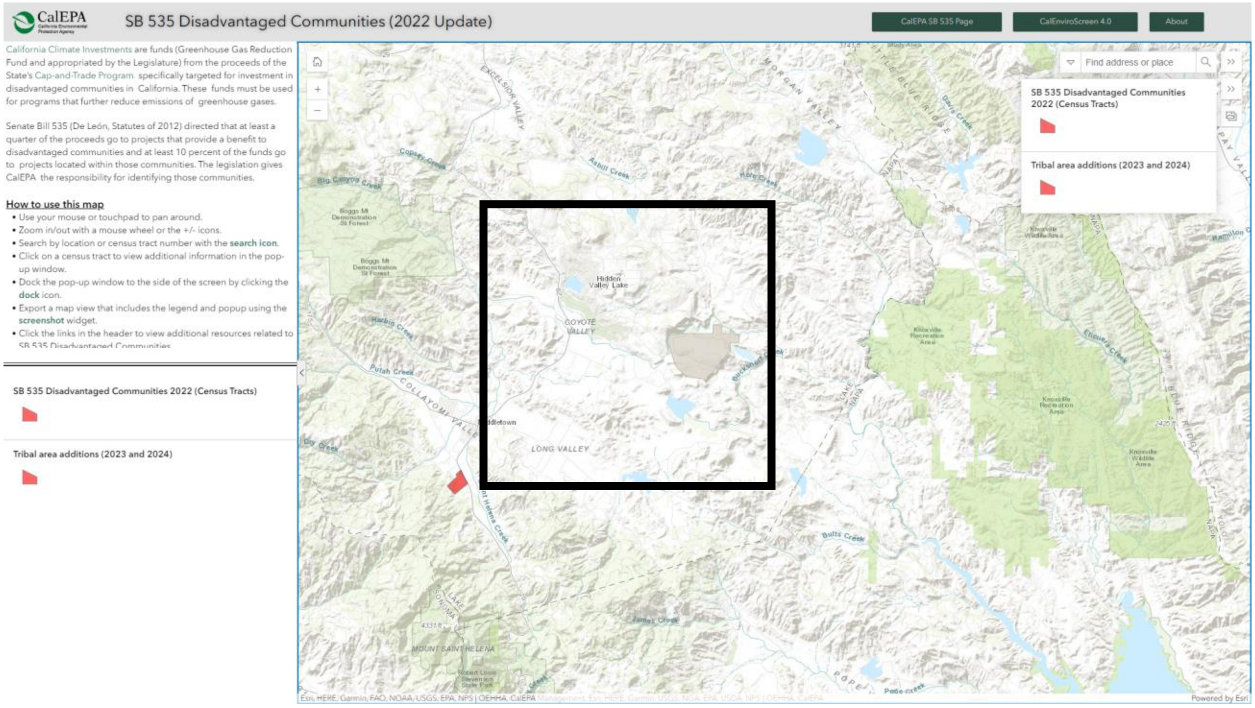
Figure 4-1 HVLCSD Planning Area – CalEPA Disadvantaged Communities



Source: CalEPA, map retrieved 06/26/2024

CalEPA has another way to track disadvantaged communities. California Climate Investments are funds (Greenhouse Gas Reduction Fund and appropriated by the Legislature) from the proceeds of the State's Cap-and-Trade Program specifically targeted for investment in disadvantaged communities in California. These funds must be used for programs that further reduce emissions of greenhouse gases. Senate Bill (SB) 535 directed that at least a quarter of the proceeds go to projects that provide a benefit to disadvantaged communities and at least 10 percent of the funds go to projects located within those communities. CalEPA has also mapped these communities. Those communities that fall inside this program in and around HVLCSD are shown on Figure 4-2. HVLCSD falls outside this area.

Figure 4-2 HVLCSD SB 535 Disadvantaged Communities (2022)



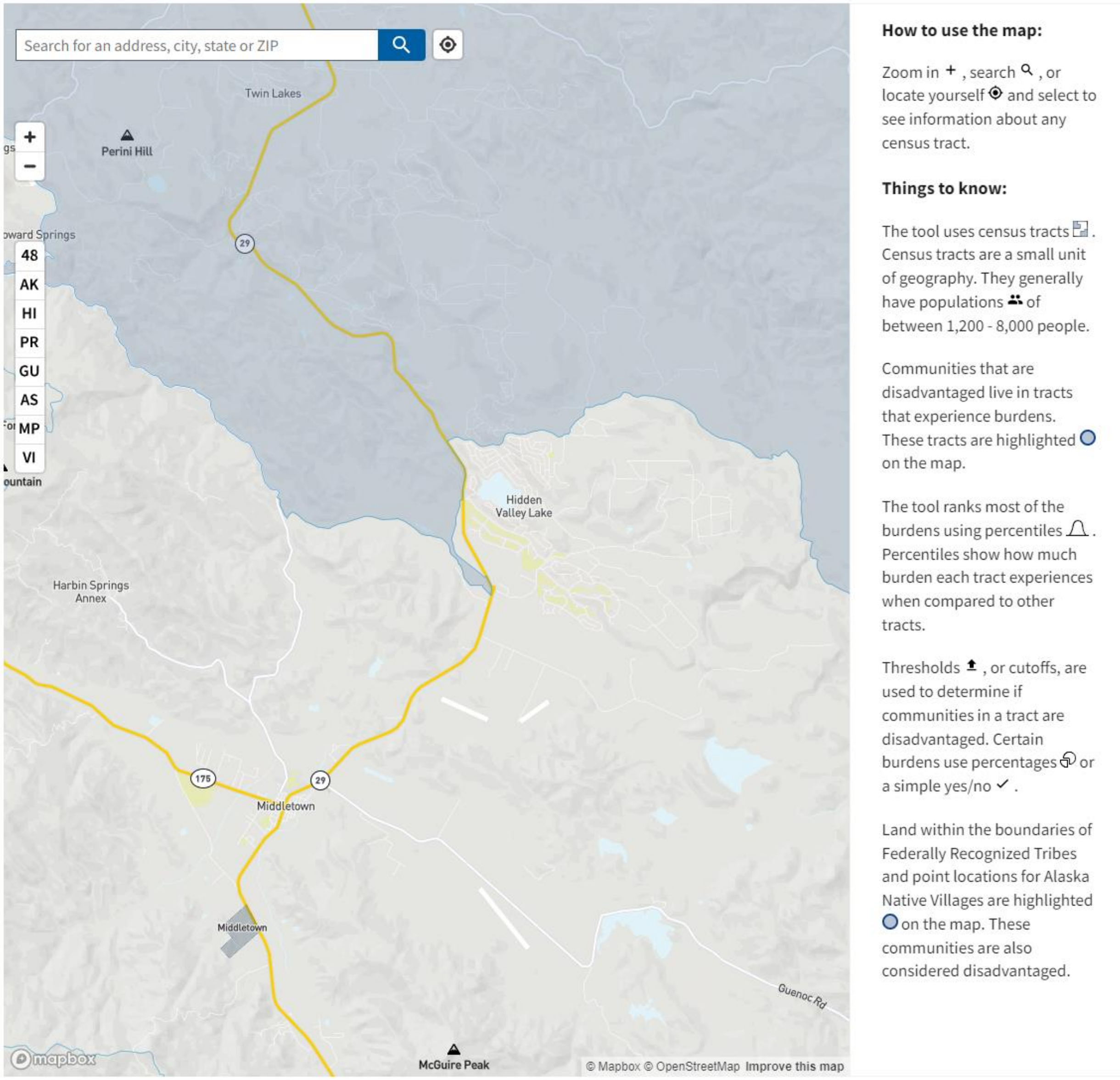
Source: CalEPA, map retrieved 06/26/2024

Justice 40 Initiative

Recently, the federal government has made it a goal that 40 percent of the overall benefits of certain Federal climate, clean energy, affordable and sustainable housing, and other investments flow to disadvantaged communities that are marginalized by underinvestment and overburdened by pollution. To accomplish this goal, the Justice 40 Initiative was announced. A mapping tool was created known as the Climate and Economic Justice Screening Tool (CEJST). The tool uses datasets as indicators of burdens. The burdens are organized into categories. A community is highlighted as disadvantaged on the CEJST map if it is in a census tract that is (1) at or above the threshold for one or more environmental, climate, or other burdens, and (2) at or above the threshold for an associated socioeconomic burden. In addition, a census tract that is completely surrounded by disadvantaged communities and is at or above the 50% percentile for low income is also considered disadvantaged. Census tracts that are overburdened and underserved are highlighted as being disadvantaged on the map. Federally Recognized Tribes, including Alaska Native Villages, are also considered disadvantaged communities.

Those areas in and near the HVLCSD that fall in these areas is shown on Figure 4-3. As shown, HVLCSD lies adjacent to but outside these areas.

Figure 4-3 HVLCSD – Justice 40 Initiative Areas



Source: Climate and Economic Justice Screening Tool. Retrieved 10/13/2024.

CDC Social Vulnerability Index

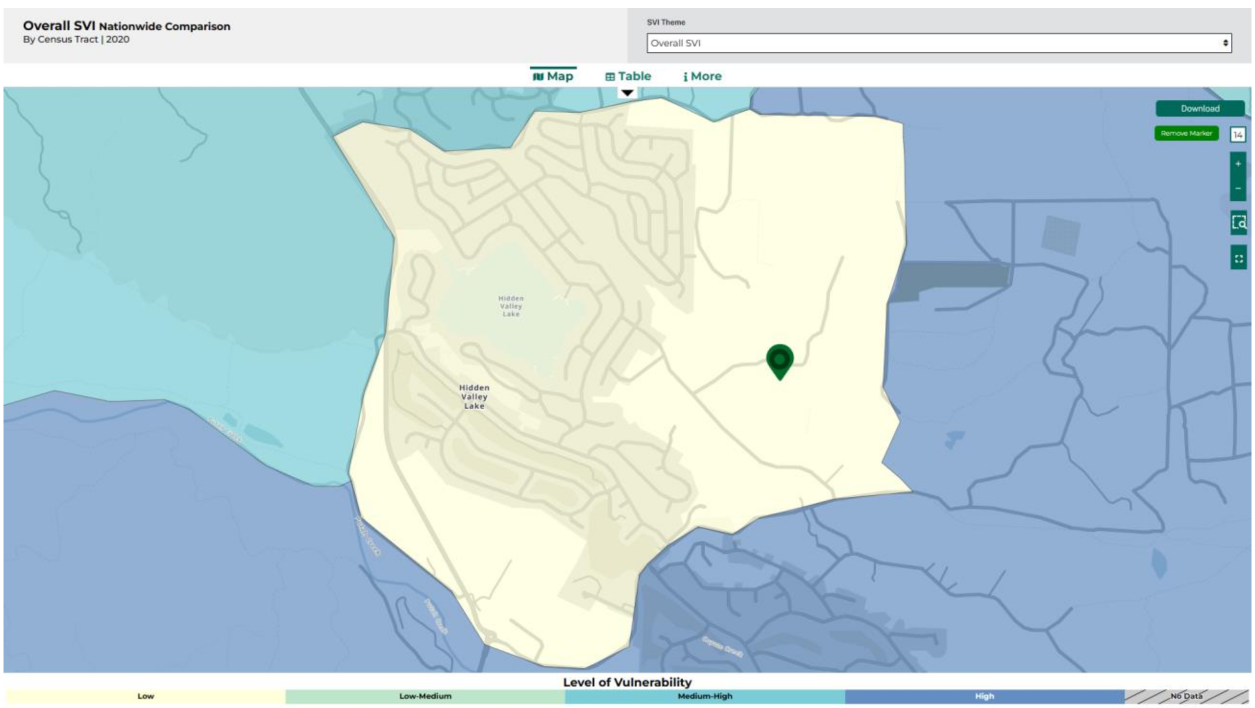
Every community must prepare for and respond to hazardous events, whether a natural disaster like a tornado or disease outbreak, or a human-made event such as a harmful chemical spill. A number of factors, including poverty, lack of access to transportation, and crowded housing may weaken a community's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

Social vulnerability refers to the potential negative effects on communities caused by external stresses on human health. Such stresses include natural or human-caused disasters, or disease outbreaks. Reducing social vulnerability can decrease both human suffering and economic loss. CDC Social Vulnerability Index

(CDC SVI) uses 15 U.S. census variables to help local officials identify communities that may need support before, during, or after disasters.

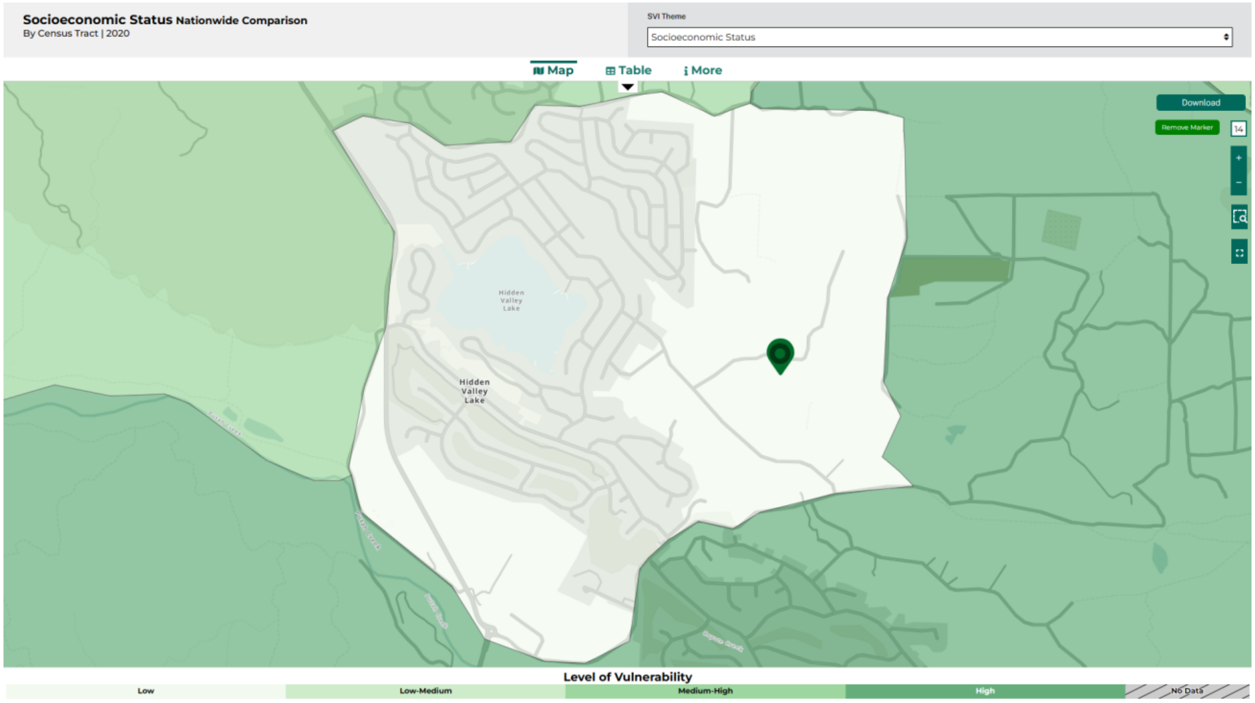
The Agency for Toxic Substances and Disease Registry's (ATSDR) Geospatial Research, Analysis & Services Program (GRASP) created databases to help emergency response planners and public health officials identify and map communities that will most likely need support before, during, and after a hazardous event. CDC SVI uses U.S. Census data to determine the social vulnerability of every census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. The CDC SVI ranks each tract on 15 social factors, including poverty, lack of vehicle access, and crowded housing, and groups them into four related themes. Each tract receives a separate ranking for each of the four themes, as well as an overall ranking. Maps of the four themes are shown in the figure below for the tract that contains Hidden Valley Lake. The overall SVI map is shown in Figure 4-4; the socioeconomic SVI for the Planning Area is shown in Figure 4-5; the household composition SVI is shown in Figure 4-6; the minority and language SVI is shown in Figure 4-7; and the housing and transportation SVI is shown in Figure 4-8. These maps show little to no change in social vulnerability (from any of the above factors) across the District.

Figure 4-4 HVLCSD – Overall Social Vulnerability



Source: CDC Social Vulnerability Index – map retrieved map retrieved 5/1/2024
Level of Vulnerability Rating: **Yellow** – Low; **Green** – Low/Medium; **Aqua** – Medium/High; **Blue** – High; **Grey Hatched** – No Data; **Grey** – Not Available

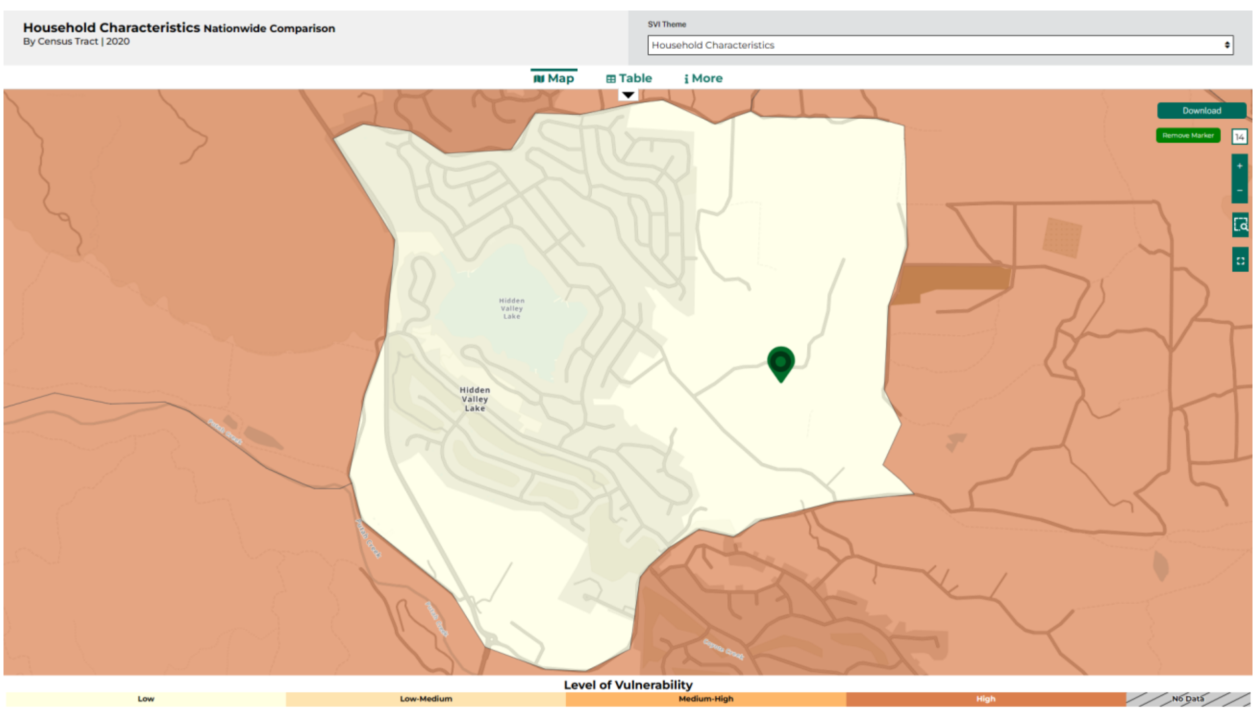
Figure 4-5 HVLCSD – Socioeconomic Status Vulnerability



Source: CDC Social Vulnerability Index – map retrieved 5/1/2024

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

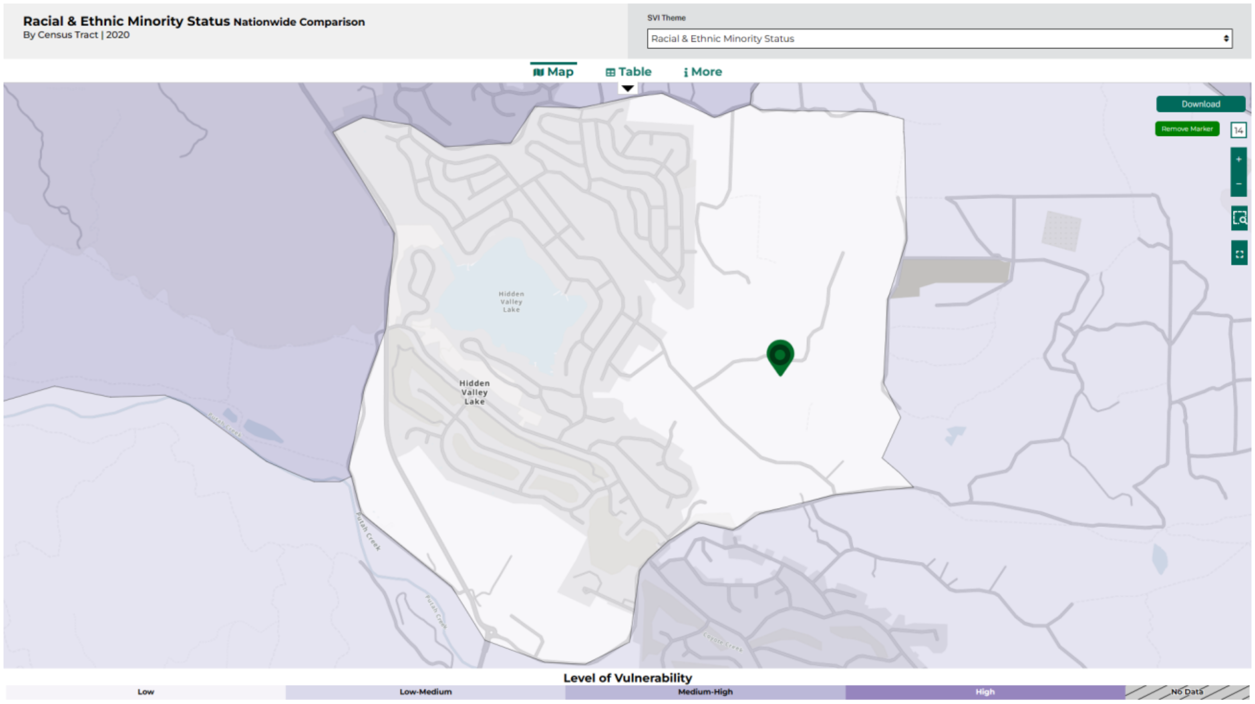
Figure 4-6 HVLCSD – Household Composition and Disabilities Social Vulnerability



Source: CDC Social Vulnerability Index – map retrieved map retrieved 5/1/2024

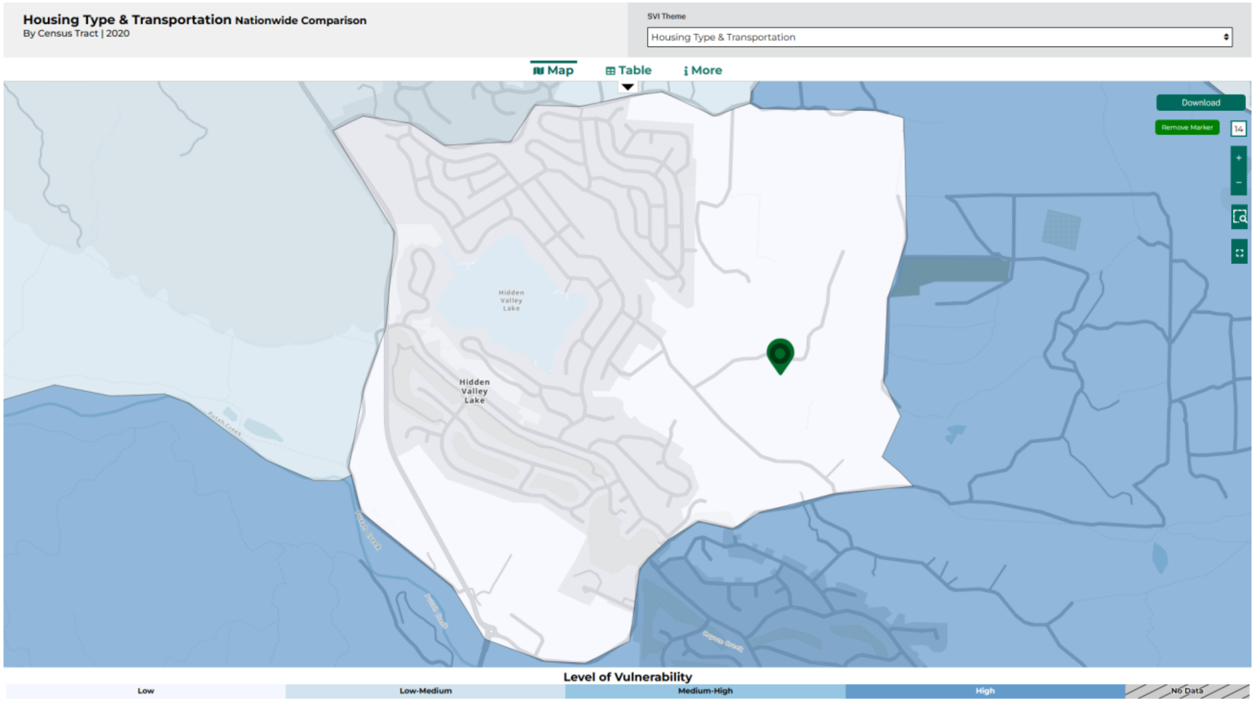
Level of Vulnerability Rating: **Faint Orange** – Low; **Light Orange**– Low/Medium; **Orange** – Medium/High; **Dark Orange** – High; **Grey Hatched** – No Data; **Grey** – Not Available

Figure 4-7 HVLCSD – Minority/Language Social Vulnerability



Source: CDC Social Vulnerability Index – map retrieved map retrieved 5/1/2024
Level of Vulnerability Rating: **Faint Purple** – Low; **Light Purple** – Low/Medium; **Purple** – Medium/High; **Dark Purple** – High; **Grey Hatched** – No Data; **Grey** – Not Available

Figure 4-8 HVLCSD – Housing/Transportation Social Vulnerability

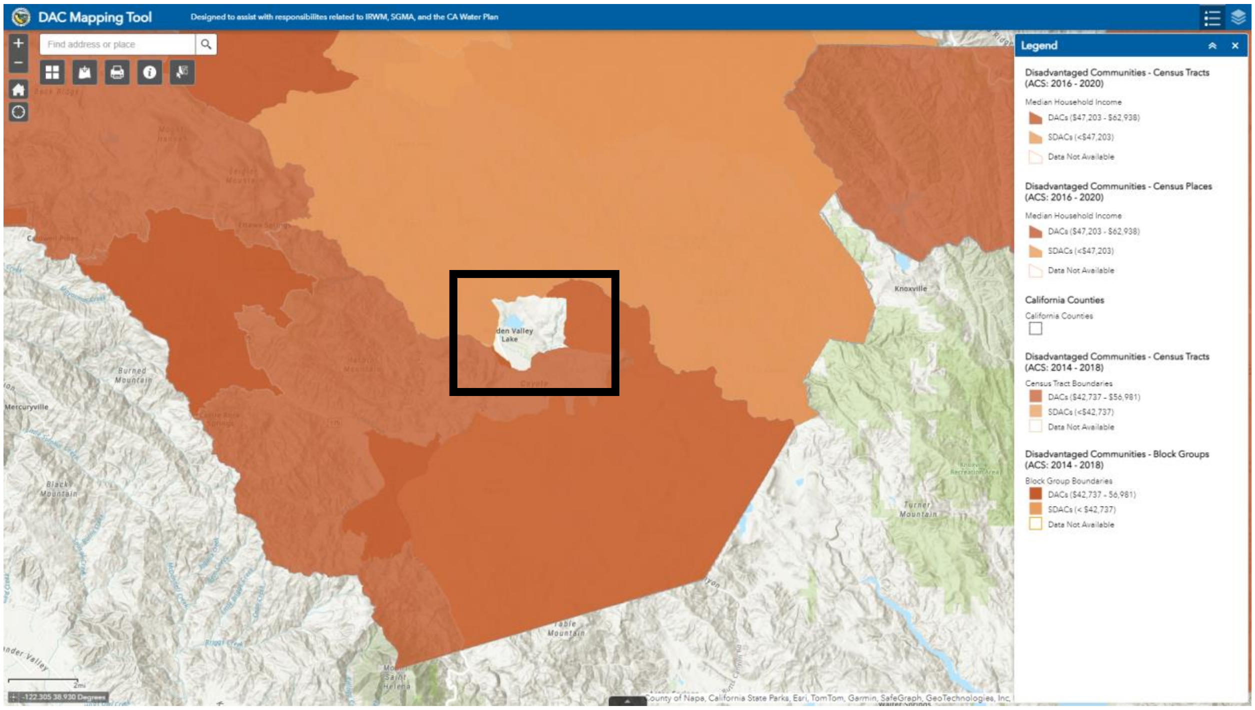


Source: CDC Social Vulnerability Index – map retrieved map retrieved 5/1/2024
Level of Vulnerability Rating: **Faint Blue** – Low; **Light Blue** – Low/Medium; **Blue** – Medium/High; **Dark Blue** – High; **Grey Hatched** – No Data; **Grey** – Not Available

California DWR Disadvantaged Community Mapping Tool

The State of California's Proposition 1 Disadvantaged Community (DAC) Involvement Program is designated to ensure the involvement of DACs as well as Economically Distressed Areas and Underrepresented Communities, which DWR collectively refers to as DACs. The Cal DWR definition for a Disadvantaged Community is a community with an annual median household income (MHI) that is less than 80% of the Statewide annual MHI (PRC Section 75005(g)), and those census geographies with an annual MHI less than 60% of the Statewide annual MHI are considered "Severely Disadvantaged Communities". Those areas in the Planning Area considered disadvantaged are shown in Figure 4-9. As shown, HVLCSD is surrounded by higher vulnerability areas, but resides outside of these areas.

Figure 4-9 HVLCSD – Disadvantaged Areas



Source: Cal DWR DAC Mapping Tool – retrieved 6/27/2024

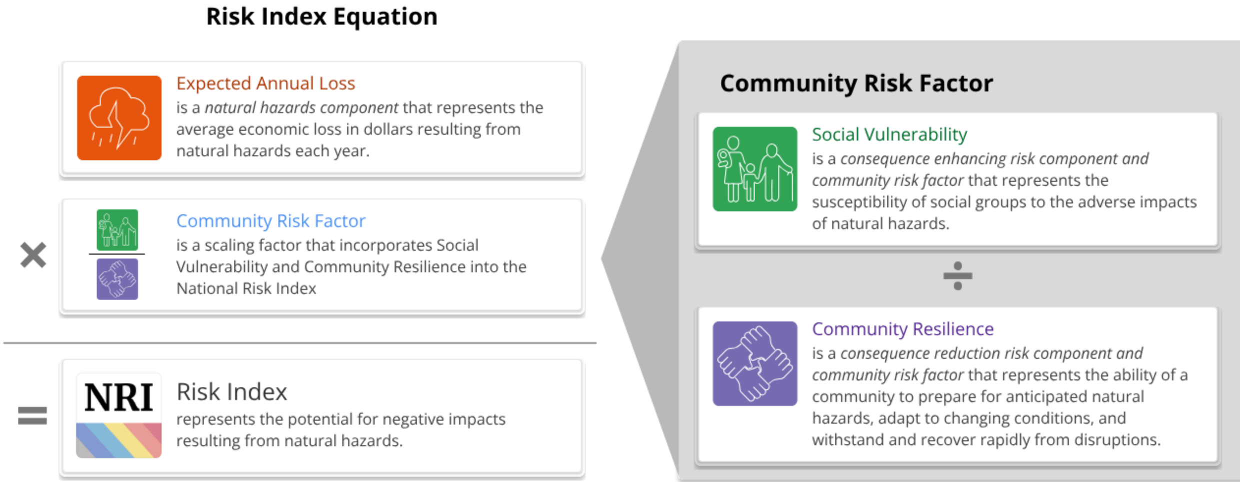
FEMA National Risk Index

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

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

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

Figure 4-10 National Risk Index Equation



Source: FEMA National Risk Index

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

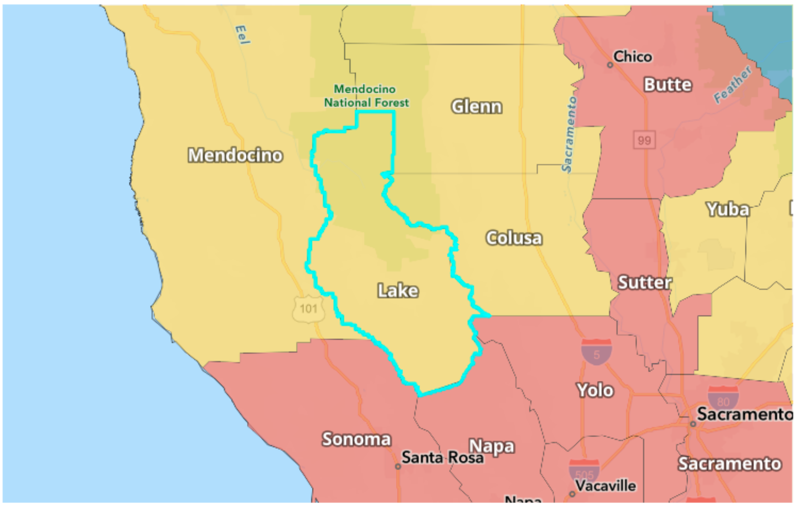
Data from the National Risk Index for Lake County is seen below. Information is not specific to the District, but to the County in which the District lies. Figure 4-11 shows a summary map and score for the District. As shown, greater Lake County's Risk Index rating is Relatively Moderate. Figure 4-12 shows the expected annual loss map and score. As shown, greater Lake County's expected annual loss rating is Relatively Moderate. Figure 4-13 shows the social vulnerability map and score. As shown, greater Lake County has a Very High social vulnerability. Figure 4-14 shows the community resilience map and score. As shown, communities in Lake County have a Relatively Low ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.

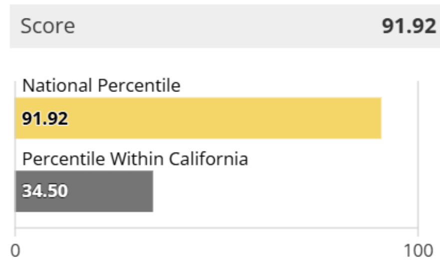
The Lake County FEMA National Risk Index Report is included in its entirety in Appendix G.

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

Risk Index

The Risk Index rating is **Relatively Moderate** for **Lake County, CA** when compared to the rest of the U.S.





92% of U.S. counties have a lower Risk Index

34% of counties in California have a lower Risk Index

Risk Index Legend

Very High · Relatively High · Relatively Moderate · Relatively Low · Very Low

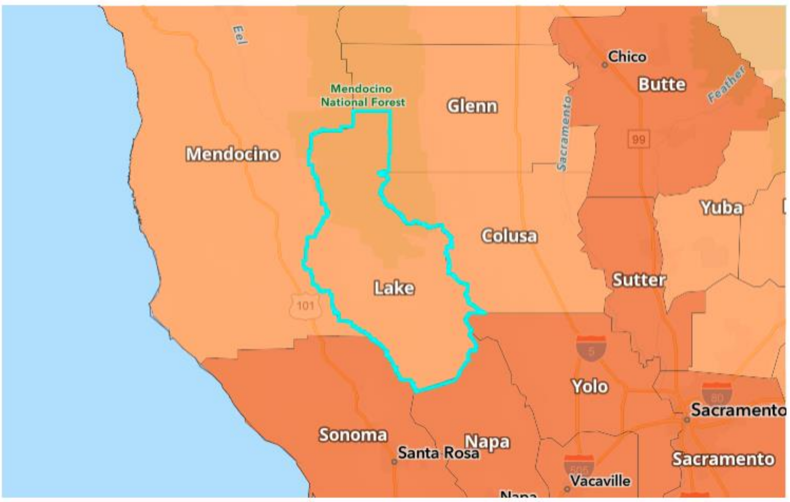
No Rating · Not Applicable · Insufficient Data

Source: FEMA National Risk Index, retrieved 6/27/2024.

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

Expected Annual Loss

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



Score	89.85

National Percentile: 89.85

Percentile Within California: 31.00

0 100

90% of U.S. counties have a lower Expected Annual Loss

31% of counties in California have a lower Expected Annual Loss

Expected Annual Loss Legend

Very High · Relatively High · Relatively Moderate · Relatively Low · Very Low

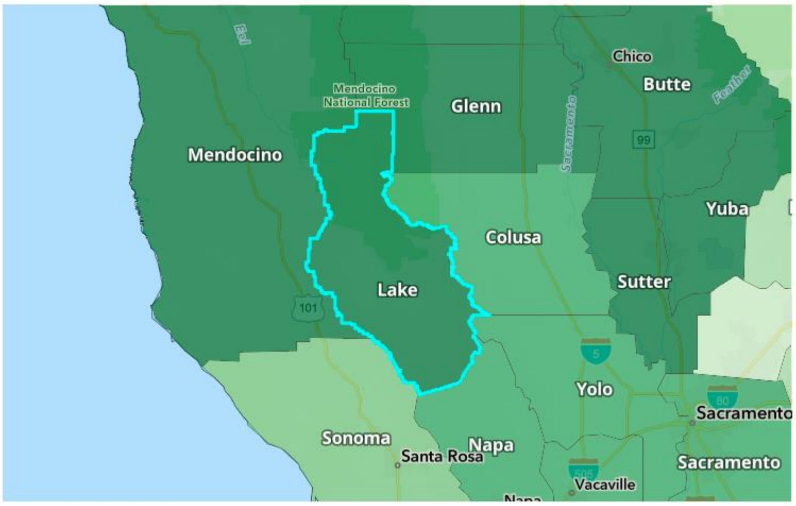
No Expected Annual Losses · Not Applicable · Insufficient Data

Source: FEMA National Risk Index, retrieved 6/27/2024.

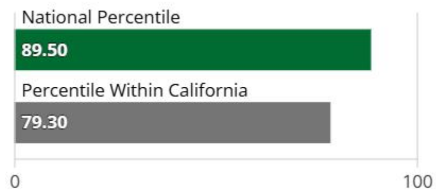
Figure 4-13 FEMA National Risk Index – Social Vulnerability Map and Score for Lake County

Social Vulnerability

Social groups in **Lake County, CA** have a **Very High** susceptibility to the adverse impacts of natural hazards when compared to the rest of the U.S.



Score **89.5**



90% of U.S. counties have a lower Social Vulnerability

79% of counties in California have a lower Social Vulnerability

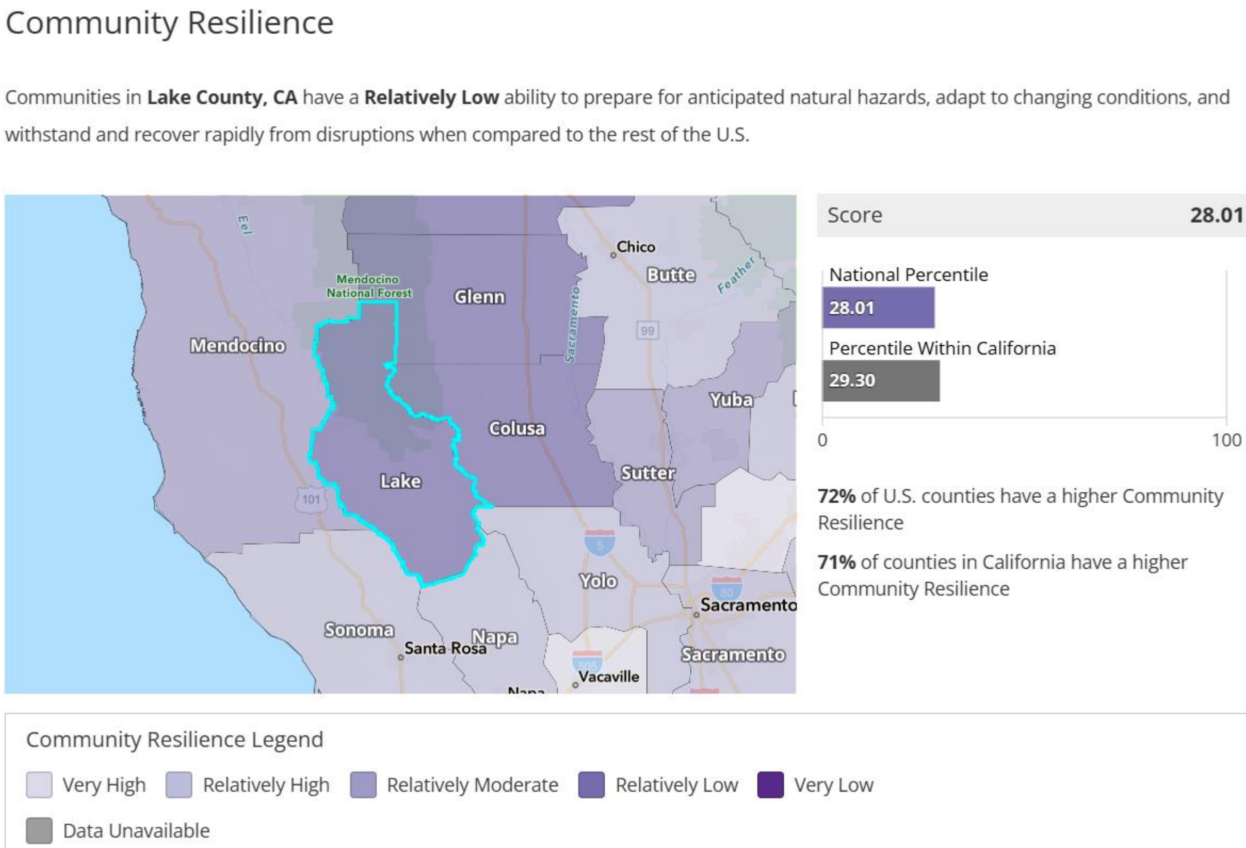
Social Vulnerability Legend

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

Data Unavailable

Source: FEMA National Risk Index, retrieved 6/27/2024.

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



Source: FEMA National Risk Index, retrieved 6/27/2024.

Local Input

The HMPC noted that, while there are vulnerable and underserved populations in surrounding Lake County, these populations are more limited in the HVLCSD Planning Area. This coincides with the Cal DWR and CDC findings in the sections above. The elderly and disabled are a concern during hazard events and disasters. The ability to hear warning sirens, ability to evacuate and relocate is very challenging and can be expensive when evacuation is extended for a lengthy time. The District noted that the area it serves is small, rural, and remote.

Structures

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

The analysis for structures in the HVLCSD Planning Area is separated out into two separate analyses:

- **HVLCSD Facility Assets** – These are the facilities, structures, and other assets which HVLCSD owns and maintains operational control.
- **HVLCSD Service Area** – This is comprised of the parcels and structures associated with the residents and businesses located within HVLCSD's Service Area who use the services provided by HVLCSD.

HVLCSD Owned Assets

This analysis captures the values associated with HVLCSD owned assets. The data provided by HVLCSD represents best available data and provides information as to which HVLCSD assets are potentially at risk and vulnerable to the damaging effects of natural hazards.

Methodology

HVLCSD's assets were used as the basis for the inventory of HVLCSD's owned assets and their values. Other GIS data, such as jurisdictional boundaries, roads, streams, and area features, was also obtained from HVLCSD, Lake County, and other sources to support mapping and analysis of assets at risk. The HVLCSD point assets are categorized as land, general, sewer system, and water system assets totaling 1,362 assets. The line assets are categorized as sewer line and reclaimed water line assets totaling 60.5 miles. HVLCSD maintains 32 miles of water mainlines (believed, though not all mapped by GIS), 24 miles of sewer mainlines, and around 4.5 miles of recycled water main lines. The HVLCSD owned land assets and their analysis for the District utilized the methodology provided below for the HVLCSD Service area and include parcels, by property type, with land and content replacement values.

The HVLCSD owned assets include:

- Land Assets – parcels
- General Assets – buildings
- Sewer System Assets – generators, manholes, sewer pumps, sewer lines, reclaimed water line
- Water System Assets – hydrants, PRVs, pumps, tanks, valves, wells, lines

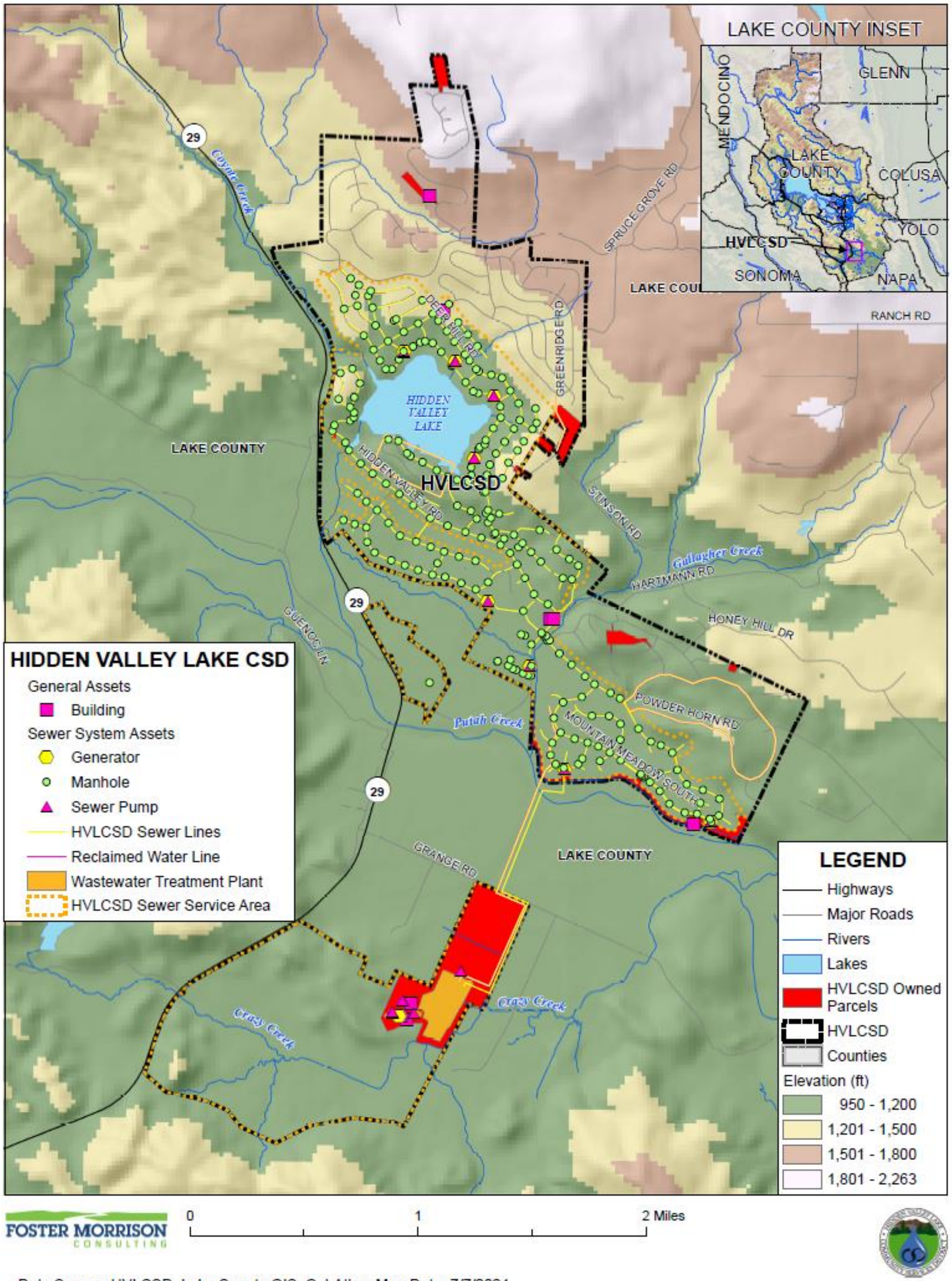
Data Limitations & Notations

Although based on best available data, the resulting information should only be used as an initial guide to overall values associated with HVLCSD assets. In the event of a disaster, structures and other infrastructure improvements are at the greatest risk of damage. Depending on the type of hazard and resulting damages, the land itself may not suffer a significant loss. For that reason, the values of structures and other infrastructure improvements are of greatest concern. With respect to the value of land associated with HVLCSD owned parcels, assessor values were not available as these parcels fall under a tax exempt status. Instead, the HVLCSD consulted with local realtors to obtain estimated fair market values of the 18 owned HVLCSD parcels. **Note**: water line lengths were available for analysis, but values were not due to data limitations.

HVLCSD Asset Analysis: Values at Risk Results

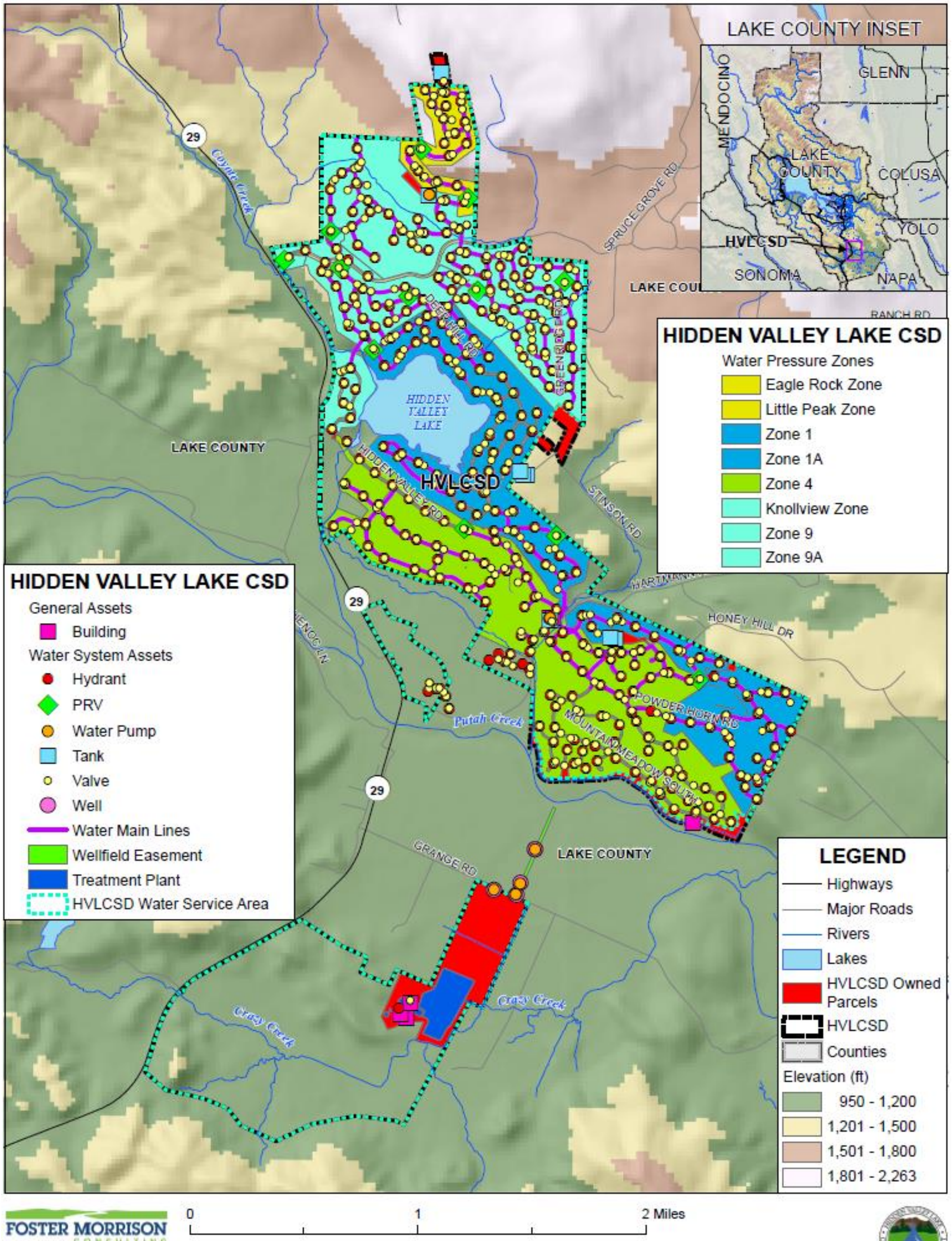
HVLCSD water, sewer, general, and land values from identified assets were identified and summed in order to determine total values at risk associated with HVLCSD owned assets. HVLCSD sewer service assets are shown on Figure 4-15, while water service assets are shown on Figure 4-16. Table 4-6 shows the total values or exposure for the point assets. Table 4-7 shows the total values or exposure for the sewer line assets. Table 4-8 contains no values but shows the water system line lengths.

Figure 4-15 HVLCSD – Sewer System and Service Area Assets



Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/7/2024.

Figure 4-16 HVLCSD – Water System and Service Area Assets



Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 10/30/2024.

Table 4-6 HVLCSD – Sewer and Water System Point Asset Counts and Values

Asset	Asset Count	Asset Value	Content Value
Land Asset			
Parcel	20	$2,765,000	–
Land Asset Total	**20**	**$2,765,000**	–
General Asset			
Building	8	$7,495,389	$1,590,091
General Asset Total	**8**	**$7,495,389**	**$1,590,091**
Sewer System Asset			
Generator	10	$1,029,884	–
Manhole	246	$287,574	–
Sewer Pumps	34	$520,100	–
Sewer System Asset Total	**290**	**$1,837,558**	–
Water System Asset			
Generator	2	$381,164	–
Hydrant	316	$736,280	–
PRV	12	$67,308	–
Pump	16	$893,990	–
Tank	8	$4,255,773	–
Valve	685	$715,142	–
Well	5	$915,425	–
Water System Asset Total	**1,044**	**$7,965,082**	**–**
Grand Total	**1,362**	**$20,063,029**	**$1,590,091**

Source: HVLCSD

Table 4-7 HVLCSD – Sewer System Line Asset Counts and Values

Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Sewer Line	4	$70	9,095	$636,672
	6	$90	61,001	$5,490,067
	8	$135	12,188	$1,645,407
	10	$208	16,094	$3,347,523
	12	$208	1,805	$375,453
	15	$353	4,581	$1,616,965
	Sewer Line Total		**104,764**	**$13,112,087**
Reclaimed Water Line	–	$208	24,158	$5,024,958
	Reclaimed Water Line Total		**24,158**	**$5,024,958**

Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Grand Total			**128,922**	**$18,137,045**

Source: HVLCSD

Table 4-8 HVLCSD – Water System Line Asset Lenths

Asset Diameter (inches)	Asset Length (feet)	Asset Length (miles)
Water Main Line		
(blank)	2,244	0.43
8"	28,659	5.43
6"	87,350	16.54
4"	2,167	0.41
12"	5,442	1.03
10"	2,062	0.39
Water Main Line Total	**127,924**	**24.23**
Water Lateral Lines		
3"	13	0.01
4"	1,024	4.45
6"	1,225	1.62
Water Lateral Lines Total	**2,262**	**6.08**

Source: HVLCSD

HVLCSD Service Area

This analysis captures the values associated with all parcels located within the HVLCSD Service Area (which coincides with the District Planning Area), comprised of the existing HVLCSD jurisdictional boundary and the current sewer and water service area boundaries. This data provided by HVLCSD and Lake County, as described further below, represents best available data and provides information as to which parcels are potentially at risk and vulnerable to the damaging effects of natural hazards within the HVLCSD Service Area.

Methodology

Lake County's 2023 Assessor Data and the County's GIS parcel data were used as the basis for the inventory of assessed values for both improved and unimproved parcels within the HVLCSD Service Area. This data provides the land and improved values assessed for each parcel, along with key information such as property use. Other GIS data, such as jurisdictional boundaries, roads, streams, and area features, was also obtained from HVLCSD and Lake County to support mapping and analysis of assets at risk. The Lake County GIS parcel data contained a vast number of parcels. This plan focuses on the HVLCSD Service Area for this effort, and therefore the GIS parcel data specific to the HVLCSD Service Area contained 2,431 parcels.

Data Limitations & Notations

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

Property Use Categories

Lake County provided a Zoning dataset containing base zoning code data which provided detailed descriptive information about how each property is generally used, such as residential, commercial, or open space. The zoning codes were refined and categorized into the following property use categories and linked back to the Lake County Assessor data. The final property use categories include:

- Agricultural
- Commercial
- Open Space / Rural Lands
- Residential

Once Property Use Codes were grouped into categories, the number of total and improved parcels and land and improved values were inventoried for the HVLCSD Service Area by property use.

Estimated Content Replacement Values

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

Table 4-9 HVLCSD – Content Replacement Factors by Property Use

Property Use Categories	Hazus Property Use Categories	Hazus Content Replacement Values
Agricultural	Agricultural	100%
Commercial	Commercial	100%
Open Space/Rural Lands	Open Space	100%
Residential	Residential	50%

Source: Hazus

HVLCSD Service Area Parcel Analysis - Values at Risk Results

Values associated with land, and improved structure values were identified and summed in order to determine total assessed values at risk in the HVLCSD Service Area. Together, the land value and improved structure value make up the majority of assessed values associated with each identified parcel or asset. Improved parcel counts were based on the assumption that a parcel was improved if a structure value was present. The CRVs were added to the assessed values. Table 4-10 shows the total values or exposure for the parcels located within the HVLCSD Service Area. The values for the HVLCSD Service Area are broken out by property use and are provided in Table 4-11. As shown, there are $741 million in land, structure, and contents value in the Service Area, of which $741 million is residential properties.

Table 4-10 HVLCSD – Service Area Parcels Counts and Values

Parcels / Location	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
HVLCSD	3,409	2,431	$90,762,553	$431,484,835	$218,856,657	$741,104,045

Source: Lake County 2023 Parcel/Assessor Data, HVLCSD

Table 4-11 HVLCSD Service Area Parcels Counts and Values by Property Use

Location / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
HVLCSD						
Agricultural	1	0	$0	$0	$0	$0
Commercial	33	27	$2,264,070	$6,228,479	$6,228,479	$14,721,028
Residential	3,328	2,404	$88,478,886	$425,256,356	$212,628,178	$726,363,420
Open Space / Rural Lands	47	0	$19,597	$0	$0	$19,597
HVLCSD Total	**3,409**	**2,431**	**$90,762,553**	**$431,484,835**	**$218,856,657**	**$741,104,045**

Source: Lake County 2023 Parcel/Assessor Data, HVLCSD

Critical Facilities and Infrastructure

For purposes of this Plan and consistent with the approach used in other Lake County LHMPs, a critical facility is defined as:

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

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

- **Essential Services Facilities** include, without limitation, public safety, emergency response, emergency medical, designated emergency shelters, communications, public utility plant facilities and equipment, and government operations. Sub-Categories include:
  - ✓ Public Safety - Police stations, fire and rescue stations, emergency operations centers.
  - ✓ Emergency Response - Emergency vehicle and equipment storage and essential governmental work centers for continuity of government operations.
  - ✓ Emergency Medical - Hospitals, emergency care, urgent care, ambulance services.
  - ✓ Designated Emergency Shelters.
  - ✓ Communications - Main hubs for telephone, main broadcasting equipment for television systems, radio and other emergency warning systems.
  - ✓ Public Utility Plant Facilities - including equipment for treatment, generation, storage, pumping and distribution (hubs for water, wastewater, power and gas).
  - ✓ Essential Government Operations - Public records, courts, jails, building permitting and inspection services, government administration and management, maintenance and equipment centers, and public health.
  - ✓ Transportation Lifeline Systems - Airports, helipads, critical highways, roads, bridges and other transportation infrastructure (Note: Critical highways, roads, etc. will be determined during any hazard-specific evacuation planning and are not identified in this plan).
- **At Risk Population Facilities** include, without limitation, pre-schools, public and private primary and secondary schools, before and after school care centers with 12 or more students, daycare centers with 12 or more children, group homes, and assisted living residential or congregate care facilities with 12 or more residents.
- **Hazardous Materials Facilities** include, without limitation, any facility that could, if adversely impacted, release of hazardous material(s) in sufficient amounts during a hazard event that would create harm to people, the environment and property.

Using this definition, all HVLCSD facilities are considered critical facilities. These were shown on Figure 4-15 and Figure 4-16 above.

Community Lifelines

Assessing the vulnerability of the HVLCSD Planning Area to natural hazards and disasters also involves reviewing and inventorying the community lifelines in place that could be affected. It is important to include these items in hazard discussions as the continuous operation of critical government and business functions is essential to human health and safety and/or economic security. Information on community lifelines include:

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

For this Plan, community lifelines include the following (as defined by FEMA):

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

In the HVLCSD Planning Area, the District has ownership of only a few of these community lifelines. The District noted that many of these community lifelines are all in place and functional as part of regular government operations of Lake County. The District relies on the larger County to provide many of these lifelines to the residents that the District serves.

Natural, Historical, and Cultural Resources

Assessing the vulnerability of the HVLCSD Planning Area to disaster also involves inventorying the natural, historic, and cultural assets of the area. This step is important for the following reasons:

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- If these resources are impacted by a disaster, knowing so ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts are higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, such as wetlands and riparian habitat, which help absorb and attenuate floodwaters.

Natural Resources

Natural resources are important to include in cost/benefit analyses for future projects and may be used to leverage additional funding for mitigation projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural resource assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as reducing the force of and storing floodwaters. The District Planning Area contains a variety of natural resources. The sections below discuss the natural resources that fall within the HVLCSD boundary.

Special Status Species

To further understand natural resources that may be particularly vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to identify potentially at-risk species (i.e., endangered species) in the District Planning Area. An endangered species is any species of fish, plant life, or wildlife that is in danger of extinction throughout all or most of its range. A threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Both endangered and threatened species are protected by law and any future hazard mitigation projects are subject to these laws. Candidate species are plants and animals that have been proposed as endangered or threatened but are not currently listed. There are many federal endangered, threatened, or candidate species in or near the District. The California Natural Diversity Database was searched for listed species. The quad that contains the District Planning Area contains 42 species. These species are listed in Table 4-12.

Table 4-12 HVLCSD – Threatened and Endangered Species

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Animals - Amphibians					
Rana boylii	foothill yellow-legged frog	None	Candidate Threatened	SSC	–
Animals - Birds					
Haliaeetus leucocephalus	bald eagle	Delisted	Endangered	FP	–
Animals - Mammals					
Corynorhinus townsendii	Townsend's big-eared bat	None	None	SSC	–
Lasionycteris noctivagans	silver-haired bat	None	None	–	–
Lasiurus cinereus	hoary bat	None	None	–	–
Myotis yumanensis	Yuma myotis	None	None	–	–
Animals - Reptiles					
Emys marmorata	western pond turtle	None	None	SSC	–
Community - Terrestrial					
Northern Basalt Flow Vernal Pool	Northern Basalt Flow Vernal Pool	None	None	–	–
Plants - Vascular					
Lomatium repostum	Napa lomatium	None	None	–	4.3
Erigeron greenei	Greene's narrow-leaved daisy	None	None	–	1B.2
Harmonia hallii	Hall's harmonia	None	None	–	1B.2
Helianthus exilis	serpentine sunflower	None	None	–	4.2
Hemizonia congesta ssp. congesta	congested-headed hayfield tarplant	None	None	–	1B.2
Lasthenia burkei	Burke's goldfields	Endangered	Endangered	–	1B.1
Amsinckia lunaris	bent-flowered fiddleneck	None	None	–	1B.2
Streptanthus hesperidis	green jewelflower	None	None	–	1B.2
Legenere limosa	legenere	None	None	–	1B.1
Calystegia collina ssp. oxyphylla	Mt. Saint Helena morning-glory	None	None	–	4.2

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Sedella leiocarpa	Lake County stonecrop	Endangered	Endangered	–	1B.1
Astragalus breweri	Brewer's milk-vetch	None	None	–	4.2
Astragalus rattanii var. jepsonianus	Jepson's milk-vetch	None	None	–	1B.2
Trifolium hydrophilum	saline clover	None	None	–	1B.2
Calochortus uniflorus	pink star-tulip	None	None	–	4.2
Erythronium helenae	St. Helena fawn lily	None	None	–	4.2
Hesperolinon bicarpellatum	two-carpellate western flax	None	None	–	1B.2
Hesperolinon didymocarpum	Lake County western flax	None	Endangered	–	1B.2
Hesperolinon sharsmithiae	Sharsmith's western flax	None	None	–	1B.2
Castilleja rubicundula var. rubicundula	pink creamsacs	None	None	–	1B.2
Erythranthe nudata	bare monkeyflower	None	None	–	4.3
Gratiola heterosepala	Boggs Lake hedge-hyssop	None	Endangered	–	1B.2
Calamagrostis ophitidis	serpentine reed grass	None	None	–	4.3
Orcuttia tenuis	slender Orcutt grass	Threatened	Endangered	–	1B.1
Collomia diversifolia	serpentine collomia	None	None	–	4.3
Leptosiphon acicularis	bristly leptosiphon	None	None	–	4.2
Leptosiphon jepsonii	Jepson's leptosiphon	None	None	–	1B.2
Leptosiphon latisectus	broad-lobed leptosiphon	None	None	–	4.3
Navarretia cotulifolia	cotula navarretia	None	None	–	4.2
Navarretia jepsonii	Jepson's navarretia	None	None	–	4.3
Navarretia leucocephala ssp. bakeri	Baker's navarretia	None	None	–	1B.1
Navarretia leucocephala ssp. plieantha	many-flowered navarretia	Endangered	Endangered	–	1B.2
Navarretia paradoxinota	Porter's navarretia	None	None	–	1B.3
Delphinium uliginosum	swamp larkspur	None	None	–	4.2

Source: California Natural Diversity Database. Retrieved May 2024

Legend: CDFW: WL – Watch List; SSC – Species of Special Concern; FP – Fully Protected

Legend: CA Rare Plan Rank:

1A Plants presumed extinct in California and rare/extinct elsewhere
1B.1 Plants rare, threatened, or endangered in California and elsewhere; seriously threatened in California
1B.2 Plants rare, threatened, or endangered in California and elsewhere; fairly threatened in California
1B.3 Plants rare, threatened, or endangered in California and elsewhere; not very threatened in California
2A Plants presumed extirpated in California, but more common elsewhere
2B.1 Plants rare, threatened, or endangered in California, but more common elsewhere; seriously threatened in California
2B.2 Plants rare, threatened, or endangered in California, but more common elsewhere; fairly threatened in California
2B.3 Plants rare, threatened, or endangered in California, but more common elsewhere; not very threatened in California
3.1 Plants about which we need more information; seriously threatened in California
3.2 Plants about which we need more information; fairly threatened in California

3.3	Plants about which we need more information; not very threatened in California
4.1	Plants of limited distribution; seriously threatened in California
4.2	Plants of limited distribution; fairly threatened in California
4.3	Plants of limited distribution; not very threatened in California

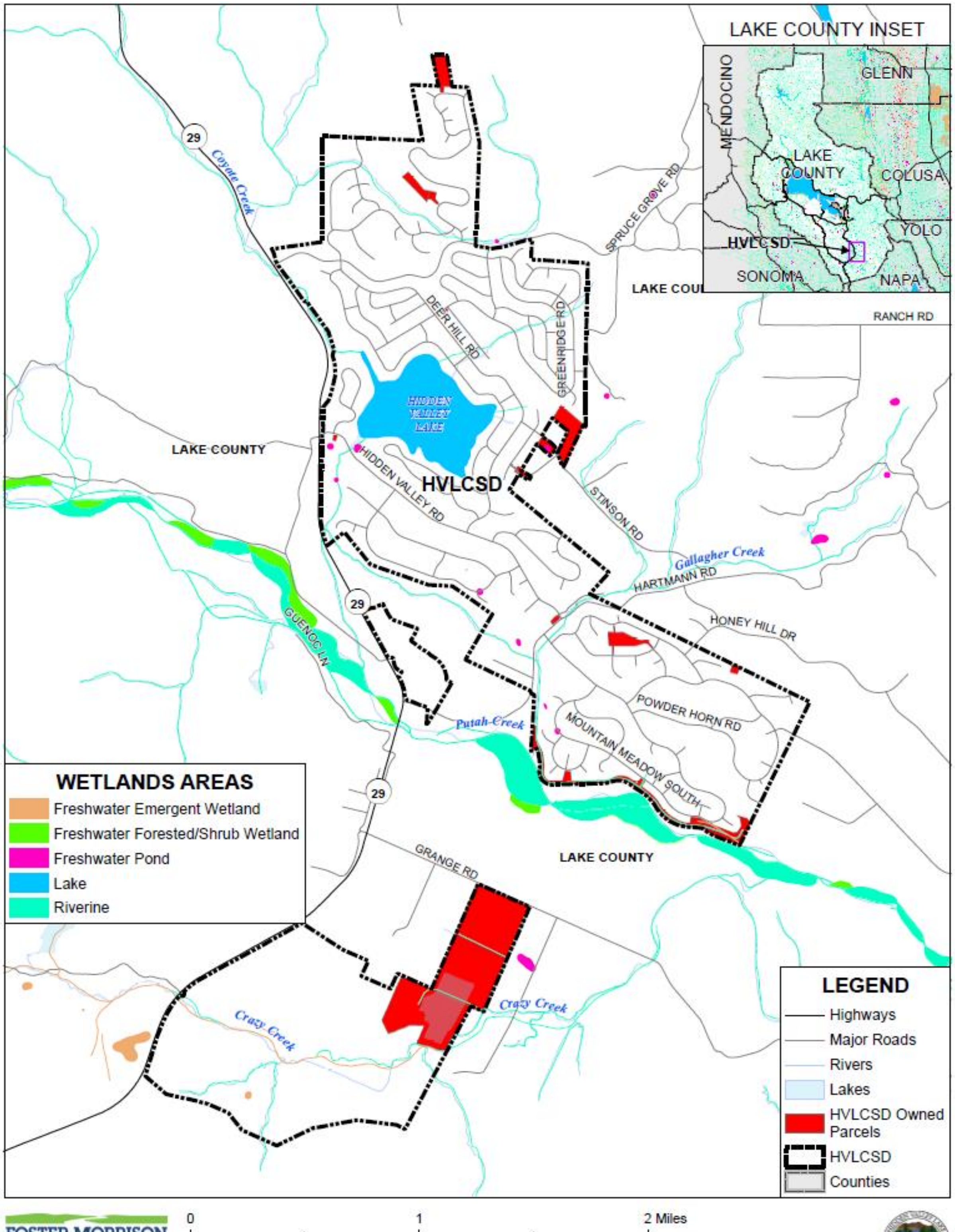
Wetlands

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

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

The National Wetlands inventory indicates that small wetland areas are located within the District Planning Area. Wetlands in and around the District are shown in Figure 4-17.

Figure 4-17 HVLCSD – Wetland Locations



Data Source: U.S. Fish and Wildlife Service National Wetlands Inventory May 2017, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/7/2024.

Wetlands Natural and Beneficial Functions

Wetlands are often found in floodplains and depressional areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flow. Wetlands perform a variety of ecosystem functions including food web support, habitat for insects and other invertebrates, fish and wildlife habitat, filtering of waterborne and dry-deposited anthropogenic pollutants, carbon storage, water flow regulation (e.g., flood abatement), groundwater recharge, and other human and economic benefits.

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

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

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

Cultural and Historical Resources

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

- The **National Register of Historic Places** is the nation's official list of cultural resources worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of the Interior.
- The **California Register of Historical Resources** program encourages public recognition and protection of resources of architectural, historical, archeological, and cultural significance and identifies historical resources for state and local planning purposes; determines eligibility for state historic preservation grant funding; and affords certain protections under the California Environmental Quality

Act. The Register is the authoritative guide to the state's significant historical and archeological resources.

- **California Historical Landmarks** are sites, buildings, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Landmarks #770 and above are automatically listed in the California Register of Historical Resources.
- **California Points of Historical Interest** are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Points designated after December 1997 and recommended by the State Historical Resources Commission are also listed in the California Register.

There is one historic property in the District. This is shown in Table 4-13.

Table 4-13 HVLCSD – Historical Resources

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City
Stone House (450)		X		11/2/1949	Middletown

Source: California Department of Parks and Recreation Office of Historic Preservation, http://ohp.parks.ca.gov/. Retrieved 6/28/2024.

It should be noted that these lists may not be complete, as they may not include those currently in the nomination process and not yet listed. Additionally, as defined by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by CEQA and NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

Economic Assets and Community Activities of Value

Assessing the vulnerability of the District to natural hazards and disasters also involves inventorying the economic assets and community activities of value to the HVLCSD.

Economic Assets

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

- Primary Economic Sectors
- Major employers
- Commercial Centers

The HVLCSD noted that the District is the largest employer in the Hidden Valley Lake area, making it the primary economic asset. Most of the adjacent area is residential property with a small commercial district that has been recently developed. Middletown is also nearby that includes additional commercial areas and the Tribal Casino. While not in our planning area, many residents served by the HVLCSD are also served by businesses in the Middletown area.

Community Activities of Value

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

- Festivals and Fairs
- Sporting Events
- Tourism

The District noted that there are a few smaller activities of value (community gatherings and sporting events) that happen sporadically throughout the year. This is the result of the District serving a HOA that is mostly residential.

4.2.2. Growth and Development Trends

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

Population Trends and Projections

Past growth and current populations were gathered for the District. Information from the HVLCSD (for staff populations, as well as Service Area populations) and the US Census Bureau form the basis of this discussion.

HVLCSD Staff and Facility Populations

In addition to the population of the HVLCSD Service Area, there is a population of HVLCSD staff and contractors who are on site in HVLCSD buildings each day. These staff are at risk from any hazard event. Staff travel between HVLCSD buildings and parcels, so analysis of staff in each location is difficult.

Past Growth and Current Population in the HVLCSD Service Area

As shown in Table 4-14, there has been steady growth in the HVLCSD Service Area boundaries. Census estimates in 2020 showed 6,235 in Hidden Valey Lake Census Designated Place. The District estimates a larger number and assumes 7,500 served by the District.

Table 4-14 HVLCSD – Past and Current Populations

Year	Population	Population Change
2000	3,777	–
2010	5,579	1,802
2020	6,235	656
2024 (HVLCSD Estimate)	7,500	1,265

Source: HVLCSD, US Census Bureau, Data USA

Population Projections

The District continues to see growth in the area. Population projections for HVLCSD and its Service Area are not currently available, but the lifting of the State Water Resources Control Board (SWRCB) development restrictions has encouraged growth to occur in the District. It should be noted that the District has no direct control over population growth which falls under the purview of Lake County; it responds to this growth by providing water and wastewater services to new development. The District noted that the groundwater basin it draws from can supply the water needs of a larger population.

Development since 2020 Plan

The District noted that while no new water or sewer facilities have been added since the 2020 LHMP, there have been several projects implemented to replace and upgrade existing facilities. This includes the installation of new steel water storage tanks to replace the previous tanks made of wood. The wooden tank at Unit 9, Eagle Rock, is being replaced with two steel tanks and generators have been added to water pumping stations. Both the tank replacement projects and the addition of generators should reduce the vulnerability of the HVLCSD to future hazard events.

Future Development Areas

As discussed in the 2020 HVLCSD LHMP, in 2014 the State Water Resources Control Board (SRWCB) issued a Compliance Order that the Grange Wells in the District needed to curtail their diversions. This order required the District to take steps to prevent new service connections and to secure a reliable long-term water supply. This caused the District (and the surrounding HVLA) issues with vacant lot owners, who were upset that their property was not able to be developed. After the 2020 LHMP was submitted for approval, the SWRCB completed research that the groundwater in the Coyote Valley alluvial aquifer was considered “percolating groundwater”. This effectively ended the Compliance Order issued in 2014. Effectively nothing changed in the groundwater basin, other than the SRWCB understanding the issue in more detail, and concluding that the aquifer does provide a reliable long-term water supply. This Compliance Order is no longer valid, and the District is free to develop in the future.

Service area expansion is underway to provide service to a golf course. There is current development on major projects that will replace two old wooden water tanks and placement of two generators that will keep water services going during a power shut off.

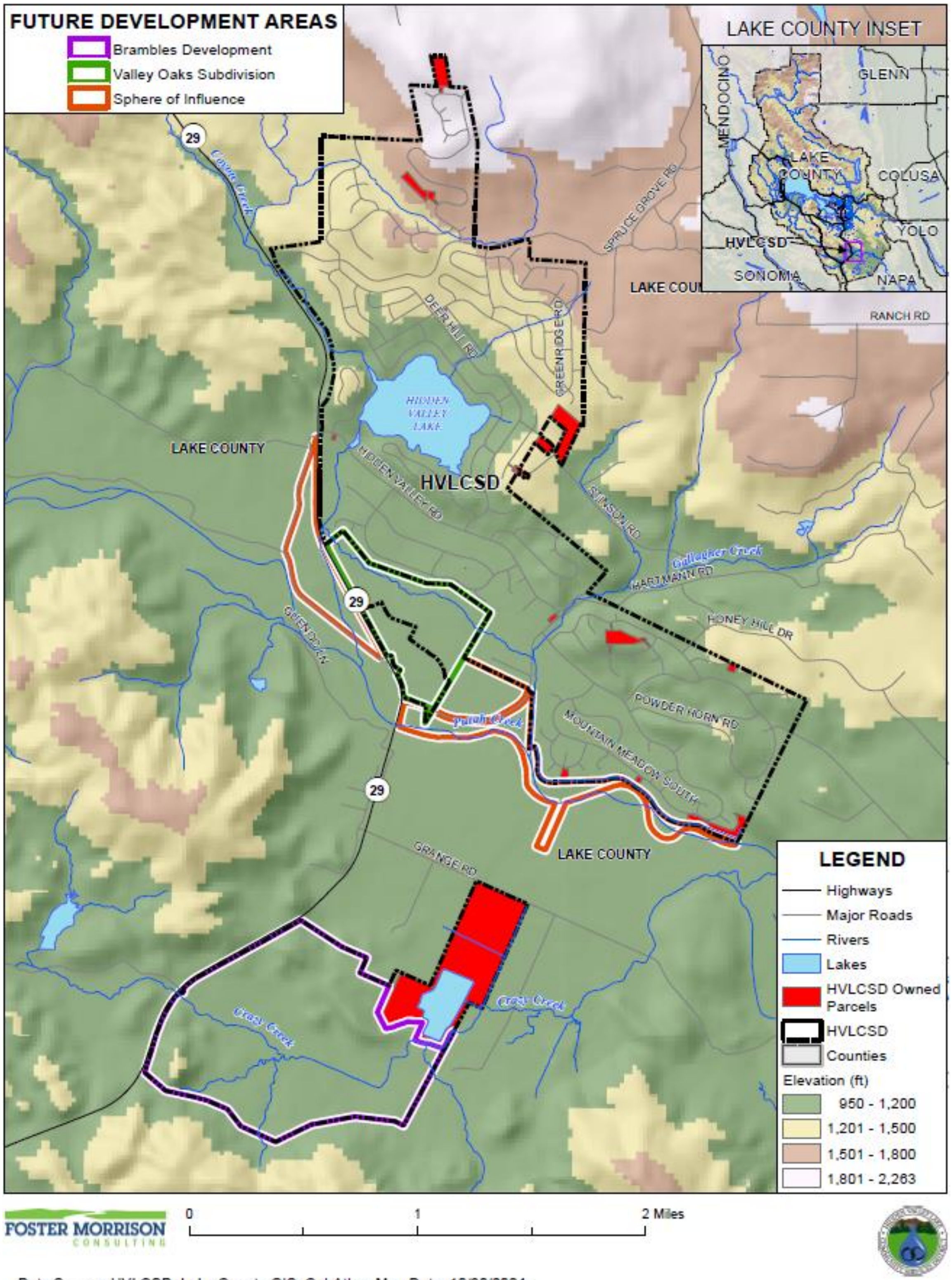
For HVLCSD, the only future development for the District will likely be an expansion of new water and/or wastewater hookups to accommodate new development within the HVLCSD's SOI. For the Service Area - the District noted it has areas where future development is expected to occur:

- Valley Oaks Subdivision – this subdivision has been in the works since before the previous LHMP was complete. With the lifting of the SWRCB order, development is occurring in earnest.
- The Brambles development area is a new addition that is occurring.
- The SOI – this would include all areas/parcels within the SOI where there are not existing hookups. These areas may not have developed plans for how development will occur, but these are areas where future growth could happen.

GIS Analysis

Using the areas supplied by HVLCSD, a GIS analysis of future development areas was performed. The Valley Oaks, Brambles, and SOI areas are shown on Figure 4-18. A summary of the parcels and acres for each of these is shown in Table 4-15. Table 4-16 breaks down the information in Table 4-15 to show the property use categories of these developments.

Figure 4-18 HVLCSD – Future Development Areas



Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 10/30/2024.

Table 4-15 HVLCSD – Future Development Areas, Parcels, and Acres

Future Development	Total Parcel Count	Total Acres	Improved Parcel Count	Total Improved Acres	Unimproved Parcel Count	Total Unimproved Acres
Brambles Development	1	497	1	497	0	0
Valley Oaks Subdivision	2	150	1	47	1	103
Sphere of Influence	19	189	13	104	6	85
Grand Total	**22**	**836**	**15**	**648**	**7**	**188**

Source: HVLCSD

Table 4-16 HVLCSD – Future Development Areas, Parcels, and Acres by Property Use

Future Development/ Property Use	Total Parcel Count	Total Acres	Improved Parcel Count	Total Improved Acres	Unimproved Parcel Count	Total Unimproved Acres
Brambles Development						
Agricultural	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Residential	1	496.7	1	496.7	0	0
Open Space/ Rural Lands	0	0	0	0	0	0
Brambles Development Total	**1**	**496.7**	**1**	**496.7**	**0**	**0**
Valley Oaks Subdivision						
Agricultural	0	0	0	0	0	0
Commercial	1	47.2	1	47.2		
Residential	1	103.1			1	103.1
Open Space/ Rural Lands	0	0	0	0	0	0
Valley Oaks Subdivision Total	**2**	**150.3**	**1**	**47.2**	**1**	**103.1**
Sphere of Influence						
Agricultural	2	37.6	2	37.6	0	0
Commercial	6	62.4	3	41.2	3	21.2
Residential	9	47.2	8	25.4	1	21.8
Open Space/ Rural Lands	2	41.6	0	0	2	41.6

Sphere of Influence Total	**19**	**188.8**	**13**	**104.2**	**6**	**84.6**
Grand Total	**22**	**835.8**	**15**	**648.1**	**7**	**187.7**

Source: HVLCSD

4.3 Hazard Profiles and Vulnerability Assessment

44 CFR Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the…location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
44 CFR §201.6(c)(2)(i): [The risk assessment shall include a] description of the…location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
44 CFR §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.
44 CFR §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.
44 CFR §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.
44 CFR §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

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

Hazard Profiles Methodology

Each hazard is profiled in the following format:

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

- ✓ **Likely**—Between 10 and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.
- ✓ **Occasional**—Between 1 and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.
- ✓ **Unlikely**—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

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

Vulnerability Assessment Methodology

With the HVLCSD's hazards identified and profiled, a vulnerability assessment was conducted to describe the vulnerability and impact that each hazard would have on the District. The vulnerability assessment quantifies, to the extent feasible using best available data, assets at risk to identified hazards and estimates potential losses. The vulnerability assessment is done in the following format:

- ➢ **General Vulnerability Discussion** – An assessment of the vulnerability of the HVLCSD to each hazard is provided, followed by a general discussion of the hazard and its vulnerability on the HVLCSD Planning Area. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into one of the following classifications:
  - ✓ **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
  - ✓ **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
  - ✓ **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
  - ✓ **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
  - ✓ **Extremely High**—Very widespread with catastrophic impact.
- ➢ **Local Concerns** – This includes HVLCSD information on how the District is uniquely affected by or vulnerable to each hazard. Information contained in this section also supports the resulting mitigation strategy.
- ➢ **Assets at Risk** – A discussion of the assets at risk follows. This includes sections on: People and Populations; Structures; Critical Facilities and Infrastructure, Community Lifelines; Natural, Historic, and Cultural Resources; and Economic Assets and Community Activities of Value. These are discussed in specific terms for mapped hazards, and in more general terms for those hazards that are unmapped.
- ➢ **Impacts** – A discussion on hazard impacts follows. Impacts describe how each hazard can affect the District and its assets. The type and severity of impacts reflect both the potential magnitude of the hazard and the vulnerability of the asset.
- ➢ **Future Conditions/Future Development** – A discussion of how future conditions will influence or affect the hazard over time is included here and considers factors related to climate change, changes in population patterns, and changes in land use and development. This section also discusses future development plans relative to each hazard as well as mitigating measures that should be considered in

the development process. Future conditions and future development is addressed specifically for mapped hazards, and in more general terms for those hazards that are unmapped.

As part of the vulnerability assessment, an estimate of the vulnerability of the HVLCSD to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential.

Existing Built Environment and Assets at Risk

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of assets subject to the identified hazard can be counted and their values tabulated. This information conveys the impact, or vulnerability, of the District to that hazard.

The vulnerability assessment identified four hazards in the HVLCSD for which specific geographical hazard areas have been defined and for which sufficient data exists to support a more quantifiable vulnerability analysis. These four hazards are:

- Dam Failure
- Earthquake
- Flood: 1%/0.2%
- Wildfire

These hazards were analyzed using GIS with HVLCSD and Lake County data.

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

- Climate Change
- Drought and Water Shortage
- Flood: Localized/Stormwater
- Levee Failure
- Severe Weather: Extreme Cold and Freeze
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)

Power Outages/Failure: A Common Vulnerability of all Hazards

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

Intentional Disruptions

There are four types of intentional disruptions:

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

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

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

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

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

A July 2006 heat storm event affected the entire state as well as most of the West, producing record energy demand levels in California. The State was able to avoid rotating outages due to a combination of favorable factors that included no major transmission outages, lower than typical generator outages, significant customer response to pleas for energy conservation, high imports from the Pacific Northwest despite unusually high loads, outstanding cooperation among western control area operators, and prompt response to fires that potentially threatened major interties. However, the event brought to light the vulnerability of the electric distribution system, as over 3,500 distribution transformers failed, leaving over two million customers without power at various times over the ten-day event, many for several hours and a small minority for up to three days.

In 2020, the state battled both extreme heat and wildfires. As a result of extreme heat, the CAISO declared a Stage 3 Emergency. PG&E initiated rotating outages in August at the request of California's grid operator.

The outages, which impacted 220,000 customers, occurred during periods of high heat. These rolling blackouts lasted less than a week.

Unintentional Disruptions

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

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

Public Safety Power Shutoff

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

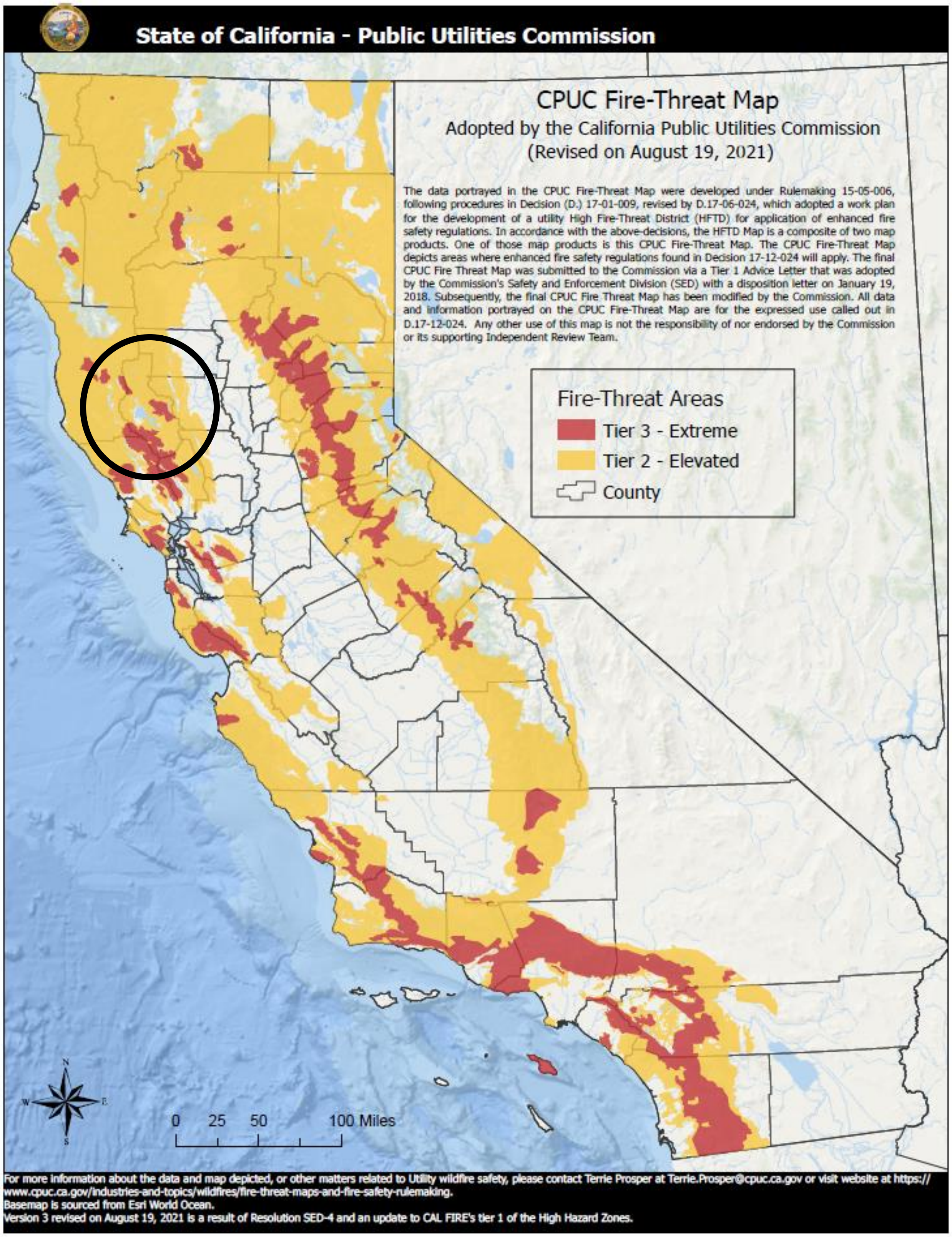
Public Safety Power Shutoff Criteria

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

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

The most likely electric lines to be considered for shutting off for safety will be those that pass through areas that have been designated by the CPUC as at elevated (Tier 2) or extreme (Tier 3) risk for wildfire (seen on Figure 4-19). This includes both distribution and transmission lines. The specific area and number of affected customers will depend on forecasted weather conditions and which circuits PG&E needs to turn off for public safety. Although a customer may not live or work in a high fire-threat area, their power may also be shut off if their community relies upon a line that passes through an area experiencing extreme fire danger conditions. This means that any customer who receives electric service from PG&E should be prepared for a possible PSPS. PSPS events, while preventative in nature, can cause a variety of issues related to the lack of power to those impacted by the PSPS. For the HVLCSD, a significant concern is the impact to their SCADA communication systems as well as on other critical infrastructure and services. PSPS events also cause concerns for certain vulnerable populations. As seen on Figure 4-19, HVLCSD is located inside and Tier 3 areas, representing the highest risk.

Figure 4-19 State of California Tier 2 and 3 Areas



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

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

According to records provided by jurisdictions in the HVLCSD, the District has experienced numerous power outages including PSPS events. Keeping the water flowing during these events is a major concern, especially during fire season. The following events in Table 4-17 have affected the District:

Table 4-17 HVLCSD – Power Outages/PSPS Events

Date	Description	Total hours	Type	Diesel used (in generators)
10/8/19 - 10/10/19	Out by 0:00-4:00 returned by 22:30	70.5	PSPS	889.6 gallons + 14.9 gasoline?
10/26/19 - 10/30/19	Out by 19:22, returned by 17:00?	93.5	PSPS	1196.35 gal
11/1/19 - 11/2/19	Returned by 13:00	37	PSPS	472.4 gal
11/20/19 - 11/21/19	Returned by 13:00	37	PSPS	472.4 gal
12/16/2019	19:00-19:39 due to repairs?	0.5	Outage	6.1 gal
8/31/2020	10:30 - 11:30	1	Outage	12.3 gal
9/30/2020	13:45-13:56	11 minutes	Outage	
10/25/20 - 10/27/20	out by 16:00, returned by 16:00	48	PSPS	613.516 gal
1/7/2021	15:23-18:38 out at Unit 9	3 hours 15 minutes	Outage	
1/27/2021	2:40-6:08		Outage	
4/7/2021	15:05-17:05	2	Outage	
4/20/2021	23:38 - 23:53		Outage	
6/21/2021	18:17-20:29		Outage	
7/10/2021 - 7/11/21	17:38-8:49 Unit 9		Outage	
7/11/2021	18:31-20:55		Outage	
8/12/2021	14:06-16:39 Main office & LS Hardester's		Outage	

Date	Description	Total hours	Type	Diesel used (in generators)
8/15/2021 - 8/16/21	18:19-02:50 equipment issue at LS5, Greenridge booster station, LS6, LS7, LS4		Outage	
8/17/21 - 8/19/21	Out by 18:45, returned by 16:30 in the middle of the community and 14:37 everywhere else. LS4, LS6, LS7, Unit 9, LS5, Greenridge.	43.52 (1.8 days)	PSPS	
10/11/21 - 10/12/21	Out at 6:30, returned at 12:15.	29.75 (1.24 days)	PSPS	
10/13/2021	outage in Lower Lake grid, 7:45 to unknown		Outage	
11/25/2021	6:37-8:38			
11/29/2021	planned from 12:00-16:00 only for one hour.		Outage	
1/19/2022	8:55-10:00		Outage	
5/19/2022	12:31-13:00 Unit 9		Outage	
7/20/2022	18:46-18:00 unplanned outage		Outage	
7/24/2022	0:24-4:00 unplanned outage		Outage	
8/12/2022	15:22-17:00 unplanned outage		Outage	
9/1/2022	2:10-6:00 LS7, LS6, LS4, LS5		Outage	
9/5/2022	3:46-4:00 unplanned outage		Outage	
9/19/2022	19:18-20:34 unplanned outage due to storm.		Outage	
11/5/2022	12:19-12:52 weather caused		Outage	
11/9/2022	16:21-17:10: S5, LS4, LS7, LS6, Greenridge		Outage	
1/4/23 - 1/10/23	frequent outages and power surges due to storm.	Too hard to calculate everything. Also, PG&E failed to send out outage notices; they do not even know what areas are affected.	Outage	

Date	Description	Total hours	Type	Diesel used (in generators)
2/12/2023	21:01-21:24 office and Hardester's		Outage	
2/13/2023	wind advisory, power outage for 1 minute. Power surges the weekend 2/11-2/12.		Outage	
2/14/2023	10:01-18:11 LS7, LS4, LS5, LS6, Lab. Equipment issues.		Outage	
2/24/2023	0:13-7:32 weather (SNOW)		Outage	
2/24/2023	12:02-20:35 LS5, LS4, LS6, LS7 weather (SNOW)		Outage	
2/24/2023 - 2/26/23	22:17-8:08 weather (SNOW)		Outage	
2/26/2023	8:54-18:41 LS6, LS5, LS7, LS4, Unit 9		Outage	
4/9/2023	15:06-15:24		Outage	
5/10/2023	12:22 - 13:20 all		Outage	
7/6/2023	unknown - 10:00: LS4, LS5, LS6, Greenridge, LS7 (out until 12:00).		Outage	
7/18/2023 - 7/19/23	11:30 - 19:00: Unit 9 tank		Outage	
7/21/2023	13:28 - 15:00: AG Well, well 3,		Outage	
9/6/23 - 9/7/23	Outage at the same time as a fire broke out in Lower Lake. They had some mandatory evacuations. Only Unit 9 out	"16:12 - 17:07 on 9/6		
1:15 - 9:20 on 9/7"	Outage			
1/10/2024	Community-wide outage; due to windy storms	Power bump at 4:01. Outage 6:27- 6:34.	Outage	
2/5/2024	Caused by rain/windstorm. MMS & parts of North. LS 1&2	12:11 - 8:55	Outage	
4/15/2024	19851, unknown cause	09:43 - 09:49	Outage	

Date	Description	Total hours	Type	Diesel used (in generators)
7/6/2024	Power fluctuated for two days	1	Outage	
7/9/2024		1	Outage	
8/15/2024		2	Outage	
10/17/2024		2.5	Outage	
10/22/2024		2.25	Outage	
10/24/2024		1.5	Outage	
11/6/2024		1	Outage	

Source: HVLCSD

It was noted that PG&E is working to enhance its power network with Enhanced Powerline Safety Settings (EPSS) capable lines. EPSS are advanced safety settings. They allow PG&E powerlines to automatically turn off power within one-tenth of a second. This can happen when there is a hazard, like a tree branch falling into a powerline, which can cause a fire. These settings are in high fire-risk and surrounding areas. These have begun to be installed in and near the District, as PG&E focuses on other very high fire hazard areas in its Service Area first. Due to the District's fire hazard severity rankings, areas around the District have been prioritized for EPSS conversion.

Climate Change and Power Outages/Failures (Energy Shortage)

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

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

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

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

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

Hazard Profiles and Vulnerability Assessment by Hazard

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

Data Sources

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

- 2000 HVLCSD Master Drainage Plan
- 2005 FIS
- 2008 Lake County General Plan
- 2013 Lake County Drought Management Plan
- 2016 Strategic Fire Plan
- 2018 California State Hazard Mitigation Plan
- 2019/2020 HVLCSD Research Project (CivicSparks Fellow)
- 2020 HVLCSD LHMP
- 2021 California Climate Adaptation Strategy
- 2023 Lake County Community Wildfire Protection Plan
- 2023 Lake County Parcel/Assessor Data, Average Household Size
- 2023 State Hazard Mitigation Plan
- CA DWR – 2012-2016 California Drought: Historical
- CAL FIRE
- CAL FIRE FRA, SRA, LRA, 2018
- Cal OES and the National Performance of Dams Program
- Cal Office of Emergency Services
- Cal-Adapt
- Cal-Adapt – Extended Drought Scenarios
- Cal-Adapt – Precipitation: Decadal Averages Map
- Cal-Atlas
- California Department of Water Resources
- California Department of Water Resources Division of Safety of Dams
- California Division of Mines and Geology
- California Geological Survey
- California Natural Resource Agency
- California's Adaptation Planning Guide: Understanding Regional Characteristics
- Center for Western Weather and Water Extremes

- Climate Change and Health Profile Report
- Climate Change and Health Profile Report – Lake County
- Coyote Creek (Hidden Valley) Lake Dam Inundation Study
- Earthquake Intensity Zonation and Quaternary Deposits
- FEMA
- FEMA DFIRM 10/10/2024
- FM Global Insurance company
- Foxweather.com
- Hazus 6.1
- Hidden Valley Lake Dam Inundation Study, Schaaf & Wheeler 2019
- HMPC
- HVLCSD
- HVLCSD Average Household Size
- Intergovernmental Panel on Climate Change
- IPCC Sixth Assessment Synthesis Report
- Lake County Flood Insurance Study
- Lake County General Plan
- Lake County Water Inventory and Analysis Report – March 2006
- Levees in History: The Levee Challenge. Dr. Gerald E. Galloway, Jr., P.E., Ph.D., Water Policy Collaborative, University of Maryland, Visiting Scholar
- Miscellaneous Field Studies Map 9093, 1977
- Multi-Hazard Identification and Risk Assessment
- National Aeronautics and Space Administration
- National Center for Atmospheric Research
- National Climate Assessment
- National Climatic Data Center
- National Drought Mitigation Center
- National Flood Insurance Program
- National Integrated Drought Information System
- National Levee Database
- National Oceanic and Atmospheric Administration
- National Performance of Dams Program
- National Weather Service
- National Weather Service XMAC site
- NOAA Storm Prediction Center
- Public Policy Institute of California
- Sacramento River Watershed Program
- Smoke Impacts CA: 2020 Lessons – 2021 Actions
- STARR II: Incorporation of Burned Areas in Hydrology in Lake County
- U.S. Drought Monitor
- U.S. Environmental Protection Agency
- United Nations IPCC
- United States Army Corps of Engineers
- United States Geological Survey Open File Report 2015-3009
- University of California, Berkeley's Department of Environmental Science, Policy, and Management
- US Forest Service

- US Geological Survey
- Vaisala National Lightning Detection Network
- Western Regional Climate Center

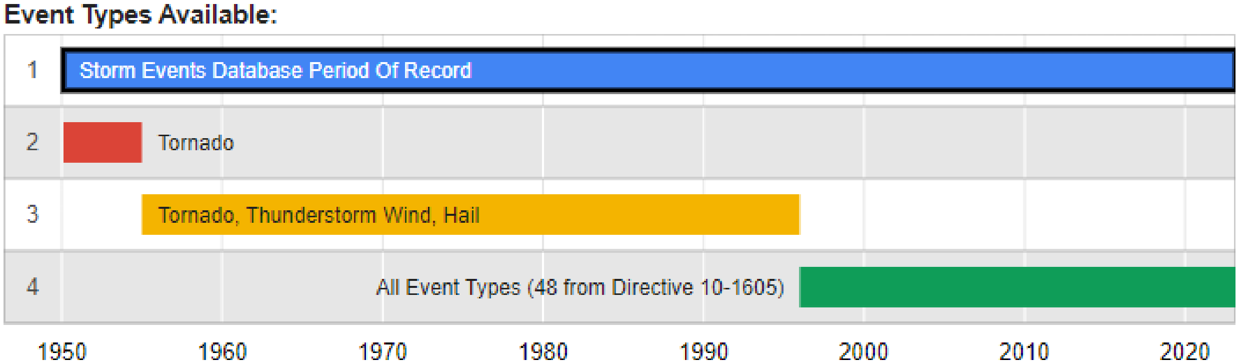
4.3.1. Severe Weather: General

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

The National Oceanic and Atmospheric Administration's (NOAA's) National Climatic Data Center (NCDC) has been tracking severe weather since 1950. Their Storm Events Database contains data on the following: all weather events from 1993 to current (except from 6/1993-7/1993); and additional data from the Storm Prediction Center, which includes tornadoes (1950-1992), thunderstorm winds (1955-1992), and hail (1955-1992). Their Storm Events Database contains data on the following events shown on Figure 4-20.

Figure 4-20 NCDC Storm Events Database Period of Record

Event Types Available:



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

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

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

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

Source: NCDC

This database contains 350 severe weather events that occurred in greater Lake County between January 1, 1950, and December 31, 2023. Table 4-18 summarizes these events.

*Table 4-18 NCDC Severe Weather Events for Lake County 1950-12/31/2023**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Blizzard	1	0	0	0	0	$0	$0
Debris Flows	2	0	0	0	0	$300,000	$0
Drought	44	0	0	0	0	$0	$0
Excessive Heat	11	0	0	0	0	$0	$0
Flash Flood	2	0	0	0	0	$10,000	$0
Flood	21	1	0	4	0	$23,430,000	$0
Frost/Freeze	2	0	0	0	0	$0	$0
Hail	2	0	0	0	0	$0	$0
Heat	8	0	0	0	0	$0	$0
Heavy Rain	10	0	0	0	0	$0	$0
Heavy Snow	13	0	0	0	0	$10,000	$0
High Wind	15	0	0	0	0	$183,000	$0
Strong Wind	17	0	0	0	0	$39,000	$0
Wildfire	22	5	1	37	9	$5,750,000	$0
Winter Storm	68	0	0	0	0	$0	$0
Winter Weather	35	0	0	0	0	$0	$0
Total	**273**	**6**	**1**	**41**	**9**	**$29,722,000**	**$0**

Source: NCDC. Retrieved 3/18/2024.
*Note: Losses reflect totals for all impacted areas, some of which fell outside of Lake County

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

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

- Severe Weather: Extreme Cold and Freeze
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)

4.3.2. Severe Weather: Extreme Cold and Freeze

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

Hazard Profile

Hazard/Problem Description

Extreme Cold and Freeze

According to the National Weather Service (NWS) and the Western Regional Climate Center (WRCC), extreme cold often accompanies a winter storm or is left in its wake. Prolonged exposure to cold can cause frostbite or hypothermia and can be life-threatening.

In 2001, the NWS implemented an updated Wind Chill Temperature index (shown in Figure 4-21), which is reproduced below. This index was developed to describe the relative discomfort/danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

Figure 4-21 Wind Chill Temperature Chart

Temperature (°F)

Wind (mph) / Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

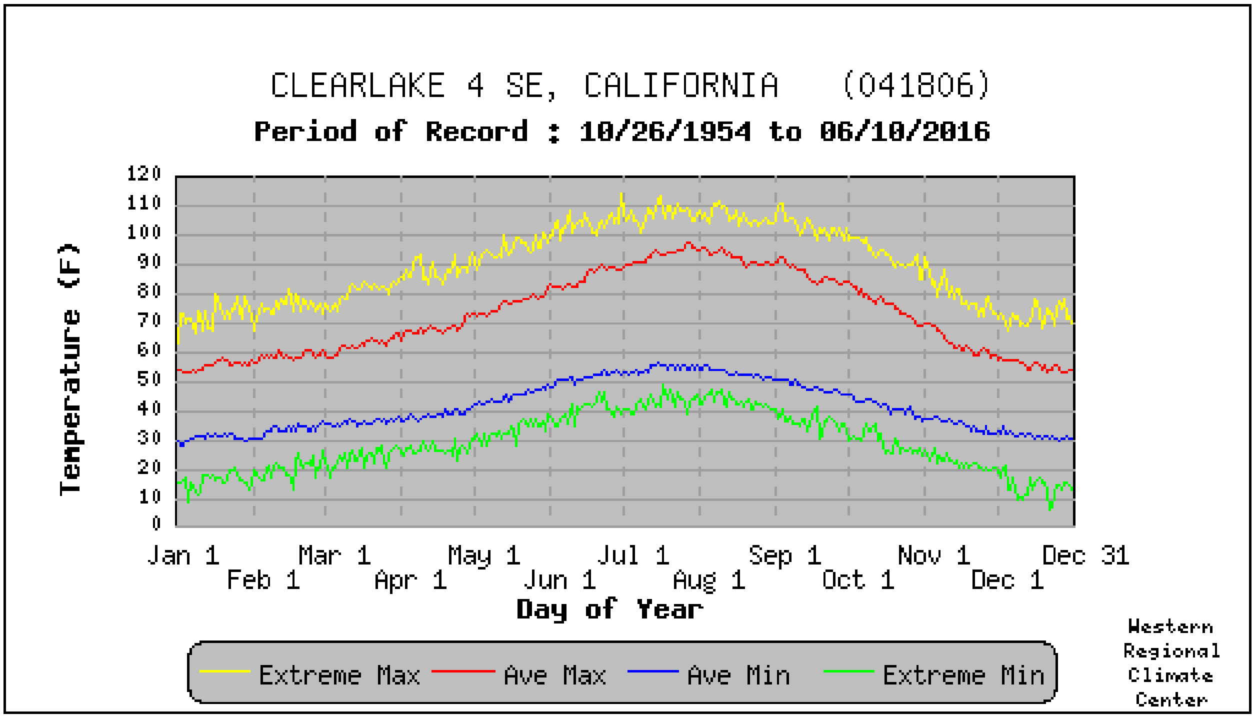
Source: National Weather Service

The WRCC and NWS maintain data on weather normal and extremes in the western United States. Each of these data sources maintain data in slightly different ways. Data from the WRCC stopped being collected in June of 2016. NWS covers the entire time period to present. Therefore, both data sets are shown below. The closest weather station was chosen for the District – the Clearlake SE 4 Weather Station. WRCC and NWS data for the District from that station is summarized below.

WRCC Clearlake 4 SE Weather Station, Period of Record 1954 to 2016

According to the WRCC, in the District monthly average minimum temperatures from November through April range from the low to upper 30s. The lowest recorded daily extreme was 6°F on December 22, 1990. In a typical year, minimum temperatures fall below 32°F on 82.1 days with no days falling below 0°F. Table 4-19 shows the record low temperatures by month for the District. Average daily temperatures for the District are shown in Figure 4-22.

Figure 4-22 HVLCSD – Daily Temperature Averages and Extremes



Source: Western Regional Climate Center. Retrieved 6/28/2024.

Table 4-19 HVLCSD – Record Low Temperatures 1954 to 2016

Month	Temperature	Date	Month	Temperature	Date
January	8°	1/5/1974	July	39°	7/27/1965
February	16°	2/4/1957	August	40°	8/30/1955
March	17°	3/3/1966	September	30°	9/19/1965
April	23°	4/24/1964	October	21°	10/6/1983
May	28°	5/4/1964	November	19°	11/25/1956
June	34°	6/3/1966	December	6°	12/22/1990

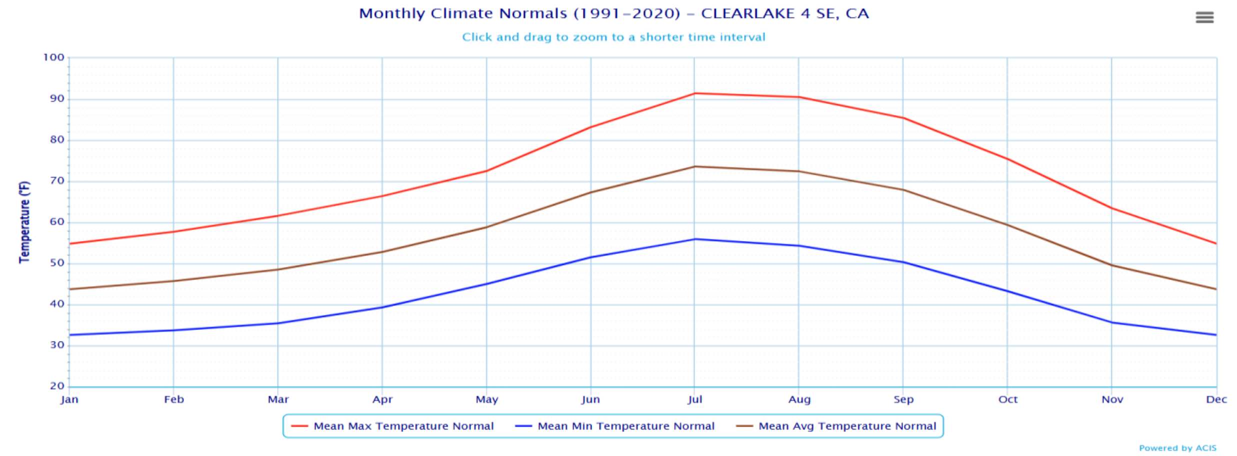
Source: Western Regional Climate Center. Retrieved 6/28/2024

NWS Clearlake 4 SE Weather Station, Period of Record 1954 to 2024

According to the NWS, monthly average maximum temperatures in the coldest months (December to February) range from the low-30s to mid-40s. The lowest recorded daily extreme was 6°F on December

22, 1990. Figure 4-23 shows the average daily low temperatures and extremes for the District. Table 4-20 shows the record low temperatures for the District by month.

Figure 4-23 HVLCSD – Daily Temperature Averages and Extremes, 1991-2020



Month	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
January	54.8	32.6	43.7
February	57.7	33.7	45.7
March	61.6	35.4	48.5
April	66.4	39.3	52.8
May	72.5	45.0	58.8
June	83.2	51.5	67.3
July	91.4	55.9	73.6
August	90.5	54.3	72.4
September	85.4	50.3	67.9
October	75.4	43.2	59.3
November	63.4	35.6	49.5
December	54.8	32.6	43.7
Annual	71.4	42.5	56.9

Source: National Weather Service XMAC site. Retrieved 6/28/2024

Table 4-20 HVLCSD – Record Low Temperatures 1954 to 2024

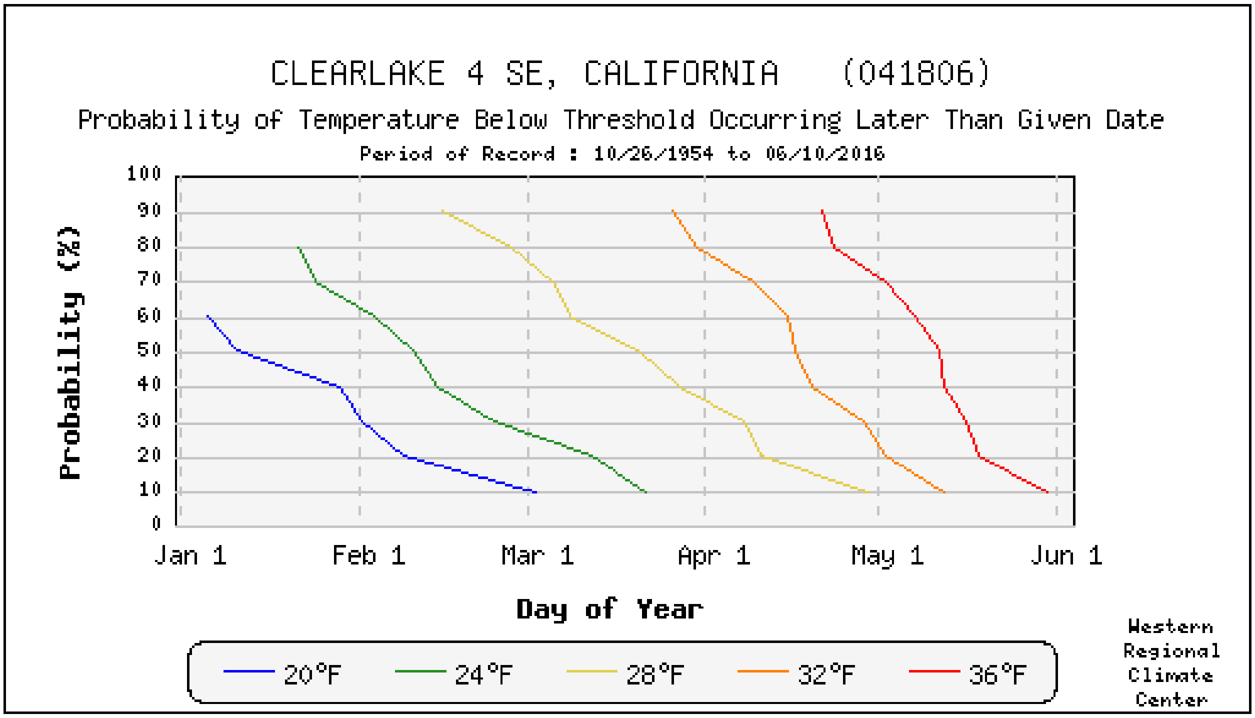
Temperature	Date
6.0°	12/22/1990
7.0°	12/23/1990
8.0°	1/5/1974
9.0°	12/11/1972
9.0°	12/9/1972
10.0°	12/10/1972
11.0°	12/24/1990
11.0°	1/9/1974
11.0°	12/13/1972
11.0°	12/12/1972

Source: National Weather Service XMAC site. Retrieved 6/28/2024

Location and Extent

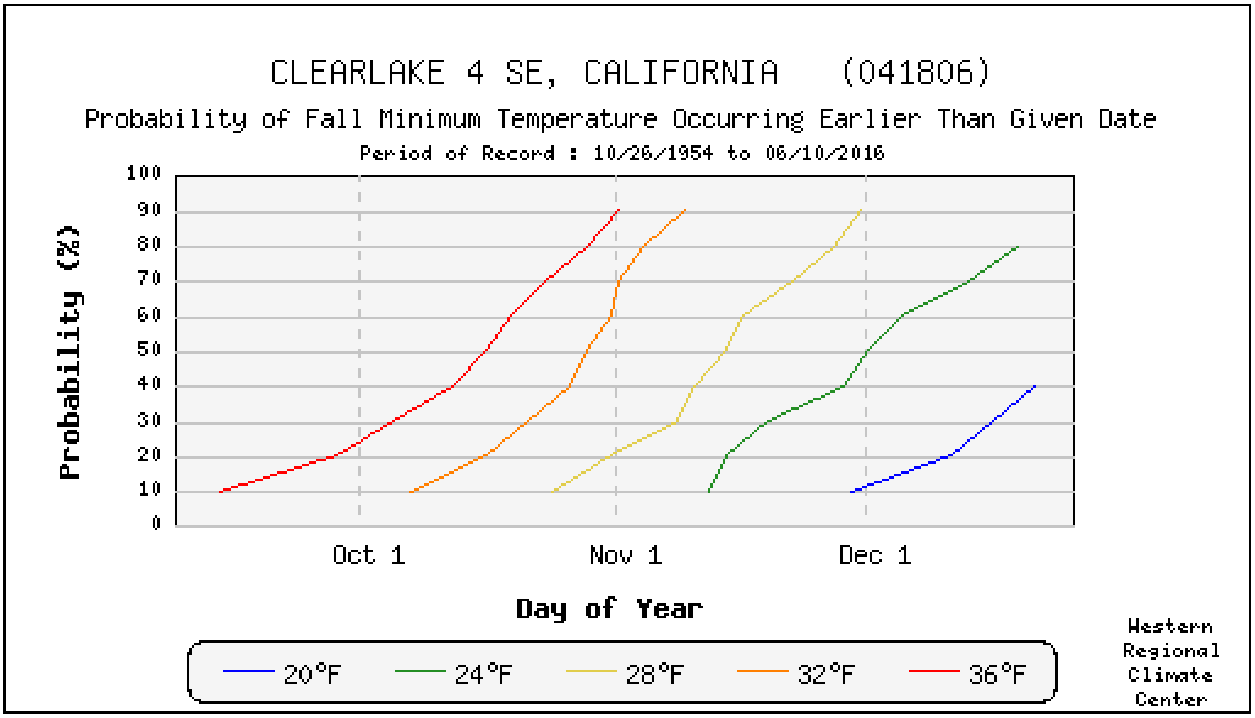
Extreme cold and freeze events occur on a regional basis. Extreme cold can occur in any location of the District, with little variation. While there is no scale (i.e. Richter, Enhanced Fujita) to measure the effects of freeze, temperature data from the WRCC indicates that there are 82.1 days that fall below 32°F. Freeze has a slow onset and can be generally be predicted in advance for the District. Freeze events can last for hours (in a cold overnight), or for days to weeks at a time. Figure 4-24 and Figure 4-25 show the probabilities in the District of freeze for both spring and fall. There has not been a past occurrence of freeze in the months of May through September.

Figure 4-24 HVLCSD – Spring Freeze Probabilities



Source: Western Regional Climate Center. Retrieved 6/28/2024.

Figure 4-25 HVLCSD – Fall Freeze Probabilities



Source: Western Regional Climate Center. Retrieved 6/28/2024.

Past Occurrences

Disaster Declaration History

Lake County has had two past state and no past federal disaster declarations for extreme cold and freeze. Table 4-21 shows the dates of the disaster declarations.

Table 4-21 Lake County –State and Federal Disaster Declarations for Freeze 1950-2024

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Freeze	2	1970, 1972	0	–

Source: Cal OES, FEMA. Retrieved June 2024.

NCDC Events

The NCDC data shows two extreme cold and freeze incidents for Lake County since 1993. Information for these events are shown in Table 4-26.

*Table 4-22 NCDC Extreme Cold and Freeze Events in Lake County 1993 to 12/31/2023**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Frost/Freeze	2	0	0	0	0	$0	$0

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Total	**2**	**0**	**0**	**0**	**0**	**$ 0**	**$0**

Source: NCDC

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

Hazard Mitigation Planning Committee Events

While the HMPC noted that cold and freeze events occur on a regular basis in the winter months in the District, the HMPC recalled that in 1971 or 1972, cold persisted for an extended period. Water and wastewater systems froze in nearby Clearlake during these events, and there was no potable water for a time in the City. The District noted that it wasn't in existence at the time, so no damages were suffered by the District.

2023 had a snow and freeze event in March. Two inches of snowfall were received and stayed for multiple days. Little Peak had a foot of snow. The snowfall interfered with District staff availability and operations, caused frequent and long-term power outages leading to a reliance on backup power, caused administration office closures, and contributed to numerous SCADA communication losses.

Likelihood of Future Occurrence

Highly Likely—Extreme cold and freeze are likely to continue to occur annually in the District. In a typical year, minimum temperatures fall below 32°F on 82.1 days. This equates to a likelihood of future occurrences being considered highly likely.

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

Climate Change and Cold, Freeze and Snow

According to the CAS, freezing spells (including cold and snow) are likely to become less frequent in California as climate temperatures increase; if emissions increase, freezing events could occur only once per decade in large portion of the State by the second half of the 21st century. According to a California Natural Resources Report in 2021, it was determined that while fewer freezing spells would decrease cold related health effects, too few freezes could lead to increased incidence of disease as vectors and pathogens do not die off.

Vulnerability Assessment

Vulnerability—Medium

Extreme cold and freeze events happen in the District each year. It can impact both structures and populations in the HVLCSD. The whole of the District has some measure of vulnerability to extreme cold and freeze. An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to the District. This is included in the Local Concerns section below. The sections that follow include a discussion of this hazard relative to assets at risk, impacts, and future development/future conditions.

Local Concerns

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

Frozen pipes and water and wastewater system components can by affected by extreme cold and freeze conditions. This includes exposed pipes found in wellheads that are subject to freezing. Also of concern, the HVLCSD WWTP treats wastewater by an activated sludge process which is sensitive to extreme temperature conditions. Sludge is actively broken down by bacteria and protozoa. During periods of extreme cold, these live organisms slow down, approach dormancy, and the treatment process becomes less effective. Higher volumes of wastewater during the cold, rainy season, and less effective treatment puts the wastewater treatment plant in danger of sludge overflow. To offset the effect of dormant organisms, more organisms are added to manage the flow. This activity in turn raises the sludge volume index (SVI). The SVI is one tool operators use to reduce the possibility of sludge overflow. A higher SVI represents a higher danger of sludge overflow.

Residents in the "flats" which is the Mountain Meadow South and Hidden Valley Rd (and below) areas are impacted by frozen water pipes the most.

Assets at Risk

Assets at risk from extreme cold and freeze include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

The District has 14 employees. Some employees may face a risk while working outdoors.

All populations served by the District are vulnerable to extreme cold and freeze, but this hazard generally affects people spending large amounts of time outside (including District staff). Prolonged exposure to cold can cause frostbite or hypothermia and can be life-threatening. Vulnerable populations to cold and freeze include the unhoused; individuals who exercise or train outdoors; outdoor workers; individuals that lack the resources to afford heat; and the young, old, or medically fragile individuals that are more susceptible to cold related impacts. In addition to vulnerable populations, pets and livestock are at risk to freeze and cold.

Structures (Critical Facilities and Infrastructure)

Structures (and critical facilities) in the District have some measure of risk from extreme cold and freeze. These include both district owned structures and those located throughout the planning area. Buildings can be affected directly by freeze; pipes that feed buildings can be damaged during periods of extreme cold and cause water damage and other related impacts to a structure. Structures can also be damaged by downed trees during freeze and winter storm events. Infrastructure such as roads, highways, and bridges can become slippery, causing accidents and road closures.

Community Lifelines

Freeze presents a threat to life and property, including community lifelines in the District and greater Lake County. Impacts of freeze can affect the supporting mechanisms or systems of a community's infrastructure. For example, when extreme cold is coupled with high winds or ice storms, power lines may be downed, resulting in an interruption in the transmission of that power shutting down electric furnaces, which may lead to frozen pipes in homes and businesses. Community lifelines are likely to be affected to some degree by extreme cold, freeze, and snow events. Impacts to these lifelines include:

- **Safety and Security** – Police and fire personnel may see additional demand during periods of extreme cold.
- **Food, Hydration, Shelter** – Warming centers and other public shelters will need to be open and staffed.
- **Health and Medical** – Though rare, hypothermia may cause additional strains on medical facilities in the area.
- **Energy** – Freezing rain can cause power outages as power lines get heavy from the additional weight of ice.
- **Water Systems** – Water lines (like the HVLCSD's fresh and wastewater) above ground can freeze, causing burst pipes. This is true when temperatures are below freezing for a longer period of time.

Due to the limited nature of extreme cold and freeze in the District and larger Lake County Planning Area, community lifelines are unlikely to be overwhelmed by this hazard.

Natural, Historic, and Cultural Resources

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

Economic Assets and Community Activities of Value

As previously noted, the largest economic asset in the District Service Area is the HVLCSD. Many economic assets within the District are not highly vulnerable to extreme cold and freeze events. However, during periods of extreme cold and freeze and large snow events, the economy may slow as people stay home or inside. With the District primarily serving a residential and small commercial area, economic assets are not expected to be highly affected by extreme cold and freeze. Community activities of value may see a reduction in attendance, impacting revenues associated with these events, especially those that occur outdoors during the colder months.

Impacts from Severe Weather: Extreme Cold and Freeze

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

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

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

Future Conditions/Future Development

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

- Climate change is unlikely to exacerbate extreme cold and freeze and their associated impacts to the HVLCSD.
- While population projections for the area served by the District show additional expected growth, these anticipated future changes in population are expected to be relatively small, which is unlikely to affect this hazard and associated impacts to the District. The District may add staff, but this number would be small. The District noted it has no control over population changes in its Planning Area, it merely reacts to them by providing additional (or reduced) services.
- Changes in land use and development in the Hidden Valley Lake area are expected to be limited in the near future and thus are not likely to affect extreme cold and freeze and associated impacts to the District. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District to this hazard.

Future development built to code should be able to withstand extreme cold and freeze. Pipes at risk of freezing should be mitigated by either burying or insulating them from freeze as new facilities are improved or added. Current Lake County codes provide such provisions for new construction. New wells and appurtenances will be built inside insulated buildings, reducing the risk of loss of potable water due to frozen pipes.

4.3.3. Severe Weather: Extreme Heat

Hazard Profile

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

Hazard/Problem Description

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died. Recently in California, records were set across the state during a September 2022 heat event. 2023 was considered the hottest on record. Extreme heat can also affect the agricultural industry.

Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds a level at which the body can remove it, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise, and heat-related illness may develop. Elderly persons, small children, those on certain medications or drugs, and persons with weight and alcohol problems are particularly susceptible to heat related impacts.

Location and Extent

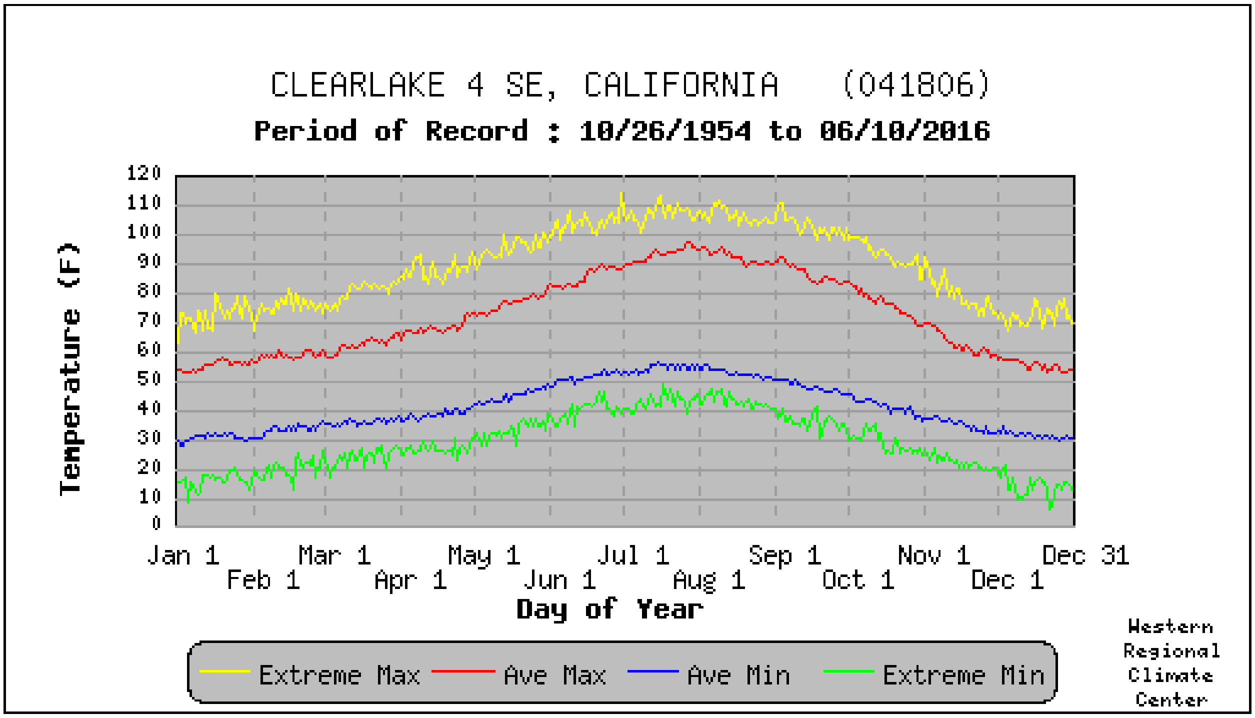
Extreme heat events occur on a regional basis. Extreme heat can occur in any location of the District. Extreme heat occurs throughout the HVLCSD primarily during the summer months.

The WRCC and NWS maintain data on weather normal and extremes in the western United States. Each of these data sources maintain data in slightly different ways. Data from the WRCC stopped being collected in June of 2016. NWS covers the entire time period to present. Therefore, both data sets are shown below. The closest weather station was chosen for the District – the Clearlake SE 4 Weather Station. WRCC and NWS data for the District from that station is summarized below.

WRCC Clearlake SE Weather Station, Period of Record 1954 to 2016

According to the WRCC, near HVLCSD, monthly average maximum temperatures in the warmest months (June through September) range from the mid-80s to the low 90s. The highest recorded daily extreme was 109°F on September 2, 1950. In a typical year, maximum temperatures exceed 90°F on 71 days. Figure 4-26 shows the average daily high temperatures and extremes for the District. Table 4-23 shows the record high temperatures by month for the District.

Figure 4-26 HVLCSD — Daily Temperature Averages and Extremes



Source: Western Regional Climate Center, www.wrcc.dri.edu/. Retrieved 6/28/2024

Table 4-23 HVLCSD – Record High Temperatures 1954 to 2016

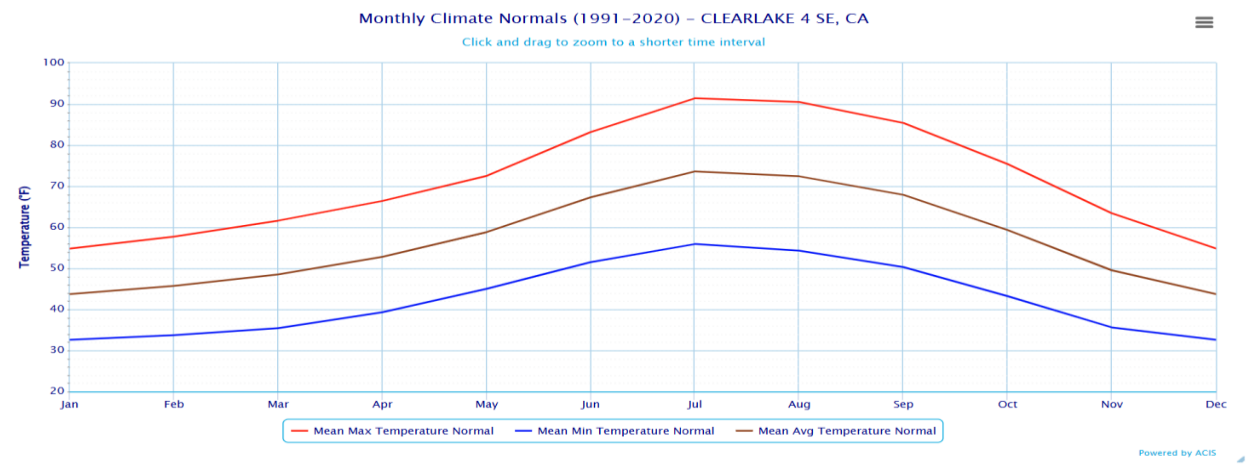
Month	Record High	Date	Month	Record High	Date
January	78°	1/8/1962	July	103°	7/14/1972
February	81°	2/14/1977	August	99°	8/9/1978
March	88°	3/31/1966	September	109°	9/2/1950
April	97°	4/21/2009	October	103°	10/2/2001
May	105°	5/31/1950	November	84°	11/27/1949
June	107°	6/15/1961	December	75°	12/26/1967

Source: Western Regional Climate Center. Retrieved 6/28/2024

NWS Clearlake SE Weather Station, Period of Record 1954 to 2023

According to the NWS, monthly average maximum temperatures in the warmest months (June through September) range from the upper-80s to mid-90s. The highest recorded daily extreme was 114°F on June 30, 1977. Figure 4-27 shows the average daily high temperatures and extremes for the District. Table 4-24 shows the record high temperatures for the District.

Figure 4-27 HVLCSD Daily Temperature Averages and Extremes, 1991-2020



Month	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
January	54.8	32.6	43.7
February	57.7	33.7	45.7
March	61.6	35.4	48.5
April	66.4	39.3	52.8
May	72.5	45.0	58.8
June	83.2	51.5	67.3
July	91.4	55.9	73.6
August	90.5	54.3	72.4
September	85.4	50.3	67.9
October	75.4	43.2	59.3
November	63.4	35.6	49.5
December	54.8	32.6	43.7
Annual	71.4	42.5	56.9

Source: National Weather Service XMAC site. Retrieved 6/28/2024

Table 4-24 HVLCSD – Record High Temperatures 1954 to 2024

Temperature	Date
114.0°	6/30/1977
113.0°	9/7/2022
113.0°	7/16/1972
112.0°	8/9/1981
112.0°	8/9/1978
112.0°	7/15/1972
111.0°	7/23/2006
111.0°	8/7/1978
111.0°	9/4/1955
111.0°	9/3/1955

Source: National Weather Service XMAC site. Retrieved 6/28/2024.

Heat emergencies are often slower to develop, taking several days of continuous, oppressive heat before a significant or quantifiable impact is seen. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations. Heat waves do not generally cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios. While heat waves are obviously less dramatic, they are potentially deadlier. According to the

2023 California State Hazard Mitigation Plan, the worst single heat wave event in California occurred in Southern California in 1955, when an eight-day heat wave resulted in 946 deaths.

The NWS has in place a system to initiate alert procedures (advisories or warnings) when extreme heat is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. The NWS HeatRisk forecast provides a quick view of heat risk potential over the upcoming seven days. The heat risk is portrayed in a numeric (0-4) and color (green/yellow/orange/red/magenta) scale which is similar in approach to the Air Quality Index (AQI) or the UV Index. This can be seen in Table 4-25.

Table 4-25 National Weather Service HeatRisk Categories

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

Source: National Weather Service

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

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

Past Occurrences

Disaster Declaration History

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

NCDC Events

The NCDC data shows 19 extreme heat incidents for Lake County since 1993. Information for these events are shown in Table 4-26.

*Table 4-26 NCDC Extreme Heat Events in Lake County 1993 to 12/31/2023**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Excessive Heat	11	0	0	0	0	$0	$0
Heat	8	0	0	0	0	$0	$0

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Total	**19**	**0**	**0**	**0**	**0**	**$ 0**	**$0**

Source: NCDC

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

Hazard Mitigation Planning Committee Events

The HMPC noted that extreme heat is an annual occurrence, but noted no past events that caused damages, deaths or injuries. Climate change is expected to worsen this over time, and damages may occur in the future.

Likelihood of Future Occurrence

Highly Likely—Temperature extremes are likely to continue to occur annually in the HVLCSD. Temperatures at or above 90°F are common on summer days in the District.

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

Climate Change and Extreme Heat

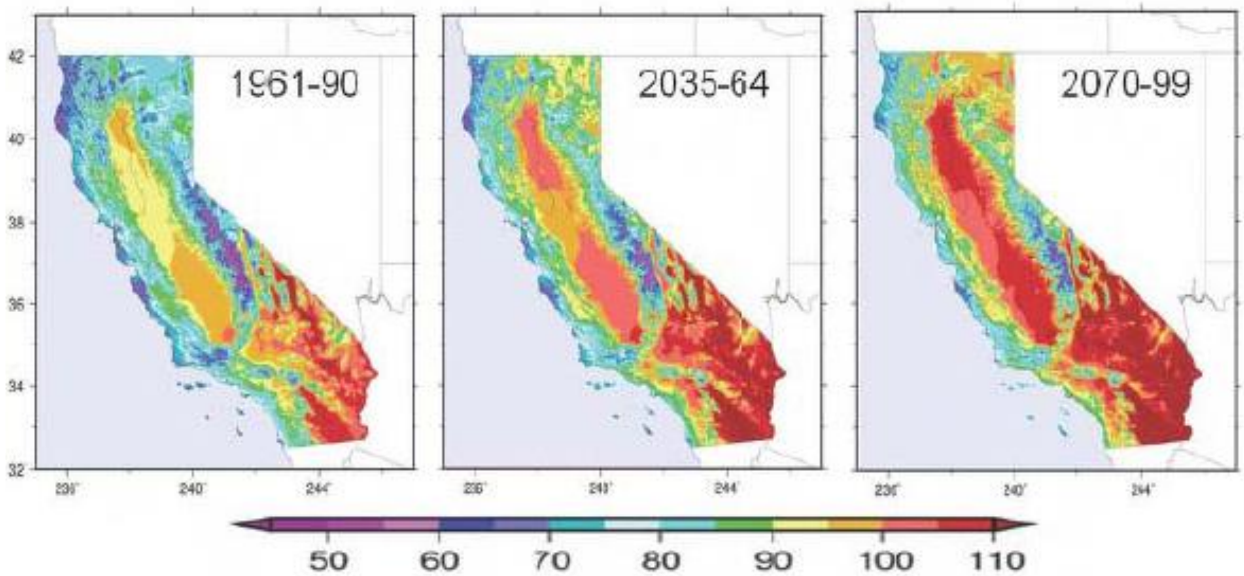
Climate change and its effect on extreme heat near the District is discussed by three sources:

- California Climate Adaptation Strategy (CAS) – 2021
- Climate Change and Health Profile Report – Lake County
- Cal-Adapt

Climate Adaptation Strategy

The 2021 California Climate Adaptation Strategy (CAS), citing a California Energy Commission study, states that "over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined." This study shows that California is getting warmer, leading to an increased frequency, magnitude, and duration of heat waves. These factors may lead to increased mortality from excessive heat, as shown in Figure 4-28.

Figure 4-28 California Historical and Projected Temperature Increases – 1961 to 2099



Source: Dan Cayan; California Climate Adaptation Strategy

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

Climate Change and Health Profile Report – Lake County

The CCHPR noted for Lake County that increased temperatures manifested as heat waves and sustained high heat days directly harm human health through heat-related illnesses (mild heat stress to fatal heat stroke) and the exacerbation of pre-existing conditions in the medically fragile, chronically ill, and vulnerable. Increased heat also intensifies the photochemical reactions that produce smog and ground level ozone and fine particulates (PM2.5), which contribute to and exacerbate respiratory disease in children and adults. Increased heat and carbon dioxide enhance the growth of plants that produce pollen, which are associated with allergies. Increased temperatures add to the heat load of buildings in urban areas and exacerbate existing urban heat islands adding to the risk of high ambient temperatures.

Cal-Adapt

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

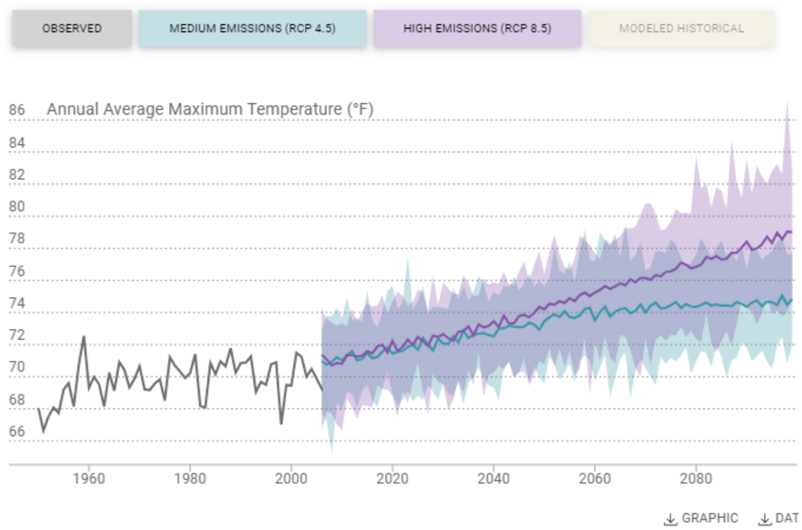
These projections also differ depending on the time of year and the type of measurement (highs vs. lows), all of which have different potential effects to the state's ecosystem health, agricultural production, water use and availability, and energy demand. Future temperature estimates from Cal-Adapt for the District are shown in Figure 4-29 and Figure 4-30. It shows the following:

- Figure 4-29 shows number of days in a year when daily maximum temperature is above the extreme heat threshold of 90.0°F. Data is shown for the census tract that contains the HVLCSD under the RCP 8.5 scenario in which emissions continue to rise strongly through 2050 and plateau around 2100.
- Figure 4-30 shows number of days in a year when daily maximum temperature is above the extreme heat threshold of 90.0 °F. Data is shown for the census tract that contains the HVLCSD under the RCP 4.5 scenario in which emissions peak around 2040, then decline.

Figure 4-29 HVLCSD – Future Temperature Estimates in High Emission Scenarios

This visualization shows the most likely outcome (—, —) and range (,) of future projections of Annual Average Maximum Temperature.

- Tour this visualization
- About the data
- Best practices for working with climate data
- Explore related climate tools



This table provides a snapshot of Annual Average Maximum Temperature for three 30-year time periods.

- About this table

Observed (1961-1990) 30yr Average: 70.0 °F

	Change from baseline	30yr Average	30yr Range
Baseline (1961-1990)			
MODELED HISTORICAL	-	69.6 °F	69.3 - 69.9 °F
Mid-Century (2035-2064)			
MEDIUM EMISSIONS (RCP 4.5)	+3.8 °F	73.4 °F	71.5 - 74.7 °F
HIGH EMISSIONS (RCP 8.5)	+4.6 °F	74.2 °F	71.4 - 75.5 °F
End-Century (2070-2099)			
MEDIUM EMISSIONS (RCP 4.5)	+4.9 °F	74.5 °F	72.4 - 76.4 °F
HIGH EMISSIONS (RCP 8.5)	+7.9 °F	77.5 °F	73.3 - 80.2 °F

GRAPHIC DAT

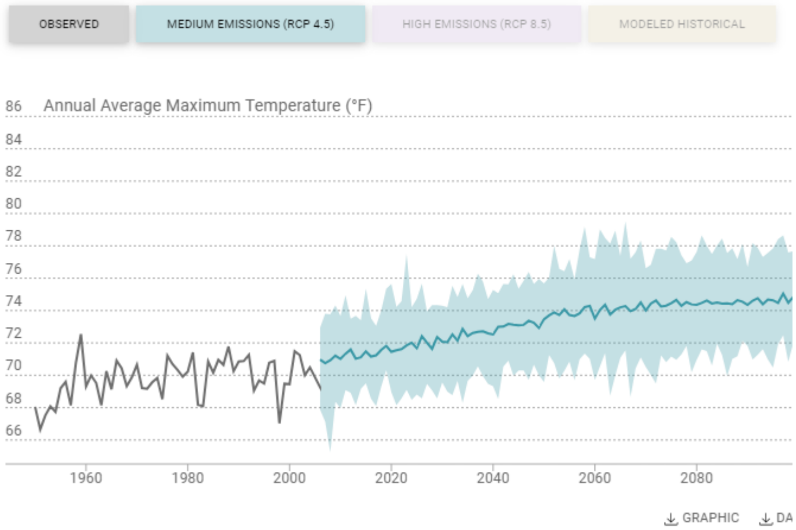
1. Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.
2. Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.
3. Data presented are aggregated over all LOCA grid cells that intersect Census Tract 6033001300 boundary.

Source: Cal-Adapt – Number of Extreme Heat Days by Year. Retrieved 6/28/2024.

Figure 4-30 HVLCSD – Future Temperature Estimates in Medium Emission Scenarios

This visualization shows the most likely outcome (—, —) and range (,) of future projections of Annual Average Maximum Temperature.

- Tour this visualization
- About the data
- Best practices for working with climate data
- Explore related climate tools



This table provides a snapshot of Annual Average Maximum Temperature for three 30-year time periods.

- About this table

Observed (1961-1990) 30yr Average: 70.0 °F

	Change from baseline	30yr Average	30yr Range
Baseline (1961-1990)			
MODELED HISTORICAL	-	69.6 °F	69.3 - 69.9 °F
Mid-Century (2035-2064)			
MEDIUM EMISSIONS (RCP 4.5)	+3.8 °F	73.4 °F	71.5 - 74.7 °F
HIGH EMISSIONS (RCP 8.5)	+4.6 °F	74.2 °F	71.4 - 75.5 °F
End-Century (2070-2099)			
MEDIUM EMISSIONS (RCP 4.5)	+4.9 °F	74.5 °F	72.4 - 76.4 °F
HIGH EMISSIONS (RCP 8.5)	+7.9 °F	77.5 °F	73.3 - 80.2 °F

GRAPHIC DA

1. Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.
2. Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.
3. Data presented are aggregated over all LOCA grid cells that intersect Census Tract 6033001300 boundary.

Source: Cal-Adapt – Number of Extreme Heat Days by Year. Retrieved 6/28/2024.

Vulnerability Assessment

Vulnerability—Medium

Extreme heat is becoming more frequent, intense, longer lasting and geographically widespread. Extreme heat occurs on an annual basis in the District. In recent years, compounded by climate change conditions, summer months continue to get a bit hotter.

The whole of the HVLCSD has some measure of vulnerability to extreme heat. An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to the District. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect the HVLCSD. The sections that follow include a discussion of this hazard relative to assets at risk, impacts, and future development/future conditions.

Local Concerns

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

Extreme heat affects both the people that work at the District and the ability of the District to provide water and wastewater services to their end users. As temperatures rise, many of the water and wastewater facilities heat up exposing workers to high temperatures. The Blower Room is one area that significantly heats up and the existing cooling system is inadequate to keep the room at a comfortable temperature. Also a concern to the District are the air quality issues that occur during periods of high heat also creating challenging and sometimes unsafe worker conditions. The HVLCSD does have a Heat-Illness Protection Plan to meet OSHA requirements for both indoor and outdoor workers that help address these heat related issues to District staff. Extreme heat causes issues for the pumps more than the actual water source. District staff concerns also exist. The District tries not to have staff work outside when it's triple digits, but sometimes they have to. While there is no current project to update the cooling system in the Blower Room, mitigation actions for this are included in this LHMP and will be pursued in the future.

Extreme heat can introduce complexity in the wastewater treatment process. Heat affects the quality of effluent in both the pipes and the system's holding pond. Heat creates biological changes that lead to increased algae and other biological changes in the affluent. These biological changes and aquatic growth can impact the pH level of the water requiring system changes to stabilize the effluent.

With the exception of impacts to the pH levels in the wastewater holding pond, there have been very few other concerns on the wastewater side of the HVLCSD directly related to extreme heat. PG&E, and associated power outages and power fluctuations associated with extreme heat conditions are an ongoing concern, as heat can damage pumps and other sensitive equipment. Also a concern during power outages are the District employees, including the mechanics who work on these pumps during extreme heat conditions.

The HVLCSD may also be affected during extreme heat events if PG&E shuts off electricity to the District during red flag days. Public Safety Power Shutdowns (PSPS) severely impacts the productivity and support capabilities of the District. PSPS events in Oct, Nov of 2019 cost the district nearly 50% of its fuel budget on this unexpected cost, as well as costs to the District's repair and replace budget. Salary was tracked essentially as time spent not working on District tasks. Several days were not even tracked, as employees were sent home. The District continues to struggle with the perception from PG&E of what qualifies as critical infrastructure, and essential services. For this reason, PG&E hesitates to provide support to the District and similar facilities during power outage events.

The District noted that, in addition to the direct effects of extreme heat, it is often wildfires that are exacerbated during hot weather that are most damaging.

Assets at Risk

Assets at risk from extreme heat include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

The District currently has 14 employees. Those District employees that work outdoors or inside facilities without proper cooling systems are likely to be most affected by extreme heat conditions.

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

Structures (including Critical Facilities and Infrastructure)

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

Community Lifelines

Community lifelines are likely to be affected to some degree by extreme heat events. Impacts to these community lifelines in the District and greater Lake County.

- **Safety and Security** – Police and fire personnel may see additional demand during periods of extreme heat. This may also cause emergency responders to be exposed to the effects of higher heat.
- **Food, Hydration, Shelter** – Water distribution may need to occur during extreme heat events. Cooling centers and other public shelters will need to be open and staffed.
- **Health and Medical** – Heat stroke and exhaustion may occur with greater frequency. This can cause EMS and medical personnel to have a large influx of those needing medical attention.
- **Energy** – Power outages can occur in extreme heat situations. Power outages during extreme heat can cause air conditioning systems to go offline, causing injuries or deaths. PSPS events can also occur during times of extreme heat, causing the electric grid to temporarily go offline.
- **Communication**s – Communication infrastructure may be impacted during extreme heat events. Alert warnings and messages may need to be given to the general public. These systems can be temporarily

overloaded during emergency events. They also could be affected during related power outages. Communications and IT equipment located inside these facilities may also be at risk to extreme heat.

- **Water Systems** – Water and wastewater systems in the HVLCSD and greater Lake County can be taxed during extreme heat events.

While community lifelines can be affected by extreme heat events, they are not likely to be overwhelmed with the exception of the power grid. As discussed above, extreme heat can contribute to power interruptions and outages that can lead to additional impacts and concerns. Backup power sources should be in place to keep critical facilities and community lifelines online and functioning, including for HVLCSD facilities.

Natural, Historic, and Cultural Resources

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

Economic Assets and Community Activities of Value

As previously noted, the largest economic asset in the District Service Area is the HVLCSD. Most economic assets within the District are not vulnerable to extreme heat events. However, during periods of extreme heat, the economy may slow as people stay home or inside. Additionally, extreme heat causes power costs borne by individuals and businesses in the Planning Area to increase, which reduces the amount of money available to circulate inside the local economy. Community activities of value may see a reduction in attendance, impacting revenues associated with these events, especially those that occur outdoors in the hotter summer months.

Impacts from Severe Weather: Extreme Heat

The District experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-115°F in rather extreme situations. Extreme heat can introduce complexity in the wastewater treatment process. Heat affects the quality of effluent in both the pipes and the system's holding pond. Heat creates biological changes that lead to increased algae and other biological changes in the affluent. These biological changes and aquatic growth can impact the pH level of the water requiring system changes to stabilize the effluent.

During these times, drought conditions may worsen and the Planning Area may see an increase in dry fuels contributing to wildfires. Power outages and PSPS events may occur during these times as well. Health issues are the primary concern with this hazard with vulnerable populations at greater risk, although economic impacts can also be an issue. Air quality can also be an issue during extreme heat.

Extreme heat may also cause drought-like conditions. For example, several weeks of extreme heat increases evapotranspiration and reduces moisture content in vegetation, leading to higher wildfire vulnerability for that time period even if the rest of the season is relatively moist. Drought is discussed further in Section 4.3.7 and wildfire in Section 4.3.12. Extreme heat can also contribute to initiation of PSPS events.

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

Future Conditions/Future Development

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

- As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time.
- While population projections for the area served by the District show additional expected growth, these anticipated future changes in population are expected to be relatively small, which is unlikely to affect this hazard and associated impacts to the District. The District may add staff, but this number would be small. The District noted it has no control over population changes in its Planning Area, it merely reacts to them by providing additional (or reduced) services.
- Changes in land use and development in the Hidden Valley Lake area are expected to be limited in the near future and thus are not likely to affect heat and associated impacts to the District. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District to this hazard. With adherence to development standards, future losses to new development should be minimal.

Future development in the District will take extreme heat into account. The backup generator at the treatment plant maintains all processes that require electricity. The 5,000 sq. ft. building at the plant also serves as a cooling center for employees. The HVLCSD also maintains a Heat-Illness Prevention Plan to protect its workers. Future development will incorporate a suitable climate that can be maintained for infrastructure and telemetry during periods of extreme heat. In the event of grid-tied power outages, a reliable backup power source must be included in development plans. Additionally, implementing energy efficiency and conservation efforts to reduce stress on electricity systems during heat waves.

4.3.4. Severe Weather: Heavy Rains and Storms

Hazard Profile

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

Hazard/Problem Description

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

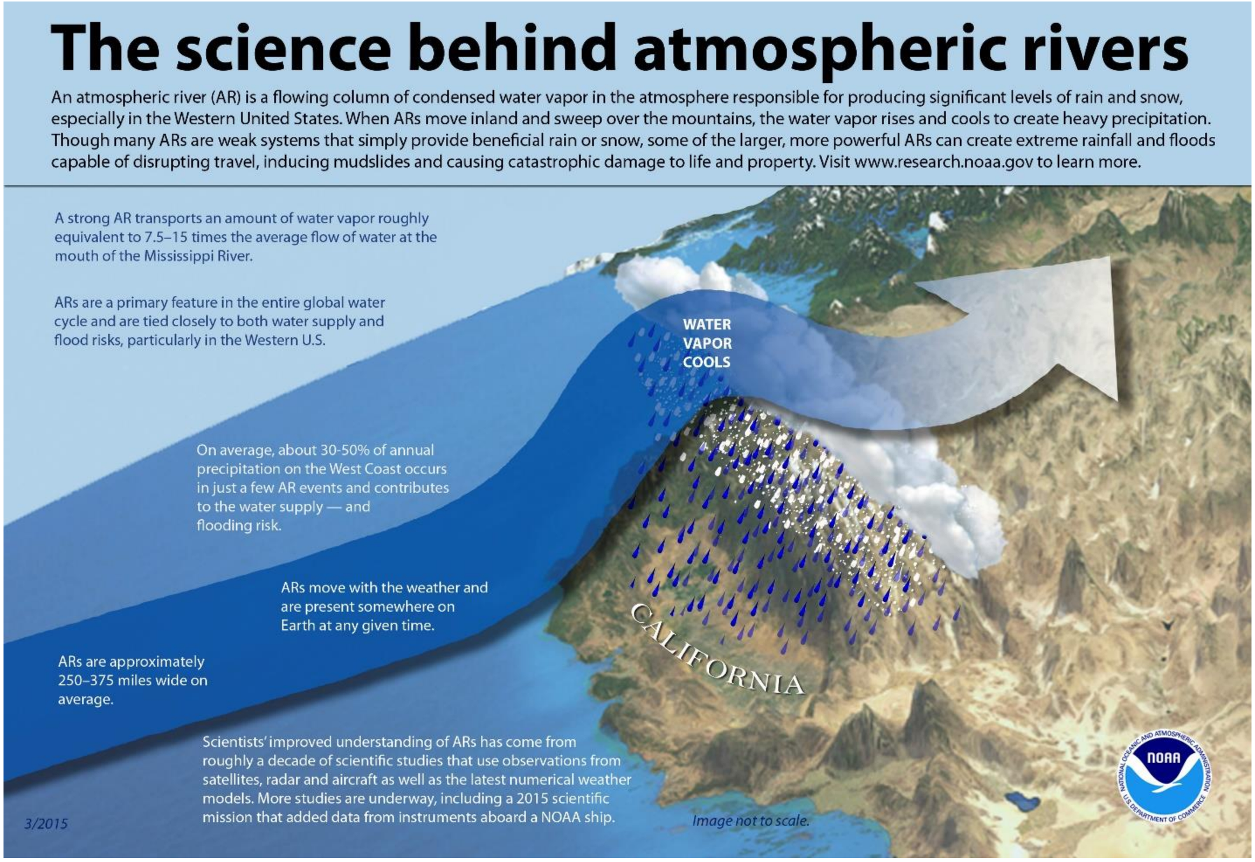
A separate hazard/problem description and location and extent for heavy rains and storms, hail, lightning, and high winds follows.

Heavy Rain and Storms

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

The District and the rest of Northern California can be affected by a phenomenon known as an atmospheric river. According to the NOAA, atmospheric rivers are relatively long, narrow regions in the atmosphere – like rivers in the sky – that transport most of the water vapor outside of the tropics. These columns of vapor move with the weather, carrying an amount of water vapor roughly equivalent to the average flow of water at the mouth of the Mississippi River. When the atmospheric rivers make landfall, they often release this water vapor in the form of rain or snow. This can be seen in Figure 4-31.

Figure 4-31 Atmospheric Rivers



Source: NOAA

Although atmospheric rivers come in many shapes and sizes, those that contain the largest amounts of water vapor and the strongest winds can create extreme rainfall and floods, often by stalling over watersheds vulnerable to flooding. These events can disrupt travel, induce mudslides and cause catastrophic damage to life and property. A well-known example is the "Pineapple Express," a strong atmospheric river that is capable of bringing moisture from the tropics near Hawaii over to the U.S. West Coast.

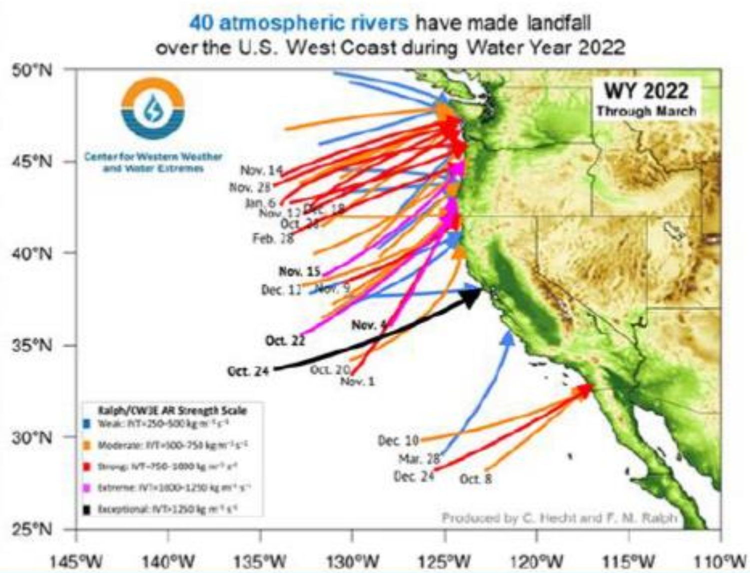
Not all atmospheric rivers cause damage; most are weak systems that often provide beneficial rain or snow that is crucial to the water supply. Atmospheric rivers are a key feature in the global water cycle and are closely tied to both water supply and flood risks — particularly in the western United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

While atmospheric rivers are responsible for great quantities of rain that can produce flooding, they also contribute to beneficial increases in snowpack. A series of atmospheric rivers fueled the strong winter storms that battered the U.S. West Coast from western Washington to southern California from Dec. 10–22, 2010, producing 11 to 25 inches of rain in certain areas. These rivers also contributed to the snowpack in the Sierras, which received 75 percent of its annual snow by Dec. 22, the first full day of winter. Another example of this happened in 2022. Multiple atmospheric river storms occurred in the District and the rest of California. This can be seen in Figure 4-32. This also happened in the 2023 as well as in 2024, which can be seen in Figure 4-33 and Figure 4-34, respectively.

Figure 4-32 2022 Atmospheric River Events

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

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



CW3E

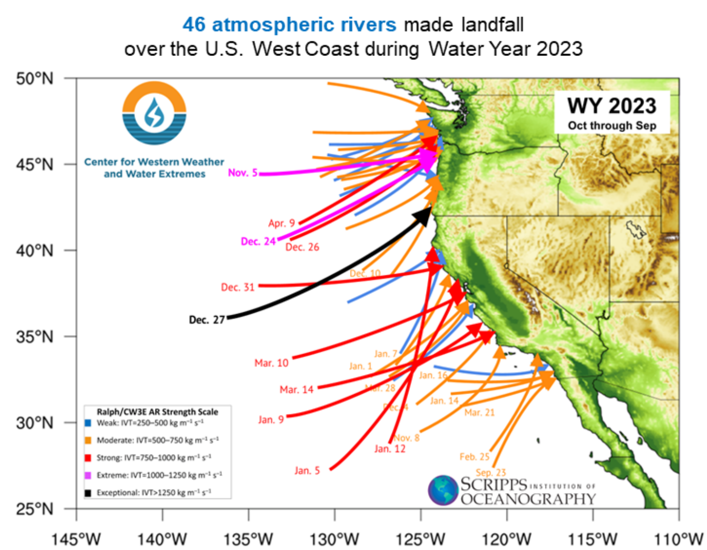
*Arrows are placed on the map where each AR was strongest over the coast

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

Figure 4-33 2023 Atmospheric River Events

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

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

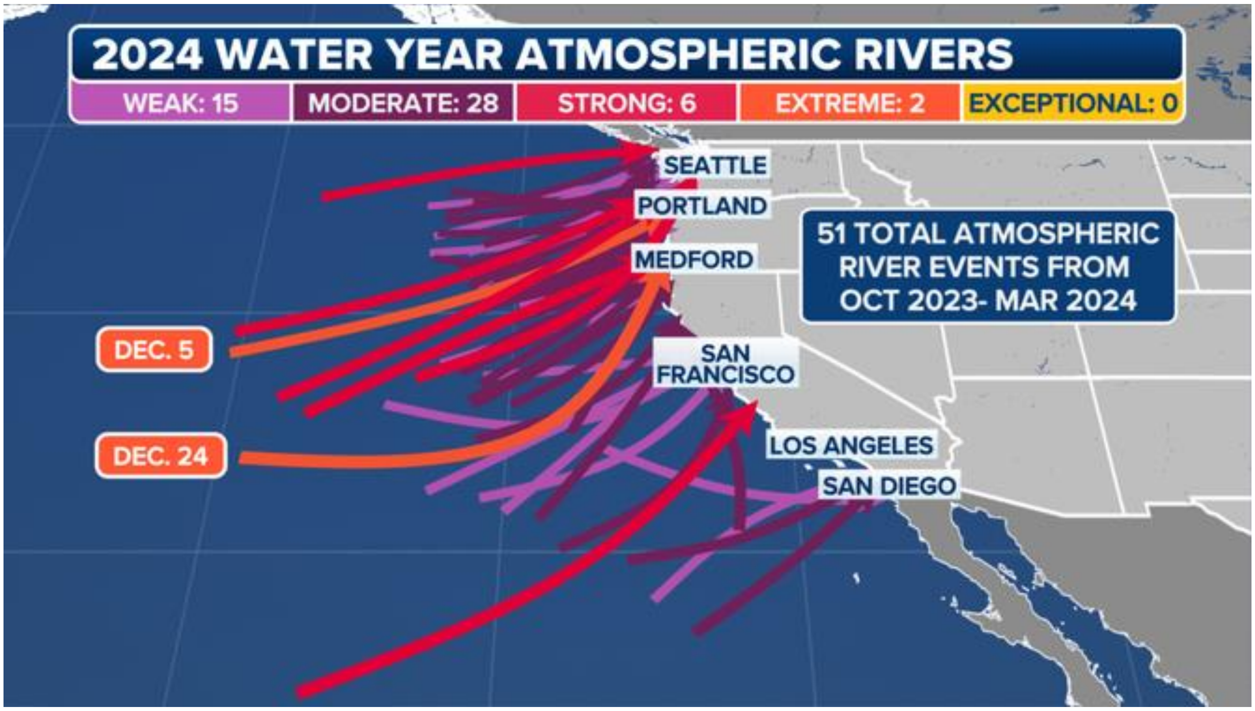


CW3E
Center for Western Weather and Water Extremes

*Arrows are placed on the map where each AR was strongest over the coast

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

Figure 4-34 2024 Atmospheric Rivers



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

Short-term, heavy storms can cause both widespread flooding as well as extensive localized drainage issues. With the increased growth of the area, the lack of adequate drainage systems has become an increasingly important issue. In addition to the flooding that often occurs during these storms, strong winds, when combined with saturated ground conditions, can down very mature trees and powerlines. More information about this can be found in the Localized Flood discussion in Section 4.3.10.

Location and Extent

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

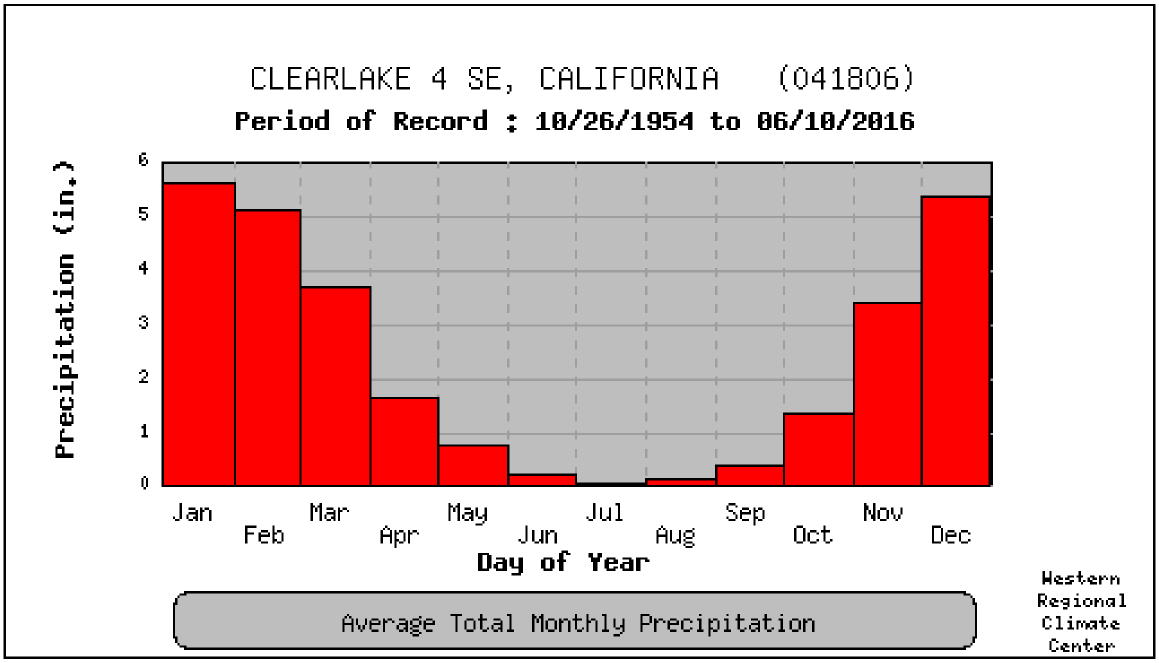
There is no scale by which heavy rains are measured – usually it is measured in terms of rainfall amounts. Magnitude of storms is measured often in rainfall and damages. The speed of onset of heavy rains can be short, but accurate weather prediction mechanisms often let the public know of upcoming events.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

The WRCC and NWS maintain data on weather normal and extremes in the western United States. Each of these data sources maintain data in slightly different ways. Data from the WRCC stopped being collected in June of 2016. NWS covers the entire time period to present. Therefore, both data sets are shown below. The closest weather station was chosen for the District – the Clearlake SE 4 Weather Station. WRCC and NWS data for the District from that station is summarized below.

WRCC Clearlake SE Weather Station, Period of Record 1954 to 2016

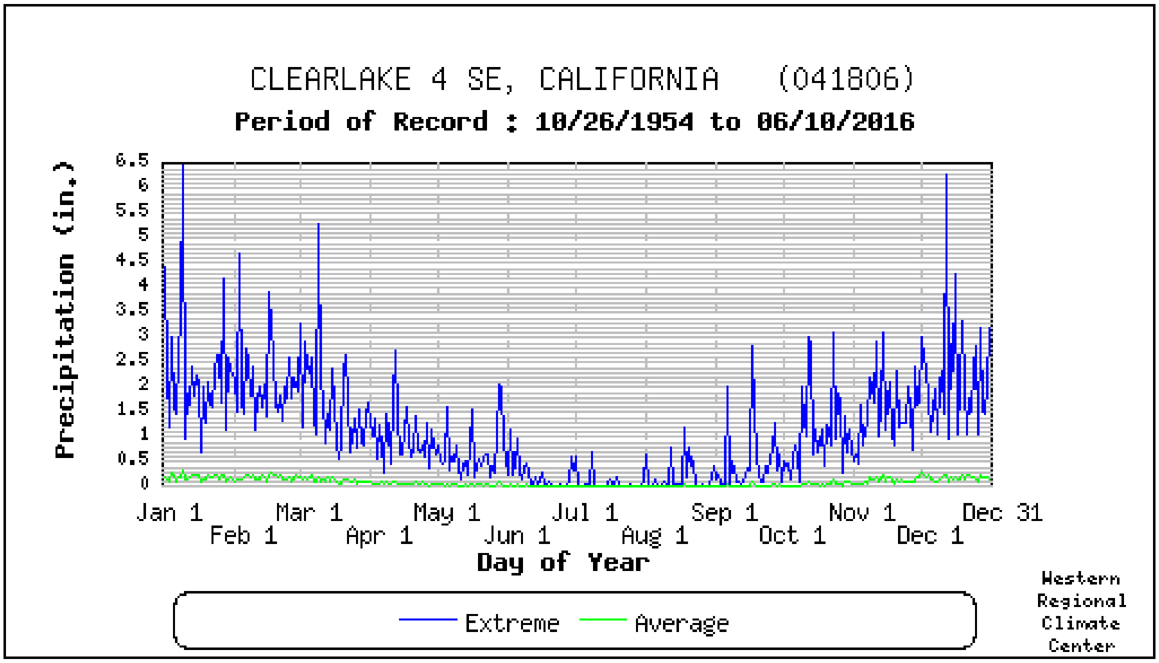
According to the WRCC, average annual precipitation in Clearlake and the District is 27.48 inches per year. The highest recorded annual precipitation is 61.88 inches in 1983; the highest recorded precipitation for a 24-hour period is 6.28 inches on January 4, 1982. The lowest recorded annual precipitation was 8.17 inches in 1976. Average monthly precipitation for Clearlake and the District is shown in Figure 4-35. Daily average and extreme precipitations are shown in Figure 4-36.

Figure 4-35 HVLCSD– Monthly Average Total Precipitation



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

Figure 4-36 HVLCSD – Daily Average and Extreme Precipitation

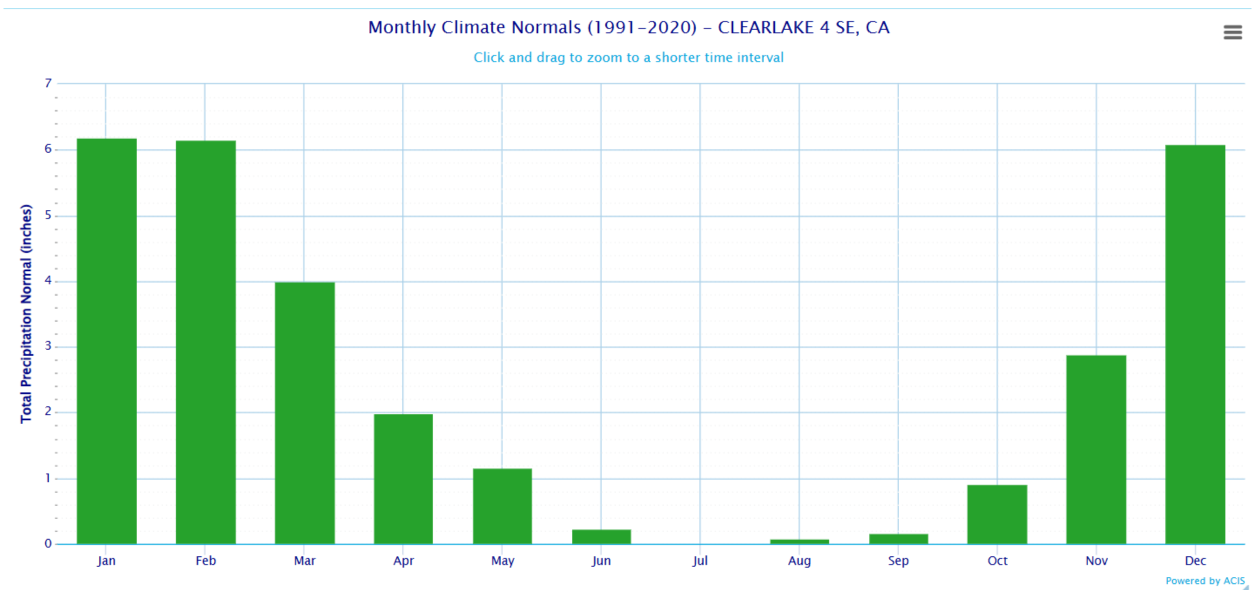


Source: Western Regional Climate Center, www.wrcc.dri.edu/

NWS Clearlake SE Weather Station, Period of Record 1954 to 2023

According to the NWS, average annual precipitation in the District is 29.86 inches per year. Average monthly precipitation for HVLCSD is shown in Figure 4-37. One day extreme precipitations are shown in Table 4-27.

Figure 4-37 HVLCSD — Monthly Average Total Precipitation 1991 to 2020



Source: National Weather Service XMAC site. Retrieved 6/28/2024

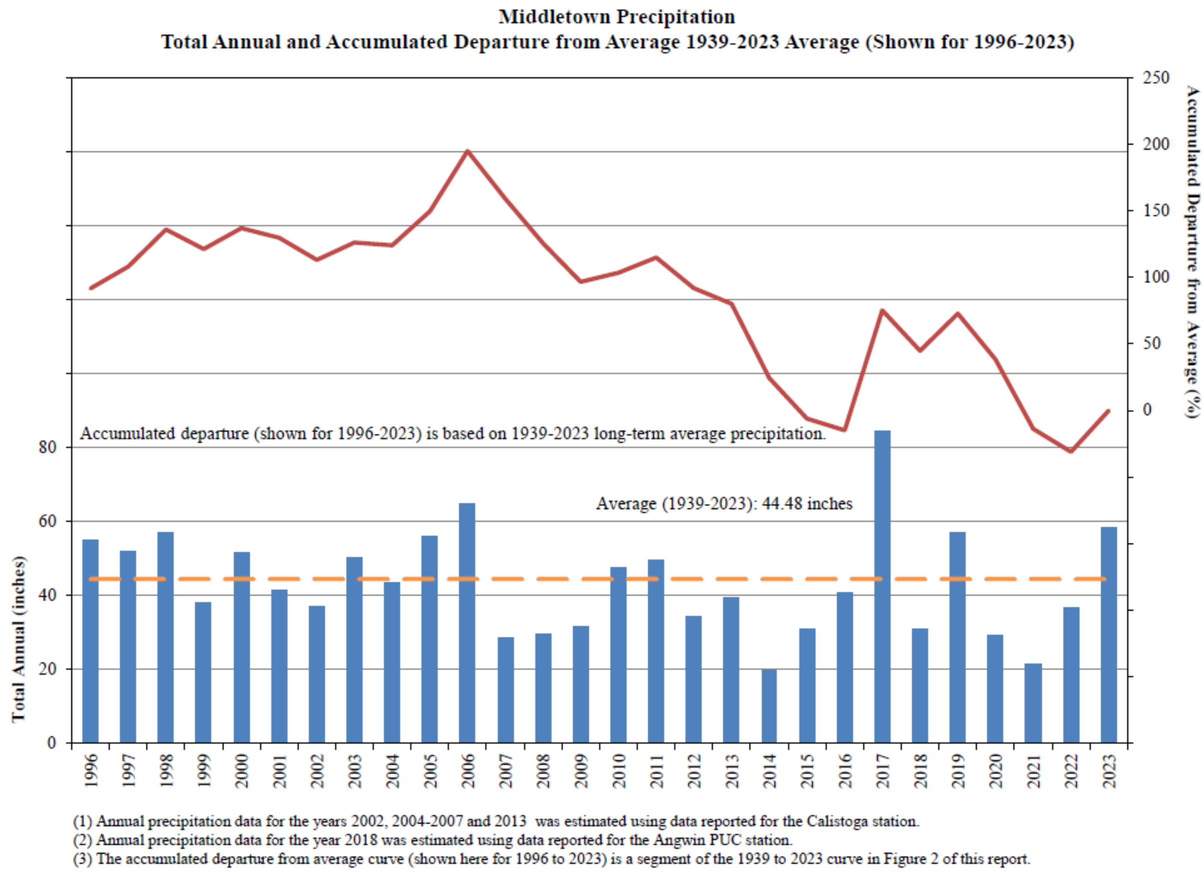
Table 4-27 HVLCSD – One Day Maximum Precipitation 1954 to 2023

Rainfall in Inches	Date
6.47	1/9/1995
6.28	12/12/1995
5.26	3/9/1995
4.70	2/3/1998
4.43	2/27/2019
4.43	1/1/1997
4.29	12/16/2002
4.16	1/27/1983
3.89	2/16/1959
3.41	1/8/1995

Source: National Weather Service XMAC site. Retrieved 6/28/2024

In addition to the WRCC and NWS data above, HVLCSD provided data on precipitation received in nearby Middletown from 1995 to 2023. This is shown on Figure 4-38.

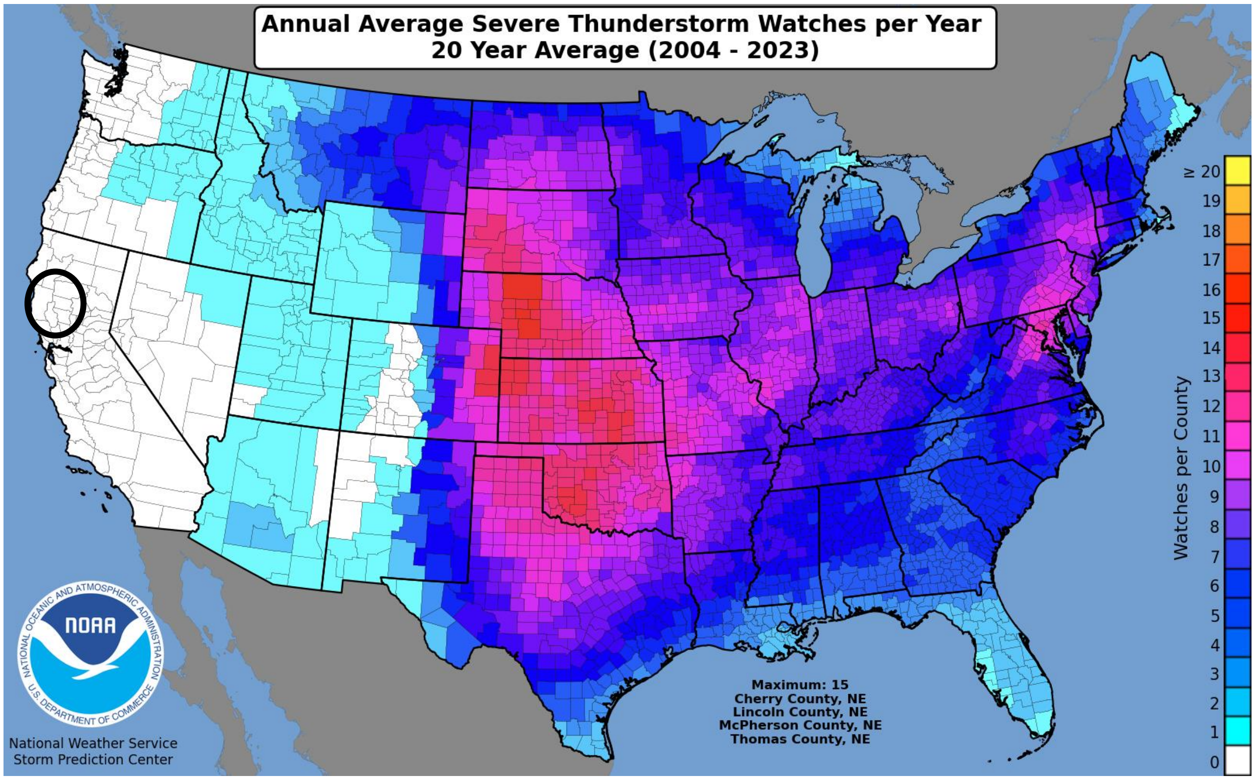
Figure 4-38 Middletown Precipitation – Total Annual and Accumulated Departure from Average from 1995-2019



Source: HVLCSD (from 2020 HVLCSD LHMP)

The NOAA Storm Prediction Center tracks thunderstorm watches on a county basis. Figure 4-39 shows thunderstorm watches in the District and the United States for a 20-year period between 2004 and 2023.

Figure 4-39 HVLCSD – Average Thunderstorm Watches per Year (2004 to 2023)



Source: NOAA Storm Prediction Center. Retrieved 7/1/2024.

Hail

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

The NWS classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 4-28 indicates the hailstone measurements utilized by the NWS.

Table 4-28 Hailstone Measurements

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

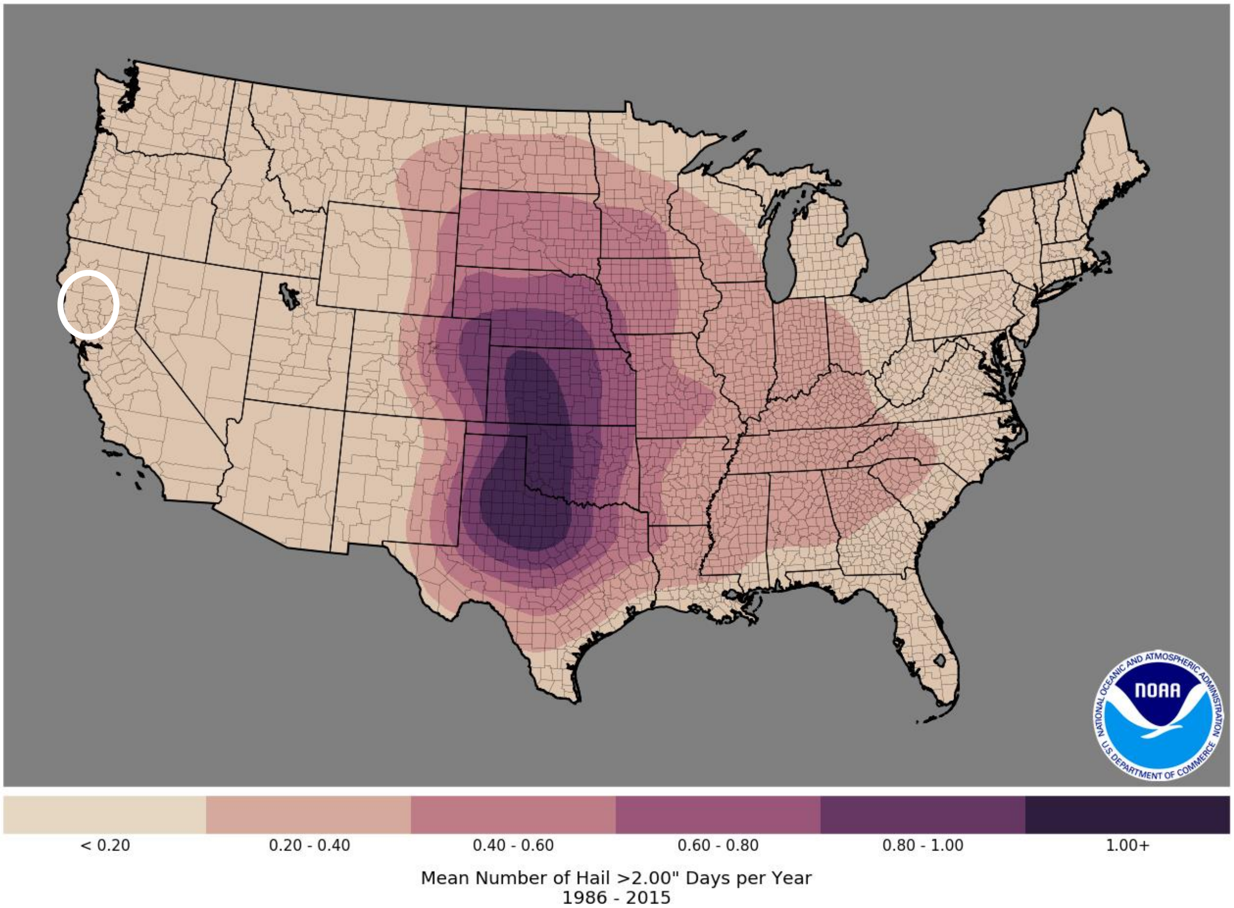
Average Diameter	Corresponding Household Object
1.75 inch	Golf-Ball
2.0 inch	Hen Egg
2.5 inch	Tennis Ball
2.75 inch	Baseball
3.00 inch	Teacup
4.00 inch	Grapefruit
4.5 inch	Softball

Source: National Weather Service

Location and Extent

Hail events can occur in any location of the District. All portions of the District are at risk to hail. Hail tends to be rare in California and the District. There is no scale in which to measure hail, other than hail stone size as detailed above. The speed of onset of hail can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of thunderstorms that can cause hail in California is often short, ranging from minutes to hours. Hail events last shorter than the duration of the total thunderstorm. The National Weather Service tracks hail events. Figure 4-40 shows the average days each year where hail of greater than 1" in diameter occurred during a 20-year period from 1986 to 2015 (the most recent data available).

Figure 4-40 HVLCSD – Average Hail Days per Year (1986 to 2015)



Source: National Weather Service. Retrieved 7/1/2024.

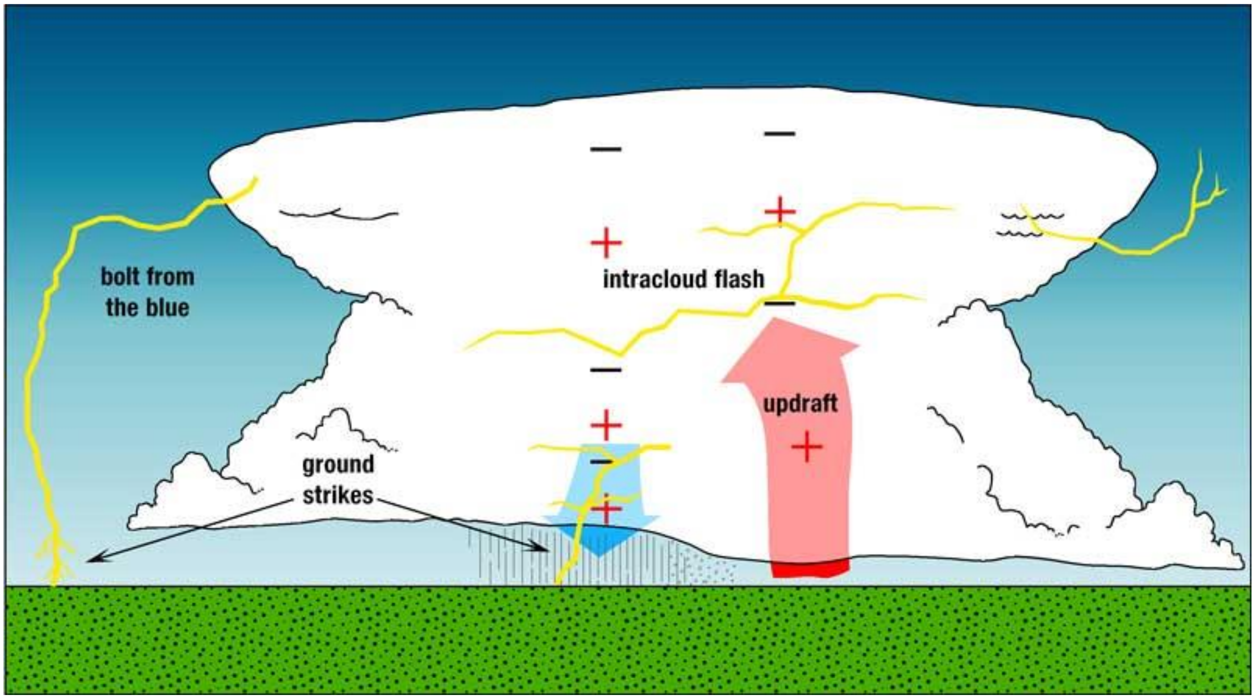
Lightning

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

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

Cloud-to-ground lightning is the most damaging and dangerous type of lightning, though it is also less common. Most flashes originate near the lower-negative charge center and deliver negative charge to earth. However, a large minority of flashes carry positive charge to earth. These positive flashes often occur during the dissipating stage of a thunderstorm's life. Positive flashes are also more common as a percentage of total ground strikes during the winter months. This type of lightning is particularly dangerous for several reasons. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike as far as 5 or 10 miles from the storm in areas that most people do not consider to be a threat (see Figure 4-41). Positive lightning also has a longer duration, so fires are more easily ignited. And, when positive lightning strikes, it usually carries a high peak electrical current, potentially resulting in greater damage.

Figure 4-41 Cloud to Ground Lightning



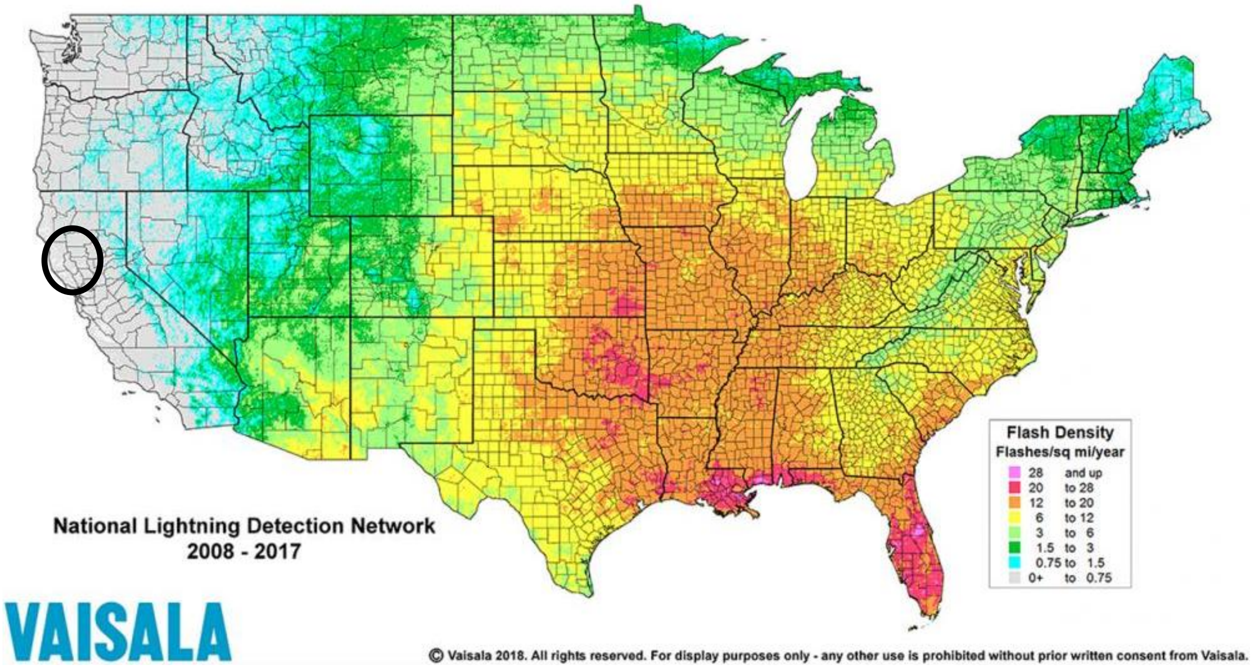
Source: National Weather Service

Lightning in the District is also a concern due to the number of fires that are started by lightning strikes; often occurring outside of rain events. Wildfire is discussed in more detail in Section 4.3.12.

Location and Extent

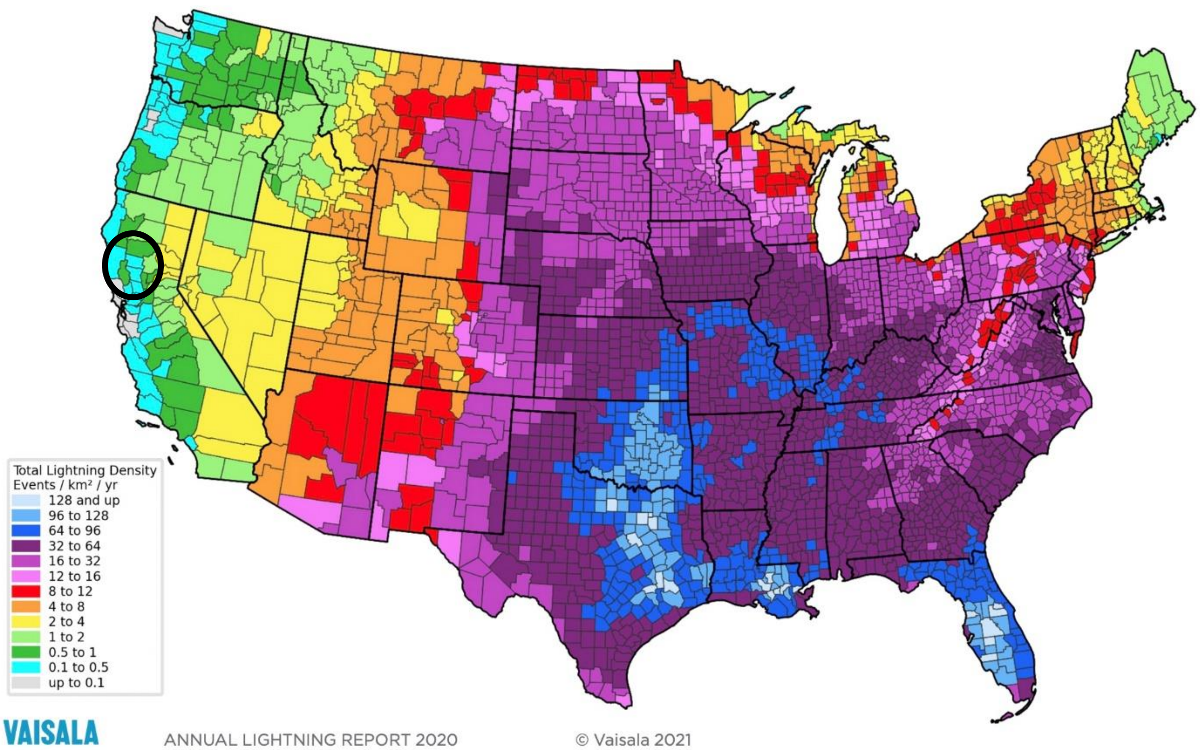
Lightning events can occur in any location of the District and are often associated with thunderstorms. All portions of the District are at risk to lightning. Lightning in the District can occur during thunderstorms. The speed of onset of thunderstorms that can cause lightning can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of thunderstorms in California is often short, ranging from minutes to hours. Thunderstorms and lightning are rare in the District. Lightning can also occur in the District outside of a thunderstorm event. Vaisala maintains the National Lightning Detection Network. It tracks cloud to ground lightning incidences in the United States. Figure 4-42 shows lightning incidences in the District and the rest of the United States from 2008 to 2017 (the most recent long term tracking map available). Figure 4-43 shows a more recent lightning density by County map.

Figure 4-42 HVLCSD – Lightning Incidence Map 2008 to 2017



Source: Vaisala National Lightning Detection Network. Retrieved 7/1/2024.

Figure 4-43 HVLCSD – Average US Total Lightning Density per County 2015-2019



Source: Vaisala National Lightning Detection Network. Retrieved 7/1/2024.

High Winds

High winds can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. High winds, as defined by the NWS glossary, are sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration. These winds may occur as part of a seasonal climate pattern or in relation to other severe weather events such as thunderstorms.

Straight-line winds may also exacerbate existing weather conditions by increasing the effect on temperature and decreasing visibility due to the movement of particulate matters through the air, as in dust and snowstorms. The winds may also exacerbate fire conditions by drying out the ground cover, propelling fuel around the region, and increasing the ferocity of exiting fires. These winds may damage crops, push automobiles off roads, damage roofs and structures, and cause secondary damage due to flying debris.

Location and Extent

The entire District is subject to significant, non-tornadic (straight-line), winds. Each area of the HVLCSD is at risk to high winds. Magnitude of winds is measured often in speed and damages. These events are often part of a heavy rain and storm event, but can occur outside of storms. The speed of onset of winds can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of winds in California is often short, ranging from minutes to hours. The Beaufort scale is an empirical measure that relates wind speed to observed conditions at sea or on land. Its full name is the Beaufort wind force scale. Figure 4-44 shows the Beaufort wind scale.

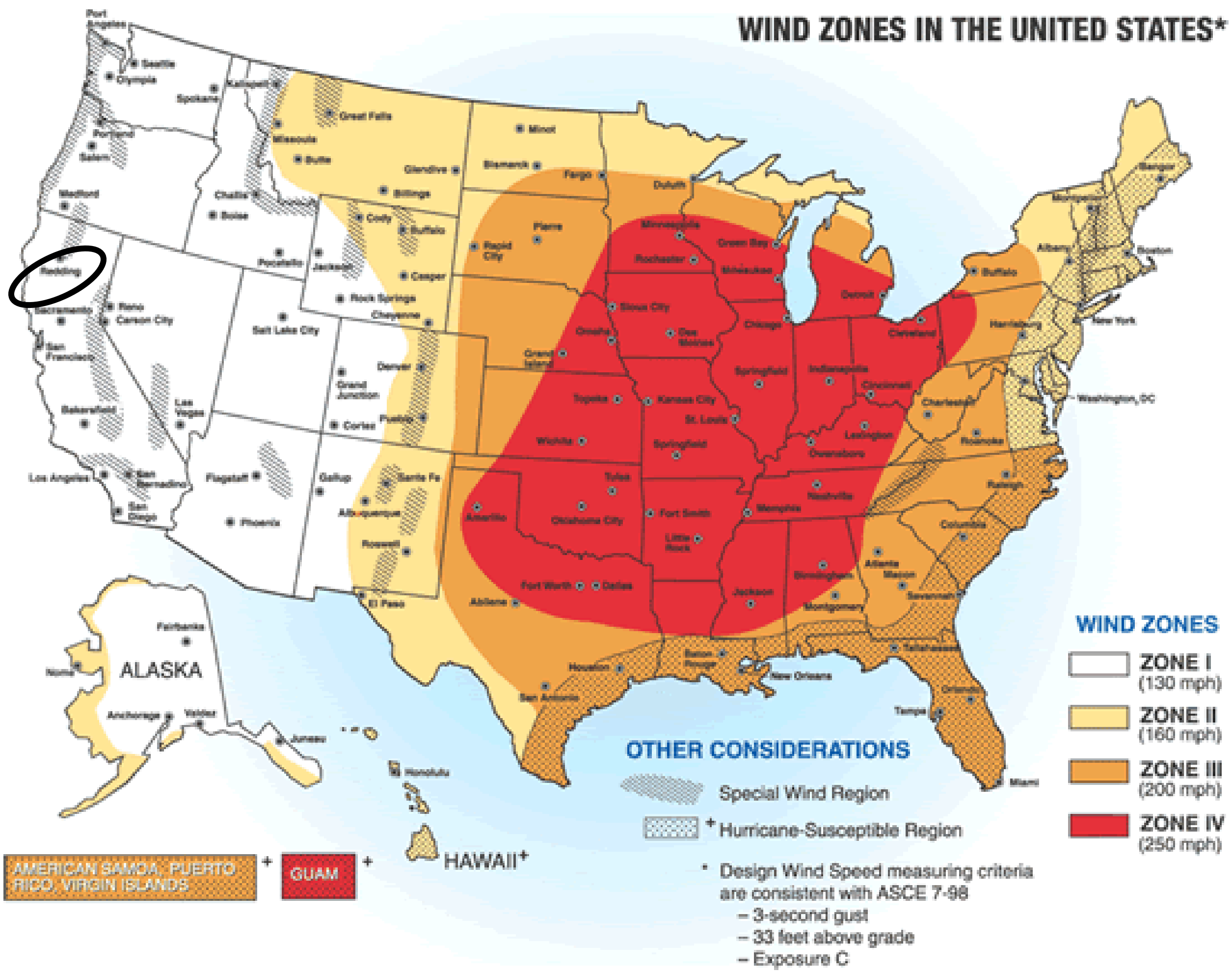
Figure 4-44 Beaufort Wind Scale

Beaufort Number	Wind Speed (miles/hour)	Wind Speed (km/hour)	Wind Speed (knots)	Description	Wind Effects on Land
0	< 1	< 1	< 1	Calm	Calm. Smoke rises vertically.
1	1-3	1-5	1-3	Light Air	Wind motion visible in smoke.
2	4-7	6-11	4-6	Light Breeze	Wind felt on exposed skin. Leaves rustle.
3	8-12	12-19	7-12	Gentle Breeze	Leaves and smaller twigs in constant motion.
4	13-18	20-28	11-16	Moderate Breeze	Dust and loose paper are raised. Small branches begin to move.
5	19-24	29-38	17-21	Fresh Breeze	Small trees begin to sway.
6	25-31	39-49	22-27	Strong Breeze	Large branches are in motion. Whistling is heard in overhead wires. Umbrella use is difficult.
7	32-38	50-61	28-33	Near Gale	Whole trees in motion. Some difficulty experienced walking into the wind.
8	39-46	62-74	34-40	Gale	Twigs and small branches break from trees. Cars veer on road.
9	47-54	75-88	41-47	Strong Gale	Larger branches break from trees. Light structural damage.
10	55-63	89-102	48-55	Storm	Trees broken and uprooted. Considerable structural damage.
11	64-72	103-117	56-63	Violent Storm	Widespread damage to structures and vegetation.
12	> 73	> 117	> 64	Hurricane	Considerable and widespread damage to structures and vegetation. Violence.

Source: National Weather Service

Figure 4-45 depicts wind zones for the United States. The map denotes that the District falls into Zone I, which is characterized by high winds of up to 130 mph.

Figure 4-45 Wind Zones in the United States



Source: FEMA

Past Occurrences

Disaster Declaration History

A search of FEMA and Cal OES disaster declarations turned up multiple events. Heavy rains and storms have caused flooding in the District. Events where heavy rains and storms and resultant flooding resulted in a state or federal disaster declaration are shown in Table 4-29.

Table 4-29 Lake County – Disaster Declarations from Heavy Rain and Storms 1950-2024

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	23	1950, 1955, 1958 (twice), 1963, 1964 (twice), 1970, 1980, 1983, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2014, 2017 (twice), 2019, 2023 (twice)	19	1955, 1958, 1963, 1964, 1970, 1983, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019, 2023 (three)

Source: Cal OES, FEMA. Retrieved June 2024.

NCDC Events

The NCDC data recorded 44 heavy rain, hail, high wind, and lightning incidents for Lake County since 1950. A summary of these events is shown in Table 4-30. More information on past occurrences of heavy rains can be found in the flood profile in Section 4.3.9 and in the localized flood profile in Section 4.3.10.

*Table 4-30 NCDC Heavy Rain and Storm Events in Lake County 1950-12/31/2023**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Hail	2	0	0	0	0	$0	$0
Heavy Rain	10	0	0	0	0	$0	$0
High Wind	15	0	0	0	0	$183,000	$0
Strong Wind	17	0	0	0	0	$39,000	$0
Total	**44**	**0**	**0**	**0**	**0**	**$222,000**	**$0**

Source: NCDC

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

Hazard Mitigation Planning Committee Events

The HMPC noted that heavy rains, snow, and storms are annual occurrences in the District. Other specific events are discussed in the Flood (Section 4.3.9) and Localized Flood (Section 4.3.10) past event sections.

Likelihood of Future Occurrence

Highly Likely – Based on NCDC data and HMPC input, 44 heavy rain and storm incidents over a 74-year period (1950-2023) equates to a severe storm event every 1.68 years. As noted, this database likely doesn't capture all heavy rain, hail, lightning, and winter weather events. Severe weather is a well-documented seasonal occurrence that will continue to occur often in the District.

It is likely that climate change will increase the chance of future occurrence as well as future impacts. More information on climate change and heavy rains and storms can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Heavy Rains and Storms

According to the CAS, while average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is unlikely that hail will become more common in the District. This may bring stronger thunderstorm winds. The CAS does not discuss non-thunderstorm winds. The amount of lightning is not projected to change.

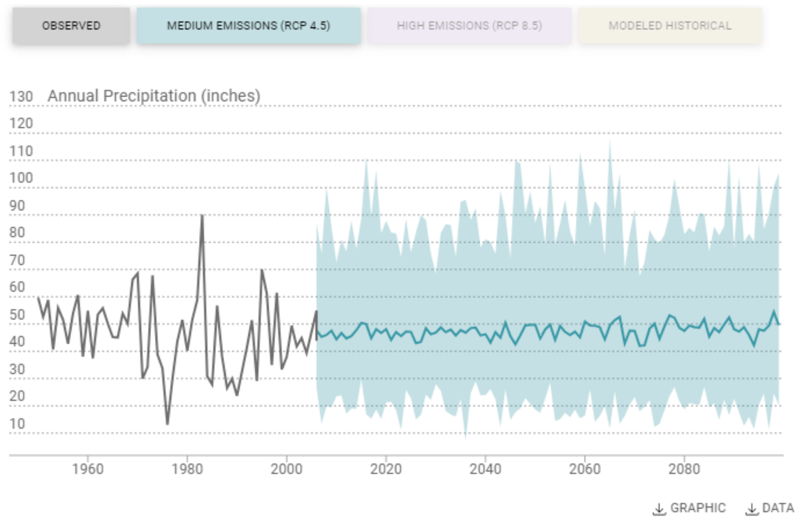
Cal-Adapt noted that, on average, the projections show little change in total annual precipitation in California. Furthermore, among several models, precipitation projections do not show a consistent trend during the next century. The Mediterranean seasonal precipitation pattern is expected to continue, with most precipitation falling during winter from North Pacific storms. One of the four climate models projects slightly wetter winters, and another projects slightly drier winters with a 10 to 20 percent decrease in total annual precipitation. However, even modest changes would have a significant impact because California ecosystems are conditioned to historical precipitation levels and water resources are nearly fully utilized. Future precipitation estimates for the District are shown in Figure 4-46 and Figure 4-47.

- Figure 4-46 shows annual averages of observed and projected precipitation values for the selected area on map under the RCP 4.5 scenario. The gray line (1950 – 2005) is observed data. The blue line represents the most likely outcome for the Medium Emissions Scenario (RCP 4.5). In this scenario, emissions peak in 2040 and then decline. The shaded regions show the range of climate projections for 2006-2099 from all climate models
- Figure 4-47 shows annual averages of observed and projected Precipitation values for the selected area on map under the RCP 8.5 scenario. The gray line (1950 – 2005) is observed data. The pink line represents the most likely outcome for the High Emissions Scenario (RCP 8.5). In this scenario, emissions continue to rise throughout the 21st century. The shaded regions show the range of climate projections for 2006-2099 from all climate models

Figure 4-46 Lake County– Future Precipitation Estimates: Low Emission Scenarios

This visualization shows the most likely outcome (—, —) and range (,) of future projections of Annual Precipitation.

- Tour this visualization
- About the data
- Best practices for working with climate data
- Explore related climate tools



This table provides a snapshot of Annual Precipitation for three 30-year time periods.

- About this table

Observed (1961-1990) 30yr Average: 44.8 inches

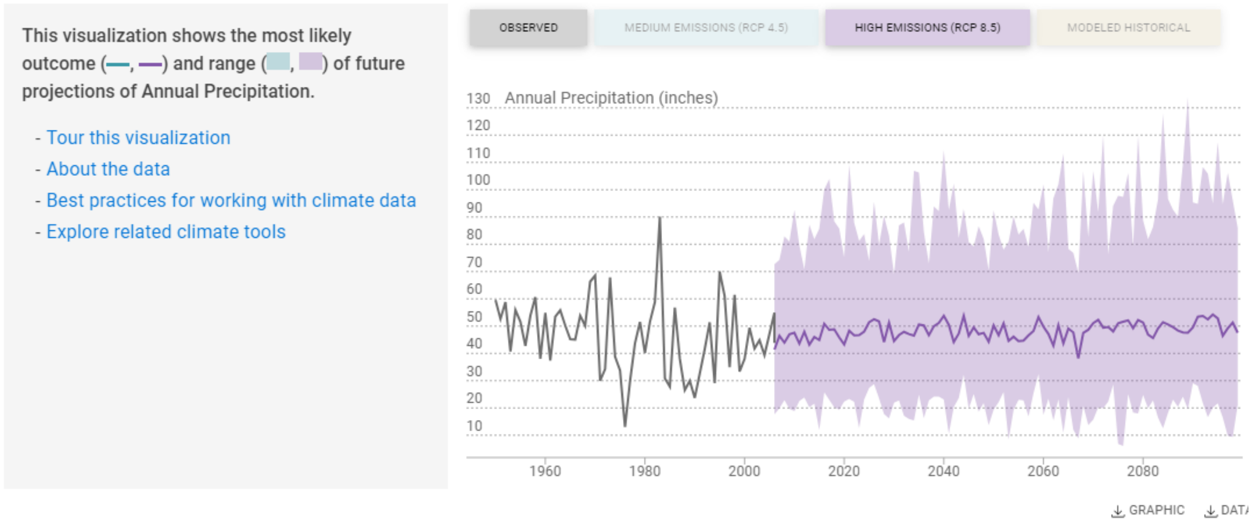
	Change from baseline	30yr Average	30yr Range
Baseline (1961-1990)			
MODELED HISTORICAL	-	46.5 inches	42.2 - 50.7 inches
Mid-Century (2035-2064)			
MEDIUM EMISSIONS (RCP 4.5)	+0.7 inches	47.2 inches	40.0 - 62.1 inches
HIGH EMISSIONS (RCP 8.5)	+1.6 inches	48.1 inches	38.5 - 64.2 inches
End-Century (2070-2099)			
MEDIUM EMISSIONS (RCP 4.5)	+1.8 inches	48.3 inches	40.6 - 60.0 inches
HIGH EMISSIONS (RCP 8.5)	+3.7 inches	50.2 inches	36.7 - 66.9 inches

GRAPHIC DATA

1. Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.
2. Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.
3. Data presented are aggregated over all LOCA grid cells that intersect Census Tract 6033001300 boundary.

Source: Cal-Adapt – Precipitation: Decadal Averages Map. Retrieved July 1, 2024.

Figure 4-47 Lake County– Future Precipitation Estimates: High Emission Scenarios



This table provides a snapshot of Annual Precipitation for three 30-year time periods.

- About this table

Observed (1961-1990) 30yr Average: 44.8 inches

	Change from baseline	30yr Average	30yr Range
Baseline (1961-1990)			
MODELED HISTORICAL	-	46.5 inches	42.2 - 50.7 inches
Mid-Century (2035-2064)			
MEDIUM EMISSIONS (RCP 4.5)	+0.7 inches	47.2 inches	40.0 - 62.1 inches
HIGH EMISSIONS (RCP 8.5)	+1.6 inches	48.1 inches	38.5 - 64.2 inches
End-Century (2070-2099)			
MEDIUM EMISSIONS (RCP 4.5)	+1.8 inches	48.3 inches	40.6 - 60.0 inches
HIGH EMISSIONS (RCP 8.5)	+3.7 inches	50.2 inches	36.7 - 66.9 inches

GRAPHIC DATA

1. Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.
2. Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.
3. Data presented are aggregated over all LOCA grid cells that intersect Census Tract 6033001300 boundary.

Source: Cal-Adapt – Precipitation: Decadal Averages Map. Retrieved July 1, 2024.

Vulnerability Assessment

Vulnerability—Medium

According to historical hazard data, heavy rains and storms, including lightning and sometimes hail, are an annual occurrence in the HVLCSD Planning Area. Heavy rains can cause both localized flooding and flooding in the FEMA floodplains. Atmospheric river storms are of great concern as they can dump large amounts of water in single storms, or in back-to-back storms as seen above in 2022, in the winter storms of 2022/2023, as well as the winter storms of 2023/2024. Impacts can be felt by both the population the District serves as well as HVLCSD facilities.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to the District. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect the HVLCSD. The sections below include assets at risk, impacts, and how future development can be affected by this hazard.

Local Concerns

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

The District noted that the Lake County General Plan discussed rains and storms. As described for Lake County which includes the HVLCSD, four climatic factors work together to develop the annual season of precipitation: geographical altitude, pacific coastal mountain range barriers, prevailing storm tracks, and air masses.

- The County's location in the Pacific Coastal mountain range naturally gives the County varying elevations. The coastal mountain elevations in the County range from an average of 1,200 feet to over 7,000 feet.
- Lake County is located in the center of the Pacific Coastal mountain range. The mountain range acts as a barrier to approaching air masses, which approach the mountains from the west, 30 miles inland from the Pacific Ocean coastline. The mountains act as a lifting mechanism as air masses migrate over them, increasing the chance for precipitation.
- The winter storm track for Lake County funnels storm systems from a semi-permanent low-pressure system in the Gulf of Alaska southward to the California coast following the Westerlies, a global atmospheric wind pattern that provides a relatively consistent westerly flow of air throughout most of the year.
- Air masses typical of Lake County are classified as marine polar. The County's proximity to the Pacific Ocean, in conjunction with the aforementioned storm track, brings cold and moist marine polar air masses over the County throughout much of the year, especially during the winter months.

According to the District, short-term, heavy storms can cause both widespread flooding as well as extensive localized drainage issues. In the Master Storm Drainage Plan of 2000, 78 drainage structures were identified as undersized. Based on 2000 census data, and extrapolation into 2020, population has doubled. With the increased growth of the area, the lack of adequate drainage systems has become an increasingly important issue. Localized flooding occurs throughout the community, especially in the Mountain Meadow South, Gold Flat Ct., and Fishhook Ct. areas. It can also flood on the road leading to the WWTP, interfering with operations along with wells that are on the road. In addition to the flooding that often occurs during these storms, strong winds, when combined with saturated ground conditions, can down very mature trees. Power outages are also a concern during severe storms.

The HVLCSD noted that sewage may potentially enter flooding streets during flood events, adding risk and complexity to an existing dangerous situation. The aggregate effect of stormwater inundation to the wastewater treatment plant is very damaging and could lead to a complete loss of function. In the community, the useful life of sewer pumps in lift stations is drastically reduced. Excessive sediment can cause immediate pump failure.

Impacts to District operations associated with the primary effects of heavy rains and storms, such as infiltration and inflow, is an ongoing issue. Dilution of sewage decreases the efficiency of treatment and may cause sewage volumes to exceed design capacity. Damaged systems may also lead to compliance issues and treatment cost increase.

For District water treatment, the mechanisms by which chlorine is introduced are discussed and illustrated. A single chlorine analyzer located in a room several hundred feet from the actual chlorine contact basin, is responsible for maintaining a chlorine residual to a 6048 cubic-foot body of water. During the heavy rains of 2017 and 2019, which resulted in four federally declared disasters (4301, 4308, 4431, 4434), this single chlorine analyzer was unable to keep pace with the flow into the basin. The advent of more frequent and more intense storm events has revealed a risk of wastewater treatment plant loss of function.

Heavy rains and storms occur every year and do not significantly affect community vulnerability and assets; it is the secondary hazard, flooding, which poses the biggest impact. Community vulnerability and assets at risk to flooding resulting from heavy rains and storm events are discussed in further detail in the Flood: 1%/0.2% Annual Chance in Section 4.3.9 and those affected by localized flooding areas (discussed in further detail in the Flood: Localized Stormwater Flooding in Section 4.3.10).

HVLCSD noted that mitigation actions for heavy rains and storms include addressing stormwater drainage, the levee issue, and resolving inflow and infiltration (I/I) issues (e.g., installing airtight manhole lids, sealing sewer cleanouts to prevent stormwater drainage into them, and sealing damaged underground sewer collections system infrastructure to prevent stormwater from entering.)

Assets at Risk

Assets at risk from heavy rain and storms include people and populations; structures; critical facilities and infrastructure and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

The District has 14 employees. Those District employees that work outdoors would be affected to a limited extent by this hazard.

All populations served by the District have some measure of risk to heavy rains and storms. Those populations that work or recreate outside and unhoused individuals are more vulnerable to impacts from heavy storm events. Heavy rains and storms occur every year and do not generally cause significant adverse impacts to individuals; it is the secondary hazard, flooding, which poses the biggest impact to people.

Structures (Critical Facilities and Infrastructure)

HVLCSD facilities and structures have some risk to heavy rains and storms. Heavy rain and storms can affect critical facilities and infrastructure during large events. Structures built to modern building codes are built to withstand heavy rains and storms (including thunderstorm winds and lightning); older structures may be more vulnerable. During a heavy storm, localized flooding may cause water intrusion into buildings from the outside. Trees can be downed causing impacts to structures. Older homes and buildings may be at increased risk to heavy rains and storms. Power outages during severe storm events can occur, impacting the use of structures until the power is back online. Local roads, streets, and bridges can be impacted resulting in closures restricting traffic flow in the District. In certain areas, large storms can cause erosion and localized landslides which can impact affected facilities.

Community Lifelines

Community lifelines likely to have some vulnerability to heavy rains and storms include:

- **Safety and Security** – Search and rescue and swiftwater teams may be called on to perform riskier duties during times of heavy rains and flooding. Police, Fire, EMS, and Public Works personnel are often called on to respond during flood emergencies taxing these resources.
- **Food, Hydration and Shelter** – Those displaced by heavy rains and flooding and the unsheltered may have needs for food and water.
- **Health and Medical** – Injuries can occur during storm events. Patient movement from accident scenes by EMS may have to be rerouted around inundated and closed streets. Public health can be at risk from contaminated floodwaters caused by heavy rains.
- **Energy** –Significant storms can cause power outages throughout the District and greater Lake County. Downed trees can fall on electric lines in the District, causing power outages. High winds and other lightning strikes can cause transformers and other infrastructure to be damaged. Fuel supplies can be temporarily cut off, until flooding subsides.
- **Communications** – Communication systems may be damaged during severe storm events. An influx of service calls to dispatch centers for reporting of flooding, power outages, downed trees, or other issues can occur. Messaging systems need to be deployed during these times to let the public know about road and closures, washouts, and debris or flooding on roads.
- **Transportation** – Highways, local roads, and bridges may be impacted by heavy rains and flooding causing road closures. These closures can affect response personnel (EMS, Fire, Police) as well as cause additional traffic issues for residents.
- **Hazardous Material** – Hazardous material facilities can be affected by heavy rains and flooding. Releases during these times can contaminate the environment, affecting drinking water and natural systems.
- **Water Systems** – Water, drainage, and wastewater systems (like the HVLCSD) can experience storm related impacts, including excessive water intrusion which can affect the operations of these systems.

Short-term, heavy rains and storms can cause both widespread flooding as well as extensive localized drainage issues throughout the District. As storms continue to increase in intensity, existing drainage and stormwater systems may be overwhelmed at least temporarily contributing to an increase in flooding related impacts. While components of these lifelines may be damaged or otherwise impacted, it is unlikely that large storm events would overwhelm and take out any of these lifelines in the HVLCSD or greater Lake County as a whole.

Natural, Historic, and Cultural Resources

Large storm events and associated flooding can affect natural, historic, and cultural resources. Silt and sediment can damage natural areas. Trees can be uprooted and downed by high winds. Extended periods of rainfall can erode natural banks along waterways and degrade soil stability for terrestrial species. While some natural systems can be adversely impacted during these large storms, heavy rain events can also provide benefits. Groundwater and wetland areas can be recharged and water supplies replenished. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures affected by large storm events, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged, and lost during extreme storm and flood events.

Economic Assets and Community Activities of Value

As previously noted, the largest economic asset in the District Service Area is the HVLCSD. Heavy rain and storm events can cause direct damage to economic assets such as businesses and commercial centers. During extreme events, the economy may slow as people stay home or inside. Business revenue may be reduced during extended storm events. Community activities of value may see a reduction in attendance, impacting revenues associated with these events, especially those that occur outdoors. Events may be cancelled or rescheduled.

Impacts from Heavy Rains and Storms

Impacts from heavy rains and storms include damage to property, critical facilities and infrastructure, and the natural landscape. This includes: erosion, downed trees, damaged utility structures and infrastructure; power outages; road damage and blockages; and lightning strikes to critical infrastructure and people. Lightning can also cause wildfires and urban fires to occur. Landslides occur when the soil on slopes becomes oversaturated and fails. Climate change may cause these impacts to worsen.

Impacts to District operations associated with the primary effects of heavy rains and storms, such as infiltration and inflow, is an ongoing issue. Dilution of sewage decreases the efficiency of treatment and may cause sewage volumes to exceed design capacity.

Actual damage associated with the primary effects of severe storms and heavy rains has been somewhat limited. It is the secondary hazards caused by these severe weather events, such as floods, landslides, and erosion that have had the greatest impact on the Planning Area. The risk and vulnerability associated with these secondary hazards are discussed in other sections of this Plan (Section 4.3.9 Flood: 1%/0.2% Annual Chance, Section 4.3.10 Flood: Localized Stormwater, Section 4.3.6 Dam Failure, and Section 4.3.11 Levee Failure).

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

Future Conditions/Future Development

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

- As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time.
- While population projections for the area served by the District show additional expected growth, these anticipated future changes in population are expected to be relatively small, which is unlikely to affect

this hazard and associated impacts to the District. The District may add staff, but this number would be small. The District noted it has no control over population changes in its Planning Area, it merely reacts to them by providing additional (or reduced) services.

- Changes in land use and development in the Hidden Valley Lake area are expected to be limited in the near future and thus are not likely to affect heavy rains and storm and associated impacts to the District. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District to this hazard. With adherence to development standards, future losses to new development should be minimal.

The District noted that the future development issues for heavy rains and storms are the same as those raised in the localized flooding future development discussion in Section 4.3.10 Flood: Localized Stormwater. They also noted that new critical facilities and other development should be built to withstand severe storms and thunderstorm winds.

4.3.5. Climate Change

Hazard Profile

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

Hazard/Problem Description

Climate change is the distinct change in measures of weather patterns over a long period of time, ranging from decades to millions of years. More specifically, it may be a change in average weather conditions such as temperature, rainfall, snow, ocean and atmospheric circulation, or in the distribution of weather around the average. While the Earth's climate has cycled over its 4.5-billion-year age, these natural cycles have taken place gradually over millennia, and the Holocene, the most recent epoch in which human civilization developed, has been characterized by a highly stable climate – until recently.

This LHMP Update is concerned with human-induced climate change that has been rapidly warming the Earth at rates unprecedented in the last 1,000 years. Since industrialization began in the 19th century, the burning of fossil fuels (coal, oil, and natural gas) at escalating quantities has released vast amounts of carbon dioxide and other greenhouse gases responsible for trapping heat in the atmosphere, increasing the average temperature of the Earth.

In Lake County and the HVLCSD, each year seems to get a bit warmer. Precipitation patterns also seem to be changing. 2023 was one of the wettest (and hottest) years ever. California's Adaptation Planning Guide: Understanding Regional Characteristics has divided California into 11 different regions based on political boundaries, projected climate impacts, existing environmental setting, socioeconomic factors and regional designations. Lake County and the District falls within the North Coast Region characterized as a sparsely settled region where the region's economy is primarily tourism and agriculturally based. In addition, the North Coast is home to sandy beaches and several estuaries that support rich biodiversity. Due to varied terrain, it is also home to several microclimates and distinct ecosystems. Table 4-31 provides a summary of Cal-Adapt Climate Projections for the North Coast Region.

Table 4-31 North Coast Region – Cal Adapt Climate Projections

Effect	Ranges
Temperature Change, 1990-2100	January increase in average temperatures: 2°F by 2050 and up to 5°F by 2100. July increase in average temperatures: 3°F by 2050 and up to 6°F by 2100 (Modeled average temperatures; high emissions scenario).
Precipitation	Annual precipitation varies by location with a subtle decrease throughout the century in most areas. Areas of heavy rainfall (80 inches or more) are projected to lose 5 to 7 inches by 2050 and 11 to 15 inches by the end of the century. Slightly drier places are projected to see a decrease of around 3 to 4 inches by 2050 and 6 inches of precipitation by 2100. (Community Climate System Model 3 (CCSM3) climate model; high carbon emissions scenario)
Heat wave	Heat wave is defined as five consecutive days over 68°F over most of the coastal areas and as high as 93°F in some inland areas to the south. Little change is expected by 2050 with possibly one to three more heat waves projected in region. By 2100, projected heat waves are more variable. Along much of the coast eight to 15 more heat waves than currently occur are projected. Inland it is variable, but generally lower, between two and eight more waves per year.
Snowpack	March snow levels in the eastern, higher-elevation portion of the region will drop to almost zero by the 2090s, a decrease of 2 to 10 inches from 2010 levels. In areas with more snow, 3 to 5 inches of reduction will occur by 2050. In areas with currently little snow (<3 inches), the snowpack is projected to be near zero by 2050. (CCSM3 climate model; high carbon emissions scenario)
Wildfire	Substantial increase in fire risk is expected throughout the region. Modest increases in area burned are projected for 2050. By 2100, the projected frequency increases dramatically. Lake County is projected to have up to 2.5 times greater wildfire frequency. (Geophysical Fluid Dynamics Laboratory (GFDL) climate model; high carbon emissions scenario)

Source: Cal-Adapt (2017)

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the District. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, such as drought, extreme heat, flooding, wildfire, and others. The speed of onset of climate change is very slow. The duration of climate change is not yet known but is feared to be tens to hundreds of years.

Past Occurrences

Disaster Declaration History

Climate change has never been directly linked to any declared disasters, as shown in Table 4-4.

NCDC Events

The NCDC does not track climate change events.

Hazard Mitigation Planning Committee Events

While the HMPC noted that climate change is of concern, no specific climate change incidents could be recalled. HMPC members noted that the strength of storms does seem to be increasing and the temperatures seem to be getting hotter.

Likelihood of Future Occurrence

Highly Likely – Climate change is virtually certain to continue without immediate and effective global action. According to NASA, 2023 was one of the hottest years on record. Without significant global action to reduce greenhouse gas emissions, the IPCC concludes in its Sixth Assessment Synthesis Report (2022) that average global temperatures are likely to exceed 1.5°C by the end of the 21st century, with consequences for people, assets, economies and ecosystems, including risks from heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surges.

Climate Scenarios

The United Nations IPCC developed several greenhouse gas (GHG) emissions scenarios based on differing sets of assumptions about future economic growth, population growth, fossil fuel use, and other factors. The emissions scenarios range from "business-as-usual" (i.e., minimal change in the current emissions trends) to more progressive (i.e., international leaders implement aggressive emissions reductions policies). Each of these scenarios leads to a corresponding GHG concentration, which is then used in climate models to examine how the climate may react to varying levels of GHGs. Climate researchers use many global climate models to assess the potential changes in climate due to increased GHGs.

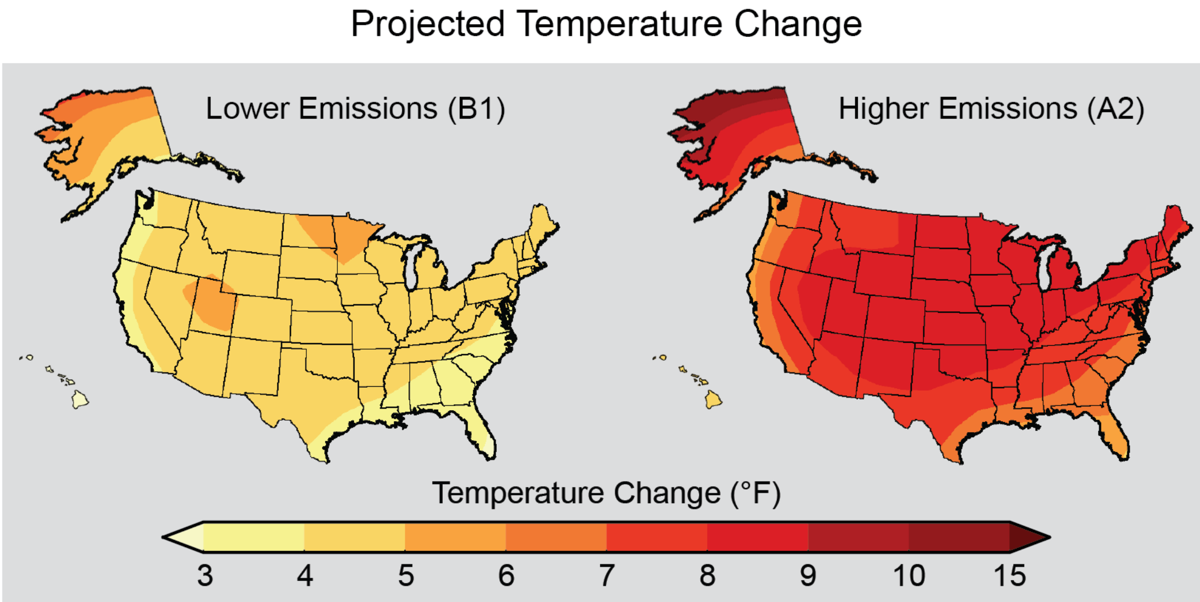
Key Uncertainties Associated with Climate Projections

- Climate projections and impacts, like other types of research about future conditions, are characterized by uncertainty. Climate projection uncertainties include but are not limited to:
  - ✓ Levels of future greenhouse gas concentrations and other radiatively important gases and aerosols,
  - ✓ Sensitivity of the climate system to greenhouse gas concentrations and other radiatively important gases and aerosols,
  - ✓ Inherent climate variability, and
  - ✓ Changes in local physical processes (such as afternoon sea breezes) that are not captured by global climate models.

Even though precise quantitative climate projections at the local scale are characterized by uncertainties, the information provided can help identify the potential risks associated with climate variability/climate change and support long term mitigation and adaptation planning.

Maps show projected change in average surface air temperature in the later part of this century (2071-2099) relative to the later part of the last century (1970-1999) under a scenario that assumes substantial reductions in heat trapping gases and a higher emissions scenario that assumes continued increases in global emissions. These are shown in Figure 4-48.

Figure 4-48 Projected Temperature Change – Lower and Higher Emissions Scenario



Source: National Climate Assessment

According to the California Natural Resource Agency (CNRA), climate change is already affecting California and is projected to continue to do so well into the foreseeable future. Current and projected changes include increased temperatures, sea level rise, a reduced winter snowpack altered precipitation patterns, and more frequent storm events. Over the long term, reducing greenhouse gases can help make these changes less severe, but the changes cannot be avoided entirely. Unavoidable climate impacts can result in a variety of secondary consequences including detrimental impacts on human health and safety, economic continuity, ecosystem integrity and provision of basic services.

The CNRA's 2021 CAS delineated how climate change may impact and exacerbate natural hazards in the future, including wildfires, extreme heat, floods, and drought:

- Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in Lake County and the rest of California, which are likely to increase the risk of mortality and morbidity due to heat-related illness and exacerbation of existing chronic health conditions. Those most at risk and vulnerable to climate-related illness are the elderly, individuals with chronic conditions such as heart and lung disease, diabetes, and mental illnesses, infants, the socially or economically disadvantaged, and those who work outdoors.
- Higher temperatures will melt the Sierra snowpack earlier and drive the snowline higher, resulting in less snowpack to supply water to California users.
- Droughts are likely to become more frequent and persistent in the 21st century.
- Intense rainfall events, periodically ones with larger than historical runoff, will continue to affect California with more frequent and/or more extensive flooding.
- Storms and snowmelt may coincide and produce higher winter runoff from the landward side, while accelerating sea-level rise will produce higher storm surges during coastal storms. Together, these changes may increase the probability of floods and levee and dam failures, along with creating issues related to saltwater intrusion.

- Warmer weather, reduced snowpack, and earlier snowmelt can be expected to increase wildfire through fuel hazards and ignition risks. These changes can also increase plant moisture stress and insect populations, both of which affect forest health and reduce forest resilience to wildfires. An increase in wildfire intensity and extent will increase public safety risks, property damage, fire suppression and emergency response costs to government, watershed and water quality impacts, vegetation conversions and habitat fragmentation.

Vulnerability to Climate Change

The whole of the District is at some measure of vulnerability to climate change. It is likely that the vulnerability will grow to be greater in the future. An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to the HVLCSD. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect the District. These sections below include assets at risk, impacts, and how future development can be affected by this hazard.

Local Concerns

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

The District noted that climate change is changing standards used by the District. For example, what was considered a 10- year flood event is changing; as such, design standards need to change. The earthen retention pond used by the District was built to the 10-year flood standard - as an open air pond, the ability to contain future flood events is a concern. If rainstorms increase in intensity, the retention pond maybe overwhelmed much more easily. Localized flooding also occurs throughout the community, especially in the Mountain Meadow South, Gold Flat Ct, and Fishhook Ct areas. Along with this, the warming climate increases the heat impacts to the District, also affecting areas bordering the outside of the community which are most susceptible to wildfires. Mitigation actions will focus on decreasing susceptibility to various climate related hazards.

EPA CREAT Tool Modeled Risks

Background and Methodology

The U.S. Environmental Protection Agency (EPA) developed the Climate Resilience Evaluation and Awareness Tool (CREAT) to assist drinking water, wastewater and stormwater utility owners and operators in understanding potential climate change threats and assessing the related risks at their individual utilities. The results generated by CREAT provide decision support outputs to assist in the selection and justification of investments in climate change adaptation. The risk assessment process is designed to be iterative; it can be revisited for future risk analyses. The fundamental goals of CREAT are to:

- Increase drinking water, wastewater and stormwater operator awareness of potential climate change impacts on utility operations and missions;
- Assist utilities in the determination of threshold levels for asset failures and resulting consequences of an asset's inability to perform its designed function;

- Guide utilities through the risk assessment process to quantify potential consequences from climate-related or other threats;
- Inform adaptation decision-making by identifying and considering adaptation options that address identified threats and reduce associated impacts; and
- Examine the cost of these different adaptation options in comparison to the economic losses associated with the consequences of climate change threats.

The time period selected for this analysis was from 2024 to 2100, which aligns with the 2060 projected climate and sea level data provided in CREAT. The CREAT tool was run on the drinking water services and wastewater services the District it provides. The HVLCSD input the following into the tool:

- Combined Water: a combined utility with a focus primarily on water assets and secondarily on wastewater
- 0.77 million gallons treated per day
- 7,500 people served by the District

The entire report for the District, including all methodologies and assumptions, can be found in Appendix F.

CREAT Analysis Results

THIS IS THE PREVIOUS CREAT TOOL WITH INFLATION ADJUSTED NUMBERS. FM WILL WORK WITH THE DISTRICT TO TRY THE NEW TOOL.

The District ran the CREAT Tool on climate change and its effects on flooding in the District. Below is a summary of the results obtained from risk assessments for each scenario. These results indicate the change in monetized risk attributable to the implementation of All Potential Measures (as shown in Appendix F) relative to the resilience already provided by Current Measures. Total risk, as shown in the Table 4-32 (for the baseline scenario) and Table 4-33 (for the warmer and wetter scenario), is the sum of assessments made for asset-threat pairs, assigned based on the determination that an asset is imperiled by the assigned threat.

Table 4-32 HVLCSD – Economic Consequences of Baseline Scenario

	Current Measures	Selected Plan
Economic Consequences	$1,416,750 - $58,104,060	$206,950 - $3,538,325

Source: EPA CREAT Tool

*Table 4-33 HVLCSD – Economic Consequences of Warmer, Wetter and Stormier Future Conditions**

	Current Measures	Selected Plan
Economic Consequences	> $4,346,550	$854,500 - $4,280,500

Source: EPA CREAT Tool

* This scenario includes projected changes for moderate increases in average annual temperature, a potential increase in total annual precipitation, and an increase in 24-hr intense precipitation events.

The overall risk reduction performance of this plan, compared to other plans in this assessment, is listed in Table 4-34. The plan described in this report is at the top with any other plans considered in this CREAT analysis listed below.

Table 4-34 HVLCSD – Monetized Risk Reduction

Plan	Total Cost	Baseline Scenario	Warmer, Wetter and Stormier Future Conditions
All Potential Measures	$0	$387,890 - $2,387,650	> $1,057,500

Source: EPA CREAT Tool

Climate change presents challenges to water, wastewater and stormwater utilities and the communities they serve. Those utilities that adapt to these changes may need to raise rates to develop new water supplies and adjust their treatment and operations. Without adaptation, infrastructure and operations designed for historical climate conditions could be overwhelmed or damaged. Main breaks, overflows, and service outages would lead to lost local business revenue and public health concerns. Several changes are possible for you're the HVLCSDs location has unique challenges to consider, as shown in Table 4-35.

Table 4-35 HVLCSD – Future Climate Impacts

What if the climate were significantly hotter?	**3.92°F increase in average annual temperature**
Adjust treatment processes to warmer waters and altered water quality Utility crews and equipment stressed during hotter conditions	Increased seasonal demand during hotter conditions exceeding supply leads to outages and public health risks Larger wildfires and damage to infrastructure and water resources under hotter conditions
What if the climate were significantly wetter?	**19.44% change in annual precipitation and 26.7% increase in 100-year storm by 2060**
Strained reservoirs, overwhelmed treatment and flooded facilities during sustained and intense storm events Adjust treatment processes to lesser quality inflow due to soil erosion and contaminants from overland flows	Flooded streets and basements throughout the community following heavy precipitation events Health risk from Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs)
What if the climate were significantly drier?	**-4.01% change in annual precipitation by 2060**
Revenue loss from reduced usage during voluntary or mandatory conservation actions in response to drought Operational changes to increase efficiency, conserve and access alternate supplies during intense drought	Disrupted historical storage cycles in aquifers, reservoirs and snowpack Larger wildfires and damage to infrastructure and water resources under hotter conditions

Source: EPA CREAT Tool

Assets at Risk

Assets at risk from climate change include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value.

People and Populations

Climate change affects people and populations within a community, especially those climate change issues related to increases in temperature over time. While all populations (both the District staff and those served by the District) can be affected by temperature extremes, populations particularly vulnerable include the very old and very young, medically fragile people, people without means of shelter (and air conditioning) or transportation, people who are socially isolated and other socially vulnerable or underserved populations (as shown in Special Populations discussion in Section 4.2.1). Those who work (like HVLCSD staff) and recreate outdoors will also be affected by temperature extremes. Acclimatization to heat may help reduce risks from heat waves in the healthy general population but may not be sufficient to protect those with underlying issues and lack of resources.

Structures (including Critical Facilities and Infrastructure)

Climate change, on its own, does not generally impact structures. However, structures in areas of increased wildfire, drought, extreme heat, or flood areas exacerbated by the effects of climate change would be at increased risk, as described throughout this LHMP. Due to the slow onset of climate change, many structures in the District are expected to undergo improvements and adapt over time to a new climate normal.

Community Lifelines

Due to its slow onset, community lifelines in the District and greater Lake County should not be overwhelmed by climate change. During the slow onset of climate change, community lifelines in the HVLCSD and Lake County are also expected to undergo improvements and adapt over time.

Natural, Historic, and Cultural Resources

The rivers, streams, and open space areas of the District support rich biodiversity, including many special-status species. These are all at risk from the effects of climate change. In addition, if heat changes wildfire patterns, all areas of the District are at increased risk from fire – including natural, historic, and cultural resources. Furthermore, if climate change exacerbates the drought hazard, areas of wetlands in the District may dry up temporarily, which could damage habitat areas for waterfowl and other species that depend on these areas.

Economic Assets and Community Activities of Value

As previously noted, the largest economic asset in the District Service Area is the HVLCSD. All economic assets and community activities of value in the District are at some measure of risk to hazards exacerbated by climate change. The 2023 State of California Hazard Mitigation Plan document noted that the frequency of large storm sequences (i.e., atmospheric rivers) over short timeframes is projected to increase, causing flooding events that could affect portions of the District. Should storms or other climate-related hazard events occur, certain economic assets and activities could be adversely affected.

Impacts from Climate Change

The 2017 California Adaptation Planning Guide (APG) North Coast Region identifies area specific impacts and vulnerabilities to the District. These impacts include:

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

Secondary impacts include changes in precipitation patterns, the global water cycle, melting glaciers and ice caps, and rising sea levels. According to the Intergovernmental Panel on Climate Change (IPCC), climate change will "increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems" if unchecked.

Through changes to oceanic and atmospheric circulation cycles and increasing heat, climate change affects weather systems around the world. Climate change increases the likelihood and exacerbates the severity of extreme weather – more frequent or intense storms, floods, droughts, and heat waves.

Consequences for human society include loss of life and injury, damaged infrastructure, long-term health effects, loss of agricultural crops, disrupted transport and freight, and more. Climate change is not a discrete event but a long-term hazard, the effects of which communities are already experiencing.

Climate change adaptation is a key priority of the State of California. The 2023 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and earlier runoff of both snowmelt and rainwater in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

In addition to these sources, the 2023 State of California Hazard Mitigation Plan noted that according to California's Fourth Climate Change Assessment, the state will experience the following climate impacts:

- Annual average daily high temperatures are expected to rise by 2.7 °F by 2040, 5.8°F by 2070, and 8.8°F by 2100 compared to observed and modeled historical conditions. These changes are statewide averages.
- Heat waves are projected to become longer, more intense, and more frequent.
- Warming temperatures are expected to increase soil moisture loss and lead to drier conditions. Summer dryness may become prolonged, with soil drying beginning earlier in the spring and lasting longer into the fall and winter.
- Droughts are likely to become more frequent and persistent through 2100.

- The strength of the most intense precipitation and storm events affecting California is expected to increase.
- Snowpack levels are projected to decline significantly by 2100 due to reduced snowfall and faster snowmelt.
- Marine layer clouds are projected to decrease.
- Extreme wildfires (i.e., fires larger than 24,710 acres) would occur 50 percent more frequently. The maximum area burned statewide may increase 178 percent by the end of the century.
- Sea level rise is expected to continue to increase beach, cliff, and bluff erosion.

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

Future Conditions/Future Development

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

- As climate change continues to accelerate over time, climate related impacts to the HVLCSD will continue to increase.
- While population projections for the area served by the District show additional expected growth, these anticipated future changes in population are expected to be relatively small, which is unlikely to affect this hazard and associated impacts to the District. The District may add staff, but this number would be small. The District noted it has no control over population changes in its Planning Area, it merely reacts to them by providing additional (or reduced) services.
- Changes in land use and development in the Hidden Valley Lake area are expected to be limited in the near future and thus are not likely to affect climate change impacts to the District. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District to this hazard. With adherence to development standards, future losses to new development should be minimal.

Climate change can influence development in the District over time. The District could see population fluctuations as a result of climate impacts relative to those experienced in other regions, and these fluctuations are expected to impact demand for housing and other development. While there are currently no formal studies of specific migration patterns expected to impact the HVLCSD, climate-induced migration was recognized within the UNFCCC Conference of Parties Paris Agreement of 2015 and is expected to be the focus of future studies.

4.3.6. Dam Failure

Hazard Profile

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

Hazard/Problem Description

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

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

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

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

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

- **Extremely High Hazard** – Expected to cause considerable loss of human life or would result in an inundation area with a population of 1,000 or more.
- **High Hazard** – Expected to cause loss of at least one human life.

- **Significant Hazard** – No probable loss of human life but can cause economic loss, environmental damage, impacts to critical facilities, or other significant impacts.
- **Low Hazard** – No probable loss of human life and low economic and environmental losses. Losses are expected to be principally limited to the owner's property.

Location and Extent

According to data provided by Cal DWR and Cal OES, there are 21 dams in Lake County that were constructed for flood control, storage, treatment impoundments, electrical generation, and recreational purposes. Of the 21 dams, 3 are rated as Extremely High Hazard, 10 are rated as High Hazard, 1 as Significant Hazard, 7 as Low Hazard. Figure 4-49 identifies the dams located greater Lake County. Table 4-36 gives information on each of the dams shown in Figure 4-49.

Figure 4-49 Lake County Dam Inventory

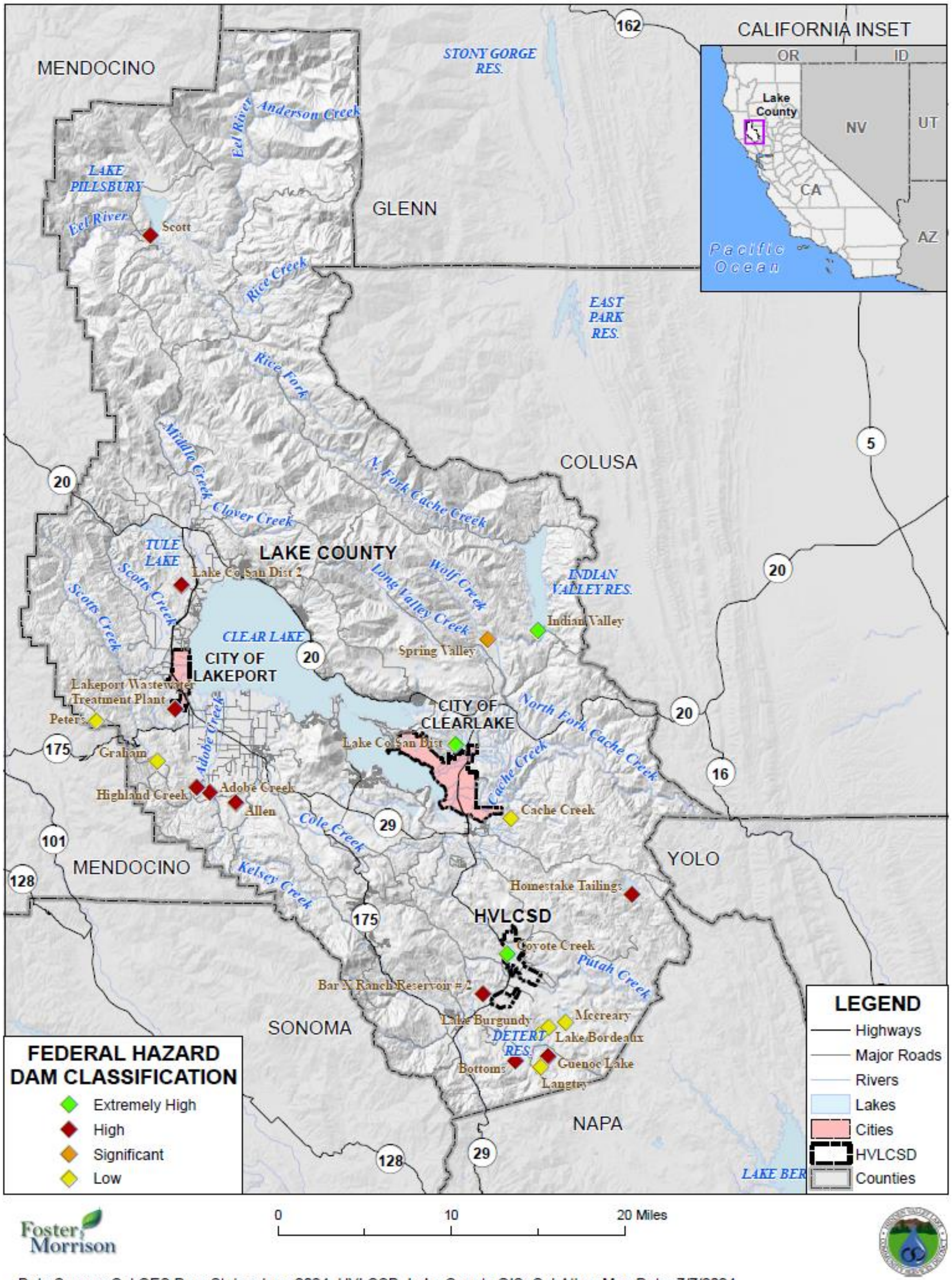


Table 4-36 Lake County – Dam Inventory

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	EAP
Adobe Creek	Lake County Watershed Protection District	High	Rockfill	Adobe Creek	36	695	Not reported
Allen	Richard and Wendy Reynolds	High	Rockfill	Tr Kelsey Cr	33	85	Not reported
Bar X Ranch Reservoir # 2	Heart Consciousness Church	High	Rockfill	Crazy Creek	30	147	Not reported
Bordeaux, Lake	Langtry Farms, LLC	Low	Rockfill	Tr Bucksnort Creek	42	538	Not reported
Bottoms	Middletown Enterprises	High	Rockfill	Tr Helena Creek	47	315	Not reported
Burgundy, Lake	Langtry Farms, LLC	Low	Rockfill	Tr Bucksnort Creek	27	200	Not reported
Cache Creek	Yolo County Flood Control and Water Conservation District	Low	Gravity	Cache Creek	35	320,000	Y
Coyote Creek	Hidden Valley Lake Association	Extremely High	Rockfill	Coyote Creek	92	3,375	Y
Graham	Sue Thomason	Low	Rockfill	Tr Highland Cr	39	62	Not reported
Guenoc Lake	Langtry Farms, LLC	High	Rockfill	Bucksnort Creek	50	3,237	Not reported
Highland Creek	Lake County Watershed Protection District	High	Rockfill	Highland Creek	76	3,500	Y
Homestake Tailings	Homestake Mining Company	High	Rockfill	Tr Hunting Cr	171	0.4	Y
Indian Valley	Yolo County Flood Control and Water Conservation District	Extremely High	Earth	North Fork Cache Creek	210	261,000	Y
Southeast Wastewater Treatment Plant	Lake County Sanitation District	Extremely High	Rockfill	Tr Burns Val Creek	40	530	Not reported

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	EAP
Lake Co San Dist 2	Lake County Sanitation District	High	Rockfill	Tr Lyons Creek	78	870	Not reported
Lakeport	City of Lakeport Municipal Sewer District Number 1	High	Rockfill	Tr Manning Cr	51	650	Not reported
Langtry	Langtry Farms, LLC	Low	Rockfill	Tr Cassidy Creek	50	525	Not reported
Mccreary	Langtry Farms, LLC	Low	Rockfill	Bucksnort Creek	20	2,100	Not reported
Peters	Stephen Cowan	Low	Rockfill	Benmore Creek	33	112	Not reported
Scott	Pacific Gas and Electric Company	High	Gravity	Eel River	135	80,600	Y
Spring Valley	County of Lake	Significant	Rockfill	Wolf Creek	37	325	Not reported

Source: Cal OES and the National Performance of Dams Program, 7/1/2024
*One Acre Foot=326,000 gallons

According to data provided by Cal DWR, Cal OES, and the HVLCSD, there are two dams that pose a risk to the District. Table 4-37 identifies the dam that could affect the District.

Table 4-37 HVLCSD Dams of Concern

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	EAP
Bar X Ranch Reservoir # 2	Heart Consciousness Church	High	Rockfill	Crazy Creek	30	147	Not reported
Coyote Creek	Hidden Valley Lake Association	Extremely High	Rockfill	Coyote Creek	92	3,375	Yes

Source: Cal OES, National Performance of Dams Program; HMPC
*One acre foot equals 325,000 gallons

Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, dam failure would most probably happen in consequence of the natural disaster triggering the event. While expected flood depths can be measured based on dam failure scenarios, there is no scale with which to measure dam failure, only a scale to measure dam hazards based on size of dam and proximity to development as previously noted – the Extremely High, High, Significant, and Low Hazard classifications as described above. While a dam may fill slowly with runoff from winter storms, a dam break can have a very quick speed of onset. The duration of dam failure is not long – only as long as it takes to empty the reservoir of water the dam held back.

Dam inundation affects discrete areas of the District. As previously mentioned, the Coyote Creek and Bar X Dam would affect the District. The District noted that dam failure is most likely not going to be a total dam failure but likely would be a failure of part of the dam. This extent discussion focuses on a total dam failure. GIS analysis was performed to determine what percentages of the District would be inundated (using dam inundation data from the Coyote Creek (Hidden Valley) Lake Dam Inundation Study) and from Cal OES/DSOD for the Bar X Ranch Reservoir #2. This can be seen in Table 4-38.

Table 4-38 HVLCSD – Dam Inundation Geographical Extents

Dam Inundation Area	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Coyote Creek	393	17.73%	184	13.82%	209	23.59%
Bar X Ranch Reservoir # 2	101	4.75%	98	7.39%	3	0.41%

Source: Coyote Creek (Hidden Valley) Lake Dam Inundation Study, Cal OES/DSOD

Past Occurrences

Disaster Declaration History

There has been no state or federal disaster declaration related to dam failure in Lake County, as shown previously in Table 4-4.

NCDC Events

There have been no NCDC dam failure events in Lake County.

National Performance of Dams Program Events

The National Performance of Dams Program at Stanford University tracks dam failures. A search of the National Performance of Dams Program database showed no past dam failure events affecting the District.

Hazard Mitigation Planning Committee Events

The HMPC noted no past dam failure events.

Likelihood of Future Occurrence

Unlikely – There have been no recorded events of dam failure or other issues of concern with the integrity or overtopping of the Coyote Creek or Bar X dam. Based on past occurrences and the rigorous monitoring and inspection requirements for dams, it is unlikely a dam failure will occur in the future that would impact the HVLCSD.

It is likely that climate change will increase the chance of future occurrence as well as future impacts associated with Dam Failure. More information on climate change and dam failure can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Dam Failure

The 2023 California State Hazard Mitigation Plan noted that modeling described in California's Fourth Climate Change Assessment projects less frequent but more extreme daily precipitation. Year-to-year precipitation will become more volatile, and the number of dry years will increase by mid-century. As the climate continues to warm, atmospheric rivers will carry more moisture, and extreme precipitation may increase. Climate model projections show a tendency for the northern part of the State to become wetter. Increases in both precipitation and heat causing snow melt in areas upstream of dams could increase the potential for dam failure and uncontrolled releases in Lake County and the HVLCSD.

Vulnerability Assessment

Vulnerability—Extremely High

Dam failure flooding can occur as the result of a partial or complete collapse of an impoundment. Dam failures often result from prolonged rainfall and flooding. An earthquake event can also contribute to a dam failure. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam. A dam failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to dam failures is generally confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions. Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to the District. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect HVLCSD. The sections below include assets at risk, impacts, and how future development can be affected by this hazard.

Local Concerns

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

While the District is concerned with the Bar X Dam, it has a smaller possible impact on the District. The District's main concern is the Coyote Creek Dam. That is discussed in greater detail below. A discussion of all dams follows.

Coyote Creek

The Coyote Creek Dam is owned and operated by the Hidden Valley Lake Association (HVLA). The water held by the dam is owned by the HVLCSD. The dam is an earthen dam with an impervious clay core, which was keyed into the existing ground. The dam was originally built in 1968 on Coyote Creek, a tributary to Putah Creek. The reservoir has a drainage area of approximately 3,410 acres and receives the majority of its runoff from undeveloped hillside drainage and surrounding residential land. The Hidden Valley Lake impounded by Coyote Creek Dam is currently used for recreation by the Hidden Valley Lake community. The dam is generally operated at full capacity and is not drawn down for purposes other than annual testing. Lake levels vary throughout the seasons due to mainly evaporation. The HVLA monitors lake levels and turbidity regularly. The lake is filled by runoff and spring water. Perforated drainpipes were installed to maintain spring flow through the dam. The dam and spillway were designed to pass the probable maximum flood.

While under normal, and to some extent, extreme weather conditions, a total failure of the Coyote Creek Dam is thought to be unlikely by the District. However, a total failure of the dam is possible as a secondary impact of a large earthquake occurring in or near the HVLCSD Planning Area. Coyote Creek Dam is located in the southern part of Lake County in Hidden Valley Lake, which is a mix of rural, residential, and agricultural areas. The dam site is located near the center of HVLA limits and sits in the Coyote Valley near the Pacific Coast Range of Mountains. The dam site is between the Hunting Creek Fault to the east, the Konocti Bay Fault Zone to the north, and the Maacama Fault to the west. The foundation of the dam is on mainly native soils replaced with special foundation treatment. An impervious blanket was placed on the upstream side of the dam, and the dam was constructed in zones, as shown in the as-built plans.

According to the April 2019 Hidden Valley Lake Dam Inundation Study, the Certificate of Approval from DWR DSOD, water may be impounded to an Elevation 1,082.00 feet NAVD 88 with a storage of 3,375 acre-feet; this is the elevation at the top of the concrete spillway. Information on the dam can be found on Table 4-39.

Table 4-39 Statistical Information on Coyote Creek Dam and Hidden Valley Lake

Statistical Information	Value
Downstream toe of dam (feet, NAVD)	998
Height of dam measured from downstream toe to the crest (feet)	92.3
Bottom of Reservoir Elevation (feet, NAVD)	1,025
Outfall Structure Lift Gate Elevation (feet, NAVD)	1,035
Normal pool storage elevation (feet, NAVD)	1,082
Spillway crest elevation (fee, NAVD)	1,082
Crest of dam elevation (feet, NAVD)	1,090.30
Capacity at normal pool elevation (acre-feet)	3,375
Surface area at storage pool elevation (acre)*	98

*Measured from Aerial Imagery and Lake County GIS data

Source: Hidden Valley Lake Dam Inundation Study April 2019

According to this study the possibility of catastrophic collapse of this dam is remote. Should this occur, however, the spill-out would result in sizable damages to the downstream Hidden Valley Lake community.

The study did note that if a large earthquake were to occur close to the dam, there is a concern regarding dam failure. The District noted that the Middletown Area Plan also discussed dam failure inundation in the District. That plan noted that sections of the Hidden Valley Lake Subdivision and areas along Putah Creek are subject to potential inundation if the Coyote Creek Dam catastrophically fails. The affected inundation area stretches from the Coyote Creek dam spillway to Highway 29 and southeasterly to the Coyote Creek channel, which discharges into Putah Creek. The potential affected area of the subdivision includes that entire portion of the valley north of Highway 29 and south of Hidden Valley Road and Mountain Meadow Road South. It is possible that a portion of the water might flow down Coyote Creek, and then continue southwesterly across Highway 29 more directly into Putah Creek.

District Impacts from All Dams

The District noted that the biggest concern related to dam failure are loss of homes and lives in the HVLCSD Service Area and surrounding community. This would also result in a loss of customers and operational monies to the District. Other concerns from a dam failure include flood waters that cause extensive erosion around District pipes and other assets, as well as direct impacts to District facilities. A complete dam failure would take out collections systems and would cause significant I/I issues and potentially destroy the District's ability to deliver sewage to the WWTP, causing sewer backups throughout the community. Additionally, a large portion of manhole lids are not airtight, leaving them susceptible to intrusion. With a dam failure, water can infiltrate the manholes and get into sewer lines causing backups and overwhelming the treatment plan. The resulting sewer overflows contaminate soils, cause fish kills, and result in habitat loss. Fines are also incurred by District from regulatory agencies in the State.

In addition, the District provides water service to 2,518 connections. The HVLCSDs water supply consists of three wells, localized in one area south of the District's service area. Should a catastrophic event, such as dam failure occur, flood waters would likely damage the wells, two water distribution mains, water treatment plant, and the booster pump stations. The presence of water would increase pressure surrounding the water mains along the inundation area, which could lead to water mainline breaks that would eventually impact non inundated areas. This would cause contamination as well as affecting the entire service area. Such an event could also cause any of the water storage tanks to fail. A complete dam failure could leave the District unable to provide water to its users as well as water for fire protection for the District Planning Area and the larger Hidden Valley Lake community.

Another concern of the District in the event of a dam failure is associated with the proper functioning of the District's flood control system. The District maintains a flood control detention basin with a diversion structure along Putah Creek, equipped with a 90" check valve to regulate discharge from this channel. The operation of this valve is problematic and at times allows backup into the flood control channel when the valve is plugged with debris. This results in flows in Putah Creek at a higher head than the channel. Should a catastrophic event, such as a dam failure, occur that would cause this valve to remain open for an extended period of time when the water surface elevation in Putah Creek is higher than the water surface elevation in the flood control channel and nearby properties, the District is at risk of being unable to control storm flows out of the flood control channel and unable to stop flooding along the southerly boundary of the District's service area.

The District noted that a Bar X dam failure would potentially damage the Equalization Basin and Reclamation Pond out at the WWTP. This compromises the wastewater treatment process, the delivery of reclaimed water, and interruptions of wastewater treatment that would cause impacts to the community.

Mitigation actions include building up the walls of the Basin and Pond to be able to withstand a high water impact.

Assets at Risk from Dam Failure

Assets at risk from dam failure include people and populations; structures; critical facilities and infrastructure and community lifelines; natural, historic, and cultural resources, economic assets, and community activities of value). These are discussed in the following sections.

Methodology and Results

The following methodology is used for the Cal OES/DSOD inundation analysis below. Lake County's 2023 Assessor Data and the County's GIS parcel data were used as the basis for the inventory of assessed values for both improved and unimproved parcels within HVLCSD Service Area. GIS was used to create a centroid, or point representing the center of the parcel polygon. The dam inundation areas, obtained from Schaaf & Wheeler Consulting Civil Engineers for the Coyote Creek Dam as well as the DSOD inundation layer for the Bar X Ranch Dam, were then overlaid on the parcel layer. For the purposes of this analysis, if the dam inundation layer intersected a parcel centroid, the entire parcel was considered to be in the dam inundation area. The parcels were segregated and analyzed in this fashion for the HVLCSD Service Area. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessors database and the GIS parcel layer.

People and Populations

All people and populations (including both District staff and the population served by the District) located in dam inundation areas are vulnerable to dam failure. Certain vulnerable populations may be at increased risk to dam failure, especially during a large event with minimal advance notice. These vulnerable populations may include: the unhoused, those with limited mobility, and those that lack the resources to leave the area.

Service Area residents that live in these dam inundation areas are often the most vulnerable. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events. To further evaluate the impact to the HVLCSD's residential populations located in these hazard areas, a separate analysis was performed to determine residential populations in the dam inundation areas. The DSOD and Cal OES dam inundation areas were overlayed on the parcel layer and linked to the Assessor Data. Those residential parcel centroids that intersect the dam inundation areas were counted and multiplied by the average household factors for the District. This is shown in Table 4-40.

Table 4-40 HVLCSD – Improved Residential Parcels and Population by Dam Inundation Area

Dam Inundation Area	Improved Residential Parcels	Population
Bar X Ranch Dam	1	3
Coyote Creek Dam	529	1,650

Source: Schaaf & Wheeler 2019. DSOD, 2023 Lake County Parcel/Assessor Data, Average Household Size (3.12).

Structures (including Critical Facilities and Infrastructure)

Many facilities structures in the HVLCSD have some measure of risk to dam failure. Dam failure flooding can affect the built environment of many locations in the HVLCSD. Structures in dam inundation areas are at risk and depending on flood depths, can range from slight damage to totally inundated. Structures at risk are presented in two sections using the same dam inundation layer provided by HVLA:

- 2019 Coyote Creek Dam Inundation Report and Analysis (captures the dam inundation analysis in the report done for the HVLCSD by Schaaf & Wheeler)
- GIS Analysis of the Coyote Creek and Bar X Ranch Dam inundation areas. This includes:
  - ✓ Coyote Creek Dam Inundation GIS Analyses (GIS analysis of HVLCSD owned point and line assets and HLVCSD Service Area Parcel Analysis at risk using the 2019 Coyote Creek Dam Inundation layer)
  - ✓ Bar X Ranch Dam Inundation GIS Analyses (GIS analysis of HVLCSD owned point and line assets and HLVCSD Service Area Parcel Analysis at risk using Cal OES/DSOD dam inundation layer)

2019 Coyote Creek Dam Inundation Report and Analysis (Schaaf & Wheeler)

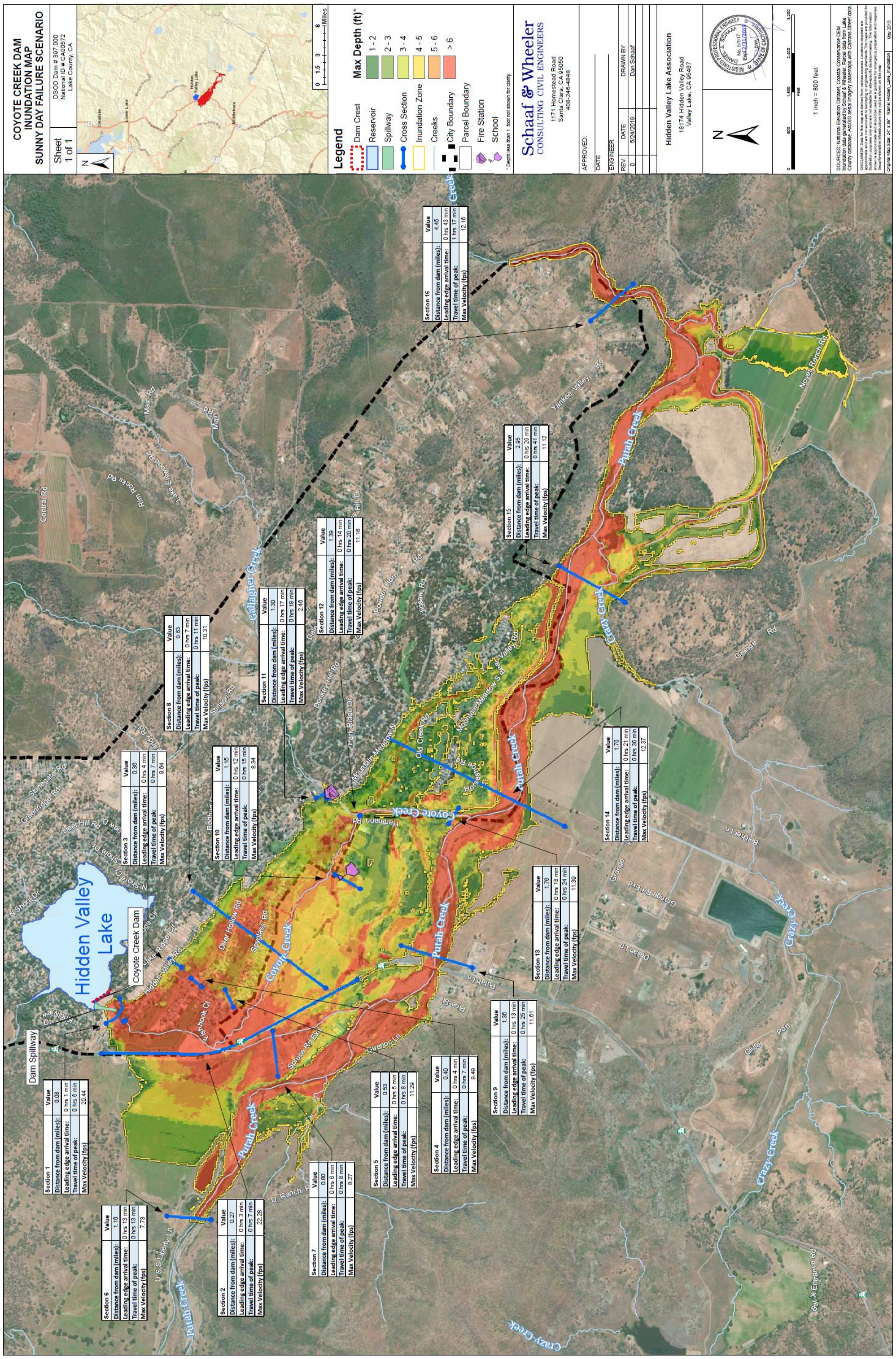
This dam break inundation study (performed by Schaaf & Wheeler) analyzes the possible consequences from catastrophic failure of the Coyote Creek Dam, Department of Water Resources (DWR) Dam No. 397.000, National ID # CA00572. The United States Army Corps of Engineers' (USACE) HEC-RAS computer program Version 5.0.6 (November 2018) was used for this dam break inundation study. The USGS National Elevation Dataset (NED) 2010 1/3 arc-second data for Lake County was used to represent the topography and build the surface for this study.

A sunny day failure condition was assumed as the failure scenario for the dam. The sunny day scenario, also known as the fair weather scenario, assumes the reservoir is at full pool elevation (1,082 feet, NAVD 88). A piping failure was chosen as the most likely failure mode for the earthen dam since the dam is not expected to overtop under normal operating conditions. The as-builts show the dam was built to have freeboard for the probable maximum flood storm.

The breach parameters chosen for the Coyote Creek Dam assumed a completely and nearly instantaneous loss of the dam, which resulted in the worst case breach hydrograph and inundation extents. The maximum certified water surface elevation of 1,082 feet (NAVD88) was used as the starting water surface in the sunny day failure scenario.

Due to the unpredictable nature of dam breaks, the instantaneous and complete dam failure parameters were used to create inundation maps because it results in more conservative arrival times, inundation extents, and depths. These are shown on Figure 4-50.

Figure 4-50 Modeled Coyote Dam Inundation Areas



Source: Hidden Valley Lake Dam Inundation Study, Schaaf & Wheeler April 2019

This dam break inundation study investigated the theoretical impacts and flooding extents from the catastrophic failure of Coyote Creek Dam. The study determined that failure of the Coyote Creek Dam may produce a peak flood wave of approximately 248,300 cfs. This flood wave would move downstream of the dam through the residential and commercial areas of Hidden Valley Lake until it flows into Putah Creek, directly or first through Coyote Creek. The large flows expected from failure of the dam could potentially result in damage to structures downstream of the Coyote Creek Dam, especially residences and the nearby Elementary school. The population that lives and works in the inundation zone could be severely impacted in the unlikely event of a catastrophic dam failure.

Analyses of dam failures are complex with many historical dam failures not completely understood. The theoretical flooding from a failure of the Coyote Creek Dam presented in this document far exceeds any recorded, historical flooding in this area. It should be recognized that the inundation mapping procedure contains inherent uncertainty and that the flood elevations presented in this report may be higher or lower in reality. Furthermore, the limits of flooding shown on the inundation maps and flood wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Actual areas inundated will depend on actual failure or flooding conditions, and can potentially differ from inundation areas shown on the maps. It is advised that one should not place total confidence that a structure one to two feet above the defined flood inundation depths or extents will be safe or unaffected by a dam break.

Coyote Creek and Bar X Ranch Dam Inundation Area Analysis (2024 LHMP Analysis)

HVLCSD has mapped dam inundation areas. GIS was used to determine the possible impacts of dam inundation to HVLCSD. Specifically, this analysis focused on values at risk to the 1% annual chance flood event and 0.2% annual chance flood events. This analysis is broken out into two parts:

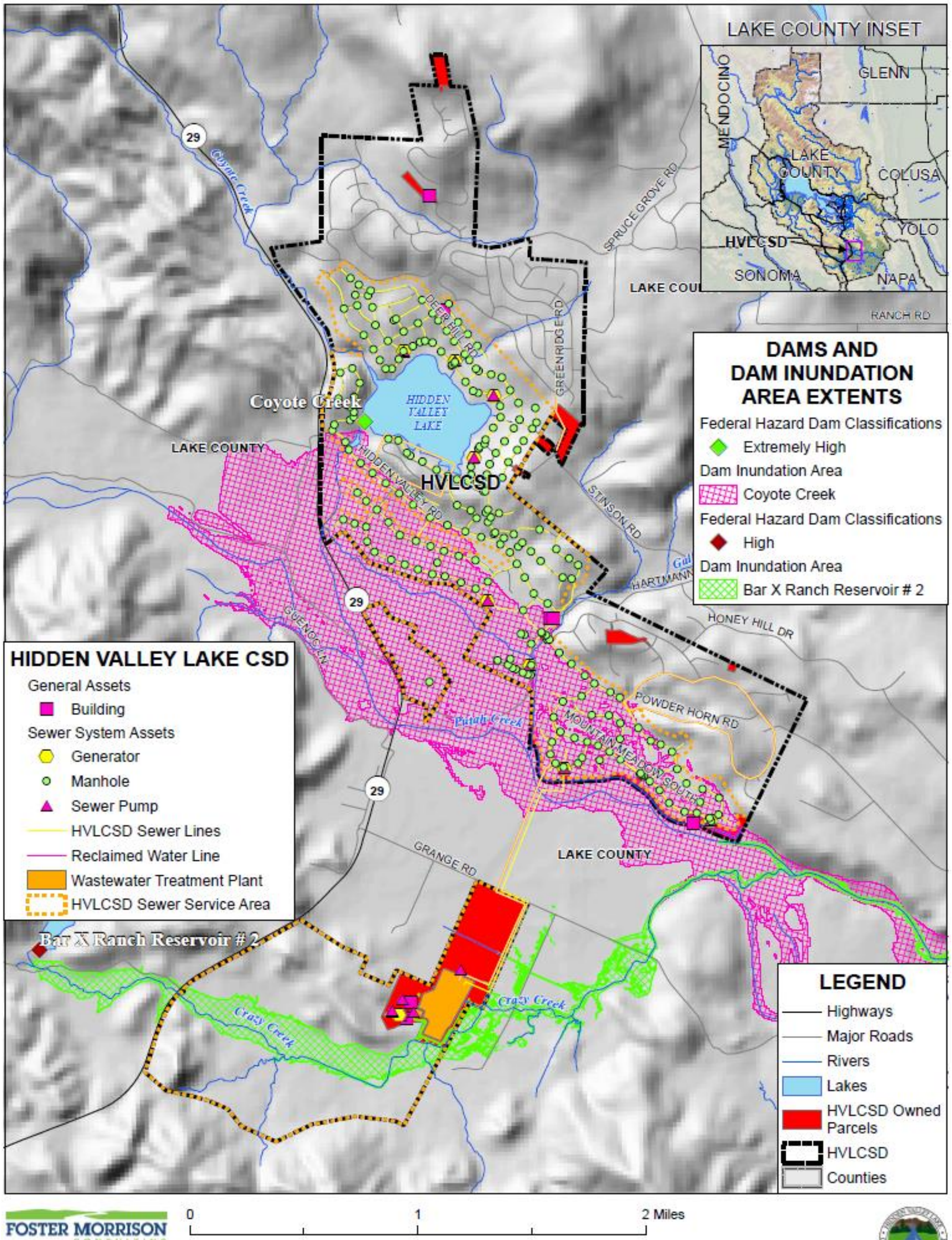
- HVLCSD Owned assets
- HVLCSD Service Area

HVLCSD Owned Assets

HVLCSD's sewer, water, general, and land assets were used as the basis for the inventory of HVLCSD asset values and included point and linear assets. Each of the assets, and their values, were intersected by the dam inundation data for the Coyote Creek (Schaaf & Wheeler) and Bar X Ranch (Cal OES/DSOD) dams. Analysis on HVLCSD assets at risk to dam inundation is provided below. Two maps were created to depict this analysis. Figure 4-51 shows the two dam inundation areas for both the Coyote Creek and Bar X Ranch dams overlayed on the sewer system assets. Figure 4-52 shows the same two dam inundation areas overlayed on the water system assets.

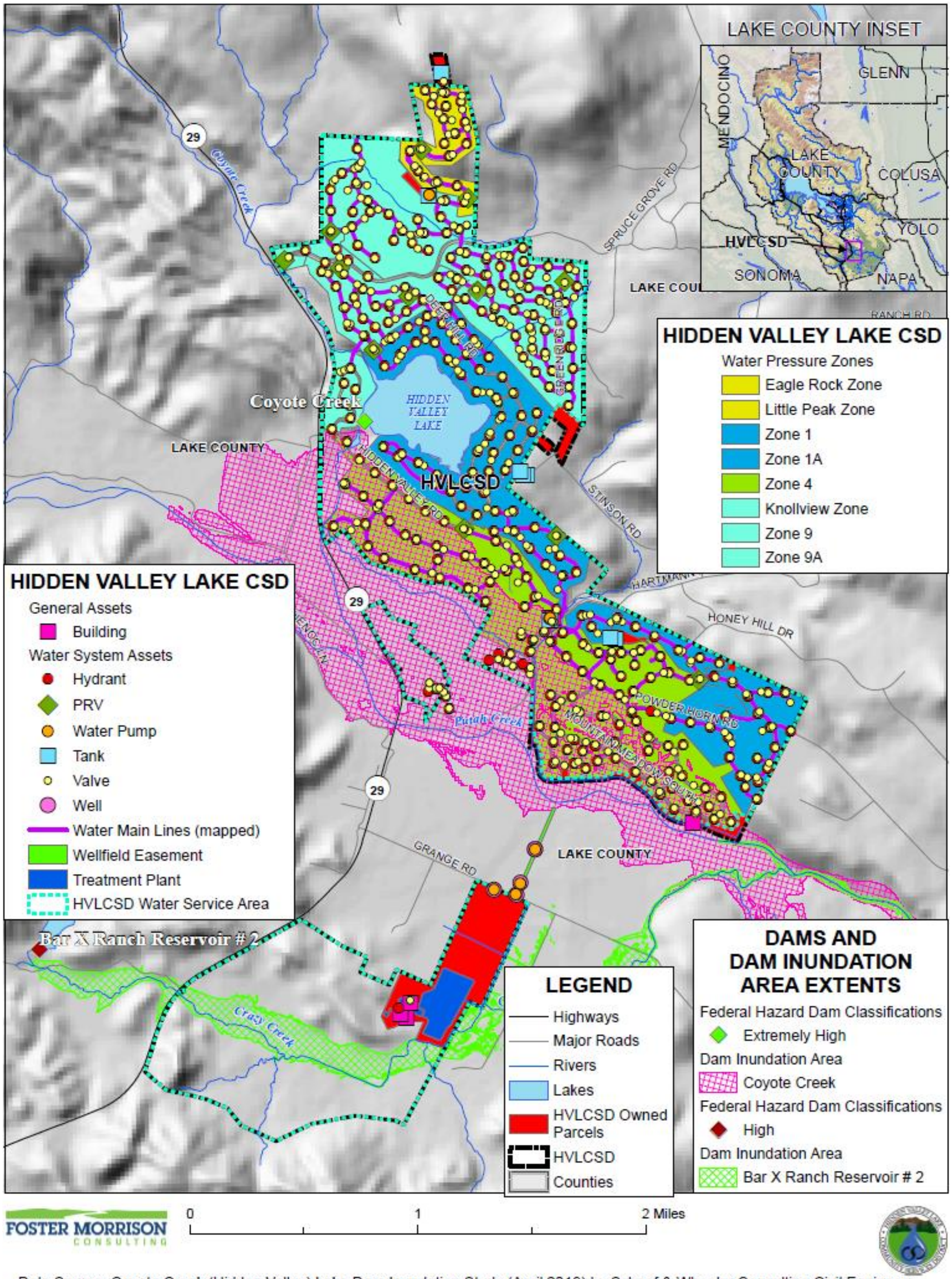
Three tables were created to identify HVLCSD owned assets in the dam inundation areas for Coyote Creek and Bar X Ranch Dams. Table 4-41 identifies HVLCSD point assets in the Coyote Creek dam inundation area. Table 4-42 identifies HVLCSD sewer line assets in the Coyote Creek dam inundation area. Table 4-43 shows the water main and lateral line assets (with no values) that fall in the Coyote Creek Dam inundation area. Table 4-44 identifies HVLCSD line assets in the Bar X Ranch dam inundation area. None of the point assets or water main and later line assets fell within the Bar X Ranch Dam inundation area; as such, no tabular analysis is shown. Detailed tables showing each individual asset and which dam inundation area they lie in are shown in Appendix F.

Figure 4-51 HVLCSD – Sewer System and Service Area Assets in Dam Inundation Areas



Data Source: Coyote Creek (Hidden Valley) Lake Dam Inundation Study (April 2019) by Schaaf & Wheeler Consulting Civil Engineers, DWR DSOD Data June 2024, Cal OES Dam Status June 2024, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/7/2024.

Figure 4-52 HVLCSD – Water System and Service Area Assets in Coyote Creek Dam Inundation Area



Data Source: Coyote Creek (Hidden Valley) Lake Dam Inundation Study (April 2019) by Schaaf & Wheeler Consulting Civil Engineers, DWR DSOD Data June 2024, Cal OES Dam Status June 2024, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 12/19/2024.

Table 4-41 HVLCSD – Count and Value of Sewer and Water Point Assets in Coyote Creek Dam Inundation Area

Asset	Asset Count	Asset Value	Content Value
Land Asset			
Parcel	5	$284,000	–
Land Asset Total	**5**	**$284,000**	–
General Asset			
Building	2	$218,656	$591,774
General Asset Total	**2**	**$218,656**	**$591,774**
Sewer System Asset			
Generator	5	$485,860	–
Manhole	86	$100,534	–
Sewer Pumps	11	$282,500	–
Sewer System Asset Total	**102**	**$868,894**	–
Water System Asset			
Hydrant	67	$156,110	–
Pump	2	$36,400	–
Valve	124	$127,844	–
Water System Asset Total	**193**	**$320,354**	**–**
Grand Total	**302**	**$1,691,904**	**$591,774**

Source: HVLCSD Dam Inundation Study, Schaaf & Wheeler 2019, DSOD. HVLCSD

Table 4-42 HVLCSD – Count and Value of Sewer Line Assets in Coyote Creek Dam Inundation Area

Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Sewer Line	4	$70	273	$19,083
	6	$90	21,272	$1,914,495
	8	$135	5,836	$787,826
	10	$208	3,771	$784,405
	12	$208	337	$70,053
	15	$353	3,106	$1,096,353
	Sewer Line Total		**34,595**	**$4,672,215**
Reclaimed Water Line	–	$208	2,471	$514,013
	Reclaimed Water Line Total		**2,471**	**$514,013**
Grand Total			**37,066**	**$5,186,228**

Source: HVLCSD Dam Inundation Study Schaaf & Wheeler 2019, DSOD, HVLCSD

Table 4-43 HVLCSD – Water Main and Lateral Line Lengths in Coyote Creek Dam Inundation Area

Asset	Asset Length (feet)	Asset Length (miles)
Water Main Line	12,581	2.38
Water Lateral Lines	874	2.63

Source: HVLCSD Dam Inundation Study Schaaf & Wheeler 2019, DSOD, HVLCSD

Table 4-44 HVLCSD – Count and Value of Sewer Line Assets in Bar X Ranch Dam Inundation Area

Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Sewer Line	10	$208	370	$76,870
	Sewer Line Total		**370**	**$76,870**
Reclaimed Water Line	–	$208	17	$3,520
	Reclaimed Water Line Total		**17**	**$3,520**
Grand Total			**386**	**$80,389**

Source: DSOD, HVLCSD

HVLCSD Service Area Parcel (Structure) Analysis

Table 4-45 and Table 4-46 contain dam inundation analysis results for the HVLCSD Sewer and Water System Service Area. These tables show the number of parcels and values at risk in each dam inundation area. Table 4-45 shows a summary of the value of improved parcels that fall in the Coyote Creek Dam inundation area. Table 4-46 shows a summary of the value of improved parcels that fall in the Bar X Dam inundation area.

Table 4-45 HVLCSD Sewer and Water System Service Area – Count and Value of Parcels by In Coyote Creek Dam Inundation Areas

Dam Inundation Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Coyote Creek						
HVLCSD	662	556	$18,169,276	$95,958,530	$51,093,505	$165,221,311

Source: HVLCSD Dam Inundation Study, Schaaf & Wheeler 2019, Lake County 2023 Parcel/Assessor's Data

Table 4-46 HVLCSD Sewer and Water System Service Area – Count and Value of Parcels by In Bar X Dam Inundation Areas

Dam Inundation Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Bar X Ranch Reservoir # 2						
HVLCSD	3	1	$2,703,270	$450,069	$225,035	$3,378,374

Source: DSOD, Lake County 2023 Parcel/Assessor's Data

Community Lifelines

Dam failure flooding presents a threat to life and property, including community lifelines in the District and greater Lake County. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Community lifelines that would be at risk to dam failure flooding include:

- **Safety and Security** – Police, Fire, EMS, and Public Works personnel are often called on to respond during flood emergencies. This would be especially true in a dam failure event. Search and rescue and swiftwater teams may be called on to perform riskier duties during times of heavy rains and flooding.
- **Food, Hydration, Shelter** – A dam failure would displace many residents in the District. Some would need shelter, as well as food and water.
- **Health and Medical** – There is the potential for multiple injuries and deaths from a catastrophic dam failure taxing health and medical facilities. Casualty and patient movement from the inundation areas and unrelated incidents by EMS may be significantly impacted and have to be rerouted. Public health facilities can also be at risk from flooding caused by dam failures.
- **Energy** – Dam failure could impact large areas of above ground electric infrastructure, causing widespread power outages. Dam failure could also affect fueling stations, as well as electric car charging stations.
- **Communications** – An influx of service calls to dispatch centers for reporting of flooding, power outages, and rescues or other issues can occur resulting in communication networks going down for extended periods of time. Messaging systems need to be deployed during these events to let the public know about road closures, washouts, debris on roads, or lane closures. Calls to and from family and friends during a hazard event can further overwhelm communication systems such as cell towers and other infrastructure. Demand may exceed the capacity of these systems to remain operational during response efforts.
- **Transportation** – Highways and local roads may see extensive flooding. Bridges can be damaged or destroyed. This can cause lane closures or road closures and limit available routes altogether. These closures can affect response personnel (EMS, Fire, Police) as well as cause additional traffic issues for residents. Evacuation efforts may be difficult and further put people at risk of death or injury.
- **Hazardous Material** – Hazardous material facilities can be affected by flooding. Releases during these events can contribute to the dangers of floodwaters and cause contamination of potable water sources, as well as additional exposure to the environment.
- **Water Systems** – Any water or wastewater system (like those of the HVLCSD) located in a dam inundation area may be affected by dam failure flooding. Stormwater drainage systems and facilities may also be affected.

A large dam failure event could overwhelm many community lifelines in the District and greater Lake County. A failure of the Coyote Creek Dam could, at least temporarily, overwhelm the community lifelines in place in affected areas of the HVLCSD.

Natural, Historic, and Cultural Resources

A major dam failure event and associated flooding could have a devastating impact on the District. Large flood events can affect all natural, historic, and cultural resources that lie in the dam inundation areas. There are a number of ways floodwaters associated with a dam failure event can impact natural resources and the environment: Wildlife habitats can be destroyed by floodwaters. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levées can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to these structures within the inundated areas, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged, and lost during extreme flood events.

Economic Assets and Community Activities of Value

As previously noted, the largest economic asset in the District Service Area is the HVLCSD. As shown on the maps and tables above, the Coyote Dam would affect large swaths of the HVLCSD Service Area should it fail. Many economic assets of the Planning Area would be at least temporarily disrupted. Some economic assets may be damaged to the point where the business or area would no longer be economically viable to continue to operate. Most community activities of value would be affected if they occurred during a dam failure event.

The HOA administration building is in the inundation area and would be completely destroyed. Other HOA amenities, like the Greenview restaurant, the golf course would be impacted. While most likely less severe, the Coyote Valley Shopping Plaza, Elementary School, and Grocery Outlet would also be impacted.

Impacts from Dam Failure

Impacts to the District from dam failure flooding could be extensive and widespread and include loss of life and injury, flooding and damage to property and structures, damage to critical facilities and infrastructure, loss of natural resources, and all other flood related impacts. Additionally, mass evacuations and associated economic losses can also be significant.

Other impacts associated with dam failure are landslides, bank erosion, and destruction of habitat. Dam failures can cause downstream flooding and can transport large volumes of sediment and debris and contaminants from the floodwaters. Other environmental impacts can include contamination from septic or sewer system failures and releases of contaminants from hazardous materials facilities, contamination of potable water supplies; changes in configurations of streams; loss of wildlife habitats; and degradation of wetlands. A large dam failure event could have significant and catastrophic impacts.

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

Future Conditions/Future Development

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

- As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time.

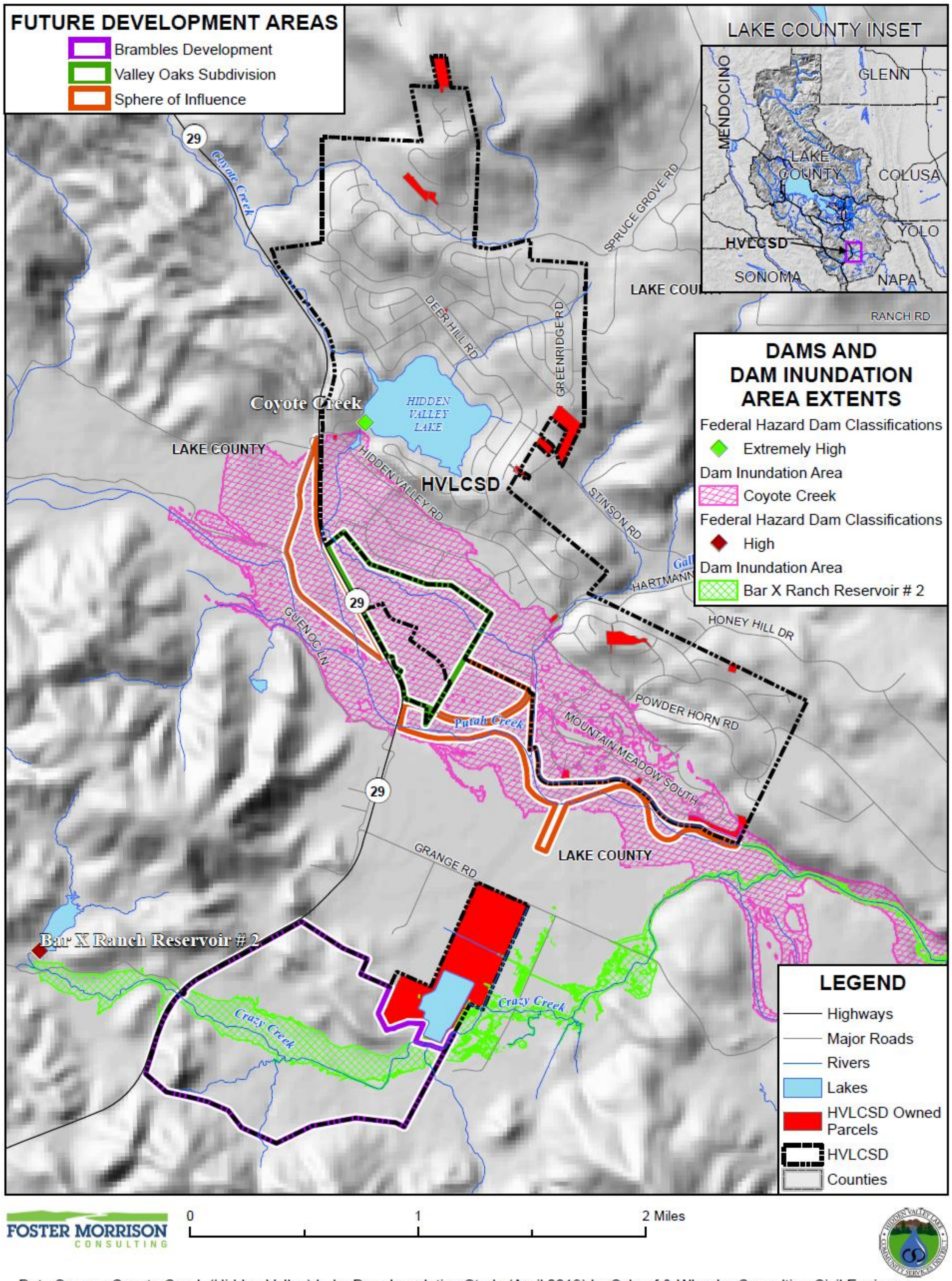
- While population projections for the area served by the District show additional expected growth, these anticipated future changes in population are expected to be relatively small, which limits additional impacts to the District. The District may add staff, but this number would be small. Additional growth within the dam inundation areas of the District would place additional populations at risk to dam failure. The District noted it has no control over population changes, it merely reacts to them by providing additional (or reduced) services.
- Land use planning should be proactive to address future hazard conditions. Locating new development, structures, and critical facilities and infrastructure within or near areas of dam failure risk may put additional development at risk. Depending on the location of new development and adherence to protective building codes, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the District to this hazard.

Although new growth and development would mostly fall in the area flooded by a dam failure of the Coyote Creek Dam, given the limited potential of total dam failure and the large area that a dam failure would affect, development in the dam inundation area will continue to occur. More information on dam failure and future development can be seen in the GIS analysis below.

GIS Analysis

The District provided the future development areas which were used as the basis for the inventory of future development areas for the District. Figure 4-53 show the locations of the future development areas overlayed on the dam inundation areas that intersect the future development areas. Table 4-47 and Table 4-48 shows the future development structures and counts and which dam inundation area they fall in.

Figure 4-53 HVLCSD – Dam Inundation Areas and Future Development



Data Source: Coyote Creek (Hidden Valley) Lake Dam Inundation Study (April 2019) by Schaaf & Wheeler Consulting Civil Engineers, DWR DSOD Data June 2024, Cal OES Dam Status June 2024, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 10/30/2024.

Table 4-47 HVLCSD – Coyote Creek Dam Inundation and Future Development Area Parcels and Acres

Future Development/ Dam Inundation Area/ Property Use	Total Parcel Count	Total Acres	Improved Parcel Count	Total Improved Acres	Unimproved Parcel Count	Total Unimproved Acres
Valley Oaks Subdivision						
Coyote Creek						
Agricultural	0	0	0	0	0	0
Commercial	1	47.2	1	47.2	0	0
Residential	1	103.1	0	0	1	103.1
Open Space/ Rural Lands	0	0	0	0	0	0
Coyote Creek Total	**2**	**150.3**	**1**	**47.2**	**1**	**103.1**
Valley Oaks Subdivision Total	**2**	**150.3**	**1**	**47.2**	**1**	**103.1**
Sphere of Influence						
Coyote Creek						
Agricultural	1	31.7	1	31.7	0	0
Commercial	6	62.4	3	41.2	3	21.2
Residential	9	47.2	8	25.4	1	21.8
Open Space/ Rural Lands	2	41.6	0	0	2	41.6
Coyote Creek Total	**18**	**182.8**	**12**	**98.3**	**6**	**84.6**
Sphere of Influence Total	**18**	**182.8**	**12**	**98.3**	**6**	**84.6**
Grand Total	**20**	**333.1**	**13**	**145.5**	**7**	**187.7**

Source: Cal OES/DSOD, HVLCSD

Table 4-48 HVLCSD – Bar X Ranch Dam Inundation and Future Development Area Parcels and Acres

Future Development / Dam Inundation Area / Property Use	Total Parcel Count	Total Acres	Improved Parcel Count	Total Improved Acres	Unimproved Parcel Count	Total Unimproved Acres
Brambles Development						
Bar X Ranch Reservoir # 2						
Agricultural	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Residential	1	496.7	1	496.7	0	0
Open Space / Rural Lands	0	0	0	0	0	0
Brambles Development Total	**1**	**496.7**	**1**	**496.7**	**0**	**0**
Grand Total	**1**	**496.7**	**1**	**496.7**	**0**	**0**

Source: Schaaf & Wheeler (2019), HVLCSD

4.3.7. Drought and Water Shortage

Hazard Profile

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

Hazard/Problem Description

A separate hazard/problem description and location and extent for both drought and water shortage follows.

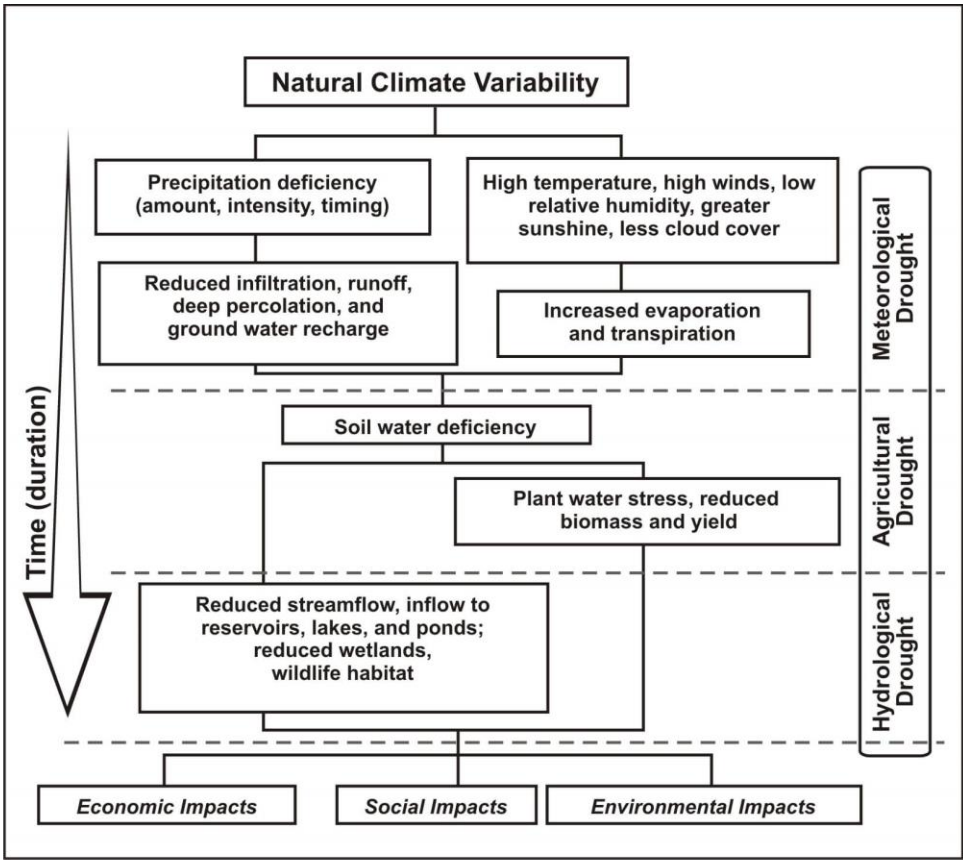
Drought

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

Drought is a complex issue involving (see Figure 4-54) many factors—it occurs when a normal amount of precipitation and snow is not available to satisfy an area’s usual water-consuming activities. Drought can often be defined regionally based on its effects:

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

Figure 4-54 Causes and Impacts of Drought



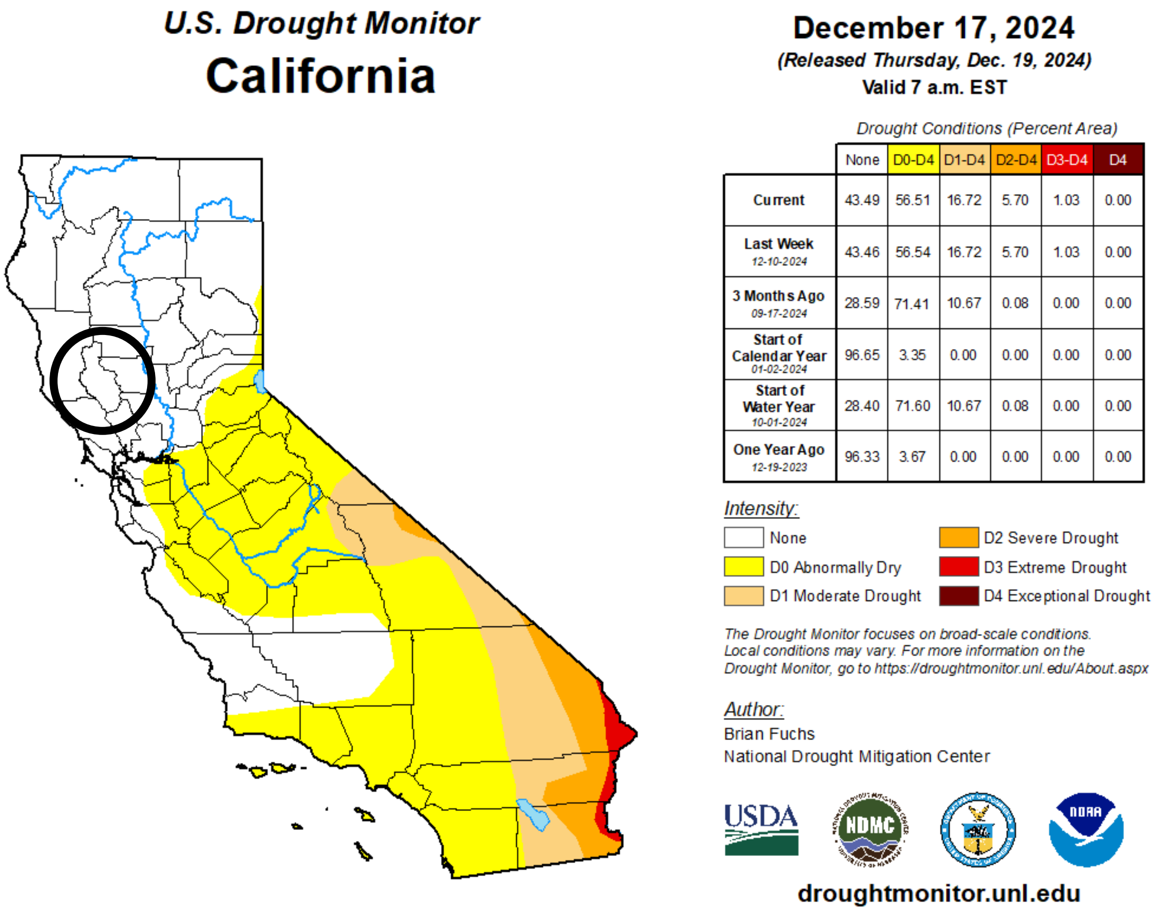
Source: National Drought Mitigation Center (NDMC)

The HMPC noted that drought can cause increased wildfire risk, discussed in Section 4.3.12.

Location and Extent of Drought

Since drought is a regional phenomenon, it affects the whole of the District. Speed of onset of drought is slow, while the duration varies from short (months) to long (years) Drought in the United States is monitored by the National Integrated Drought Information System (NIDIS). A major component of this portal is the U.S. Drought Monitor. The Drought Monitor concept was developed jointly by the NOAA's Climate Prediction Center, the NDMC, and the USDA's Joint Agricultural Weather Facility in the late 1990s as a process that synthesizes multiple indices, outlooks and local impacts, into an assessment that best represents current drought conditions. The final outcome of each Drought Monitor is a consensus of federal, state, and academic scientists who are intimately familiar with the conditions in their respective regions. A snapshot of the current drought conditions in California and the HVLCSD can be found in Figure 4-55. Snapshots from 2014 through and 2023 are shown in Figure 4-55 and Figure 4-56. As seen in these figures and related data, the District has been in and out of drought over the past ten years since the last drought started in 2014.

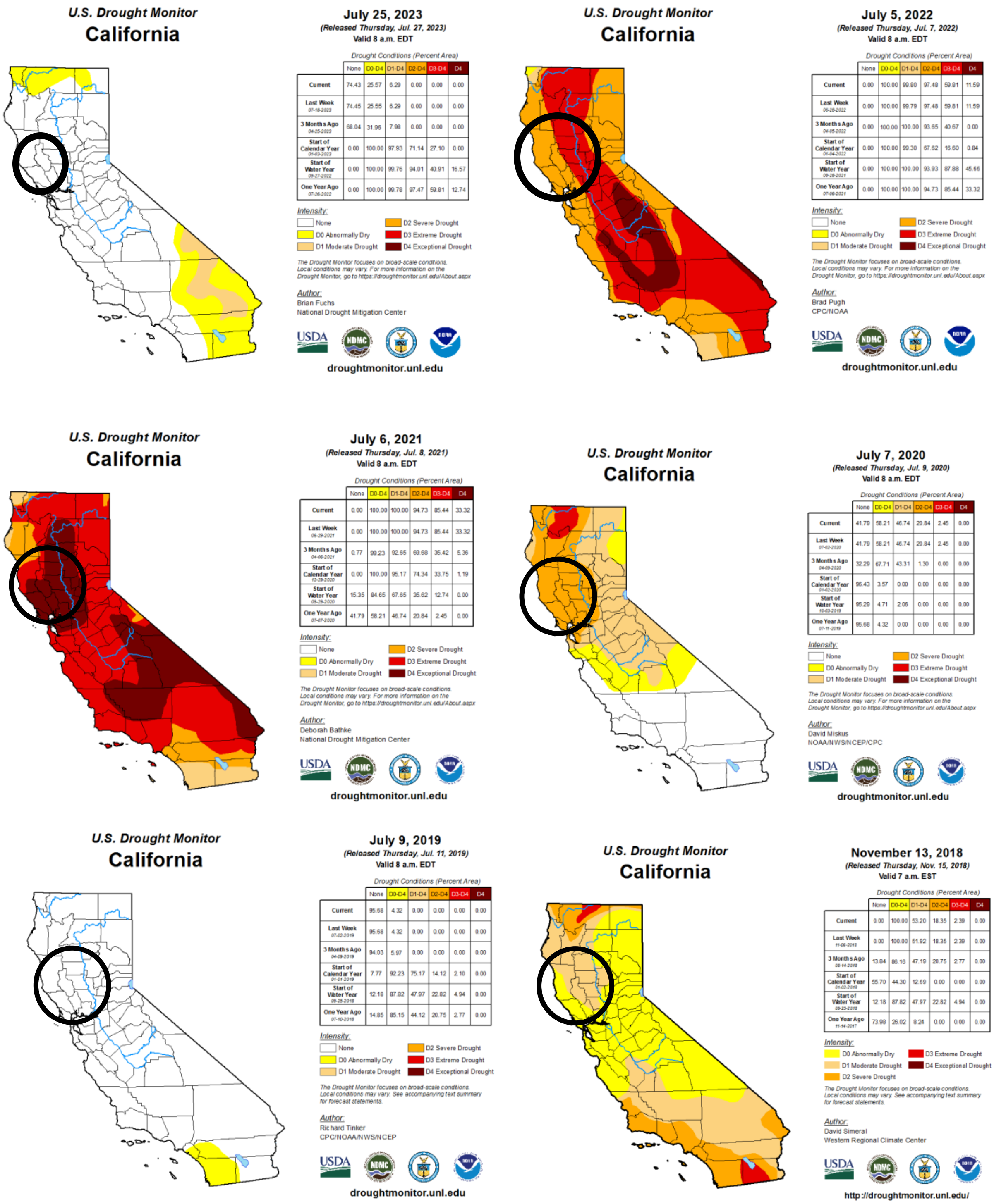
Figure 4-55 HVLCSD – Current Drought Status



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	43.49	56.51	16.72	5.70	1.03	0.00
Last Week 12-10-2024	43.46	56.54	16.72	5.70	1.03	0.00
3 Months Ago 09-17-2024	28.59	71.41	10.67	0.08	0.00	0.00
Start of Calendar Year 01-02-2024	96.65	3.35	0.00	0.00	0.00	0.00
Start of Water Year 10-01-2024	28.40	71.60	10.67	0.08	0.00	0.00
One Year Ago 12-19-2023	96.33	3.67	0.00	0.00	0.00	0.00

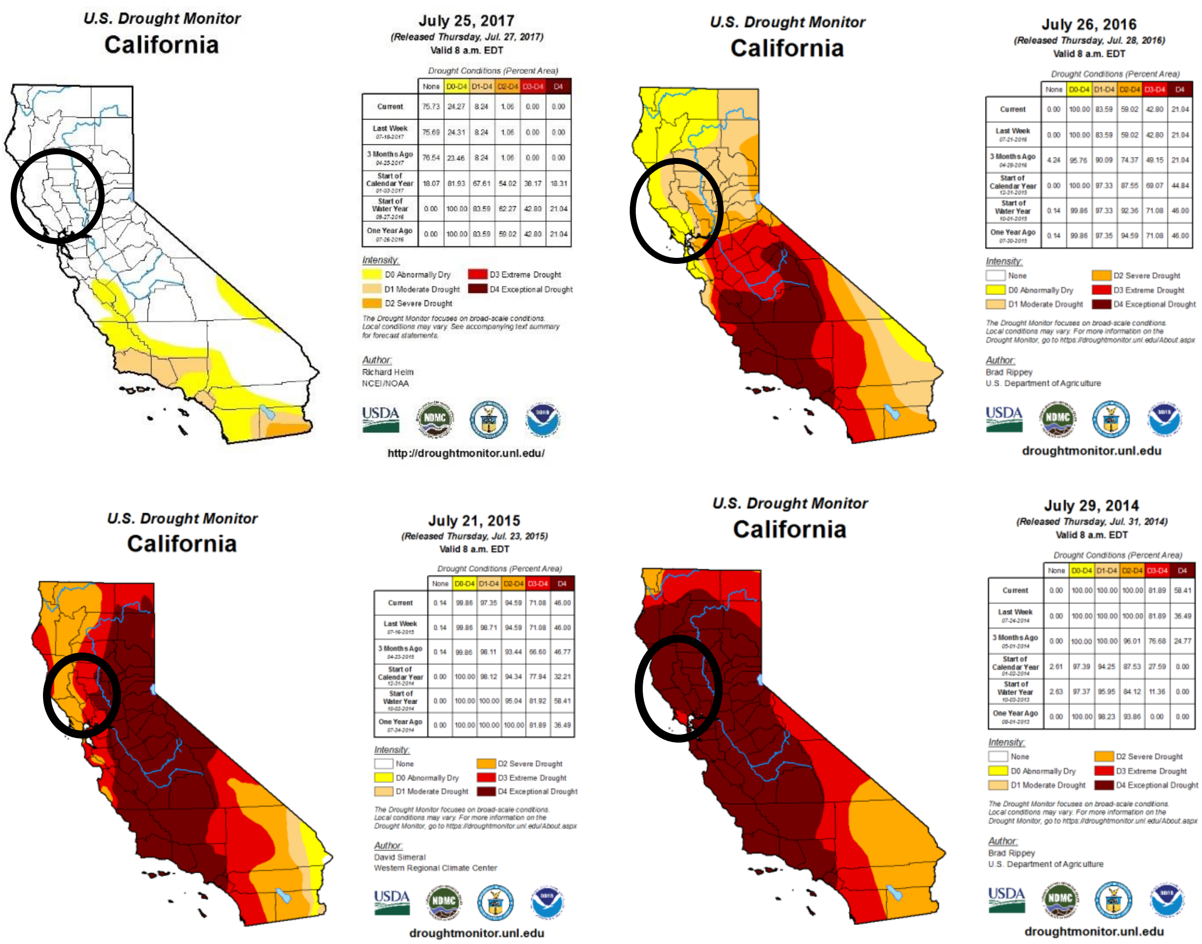
Source: US Drought Monitor

Figure 4-56 Previous Drought Status in HVLCSD (2018-2023)



Source: US Drought Monitor

Figure 4-57 Previous Drought Status in HVLCSD (2014-2017)



Source: US Drought Monitor

Cal DWR says the following about drought:

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

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

As shown on the previous figures, drought is tracked by the US Drought Monitor. The Drought Monitor includes a scale to measure drought intensity:

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

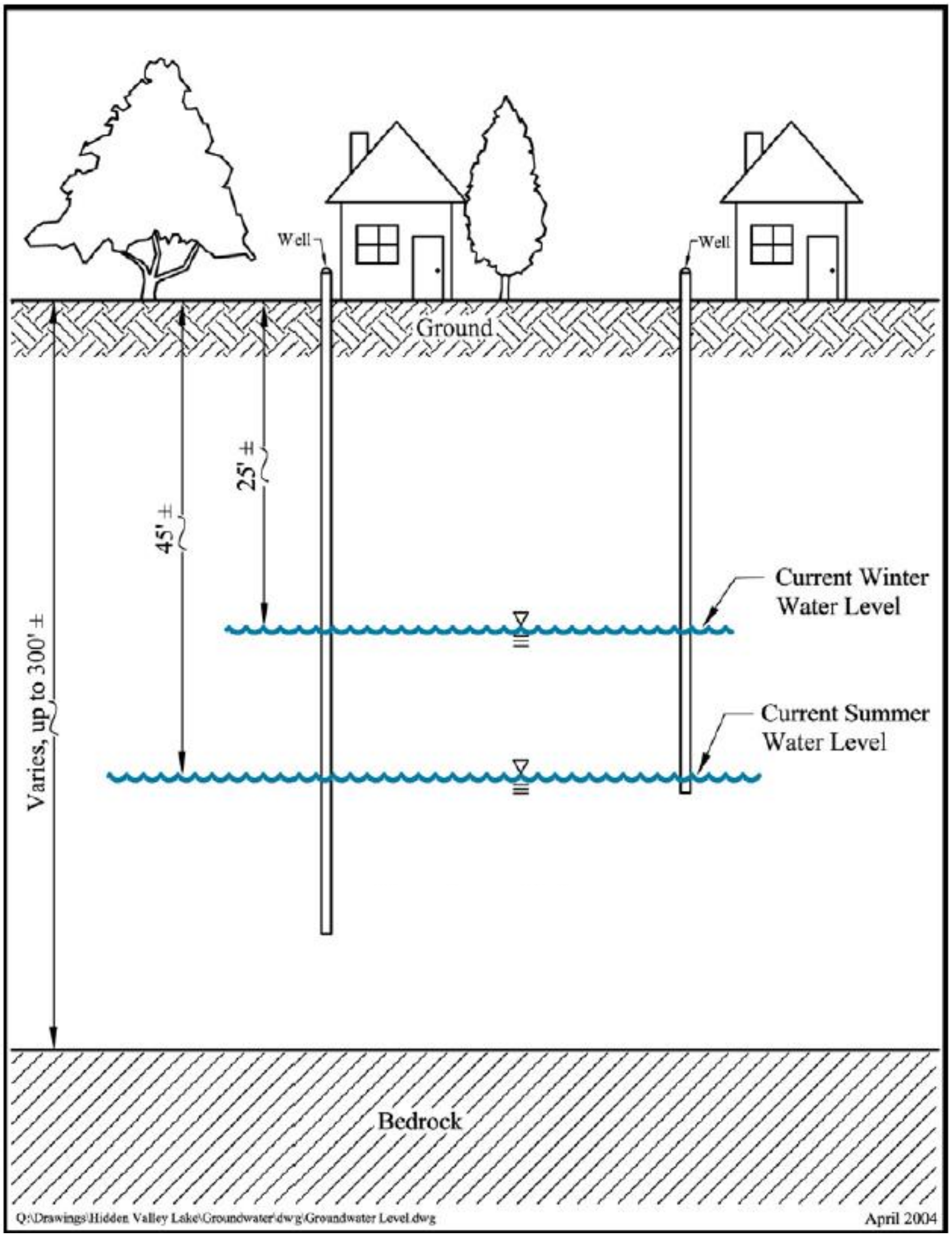
Drought has a slow onset and long duration. Drought is not initially recognized as a problem because it normally originates in what is considered good weather, which typically includes a dry late spring and summer in Mediterranean climates, such as in California. This is particularly true in Northern California where drought impacts are delayed for most of the population by the wealth of stored surface and ground water. The drought complications normally appear more than a year after a drought begins. The most direct and likely most difficult drought impact to quantify is to local economies, especially agricultural economies. Drought has the potential to affect the entire District.

Water Shortage

Northern California communities, including HVLCSD, generally have sufficient groundwater and surface water supplies to mitigate even the severest droughts of the past century. Many other areas of the State, however, also place demands on these water resources during severe drought.

The District noted that it is fortunate to have access to a reasonably reliable and, for the most part, a contaminant-free drinking water supply. The District's water supply consists of three wells, localized in one area south of the District's service area. The Coyote Valley groundwater basin is fully recharged each spring in all but the driest years, and due to the largely rural character of the region, is not heavily impacted by urban or industrial source pollutants. The District is taking steps to maintain its current water rights to the Coyote Valley groundwater basin, and increase hydrogeologic understanding of the supply, while promoting resource stewardship to ensure its sustainability.

Figure 4-58 HVLCSD - Seasonal Water Level Changes Under Current Demands



Source: HVLCSD

Location and Extent of Water Shortage

Since water shortage generally happens on a regional scale, the entirety of the District is at risk. There is no established scientific scale to measure water shortage. The speed of onset of water shortage tends to be lengthy. The duration of water shortage can vary, depending on the severity of the drought that accompanies it. Factors for extent include the nature, source, and reliability of water. The District indicates it has sufficient water supply within the Coyote Valley Groundwater Basin, which reduces the extent of water shortage impacts in the District. The District's water rights are junior to others in the watershed.

Past Occurrences

Disaster Declaration History

There has been one state and one federal disaster related to drought and water shortage in Lake County. This can be seen in Table 4-49.

Table 4-49 Lake County – Disaster Declarations from Drought 1950-2024

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Drought	1	2014	1	1977

Source: FEMA, Cal OES

NCDC Events

There have been 44 NCDC drought events in Lake County, as shown in Table 4-18. 29 of these drought events occurred since the 2020 LHMP. No damages, deaths, or injuries were reported to the NCDC from these events.

*Table 4-50 NCDC Severe Weather Events for Lake County 1950-7/31/2023**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Drought	44	0	0	0	0	$0	$0

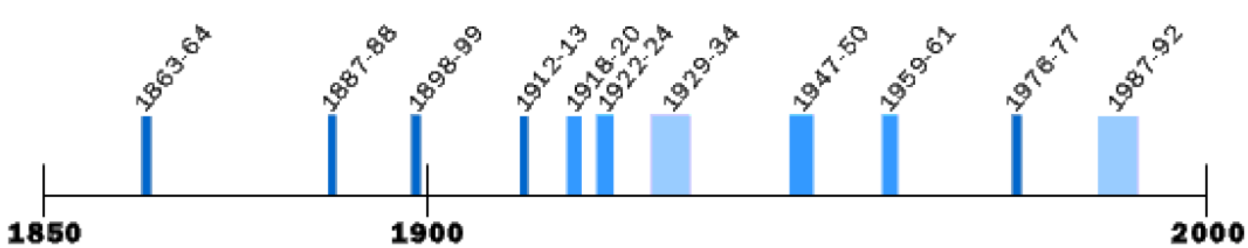
Source: NCDC

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

CA DWR Events (with Hazard Mitigation Planning Team Inputs)

Historically, California has experienced multiple severe droughts. According to the DWR, droughts exceeding three years are relatively rare in Northern California, the source of much of the State's developed water supply. Figure 4-59 depicts California's Multi-Year Historical Dry Periods, 1850-2000. The 1929-34 drought established the criteria commonly used in designing storage capacity and yield of large northern California reservoirs. Figure 4-60 compares the 1929-34 drought to the 1976-77, 1987-92, 2007-09, and 2012-2016 droughts.

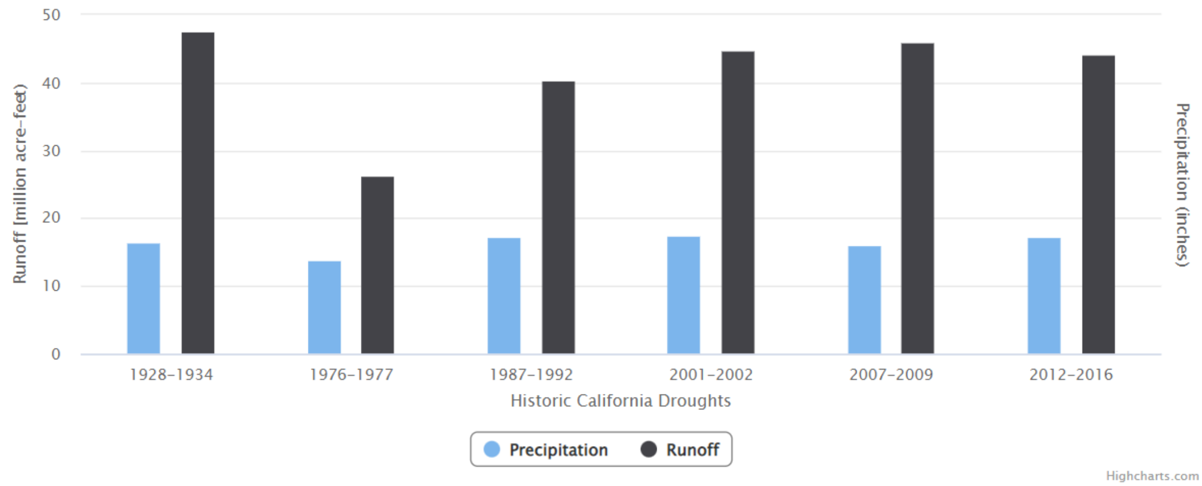
Figure 4-59 California's Multi-Year Historical Dry Periods, 1850-2000



Source: CA DWR

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

Figure 4-60 Average Annual Runoff and Precipitation for Historic Droughts



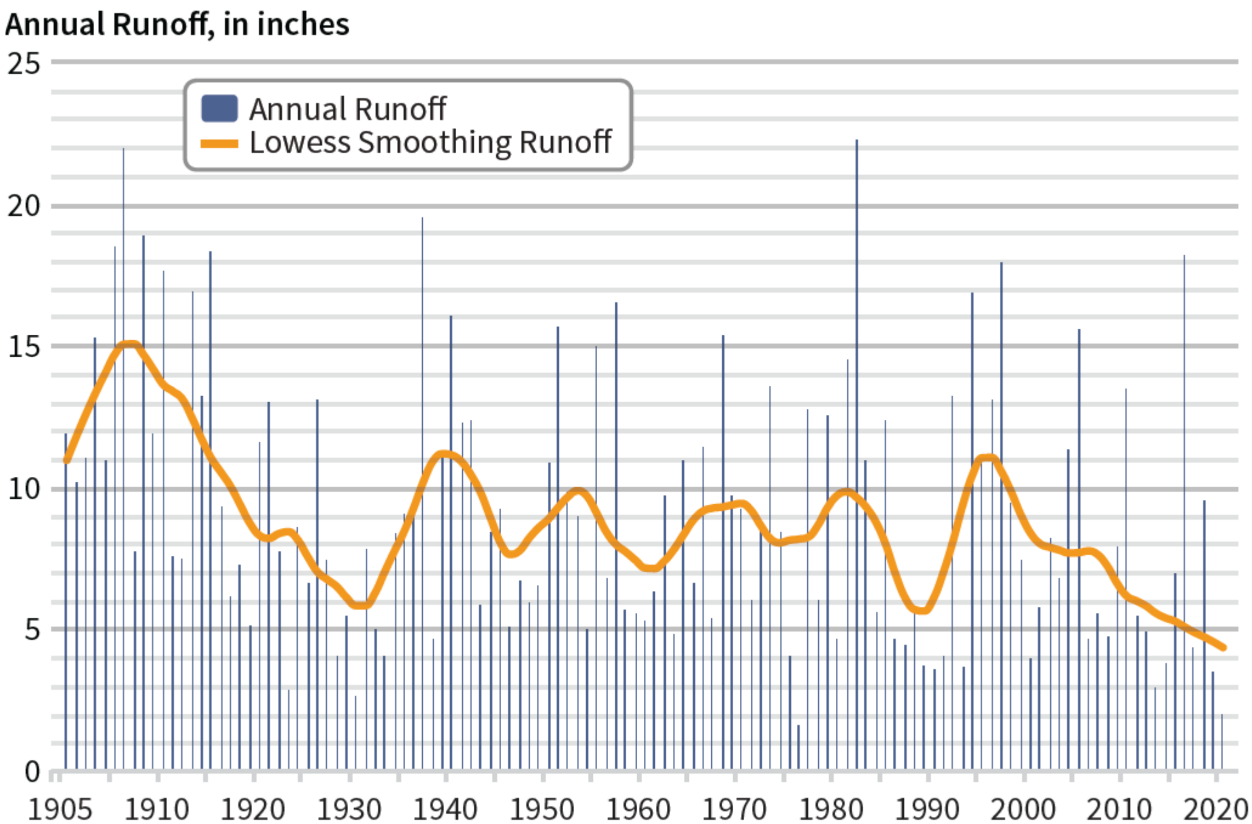
Click and drag across the graph to zoom.
Roll over graph lines for specific values.
Click legend to toggle graph lines on and off.

Runoff and precipitation conditions for California's six historical droughts. The most severe drought both in terms of precipitation and runoff was the drought of 1976-77. However, because it was just a two-year drought, the water supply impacts were not as severe as those associated with the longer duration droughts because shorter droughts can be partially mitigated by surface and groundwater storage.

Source: CA DWR – 2012-2016 California Drought: Historical Perspective (https://ca.water.usgs.gov/california-drought/california-drought-comparisons.html)

Figure 4-61 depicts runoff for the State from 1905 to 2021. This gives a historical context for the 2014-2020 drought to compare against past droughts.

Figure 4-61 Annual California Runoff –1905 to 2021



Source: Cal DWR

The 2018 and 2023 California State Hazard Mitigation Plan discussed the major droughts from 1900 to 2022. The discussion below appends to the tables and figures above.

The 1975-1977 Drought

From November 1975 through November 1977, California experienced one of its most severe droughts. Although people in many areas of the state are accustomed to very little precipitation during the growing season (April to October), they expect it in the winter. In 1976 and 1977, the winters brought only one-half and one-third of normal precipitation, respectively. Most surface storage reservoirs were substantially drained in 1976, leading to widespread water shortages when 1977 turned out to be even drier. The District, as it currently exists, was not in existence at this time.

The 1987-1992 Drought

From 1987 to 1992, California again experienced a serious drought due to low precipitation and run-off levels. The hardest-hit region was the Central Coast, roughly from San Jose to Ventura. In 1988, 45 California counties experienced water shortages that adversely affected about 30 percent of the state's population, much of the dry-farmed agriculture, and over 40 percent of the irrigated agriculture. Fish and wildlife resources suffered, recreational use of lakes and rivers decreased, forestry losses and fires increased, and hydroelectric power production decreased. In February 1991, DWR and Cal OES surveyed drought conditions in all 58 California counties and found five main problems: extremely dry rangeland, irrigated agriculture with severe surface water shortages and falling groundwater levels, widespread rural areas where individual and community supplies were going dry, urban area water rationing at 25 to 50 percent of normal usage, and environmental impacts.

Storage in major reservoirs had dropped to 54 percent of average, the lowest since 1977. The shortages led to stringent water rationing and severe cutbacks in agricultural production, including threats to survival of permanent crops such as trees and vines. Fish and wildlife resources were in critical shape as well. Not since the 1928-1934 drought had there been such a prolonged dry period. In response to those conditions, the Governor established the Drought Action Team. This team almost immediately created an emergency drought water bank to develop a supply for four critical needs: municipal and industrial uses, agricultural uses, protection of fish and wildlife, and carryover storage for 1992. The large-scale transfer program, which involved over 800,000 acre-feet of water, was implemented in less than 100 days with the help and commitment of the entire water community and established important links between state agencies, local water interests, and local governments for future programs. The District noted no specific damages or issues during this drought could be recalled.

The 2007-2009 Drought

Water years 2007-2009 were collectively the 15th driest three-year period for DWR's eight-station precipitation index, which is a rough indicator of potential water supply availability to the State Water Project (SWP) and Central Valley Project (CVP). Water year 2007 was the driest single year of that drought and fell within the top 20 percent of dry years based on computed statewide runoff. In June 2008, a state emergency proclamation was issued due to water shortage in selected Central Valley counties. In February 2009, for the first time in its history, the State of California proclaimed a statewide drought. The state placed unprecedented restrictions on CVP and SWP diversions from the Delta to protect listed fish species, a regulatory circumstance that exacerbated the impacts of the drought for water users.

The greatest impacts of the 2007–2009 drought were observed in the CVP service area on the west side of the San Joaquin Valley, where hydrologic conditions combined with reduced CVP exports resulted in substantially reduced water supplies (50 percent supplies in 2007, 40 percent in 2008, and 10 percent in 2009) for CVP south-of Delta agricultural contractors. Small communities on the west side highly dependent on agricultural employment were especially affected by land fallowing due to lack of irrigation supplies, as well as by factors associated with current economic recession. The coupling of the drought and economic recession necessitated emergency response actions related to social services, such as food banks and unemployment assistance. The District noted no specific damages or issues during this drought could be recalled.

The 2012-2017 Drought (which carried forward until 2023 after a pause in 2017 and 2019)

The statewide drought of 2012-2017, which is still ongoing, will be remembered as one of the most severe and costliest droughts of record in California. The drought that spanned water years 2012 through 2017 included the driest four-year statewide precipitation on record (2012-2015) and the smallest Sierra-Cascades snowpack on record (2015, with 5 percent of average). It was marked by extraordinary heat: 2014, 2015, and 2016 were California's first, second, and third warmest years in terms of statewide average temperatures. By the time the drought was declared officially over in April 2017, the state had expended

$6.6 billion in drought response and mitigation programs and had been declared a federal disaster area. Lake County was affected in many ways. The drought led to USDA disaster declarations for farmers in the County. Wildfires were worse that summer. 2015 had multiple federal and state disaster declarations due to drought and resultant fires.

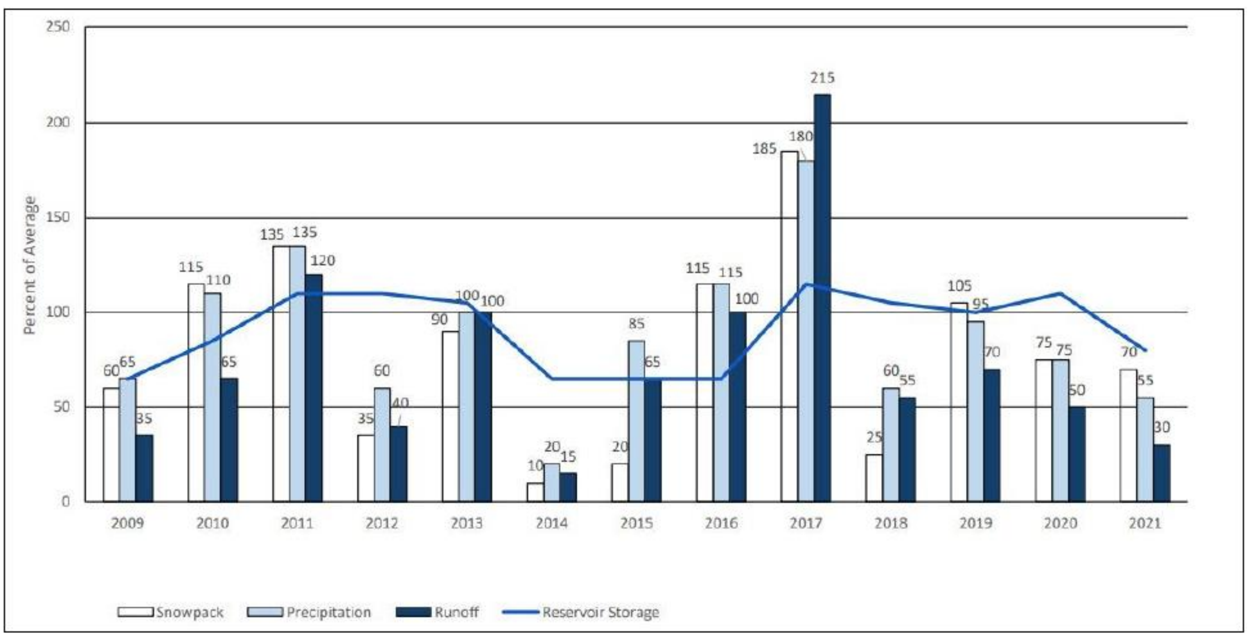
Affects to the District were noted. First drought, then fires, then floods occurred as a result of these events. Burn scar from fires created more runoff and higher sedimentation in the waters of the HVLCSD.

The District noted that since 2020 there have been drought conditions, but there have been no issues associated with these conditions that have affected the District.

Water Shortage

Figure 4-62 illustrates several indicators commonly used to evaluate water conditions in California. The percent of average values are determined by measurements made in each of the ten major hydrologic regions. The chart describes water conditions in California between 2007 and 2021. The chart illustrates the cyclical nature of weather patterns in California.

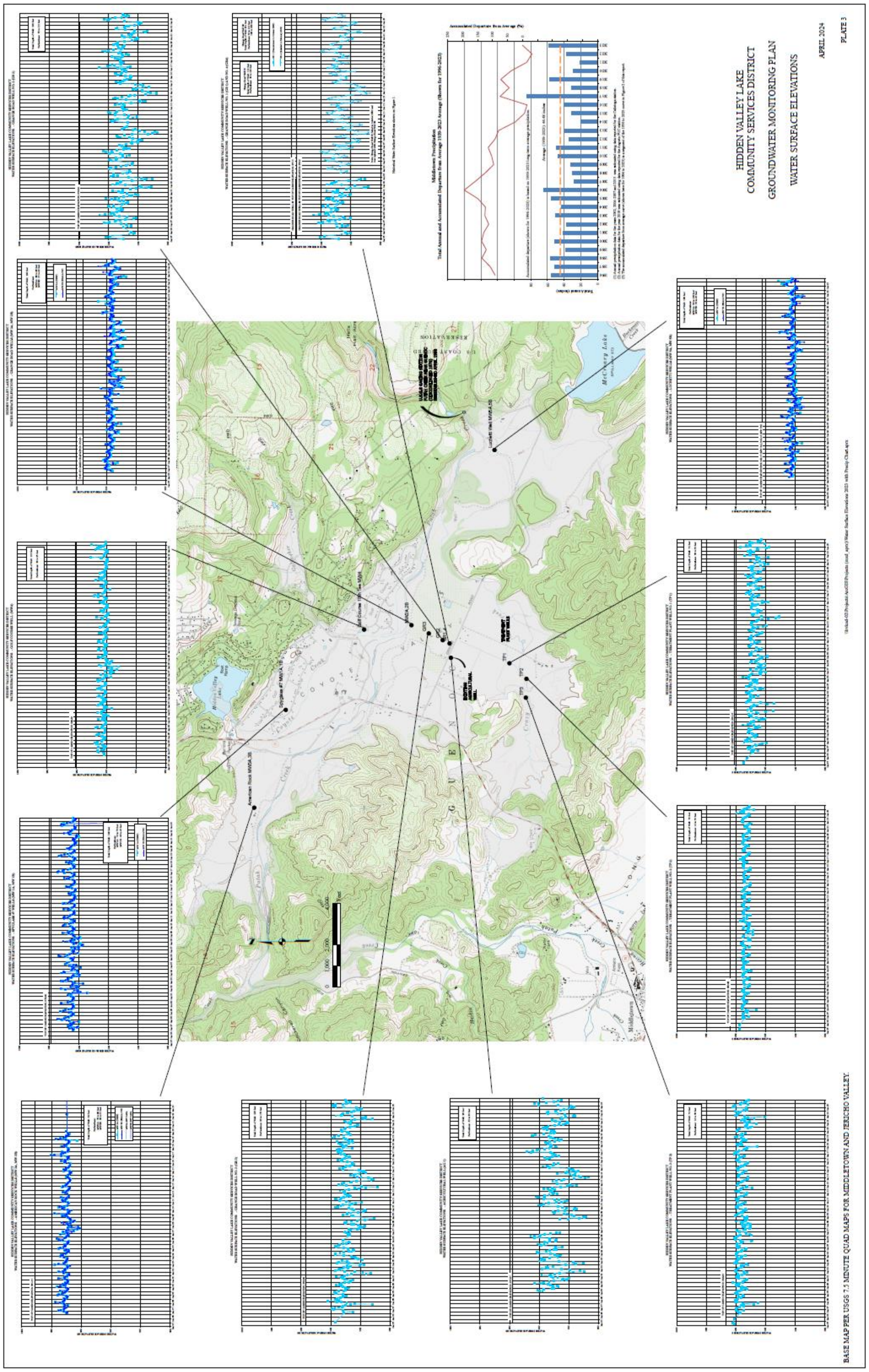
Figure 4-62 Water Supply Conditions, 2009 to 2021



Source: 2023 State of California Hazard Mitigation Plan

In the District, water levels are tracked. Water level measurements for Grange Road wells GR1 and GR2 (Points of Diversion #1 and #2) were taken periodically beginning in 1984 and monthly since 1990. Monthly monitoring of Grange Road well GR3 (Point of Diversion #3) began in 1995. In October 2002, Grange Road well GR1 (Point of Diversion #1) failed and was immediately removed from service. In February 2003, the District installed Grange Road well GR4 at the same location to replace the failed GR1 well. GR4 will be considered as Point of Diversion #1 for purposes of diversion and reporting under the License and Permit. Monthly monitoring of GR4 began in July 2003. The Agricultural Well (Point of Diversion #5) was added to the Permit and monthly monitoring began in February 1999. The District began monthly monitoring of wells TP 1, 2 & 3 in 1995, and wells MW 1, 2, 3 & 4 in 1996. Monitoring well MW-5 was constructed in June 1998 and has been monitored monthly since that time. Monthly water surface elevations in the monitoring wells are shown graphically as of January 2020 on Figure 4-63.

Figure 4-63 HVLCSD – Monthly Water Surface Elevations in Monitoring Wells, 2020



Source: HVLCSD

With a reduction in water, water supply issues based on water rights becomes more evident. The District will continue to monitor drought and water supply issues. The District noted that there is a need for deeper geological analysis to gain a full understanding of the groundwater basin.

Likelihood of Future Occurrence

Drought

Likely—Historical drought data for the HVLCSD and region indicate there have been 5 significant droughts in the last 86 years. This equates to a drought every 16.8 years on average or a 6.0 percent chance of a drought in any given year. Based on this data and given the multi-year length and cyclical nature of droughts, the HMPC determined that future drought occurrences in the District are likely.

Water Shortage

Occasional — Recent historical data for water shortage indicates that Lake County may at some time be at risk to both short and prolonged periods of water shortage. Based on this it is possible that water shortages will affect the District in the future during extreme drought conditions. New development, landscaping, and road paving put stress on water resources. The supply of water is currently sufficient, but as population grows and land use patterns shift, it will be necessary to consider the added stress that new development will put on water demand and quality.

It is likely that climate change will increase the chance of future occurrence as well as future impacts. More information on climate change and drought and water shortage can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Drought and Water Shortage

Climate change and its effect on drought near the District has been discussed by the following sources:

- CAS
- Public Policy Institute of California
- Cal-Adapt
- HMPC

Climate Adaptation Strategy

Climate scientists studying California find that drought conditions are likely to become more frequent and persistent over the 21st century due to climate change. The experiences of California during recent years underscore the need to examine more closely the state's water storage, distribution, management, conservation, and use policies. The 2021 CAS stresses the need for public policy development addressing long term climate change impacts on water supplies. The CAS notes that climate change is likely to significantly diminish California's future water supply, stating that: California must change its water management and uses because climate change will likely create greater competition for limited water supplies needed by the environment, agriculture, and cities.

Public Policy Institute of California

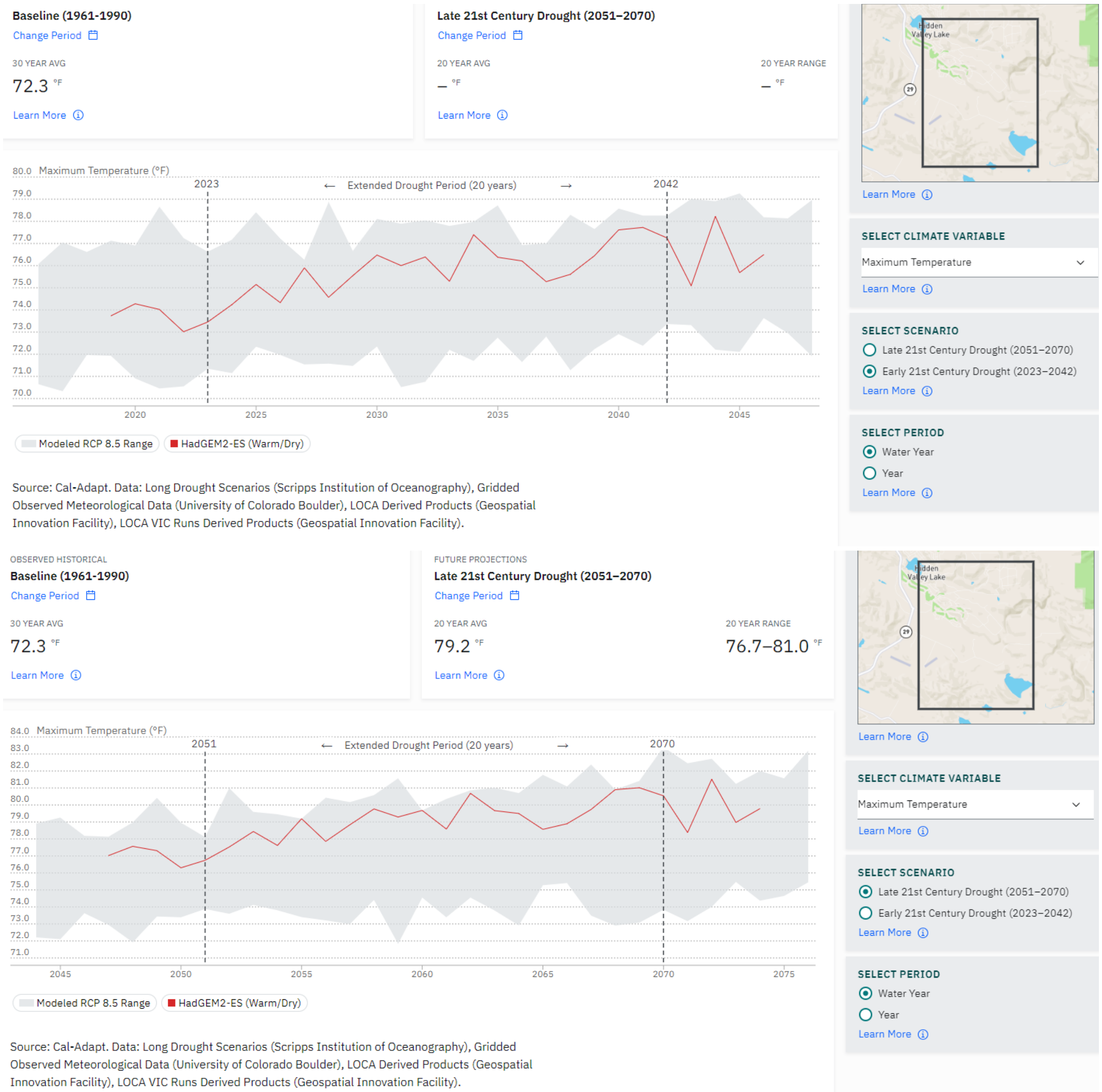
A 2018 report from the Public Policy Institute of California noted that thousands of Californians – mostly in rural, small, disadvantaged communities – already face acute water scarcity, contaminated groundwater, or complete water loss. Climate change would make these effects worse.

Cal-Adapt

Cal-Adapt has modeled future risk of drought. Recent research suggests that extended drought occurrence (“mega-drought”) could become more pervasive in future decades. This tool explores data for two 20-year drought scenarios (using the quad that contains the District in Figure 4-64) derived from LOCA downscaled meteorological and hydrological simulations – one for the earlier part of the 21st century, and one for the latter part:

- The upper chart represents a mid-century dry spell from 2023-2042 identified from the HadGEM2-ES RCP 8.5 simulation. The extended drought scenario is based on the average annual precipitation over 20 years. This average value equates to 78% of historical median annual precipitation averaged over the North Coast and Sierra California Climate Tracker regions.
- The lower chart represents a late century dry spell from 2051–2070 identified from the HadGEM2-ES RCP 8.5 simulation. The extended drought scenario is based on the average annual precipitation over 20 years. This average value equates to 78% of historical median annual precipitation averaged over the North Coast and Sierra California Climate Tracker regions.

Figure 4-64 HVLCSD – Future Extended Drought Scenarios



Source: Cal Adapt – Extended Drought Scenarios (retrieved 7/2/2024).

HMPC

The HMPC noted that drought and water shortage can have an effect on future development in the District Service Area. However, the District noted that their supplies are robust which will likely limit future impacts.

Vulnerability Assessment

Vulnerability—Extremely High

Based on historical information, the occurrence of drought in California, including the HVLCSD, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts can be extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. The vulnerability to drought may vary and include reduction in water supply, turf losses, impacts to natural resources, and an increase in dry fuels and tree dieback. Water shortage in the District has not occurred in the past due to the robust supplies the District has access to.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to the District. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect the HVLCSD. These sections below include assets at risk, impacts, and how future development can be affected by this hazard.

Tree Mortality and Drought

One of the specific vulnerabilities associated with drought in the District is the increased risk to trees from beetle kill and other insects, pathogens and parasites, and other tree mortality and die back issues. Drought weakens trees and makes them more susceptible to insect infestation and other pathogens. Insects, such as bark beetles and others, frequently attack trees weakened by drought, disease, injuries, or other factors that may stress the tree. These insects and other pathogens can contribute to the decline and eventual death of trees throughout the District Planning Area.

The tree mortality and dieback problem are a high priority because of the issue of hazardous trees and increased wildfire hazard in the wildland areas and the potential for worsening conditions and expansion into other forested sites in future years. Fuel loading and fire potential are greater in affected stands as compared to healthy stands due to the higher proportion of dead and dying material. Removal of dead and dying trees near structures, powerlines, and roadways is also a high priority because of the immediate falling hazard.

University of California, Berkeley's Department of Environmental Science, Policy, and Management (ESPM) was commissioned in 2021 to investigate the symptoms and possible causes of the dieback. Preliminary results show that the dieback is driven mostly by environmental stressors, including but not limited to drought, predisposing trees to disease caused by opportunistic pathogens. The report includes best management practices to limit the spread of pathogens. It is important to continue investigating the causes of the tree mortality and dieback to help District staff track changes over time, recognize where other areas may potentially be susceptible to tree mortality, and apply appropriate best management practices.

Under current drought conditions, competition for resources within forested areas will likely continue to intensify with greater stress increasing tree susceptibility to insect damage and disease, and ultimately increase mortality.

In all vegetation types, drought extends the length of the fire season because of its effect on live and dead fuel moisture, with critical low fuel moisture levels occurring early in spring or summer and extending at least through the first significant rains that typically come in late fall.

Local Concerns

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

The 2013 Lake County Drought Management Plan discussed the difficulty in accessing extra water supply during times of drought. Historically, during drought or other water emergency conditions, system operators were able to supplement their supply with purchased water from another source. Unfortunately, during a prolonged drought, most other sources may not have an excess supply and cannot be relied upon to supply emergency water. However, the District is fortunate in that it obtains water from the Coyote Valley Groundwater Basin. A new groundwater well would provide a tangible resilience factor for water supply. Also discussed in this plan, reducing leakage from water source to tap is a preventative measure that is realized with meter replacement, distribution system correlator technology, and bigger, better water tanks.

The District noted there is concern for other utilities. There are currently no mutual ties with other utilities. The District and is working towards a relationship with Middletown. The District also noted that Hexavalent Chromium levels in the water supply appear to increase during periods of drought.

The District noted these concerns are being tempered by recent mitigation activity. New tanks are being built and replacing redwood tanks (see their mitigation action updates for tanks replaced to date). The new tanks reduce water loss and also will withstand wildfires. On the distribution side, a main line replacement project will also reduce issues associated with water loss.

Assets at Risk

Assets at risk from drought and water shortage include people and populations; structures; critical facilities and infrastructure and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

The people and populations (both staff and those served by the District) of the HVLCSD are not directly affected by general drought conditions; although, their turfed areas, trees, and other water dependent resources can all be affected. In extreme drought conditions, however, residents and other populations within the District may be vulnerable to drought and water shortage issues. Water quality can be impacted causing health problems, especially to vulnerable populations where access to clean water supplies can be more challenging. Water shortages can have an effect on all of the populations in the District, but often have a greater effect on the unhoused and other vulnerable populations that may be unable to access and afford clean drinking water during shortages. During periods of drought as the costs of water usage may increase, those who are economically disadvantaged may be unable to afford the increased costs of potable water.

Structures (including Critical Facilities and Infrastructure)

Most District structures, critical facilities, and infrastructure have a limited vulnerability to drought and water shortage. Should drought conditions be severe enough to cause water shortage reliability issues, some facilities and infrastructure may be affected. Water and wastewater systems (like those of the HVLCSD) may be impacted during times of reduced water supply and need to employ contingencies to remain functional and fully operational. Other water dependent systems may also be adversely affected. Further, the secondary hazard of drought (increased potential for spread of urban fires and wildfire) can pose a significant risk to District facilities. Drought can also stress trees, causing die off. These trees may fall on critical infrastructure adjacent to them and impact power lines and other utilities.

Community Lifelines

While limited, community lifelines can be vulnerable to drought and water shortage. This includes:

- **Safety and Security** – Agencies may need to assist in providing alternative water supplies. Agencies may also need to staff locations where water is distributed.
- **Food, Hydration, Shelter** – Drought can limit agricultural production, including timber and grazing activities. Additional water supplies may need to be procured.
- **Health and Medical –** Additional water supplies may be required for these facilities to remain fully operational during drought and water shortages.
- **Energy –** Sufficient water is required to generate electricity and power. Additional fuels and power may be required to move water to and from locations that need it.
- **Communications** – Most communication systems will not be affected. In extreme instances, additional messaging may be required during drought and water shortages.
- **Water Systems** – During period of drought and water shortage, additional pressure may be put on water companies (like the HVLCSD) to secure additional supplies. With reductions in available water, the ability of wastewater systems to effectively treat wastewater may be impacted.

It is unlikely that any of these community lifelines would be overwhelmed by drought and water shortages, especially given the current state of water supply reliability in the District and greater Lake County.

Natural, Historic, and Cultural Resources

Drought and water shortage can have a significant impact on natural resources. Water levels in reservoirs (like those behind Coyote Dam) and lakes may be reduced and a loss of wetlands and marsh areas may occur. Severe drought conditions can contribute to an increase in erosion of soils and lead to poor soil quality. Further, all of the trees in the District are at risk to drought impacts and a reduction in water supply. These trees provide a wealth of social and environmental benefits to HVLCSD residents and visitors, from shade and beauty to air quality, carbon reduction and stormwater management. Drought can devastate crops and dry out pastures, dry out forests and critical habitat areas, and reduce food and water available for wildlife and livestock. Additionally, drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. It is unlikely that drought and water shortage would have a significant impact on historic and cultural resources in the District.

Economic Assets and Community Activities of Value

As previously noted, the largest economic asset in the District Service Area is the HVLCSD. Economic assets and community activities in the District generally have a limited vulnerability to drought and water shortage. Drought is a problem which predominantly affects rural small business owners such as farmers and agricultural contractors who rely on water for their crops. Economic sectors with a heavy reliance on water may also be affected. Depending upon how severe the conditions get and how long they last, drought can restrict recreational and community activities, all of which can stress businesses and local economies over time.

Impacts from Drought and Water Shortage

The vulnerability to drought is Districtwide, but impacts may vary and include reduction in water supply and an increase in dry fuels. The potential for a reduction in water supply during drought conditions generally leads to both mandated and voluntary conservations measures during extended droughts. During these times, the costs of water can also increase. Also of concern, the increased dry fuels and fuel loads associated with drought conditions can result in an increased fire danger. In areas of extremely dry fuels, the intensity and speed of fires can be significant. Water supply and flows for fire suppression can also be an issue during extended droughts. Drought that occurs during periods of extreme heat and high winds can cause PSPS events to be declared in the Planning Area. When power outages occur, the District is unable to pump water for fire suppression, unless backup power systems are in place. More information on PSPS can be found in Section 4.3.1.

Other qualitative impacts associated with drought in the District are those related to water intensive activities such as municipal usage, commerce, tourism, and recreation use. The District noted that the water that is received is via atmospheric rivers, depositing a significant amount of water in a short period of time. As a result, the District's dry periods are longer and drought is predicted to become more common. This means there's a possibility of less water available for use over the long run, and additional challenges for water supply reliability, especially during periods of extended drought. This is however less of a concern due to the access to groundwater wells that the District uses.

Drought Impact Reporter

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. Tracking drought impacts can be difficult. The Drought Impact Reporter from the NDMC is a useful reference tool that compiles reported drought impacts nationwide. Table 4-51 show drought impacts for Lake County from 1850 to June 2024. The data represented is skewed, with the majority of these impacts from records within the past ten years.

Table 4-51 Lake County Drought Impacts 1850-6/30/2024

Category	Number of Impacts
Agriculture	38
Business and Industry	6
Energy	6

Category	Number of Impacts
Fire	24
Plants & Wildlife	17
Relief, Response, and Restrictions	58
Society and Public Health	34
Tourism and Recreation	7
Water Supply and Quality	56
Total	**246**

Source: National Drought Mitigation Center. Retrieved 7/2/2024.

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

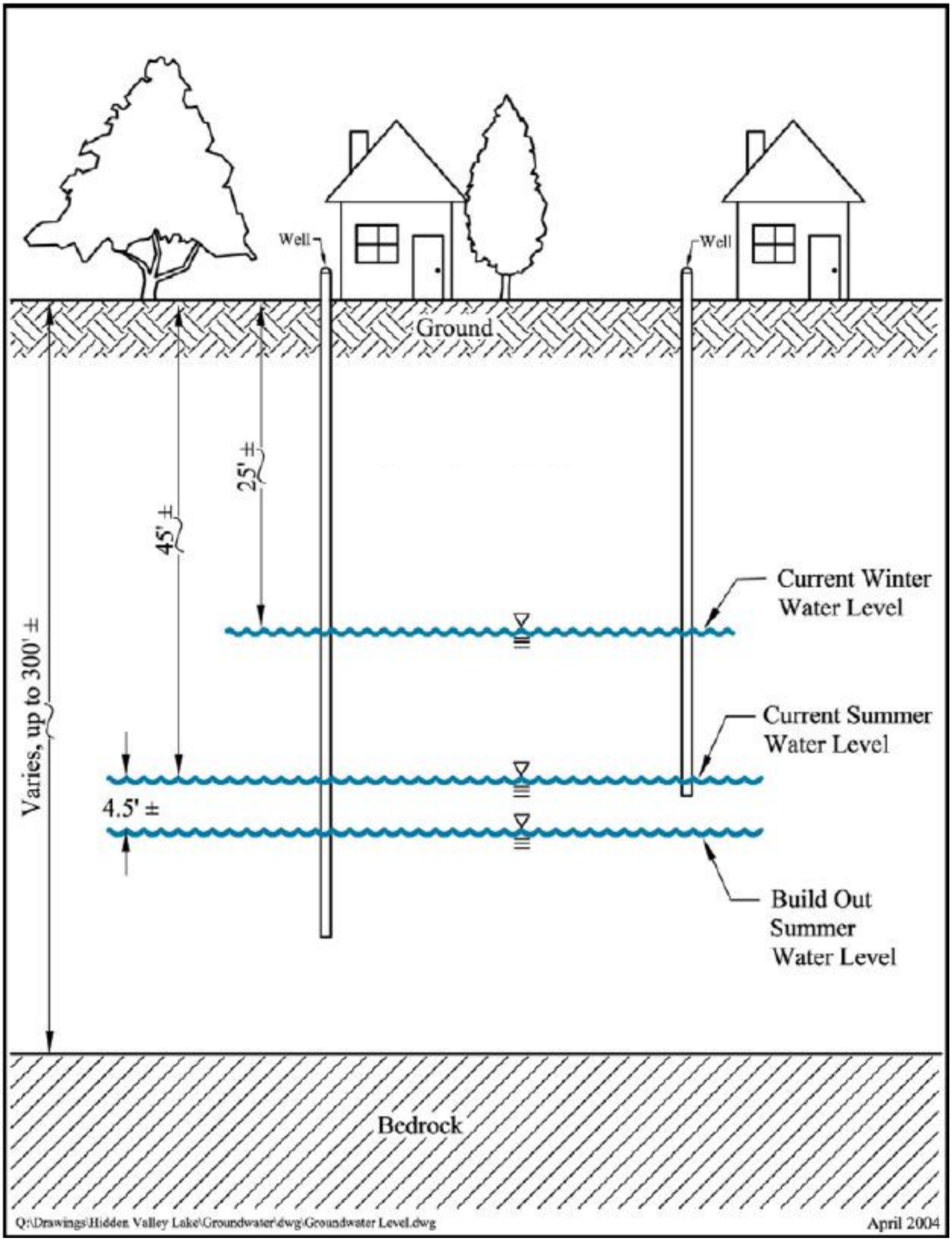
Future Conditions/Future Development

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

- Climate change is likely to exacerbate future drought conditions and associated impacts and vulnerability of the District to drought and water shortage.
- While population projections for the area served by the District show additional expected growth, these anticipated future changes in population are expected to be relatively small, which is unlikely to affect this hazard and associated impacts to the District. The District may add staff, but this number would be small. The District noted it has no control over population changes in its Planning Area, it merely reacts to them by providing additional (or reduced) services.
- It is unknown how changes in land use and development will affect drought and water shortage in the District's Service Area. HVLCSD conducts water supply planning to ensure a continued water supply to address future drought conditions.

The District has access to large quantities of water through its groundwater supply. However, population growth in the District will add additional pressure to the HVLCSD as a water company during periods of drought and water shortage. To support the plan for future development within the HVLCSD SOI, the District has modeled the estimated average drawdown of water under a fully built out scenario and found there to be sufficient water supply to accommodate this future growth (see Figure 4-65). The HVLCSD will need to continue to plan for and add infrastructure capacity to account for future population growth.

Figure 4-65 HVLCSD – Estimated Average Drawdown of Groundwater Level at Buildout



Source: HVLCSD

4.3.8. Earthquake

Hazard Profile

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

Hazard/Problem Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, seiches, hazmat incidents, fires, avalanches, and landslides. The degree of damage depends on many interrelated factors. Among these are: the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction. This section briefly discusses issues related to types of seismic hazards.

Ground Shaking

Ground shaking is motion that occurs as a result of energy released during faulting. The damage or collapse of buildings and other structures caused by ground shaking is among the most serious seismic hazards. Damage to structures from this vibration, or ground shaking, is caused by the transmission of earthquake vibrations from the ground to the structure. The intensity of shaking and its potential impact on buildings is determined by the physical characteristics of the underlying soil and rock, building materials and workmanship, earthquake magnitude and location of epicenter, and the character and duration of ground motion.

Actual ground breakage generally affects only those buildings directly over or nearby the fault. Ground shaking generally has a much greater impact over a greater geographical area than ground breakage. The amount of breakage and shaking is a function of earthquake magnitude, type of bedrock, depth and type of soil, general topography, and groundwater. As with most communities in Northern California near active faults, the District could be susceptible to violent ground shaking, depending on the location of the event. The Coyote Valley Basin, in which the Hidden Valley Lake service area is located, is an alluvial plain, which can cushion and reduce shaking.

Seismic Structural Safety

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

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

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

The District noted that a Utility Supervisor reviewed buildings in the District for earthquake. Most of the buildings were built in the late 1990s and early 2000s. These buildings were built to earthquake codes of that time, which are not greatly different from those today.

Liquefaction Potential

Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other. When liquefaction occurs, the strength of the soil decreases and the ability of a soil deposit to support foundations for buildings and bridges is reduced. Liquefied soil also exerts higher pressure on retaining walls, which can cause them to tilt or slide. This movement can cause settlement of the retained soil and destruction of structures on the ground surface. Increased water pressure can also trigger landslides and cause the collapse of dams. Because liquefaction only occurs in saturated soil, its effects are most commonly observed in low-lying areas near bodies of water such as rivers, lakes, bays, and oceans. This would include areas in the Putah Creek floodplain, as well as areas surrounding Hidden Valley Lake.

Liquefaction during major earthquakes has caused severe damage to structures on level ground as a result of settling, titling, or floating. Such damage occurred in San Francisco on bay-filled areas during the 1989 Loma Prieta earthquake, even though the epicenter was several miles away. If liquefaction occurs in or under a sloping soil mass, the entire mass may flow toward a lower elevation. Also of particular concern in terms of developed and newly developing areas are fill areas that have been poorly compacted.

Landslide/Debris Flows

Landslides can occur as a result of horizontal seismic inertia induced in the slopes by the ground shaking. The most common earthquake-induced landslides include shallow, disrupted landslides such as rock falls, rockslides, and soil slides. Debris flows are created when surface soil on steep slopes becomes totally saturated with water. Once the soil liquefies, it loses the ability to hold together and can flow downhill at very high speeds, taking vegetation and/or structures with it. Slide risks increase after an earthquake during a wet winter.

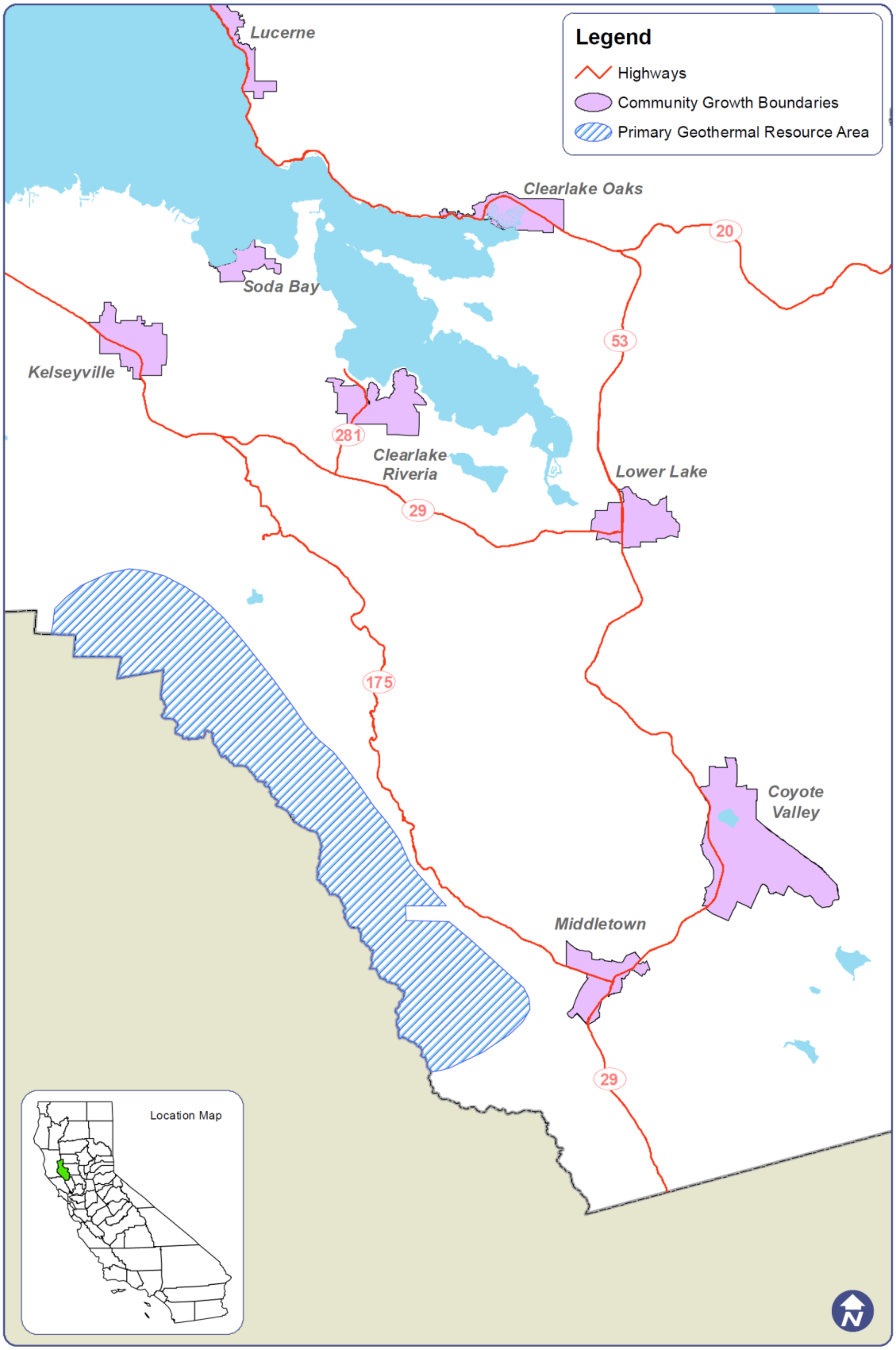
Settlement

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

Geysers Geothermal Steam Field

The Geysers Geothermal Field is located 5 to 10 miles west of the District near the Middletown area in both Lake and Sonoma Counties (see Figure 4-66). Since the early 1980's, geothermal power development has occurred in this area as a major industry. Seismic studies of the area have indicated there is a potential increase in micro seismic of 4.0 or less on the Richter scale with a relationship between micro seismic activity and geothermal production in the Geysers. A 4.0 or less earthquake does not result in dangerous ground shaking.

Figure 4-66 Geothermal Resource Areas near HVLCSD



Source: 2008 Lake County General Plan

Fire Following Earthquake

Fire ignitions and spread following a major earthquake can further compound the potentially catastrophic impacts of a large earthquake event. Fire following earthquake is a major hazard in earthquake-prone areas which are densely developed and have high inventories of wood frame buildings. The capability of fire departments to combat fires following an earthquake is impacted by the regional nature of an earthquake, damage to transportation and water supply systems, and the potential failure of telecommunications. A local fire department may suffer impacts to its personnel, buildings, equipment, and communications systems. Moreover, fewer resources are immediately available as mutual aid – due to the commitment of nearby fire departments responding to the earthquake withing their own jurisdictions. Transportation system damage may adversely impact the mobilization of off-duty personnel and fire and rescue mutual aid resources from unaffected areas. Maneuvering fire crews within the affected areas of the earthquake may be impeded by debris or damage to roads and bridges. Additionally, the water supply system which ordinarily supports firefighting operations is likely to be impacted.

Fire following earthquake is an issue that could impact any California community that experiences an earthquake – both urban and rural. According to the FM Global Insurance company, "Fires after earthquakes commonly initiate from electrical or fuel related sources because their use is widespread. In the US, natural gas is a factor 15 to 50 percent of the time, and electrical ignitions account for 40 percent or more of post-earthquake wildfires. Ignitable liquid spills, chemical reactions, and the contact of combustibles with heat sources have also initiated or contributed to many fires after earthquakes."

Location and Extent

According to the California Geological Survey (CGS) and US Geological Survey (USGS), no faults directly underlie the District. There are faults that could indirectly affect the District. These are discussed below.

Faults

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

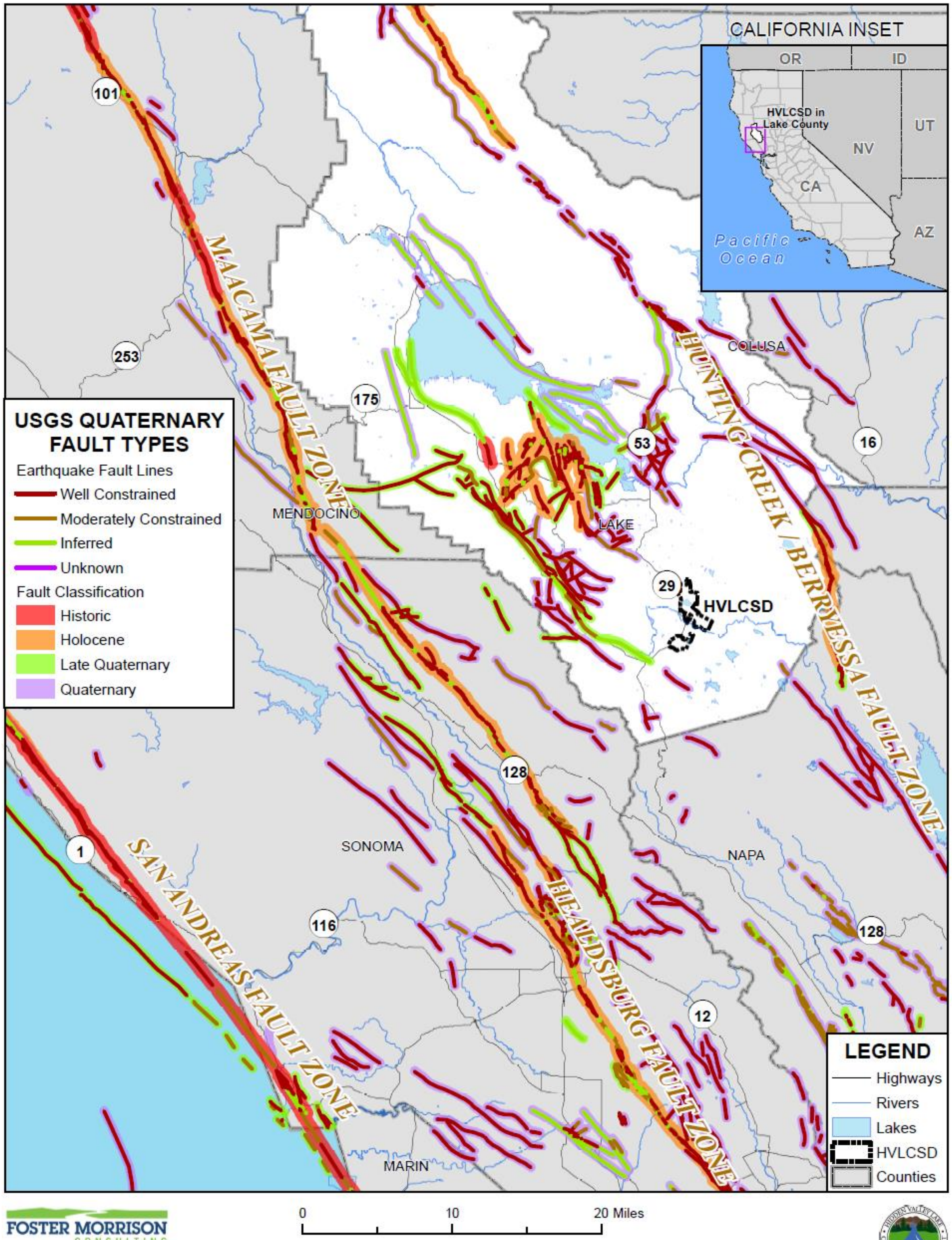
Two types of fault movement represent possible hazards to structures in the immediate vicinity of the fault: fault creep and sudden fault displacement. Fault creep, a slow movement of one side of a fault relative to the other, can cause cracking and buckling of sidewalks and foundations even without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

The geology of the Northern California Coastal Region is distinct from the rest of California. Geologists and seismologists find the region of special interest because of the San Andreas Fault, which is within 30 miles to the west, the Hayward fault, and Rogers fault extension into the Maacamas fault which is within 10 miles to the west of Lake County. These are the major faults in the area and are described in more detail below:

- The San Andreas Fault traverses the entire length of the State of California. The fault zone is located approximately 30 miles west of the Lake County line traveling the coastline of Mendocino County. The ground shaking of an 8.3 magnitude earthquake on the northern section of the fault would result in serious damage and loss of life to Northern California including Lake County. The maximum credible earthquake (MCE) capable of being generated along this system, which was responsible for the October 17, 1989 Loma Prieta earthquake (Richter magnitude 7.1), is 8.3 on the Richter scale.
- The Hunting Creek-Berryessa fault system is a significant dextral (right-lateral) strike-slip fault zone located in the northern Coast Ranges of California, west of Lake Berryessa. It is part of the larger San Andreas fault system and extends from the vicinity of Wilson Valley to the Cedar Roughs area.
- The Maacama Fault traverses the Lake and Mendocino County lines in the eastern mountains less than 20 miles from the Clear Lake basin. The Maacama Fault is the northern segment of the Healdsburg/Rodgers Creek Fault Zone in Sonoma County. The Healdsburg/Rodgers Creek Fault line is the northern segment of the Hayward Fault Zone traversing the eastern portion of the San Francisco Bay Area. Trenching studies across the fault by USGS have resulted in an estimated 250-year recurrence interval for magnitude 7.0 earthquakes. The last major earthquake along the Healdsburg/Rogers Fault was in 1808, and the USGS considers this fault a prime potential for future large earthquakes. The Hayward Fault Zone has a 25 percent chance of producing an earthquake of magnitude 7.0 or greater within the next 30 years, according to the California Division of Mines and Geology.

Throughout Lake County there are several small active faults, with most centered in the Cobb Mountain area (10 miles west of the District). Minor earthquakes occur almost daily in the south county geothermal fields near the geysers influenced region (more information below). A major threat to the entire a Northern California region is the Mendocino Triple Junction in Humboldt County, where three plates, the Gorda, the North American, and the Pacific are in contact. The region is part of the Cascadia Subduction Zone ("CSZ") and vulnerable to an earthquake up to the 9.0 magnitude range. The CSZ runs from the Cape Mendocino area of Humboldt County to north of Vancouver Island off British Columbia, Canada. Faults in and near the District can be seen on Figure 4-67.

Figure 4-67 HVLCSD – Active Faults near the District



Data Source: CGS Alquist Priolo Earthquake Fault Zones 2015, USGS Quaternary Faults (July 17, 2014), HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/10/2024.

The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake's magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales. One of the first was the Richter Scale, developed in 1932 by the late Dr. Charles F. Richter of the California Institute of Technology. The Richter Magnitude Scale is used to quantify the magnitude or strength of the seismic energy released by an earthquake. Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface (see Table 4-52). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Table 4-52 Modified Mercalli Intensity (MMI) Scale

MMI	Felt Intensity
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II	Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
III	Felt noticeably indoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors; by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, and great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

Source: Multi-Hazard Identification and Risk Assessment, FEMA 1997

Past Occurrences

Disaster Declaration History

There has been no state or federal disaster declarations from earthquake, as shown in Table 4-4 above.

NCDC Events

Earthquake events are not tracked by the NCDC database.

USGS Events

The USGS National Earthquake Information Center database contains data on earthquakes in the District Service Area. Table 4-53 shows the approximate distances earthquakes can be felt away from the epicenter. According to the table, a magnitude 5.0 earthquake could be felt up to 90 miles away. The USGS database was searched for magnitude 5.0 or greater on the Richter Scale within 90 miles of HVLCSD. These results are detailed in Table 4-54.

Table 4-53 Approximate Relationships between Earthquake Magnitude and Intensity

Richter Scale Magnitude	Maximum Expected Intensity (MMI)*	Distance Felt (miles)
2.0 - 2.9	I – II	0
3.0 - 3.9	II – III	10
4.0 - 4.9	IV – V	50
5.0 - 5.9	VI – VII	90
6.0 - 6.9	VII – VIII	135
7.0 - 7.9	IX – X	240
8.0 - 8.9	XI – XII	365

*Modified Mercalli Intensity Scale.

Source: United State Geologic Survey, Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977.

*Table 4-54 Magnitude 5.0 Earthquakes or greater within 90 Miles of HVLCSD**

Date	Richter Magnitude	Location
12/14/2016	5.01	8km NW of The Geysers, California
8/10/2016	5.09	20km NNE of Upper Lake, California
8/24/2014	6.02	South Napa
1/27/1980	5.4	San Francisco Bay area, California
1/24/1980	5.1	San Francisco Bay area, California
1/24/1980	5.8	San Francisco Bay area, California
8/2/1975	5.2	Northern California
8/2/1975	5.1	Northern California
8/1/1975	5.7	0km WSW of Palermo, California
10/2/1969	5.1	Northern California
4/29/1968	5	Northern California
6/6/1962	5.2	Northern California
3/22/1957	5.3	San Francisco Bay area, California
10/24/1955	5.4	San Francisco Bay area, California
4/18/1906	7.9	The 1906 San Francisco Earthquake
5/19/1902	5.4	Northern California
6/2/1899	5.4	San Francisco Bay area, California
4/15/1898	6.9	offshore Northern California

Date	Richter Magnitude	Location
3/31/1898	6.2	San Francisco Bay area, California
8/9/1893.	5.1	Northern California
4/30/1892	5.5	Northern California
4/21/1892	6.2	Northern California
4/19/1892	6.4	Northern California
10/12/1891	5.5	Northern California
7/31/1889	5.2	San Francisco Bay area, California
5/19/1889	6	San Francisco Bay area, California
1/7/1881	5	Northern California
4/2/1870	5.8	Near Berkeley, California
10/8/1869	5.6	Near Ukiah, California
10/21/1868	6.8	The 1868 Hayward Fault Earthquake, California
5/21/1864	5.8	Alameda County, California
7/4/1861	5.8	San Francisco Bay area, California
2/15/1856	5.5	San Mateo County, California
1/2/1856	5.3	San Mateo County, California
5/15/1851	5	San Francisco Bay area, California

Source: USGS

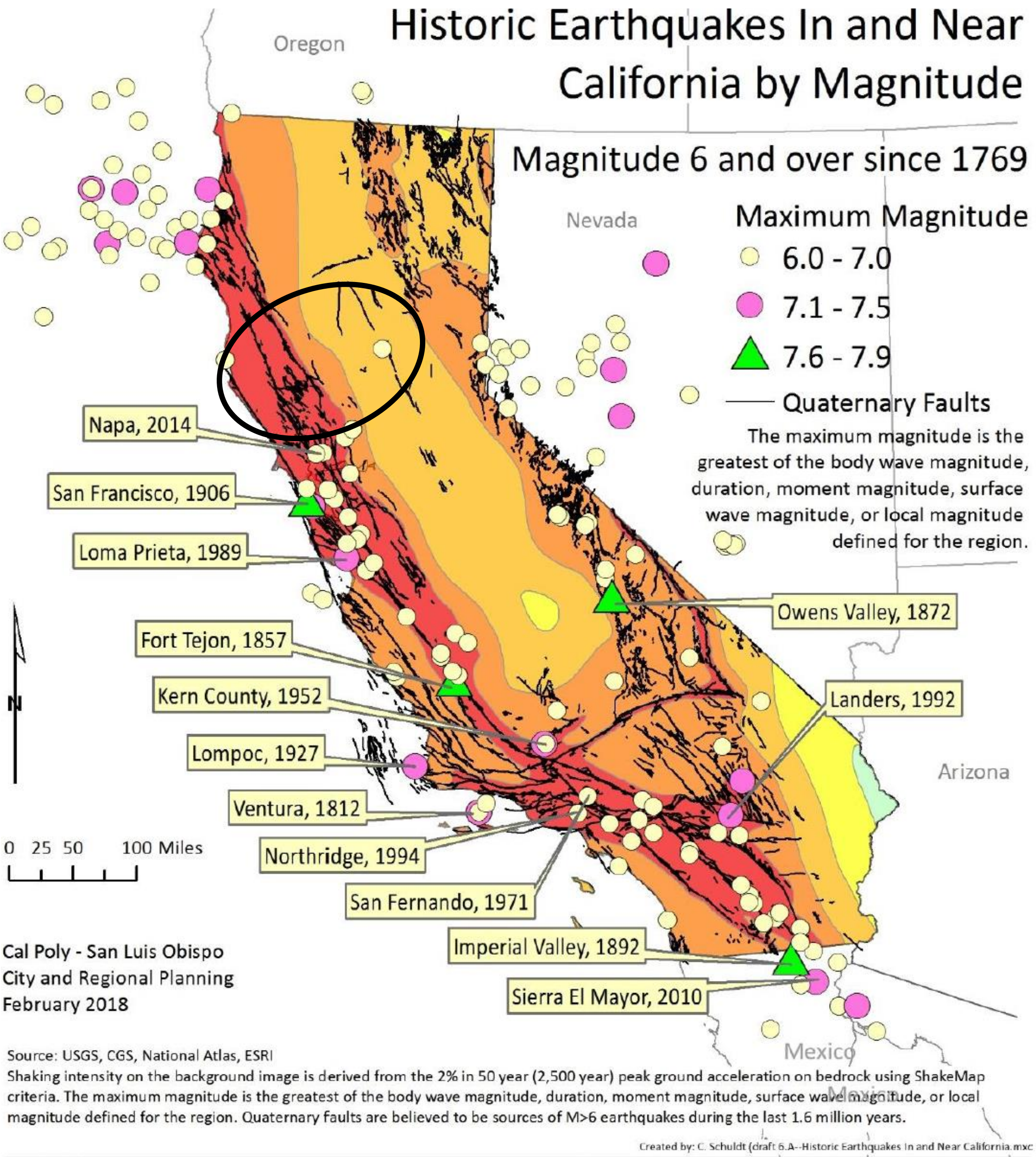
*Search dates 1950 – July 1, 2024

Figure 4-68 shows major historical earthquakes in California from 1769 to 2017. Since 2017, California has experienced four additional 6.0 or greater earthquakes:

- 2022 - 6.4 Ferndal
- 2021 - 6.0 Antelope Valley
- 2019 - 6.4 and 7.1 Ridgecrest

None of these earthquakes (over 6.0) since 2017 have affected the District.

Figure 4-68 Historic Earthquakes in California 1769 to 2017



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

Source: 2023 State of California Multi-Hazard Mitigation Plan

Hazard Mitigation Planning Committee Events

Seismic activity within the past 200 years has shown absence of any major damaging earthquake occurring along the identified fault lines within Lake County. The HMPC has identified several earthquakes that were felt by area residents and/or caused damaging shaking in the District and Lake County by faults outside the District. Details on some of these events follow.

- There was an earthquake in 1808 along the Healdsburg/Rogers fault. There is little known about the damages in the Lake County area from this event.
- On April 18, 1906, following the San Francisco 8.0 + earthquake on the San Andreas, widespread damage and loss of life affected several Northern California counties including the District and Lake County. This earthquake had the largest damage of all earthquakes experienced in nearby Lakeport. The 1906 San Francisco earthquake damaged buildings in nearby Lakeport including the Giselman and Lakeview hotels. At the Giselman, the quake threw 11-year-old Inez Green out of bed, and in later years she remembered the bricks falling past her bedroom window. Old photos show men cleaning up the bricks that fell from the Lakeview.
- The 1989 Loma Prieta earthquake had minor impacts in Lake County. The HMPC noted no damages in the District.
- As previously mentioned, there are daily small earthquakes in the Geysers geothermal field west of Middletown. Residents can feel these when the magnitude reaches 3.0 to 3.5, but no known damages are associated with these quakes.
- There were events in 2014 and 2016, but the HMPC noted no known structural damages in the District.

No past events of earthquake since the 2020 LHMP could be recalled. The District did not that the Geysers nearby can cause minor earth shaking.

Likelihood of Future Occurrence

Occasional (major earthquake); Highly Likely (minor earthquake)—Seismic activity within the past two hundred years has shown absence of any major or damaging earthquake occurring on identified fault lines within Lake County that could affect the HVLCSD. However, the possibility of an earthquake is an ever-present phenomenon facing the District. The combination of plate tectonics and associated California coastal mountain range geology essentially guarantees earthquake as a result of the periodic release of tectonic stresses. Lake County's mountainous terrain lies in the center of the North American and Pacific tectonic plate activity. There have been earthquakes as a result of this activity in the historic past, and there will continue to be earthquakes in the future of the California north coastal mountain region. It is likely that the District will be subject to minor earthquakes in the future, especially from the Geysers Field. Major earthquakes are considered to be less likely in the District.

It is likely that climate change will not change the chance of future occurrence as well as future impacts. More information on climate change and earthquake can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Mapping of Future Occurrences

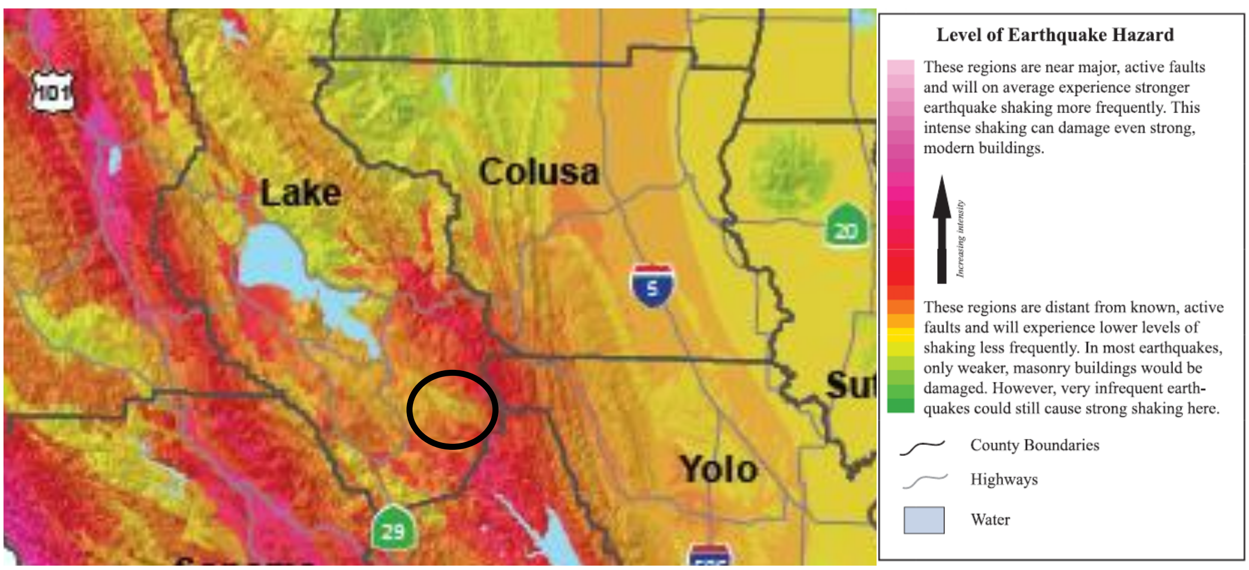
Mapping of future occurrences is presented in the following sections:

- CGS Analysis
- UCERF Analysis

CGS Analysis

Maps indicating the maximum expectable intensity of ground shaking for the District are available through several sources. Figure 4-69, prepared by the California Division of Mines and Geology, shows the expected relative intensity of ground shaking and damage in California from anticipated future earthquakes. The shaking potential is calculated as the level of ground motion that has a 2% chance of being exceeded in 50 years, which is the same as the level of ground-shaking with about a 2,500-year average repeat time. As shown, the District is in a moderate shake potential area. Although the greatest hazard is in areas of highest intensity as shown on the map, no region is immune from potential earthquake damage.

Figure 4-69 Maximum Expectable Earthquake Intensity – 2% Chance in 50 Years

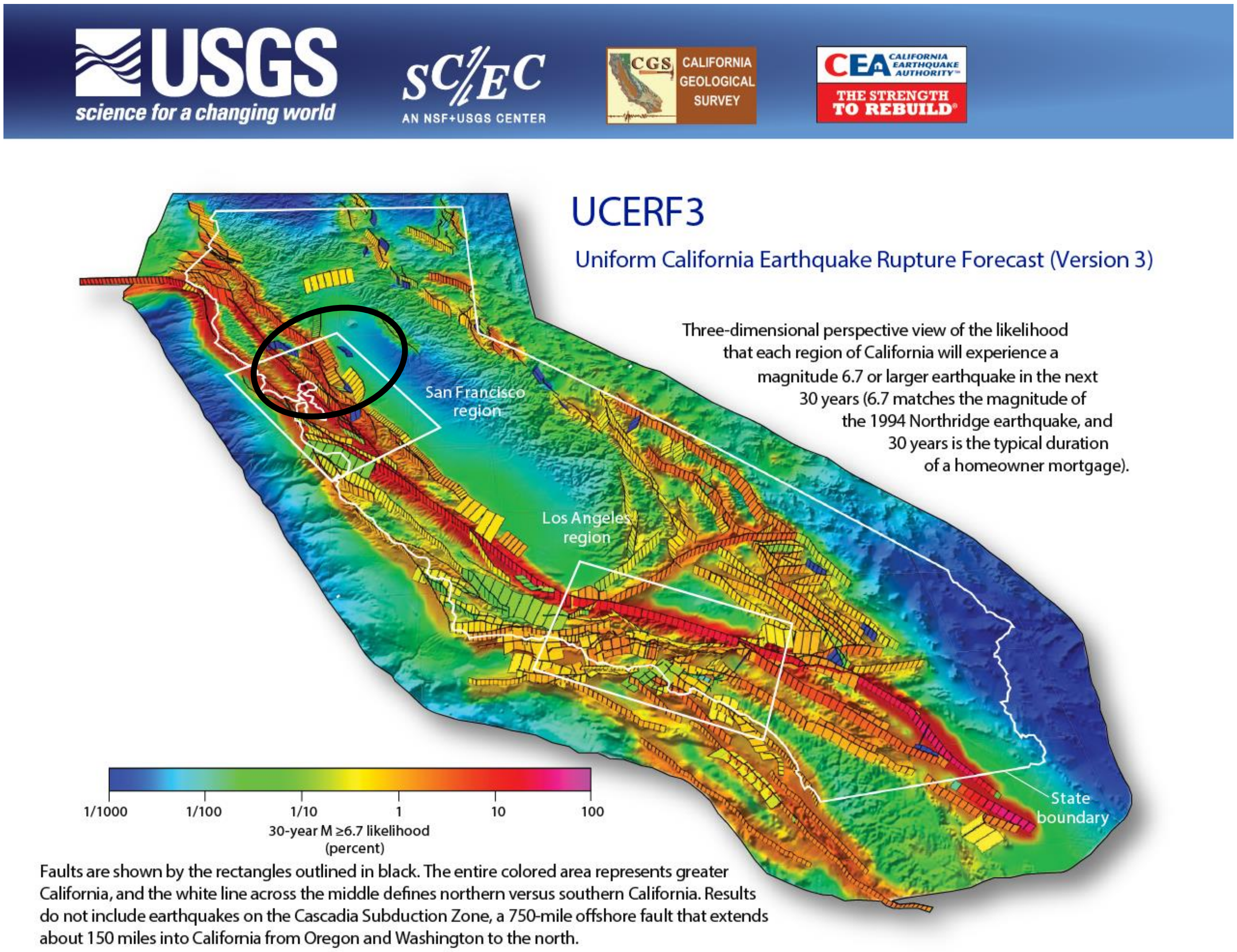


Source: California Division of Mines and Geology

UCERF Analysis

In 2014, the USGS and the California Geological Survey (CGS) released the time-dependent version of the Uniform California Earthquake Rupture Forecast (UCERF III) model. The UCERF III results have helped to reduce the uncertainty in estimated 30-year probabilities of strong ground motions in California. The UCERF map is shown in Figure 4-70 and indicates that Lake County has a moderate risk of earthquake occurrence.

Figure 4-70 Probability of Earthquake Magnitudes Occurring in 30 Year Time Frame



Source: United States Geological Survey Open File Report 2015-3009

Climate Change and Earthquake

Climate changes is unlikely to increase earthquake frequency or strength.

Vulnerability Assessment

Vulnerability—Extremely High

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while more rural areas (such as the areas around HVLCSD) are less vulnerable. The primary impacts of concern are life safety and property damage. Several faults are near the HVLCSD, and seismic hazard mapping indicates that the District has moderate seismic hazard potential. It is likely that the District will be subject to some moderate to severe seismic shaking. Depending on the location and magnitude of an earthquake event, some degree of structural damage due to stronger seismic shaking could be expected.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to the District. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect the HVLCSD. The sections below include assets at risk, impacts, and how future development can be affected by this hazard.

Local Concerns

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

Frequent, small earthquakes over time pose a problem to the underground infrastructure of water, wastewater, and networking facilities of HVLCSD. The Geysers Geothermal Steam Field in the adjacent community of Middletown has produced micro seismic activity since the 1980s. Water distribution system leaks at HVLCSD have increased in recent years, which in turn creates wasteful, reactionary activity. Stormwater flows into the wastewater collection system during heavy storms which could threaten public safety by exposing diluted wastewater to the surface in the event of a sanitary sewer overflow. SCADA could also be impacted by an earthquake event, causing the system to fail. Fortifying the integrity of these underground infrastructure systems are the foundation of the inflow and infiltration assessment and reduction plan, the water distribution correlator technology, and water mainline replacements.

A major earthquake would be expected to cause considerable damage to District facilities and water distribution and sewer systems. A major earthquake would be expected to cause considerable damage to transportation systems in and around the District as well. Roads, bridges and highway overpasses all cross various earthquake faults as well as areas susceptible to ground failure. HVLCSD assets at risk include assets on concrete structures – equalizer basin, sludge beds, chlorination basis, filtration system, aeration system, water storage tanks (4 out of 9 are redwood tanks). Other District assets of concern include earthen ponds, wells, submersible pumps, pipes, and most infrastructure just below or on the surface.

The HMPC noted that most District buildings were built in either 1994 or 2003, in accordance with codes appropriate for the time period. One older building, located on Eagle Rock Rd, was built in 1968, and would be the only building with structural vulnerability.

The HVLCSDs water supply consists of three wells, localized in one area south of the District's service area. Should a catastrophic event, such as an earthquake occur that would damage the wells, two water distribution mains, water treatment plant, or the booster pump station, the District would be unable to provide water supply and fire protection to the entire community until such time as the damaged infrastructure is repaired. Depending on the extent of damages, repairs could take weeks or months.

The District maintains a flood control detention basin with a diversion structure, equipped with a 90" check valve to regulate discharge from this channel. The operation of this valve is problematic and at times allowed backup into the flood control channel when the valve is plugged with debris and flows in Putah Creek are at a higher head than the channel. Should a catastrophic event such as an earthquake occur, that would cause this valve to remain open for an extended period of time when the water surface elevation in Putah Creek is higher than the water surface elevation in the flood control channel and nearby properties, the District is at risk of being unable to control storm flows out of the flood control channel and unable to stop flooding along the southerly boundary of the District's service area.

Assets at Risk

Assets at risk from earthquake include people and populations; structures; critical facilities and infrastructure and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. A Hazus analysis for earthquake shaking follows that provides more information on vulnerable assets.

People and Populations

All people and populations (both District staff and those residing in the District Service Area) are at risk from earthquake shaking and associated hazards. Those at heightened risk include:

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

The greatest risk to people and populations from earthquake is death and injury. More information on people and populations at risk to earthquake events can be seen in the Hazus scenarios described in the Hazus Analysis section below.

Structures (including Critical Facilities and Infrastructure)

All structures in the District are vulnerable to earthquakes, depending on the severity and location of the shake. Unreinforced masonry and soft story buildings are at a much greater risk to earthquakes. More information on structures at risk can be seen in the below earthquake liquefaction analysis and the Hazus scenarios.

Community Lifelines

Community lifelines at risk to earthquake include:

- **Safety and Security** – Many personnel from the Planning Area would be involved in response and recovery efforts. This includes police, fire, EMS, public works, and other personnel. Due to the potential for widespread and major damages both District and Countywide, these resources can be stretched and quickly overwhelmed.
- **Food, Hydration, and Shelter** – As homes are damaged, shelter needs would significantly increase. Temporary housing would be to be established. Water supplies could be offline for an extended period. Residents, visitors and others caught in a large event would need to find sources of food and water until the Planning Area recovers.

- **Health and Medical** – Substantial numbers of injuries and deaths can occur. This causes EMS calls and ER visits to spike. Portable morgues and refrigeration units may need to be brought in. Transporting patients to medical facilities may be difficult. Depending on the extent of injuries and deaths the capacity of medical facilities could be strained and eventually overwhelmed.
- **Energy** – The power grid may be damaged from earthquake. Restoring these systems may take longer during a widespread event.
- **Communications** – Communications systems may be damaged during shaking events. Once the shaking ceases, responder communications need to be back online quickly to coordinate response efforts in the District. Messaging boards and alerts need to be then put into place to ensure public safety and order. Calls to and from family and friends during a hazard event can further overwhelm communication systems such as cell towers and other infrastructure. Demand may exceed the capacity of these systems to remain operational during response efforts.
- **Transportation** – Major damage can occur to roads and bridges in or around the District. Damage can also occur to rail lines and airports in and near the District. Roads may be closed due to damage, or to debris on the roads from earthquake events. These closures could be in place for an extended period while debris clearing efforts are undertaken to allow repairs to be made.
- **Hazardous Material** – Hazardous materials facilities can be compromised during times of earthquake events causing releases of contaminants into the environment.. This can affect not only residents, but those who are charged with responding to or resolving the spill/rupture.
- **Water Systems** – Damages to underground pipes (like those in the HVLCSD) may occur. These take time to locate and fix in normal circumstances. During periods of earthquake, this becomes even more difficult. Water and wastewater systems and their respective piping can be damaged and systems may become inoperational for extended periods of time.

All community lifelines in the HVLCSD are vulnerable to earthquakes, depending on the severity and location of the event. A major earthquake event could cause these lifelines to be overwhelmed. Some of these would be able to be restored to service quickly, while others would be overwhelmed, at least temporarily and would take more time having a prolonged impact on the people and structures within the District. More information on community lifelines at risk can be seen in the Hazus scenarios below.

Natural, Historic, and Cultural Resources

The 2023 State Hazard Mitigation Plan noted that environmental problems from earthquakes can be numerous. Earthquakes can significantly damage surrounding habitats. It is also possible for earthquakes to reroute streams, which can change the water quality, possibly damaging habitat and feeding areas. Streams fed by groundwater and/or springs may dry up because of changes in underlying geology. Another threat to the environment from earthquakes is the potential release of hazardous materials. Historical and cultural resources are at risk, often due to their age and construction types. The Hazus scenarios below are relatively silent on the vulnerability to natural, historic, and cultural resources, but impacts to these resources could be long lasting.

Economic Assets and Community Activities of Value

As previously noted, the largest economic asset in the District Service Area is the HVLCSD. All economic assets in the District are vulnerable to earthquakes, depending on the severity and location of the shake and associated cascading hazards and impacts. More information on economic assets at risk can be seen in the

Hazus scenarios below. All community activities of value would be affected by an earthquake if they were underway during an earthquake event and may be postponed or cancelled until the District and larger Lake County has sufficiently recovered.

Hazus Analysis

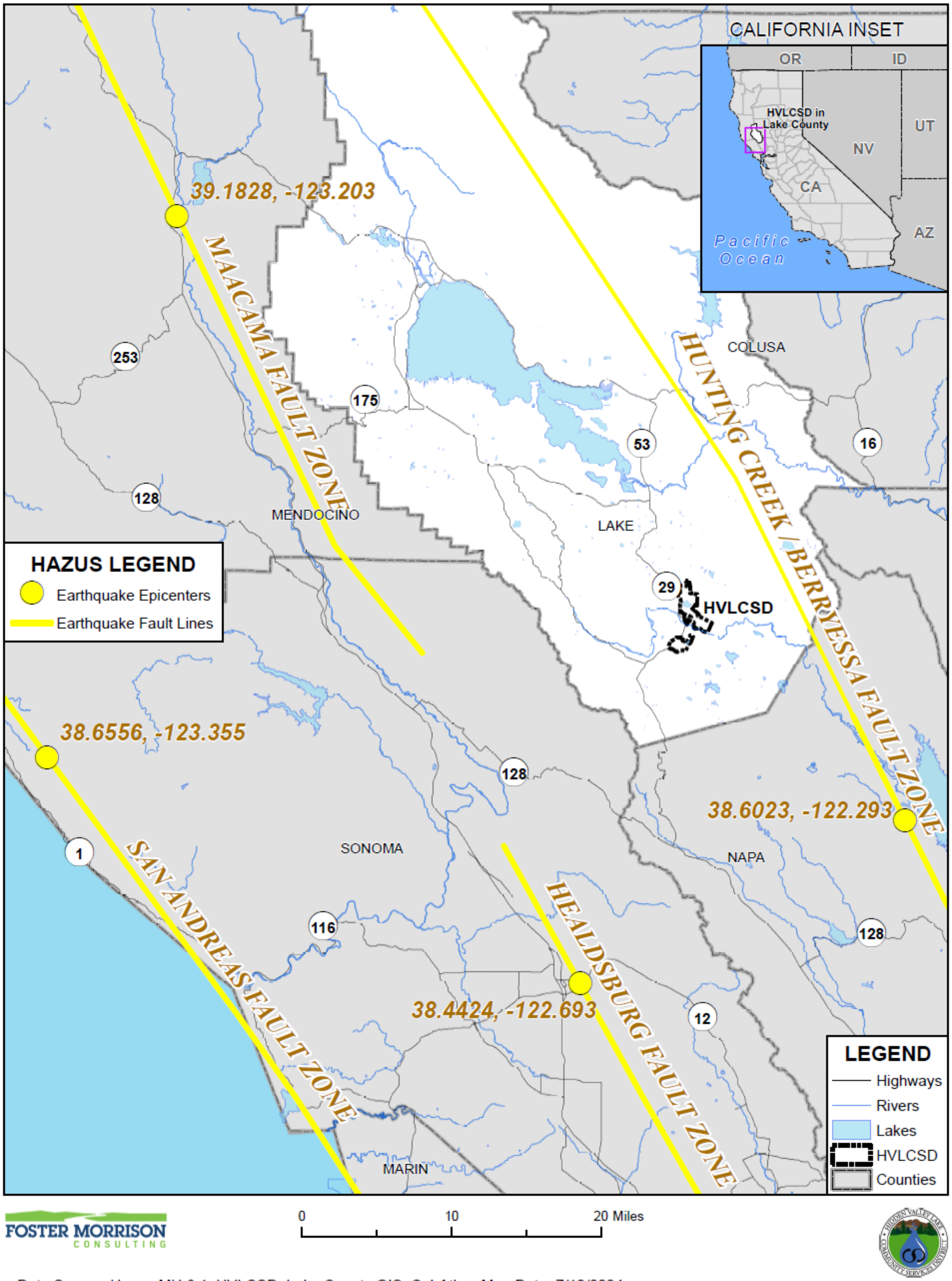
Hazus is a regional earthquake loss estimation model that was developed by FEMA and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates can be used by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

Specifically, the probable magnitude used for HVLCSD utilized four scenarios based on data from the District, the Lake County General Plan, and the USGS Hazus catalog.

- 7.19 Healdsburg Fault Earthquake Fault Scenario
- 6.69 Hunting Creek Berryessa Earthquake Fault Scenario
- 7.55 Maacama Fault Earthquake Fault Scenario
- 8.5 San Andreas Earthquake Fault Scenario

These faults and the epicenters analyzed are shown on Figure 4-71 . Level 1 analyses were run, meaning that only the default data was used and not supplemented with local building inventory or hazard data. There are certain data limitations when using the default data, so the results should be interpreted accordingly; this is a planning level analysis. The methodology for running the deterministic earthquake scenario used seismic hazard contour maps developed by the U.S. Geological Survey (USGS) for the 2002 update of the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of potential ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively. The 2,500-year return period analyzes ground shaking estimates with a 2 percent probability of being exceeded in 50 years, from the various seismic sources in the area. The International Building Code uses this level of ground shaking for building design in seismic areas and is more of a worst-case scenario.

Figure 4-71 HVLCSD – Regional Faults and Earthquake Epicenters



Data Source: Hazus-MH 6.1, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/10/2024.

7.19 Healdsburg Fault Earthquake Fault Scenario

The results of the deterministic scenario for the Healdsburg Fault are captured in Table 4-55. Maps showing total losses for the census tracts that contain the HVLCSD are shown in Figure 4-72.

Table 4-55 HVLCSD – Healdsburg Fault Hazus Earthquake Deterministic Scenario Results for 7.19 Event

Type of Impact	Impacts to District from 7.19 Deterministic Earthquake	
Total Buildings Damaged (based on 6,000 buildings)	Slight: 1,030 Moderate: 270 Extensive: 32 Complete: 1	
Building and Income Related Losses	$35,200,000	
Total Economic Losses (Includes building, income and lifeline losses)	$35,630,000	
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 3 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0	
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 2 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0	
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 2 Requiring hospitalization: 0 Life threatening:0 Fatalities: 0	
Damage to Transportation Systems	0 facilities with at least moderate damage	
Damage to Essential Facilities	0 facilities with at least moderate damage.	
Damage to Utility Systems	0 Facilities with at least moderate damage. 0 facilities with complete damage. 12 potable water line breaks, 6 wastewater line breaks, and 2 natural gas line breaks (HVLSCD noted that Hazus assumes a certain portion of natural gas lines in the vicinity. In the District, they do not exist, as liquified propane is the main fuel source).	
Households without Power/Water Service (Based on 4,303 total households)	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Water loss, Day 3:0 Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	5 displaced households	
Shelter Requirements	2 persons	
Debris Generation	4,000 tons	

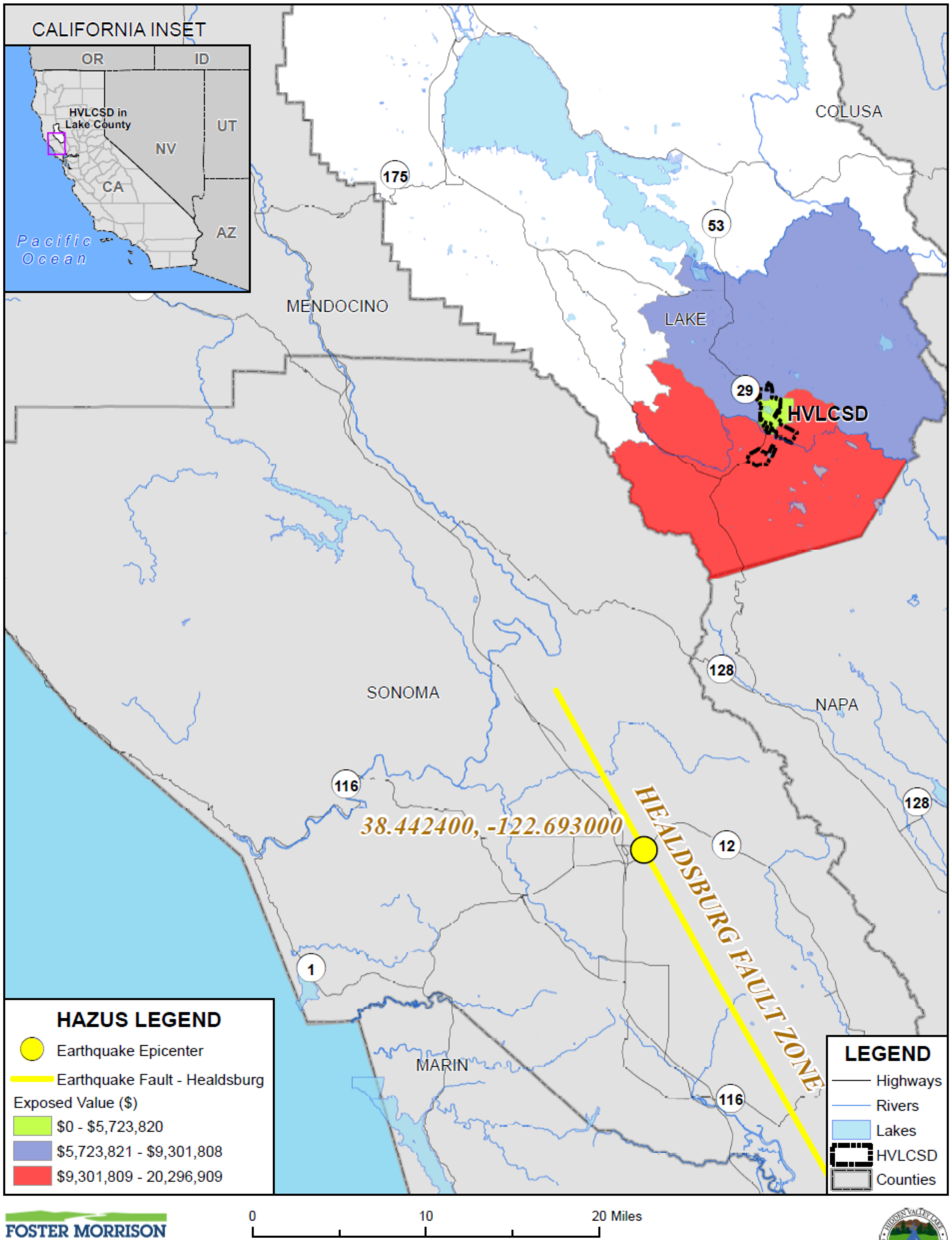
Source: Hazus 6.1

Loss Estimates Highlights

Hazus estimates that about 303 buildings will be at least moderately damaged. This is over 5.00 percent of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair.

The total building-related losses were 35.20 (millions of dollars); 11 percent of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 57 percent of the total loss.

Figure 4-72 HVLCSD – Healdsburg Scenario Exposed Values



Data Source: Hazus-MH 6.1, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/10/2024.

6.69 Hunting Creek/Berryessa Fault Earthquake Fault Scenario

The results of the Hunting Creek/Berryessa Fault deterministic scenario are captured in Table 4-56. Maps showing total losses for the census tracts that contain the HVLCSD are shown in Figure 4-73.

Table 4-56 HVLCSD – Hunting Creek/Berryessa Fault Hazus Earthquake Deterministic Scenario Results for 6.69 Event

<table>
<tr><th>Type of Impact</th><th colspan="2">Impacts to District from 6.69 Deterministic Earthquake</th></tr>
<tr><td>Total Buildings Damaged
(based on 6,000 buildings)</td><td colspan="2">Slight: 1,004
Moderate: 251
Extensive: 28
Complete: 1</td></tr>
<tr><td>Building and Income Related Losses</td><td colspan="2">$31,590,000</td></tr>
<tr><td>Total Economic Losses
(Includes building, income and lifeline losses)</td><td colspan="2">$31,830,000</td></tr>
<tr><td>Casualties
(Based on 2 a.m. time of occurrence)</td><td colspan="2">Without requiring hospitalization: 2
Requiring hospitalization: 0
Life threatening: 0
Fatalities: 0</td></tr>
<tr><td>Casualties
(Based on 2 p.m. time of occurrence)</td><td colspan="2">Without requiring hospitalization: 2
Requiring hospitalization: 0
Life threatening: 0
Fatalities: 0</td></tr>
<tr><td>Casualties
(Based on 5 p.m. time of occurrence)</td><td colspan="2">Without requiring hospitalization: 1
Requiring hospitalization: 0
Life threatening:0
Fatalities: 0</td></tr>
<tr><td>Damage to Transportation Systems</td><td colspan="2">0 facilities with at least moderate damage</td></tr>
<tr><td>Damage to Essential Facilities</td><td colspan="2">0 facilities with at least moderate damage.</td></tr>
<tr><td>Damage to Utility Systems</td><td colspan="2">0 Facilities with at least moderate damage.
8 potable water line breaks, 4 wastewater line breaks, and 1 natural gas line break (HVLSCD noted that Hazus assumes a certain portion of natural gas lines in the vicinity. In the District, they do not exist, as liquified propane is the main fuel source).</td></tr>
<tr><td>Households without Power/Water Service
(Based on 4,303 total households)</td><td>Power loss, Day 1: 0
Power loss, Day 3: 0
Power loss, Day 7: 0
Power loss, Day 30: 0
Power loss, Day 90: 0</td><td>Water loss, Day 1: 0
Water loss, Day 3:0
Water loss, Day 7: 0
Water loss, Day 30: 0
Water loss, Day 90: 0</td></tr>
<tr><td>Displaced Households</td><td colspan="2">3 displaced households</td></tr>
<tr><td>Shelter Requirements</td><td colspan="2">1 person</td></tr>
<tr><td>Debris Generation</td><td colspan="2">3,000 tons</td></tr>
</table>

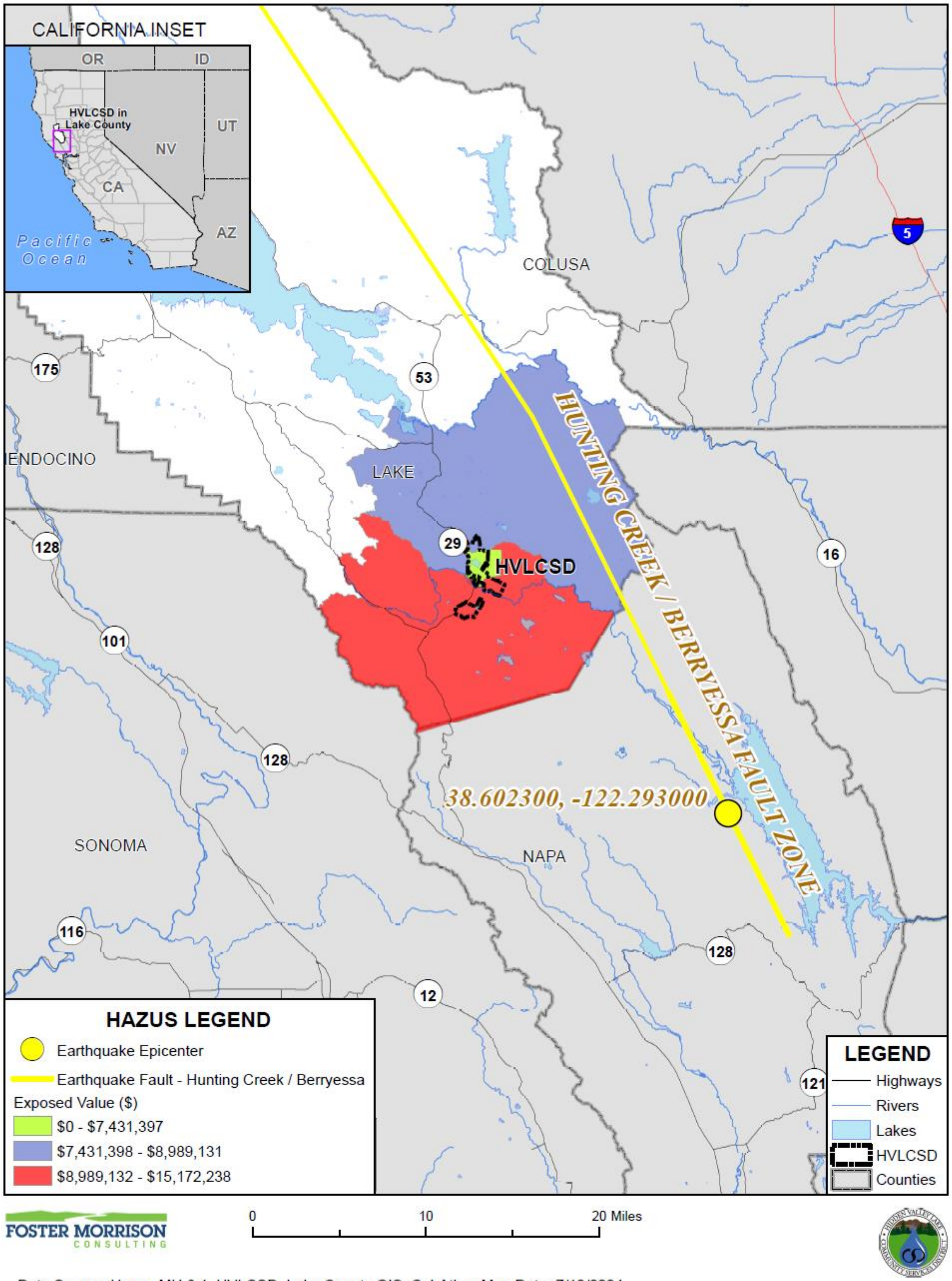
Hazus 6.1

Loss Estimates Highlights

Hazus estimates that about 279 buildings will be at least moderately damaged. This is over 4.00 percent of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair.

The total building-related losses were 31.59 (millions of dollars); 11 percent of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 59 percent of the total loss.

Figure 4-73 HVLCSD – Hunting Creek/Berryessa Scenario Exposed Values



Data Source: Hazus-MH 6.1, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/10/2024.

6.55 Maacama Fault Earthquake Fault Scenario

The results of the Maacama Fault deterministic scenario are captured in Table 4-57. Maps showing total losses for the census tracts that contain the HVLCSD are shown in Figure 4-74.

Table 4-57 HVLCSD – Maacama Fault Hazus Earthquake Deterministic Scenario Results for 6.55 Event

<table>
<tr><th>Type of Impact</th><th colspan="2">Impacts to District from 6.55 Deterministic Earthquake</th></tr>
<tr><td>Total Buildings Damaged
(based on 6,000 buildings)</td><td colspan="2">Slight: 1,339
Moderate: 522
Extensive: 119
Complete: 7</td></tr>
<tr><td>Building and Income Related Losses</td><td colspan="2">$57,660,000</td></tr>
<tr><td>Total Economic Losses
(Includes building, income and lifeline losses)</td><td colspan="2">$58,470,000</td></tr>
<tr><td>Casualties
(Based on 2 a.m. time of occurrence)</td><td colspan="2">Without requiring hospitalization: 6
Requiring hospitalization: 1
Life threatening: 0
Fatalities: 0</td></tr>
<tr><td>Casualties
(Based on 2 p.m. time of occurrence)</td><td colspan="2">Without requiring hospitalization: 5
Requiring hospitalization: 1
Life threatening: 0
Fatalities: 0</td></tr>
<tr><td>Casualties
(Based on 5 p.m. time of occurrence)</td><td colspan="2">Without requiring hospitalization: 4
Requiring hospitalization: 1
Life threatening:0
Fatalities: 0</td></tr>
<tr><td>Damage to Transportation Systems</td><td colspan="2">0 facilities with at least moderate damage</td></tr>
<tr><td>Damage to Essential Facilities</td><td colspan="2">0 facilities with at least moderate damage.</td></tr>
<tr><td>Damage to Utility Systems</td><td colspan="2">0 Facilities with at least moderate damage.
21 potable water line breaks, 11 wastewater line breaks, and 4 natural gas line breaks (HVLSCD noted that Hazus assumes a certain portion of natural gas lines in the vicinity. In the District, they do not exist, as liquified propane is the main fuel source).</td></tr>
<tr><td>Households without Power/Water Service
(Based on 4,303 total households)</td><td>Power loss, Day 1: 0
Power loss, Day 3: 0
Power loss, Day 7: 0
Power loss, Day 30: 0
Power loss, Day 90: 0</td><td>Water loss, Day 1: 0
Water loss, Day 3:0
Water loss, Day 7: 0
Water loss, Day 30: 0
Water loss, Day 90: 0</td></tr>
<tr><td>Displaced Households</td><td colspan="2">11 displaced households</td></tr>
<tr><td>Shelter Requirements</td><td colspan="2">5 persons</td></tr>
<tr><td>Debris Generation</td><td colspan="2">10,000 tons</td></tr>
</table>

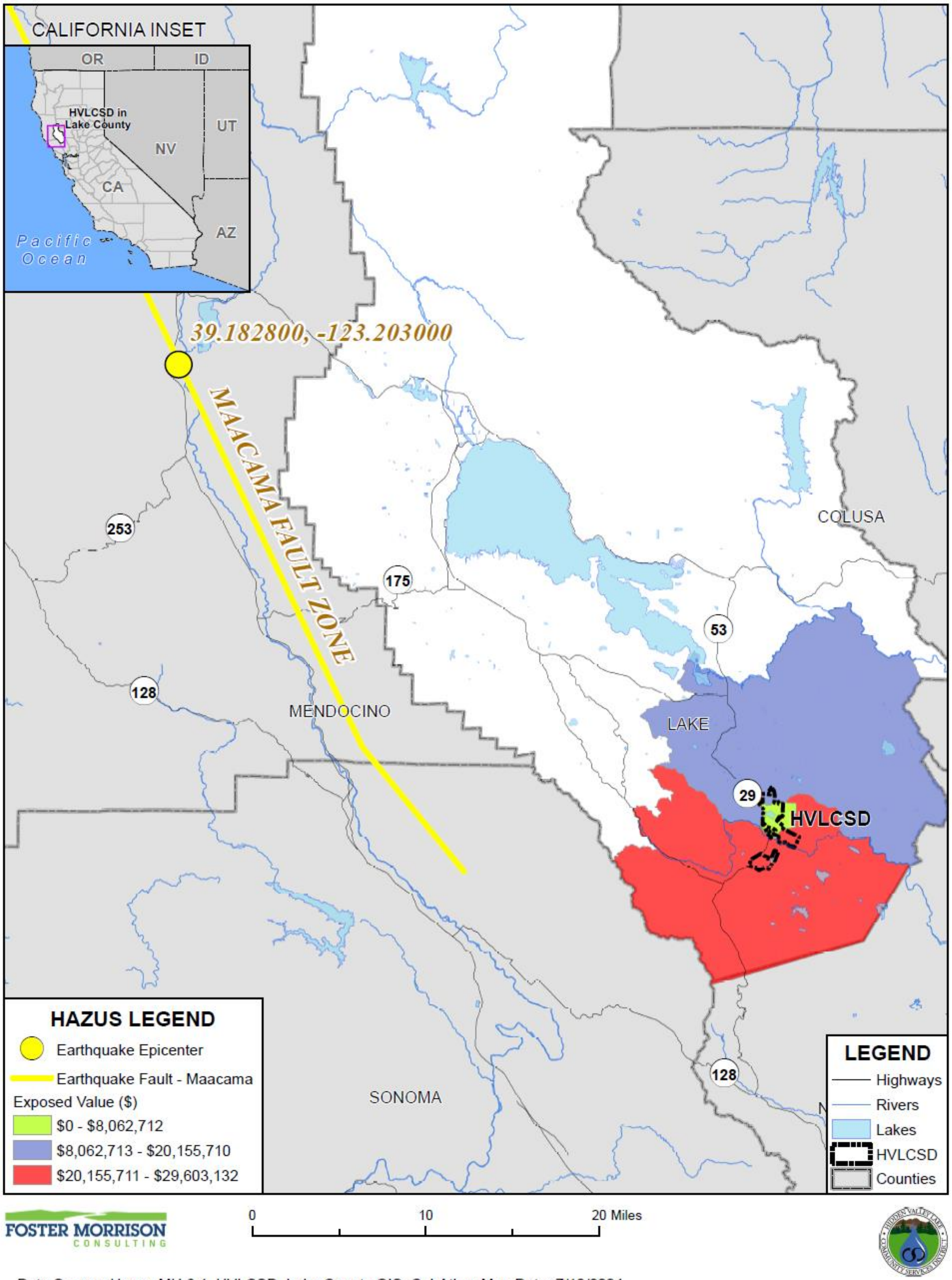
Hazus 6.1

Loss Estimates Highlights

Hazus estimates that about 647 buildings will be at least moderately damaged. This is over 10.00 percent of the buildings in the region. There are an estimated 7 buildings that will be damaged beyond repair.

The total building-related losses were 57.66 (millions of dollars); 13 percent of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 56 percent of the total loss.

Figure 4-74 HVLCSD – Maacama Scenario Exposed Values



Data Source: Hazus-MH 6.1, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/10/2024.

7.94 San Andreas Fault Earthquake Fault Scenario

The results of the San Andreas Fault deterministic scenario are captured in Table 4-58. Maps showing total losses for the census tracts that contain the HVLCSD are shown in Figure 4-75.

Table 4-58 HVLCSD – San Andreas Fault Hazus Earthquake Deterministic Scenario Results for 7.94 Event

Type of Impact	Impacts to District from 7.94 Deterministic Earthquake	
Total Buildings Damaged (based on 6,000 buildings)	Slight: 648 Moderate: 171 Extensive: 19 Complete: 0	
Building and Income Related Losses	$18,2400,000	
Total Economic Losses (Includes building, income and lifeline losses)	$18,630,000	
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 1 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0	
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 1 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0	
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 1 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0	
Damage to Transportation Systems	0 facilities with at least moderate damage	
Damage to Essential Facilities	0 facilities with at least moderate damage.	
Damage to Utility Systems	0 Facilities with at least moderate damage. 12 potable water line breaks, 6 wastewater line breaks, and 2 natural gas line breaks (HVLSCD noted that Hazus assumes a certain portion of natural gas lines in the vicinity. In the District, they do not exist, as liquified propane is the main fuel source).	
Households without Power/Water Service (Based on 4,303 total households)	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Water loss, Day 3:0 Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	2 displaced households	
Shelter Requirements	1 person	
Debris Generation	2,000 tons	

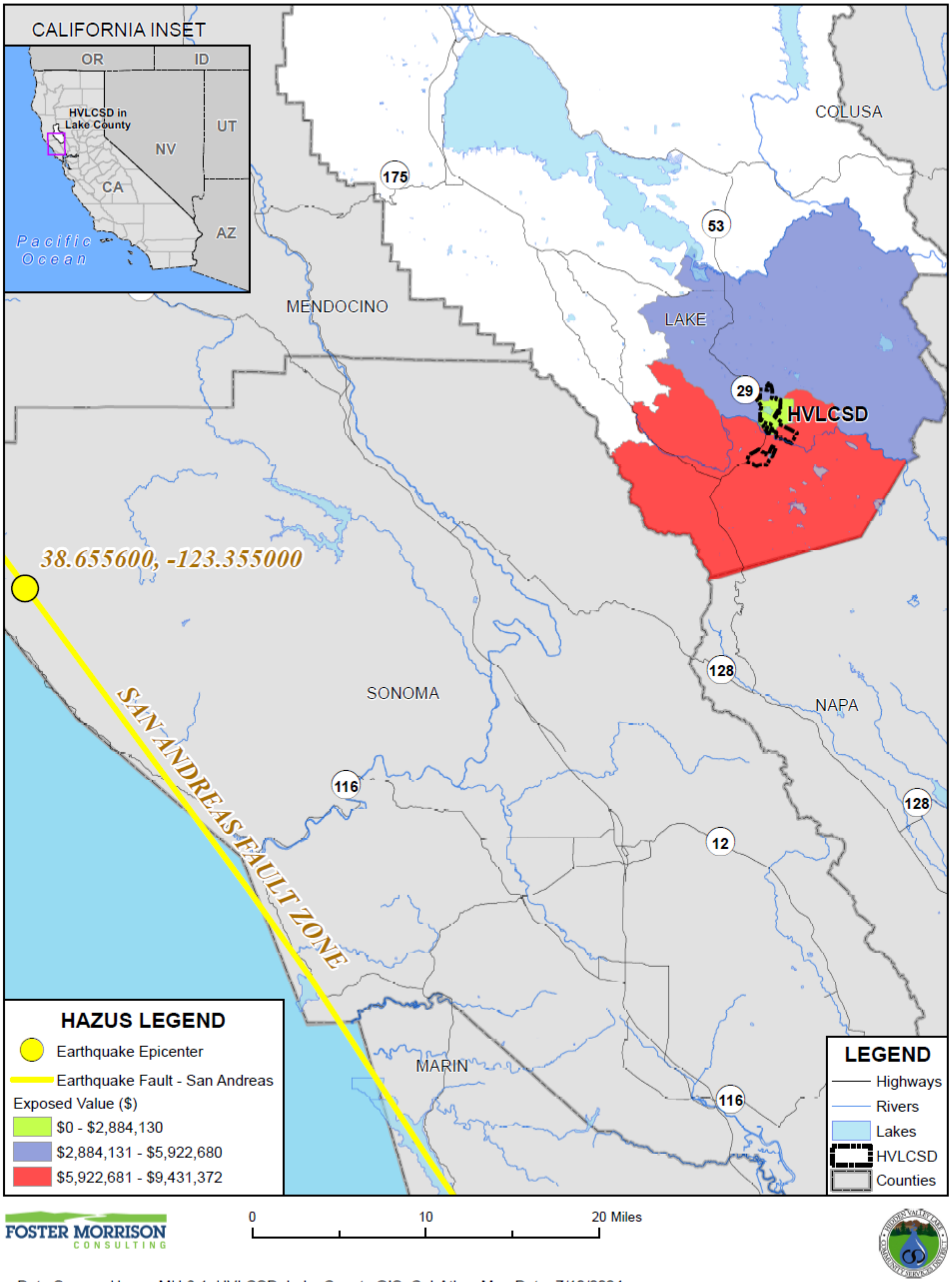
Hazus 6.1

Loss Estimates Highlights

Hazus estimates that about 190 buildings will be at least moderately damaged. This is over 3.00 percent of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair.

The total building-related losses were 18.24 (millions of dollars); 12 percent of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 57 percent of the total loss.

Figure 4-75 HVLCSD – San Andreas Scenario Exposed Values



Data Source: Hazus-MH 6.1, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/10/2024.

Table 4-59 displays a comparison of the results of each of the Hazus earthquake scenarios above.

Table 4-59 Hazus – Scenario Comparisons

Type of Impact	Impacts to District from 7.19 Deterministic Earthquake	Impacts to District from 6.69 Deterministic Earthquake	Impacts to District from 6.55 Deterministic Earthquake	Impacts to District from 7.94 Deterministic Earthquake
Total Buildings Damaged (based on 6,000 buildings)	Slight: 1,030 Moderate: 270 Extensive: 32 Complete: 1	Slight: 1,004 Moderate: 251 Extensive: 28 Complete: 1	Slight: 1,339 Moderate: 522 Extensive: 119 Complete: 7	Slight: 648 Moderate: 171 Extensive: 19 Complete: 0
Building and Income Related Losses	$35,200,000	$31,590,000	$57,660,000	$18,2400,000
Total Economic Losses (Includes building, income and lifeline losses)	$35,630,000	$31,830,000	$58,470,000	$18,630,000
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 3 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0	Without requiring hospitalization: 2 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0	Without requiring hospitalization: 6 Requiring hospitalization: 1 Life threatening: 0 Fatalities: 0	Without requiring hospitalization: 1 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 2 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0	Without requiring hospitalization: 2 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0	Without requiring hospitalization: 5 Requiring hospitalization: 1 Life threatening: 0 Fatalities: 0	Without requiring hospitalization: 1 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 2 Requiring hospitalization: 0 Life threatening:0 Fatalities: 0	Without requiring hospitalization: 1 Requiring hospitalization: 0 Life threatening:0 Fatalities: 0	Without requiring hospitalization: 4 Requiring hospitalization: 1 Life threatening:0 Fatalities: 0	Without requiring hospitalization: 1 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0
Damage to Transportation Systems	0 facilities with at least moderate damage	0 facilities with at least moderate damage	0 facilities with at least moderate damage	0 facilities with at least moderate damage
Damage to Essential Facilities	0 facilities with at least moderate damage.	0 facilities with at least moderate damage.	0 facilities with at least moderate damage.	0 facilities with at least moderate damage.
Damage to Utility Systems	0 Facilities with at least moderate damage. 0 facilities with complete damage. 12 potable water line breaks, 6 wastewater line breaks, and 2 natural gas line breaks.	0 Facilities with at least moderate damage. 8 potable water line breaks, 4 wastewater line breaks, and 1 natural gas line breaks.	0 Facilities with at least moderate damage. 21 potable water line breaks, 11 wastewater line breaks, and 4 natural gas line breaks.	0 Facilities with at least moderate damage. 12 potable water line breaks, 6 wastewater line breaks, and 2 natural gas line breaks.

Type of Impact	Impacts to District from 7.19 Deterministic Earthquake		Impacts to District from 6.69 Deterministic Earthquake		Impacts to District from 6.55 Deterministic Earthquake		Impacts to District from 7.94 Deterministic Earthquake	
Households without Power/Water Service (Based on 4,303 total households)	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Water loss, Day 3:0 Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Water loss, Day 3:0 Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Water loss, Day 3:0 Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Water loss, Day 3:0 Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	5 displaced households		3 displaced households		11 displaced households		2 displaced households	
Shelter Requirements	2 persons		1 person		5 persons		1 person	
Debris Generation	4,000 tons		3,000 tons		10,000 tons		2,000 tons	

Hazus 6.1

Impacts from Earthquake

Earthquakes can strike without warning and cause dramatic changes to the landscape of an area that can have devastating impacts on the built environment. The greatest impact is to life safety of HVLCSD residents and visitors. Other impacts to the District would include damages to infrastructure such as roads, bridges, and dams; damages and loss of services to utilities and critical infrastructure, including those related to gas, power, water, wastewater and communication systems; damages to structures and other development; and possible loss of life and injuries.

Earthquakes can also cause failure of dams, levees, and reservoirs (like the reservoir beyond Coyote Dam). Facilities and land downslope from dams or water reservoirs or behind levees might be subject to flooding, if the dams, reservoirs, or levees fail as a result of an earthquake. The District has locations with significant flood risk that include facilities downslope from dams or reservoirs or behind levees.

Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure, utilities, and services;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community; and
- Negative impact on commercial and residential property values

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

Future Conditions/Future Development

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

- As discussed in the hazard profile section, climate change is not anticipated to affect this hazard over time.
- While population projections for the area served by the District show additional expected growth, these anticipated future changes in population are expected to be relatively small, which is unlikely to affect this hazard and associated impacts to the District. The District may add staff, but this number would be small. The District noted it has no control over population changes in its Planning Area, it merely reacts to them by providing additional (or reduced) services.
- Changes in land use and development in the Hidden Valley Lake area are expected to be limited in the near future and thus are not likely to affect earthquake and associated impacts to the District. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District to this hazard. With adherence to development standards, future losses to new development should be minimal.

Although new growth and development would fall in the area affected by earthquake, given the small chance of major earthquake and the building codes in effect, development in the earthquake area will continue to occur. Future District facilities will be built to codes which take earthquake vulnerability into account when siting and constructing facilities.

4.3.9. Flood: 1%/0.2% Annual Chance

Hazard Profile

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

Hazard/Problem Description

Flooding is the rising and overflowing of a body of water onto normally dry land. Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities and can cause life safety issues. Floods can be extremely dangerous. Six inches of moving water can knock over a person given a strong current. A car will float in less than two feet of moving water and can be swept downstream into deeper waters. Floods kill more people trapped in vehicles than anywhere else.

There are three primary types of freshwater flood events in the District: riverine and lake, flash flooding, and localized stormwater. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area or upstream reaches.

- **Riverine and lake flooding** is the most common type of flood event and occurs when a watercourse exceeds its "bank-full" capacity. Riverine flooding generally occurs as a result of prolonged rainfall, or rainfall that is combined with already saturated soils from previous rain events. The duration of riverine floods may vary from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation amount, intensity and distribution, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization. The warning time associated with slow rise floods assists in life and property protection.
- The term "**flash flood**" describes localized floods of great volume and short duration. In contrast to riverine flooding, this type of flood usually results from a heavy rainfall on a relatively small drainage area. Precipitation of this sort usually occurs in the winter and spring. Flash floods often require immediate evacuation within the hour.
- **Localized/Stormwater** flood events have increased as land has been converted from fields or woodlands to roads and parking lots and lost its ability to absorb rainfall. Urbanization increases runoff by two to six times that of natural terrain. This is discussed in the Section 4.3.10 below.

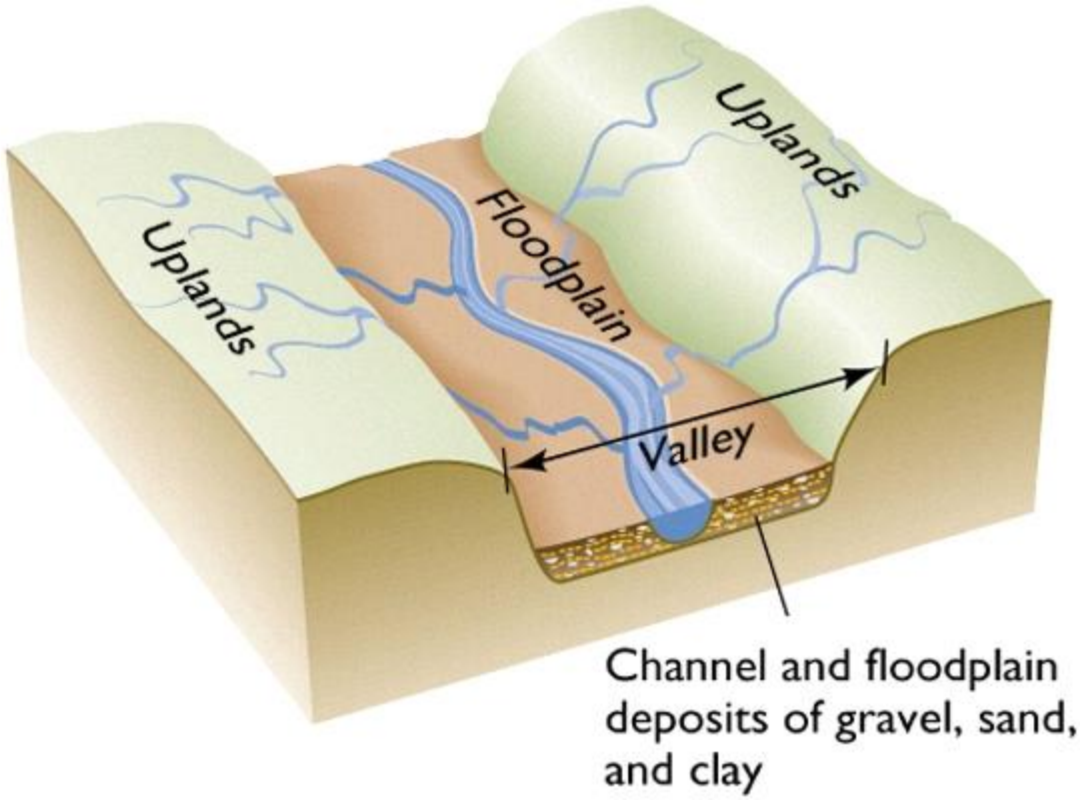
The District is also at risk to flooding resulting from dam and levee failures. Dam failure flooding is discussed separately in Section 4.3.6 of this document, while levee failures are discussed in Section 4.3.11. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area or upstream reach.

Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area or upstream reaches. The potential for flooding can change and increase through various land use changes and changes to land surface, resulting in a change to the floodplain. Environmental changes can create localized flooding problems in and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

Location and Extent

The area adjacent to a channel is the floodplain (see Figure 4-76). Floodplains are illustrated on inundation maps, which show areas of potential flooding and water depths. In its common usage, the floodplain most often refers to that area that is inundated by the 1% annual chance (or 100-year) flood, the flood that has a one percent chance in any given year of being equaled or exceeded. The 1% annual chance flood is the national minimum standard to which communities regulate their floodplains through the National Flood Insurance Program (NFIP). The 500-year flood is the flood that has a 0.2% chance of being equaled or exceeded in any given year. The potential for flooding can change and increase through various land use changes and changes to land surface, which result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

Figure 4-76 Floodplain Schematic



Source: FEMA

California Hydrologic Regions

California has 10 hydrologic regions. The District sits in the Sacramento River hydrologic region.

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

A map of the California's hydrological regions is provided in Figure 4-77.

Figure 4-77 California Hydrologic Regions

Source: 2023 State of California Hazard Mitigation Plan

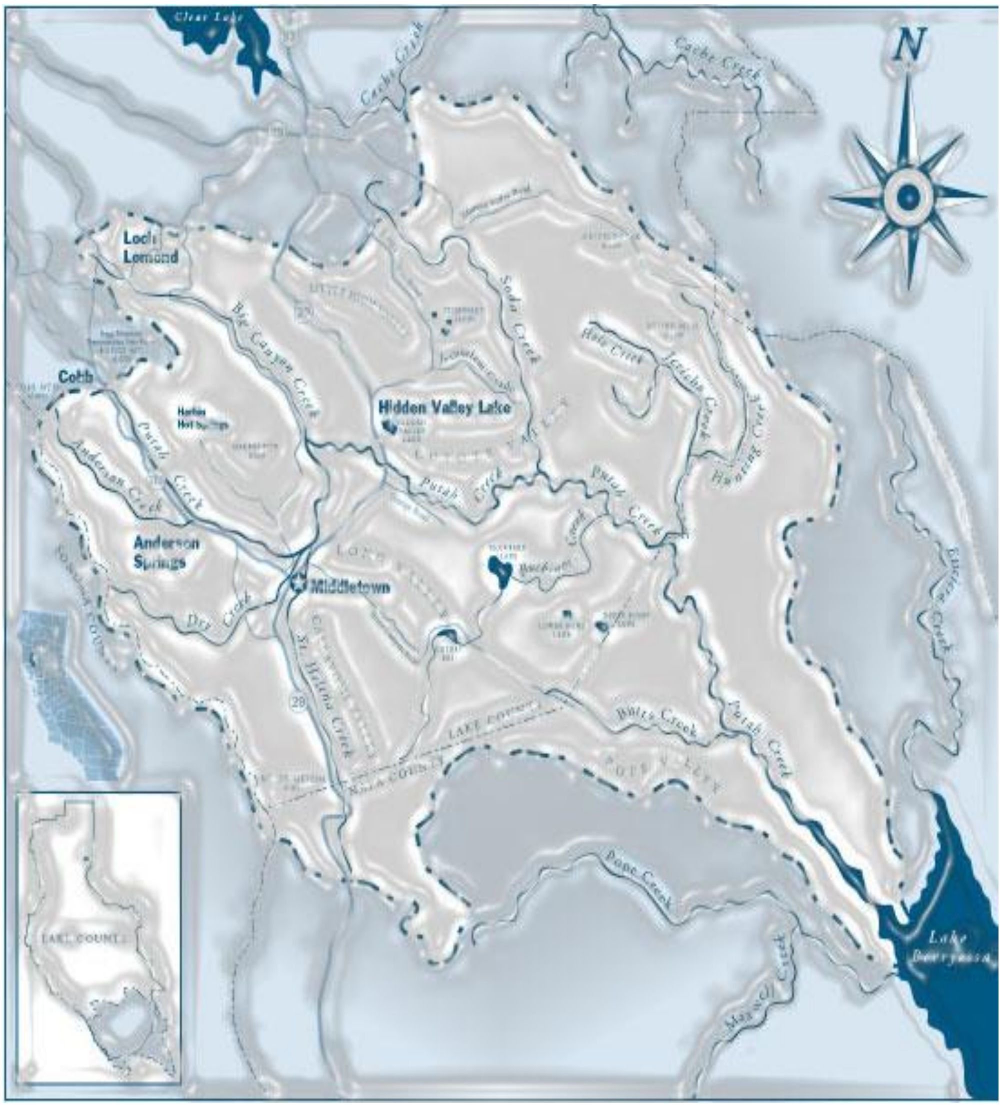
HVLCSD Watersheds and Streams

The District lies in the Upper Putah Creek watershed. The Upper Putah Creek Watershed encompasses 178,477 acres in southeast Lake County and some of Napa and Solano Counties. It is approximately 35 miles in length and 20 miles at its widest point. Elevations range from 440 feet at Lake Berryessa to 4,722 feet at Cobb Mountain. The two main sub-basins in the Upper Putah Creek Watershed are:

- The Callayomi Valley (Middletown area), and
- The Coyote Valley (Hidden Valley area).

According to the Putah Creek Council, the Putah Creek watershed begins from springs on the east side of Cobb Mountain. The creek is approximately 70 miles long and its watershed encompasses a vast array of ecosystems whose make up is determined by geology, elevation, and micro-climates. Defining attributes of the watershed include Monticello Dam (forming Lake Berryessa, one of the largest reservoirs in California) and the Yolo Bypass. The main drainage is into Lake Berryessa. The upper watershed lies above Berryessa and is characterized by oak savannas, rolling hills, and steep terrain. The watershed below the dam includes 32 miles of Putah Creek, much of which is flat and flanked by agriculture. Tributaries include Putah Creek, Anderson Creek, St. Helena Creek, Dry Creek, and Big Canyon creeks. The Upper Putah Creek Watershed is shown in Figure 4-78.

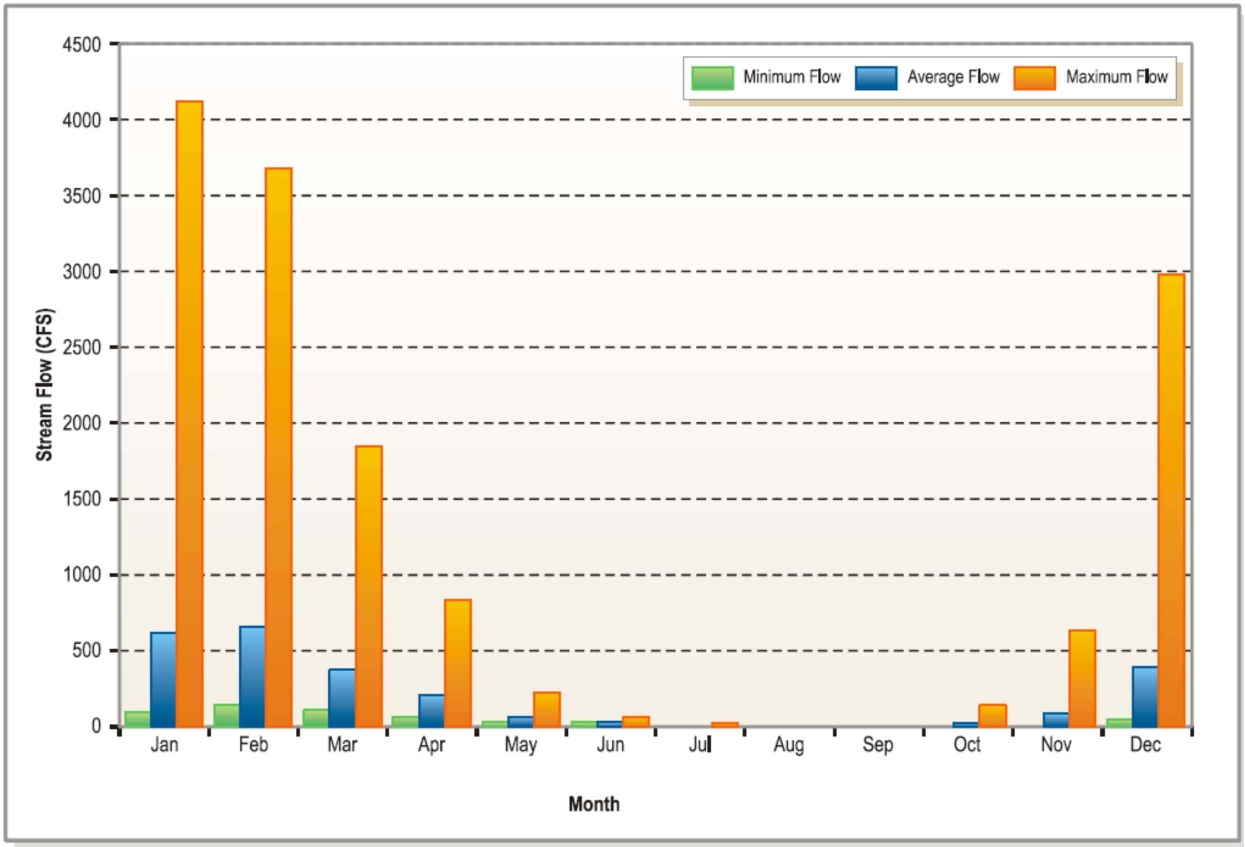
Figure 4-78 Upper Putah Creek Watershed Basin



Source: Sacramento River Watershed Program

The general hydrologic characteristics of the Putah Creek drainage consist of direct rainfall runoff with a very small snowmelt and base flow components. A comparison of flows on Putah Creek (Figure 4-79) and precipitation at Lakeport shows a strong correlation between rainfall and flows on Putah Creek.

Figure 4-79 Monthly Flows on Putah Creek near Guenoc – USGS Stream Gage 11453500



Source: Lake County Water Inventory and Analysis Report – March 2006

The 2000 Lake County Flood Management Plan performed an analysis of flooding of water bodies in the County, including Putah Creek. It noted that much of the upper watershed is heavily forested mountain slopes and receives some of the highest rainfall amounts in Lake County. In spite of the size of the drainage, flows rise and fall quickly, however, extended periods of heavy rain can keep the creek above flood stage for several days. The cause of the flooding is inadequate channel and bridge capacities. The 2000 Lake County Flood Management Plan also noted that there is infrequent flooding on Putah Creek; most flows are generally contained within the channel. There are overflows at HWY 29 that threaten the roadway. High creek levels at the Hidden Valley Lake Subdivision limit outflows through the levee, causing interior flooding. This area is a repetitive loss area in the District.

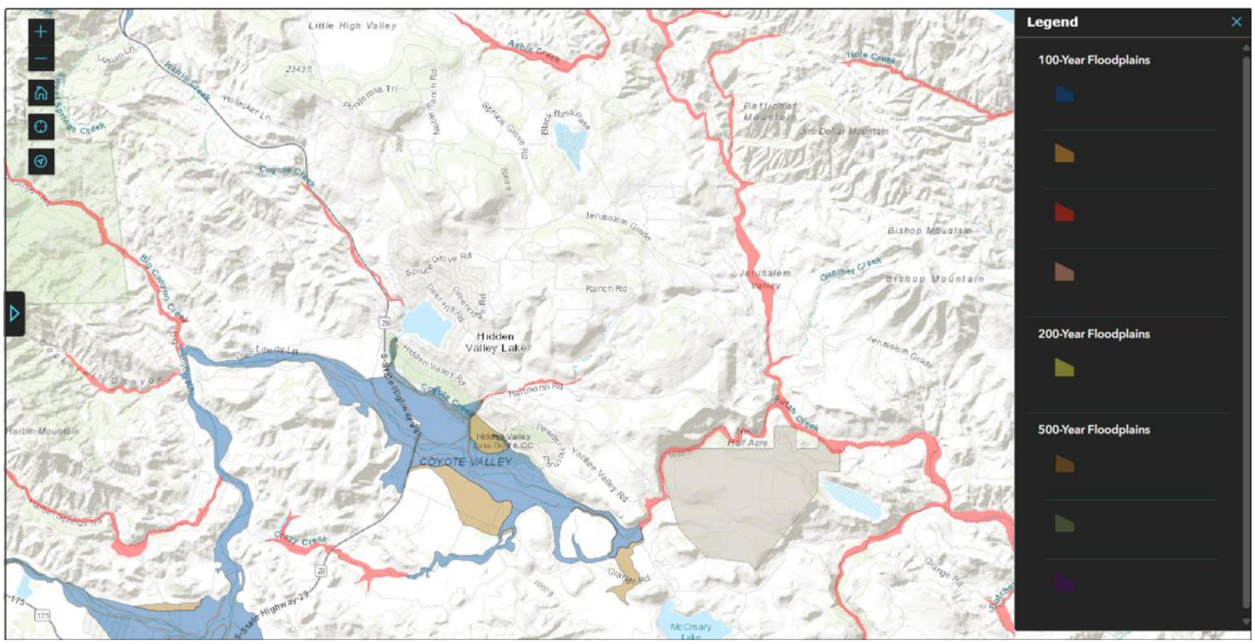
DWR Best Available Maps

The FEMA regulatory maps provide just one perspective on flood risks in the District. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Sacramento-San Joaquin (SAC-SJ) Valley watershed. SB 5 requires that these maps contain the best available information on flood hazards and be provided to cities and counties in the SAC-SJ Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100- and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM maps are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100- and 500-year floodplain areas. These studies are used for different planning and/or regulatory applications. They are for the same flood frequency; however, they may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the HVLCSD Planning Area than that provided in the FEMA DFIRMs. This provides the HVLCSD and surrounding community with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 100-year floodplain, it also supports identification of the need and requirement for flood insurance. These floodplain maps for HVLCSD can be seen in Figure 4-80.

Figure 4-80 HVLCSD – Best Available Map



Source: California DWR. Map retrieved 6/27/2024.

Legend explanation: **Blue** - FEMA 100-Year, **Orange** – Local 100-Year (developed from local agencies), **Red** – DWR 100-year (Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures.), **Pink** – USACE 100-Year (2002 Sac and San Joaquin River Basins Comp Study), **Yellow** – USACE 200-Year (2002 Sac and San Joaquin River Basins Comp Study), **Tan** – FEMA 500-Year, Grey – Local 500-Year (developed from local agencies), **Purple** – USACE 500-Year (2002 Sac and San Joaquin River Basins Comp Study).

FEMA Floodplain Mapping

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

Flood Insurance Study (FIS)

The FIS develops flood-risk data for various areas of the community that will be used to establish flood insurance rates and to assist the community in its efforts to promote sound floodplain management. The current Lake County FIS is dated October 10, 2024.

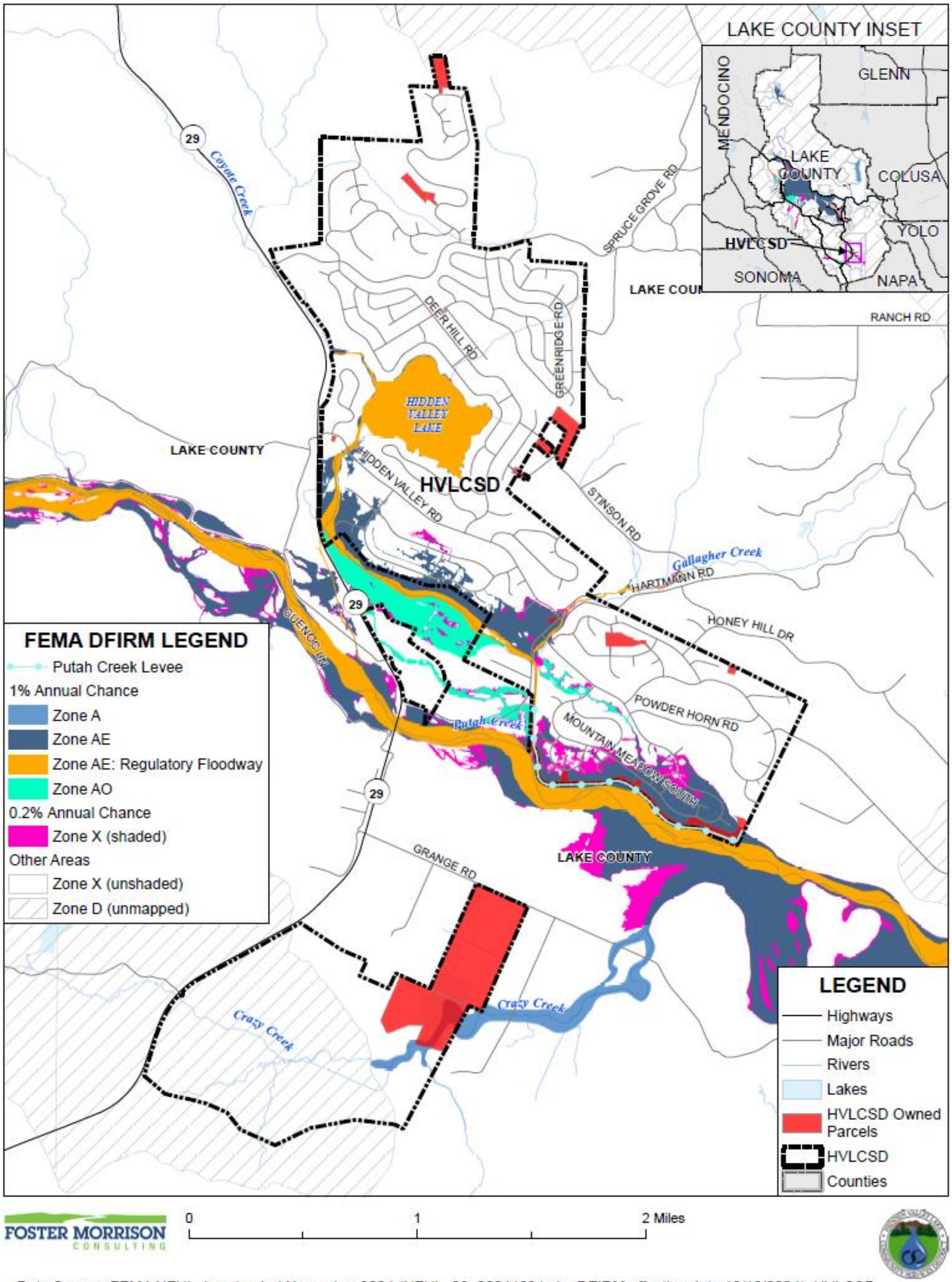
Digital Flood Insurance Rate Maps (DFIRM)

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

- Incorporate the latest updates (Letters of Map Revision (LOMRs) and Letters of Map Amendment (LOMAs));
- Utilize community supplied data;
- Verify the currency of the floodplains and refit them to community supplied base maps;
- Upgrade the FIRMs to a GIS database format to set the stage for future updates and to enable support for GIS analyses and other digital applications; and
- Solicit community participation.

DFIRMs for Lake County have been developed and are dated September 30, 2005. These have been updated with 6/8/2020 LOMRs, which is being used for the flood analysis for this LHMP. This is shown in Figure 4-81. Flood zones present in each jurisdiction can be found in Table 4-60. It should be noted that the FEMA DFIRMs only include 1% and 0.2% annual chance floodplains.

Figure 4-81 HVLCSD – DFIRM Flood Zones



Data Source: FEMA NFHL downloaded November 2024 (NFHL_06_20241031.zip; DFIRM effective date 10/10/2024), HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/11/2024.

Table 4-60 HVLCSD – DFIRM Flood Zones

Flood Zone	Description	Present in the District
Zone A	1% annual chance flooding: No base flood elevations provided	X
Zone AE	1% annual chance flooding: Base flood elevations provided	X
Zone AE Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided	X
Zone AH	1% annual chance flood areas of shallow flooding between one to three feet deep. Regulatory floodway; Base flood elevations provided	X
Zone AO	1% annual chance flooding: sheet flow areas. BFEs derived from detailed hydraulic analyses are shown in this zone.	X
Zone X (shaded)	0.2% annual chance flooding: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	X
Zone D (unmapped)	Zone D includes areas with possible flood hazards, but because no flood hazard analysis has been conducted to determine probability, the flood risk in these areas is undetermined. Insurance rates are based on the uncertainty of the flood risk.	X
Zone X (unshaded)	No flood hazard	X

Source: FEMA DFIRM 10/10/2024

Flood extents are usually measured in depths of flooding, geographical extent of the floodplain, as well as flood zones that a location falls in (i.e., 1% or 0.2% annual chance flood). Expected flood depths in the District vary and are not well defined. Flood durations in the District tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Geographical flood extent from the FEMA DFIRMs is shown in Table 4-61.

Table 4-61 HVLCSD – Geographical Flood Hazard Extents in FEMA DFIRM Flood Zones

Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood Hazard	193	8.74%	74	5.60%	119	13.43%
0.2% Annual Chance Flood Hazard	30	1.36%	17	1.31%	13	1.42%
Other Areas	1,991	89.91%	1,236	93.09%	755	85.15%

Source: FEMA 10/10/2024 DFIRM

Past Occurrences

Disaster Declaration History

A list of state and federal disaster declarations for Lake County from flooding, (including heavy rains and storms) is shown on Table 4-62.

Table 4-62 Lake County –State and Federal Disaster Declaration from Flood 1950-2024

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	23	1950, 1955, 1958 (twice), 1963, 1964 (twice), 1970, 1980, 1983, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2014, 2017 (twice), 2019, 2023 (twice)	19	1955, 1958, 1963, 1964, 1970, 1983, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019, 2023 (three)

Source: Cal OES, FEMA

NCDC Events

The NCDC tracks flooding events for the County. Events have been tracked for flooding since 1993. Table 4-63 shows the 23 events in Lake County since 1993.

*Table 4-63 NCDC Flood Events in Lake County 1993 to 12/31/2023**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Flash Flood	2	0	0	0	0	$10,000	$0
Flood	21	1	0	4	0	$23,430,000	$0
Total	**23**	**1**	**0**	**4**	**0**	**$23,440,000**	**$0**

Source: NCDC

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

Hazard Mitigation Planning Committee Events

The District noted the following events that have directly affected the District:

- **1996 -** Heavy rains occurred which led to higher flow in Putah Creek and an overflow of the flood control overflow basin leading to flooding of the adjacent neighborhoods. Flooding occurred near the streets of Gold Flat and Mountain Meadow South. The District lost a 6- or 8-inch pipe after a tree fell and broke the transmission line; the line later flowed into Putah Creek. Flapper valves had to be installed after the flood to keep ponds from overflowing. The District had to dig 80 feet of trench to replace the water transmission main; which encompassed the entire workday.
- **2006** – In January of 2006, heavy rains fell and flooded areas along Putah Creek. The District suffered some direct damages. Flooding took out a portion of a pipeline (supplemental flow) going back into Putah Creek. The levee at the reclamation pond was also washed out (it also took a part of the Sutter Home vineyard). Supplemental diversion pipes on Mr. Comstock's land were exposed. The WWTP access road washed out from transfer pumps to sludge beds. An extended power outage occurred,

though it affected the Grange Road facility only. Generators were needed to run pumps at well fields. Sizable damages occurred. FEMA and State of California funds were used to repair certain areas:

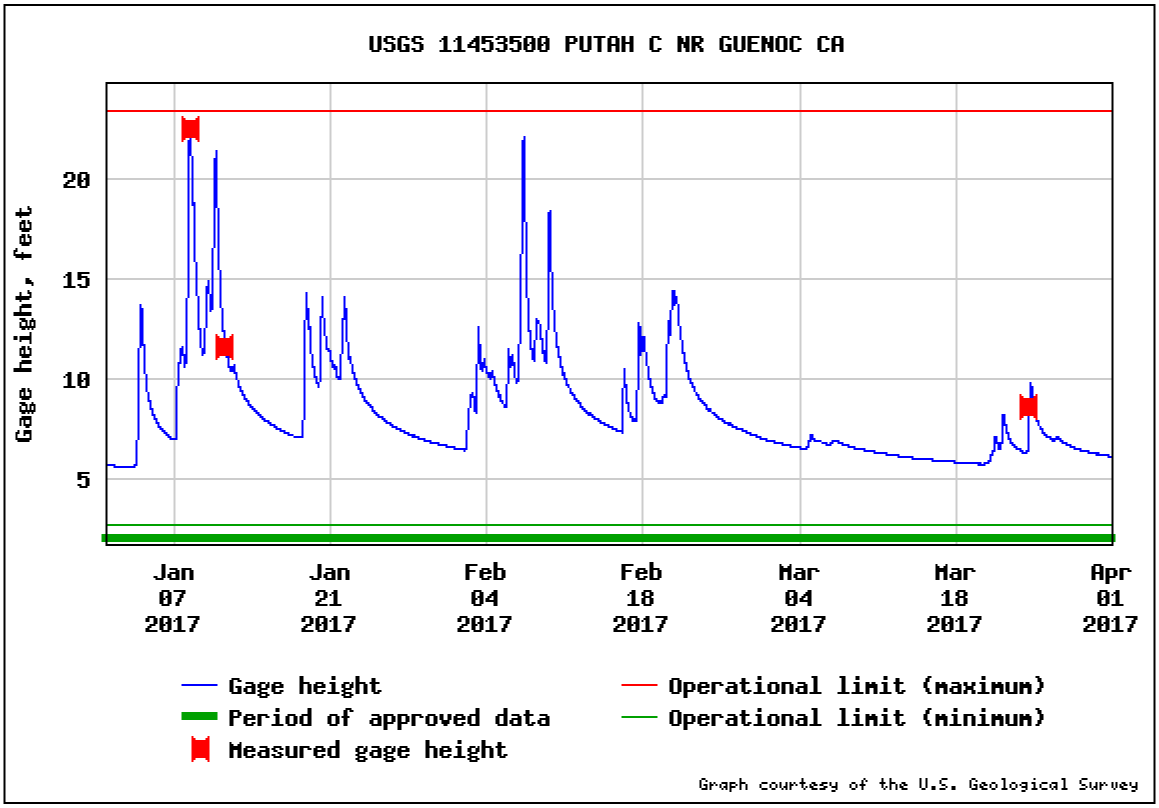
- ✓ Pipeline restoration project - $1,140,235 Federal and $76,015 State
- ✓ Emergency response sewer pump - $12,141 Federal and $4,183 State
- ✓ Access Road and Flow equalization basin road - $10,763 Federal and $717 State
- ✓ Access Road - $40,690 Federal and $14,346 State

- **2013** – Heavy rains caused flooding in the District. To fight these floods, pumper trucks were called in to assist the District in moving excess water. The District noted that more than $40,000 of direct costs were borne by the District for overtime labor hours.

The District noted a report on the Valley Fire and its effects on flooding (more information on this report can be found in the Post-Wildfire Flood Flows in the Wildfire profile in Section 4.3.12). The report concluded that the post-burn 1% peak flows of Putah Creek at the downstream end of the Upper Putah watershed were approximately 2.3 times that of the pre-burn 1% peak flows. In sum, the wildfire greatly increased the chances of flooding in the District after the Valley Fire. An article from Sfgate.com noted an interview with the director of Public Works for Lake County, who stated that "The headwaters of Putah Creek are all up in the areas that burned and because of that we are expecting additional runoff." Post-Valley Fire flood events are discussed below:

- **2015/2016** – An El Nino year caused issues in the District. The Lake County Record Bee reported that HVLCSD was under pressure to complete flood control projects ahead of heavy rainfall expected in January of 2016. There was worry that, while flood waters were expected to come primarily from Putah Creek, other creeks in HVL-area were also likely to flood this winter, including Coyote and Gallagher. Rain runoff from Cobb Mountain and Middletown, areas heavily affected by the fire, naturally would channel down and into Putah Creek, causing it to flood. The runoff was made worse by the burned, barren ground that turned to a concrete-like material that allowed water to flow rapidly and not get fully absorbed into the ground. This dangerous situation was compounded by the lack of grasses, brush and trees that act as natural flood and erosion controls.
- **2017** – High water caused flooding in the District. Damages occurred in the District (discussed in more detail in Section 4.3.9). Figure 4-82 show the flows on Putah Creek, while Figure 4-83 shows the USGS performing flow checks on Putah Creek. Note the high water level at the bridge.

Figure 4-82 HVLCSD – Putah Creek Flows January to April 2017



Source: HVLCSD

Figure 4-83 USGS Performing Flow Checks on Putah Creek

Source: HVLCSD

The District noted, in a 2022 NOI for a grant for HMGP funds from the State of California that the frequency and intensity of extreme weather events has increased in the recent past. This includes rain events that precipitated disaster declarations 4301, 4305, 4308, 4431, and 4434 in Northern California. The Wastewater infrastructure (including the Wastewater Treatment Plant) at HVLCSD is in need of a retrofit.

Inundation from rains in DR 4301, 4308, and 4434 resulted in a request for public assistance by HVLCSD. Multiple Sewer System Overflows (SSO), and Wastewater Treatment Plant damage are recurring during these storms. Raw sewage spills created a danger to the life and health of the community. The District also noted that with the quick succession of storms, HVLCSD has been able to work with engineering consultants to conduct research and analysis, as well as affect some incremental changes within the sewer infrastructure. It is apparent however, that a larger scale project effort is needed to overcome the cycle of repetitive loss. While operating within its design capacity, the Wastewater Treatment Plant has experienced multiple basin overflows, and the sewer collection system has overflowed onto land. During storm events as seen in disasters 4301, 4308, and 4434, stormwater enters the sewer collection system, and pushes this collection system, as well as the wastewater treatment plant beyond its capacity. Raw sewage spills created a danger to the life and health of the community.

2019 – Heavy rains caused risk of flooding in the District. $1M in emergency repairs, and $270k in permanent repairs from this one disaster (DR-4434). Stormwater infiltration into the sewer system occurred during this event. High flows also put the levee at risk.

Winter 2022/2023 – The 2023 water year experienced above normal rainfall of 58.31 inches compared to the long-running average of 40.26 inches between the 1997 – 2022 water years (a 31% increase). Heavy rains caused risk of flooding in the District. Lower flats areas of the District did see flooding. There were limited evacuations in different parts of the area. There was reports of damage from areas in Gold Flat Ct over and up to Oak Flat Rd. The District noted that many staff hours were dedicated to run the pumps. There were areas that were considered safe because they were protected by levee.

More information on many of these events can be found in the Localized Flood (Section 4.3.10) and in the Levee Failure past events (Section 4.3.11) below.

Likelihood of Future Occurrence

1% Annual Chance Flood

Occasional— The 1% annual chance flood (100-year) is the flood that has a 1 percent chance of being equaled or exceeded in any given year. This, by definition, makes the likelihood of future occurrence occasional. However, the 100-year flood could occur more than once in a relatively short period of time.

0.2% Annual Chance Flood

Unlikely—The 0.2% annual chance flood (500-year) is the flood that have a 0.2 percent chance of being equaled or exceeded in any given year, respectively. This, by definition, makes the likelihood of future occurrence unlikely.

It is likely that climate change will increase the chance of future occurrence as well as future impacts. More information on climate change and 1%/0.2% annual chance flooding can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Flood

Climate change and its effect on flooding is discussed using three sources:

- 2021 CAS
- Cal-Adapt
- National Center for Atmospheric Research

California Climate Adaptation Strategy

According to the CAS, climate change may affect flooding in California and the HVLCSD. While average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is possible that average soil moisture and runoff could decline, however, due to increasing temperature, evapotranspiration rates, and spacing between rainfall events. Reduced snowpack and increased number of intense rainfall events are likely to put additional pressure on water infrastructure which could increase the chance of flooding associated with breaches or failures of flood control structures such as levees and dams.

Cal Adapt

Cal Adapt future precipitation projections were shown in Figure 4-46 in Section 4.3.4. These could affect flooding in the District.

National Center for Atmospheric Research

Also, according to the National Center for Atmospheric Research in Boulder, Colorado, atmospheric rivers are likely to grow more intense in coming decades, as climate changes warms the atmosphere enabling it to hold more water. This is likely to contribute to greater flooding in the future.

Vulnerability Assessment

Vulnerability—High

Historically, the District has always been at risk to flooding during the rainy season from November through April. The Lake County FIS noted that floods result from prolonged heavy rainfall and are characterized by high peak flows of moderate duration and by a large volume of runoff. Flooding is more severe when antecedent rainfall has resulted in saturated ground conditions. Several areas of the HVLCSD are subject to flooding by the overtopping of rivers and creeks, levee failures, and the failure of local drainage systems that cannot accommodate large volumes of water during severe rainstorms. In addition to the major rivers, there are many streams, channels, canals, and creeks that serve the drainage needs of the District and communities surrounding it. Hidden Valley Lake has a number of natural streams and creeks that flow through the area. The Coyote Valley Basin contains an extremely robust aquifer. Seasonally, the groundwater is fully recharged, and flooding often occurs in the community. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damages.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to the District. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire HVLCSD. These sections below include assets at risk, impacts, and how future development can be affected by this hazard.

Local Concerns

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

The 2013-2018 HVLCSD Strategic Plan noted that at the time of formation, the District inherited a flood retention basin and approximately one mile of flood control levee along Putah Creek, for which there is no dedicated source of funding for operations and maintenance, or documented maintenance program. Putah Creek is the main source of riverine flooding for the District.

Floods are one of the more significant natural hazards impacting the District. Major floods in the District, caused by heavy rains, generally affect residential and commercial properties and also affect District facilities and operations. Streets, roads, and highways can be overtopped, washed out, or covered with debris causing the temporary cessation of traffic flow.

The District noted that floodwaters inundate sewer lines, which in turn overflow into flooded streets. Sewer in floodwaters are a significant health hazard to the public. Floodwaters that inundate sewer lines can reach the wastewater treatment plant, and render it inoperative. Also, a significant detriment to the community. Floodwaters can cause stormwater management infrastructure to overtop, which again inundates sewer lines. The wellfield for the District is located within the 0.2% annual chance flood zone. A flood event here would disable the District's ability to provide potable water.

Additionally, HVLCSD noted that ground saturation is hazardous to utilities that provide wastewater collection services, as well as stormflow management. Prevention of sewer system overflows and treatment plant inundation is paramount to the protection of health and safety of the Hidden Valley Lake residents.

The HVLCSDs water supply consists of three wells, localized in one area south of the District's service area. Water from these three wells is pumped into two water distribution mains that traverse beneath Putah Creek to the water treatment plant at the Administration Building, entirely through a FEMA mapped flood plain area. The District's main booster pump station, also located at the Water Treatment Plant, distributes water to one of several water storage tanks that serve the District's customers and provides fire protection for the service area in case of emergency. Should a catastrophic event, such as a flood (in addition to earthquake, fire, or drought) occur that would damage the wells, two water distribution mains, water treatment plant, or the booster pump station, the District would be unable to provide water supply and fire protection to the entire community until such time as the damaged infrastructure is repaired. Depending on the extent of damages, repairs could take weeks or months.

In addition, the HMPC noted that the southerly service boundary of the District is adjacent to Putah Creek. The District owns drainage infrastructure for the residents within the District' service area, which is protected by a levee along Putah Creek and flood control channel on the District's side of the levee. The top of the levee is approximately six feet higher than the residential area. The District maintains a flood control detention basin with a diversion structure, equipped with a 90" check valve to regulate discharge from this channel. The operation of this valve is problematic and at times allows backup into the flood control channel when the valve is plugged with debris and flows in Putah Creek are at a higher head than the channel. The 100-year flood surface elevation is approximately 2 feet above existing grade along the southerly boundary of the District's service area. Should a catastrophic event, such as a flood, earthquake, fire, or terrorist activity, occur that would cause this valve to remain open for an extended period of time when the water surface elevation in Putah Creek is higher than the water surface elevation in the flood control channel and nearby properties, the District is at risk of being unable to control storm flows out of the flood control channel and unable to stop flooding along the southerly boundary of the District's service area.

The District noted, in a NOI for a grant from the State of California, that the frequency and intensity of extreme weather events has increased in the recent past. This includes rain (and flood) events that precipitated disaster declarations 4301, 4305, 4308, 4431, and 4434 in Northern California. The Wastewater infrastructure (including the Wastewater Treatment Plan) at HVLCSD is in need of a retrofit. Inundation from rains in DR 4301, 4308, and 4434 resulted in a request for public assistance by HVLCSD. Multiple Sewer System Overflows (SSO), and Wastewater Treatment Plant damage are recurring during these storms. Raw sewage spills created a danger to the life and health of the community. The District also noted that with the quick succession of storms, HVLCSD has been able to work with engineering consultants to conduct research and analysis, as well as affect some incremental changes within the sewer infrastructure. It is apparent, however, that a larger scale project effort is needed to overcome the cycle of repetitive loss. While operating within its design capacity, the Wastewater Treatment Plant has experienced multiple basin overflows, and the sewer collection system has overflowed onto land. During storm events as seen in disasters 4301, 4308, and 4434, stormwater entered the sewer collection system, and pushed this collection system, as well as the wastewater treatment plant beyond its capacity. Raw sewage spills created a danger to the life and health of the community. The District noted that the systems are regularly inspected during heavy rain events, but the sewer issues have yet to be mitigated.

The District's flat areas of the community are of the greatest vulnerability to SSOs due to flooding. While the oldest parts of the sewer system are the most vulnerable to intruding stormwater in general, since the pipes are more likely to be damaged from age.

Assets at Risk

The HVLCSD has mapped FEMA flood hazard areas. GIS was used to determine the possible impacts of flooding within the District and how the risk varies across the District. The following methodology was utilized in determining populations and assets at risk to the 1% annual chance flood event and 0.2% annual chance flood event.

Methodology (HVLCSD Owned Assets)

HVLCSD's sewer and water, general, and land assets were used as the basis for the inventory of HVLCSD asset values. Each of the assets and their values, whether a single location or a linear asset, were intersected by the FEMA DFIRM flood data as described above and assigned a flood zone.

Methodology (Service Area Parcel and Structures)

Lake County's 2018 Assessor Data and the County's GIS parcel data were used as the basis for the inventory of parcels and values. Lake County, including the HVLCSD, has a FEMA effective DFIRM dated September 30, 2005, which was obtained from FEMA's National Flood Hazard Layer to perform the flood analysis.

In some cases, there are parcels in multiple flood zones, such as Zone A, Zone X, or Shaded X. GIS was used to create a centroid, or point representing the center of the parcel polygon. DFIRM flood data was then overlaid on the parcel layer. For the purposes of this analysis, the flood zone that intersected a parcel centroid was assigned the flood zone for the entire parcel. The parcels were segregated and analyzed in this fashion for the HVLCSD Service Area. Analysis on values at risk to floods associated with parcels located in the HVLCSD Service Area is provided below in the results section.

This parcel analysis for flood includes both an analysis of parcel values including estimated content replacement values and flood loss estimates. Flood loss estimates take the parcel values at risk and assume a damage factor to obtain loss estimates by flood zone. When a flood occurs, seldom does the event cause total loss of an area or building. Potential losses from flooding are related to a variety of factors including flood depth, flood velocity, building type, and construction. The percent of damage is primarily related to the flood depth. FEMA's flood benefit/cost module uses a simplified approach to model flood damage based on building type and flood depth. The values at risk in the flood analysis tables were refined by applying an average damage estimation of 20% of the total building value. The 20% damage estimate utilized FEMA's Flood Building Loss Table based on an assumed average flood depth of 2 feet. The end result of the flood hazard analysis is an inventory of the numbers, types, and values of parcels subject to the flood hazard, with the damage factor applied.

People and Populations

All people and populations (both District staff and those in the Service Area) located in the 1% and 0.2% annual chance floodplains are at some risk to flooding. Certain vulnerable populations located within areas prone to flooding may be at increased risk to this hazard, especially during a large event with minimal advance notice. These vulnerable populations include: the unhoused, those with limited mobility, and those that lack the resources to leave the area.

HVLCSD Service Area residents that live in the 1% and 0.2% annual chance floodplains are often the most vulnerable. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events. To further evaluate the impact to the HVLCSD's residential population residing within the flood hazard areas of the District Service Area, the DFIRM flood zones were overlayed on the parcel layer and linked to the Assessor Data. Those residential parcel centroids that intersect the flood zones were counted and multiplied by the average household factors. This is shown in Table 4-64.

Table 4-64 HVLCSD – Improved Residential Parcels and Population by FEMA DFIRM Flood Zone

Jurisdiction	1% Annual Chance		0.2% Annual Chance	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population
HVLCSD	190	593	62	193

Source: FEMA DFIRM 10/10/2020, Lake County 2023 Parcel/Assessor Data, HVLCSD Average Household Size – 3.12

Structures (including Critical Facilities and Infrastructure)

HVLCSD has mapped FEMA flood hazard areas. GIS was used to determine the possible impacts of flooding to HVLCSD. Specifically, this analysis focused on values at risk to the 1% annual chance flood event and 0.2% annual chance flood events. This analysis is broken out into two parts:

- HVLCSD Owned assets
- HVLCSD Service Area

HVLCSD Owned Assets

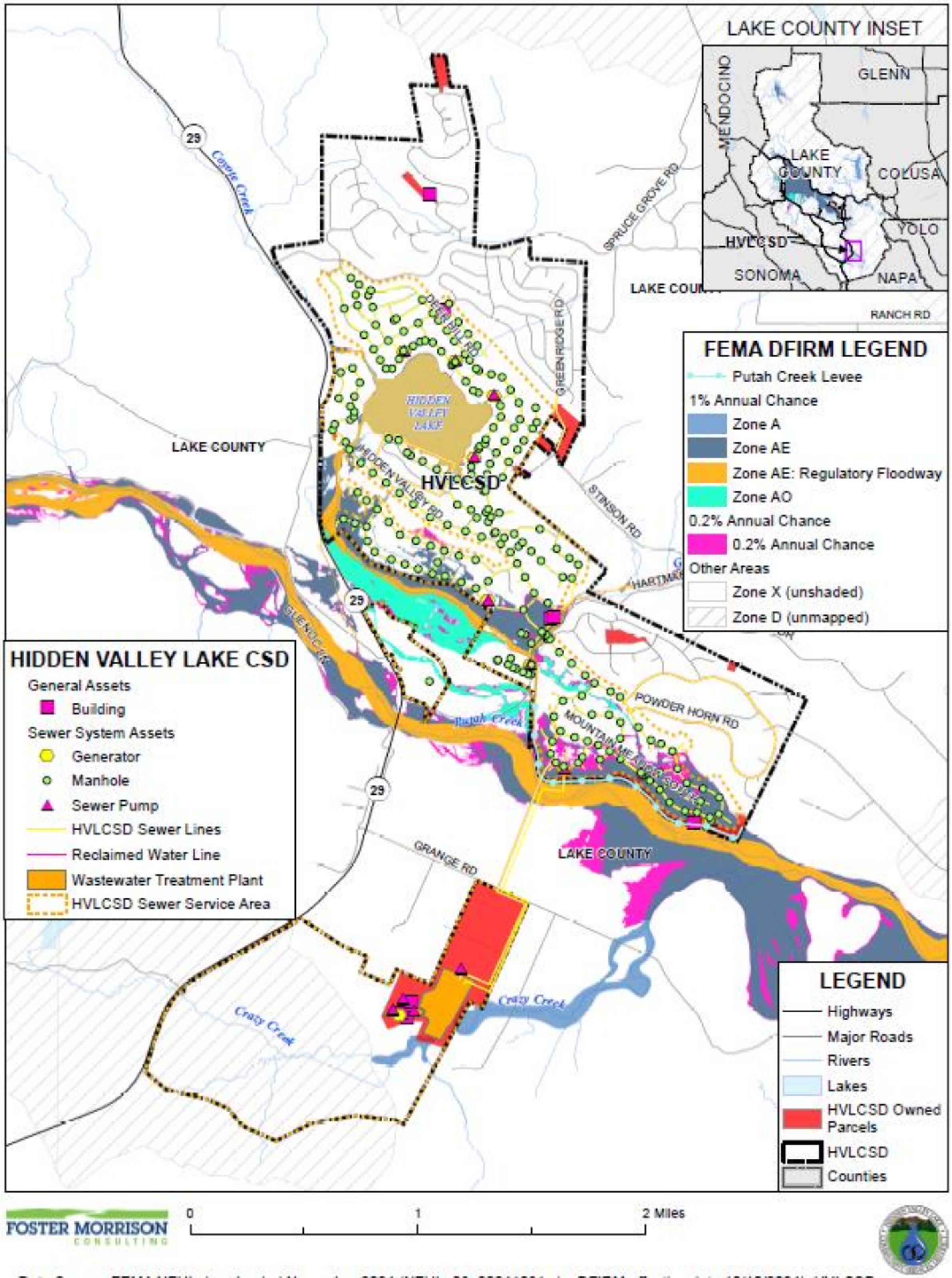
For the HVLCSD asset analysis, the lines, points, and HVLCSD owned parcels were spatially located. The DFIRM flood zones were overlaid over these points to determine if HVLCSD assets were located in the DFIRM flood zones, and if so, what flood zone they were located in. Two maps were created to depict this analysis:

- Figure 4-84 shows the DFIRM flood zones overlayed on the sewer system assets Figure 4-85 shows the DFIRM flood zones overlayed on the water system assets points.

Four tables were created to identify HVLCSD assets in the DFIRM flood zones. Detailed tables showing each individual asset, and which detailed flood zone they lie in are shown in Appendix F.

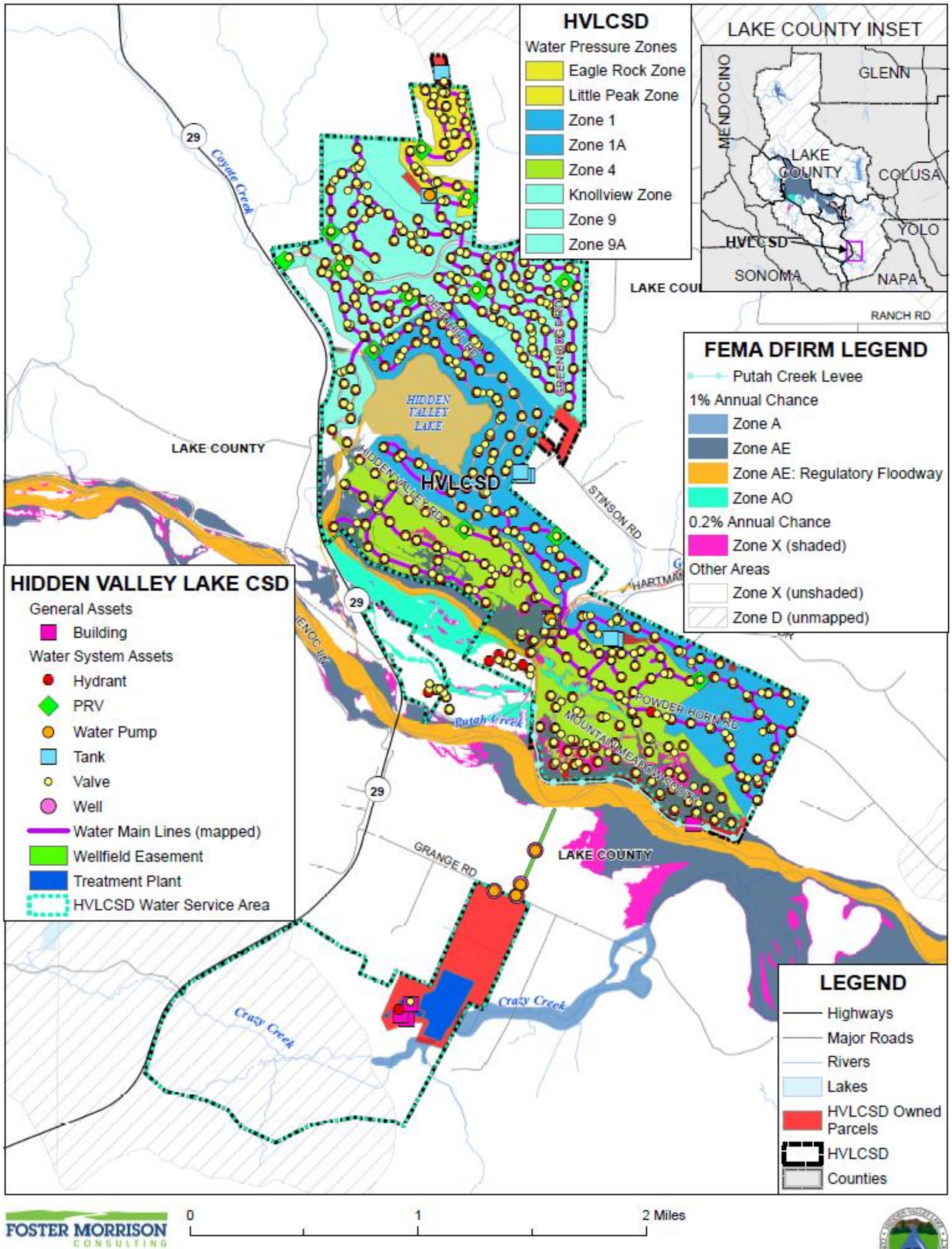
- Table 4-65 identifies HVLCSD point assets summarized into 1% and 0.2% annual chance DFIRM flood zones.
- Table 4-66 identifies HVLCSD point counts and assets in detailed DFIRM flood zones.
- Table 4-67 identifies HVLCSD line counts and assets summarized into 1% and 0.2% annual chance DFIRM flood zones.
- Table 4-68 identifies HVLCSD line counts and assets in detailed DFIRM flood zones.

Figure 4-84 HVLCSD – Sewer System and Service Area Assets in FEMA DFIRM Flood Zones



Data Source: FEMA NFHL downloaded November 2024 (NFHL_06_20241031.zip; DFIRM effective date 10/10/2024), HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/11/2024.

Figure 4-85 HVLCSD – Water System and Service Area Assets in FEMA DFIRM Flood Zones



Data Source: FEMA NFHL downloaded November 2024 (NFHL_06_20241031.zip; DFIRM effective date 10/10/2024), HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 12/19/2024.

Table 4-65 HVLCSD – Sewer and Water System Point Assets in 1% and 0.2% Annual Chance FEMA DFIRM Flood Zones

Flood Zone	Asset Count	Asset Value	Content Value
1% Annual Chance Flood Hazard	123	$1,776,750	$877,471
0.2% Annual Chance Flood Hazard	33	$407,171	$0
Other Areas	1,206	$17,879,108	$712,620
Grand Total	**1,362**	**$20,063,029**	**$1,590,091**

Source: FEMA DFIRM 10/10/2024, HVLCSD

Table 4-66 HVLCSD – Sewer and Water System Point Assets in Detailed 1% and 0.2% Annual Chance FEMA DFIRM Flood Zones by Asset Type

Flood Zone / Asset	Asset Count	Asset Value	Content Value
1% Annual Chance Flood Hazard			
Land Asset	5	$409,000	
General Asset	3	$698,998	$877,471
Sewer System Asset	36	$137,680	
Water System Asset	79	$531,072	
1% Annual Chance Flood Hazard Total	**123**	**$1,776,750**	**$877,471**
0.2% Annual Chance Flood Hazard			
Sewer System Asset	14	$377,190	–
Water System Asset	19	$29,981	–
0.2% Annual Chance Flood Hazard Total	**33**	**$407,171**	**–**
Other Areas			
Land Asset	15	$2,356,000	–
General Asset	5	$6,796,391	$712,620
Sewer System Asset	240	$1,322,688	–
Water System Asset	946	$7,404,029	–
Other Areas Total	**1,206**	**$17,879,108**	**$712,620**
Grand Total	**1,362**	**$20,063,029**	**$1,590,091**

Source: FEMA DFIRM 10/10/2024, HVLCSD

Table 4-67 HVLCSD – Sewer System Line Assets in 1% and 0.2% Annual Chance FEMA DFIRM Flood Zones

Flood Zone	Asset Count	Asset Value
1% Annual Chance Flood Hazard	18,121	$2,425,336
0.2% Annual Chance Flood Hazard	4,488	$711,732
Other Areas	106,313	$15,029,976
Grand Total	**128,922**	**$18,137,045**

Source: FEMA DFIRM 10/10/2024, HVLCSD

Table 4-68 HVLCSD – Sewer System Line Assets in Detailed 1% and 0.2% Annual Chance FEMA DFIRM Flood Zones by Asset Type

Flood Zone	Asset	Value per Linear Foot	Asset Length (ft)	Total Value
1% Annual Chance Flood Hazard				
Zone AE	Sewer Line	$70	224	$15,688
		$90	10,492	$944,279
		$135	1,776	$239,743
		$208	1,696	$352,814
		$353	227	$80,140
		Sewer Line Total	**14,415**	**$1,632,664**
	Reclaimed Water Line	$208	600	$124,902
		Reclaimed Water Line Total	**600**	**$124,902**
Zone AE Floodway	Sewer Line	$70	2	$109
		$90	114	$10,234
		$208	969	$201,516
		$353	39	$13,726
		Sewer Line Total	**1,124**	**$255,585**
	Reclaimed Water Line	$208	1,982	$412,185
		Reclaimed Water Line Total	**1,982**	**$412,185**
1% Annual Chance Flood Hazard Total			**18,121**	**$2,425,336**
0.2% Annual Chance Flood Hazard				
Zone X (shaded)	Sewer Line	$90	2,126	$191,318
		$135	315	$42,477
		$208	1,460	$303,580
		$353	358	$126,452
		Sewer Line Total	**4,258**	**$663,827**
	Reclaimed Water Line	$208	230	$47,905
		Reclaimed Water Line Total	**230**	**$47,905**
0.2% Annual Chance Flood Hazard Total			**4,488**	**$711,732**
Other Areas				
Zone X (unshaded)	Sewer Line	$70	8,870	$620,874
		$90	48,269	$4,344,236
		$135	10,098	$1,363,187
		$208	13,774	$2,865,066
		$353	3,957	$1,396,647
		Sewer Line Total	**84,967**	**$10,590,010**
	Reclaimed Water Line	$208	21,346	$4,439,966
		Reclaimed Water Line Total	**21,346**	**$4,439,966**

Flood Zone	Asset	Value per Linear Foot	Asset Length (ft)	Total Value
Other Areas Total			**106,313**	**$15,029,976**
Grand Total			**128,922**	**$18,167,044**

Source: FEMA DFIRM 10/10/2024, HVLCSD

Table 4-69 HVLCSD – Water Main and Lateral Line Lengths in Detailed 1% and 0.2% Annual Chance FEMA DFIRM Flood Zones

Asset/ Flood Zone	Asset Length (feet)	Asset Length (miles)
Water Main Line		
1% Annual Chance Flood Hazard		
Zone AE	4,040	0.77
Zone AE Floodway	231	0.04
0.2% Annual Chance Flood Hazard		
Zone X (shaded)	221	0.04
Other Areas		
Zone X (unshaded)	123,432	23.38
Water Main Line Total	**127,924**	**24.23**
Water Lateral Lines		
1% Annual Chance Flood Hazard		
Zone AE	4,806	0.91
Zone AE Floodway	88	0.02
0.2% Annual Chance Flood Hazard		
Zone X (shaded)	1,531	0.29
Other Areas		
Zone X (unshaded)	25,686	4.86
Water Lateral Lines Total	**32,112**	**6.08**

Source: FEMA DFIRM 10/10/2024, HVLCSD

HVLCSD Service Area Parcel (Structure) Analysis

Table 4-70 and Table 4-71 contain flood analysis results for the HVLCSD Sewer and Water System Service Area. These tables show the number of parcels and values at risk to the 1% and 0.2% annual chance event for the HVLCSD Service Area. Table 4-70 shows a summary of the value of improved parcels by 1% and 0.2% annual chance flood zone. Table 4-71 shows the improved parcels by property use category in each flood zone for the District Service Area.

*Table 4-70 HVLCSD Sewer and Water System Service Area – Count and Value of Parcels by FEMA DFIRM 1% and 0.2% Annual Chance Flood Zones**

Flood Zone / Location	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard						
HVLCSD	263	191	$9,553,777	$32,912,172	$16,556,086	$59,022,035
0.2% Annual Chance Flood Hazard						
HVLCSD	75	62	$1,866,700	$10,413,379	$5,206,690	$17,486,769
Other Areas						
HVLCSD	3,071	2,178	$79,342,076	$388,159,284	$197,093,882	$664,595,242
Grand Total	3,409	2,431	$90,762,553	$431,484,835	$218,856,657	$741,104,045

Source: FEMA 10/10/2024 DFIRM, Lake County 2023 Parcel/Assessor's Data

*With respect to improved parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance floodplain.

*Table 4-71 HVLCSD Sewer and Water System Service Area – Count and Value of Parcels by Detailed FEMA DFIRM Flood Zones and Property Use**

Flood Zone / Location / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard						
Zone A						
Residential	1	1	$2,703,270	$450,069	$225,035	$3,378,374
Open Space / Rural Lands	1	0	$0	$0	$0	$0
Zone A Total	**2**	**1**	**$2,703,270**	**$450,069**	**$225,035**	**$3,378,374**
Zone AE						
Residential	235	184	$5,539,093	$31,271,859	$15,635,930	$52,446,882
Open Space / Rural Lands	9	0	$0	$0	$0	$0
Zone AE Total	**244**	**184**	**$5,539,093**	**$31,271,859**	**$15,635,930**	**$52,446,882**
Zone AE Floodway						
Commercial	1	0	$0	$0	$0	$0
Residential	12	5	$134,377	$990,244	$495,122	$1,619,743
Open Space/Rural Lands	3	0	$0	$0	$0	$0

Flood Zone / Location / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Zone AE Floodway Total	**16**	**5**	**$134,377**	**$990,244**	**$495,122**	**$1,619,743**
Zone AO						
Commercial	1	1	$1,177,037	$200,000	$200,000	$1,577,037
Zone AO Total	**1**	**1**	**$1,177,037**	**$200,000**	**$200,000**	**$1,577,037**
1% Annual Chance Flood Hazard Total	**263**	**191**	**$9,553,777**	**$32,912,172**	**$16,556,086**	**$59,022,035**
0.2% Annual Chance Flood Hazard						
Zone X (shaded)						
Residential	74	62	$1,856,364	$10,413,379	$5,206,690	$17,476,433
Open Space / Rural Lands	1	0	$0	$0	$0	$0
Zone X (shaded) Total	**75**	**62**	**$1,866,700**	**$10,413,379**	**$5,206,690**	**$17,486,769**
0.2% Annual Chance Flood Hazard Total	**75**	**62**	**$1,866,700**	**$10,413,379**	**$5,206,690**	**$17,486,769**
Other Areas						
Zone X (unshaded)						
Agricultural	1	0	$0	$0	$0	$0
Commercial	31	26	$1,087,033	$6,028,479	$6,028,479	$13,143,991
Residential	3,006	2,152	$78,245,782	$382,130,805	$191,065,403	$651,441,990
Open Space / Rural Lands	33	0	$9,261	$0	$0	$9,261
Zone X (unshaded) Total	**3,071**	**2,178**	**$79,342,076**	**$388,159,284**	**$197,093,882**	**$664,595,242**
Grand Total	**3,409**	**2,431**	**$90,762,553**	**$431,484,835**	**$218,856,657**	**$741,104,045**

Source: FEMA 10/10/2024 DFIRM, Lake County 2023 Parcel/Assessor's Data

*With respect to improved parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

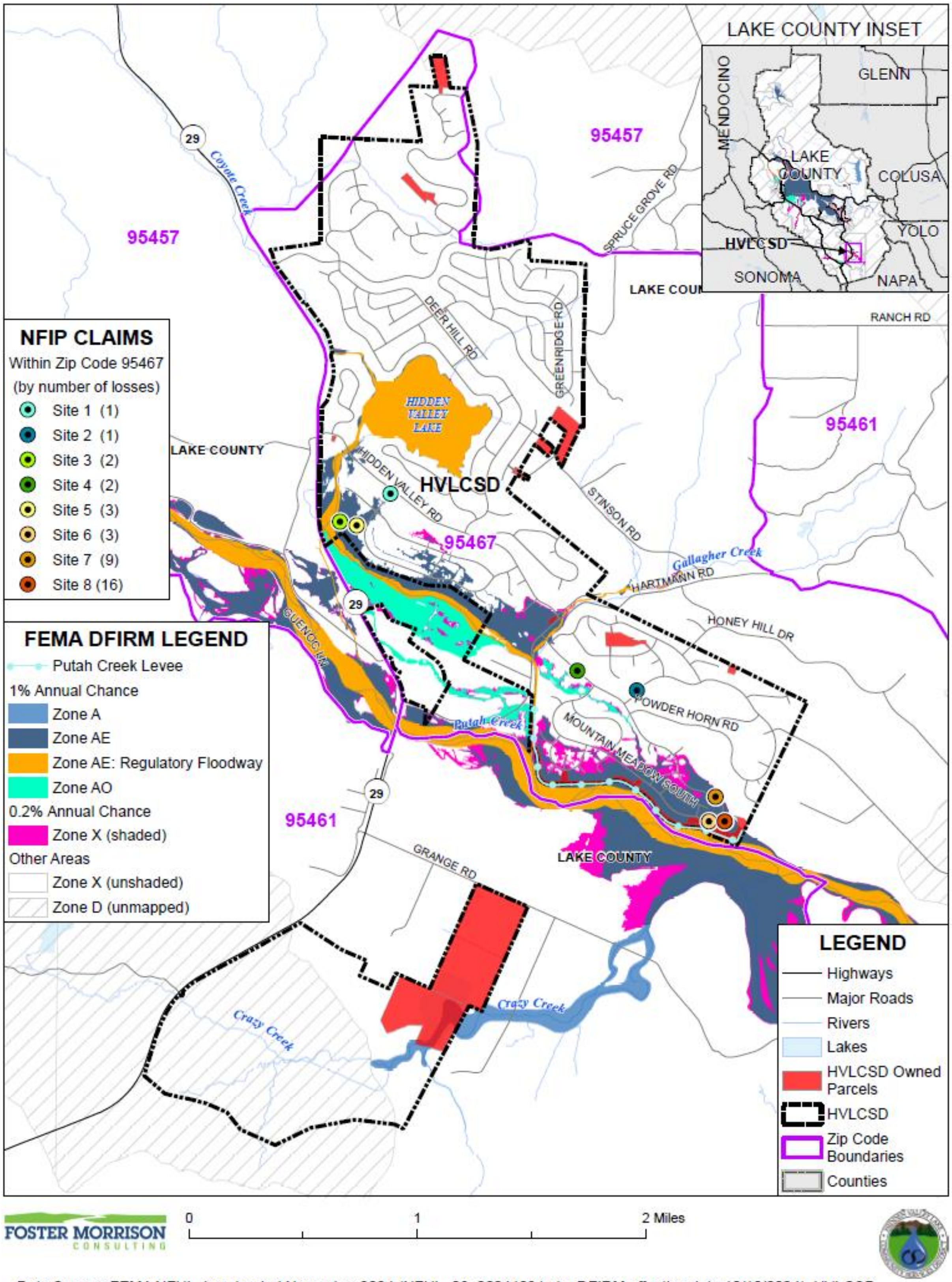
**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance floodplain.

Insurance Coverage, Claims Paid, and Repetitive Losses

The District does not participate in the NFIP. The area served by the District is covered by Lake County's floodplain ordinance. No detailed analysis of insurance coverage in force is provided, due to the District's lack of participation in the NFIP.

The District did provide data on FIP insurance claims in the District. This data is used by the District during grant writing for flood projects. NFIP insured properties in the District can be seen on Figure 4-86 and summarized on Table 4-72.

Figure 4-86 HVLCSD - NFIP Claims Locations



Data Source: FEMA NFHL downloaded November 2024 (NFHL_06_20241031.zip; DFIRM effective date 10/10/2024), HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/11/2024.

Table 4-72 HVLCSD – NFIP Claims in the District Service Area

State	Number of Losses	Total Net Payment	Avg. Net Payment	Active Policies	Total Premium	Average Premium
Grand Total	37	$510,938.65	$13,809.15	134	$121,462	$906

Source: HVLCSD

Community Lifelines

1% and 0.2% annual chance flooding presents a threat to life and property, including community lifelines in the District and greater Lake County. Community lifelines that would be vulnerable to flooding include:

- **Safety and Security** – Search and rescue and swiftwater teams may be called on to perform riskier duties during times of flooding. Police, Fire, EMS, and Public Works personnel are often called on to respond during flood emergencies. During large events, these services may become stretched.
- **Food, Hydration, and Shelter –** Public health can also be at risk from flooding. Floodwater is often contaminated with sewage, which can lead to illness and affect clean drinking water.
- **Health and Medical** – Loss of life and injuries can occur during significant flood events. Flooding may complicate the ability to transport the injured possibly requiring rerouting of injured to other facilities.
- **Energy** – Floods can cause power grid issues and lead to power outages. During extreme flood events gas lines may break or otherwise be damaged from erosion and debris in floodwaters.
- **Communications** – Communication infrastructure can be inundated by a flood event causing damage and disruption in service. As well an influx of service calls to dispatch centers for reporting of flooding, power outages, or other issues can occur. Messaging systems need to be deployed during these times to let the public know about lane and road closures, washouts, debris on roads, and requirements for evacuations or sheltering.
- **Transportation –** Transport networks can be affected, such as flood damage to bridges, railways and roads. This can cause lane and road closures. These closures can affect response personnel (EMS, Fire, Police) as well as cause additional traffic issues for residents and impact evacuation routes. Life safety can also be an issue on flooded roads.
- **Hazardous Material** – Hazardous material facilities can be affected by flooding. Releases during these times can be comingles with flood waters, contaminate drinking water, as well as create additional exposures to the environment.
- **Water Systems** – Floods can affect the ability for water and wastewater systems (like those in HVLCSD) to operate, since many are located near flood zones.

Generally, even major flood events are temporary events with flood waters receding back to pre-storm levels at the conclusion of the storm. However, depending on the location, duration, and magnitude and severity of any given flood event, some of these community lifelines may be overwhelmed in the short term.

Natural, Historic, and Cultural Resources

Large flood events can affect natural, historic, and cultural resources. There are a number of ways floodwaters can impact natural resources and the environment: Wildlife habitats can be destroyed by floodwaters. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levées can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures within the flooded areas, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged and lost during extreme flood events. Any of these resources that fall in the flood zones would be vulnerable.

Economic Assets and Community Activities of Value

As previously noted, the largest economic asset in the District Service Area is the HVLCSD. Major flood events could affect any economic asset that lies in the floodplain and can have long lasting effects. This could cause those businesses and economic assets within these areas to close or relocate. These events can also affect those economic assets outside of the floodplain, at least in the short term until the Planning Area has sufficiently recovered. Community activities of value can also be disrupted by floods, though many of these events take place in the summer months, where flooding is less likely.

Within the District, the golf course, the Greenview restaurant and it's public events area, along with all commercial buildings (not including the HOA building, although HOA property would be affected) would impacted by this hazard.

Impacts from Flood: 1%/0.2% Annual Chance Flood

Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Large flood events, including those associated with 1% and 0.2% annual chance floods, can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. People may be swept away in floodwaters, causing injuries or deaths. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Floodwaters can transport large objects downstream which can damage or remove stationary structures. Structures can be damaged directly from floodwaters and can also be damaged from trees falling as a result of water-saturated soils. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services causing power outages. The interruption of power causes major problems and can result in the closure of governmental offices and community businesses. Public schools may also be required to close or be placed on a delayed start schedule. Roads can be damaged and closed, causing safety and evacuation issues. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts from any type of flooding.

Standing water can cause damage to crops, roads, foundations, and electrical circuits. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Floods are one of the more significant natural hazards impacting the District. Major floods in the District, caused by heavy rains, generally affect residential and commercial properties and also affect District facilities and operations. Streets, roads, and highways can be overtopped, washed out, or covered with debris causing the temporary cessation of traffic flow. Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Disruption of and damage to HVLCSD and other public infrastructure, utilities, and services;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community; and
- Negative impact on commercial and residential property values.

Health Hazards from Flooding

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

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

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

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

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

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

Future Conditions/Future Development

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

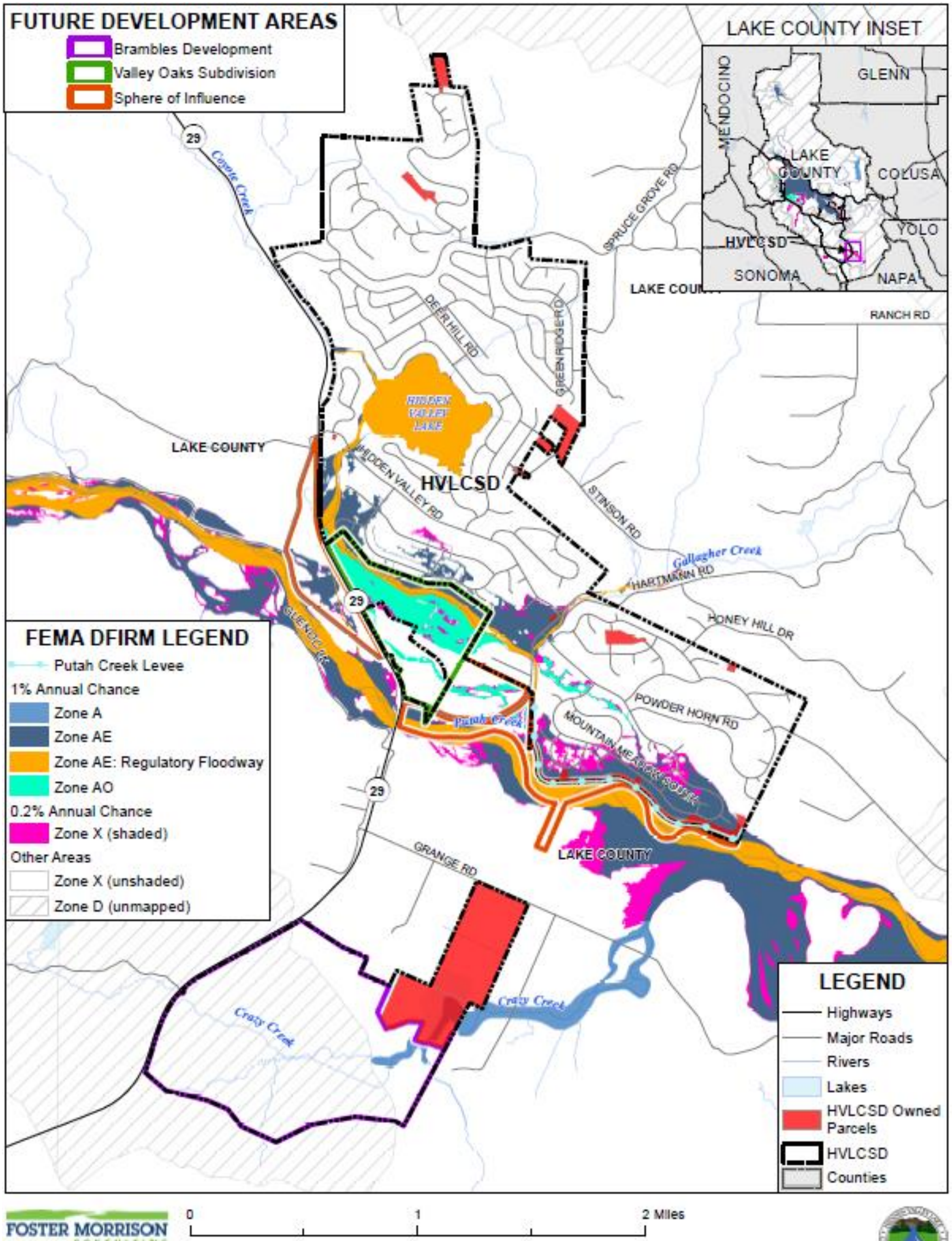
- As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time.
- While population projections for the area served by the District show additional expected growth, these anticipated future changes in population are expected to be relatively small, which is unlikely to affect this hazard and associated impacts to the District. The District may add staff, but this number would be small. The District noted it has no control over population changes in its Planning Area, it merely reacts to them by providing additional (or reduced) services.
- Changes in land use and development in the Hidden Valley Lake area are expected to be limited in the near future and thus are not likely to affect flooding and associated impacts to the District. Additional development traditionally leads to additional flooding. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District to this hazard. With adherence to development standards, future losses to new development should be minimal.

Future development in the HVLCSD may be built in the floodplain, as long as it conforms to the standards of the floodplain ordinance. Lake County should be enforcing the floodplain ordinance on new development and substantial improvements in the District. New HVLCSD facilities and assets will be sited in such a way as to reduce the risk from flooding to HVLCSD Owned Assets.

Future Development: GIS Analysis

The District provided the future development areas which were used as the basis for the inventory of future development areas for the District. Figure 4-87 show the locations of the future development areas overlayed on the DFIRM flood zones that intersect the future development areas. Table 4-73 shows the future development structures and counts and which DFIRM flood zone they fall in.

Figure 4-87 HVLCSD – Future Development Areas in DFIRM Flood Zones



Data Source: FEMA NFHL downloaded November 2024 (NFHL_06_20241031.zip; DFIRM effective date 10/10/2024), HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/11/2024.

Table 4-73 HVLCSD –DFIRM Flood Zones and Future Development Parcels and Acres

Future Development / Flood Zone	Total Parcel Count	Total Acres	Improved Parcel Count	Total Improved Acres	Unimproved Parcel Count	Total Unimproved Acres
Brambles Development						
1% Annual Chance Flood Hazard						
Zone A	1	496.7	1	496.7	0	0
1% Annual Chance Flood Hazard Total	**1**	**496.7**	**1**	**496.7**	**0**	**0**
Brambles Development Total	**1**	**496.7**	**1**	**496.7**	**0**	**0**
Valley Oaks Subdivision						
1% Annual Chance Flood Hazard						
Zone AO	2	150.3	1	47.2	1	103.1
1% Annual Chance Flood Hazard Total	**2**	**150.3**	**1**	**47.2**	**1**	**103.1**
Valley Oaks Subdivision Total	**2**	**150.3**	**1**	**47.2**	**1**	**103.1**
Sphere of Influence						
1% Annual Chance Flood Hazard						
Zone AE	5	40.5	3	10.8	2	29.7
Zone AE Floodway	1	33.7	0	0	1	33.7
Zone AO	1	31.7	1	31.7	0	0
1% Annual Chance Flood Hazard Total	**7**	**105.8**	**4**	**42.4**	**3**	**63.4**
Other Areas						
Zone X (unshaded)	12	82.9	9	61.8	3	21.2
Other Areas Total	**12**	**82.9**	**9**	**61.8**	**3**	**21.2**
Sphere of Influence Total	**19**	**188.8**	**13**	**104.2**	**6**	**84.6**
Grand Total	**22**	**835.7**	**15**	**648.1**	**7**	**187.7**

Source: FEMA 10/10/2024 DFIRM, HVLCSD

4.3.10. Flood: Localized Flooding

Hazard Profile

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

Hazard/Problem Description

Flooding occurs in areas other than the FEMA mapped floodplains. Flooding may be from drainages not studied by FEMA, lack of or inadequate drainage infrastructure, or inadequate maintenance. Localized, stormwater flooding occurs throughout the District during the rainy season from November through April. Prolonged heavy rainfall contributes to a large volume of runoff resulting in high peak flows of moderate duration. Flooding is more severe when previous rainfall has created saturated ground conditions. Urban storm drainpipes and pump stations have a finite capacity. When rainfall exceeds this capacity, or the system is clogged, water accumulates in the street until it reaches a level of overland release. This type of flooding may occur when intense storms occur over areas of development.

Location and Extent

Localized flooding areas are tracked by District. These localize flood problem areas in the District are shown in the Local Concerns section below as summarized in Table 4-74. There is no established scientific scale or measurement system for localized flooding. Localized flooding is generally measured by volume, velocities, and depth of flooding and the area affected. Localized flooding often happens quickly and has a short speed of onset. Localized flooding often has a short duration.

Past Occurrences

Disaster Declarations

There are no identified state or federal disaster declarations for localized flooding, as shown in Table 4-4. However, localized flooding was likely an issue during previous declarations for severe storms, heavy rains and floods as included in the Flood:1%/0.2% Annual Chance in Section 4.3.9.

NCDC Events

The past occurrences of localized flooding are included in the 1%/0.2% annual chance flood hazard profile in Section 4.3.9.

Hazard Mitigation Planning Committee Events

The HMPC noted major events that occurred in 2017, 2019, and 2023. These are discussed below.

2017 Flooding

From 1/7/17 – 1/11/17, a storm event deposited 13.59" of rain that compounded with runoff from Valley Fire burn scars at higher elevations. The HMPC noted that during this time, two sewer manholes and two private lateral cleanouts overflowed.

On January 8 and 10, 2017, CVRWQCB staff was notified of three raw sewage spills (OES Control Nos. 17-0159 {Manhole located at the corner of 18550 Brookfield Road and North Shore Drive}, 17-0160 {Private lateral cleanout located at the corner of 19666 Mountain Meadow South, and another private lateral cleanout located at 19683 Mountain Meadow South}, and 17-0297{ related to a manhole located at 18805 North Shore Drive }). In follow-up to the notifications, the District submitted a spill response report on January 19, 2017 and an update to the report on March 29, 2017. In addition to the three raw sewage spills, on 10 January 2017 the equalization basin (EQ) at the wastewater treatment plant (WWTP) overflowed into the storage reservoir. This resulted from the collection system being inundated with high volumes of storm water and raw sewage, and the wastewater treatment plant unable to manage peak wet weather flows resulting from the unusually high January and February 2017 storm events.

The District states that between January 7 and January 11, 2017 the collection system and WWTP all exceeded their design capacities. In an effort to prevent a wet weather sewer system overflow within the sewer collection system during the January 8 to 10, 2017 storm event, the District utilized pumper trucks to extract water from the sewer collection system and transport it into the WWTP at the EQ Basin. This volume was reported to be approximately 700,000 gallons from vendor costs. The wastewater was pumped out of the sewer collection system at Lift Station 5 and Lift Station 1 and nearby manholes and hauled to the EQ Basin.

From January 10 to February 23, 2017, pumper trucks took approximately 2.8 million gallons of wastewater out of the EQ Basin, hauling to a treatment plant in Clearlake, approximately 20 minutes away. Examples can be seen in Figure 4-88 and Figure 4-89.

Figure 4-88 HVLCSD – Pumping and Hauling Operations

Source: HVLCSD

Figure 4-89 HVLCSD – Pumping and Hauling Operations

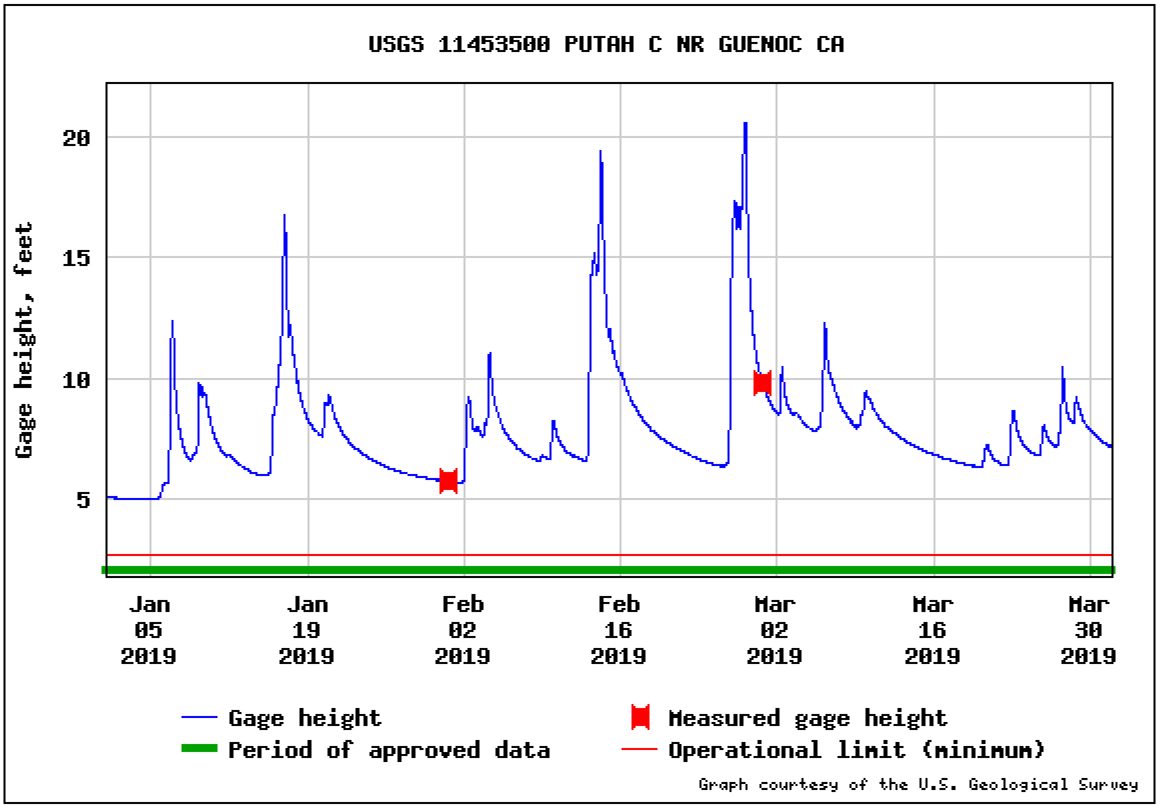
Source: HVLCSD

During 2017 there were 2 different disaster declarations (DR4301 and DR 4308) with approximately $1.4 million of damages that occurred to the District.

2019 Flooding

In 2019, heavy rains fell multiple times (see Figure 4-90).

Figure 4-90 HVLCSD Rainfall – January through March 2019.



Source: HVLCSD

These rains inundated the Wastewater Treatment Plant causing sludge overflow damage (see Figure 4-91 and Figure 4-92). A disaster declaration occurred from this flooding in Lake County (DR4434). Approximately $1.7M of damage occurred to the District.

Figure 4-91 HVLCSD – Basin After DR4434

Source: HVLCSD

Figure 4-92 HVLCSD – Basin After DR4434

Source: HVLCSD

2023 Flooding

In 2023, localized flooding occurred and caused issues in sewer systems. Inflow and infiltration occurred at various areas in the District. HVLCSD didn't bring in as many pumping trucks due to cost. It was noted that the State came out to help during this time.

Likelihood of Future Occurrence

Highly Likely—Storm drainage systems have a finite capacity generally based on the design criteria. When rainfall exceeds this capacity or systems clog, water accumulates in the street until it reaches a level of overland release. Due to aging and often undersized infrastructure, this type of flooding will continue to occur during heavy rains.

It is likely that climate change will increase the chance of future occurrence as well as future impacts. More information on climate change and localized flooding can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Localized Flood

Even if average annual rainfall may decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century, increasing the likelihood localized flood events overwhelming stormwater systems built to historical rainfall averages. This makes localized flooding more likely.

Vulnerability Assessment

Vulnerability—High

Flood vulnerability and their impacts vary by location and severity of any given flood event and will likely only affect certain areas of the District during specific times. Based on this risk assessment, it is evident that floods will continue to have potentially significant economic impacts to certain areas of the HVLCSD. However, while flooding can cause significant impacts depending on the duration and volume of precipitation and the drainage in any given area, many of the floods in the District are minor, localized flood events that are more of a nuisance than a disaster.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to the District. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect the HVLCSD. These sections below include assets at risk, impacts, and how future development can be affected by this hazard.

Local Concerns

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

The District is traversed by several streams and drainage areas which cross through the area. The development that has occurred during the past forty years has accentuated existing drainage problems and has increased the potential for localized flooding. Continued construction of new buildings increases the area of impermeable surface and thus the amount of storm water that flows through the District's storm drain system.

Multiple sources of information detail the issue with localized flooding in the District. These include the following and are discussed below:

- 2000 HVLCSD Master Drainage Plan
- Lake County FIS
- Impacts noted by the HMPC
- Impacts from PSPS

Localized Flood Impacts in the District from Master Drainage Plan

The 2000 HVLCSD Master Drainage Plan provided analysis of localized flooding. The analysis indicates approximately 78 drainage structures within the Hidden Valley Lake Subdivision are undersized for the design flow. In addition to the drainage structures (culverts), a storm water pump station, located at the southeast end of the subdivision (Watershed I), has inadequate capacity to carry the 10-year design storm. The upstream portion of Watershed I through the golf course could be used as a detention facility to reduce peak flows to the pump station. However, major upsizing of the station would still be required. A gravity system alternative to the pump station was analyzed that would carry flows downstream entering Putah Creek at a hydraulic grade elevation that would prevent upstream flooding.

Lake County FIS

The Lake County FIS noted that localized flooding can occur in areas of the County, including the Hidden Valley Lake area and the District. Cloudburst storms lasting as long as three hours can occur in the watersheds around the District practically anytime during the fall, winter, and spring and may occur as an extremely severe sequence in a general rainstorm. Cloudbursts are high-intensity storms that can produce floods characterized by high peak flows, short duration, and relatively small volume of runoff. In small drainage basins, such as those existing in the District, cloudbursts can produce peak flows substantially larger than those of general rainstorm runoff. Flooding can lead to stormwater inflow into the District sewer system. Since the HVLCSD sewer system is largely gravity fed, it is not pressurized and water can flow directly into the system through non airtight manhole lids or through increased pressure in the water table. This increased flow of water in the sewer system can cause overflows. Sewer system overflows are of great concern to the District and public health. The HVLCSD Wastewater Treatment Plant is also all open to the air, and flooding from 'cloudbursts' could lead to potential inoperability due to heavy flows.

Impacts note by the HMPC

The HVLCSD noted a letter from the Lake County Supervisors (District 1) that noted that the County of Lake appears to have maintenance responsibilities for the drainage facilities located within the roadways of HVLCSD. The same letter pointed out that there are drainage facilities in HVLCSD that are not located within the roadways, namely the levee and the retention pond and pump station, would be the responsibility of the Hidden Valley Lake Association and the HVLCSD respectively.

The District noted that rainfall creates a high water table, surging rivers and saturated soil. Hidden Valley Lake is vulnerable to the destructive effects of flooding in these circumstances. The levee that protects the community from a flooding waterway (Putah Creek), keeps the stormwater from reaching the Creek. This stormflow then floods houses and streets, repeatedly in low-lying areas. Infiltration of stormwater into the wastewater collections system presents a threat to public health and safety, when the infrastructure is no longer able to meet the demand. Repetitive loss claims, interruption of traffic flow, and infrastructure repair costs will impact the community. The overall cost to treat water and wastewater will rise in the wake of these disasters, and ultimately make these services less affordable to its residents. Impacts primarily include damages to infrastructure and property. Impacts to and life safety from localized flooding would be more limited.

The HMPC also noted that in the low-lying areas of the community, the stormwater detention basin is currently unable to contain the rising water levels and frequency of severe storms. The HVLCSD noted that a number of alternatives have been investigated, including updating the Stormwater Master Plan to reflect the current issues arising from atmospheric river events. Analysis on additional workable mitigation options are being completed by the District.

According to the District, numerous parcels and roads throughout the District, not included in the FEMA 1% and 0.2% annual chance floodplains, are subject to flooding in heavy rains. These are delineated in Table 4-74. In addition to flooding, damage to these areas during heavy storms can include pavement deterioration, washouts, mudslides, debris areas, and downed trees. The frequency and type of damage or flooding that occurs varies from year to year, depending on the quantity of runoff.

Table 4-74 HVLCSD – Localized Flooding Areas

Road/Area Name	Flooding	Pavement Deterioration	Washouts	High Water/ Creek Crossing	Landslides/ Mudslides	Debris	Downed Trees
Gold Flat Ct	X					X	
Mountain Meadow North SE of Powder Horn Rd	X					X	
Oak Flat Rd	X					X	
Bear Valley Rd	X					X	
Mill Pond Rd	X					X	
Horseshoe Rd	X					X	
Gooselake Ct	X					X	
Glencove Ct	X					X	
Magnolia Ct	X					X	
Dove Ct	X					X	

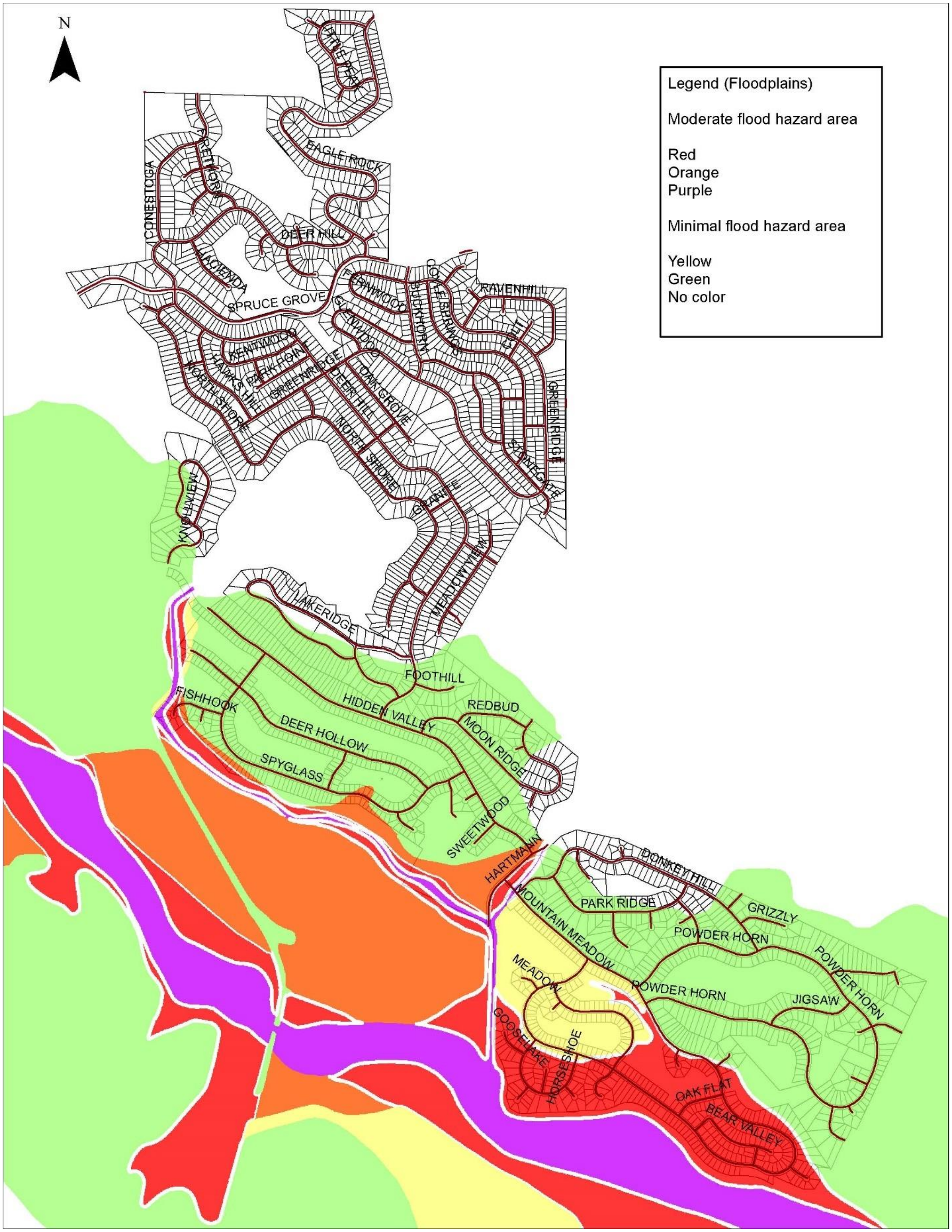
Road/Area Name	Flooding	Pavement Deterioration	Washouts	High Water/ Creek Crossing	Landslides/ Mudslides	Debris	Downed Trees
Old Creek Rd S of #19625	X					X	
Mountain Meadow South SE of Horseshoe Rd	X					X	
Oak Flat Rd	X					X	
Hartmann Rd S of Hidden Valley Rd	X					X	
Fishhook Ct	X					X	
Lift Station (5) Located 18477 North Shore Dr	X					X	
Manhole located 18805 North Shore Dr	X					X	
Lift Station 6 Basin	X					X	
Fishhook and Spyglass	X						

Source: HVLCSD

The HMPC noted that localized flooding is prevalent in two specific areas of the Hidden Valley Lake community. The flows of Putah Creek are held back by a levee during a normal rainy season. This same levee, and flood detention system can cause local flooding to nearby parcels when the level of the creek is higher than the gate valve flowing out of the community. Another creek that flows adjacent to parcels within the District and the Hidden Valley Lake area is Coyote Creek. There is no levee separating this creek from homes. Localized flooding recurs in parcels near this creek. More information can be found in the Local Concerns of the Section 4.3.11.

Other issues specific to the District during flood events include the inflow and infiltration of stormwater into the District's wastewater collection system. Flooding over roadways and properties risk stormwater inflow through infrastructure appurtenances such as cleanouts and manholes. Vulnerable areas are adjacent to creeks that flow through the community, as well as the area in the immediate vicinity of the community's flood detention basin. This flood control area built in 1968, was designed to withstand the annual 10% chance of flood. Figure 4-93, Figure 4-94, and Figure 4-95 show localized flood locations as well as localized flood basins and lift station locations.

Figure 4-93 HVLCSD – Localized Flood Locations

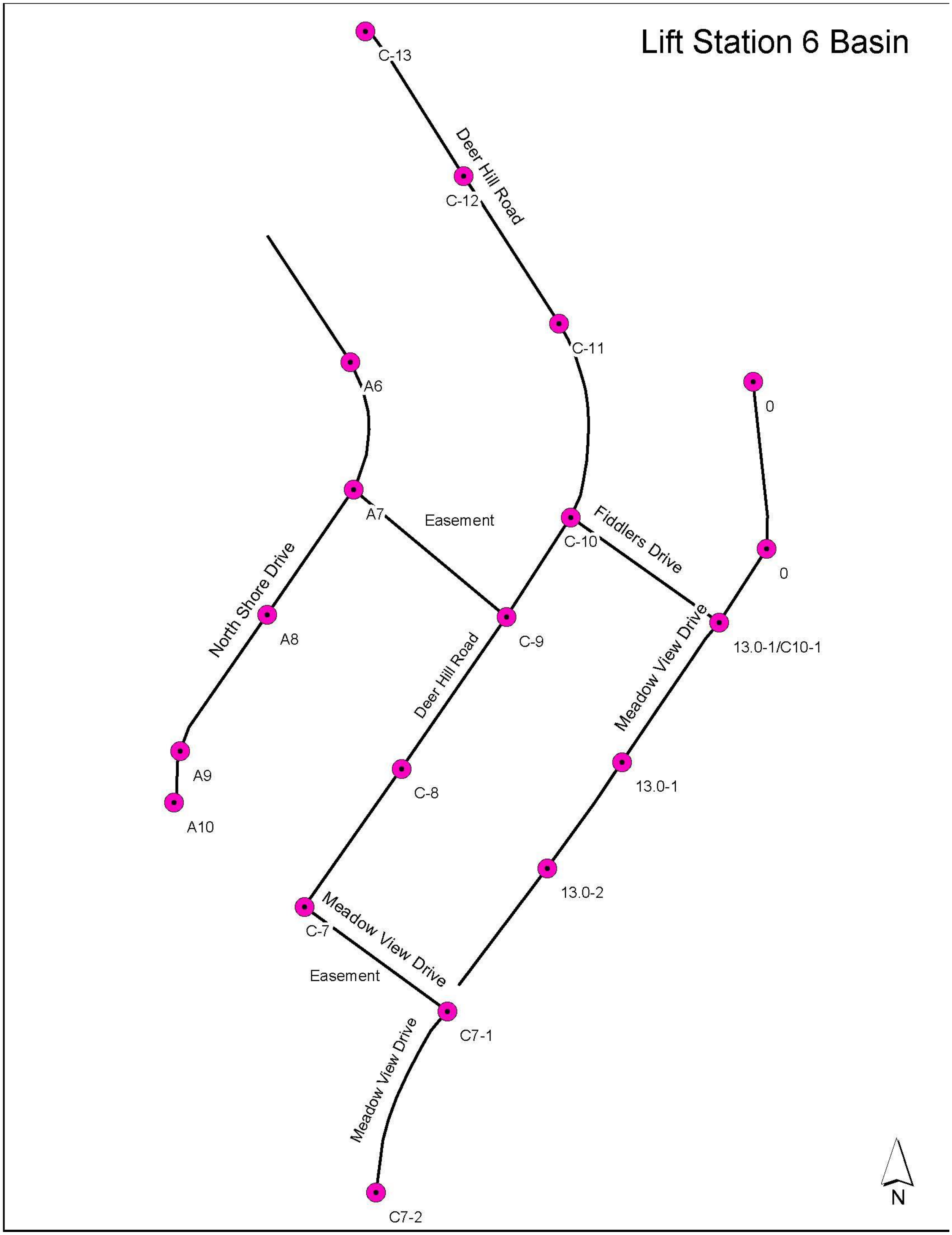


Source: HVLCSD

Figure 4-94 HVLCSD – Flood Detention Basin

Source: HVLCSD

Figure 4-95 HVLCSD – Lift Stations



Source: HVLCSD

Infiltration into the sewer system is a problem for the District. This infiltration can be seen in Figure 4-96, Figure 4-97, and Figure 4-98.

Figure 4-96 HVLCSD – Snapshot through Manhole Cover - Infiltration into Sewer Lines

Source: HVLCSD

Figure 4-97 HVLCSD – Snapshot during Rain Event, Illustrating High Flows. Presence of Stormwater in Sewer Lines.

Source: HVLCSD

Figure 4-98 HVLCSD – Sewer System Overflow

Source: HVLCSD

PSPS and Localized Flooding Impacts

The District also noted that Public Safety Power Shutoff (PSPS) events have impacts on the pumps the District owns for both water and wastewater. Pumps aren't made to be turned on and off such as during a PSPS. This can compromise the integrity of the seals and pump mechanisms, causing damage to the pumps. Air-tight manhole lids are installed in nearly all highly flood-prone areas. The District is slowly replacing all lids in other less severe areas now.

Assets at Risk

Assets at risk from localized flood include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

People and populations are traditionally not highly vulnerable to localized flooding, but their structures and contents can be at risk. Localized flooding may also cause transportation issues for District staff as roads and streets are impacted or closed and affect the ability for people to travel throughout the District.

Structures (including Critical Facilities and Infrastructure)

Both District structures as well as any Service Area structure in areas with localized flooding can be affected if floodwaters intrude into the structure. Structures in low lying areas, or those with basements can be at greater risk. Buildings with older foundations that are prone to water intrusion are also at greater risk. Once water finds its way into a structure, it tends to continue to do so until the path that brings water into a structure is mitigated. Ground saturation can result in instability, collapse, or other damage to structures. Trees can also be compromised and uprooted falling on structures causing damage.

Community Lifelines

Due to the relatively minor nature of localized flooding, community lifelines are unlikely to be overwhelmed. There may be minor vulnerabilities to the following:

- **Safety and Security** – Law Enforcement/Security, Fire Service, and Community Safety officials may be needed to close roads and redirect traffic during localized flood events. These agencies may also experience flooded roads when responding to emergencies.
- **Communications** – Unless directly affected by flooding, communication systems are not likely to be impacted. Warnings and Messaging may be required to reroute traffic away from localized flooding areas.
- **Transportation** – Highways, roads, and bridges may be temporarily blocked until localized floodwaters recede.
- **Water Systems** – Water and wastewater systems can be infiltrated during localized flooding events. Stormwater drainage systems are often undersized and inadequate to convey the volume of flood waters.

Natural, Historic, and Cultural Resources

Natural resource assets may have some vulnerabilities to localized flood during major storm events, but can benefit from floodwaters, often by design. Many parks and green spaces are designed to take overflow water and release it into the underlying soils and natural areas. Wetlands areas in the HVLCSD actually help reduce the risk of flooding, as they can absorb excess rainfall that would have to be drained away from impervious surfaces. Flooding can provide many benefits to the natural environment, including recharging wetlands and groundwater, increasing fish production, creating wildlife habitat, and rejuvenating soil fertility. These smaller localized flooding events often provide more benefits to the environment in comparison to negative impacts associated with large flood events. Historic and cultural resources may be at some measure of vulnerability if they are located in areas subject to repeated localized flooding.

Economic Assets and Community Activities of Value

As previously noted, the largest economic asset in the District Service Area is the HVLCSD. Localized flooding occurs on an annual basis throughout the District during storm events. Most of these events have limited impacts and include those associated with localized flooding due to undersized drainage systems, affecting nearby roads, structures, and other nearby assets. Unless directly affected by localized flooding, these events are unlikely to affect the District's key economic assets.

Community activities of value may have minor vulnerabilities if a localized flood event were to occur during the activity. This may cause the activity to be relocated, cancelled, or rescheduled.

Impacts from Localized Flood

Primary concerns associated with stormwater flooding include impacts to infrastructure that provides a means of ingress and egress throughout the community. Ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical infrastructure. Objects can also be buried or destroyed through sediment deposition. Floodwaters can break utility lines and interrupt services. Standing water can cause damage to crops, roads, and foundations. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Life safety issues from localized flooding would be more limited. The amount and type of damage or flooding that occurs varies from year to year and from storm to storm, depending on the quantity of precipitation and runoff.

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

Future Conditions/Future Development

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

- As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time.
- While population projections for the area served by the District show additional expected growth, these anticipated future changes in population are expected to be relatively small, which is unlikely to affect this hazard and associated impacts to the District. The District may add staff, but this number would be small. The District noted it has no control over population changes in its Planning Area, it merely reacts to them by providing additional (or reduced) services.
- Changes in land use and development in the Hidden Valley Lake area are expected to be limited in the near future and thus are not likely to affect flooding and associated impacts to the District. Additional development traditionally leads to additional flooding. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District to this hazard. With adherence to development standards, future losses to new development should be minimal.

The District noted that post-construction runoff impact occurs by changing the natural hydrology of a land area through the creation of new impervious surfaces during development. Increased impervious surfaces interrupts the natural cycle of gradual percolation of water through vegetation and soil by altering the timing and quantity of peak flows. Instead, water is collected from surfaces such as asphalt and concrete and routed to drainage systems where large volumes of runoff quickly flow to the nearest receiving waterway. The effects of this process include stream bank scouring, bank erosion and downstream flooding, which often lead to a loss of aquatic life and damage to property. The risk of stormwater/localized flooding to future development can be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater or choosing not to develop in areas that often are subject to localized flooding will reduce future risks of losses due to stormwater/localized flooding. Future development in the District will add to the drainage issues already faced by the District, unless adequate drainage facilities are installed in new development locations.

4.3.11. Levee Failure

Hazard Profile

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

Hazard/Problem Description

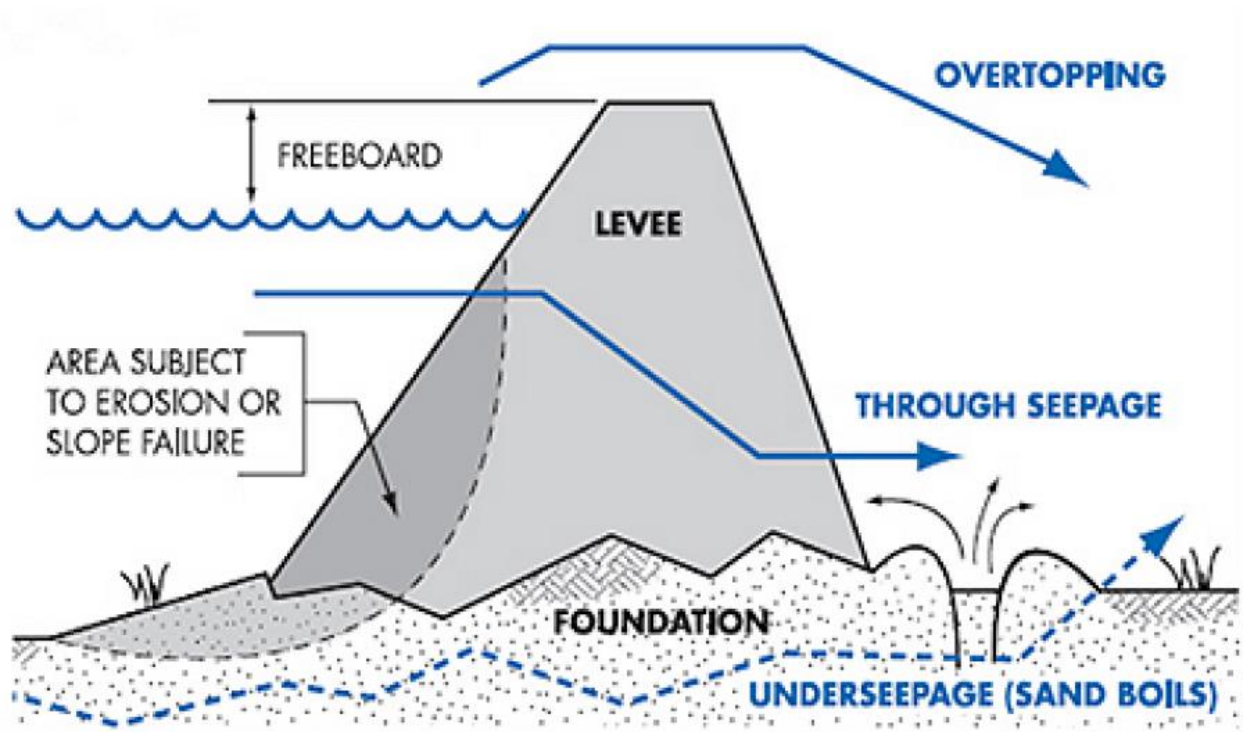
A levee is a raised area that runs along the banks of a stream or canal. Levees reinforce the banks and help prevent flooding by containing higher flow events to the main stream channel. By confining the flow to a narrower steam channel, levees can also increase the speed of the water. Levees can be natural or manmade. Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe weather events or dam failure. Levees reduce, not eliminate, the risk to individuals and structures located behind them.

A levee system failure or overtopping can create severe flooding and high-water velocities. It's important to remember that no levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

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

Rodents burrowing into and compromising the levee system is a significant issue in the District. Erosion can also lead to levee failure. Figure 4-99 depicts the causes of levee failure.

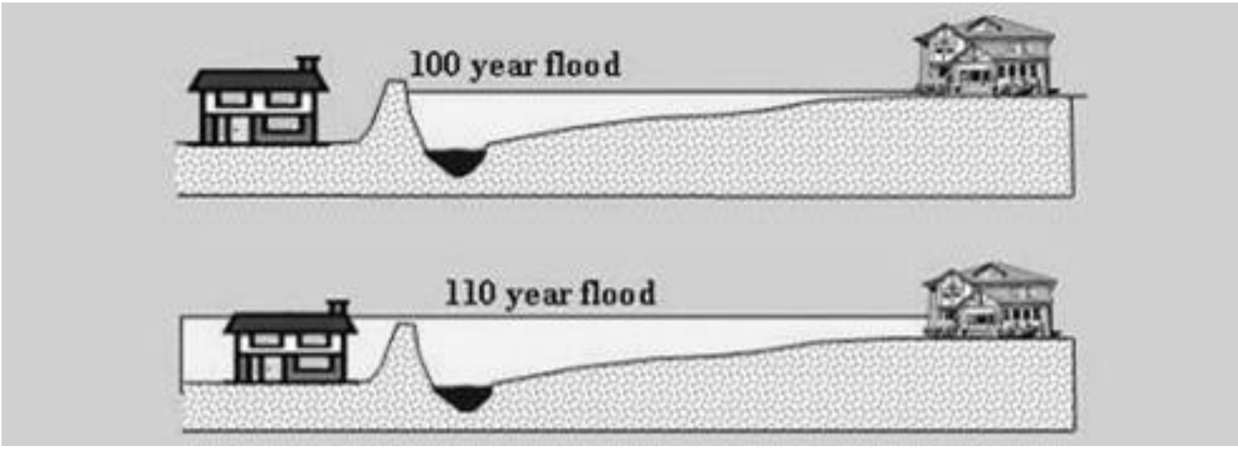
Figure 4-99 Potential Causes of Levee Failure



Source: USACE

Overtopping failure occurs when the flood water level rises above the crest of a levee. As shown in Figure 4-100, overtopping of levees can cause greater damage than a traditional flood due to the often lower topography behind the levee.

Figure 4-100 Flooding from Levee Overtopping

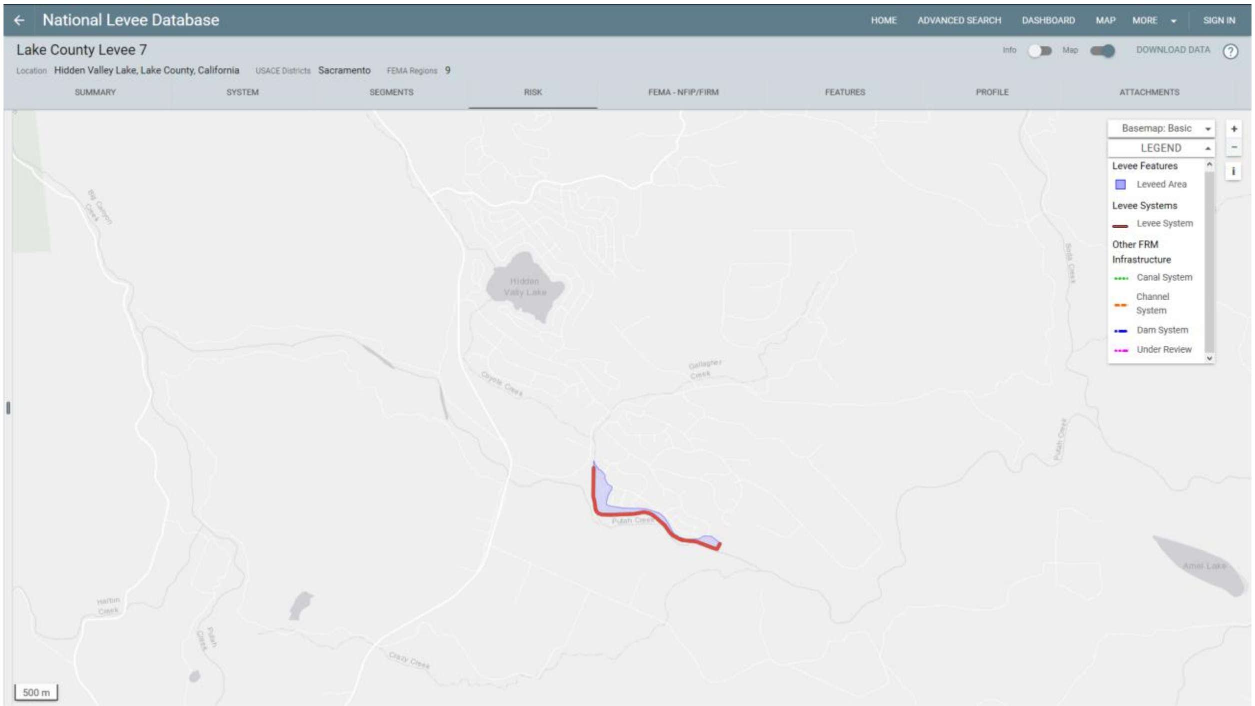


Source: Levees in History: The Levee Challenge. Dr. Gerald E. Galloway, Jr., P.E., Ph.D., Water Policy Collaborative, University of Maryland, Visiting Scholar, USACE, IWR.

Location and Extent

The National Levee Database and the Lake County Flood Insurance Study (FIS) were searched for levee locations in and near the District. According to the National Levee Database, Lake County Levee System 7 protects areas along Putah Creek in the District. This can be seen in Figure 4-101. The red line indicates the levee system, and the purple area indicates the leveed area. According to the National Levee Database, Levee System 7 is not certified as providing protection from the 1% annual chance flood event. Levee failure in the District would likely have a short onset, and the duration would be short. However, if the levee failed during an atmospheric river event, the duration could be prolonged.

Figure 4-101 HVLCSD – Levees in and Near the District



Source: National Levee Database. Map created 7/8/2024

Past Occurrences

Disaster Declaration History

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

NCDC Events

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

Hazard Mitigation Planning Committee Events

2019 - The HMPC noted that there have been no levee failures in the District. It was noted that during storm events occurring on February 26, 2019 that HVLA and HVLCSD were carefully monitoring flood conditions of Putah Creek and the HVLCSD retention basin on Mountain Meadow South. Predictions placed Putah Creek at 20.8 feet by 7:00 AM on the morning of the 27th. A notice went out stating that the levee could be overtopped at 21 feet. If that occurs, residents in flood-prone or low-lying areas are advised to evacuate their homes. Prior to that, it was recommended that residents east of Oak Flat Road should consider evacuation by that evening. Other potential areas of flooding included the Greenview Restaurant and adjacent areas, Fishhook Court, Deer Hollow cul-de-sac, and residences near Putah Creek, Gallagher Creek, and Coyote Creek. Ultimately the levee held.

2022/2023 - High water also occurred in the winter of 2022/2023. The levee held during these high water events. Pumping stations were manned to keep pressure off of the levees.

Likelihood of Future Occurrence

Occasional – Though there is one only one leveed area located in the District, with limited past issues, the HMPC determined the likelihood of levee failure is occasional. This rating was in part determined due to issues surrounding ownership and maintenance of the levee system. It was noted that other hazards like earthquakes, floods, and fires could also increase the likelihood of future occurrence.

It is likely that climate change will increase the chance of future occurrence as well as future impacts associated with levee failure. More information on climate change and levee failure can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Levee Failure

In general, increased flood frequency (which can cause levee failure) in California is a predicted consequence of climate change. Mechanisms whereby climate change leads to an elevated flood risk include more extreme precipitation events and shifts in the seasonal timing of river flows. This threat may be particularly significant because recent estimates indicate the additional force exerted upon the levees is equivalent to the square of the water level rise. These extremes are most likely to occur during storm events, leading to more severe damage from waves and floods.

Vulnerability Assessment

Vulnerability—High

The probability of levee failure is increasing over time due to increased storms and flooding potential from global climate change. Levee failure flooding can occur as the result of partial or complete collapse of an impoundment, and often results from prolonged rainfall and flooding. A levee failure can range from a small uncontrolled release to a catastrophic failure. The primary danger associated with levee failure is the high velocity flooding of those properties downstream of the breach. Vulnerability to levee failures is generally confined to the areas subject to inundation downstream of the levee. In addition, levee failure can cause stream bank erosion, which can in some instances have effects worse than those of flooding itself.

In addition to storm and flood related levee failures, the levees in the District are at risk to failure during an earthquake event. Levee failure flooding could accompany an earthquake if an upstream dam or reservoir fails or if a levee is directly damaged during the seismic event. Severe ground shaking from an earthquake event can cause a dam to fail or overflow to the surrounding area and can also compromise the structural integrity of the levee itself.

Channels and water courses with earthen banks and levees are particularly vulnerable and could collapse in a major earthquake resulting in partial or complete blockage of channels causing flooding upstream of the impoundment. Levees can be especially susceptible to rapid settlement due to liquefaction or horizontal spreading of underlying soils.

Portions of the District are at some measure of vulnerability to levee failure. An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure the District. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect HVLCSD. These sections below include assets at risk, impacts, and how future development can be affected by this hazard.

Local Concerns

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

The HVLCSD noted that the southerly service boundary of the District is adjacent to Putah Creek. Nearby residents within the District's Service Area are protected by a levee along Putah Creek and the flood control channel on the District's side of the levee. The top of the levee is approximately six feet higher than the residential area.

The HVLCSD noted erosion on the river side of the levee, at the north end. Also, burrowing rodents have been observed in the levee wall. The District also noted that the sewer system, by design, is not airtight. In the event of a levee failure, river flow would inundate the sewer collection system, and damage pumping equipment. This would cause floodwaters to contain raw sewage, a threat to the health and safety of the community, as well as a significant hazard to the riparian ecostructure.

It should be noted that the ownership of the levee system is unclear. The levee system falls on two parcels joining at the top of the levee. The creekside parcel is owned by the HVLA; the landside parcel is owned by the HVLCSD. The levee, and associated pump system, was built by the USACE and actual ownership and maintenance responsibilities are unknown. The District is in process of clarifying the ownership and maintenance responsibilities, and these items are a mitigation action included in this Plan in Chapter 5.

It is unclear the degree to which the HVLA maintains the levee from the top of the levee to the creek. However, the water side of levee was repaired in 2017 when excessive rains caused levee erosion which occurs during high flows. On the District side, they inspect, weed whack, and work on defensible space.

Multiple sources of information detail the levee issues in the District. These include the following and are discussed below:

- 2005 FIS
- 2019/2020 HVLCSD Research Project (CivicSparks Fellow)

2005 FIS

The FIS for Lake County noted that selected reaches were restudied to apply FEMA policy to a levee (Lake County 7) built around a subdivision and golf course within the old Coyote Creek floodplain near the District. Coyote Creek diverts around the development before emptying into Putah Creek. An 8-foot-high levee exists on the left banks of both Coyote Creek and Putah Creek. This levee is not certified by any governmental agency to protect from the 1% annual chance flood. Levee freeboard is less than 3 feet between River Mile (RM) 10.28 and RM 10.46, as well as in the vicinity of RM 11.07. Irrespective of inadequate freeboard, since no public agency maintains the levee system, the hydraulic analysis assumed that the left-bank levee along Putah and Coyote Creeks will fail under the 1-percent-annual-chance flood.

Following FEMA guidelines, levees without adequate freeboard are assumed not to exist when mapping flood elevations on the protected side of the levee. The worst-case water surface profile for the left overbank (i.e., within the subdivision) occurs when the levee fails upstream of RM 11.07, while the levee downstream of this river remains intact. Water in the left overbank must weir back over the downstream levee, which controls the left overbank water-surface profile. Coyote Creek is perched above the subdivision, even when there is no left-bank levee. Any water in excess of channel capacity must flow away from Coyote Creek through the subdivision, where it could be trapped behind the downstream levee. In the levee-failure mode, the peak rate of water leaving Coyote Creek is less than 1,000 cfs over the entire reach. The resulting inundation adjacent to Coyote Creek is less than 1 foot deep and is mapped as Zone X.

2019/2020 HVLCSD Research Project (CivicSparks Fellow)

The District provided levee research performed by a 2019-2020 CivicSpark Fellow. That research noted that adjacent to Lift Station 2 is a levee for both Putah Creek and Coyote Creek which fails to protect the low-lying areas of the community - primarily sub-basins 1 and 2 - from stormwater during severe weather events. While a levee is designed to redirect stream flow, during heavy precipitation events this levee causes localized flooding. This threatens both the collection system and the WWTP since flood waters enter the collection system through manholes and other openings and overwhelm the system. Extremely diluted stormwater then travels to the WWTP and compromises the biological processes that occur during wastewater treatment. The reason the levee "fails" is because it is not constructed to withstand the 100-year flood. During major storms the levee door seals shut due to pressure pushing against it from stormwater which prevents water from escaping into either creek.

There is an ongoing issue between the Hidden Valley Lake Association and the HVLCSD as to who owns and is responsible for maintaining the levee. Hidden Valley Lake was originally agricultural land owned by the Hartmann family. It was sold to Boise Cascade – a timber company looking to expand into the home development industry - in 1968. The community was designed like other Boise Cascade developments: with a man-made lake and golf course and with the intention of being a vacation/retirement community. As such, both wastewater and water infrastructure were not designed to accommodate year-round populations. Upon leaving the housing development industry, Boise Cascade created the Hidden Valley Lake Association (HVLA) and Stonehouse Mutual Water Company (SMWC) to manage the community. One of the developments that the company left behind was the Putah Creek levee located at 19963 Mountain Meadow South. Between 1971 - 1974, the company transferred parcel ownership that covers both the stream bed of Putah Creek and the part of the levee that faces it to HVLA and both the stormwater detention basin and the part of the levee that confines it - including the pumphouse - to SMWC. In 1984 residents voted to create the HVLCSD and in 1992 SMWC was merged into the HVLCSD. With it, the portion of the levee that SMWC owned transferred to the District.

The difficulty in establishing ownership lies in the desire for responsibility and the lack of funds. The HVLCSD, under jurisdiction of Lake Local Agency Formation Commission (LAFCo), is only authorized to provide water and wastewater services and therefore lacks funding for stormwater. The HVLA shows no interest in full ownership due to the legal and financial obligations that would come with it. The County does not have a property tax for stormwater management and lacks the capacity to implement major changes due to staff shortages. Although this requires confirmation, there is also the possibility that the County Water Resources Department is unable to address the levee due to it being privately owned and lacking proper certification. The cities of Lakeport and Clearlake both hold Municipal Separate Storm Sewer System (MS4) permits and are under joint agreements with the County Water Resources Department. MS4's are given to municipalities, or their next higher level agency, for the purpose of regulating stormwater. Hidden Valley Lake holds an MS4 permit which is regulated by the County Water Resources Department since Hidden Valley Lake is an unincorporated area of Lake County; the permit is likely overlooked due to the County staffing shortage.

Assets at Risk

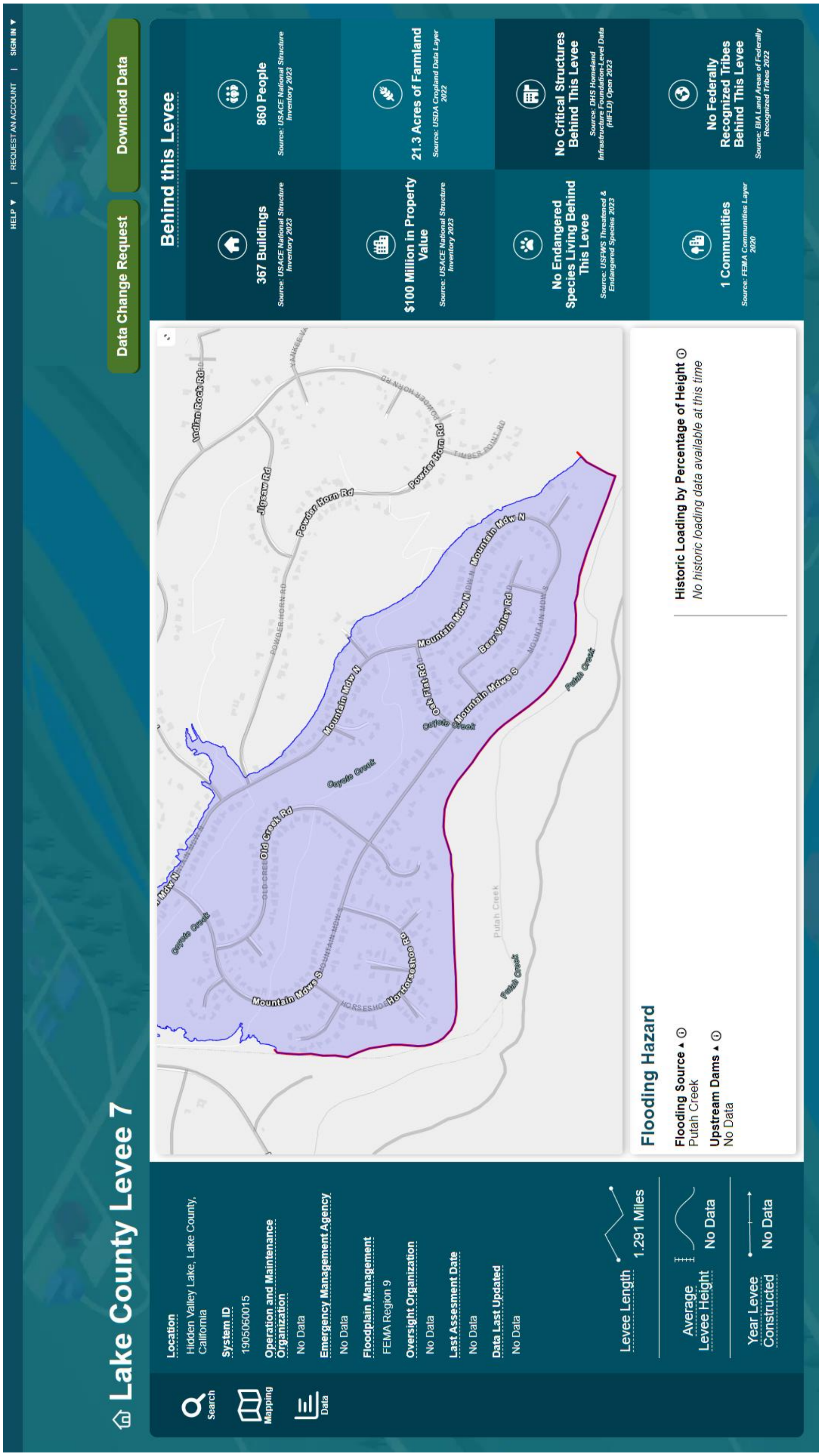
Assets at risk from levee failure include people and populations; structures; critical facilities and infrastructure and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

Populations in the floodplains (both District staff and Service Area residents) are at risk to levee failure flooding. Certain vulnerable populations may be at greater risk from the effects of levee failure flooding. Certain vulnerable populations may be at a greater risk of a sudden levee failure, including the unsheltered, those with limited mobility and those that lack the resources to leave the area.

As the Lake County Levee 7 does not provide protection against the 1% annual chance flood, the FEMA DFIRMs do not include an X protected by levee flood zone. The National Levee Database (NLD), developed by the USACE, does however, contain information on the majority of levees within the USACE program, including the Lake County Levee 7. As part of the USACE Levee Program, the NLD provides an analysis of the area protected by Lake County Levee 7. The analysis includes information regarding populations, structures, and values in the levee protected area as shown on Figure 4-102. The NLD estimates there are 860 people who reside in the levee protected area. However, the date of the NLD analysis is unknown; as such, the populations falling within the levee protected area may have increased.

Figure 4-102 HVLCSD – National Levee Database



Source: National Levee Database. Map created 7/8/2024

Structures (including Critical Facilities and Infrastructure)

A levee failure can affect the built environment of the District, with some parcels and structures in the HVLCSD at risk to a levee failure event. As shown on Figure 4-102 above, there are 367 structures worth $100 million in the levee protected area. Since it is unknown as to the date of this NLD analysis, the number of structures in the levee protected area may have increased. Figure 4-102 states there are no critical facilities behind this levee, however the District does have hydrants, valves, and lines in these areas.

Community Lifelines

Levee failure flooding presents a threat to life and property, including community lifelines in the District and greater Lake County. Community lifelines that would be vulnerable to levee failure flooding include:

- **Safety and Security** – Search and rescue and swiftwater teams may be called on to perform riskier duties during times of levee failure and flooding. Police, Fire, EMS, and Public Works personnel are often called on to respond during flood emergencies which at times may stretch their capacity.
- **Food, Hydration, Shelter –** Floodwater is often contaminated with sewage and other contaminants, which can lead to illness and affect clean drinking water. These life safety and public health issues can tax the ability of the health and medical systems to provide necessary services, even if only temporarily.
- **Health, and Medical** – Loss of life and injuries can occur during significant levee failure events. Flooding may complicate the ability to transport the injured possibly requiring rerouting of injured to other facilities. Public health can also be at risk from flooding.
- **Energy** – Levee failure flooding could affect power distribution locations in the Planning Area. Power outages may occur. Fuel supplies may be temporarily cut off until levees are repaired (allowing for transport of fuel to resume).
- **Communications** – Communication infrastructure can be inundated by a levee failure event causing damage and an interruption in service. As well, an influx of service calls to dispatch centers for reporting of flooding, power outages, or other issues can occur. Messaging systems may need to be deployed during these times to let the public know about road and lane closures, washouts, and debris or flooding on roads.
- **Transportation** – Highways and local roads may experience levee failure flooding. This can cause lane or road closures, bridge closures and significantly limit mobility in the Planning Area. These closures can affect response personnel (EMS, Fire, Police) as well as cause additional traffic issues for residents and impact evacuation routes.
- **Hazardous Material** – Hazardous material facilities can be affected by levee failure flooding. Hazardous materials releases can occur if waters that overtop levees rupture storage tanks and other containment structures and cause them to spill into streams, rivers or drainage systems. Releases during these times can be comingled with flood waters, contaminate drinking water, as well as create additional exposures to the environment.
- **Water Systems** – Floods from levee failures can affect the ability for water and wastewater systems (like those in the HVLCSD) to operate, since many are located near leveed areas.

Given the amount of area that falls in the leveed areas in the District, should they fail, these community lifelines could be overwhelmed during a levee failure event, as least in the short term.

Natural, Historic, and Cultural Resources

Large levee failure events can affect natural, historic, and cultural resources. There are a number of ways levee failures and associated floodwaters can impact natural resources and the environment: Wildlife habitats can be destroyed. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levées can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures within the areas inundated by a levee, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged and lost during extreme levee failure events. Any of these that fall behind any levee would be vulnerable.

Economic Assets and Community Activities of Value

As previously noted, the largest economic asset in the District Service Area is the HVLCSD. Major levee failure flooding events could affect any economic asset that lies in the areas protected by levees. These events can also affect those economic assets outside of the areas protected by levees, at least in the short term until floodwaters have receded and the District has sufficiently recovered. The District felt that a levee failure would have little bearing on community activities of value, unless a failure had a direct impact on the activity while it was occurring.

Impacts from Levee Failure

Floods and their impacts vary by location, including the added impacts associated with a levee failure flood event, regardless of the cause. Impacts would affect those areas of the District fall within the areas inundated by a levee failure. Impacts that are not quantified, but could be anticipated in a large levee failure event, include:

- Injury and loss of life.
- Commercial and residential structural and property damage.
- Disruption of and damage to District critical infrastructure and services.
- Health hazards associated with mold and mildew, contamination of District drinking water, etc.
- Impacts to natural resource areas, including stream bank erosion.
- Damage to roads/bridges resulting in loss of mobility.

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

Future Conditions/Future Development

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

- Climate change is likely to exacerbate future heavy rains and storms and vulnerability of the District to levee failure.
- While population projections for the area served by the District show additional expected growth, these anticipated future changes in population are expected to be relatively small, which is unlikely to affect this hazard and associated impacts to the District. The District may add staff, but this number would be small. The District noted it has no control over population changes in its Planning Area, it merely reacts to them by providing additional (or reduced) services.
- Changes in land use and development in the Hidden Valley Lake area are expected to be limited in the near future and thus are not likely to affect levee failure flooding and associated impacts to the District. Additional development traditionally leads to additional flooding. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District to this hazard. With adherence to development standards, future losses to new development should be minimal.

Future development that occurs in areas behind levees should conform to the Lake County development ordinances, including any requirements contained within the County's floodplain ordinance.

4.3.12. Wildfire

Hazard Profile

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

Hazard/Problem Description

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

Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Economic losses could also result. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides and mudflows, and erosion during the rainy season. Additional losses could occur if PG&E initiates a power shutdown during extreme fire weather conditions. This is discussed in greater detail in Section 4.3.

Wildfire Smoke and Air Quality

Smoke from wildfires is made up of gas and particulate matter, which can be easily observed in the air. Air quality standards have been established to protect human health with the pollutant referred to as PM2.5 which consists of particles 2.5 microns or less in diameter. These smaller sizes of particles are responsible for adverse health effects because of their ability to reach the lower regions of the respiratory tract.

Wildfire smoke can have negative effects to those who live in or near a fire burn area. Smoke and air pollution from wildfires can be a severe health hazard. Large wildfires occurring in nearby northern California communities since the 2020 LHMP Update have created significant air pollution affecting area residents. Local residents have been affected by wildfire smoke and poor air quality, from fires both within the Planning Area and from those much further away. Purple air sensors in the County showed periods of very poor air quality in recent fires. This was a concern especially during Covid. A document titled Smoke Impacts CA: 2020 Lessons – 2021 Actions that was published by the US Forest Service noted that wildfire smoke exposure could result in greater susceptibility to COVID-19 and other viruses/bacteria (decrease in local and systemic immune function).

Location and Extent

Wildfire is part of California's natural ecology. However, its danger and cost have increased as fire-prone areas across the State have been developed. This is especially true in Lake County and the District. Over the years, fire suppression and invasive plants have contributed to fuel build-up and increased the risk of more catastrophic fire events.

Wildland fires affect grass, forest, and brushlands, as well as any structures located within them. Where there is human access to wildland areas the risk of fire increases due to a greater chance for human carelessness and historical fire management practices. Generally, there are four major factors that sustain wildfires and allow for predictions of a given area's potential to burn. These factors include fuel, topography, weather, and human actions.

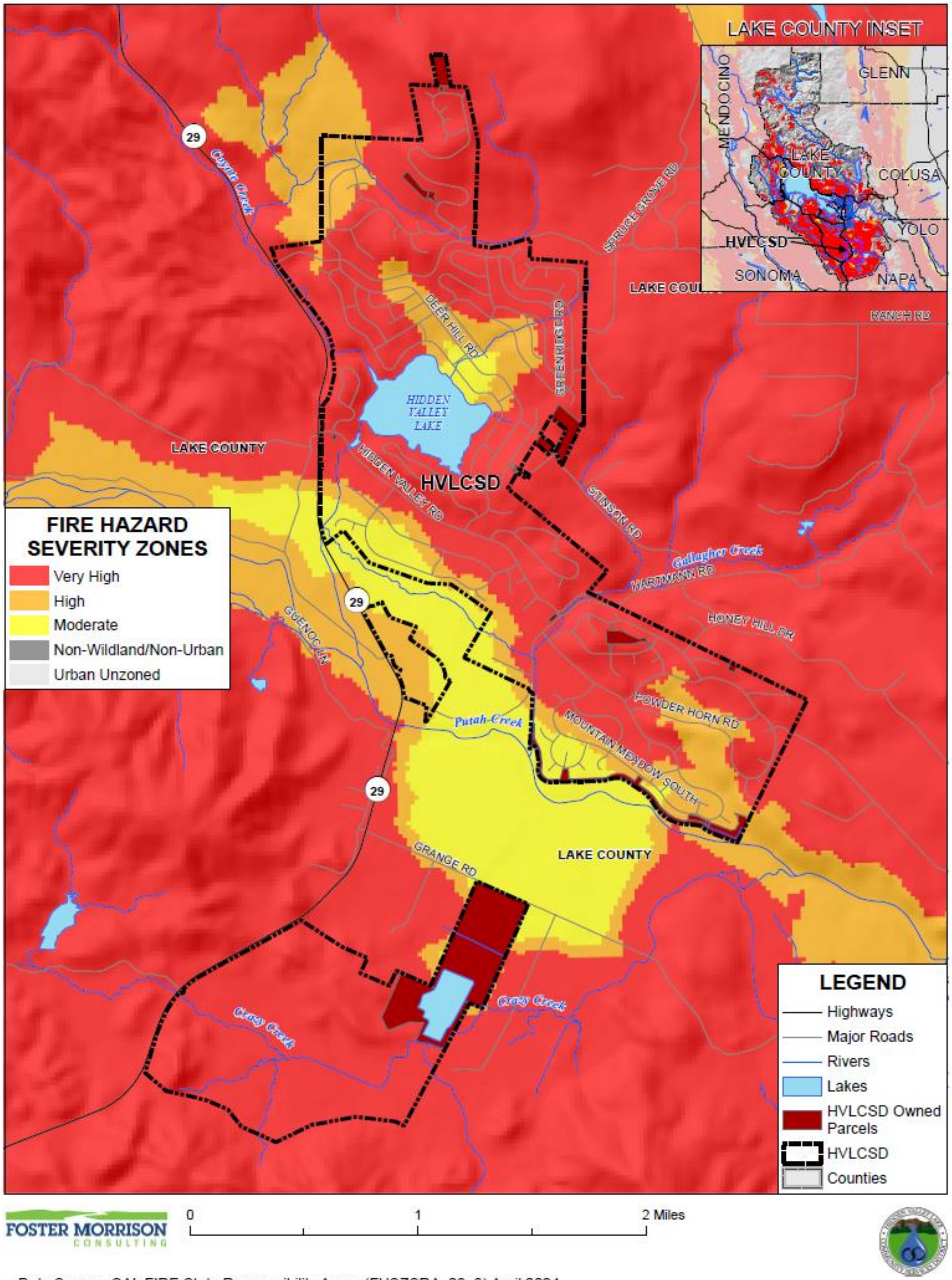
- **Fuel** – Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source are manmade structures, such as homes and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Fuel is the only factor that is under human control. In and near the District, there are open space areas, scrub vegetation, and forested areas that can increase the potential for structural losses in fires.
- **Topography** – An area's terrain and land slopes affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes. The periphery of District is a wildland urban interface (WUI) area where structures are at significant risk of fire exposure. The steep and windy nature of local roads make it difficult for fire suppression vehicles. Surrounded by wildlands, the steep terrain is quite rugged, and therefore challenging for firefighters. Elevation rises from 950msl to 2100msl all within a 3 square mile area.

- **Weather –** Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out fuels that feed wildfires, creating a situation where fuel will ignite more readily and burn more intensely. Thus, during periods of drought, the threat of wildfire increases. Wind is the most treacherous weather factor. The greater a wind, the faster a fire will spread and the more intense it will be. In addition to wind speed, wind shifts can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. Winds have caused power lines to arc and become fire risks to the District. Lightning also ignites wildfires, often in difficult to reach terrain for firefighters. The 2016 Strategic Fire Plan noted that in Lake County and the District, the weather is generally warm and dry during the day with good relative humidity recovery at night. Mid slope elevations may see poor humidity recovery due to inversions. Critical weather patterns are generally those that have higher temperatures and dryer conditions with poor nighttime humidity recovery such as north and east winds. When these conditions combine with the topography, expect extreme rates of spread, especially along exposed ridges and through constricted areas. Peak summer day temperatures generally range from 90-110°F, with relative humidity ranging between 10 – 25%. Gradient winds are generally out of the west or northwest at 5-10 mph. Wind gusts in the area can be in excess of 50 mph, causing red flag days in the District.
- **Human Actions** – Most wildfires are ignited by human action, the result of direct acts of arson, carelessness, or accidents. Many fires originate in populated areas along roads and around homes, and are often the result of arson or careless acts such as the disposal of cigarettes, use of equipment or debris burning. Recreation areas that are located in high fire hazard areas also result in increased human activity that can increase the potential for wildfires to occur.

The 2023 Lake County Community Wildfire Protection Plan (CWPP) noted much about the wildfire environment in the County. From the grasslands and chaparral to the pine/oak woodlands and conifer forests, it is generally believed today that fires in the rural landscape of Lake County are less frequent and more severe compared to the patterns present before Europeans settled the area. This region evolved with fire, and fire will continue to shape it. Much of the vegetation in the county is adapted to, meaning it has evolved with, fire. For example, ponderosa pine (*Pinus ponderosa*) and incense cedar (*Calocedrus decurrens*) both produce very thick bark with age, helping them to withstand the heat of low and moderate intensity fire.

Fires can have a quick speed of onset, especially during periods of drought. Fires can burn for a short period of time, or may have durations lasting for a week or more. Wildfire can affect any area of the HVLCSD. CAL FIRE has mapped areas in California that are at risk to wildfire. Methodologies for this analysis and maps showing the various Fire Hazard Severity Zones, which range from Moderate to Very High, can be found in the Vulnerability Assessment below. Fire Hazard Severity Zones and geographic extents of wildfire in the District can be seen on Figure 4-103 and is detailed in Table 4-75.

Figure 4-103 HVLCSD – CAL FIRE Fire Hazard Severity Zones



Data Source: CAL FIRE State Responsibility Areas (FHSZSRA_23_3) April 2024,
CAL FIRE Federal/Local Responsibility Areas (Adopted SRA fhszs06_3_17) Nov. 2007,
HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/7/2024.

Table 4-75 HVLCSD – Geographical FHSZ Extent

Fire Hazard Severity Zones	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Very High	1,648	74.44%	1,051	79.13%	598	67.43%
High	381	17.22%	195	14.68%	186	21.04%
Moderate	185	8.33%	82	6.20%	102	11.54%

Source: CAL FIRE

Post-Wildfire Landslides and Debris Flows

Post-wildfire landslides and debris flows are a concern in Lake County and the HVLCSD. Fires that burn in hilly areas remove vegetation that holds hillsides together during rainstorms. Once that vegetation is removed, the hillside may be compromised, resulting in landslides and debris flows. Mapping of these areas has begun to occur, and is shown below. This can show the extent of past wildfires. Post-fire debris flow hazard assessments were searched from 2013 to 2024. While many affected Lake County, none of these mapped areas affected the District. It was noted that effects could have been felt by those traveling in and around the County from the District.

Past Occurrences

Disaster Declaration History

Lake County is no exception to the increasingly common problem of property loss and habitat destruction from wildfire. Fuel loads have been accumulating to unnaturally high levels throughout the region due to decades of fire suppression and prevalent land-management practices. This has led to an increase in large, catastrophic wildfires. In 2008, fire protection agencies responded to 687 fires in Lake County. One of the largest fires that year was the Walker Fire, burning a total of 14,500 acres in the Walker Ridge area near Colusa County. It started at the same time as the extensive lightning strike fires burned throughout northern California, stressing local fire protection resources. Further, in 2012 the Wye Fire burned in Lake and Colusa County, consuming 7,394 acres. In 2015, due to drought conditions that occurred throughout California, other major fires occurred: the Valley Fire, Jerusalem Fire, and Rocky Fire. These fires caused major damage. In 2016, the Clayton Fire caused large damages in the County as well. The 2018 Ranch fire caused large damages as well.

A search of FEMA and Cal OES disaster declarations turned up multiple state and federal disaster declarations. This is shown in Table 4-76. Fires since the past plan with disaster declarations include the Caldor Fire and LNU Lightning Complex Fire.

Table 4-76 Lake County –State and Federal Disaster Declaration from Wildfire 1950-2024

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Fire	7	1987, 1996, 2015, 2018 (twice), 2020, 2021	14	1985, 2012, 2015 (three), 2016, 2017 (twice), 2018 (three), 2020 (twice), 2021

Source: Cal OES, FEMA

NCDC Events

The NCDC has tracked wildfire events in the County dating back to 1993. The 22 events in Lake County in the database are shown in Table 4-77.

*Table 4-77 NCDC Wildfire Events in Lake County 1993 to 12/31/2023**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Wildfire	22	5	1	37	9	$5,750,000	$0

Source: NCDC

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

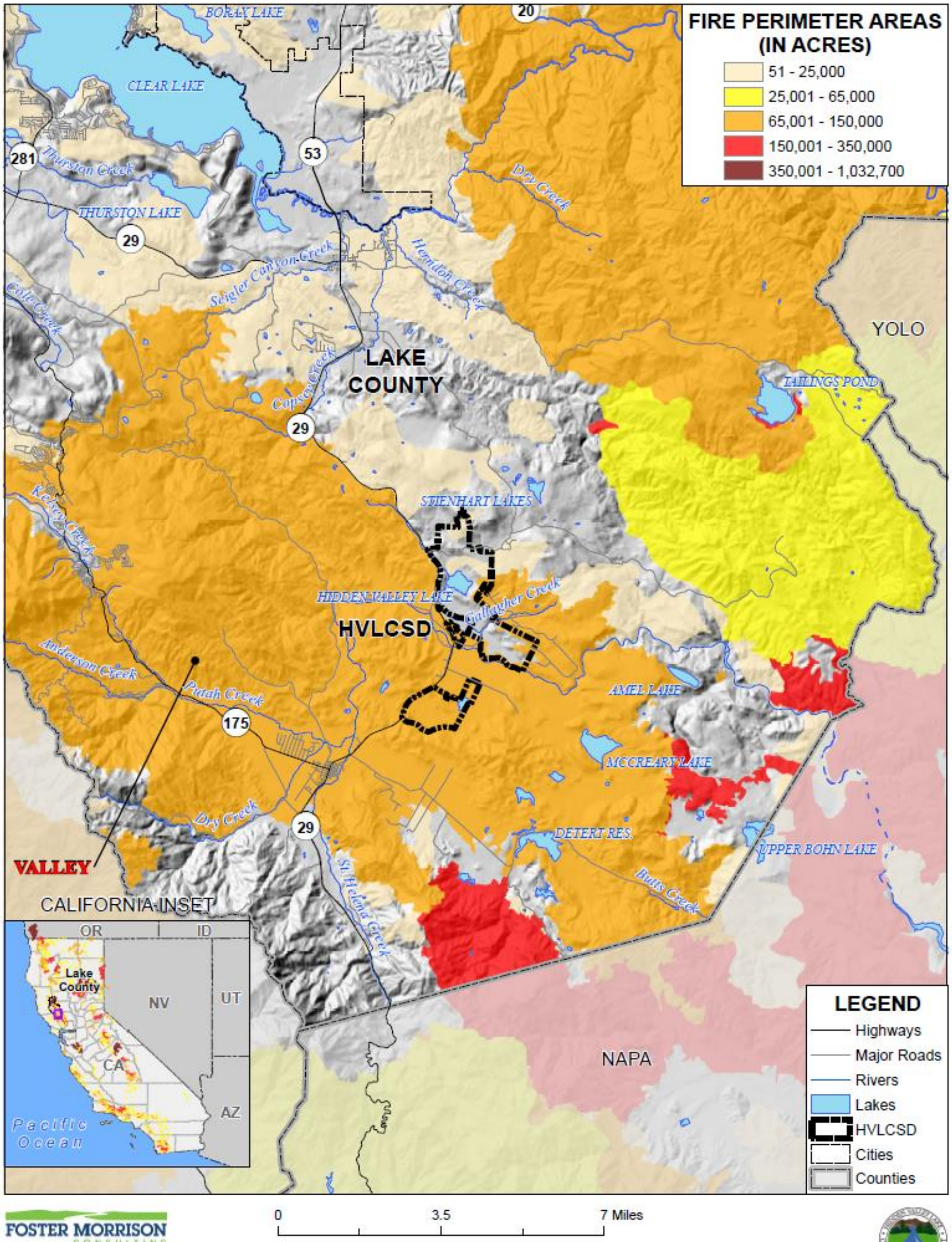
CAL FIRE Events

CAL FIRE, USDA Forest Service Region 5, Bureau of Land Management (BLM), the National Park Service (NPS), Contract Counties and other agencies jointly maintain a comprehensive fire perimeter GIS layer for public and private lands throughout the state. The data covers fires back to 1878 (though the first recorded incident for Lake County was in 1917). For the National Park Service, Bureau of Land Management, and US Forest Service, fires of 10 acres and greater are reported. For CAL FIRE, timber fires greater than 10 acres, brush fires greater than 50 acres, grass fires greater than 300 acres, and fires that destroy three or more residential dwellings or commercial structures are reported. CAL FIRE recognizes the various federal, state, and local agencies that have contributed to this dataset, including USDA Forest Service Region 5, BLM, National Park Service, and numerous local agencies.

Fires may be missing altogether or have missing or incorrect attribute data. Some fires may be missing because historical records were lost or damaged, fires were too small for the minimum cutoffs, documentation was inadequate, or fire perimeters have not yet been incorporated into the database. Also, agencies are at different stages of participation. For these reasons, the data should not be used for statistical or analytical purposes.

The data provides a reasonable view of the spatial distribution of past large fires in California. Using GIS, fire perimeters that intersect the District were extracted and are listed in Table 4-78. There are 6 fires recorded in this database for HVLCSD greater than 50 acres. Each of them was tracked by CAL FIRE. Many more small fires have occurred but were not included in the analysis. Figure 4-104 shows fire history for the County, colored by the size of the acreage burned. This map contains fires from 1950 to 2022, while the detailed tables of wildfire shown in Table 4-78.

Figure 4-104 HVLCSD Wildfire History – CAL FIRE 1910 to 2022



Data Source: CAL FIRE Fire History (InformationFirep22_1) April 2023, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/7/2024.

Table 4-78 HVLCSD – Wildfire History

Wildfire Name	Date	Cause Description	GIS Acres
HIDDEN	11/2/2000	Equipment Use	443
HIDDEN VALLEY	9/7/1985	Unknown / Unidentified	140
MARY BOWCHER	9/15/1951	Unknown / Unidentified	57
ROADSIDE #13	8/7/1961	Unknown / Unidentified	94
VALLEY	9/12/2015	Unknown / Unidentified	1,133
(blank)	(blank)	Unknown / Unidentified	28
HVLCSD Total			**1,895**

Source: CAL FIRE (4/2023), Cal-Atlas (4/4/2024)

Hazard Mitigation Planning Committee

The HMPC noted that fire has played a significant historical role in defining the current vegetative strata in Lake County and the District. Past occurrences the HMPC noted are as follows:

- **2012 Wye Fire –** No impacts occurred in the District from this fire.
- **2015 Rocky Fire** (FM-5112)/**Jerusalem Fire** – The District experienced impacts from this fire. Power outages necessitated generator rentals. The air quality in the District was unhealthy.
- **September 2015** – The **Valley Fire** started September 12th, 2015, and the evacuation lasted for nine days with repairs being conducted for months after. The Valley Fire was fully contained on October 15th after burning 76,067 acres and destroying nearly 2,000 structures. In the District, 73 homes burned; and 1 death also occurred. HVLCSD had 16 sewer connections were affected, as well as 71 water connections (1 being a water fountain). The HMPC provided data showing multiple affects were felt by the District:
  - ✓ 73 homes destroyed
  - ✓ Power and telemetry control destroyed at water source
  - ✓ Flood control station pump house, generator, telemetry, pump motor destroyed
  - ✓ Broken windows at treatment plant
  - ✓ Vegetation compromised flood detention basin functionality
  - ✓ Truck burned
  - ✓ Chemical testing DS, Watershed
  - ✓ Altitude valve/PRVs failure
  - ✓ Boil water notice
  - ✓ Evacuation for 9 days. Essential personnel only.
  - ✓ All field staff working 24x7 to provide water for fire-fighters, and repair burned areas.
  - ✓ Water hammer damage
  - ✓ The air quality in the District was unhealthy
  - ✓ The wellfield control panels were burned in the fire and needed to be replaced. A generator was installed, and pumps were operating in hand to meet fireflow needs.
  - ✓ Water used for fighting the fire, Fire Flow, caused damage to multiple types of valves. The damage was a result of extracting too much water from the system.
  - ✓ The water meters were damaged at the homes that were burned.

- ✓ At the homes that were burned there was sewer access pipes that became exposed and needed to be capped.
- ✓ At the flood detention basin, the flood control pump house burned down. In the pumphouse the District lost a generator, control modules, and the pump motor.
- ✓ Trees were also burned in the flood control detention basin and had to be removed for the proper functioning of the basin.
- ✓ Two employees lost their home, essential personnel resided at the plant
- ✓ With damage to automated controls for water extraction, field staff had to be diverted to manually monitor water extraction.
- ✓ There was a lot of overtime for field staff who repaired the infrastructure damage.
- ✓ Water quality checks were conducted after Fire Flow over extracted the system, leading to back siphonage and the possibility of contaminants entering the system.
- ✓ Boil water notices were issued after having non-chlorinated water in the system, these notices were distributed by directors and family.
- ✓ HVLCSD had to set up a satellite office for taking payments and setting up payroll.
- ✓ There was no water/wastewater charge for those affected by the fire for 6 months after the fire.
- ✓ Since the CSD building was used as a center for CalFire, costs of water and electricity increased as building would run 24/7.
- ✓ Road closures affected the staff's ability to work at the office.
- ✓ Postal service was down during the evacuation, many forms of payment came in the mail. The staff had to go to the mail center in Middletown to get the payments that were mailed in.
- ✓ Bank deposits were made at an alternate branch
- ✓ The CSD building was used as a community center for CalFire during the firefighting
- ✓ The District had the following expenses:
  - Flood control $163,450.71
  - Food $75.48
  - Fuel $12,780.46
  - Generators $57,717.79
  - Labor equipment materials used $17,066.84
  - SCADA $59,862.41
  - Truck repairs $1,082.58
  - Well field $137,974.30
  - **Total expenses: $450,010.57**
- ✓ To add insult to injury, it was reported that damages to the District from the wildfire to some of the flood control systems took longer to repair due to a delay in collecting insurance money. These delays caused the District to have to delay repairs into early 2019, which could have caused greater flood damages to the District as most flooding occurs between November and April.

➢ **2016 Clayton Fire** (FM-5145): Mandatory evacuation for some District employees. There was a partial power outage. Air quality in the District was unhealthy.

➢ **2017 Sulphur fire (FM-5221)** – No impacts to the District were recorded.

➢ **2017 Tubbs Fire** – California Wildfires (DR-4344): HVLCSD provided mutual aid to Sonoma county water agencies (Calistoga). Air quality in the District was unhealthy.

➢ **August 2018 Mendocino Complex Fires** – A wildfire broke out in Mendocino County (and spread to Lower Lake) affected the District and neighboring communities, which caused a power shut down for part of the HVLCSD. As a result, the HVLCSD had to rent generators from a construction company to pump water to District tanks to operate as usual. No direct impacts to HVLCSD. Some employees under evacuation notice. The HVLCSD provided mutual aid to Lake County (Lakeport). The air quality was unhealthy in the District.

- **2019 Kincade Fire** occurred in nearby Sonoma County. There was no disaster declaration in Lake County, but areas of Lake County were evacuated. Middletown was under evacuation warning, but not Hidden Valley Lake. Some employees commute from Middletown. HVLCSD was without grid power throughout the Kincade fire. PG&E (begrudgingly) supplied generators to keep water flowing within the community. The Administration building was severely impacted, and ultimately sent their employees home. No heat and no internet made for a very non-productive environment.

In anticipation of the LNU Lighting Complex Fire reaching the District service area, the District created multiple firebreaks to protect critical infrastructure. Staff worked overtime in case of fire contact and to perform admin work related to the firebreak. Generators were also rented in anticipation of power outages.

Wildfire Smoke Events

Smoke can impact the District due to being in a bowl. There have been several fires surrounding the District. Some small (an acre) fire started inside the boundary but were contained. The large fires above did cause smoke issues in the District.

Likelihood of Future Occurrence

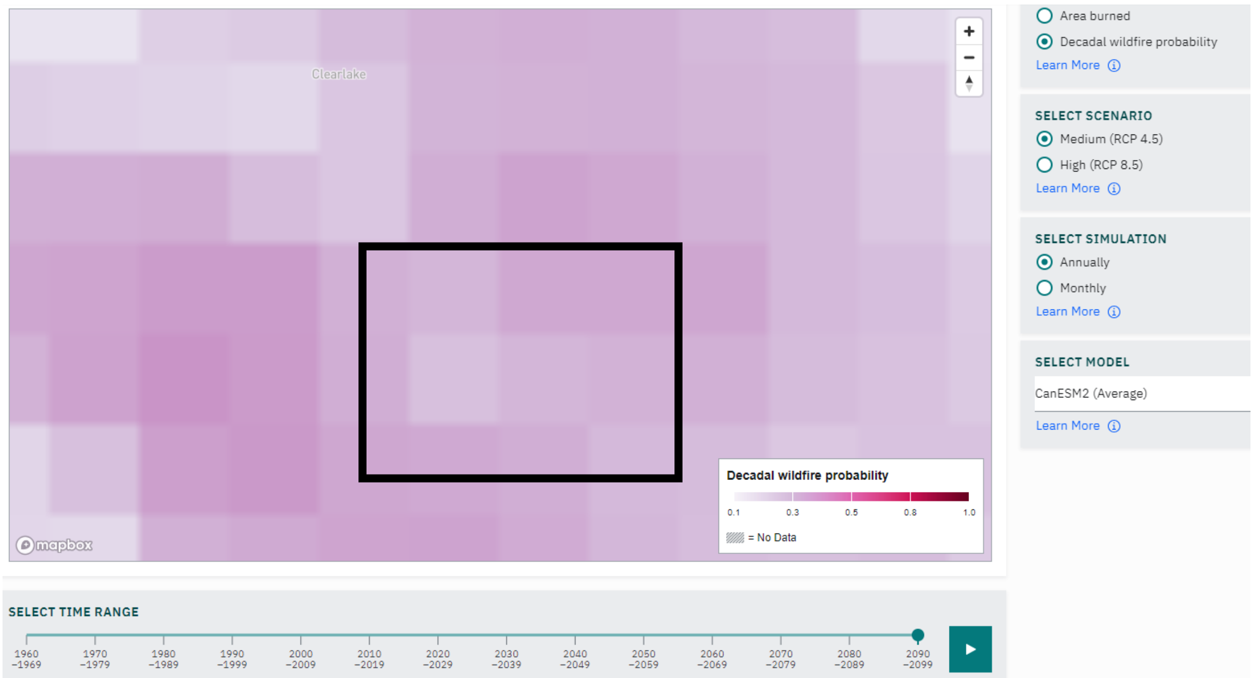
Highly Likely — Each year, the District faces a serious wildland fire threat. Fires will continue to occur on an annual basis in the HVLCSD. The threat of wildfire and potential losses are constantly increasing as human development and population increase and the wildland urban interface areas expand.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

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

Climate Change and Wildfire

Warmer temperatures, such as those caused by climate change, can exacerbate drought conditions. Drought dries out and often kills plants and trees, which serve as fuel for wildfires. Warmer temperatures could increase the number of wildfires and pest outbreaks, such as the western pine beetle which also contribute to high fuel loads. Cal-Adapt's wildfire tool predicts the potential increase in the amount of burned areas for the year 2090-2099, as compared to recent (2010) conditions. This is shown in Figure 4-105. Based on this model, Cal-Adapt predicts that wildfire risk in the District will increase moderately by the end of the century. However, wildfire models can vary depending on the parameters used. Cal-Adapt does not take landscape and fuel sources into account in their model. In all likelihood, in the HVLCSD, precipitation patterns, high levels of heat, topography, and fuel load will determine the frequency and intensity of future wildfires.

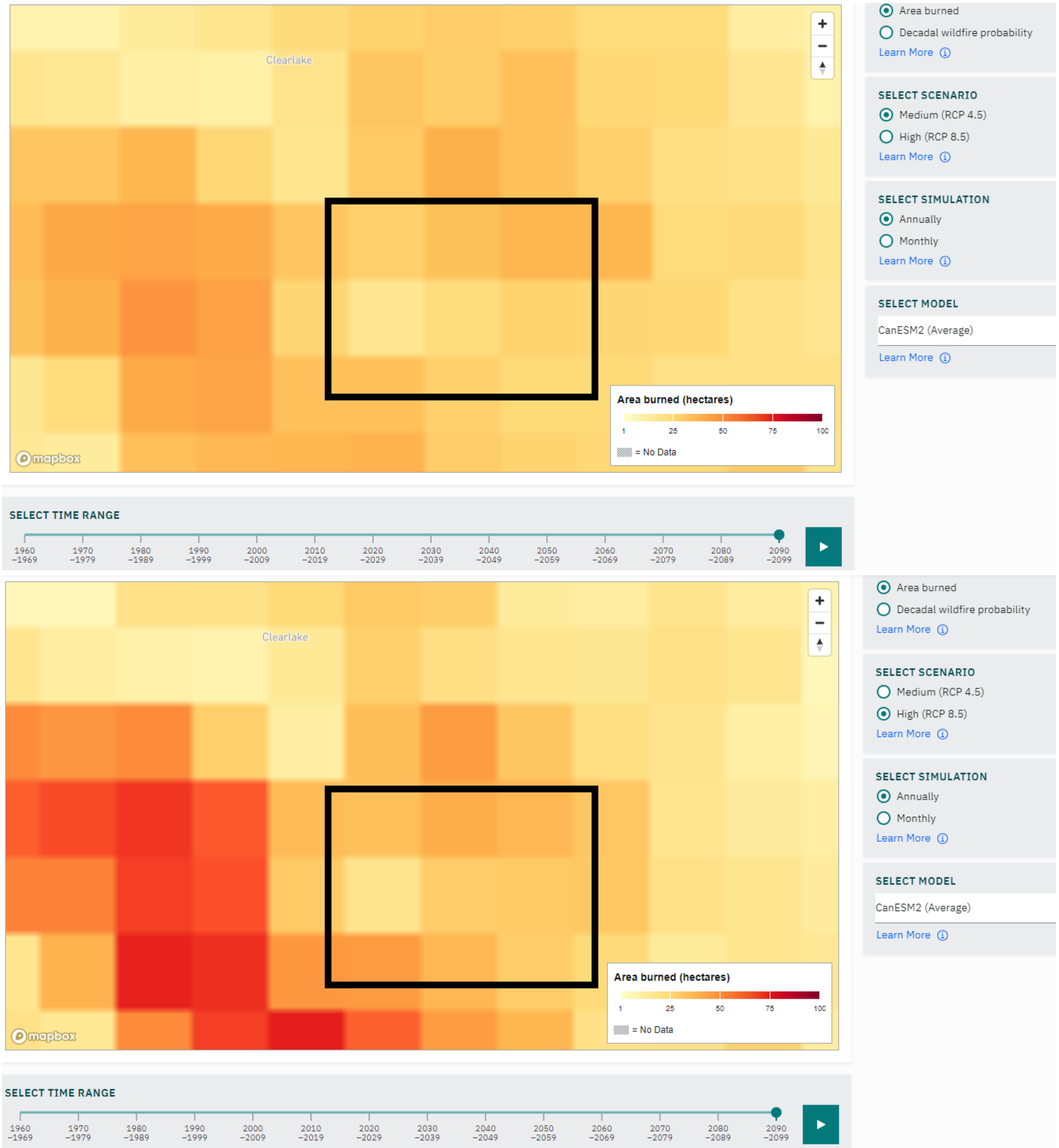
Figure 4-105 HVLCSD – Projected Increase in Wildfire Burn Areas



Source: Cal-Adapt. Retrieved 7/9/2024.

Wildfire scenario projections were done by Cal-Adapt, based on statistical modeling from historical data of climate, vegetation, population density, and fire history. The fire modeling ran simulations on five variables on a monthly time step - Large fire presence/absence, Number of fires given presence, Area burned in a grid cell given a fire, High severity burned area given a fire and emissions. These are shown on Figure 4-106. The upper chart shows modeled annual averages of area burned for the District under the RCP 4.5 scenario, while the lower chart shows modeled annual averages of area burned for the Planning Area under the RCP 8.5 scenario.

Figure 4-106 HVLCSD – Future Annual Averages of Acres Burned under RCP 4.5 and 8.5 Scenarios



Source: Cal-Adapt. Retrieved 3/29/2024.

Vulnerability Assessment

Vulnerability—Extremely High

Risk and vulnerability to the District from wildfire is of significant concern. Wildfires that occur in the District occur from a variety of both natural and manmade causes. The District can be affected both by fires that start on or near HVLCSD lands as well as those that start elsewhere and move into the District. In addition to burning large areas of land, air quality can be affected in the County by fires occurring inside the District as well as those from many miles away. As growth continues and populations increase in the District, the potential for wildfires will also increase.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to the District. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect the HVLCSD. The sections below include assets at risk, impacts, and how future development can be affected by this hazard.

Local Concerns

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

Previous droughts have exacerbated the risk of major wildland/urban interface fires in or near the District. Future droughts will create greater risks to the District to wildfire.

The HVLCSDs water supply consists of three wells, localized in one area south of the District's service area. Should a catastrophic event, such as a wildfire occur that would damage the wells, two water distribution mains, water treatment plant, or the booster pump station, the District would be unable to provide water supply and fire protection to the entire community until such time as the damaged infrastructure is repaired. Depending on the extent of damages, repairs could take weeks or months.

The District maintains a flood control detention basin with a diversion structure, equipped with a 90" check valve to regulate discharge from this channel. The operation of this valve is problematic and at times allowed backup into the flood control channel when the valve is plugged with debris and flows in Putah Creek are at a higher head than the channel. Should a catastrophic event such as a wildfire occur, that would cause this valve to remain open for an extended period of time. When the water surface elevation in Putah Creek is higher than the water surface elevation in the flood control channel and nearby properties, the District is at risk of being unable to control storm flows out of the flood control channel and unable to stop flooding along the southerly boundary of the District's service area. Wildfire debris can also fill the basin and block the valve from closing, causing flood control issues.

The HVLCSD noted that the fire hydrants in the District's water distribution system are non-standard (to the NFPA) wharf hydrants. The District needs to replace these non-standard wharf hydrants with dry-barrel fire hydrants. Dry-barrel fire hydrants are compatible with all standard fire suppression equipment. Dry-barrel fire hydrants provide greater fire flows (typically by a factor of two) when compared to non-standard wharf hydrants. In cases of emergency, this increased fire flow is essential for protection of life and preservation of property. Should a catastrophic event, such as a flood, earthquake, fire, power outage, or terrorist activity, occur, the District would be challenged to produce sufficient quantity of water for fire protection for the District's entire service area with the existing non-standard wharf hydrants. Commercial areas do have dry-barrel hydrants.

The HMPC also noted the effects of wildfire threat to HVLCSD includes loss of electricity (either from PSPS or from other issues), cellular service, and internet functionality. The municipality's administration and water conveyance system cannot function without these three essential components. Recent wildfire threats have highlighted these vulnerabilities. When electricity is unavailable, water pumps are unable to boost the water to tanks and higher pressure zones in areas that do not have a backup power source. A loss of electricity makes water delivery impossible. Operators in the field are cut off from communications without cellular service, and they are essentially unable to complete their responsibilities. Internet access is the foundation of administration functionality. Remotely hosted software that runs customer billing, and field service orders cannot be accessed without the internet.

The District also noted that vacant homes that are no longer kept and are overgrown becomes a fire hazard and liability to those around them. New construction is completed using fire-resistant materials around critical infrastructure to protect these structures. Along with this, the District maintains owned land and clear vegetation growth.

Assets at Risk

Assets at risk from wildfire include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

Methodology

The following methodologies are used in these assets at risk section for wildfire.

FRA, SRA, LRA

There are various wildland fire protection agencies that have responsibility within the California counties. There are also numerous fire departments and fire protection districts that serve local areas, many of whom have mutual aid agreements with each other as well as federal and state agencies for fire suppression and protection. Fire Responsibility areas are generally categorized by Federal Responsibility Areas (FRA), State Responsibility Areas (SRA) and Local Responsibility Areas (LRA).

The CAL FIRE data, detailing Fire Responsibility Areas within the Lake County and the HLVCSD Planning Area, was utilized to determine the locations, numbers, types, and values of land and structures falling within each Fire Responsibility Area. CAL FIRE has a legal responsibility to provide fire protection on all SRA lands, which are defined based on land ownership, population density and land use. CAL FIRE's Fire Responsibility Area layer was used in this analysis to show HVLCSD's parcel counts and values by FRA, SRA, and LRA.

FHSZ

As part of the Fire and Resource Assessment Program (FRAP), the State Fire Marshall was mandated to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors, including areas where winds have been identified as a major cause of wildfire spread. These zones, referred to as Fire Hazard Severity Zones (FHSZs), include moderate, high, and very high FHSZs. The FHSZ map evaluates hazard, not risk. Hazard is based on the physical conditions that create a likelihood and expected fire behavior over a 30-50 year period without considering mitigation measures such as home hardening, recent wildfire, or fuel reduction efforts. Risk is the potential damage a fire can do to an area under existing conditions, accounting for any modification such as fuel reduction projects, defensible space, and ignition resistant building construction.

Effective April 1, 2024, CAL FIRE updated its Fire Hazard Severity Zone (FHSZ) maps for the State Responsibility Area (SRA) to provide updated map zones based on new science in local climate data and improved fire assessment modeling. The FHSZ model for wildland fire has two key elements: probability of an area burning and expected fire behavior under extreme fuel and weather conditions. The factors considered in determining fire hazard within wildland areas are fire history, flame length, terrain, local weather, and the potential fuel over a 50-year period. Outside of wildlands, the model considers factors that might lead to buildings being threatened, including terrain, weather, urban vegetation cover, blowing embers, proximity to wildland, fire history and fire hazard in nearby wildlands. FHSZs are not a structure loss model, as key information regarding structure ignition (such as roof type, etc.) is not included.

The new FHSZ mapping will create more accurate zone designations that can direct the implementation of mitigation strategies in areas where hazards warrant these investments. The FHSZ mapping program is still ongoing with new mapping in Local Responsibility Areas (LRA) in process.

For the Lake County Planning Area, the following datasets were utilized for the analysis and contained all FHSZ hazard classes from Very High to Urban Unzoned: CAL FIRE State Responsibility Area (FHSZSRA_23_3) April 2024 and CAL FIRE Federal/Local Responsibility Areas: (Adopted SRA FHSZ 11/2007 - fhszs06_3_6 and Draft LRA FHSZ 9/2007 - c6fhszl06_1). Since it is possible for any given parcel to intersect with multiple categories for purposes of this analysis, the parcel centroid was used to determine which FHSZ to assign to each parcel. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessor's database and the parcel layer. Based on this approach, the FHSZs for the Planning Area were determined and further broken out by property use and included information on both land and improved values.

This methodology is used below for the FHSZ analysis of people and populations, structures, and critical facilities at risk as well as with respect to future development areas.

People and Populations

All populations (both District staff and Service Area populations) are at some vulnerability to wildfire. Certain vulnerable populations are at greater risk to the effects of wildfire as well as smoke and air quality issues that wildfires bring. Vulnerable populations include:

- Unhoused
- Infants and children under age five and their caregivers
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals who exercise or recreate outdoors
- Individuals who work outdoors
- Individuals with impaired mobility

HVLCSD Service Area residents that live in CAL FIRE FHSZs are often the most vulnerable. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events. To further evaluate the impact to the residential population within the District Service Area, CAL FIRE's wildfire hazard layers were overlayed on the parcel layer and linked to the Assessor data. Those residential parcel centroids that intersect the mapped layers were counted and multiplied by the HVLCSD average household factors for each jurisdiction. These are shown for moderate and higher FHSZs for the District in Table 4-79.

Table 4-79 HVLCSD Service Area – Improved Residential Parcels and Population by CAL FIRE Fire Hazard Severity Zones

Jurisdiction	Very High		High		Moderate	
	Imp. Res. Parcels	Population	Imp. Res. Parcels	Population	Imp. Res. Parcels	Population
HVLCSD	1,663	5,189	499	1,869	250	780

Source: CAL FIRE, 2023 Lake County Parcel/Assessor's Data, HVLCSD Average Household Size – 3.12

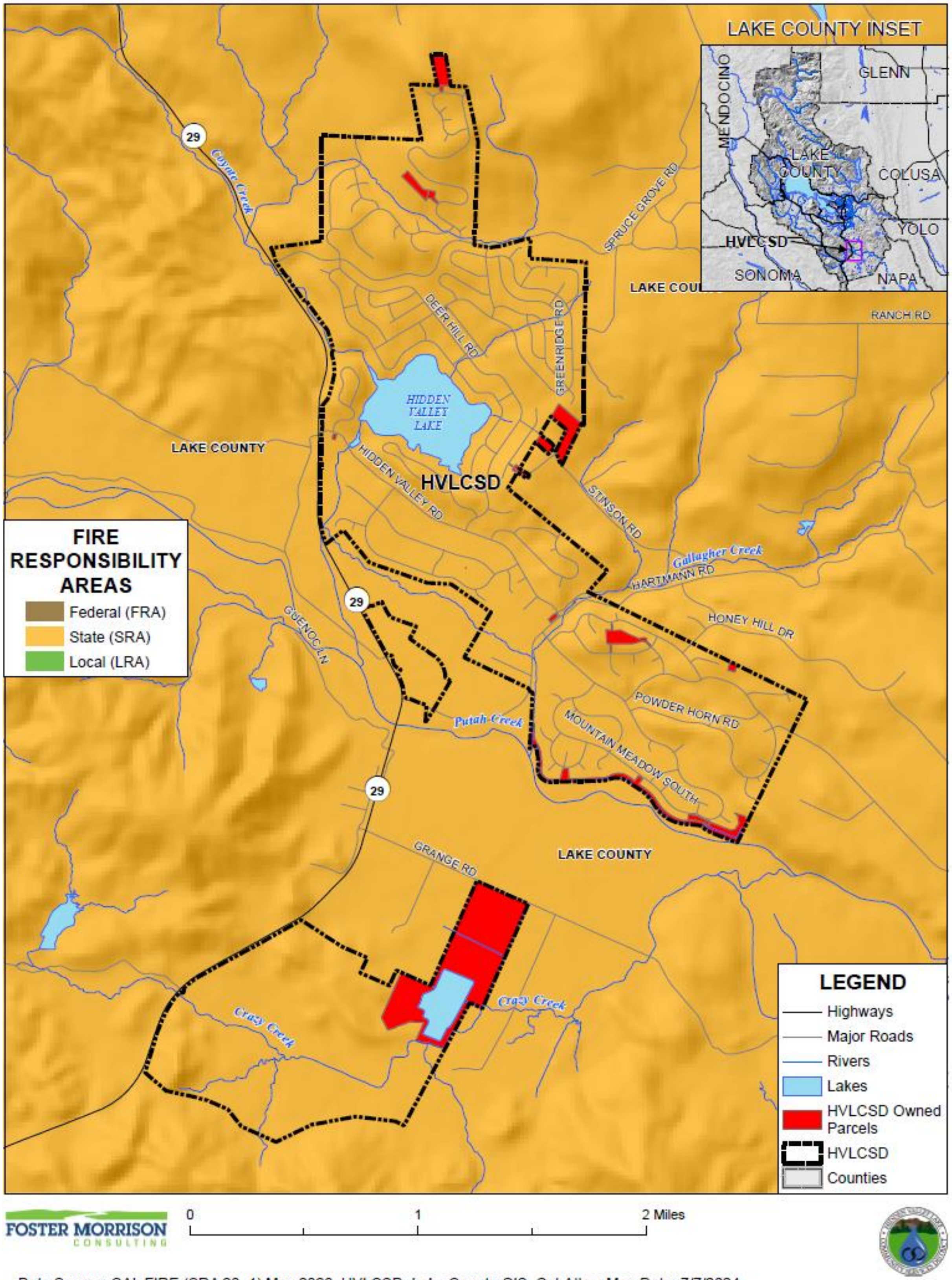
Structures (including Critical Facilities and Infrastructure)

This section is presented in two sections: Fire Responsibility Area Analysis and Fire Hazard Severity Zone Analysis.

Fire Responsibility Area Analysis

The fire responsibility area layer was overlaid with the parcel data. Since it is possible for any given parcel to intersect with multiple fire responsibility areas, for purposes of this analysis, the parcel centroid was used to determine which fire responsibility area to assign to each parcel. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessor's database and the FIS parcel layer. Based on this approach, the fire responsibility areas for the HVLCSD were determined and further broken out by property use and included information on both land and improved values. Locations of each responsibility area are shown in Figure 4-107. As shown, the entire HVLCSD falls in the State Responsibility Area. No tabular analysis is shown for this, as the values in the SRA would be the same as those in Table 4-10 in Section 4.2.1.

Figure 4-107 HVLCSD – Fire Responsibility Areas in FRA, SRA, and LRA



Data Source: CAL FIRE (SRA 23_1) May 2023, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 7/7/2024.

Fire Hazard Severity Zone Analysis

Analysis results for the CAL FIRE FHSZs in the HVLCSD are presented in two parts:

- HVLCSD owned assets, lines, and infrastructure.
- HVLCSD Service Area parcels and structure.

HVLCSD Owned Asset Analysis

For the HVLCSD asset analysis, the lines, points, and HVLCSD owned parcels were spatially located. CAL FIRE FHSZs were overlaid over HVLCSD asset layer to determine assets located in the FHSZs. Two maps were created to depict this analysis. Figure 4-108 shows the CAL FIRE FHSZs overlayed on the sewer lines and infrastructure. Figure 4-109 shows the CAL FIRE FHSZs overlayed on the water lines and infrastructure. Two tables were created to identify HVLCSD assets in the CAL FIRE FHSZs. Table 4-80 identifies HVLCSD point counts and assets in detailed. Table 4-81 identifies HVLCSD line counts and assets in detailed. Detailed tables showing each individual asset, and which detailed FHSZ they lie in are shown in Appendix F.

Figure 4-108 HVLCSD – Sewer System and Service Area Assets in Fire Hazard Severity Zones

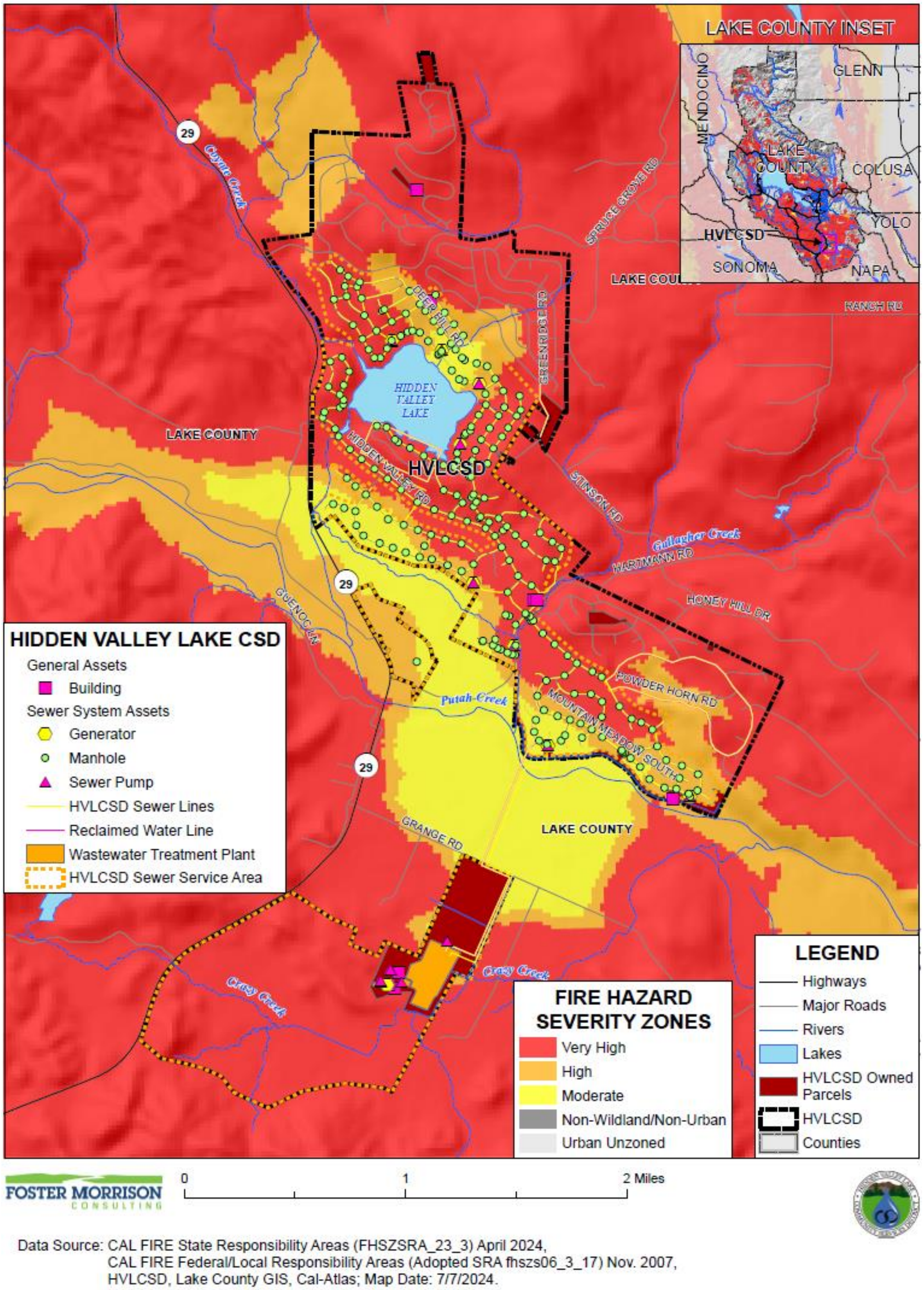


Figure 4-109 HVLCSD – Water System and Service Area Assets in Fire Hazard Severity Zones

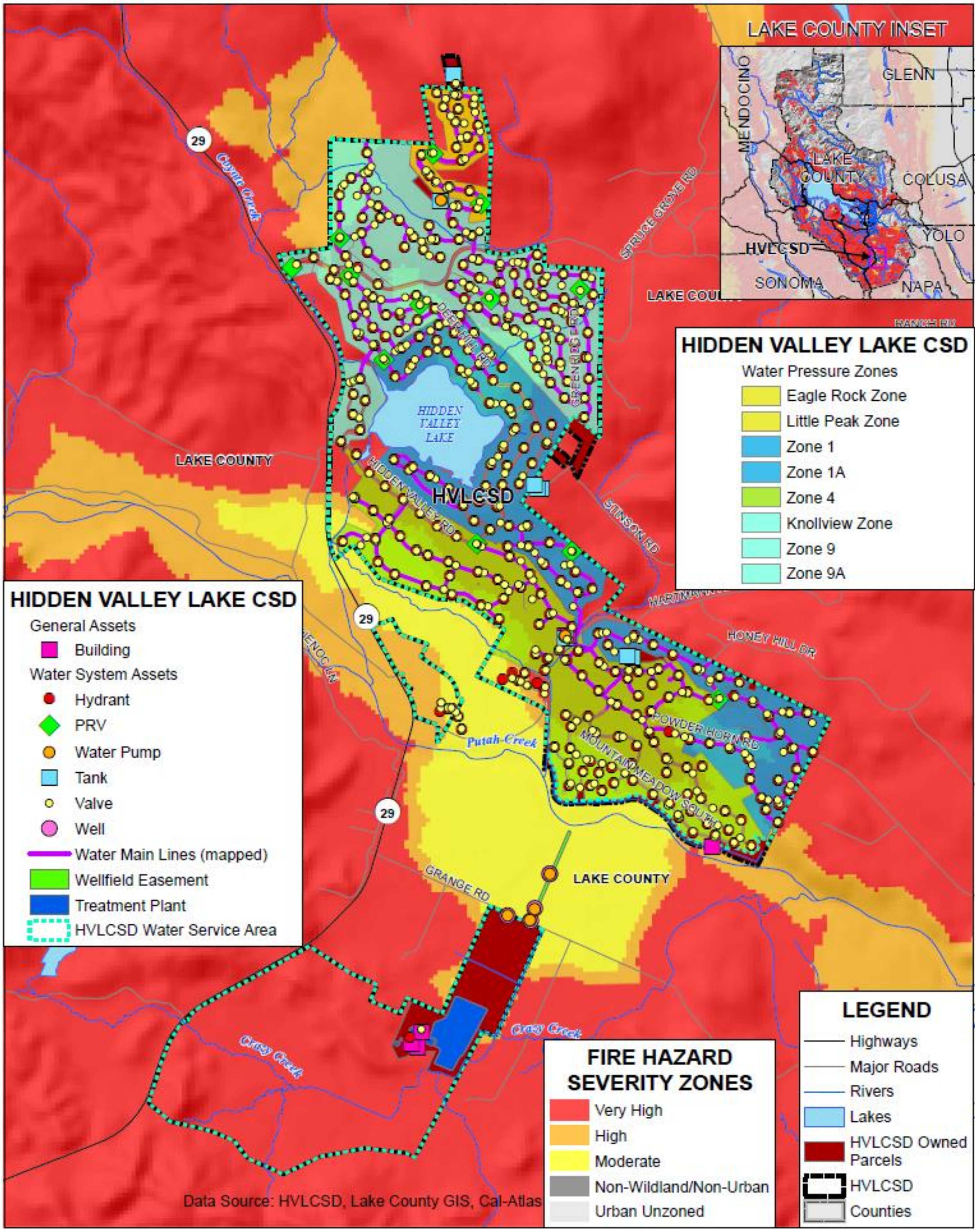


Table 4-80 HVLCSD – Sewer and Water Point Assets in Fire Hazard Severity Zones by Asset Type

Fire Hazard Severity Zone / Asset	Asset Count	Asset Value	Content Value
Very High			
Land Asset			
Parcel	15	$1,585,000	–
Land Asset Total	**15**	**$1,585,000**	**–**
General Asset			
Building	6	$7,390,769	$1,268,249
General Asset Total	**6**	**$7,390,769**	**$1,268,249**
Sewer System Asset			
Generator	4	$439,404	–
Manhole	152	$177,688	–
Sewer Pumps	17	$156,600	–
Sewer System Asset Total	**173**	**$773,692**	–
Water System Asset			
Generator	1	$220,388	–
Hydrant	228	$531,240	–
PRV	11	$61,699	–
Pump	9	$120,850	–
Tank	8	$4,255,773	–
Valve	494	$515,252	–
Water System Asset Total	**751**	**$5,705,202**	**–**
Very High Total	**945**	**$15,454,663**	**$1,268,249**
High			
Land Asset			
Parcel	3	$30,000	–
Land Asset Total	**3**	**$30,000**	**–**
General Asset			
Building	2	$104,620	$321,842
General Asset Total	**2**	**$104,620**	**$321,842**
Sewer System Asset			
Generator	4	$313,860	–
Manhole	58	$67,802	–
Sewer Pumps	9	$112,500	–
Sewer System Asset Total	**71**	**$494,162**	**–**
Water System Asset			
Generator	1	$160,776	–

Fire Hazard Severity Zone / Asset	Asset Count	Asset Value	Content Value
Hydrant	60	$139,800	–
PRV	1	$5,609	–
Pump	2	$20,800	–
Valve	137	$144,216	–
Water System Asset Total	**201**	**$471,201**	**–**
High Total	**277**	**$1,099,983**	**$321,842**
Moderate			
Land Asset			
Parcel	2	$1,150,000	–
Land Asset Total	**2**	**$1,150,000**	–
Sewer System Asset			
Generator	2	$276,620	–
Manhole	36	$42,084	–
Sewer Pumps	8	$251,000	–
Sewer System Asset Total	**46**	**$569,704**	–
Water System Asset			
Hydrant	28	$65,240	–
Pump	5	$752,340	–
Valve	54	$55,674	–
Well	5	$915,425	–
Water System Asset Total	**92**	**$1,788,679**	–
Moderate Total	**140**	**$3,508,383**	**–**
Grand Total	**1,362**	**$20,063,029**	**$1,590,091**

Source: CAL FIRE, HVLCSD

Table 4-81 HVLCSD – Sewer Line Assets in Fire Hazard Severity Zones by Asset Type

FHSZ/Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Very High				
Sewer Line	4	$70	7,695	$538,672
	6	$90	36,619	$3,295,722
	8	$135	4,304	$581,098
	10	$208	6,275	$1,305,126
	12	$208	1,805	$375,453
	15	$353	2,939	$1,037,483
	Sewer Line Total		**59,637**	**$7,133,554**
Reclaimed Water Line	–	$208	13,678	$2,844,979

FHSZ/Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
	Reclaimed Water Line Total		**13,678**	**$2,844,979**
Very High Total			**73,315**	**$9,978,533**
High				
Sewer Line	4	$70	1,400	$98,000
	6	$90	14,841	$1,335,666
	8	$135	6,369	$859,875
	10	$208	2,804	$583,169
	15	$353	542	$191,217
	Sewer Line Total		**25,956**	**$3,067,927**
Reclaimed Water Line	–	$208	4,279	$889,967
	Reclaimed Water Line Total		**4,279**	**$889,967**
High Total			**30,235**	**$3,957,894**
Moderate				
Sewer Line	6	$90	9,541	$858,679
	8	$135	1,514	$204,434
	10	$208	7,016	$1,459,228
	15	$353	1,100	$388,265
	Sewer Line Total		**19,171**	**$2,910,606**
Reclaimed Water Line	–	$208	6,202	$1,290,011
	Reclaimed Water Line Total		**6,202**	**$1,290,011**
Moderate Total			**25,373**	**$4,200,617**
Grand Total			**128,922**	**$18,137,044**

Source: CAL FIRE, HVLCSD

Table 4-82 HVLCSD – Water Main and Lateral Lines in CAL FIRE Fire Hazard Severity Zones

Asset/ Flood Zone	Asset Length (feet)	Asset Length (miles)
Water Main Line		
1% Annual Chance Flood Hazard		
Zone AE	1,281	0.24
Zone AE Floodway	173	0.03
Zone AO	1,633	0.31
0.2% Annual Chance Flood Hazard		
Zone X (shaded)	216	0.04
Other Areas	0	0
Zone D (unmapped)	80,056	15.16

Asset/ Flood Zone	Asset Length (feet)	Asset Length (miles)
Zone X (unshaded)	44,565	8.44
Water Main Line Total	**127,924**	**24.22**
Water Lateral Lines		
1% Annual Chance Flood Hazard		
Zone AE	604	1.11
Zone AE Floodway	0	0
Zone AO	53	0.07
0.2% Annual Chance Flood Hazard		
Zone X (shaded)	82	0.57
Other Areas	0	0
Zone D (unmapped)	437	1.45
Zone X (unshaded)	1,085	2.88
Water Lateral Lines Total	**2,261**	**6.08**

Source: CAL FIRE, HVLCSD

HVLCSD Service Area Parcel/Structure Analysis

All structures in the District have some risk to wildfire. GIS was used to determine the possible impacts of wildfire within the District's service area. Summary analysis results for HVLCSD are shown in Table 4-83, which summarizes total parcel counts, improved parcel counts and their structure values by fire hazard severity zone. As shown on Table 4-83, there are 1,679 improved parcels in the Very High FHSZ, with a total value in excess of $508 million in the HVLCSD Service Area.

Table 4-83 HVLCSD Sewer and Water System Service Area – Count and Value of Parcels by CAL FIRE Fire Hazard Severity Zone

Fire Hazard Severity Zone / Location	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Very High						
HVLCSD	2,434	1,679	$62,925,739	$294,384,265	$149,415,816	$506,725,820
High						
HVLCSD	686	502	$19,498,208	$91,416,071	$46,598,592	$157,512,871
Moderate						
HVLCSD	289	250	$8,338,606	$45,684,499	$22,842,250	$76,865,355

Source: CAL FIRE FRA, SRA, LRA (10/1/2018), HVLCSD, Cal-Atlas (retrieved 3/5/2024), 2023 Lake County Parcel/Assessor Data

Community Lifelines

Wildfire presents a threat to life and property, including to community lifelines in the HVLCSD and greater Lake County. Community lifelines that would be vulnerable to wildfire include:

- **Safety and Security** –Police, Fire, and EMS personnel are often called on to respond during fire emergencies. This would be especially true if a wildfire occurred in or near the Planning Area. Emergency resources may be stretched during a large event.
- **Food, Hydration, Shelter** – Shelters may need to be opened to handle those displaced by a wildfire. Food and water would need to be provided.
- **Health and Medical** – There may be injuries and deaths from wildfire. Patient movement from accident scenes by EMS may have to be rerouted due to fire or smoke issues. Hospitals could see an influx of injured. Public health can be at risk from air quality issues from smoke.
- **Energy** – Wildfires could impact large areas of above ground electric infrastructure, causing widespread power outages. Even the threat of wildfire can cause power outages when fire weather conditions lead to PSPS events. Fire may cause fuel transportation to be delayed, causing local shortages.
- **Communications** – Communication systems can be damaged during a wildfire. An influx of service calls to dispatch centers for reporting of wildfire, power outages, or other issues can occur. Calls to and from family and friends during a wildfire can further overwhelm communication systems such as cell towers and other infrastructure. Demand may exceed the capacity of these systems to remain operational during response efforts. Messaging systems need to be deployed during these times to let the public know about road closures or evacuation routes.
- **Transportation** – Highways and local roads may see closures. These closures can affect response personnel (EMS, Fire, Police) as well as cause additional traffic issues for residents. Evacuation routes may be affected and overwhelmed during a large event.
- **Hazardous Material** – Hazardous material facilities can be affected by wildfire. A release during these times can cause additional risk to responders, as well as additional exposure to the environment.
- **Water Systems** – Water systems may be taxed during wildfires. Access to water for firefighting can also be a challenge if power outages occur in affected areas. Wastewater systems, like those in HVLCSD, can also be affected by an increase in silt, debris ash, and other materials entering the systems.

A large wildfire event could overwhelm many critical facilities and community lifelines in both HVLCSD and the greater Lake County Planning Area.

Natural, Historic, and Cultural Resources

Natural, historic, and cultural resources located within areas at risk to wildfire would be vulnerable. Should a wildfire occur in the District, the impacts to natural, historic, and cultural resources could be extensive and include air pollution, contamination from water runoff containing toxic products, and other environmental discharges or releases from burned materials affecting soils, habitat areas, wildlife, and aquatic resources. Historic and cultural resources can be affected and are often more vulnerable due to their older age, construction type, and lack of fire prevention infrastructure such as sprinklers.

Economic Assets and Community Activities of Value

As previously noted, the largest economic asset in the District Service Area is the HVLCSD. Wildfires in the HVLCSD can cause direct damage to economic assets such as businesses and commercial centers located in affected areas. During extreme events, the economy may slow while recovery efforts are prioritized. Business revenue may be reduced during extended events. Since 2018 the District has seen a continued rise in population and commercial growth, increasing the economic activity in the District. Community activities and events in areas affected by wildfire (and smoke and air quality issues) may be cancelled or rescheduled.

If the District's infrastructure burns it would impact the entire water and wastewater system. If water is unavailable then local businesses cannot function. Infrastructure on the border of the District's service area would be impacted first if a wildfire started outside of District boundaries.

Impacts from Wildfire

Potential impacts from wildfire include loss of life and injuries; damage to structures (commercial, industrial, and residential) and other improvements, natural and cultural resources, croplands, and timber; and loss of recreational opportunities. Wildfires can cause short-term and long-term disruption to the HVLCSD. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the District Planning Area by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality.

Although the physical damages and casualties arising from wildland-urban interface fires may be severe, it is important to recognize that they also cause significant economic impacts by resulting in a loss of function of buildings and infrastructure. Economic impacts of loss of transportation and utility services may include traffic delays/detours from road and bridge closures and loss of electric power, potable water, and wastewater services. Schools and businesses can be forced to close for extended periods of time. Recently, the threat of wildfire, combined with the potential for high winds, heat, and low humidity, has caused PG&E to initiate a PSPS which can also significantly impact a community through loss of services, business closures, and other impacts associated with loss of power for an extended period. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

The impacts of a fire are felt long after the fire is extinguished. In addition to the loss of property in fires, the loss in vegetation and changes in surface soils alters the environment. When supporting vegetation is burned, hillsides become destabilized and prone to erosion. The burnt surface soils are harder and absorb less water. When winter rains come, this leads to increased runoff, erosion, and landslides in sloped areas.

Impacts to the District include potential loss of water availability for fire suppression and/or consumption. Wastewater treatment can also be rendered inoperable when wildfire eliminates the availability of electricity. All wastewater equipment have generators, however, the water distribution equipment does not. Without backup electricity generation, water and wastewater cannot be conveyed. Water quality will also suffer if water treatment functionality is compromised. The economic impact alone to the District including the loss of function of buildings and infrastructure and the cost of reacting to these fires is a major concern.

Wildfire smoke can also have negative effects to those who live in or near a fire burn area. Smoke and air pollution from wildfires can be a severe health hazard. Significant wildfires occurring in nearby northern California communities since the previous LHMP have created significant air pollution affecting area residents. District residents have been affected by wildfire smoke and poor air quality, from fires both within the County and from those much further away.

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

Future Conditions/Future Development

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

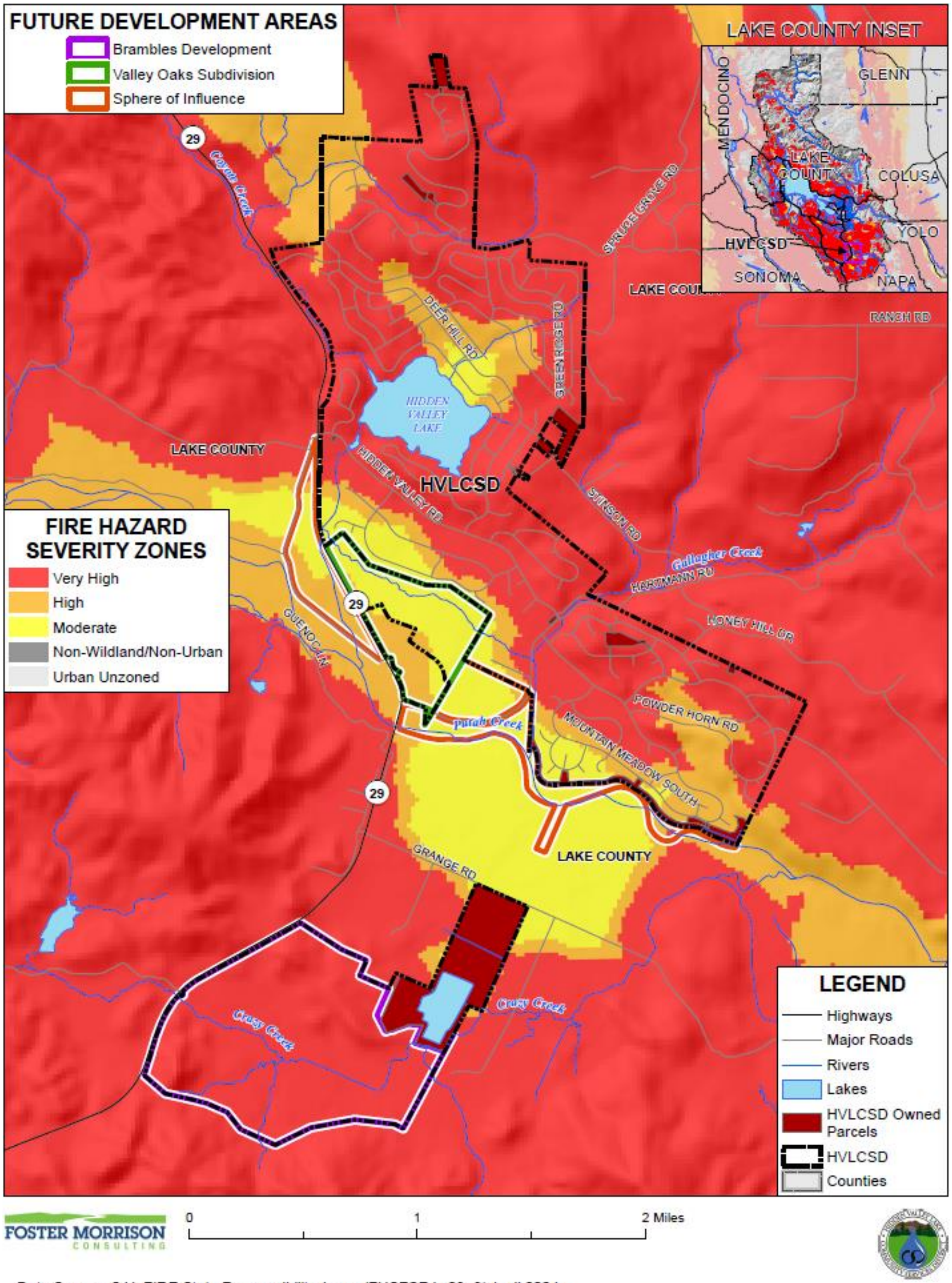
- As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time.
- While population projections for the area served by the District show additional expected growth, these anticipated future changes in population are expected to be relatively small, which is unlikely to affect this hazard and associated impacts to the District. The District may add staff, but this number would be small. The District noted it has no control over population changes in its Planning Area, it merely reacts to them by providing additional (or reduced) services.
- Changes in land use and development in the Hidden Valley Lake area are expected to be limited in the near future and thus would have possible associated wildfire impacts to the District. Additional development traditionally leads to additional fires. In addition, adherence to protective building codes for new development will also assist in limiting future impacts and associated vulnerabilities of the District to this hazard. With adherence to development standards, future losses to new development should be minimal.

The HVLCSD will take wildfire into account when siting new facilities. Fire hydrants, defensible space, well production, water storage, and distribution should all be considered when assessing future development. New facilities will be built to the most current California Building standards for wildfire.

GIS Analysis

The District provided the future development areas which were used as the basis for the inventory of future development areas for the District. Figure 4-110 show the locations of the future development areas overlayed on the CAL FIRE FHSZs that intersect the future development areas. Table 4-84 shows the future development structures and counts and which FHSZ they fall in.

Figure 4-110 HVLCSD – Future Development in CAL FIRE Fire Hazard Severity Zones



Data Source: CAL FIRE State Responsibility Areas (FHSZSRA_23_3) April 2024,
CAL FIRE Federal/Local Responsibility Areas (Adopted SRA fhszs06_3_17) Nov. 2007,
HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 10/30/2024.

Table 4-84 HVLCSD – CAL FIRE Fire Hazard Severity Zones and Future Development Area Parcels and Acres

Future Development/ Property Use/ Fire Hazard Severity Zone	Total Parcel Count	Total Acres	Improved Parcel Count	Total Improved Acres	Unimproved Parcel Count	Total Unimproved Acres
Brambles Development						
Very High						
Agricultural	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Residential	1	496.7	1	496.7	0	0
Open Space/ Rural Lands	0	0	0	0	0	0
Very High Total	**1**	**496.7**	**1**	**496.7**	**0**	**0**
Brambles Development Total	**1**	**496.7**	**1**	**496.7**	**0**	**0**
Valley Oaks Subdivision						
High						
Agricultural	0	0	0	0	0	0
Commercial	1	47.2	1	47.2	0	0
Residential	0	0	0	0	0	0
Open Space/ Rural Lands	0	0	0	0	0	0
High Total	**1**	**47.2**	**1**	**47.2**	**0**	**0**
Moderate						
Agricultural	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Residential	1	103.1	0	0	1	103.1
Open Space/ Rural Lands	0	0	0	0	0	0
Moderate Total	**1**	**103.1**	**0**	**0**	**1**	**103.1**
Valley Oaks Subdivision Total	**2**	**150.3**	**1**	**47.2**	**1**	**103.1**
Sphere of Influence						
Very High						
Agricultural	0	0	0	0	0	0
Commercial	1	7.7	1	7.7	0	0

Future Development/ Property Use/ Fire Hazard Severity Zone	Total Parcel Count	Total Acres	Improved Parcel Count	Total Improved Acres	Unimproved Parcel Count	Total Unimproved Acres
Residential	0	0	0	0	0	0
Open Space/ Rural Lands	0	0	0	0	0	0
Very High Total	**1**	**7.7**	**1**	**7.7**	**0**	**0**
High						
Agricultural	0	0	0	0	0	0
Commercial	2	4.2	0	0	2	4.2
Residential	8	25.4	8	25.4	0	0
Open Space/ Rural Lands	1	7.9	0	0	1	7.9
High Total	**11**	**37.5**	**8**	**25.4**	**3**	**12.1**
Moderate						
Agricultural	2	37.6	2	37.6	0	0
Commercial	3	50.4	2	33.5	1	16.9
Residential	1	21.8	0	0	1	21.8
Open Space/ Rural Lands	1	33.7	0	0	1	33.7
Moderate Total	**7**	**143.5**	**4**	**71.1**	**3**	**72.4**
Sphere of Influence Total	**19**	**188.7**	**13**	**104.2**	**6**	**84.5**
Grand Total	**22**	**835.7**	**15**	**648.1**	**7**	**187.7**

Source: CAL FIRE, HVLCSD

4.4 Capability Assessment

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

This section presents the District's mitigation capabilities that are applicable to the HVLCSD. These are in addition to, and supplement, the many plans, reports, and technical information reviewed and used for this LHMP Update as identified in Chapter 3 and in Chapter 4.

This assessment is divided into four sections: regulatory mitigation capabilities are discussed in Section 4.4.1; administrative and technical mitigation capabilities are discussed in Section 4.4.2; fiscal mitigation capabilities are discussed in Section 4.4.3; and mitigation education, outreach, and partnerships are discussed in Section 4.4.4.

4.4.1. HVLCSD's Regulatory Mitigation Capabilities

Table 4-85 lists planning mechanisms typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the District. Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more detail on existing mitigation capabilities.

Note: The District does not have the authority to regulate land use and development within its jurisdiction. Authority for promulgating and enforcing zoning, land use, and development requirements falls to counties and incorporated communities. As such development within the District's jurisdictional boundaries will conform to the zoning and land use development ordinances and building codes of the county or incorporated community in which the District is located.

Table 4-85 HVLCSD Regulatory Mitigation Capabilities

Plans	In Place Y/N	Does the plan address hazards? Can the plan be used to carry out mitigation actions? When was it last updated??
Capital Improvements Plan	Y	Identifies projects, to be used in mitigation actions.
Climate Change Adaptation Plan	N	
Community Wildfire Protection Plan	N	
Comprehensive/Master Plan	N	The District maintains a Strategic Plan. The current plan covers 2024-2029 and is dated December 2023. It does identify mitigation strategies in the form of continuous improvement.
Continuity of Operations Plan	N	It should be noted that several individuals at the District have been certified in FEMA ICS 100, 200, 700 and 800
Drought Preparedness and Mitigation Plan	Y	There is a water shortage and contingency plan.
Economic Development Plan	Y	A municipal services review (MSR) is sent to the Local Agency Formation Commission (LAFCO)
Land Use Plan	N	
Local Emergency Operations Plan	Y	The District has an Emergency Notification Plan (ENP) regarding Water Treatment. We also have an Emergency Response Plan (ERP), as part of the Wastewater Risk Management Plan (RMP). Due to the 2018 American's Water Infrastructure Act (AWIA), the District will be required to complete a Risk and Resilience Plan (RRP) and an all-encompassing Emergency Response Plan (ERP) by the year 2021. There is a mitigation action worksheet identified to meet this National requirement. There is also a RMP for water operations.

Stormwater Management Plan	Y	While this is not a District responsibility, a study was conducted and shared with the Hidden Valley Lake Association (HOA), and Lake County Water Resources Department
Transportation Plan	N	
Engineering Studies for Streams (other)	Y	In alignment with the District's water rights permits, and the annual Groundwater Monitoring Report, a Habitat Assessment was conducted in 2014 in the vicinity of the USGS Putah Creek stream gauge.
Other (describe)	Y	Water Master Plan, Municipal Services Review, Infrastructure Plan, Risk Management Plan, Groundwater Monitoring Report, Putah Creek Watermaster Diversion Reports, Sewer System Management Plan, Consumer Confidence Report, Electronic Annual Report, Waste Discharge Requirement reporting, Maintenance and Operations Plan, WWTP.
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective way to reduce hazard impacts?** **Is the ordinance adequately administered and enforced?**
Acquisition of land for open space and public recreation use	N/A	
Building code	N/A	The District follows the Lake County building codes. The most recent codes adopted are the 2022 California Building Code.
Flood insurance rate maps	Y	County enforces the floodplain ordinance based on the FIRMs. The District has no enforcement authority over this issue.
Floodplain ordinance	N/A	The County a floodplain ordinance that is applied to the area the HVLCSD serves. The District has no enforcement authority over this issue.
Natural hazard-specific ordinance (stormwater, steep slope, wildfire)	N/A	Not District's authority
Subdivision ordinance	N/A	Not District's authority
Zoning ordinance	N/A	Not District's authority
Other		
How can these capabilities be expanded and improved to reduce risk?		
Act upon identified mitigation opportunities. Expand capital funding now that the development moratorium is lifted. Continue to train staff with FEMA ICS coursework. Become a GSA.		

Sewer and Wastewater Ordinance (2022)

This Ordinance sets forth uniform requirements for Users of the District's Publicly Owned Treatment Works (POTW) and enables the District to comply with applicable State and federal law, including the Clean Water Act (33 U.S.C. section 1251 et seq.) and the General Pretreatment Regulations (Title 40 of the Code of Federal Regulations (CFR) Part 403). The objectives of this Ordinance are to:

- Protect District personnel who may be affected by wastewater and sludge in the course of their employment and the general public;

- Prevent the introduction of Pollutants into the District's wastewater collection system which would cause Interference with the system, the District's POTW, or other District operations.
- Prevent the introduction of Pollutants into the District's wastewater collection system which cannot sufficiently be treated and pass through the District's POTW, or which will have a deleterious effect on the District's POTW, or which are incompatible with the District's treatment operations.
- Promote reuse and recycling of wastewater and sludge from the POTW;
- Provide for fees for the equitable distribution of the cost of operation, maintenance, and improvement of the POTW; and
- Enable the District to comply with its Wastewater Discharge Requirements, sludge use and disposal requirements, and any other applicable federal or State law to which the POTW is subject.

This Ordinance authorizes the issuance of Wastewater Discharge Permits; provides for monitoring, compliance, and enforcement activities; establishes administrative review procedures; requires User reporting; and provides for the setting of fees for the equitable distribution of costs resulting from the program established herein.

This Ordinance shall apply to all Users of the POTW, including any Users outside of the District's service area and tributary to the District's sewerage facilities.

Water Shortage Contingency Plan (2023)

In order to conserve the available water supply and protect the integrity of public water system supply facilities, with particular regard for domestic water use, sanitation, and fire protection, and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the Hidden Valley Lake Community Services District adopts the a group of regulations and restrictions, as described in the trigger event criteria inside the Plan, on the delivery and consumption of water through a Resolution and Policy #2013.

Water uses regulated or prohibited under the Water Shortage Contingency Plan are generally considered to be non-essential. Continuation of such uses during times of water shortage or other emergency water supply conditions are deemed to constitute a waste of water which subjects the offender(s) to penalties as defined in Section X of the Plan.

Infiltration and Inflow Assessment (2023)

The District maintains an Infiltration and Inflow (I/I) Assessment that evaluates repairs and inspections, weather (precipitation and Putah Creek flow), lift station pump run times, Wastewater Treatment Plant inflow (Parshall Flume) and consumption data. The Plan is updated annually and began in 2017, when the District was directed to investigate I/I more heavily after a heavy rain event that led to a flood in the Mountain Meadow South area of the community, inundated the Wastewater Treatment Plant, and caused three sanitary sewer overflows that contaminated Hidden Valley Lake. In 2019, similarly intense rain events in February and March caused 3 additional SSOs and damage to the Treatment Plant. Reducing I/I is in the District’s best interest as it will reduce costs, protect public health, and limit the recurrence of sanitary sewer overflows. Findings will also direct additional sewer improvement projects in the future.

Water Outage and Boil Water Notice Standard Operating Procedure (2022)

Water outages, such as mainline breaks, are an emergency and must be addressed as quickly as possible. Administrative staff may be required to assist field staff in informing customers of service interruption, contacting local officials, etc. in the event of a water outage. Considering this, the District maintains a standard operating procedure (SOP) that guides HVLCSD staff through the proper procedures in the event of a water outage.

Depending on the severity and situation, a water outage may or may not require a Boil Water Notice. Notices are issued when "The water supply has a microbiological contaminant that can be rendered safe by boiling the water or by using bottled water". It is often unknown whether the situation has caused microbial contaminants to enter the water supply, but it is always best to err on the side of caution when addressing public health. A Boil Water Notice is called when either a system pressure loss to less than 5 psi has occurred and/or there is a high probability that contamination occurred during a repair that warrants bacteriological testing.

Master Storm Drainage Plan (2000)

The District has a Storm Water Master Plan which provides the review of the hydrology and hydraulics of the watershed including an assessment of the carrying capacity and existing facilities; preliminary recommendations on upgrades required; the cost of these upgrades; Encroachment Standards; and Storm Water Best Management Practices.

HVLCSD Strategic Plan (2023)

This Strategic Plan incorporates elements from the Strengths, Weaknesses, Opportunities, and Threats analysis and follows the themes set forth in the District's mission, values, and vision. The purpose of the plan is to guide directors and staff by identifying the actions that must be taken in order to achieve the District's goals. Management must expect the unexpected and be prepared to alter strategies with the emergence of new technologies, regulations, environmental impacts, and other factors that affect the industry. The Plan is reviewed annually at a minimum, officially revised every five years, and evaluated to reconsider best strategies. It is crucial that projects be implemented appropriately, as the District's resources are limited and the cost of providing water and wastewater services continues to increase.

Wastewater Reclamation Plant Risk Management Plan (2022)

The Hidden Valley Lake Community Services District operates a Wastewater Reclamation Plant that treats domestic wastewater from the community of Hidden Valley Lake. The District maintains a Risk Management Plan that covers the Water Reclamation Plant due to the regulations and requirements on the use of chlorine gas. The process that uses the regulated substance is the chlorine gas storage and distribution system that adds chlorine to the treated wastewater effluent. Regulated substances are listed pursuant to Section 25532(g)(2) of the Health and Safety Code and can be found in Table 3 of CalARP Regulation 19 CCR.

Water and Sewer Rate Study Report (2020)

This evaluation of the District's water and sewer rates is intended to ensure that the District's rates meet substantive Proposition 218 (Prop 218) requirements and broader industry standards, reflect the District's current funding priorities and costs of service, and promote transparent communications between the District and its ratepayers. This report also documents the District's cost of service analysis and rate study as required by Prop 218. In developing the proposed new water and sewer rates, NBS worked cooperatively the District finalized new financial plans and rate adjustments. The proposed rates summarized in the report represent projected rates based on current budgets at the time and carefully reviewed capital improvement plans.

Emergency Response Plan (2022)

The District maintains a comprehensive Emergency Response Plan. The document contains resilience strategies, including physical security as well as cyber security; emergency plans and procedures that can be implemented in the event of a malevolent act or natural hazard that threatens the District's ability to deliver safe drinking water; and mitigation actions procedures, and equipment which can eliminate or significantly lessen the impact of a malevolent act or natural hazard on the public health and the safety and supply of drinking water provided to the community and individuals. Mitigation actions can include the development of alternative source water options, relocation of water intakes, and construction of flood protection barriers.

4.4.2. HVLCSD's Administrative/Technical Mitigation Capabilities

Table 4-86 identifies the District administrative and technical mitigation capabilities, including District personnel responsible for activities related to mitigation and loss prevention in the HVLCSD.

Table 4-86 HVLCSD Administrative/Technical Mitigation Capabilities

Administration	In Place Y/N	Describe capability Is coordination effective?
Staff		**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	Jurisdiction of Lake County
Civil Engineer, including dam and levee safety	Y	Professional Services Agreement with Civil Engineering firm. The firm's staff is trained and coordinates with District staff.
Community Planner	**N**	
Emergency Manager	Y	The General Manager is trained, and coordinates with Lake County Managers.
Floodplain Administrator	N	Jurisdiction of Lake County
GIS Coordinator	Y	Responsibility of Water Resource Specialist.
Planning Commission	N/A	

Other	Y	It should be noted that several individuals at the District have been certified in FEMA ICS 100, 200, 700 and 800
Technical	**Y/N**	**Has capability been used to assess/mitigate risk in the past?**
Grant writing	Y	Submitted applications to DWSRF, CWSRF, IRWM, USBR, FEMA HMGP, FEMA RPA.
Hazard data and information	Y	Developing LHMP, RMP approved 4-30-18, Several NOIs and Subapplication.
GIS analysis	N	
Mutual aid agreements	Y	District is member of CalWARN
Other		
How can these capabilities be expanded and improved to reduce risk?		
Stormwater capabilities could be improved by developing a Memorandum of Understanding with the Lake County Water Resources Department, to establish a funding mechanism for mitigation activities. The District continues to develop additional GIS capabilities inhouse.		

4.4.3. HVLCSD's Fiscal Mitigation Capabilities

Table 4-87 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table 4-87 HVLCSD Fiscal Mitigation Capabilities

Funding Resource	In Place Y/N	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Past telemetry improvements, collection system generators. Currently contributing to both water and wastewater capital funds in anticipation for future mitigation actions.
Community Development Block Grant	Y	This has not been used in the past. While possible for future mitigation actions, scoring system favors low/mid income community.
Federal funding programs (non-FEMA)	Y	Used and will continue to use when appropriate FEMA/CalOES RPA, FEMA HMGP, USBR, USDA
Fees for water, sewer, gas, or electric services	Y	Water and Sewer use fees are the primary revenue sources for the District. A portion of this revenue contributes to the District's capital funds.
Impact fees for new development	N	

Funding Resource	In Place Y/N	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
State funding programs	Y	Applied, and will continue to apply when appropriate CWSRF, DWSRF FEMA/CalOES RPA
Stormwater utility fee	N	
Other	Y	Water Bond 2023 Multiple bonds (4) have been issued for wastewater improvements, of which 3 have been paid off. This funding vehicle continues to be available to fund future mitigation actions.
How can these capabilities be expanded and improved to reduce risk?		
The District is fully evaluating options on funding for infrastructure improvements. These are being incorporated into long term capital planning.		

4.4.4. HVLCSD's Mitigation Education, Outreach, and Partnerships

Table 4-88 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 4-88 HVLCSD Mitigation Education, Outreach, and Partnerships

Program/Organization	In Place Y/N	How widespread are each of these in your community?
Community newsletters	Y	Sent to residents quarterly.
Hazard awareness campaigns (such as Firewise, Storm Ready, Severe Weather Awareness Week, school programs, public events)	Y	The District has not participated in this outreach since 2020. The District did participate in the Southlake Fire Open House and 2024 Earth Day. There are multiple COAD and VOAD organizations, local emergency operations groups, and FireWise groups that the District partners with on mitigation related efforts. California Rural Water, Rural Community Assistance Corporation, Association of California Water Agencies, Community Organizations Active in Disaster, Volunteer Organizations Active in Disaster, PG&E, Integrated Regional Water Management
Local news	N	
Organizations that interact with underserved and vulnerable communities	N	While not specific to the District, many of the seniors located within the HVLCSD Service Area utilize the services of the Middletown Senior Center.

Program/Organization	In Place Y/N	How widespread are each of these in your community?
Social media	Y	Website, local event participation (Firewise, Concerts on the Green)
How can these capabilities be expanded and improved to reduce risk?		
These capabilities are currently near their peak given the current staffing of the District. Additional staffing will be needed to expand. A mitigation action on this plan has been added to increase mitigation partnerships with the District and the HVLA.		

4.4.5. Other Mitigation Efforts

The District noted the following other mitigation efforts:

- The District secured a $5M revenue bond to help pay for the 2023 Water Reliability Project.
- Fire breaks were done in 2020 to help reduce the risk and impacts to wildfire.
- The District has submitted an application to the Drinking Water State Revolving Fund for a $28M effort to improve water reliability.
- The District has developed a $15M implementation plan for SCADA refresh.
- Since the 2017 SSOs, the District began replacing cast-iron manhole lids with composite air-tight lids to prevent water from entering through manholes from the surface. Lid replacements continue to be the most cost-effective solution for immediate I/I reduction, especially in flood-prone areas such as Mountain Meadow North and South.
- Dam service date: the HVL dam is inspected annually by the CA Department of Water Resources, Division of Safety of Dams, owned and operated by the Hidden Valley Lake Association (HVLA).
- The FLASHES project uses District land and water to create a "tank on a hill" concept that generates electricity by harvesting the energy from the falling water. The compensation for these resources would be very lucrative for the District and would help facilitate large capital improvement projects. The District has been working on this project for ~8 years, but believe they are very close to being able to start. The District hopes to know by Jan 2025 if it is ready to solicit bids for an investor.
- Levee accreditation and drainage structure retrofits, including additional flood detention basins have been identified as priorities in the stormwater mitigation project.
- District staff noted that there were efforts to "repair" the creek-side of the levee in 2017 by the HVLA.

4.5 Natural Hazards Summary

As detailed in the hazard identification section, those hazards identified as a high or medium significance in Table 4-89 are considered priority hazards for mitigation planning. Those hazards that occur infrequently or have little or no impact on each jurisdiction in the HVLCSD were determined to be of low significance and not considered a priority hazard for mitigation strategy planning. Significance was determined based on the hazard profile, focusing on key criteria such as frequency, extent, and resulting damage, including deaths/injuries and property, natural and cultural resources, and economic damage. The ability of a jurisdiction to reduce losses through implementation of existing and new mitigation measures was also considered as to the significance of a hazard. This assessment was used by the District to prioritize those hazards of greatest significance and that will be addressed with specific actions in the mitigation strategy.

Table 4-89 Hazard Summary and Determination of Priority Hazards

Hazard	Likelihood of Future Occurrence	Vulnerability	Priority Hazard
Climate Change	Highly Likely	High	Y
Dam Failure	Unlikely	Extremely High	Y
Drought & Water shortage (w/tree mortality)	Highly Likely / Occasional	Extremely High	Y
Earthquake	Occasional	High	Y
Floods: 1%/0.2% annual chance	Occasional / Likely	High	Y
Floods: Localized Stormwater	Highly Likely	High	Y
Levee Failure	Unlikely	High	Y
Severe Weather: Extreme Cold and Freeze	Highly Likely	Medium	Y
Severe Weather: Extreme Heat	Highly Likely	Medium	Y
Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)	Highly Likely	Medium	Y
Wildfire (w/smoke and air quality)	Highly Likely	Extremely High	Y

Chapter 5 Mitigation Strategy

44 CFR §201.6(c)(3) and §201.7(c)(3): [The plan shall include] a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section describes the mitigation strategy process and mitigation action plan for this 2025 HVLCSD LHMP Update. It describes how the HVLCSD, as the single participating jurisdiction, met the following requirements from the 10-step planning process:

- Planning Step 6: Set Goals
- Planning Step 7: Review Possible Activities
- Planning Step 8: Draft an Action Plan

5.1 Mitigation Strategy: Overview

The results of the planning process, the risk assessment, the goal setting, the identification of mitigation actions, and the hard work of the HMPC led to the mitigation strategy and mitigation action plan for this LHMP Update. As part of the LHMP Update process, a comprehensive review and update of the mitigation strategy portion of the 2020 LHMP was conducted. Some of the initial goals and objectives from the previous LHMP were refined and reaffirmed, some goals were deleted, and others were added. The end result was a new set of goals, to reflect the completion of, or progress towards the 2020 actions, the updated risk assessment, and the new priorities of HVLCSD and this 2025 LHMP Update.

To support the updated mitigation strategy including updated goals, the mitigation actions from 2020 LHMP were reviewed and assessed for their value in reducing risk and vulnerability to the HVLCSD Planning Area from identified hazards and further evaluated for their inclusion in this LHMP Update (See Chapter 2 What's New). Section 5.2 below identifies the new goals and objectives of this 2025 LHMP Update and Section 5.4 details the new mitigation action plan.

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

- Communicate the hazard information collected and analyzed through this planning process as well as mitigation success stories so that the community better understands what can happen where and what they themselves can do to be better prepared.
- Implement the mitigation action plan recommendations of this Plan.
- Use existing rules, regulations, policies, and procedures already in place.
- Monitor multi-objective management opportunities so that funding opportunities may be shared and packaged, and broader constituent support may be garnered.

5.1.1. Continued Compliance with NFIP

As previously described, the HVLCSD, as a special district, is not eligible to participate in the NFIP. However, given the nature and extent of the flood hazard in the HVLCSD Planning Area, an emphasis will be placed on supporting the objectives of the NFIP in the identification and implementation of sound floodplain management and risk reduction measures included in this LHMP Update. The HVLCSD will continue to comply with the Lake County flood ordinance that governs development and other activities within the unincorporated area of Lake County where the District is located.

5.1.2. Integration of Mitigation with Post Disaster Recovery and Mitigation Strategy Funding Opportunities

Hazard mitigation actions are essential to weaving long-term resiliency into all community recovery efforts so that at-risk infrastructure, development, and other community assets are stronger and more resilient for the next severe storm event. Mitigation measures to reduce the risk and vulnerability of a community to future disaster losses can be implemented in advance of a disaster event and also as part of post-disaster recovery efforts.

Mitigation applied to recovery helps communities become more resilient and sustainable. It is often most efficient to fund eligible infrastructure mitigation through FEMA's Public Assistance mitigation program if the asset was damaged in a storm event. Mitigation work can be added to project worksheets if they can be proven to be cost-beneficial.

Integration of mitigation into post disaster recovery efforts should be considered by the HVLCSD as part of their post disaster redevelopment and mitigation policies and procedures. Post-disaster redevelopment and mitigation policies and procedures are evaluated and updated as part of the Emergency Operations Plan (EOP) updates and other emergency management plans for the District.

These EOP's and other emergency management documents, through its policies and procedures, seek to mitigate the effects of hazards, prepare for measures to be taken which will preserve life and minimize damage, enhance response during emergencies, and provide necessary assistance, and establish a recovery system in order to return the community to their normal state of affairs. Mitigation is emphasized as a major component of recovery efforts.

Mitigation Strategy Funding Opportunities

An understanding of the various funding streams and opportunities enables the District to match identified mitigation projects with the grant programs that are most likely to fund them. Additionally, some of the funding opportunities can be utilized together. Mitigation grant funding opportunities available pre- and post- disaster include the following.

FEMA HMA Grants

Cal OES administers four main types of HMA grants: (1) Hazard Mitigation Grant Program, (2) Pre-Disaster Mitigation Program, (3) Flood Mitigation Assistance Program, and (4) Building Resilient Infrastructure and Communities. Eligible applicants for the HMA include state and local governments, certain private non-profits, and federally recognized Indian tribal governments. While private citizens cannot apply directly for the grant programs, they can benefit from the programs if they are included in an application sponsored by an eligible applicant.

FEMA Public Assistance Section 406 Mitigation

The Robert T. Stafford Disaster Relief and Emergency Assistance Act provides FEMA with the authority to fund the restoration of eligible facilities that have sustained damage due to a presidentially declared disaster. The regulations contain a provision for the consideration of funding additional measures that will enhance a facility's ability to resist similar damage in future events.

Community Development Block Grants

The California Department of Housing and Community Development administers the State's Community Development Block Grant (CDBG) program with funding provided by the U.S. Department of Housing and Urban Development. The program is available to all non-entitlement communities that meet applicable threshold requirements. All projects must meet one of the national objectives of the program – projects must benefit 51 percent low- and moderate-income people, aid in the prevention or clearance of slum and blight, or meet an urgent need. Grant funds can generally be used in federally declared disaster areas for CDBG eligible activities including the replacement or repair of infrastructure and housing damaged during, or as a result of, the declared disaster.

Small Business Loans

The Small Business Association offers low-interest, fixed-rate loans to disaster victims, enabling them to repair or replace property damaged or destroyed in declared disasters. It also offers such loans to affected small businesses to help them recover from economic injury caused by such disasters. Loans may also be increased up to 20 percent of the total amount of disaster damage to real estate and/or leasehold improvements to make improvements that lessen the risk of property damage by possible future disasters of the same kind.

Increased Cost of Compliance

Increased Cost of Compliance (ICC) coverage is one of several resources for flood insurance policyholders who need additional help rebuilding after a flood. It provides up to $30,000 to help cover the cost of mitigation measures that will reduce flood risk. ICC coverage is a part of most standard flood insurance policies available under NFIP.

5.2 Goals and Objectives

44 CFR §201.6(c)(3)(i) and §201.7(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Up to this point in the planning process, the HVLCSD has organized resources, assessed hazards and risks, and documented mitigation capabilities. The resulting goals, objectives, and mitigation actions were developed based on these tasks. The HMPC held a series of meetings and exercises designed to achieve a collaborative mitigation strategy as described further throughout this section. Appendix C documents the information covered in these mitigation strategy meetings, including information on the goals development and the identification and prioritization of mitigation alternatives by the HVLCSD and HMPC.

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

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

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

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

HMPC members were provided with the list of goals from the 2020 LHMP as well as a list of other sample goals to consider. The committee was told that they could use, combine, or revise the statements provided or develop new ones, keeping the risk assessment in mind. Each member was asked to provide three goal statements. Goal statements were collected and grouped into similar themes and provided to the HMPC. Some of the statements were determined to be better suited as objectives or actual mitigation actions and were set aside for later use. Next, the HMPC developed objectives that summarized strategies to achieve each goal. Edits and refinements to these new goals and resulting objectives were provided by the HMPC until the committee and HVLCSD came to consensus on the final goals and objectives for this 2025 LHMP Update.

Figure 5-1 HVLCSD - Goal Setting Meeting

Source: Foster Morrison Consulting

Based on the risk assessment review and goal setting process, the HMPC identified the following goals and objectives, which provide the direction for reducing future hazard-related losses within the HVLCSD Planning Area. Also included as part of the goals, the HVLCSD's existing Mission Statement and Vision Statement for the District is recognized to be part of the updated goals and objectives for this LHMP Update.

HVLCSD Mission Statement: To provide, maintain, and protect our community's water.

HVLCSD Vision Statement: To provide innovative and reliable service in an environmentally conscious manner that produces a high level of ratepayer satisfaction.

Goal 1: Minimize risk and vulnerability of HVLCSD to natural hazards and protect lives, enhance public safety, and prevent losses to property and the environment

- Ensure the public health and safety of employees and community
- As stewards of natural resources, provide protection measures to ensure the sustainability of natural resources vital to the local ecology
- Protect, maintain, and provide safe drinking water and sewer services for existing and future development within the HVLCSD Service area
- Improve inclusion activities that fortify the strength of the whole community by education and consensus

Goal 2: Ensure HVLCSD's Water and Wastewater Infrastructure Reliability and Resiliency

- Provide protection and reduce damages to District infrastructure and services and minimize disruptions

- Protect and harden water and sewer infrastructure from extreme conditions and to withstand a higher level of damage from natural disasters
- Provide water and wastewater services in accordance with codes and regulations, with ratepayers and the environment as the highest priority

Goal 3: Improve HVLCSD's capabilities to plan for/prevent/mitigate hazard-related losses and to be prepared for, respond to, and recover from a disaster event

- Maintain and enhance current service levels at affordable rates
- Ensure financial stability
- Attract and protect the most qualified workforce who are dedicated to District goals and mission statement
- Ensure the ongoing ability to deliver high quality water and sewer services, before, during, and after a disaster
- Establish and maximize cross-functional and multi-agency cooperation and use of shared resources
- Update and maintain disaster and emergency plans, with a long-term focus to address changing District and community needs to prevent, minimize, and recover from disasters

Goal 4: Increase HVLCSD and community outreach, education, and awareness of risk and vulnerability to hazards and promote preparedness and self-responsibility to reduce hazard-related losses

- Enhance communication between HVLCSD, HVLA, other Agencies, and the Community
- Ensure planning for the whole community to support equity and inclusion in mitigation planning and implementation
- Enhance hazard mitigation and preparedness education and outreach programs
- Inform and educate HVLCSD staff and service area residents and businesses about all hazards they are exposed to, where they occur, what they can do to mitigate exposure or damages

Goal 5: Increase and maintain wildfire prevention and protection

- Reduce the wildfire risk and vulnerability to HVLCSD
- Improve communication and coordination of wildfire mitigation efforts

Goal 6: Improve HVLCSD resiliency to flooding

- Determine ownership of the levee
- Protect the HVLCSD and reduce losses from localized, stormwater flooding, 1% and 0.2% annual chance flood events, and dam and levee flooding
- Improve and maintain HVLCSD stormwater system to improve system reliability and to reduce losses and extend existing life
- Evaluate, implement, and improve flood control within the HVLCSD
- Minimize risk and vulnerability to life and critical facilities and infrastructure from a levee failure event

Goal 7: Maintain FEMA Eligibility for Grant Funding

- Position HVLCSD to apply for and obtain grant funds to reduce losses from priority hazards
- Identify and pursue FEMA and other hazard mitigation funding sources

5.3 Identification and Analysis of Mitigation Actions

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

In order to identify and select mitigation actions to support the mitigation goals, each hazard identified in Section 4.1 was evaluated at the completion of the risk assessment as part of the second prioritization process to determine which hazards were priorities for mitigation strategy planning. Only those hazards that were determined to be a priority hazard for the HVLCSD were considered further in the development of hazard-specific mitigation actions. Those hazards not considered a priority for mitigation strategy development were eliminated from further consideration because the risk of a hazard event to the HVLCSD is unlikely, the vulnerability of the HVLCSD is low, or capabilities are already in place to mitigate negative impacts. Further, the resulting mitigation strategy presented in this Chapter focuses on those mitigation actions that the HVLCSD has the authority, resources, and capacity to consider for implementation over the next 5-years covered by this LHMP Update. The following hazards were considered priority hazards to the District to be addressed in the mitigation strategy portion of this Plan.

- Climate Change
- Dam Failure
- Drought & Water shortage (w/tree mortality)
- Earthquake
- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- Levee Failure
- Severe Weather: Extreme Cold and Freeze
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)
- Wildfire (w/smoke and air quality)

It is important to note, however, that all the Hazards addressed in this LHMP Update are included in the multi-hazard public awareness mitigation actions as well as in other multi-hazard, emergency management actions, and other hazard-specific actions, providing benefits to the HVLCSD as the single participating jurisdiction to this 2025 LHMP Update.

Once it was determined which hazards warranted the development of specific mitigation actions, the HVLCSD and HMPC analyzed viable mitigation options that supported the identified goals and objectives. The HMPC was provided with the following list of categories of mitigation actions, which originate from the Community Rating System:

- Prevention
- Property protection
- Structural projects
- Natural resource protection
- Emergency services
- Public information

The HMPC was provided with examples of potential mitigation actions for each of the above categories. The HMPC was also instructed to consider both future and existing structures in considering possible mitigation actions. A facilitated discussion then took place to examine and analyze the options. Appendix C provides a detailed review and discussion of the six mitigation categories to assist in the review and identification of possible mitigation activities or projects. Also utilized in the review of possible mitigation measures is FEMA's publication on Mitigation Ideas, by hazard type. Prevention type mitigation alternatives were discussed for each of the priority hazards. This was followed by a brainstorming session that generated a list of preferred mitigation actions by hazard.

5.4 Mitigation Action Plan

44 CFR §201.6(c)(3)(iii) and §201.7(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

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

Table 5-1 identifies mitigation actions for this LHMP Update. For each mitigation action item included in Table 5-1, a detailed mitigation implementation strategy has been developed and are included in this chapter.

The mitigation action plan summarized below contains both new action items developed for this 2025 LHMP Update as well as old actions that were yet to be completed from the 2020 LHMP. Table 5-1 indicates whether the action is new or from the 2020 LHMP and Chapter 2 contains the details for each 2020 mitigation action item indicating whether a given action item has been completed, deleted, or deferred.

As described throughout this 2025 LHMP Update, the HVLCSD Planning Area has many risks and vulnerabilities to identified hazards. Although many possible mitigation actions, as detailed in Appendix C, were brainstormed and prioritized during the mitigation strategy meetings, the resulting mitigation strategy presented in this Chapter 5 of this LHMP focuses only on those mitigation actions that are both reasonable and realistic for the HVLCSD to consider for implementation over the next 5-years covered by this 2025 Update. Thus, only a portion of the actions identified in Appendix C have been carried forward into the mitigation strategy presented in Table 5-1. Although many good ideas were developed during the mitigation action brainstorming process, the reality of determining which priority actions to develop and include in this LHMP Update came down to the actual priorities of the District, individuals and departments based in part on department direction, staffing, and available funding. The overall value of the mitigation action table in Appendix C is that it represents a wide-range of mitigation actions that can be consulted and developed for this LHMP Update during annual plan reviews and the formal 5-year update process.

It is also important to note that the HVLCSD has numerous existing, detailed action descriptions, which include benefit-cost estimates, in other planning documents, such as stormwater and drainage plans, flood and water management plans, fire plans, and capital improvement budgets and reports. These actions are considered to be part of this LHMP, and the details, to avoid duplication, should be referenced in their original source document. The HVLCSD and HMPC also realized that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions, as necessary, as long as they conform to the overall goals of this LHMP Update.

Further, it should be clarified that the actions included in this mitigation strategy are subject to further review and refinement; alternatives analyses; and reprioritization due to funding availability and/or other criteria. The HVLCSD is not obligated by this document to implement any or all of these projects. Rather this mitigation strategy represents the desires of the District to mitigate the risks and vulnerabilities from identified hazards. The actual selection, prioritization, and implementation of these actions will also be further evaluated in accordance with the mitigation categories and criteria contained in Appendix C.

Many of these mitigation efforts are collaborative efforts among other HVLCSD planning partners including the HVLA. In addition, the public outreach action, as well as many of the multi hazard actions, apply to all hazards regardless of hazard priority. Collectively, this mitigation strategy includes only those actions and projects which reflect the actual priorities and capacity of the HVLCSD to implement over the next 5-years covered by this 2025 LHMP Update.

Table 5-1 HVLCSD Planning Area Mitigation Actions

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Multi-Hazard Actions					
Action 1. Public Awareness Program	Previous Action	X	X	X	Public Information
Action 2. Generator projects for all critical facilities and infrastructure	Previous Action	X	X		Emergency Services Property Protection Natural Resource Protection
Action 3. Improve the SCADA system	Previous Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 4. Update Water Master Plan	Previous Action	X	X		Prevention
Action 5. Establish additional well(s)	Previous Action	X	X		Structural Projects Property Protection Natural Resource Protection
Action 6. Water Storage and Materials	Previous Action	X	X		Structural Projects Property Protection Natural Resource Protection
Action 7. Water Distribution System Reliability	Previous Action	X	X		Structural Projects Property Protection Natural Resource Protection
Climate Change, Drought, and Severe Weather: Extreme Heat Actions					
Action 8. Develop a Groundwater Sustainability Plan	New Action	X	X		Prevention
Dam Failure, Flood, Localized Flood, Levee Failure, Severe Weather: Heavy Rains and Storms Actions					
Action 9. Chlorine Analyzers	Previous Action	X	X	X	Prevention Property Protection
Action 10. Establish Cross Functional Committee and Address Levee & Stream Issues	Previous Action	X	X	X	Prevention
Action 11. Update and Implement Stormwater Master Plan/Stormwater Mitigation	Previous Action	X	X	X	Prevention Property Protection Natural Resource Protection
Earthquake Actions					
Action 12. Earthquake Vulnerability Assessment and Retrofit	Previous Action	X	X		Property Protection Structural Projects

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 13. I/I Program and Sewer System Rehabilitation	Previous Action	X	X		Structural Projects Property Protection Natural Resource Protection
Wildfire Actions					
Action 14. Fuel Mitigation/Defensive Space	Previous Action	X	X		Property Protection Natural Resource Protection
Action 15. Add/Improve/Fortify Fire Hydrants	Previous Action	X	X		Property Protection Natural Resource Protection

5.4.1. Prioritization Process

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

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

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

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

The initial list of mitigation actions from the 2020 LHMP and new actions identified during this planning process were reviewed and prioritized using the criteria (alternatives and selection criteria) in Appendix C.

With these criteria in mind, the HMPC was each given a set of nine colored dots, three each of red, blue, and green. The dots were assigned red for high priority (worth five points), blue for medium priority (worth three points), and green for low priority (worth one point). The HMPC was asked to use the dots to prioritize actions with the above criteria in mind. The point score for each action was totaled. Appendix C contains the total score given to each identified mitigation action.

The process of identification and analysis of mitigation alternatives allowed the HVLCSD and HMPC to come to consensus and to prioritize recommended mitigation actions. During the voting process, emphasis was placed on the importance of a benefit-cost review in determining project priority; however, this was not a quantitative analysis. The committee agreed that prioritizing the actions collectively enabled the actions to be ranked in order of relative importance and helped steer the development of additional actions that meet the more important objectives while eliminating some of the actions which did not garner much support.

Benefit-cost was also considered in greater detail in the development of the Mitigation Action Plan detailed below in Section 5.4 The cost-effectiveness of any mitigation alternative will be further considered in greater detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this 2025 LHMP Update.

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

Multi-Hazard Actions

Action 1. Public Awareness Program

Hazards Addressed: Multi-Hazard (Climate Change, Dam Failure, Drought & Water shortage (w/tree mortality), Earthquake, Floods: 1%/0.2% annual chance, Floods: Localized Stormwater, Levee Failure, Severe Weather: Extreme Cold and Freeze, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning), Wildfire (w/smoke and air quality))

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background: The Community of Hidden Valley Lake has been exposed to multiple natural disasters within the recent past (4240, 4301, 4308, 4344, 4431, 4434), all of which have significantly impacted HVLCSD's ability to continue to provide seamless water and wastewater services. The lack of public awareness and failure to provide advanced notification during the Valley Fire (4240) caused a significant delay to first responders and essential personnel. The inability to cross roadblocks severely jeopardized HVLCSD's ability to prevent a loss of service of water and wastewater treatment and conveyance. Comprehensive prevention and preparation have been lacking during recent natural disasters and HVLCSD is committed to partnering with regional agencies who all play a part in the public awareness responsibility. The ever increasingly intense and frequent disasters make this mitigation need a high priority.

Project Description: Providing a consistent message, whether it is education opportunities that take place well in advance of an emergency, or timely and consistent messaging immediately prior or during an emergency is the cornerstone to the success of this project. Since the Valley Fire of 2015, numerous improvements have been made. Following this path of improvement are the following partnership activities that HVLCSD envisions:

- Advanced messaging
- HVLCSD website – Create a Community Preparedness page that is consistent with messaging from all regional agencies and a focus on self-reliability. The content will likely rotate on a seasonal basis, based on the potential threat.
- Brochures – Develop literature that provides a consistent message of preparedness, to be made available at public venues, such as the HVLCSD office, and community events.
- Community events – HVLCSD personnel to participate together with other regional agencies to deliver the consistent preparedness message. HVLCSD to continue, but also expand its presence at these events, such as Firewise, Concert on the Green, Community Organizations Active in Disaster (COAD), HVLA Concerts on the Green, etc.

- Emergency messaging
- Emergency alerts – Integrate efforts for a consistent message with the HVLA emergency alert system, including the establishment of a chain of command.
- Radios – Train HVLCSD personnel on the use and methodology for emergency communication.

Mitigation against the myriad of hazards that HVLCSD faces must include a communication aspect. It is the lynchpin to the success of prevention and protection. Training of staff, having a chain of command, and having a prepared and educated public are the steps that HVLCSD is committed to conducting. Reducing the effects of disasters can be achieved through these education efforts, as well as the improved speed of response.

Other Alternatives: One alternative would be to continue public information and notification that is currently in place and make no changes. Continuous improvement to a process ensures its continued relevance. In-place communication is a good foundation upon which to apply lessons learned. Information and notification that does not change as these lessons are learned, quickly makes those procedures obsolete, and leaves the community exposed.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Strategic Plan, staffing plan to meet partnering timelines, Memorandum of Agreement to partnership.

Responsible Office/Partners: Hidden Valley Lake Community Services District

Project Priority: High

Benefits (Losses Avoided):

- Increase residents' knowledge of potential hazards and activities on how to be better prepared
- Reduce the risk to life and property
- Improve communication and coordination of wildfire mitigation efforts

Potential Funding: In-kind services, Grant funding (FEMA BRIC, PDM, HMPG, as well as Cal OES grants) and District budgeting

Timeline: 12 months (And ongoing for the next five years)

Action 2. Generator projects for all critical facilities and infrastructure

Hazards Addressed: Multi-Hazard (Climate Change, Dam Failure, Drought & Water shortage (w/tree mortality), Earthquake, Floods: 1%/0.2% annual chance, Floods: Localized Stormwater, Levee Failure, Severe Weather: Extreme Cold and Freeze, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning), Wildfire (w/smoke and air quality))

Issue/Background: A loss of power can be brought about in a number of ways. Lake County's history of wildfire, flood, heavy windstorms and earthquakes are a testimony to the high risk of local power loss.

In the event of a grid-tied power loss, HVLCSD's ability to deliver drinking water to the community will be compromised. The groundwater wells, and three pump stations draw electricity to deliver drinking water to the community. Two of these locations lack permanent redundant power capabilities.

Given the increase in extreme environmental events in the recent past, the value of implementing power redundancy has also increased.

Project Description: This project would place appropriately sized power generators at the final water delivery pump station and well site. For water to be made available for households and firefighters, electricity required to pump water from the source up to the water tanks would no longer be a weak spot in the water distribution system. This project would also necessarily include the switchgear needed to transition from grid-tied to generator power, as well as assuring proper access into pump locations.

Acquiring generators will have a positive effect on the entire community. This integral step in providing water storage to the community as well as fire flows to firefighters will help to mitigate risks from the aforementioned hazards.

Ensuring the delivery and storage of water, as well as seamless administrative services is a commitment HVLCSD considers a continual monitoring and management process. HVLCSD remains vigilant in ensuring the reliability of water availability.

Other Alternatives: Rental of trailered generators on an as-needed basis, creates a dependency on the vendor's inventory, which is likely reduced during periods of extreme environmental events such as wildfire, flood, windstorms, and earthquakes. The reduction in inventory poses the risk of no generator available to keep the water and operations flowing, or a wrong-sized generator. Neither of these possibilities would be fiscally responsible.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Water Master Plan, 2023 Strategic Plan, Rate Study analysis, Rate increase, Bond issuance, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District

Benefits (Losses Avoided): Losses avoided:

- Threat to public safety
- Wildfire conflagration

Potential Funding: In-kind services, Water Use Fees, Capital funds, Federal and State grant funding (FEMA BRIC, PDM, HMPG, as well as Cal OES grants), Bond funds

Timeline: Within 18 months

Project Priority (High, Medium, Low): High

Action 3. Improve the SCADA system

Hazards Addressed: Floods: 1%/0.2% annual chance; Earthquake; Severe Weather: Heavy Rains and Storms; Wildfire

Issue/Background: The important function of Supervisory Control and Data Acquisition (SCADA) is not currently impermeable to extreme natural weather events. Water and wastewater processes such as pumping, tank levels, and chlorination are managed by three different levels of SCADA: 1) programmable logic controllers (PLCs) in the field, 2) a Human Management Interface (HMI) in a control building, and 3) alarm conditions by field staff.

Key elements of this telemetry architecture are exposed to the open air. In the Valley Fire of 2015, PLCs that provided pumping telemetry were lost at HVLCSD's water source, and flood pumping station. The condition of being unable to pump water to fire hydrants put the community at risk for catastrophic fire danger. The loss of the flood pumping station PLCs also subverted the area's future ability to protect against flooding caused by excessive rainfall now received during the rainy season.

There does not currently exist any redundancy in SCADA, which is most hazardous at the HMI level. A natural event of wildfire or earthquake that causes this single PC to fail would essentially render any alarm visibility inoperable. Also, and perhaps the most hazardous consequence is that the PLCs located throughout the community would no longer be able to communicate to this central repository of data.

The rural nature of the District presents unique challenges in the protection against natural hazards. Standard operations and maintenance of the complex and continually changing technology of SCADA can lead to staffing gaps that leave a level of exposure to HVLCSD and its service area.

Project Description: The project to improve the SCADA system will fortify the three levels of control; PLCs, HMI and alarms.

Changes to the controls needed at the PLC level would take advantage of the changes in technology to simplify yet expand functionality. These PLCs would come pre-configured and can be managed remotely. New PLCs would be protected with earthquake-proof and weather resistant housing that meet the ASCE 7 Standard and NFPA 220 Standard.

Outsourcing the HMI aspect of SCADA removes this PC previously located in a local control building, and places cloud-sourced function and management in its place. In the event there is a physical disruption in service to this local building, the SCADA functionality remains fully functional, as well as the communication with PLCs and staff.

The critical assets throughout Hidden Valley Lake are dependent on a strong and reliable SCADA system to maintain their functionality and operate at the highest level of efficiency. This project is crucial to the success of a protected community, in that it pinpoints every single device that makes the municipality work.

Other Alternatives: An alternative to this project is the continuation of repair/replace activities with current technology. This reactive type of project doesn't resolve the imminent threat of natural disasters and may not guarantee all equipment is in the best configuration or working order when disaster strikes.

Existing Planning Mechanism(s) through which Action Will Be Implemented: 2023 Strategic Plan, Rate Study analysis, Rate increase, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District

Benefits (Losses Avoided): Adequate and reliable sewer and water infrastructure that can withstand a higher-level damage from natural disasters, and continued improvements to infrastructure equipment and facilities.

Potential Funding: In-kind services, Water/Sewer Use Fees, Capital funds, Federal and State grant funding

Timeline: 2024 and annually

Project Priority (High, Medium, Low): High

Action 4. Update Water Master Plan

Hazards Addressed: Multi-Hazard (Climate Change, Dam Failure, Drought & Water shortage (w/tree mortality), Earthquake, Floods: 1%/0.2% annual chance, Floods: Localized Stormwater, Levee Failure, Severe Weather: Extreme Cold and Freeze, Severe Weather: Extreme Heat, Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning), Wildfire (w/smoke and air quality))

Issue/Background: The current Water Master Plan for HVLCSD was written in 2001. With the myriads of changes that have taken place both directly (laws, population) and indirectly (weather), over the years since this plan was accepted, not having an updated plan is a vulnerability to HVLCSD.

Legal changes that amplify water agency responsibilities and change procedures are listed in the California Water Code, California Health & Safety Code, and the California Code of Regulations. A plan that does not include these changes is at risk of non-compliance and enforcement action.

Community growth and water demands have changed and will require an updated forecast model. The number of residents in Hidden Valley Lake may have increased, but water use patterns may have offset previously projected growth estimates based on the effects of drought in the recent past. HVLCSD must not be unaware of expected water demand and jeopardize the availability of water to their customers or appropriate conservation measures.

Some improvements identified in 2001 may have been realized and should now be listed as a capability of HVLCSD. Backup power has been implemented for the entire wastewater collection system, protecting the community from both expected and unexpected power fluctuations. GHG emissions have been reduced by the creation (2011), and later expansion (2017), of a photovoltaic power source. These projects offer a foundation upon which to build and should not be overlooked.

The increase in the frequency and intensity of extreme weather events will also change improvement opportunities. Federally declared disasters are on the rise, have caused significant damage to HVLCSD, and have made clear several new opportunities for improvement.

Without an update to the Water Master Plan, the mechanism by which HVLCSD remains prepared, active in improvements, and resilient to climate change is lost.

Project Description: The year 2013 has been anecdotally recognized as the last year before a multi-year drought in most of California. Changes in human behavior, procedures and policies of water agencies, and state authority were all dramatically altered during the years following 2013. These altered activities will tangibly affect how HVLCSD views the priorities of improvement opportunities and should be reflected in the new Water Master Plan.

The updated Local Hazard Mitigation Plan and a new Water Master Plan are tools that can provide mutual benefit to each other for HVLCSD. Improvement opportunities from the LHMP should parallel the Water Master Plan. Additional funding mechanisms should be added to the Water Master Plan that have become available to HVLCSD with the influx of local disaster declarations.

The Water Master Plan of HVLCSD helps maintain a sustainable infrastructure for the community of Hidden Valley Lake, but also aligns with the goals of the State, and the Nation. The USEPA states:

"In September 2010, EPA released the Clean Water and Safe Drinking Water Infrastructure Sustainability Policy which described EPA's overall vision and priorities for ensuring the long-term sustainability of water infrastructure and communities throughout the nation. As the Policy was developed, stakeholders strongly emphasized the need to focus on the planning that takes place in the project development phase, before infrastructure solutions are designed and implemented."

A recent analysis of the California Water Master Plan Update 2013 in Maven's Notebook states:

"Three related themes distinguish California Water Plan Update 2013. DWR and other State agencies consider the three themes critical to securing California's water future: 1. Commit to Integrated Water Management, 2. Strengthen Government Agency Alignment, and 3. Invest in Innovation and Infrastructure."

The concepts of planning, alignment and innovation will be incorporated into the HVLCSD Water Master Plan. Remaining active in preparedness, developing appropriate and innovative improvements, with an eye towards resilience and sustainability will only serve to strengthen HVLCSD.

Other Alternatives: Alternatively, HVLCSD could simply align itself to the philosophy and commitments of the State and EPA water sustainability and infrastructure goals. This Resolution may not be specific enough, however, to address the issues and opportunities that are unique to HVLCSD.

Existing Planning Mechanism(s) through which Action Will Be Implemented: LHMP, California Water Master Plan Update 2013, IRWM, 2023 Strategic Plan, LAFCO, Staffing plan, Five-year budget plan for Operations and Capital Funds.

Responsible Office/Partners: Hidden Valley Lake Community Services District

Benefits (Losses Avoided): Improve sustainability and resiliency of HVLCSD

Protect, maintain, and provide safe drinking water and sewer services for existing and future development within the HVLCSD service area.

Potential Funding: FEMA, Water and Sewer Use Fees, HMGP Funding, In-kind services, State Funding

Timeline: 12 months

Project Priority (High, Medium, Low): Medium

Action 5. Establish additional well(s)

Hazards Addressed: Climate Change, Drought and Water Shortage, Floods: 1%/0.2% annual chance, Wildfire

Issue/Background: While the location of multiple wells in a single area is efficient from an economy of scale perspective, one catastrophic failure at this location eliminates water availability from the entire community, especially given future climate change considerations.

The three groundwater wells that provide drinking water for the Hidden Valley Lake Community are adjacent to Putah Creek and are all within approximately 1,000 feet of each other. Electrical service, pumping capabilities, water main tie-ins, and regular maintenance activities serve as benefits for having the wells in proximity of each other, but also serve as a liability.

A wildfire in this vicinity would stop water conveyance, as illustrated in the Valley Fire in 2015. Supervisory Controls and Data Acquisition (SCADA) equipment, as well as power delivery are interrupted as a result of wildfire conflagration.

A portion of the groundwater well location is located in the Flood Insurance Rate Map (FIRM), Special Flood Hazard area, and the water mains are conveying this groundwater under the Putah Creek floodway. Flooding near a well or water mains can be problematic in terms of groundwater saturation, sufficient air gap clearance (wells), and water treatment operations.

Project Description: This project would add redundancy and water delivery reliability to the community by developing a new well, and water delivery system in a location two miles away from the District's existing wells.

The discovery process of developing a new well location involves water sampling and pump capacity testing. Once a suitable location is established, the buildout will include drilling of the production well, chlorination system, mixing, booster pumps, SCADA controls, transmission mains, power redundancy, access road, and security measures.

The entire community of Hidden Valley Lake will benefit from this project. The new well and its water delivery system will improve water reliability as it is stored in tanks, and made available to residential households, commercial entities, and firefighters.

A wildfire near the existing groundwater well cluster has a reduced risk to water delivery, and a better chance at faster containment given the enhanced fire flows provided by the additional well.

The new well location and its transmission mains will not be located in a Special Flood Hazard area, and therefore will not pose a risk of failure or complications related to groundwater saturation or water treatment capabilities.

Having a water source that is not located near Putah Creek eliminates the risk of water shortage or drought conditions in that natural waterway. This alternate source of water further insulates the community from this risk.

As a measure of stewardship of natural resources, HVLCSD ensures water delivery for its present customers as well as future. Given the strong potential for development in this particular community of Lake County, a new well within HVLCSD's sphere of influence is a protection against individual household wells.

Other Alternatives: Developing a new water source and rehabilitating an existing groundwater well have been explored. Water quality, comprehensive hazard mitigation, and natural resource protection measures for alternate locations have not all been met with the same benefits as the aforementioned solution.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Water Master Plan, 2023 Strategic Plan, Rate Study analysis, Rate increase, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District

Benefits (Losses Avoided): Losses avoided:

- Threat to public safety (insufficient water supply)
- Wildfire conflagration (insufficient water supply)
- Boil water notice (contaminated water)

Potential Funding: In-kind services, Water Use Fees, Capital funds, Federal and State grant funding (FEMA BRIC, PDM, HMPG, as well as Cal OES grants)

Timeline: Within 36 Months

Project Priority (High, Medium, Low): Medium

Action 6. Water Storage and Materials

Hazards Addressed: Climate Change, Drought and Water Supply, Earthquake, Floods: 1%/0.2% annual chance, Floods: Localized Stormwater, Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning), and Wildfire

Issue/Background: The propensity for wildfire in Hidden Valley Lake is compounded by the density of the community and the proximity to wildland fuels. Wooden water storage structures present a hazard in this environment.

Recent drought conditions have illustrated the need for sufficient water storage capabilities. Changing environmental conditions such as extended drought conditions necessitate increased water storage to address this hazard.

Winter storms have increased in frequency and intensity which saturate the soil upon which tanks are situated. Soft soils have the potential of compromising the structural integrity of these tanks. One of the tanks is also located in an area subject to flooding.

The community of Hidden Valley Lake is located in an Earthquake Hazard Zone of “Very High”, which is the highest rating the EPA provides. Ground displacement, liquefaction, lateral spreading and settling are all impacts that could significantly interrupt water delivery.

Project Description: This project replaces four redwood tanks (one is in progress) with four modern steel tanks. Steel will significantly reduce the potential damage to tanks due to wildfire. Steel tanks holding water will also provide firefighters with sufficient fire flows, and potentially reduce the extent of a wildfire. The use of alternative materials will also be evaluated.

Ensuring increased storage capacity not only aids in firefighting, but also guards against potential drought conditions. Meeting the community’s water demands with a readily available stored supply fortifies the beneficial use of Hidden Valley Lake’s natural resources of waterways and aquifers.

The fortification efforts involved in this project protect against the effects of wind and rain from winter storms, which in turn mitigates the danger that soft soil presents. These efforts would also include tank and foundation stabilization to protect against sloshing and ground movement during an earthquake.

The HVLCSD remains committed to providing its residents with access to safe reliable drinking water while protecting the natural resources of the area, and this project is expected to provide the protection needed.

Other Alternatives: Replacing less than all tanks would be less effective in providing fire resilience and redundancy, as well as the previously mentioned earthquake protections.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Water Master Plan, 2023 Strategic Plan, Rate Study analysis, Rate increase, Bond issuance, Five-year budget plan for Operations and Capital Funds.

Responsible Office/Partners: Hidden Valley Lake Community Services District

Benefits (Losses Avoided): Losses avoided:

- Threat to public safety (tank collapse)
- Boil water notice (tank collapse)
- Fire damage reduction (insufficient water storage)
- GHG reduction (insufficient water storage)

Potential Funding: In-kind services, Water Use Fees, Capital funds, Federal and State grant funding (FEMA BRIC, PDM, HMPG, as well as Cal OES grants), Bond funding

Timeline: 2025 and annually

Project Priority (High, Medium, Low): High

Action 7. Water Distribution System Reliability

Hazards Addressed: Drought and Water Supply, Earthquake, Heavy Rains and Storms

Issue/Background: The delivery of safe drinking water is dependent upon the integrity of the water conveyance system. Buried underground are over 30 miles of a water distribution system designed to bring safe drinking water to its residents. There are three aspects to HVLCSD's water distribution system that make it vulnerable to natural events:

1. Hidden Valley Lake is located in a "Very High" earthquake hazard zone.

2. The frequency and intensity of winter storms is increasing.

3. Water supply during times of drought makes efficient conveyance of water of paramount importance.

In the event of an earthquake, or the result of storm events that bring heavy rains, the soil that surrounds this conveyance system weakens. Pressure from groundwater on underground pipelines can create pinhole leaks, cracks, and full circle breaks, interrupting the flow of potable water to the community. Soil liquefaction, ground displacement and settling are all earthquake effects that will have a devastating effect on water delivery and service.

Similarly, the loss of drinking water during times of drought is an unacceptable consequence of natural events, and an irresponsible position for HVLCSD to be in.

Project Description: The Water Distribution System Reliability project will address the above mentioned hazards with different facets of mitigation.

Air Valves – Crucial to the success of a water distribution system, these devices regulate water pressure though all water pipelines. Natural events that may cause cracks in water pipes, have the dangerous effect of introducing air into a pressurized water main. Air from these events can cause cavitation and ultimately pipeline collapse, unless air valves are present to discharge this air. Improvements and implementation of these air valves into the distribution system help mitigate the effects of storms, earthquakes and drought upon the water utility.

Mainline replacement/rehabilitation – Existing water infrastructure is outdated and approaching the end of its expected life. Plans should be made for the rehabilitation/replacement of the most compromised segments of the distribution system.

Other Alternatives: The alternatives are either to replace pipes based on the date of installation or respond to leaks as they reach the surface. Neither of these solutions are proactive or cost-effective, because they are not taking into account the level of damage sustained by natural events.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Water Master Plan, 2023 Strategic Plan, Rate Study analysis, Rate increase, Bond issuance, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District

Benefits (Losses Avoided): Losses avoided:

- Threat to public safety
- Wildfire conflagration
- Damage to property
- GHG reduction

Potential Funding: In-kind services, Water Use Fees, Capital funds, Federal and State grant funding (FEMA BRIC, PDM, HMPG, as well as Cal OES grants), Bond funding

Timeline: 2025 and annually

Project Priority (High, Medium, Low): High

Climate Change, Drought, and Severe Weather: Extreme Heat Actions

Action 8. Develop a Groundwater Sustainability Plan

Hazards Addressed: Climate Change, Drought and Water Shortage, Severe Weather: Extreme Heat

Issue/Background: The District's water source is the Coyote Valley Groundwater Basin (basin). The basin is characterized as a low-priority basin under the Sustainable Groundwater Management Act (SGMA). As a low-priority basin it is not required to have a governing Groundwater Sustainability Agency (GSA) nor a Groundwater Sustainability Plan (GSP). There is a need to form both a GSA and GSP, however, since doing so would protect water supplies and encourage sustainable development by designating responsibility to one actor to manage the basin.

Project Description: With the help of engineering firms, the District would first become a GSA and then form a GSP. As the governing agency it would monitor water usage within the basin and protect the water supply.

Other Alternatives: The District could choose not to develop a plan. This runs the risk of not becoming a GSA and allowing developers to extract from the basin without first providing oversight.

Existing Planning Mechanism(s) through which Action Will Be Implemented: 2023 Strategic Plan

Responsible Office/Partners: Hidden Valley Lake Community Services District

Benefits (Losses Avoided): Avoid the potential for:

- Over-drafting the basin
- Pollution by non-sustainable development
- Decreases in supply

Potential Funding: FEMA HMGP Grant Funding, Water and Sewer Use Fees, In-kind services, County Funding, tax base establishment, other Federal and State Funding.

Timeline: Within 24 months

Project Priority (High, Medium, Low): High

Dam Failure, Flood, Localized Flood, Levee Failure, Severe Weather: Heavy Rains and Storms Actions

Action 9. Chlorine Analyzers

Hazards Addressed: Dam Failure, Floods: 1%/0.2% annual chance, Floods: Localized Stormwater, Levee Failure, Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning), and Climate Change

Issue/Background: HVLCSD's method of treating wastewater involves the use of chlorine gas. This process is highly regulated because of the dangerous nature of chlorine gas. HVLCSD has in place a Risk Management Plan (RMP) for their wastewater reclamation plant.

In the Operations & Maintenance portion of the plan (Appendix E), the mechanisms by which chlorine is introduced are discussed and illustrated. For the wastewater RMP, a single chlorine analyzer located in a room several hundred feet from the actual chlorine contact basin, is responsible for maintaining a chlorine residual to a 6048 cubic-foot body of water.

During the heavy rains of 2017 and 2019, which resulted in four federally declared disasters (4301, 4308, 4431, 4434), this single chlorine analyzer was unable to keep pace with the flow into the basin. The advent of more frequent and more intense storm events has revealed a risk of wastewater treatment plant loss of function.

Project Description: The chlorine analyzers project will improve the design of the wastewater treatment plant to better manage chlorination during periods of high flow. The chlorination basin is subject to influences of the upstream processes of wastewater treatment. Disinfection by chlorination is the final step before this tertiary treatment process becomes recycled water and is ready for irrigation.

Since maintaining a chlorine residual is a function of time and distance, the timely injection of chlorine is the key success factor in maintaining a chlorine residual that meets the Wastewater Discharge Requirements (WDR 5-00-019). To offset any disturbances in upstream processes, and to more quickly react to rain events in this open air basin, two chlorine analyzers will be placed at the beginning and end of the chlorine contact basin. These chlorine analyzers will take the place of the single chlorine analyzer located hundreds of feet away from the basin.

The physical location of these chlorine analyzers will provide the benefit of a flow paced chlorination system. Incorporating this equipment into the normal operations of the wastewater treatment plant will greatly reduce the need for wasteful response activities that require an excess of chemicals and impose administrative complexity. Meeting the exact need of the wastewater treatment plant's disinfection needs instead of reacting to excessive flow, will make for a more resilient and sustainable process.

Other Alternatives: While many alternatives to address the impacts of heavy rain and storms exist for the wastewater treatment plant, the primary goal for these alternatives is more responsive in nature, and exorbitantly expensive. Recently identified alternatives include increasing the size of the 1.2 M gallon concrete lined equalization basin, covering all open-air basins in the treatment process, or creating a third basin that provides raw sewage storage or recycled water storage, based on the season. Instead, this project to improve the efficiency of operations with strategically placed chlorine analyzers, is much more cost-effective, and sustainable.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Wastewater Reclamation Plant RMP, LHMP, 2023 Strategic Plan, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District

Benefits (Losses Avoided): Improve sustainability and resiliency of HVLCSD.

Ensure adequate and reliable sewer and water infrastructure that can withstand a higher level of damage from natural disasters

Potential Funding: In-kind services, Water Use Fees, Capital funds, Federal and State grant funding (FEMA BRIC, PDM, HMPG, as well as Cal OES grants)

Timeline: within 6 months and ongoing for the next 5 years

Project Priority (High, Medium, Low): Medium

Action 10. Establish Cross Functional Committee and Address Levee & Stream Issues.

Hazards Addressed: Floods: 1%/0.2% annual chance, Floods: Localized Stormwater, Levee Failure, and Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)

Issue/Background: Difficulties in verifying ownership of the levee are driving the District to create a cross-functional committee that will determine its sole proprietor. Five other key vulnerabilities cannot be addressed until a consensus is reached on ownership as well as roles and responsibilities amongst all beneficial parties.

- Erosion – Rodent tunneling has been observed in the Putah Creek levee. Extreme rain events have become more frequent and occur with higher intensity. The aggregate effect of these changes to the levee has become a threat to its integrity.
- Sediment – The multiple rain events that have resulted in federally declared disasters, coupled with the multiple wildfire disasters result in significant sedimentation in creek beds surrounding Hidden Valley Lake.
- Drainage – The flood detention basin located in the Southeastern most section of the Putah Creek levee, is also the lowest point within the community. Drainage of stormflow from the community does not currently have an effective path back to Putah Creek.
- Maintenance – Preventative activities have not been fully vetted, and therefore prevention has not reached its full potential.

Certification – The levee does not hold certification for a 100-year flood event.

Project Description: This project has many facets but must begin with the determination of ownership. From this beginning, agreements can be developed to address the most salient of vulnerabilities. Each of the three required entities in this project, HVLCSD, HVLA, and Lake County Water Resources Department will have a unique vested interest in participating in the various mitigation activities.

- Erosion – In concert with the appropriate regulatory and permitting agencies, tunnel eradication, and possible levee restoration (rip-rap) can help prevent a breach of the levee.
- Sediment – A process to restore creek depth and width will again likely involve all agencies with a vested interest, and the corresponding permitting entity. Removing sedimentation will deepen the creek, making the levee walls more effective and narrowing creek flow headed downstream.
- Drainage – Resolving this complex issue of stormwater flow to Putah Creek, despite the presence of a levee will require cooperation and coordination with all entities and will have a profoundly positive effect on the constituents of these entities. Drainage can be categorized as both stormflow management throughout the community, and stormflow management at the flood control station. Taking control and responsibility for the maintenance and improvements of both categories is likely to require the formation of a Special Assessment District. A vote of landowners within the boundary of this Special Assessment District will determine the success of this project. Constituents will need to make a fiscal commitment to infrastructure improvements, and the responsible agency will be empowered to act upon this new formation.
- Maintenance – Monitoring levee integrity and fuels mitigation are a few examples of how ongoing activities can help prevent the backlog of issues currently facing this community.
- Certification – In concert with engineering research, and support from the Army Corps of Engineers, a certification of the Putah Creek levee can support the resilience requirement of the National Flood Insurance Rate Map.

All five of these key levee issues can benefit HVLCSD by providing a secure environment for existing infrastructure. The expertise of HVLCSD personnel to flood protection and mitigation will lend support to the solution.

Other Alternatives: Not identify the proprietor of the levee and leave it unchecked, potentially leading to localized flooding and disrupting regular operations.

Existing Planning Mechanism(s) through which Action Will Be Implemented: LHMP, Memorandum of Agreement, Mutual Aid, 2023 Strategic Plan, LAFCO, CSDA, SAD, Master Storm Drainage Plan, Water Master Plan, Staffing Plan, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District/Lake County Water Resources/Hidden Valley Lake Association

Benefits (Losses Avoided): Protection of life and property by reducing flood likelihood, a thriving riparian environment, a naturally maintained ecosystem, a stronger District that is prepared, able to respond, and recover from disastrous events, and reduced localized flooding/increased resiliency to flooding.

Potential Funding: FEMA, Water and Sewer Use Fees, HMGP Funding, In-kind services, State Funding, Special Assessment District, Storm Control Use Fees

Timeline: 2024 and annually

Project Priority (High, Medium, Low): High

Action 11. Update and Implement Stormwater Master Plan/Stormwater Mitigation

Hazards Addressed: Floods: Localized Stormwater, Levee Failure

Issue/Background: In 2000, resulting from a partnership of local agencies (HVLCSD, HVLA, Lake County Flood Control, and Water Conservation District), a Master Storm Drainage Plan was published. There have been no updates to this plan since its inception. Some improvements to HVLCSD infrastructure have taken place and have become a capability for the utility. Joint efforts between agencies to achieve improvements, however, have proven difficult.

Localized flooding has increased in frequency and intensity in recent years and the need for improvement has consequently increased. The damage resulting from these storms impact the local watershed, flood management, residents, roads, and infrastructure. For HVLCSD, unabated stormwater inundates sewer lines, and the wastewater treatment plant, and shortens the useful life of pumps needing to move this unanticipated volume of stormwater. Inundation has caused sewer system overflows, which have likely drained into the waters of the US. At the wastewater treatment plant, inundation has caused an interruption in the processing of waste. Flood waters also increase pressure around water mainline infrastructure, increasing the likelihood of a break.

Stormwater is of great concern to HVLCSD as infrastructure is clearly affected by localized flooding events. Sewer system overflows are negatively impacting the watershed, and flood management teams cannot be successful under the current environment. Flood management teams are unable to attend to flood control structures and appurtenances. Repetitive loss to homeowners can create insurance consequences for homeowners. Roads and traffic control in the community is a safety and administrative concern for the homeowner's association and its members. Jurisdictional and fiscal roadblocks remain in place while the threat of extreme weather increases.

Updating the Master Storm Drainage Plan of 2000 to reflect the current issues arising from atmospheric river events and implementing the new plan would be a major way to avoid further damage to the community and HVLCSD's infrastructure and operations. This new plan would have to involve HVLCSD, Hidden Valley Lake Association (an HOA), and Lake County Flood Control and Water Conservation District.

Project Description: The Update and Implement Stormwater Master Plan or Stormwater Mitigation project would start with a review of the 2000 plan. Removing improvements and new capabilities from the plan would help pave the way to a renewed focus on the improvement opportunities within the community. Net present value of projects and newer technologies applied to these projects would need to be applied to these remaining improvement opportunities.

Cooperation by all vested agencies will be highlighted as a key success factor in the plan, and its projects. This cooperation would include input, active participation, and fiscal commitment in the form of budget line items for all entities, and these budgets line items should mirror each other. This mutual commitment cannot be overstated and is likely to require Memorandums of Agreement to move forward.

Salient projects will likely be;

- Financial solution to empower project implementation
- A drainage solution from the collection point for the entire community, adjacent to the Putah Creek levee.
- Improved stormwater drainage throughout the community

- Maintenance plans complete with roles, responsibilities, and timelines.

Potential funding may require the election of a lead agency in concert with the aforementioned Memorandums of Agreement.

Other Alternatives: No update to stormwater plans and no change in constant reaction to disaster declarations, perpetuating a cycle of applications for emergency grant funding to solve urgent problems and not systemic issues.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Master Storm Drainage Plan (2000), 2023 Strategic Plan, Staffing plan to meet partnering timelines, Memorandum of Agreement to Partnership, Service Agreement Contract, Five-year budget plan for Operations and Capital Funds.

Responsible Office/Partners: Hidden Valley Lake Community Services District/Lake County Water Resources Department/Hidden Valley Lake Association

Benefits (Losses Avoided): This project will minimize risk and vulnerability of HVLCSD to hazards and protect lives and prevent losses to property and the environment.

This project will improve HVLCSD's capabilities to plan for/prevent/mitigate hazard-related losses and to be prepared for, respond to, and recover from a disaster event.

This project will improve HVLCSD's resiliency to flooding.

Potential Funding: FEMA HMGP Grant Funding, Water and Sewer Use Fees, In-kind services, County Funding, tax base establishment, Federal and State Funding.

Timeline: 10 years

Project Priority (High, Medium, Low): High

Earthquake Actions

Action 12. Earthquake Vulnerability Assessment and Retrofit

Hazards Addressed: Earthquake

Issue/Background: Hidden Valley Lake Community Services District is in a "Very High" Relative Earthquake Hazard zone according to the United States Geological Survey (USGS) Seismic Hazards Map. HVLCSD is also adjacent to five named fault lines, Collayomi, Cobb Mountain, Konocti Bay, Berryessa, and Hunting Creek Faults. One of the largest geologic features in Lake County, Clear Lake, has a large volcanic field associated with it, with a current threat potential of 'High' as designated by the USGS. With all these seismic factors, Lake County, and Hidden Valley Lake by extension, is in a very geologically active area, and is susceptible to a significant seismic event.

The nature of underground water and wastewater infrastructure, unless designed otherwise, is a stiff scaffolding of air and water filled pipes underground with scattered access points along the surface. The underground infrastructure can break with large jarring movements or slowly weaken over repeated small tremors. In areas of liquefaction, air filled underground infrastructure has been known to 'float' as the land settles and sinks. Above ground infrastructure can also be a vulnerability, water tanks and tanks without proper anchoring, and the wastewater treatment plant that could crack and leak. Infrastructure resilience can be greatly improved nearly everywhere.

Much of the District's infrastructure was built in the 1960s. Given the increasing nature of natural hazards, the proximity to active fault zones, and the ever-changing building standards HVLCSD needs to assess the seismic vulnerability of its assets.

Project Description: Results of an assessment will shape the scope of an Earthquake Vulnerability Assessment and Retrofit project. Given the wide span of structure age of District infrastructure, the detail of mitigation activities will be varied. The unique nature of the community's geography and geology are considerations that will shape both the assessment and the mitigation.

The District is a member of the California-wide mutual aid organization called the California Water and Wastewater Agency Response Network (Cal WARN). This membership will benefit in the possible event of an earthquake. Assistance from other water or wastewater agencies helps the speed of recovery from a catastrophic event, and fits into the framework of California Standardized Emergency Management System (NEMS), and the Federal National Incident Management System (NIMS).

Assessment results will also be integrated into the state-mandated Risk and Resilience Assessment, and ERP (Emergency Response Plan) for the District.

Other Alternatives: History has proven that earthquakes are usually catastrophic in nature, and really do not offer an alternative to being prepared.

Existing Planning Mechanism(s) through which Action Will Be Implemented: 2023 Strategic Plan, Five-year budget plan for Operations and Capital Funds.

Responsible Office/Partners: Hidden Valley Lake Community Services District

Benefits (Losses Avoided): This project would improve the sustainability and resiliency of HVLCSD.

- This project would help protect, maintain, and provide safe drinking water and sewer services for existing and future development within the HVLCSD Service area.
- This project would ensure adequate and reliable sewer and water infrastructure that can withstand a higher level of damage from natural disasters.
- This project would improve HVLCSD's capability to plan for/prevent/mitigate hazard-related losses and to be prepared for, respond to, and recover from a disaster event.
- This project would increase HVLCSD and community outreach, education, and awareness of risk and vulnerability to hazards and promote preparedness and self-responsibility to reduce hazard-related losses.

Potential Funding: Water and Sewer Use Fees, In-kind services, and Federal and State Funding.

Timeline: 48 months

Project Priority (High, Medium, Low): High

Action 13. I/I Program and Sewer System Rehabilitation

Hazards Addressed: Earthquakes, Floods: Localized Stormwater, Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)

Issue/Background: Since 2017, extreme weather events have led to four disaster declarations, 4301, 4308, 4434, and 4619 which have caused significant damage to the sewer collections system and the Wastewater Treatment Plant. While some projects have come to fruition and progress has been made in monitoring and reducing infiltration and inflow (I/I), the increase in severity and frequentness of storms hints that a larger scale project effort is needed to overcome the cycle of repetitive loss.

A Sanitary Sewer Overflow is a critical vulnerability that HVLCSD is committed to addressing. Additionally, the inundation effect of I/I from the sewer lines into the Wastewater Treatment Plant can compromise the District's ability to provide wastewater and recycled water services.

When the sewer system overflows onto land, the public and the environment is exposed to dangerous bacteria, viruses, and parasites. While operating within its design capacity, the sewer collection system has overflowed onto land on multiple occasions. During storm events as seen in the aforementioned disasters, stormwater is entering the sewer collection system, pushing both the collection system and the wastewater treatment plant, beyond its capacity.

The community of Hidden Valley Lake is located in an Earthquake Hazard Zone of "Very High", which is the highest rating the EPA provides. Ground displacement, liquefaction, lateral spreading and settling are all impacts that could significantly interrupt wastewater collections and wastewater treatment.

Project Description: This project will reduce the amount of stormwater entering the sewer collection system, to aid in its design function of sewer treatment only, not stormwater. A sewer system rehabilitation project will take the results of previous years research and analysis and enact upon the plan that will reduce the flow of effluent to the wastewater treatment plant.

The I/I or sewer system rehabilitation project is divided into two categories:

Infiltration occurs when groundwater seeps into sewer lines. The repair/replacement of sewer lines susceptible to infiltration is one category of this project that will reduce the amount of stormwater entering the system and consequently reduce the threat of Sewer System Overflows and Wastewater Treatment Plant inundation.

Inflow occurs when rain falls directly into sewer lines through openings such as manholes or cleanouts. Manhole lid replacement is the second category of this project that will also reduce the amount of stormwater entering the system and consequently reduce the threat of Sewer System Overflows and Wastewater Treatment Plant inundation.

The oldest areas of the collection system should be prioritized in a phased project since they are the most prone to the occurrence of I/I.

Other Alternatives: An alternative option of expanding the Equalization Basin was introduced and fully vetted. The extraordinary time and cost of this expansion, to include permitting requirements, did not provide a sufficient long-term solution by simply treating the result (higher influent) rather than the cause (collections system I/I).

Existing Planning Mechanism(s) through which Action Will Be Implemented: Master Storm Drainage Plan, 2023 Strategic Plan, Regional Waterboards Waste Discharge Requirements 5-00-019, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District

Benefits (Losses Avoided): Losses avoided:

- Threat to public safety (Sewer System Overflow)
- Loss of function (Wastewater Treatment Plant inundation)

Potential Funding: In-kind services, Sewer Use Fees, Capital funds, Federal and State grant funding (FEMA BRIC, PDM, HMPG, as well as Cal OES grants)

Timeline: Annually and ongoing during the life cycle of this LHMP and beyond.

Project Priority (High, Medium, Low): High

Wildfire Actions

Action 14. Fuel Mitigation/Defensive Space

Hazards Addressed: Wildfire

Issue/Background: The community of Hidden Valley Lake is a densely populated area, juxtaposed with areas of expansive forests, grasses, and rugged terrain. The wildland urban interface (WUI) is defined as a place where "humans and their development meet or intermix with wildland fuel". The devastation of the 2015 Valley Fire to Hidden Valley Lake and the proximity of the LNU lighting complex fire of 2020, among others, highlighted its vulnerability to wildfire. Seventy-three homes were lost, and extensive damage to HVLCSD infrastructure was sustained.

In the years following the Valley Fire, Lake County experienced several wildland fire events that resulted in several Federally declared disasters. To date, over sixty percent of Lake County has burned. The frequency and intensity of these fires demand a change in preventative measures. Seasonally, "Diablo wind" patterns traverse northern California mountain ranges, including the Mayacama range, in which Hidden Valley Lake is situated.

These recent catastrophic natural events have underscored the destructive role that vegetation plays in the threat to public safety, and the threat to critical infrastructure.

Project Description: The fuel mitigation/defensive space project will help HVLCSD take preventative action against wildfire and its spread.

With seasonal winds exacerbating the arid conditions of spring and fall, the timing of this project will be the cornerstone of its success. In accordance with the National Firewise Communities Program (NFCP), the fuel mitigation/defensive space project will develop and implement a defensible space around critical and essential facilities. To continue to be able to provide water to firefighters and safe drinking water to the community, the project would identify and maintain two zones of defensible space, making a 100' perimeter around these facilities, as described in the CalFire readyforwildfire.org publication.

The implementation phase of this project will also address continuous improvement opportunities such as landscaping efforts with fire retardant plant species, possible structural improvements such as replacing an earthen basin with a concrete-lined basin, and erecting masonry buildings to protect key infrastructure.

Other Alternatives: Implementing continuous improvement projects prior to the fuel mitigation project is an option, but this would not provide tangible evidence of the effectiveness of the NFCP and CalFire guidelines. The cost benefit of concrete-lined basin, and masonry may be best vetted by implementing fuels mitigation first.

Existing Planning Mechanism(s) through which Action Will Be Implemented: 2023 Strategic Plan, Staffing to meet partnership timelines, Service Agreement contract, Five-year budget plan for Operations and Capital Funds, Bond issuance

Responsible Office/Partners: Hidden Valley Lake Community Services District

Benefits (Losses Avoided): Fuels reduction to reduce wildfire emissions damage and loss to wildfires Losses include Critical facilities That serve a vast public of a potential critical need of safe drinking water/Protecting the downstream user from harsh environmental impacts. Forest damage and loss to wildfires, insects and disease, or development can result in large CO2 emissions.

Potential Funding: Capital funding, water/wastewater budget line items and grant funding (FEMA BRIC, PDM, HMPG, as well as Cal OES grants), bond funds

Timeline: 2025 and annually

Project Priority (High, Medium, Low): High

Action 15. Add/Improve/Fortify Fire Hydrants

Hazards Addressed: Wildfire

Issue/Background: Hidden Valley Lake is located in an elevated fire threat zone. In this densely populated area, on the cusp of wildland fuels, the potential for catastrophic wildfire has been realized on several occasions in the recent past.

The speed and extent of wildfire is largely dependent on the capabilities of the fire hydrants available to firefighters. Once a fire reaches a populated area, hydrants stand in the way of that fire reaching homes and families.

Recent standards adopted by NFPA in 2016 (#24, #25) encourage water companies to optimize fire flow, provide reliable equipment, and to reduce distance between hydrants as feasible to provide the most protection against wildfire. The hydrants in Hidden Valley Lake were implemented before these standards were developed and are a vulnerability to life and property within the community.

Project Description: The hydrant project would replace over 300 standpipe, wet barrels, single port wharf hydrants with dry barrel, multi-port standard fire hydrants.

Reliability - A dry barrel hydrant is more resistant to damage than a wet barrel. Due to its internal composition, there is no water under pressure in a dry barrel hydrant until it is activated. This eliminates the risk of freezing in cold weather, and extensive repair and water loss in the case of a traffic accident. Replacing a standpipe hydrant with a more traditional hydrant also supports the effort to increase reliability, as standard hydrants are significantly sturdier. This hydrant improves reliability and is more likely to be available when fire-fighters need them.

Fire flow – A multi-port hydrant provides fire-fighters with the ability to connect hoses of different sizes, as well as more than one hose at a time to combat a fire. This provides a significant improvement reducing the effects of wildfire than a single port hydrant.

Proximity – Another step towards reducing the effects of wildfire, hydrants would be placed closer to each other than they are currently. When fire-fighters arrive on the scene, having multiple fire hydrants available reduces set-up time and increases efficiency.

Other Alternatives: Replacing less than all the hydrants would reduce the effectiveness of the project by the number of unimproved hydrants. This would pose the difficult question of which areas in the community are more deserving of improvements than others.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Water Master Plan, 2023 Strategic Plan, Rate Study analysis, Rate increase, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District

Benefits (Losses Avoided): Threat to public safety and property and District infrastructure

Potential Funding: In-kind services, Water Use Fees, Capital funds, Federal and State grant funding

Timeline: 36 months

Project Priority (High, Medium, Low): High

Chapter 6 Plan Adoption

44 CFR §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, county commissioner, Tribal Council).

The purpose of formally adopting this 2025 Local Hazard Mitigation Plan (LHMP) Update is to secure buy-in from the Hidden Valley Lake Community Services District (HVLCSD or District), as the single participating jurisdiction to this Plan, raise awareness of the Plan, and formalize the Plan's approval and implementation. The adoption of this LHMP completes Planning Step 9 of the 10-step planning process: Adopt the Plan, in accordance with the requirements of DMA 2000. The governing board for the District has adopted this 2025 Local Hazard Mitigation Plan by passing a resolution. A copy of the generic, sample resolution is included in Appendix D: Adoption Resolution.

Chapter 7 Plan Implementation and Maintenance

44 CFR §201.6(c)(4): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Implementation and maintenance of this 2025 Hidden Valley Lake Community Services District (HVLCSD or District) Local Hazard Mitigation Plan (LHMP) Update is critical to the success of hazard mitigation in the HVLCSD Planning Area. Plan implementation and maintenance is Planning Step 10 of the 10-step planning process. Accordingly, this chapter provides an overview of the overall strategy for Plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the Plan. The chapter also discusses incorporating the Plan into existing planning mechanisms and how to address continued public involvement in local hazard mitigation planning.

Chapter 3, Planning Process, includes information on the implementation and maintenance process since the adoption of the 2020 LHMP Update. This chapter includes information on the implementation and maintenance process for the development of this Plan, the 2025 HVLCSD LHMP Update.

7.1 Implementation

Once adopted, this 2025 HVLCSD LHMP Update faces the truest test of its worth: implementation. While the Plan contains many worthwhile actions, the HVLCSD will need to decide which action(s) to undertake first. Two factors should be considered when making that decision: the priority assigned to the Mitigation Actions in the Plan and funding availability. Low or no-cost actions most easily demonstrate progress toward successful Plan implementation.

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans and mechanisms such as strategic plans, stormwater plans, wildfire plans, Emergency Operations Plans (EOPs), infrastructure improvement plans, evacuation plans, and other hazard and emergency management planning efforts by the HVLCSD. The HVLCSD already implements policies and programs to reduce losses to life and property from hazards. This 2025 LHMP Update builds upon the momentum developed through prior, related planning and mitigation programs and recommends implementing actions, where possible, through other programs.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. Implementation can be accomplished by adhering to the schedules identified for each action through sustained collaborative efforts by highlighting the mutual benefits of proposed mitigation actions to the HVLCSD, its stakeholders, and the public. This is achieved through the routine actions of monitoring agendas, attending meetings, and promoting mitigation initiatives to enhance the safety and sustainability of the communities. Additional mitigation strategies may include consistent and ongoing enforcement of existing policies and the vigilant review of programs for coordination and multi-objective opportunities to enhance mitigation.

Simultaneously, it is important to continuously monitor potential funding opportunities to finance mitigation actions. This may include identifying funding sources to meet local matching funds requirements under FEMA pre- and post-disaster mitigation grant programs, and other sources. When funding does become available, the HVLCSD will be better positioned to capitalize on the opportunity.

Responsibility for Implementation of Goals and Activities

The elected officials, executive leadership teams, responsible staff and departments of the HVLCSD are charged with implementation of various activities in the 2025 LHMP Update. During the annual reviews as described later in this section, the HVLCSD should conduct an assessment of progress toward meeting the goals and activities of the LHMP Update. At that time, recommendations may be made to modify timeframes for the completion of identified mitigation actions, identify funding sources, and work with responsible entities to implement the actions. On an annual basis, the priority of various mitigation actions may be adjusted. Some activities that are found not to be feasible may be removed from the Plan entirely, while other mitigation actions unforeseen during Plan development process may be added.

7.1.1. Role of the LHMP Update HMPC in Implementation and Maintenance

With adoption of this Plan, the HVLCSD will be responsible for LHMP implementation and maintenance. The HMPC identified in Chapter 3 (or a similar committee) will reconvene annually each year to ensure mitigation strategies are being implemented. The HVLCSD Project Manager will continue in their role as project lead for overall LHMP implementation and maintenance. As such, the HVLCSD Lead will continue their relationship with, and will plan to convene a similar LHMP Update HMPC when preparing the subsequent LHMP Update. The HVLCSD project lead, with support from the LHMP Update HMPC will:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Ensure hazard mitigation remains a consideration for community decision makers;
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the District implement the Plan's recommended actions for which no current funding exists;
- Monitor and assist in the implementation and update of this Plan;
- Report on Plan progress and recommended changes to the HVLCSD governing board; and
- Inform and solicit input from the public.

The primary duty of the HVLCSD and the HMPC is to see the LHMP Update successfully carried out and to report to their governing board and the public on the status of LHMP implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information about the LHMP on the HLVCSD website.

7.2 Maintenance

Plan maintenance implies an ongoing effort to monitor and evaluate LHMP implementation and to update the Plan as progress, roadblocks, or changing circumstances are encountered.

7.2.1. Maintenance Schedule

The HVLCSD Project Manager, as project lead, is responsible for initiating Plan reviews. In order to monitor progress and update the mitigation strategies identified in the mitigation action plan, the HVLCSD and the HMPC will revisit this Plan annually each year and following a hazard event. Annual reviews will include and assessment of progress towards Plan implementation. The HVLCSD will also submit a five-year written update to the State and FEMA Region IX, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. With this 2025 LHMP Update anticipated to be fully approved and adopted in mid-2025, the next required written update of the Plan must be completed prior to the 2025 Plan expiration date. The HVLCSD lead will initiate the Plan update – which may include securing grant funding to hire professional services to assist in preparing the 2030 LHMP Update. The 2030 LHMP Update development process should be initiated in 2027 to ensure the 2030 LHMP Update can be funded and completed by this 2025 HVLCSD LHMP's expiration date.

7.2.2. Maintenance Evaluation Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the Plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions;
- Increased vulnerability as a result of new development (and/or annexation); and/or
- Increased vulnerability resulting from unforeseen or new circumstances.

Updates to this Plan will:

- Consider changes in vulnerability due to action implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to infrastructure inventories; and
- Incorporate new action recommendations or changes in action prioritization.

Changes will be made to this Plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, HVLCSD priorities, and/or funding resources. All mitigation actions will be reviewed during the monitoring and update of this Plan to determine feasibility of future implementation. Updating of this LHMP will be by written changes and submissions, as the HVLCSD and HMPC deem appropriate and necessary, and as approved by the HVLCSD governing board. In keeping with the five-year update process, the HVLCSD and the HMPC will convene public meetings to solicit public input on this LHMP Update and its routine maintenance, and the final product will be again adopted by the HVLCSD governing board.

Annual Plan Review Process

For the LHMP Update review process, the HVLCSD project lead will be responsible for facilitating, coordinating, and scheduling reviews and maintenance of the LHMP. ***The LHMP is intended to be a living document.*** The review of the 2025 LHMP Update will normally occur on an annual basis each year and will be conducted by the HVLCSD and the HMPC as follows:

- HVLCSD project lead will place an advertisement in the local newspaper and through social media mechanisms and will utilize other public outreach tools, such as e-newsletters, social media blasts, and others, advising the public of the date, time, and place for each annual review of the LHMP Update and will be responsible for leading the meeting to review the Plan.
- Notices will be mailed or emailed to the members of the HMPC, federal, state, and local agencies, non-profit groups, local planning agencies, representatives of business interests, neighboring communities, and others advising them of the date, time, and place for the review.
- County/City/District/Tribal officials will be noticed by email and telephone or personal visit and urged to participate.
- Prior to the review, department heads and others tasked with implementation of the various activities will be queried concerning progress on each activity in their area of responsibility and asked to present a report at the review meeting.
- The local news media will be contacted, and a copy of the current LHMP will be available for public comment on the HVLCSD LHMP webpage.
- After the review meeting, minutes of the meeting and an annual report will be prepared by the HVLCSD and HMPC and forwarded to the news media (public).
- A copy of the 2025 LHMP Update will be continually posted on the HVLCSD LHMP website.

Criteria for Annual Reviews

The criteria recommended in 44 CFR 201 and 206 will be utilized in reviewing and updating the 2025 LHMP Update. More specifically, the reviews should include the following information:

- Community growth or change in the past year.
- The number of substantially damaged or substantially improved structures by flood zone.
- The renovations to public infrastructure including water, sewer, drainage, roads, bridges, gas lines, and buildings.
- Natural hazard occurrences that required activation of the Emergency Operations Center(s) (EOC) and whether or not the event resulted in a federal disaster declaration.
- Natural hazard occurrences that were not of a magnitude to warrant activation of the EOC or a federal disaster declaration but were severe enough to cause damage in the community or closure of businesses, schools, or public services.
- The dates of hazard events and descriptions.
- Documented damages due to the events.
- HVLCSD closures or service interruptions and the number of days closed.
- Road or bridge closures due to the hazard and the length of time closed.

- Assessment of the number of HVLCSD assets and private and public buildings damaged and whether the damage was minor, substantial, major, or if buildings were destroyed.
- Review of the status of implementation of projects (mitigation strategies) including projects completed will be noted. Projects behind schedule will include a reason for delay of implementation.
- Review of any changes in federal, state, and local policies to determine the impact of these policies on the HVLCSD and how and if the policy changes can or should be incorporated into the next LHMP Update.

7.2.3. Incorporation into Existing Planning Mechanisms

Another important implementation mechanism that is highly effective and low-cost is incorporation of the 2025 LHMP Update recommendations and their underlying principles into other jurisdictional plans and mechanisms. Where possible, Plan participants will use existing plans and/or programs to implement hazard mitigation actions. As previously stated in Section 7.1 of this Plan, mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. The point is re-emphasized here. As described in this LHMP's capability assessment, the HVLCSD already implements policies and programs to reduce losses to life and property from hazards. This Plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. These existing mechanisms include:

- Strategic and master plans
- Emergency Operations Plans and other emergency management efforts
- District policies and standard operating procedures
- Flood/stormwater management/master plans
- Community Wildfire Protection Plans and other Fire Plans
- Climate Plans
- Capital Improvement Plans and budgets
- Other plans and policies outlined in the capability assessment
- Other plans, regulations, and practices with a mitigation focus

HVLCSD and HMPC members involved in these other planning and program mechanisms will be responsible for integrating the findings and recommendations of this LHMP with these other plans, programs, etc., as appropriate. As described in Section 7.1 Implementation, incorporation into existing planning mechanisms will be done through the routine actions of:

- monitoring other planning/program agendas;
- attending other planning/program meetings;
- participating in other planning processes; and
- monitoring community budget meetings for other community program opportunities.

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community.

Examples of incorporation of the 2025 LHMP Update into existing planning mechanisms include:

1. Integration of flood actions identified in this mitigation strategy with implementation priorities in existing Watershed, Flood, and Stormwater Drainage Plans. People responsible for development and implementation of Flood Plans and Stormwater Master Plans participated on the HMPC. Key projects were identified and integrated specifically into this LHMP, while others currently of lessor priority should be referenced in their source document. Actual implementation of these projects will likely occur through the flood and stormwater plans' processes through the efforts of the HVLCSD.
2. Integration of wildfire actions identified in this mitigation strategy with the actions and implementation priorities established in existing and new Community Wildfire Protection Plans and other fire plans.
3. Integration of many of the infrastructure facility improvement projects with the HVLCSD Capital Improvement Program.
4. Use of risk assessment information to inform future updates of the hazard analysis in the Emergency Operations Plans and related emergency management efforts for the HVLCSD.

The HVLCSD will consider incorporation of the LHMP into planning mechanisms listed on Table 7-1.

Table 7-1 HVLCSD – 2025 LHMP Incorporation into other Planning Mechanisms

Jurisdiction	Strategic Plan / Risk Management Plan	EOP	CIP	CWPP and Fire Plans	Stormwater /Flood Plans & Studies	Climate Plans	Other Plans
HVLCSD	X	X	X	X	X	X	Evacuation Planning

The LHMP for HVLCSD will be included into the District's Risk Management Plan, HVLCSD Strategic Plan, and Capital Improvements Plan and other plans as identified above. In addition, the below mitigation actions included within the HVLCSD's mitigation strategy contain a category identifying "Existing Planning Mechanism(s) through which Action will be Implemented" that describes how each mitigation action is related to other planning mechanisms and HVLCSD programs.

Efforts should continuously be made to monitor the progress of mitigation actions implemented through these other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this LHMP.

7.2.4. Continued Public Involvement

Continued public involvement is a crucial element of successful Plan implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stories from the 2025 LHMP implementation and to seek additional public comment. The Plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, press releases to local media, and through public meetings.

Public Involvement Process for Annual Reviews

The public will be noticed by placing an advertisement in the newspaper and will utilize other public outreach mechanisms, such as e-newsletters, social media blasts, and others, specifying the date and time for the review and inviting public participation. The HMPC, local, state, and regional agencies will also be notified and invited to attend and participate.

Public Involvement for Five-year Update

When the HVLCSD and HMPC reconvene for the next LHMP Update, they will coordinate with all stakeholders participating in the planning process—including those that joined the committee since the planning process began—to update and revise the Plan. In reconvening, the HVLCSD and HMPC will identify a public outreach subcommittee, which will be responsible for coordinating the activities necessary to involve the greater public. The subcommittee will develop a plan for public involvement and will be responsible for disseminating information through a variety of media channels detailing the LHMP update process. As part of this effort, public meetings will be held, and public comments will be solicited on the LHMP Update drafts. In addition, continued public involvement and outreach efforts will place an emphasis on identifying and inviting representatives from underserved and vulnerable populations to be part of the next, 2030 HVLCSD LHMP Update. As a starting point the underserved and vulnerable population groups identified for this 2025 LHMP Update will be contacted to invite them to the 2030 LHMP Update process with additional groups identified and added to support the ongoing goal of mitigation planning for the whole community.

Appendix A Planning Process

A.1 Lists of HMPC Invites/Stakeholders

A.1.1. LHMP Invite List – TO BE INSERTED AT END OF PROCESS

Agency	Name

A.1.2. HMPC Participant List – TO BE INSERTED AT END OF PROCESS

Agency	Name

A.2 Website for Hazard Mitigation Plan

A.3 HMPC Meeting #1: Kickoff Meeting

A.3.1. HMPC Meeting#1: Kickoff Invite to HMPC and Stakeholders

Sent: Tuesday, March 12, 2024 4:44 PM
To: Yolanda Garibay <Yolanda.Garibay@lakecountyca.gov>; Dennis White <dwhite@hvlcsd.org>; Penny Cuadras <pcuadras@hvlcsd.org>; Alyssa Gordon <agordon@hvlcsd.org>; Trish Wilkinson <twilkinson@hvlcsd.org>; Donna Mahoney <dmahoney@hvlcsd.org>; Lisa Smallcomb <lsmallcomb@hvlcsd.org>; Hannah Davidson <hdavidson@hvlcsd.org>; Barry Silva <bsilva@hvlcsd.org>; Nathan Reese <nreese@hvlcsd.org>; Dominic Hernandez <dhernandez@hvlcsd.org>; Jacob McClure <jmcclure@hvlcsd.org>; Jarrod Cunningham <jcunningham@hvlcsd.org>; Connor Bounsall <cbounsall@hvlcsd.org>; Chase Hollman <chollman@hvlcsd.org>; Jim Freeman <jfreeman@hvlcsd.org>; Jim lieberman <jlieberman@hvlcsd.org>; Gary Graves <ggraves@hvlcsd.org>; Matthew Metcalf <mmetcalf@hvlcsd.org>; Sean Milleric <smillerick@hvlcsd.org>; gm@hvla.com; accountingmgr@hvla.com; execasst@hvla.com; opsdir@hvla.com; eccoord@hvla.com; ecclerk@hvla.com; maintdir@hvla.com; dpsdir@hvla.com; Victoria.LaMar-Haas@CalOES.ca.gov; centralvalleysacramento@waterboards.ca.gov; chris.morrison@fostermorrison.com; jeanine.foster@fostermorrison.com; Jessica Pyska <Jessica.Pyska@lakecountyca.gov>; Moke Simon <Moke.Simon@lakecountyca.gov>; Bruno Sabatier <Bruno.Sabatier@lakecountyca.gov>; Matthew Rothstein <Matthew.Rothstein@lakecountyca.gov>; Susan Parker <Susan.Parker@lakecountyca.gov>; Terre Logsdon <Terre.Logsdon@lakecountyca.gov>; Craig Wetherbee <Craig.Wetherbee@lakecountyca.gov>; dwdist03@waterboards.ca.gov; info@NCOinc.org; ccwdfiora@att.net; thobbs@clearlakepd.org; llambert@clearlakepd.org; Jonathan Armas <Jonathan.Armas@lakecountyca.gov>; Mike.Marcucci@fire.ca.gov; Douglas Gearhart <dougg@lcaqmd.net>; Elizabeth Knight <elizabethk@lcaqmd.net>; Richard Ford <Richard.Ford@lakecountyca.gov>; sryan@big-valley.net; Katherine Vanderwall <Katherine.Vanderwall@lakecountyca.gov>; reza@yolorcd.org; teresa.connor@water.ca.gov; secretary@resources.ca.gov; christopher.silke@countyofnapa.org; mountainlionsclub@gmail.com; lakecountydart.org@gmail.com; ajack@big-valley.net; rudy.baltazar@fire.ca.gov; peter.crase@caloes.ca.gov; aflora@clearlake.ca.us; abritton@cityoflakeport.com; kingram@cityoflakeport.com; nwalker@cityoflakeport.com; rladd@cityoflakeport.com; Christopher Veach <Christopher.Veach@lakecountyca.gov>; kn@koination.com; mary.ann.heywood@konoctiusd.org; info@firesafelake.org; Elise Jones <Elise.Jones@lakecountyca.gov>; Lars Ewing <Lars.Ewing@lakecountyca.gov>; fdchf700@yahoo.com; Chelsea.Spier@water.ca.gov; agarcia@elemindiancolony.org; kahart@gswater.com; streppa@hpultribe-nsn.gov; mmarcks@hpultribe-nsn.gov; jdavis@highlandswater.com; brenna@brennahowell.com; Lon Sharp <Lon.Sharp@lakecountyca.gov>; Leah Sautelet <Leah.Sautelet@lakecountyca.gov>; Alma Perez <Alma.Perez@lakecountyca.gov>; Rob Howe <Rob.Howe@lakecountyca.gov>; Scott Harter <Scott.Harter@lakecountyca.gov>; Scott DeLeon <Scott.DeLeon@lakecountyca.gov>; Jordan Beaton <Jordan.Beaton@lakecountyca.gov>; lakepillsburyfire@gmail.com; mrsleeannmckay@gmail.com; jhejnowicz@cityoflakeport.com; brasmussen@lakeportpolice.org; mhumphrey@cityoflakeport.com; pharris@cityoflakeport.com; ryoung@lakecoe.org; lakeportfire@lakeportfire.com; vancamp@mbkengineers.com; david.miller@middletownusd.org; cnegrete@middletownrancheria.com; michelle.mead@noaa.gov; mcolacion@northshorefpd.com; phil@putahcreekcouncil.org; kathylandre@yahoo.com; webmaster@rrcbc-nsn.gov; mschaver@robinsonrancheria.org; shawn.davis@sv-nsn.gov; magdalenavh@sscra.org; iquitiquit@svpomo.org; paul.duncan@fire.ca.gov; gloria.fong@fire.ca.gov; mike.wink@fire.ca.gov; martye49@gmail.com; lgalupe@middletownrancheria.com; jgoulart@ucanr.edu; brian@sfcard.org; dbelger@redwoodcoastrc.org; jgalvan@srcharities.org; gethelp@srcharities.org; garrett.thomsen@caloes.ca.gov; nancy.ward@caloes.ca.gov; brian.marshall@caloes.ca.gov; heather@sfcard.org; lhart@lakecoe.org; lakecountyrcds@gmail.com; erica.lundquist@usda.gov; info@theclerc.org; will.evans@clerc.co; cordova@mbkengineers.com; rsanford@scwa2.com;

mstevenson@scwa2.com; sherri@cieaweb.org; j.benoit4@icloud.com; ceo@lakecochamber.com; kimh@lcaor.com; anne.rosinski@fema.dhs.gov; aaron.lim@fema.dhs.gov; robyn.fenning@caloes.ca.gov; amelia.mucci@hagertyconsulting.com; cgshq@conservation.ca.gov; r2info@wildlife.ca.gov; shannon.kimbelauth@redcross.org; danielle.mathewsseperas@calpine.com; derekfiedler@gmail.com; hssc.3245@mediacombb.net; epadilla@lcthc.org; msrc01@att.net; mlrivera@middletownrancheria.com; richardb@lakehabitat.org; contractormatt.jacobs@caloes.ca.gov; Juan.M.Gonzalez@usace.army.mil
Subject: [EXTERNAL] Kick-Off Meeting invite: CSD LHMP Update

Hello,

The Hidden Valley Lake Community Services District would like to invite you to our LHMP Update kick-off meeting later this month. Please see attached memo for more information.

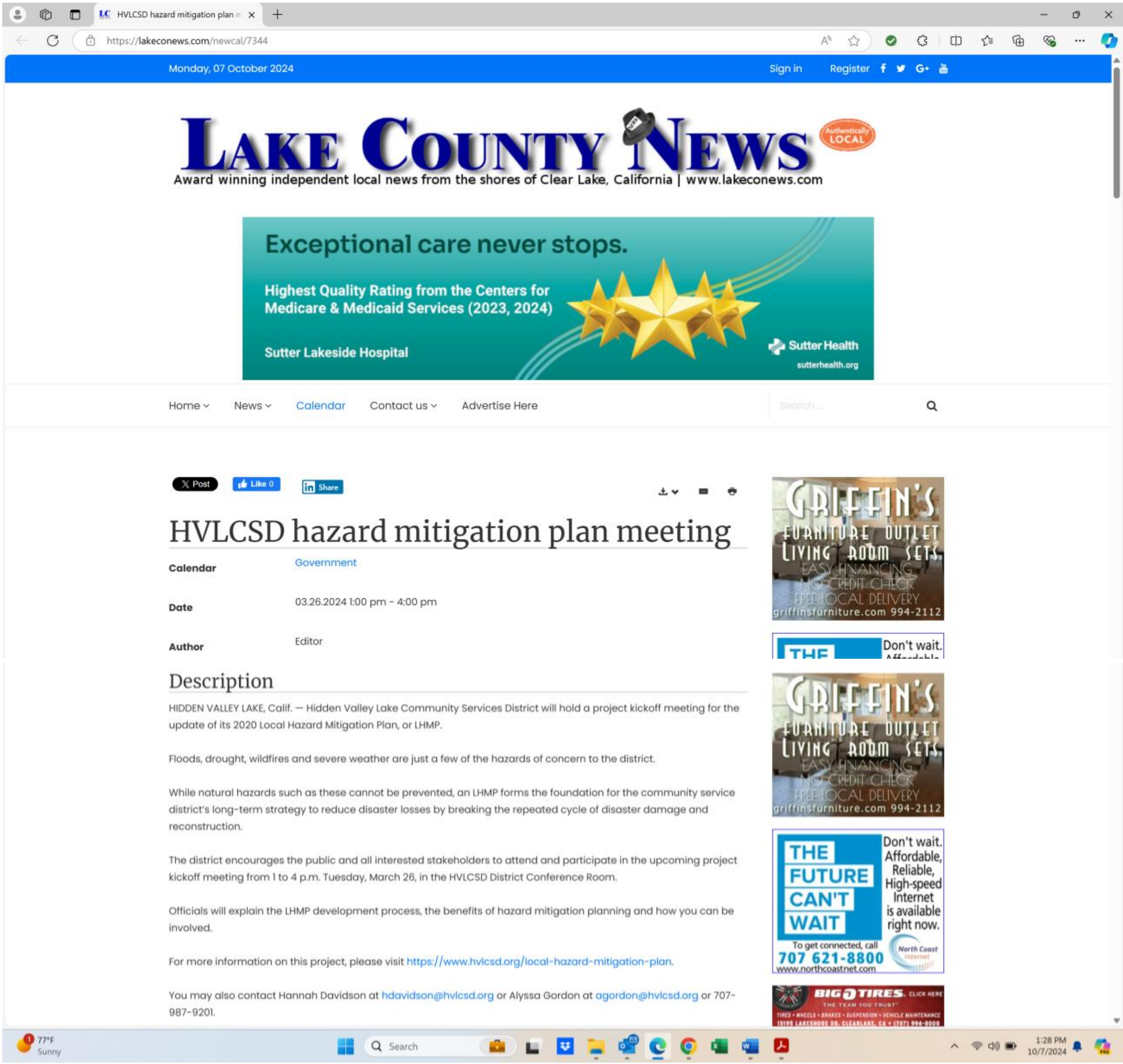
We look forward to seeing you there!

Thank you,
Alyssa Gordon
Hannah Davidson

Note: this email was sent separately to certain individuals as well. It was sent to:

- Robyn.Fennig@CalOES.ca.gov – Cal OES
- memoree.mcintire@caloes.ca.gov – Cal OES
- ryan.aylward@noaa.gov – National Weather Service
- Terre.Logsdon@lakecountyca.gov – Lake County Supervisor
- LakeCOAD@gmail.com – Lake County
- ddwsantarosa@waterboards.ca.gov – WB-DDW-SantaRosa
- sshope@middletownrancheria.com – Tribal Contact
- bcromwell@rrcbc-nsn.gov – Tribal Contact
- shawn.davis@sv-nsn.gov – Tribal Contact
- jessi.widhalm@hagertyconsulting.com – Hagerty Consulting
- shannon.kimbellauth@redcross.org – American Red Cross
- danielle.matthewsseperas@calpine.com;
- joverton@clearlake.ca.us – City of Clearlake

A.3.2. HMPC #1: Kickoff Meeting Article on Lake County News



Monday, 07 October 2024

Sign in Register

LAKE COUNTY NEWS

Award winning independent local news from the shores of Clear Lake, California | www.lakeconews.com

Home News Calendar Contact us Advertise Here

HVLCSD hazard mitigation plan meeting

Calendar	Government
Date	03.26.2024 1:00 pm - 4:00 pm
Author	Editor

Description

HIDDEN VALLEY LAKE, Calif. — Hidden Valley Lake Community Services District will hold a project kickoff meeting for the update of its 2020 Local Hazard Mitigation Plan, or LHMP.

Floods, drought, wildfires and severe weather are just a few of the hazards of concern to the district.

While natural hazards such as these cannot be prevented, an LHMP forms the foundation for the community service district's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction.

The district encourages the public and all interested stakeholders to attend and participate in the upcoming project kickoff meeting from 1 to 4 p.m. Tuesday, March 26, in the HVLCSD District Conference Room.

Officials will explain the LHMP development process, the benefits of hazard mitigation planning and how you can be involved.

For more information on this project, please visit https://www.hvlcsd.org/local-hazard-mitigation-plan.

You may also contact Hannah Davidson at hdavidson@hvlcsd.org or Alyssa Gordon at agordon@hvlcsd.org or 707-987-9201.

A.3.3. HMPC #1: Kickoff Meeting Agenda

AGENDA

HIDDEN VALLEY LAKE COMMUNITY SERVICES DISTRICT
LOCAL HAZARD MITIGATION PLAN (LHMP) UPDATE
Hazard Mitigation Planning Committee (HMPC)
Kickoff Meeting #1

Tuesday March 26, 2024
1:00 - 4:00 pm

---

1. Introductions
2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements
3. The Role of the Hazard Mitigation Planning Committee (HMPC): HVLCSD and Stakeholders
4. Planning for Public Input
5. Coordinating with Other Agencies and Stakeholders
6. LHMP Update Schedule
7. Hazard Identification
8. Data Needs
9. Questions?

A.3.4. HMPC #1: Kickoff Meeting Sign-in Sheet

SIGN-IN SHEET
HVLCSD LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Meeting #1: Project Kickoff
March 26, 2024 (1:00-4:00 pm)

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Terre Logsdon	terre.logsdon@lakecountyca.gov	263-2580	County
Marty Englander	martye49@gmail.com	707-692-4104	S.F.F.S.C
BARRY SILVA	BSILVA@HVLCSD.ORG	707-355-2418	CSD
Jim Lieberman	Jim67Judy@ATT.NET	707-972-2593	CSD
Dennis white	dwhite@hvlcsd.org	(707) 987-9201	CSD
PAUL DUNCAN	PAUL.DUNCAN@FIRE.CA.GOV	707-481-2362	CALFIRE
Margaret Titus	adminsgt@hvla.com	707-987-3138	HVLA Security
JOHN DRAGO	dpsdir@hvla.com	(510) Cell # 928-2784	HVLA Security
Matt Woodard	maintdir@hvla.com	707 355 0026	HVLA Maint. Dir
MIKE WINK	MIKE.WINK@FIRE.CA.GOV	707 889-4225	CAL FIRE
Gary Graves	ggraves@hvlcsd.org	696-5294	CSD
Hannah Davidson	hdavidson@hvlcsd.org	707-987-9201	HVLCSD
TRISH WILKINSON ACCT. SUP	twilkinson@hvlcsd.org	707-987-9201	HVLCSD
A Gordon	agordon@hvlcsd.org	707-987-9201	CSD

A.4 HMPC #2: Risk Assessment Meeting

A.4.1. HMPC #2: Emailed Invite to Risk Assessment Meeting

From: Hannah Davidson <hdavidson@hvlcsd.org>
Sent: Friday, June 28, 2024 1:16 PM
To: Dennis White <dwhite@hvlcsd.org>; Penny Cuadras <pcuadras@hvlcsd.org>; Trish Wilkinson <twilkinson@hvlcsd.org>; Donna Mahoney <dmahoney@hvlcsd.org>; Lisa Smallcomb <lsmallcomb@hvlcsd.org>; Hannah Davidson <hdavidson@hvlcsd.org>; Barry Silva <bsilva@hvlcsd.org>; Nathan Reese <nreese@hvlcsd.org>; Dominic Hernandez <dhernandez@hvlcsd.org>; Jacob McClure <jmcclure@hvlcsd.org>; Jarrod Cunningham <jcunningham@hvlcsd.org>; Connor Bounsall <cbounsall@hvlcsd.org>; Chase Hollman <chollman@hvlcsd.org>; Terre Logsdon <Terre.Logsdon@lakecountyca.gov>; martye49@gmail.com; Paul.Duncan@fire.ca.gov; Margaret Titus <adminsgt@hvla.com>; Charles Russ <dpsdir@hvla.com>; HVLA Maintenance Dir. - Matt Woodard <maintdir@hvla.com>; Mike Wink <Mike.Wink@fire.ca.gov>; Kelly Reese <kreese@hvlcsd.org>
Cc: Alyssa Gordon <agordon@hvlcsd.org>; Jeanine Foster <jeanine.foster@fostermorrison.com>; Chris Morrison <chris.morrison@fostermorrison.com>
Subject: HVLCSD LHMP Update: Risk Assessment Meeting

Good morning,

In late March, we kicked off the **Hidden Valley Lake Community Services District (HVLCSD) Local Hazard Mitigation Plan (LHMP) Update project**. That meeting provided an overview of the project and was used to identify a list of natural hazards (e.g., wildfire, flood, earthquake, severe weather, etc.) to include in the LHMP. Since then, Foster Morrison Consulting has been collecting data and preparing a risk assessment – which will consist of a written profile and analysis of each identified natural hazard, supported by technical, historical, and local data. The risk assessment will become a part of the updated LHMP.

Please join us for our second Hazard Mitigation Planning Committee (HMPC) Meeting, as follows. The purpose of this meeting is to share draft risk assessment materials – including mapping, data, and other information – and invite your feedback. See attached agenda.

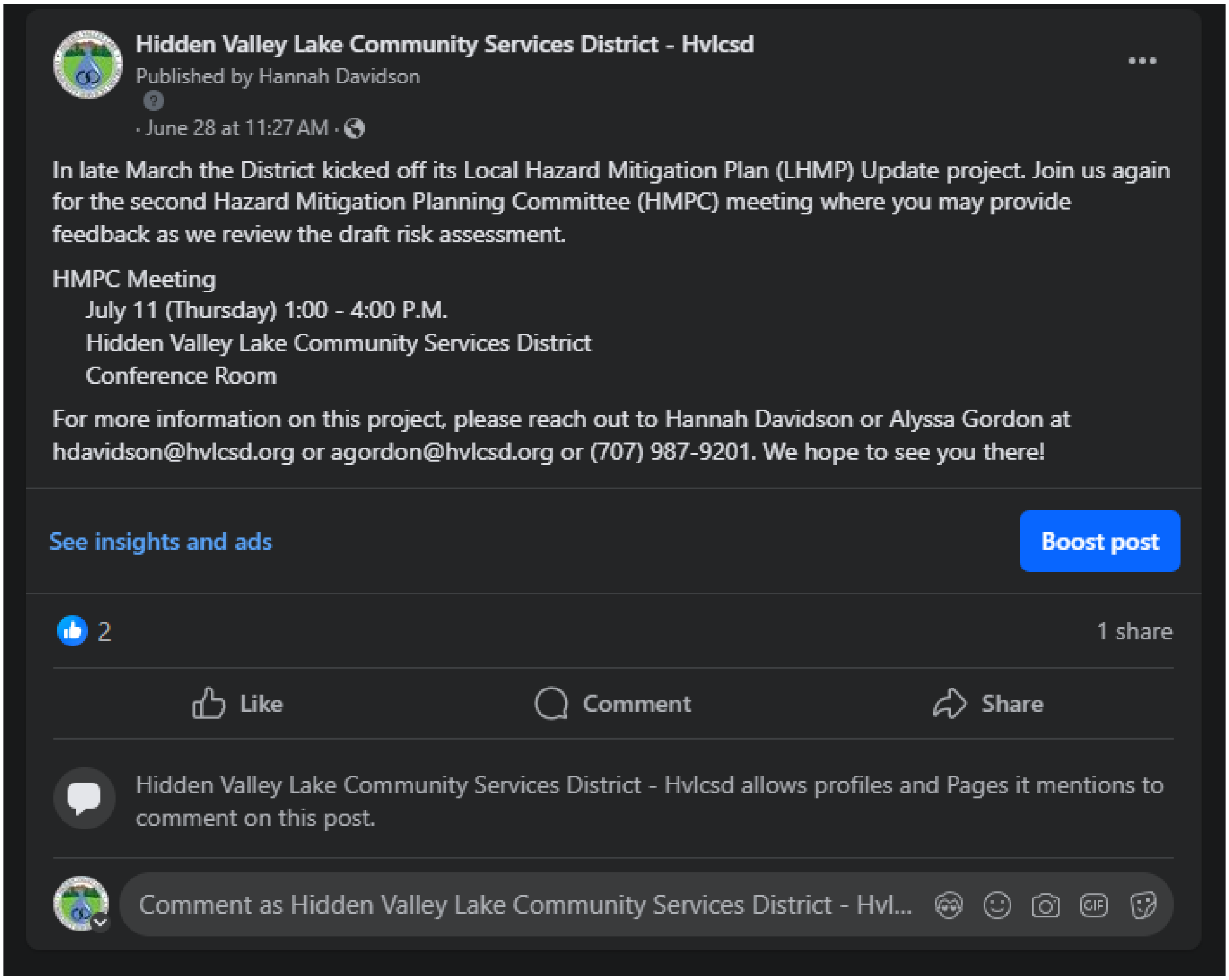
> **Wednesday, July 11, 2024 (1:00 - 4:00 pm)**
> **HVLCSD**
> **District Conference Room**
> **19400 Hartmann Rd, Hidden Valley Lake, CA 95467**

Questions? Please feel free to reach out to myself or Jeanine Foster, Foster Morrison Consulting, at 303 717-7171 or jeanine.foster@fostermorrison.com. For more information about the project, visit: https://www.hvlcsd.org/local-hazard-mitigation-plan

Hope to see you there,
Hannah Davidson
Water Resources Specialist II
Hidden Valley Lake CSD
hdavidson@hvlcsd.org
T: (707) 987-9201 F: (707) 987-3237

"When the well is dry, we know the worth of water" – Benjamin Franklin

A.4.2. HMPC #2: Facebook Post Invitation



A.4.3. HMPC #2: Article in Newsletter

MAIN line
the HVLCSD

PUBLISHED QUARTERLY BY HIDDEN VALLEY LAKE COMMUNITY SERVICES DISTRICT

JULY 2024

THE MISSION OF THE HIDDEN VALLEY LAKE COMMUNITY SERVICES DISTRICT IS TO PROVIDE, MAINTAIN AND PROTECT OUR COMMUNITY'S WATER.

OUR VISION IS TO PROVIDE INNOVATIVE AND RELIABLE SERVICES IN AN ENVIRONMENTALLY CONSCIOUS MANNER THAT PRODUCES A HIGH LEVEL OF RATEPAYER SATISFACTION.

HIDDEN VALLEY LAKE COMMUNITY SERVICES DISTRICT
19400 HARTMANN ROAD
HIDDEN VALLEY LAKE, CA 95467
P: 707.987.9201
F: 707.987.3237
www.hvlcsd.org

WELCOME!

Hidden Valley Lake Community Services District has some exciting updates and news to share with you! We continue to provide a concise report of important news and events and how they affect your water and wastewater system. If you have questions about items in this newsletter, please email them to Penny Cuadras, at pcuadras@hvlcsd.org; we will respond to your inquiries as soon as possible. In the meantime, please familiarize yourself with our website, www.hvlcsd.org, which contains a lot of helpful information. We encourage you to check it out!

WATER QUALITY

CONSUMER CONFIDENCE REPORT

Each year since 1998, the EPA requires public water systems to publish a Consumer Confidence Report. This report provides important information about the quality of your drinking water. The District is pleased to report that our drinking water continues to comply with all state and federal regulations. A copy of the 2023 report can be found at https://www.hvlcsd.org/files/114bf3035/2023+CCR.pdf.

FINANCIALS

A five-year rate structure was adopted in 2020, planning consecutive rate changes until 2025. Starting July 1, new water and sewer rates will be effective to reflect the new rate schedule. For more information on the rate structure please visit https://www.hvlcsd.org/water-wastewater-recycled-rates.

PROJECT UPDATES

LOCAL HAZARD MITIGATION PLAN UPDATE

In 2020, CSD adopted its first Local Hazard Mitigation Plan (LHMP) which outlined the mitigation opportunities for threats against water and wastewater infrastructure in Hidden Valley Lake. The Plan was crucial in unlocking access to federal and state funding opportunities for projects. Since the Plan's adoption the we have received funding for four major projects on tank replacements, backup power acquisition, water mainline replacements, and vegetation removal.

The District is in the Risk Assessment phase of the plan update. During this time, hazards are evaluated and better understood so that a plan to mitigate against them can later be created. To that end, we are holding a Hazard Mitigation Planning Committee meeting on July 11 at 19400 Hartmann Road from 1:00–4:00 PM. The public is invited. We hope to see you there!

For more information on the LHMP check out our website under District Business > Local Hazard Mitigation Plan (https://www.hvlcsd.org/local-hazard-mitigation-plan) for the latest updates, meeting dates, and directions on how to provide your input.

A.4.4. HMPC #2: Risk Assessment Meeting Agenda

AGENDA

HIDDEN VALLEY LAKE COMMUNITY SERVICES DISTRICT
LOCAL HAZARD MITIGATION PLAN (LHMP) UPDATE
Hazard Mitigation Planning Committee (HMPC)
Meeting #2 – Risk Assessment

Thursday July 11, 2024
1:00 - 4:00 pm

---

1. Introductions
2. Status of the DMA Planning Process
3. Review of Risk Assessment (PowerPoint)
4. Open Discussion and Input on the Risk Assessment (Handout)
5. Review of Data Needs
6. Next Steps
7. Questions?

A.4.5. HMPC #2: Risk Assessment Meeting Sign in Sheet

SIGN-IN SHEET
HVLCSD LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Meeting #2: Risk Assessment
July 11, 2024 (1:00-4:00 pm)

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Hannah Davidson Water Resources Specialist	hdavidson@hvlcsd.org	707-987-9201	HVLCSD
Amy Graves	ggraves@HVLCSD.org	707 696 5894	HVLCSD
Jim Lieberman Dir CSD	Jim67Judy@ATT.NET	707-972-2593	HVLCSD
Kelly Reese Admin CSD	Kreese@hvlcsd.org	707 987 9201	HVLCSD
Dennis White	[illegible]	707-533-3498	HVLCSD
Barry Silva	[illegible]	707-355-2418	HVL CSD
Trish Wilkinson	[illegible]	7075336783	HVLCSD
Caitlyn Morrison Jr. planner	caitlyn.m.morrison@gmail.com	720-454-2218	Foster Morrison
Chris Morrison	Chris.morrison@fostermorrison.com	701-318-4445	Foster Morrison

A.5 HMPC #3 & #4: Mitigation Strategy Meetings

A.5.1. Email Invites to Mitigation Strategy Meetings

From: Hannah Davidson <hdavidson@hvlcsd.org>
Sent: Wednesday, August 28, 2024 1:20 PM
To: Dennis White <dwhite@hvlcsd.org>; Penny Cuadras <pcuadras@hvlcsd.org>; Trish Wilkinson <twilkinson@hvlcsd.org>; Donna Mahoney <dmahoney@hvlcsd.org>; Lisa Smallcomb <lsmallcomb@hvlcsd.org>; Kelly Reese <kreese@hvlcsd.org>; Barry Silva <bsilva@hvlcsd.org>; Nathan Reese <nreese@hvlcsd.org>; Dominic Hernandez <dhernandez@hvlcsd.org>; Jacob McClure <jmcclure@hvlcsd.org>; Jarrod Cunningham <jcunningham@hvlcsd.org>; Connor Bounsall <cbounsall@hvlcsd.org>; Chase Hollman <chollman@hvlcsd.org>; Terre Logsdon <Terre.Logsdon@lakecountyca.gov>; martye49@gmail.com; Paul.Duncan@fire.ca.gov; Margaret Titus <adminsgt@hvla.com>; Charles Russ <dpsdir@hvla.com>; HVLA Maintenance Dir. - Matt Woodard <maintdir@hvla.com>; Mike Wink <Mike.Wink@fire.ca.gov>
Cc: Alyssa Gordon <agordon@hvlcsd.org>; Jeanine Foster <jeanine.foster@fostermorrison.com>; Chris Morrison <chris.morrison@fostermorrison.com>
Subject: HVLCSD LHMP Update: Mitigation Strategy Meetings

Good morning,

In late March, we kicked off the **Hidden Valley Lake Community Services District (HVLCSD) Local Hazard Mitigation Plan (LHMP) Update project**.

In preparation for the upcoming **Mitigation Strategy meetings**, please see below:

1. **Prep for these working meetings.**
   Identify and bring your mitigation project ideas to the meetings!

   These are the two most important meetings for this LHMP Update project:
   - ✓ **Wednesday, September 18 (1:00 - 4:00 pm)** - we will be briefly revisiting the risk assessment data developed to date and will be establishing updated LHMP goals and objectives.
   - ✓ **Thursday, September 19 (9:00 am – 12:00 pm)** - we will be working to identify and discuss potential mitigation actions and projects for reducing HVLCSD's risk and vulnerability to identified hazards and disasters.

   Note: Will be sending out two calendar invites after this email

   Meeting Location (for both September 18 and 19 meetings):
   Hidden Valley Lake Community Services District
   19400 Hartmann Road
   Hidden Valley Lake, CA 95467

   Please make sure everyone attends that has mitigation actions and projects to include in the LHMP Update for all identified priority hazards.

2. **Attached is an Agenda for the two meetings**.

3. **Also attached is a FEMA publication – Mitigation Ideas**
   Take a look – it is easy to skim through and will give you mitigation ideas, by hazard. What fits for HVLCSD?

District and stakeholder participation and coordination is a requirement of an approved LHMP, as is the inclusion of any hazard data, information, and mitigation projects may want to see included in the Plan. Your continued participation and input is critical to the success of this project!

Please reach out to me or Jeanine Foster at Jeanine.foster@fostermorrison.com if you have questions. For more information about the project, visit: https://www.hvlcsd.org/local-hazard-mitigation-plan.

We look forward to seeing everyone!
Hannah Davidson
Water Resources Specialist II
Hidden Valley Lake CSD
hdavidson@hvlcsd.org
T: (707) 987-9201 F: (707) 987-3237

"When the well is dry, we know the worth of water" – Benjamin Franklin

Note: This email was also sent to other recipients. These are included below.

From: Microsoft Outlook <MicrosoftExchange329e71ec88ae4615bbc36ab6ce41109e@hvlcsd.org> **On Behalf Of** Alyssa Gordon
Sent: Wednesday, August 28, 2024 3:42 PM
To: Hannah Davidson <hdavidson@hvlcsd.org>
Subject: Meeting Forward Notification: HVLCSD LHMP Update: HMPC Mitigation Strategy Meeting

Your meeting was forwarded

Alyssa Gordon has forwarded your meeting request to additional recipients.

Meeting

HVLCSD LHMP Update: HMPC Mitigation Strategy Meeting

Meeting Time

Thursday, September 19, 2024 9:00 AM-12:00 PM.

Recipients

Tom Stricklin

gm@hvla.com

Kathy Maynor

Angela Cerrito

All times listed are in the following time zone: (UTC-08:00) Pacific Time (US & Canada)

A.5.2. HMPC #3 & #4: Mitigation Strategy Meeting Facebook Invite

Hidden Valley Lake Community Services District - Hvlcsd
August 28 at 11:43 AM ·

In late March the District kicked off its Local Hazard Mitigation Plan (LHMP) Update project. Join us again for the third set of Hazard Mitigation Planning Committee (HMPC) meetings where we will discuss mitigation strategies; these are the two most important meetings for this project!

Meeting #1
September 18 (Wednesday) 1:00 - 4:00 P.M.
Hidden Valley Lake Community Services District
Conference Room

Meeting #2
September 19 (Thursday) 9:00 - 12:00 P.M.
Hidden Valley Lake Community Services District
Conference Room

For more information on this project, please reach out to Hannah Davidson at hdavidson@hvlcsd.org or (707) 987-9201. We hope to see you there!

Boost this post to reach up to 721 more people if you spend $2. Boost post

Alyssa Proctor Gordon 2 shares

Like Share

A.5.3. HMPC #3 & #4: Mitigation Strategy Meeting Agenda

AGENDA

HIDDEN VALLEY LAKE COMMUNITY SERVICES DISTRICT
LOCAL HAZARD MITIGATION PLAN (LHMP) UPDATE
Hazard Mitigation Planning Committee (HMPC)
Meeting #3 & 4 – Mitigation Strategy Meetings

Wednesday September 18, 2024 (1:00 - 4:00 pm)
Thursday September 19, 2024 (9:00 am - 12:00 pm)

HMPC Meeting #3:

1. Introductions
2. LHMP Project Status and Next Steps/Timeline
3. Risk Assessment Status
4. Priority Hazards Review
5. Develop Plan Goals and Objectives
6. Introduction to HMPC Meeting #4: Mitigation Alternatives/Actions/Projects

HMPC Meeting #4:

1. Introductions
2. Review Mitigation Categories and Selection Criteria
3. Brainstorming of Mitigation Alternatives/Actions/Projects by Hazard
4. Prioritization of Mitigation Actions/Projects
5. Questions

A.5.4. HMPC #3 & #4: Mitigation Strategy Meeting Sign in Sheets

September 18th Meeting

SIGN-IN SHEET
HVLCSD LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Meeting #3: Mitigation Strategy Meeting
September 18, 2024 (1:00-4:00 pm)

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Gary Graves /Dir	ggraves@HVLCSD.org	707-696-5294	CSD
Jim Lieberman/DIR	Jim67Judy@ATT.NET	707-972-2593	CSD
Marty Englander	martye49@gmail	707-692-4104	public
Kelly Reese | HVLCSD EMPLY.	kreese@hvlcsd.org	707 264 9271	CSD
Hannah Davidson	hdavidson@hvlcsd.org	707-987-9201	CSD
Angela Cerrito	angc33@gmail.com	707.804.8323	Resident
Alyssa Gordon	agordon@hvlcsd.org	707 533-9073	CSD
TRISH WILKINSON	twilkinson@hvlcsd.org	7079879201	CSD

September 19th Meeting

SIGN-IN SHEET
HVLCSD LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Meeting #4: Mitigation Strategy Meeting
September 19, 2024 (9:00-12:00 pm)

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Kelly Reese / HVLCSD	kreese@hvlcsd.org	707 264 9271	HVLCSD
Gary Graves/Dir	ggraves@hvlcsd.org	707 696 5294	HVLCSD
John Hess	hess5861@gmail.com	202.999.9221	HVL Resident
Jim Lieberman Dir	Jim67Judy@ATT.NET	707.922.2593	HVLCSD Dir
MATTHEW METCALF	mmetcalf@hvlcsd.org	707-355-0855	HVL CSD DIR
Alyssa Gordon	agordon@hvlcsd.org	707-533-9073	HVLCSD
Hannah Davidson	hdavidson@hvlcsd.org	707-987-9201	HVLCSD
Dennis White	dwhite@hvlcsd.org	707-987-9201	Hvlcsd
Angela Cerrito	angc33@gmail.com	707 804 8323	Resident
JOHN DRAGO HVL Sec.	dpsdir@hvla.com	707 987-3138 ext 122	HVLA Security
TRISH WILKINSON	twilkinson@hvlcsd.org	707-987-9201	Hvlcsd

A.6 HMPC #5: Final HMPC Meeting

A.6.1. Final HMPC Meeting Invite

PLACE

A.6.2. HMPC #5: Final HMPC Meeting Agenda

PLACE

A.6.3. HMPC #5: Final Meeting Sign In Sheets

PLACE

A.7 Public Involvement

A.7.1. Public Meeting #1 Public Meeting Outreach Flyer

Help Reduce Disaster Losses in Your Community by Participating in the Hidden Valley Lake Community Services District 2024 Local Hazard Mitigation Plan Update

The Hidden Valley Lake Community Services District (HVLCSD) is developing a Local Hazard Mitigation Plan (LHMP) Update to their 2020 plan. The purpose of the LHMP Update is to assess risk to natural hazards, implement actions to reduce future losses, and maintain eligibility for federal mitigation grant funding in accordance with the Disaster Mitigation Act of 2000.

What is Hazard Mitigation?

Hazard mitigation means any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.

Why is Hazard Mitigation Important?

Most people who live or work in Lake County and the Hidden Valley Lake area have been affected by natural hazards in one way or another. HVLCSD and the surrounding community are vulnerable to a variety of hazards including floods, drought, wildfire, and other severe weather events.

Rising costs associated with disaster response and recovery have focused the attention of federal, state, and local government officials on addressing natural hazards before they occur. For example, torrential rains and floods cannot always be prevented from occurring. Planning for natural hazards and implementing hazard mitigation and risk reduction measures, however, can reduce the impact of such events when they do occur. Emergency response and recovery costs; property damage; personal injury and loss of life; and the overall economic and social impact on the District and its community can all be reduced, and in some instances eliminated through natural hazard mitigation.

2024 Local Hazard Mitigation Plan and Plan Update Process

HVLCSD staff are leading the effort to develop an update to their 2020 LHMP. The 2024 LHMP Update is being developed by a Hazard Mitigation Planning Committee (HMPC) comprised of representatives from various District departments; neighboring jurisdictions; key federal, state, and local agency stakeholders; and the public.

The plan will be developed to meet new FEMA LHMP guidance (effective April 2023) and will address an updated list of hazards and assess the likely risk and vulnerability of these hazards to the people and assets of the HVLCSD planning area. This will involve establishing an updated mitigation strategy designed to reduce the impacts of future disasters on people and property, critical facilities and infrastructure, and the environment as well as to the local economy.

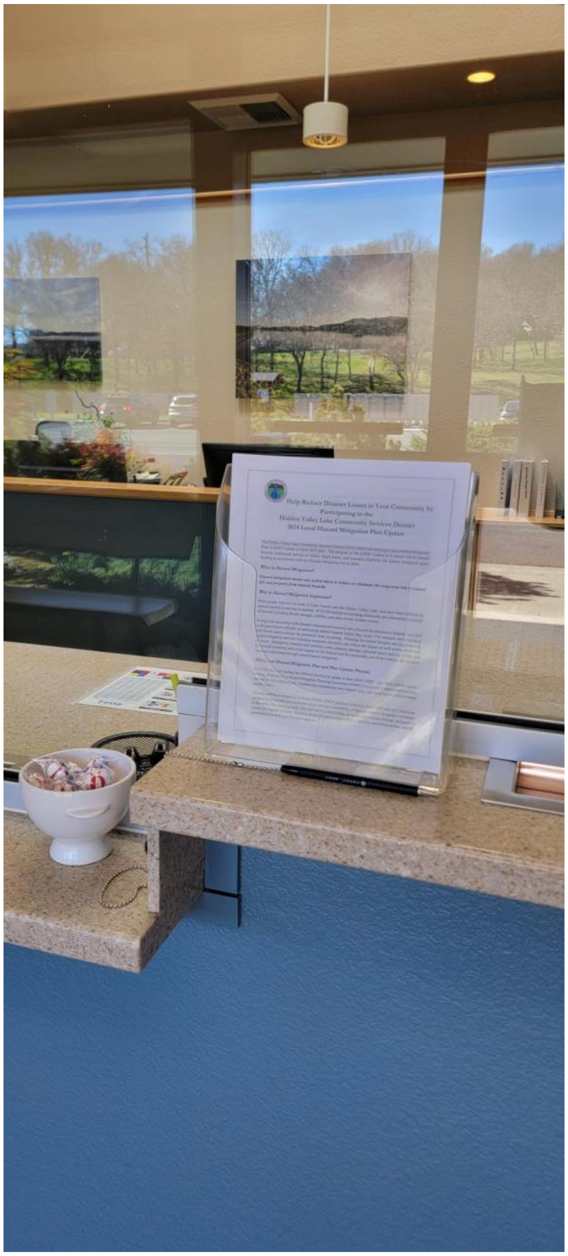
Opportunities for Input

Members of the community have a very important role in this process. Several planning committee and public meetings will be held over the next 6 months. A draft of the 2024 HLVCSD LHMP Update will be available in the fall of 2024 for review and comment by the public and all interested stakeholders on the HLVCSD LHMP website at: Local Hazard Mitigation Plan - Hidden Valley Lake Community Services District (hvlcsd.org) and in hard copy form in select public locations. A public meeting on the Draft Plan and a final planning committee meeting will also occur in winter 2024. All interested stakeholders and members of the public are encouraged to attend the planning committee and public meetings.

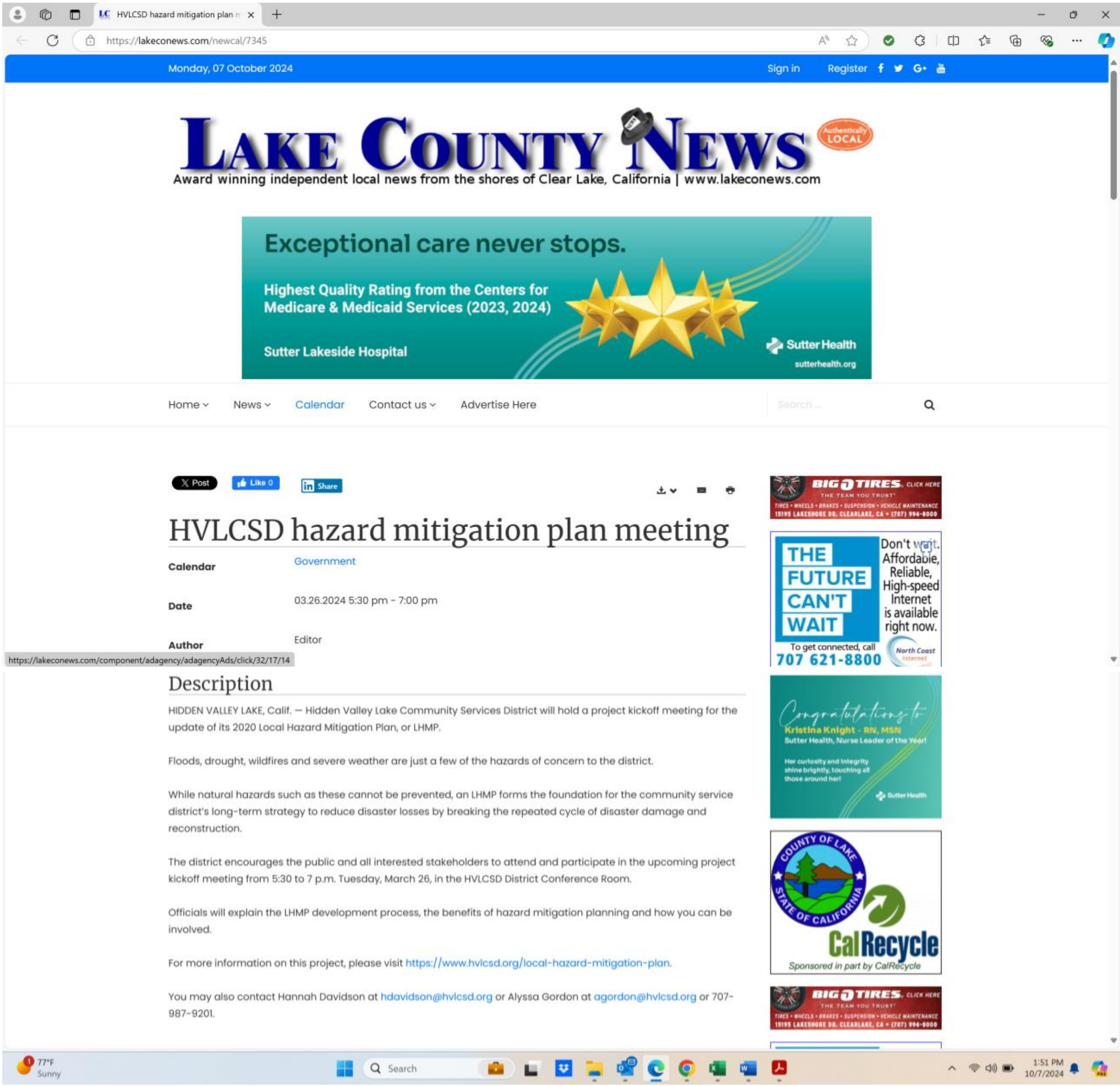
For more information on this project contact the following individuals:

Alyssa Gordon / Hannah Davidson	Jeanine Foster
Hidden Valley Lake Community Services District	Foster Morrison Consulting Ltd.
Phone: (707) 987-9201	Phone: (303) 717-7171
agordon@hvlcsd.org / hdavidson@hvlcsd.org	jeanine.foster@fostermorrison.com

A.7.2. Public Meeting#1: Kickoff Invite Posted in HVLCSD Lobby



A.7.3. Public Meeting #1: Lake County News Article



Monday, 07 October 2024

LAKE COUNTY NEWS

Award winning independent local news from the shores of Clear Lake, California | www.lakeconews.com

Home News Calendar Contact us Advertise Here

HVLCSD hazard mitigation plan meeting

Calendar	Government
Date	03.26.2024 5:30 pm - 7:00 pm
Author	Editor

Description

HIDDEN VALLEY LAKE, Calif. — Hidden Valley Lake Community Services District will hold a project kickoff meeting for the update of its 2020 Local Hazard Mitigation Plan, or LHMP.

Floods, drought, wildfires and severe weather are just a few of the hazards of concern to the district.

While natural hazards such as these cannot be prevented, an LHMP forms the foundation for the community service district's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction.

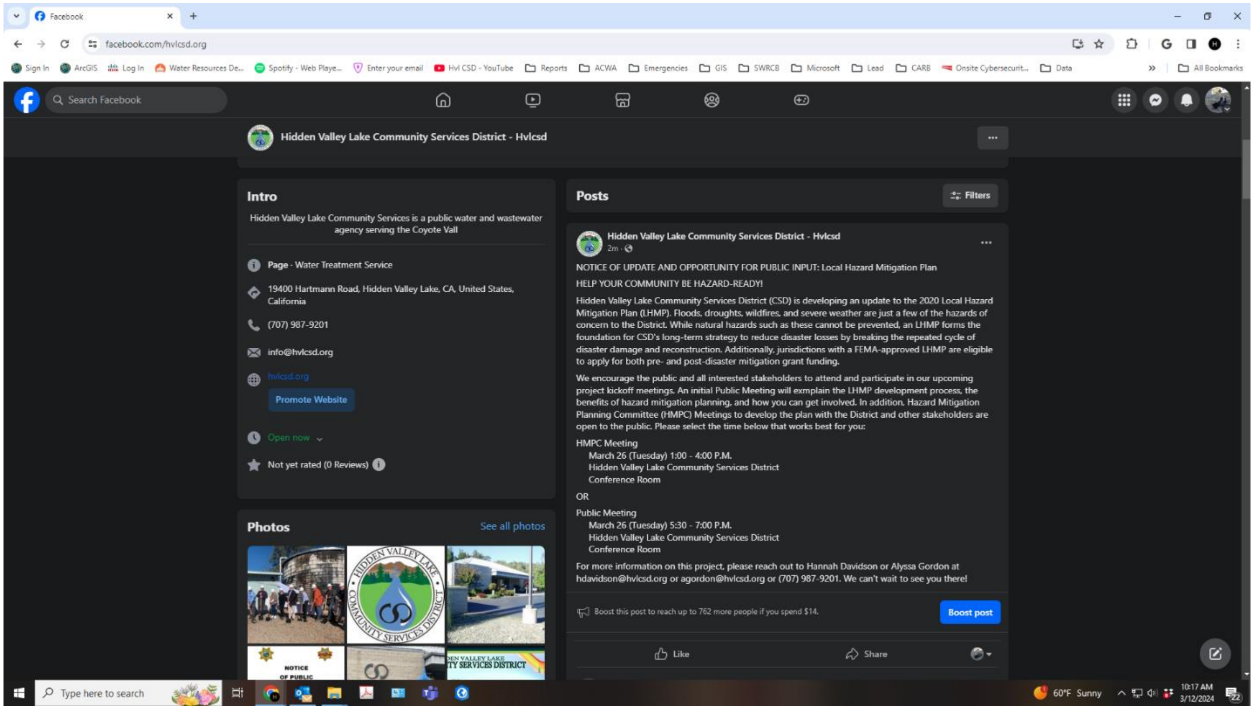
The district encourages the public and all interested stakeholders to attend and participate in the upcoming project kickoff meeting from 5:30 to 7 p.m. Tuesday, March 26, in the HVLCSD District Conference Room.

Officials will explain the LHMP development process, the benefits of hazard mitigation planning and how you can be involved.

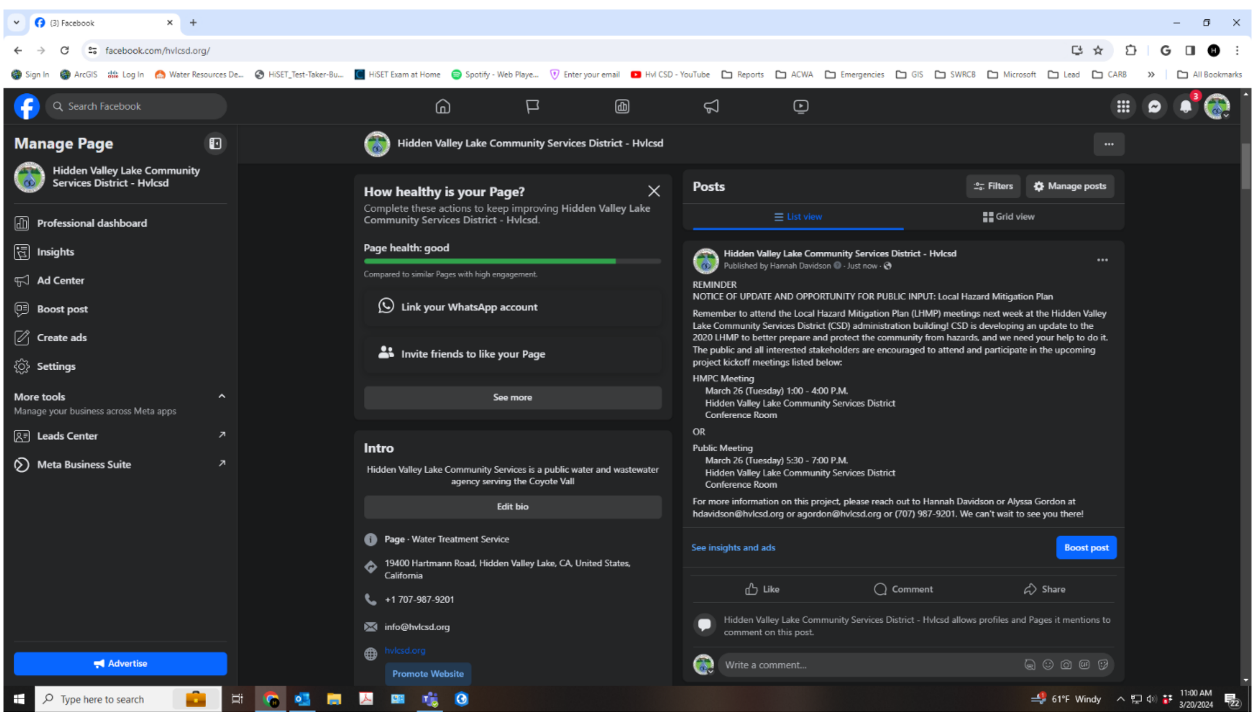
For more information on this project, please visit https://www.hvlcsd.org/local-hazard-mitigation-plan.

You may also contact Hannah Davidson at hdavidson@hvlcsd.org or Alyssa Gordon at agordon@hvlcsd.org or 707-987-9201.

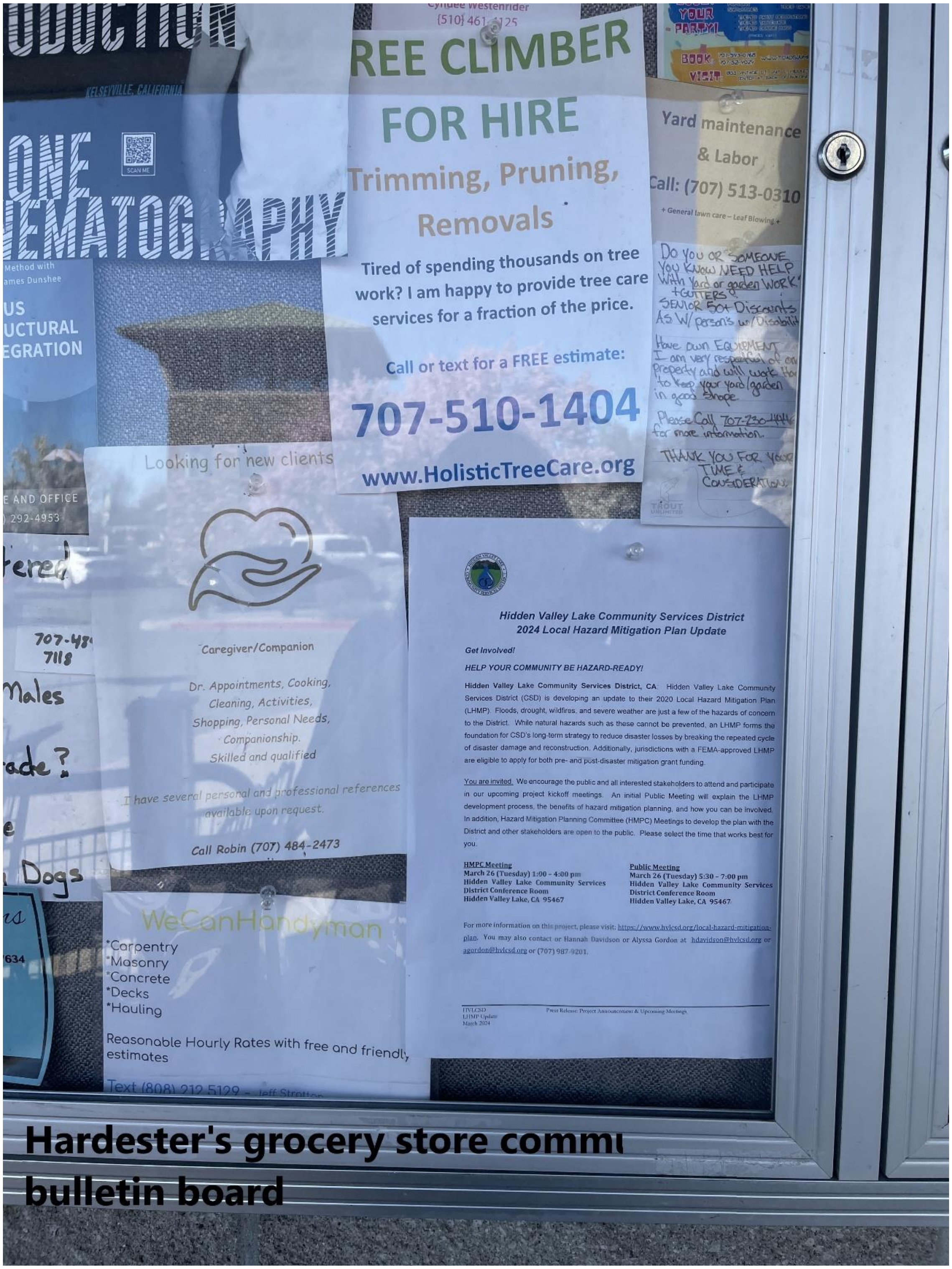
A.7.4. Public Meeting #1 Facebook Post – 3/12/2024



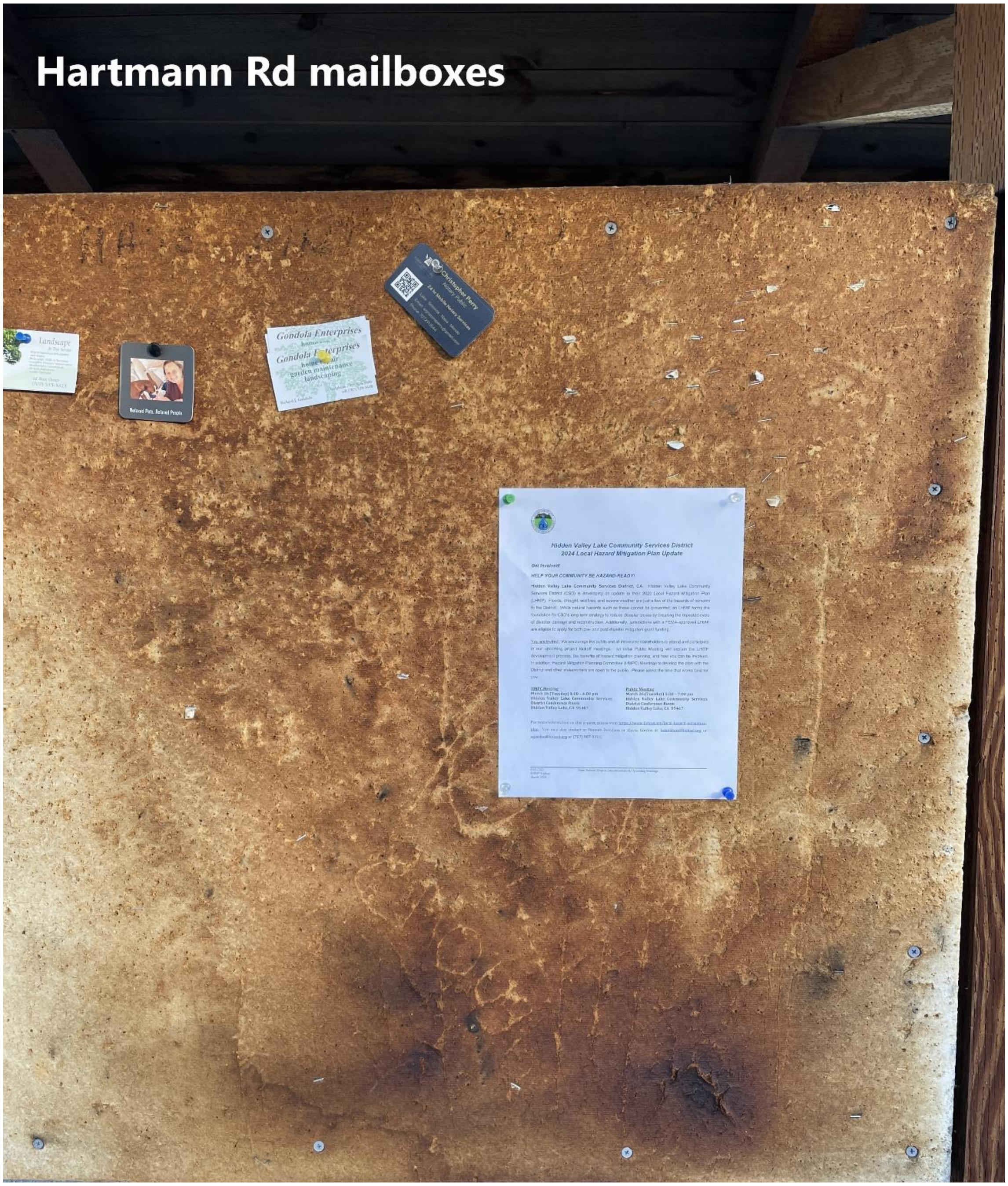
A.7.5. Public Meeting #1 Facebook Post – 3/20/2024



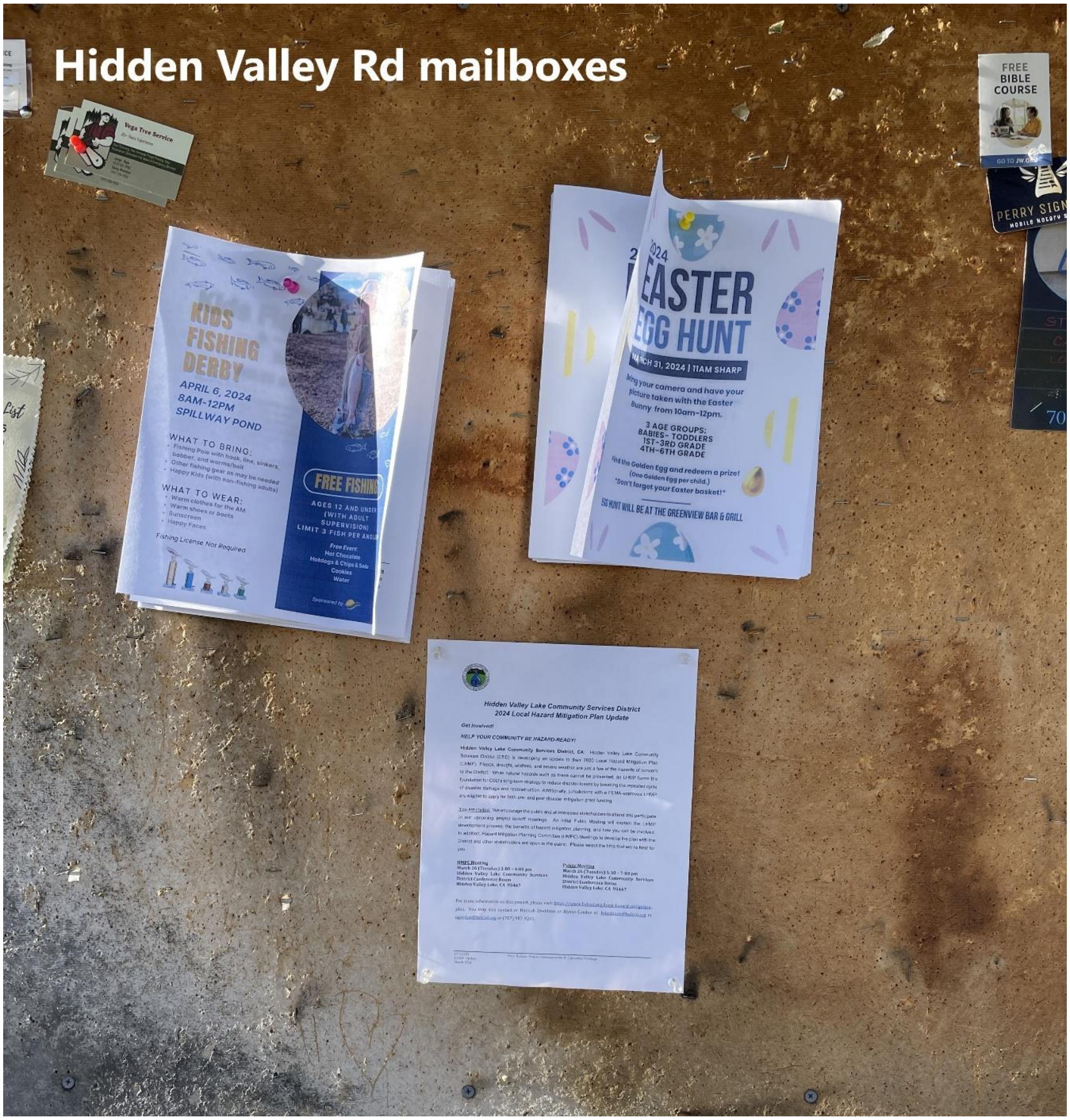
A.7.6. Public Meeting #1 Invite Posting Locations



Source: HVLCSD



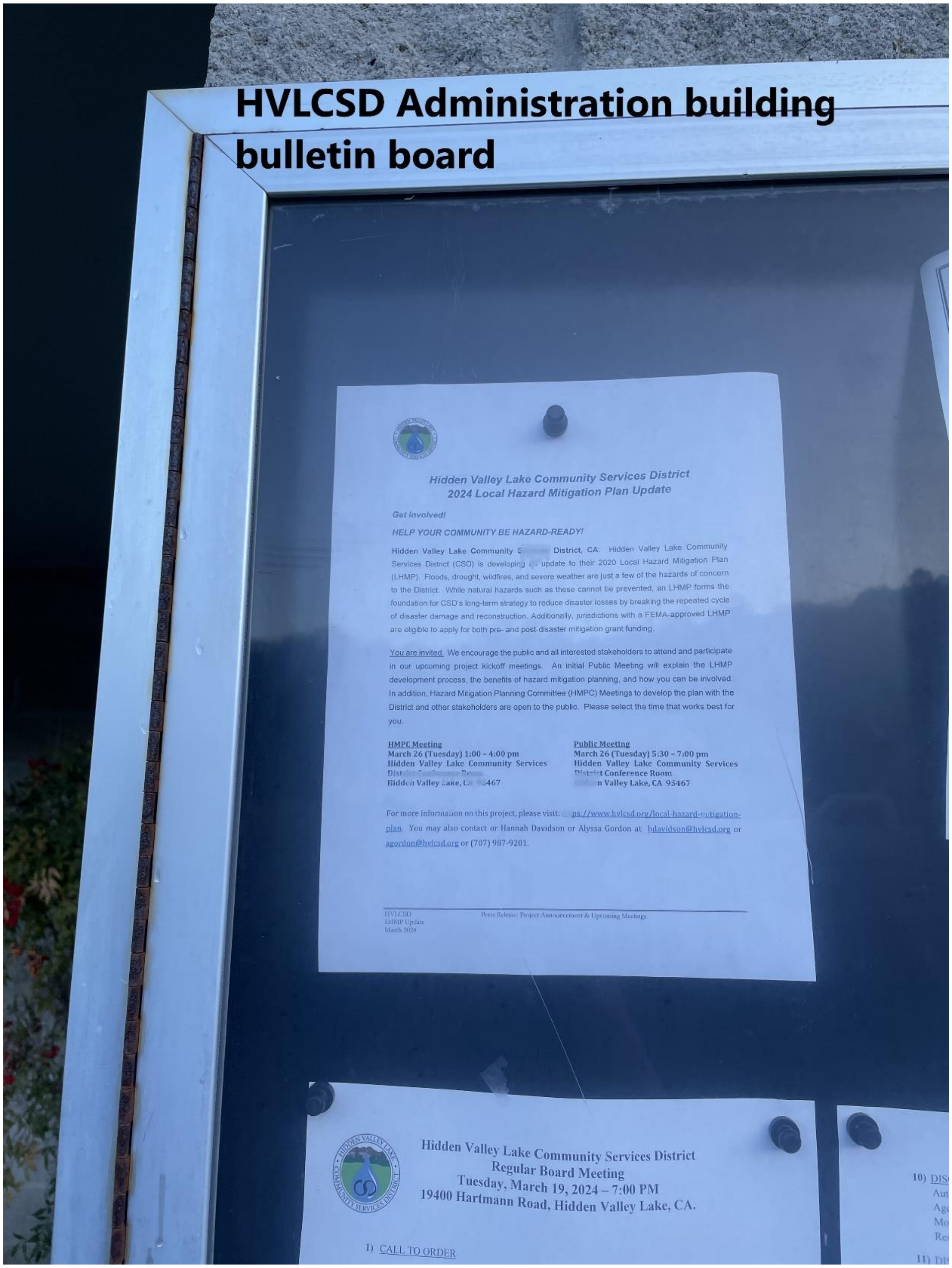
Source: HVLCSD



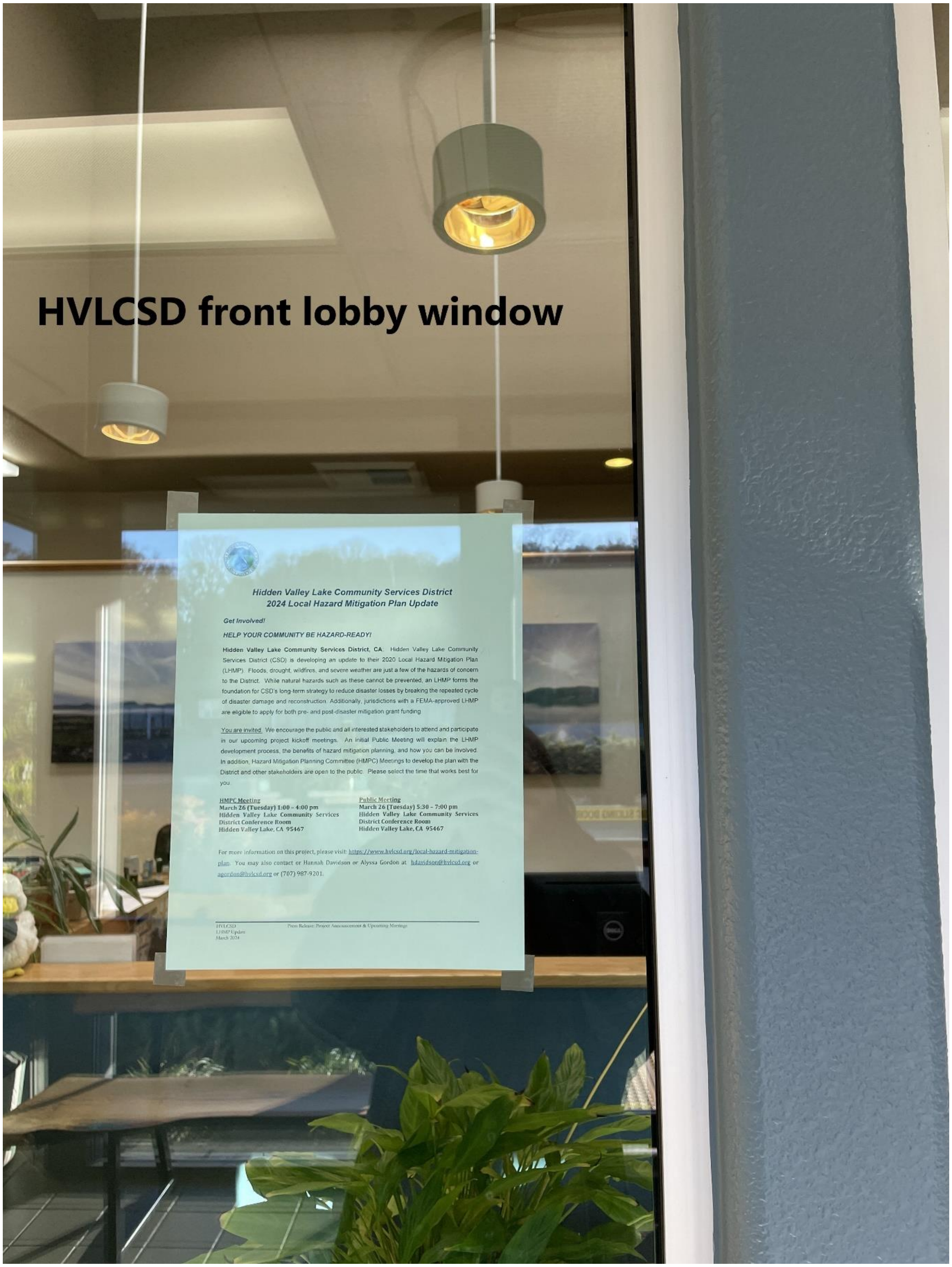
Source: HVLCSD

Source: HVLCSD

Source: HVLCSD



Source: HVLCSD



Source: HVLCSD

A.7.7. Public Meeting #1: Public Agenda

AGENDA

HIDDEN VALLEY LAKE COMMUNITY SERVICES DISTRICT
LOCAL HAZARD MITIGATION PLAN (LHMP) UPDATE
Public Kickoff Meeting #1

Tuesday March 26, 2024
5:30 - 7:00 pm

---

1. Introductions
2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements
3. LHMP Update Schedule
4. Hazard Identification
5. Data Needs
6. Questions?

A.7.8. Public Meeting #1: Public Sign in Sheet

SIGN-IN SHEET
HVLCSD LOCAL HAZARD MITIGATION PLANNING PROJECT
Public Meeting #1: Project Kickoff
March 26, 2024 (5:30-7:00 pm)

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Dedre Duncan	mailddunca@yahoo	831 710 7300	none
Gary Graves	ggraves@hvlcsd.org	696-5294	CSD
Hannah Davidson Water Resources Specialist	hdavidson@hvlcsd.org	707-987-9201	HVLCSD
Dennis White GM	dwhite@hvlcsd.org	(707) 987-9201	CSD
Marty Englander	martye49@gmail.com	707 692 4104	resident
A. Gordon	agordon@hvlcsd.org	707 987-9201	CSD
Donald Gordon	APGDCG@Yahoo.com		none
Julie Gordon			none

A.7.9. Public Meeting #2: Draft Plan Outreach Flyers

PLACE

A.7.10. Public Meeting #2: Public Meeting Invite on Draft Plan

PLACE

A.7.11. Public Meeting #2: Agenda

PLACE

A.7.12. Public Meeting #2: Sign in Sheets

PLACE

A.7.13. Public Comments

No public or other stakeholder comments were received during the 2024 LHMP Update development process.

A.8 Project Outreach to Vulnerable and Underserved Populations

A.8.1. Email to HVLA

From: Jeanine Foster
Sent: Tuesday, September 10, 2024 2:48 PM
To: msrc01@att.net
Cc: Hannah Davidson <hdavidson@hvlcsd.org>; Alyssa Gordon <agordon@hvlcsd.org>; Dennis White <dwhite@hvlcsd.org>
Subject: HVLCSD Local Hazard Mitigation Plan Update

Hi Lori,

Thank you for returning my call today.

As mentioned, we are the consultants developing a Local Hazard Mitigation Plan (LHMP) Update for the Hidden Valley Lake Community Services District (HVLCSD). This FEMA plan will allow the HVLCSD to maintain eligibility to apply for FEMA mitigation grants to help protect the HVLCSD and the community it serves from future disaster related losses associated with natural hazards such as flood and wildfire.

As part of the LHMP development process there is new FEMA guidance in place that requires planning for the "whole community". Specifically, FEMA's guidance requires coordination with representatives of socially vulnerable and underserved populations, individuals with access and functional needs, and communities disproportionately impacted by disasters and climate change. It is also a priority of the State to ensure that these groups are represented in local planning efforts.

One of the key groups identified through this planning effort is the senior and aging populations in the Hidden Valley Lake community. Since you provide local resources to this group, we wanted to see if we can work with you to assist in getting the word out on this project.

I am attaching a flyer on this project that also includes information on our upcoming meetings being held next week. If you could post this (front and back) on your bulletin board or other convenient location, we would appreciate it.

If you have additional questions, please feel free to contact me. As mentioned, I will plan on stopping by and introducing myself around 10:00 am next Wednesday September 18th.

Thank you very much and look forward to meeting with you.

Jeanine Foster
Foster Morrison Consulting
(303) 717-7171

A.8.2. Outreach Flyer

Help Reduce Disaster Losses in Your Community by Participating in the Hidden Valley Lake Community Services District 2024 Local Hazard Mitigation Plan Update

The Hidden Valley Lake Community Services District (HVLCSD) is developing a Local Hazard Mitigation Plan (LHMP) Update to their 2020 plan. The purpose of the LHMP Update is to assess risk to natural hazards, implement actions to reduce future losses, and maintain eligibility for federal mitigation grant funding in accordance with the Disaster Mitigation Act of 2000.

What is Hazard Mitigation?

Hazard mitigation means any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.

Why is Hazard Mitigation Important?

Most people who live or work in Lake County and the Hidden Valley Lake area have been affected by natural hazards in one way or another. HVLCSD and the surrounding community are vulnerable to a variety of hazards including floods, drought, wildfire, and other severe weather events.

Rising costs associated with disaster response and recovery have focused the attention of federal, state, and local government officials on addressing natural hazards before they occur. For example, torrential rains and floods cannot always be prevented from occurring. Planning for natural hazards and implementing hazard mitigation and risk reduction measures, however, can reduce the impact of such events when they do occur. Emergency response and recovery costs; property damage; personal injury and loss of life; and the overall economic and social impact on the District and its community can all be reduced, and in some instances eliminated through natural hazard mitigation.

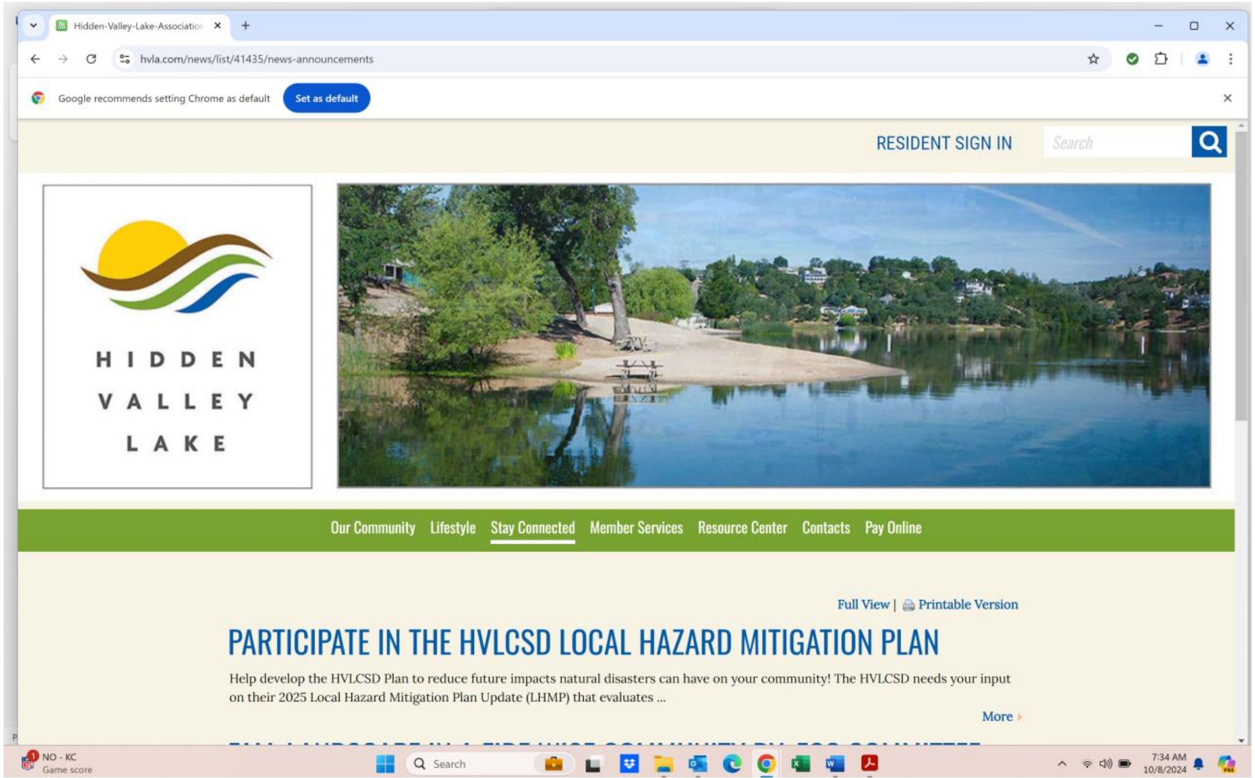
2024 Local Hazard Mitigation Plan and Plan Update Process

HVLCSD staff are leading the effort to develop an update to their 2020 LHMP. The 2024 LHMP Update is being developed by a Hazard Mitigation Planning Committee (HMPC) comprised of representatives from various District departments; neighboring jurisdictions; key federal, state, and local agency stakeholders; and the public.

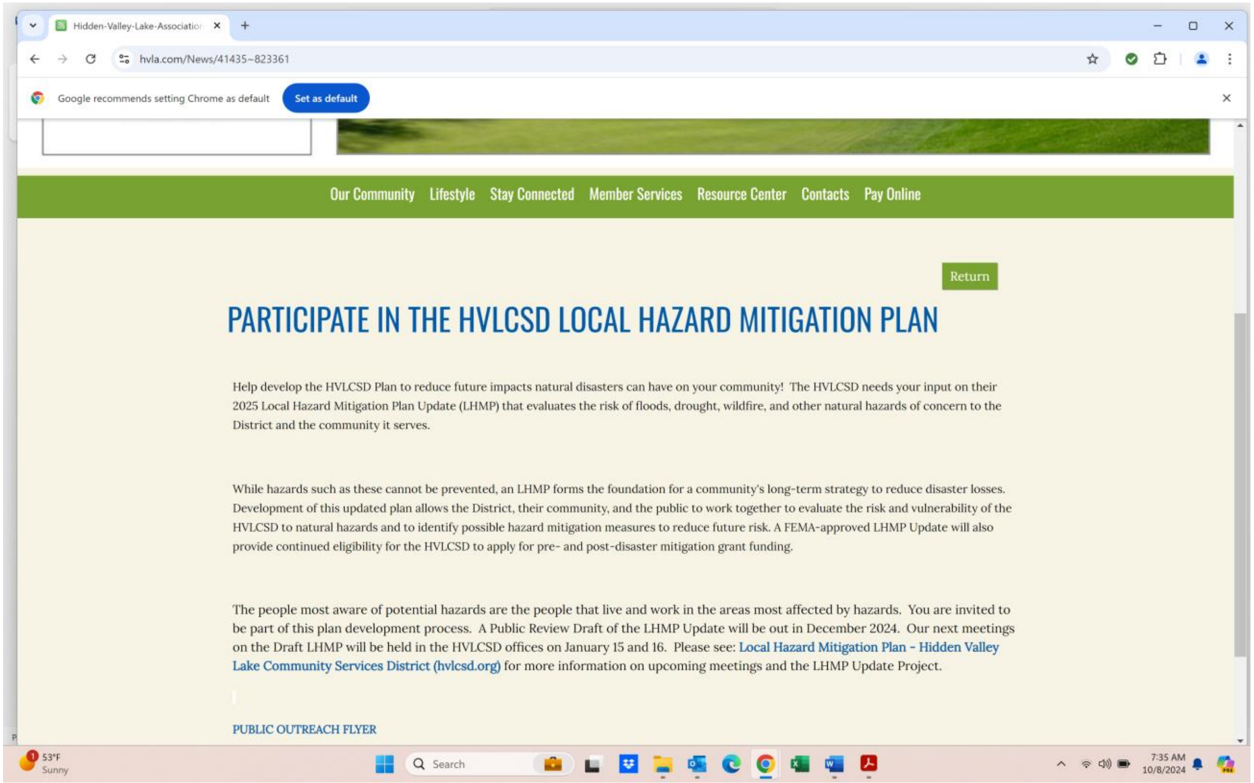
The plan will be developed to meet new FEMA LHMP guidance (effective April 2023) and will address an updated list of hazards and assess the likely risk and vulnerability of these hazards to the people and assets of the HVLCSD planning area. This will involve establishing an updated mitigation strategy designed to reduce the impacts of future disasters on people and property, critical facilities and infrastructure, and the environment as well as to the local economy.

A.8.3. Posted Flyers at Middletown Senior Center

A.8.4. Underserved Populations Outreach on HVLA Website (front page)



Detail page on HVLA Website



A.9 Meeting Handouts

Below are the handouts for each meeting. Handouts specific to the Mitigation Strategy Meetings can be found in Appendix C.

A.9.1. HMPC Meeting #1: Kickoff Meeting Handouts

Disaster Declarations and National Weather Service Research

Lake County – Disaster Declarations 1950-2024

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration Date	Federal Declaration Date
2023	California Severe Winter Storms, Straight-line Winds, Flooding, Landslides, and Mudslides	Storms	Storms	DR-4699	–	4/3/2023
2023	California Severe Winter Storms, Flooding, Landslides, and Mudslides	Storms	Storms	EM-3592	3/1/2023 3/8/2023	3/10/2023
2023	California Severe Winter Storms, Flooding, and Mudslides	Storms	Storms	EM-3591 2022-09	1/4/2023	1/9/2023
2021	Caldor Fire and Cache Fire	Fire	Fire	DR-4619 2021-06	8/17/2021 9/1/2021	9/12/2021
2020	California Wildfires	Fire	Fire	DR-4558 2020-06	8/18/2020	8/22/2020
2020	California Lnu Lightning Fire Complex	Fire	Fire	FM-5331	–	8/18/2020
2020	California Covid 19 Pandemic	Biological	Pandemic	DR-4482	3/4/2020	3/22/2020
2020	California Covid 19	Biological	Pandemic	EM-3428	3/4/2020	3/13/2020

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration Date	Federal Declaration Date
2019	California Severe Winter Storms, Flooding, Landslides, And Mudslides	Storms	Storms	DR-4434 2019-03	5/18/2019	5/18/2019
2018	Summer 2018 California Wildfires and High Winds	Fire	Fire	2018-06	7/29/201/ 11/30/2018	–
2018	Mendocino Complex Fires	Fire	Fire	DR-4382	–	8/4/2018
2018	Mendocino Complex Fires	Fire	Fire	FM-5262	7/28/2018	7/28/2018
2018	Pawnee Fire	Fire	Fire	FM-5244 2018-03	06/25/2018	6/24/2018
2017	California Wildfires	Fire	Fire	DR-4344	–	10/10/2017
2017	Sulphur Fire	Fire	Fire	FM-5221	–	10/9/2017
2017	California Severe Winter Storms, Flooding, Mudslides	Flood	Storms	DR-4308 2017-03	3/7/2017	4/1/2017
2017	California Severe Winter Storms, Flooding, Mudslides	Flood	Storms	DR-4301 (2017-01)	1/23/2017	2/14/2017
2016	Clayton Fire (also called Chimney Fire)	Fire	Fire	FM-5145	–	8/14/2016
2015	Valley Fire and Butte Fire	Fire	Fire	DR-4240 (2015-03)	8/27/2015	8/22/2015
2015	Valley Fire	Fire	Fire	FM-5112	–	9/12/2015
2015	Rocky Fire	Fire	Fire	FM-5093	–	7/29/2015
2014	California Drought	Drought	Drought	GP 2014-13	1/17/2014	–
2014	December 2014 Storms	Flood	Storms	2014-07	3/2/2015	–
2012	Wye Fire	Fire	Fire	FM-5004	–	8/13/2012
2006	2006 June Storms	Flood	Storms	DR 1646 2006-03	4/10/2006	6/5/2006
2005/2006	2005/06 Winter Storms	Flood	Storms	DR-1628 2006-01	1/12/2006	2/3/2006

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration Date	Federal Declaration Date
2005	Hurricane Katrina Evacuations	Economic	Hurricane	EM-3248 2005	–	9/13/2005
2003	State Road Damage	Road Damage	Flood	GP 2003	1/1/2003	–
2001	Energy Emergency	Economic	Greed	GP 2001	1/1/2001	–
1998	1998 El Nino Floods	Flood	Storms	DR-1203 98-01	2/19/1998	2/19/1998
1997	1997 January Floods	Flood	Storms	DR-1155 97-01	1/2/97-1/31/97	1/4/1997
1996	Lake County Fire	Fire	Fire	96-03	8/1/1996	–
1995	California Severe Winter Storms, Flooding, Landslides, Mud Flows	Flood	Storms	DR-1046 95-03, 95-04	3/24/95	3/12/1995
1995	1995 Severe Winter Storms	Flood	Storms	DR-1044 95-01, 95-02, 95-03, 95-04	1/6/95-3/14/95	1/13/1995
1987	1987 Fires	Fire	Fire	GP	9/10/87, 9/3/87	–
1986	1986 Storms	Flood	Storms	DR-758 86-01	2/18-86-3/12/86	2/18/1986
1985	Hidden Valley Lake Fire	Fire	Fire	FM-2055	–	7/11/1985
1983	Winter Storms	Flood	Flood	DR-677 82-18	12/8/82-3/21/83	2/9/1983
1980	April Storms	Flood	Storms	80-01 – 80-25	4/1/1980	–
1979	Gasoline Shortage	Economic	OPEC	–	5/8/1979-11/13/79	–
1977	1977 Drought	Drought	Drought	EM-3023	–	1/20/1977
1972	1972 Freeze	Freeze	Freeze	–	7/13/1972	–
1970	1970 Freeze	Freeze	Freeze	–	5/1/70, 5/19/70, 6/8/70, 6/10/70, 7/24/70	–
1970	1970 Northern California Flooding	Flood	Flood	DR 283	1/27/1970 - 3/2/1970	2/16/1970

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration Date	Federal Declaration Date
1964	1964 Late Winter Storms	Flood	Storms	DR-183	–	12/24/1964
1963	1963 Floods and Rains	Flood	Storms	DR-145	2/7/63, 2/26/63, 2/29/63, & 4/22/63	2/25/63
1963	1963 Floods	Flood	Storms	–	2/14/1964	–
1958	1958 April Storms and Floods	Flood	Storms	DR-52	4/5/1958	4/4/1958
1958	1958 February Storms and Floods	Flood	Storms	CDO 58-03	2/26/1958	–
1955	1955 Floods	Flood	Flood	DR-47	12/22/1955	12/23/1955
1950	1950 Floods	Flood	Flood	OCD 50-01	11/21/1950	–

Source: FEMA, Cal OES, March 2024

Lake County Disaster Declaration Summary Table by Hazard Type 1950-2024

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Drought	1	2014	1	1977
Economic	2	1979, 2001	0	–
Fire	7	1987, 1996, 2015, 2018 (twice), 2020, 2021	14	1985, 2012, 2015 (three), 2016, 2017 (twice), 2018 (three), 2020 (twice), 2021
Flood (including heavy rains and storms)	23	1950, 1955, 1958 (twice), 1963, 1964 (twice), 1970, 1980, 1983, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2014, 2017 (twice), 2019, 2023 (twice)	19	1955, 1958, 1963, 1964, 1970, 1983, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019, 2023 (three)
Freeze	2	1970, 1972	0	–
Hurricane	0	–	1	2005
Pandemic	2	2020 (twice)	2	2020 (twice)
Road Damage	1	2003	0	–
Totals	**38**	–	**37**	**–**

Source: FEMA, Cal OES, December 2023

Lake County Disasters since 2019 LHMP

- 2023 Floods (two state and three federal)
- 2021 Fire (one state and one federal)
- 2020 Fires (one state and two federal)

➢ 2020 Pandemic (two federal and two state)

Severe Weather Events

NCDC Severe Weather Events for Lake County 1950-12/31/2024*

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Blizzard	1	0	0	0	0	$0	$0
Debris Flows	2	0	0	0	0	$300,000	$0
Drought	44	0	0	0	0	$0	$0
Excessive Heat	11	0	0	0	0	$0	$0
Flash Flood	2	0	0	0	0	$10,000	$0
Flood	21	1	0	4	0	$23,430,000	$0
Frost/Freeze	2	0	0	0	0	$0	$0
Hail	2	0	0	0	0	$0	$0
Heat	8	0	0	0	0	$0	$0
Heavy Rain	10	0	0	0	0	$0	$0
Heavy Snow	13	0	0	0	0	$10,000	$0
High Wind	15	0	0	0	0	$183,000	$0
Strong Wind	17	0	0	0	0	$39,000	$0
Wildfire	22	5	1	37	9	$5,750,000	$0
Winter Storm	68	0	0	0	0	$0	$0
Winter Weather	35	0	0	0	0	$0	$0
Total	**273**	**6**	**1**	**41**	**9**	**$29,722,000**	**$0**

Source: National Climatic Data Center

*Note: Losses reflect totals for all impacted areas

**Due to the regional nature of reporting certain hazard events, these hazards are included in the NCDC database for Lake County

2024 HVLCSD Hazards Comparison Summary

2019 HVLCSD LHMP	2023 Lake County LHMP	2023 State of California Plan Applicable Hazards	Proposed 2024 Hazards*
Aquatic Biological Hazards: quagga mussel	Aquatic Hazards	Invasive and Nuisance Species	—
Climate Change	–	Climate Change and Related Hazards	Climate Change
Dam Failure	Dam Failure	Dam Failure	Dam Failure
Drought and Water Shortage	Drought	Droughts and Water Shortage	Drought & Water Shortage (w/Tree Mortality)
Earthquake	Earthquake	Earthquake	Earthquake
Flood: 1%/0.2% Annual Chance	Flood	Riverine, Stream, and Alluvial Flood	Flood: 1%/0.2% Annual Chance
Flood: Localized/Stormwater	Flood	Riverine, Stream, and Alluvial Flood	Floods: Localized Stormwater
Landslide and Debris Flows		Landslide, Debris Flow, and other Mass Movements	—
Levee Failure	Levee Failure	Levee Failure	Levee Failure
Severe Weather: Extreme Cold and Freeze	–	Severe Wind, Weather, and Storms	Severe Weather: Extreme Cold and Freeze
Severe Weather: Extreme Heat	Extreme Heat	Extreme Heat	Severe Weather: Extreme Heat
Severe Weather: Heavy Rains, Snow, and Storms	Heavy Rains, Snow, and Storms	Severe Wind, Weather, and Storms	Severe Weather: Heavy Rains, Snow, and Storms
Severe Weather: High Winds	–	Severe Wind, Weather, and Storms	—
–	Tree Mortality	Tree Mortality	—
Wildfire	Wildfire	Wildfire	Wildfire (w/smoke and air quality)

*Power Outages/PSPS will be discussed as a vulnerability of all hazards.

HVLCSD Hazard Identification 2024: HVLCSD Planning Area

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Climate Change					–
Dam Failure					Medium
Drought & Water shortage					High
Earthquake					Low
Floods: 1%/0.2% annual chance					Medium
Floods: Localized Stormwater					Medium
Levee Failure					Medium
Severe Weather: Extreme Cold and Freeze					Medium
Severe Weather: Extreme Heat					High
Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)					Medium
Wildfire					Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Likelihood of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic: More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical: 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited: 10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible: Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: Minimal potential impact
Medium: Moderate potential impact
High: Widespread potential impact

Climate Change Influence
Low: Minimal potential impact
Medium: Moderate potential impact
High: Widespread potential impact

A.9.2. HMPC Meeting #2: Risk Assessment Meeting Handouts

Status of the 2024 HVLCSD LHMP Update Project/Next Steps

LHMP Update Project Schedule/Key Dates

2024 LHMP Update Meetings

- **March 26** (Tuesday): HMPC* (Kickoff) Meeting #1 (1:00 – 4:00 pm)
- **November 26** (Tuesday): Public Meeting #1 (5:30 – 7:00 pm)
- **July 11** (Thursday) HMPC Meeting #2 (Risk Assessment) (1:00-4:00 pm)
- **September 18** (Wednesday): HMPC Meetings #3 (Mitigation Strategy: Goals Development) (9:00 am – 12:00 pm)
- **September 19** (Thursday): HMPC Meetings #4 (Mitigation Strategy: Actions and Projects) (9:00 am – 12:00 pm)
- **January 15** (Wednesday) Final Public Meeting #3 (5:30 – 7:00 pm)
- **January 16** (Thursday) Final HMPC Meeting #5 (9:00 – 12:00 pm)

Mitigation Strategy Meetings - Follow up

- **September 27** (Friday): Mitigation Strategy (goals/actions) follow up processed and sent to HVLCSD/HMPC
- **October 25** (Friday): Mitigation Action (Project) Worksheets due to Foster Morrison

LHMP Document Drafts

- **November 8** (Friday): HMPC (First) Draft LHMP to HVLCSD/HMPC
- **December 6** (Friday): HVLCSD/HMPC comments due on Draft Plan
- **December 20** (Friday): Comments incorporated into Public Review (Second) Draft to HVLCSD/HMPC
- **January 3** (Friday): Public Review Draft on County website
- **January 22** (Wednesday): all HVLCSD, HMPC, and public input to Foster Morrison
- **January 31** (Thursday): Public and final comments incorporated and LHMP ready for submittal to Cal OES – **January 2025**

*HMPC = Hazard Mitigation Planning Committee

2024 Hazard Identification & Profiles: HVLCSD

Hazard*	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Climate Change	Extensive	Highly Likely	Limited - Critical	Medium	–
Dam Failure	Extensive	Unlikely	Catastrophic	High	Medium
Drought & Water shortage (w/tree mortality)	Extensive	Highly Likely / Occasional	Critical	High	High
Earthquake	Extensive	Occasional	Catastrophic	High	Low
Floods: 1%/0.2% annual chance	Significant	Occasional / Likely	Critical	High	Medium
Floods: Localized Stormwater	Significant	Highly Likely	Critical	Medium	Medium
Levee Failure	Significant	Unlikely	Critical	High	Medium
Severe Weather: Extreme Cold and Freeze	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)	Extensive	Highly Likely	Critical	Medium	Medium
Wildfire (w/smoke and air quality)	Extensive	Highly Likely	Catastrophic	High	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Likelihood of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic: More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical: 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited: 10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible: Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: Minimal potential impact
Medium: Moderate potential impact
High: Widespread potential impact

Climate Change Influence
Low: Minimal potential impact
Medium: Moderate potential impact
High: Widespread potential impact

Risk Assessment Methodology

Calculating Likelihood of Future Occurrence

The frequency of past events is used in this section to gauge the likelihood of future occurrences. Based on historical data, the likelihood of future occurrence is categorized into one of the following classifications:

- **Highly Likely**: Near 100% chance of occurrence in next year, or happens every year.
- **Likely**: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
- **Occasional**: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
- **Unlikely**: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Calculating Vulnerability

Vulnerability is measured in general, qualitative terms, and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential:

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

Defining Significance (Priority) of a Hazard

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

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

Risk Assessment Summary: HVLCSD Planning Area

Climate Change

- The 2023 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. Wildfire occurrence and intensity is also on the increase. Climate Change has the potential to alter the nature and frequency of most hazards.
- In HVLCSD, each year it seems to get a bit warmer and snow seems to start at higher levels. Rain events also seem to be of greater intensity. The atmospheric rivers of the last couple of years have been significant
- UNIQUE HVLCSD ISSUES/CONCERNS ASSOCIATED WITH CLIMATE CHANGE?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Dam failure

- According to data provided by Cal OES and National Performance of Dam's data, there are 21 dams in Lake County constructed for flood control, storage, electrical generation, and recreational purposes. Of these, 3 are extremely high, 10 are high hazard, 1 are significant hazard, and 7 are low hazard.
- Dams of concern to the District includes only one dam: Coyote Creek Dam, Extremely High Hazard dam, on Hidden Valley Lake, owned by the Hidden Valley Lake Association. The Bar X Ranch Reservoir #2, a High Hazard dam, has an inundation that runs just along the HVLSD boundary.
- ARE THERE ANY PAST OCCURRENCES OF DAM FAILURES OR RELATED ISSUES SINCE THE 2020 LHMP?
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: High
- Priority Hazard

Drought and Water Shortage

- Historical drought data for the HVLCSD planning area and region indicate there have been 5 significant droughts in the last 84 years. Drought is cyclical in nature.
- The District has been in and out of a drought since 2014. In 2012, snowpack levels in California had dropped dramatically and by 2014 drought conditions were significant. 2015 estimates place snowpack as 5 percent of normal levels with drought conditions continuing into 2016. However, snowpack levels increased in 2016 and in 2017 snowpack levels were the highest they've been in 22 years and drought conditions subsided from 2017 through 2019. 2020 through 2022 saw an increase in drought conditions. In 2023 through 2024, drought conditions have again subsided, in part due to the atmospheric river events occurring in 2022, 2023, and extending into early 2024?
- 1 state (2014) and 1 federal (1977) disaster declarations for Lake County since 1950. There have been 44 NCDC drought events in Lake County since 1950 (compared to only 15 for the 2020 District

LHMP). All of these were for the 2014-2024 drought, but no damages, injuries, or losses were reported in the NCDC database.

- Based on data provided by the District, the District generally has a reliable water supply that consists of groundwater wells and other sources.
- CAN YOU PROVIDE DAMAGES OR RESTRICTIONS THAT HAVE OCCURRED IN THE DISTRICT DUE TO THE DROUGHT CONDITIONS SINCE THE 2020 LHMP? WHAT HAS BEEN IMPACTED THE MOST?
- WHAT INPUT DOES THE DISTRICT HAVE ON FUTURE WATER SUPPLY, ESPECIALLY IN LIGHT OF THE 2014 SWRCB COMPLIANCE ORDER? WHAT IS THE STATUS OF THE CURRENT COMPLIANCE ORDER?
- Likelihood of Future Occurrence: Highly Likely – Drought; Occasional – Water Shortage
- Vulnerability: High
- Priority Hazard

Earthquake

- Within the past 200 years, no major earthquakes have occurred along faults in Lake County. There are four faults thought to affect the District: Healdsburg, Maacama (aka Mayacama), Hunting Creek/Berryessa, and San Andreas.
- Throughout Lake County there are several small active faults, with most centered in the Cobb Mountain area. Minor earthquakes occur almost daily in the south county geothermal fields near the geysers influenced region.
- The poorly consolidated younger alluvium that occupies valley floor areas of the county near Clear Lake basin are considered to have high to very high potential for liquefaction.
- The U.S. Geological Survey (USGS) issues National Seismic Hazard Maps as reports that provide acceleration and probabilities for various time periods. This data indicates that the expected severity of earthquakes in the region is moderate to high.
- There have been no disaster declarations in the County. In 1808, there was a major earthquake along the Healdsburg/Rogers Fault. However, no major earthquakes have been recorded recently within the County; although the County has felt ground shaking from earthquakes with epicenters located elsewhere. There is shaking from the Geyser geothermal field.
- WERE THERE ISSUES/DAMAGES IN THE DISTRICT FROM THE HISTORICAL EARTHQUAKES? DO DISTRICT BUILDINGS AND ASSETS NEED TO BE EVALUATED FOR EARTHQUAKE RETROFITS?
- DOES THE DISTRICT HAVE ANY STUDIES THAT ADDRESSED SEISMIC RISK TO DISTRICT FACILITIES AND SERVICES?
- Likelihood of Future Occurrence: Unlikely – large, damaging earthquake; Likely – minor earthquake
- Vulnerability: Extremely High?
- Priority Hazard

Flood Hazards

1%/0.2% annual chance flood

- Historically, portions of Lake County and the District have always been at risk to flooding because of its annual percentage of rainfall in the winter, the proximity to Hidden Valley Lake and local streams and drainages. Putah Creek is the main source of riverine flooding for the District.

- 23 state and 19 federal declarations were for flooding, including heavy rains and storms. Flooding is an ongoing issue for the planning area. NCDC notes 23 flood events since 1993.
- PROVIDE INFORMATION ON FLOOD EVENTS SPECIFIC TO THE DISTRICT SINCE 2020.
- Likelihood of Future Occurrence: 100-Occasional; 500-Unlikely
- Vulnerability: High
- Priority Hazard

Localized/Stormwater flooding

- Significant localized flood history in the District area – occurs annually. Not only does the District experience localized flooding, this is also a significant issue throughout the HVLCSD Service Area.
- PROVIDE DETAILS ON PAST OCCURRENCES IN THESE LOCALIZED FLOOD AREAS SINCE THE 2020 LHMP? PICTURES/DESCRIPTIONS.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium or High?
- Priority Hazard

Levee Failure

- Agricultural and engineered levees exist throughout the County. According to the National Levee Database, Lake County Levee System 7 protects areas along Putah Creek in the District.
- HAVE THERE BEEN ANY PAST ISSUES/OCCURENCES OF LEVEE FAILURE ON THIS LEVEE? ARE THERE ONGOING ISSUES OF EROSIONS, BURROWING RODENTS, ETC?
- WHAT IS DONE TO MAINTAIN THIS LEVEE?
- IS THERE AN AGREEMENT AS TO WHO OWNS AND MAINTAINS THE LEVEE?
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Medium
- Priority Hazard

Severe weather

Extreme Cold and Freeze

- Annual occurrences of cold temperatures. Depending on the data source, average low temperature range from low 30's to low 40's. Lowest recorded daily extreme was 6°F on Dec 22, 1990. In a typical year, maximum temperatures fall below 32°F on 82.1 days, with no days falling below 0°F.
- Two state disaster declarations for Freeze in 1970 and 1972. NCDC includes 2 events for Freeze since 1993.
- PLEASE PROVIDE DETAILS ON EXTREME COLD AND FREEZE EVENTS IN THE DISTRICT. ISSUES/CONCERNS/IMPACTS TO DISTRICT FACILITIES SINCE THE 2020 LHMP?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Extreme Heat

- Annual occurrences of hot temperatures. Depending on the data source, average low temperature range from mid 80's to mid 90's.The highest recorded daily extreme was 109°F on September 2, 1950 (WRCC) and 114°F on June 30, 1977. In a typical year, maximum temperatures exceed 90°F on 71 days.
- 19 extreme heat events (NCDC) since 1993 (compared to only 1 in 2019 LHMP); No state or federal disaster declarations
- PLEASE PROVIDE DETAILS ON EXTREME HEAT EVENTS IN THE DISTRICT? ISSUES/CONCERNS/IMPACTS TO DISTRICT FACILITIES SINCE THE 2020 LHMP?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Low?
- Non-Priority Hazard?

Heavy rains and storms

- Significant County/District history: annual occurrences. Snow is rare.
- According to the Clearlake weather station (WRCC), average annual precipitation is 27.48 inches. The highest annual precipitation was 61.88 inches in 1983 and the lowest annual was 8.17 in 1976. The highest 24 hour precipitation was 6.28 on January 4, 1982. At the same weather station, the NWS provides a average annual precipitation of 29.86 with a 24 hour high precipitation of 6.47 on January 9, 1995.
- 23 state and 19 federal declarations were for flooding, including heavy rains and storms since 1950. The NCDC data recorded 44 hail, heavy rains, and wind events for Lake County since 1950.
- PLEASE PROVIDE DETAILS ON HEAVY RAIN AND STORM EVENTS IN THE DISTRICT. ISSUES/CONCERNS/IMPACTS FOR RAIN, HAIL, LIGHTNING SINCE THE 2020 LHMP?
- NCDC HAS WINTER STORMS – BUT DOESN'T INCLUDE EVENT NARRATIVES. IS IT ISAFE TO ASSUME THESE WINTER STORMS ARE HEAVY RAINS?
- Severe storms/heavy rains are the primary cause of most major flooding
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Wildfire

- Wildfires occur on an annual basis in Lake County and the District. Numerous named fires causing a variety of damages and impacts to the District. Any ignition has the potential to become an out of control wildfire.
- 7 State and 14 federal disaster declarations for Wildfire since 1950 in the County; 3 of these since the 2019 LHMP: Caldor Fire and LNU Lightning Complex Fire, and another in 2020 that covered multiple fires in multiple counties.
- The Valley Fire was the most significant fire in terms of direct impacts and damages to the District
- HOW HAD THE DISTRICT BEEN IMPACTED BY THESE FIRES SINCE 2019? OTHER SIGNIFICANT FIRES TO NOTE? WHAT ABOUT THOSE CAUSING SMOKE/AIR QUALITY ISSUES?
- HAS PSPS BEEN AN ISSUE FOR THE DISTRICT?

- WHAT ARE THE MOST SIGNIFICANT CONCERNS/IMPACTS TO THE DISTRICT FROM FIRES?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Extremely High
- Priority Hazard

Data Needs and Questions

<u>Review of Key Items:</u>

Does the District have population projections?

Are there future development areas?

What development has happened since the 2020 Plan?

What economic assets and community activities of value are there?

Who owns the levee?

A.9.3. HMPC #3 & #4: Mitigation Strategy Meeting Handouts

These can be found in Appendix C of this Plan.

A.9.4. HMPC #5: Final Meeting Handouts for HMPC

The handout used for the HMPC is in Section 2.2 of the Base Plan.

A.9.5. Public Meeting #1: Kickoff Meeting Handouts

HVLCSD LHMP Update: 2024 Hazards

- Climate Change
- Dam Failure
- Drought & Water shortage
- Earthquake
- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- Levee Failure
- Severe Weather: Extreme Cold and Freeze
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)
- Wildfire

HVLCSD LHMP Update: Historic Hazard Worksheet (Past Occurrences)

Please fill out one sheet for each significant hazard event with as much detail as possible. Attach supporting documentation, photocopies of newspaper articles, links, or other original sources.

Type of event	
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Opinion on likelihood of occurring again	
Source of information	
Comments	

	Please return worksheets by mail, email, or fax to: Jeanine Foster, Foster Morrison 6095 Zang Way Arvada, CO 80004 fax: (720) 893-0863 email: jeanine.foster@fostermorrison.com
Prepared by:	
Phone:	
Email:	
Date:	

A.9.6. Public Meeting #2 Handouts for Public

TO BE PLACED

Appendix B References

2000 HVLCSD Master Drainage Plan

2005 FEMA Flood Insurance Study (Lake County)

2024 FEMA Flood Insurance Study (Lake County)

2008 Lake County General Plan

2013 Lake County Drought Management Plan

2016 Strategic Fire Plan

2018 California State Hazard Mitigation Plan

2019/2020 HVLCSD Research Project (Civic Sparks Fellow)

2020 HVLCSD Local Hazard Mitigation Plan

2020 US Census Bureau

2021 California Climate Adaptation Strategy

2023 Lake County Community Wildfire Protection Plan

2023 Lake County Hazard Mitigation Plan

2023 Lake County Parcel/Assessor Data, Average Household Size

2023 State of California Hazard Mitigation Plan

CA DWR – 2012-2016 California Drought: Historical

CAL FIRE

CAL FIRE FRA, SRA, LRA, 2018

Cal OES and the National Performance of Dams Program

Cal Office of Emergency Services

Cal-Adapt

Cal-Adapt – Extended Drought Scenarios

Cal-Adapt – Precipitation: Decadal Averages Map

Cal-Atlas

California Department of Parks and Recreation Office of Historic Preservation

California Department of Water Resources

California Department of Water Resources Division of Safety of Dams

California Department of Water Resources Special Populations and Disadvantaged Community Mapping

California Division of Mines and Geology

California Environmental Protection Agency Disadvantaged Communities

California Environmental Quality Act

California Geological Survey

California Natural Diversity Database

California Natural Resource Agency

California's Adaptation Planning Guide: Understanding Regional Characteristics

Center for Disease Control Social Vulnerability Index

Climate Change and Health Profile Report

Climate Change and Health Profile Report – Lake County

Coyote Creek (Hidden Valley) Lake Dam Inundation Study

Data USA

Disaster Mitigation Act of 2000

Earthquake Intensity Zonation and Quaternary Deposits

FEMA

FEMA DFIRM 10/10/2024

FEMA Disaster Declaration Database

FEMA National Risk Index

FM Global Insurance company

Hazus 6.1

Hidden Valley Lake Dam Inundation Study, Schaaf & Wheeler 2019

HMPC

HMPC input

HVLCSD

HVLCSD Average Household Size

HVLCSD GIS

Intergovernmental Panel on Climate Change

IPCC Sixth Assessment Synthesis Report

Justice 40 Initiative

Lake County 2023 Parcel/Assessor Data

Lake County Flood Insurance Study

Lake County General Plan

Lake County GIS

Lake County Water Inventory and Analysis Report – March 2006

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

Miscellaneous Field Studies Map 9093, 1977

Multi-Hazard Identification and Risk Assessment

National Aeronautics and Space Administration

National Center for Atmospheric Research

National Climate Assessment

National Climatic Data Center

National Climatic Data Center Storm Events Database

National Drought Mitigation Center

National Environmental Policy Act

National Flood Insurance Program

National Integrated Drought Information System

National Levee Database

National Oceanic and Atmospheric Administration

National Performance of Dams Program

National Weather Service

National Weather Service XMAC site

NOAA Storm Prediction Center

Office of Environmental Health Hazard Assessment

Public Policy Institute of California

Sacramento River Watershed Program

Smoke Impacts CA: 2020 Lessons – 2021 Actions

STARR II: Incorporation of Burned Areas in Hydrology in Lake County

U.S. Drought Monitor

U.S. Environmental Protection Agency

United Nations IPCC

United States Army Corps of Engineers

United States Geological Survey Open File Report 2015-3009

University of California, Berkeley's Department of Environmental Science, Policy, and Management

US Fish and Wildlife National Wetlands Inventory

US Forest Service

US Geological Survey

Vaisala National Lightning Detection Network

Western Regional Climate Center

Appendix C Mitigation Strategy

Hidden Valley Lake Community Services District
Local Hazard Mitigation Plan (LHMP) Update
HMPC Meetings #3 & #4 - Mitigation Strategy
September 18 & 19, 2024

Table of Contents

Agenda

Day 1:

- LHMP Project Status/Next Steps/Timeline…4
- Hazard Identification & Profiles…5
- Risk Assessment Methodology…6
- Risk Assessment Summary…7
- HVLCSD LHMP Update Priority Hazards13
- Mitigation Strategy: Goals…18
- 2018 State HMP/2023 State HMP Goals…19
- HVLCSD Goals from other County Plans…20
- HVLCSD Goals from 2018 LHMP…22
- Other Example Goal Statements…23
- Goals Development…24

Day 2:

- Mitigation Strategy Action Development: Ground Rules…26
- Mitigation Strategy: Actions …27
- Categories of Mitigation Actions…27
- Mitigation Actions/Projects from 2018 LHMP…31
- Mitigation Strategy: Action Plan…35
- Mitigation Criteria …35
- Mitigation Action Prioritization Instructions…37
- Mitigation Action Worksheet …39

Jeanine Foster (jeanine.foster@fostermorrison.com)
Foster Morrison Consulting Ltd.
(303) 717-7171

AGENDA

Hidden Valley Lake Community Services District
Local Hazard Mitigation Plan (LHMP) Update
HMPC Meetings #3 & #4
Mitigation Strategy

Wednesday September 18, 2024 (1:00 - 4:00 pm)
Thursday September 19, 2024 (9:00 am - 12:00 pm)

HMPC Meeting #3:

1. Introductions
2. LHMP Project Status and Next Steps/Timeline
3. Risk Assessment Status
4. Priority Hazards Review
5. Develop Plan Goals and Objectives
6. Introduction to HMPC Meeting #4: Mitigation Alternatives/Actions/Projects

HMPC Meeting #4:

1. Introductions
2. Review Mitigation Categories and Selection Criteria
3. Brainstorming of Mitigation Alternatives/Actions/Projects by Hazard
4. Prioritization of Mitigation Actions/Projects
5. Questions

Mitigation Strategy Meetings
September 18 & 19, 2024
Day 1

Status of the 2024 HVLCSD LHMP Update Project/Next Steps

FEMA's 4-Phase-10 Step DMA/CRS Planning Process

Phase I: Organize Resources

1) Get organized

2) Plan for public involvement

3) Coordinate with other departments and agencies

Phase II: Risk Assessment

4) Identify the hazard(s)

5) Assess the risks

Capability Assessment

Phase III: Mitigation Strategy

6) Set planning goals

7) Review mitigation alternatives

8) Draft an action plan

Phase IV: Adoption and Implementation

9) Adopt the plan

10) Implement the plan, evaluate its worth, and revise as needed

LHMP Project Schedule/Key Dates

2024 LHMP Update Meetings

- **September 18 (Wednesday):** HMPC Meetings #3 (Mitigation Strategy: Goals Development) (1:00 – 4:00 pm)
- **September 19 (Thursday):** HMPC Meetings #4 (Mitigation Strategy: Actions and Projects) (9:00 am – 12:00 pm)
- **January 15** (Wednesday) Final Public Meeting #3 (5:30 – 7:00 pm)
- **January 16** (Thursday) Final HMPC Meeting #5 (9:00 – 12:00 pm)

Mitigation Strategy Meetings - Follow up

- **September 27 (Friday):** Mitigation Strategy (goals/actions) follow up processed and sent to HVLCSD/HMPC
- **October 25 (Friday):** Mitigation Action (Project) Worksheets due to Foster Morrison

LHMP Document Drafts

- **November 8 (Friday):** HMPC (First) Draft LHMP to HVLCSD/HMPC
- **December 6 (Friday):** HVLCSD/HMPC comments due on Draft Plan
- **December 20 (Friday):** Comments incorporated into Public Review (Second) Draft to HVLCSD/HMPC
- **January 3** (Friday): Public Review Draft on County website
- **January 22** (Wednesday): all HVLCSD, HMPC, and public input to Foster Morrison
- **January 31** (Thursday): Public and final comments incorporated and LHMP ready for submittal to Cal OES – **January 2025**

HVLCSD Hazard Identification & Profiles

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Climate Change	Extensive	Highly Likely	Limited - Critical	Medium	–
Dam Failure	Extensive	Unlikely	Catastrophic	High	Medium
Drought & Water shortage (w/tree mortality)	Extensive	Highly Likely / Occasional	Critical	High	High
Earthquake	Extensive	Occasional	Catastrophic	High	Low
Floods: 1%/0.2% annual chance	Significant	Occasional / Likely	Critical	High	Medium
Floods: Localized Stormwater	Significant	Highly Likely	Critical	Medium	Medium
Levee Failure	Significant	Unlikely	Critical	High	Medium
Severe Weather: Extreme Cold and Freeze	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)	Extensive	Highly Likely	Critical	Medium	Medium
Wildfire (w/smoke and air quality)	Extensive	Highly Likely	Catastrophic	High	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Likelihood of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic: More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical: 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited: 10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible: Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: Minimal potential impact
Medium: Moderate potential impact
High: Widespread potential impact

Climate Change Influence
Low: Minimal potential impact
Medium: Moderate potential impact
High: Widespread potential impact

Risk Assessment Methodology

Calculating Likelihood of Future Occurrence

The frequency of past events is used in this section to gauge the likelihood of future occurrences. Based on historical data, the likelihood of future occurrence is categorized into one of the following classifications:

- **Highly Likely**: Near 100% chance of occurrence in next year, or happens every year.
- **Likely**: Between 10 and 90% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
- **Occasional**: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
- **Unlikely**: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Calculating Vulnerability

Vulnerability is measured in general, qualitative terms, and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential:

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

Defining Significance (Priority) of a Hazard

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

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

Risk Assessment Summary: HVLCSD 2024 LHMP

Climate Change

- The 2023 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. Wildfire occurrence and intensity is also on the increase. Climate Change has the potential to alter the nature and frequency of most hazards.
- In HVLCSD, each year it seems to get a bit warmer and snow seems to start at higher levels. Rain events also seem to be of greater intensity. The atmospheric rivers of the last couple of years have been significant
- UNIQUE HVLCSD ISSUES/CONCERNS ASSOCIATED WITH CLIMATE CHANGE?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Dam Failure

- According to data provided by Cal OES and National Performance of Dam's data, there are 21 dams in Lake County constructed for flood control, storage, electrical generation, and recreational purposes. Of these, 3 are extremely high, 10 are high hazard, 1 are significant hazard, and 7 are low hazard.
- Dams of concern to the District includes only one dam: Coyote Creek Dam, Extremely High Hazard dam, on Hidden Valley Lake, owned by the Hidden Valley Lake Association. The Bar X Ranch Reservoir #2, a High Hazard dam, has an inundation that runs just along the HVLSD boundary.
- No past occurrences since the 2020 LHMP.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: High
- Priority Hazard

Drought and Water Shortage

- Historical drought data for the HVLCSD planning area and region indicate there have been 5 significant droughts in the last 84 years. Drought is cyclical in nature.
- The District has been in and out of a drought since 2014. In 2012, snowpack levels in California had dropped dramatically and by 2014 drought conditions were significant. 2015 estimates place snowpack as 5 percent of normal levels with drought conditions continuing into 2016. However, snowpack levels increased in 2016 and in 2017 snowpack levels were the highest they've been in 22 years and drought conditions subsided from 2017 through 2019. 2020 through 2022 saw an increase in drought conditions. In 2023 through 2024, drought conditions have again subsided, in part due to the atmospheric river events occurring in 2022, 2023, and extending into early 2024.
- 1 state (2014) and 1 federal (1977) disaster declarations for Lake County since 1950. There have been 44 NCDC drought events in Lake County since 1950 (compared to only 15 for the 2020 District

LHMP). All of these were for the 2014-2024 drought, but no damages, injuries, or losses were reported in the NCDC database.

- Based on data provided by the District, the District generally has a reliable water supply that consists of groundwater wells and other sources. The District noted it has very robust supplies and has seen no drought issues since the 2020 LHMP.
- Likelihood of Future Occurrence: Highly Likely – Drought; Occasional – Water Shortage
- Vulnerability: High
- Priority Hazard

Earthquake

- Within the past 200 years, no major earthquakes have occurred along faults in Lake County. There are four faults thought to affect the District: Healdsburg, Maacama (aka Mayacama), Hunting Creek/Berryessa, and San Andreas.
- Throughout Lake County there are several small active faults, with most centered in the Cobb Mountain area. Minor earthquakes occur almost daily in the south county geothermal fields near the geysers influenced region.
- The poorly consolidated younger alluvium that occupies valley floor areas of the county near Clear Lake basin are considered to have high to very high potential for liquefaction.
- The U.S. Geological Survey (USGS) issues National Seismic Hazard Maps as reports that provide acceleration and probabilities for various time periods. This data indicates that the expected severity of earthquakes in the region is moderate to high.
- There have been no disaster declarations in the County. In 1808, there was a major earthquake along the Healdsburg/Rogers Fault. However, no major earthquakes have been recorded recently within the County; although the County has felt ground shaking from earthquakes with epicenters located elsewhere. There is shaking from the Geyser geothermal field.
- The District noted that earthquake effects can be seen in the main lines after these shaking events. Main lines can break due to lack of buffer around the piping. No notable impacts have been experienced since 2020. District has sent information about how these breakages work during quakes.
- Likelihood of Future Occurrence: Unlikely – large, damaging earthquake; Likely – minor earthquake
- Vulnerability: High
- Priority Hazard

Flood Hazards

1%/0.2% annual chance flood

- Historically, portions of Lake County and the District have always been at risk to flooding because of its annual percentage of rainfall in the winter, the proximity to Hidden Valley Lake and local streams and drainages. Putah Creek is the main source of riverine flooding for the District.
- 23 state and 19 federal declarations were for flooding, including heavy rains and storms. Flooding is an ongoing issue for the planning area. NCDC notes 23 flood events since 1993.
- Since the 2020 LHMP - Lower flats area flooding has been an issue. Evacuations have occurred. Flooding events require significant man hours to run pumps. Some of these areas are protected by levee.
- Likelihood of Future Occurrence: 100-Occasional; 500-Unlikely
- Vulnerability: High

- Priority Hazard

Localized/Stormwater flooding

- Significant localized flood history in the District area – occurs annually. Not only does the District experience localized flooding, this is also a significant issue throughout the HVLCSD Service Area.
- Some localized flooding occurs around Fishhook and Spyglass.
- OTHER LOCALIZED FLOOD AREAS SINCE THE 2020 LHMP? PICTURES/DESCRIPTIONS.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium or High?
- Priority Hazard

Levee Failure

- Agricultural and engineered levees exist throughout the County. According to the National Levee Database, Lake County Levee System 7 protects areas along Putah Creek in the District.
- Levee System 7 is a makeshift levee that was built in the 60s. Nothing seems to have affected the levee. Putah Creek has widened. ACOE created the pump station nearby. Young kids like to ride their dirt bikes near the levee, erodes the inside of the levee.
- Last maintenance on the levee was done by the HVLA, 2017 is estimated date of last maintenance.
- Still unknown as to who owns and is responsible for maintaining the levee.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Medium
- Priority Hazard

Severe Weather

Extreme Cold and Freeze

- Annual occurrences of cold temperatures. Depending on the data source, average low temperature range from low 30's to low 40's. Lowest recorded daily extreme was 6°F on Dec 22, 1990. In a typical year, maximum temperatures fall below 32°F on 82.1 days, with no days falling below 0°F.
- Two state disaster declarations for Freeze in 1970 and 1972. NCDC includes 2 events for Freeze since 1993.
- 2023 had a snow event. An inch fell in the flats and the (Little?) Peak had up to a foot. Extreme summers mean more extreme winters and seems to be a common occurrence.
- OTHER ISSUES/CONCERNS/IMPACTS TO DISTRICT FACILITIES SINCE THE 2020 LHMP?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Extreme Heat

- Annual occurrences of hot temperatures. Depending on the data source, average low temperature range from mid 80's to mid 90's. The highest recorded daily extreme was 109°F on September 2, 1950 (WRCC) and 114°F on June 30, 1977. In a typical year, maximum temperatures exceed 90°F on 71 days.

- 19 extreme heat events (NCDC) since 1993 (compared to only 1 in 2019 LHMP); No state or federal disaster declarations
- Longer periods of extreme heats. Occurred summer of 2024. No issues on the wastewater side. PG&E is the bigger issues due to power. Mechanics can have issues due to heat. Regulators for mechanical stuff
- OTHER EXTREME HEAT EVENTS IN THE DISTRICT? ISSUES/CONCERNS/IMPACTS TO DISTRICT FACILITIES SINCE THE 2020 LHMP?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium or Low?
- Non-Priority Hazard?

Heavy Rains and Storms

- Significant County/District history: annual occurrences. Snow is rare.
- According to the Clearlake weather station (WRCC), average annual precipitation is 27.48 inches. The highest annual precipitation was 61.88 inches in 1983 and the lowest annual was 8.17 in 1976. The highest 24 hour precipitation was 6.28 on January 4, 1982. At the same weather station, the NWS provides a average annual precipitation of 29.86 with a 24 hour high precipitation of 6.47 on January 9, 1995.
- 23 state and 19 federal declarations were for flooding, including heavy rains and storms since 1950. The NCDC data recorded 44 hail, heavy rains, and wind events for Lake County since 1950.
- 2023 had localized flooding and caused issues in sewer systems. Inflow infiltration didn't bring in as many pumping trucks due to cost. State came out to help.
- ANY OTHER EVENTS TO BE NOTED?
- Severe storms/heavy rains are the primary cause of most major flooding
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Wildfire

- Wildfires occur on an annual basis in Lake County and the District. Numerous named fires causing a variety of damages and impacts to the District. Any ignition has the potential to become an out of control wildfire.
- 7 State and 14 federal disaster declarations for Wildfire since 1950 in the County; 3 of these since the 2019 LHMP: Caldor Fire and LNU Lightning Complex Fire, and another in 2020 that covered multiple fires in multiple counties.
- The Valley Fire was the most significant fire in terms of direct impacts and damages to the District
- Smoke can impact due to being in a bowl. Fire breaks were done in 2020. There have been several fires around. Some small (an acre) fire started inside the boundary but was contained.
- Have felt issues with PSPS in the past.
- WHAT ARE THE MOST SIGNIFICANT DISTRICT'S CONCERNS/IMPACTS FROM FIRES?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Extremely High
- Priority Hazard

HVLCSD LHMP Update Priority Hazards

SHOULD ANY BE MOVED TO LOW PRIORITY – ARE THERE MITIGATION ACTIONS FOR EACH OF THESE HAZARDS

Priority Hazards:

- Climate Change
- Dam Failure
- Drought & Water Shortage (w/Tree Mortality)
- Earthquake
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Levee Failure
- Severe Weather: Extreme Cold and Freeze
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (wind, hail, lightning)
- Wildfire (w/smoke and air quality)

Non-Priority Hazards:

Mitigation Strategy: Goals

The most important element of the LHMP is the resulting mitigation strategy which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy is comprised of three components:

6. Mitigation Goals
7. Mitigation Actions
8. Mitigation Action (Implementation) Plan

Mitigation Goals

Up to now, the Hazard Mitigation Planning Committee (HMPC) has been involved in collecting and providing data for the 2024 HVLCSD Local Hazard Mitigation Plan Update. From this information, a Risk Assessment has been developed that describes the risk and vulnerability of the HVLCSD Planning Area to identified hazards and includes an assessment of the area's current capabilities for countering these threats through existing policies, regulations, programs, and projects.

This analysis identifies areas where improvements could or should be made. Formulating Goals will lead to incorporating these improvements into the Mitigation Strategy portion of the LHMP. Our planning goals should provide direction for what risk reduction activities can be undertaken to make the HVLCSD Planning Area more disaster resistant.

Mitigation Goals are general guidelines that represent the community's vision for reducing or avoiding losses from identified hazards. Goals are stated without regard for achievement, that is, implementation, cost, schedule, and means are not considered.

Goals are public policy statements that:

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

  - ✓ While goals are not specific (quantitative), they should not be so general as to be meaningless or unachievable.
  - ✓ Goal statements may form the basis for objectives. They should be stated in such a way as to develop one or more objectives related to each goal.
  - ✓ The key point in writing goals is to remember that they must deal with results, not the activities that produce those results.
  - ✓ Consider other planning area goals from other regional/county/city programs, plans and priorities.

Types/Sources of other area mitigation plans/ programs include:

- General Plans

- Master Plans
- Stormwater Program and Plans
- Flood/Levee/Watershed Management Plans and Studies
- Drought Plans, Urban/Integrated Regional Water Management Plans
- Earthquake Studies
- Community Wildfire Protection Plans
- Strategic Fire Plans
- Dam Emergency Action Plans
- Emergency Operations Plans
- Climate Plans
- Others?

2018 California State Hazard Mitigation Plan Goals

1. Significantly reduce life loss and injuries.

2. Minimize damage to structures and property, as well as minimizing interruption of essential services and activities.

3. Protect the environment.

4. Promote community resilience through integration of hazard mitigation with public policy and standard business practices.

2023 State Hazard Mitigation Plan Goals

GOAL 1—Significantly reduce risk to life, community lifelines, the environment, property, and infrastructure by planning and implementing whole-community risk reduction and resilience strategies.

GOAL 2—Build capacity and capabilities to increase disaster resilience among historically underserved populations, individuals with access and functional needs, and communities disproportionately impacted by disasters and climate change.

GOAL 3—Incorporate equity metrics, tools, and strategies into all mitigation planning, policy, funding, outreach, and implementation efforts.

GOAL 4—Apply the best available science and authoritative data to design, implement, and prioritize projects that enhance resilience to natural hazards and climate change impacts.

GOAL 5—Integrate mitigation principles into laws, regulations, policies, and guidance to support equitable outcomes to benefit the whole community.

GOAL 6— Significantly reduce barriers to timely, efficient, and effective hazard mitigation planning and action.

Master Storm Drainage Plan, Hidden Valley Lake, 2000: Purpose

The only comprehensive review of the drainage system in the Hidden Valley Lake area was conducted in the late 1960s and early 1970s as part of the original subdivision process. Portions of the Subdivision have experienced periodic flooding over the course of the past 25 years, with several severe flooding incidents in the late 1980s and early 1990s. This stormwater master planning effort will identify an orderly approach to correcting existing problems and identify storm nm-off flows so future facilities can be integrated into the entire flood control system. The objectives of the Stormwater Master Plan include:

- Identifying the existing flow patterns and quantities of runoff that can be expected to occur.
- Evaluating the capacities of the existing stormwater facilities.
- Developing and evaluating solutions to capacity deficiencies.
- Estimating the costs of implementing the solutions.
- Prioritizing the required improvements

Goals from HVLCSD 2023 Strategic Plan (2024-2029)

Mission Statement: The mission of the Hidden Valley Lake Community Services District is to provide, maintain and protect our community's water.
The District's Goals:

- Achieve Water and Wastewater Service Reliability
- Maintain Financial Stability
- Foster a Desirable Work Environment
- Strive for Excellent Ratepayer Communications
- Maintain Regulatory Compliance

Lake County Community Wildfire Protection Plan (CWPP), 2023

None

Lake County 2023 LHMP Update

GOAL ONE: Minimize loss of life, injury and damage to property, the economy, and the environment from natural hazards.

Objective 1.1: Increase and maintain wildfire prevention and protection in Lake County.

Objective 1.2: Improve community resilience to hazards.

Objective 1.3: research, develop and promote adoption of cost-effective building, land use, and development laws, regulations and ordinances that exceed current minimum levels needed for life safety and that anticipate future conditions.

Objective 1.4: Mitigate tree mortality through removal, replanting and preventative efforts.

Objective 1.5: Develop, update or revise hazard monitoring, alert and response processes.

Objective 1.6: Prevent, protect, and harden County infrastructure, residential and commercial areas against natural hazards.

GOAL TWO: Increase community awareness of natural hazards and shared responsibility in preparedness, response, mitigation, and recovery activities.

Objective 2.1: Inform and educate residents and businesses about natural hazards that may occur in their community and what they can do to mitigate exposure and damages.

Objective 2.2: Develop public education and outreach that encompasses a variety of delivery mechanisms and unique population subset considerations.

Objective 2.3: Enhance public alert, warning and emergency information systems.

GOAL THREE: Improve local mitigation capabilities that protect the community from natural hazards.

Objective 3.1: Reduce the number of emergency incidents and disaster occurrences.

Objective 3.2: Improve local capacity to prepare for and respond to disasters.

Objective 3.3: Continued improvements to infrastructure, equipment, facilities, etc. to enhance public safety.

HVLCSD Goals from Previous 2020 LHMP (This is what we are updating)

Goal 1: Minimize risk and vulnerability of HVLCSD to hazards and protect lives and prevent losses to property and the environment

- Improve sustainability and resiliency of HVLCSD
- Provide protection and reduce damages to HVLCSD critical infrastructure and services and minimize disruption
- Protect, maintain, and provide safe drinking water and sewer services for existing and future development within the HVLCSD Service area
- Ensure adequate and reliable sewer and water infrastructure that can withstand a higher level of damage from natural disasters
- Continued improvements to infrastructure, equipment, facilities, etc.

Goal 2: Improve HVLCSD's capabilities to plan for/prevent/mitigate hazard-related losses and to be prepared for, respond to, and recover from a disaster event

- Improve local HVLCSD capacity to prepare for disasters
- Ensure the ongoing ability to deliver high quality water and sewer services, before, during, and after a disaster
- Establish and maximize cross-functional and multi-agency cooperation and use of shared resources
- Update and maintain disaster and emergency plans, with a long-term focus to address changing community needs to prevent, minimize, and recover from disasters

Goal 3: Increase HVLCSD and community outreach, education, and awareness of risk and vulnerability to hazards and promote preparedness and self-responsibility to reduce hazard-related losses

- Enhance hazard mitigation and preparedness education and outreach programs
- Inform and educate HVLCSD staff and service area residents and businesses about all hazards they are exposed to, where they occur, what they can do to mitigate exposure or damages.

Goal 4: Increase and maintain wildfire prevention and protection

- Reduce the wildfire risk and vulnerability to HVLCSD
- Improve communication and coordination of wildfire mitigation efforts

Goa1 5: Improve HVLCSD resiliency to flooding

- Protect the HVLCSD and reduce losses from both localized, stormwater flooding and 0.1% and 0.2% annual chance flood events
- Improve and maintain HVL stormwater system to improve system reliability and to reduce losses and extend existing life
- Evaluate, implement, and improve flood control within the HVL
- Minimize risk and vulnerability to life and critical facilities and infrastructure from a levee failure event

Goa1 6: Maintain FEMA Eligibility for Grant Funding

- Identify and pursue FEMA and other hazard mitigation funding sources

Other Example Goal Statements

- Minimize risk and vulnerability from natural hazards
- Increase communities' awareness of vulnerability to hazards
- Increase the use of shared resources
- Improve communities' capabilities to mitigate losses
- Maintain coordination of disaster plans with changing DHS/FEMA needs
- Maintain FEMA eligibility/position jurisdictions for grant funding
- Maintain/enhance the flood mitigation program to provide 200/500-year flood protection
- Maintain current service levels
- Provide protection for existing buildings from hazards
- Provide protection for future development from hazards
- Provide protection for natural and cultural resources from hazard impacts
- Provide protection for people's lives from hazards
- Provide protection for public health
- Provide protection for critical services (fire, police, etc.) from hazard impacts
- Provide protection for critical lifeline utilities from hazard impacts
- Reduce exposure to hazard related losses
- Reduce the number of emergency incidents
- Make better use of technology

General Recommendation for Categories of Goals

- Reduce Losses/Protection of Life, Property, Public Health, and the Environment from all Hazards
- Reduce Losses/Protection of Critical Facilities and Infrastructure from all Hazards
- Public Education
- Increase County Capabilities to all Hazards
- Any Hazard-specific goals
- Integrate strategies for the protection of underserved and vulnerable populations

Goals Development

The purpose of goal's development is to reach a consensus on goals for the HVLCSD 2025 LHMP Update. Provided above are example goals for this LHMP. ***You may reword those above or develop your own goals.*** These goal statements should serve as examples. It is vital that our HMPC establish its own goals.

You will each be given 3 sticky notes. On each note you will write what you think the goals for this HVLCSD LHMP Update should be. Use one sticky note for each goal.

When done, we will:

- Pin/tape them to the wall/easel-chart and arrange them by category
- Combine and reword them into 3-5 goals for the plan and send them out to the HMPC for further review and refinement.

Mitigation Strategy Meetings
September 18 & 19, 2024
Day 2

Mitigation Strategy Action Development: Ground Rules

Rule 1: HVLCSD MUST have a Mitigation Action/Project to address each of their Priority Hazards (those rated as a high or medium significance in their Hazard Identification table).

Rule 2: Every Mitigation Action/Project MUST be supported by Risk Assessment Data contained within Chap 4 of the Base Plan. Note: this might necessitate backfilling the hazard risk assessment data.

Rule 3: The Mitigation Actions/Projects for this 2025 LHMP should reflect HVLCSD's WISH LIST for mitigation, regardless of funding source.

Rule 4: Any Mitigation Action/Project that might be considered for FEMA mitigation grant funding over the next 5-years covered by this LHMP MUST be included in this 2025 LHMP.

Rule 5: While the updated Mitigation Strategy should include all potential Mitigation Actions/Projects for HVLCSD (regardless of funding source), keep in mind that HVLCSD is NOT obligated to implement ANY of the identified Mitigation Actions/Projects – all are always subject to funding and changing priorities.

Rule 6: Each Mitigation Action/Project to be included in this LHMP MUST have a Mitigation Action Worksheet completed by the owning Department or Agency. This applies to Mitigation Actions/Projects being carried forward from HVLCSD's previous LHMP.

Rule 7: HVLCSD CAN LATER include Mitigation Actions/Projects that might not get identified during this Mitigation Action/Project Prioritization process – the key is to complete a Mitigation Action Worksheet for any project to be included in the LHMP prior to submittal to Cal OES/FEMA.

REMEMBER: Having a FEMA approved LHMP for HVLCSD is a prerequisite for being eligible to apply for FEMA pre and post mitigation funding.

Mitigation Strategy: Actions

Mitigation Actions are specific projects and activities that help achieve the goals and accomplish risk reduction in the community.

Categories of Mitigation Actions

PREVENTION: Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open Space Preservation
- Land Development Regulations
  - ✓ Subdivision regulations
  - ✓ Building Codes
    - Fire-Wise Construction
  - ✓ Floodplain development regulations
  - ✓ Geologic Hazard Areas development regulations (for roads too!)
- Storm Water Management
- Fuels Management, Fire-Breaks

EMERGENCY SERVICES: protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (flooding, tornadoes, winter storms, geologic hazards, fire)
  - ✓ NOAA Weather Radio
  - ✓ Sirens
  - ✓ "Reverse 911" (Emergency Notification System)
- Emergency Response
  - ✓ Evacuation & Sheltering
  - ✓ Communications
  - ✓ Backup power supply/generators
  - ✓ Emergency Planning
    - Activating the EOC (emergency management)
    - Closing streets or bridges (police or public works)
    - Shutting off power to threatened areas (utility company)
    - Holding/releasing children at school (school district)
    - Ordering an evacuation (mayor)
    - Opening emergency shelters (Red Cross)
    - Monitoring water levels (engineering)
    - Security and other protection measures (police)
- Critical Facilities Protection (Buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)

    - ✓ Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
    - ✓ Lifeline Utilities Protection
- ➢ Post-Disaster Mitigation
- ➢ Building Inspections
    - ✓ ID mitigation opportunities & funding before reconstruction

PROPERTY PROTECTION: Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

- ➢ Retrofitting/disaster proofing
    - ✓ Floods
        - Wet/Dry floodproofing (barriers, shields, backflow valves)
        - Relocation/Elevation
        - Acquisition
        - Retrofitting
    - ✓ High Winds/Tornadoes
        - Safe Rooms
        - Securing roofs and foundations with fasteners and tie-downs
        - Strengthening garage doors and other large openings
    - ✓ Winter Storms
        - Immediate snow/ice removal from roofs, tree limbs
        - "Living" snow fences
    - ✓ Geologic Hazards (Landslides, earthquakes, sinkholes)
        - Anchoring, bracing, shear walls
        - Dewatering sites, agricultural practices
        - Catch basins
    - ✓ Drought
        - Improve water supply (transport/storage/conservation)
        - Remove moisture competitive plants (Tamarisk/Salt Cedar)
        - Water Restrictions/Water Saver Sprinklers/Appliances
        - Grazing on CRP lands (no overgrazing-see Noxious Weeds)
        - Create incentives to consolidate/connect water services
        - Recycled wastewater on golf courses
    - ✓ Wildfire, Grassfires
        - Replacing building components with fireproof materials
        - Roofing, screening
        - Create "Defensible Space"
        - Installing spark arrestors
        - Fuels Modification
    - ✓ Noxious Weeds/Insects

- Mowing
- Spraying
- Replacement planting
- Stop overgrazing
- Introduce natural predators

➢ Insurance

NATURAL RESOURCE PROTECTION: Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the natural beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

➢ storage of floodwaters
➢ absorption of flood energy
➢ reduction in flood scour
➢ infiltration that absorbs overland flood flow
➢ groundwater recharge
➢ removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
➢ habitat for flora and fauna
➢ recreational and aesthetic opportunities

Methods of protecting natural resources include:

➢ Wetlands Protection
➢ Riparian Area/Habitat Protection/Threatened-Endangered Species
➢ Erosion & Sediment Control
➢ Best Management Practices

Best management practices ("BMPs") are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project's design to permanently address nonpoint source pollutants. There are three general categories of BMPs:

1. Avoidance: setting construction projects back from the stream.
2. Reduction: Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
3. Cleanse: Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained:

➢ Dumping Regulations
➢ Set-back regulations/buffers
➢ Fuels Management
➢ Water Use Restrictions

- Landscape Management
- Weather Modification

STRUCTURAL: Projects that have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they "stop" flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

- They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.
- They disturb the land and disrupt natural water flows, often destroying habitats or requiring Environmental Assessments.
- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/Retention structures
- Erosion and Sediment Control
- Basins/Low-head Weirs
- Channel Modifications
- Culvert resizing/replacement/Maintenance
- Levees and Floodwalls
- Anchoring, grading, debris basins (for landslides)
- Fencing (for snow, sand, wind)
- Drainage System Maintenance
- Reservoirs (for flood control, water storage, recreation, agriculture)
- Diversions
- Storm Sewers

PUBLIC INFORMATION: A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection:

- Hazard Maps and Data
- Outreach Projects (mailings, media, web, speakers, displays)
- Library Resources
- Real Estate Disclosure
- Environmental Education

Mitigation Actions/Projects from 2020 HVLCSD LHMP (This is what we are updating)

Action Title	Complete	Ongoing	Not Yet Started	In 2025 Plan Update
Multi-Hazard Mitigation Actions				
Water Distribution System Reliability		x		x
Generator Projects for all Critical Facilities and Infrastructure		x		x
Establish Fully Functioning GIS Capabilities		x		x
Water Storage and Materials		x		x
Establish Additional Well(s)		x		x
Chlorine Automatic Shut-off Valve			x	x
Develop Risk and Resilience Plan (RRP), and Emergency Response Plan (ERP)	x			
Improve the SCADA system		x		
Public Awareness Program		x		x
Wastewater Treatment Plant Improvements			x	x
Update Water Master Plan			x	x
Climate Change Actions				
Develop HVLCSD Climate Action Plan			x	x
Dam Failure, Flood, Localized Flood, Levee Failure Actions				
I & I Program		x		x
Update and Implement Stormwater Master Plan		x		x
Establish Cross Functional Committee and Address Levee & Stream Issues			x	x
Chlorine Analyzers			x	x
Dam Inundation Mitigation			x	x
Drought Actions				
Rescind the Water Moratorium	x			
Hexavalent Chromium		x		x
Earthquake Actions				
Earthquake Vulnerability Assessment and Retrofit			x	x
Wildfire Actions				
Fuel Mitigation		x		x
Add/Improve/Fortify Fire Hydrants			x	x

Mitigation Strategy: Action (Implementation) Plan

The mitigation action plan describes how the mitigation actions will be implemented, including how those actions will be prioritized, administered, and incorporated into the community's existing planning mechanism. Each participating jurisdiction must have a mitigation action(s) and an action plan specific to that jurisdiction and its priority hazards and vulnerabilities.

Mitigation Criteria

For use in selecting and prioritizing Proposed Mitigation Measures

1. STAPLEE

Social: Does the measure treat people fairly? (different groups, different generations)

- Community Acceptance
- Effect on Segment of Population
- Social Benefits

Technical: Will it work? (Does it solve the problem? Is it feasible?)

- Technical Feasibility
- Reduce Community Risk
- Long Term Solution/Sustainable
- Secondary Impacts

Administrative: Do you have the capacity to implement & manage project?

- Staffing
- Funding Allocated
- Maintenance/Operations

Political: Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support?

- Political Support
- Local Champion
- Public Support
- Achieves Multiple Objectives
- Supported by a broad array of Stakeholders

Legal: Does your organization have the authority to implement? Is it legal? Are there liability implications?

- Existing Local Authority
- State Authority
- Potential Legal Challenges

Economic: Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development?

- Benefit of Action
- Cost of Action
- Cost Effective/Economic Benefits
- Economically Viable
- Outside Funding Required

Environmental: Does it comply with Environmental regulations?

- Effect on Land/Water
- Effect on Endangered Species
- Effect on Cultural Resources
- Effect on Hazmat sites
- Consistent with Community Environmental Goals
- Consistent with Environmental Laws
- Environmental Benefits

2. SUSTAINABLE DISASTER RECOVERY

- Quality of Life
- Social Equity
- Hazard Mitigation
- Economic Development
- Environmental Protection/Enhancement
- Community Participation

3. SMART GROWTH PRINCIPLES

- Infill versus Sprawl
- Efficient Use of Land Resources
- Full Use of Urban Resources
- Mixed Uses of Land
- Transportation Options
- Detailed, Human-Scale Design

4. OTHER

- Does measure address area with highest risk?
- Does measure protect …
  - ✓ The largest # of people exposed to risk?
  - ✓ The largest # of buildings?
  - ✓ The largest # of jobs?
  - ✓ The largest tax income?
  - ✓ The largest average annual loss potential?
  - ✓ The area impacted most frequently?
  - ✓ Critical Infrastructure (access, power, water, gas, telecommunications)
- Timing of Available funding
- Visibility of Project
- Community Credibility

Mitigation Action Prioritization Instructions

The HMPC's brainstormed list of mitigation actions and projects are organized by hazard and posted on flip-chart paper around the room.

You each have 3 sets of colored dots:

- 3 red dots
- 3 blue dots
- 3 green dots

The red dots are for high priority (5 points each)

The blue dots are for medium priority (3 points each)

The green dots are for low priority (1 point each)

Place your dots on any mitigation action/project, using the different colors to indicate your priority. You may use as many of your dots, of any color, on any mitigation action/project --- or you may spread them out using as few of your dots as you wish. The scored dots will indicate the consensus of the HMPC.

Use the list of mitigation selection criteria (above) to help you make your determinations.

Your votes will indicate the consensus of the team.

After the totals are counted, we will discuss them further to confirm or modify any of the results as necessary to best meet the goals of this LHMP Update.

Hidden Valley Lake Community Services District
Mitigation Action Worksheet

Mitigation Action/Project Title:	
Hazards Addressed:	
Issue/Background: (Problem Statement)	
Project Description:	
Other Alternatives:	
Existing Planning Mechanism(s) through which Action Will Be Implemented:	
Responsible Office/Partners:	
Benefits (Losses Avoided):	
Potential Funding:	
Timeline:	
Project Priority (High, Medium, Low):	

Worksheet completed by:	
Name and Title:	
Phone:	

Hidden Valley Lake Community Services District 2025 LHMP Update

Mitigation Strategy Meetings – Action Prioritization

Actions Sorted by Hazards

Agency/ Department	Mitigation Action Title	Hazards Addressed	Votes (Points)
Multi-Hazard	1. Enhance Public Education and Outreach program for all hazards (priority and non-priority)	Multi-Hazard	2
2019 Action	2. Establish cross functional/agency/stakeholder teams (Dam and levee failure, stream, stormwater flooding, wildfire) to enhance communications	Multi-Hazard	10
2019 Action	3. Backup Power/generator projects for key critical facilities and infrastructure (e.g.., generators, batteries, solar, etc.)	Multi-Hazard	10
2019 Action	4. Water distribution system reliability (to include water main line replacements)	Multi-Hazard	25
2019 Action	5. Wastewater treatment plant improvements	Multi-Hazard	1
2019 Action	6. Water Storage and Materials	Multi-Hazard	0
2019 Action	7. GIS capability enhancements w/ regular updates	Multi-Hazard	1
Multi-Hazard	8. Install chlorine automatic shut off valve	Multi-Hazard	6
Multi-Hazard	9. Establish additional wells	Multi-Hazard	2
Multi-Hazard	10. Improve SCADA system	Multi-Hazard	11
2019 Action	11. Develop a Climate Action Plan	Climate Change	
	12. Purchase and install cooling system in blower room	Climate Change	2
	13. Coordination with Dam owners/participation in Dam exercises (establishing an MOU)	Dam Failure	0
2019 Action	14. Coyote Creek Dam Mitigation (retrofits/seismic upgrades/improvements)	Dam Failure	17
HVLA?	15. Conduct a feasibility study/alternative analysis for dam improvements	Dam Failure	1
	16. Retrofit corner of reclamation pond by the Bar X Dam inundation area	Dam Failure	3
	17. Develop and implement Groundwater Sustainability Plan (Help direct local development)	Drought & Water Shortage	10

Agency/ Department	Mitigation Action Title	Hazards Addressed	Votes (Points)
2019 Action	18. Update and implement Water Master Plan	Drought & Water Shortage	11
	19. Update and implement Drought & Water Shortage Contingency Plan	Drought & Water Shortage	0
2019 Action	20. Hexavalent Chromium Project	Drought & Water Shortage	13
	21. Interagency drought fighting planning and coordination	Drought & Water Shortage	0
2019 Action	22. Redwood Tank (Storage) Replacement Projects (3 more tanks including tank 4)	Drought & Water Shortage/ Earthquake/ Wildfire	49
2019 Action	23. Conduct seismic assessments of key facilities and infrastructure and implement recommended retrofit/hardening projects	Earthquake	1
	24. Conduct a earthquake insurance review for the District	Earthquake	2
	25. Construct Catchment Basin (5 M gallons)	Drought & Water Shortage/ Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	10
	26. Dredge Flood Retention Pond	Climate Change/ Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	9
2019 Action	27. Update and Implement Stormwater Master Plan (plan for future conditions, H&H study) (culverts, culverts, culverts)	Climate Change/ Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	36

Agency/ Department	Mitigation Action Title	Hazards Addressed	Votes (Points)
	28. Establish groundwater recharge/ injection wells	Climate Change Drought & Water Shortage/ Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	5
2019 Action	29. I & I Program	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	12
	30. Manhole Improvements	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	1
	31. Prioritize sewer collections systems and pipes (i.e., those built in the 60's) for flood related improvements	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	19
2019 Action	32. Chlorine Analyzer Project to monitor CL2 levels in flood waters/effluent	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	1
	33. Construct a flood diversion structure to reconnect the stormwater to the floodplain	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	6

Agency/ Department	Mitigation Action Title	Hazards Addressed	Votes (Points)
	34. Update and implement best management practices (BMPs) and SOPs to control stormwater flooding (use of vegetative swales, rainwater gardens, other)	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms	
	35. Formulate a stormwater management. agency	Flood: 1%, 0.2%/ **Localized Flooding/** Heaving Rain and Storms/Dam Failure/Levee Failure	6
	36. Flood Fighting/Monitoring (surface water, rains)(MS4?)	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/**Levee Failure**	
	37. Pump station improvements	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/**Levee Failure**	0
	38. Update gate valve with tide flex valve	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	8
	39. Establish groundwater injection wells	Climate Change Drought & Water Shortage/ Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	
	40. Determine Levee ownership	Levee Failure	23
	41. Formalize a Levee maintenance plan	Levee Failure	0
	42. Levee improvements	Levee Failure	6
BRIC?	43. Levee accreditation	Levee Failure	4

Agency/ Department	Mitigation Action Title	Hazards Addressed	Votes (Points)
	44. Levee engineering study	Levee Failure	26
	45. Infrastructure Hardening (trips, motors, other)	Climate Change/ Severe Weather: Cold and Freeze/ Severe Weather: Heat	3
	46. Heat Safety Program Implementation (e.g. Heat Illness Plan)	Climate Change/ Severe Weather: Heat	5
	47. Lightning Mitigation	Severe Weather: Heavy rains and storms, winds	1
	48. Air Quality Mitigation (Heat & Smoke) Outdoor workers/Indoor air exchange, Solar Offsets	Climate Change/ Wildfire	1
2019 Action	49. Fuels Mitigation Projects	Drought & Water Shortage/Wildfire	13
2019 Action	50. Add/Improve and Fortify Fire Hydrants	Drought & Water Shortage/Wildfire	0
	51. FLASHES Project Hydroelectric, fire hydrants/cannons, pumps/dipping tank, filling station for water tenders/40M gal storage	Drought & Water Shortage/Wildfire	25

Actions Sorted by Prioritization (Voting) Results

Agency/ Department	Mitigation Action Title	Hazards Addressed	Votes (Points)
2019 Action	1. Redwood Tank (Storage) Replacement Projects (3 more tanks including tank 4)	Drought & Water Shortage/ Earthquake/ Wildfire	49
2019 Action	2. Update and Implement Stormwater Master Plan (plan for future conditions, H&H study) (culverts, culverts, culverts)	Climate Change/ Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	36
	3. Levee engineering study	Levee Failure	26
2019 Action	4. Water distribution system reliability (to include water main line replacements)	Multi-Hazard	25

Agency/ Department	Mitigation Action Title	Hazards Addressed	Votes (Points)
	5. FLASHES Project Hydroelectric, fire hydrants/cannons, pumps/dipping tank, filling station for water tenders/40M gal storage	Drought & Water Shortage/Wildfire	25
	6. Determine Levee ownership	Levee Failure	23
	7. Prioritize sewer collections systems and pipes (i.e., those built in the 60's) for flood related improvements	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	19
2019 Action	8. Coyote Creek Dam Mitigation (retrofits/seismic upgrades/improvements)	Dam Failure	17
2019 Action	9. Hexavalent Chromium Project	Drought & Water Shortage	13
2019 Action	10. Fuels Mitigation Projects	Drought & Water Shortage/Wildfire	13
2019 Action	11. I & I Program	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	12
Multi-Hazard	12. Improve SCADA system	Multi-Hazard	11
2019 Action	13. Update and implement Water Master Plan	Drought & Water Shortage	11
2019 Action	14. Establish cross functional/agency/stakeholder teams (Dam and levee failure, stream, stormwater flooding, wildfire) to enhance communications	Multi-Hazard	10
2019 Action	15. Backup Power/generator projects for key critical facilities and infrastructure (e.g.., generators, batteries, solar, etc.)	Multi-Hazard	10
	16. Develop and implement Groundwater Sustainability Plan (Help direct local development)	Drought & Water Shortage	10
	17. Construct Catchment Basin (5 M gallons)	Drought & Water Shortage/ Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	10

Agency/ Department	Mitigation Action Title	Hazards Addressed	Votes (Points)
	18. Dredge Flood Retention Pond	Climate Change/ Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	9
	19. Update gate valve with tide flex valve	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	8
Multi-Hazard	20. Install chlorine automatic shut off valve	Multi-Hazard	6
	21. Construct a flood diversion structure to reconnect the stormwater to the floodplain	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	6
	22. Formulate a stormwater management. agency	Flood: 1%, 0.2%/ **Localized Flooding/** Heaving Rain and Storms/Dam Failure/Levee Failure	6
	23. Levee improvements	Levee Failure	6
	24. Establish groundwater recharge/ injection wells	Climate Change Drought & Water Shortage/ Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	5
	25. Heat Safety Program Implementation (e.g. Heat Illness Plan)	Climate Change/ Severe Weather: Heat	5
BRIC?	26. Levee accreditation	Levee Failure	4

Agency/ Department	Mitigation Action Title	Hazards Addressed	Votes (Points)
	27. Retrofit corner of reclamation pond by the Bar X Dam inundation area	Dam Failure	3
	28. Infrastructure Hardening (trips, motors, other)	Climate Change/ Severe Weather: Cold and Freeze/ Severe Weather: Heat	3
Multi-Hazard	29. Enhance Public Education and Outreach program for all hazards (priority and non-priority)	Multi-Hazard	2
Multi-Hazard	30. Establish additional wells	Multi-Hazard	2
	31. Purchase and install cooling system in blower room	Climate Change	2
	32. Conduct a earthquake insurance review for the District	Earthquake	2
2019 Action	33. Wastewater treatment plant improvements	Multi-Hazard	1
2019 Action	34. GIS capability enhancements w/ regular updates	Multi-Hazard	1
HVLA?	35. Conduct a feasibility study/alternative analysis for dam improvements	Dam Failure	1
2019 Action	36. Conduct seismic assessments of key facilities and infrastructure and implement recommended retrofit/hardening projects	Earthquake	1
	37. Manhole Improvements	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	1
2019 Action	38. Chlorine Analyzer Project to monitor CL2 levels in flood waters/effluent	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	1
	39. Lightning Mitigation	Severe Weather: Heavy rains and storms, winds	1
	40. Air Quality Mitigation (Heat & Smoke) Outdoor workers/Indoor air exchange, Solar Offsets	Climate Change/ Wildfire	1
2019 Action	41. Water Storage and Materials	Multi-Hazard	0

Agency/ Department	Mitigation Action Title	Hazards Addressed	Votes (Points)
	42. Coordination with Dam owners/participation in Dam exercises (establishing an MOU)	Dam Failure	0
	43. Update and implement Drought & Water Shortage Contingency Plan	Drought & Water Shortage	0
	44. Interagency drought fighting planning and coordination	Drought & Water Shortage	0
	45. Pump station improvements	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/**Levee Failure**	0
	46. Formalize a Levee maintenance plan	Levee Failure	0
2019 Action	47. Add/Improve and Fortify Fire Hydrants	Drought & Water Shortage/Wildfire	0
2019 Action	48. Develop a Climate Action Plan	Climate Change	
	49. Update and implement best management practices (BMPs) and SOPs to control stormwater flooding (use of vegetative swales, rainwater gardens, other)	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms	
	50. Flood Fighting/Monitoring (surface water, rains)(MS4?)	Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/**Levee Failure**	
	51. Establish groundwater injection wells	Climate Change Drought & Water Shortage/ Flood: 1%, 0.2%/ Localized Flooding/ Heaving Rain and Storms/Dam Failure/Levee Failure	

Appendix D Planning Adoption

Note to Reviewers: When this plan has been reviewed and approved pending adoption by FEMA Region IX, the adoption resolutions will be signed by the District and added to this appendix.

(LOCAL GOVERNMENT: Special Districts)

RESOLUTION NO.

A RESOLUTION OF (LOCAL GOVERNMENT) ADOPTING THE (TITLE AND DATE OF MITIGATION PLAN).

WHEREAS the (local governing body) recognizes the threat that natural hazards pose to people and property within (local government); and

WHEREAS the (local government) has prepared a multi-hazard mitigation plan, hereby known as (title and date of mitigation plan) in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS (title and date of mitigation plan) identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in (local government) from the impacts of future hazards and disasters; and

WHEREAS adoption by the (local governing body) demonstrates its commitment to hazard mitigation and achieving the goals outlined in the (title and date of mitigation plan).

NOW THEREFORE, BE IT RESOLVED BY THE (LOCAL GOVERNMENT), (STATE), THAT:

In accordance with (local rule for adopting resolutions), the (local governing body) adopts the (title and date of mitigation plan). *While content related to (local government) may require revisions to meet the plan approval requirements, changes occurring after adoption will not require (local government) to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.*

BE IT FURTHER RESOLVED, the (local governing body) will submit this adoption resolution to the California Office of Emergency Services and FEMA Region IX officials to enable the plan's final approval in accordance with the requirements of the Disaster Mitigation Act of 2000.

ADOPTED by a vote of ____ in favor and ____ against, and ____ abstaining, this _____ day of ___________, ______.

By: ________________________________ (print name)

ATTEST: By: ________________________________ (print name)

APPROVED AS TO FORM: By: ________________________________ (print name)

Appendix E Detailed Hazard Analysis Asset Tables

The following contain the detailed analysis tables for the District.

HVLCSD Assets			
Asset	Asset Count	Asset Value	Content Value
Land Asset			
Parcel			
013-060-05	1	$125,000	
014-270-10	1	$900,000	
014-280-19	1	$1,000,000	
141-033-01	1	$10,000	
141-081-27	1	$8,000	
141-231-02	1		
141-311-25	1	$130,000	
141-361-03	1	$5,000	
141-411-28	1	$10,000	
141-451-21	1		
141-611-03	1	$15,000	
141-611-07	1	$250,000	
141-732-01	1	$9,000	
142-113-01	1	$6,000	
142-301-01	1		
142-363-23	1	$7,000	
142-401-07	1	$5,000	
144-011-02	1	$95,000	
144-011-04	1	$125,000	
144-011-09	1	$65,000	
Parcel Total	**20**	**$2,765,000**	
Land Asset Total	**20**	**$2,765,000**	
General Asset			
Building			
Flood Control Pump Station	1	$52,310	$103,820
Greenridge Pump Station	1	$131,403	$183,138
Hidden Valley Lake Community Services District	1	$480,342	$285,697
Maintenance Building	1	$684,894	$311,460
Storage	1	$102,557	
Unit 9 Pump Station	1	$52,310	$218,022
Waste Water Treatment Plant	1	$5,825,227	
Water Plant	1	$166,346	$487,954
Building Total	**8**	**$7,495,389**	**$1,590,091**
General Asset Total	**8**	**$7,495,389**	**$1,590,091**
Sewer System Asset			
Generator			
Generator - Flood Control Basin	1	$125,544	
Generator - Lift Station 1	1	$172,000	
Generator - Lift Station 2	1	$62,772	
Generator - Lift Station 3	1	$62,772	
Generator - Lift Station 4	1	$104,620	
Generator - Lift Station 5	1	$62,772	
Generator - Lift Station 6	1	$62,772	
Generator - Lift Station 7	1	$62,772	
Generator - Lift Station Hardesters	1	$62,772	
Generator - WWTP Lab	1	$251,088	
Generator Total	**10**	**$1,029,884**	
Manhole			

(blank)	246	$287,574	
Manhole Total	**246**	**$287,574**	
Sewer Pumps			
400s	2	$18,000	
500s	4	$4,800	
600s	2	$20,000	
700s	2	$32,000	
800s	2	$21,500	
Lift Station #1	3	$193,500	
Lift Station #2	3	$37,500	
Lift Station #3	3	$37,500	
Lift Station #4	3	$37,500	
Lift Station #5	3	$52,500	
Lift Station #6	3	$37,500	
Lift Station #7	2	$13,800	
Lift Station Hardesters	2	$14,000	
Sewer Pumps Total	**34**	**$520,100**	
Sewer System Asset Total	**290**	**$1,837,558**	
Water System Asset			
Generator			
Greenridge Booster pump station	1	$160,776	
Water Treatment Plant	1	$220,388	
Generator Total	**2**	**$381,164**	
Hydrant			
(blank)	316	$736,280	
Hydrant Total	**316**	**$736,280**	
PRV			
16128 Eagle Rock Road	1	$5,609	
16329 Eagle Rock Road	1	$5,609	
17028 Spruce Grove Road	1	$5,609	
17972 Deer Hill Road	1	$5,609	
18317 North Shore Drive	1	$5,609	
18496 Kentwood Pl	1	$5,609	
18535 Glenwood Road	1	$5,609	
18726 Hidden Valley Road	1	$5,609	
19152 Redbud Rd	1	$5,609	
19895 Donkey Hill Road	1	$5,609	
Unknown	1	$5,609	
(blank)	1	$5,609	
PRV Total	**12**	**$67,308**	
Pump			
Ag Well	1	$183,085	
Greenridge 501	1	$10,400	
Greenridge 502	1	$10,400	
Unit 9 901	1	$11,450	
Unit 9 902	1	$11,450	
Unit 9 903	1	$11,450	
Water Treatment Plant - Well 2 - Wellfield	1	$183,085	
Water Treatment Plant 101	1	$18,200	
Water Treatment Plant 102	1	$18,200	
Water Treatment Plant 103	1	$18,200	
Water Treatment Plant 401	1	$7,300	

Water Treatment Plant 402	1	$7,300	
Water Treatment Plant 403	1	$17,300	
Well 3	1	$183,085	
Wellfield TP Booster	1	$20,000	
Wellfield Well 4	1	$183,085	
Pump Total	**16**	**$893,990**	
Tank			
Detention tank	1	$122,405	
Little Peak storage tank	1	$436,265	
Tank 1a	1	$146,468	
Tank 1b	1	$174,715	
Tank 1c	1	$436,265	
Tank 4a	1	$1,300,000	
Tank 4b	1	$436,265	
Unit 9 Storage Tank	1	$1,203,390	
Tank Total	**8**	**$4,255,773**	
Valve			
15603 Eagle Rock Road	1	$1,031	
15605 Little Peak Road	1	$1,031	
15653 Little Peak Road	1	$1,031	
15717 Little Peak Road	1	$1,031	
15783 Eagle Rock	1	$1,031	
15822 Little Peak Road & Sentinel Court, 09-10-37	1	$1,031	
15868 Littel Peak Road	1	$1,031	
15989 Eagle Rock Road	1	$1,031	
16038 Conestoga Road	1	$1,031	
16041 Eagle Rock Road	1	$1,031	
16116 Conestoga Road	1	$1,031	
16121 Eagel Rock Road	3	$3,093	
16136 Eagle Rock Road	1	$1,031	
16176 Eagle Rock Road	1	$1,031	
16184 Eagle Rock Road	1	$1,031	
16193 Eagle Rock Road	1	$1,031	
16198 Conestoga Road	1	$1,031	
16236 Eagle Rock Road	1	$1,031	
16273 Firethorn Road	1	$1,031	
16284 Eagle Rock Road	1	$1,031	
16290 Conestoga Road	1	$1,031	
16329 Eagle Rock Road	1	$1,031	
16345 Eagle Rock Road	1	$1,031	
16369 Eagle Rock Road	1	$1,031	
16369 Firethorn Road	1	$1,031	
16385 Eagle Rock Road	1	$1,031	
16402 Conestoga Road	1	$1,031	
16428 Eagle Road Road	1	$1,031	
16476 Eagle Rock Road & Deer Hill Road	1	$1,031	
16481 Deer Hill Road	1	$1,031	
16490 Deer Hill Road	1	$1,031	
16506 Cresent Court	1	$1,031	
16536 Ridgecreat Court	1	$1,031	
16542 Cresent Court	1	$1,031	
16578 Hacienda Road	1	$1,031	

16603 Round Hill Ct	1	$1,031	
16910 Knollview Drive	1	$1,031	
16950 Knollview Drive	1	$1,031	
17030 Knollview Drive	1	$1,031	
17090 Knollview Drive	1	$1,031	
17221 Knollveiw Drive	1	$1,031	
17305 Knollview Drive	1	$1,031	
17398 Deer Hill Road	1	$1,031	
17496 Deer Hill Road	1	$1,031	
17524 Deer HIll Road & Sweetwater Court	1	$1,031	
17706 Deer Hill Road	1	$1,031	
17783 Deer Hill Road	1	$1,031	
17895 Deer Hill Rad	1	$1,031	
17945 Bunker Road	1	$1,031	
17986 Deer Hill Road	1	$1,031	
18042 Deer Hill Road	1	$1,031	
18057 Spyglass Road	1	$1,031	
18118 Hidden Valley Road	1	$1,031	
18121 Spyglass Road	1	$1,031	
18126 Fishhook Court	1	$1,031	
18126 Sweetwood Court	1	$1,031	
18170 Bobcat Court	1	$1,031	
18174 Hidden Valley Road	1	$1,031	
18190 Fishhook Court	1	$1,031	
18215 Tigerwood Court	1	$1,031	
18224 Deer Hollow Road	1	$1,031	
18249 Spyglass Road	1	$1,031	
18272 Hidden Valley Road	1	$1,031	
18310 Grizzley Court	1	$1,031	
18310 Pinnacle Court	1	$1,031	
18374 Hidden Valley Road	1	$1,031	
18377 Pinewood Court	1	$1,031	
18377 Spyglass Road	1	$1,031	
18378 Deer Hollow Road	1	$1,031	
18380 Grizzley Court	1	$1,031	
18438 Sweetwater Court	1	$1,031	
18474 Hidden Valley Road	1	$1,031	
18520 Hacienda Road	1	$1,031	
18540 Deer Hollow Road	1	$1,031	
18541 Sentinel Court	1	$1,031	
18553 Spyglass Road	1	$1,031	
18572 Hidden Valley Road	1	$1,031	
18606 Pine Flat Court & Little Peak Road, 09-10-29	1	$1,031	
18616 Pin Oak Court & Eagle Rock Road	2	$2,062	
18650 Maple Leaf Court	1	$1,031	
18668 Deer Hollow Road	1	$1,031	
18670 Hidden Valley Road	1	$1,031	
18678 Horseshoe Road	1	$1,031	
18690 Magnolia Court	1	$1,031	
18717 Deer Hill Road	1	$1,031	
18726 Deer Hill Road & Hidden Valley Road	1	$1,031	
18726 Hidden Valley Road	1	$1,031	

18729 Spyglass Road	1	$1,031	
18745 Fairway Point	1	$1,031	
18755 Glencove Court	1	$1,031	
18790 Horseshoe Road	1	$1,031	
18794 Deer Hill Road	1	$1,031	
18820 Timber Point Road	1	$1,031	
18828 Deer Hollow Road	1	$1,031	
18835 Lynx Court	1	$1,031	
18838 Dove Court	1	$1,031	
18846 Horseshoe Road	1	$1,031	
18862 Moon Ridge Road	1	$1,031	
18873 Spyglass Road	1	$1,031	
18905 Bear Valley Road	1	$1,031	
18918 Hidden Valley Road	1	$1,031	
18924 Deer Hollow Road	1	$1,031	
18932 Moon Ridge Road	1	$1,031	
18932 Timber Point Road	2	$2,062	
18941 Mt Meadow South	1	$1,031	
18960 Redbud Road	1	$1,031	
18965 Spyglass Road	1	$1,031	
18966 Hidden Valley Road	1	$1,031	
19018 Hidden Valley Road	1	$1,031	
19032 Moon Ridge Road	1	$1,031	
19049 Spyglass Road	1	$1,031	
19056 Redbud Road	1	$1,031	
19088 Moon Ridge Road	1	$1,031	
19112 Hidden Valley Road	1	$1,031	
19116 Gooselake Court	1	$1,031	
19151 Sweetwood Court	1	$1,031	
19152 Moon Ridge Road	1	$1,031	
19172 Moon Ridge Road	1	$1,031	
19195 Meadow Court	1	$1,031	
19204 Mt Meadow North	1	$1,031	
19242 Moon Ridge Road	1	$1,031	
19276 Mt Meadow North	1	$1,031	
19287 Mt Meadow South	1	$1,031	
19324 Donkey Hill Road	1	$1,031	
19335 Mt Meadow South	1	$1,031	
19336 Moon Ridge Road	1	$1,031	
19360 Mt Meadow North	1	$1,031	
19385 Old Creek Road	1	$1,031	
19389 Donkey Hill Road	1	$1,031	
19398 Park Ridge Road	1	$1,031	
19407 Mt Meadow South	1	$1,031	
19426 Park Ridge Road	1	$1,031	
19440 Park Ridge Road	1	$1,031	
19456 Hidden Valley Road	1	$1,031	
19456 Mt Meadow North	1	$1,031	
19464 Picture Point Court	1	$1,031	
19465 Old Creek Road	1	$1,031	
19481 Picture Point Court	1	$1,031	
19492 Moon Ridge Road	1	$1,031	

19503 Mt Meadow South	1	$1,031	
19524 Park Ridge Drive	1	$1,031	
19540 Mt Meadow North	1	$1,031	
19552 Powder Horn Road	1	$1,031	
19571 Donkey Hill Road	1	$1,031	
19575 Mt Meadow South	1	$1,031	
19575 Old Creek Road	1	$1,031	
19608 Park Ridge Drive	1	$1,031	
19614 Mt Meadow North	1	$1,031	
19625 Old Creek Road	1	$1,031	
19655 Donkey Hill Road	1	$1,031	
19664 Powder Horn Road	1	$1,031	
19671 Mt Meadow South	1	$1,031	
19674 Mt Meadow North	1	$1,031	
19675 Old Creek Court	1	$1,031	
19734 Park Hill Road	1	$1,031	
19759 Oak Flat Road	1	$1,031	
19767 Donkey Hill Road	1	$1,031	
19767 Mt Meadow South	1	$1,031	
19776 Mt Meadow North	1	$1,031	
19787 Bear Valley Road	1	$1,031	
19840 Mt Meadow South	1	$1,031	
19854 Mt Meadow North	1	$1,031	
19857 Bear Valley Road	1	$1,031	
19857 Mt Meadow South	1	$1,031	
19897 Mt Meadow South	1	$1,031	
19908 Mt Meadow North	1	$1,031	
19936 Powder Horn Road	1	$1,031	
19944 Mt Meadow North	1	$1,031	
19963 Mt Meadow South	1	$1,031	
19968 Bear Valley Road	1	$1,031	
20032 Powder Horn Road	1	$1,031	
20048 Powder Horn Road	1	$1,031	
20144 Powder Horn Road	1	$1,031	
20191 Gold Flat Court	1	$1,031	
20249 Jigsaw Road	1	$1,031	
20250 Indian Rock Road	1	$1,031	
20297 Siesta Court	1	$1,031	
20400 Powder Horn Road	1	$1,031	
20402 Powder Horn Road	1	$1,031	
20652 Powder Horn Road	1	$1,031	
20700 Powder Horn Road	1	$1,031	
20796 Powder Horn Road	1	$1,031	
20812 Powder Horn Road	1	$1,031	
20892 Powder Horn Road	1	$1,031	
20972 Powder Horn Road	1	$1,031	
21084 Powder Horn Road	1	$1,031	
21164 Powder Horn Road	1	$1,031	
21212 Mt Meadow North	1	$1,031	
Air Vac Valve	1	$1,031	
Bear Valley Road & Mt Meadow South	1	$1,031	
Boxwood Court & Firethorn Road	1	$1,031	

Bunker Road & Deer Hollow Road	1	$1,031	
Bunker Road & Spyglass Road	1	$1,031	
Conestoga Road	2	$2,062	
Conestoga Road & Deer Hill Road	3	$3,093	
Conestogar Road & Firethorn Road	2	$5,031	
Cresent Court	1	$1,031	
Cresent Court & Deer Hill Road	1	$1,031	
Deer Hill & Bunker Road	1	$1,031	
Deer Hill & Crescent Court	1	$1,031	
Deer Hill Road	1	$1,031	
Deer Hill Road & 16476 Eagle Rock Road	1	$1,031	
Deer Hill Road & Firethorn Road	1	$1,031	
Deer Hill Road & Hidden Valley Road	1	$1,031	
Deer Hollow Road & Spyglass Road	2	$2,062	
Donkey Hill Road	1	$1,031	
Donkey Hill Road & Honey Hill	1	$1,031	
Dove Court & Horseshoe Road	1	$1,031	
Eagle Rock Road	4	$4,124	
Eagle Rock Road & 18616 Pin Oak Court	1	$1,031	
Eagle Rock Road & Little Peak Road	1	$1,031	
Firethorn Road & Conestoga Road	1	$1,031	
Firethorn Road & Deer Hill Road	1	$1,031	
Fishhook	1	$1,031	
Fishhook Court & Spyglass Road	1	$1,031	
Glencove Court & Horseshoe Road	1	$1,031	
Gold Flat Court & Mt Meadow North	1	$1,031	
Gooselake Court & Horseshoe Road	1	$1,031	
Green Point Court & Spyglass Road	1	$1,031	
Grizzly Court & Donkey Hill Road	1	$1,031	
Hidden Valley Road & Deer Hill Road	1	$1,031	
Hidden Valley Road & Spyglass Road	1	$1,031	
Honey Hill & Donkey Hill Road	1	$1,031	
Horseshoe Road & Magnolia Court	1	$1,031	
Horseshoe Road & Mt Meadow South	2	$2,062	
Indian Rock Road & Powder Horn Road	1	$1,031	
Jigsaw Road & Powder Horn	1	$1,031	
Jigsaw Road & Powder Horn Road	1	$1,031	
Knollview Drive	1	$1,031	
Knollview Drive - Knollview Drive	1	$1,031	
Knollview top	2	$2,062	
Little Peak Road & Eagle Rock Road	1	$1,031	
Lower Colt Ct	1	$1,031	
Lynx Court & Powder Horn Road	1	$1,031	
Magnolia Court & Horseshoe Road	1	$1,031	
Marine View Road & Deer Hill	3	$3,093	
Meadow Court & Mt Meadow South	1	$1,031	
Mill Pond Road & Mt Meadow South	1	$1,031	
Moon Hill Court & Moon Ridge Road	1	$1,031	
Moon Ridge Road & Redbud Road	2	$2,062	
Mt Meadow North & Gold Flat	1	$1,031	
Mt Meadow South & Bear Valley Road	1	$1,031	
Mt Meadow South & Horseshoe Road	2	$2,062	

Mt Meadow South & Meadow Court	1	$1,031	
Mt Meadow South & Mill Pond Road	1	$1,031	
Mt Meadow South & Mt Meadow North	2	$2,062	
Mt Meadow South & Oak Flat Road	1	$1,031	
Mt Meadow South & Old Creek Road	1	$1,031	
Mt Medow South & Old Creek Road	1	$1,031	
Oak Flat Road & Mt Meadow South	1	$1,031	
Old Creek Court & Mt Meadow South	1	$1,031	
Old Creek Road	1	$1,031	
Old Creek Road & Mt Meadow South	2	$2,062	
Park Hill Road & Powder Horn Road	1	$1,031	
Park Hill Road & Sugarwood Court	1	$1,031	
Park Ridge Drive & Pinewood Court	2	$2,062	
Park Ridge Drive & Pinnacle Court	2	$2,062	
Picture Point Court & Donkey Hill Road	1	$1,031	
Pin Oak Court	1	$1,031	
Pine Flat Court	1	$1,031	
Pinewood Court & Park Ridge Drive	1	$1,031	
Pinnacle Court & Park Ridge Drive	2	$2,062	
Plateau Court	4	$7,093	
Powder Horn & Donkey Hill Road	1	$1,031	
Powder Horn & Jigsaw Road	1	$1,031	
Powder Horn Road & Indian Rock Road	1	$1,031	
Powder Horn Road & Park Hill Road	1	$1,031	
Powder Horn Road & Timber Point Court	1	$1,031	
Redbud Road & Moon Ridge Road	2	$2,062	
Ridgecreat Court & Deer Hill Road	1	$1,031	
Rock Ridge Court	1	$1,031	
Saddleback Court & Little Peak Road	1	$1,031	
Spyglass Road & Bunker Road	1	$1,031	
Spyglass Road & Deer Hollow Road	2	$2,062	
Spyglass Road & Hidden Valley Road	1	$1,031	
Sugarbush Court	1	$1,031	
Sugarbush Court & Firethorn Road	1	$1,031	
Tigerwood Court & Firethorn Road	2	$5,031	
Timber Point Court & Powder Horn Road	1	$1,031	
Unit 9 Gate	1	$1,031	
Upper Colt Ct	1	$1,031	
Verde Court & Old Creek Road	1	$1,031	
Vista Point Court & Moon Ridge Road	2	$2,062	
Yankee Valley Road	1	$1,031	
(blank)	371	$382,501	
Valve Total	**685**	**$715,142**	
Well			
Ag Well	1	$183,085	
Wellfield Well 2	1	$183,085	
Wellfield Well 4	1	$183,085	
Wells 3	2	$366,170	
Well Total	**5**	**$915,425**	
Water System Asset Total	**1,044**	**$7,965,082**	
Grand Total	**1,362**	**$20,063,029**	**$1,590,091**

Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Sewer Line	Force	11.2	6	90	442	$39,814
		11.3	6	90	370	$33,261
		16.0	6	90	2,161	$194,479
			10	208	2,504	$520,784
		18.0	4	70	230	$16,075
		2.0	6	90	897	$80,715
		4.0	6	90	2,629	$236,635
		(blank)	10	208	7,150	$1,487,101
	Force Total				16,382	$2,608,864
	Gravity	1.0	10	208	2,520	$524,122
			12	208	1,805	$375,453
			15	353	4,553	$1,607,239
		1.1	10	208	1,796	$373,505
		1.1.1	6	90	184	$16,523
		1.1.2	10	208	618	$128,466
		1.1.3	6	90	554	$49,900
		1.1.4	6	90	2,010	$180,922
		1.1.4.1	6	90	177	$15,899
		1.10	6	90	598	$53,855
		1.2	6	90	390	$35,123
		1.3	6	90	244	$21,974
		1.4	6	90	429	$38,569
		1.5	6	90	332	$29,849
		1.6	6	90	313	$28,140
		1.7	6	90	331	$29,815
			10	208	711	$147,879
		1.8	6	90	211	$18,975
		1.9	6	90	321	$28,874
		10.0	6	90	2,074	$186,665
		10.1	6	90	249	$22,376
		11.0	6	90	398	$35,863
			8	135	880	$118,865
		11.1	8	135	120	$16,254
		11.3	6	90	897	$80,691
		11.3.1	6	90	895	$80,577
		12.0	6	90	812	$73,084
			8	135	1,204	$162,498
			10	208	284	$59,037
		12.1	6	90	425	$38,237
		12.2	6	90	1,372	$123,503
		12.2.1	6	90	334	$30,016
		12.3	8	135	434	$58,528
		13.0	6	90	2,466	$221,897
		13.1	6	90	512	$46,041
		13.2	6	90	1,108	$99,691
		13.3	6	90	1,459	$131,274
		13.4	6	90	734	$66,019
		14.0	6	90	703	$63,313
		14.1	6	90	991	$89,152
		15.0	6	90	1,557	$140,141
		18.0	6	90	1,977	$177,936
		18.1	6	90	2,506	$225,510
		2.0	6	90	1,430	$128,686
			8	135	2,510	$338,880
		2.1	6	90	742	$66,792
		2.2	6	90	2,124	$191,152
			8	135	1,296	$174,938
		2.2.1	6	90	1,116	$100,401
		2.2.2	6	90	216	$19,401
		2.3	6	90	834	$75,070

		2.3.1	6	90	171	$15,407
		3.0	6	90	2,561	$230,509
		3.1	6	90	647	$58,197
		3.1.1	6	90	204	$18,354
		3.2	6	90	668	$60,129
		3.3	6	90	556	$50,061
		4.0	6	90	705	$63,490
			8	135	4,004	$540,581
			10	208	72	$14,899
		4.1	6	90	328	$29,484
		4.2	6	90	324	$29,148
		4.3	6	90	247	$22,211
		5.0	6	90	2,415	$217,356
		5.1	6	90	453	$40,802
		5.1.1	6	90	258	$23,239
		5.2	6	90	163	$14,637
		6.0	4	70	1,355	$94,844
		6.1	6	90	1,281	$115,266
		6.1.1	4	70	156	$10,922
		7.0	6	90	1,622	$145,959
		7.1	6	90	1,377	$123,946
		8.0	6	90	3,681	$331,296
		8.1	4	70	745	$52,178
		8.1.1	4	70	1,402	$98,157
		9.0	6	90	930	$83,742
			8	135	1,193	$161,122
			10	208	441	$91,732
		9.1	6	90	293	$26,384
		9.2	6	90	1,117	$100,538
		9.2.1	4	70	515	$36,033
		9.2.1.1	4	70	630	$44,123
		9.2.1.2	4	70	299	$20,902
		9.3	8	135	546	$73,739
		9.4	4	70	933	$65,313
		9.5	4	70	777	$54,375
			6	90	378	$34,048
		9.5.1	4	70	146	$10,191
		9.5.2	4	70	32	$2,261
		9.5.3	4	70	811	$56,792
		9.6	4	70	839	$58,709
		A	6	90	101	$9,058
		(blank)	15	353	28	$9,726
	Gravity Total				88,156	$10,487,426
	Unknown	(blank)	4	70	226	$15,798
	Unknown Total				226	$15,798
Sewer Line Total					104,764	$13,112,087
Reclaimed Water Line	Unknown	Mainline Replacement		208	9,354	$1,945,565
		Soils Stabilization		208	5,144	$1,069,911
		Zone intertie		208	1,352	$281,165
		(blank)		208	8,309	$1,728,316
	Unknown Total				24,158	$5,024,958
Reclaimed Water Line Total					24,158	$5,024,958
Grand Total					**128,922**	**$18,137,045**

	HVLCSD Assets						
Dam Inundation Area	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Bar X Ranch Reservoir # 2	Sewer Line	Force	(blank)	10	208	370	$76,870
		Force Total				370	
	Sewer Line Total					370	
	Reclaimed Water Line	Unknown	(blank)		208	17	$3,520
		Unknown Total				17	
	Reclaimed Water Line Total					17	
Bar X Ranch Reservoir # 2 Total						386	
Grand Total						**386**	**$80,389**

HVLCSD Assets			
Dam Inundation Area / Asset	Asset Count	Asset Value	Content Value
Coyote Creek			
Land Asset			
Parcel			
141-033-01	1	$10,000	
141-231-02	1		
141-611-03	1	$15,000	
141-611-07	1	$250,000	
141-732-01	1	$9,000	
Parcel Total	5	$284,000	
Land Asset Total	**5**	**$284,000**	
General Asset			
Building			
Flood Control Pump Station	1	$52,310	$103,820
Water Plant	1	$166,346	$487,954
Building Total	2	$218,656	$591,774
General Asset Total	**2**	**$218,656**	**$591,774**
Sewer System Asset			
Generator			
Generator - Flood Control Basin	1	$125,544	
Generator - Lift Station 1	1	$172,000	
Generator - Lift Station 2	1	$62,772	
Generator - Lift Station 3	1	$62,772	
Generator - Lift Station Hardesters	1	$62,772	
Generator Total	5	$485,860	
Manhole			
(blank)	86	$100,534	
Manhole Total	86	$100,534	
Sewer Pumps			
Lift Station #1	3	$193,500	
Lift Station #2	3	$37,500	
Lift Station #3	3	$37,500	
Lift Station Hardesters	2	$14,000	
Sewer Pumps Total	11	$282,500	
Sewer System Asset Total	**102**	**$868,894**	
Water System Asset			
Hydrant			
(blank)	67	$156,110	
Hydrant Total	67	$156,110	
Pump			
Water Treatment Plant 102	1	$18,200	
Water Treatment Plant 103	1	$18,200	
Pump Total	2	$36,400	
Valve			
17945 Bunker Road	1	$1,031	
18057 Spyglass Road	1	$1,031	
18118 Hidden Valley Road	1	$1,031	
18121 Spyglass Road	1	$1,031	
18126 Fishhook Court	1	$1,031	
18174 Hidden Valley Road	1	$1,031	
18190 Fishhook Court	1	$1,031	

18224 Deer Hollow Road	1	$1,031	
18249 Spyglass Road	1	$1,031	
18272 Hidden Valley Road	1	$1,031	
18374 Hidden Valley Road	1	$1,031	
18377 Spyglass Road	1	$1,031	
18378 Deer Hollow Road	1	$1,031	
18474 Hidden Valley Road	1	$1,031	
18540 Deer Hollow Road	1	$1,031	
18553 Spyglass Road	1	$1,031	
18668 Deer Hollow Road	1	$1,031	
18678 Horseshoe Road	1	$1,031	
18690 Magnolia Court	1	$1,031	
18729 Spyglass Road	1	$1,031	
18755 Glencove Court	1	$1,031	
18790 Horseshoe Road	1	$1,031	
18828 Deer Hollow Road	1	$1,031	
18838 Dove Court	1	$1,031	
18846 Horseshoe Road	1	$1,031	
18873 Spyglass Road	1	$1,031	
18965 Spyglass Road	1	$1,031	
19116 Gooselake Court	1	$1,031	
19195 Meadow Court	1	$1,031	
19287 Mt Meadow South	1	$1,031	
19335 Mt Meadow South	1	$1,031	
19360 Mt Meadow North	1	$1,031	
19385 Old Creek Road	1	$1,031	
19465 Old Creek Road	1	$1,031	
19614 Mt Meadow North	1	$1,031	
19671 Mt Meadow South	1	$1,031	
19674 Mt Meadow North	1	$1,031	
19675 Old Creek Court	1	$1,031	
19767 Mt Meadow South	1	$1,031	
19787 Bear Valley Road	1	$1,031	
19840 Mt Meadow South	1	$1,031	
19857 Mt Meadow South	1	$1,031	
19897 Mt Meadow South	1	$1,031	
19944 Mt Meadow North	1	$1,031	
19963 Mt Meadow South	1	$1,031	
19968 Bear Valley Road	1	$1,031	
20191 Gold Flat Court	1	$1,031	
21212 Mt Meadow North	1	$1,031	
Air Vac Valve	1	$1,031	
Bear Valley Road & Mt Meadow South	1	$1,031	
Bunker Road & Deer Hollow Road	1	$1,031	
Bunker Road & Spyglass Road	1	$1,031	
Deer Hill & Bunker Road	1	$1,031	
Deer Hollow Road & Spyglass Road	1	$1,031	
Dove Court & Horseshoe Road	1	$1,031	
Fishhook	1	$1,031	
Fishhook Court & Spyglass Road	1	$1,031	
Glencove Court & Horseshoe Road	1	$1,031	
Gold Flat Court & Mt Meadow North	1	$1,031	

Gooselake Court & Horseshoe Road	1	$1,031	
Green Point Court & Spyglass Road	1	$1,031	
Hidden Valley Road & Spyglass Road	1	$1,031	
Horseshoe Road & Magnolia Court	1	$1,031	
Magnolia Court & Horseshoe Road	1	$1,031	
Meadow Court & Mt Meadow South	1	$1,031	
Mt Meadow North & Gold Flat	1	$1,031	
Mt Meadow South & Bear Valley Road	1	$1,031	
Mt Meadow South & Meadow Court	1	$1,031	
Mt Meadow South & Mt Meadow North	2	$2,062	
Mt Meadow South & Oak Flat Road	1	$1,031	
Mt Meadow South & Old Creek Road	1	$1,031	
Mt Medow South & Old Creek Road	1	$1,031	
Oak Flat Road & Mt Meadow South	1	$1,031	
Old Creek Court & Mt Meadow South	1	$1,031	
Old Creek Road	1	$1,031	
Old Creek Road & Mt Meadow South	2	$2,062	
Spyglass Road & Bunker Road	1	$1,031	
Spyglass Road & Deer Hollow Road	1	$1,031	
Spyglass Road & Hidden Valley Road	1	$1,031	
(blank)	43	$44,333	
Valve Total	124	$127,844	
Water System Asset Total	**193**	**$320,354**	
Coyote Creek Total	**302**	**$1,691,904**	**$591,774**
Grand Total	**302**	**$1,691,904**	**$591,774**

	HVLCSD Assets						
Dam Inundation Area	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Coyote Creek	Sewer Line	Force	2.0	6	90	897	$80,715
			4.0	6	90	2,460	$221,404
			(blank)	10	208	1,590	$330,745
		Force Total				4,947	
		Gravity	1.0	12	208	337	$70,053
				15	353	3,106	$1,096,353
			1.1	10	208	1,398	$290,882
			1.1.1	6	90	184	$16,523
			1.1.3	6	90	554	$49,900
			1.1.4	6	90	1,081	$97,314
			1.1.4.1	6	90	177	$15,899
			1.2	6	90	390	$35,123
			1.3	6	90	244	$21,974
			1.4	6	90	429	$38,569
			1.5	6	90	332	$29,849
			1.6	6	90	313	$28,140
			1.7	6	90	84	$7,593
				10	208	711	$147,879
			2.0	6	90	1,430	$128,686
				8	135	2,510	$338,880
			2.1	6	90	435	$39,131
			2.2	6	90	2,124	$191,152
				8	135	1,296	$174,938
			2.2.1	6	90	536	$48,212
			2.2.2	6	90	216	$19,401
			2.3	6	90	834	$75,070
			2.3.1	6	90	171	$15,407
			3.0	6	90	2,204	$198,328
			3.1	6	90	348	$31,338
			3.1.1	6	90	204	$18,354
			3.2	6	90	668	$60,129
			3.3	6	90	415	$37,323
			4.0	6	90	705	$63,490
				8	135	2,030	$274,008
				10	208	72	$14,899
			4.1	6	90	328	$29,484
			8.0	6	90	3,511	$315,989
			8.1	4	70	47	$3,286
		Gravity Total				29,422	
		Unknown	(blank)	4	70	226	$15,798
		Unknown Total				226	
	Sewer Line Total					34,594	
	Reclaimed Water Line	Unknown	Soils Stabilizatior		208	231	$48,069
			(blank)		208	2,240	$465,943
		Unknown Total				2,471	
	Reclaimed Water Line Total					2,471	
Coyote Creek Total						37,066	
Grand Total						**37,066**	**$5,186,228**

HVLCSD Assets			
Flood Zone Zone / Asset	Asset Count	Asset Value	Content Value
1% Annual Chance Flood Hazard			
Zone AE			
Land Asset			
Parcel			
141-311-25	1	$130,000	
141-611-03	1	$15,000	
141-611-07	1	$250,000	
141-732-01	1	$9,000	
Parcel Total	**4**	**$404,000**	
Land Asset Total	4	$404,000	
General Asset			
Building			
Flood Control Pump Station	1	$52,310	$103,820
Hidden Valley Lake Community Services District	1	$480,342	$285,697
Water Plant	1	$166,346	$487,954
Building Total	**3**	**$698,998**	**$877,471**
General Asset Total	3	$698,998	$877,471
Sewer System Asset			
Generator			
Generator - Lift Station 2	1	$62,772	
Generator Total	**1**	**$62,772**	
Manhole			
(blank)	31	$36,239	
Manhole Total	**31**	**$36,239**	
Sewer Pumps			
Lift Station #2	3	$37,500	
Sewer Pumps Total	**3**	**$37,500**	
Sewer System Asset Total	35	$136,511	
Water System Asset			
Generator			
Water Treatment Plant	1	$220,388	
Generator Total	**1**	**$220,388**	
Hydrant			
(blank)	21	$48,930	
Hydrant Total	**21**	**$48,930**	
Pump			
Water Treatment Plant 101	1	$18,200	
Water Treatment Plant 102	1	$18,200	
Water Treatment Plant 103	1	$18,200	
Water Treatment Plant 401	1	$7,300	
Water Treatment Plant 402	1	$7,300	
Water Treatment Plant 403	1	$17,300	
Pump Total	**6**	**$86,500**	
Tank			
Detention tank	1	$122,405	
Tank Total	**1**	**$122,405**	
Valve			
18057 Spyglass Road	1	$1,031	
18121 Spyglass Road	1	$1,031	
18126 Fishhook Court	1	$1,031	

18729 Spyglass Road	1	$1,031	
18873 Spyglass Road	1	$1,031	
18905 Bear Valley Road	1	$1,031	
18941 Mt Meadow South	1	$1,031	
19671 Mt Meadow South	1	$1,031	
19767 Mt Meadow South	1	$1,031	
19787 Bear Valley Road	1	$1,031	
19840 Mt Meadow South	1	$1,031	
19857 Bear Valley Road	1	$1,031	
19857 Mt Meadow South	1	$1,031	
19897 Mt Meadow South	1	$1,031	
19908 Mt Meadow North	1	$1,031	
19944 Mt Meadow North	1	$1,031	
19963 Mt Meadow South	1	$1,031	
19968 Bear Valley Road	1	$1,031	
20191 Gold Flat Court	1	$1,031	
Bear Valley Road & Mt Meadow South	1	$1,031	
Fishhook Court & Spyglass Road	1	$1,031	
Gold Flat Court & Mt Meadow North	1	$1,031	
Mill Pond Road & Mt Meadow South	1	$1,031	
Mt Meadow North & Gold Flat	1	$1,031	
Mt Meadow South & Bear Valley Road	1	$1,031	
Mt Meadow South & Mill Pond Road	1	$1,031	
Mt Meadow South & Oak Flat Road	1	$1,031	
Oak Flat Road & Mt Meadow South	1	$1,031	
(blank)	20	$20,620	
Valve Total	**48**	**$49,488**	
Water System Asset Total	77	$527,711	
Zone AE Total	**119**	**$1,767,220**	**$877,471**
Zone AE Floodway			
Land Asset			
Parcel			
141-361-03	1	$5,000	
Parcel Total	**1**	**$5,000**	
Land Asset Total	1	$5,000	
Sewer System Asset			
Manhole			
(blank)	1	$1,169	
Manhole Total	**1**	**$1,169**	
Sewer System Asset Total	1	$1,169	
Water System Asset			
Hydrant			
(blank)	1	$2,330	
Hydrant Total	**1**	**$2,330**	
Valve			
18190 Fishhook Court	1	$1,031	
Valve Total	**1**	**$1,031**	
Water System Asset Total	2	$3,361	
Zone AE Floodway Total	**4**	**$9,530**	
1% Annual Chance Flood Hazard Total	**123**	**$1,776,750**	**$877,471**
0.2% Annual Chance Flood Hazard			
Zone X (shaded)			

Sewer System Asset			
Generator			
Generator - Lift Station 1	1	$172,000	
Generator Total	**1**	**$172,000**	
Manhole			
(blank)	10	$11,690	
Manhole Total	**10**	**$11,690**	
Sewer Pumps			
Lift Station #1	3	$193,500	
Sewer Pumps Total	**3**	**$193,500**	
Sewer System Asset Total	14	$377,190	
Water System Asset			
Hydrant			
(blank)	8	$18,640	
Hydrant Total	**8**	**$18,640**	
Valve			
18126 Sweetwood Court	1	$1,031	
18755 Glencove Court	1	$1,031	
18838 Dove Court	1	$1,031	
19116 Gooselake Court	1	$1,031	
19456 Hidden Valley Road	1	$1,031	
19675 Old Creek Court	1	$1,031	
19759 Oak Flat Road	1	$1,031	
19854 Mt Meadow North	1	$1,031	
Glencove Court & Horseshoe Road	1	$1,031	
Horseshoe Road & Magnolia Court	1	$1,031	
Magnolia Court & Horseshoe Road	1	$1,031	
Valve Total	**11**	**$11,341**	
Water System Asset Total	19	$29,981	
Zone X (shaded) Total	**33**	**$407,171**	
0.2% Annual Chance Flood Hazard Total	**33**	**$407,171**	
Other Areas			
Zone X (unshaded)			
Land Asset			
Parcel			
013-060-05	1	$125,000	
014-270-10	1	$900,000	
014-280-19	1	$1,000,000	
141-033-01	1	$10,000	
141-081-27	1	$8,000	
141-231-02	1		
141-411-28	1	$10,000	
141-451-21	1		
142-113-01	1	$6,000	
142-301-01	1		
142-363-23	1	$7,000	
142-401-07	1	$5,000	
144-011-02	1	$95,000	
144-011-04	1	$125,000	
144-011-09	1	$65,000	
Parcel Total	**15**	**$2,356,000**	
Land Asset Total	15	$2,356,000	

General Asset			
Building			
Greenridge Pump Station	1	$131,403	$183,138
Maintenance Building	1	$684,894	$311,460
Storage	1	$102,557	
Unit 9 Pump Station	1	$52,310	$218,022
Waste Water Treatment Plant	1	$5,825,227	
Building Total	**5**	**$6,796,391**	**$712,620**
General Asset Total	5	$6,796,391	$712,620
Sewer System Asset			
Generator			
Generator - Flood Control Basin	1	$125,544	
Generator - Lift Station 3	1	$62,772	
Generator - Lift Station 4	1	$104,620	
Generator - Lift Station 5	1	$62,772	
Generator - Lift Station 6	1	$62,772	
Generator - Lift Station 7	1	$62,772	
Generator - Lift Station Hardesters	1	$62,772	
Generator - WWTP Lab	1	$251,088	
Generator Total	**8**	**$795,112**	
Manhole			
(blank)	204	$238,476	
Manhole Total	**204**	**$238,476**	
Sewer Pumps			
400s	2	$18,000	
500s	4	$4,800	
600s	2	$20,000	
700s	2	$32,000	
800s	2	$21,500	
Lift Station #3	3	$37,500	
Lift Station #4	3	$37,500	
Lift Station #5	3	$52,500	
Lift Station #6	3	$37,500	
Lift Station #7	2	$13,800	
Lift Station Hardesters	2	$14,000	
Sewer Pumps Total	**28**	**$289,100**	
Sewer System Asset Total	240	$1,322,688	
Water System Asset			
Generator			
Greenridge Booster pump station	1	$160,776	
Generator Total	**1**	**$160,776**	
Hydrant			
(blank)	286	$666,380	
Hydrant Total	**286**	**$666,380**	
PRV			
16128 Eagle Rock Road	1	$5,609	
16329 Eagle Rock Road	1	$5,609	
17028 Spruce Grove Road	1	$5,609	
17972 Deer Hill Road	1	$5,609	
18317 North Shore Drive	1	$5,609	
18496 Kentwood Pl	1	$5,609	
18535 Glenwood Road	1	$5,609	

18726 Hidden Valley Road	1	$5,609	
19152 Redbud Rd	1	$5,609	
19895 Donkey Hill Road	1	$5,609	
Unknown	1	$5,609	
(blank)	1	$5,609	
PRV Total	**12**	**$67,308**	
Pump			
Ag Well	1	$183,085	
Greenridge 501	1	$10,400	
Greenridge 502	1	$10,400	
Unit 9 901	1	$11,450	
Unit 9 902	1	$11,450	
Unit 9 903	1	$11,450	
Water Treatment Plant - Well 2 - Wellfield	1	$183,085	
Well 3	1	$183,085	
Wellfield TP Booster	1	$20,000	
Wellfield Well 4	1	$183,085	
Pump Total	**10**	**$807,490**	
Tank			
Little Peak storage tank	1	$436,265	
Tank 1a	1	$146,468	
Tank 1b	1	$174,715	
Tank 1c	1	$436,265	
Tank 4a	1	$1,300,000	
Tank 4b	1	$436,265	
Unit 9 Storage Tank	1	$1,203,390	
Tank Total	**7**	**$4,133,368**	
Valve			
15603 Eagle Rock Road	1	$1,031	
15605 Little Peak Road	1	$1,031	
15653 Little Peak Road	1	$1,031	
15717 Little Peak Road	1	$1,031	
15783 Eagle Rock	1	$1,031	
15822 Little Peak Road & Sentinel Court, 09-10-37	1	$1,031	
15868 Littel Peak Road	1	$1,031	
15989 Eagle Rock Road	1	$1,031	
16038 Conestoga Road	1	$1,031	
16041 Eagle Rock Road	1	$1,031	
16116 Conestoga Road	1	$1,031	
16121 Eagel Rock Road	3	$3,093	
16136 Eagle Rock Road	1	$1,031	
16176 Eagle Rock Road	1	$1,031	
16184 Eagle Rock Road	1	$1,031	
16193 Eagle Rock Road	1	$1,031	
16198 Conestoga Road	1	$1,031	
16236 Eagle Rock Road	1	$1,031	
16273 Firethorn Road	1	$1,031	
16284 Eagle Rock Road	1	$1,031	
16290 Conestoga Road	1	$1,031	
16329 Eagle Rock Road	1	$1,031	
16345 Eagle Rock Road	1	$1,031	
16369 Eagle Rock Road	1	$1,031	

16369 Firethorn Road	1	$1,031	
16385 Eagle Rock Road	1	$1,031	
16402 Conestoga Road	1	$1,031	
16428 Eagle Road Road	1	$1,031	
16476 Eagle Rock Road & Deer Hill Road	1	$1,031	
16481 Deer Hill Road	1	$1,031	
16490 Deer Hill Road	1	$1,031	
16506 Cresent Court	1	$1,031	
16536 Ridgecreat Court	1	$1,031	
16542 Cresent Court	1	$1,031	
16578 Hacienda Road	1	$1,031	
16603 Round Hill Ct	1	$1,031	
16910 Knollview Drive	1	$1,031	
16950 Knollview Drive	1	$1,031	
17030 Knollview Drive	1	$1,031	
17090 Knollview Drive	1	$1,031	
17221 Knollveiw Drive	1	$1,031	
17305 Knollview Drive	1	$1,031	
17398 Deer Hill Road	1	$1,031	
17496 Deer Hill Road	1	$1,031	
17524 Deer HIll Road & Sweetwater Court	1	$1,031	
17706 Deer Hill Road	1	$1,031	
17783 Deer Hill Road	1	$1,031	
17895 Deer Hill Rad	1	$1,031	
17945 Bunker Road	1	$1,031	
17986 Deer Hill Road	1	$1,031	
18042 Deer Hill Road	1	$1,031	
18118 Hidden Valley Road	1	$1,031	
18170 Bobcat Court	1	$1,031	
18174 Hidden Valley Road	1	$1,031	
18215 Tigerwood Court	1	$1,031	
18224 Deer Hollow Road	1	$1,031	
18249 Spyglass Road	1	$1,031	
18272 Hidden Valley Road	1	$1,031	
18310 Grizzley Court	1	$1,031	
18310 Pinnacle Court	1	$1,031	
18374 Hidden Valley Road	1	$1,031	
18377 Pinewood Court	1	$1,031	
18377 Spyglass Road	1	$1,031	
18378 Deer Hollow Road	1	$1,031	
18380 Grizzley Court	1	$1,031	
18438 Sweetwater Court	1	$1,031	
18474 Hidden Valley Road	1	$1,031	
18520 Hacienda Road	1	$1,031	
18540 Deer Hollow Road	1	$1,031	
18541 Sentinel Court	1	$1,031	
18553 Spyglass Road	1	$1,031	
18572 Hidden Valley Road	1	$1,031	
18606 Pine Flat Court & Little Peak Road, 09-10-29	1	$1,031	
18616 Pin Oak Court & Eagle Rock Road	2	$2,062	
18650 Maple Leaf Court	1	$1,031	
18668 Deer Hollow Road	1	$1,031	

18670 Hidden Valley Road	1	$1,031	
18678 Horseshoe Road	1	$1,031	
18690 Magnolia Court	1	$1,031	
18717 Deer Hill Road	1	$1,031	
18726 Deer Hill Road & Hidden Valley Road	1	$1,031	
18726 Hidden Valley Road	1	$1,031	
18745 Fairway Point	1	$1,031	
18790 Horseshoe Road	1	$1,031	
18794 Deer Hill Road	1	$1,031	
18820 Timber Point Road	1	$1,031	
18828 Deer Hollow Road	1	$1,031	
18835 Lynx Court	1	$1,031	
18846 Horseshoe Road	1	$1,031	
18862 Moon Ridge Road	1	$1,031	
18918 Hidden Valley Road	1	$1,031	
18924 Deer Hollow Road	1	$1,031	
18932 Moon Ridge Road	1	$1,031	
18932 Timber Point Road	2	$2,062	
18960 Redbud Road	1	$1,031	
18965 Spyglass Road	1	$1,031	
18966 Hidden Valley Road	1	$1,031	
19018 Hidden Valley Road	1	$1,031	
19032 Moon Ridge Road	1	$1,031	
19049 Spyglass Road	1	$1,031	
19056 Redbud Road	1	$1,031	
19088 Moon Ridge Road	1	$1,031	
19112 Hidden Valley Road	1	$1,031	
19151 Sweetwood Court	1	$1,031	
19152 Moon Ridge Road	1	$1,031	
19172 Moon Ridge Road	1	$1,031	
19195 Meadow Court	1	$1,031	
19204 Mt Meadow North	1	$1,031	
19242 Moon Ridge Road	1	$1,031	
19276 Mt Meadow North	1	$1,031	
19287 Mt Meadow South	1	$1,031	
19324 Donkey Hill Road	1	$1,031	
19335 Mt Meadow South	1	$1,031	
19336 Moon Ridge Road	1	$1,031	
19360 Mt Meadow North	1	$1,031	
19385 Old Creek Road	1	$1,031	
19389 Donkey Hill Road	1	$1,031	
19398 Park Ridge Road	1	$1,031	
19407 Mt Meadow South	1	$1,031	
19426 Park Ridge Road	1	$1,031	
19440 Park Ridge Road	1	$1,031	
19456 Mt Meadow North	1	$1,031	
19464 Picture Point Court	1	$1,031	
19465 Old Creek Road	1	$1,031	
19481 Picture Point Court	1	$1,031	
19492 Moon Ridge Road	1	$1,031	
19503 Mt Meadow South	1	$1,031	
19524 Park Ridge Drive	1	$1,031	

19540 Mt Meadow North	1	$1,031	
19552 Powder Horn Road	1	$1,031	
19571 Donkey Hill Road	1	$1,031	
19575 Mt Meadow South	1	$1,031	
19575 Old Creek Road	1	$1,031	
19608 Park Ridge Drive	1	$1,031	
19614 Mt Meadow North	1	$1,031	
19625 Old Creek Road	1	$1,031	
19655 Donkey Hill Road	1	$1,031	
19664 Powder Horn Road	1	$1,031	
19674 Mt Meadow North	1	$1,031	
19734 Park Hill Road	1	$1,031	
19767 Donkey Hill Road	1	$1,031	
19776 Mt Meadow North	1	$1,031	
19936 Powder Horn Road	1	$1,031	
20032 Powder Horn Road	1	$1,031	
20048 Powder Horn Road	1	$1,031	
20144 Powder Horn Road	1	$1,031	
20249 Jigsaw Road	1	$1,031	
20250 Indian Rock Road	1	$1,031	
20297 Siesta Court	1	$1,031	
20400 Powder Horn Road	1	$1,031	
20402 Powder Horn Road	1	$1,031	
20652 Powder Horn Road	1	$1,031	
20700 Powder Horn Road	1	$1,031	
20796 Powder Horn Road	1	$1,031	
20812 Powder Horn Road	1	$1,031	
20892 Powder Horn Road	1	$1,031	
20972 Powder Horn Road	1	$1,031	
21084 Powder Horn Road	1	$1,031	
21164 Powder Horn Road	1	$1,031	
21212 Mt Meadow North	1	$1,031	
Air Vac Valve	1	$1,031	
Boxwood Court & Firethorn Road	1	$1,031	
Bunker Road & Deer Hollow Road	1	$1,031	
Bunker Road & Spyglass Road	1	$1,031	
Conestoga Road	2	$2,062	
Conestoga Road & Deer Hill Road	3	$3,093	
Conestogar Road & Firethorn Road	2	$5,031	
Cresent Court	1	$1,031	
Cresent Court & Deer Hill Road	1	$1,031	
Deer Hill & Bunker Road	1	$1,031	
Deer Hill & Crescent Court	1	$1,031	
Deer Hill Road	1	$1,031	
Deer Hill Road & 16476 Eagle Rock Road	1	$1,031	
Deer Hill Road & Firethorn Road	1	$1,031	
Deer Hill Road & Hidden Valley Road	1	$1,031	
Deer Hollow Road & Spyglass Road	2	$2,062	
Donkey Hill Road	1	$1,031	
Donkey Hill Road & Honey Hill	1	$1,031	
Dove Court & Horseshoe Road	1	$1,031	
Eagle Rock Road	4	$4,124	

Eagle Rock Road & 18616 Pin Oak Court	1	$1,031	
Eagle Rock Road & Little Peak Road	1	$1,031	
Firethorn Road & Conestoga Road	1	$1,031	
Firethorn Road & Deer Hill Road	1	$1,031	
Fishhook	1	$1,031	
Gooselake Court & Horseshoe Road	1	$1,031	
Green Point Court & Spyglass Road	1	$1,031	
Grizzly Court & Donkey Hill Road	1	$1,031	
Hidden Valley Road & Deer Hill Road	1	$1,031	
Hidden Valley Road & Spyglass Road	1	$1,031	
Honey Hill & Donkey Hill Road	1	$1,031	
Horseshoe Road & Mt Meadow South	2	$2,062	
Indian Rock Road & Powder Horn Road	1	$1,031	
Jigsaw Road & Powder Horn	1	$1,031	
Jigsaw Road & Powder Horn Road	1	$1,031	
Knollview Drive	1	$1,031	
Knollview Drive - Knollview Drive	1	$1,031	
Knollview top	2	$2,062	
Little Peak Road & Eagle Rock Road	1	$1,031	
Lower Colt Ct	1	$1,031	
Lynx Court & Powder Horn Road	1	$1,031	
Marine View Road & Deer Hill	3	$3,093	
Meadow Court & Mt Meadow South	1	$1,031	
Moon Hill Court & Moon Ridge Road	1	$1,031	
Moon Ridge Road & Redbud Road	2	$2,062	
Mt Meadow South & Horseshoe Road	2	$2,062	
Mt Meadow South & Meadow Court	1	$1,031	
Mt Meadow South & Mt Meadow North	2	$2,062	
Mt Meadow South & Old Creek Road	1	$1,031	
Mt Medow South & Old Creek Road	1	$1,031	
Old Creek Court & Mt Meadow South	1	$1,031	
Old Creek Road	1	$1,031	
Old Creek Road & Mt Meadow South	2	$2,062	
Park Hill Road & Powder Horn Road	1	$1,031	
Park Hill Road & Sugarwood Court	1	$1,031	
Park Ridge Drive & Pinewood Court	2	$2,062	
Park Ridge Drive & Pinnacle Court	2	$2,062	
Picture Point Court & Donkey Hill Road	1	$1,031	
Pin Oak Court	1	$1,031	
Pine Flat Court	1	$1,031	
Pinewood Court & Park Ridge Drive	1	$1,031	
Pinnacle Court & Park Ridge Drive	2	$2,062	
Plateau Court	4	$7,093	
Powder Horn & Donkey Hill Road	1	$1,031	
Powder Horn & Jigsaw Road	1	$1,031	
Powder Horn Road & Indian Rock Road	1	$1,031	
Powder Horn Road & Park Hill Road	1	$1,031	
Powder Horn Road & Timber Point Court	1	$1,031	
Redbud Road & Moon Ridge Road	2	$2,062	
Ridgecreat Court & Deer Hill Road	1	$1,031	
Rock Ridge Court	1	$1,031	
Saddleback Court & Little Peak Road	1	$1,031	

Spyglass Road & Bunker Road	1	$1,031	
Spyglass Road & Deer Hollow Road	2	$2,062	
Spyglass Road & Hidden Valley Road	1	$1,031	
Sugarbush Court	1	$1,031	
Sugarbush Court & Firethorn Road	1	$1,031	
Tigerwood Court & Firethorn Road	2	$5,031	
Timber Point Court & Powder Horn Road	1	$1,031	
Unit 9 Gate	1	$1,031	
Upper Colt Ct	1	$1,031	
Verde Court & Old Creek Road	1	$1,031	
Vista Point Court & Moon Ridge Road	2	$2,062	
Yankee Valley Road	1	$1,031	
(blank)	351	$361,881	
Valve Total	**625**	**$653,282**	
Well			
Ag Well	1	$183,085	
Wellfield Well 2	1	$183,085	
Wellfield Well 4	1	$183,085	
Wells 3	2	$366,170	
Well Total	**5**	**$915,425**	
Water System Asset Total	946	$7,404,029	
Zone X (unshaded) Total	**1,206**	**$17,879,108**	**$712,620**
Other Areas Total	**1,206**	**$17,879,108**	**$712,620**
Grand Total	**1,362**	**$20,063,029**	**$1,590,091**

HVLCSD Assets

Flood Hazard Area	Flood Zone	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
1% Annual Chance Flood Hazard	Zone AE	Sewer Line	Force	2.0	6	90	646	$58,120
				4.0	6	90	2,534	$228,044
				(blank)	10	208	313	$65,033
			Force Total				3,492	
			Gravity	1.0	12	208	619	$128,830
					15	353	227	$80,140
				1.1	10	208	89	$18,445
				1.1.3	6	90	128	$11,540
				1.3	6	90	21	$1,879
				1.4	6	90	226	$20,330
				1.6	6	90	313	$28,140
				1.7	6	90	272	$24,461
					10	208	604	$125,607
				2.0	6	90	356	$32,028
					8	135	222	$29,914
				2.2	6	90	78	$7,049
					8	135	96	$13,002
				2.2.2	6	90	112	$10,104
				2.3	6	90	779	$70,132
				2.3.1	6	90	171	$15,407
				3.0	6	90	2,496	$224,671
				3.1	6	90	647	$58,197
				3.1.1	6	90	204	$18,354
				3.2	6	90	668	$60,129
				3.3	6	90	300	$27,020
				4.0	8	135	1,458	$196,826
					10	208	72	$14,899
				4.1	6	90	328	$29,484
				5.0	6	90	190	$17,071
				8.0	6	90	24	$2,119
			Gravity Total				10,699	
			Unknown	(blank)	4	70	224	$15,688
			Unknown Total				224	
		Sewer Line Total					14,415	
		Reclaimed Water Line	Unknown	Soils Stabilizatio		208	22	$4,586
				(blank)		208	578	$120,316
			Unknown Total				600	
		Reclaimed Water Line Total					600	
	Zone AE Floodway	Sewer Line	Force	(blank)	10	208	969	$201,516
			Force Total				969	
			Gravity	1.0	15	353	39	$13,726
				8.0	6	90	114	$10,234
			Gravity Total				153	
			Unknown	(blank)	4	70	2	$109
			Unknown Total				2	
		Sewer Line Total					1,123	
		Reclaimed Water Line	Unknown	Soils Stabilizatio		208	1,487	$309,266
				(blank)		208	495	$102,919
			Unknown Total				1,982	
		Reclaimed Water Line Total					1,982	
1% Annual Chance Flood Hazard Total							18,120	
0.2% Annual Chance Flood Hazard	Zone X (shaded)	Sewer Line	Force	2.0	6	90	111	$9,965
				4.0	6	90	95	$8,590
				(blank)	10	208	75	$15,597
			Force Total				281	
			Gravity	1.0	12	208	102	$21,132
					15	353	358	$126,452
				1.1	10	208	1,176	$244,580
				1.1.1	6	90	181	$16,324
				1.1.3	6	90	352	$31,666
				1.1.4	6	90	106	$9,552
				1.2	6	90	306	$27,539
				1.3	6	90	223	$20,095
				1.4	6	90	155	$13,950
				1.7	6	90	59	$5,354
					10	208	107	$22,271
				3.0	6	90	65	$5,839
				3.3	6	90	256	$23,041
				4.0	8	135	315	$42,477
				5.0	6	90	64	$5,762
				8.0	6	90	152	$13,642
			Gravity Total				3,977	
		Sewer Line Total					4,258	
		Reclaimed Water Line	Unknown	(blank)		208	230	$47,905
			Unknown Total				230	
		Reclaimed Water Line Total					230	
0.2% Annual Chance Flood Hazard Total							4,488	
Other Areas	Zone X (unshaded)	Sewer Line	Force	11.2	6	90	442	$39,814
				11.3	6	90	370	$33,261
				16.0	6	90	2,161	$194,479
					10	208	2,504	$520,784
				18.0	4	70	230	$16,075
				2.0	6	90	140	$12,630
				(blank)	10	208	5,793	$1,204,954
			Force Total				11,640	
			Gravity	1.0	10	208	2,520	$524,122
					12	208	1,084	$225,491
					15	353	3,929	$1,386,921

				1.1	10	208	531	$110,480
				1.1.1	6	90	2	$198
				1.1.2	10	208	618	$128,466
				1.1.3	6	90	74	$6,695
				1.1.4	6	90	1,904	$171,370
				1.1.4.1	6	90	177	$15,899
				1.10	6	90	598	$53,855
				1.2	6	90	84	$7,583
				1.4	6	90	48	$4,290
				1.5	6	90	332	$29,849
				1.8	6	90	211	$18,975
				1.9	6	90	321	$28,874
				10.0	6	90	2,074	$186,665
				10.1	6	90	249	$22,376
				11.0	6	90	398	$35,863
					8	135	880	$118,865
				11.1	8	135	120	$16,254
				11.3	6	90	897	$80,691
				11.3.1	6	90	895	$80,577
				12.0	6	90	812	$73,084
					8	135	1,204	$162,498
					10	208	284	$59,037
				12.1	6	90	425	$38,237
				12.2	6	90	1,372	$123,503
				12.2.1	6	90	334	$30,016
				12.3	8	135	434	$58,528
				13.0	6	90	2,466	$221,897
				13.1	6	90	512	$46,041
				13.2	6	90	1,108	$99,691
				13.3	6	90	1,459	$131,274
				13.4	6	90	734	$66,019
				14.0	6	90	703	$63,313
				14.1	6	90	991	$89,152
				15.0	6	90	1,557	$140,141
				18.0	6	90	1,977	$177,936
				18.1	6	90	2,506	$225,510
				2.0	6	90	1,074	$96,657
					8	135	2,289	$308,966
				2.1	6	90	742	$66,792
				2.2	6	90	2,046	$184,102
					8	135	1,200	$161,936
				2.2.1	6	90	1,116	$100,401
				2.2.2	6	90	103	$9,297
				2.3	6	90	55	$4,937
				4.0	6	90	705	$63,490
					8	135	2,232	$301,278
				4.2	6	90	324	$29,148
				4.3	6	90	247	$22,211
				5.0	6	90	2,161	$194,523
				5.1	6	90	453	$40,802
				5.1.1	6	90	258	$23,239
				5.2	6	90	163	$14,637
				6.0	4	70	1,355	$94,844
				6.1	6	90	1,281	$115,266
				6.1.1	4	70	156	$10,922
				7.0	6	90	1,622	$145,959
				7.1	6	90	1,377	$123,946
				8.0	6	90	3,392	$305,301
				8.1	4	70	745	$52,178
				8.1.1	4	70	1,402	$98,157
				9.0	6	90	930	$83,742
					8	135	1,193	$161,122
					10	208	441	$91,732
				9.1	6	90	293	$26,384
				9.2	6	90	1,117	$100,538
				9.2.1	4	70	515	$36,033
				9.2.1.1	4	70	630	$44,123
				9.2.1.2	4	70	299	$20,902
				9.3	8	135	546	$73,739
				9.4	4	70	933	$65,313
				9.5	4	70	777	$54,375
					6	90	378	$34,048
				9.5.1	4	70	146	$10,191
				9.5.2	4	70	32	$2,261
				9.5.3	4	70	811	$56,792
				9.6	4	70	839	$58,709
				A	6	90	101	$9,058
				(blank)	15	353	28	$9,726
			Gravity Total				73,328	
		Sewer Line Total					84,967	
		Reclaimed Water Line	Unknown	Mainline Replac		208	9,354	$1,945,565
				Soils Stabilizatio		208	3,635	$756,058
				Zone intertie		208	1,352	$281,165
				(blank)		208	7,006	$1,457,177
			Unknown Total				21,346	
		Reclaimed Water Line Total					21,346	
Other Areas Total							106,313	
Grand Total							**128,922**	**$18,137,045**

HVLCSD Assets			
Fire Hazard Severity Zone / Asset	Asset Count	Asset Value	Content Value
Very High			
Land Asset			
Parcel			
013-060-05	1	$125,000	
014-280-19	1	$1,000,000	
141-033-01	1	$10,000	
141-081-27	1	$8,000	
141-231-02	1		
141-311-25	1	$130,000	
141-361-03	1	$5,000	
141-411-28	1	$10,000	
141-451-21	1		
142-301-01	1		
142-363-23	1	$7,000	
142-401-07	1	$5,000	
144-011-02	1	$95,000	
144-011-04	1	$125,000	
144-011-09	1	$65,000	
Parcel Total	15	$1,585,000	
Land Asset Total	**15**	**$1,585,000**	
General Asset			
Building			
Greenridge Pump Station	1	$131,403	$183,138
Hidden Valley Lake Community Services District	1	$480,342	$285,697
Maintenance Building	1	$684,894	$311,460
Storage	1	$102,557	
Waste Water Treatment Plant	1	$5,825,227	
Water Plant	1	$166,346	$487,954
Building Total	6	$7,390,769	$1,268,249
General Asset Total	**6**	**$7,390,769**	**$1,268,249**
Sewer System Asset			
Generator			
Generator - Lift Station 5	1	$62,772	
Generator - Lift Station 7	1	$62,772	
Generator - Lift Station Hardesters	1	$62,772	
Generator - WWTP Lab	1	$251,088	
Generator Total	4	$439,404	
Manhole			
(blank)	152	$177,688	
Manhole Total	152	$177,688	
Sewer Pumps			
400s	2	$18,000	
500s	4	$4,800	
700s	2	$32,000	
800s	2	$21,500	
Lift Station #5	3	$52,500	
Lift Station #7	2	$13,800	
Lift Station Hardesters	2	$14,000	
Sewer Pumps Total	17	$156,600	
Sewer System Asset Total	**173**	**$773,692**	

Water System Asset			
Generator			
Water Treatment Plant	1	$220,388	
Generator Total	1	$220,388	
Hydrant			
(blank)	228	$531,240	
Hydrant Total	228	$531,240	
PRV			
16128 Eagle Rock Road	1	$5,609	
16329 Eagle Rock Road	1	$5,609	
17028 Spruce Grove Road	1	$5,609	
17972 Deer Hill Road	1	$5,609	
18317 North Shore Drive	1	$5,609	
18535 Glenwood Road	1	$5,609	
18726 Hidden Valley Road	1	$5,609	
19152 Redbud Rd	1	$5,609	
19895 Donkey Hill Road	1	$5,609	
Unknown	1	$5,609	
(blank)	1	$5,609	
PRV Total	11	$61,699	
Pump			
Unit 9 901	1	$11,450	
Unit 9 902	1	$11,450	
Unit 9 903	1	$11,450	
Water Treatment Plant 101	1	$18,200	
Water Treatment Plant 102	1	$18,200	
Water Treatment Plant 103	1	$18,200	
Water Treatment Plant 401	1	$7,300	
Water Treatment Plant 402	1	$7,300	
Water Treatment Plant 403	1	$17,300	
Pump Total	9	$120,850	
Tank			
Detention tank	1	$122,405	
Little Peak storage tank	1	$436,265	
Tank 1a	1	$146,468	
Tank 1b	1	$174,715	
Tank 1c	1	$436,265	
Tank 4a	1	$1,300,000	
Tank 4b	1	$436,265	
Unit 9 Storage Tank	1	$1,203,390	
Tank Total	8	$4,255,773	
Valve			
15603 Eagle Rock Road	1	$1,031	
15605 Little Peak Road	1	$1,031	
15653 Little Peak Road	1	$1,031	
15717 Little Peak Road	1	$1,031	
15783 Eagle Rock	1	$1,031	
15822 Little Peak Road & Sentinel Court, 09-10-37	1	$1,031	
15868 Littel Peak Road	1	$1,031	
15989 Eagle Rock Road	1	$1,031	
16041 Eagle Rock Road	1	$1,031	
16121 Eagel Rock Road	3	$3,093	

16136 Eagle Rock Road	1	$1,031	
16176 Eagle Rock Road	1	$1,031	
16184 Eagle Rock Road	1	$1,031	
16193 Eagle Rock Road	1	$1,031	
16236 Eagle Rock Road	1	$1,031	
16284 Eagle Rock Road	1	$1,031	
16329 Eagle Rock Road	1	$1,031	
16345 Eagle Rock Road	1	$1,031	
16369 Eagle Rock Road	1	$1,031	
16369 Firethorn Road	1	$1,031	
16385 Eagle Rock Road	1	$1,031	
16428 Eagle Road Road	1	$1,031	
16476 Eagle Rock Road & Deer Hill Road	1	$1,031	
16481 Deer Hill Road	1	$1,031	
16490 Deer Hill Road	1	$1,031	
16506 Cresent Court	1	$1,031	
16536 Ridgecreat Court	1	$1,031	
16542 Cresent Court	1	$1,031	
16578 Hacienda Road	1	$1,031	
16603 Round Hill Ct	1	$1,031	
16910 Knollview Drive	1	$1,031	
16950 Knollview Drive	1	$1,031	
17030 Knollview Drive	1	$1,031	
17090 Knollview Drive	1	$1,031	
17221 Knollveiw Drive	1	$1,031	
17305 Knollview Drive	1	$1,031	
17398 Deer Hill Road	1	$1,031	
17496 Deer Hill Road	1	$1,031	
17524 Deer HIll Road & Sweetwater Court	1	$1,031	
17706 Deer Hill Road	1	$1,031	
17783 Deer Hill Road	1	$1,031	
17895 Deer Hill Rad	1	$1,031	
17986 Deer Hill Road	1	$1,031	
18042 Deer Hill Road	1	$1,031	
18118 Hidden Valley Road	1	$1,031	
18126 Sweetwood Court	1	$1,031	
18170 Bobcat Court	1	$1,031	
18174 Hidden Valley Road	1	$1,031	
18272 Hidden Valley Road	1	$1,031	
18310 Grizzley Court	1	$1,031	
18310 Pinnacle Court	1	$1,031	
18374 Hidden Valley Road	1	$1,031	
18377 Pinewood Court	1	$1,031	
18380 Grizzley Court	1	$1,031	
18438 Sweetwater Court	1	$1,031	
18474 Hidden Valley Road	1	$1,031	
18520 Hacienda Road	1	$1,031	
18541 Sentinel Court	1	$1,031	
18572 Hidden Valley Road	1	$1,031	
18606 Pine Flat Court & Little Peak Road, 09-10-29	1	$1,031	
18616 Pin Oak Court & Eagle Rock Road	2	$2,062	
18668 Deer Hollow Road	1	$1,031	

18670 Hidden Valley Road	1	$1,031	
18726 Deer Hill Road & Hidden Valley Road	1	$1,031	
18726 Hidden Valley Road	1	$1,031	
18745 Fairway Point	1	$1,031	
18820 Timber Point Road	1	$1,031	
18828 Deer Hollow Road	1	$1,031	
18835 Lynx Court	1	$1,031	
18862 Moon Ridge Road	1	$1,031	
18918 Hidden Valley Road	1	$1,031	
18924 Deer Hollow Road	1	$1,031	
18932 Moon Ridge Road	1	$1,031	
18932 Timber Point Road	2	$2,062	
18960 Redbud Road	1	$1,031	
18965 Spyglass Road	1	$1,031	
18966 Hidden Valley Road	1	$1,031	
19018 Hidden Valley Road	1	$1,031	
19032 Moon Ridge Road	1	$1,031	
19049 Spyglass Road	1	$1,031	
19056 Redbud Road	1	$1,031	
19088 Moon Ridge Road	1	$1,031	
19112 Hidden Valley Road	1	$1,031	
19151 Sweetwood Court	1	$1,031	
19152 Moon Ridge Road	1	$1,031	
19172 Moon Ridge Road	1	$1,031	
19195 Meadow Court	1	$1,031	
19204 Mt Meadow North	1	$1,031	
19242 Moon Ridge Road	1	$1,031	
19276 Mt Meadow North	1	$1,031	
19287 Mt Meadow South	1	$1,031	
19324 Donkey Hill Road	1	$1,031	
19335 Mt Meadow South	1	$1,031	
19336 Moon Ridge Road	1	$1,031	
19360 Mt Meadow North	1	$1,031	
19385 Old Creek Road	1	$1,031	
19389 Donkey Hill Road	1	$1,031	
19398 Park Ridge Road	1	$1,031	
19426 Park Ridge Road	1	$1,031	
19440 Park Ridge Road	1	$1,031	
19456 Hidden Valley Road	1	$1,031	
19456 Mt Meadow North	1	$1,031	
19464 Picture Point Court	1	$1,031	
19465 Old Creek Road	1	$1,031	
19481 Picture Point Court	1	$1,031	
19492 Moon Ridge Road	1	$1,031	
19524 Park Ridge Drive	1	$1,031	
19540 Mt Meadow North	1	$1,031	
19552 Powder Horn Road	1	$1,031	
19571 Donkey Hill Road	1	$1,031	
19575 Old Creek Road	1	$1,031	
19608 Park Ridge Drive	1	$1,031	
19614 Mt Meadow North	1	$1,031	
19625 Old Creek Road	1	$1,031	

19655 Donkey Hill Road	1	$1,031	
19664 Powder Horn Road	1	$1,031	
19674 Mt Meadow North	1	$1,031	
19734 Park Hill Road	1	$1,031	
19767 Donkey Hill Road	1	$1,031	
19776 Mt Meadow North	1	$1,031	
19936 Powder Horn Road	1	$1,031	
20032 Powder Horn Road	1	$1,031	
20048 Powder Horn Road	1	$1,031	
20144 Powder Horn Road	1	$1,031	
20249 Jigsaw Road	1	$1,031	
20250 Indian Rock Road	1	$1,031	
20297 Siesta Court	1	$1,031	
20400 Powder Horn Road	1	$1,031	
20402 Powder Horn Road	1	$1,031	
20652 Powder Horn Road	1	$1,031	
20700 Powder Horn Road	1	$1,031	
21164 Powder Horn Road	1	$1,031	
21212 Mt Meadow North	1	$1,031	
Boxwood Court & Firethorn Road	1	$1,031	
Bunker Road & Deer Hollow Road	1	$1,031	
Conestoga Road & Deer Hill Road	3	$3,093	
Cresent Court	1	$1,031	
Cresent Court & Deer Hill Road	1	$1,031	
Deer Hill & Bunker Road	1	$1,031	
Deer Hill & Crescent Court	1	$1,031	
Deer Hill Road	1	$1,031	
Deer Hill Road & 16476 Eagle Rock Road	1	$1,031	
Deer Hill Road & Firethorn Road	1	$1,031	
Deer Hill Road & Hidden Valley Road	1	$1,031	
Deer Hollow Road & Spyglass Road	1	$1,031	
Donkey Hill Road	1	$1,031	
Donkey Hill Road & Honey Hill	1	$1,031	
Eagle Rock Road	4	$4,124	
Eagle Rock Road & 18616 Pin Oak Court	1	$1,031	
Eagle Rock Road & Little Peak Road	1	$1,031	
Firethorn Road & Deer Hill Road	1	$1,031	
Grizzly Court & Donkey Hill Road	1	$1,031	
Hidden Valley Road & Deer Hill Road	1	$1,031	
Hidden Valley Road & Spyglass Road	1	$1,031	
Honey Hill & Donkey Hill Road	1	$1,031	
Indian Rock Road & Powder Horn Road	1	$1,031	
Jigsaw Road & Powder Horn	1	$1,031	
Knollview Drive	1	$1,031	
Knollview Drive - Knollview Drive	1	$1,031	
Knollview top	2	$2,062	
Little Peak Road & Eagle Rock Road	1	$1,031	
Lower Colt Ct	1	$1,031	
Lynx Court & Powder Horn Road	1	$1,031	
Meadow Court & Mt Meadow South	1	$1,031	
Moon Hill Court & Moon Ridge Road	1	$1,031	
Moon Ridge Road & Redbud Road	2	$2,062	

Mt Meadow South & Meadow Court	1	$1,031	
Mt Meadow South & Mt Meadow North	2	$2,062	
Mt Medow South & Old Creek Road	1	$1,031	
Old Creek Road	1	$1,031	
Old Creek Road & Mt Meadow South	1	$1,031	
Park Hill Road & Powder Horn Road	1	$1,031	
Park Hill Road & Sugarwood Court	1	$1,031	
Park Ridge Drive & Pinewood Court	2	$2,062	
Park Ridge Drive & Pinnacle Court	2	$2,062	
Picture Point Court & Donkey Hill Road	1	$1,031	
Pin Oak Court	1	$1,031	
Pine Flat Court	1	$1,031	
Pinewood Court & Park Ridge Drive	1	$1,031	
Pinnacle Court & Park Ridge Drive	2	$2,062	
Plateau Court	4	$7,093	
Powder Horn & Donkey Hill Road	1	$1,031	
Powder Horn & Jigsaw Road	1	$1,031	
Powder Horn Road & Indian Rock Road	1	$1,031	
Powder Horn Road & Park Hill Road	1	$1,031	
Powder Horn Road & Timber Point Court	1	$1,031	
Redbud Road & Moon Ridge Road	2	$2,062	
Ridgecreat Court & Deer Hill Road	1	$1,031	
Rock Ridge Court	1	$1,031	
Saddleback Court & Little Peak Road	1	$1,031	
Spyglass Road & Deer Hollow Road	1	$1,031	
Spyglass Road & Hidden Valley Road	1	$1,031	
Sugarbush Court & Firethorn Road	1	$1,031	
Tigerwood Court & Firethorn Road	1	$4,000	
Timber Point Court & Powder Horn Road	1	$1,031	
Unit 9 Gate	1	$1,031	
Upper Colt Ct	1	$1,031	
Verde Court & Old Creek Road	1	$1,031	
Vista Point Court & Moon Ridge Road	2	$2,062	
Yankee Valley Road	1	$1,031	
(blank)	274	$282,494	
Valve Total	494	$515,252	
Water System Asset Total	**751**	**$5,705,202**	
Very High Total	**945**	**$15,454,663**	**$1,268,249**
High			
Land Asset			
Parcel			
141-611-03	1	$15,000	
141-732-01	1	$9,000	
142-113-01	1	$6,000	
Parcel Total	3	$30,000	
Land Asset Total	**3**	**$30,000**	
General Asset			
Building			
Flood Control Pump Station	1	$52,310	$103,820
Unit 9 Pump Station	1	$52,310	$218,022
Building Total	2	$104,620	$321,842
General Asset Total	**2**	**$104,620**	**$321,842**

Sewer System Asset			
Generator			
Generator - Flood Control Basin	1	$125,544	
Generator - Lift Station 2	1	$62,772	
Generator - Lift Station 3	1	$62,772	
Generator - Lift Station 6	1	$62,772	
Generator Total	4	$313,860	
Manhole			
(blank)	58	$67,802	
Manhole Total	58	$67,802	
Sewer Pumps			
Lift Station #2	3	$37,500	
Lift Station #3	3	$37,500	
Lift Station #6	3	$37,500	
Sewer Pumps Total	9	$112,500	
Sewer System Asset Total	**71**	**$494,162**	
Water System Asset			
Generator			
Greenridge Booster pump station	1	$160,776	
Generator Total	1	$160,776	
Hydrant			
(blank)	60	$139,800	
Hydrant Total	60	$139,800	
PRV			
18496 Kentwood Pl	1	$5,609	
PRV Total	1	$5,609	
Pump			
Greenridge 501	1	$10,400	
Greenridge 502	1	$10,400	
Pump Total	2	$20,800	
Valve			
16038 Conestoga Road	1	$1,031	
16116 Conestoga Road	1	$1,031	
16198 Conestoga Road	1	$1,031	
16273 Firethorn Road	1	$1,031	
16290 Conestoga Road	1	$1,031	
16402 Conestoga Road	1	$1,031	
17945 Bunker Road	1	$1,031	
18057 Spyglass Road	1	$1,031	
18215 Tigerwood Court	1	$1,031	
18224 Deer Hollow Road	1	$1,031	
18378 Deer Hollow Road	1	$1,031	
18540 Deer Hollow Road	1	$1,031	
18650 Maple Leaf Court	1	$1,031	
18729 Spyglass Road	1	$1,031	
18873 Spyglass Road	1	$1,031	
18905 Bear Valley Road	1	$1,031	
18941 Mt Meadow South	1	$1,031	
19407 Mt Meadow South	1	$1,031	
19575 Mt Meadow South	1	$1,031	
19671 Mt Meadow South	1	$1,031	
19759 Oak Flat Road	1	$1,031	

19767 Mt Meadow South	1	$1,031	
19787 Bear Valley Road	1	$1,031	
19840 Mt Meadow South	1	$1,031	
19854 Mt Meadow North	1	$1,031	
19857 Bear Valley Road	1	$1,031	
19897 Mt Meadow South	1	$1,031	
19908 Mt Meadow North	1	$1,031	
19944 Mt Meadow North	1	$1,031	
19963 Mt Meadow South	1	$1,031	
19968 Bear Valley Road	1	$1,031	
20191 Gold Flat Court	1	$1,031	
20796 Powder Horn Road	1	$1,031	
20812 Powder Horn Road	1	$1,031	
20892 Powder Horn Road	1	$1,031	
20972 Powder Horn Road	1	$1,031	
21084 Powder Horn Road	1	$1,031	
Air Vac Valve	1	$1,031	
Bunker Road & Spyglass Road	1	$1,031	
Conestoga Road	2	$2,062	
Conestogar Road & Firethorn Road	2	$5,031	
Deer Hollow Road & Spyglass Road	1	$1,031	
Firethorn Road & Conestoga Road	1	$1,031	
Gold Flat Court & Mt Meadow North	1	$1,031	
Green Point Court & Spyglass Road	1	$1,031	
Jigsaw Road & Powder Horn Road	1	$1,031	
Marine View Road & Deer Hill	2	$2,062	
Mill Pond Road & Mt Meadow South	1	$1,031	
Mt Meadow North & Gold Flat	1	$1,031	
Mt Meadow South & Mill Pond Road	1	$1,031	
Mt Meadow South & Oak Flat Road	1	$1,031	
Mt Meadow South & Old Creek Road	1	$1,031	
Oak Flat Road & Mt Meadow South	1	$1,031	
Old Creek Court & Mt Meadow South	1	$1,031	
Old Creek Road & Mt Meadow South	1	$1,031	
Spyglass Road & Bunker Road	1	$1,031	
Spyglass Road & Deer Hollow Road	1	$1,031	
Sugarbush Court	1	$1,031	
Tigerwood Court & Firethorn Road	1	$1,031	
(blank)	75	$77,325	
Valve Total	137	$144,216	
Water System Asset Total	**201**	**$471,201**	
High Total	**277**	**$1,099,983**	**$321,842**
Moderate			
Land Asset			
Parcel			
014-270-10	1	$900,000	
141-611-07	1	$250,000	
Parcel Total	2	$1,150,000	
Land Asset Total	**2**	**$1,150,000**	
Sewer System Asset			
Generator			
Generator - Lift Station 1	1	$172,000	

Generator - Lift Station 4	1	$104,620	
Generator Total	2	$276,620	
Manhole			
(blank)	36	$42,084	
Manhole Total	36	$42,084	
Sewer Pumps			
600s	2	$20,000	
Lift Station #1	3	$193,500	
Lift Station #4	3	$37,500	
Sewer Pumps Total	8	$251,000	
Sewer System Asset Total	**46**	**$569,704**	
Water System Asset			
Hydrant			
(blank)	28	$65,240	
Hydrant Total	28	$65,240	
Pump			
Ag Well	1	$183,085	
Water Treatment Plant - Well 2 - Wellfield	1	$183,085	
Well 3	1	$183,085	
Wellfield TP Booster	1	$20,000	
Wellfield Well 4	1	$183,085	
Pump Total	5	$752,340	
Valve			
18121 Spyglass Road	1	$1,031	
18126 Fishhook Court	1	$1,031	
18190 Fishhook Court	1	$1,031	
18249 Spyglass Road	1	$1,031	
18377 Spyglass Road	1	$1,031	
18553 Spyglass Road	1	$1,031	
18678 Horseshoe Road	1	$1,031	
18690 Magnolia Court	1	$1,031	
18717 Deer Hill Road	1	$1,031	
18755 Glencove Court	1	$1,031	
18790 Horseshoe Road	1	$1,031	
18794 Deer Hill Road	1	$1,031	
18838 Dove Court	1	$1,031	
18846 Horseshoe Road	1	$1,031	
19116 Gooselake Court	1	$1,031	
19503 Mt Meadow South	1	$1,031	
19675 Old Creek Court	1	$1,031	
19857 Mt Meadow South	1	$1,031	
Bear Valley Road & Mt Meadow South	1	$1,031	
Dove Court & Horseshoe Road	1	$1,031	
Fishhook	1	$1,031	
Fishhook Court & Spyglass Road	1	$1,031	
Glencove Court & Horseshoe Road	1	$1,031	
Gooselake Court & Horseshoe Road	1	$1,031	
Horseshoe Road & Magnolia Court	1	$1,031	
Horseshoe Road & Mt Meadow South	2	$2,062	
Magnolia Court & Horseshoe Road	1	$1,031	
Marine View Road & Deer Hill	1	$1,031	
Mt Meadow South & Bear Valley Road	1	$1,031	

Mt Meadow South & Horseshoe Road	2	$2,062	
(blank)	22	$22,682	
Valve Total	54	$55,674	
Well			
Ag Well	1	$183,085	
Wellfield Well 2	1	$183,085	
Wellfield Well 4	1	$183,085	
Wells 3	2	$366,170	
Well Total	5	$915,425	
Water System Asset Total	**92**	**$1,788,679**	
Moderate Total	**140**	**$3,508,383**	
Grand Total	**1,362**	**$20,063,029**	**$1,590,091**

	HVLCSD Assets						
Fire Hazard Severity Zone	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Very High	Sewer Line	Force	11.2	6	90	442	$39,814
			16.0	10	208	2,221	$462,002
			18.0	4	70	230	$16,075
			2.0	6	90	347	$31,273
			(blank)	10	208	382	$79,393
		Force Total				3,622	
		Gravity	1.0	10	208	2,520	$524,122
				12	208	1,805	$375,453
				15	353	2,939	$1,037,483
			1.1.4	6	90	1,792	$161,303
			1.1.4.1	6	90	177	$15,899
			1.10	6	90	598	$53,855
			1.5	6	90	332	$29,849
			1.6	6	90	313	$28,140
			1.7	6	90	331	$29,815
				10	208	711	$147,879
			1.8	6	90	211	$18,975
			1.9	6	90	321	$28,874
			10.0	6	90	2,074	$186,665
			10.1	6	90	249	$22,376
			11.1	8	135	53	$7,128
			12.3	8	135	49	$6,594
			13.0	6	90	2,035	$183,184
			13.1	6	90	512	$46,041
			13.2	6	90	662	$59,620
			13.3	6	90	1,459	$131,274
			13.4	6	90	734	$66,019
			14.0	6	90	703	$63,313
			14.1	6	90	991	$89,152
			15.0	6	90	1,557	$140,141
			18.0	6	90	1,977	$177,936
			18.1	6	90	2,506	$225,510
			2.1	6	90	446	$40,155
			2.2	6	90	42	$3,798
				8	135	475	$64,151
			2.2.1	6	90	1,116	$100,401
			2.2.2	6	90	141	$12,728
			4.0	6	90	705	$63,490
				8	135	1,988	$268,363
			4.2	6	90	269	$24,250
			4.3	6	90	247	$22,211
			5.0	6	90	2,415	$217,356
			5.1	6	90	453	$40,802
			5.1.1	6	90	258	$23,239
			5.2	6	90	163	$14,637
			6.0	4	70	1,355	$94,844
			6.1	6	90	1,281	$115,266
			6.1.1	4	70	156	$10,922
			7.0	6	90	1,622	$145,959
			7.1	6	90	1,377	$123,946
			8.0	6	90	3,381	$304,265
			8.1	4	70	745	$52,178
			8.1.1	4	70	1,402	$98,157
			9.0	6	90	930	$83,742
				8	135	1,193	$161,122
				10	208	441	$91,732
			9.1	6	90	293	$26,384
			9.2	6	90	778	$70,021
			9.2.1	4	70	515	$36,033
			9.2.1.1	4	70	230	$16,114
			9.2.1.2	4	70	299	$20,902
			9.3	8	135	546	$73,739
			9.4	4	70	492	$34,424
			9.5	4	70	777	$54,375
				6	90	378	$34,048
			9.5.1	4	70	146	$10,191
			9.5.2	4	70	32	$2,261
			9.5.3	4	70	811	$56,792
			9.6	4	70	280	$19,608
		Gravity Total				55,790	
		Unknown	(blank)	4	70	226	$15,798
		Unknown Total				226	

	Sewer Line Total					59,638	
	Reclaimed Water Line	Unknown	Mainline Replacement		208	7,129	$1,482,753
			Soils Stabilization		208	5,144	$1,069,911
			Zone intertie		208	1,352	$281,165
			(blank)		208	54	$11,151
		Unknown Total				13,678	
	Reclaimed Water Line Total					13,678	
Very High Total						73,315	
High	Sewer Line	Force	11.3	6	90	162	$14,555
			16.0	6	90	973	$87,529
				10	208	257	$53,407
			2.0	6	90	549	$49,443
			4.0	6	90	2,260	$203,379
			(blank)	10	208	1,246	$259,128
		Force Total				5,446	
		Gravity	1.0	15	353	542	$191,217
			1.1	10	208	872	$181,411
			1.1.2	10	208	357	$74,324
			1.1.3	6	90	182	$16,338
			1.1.4	6	90	218	$19,619
			11.0	6	90	398	$35,863
				8	135	726	$97,950
			11.1	8	135	68	$9,126
			11.3.1	6	90	85	$7,669
			12.0	6	90	812	$73,084
				8	135	907	$122,406
			12.2	6	90	1,126	$101,318
			12.2.1	6	90	197	$17,741
			12.3	8	135	385	$51,933
			13.0	6	90	430	$38,714
			13.2	6	90	445	$40,071
			2.0	6	90	197	$17,757
				8	135	1,448	$195,454
			2.1	6	90	296	$26,637
			2.2	6	90	1,445	$130,075
				8	135	821	$110,787
			2.2.2	6	90	74	$6,673
			3.0	6	90	2,190	$197,057
			3.1	6	90	647	$58,197
			3.1.1	6	90	204	$18,354
			3.2	6	90	373	$33,604
			3.3	6	90	556	$50,061
			4.0	8	135	2,016	$272,219
				10	208	72	$14,899
			4.1	6	90	328	$29,484
			4.2	6	90	54	$4,898
			8.0	6	90	300	$27,031
			9.2	6	90	339	$30,517
			9.2.1.1	4	70	400	$28,009
			9.4	4	70	441	$30,889
			9.6	4	70	559	$39,101
		Gravity Total				20,510	
	Sewer Line Total					25,956	
	Reclaimed Water Line	Unknown	Mainline Replacement		208	2,225	$462,813
			(blank)		208	2,054	$427,154
		Unknown Total				4,279	
	Reclaimed Water Line Total					4,279	
High Total						30,234	
Moderate	Sewer Line	Force	11.3	6	90	208	$18,706
			16.0	6	90	1,188	$106,950
				10	208	26	$5,375
			4.0	6	90	370	$33,256
			(blank)	10	208	5,522	$1,148,580
		Force Total				7,314	
		Gravity	1.0	15	353	1,072	$378,539
			1.1	10	208	924	$192,094
			1.1.1	6	90	184	$16,523
			1.1.2	10	208	260	$54,142
			1.1.3	6	90	373	$33,562
			1.2	6	90	390	$35,123
			1.3	6	90	244	$21,974
			1.4	6	90	429	$38,569
			11.0	8	135	155	$20,916
			11.3	6	90	897	$80,691
			11.3.1	6	90	810	$72,908

			12.0	8	135	297	$40,092
				10	208	284	$59,037
			12.1	6	90	425	$38,237
			12.2	6	90	246	$22,185
			12.2.1	6	90	136	$12,275
			2.0	6	90	1,233	$110,929
				8	135	1,062	$143,426
			2.2	6	90	636	$57,279
			2.3	6	90	834	$75,070
			2.3.1	6	90	171	$15,407
			3.0	6	90	372	$33,452
			3.2	6	90	295	$26,526
			A	6	90	101	$9,058
			(blank)	15	353	28	$9,726
		Gravity Total				11,857	
	Sewer Line Total					19,171	
	Reclaimed Water Line	Unknown	(blank)		208	6,202	$1,290,011
		Unknown Total				6,202	
	Reclaimed Water Line Total					6,202	
Moderate Total						25,373	
Grand Total						**128,922**	**$18,137,045**

Appendix F CREAT Report

EPA CREAT REPORT WILL FOLLOW THIS PAGE WHEN COMPLETED.

Appendix G FEMA National Risk Index Report

National Risk Index

June 27, 2024

Lake County, California

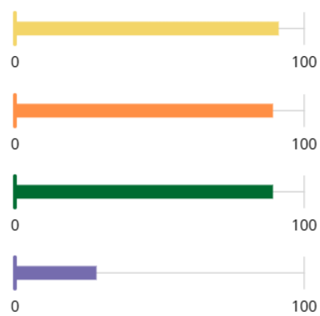
Summary

Risk Index is **Relatively Moderate** Score **91.9**

Expected Annual Loss is **Relatively Moderate** Score **89.8**

Social Vulnerability is **Very High** Score **89.5**

Community Resilience is **Relatively Low** Score **28.0**

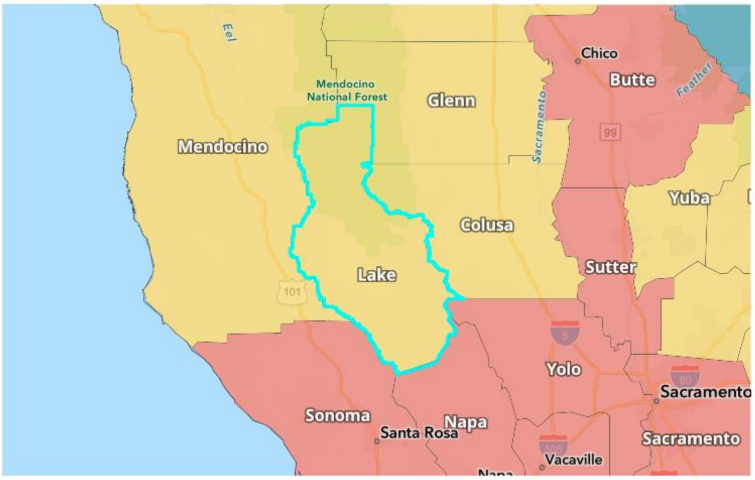


While reviewing this report, keep in mind that low risk is driven by lower loss due to natural hazards, lower social vulnerability, and higher community resilience.

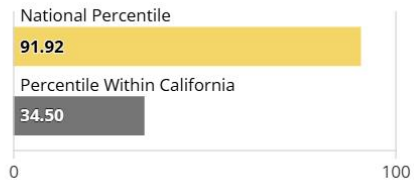
For more information about the National Risk Index, its data, and how to interpret the information it provides, please review the **About the National Risk Index** and **How to Take Action** sections at the end of this report. Or, visit the National Risk Index website at hazards.fema.gov/nri/learn-more to access supporting documentation and links.

Risk Index

The Risk Index rating is **Relatively Moderate** for **Lake County, CA** when compared to the rest of the U.S.



Score	91.92



92% of U.S. counties have a lower Risk Index

34% of counties in California have a lower Risk Index

Risk Index Legend

Very High · Relatively High · Relatively Moderate · Relatively Low · Very Low

No Rating · Not Applicable · Insufficient Data

Hazard Type Risk Index

Hazard type Risk Index scores are calculated using data for only a single hazard type, and reflect a community's Expected Annual Loss value, community risk factors, and the adjustment factor used to calculate the risk value.

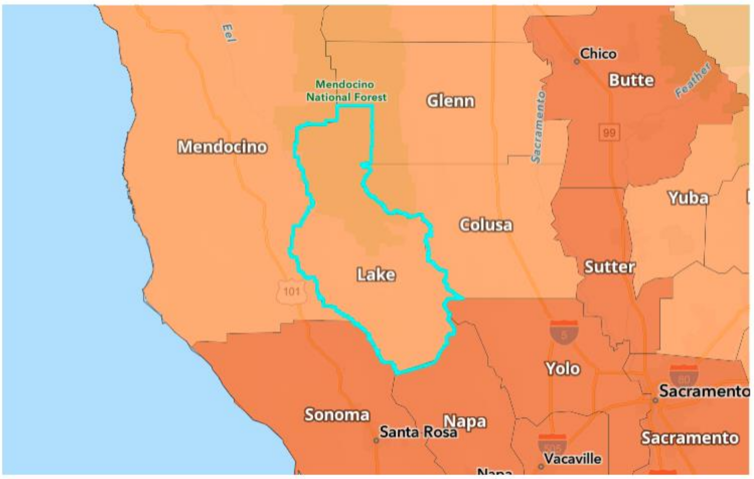
Hazard Type	Risk Index Rating	Risk Index Score	National Percentile
Avalanche	Not Applicable	--	
Coastal Flooding	Not Applicable	--	
Cold Wave	No Rating	0	0 100
Drought	Relatively High	98.9	0 100
Earthquake	Relatively Moderate	97.6	0 100
Hail	Very Low	6.6	0 100
Heat Wave	Relatively Low	63.9	0 100
Hurricane	Not Applicable	--	
Ice Storm	Not Applicable	--	
Landslide	Relatively High	97.8	0 100
Lightning	Very Low	15.2	0 100
Riverine Flooding	Relatively Moderate	79.8	0 100
Strong Wind	Very Low	2.4	0 100
Tornado	Very Low	11.4	0 100
Tsunami	Not Applicable	--	
Volcanic Activity	Not Applicable	--	
Wildfire	Relatively High	97.9	0 100
Winter Weather	Very Low	17.9	0 100

Risk Factor Breakdown

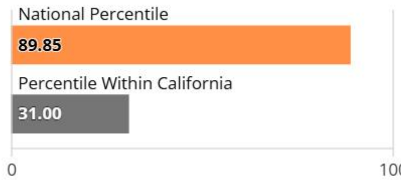
Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
Earthquake	$23,177,227	Very High	Relatively Low	1.46	$34,641,669	97.6
Wildfire	$7,740,511	Very High	Relatively Low	1.46	$10,494,913	97.9
Drought	$5,333,595	Very High	Relatively Low	1.46	$7,915,922	98.9
Riverine Flooding	$1,231,995	Very High	Relatively Low	1.46	$1,879,206	79.8
Landslide	$431,736	Very High	Relatively Low	1.46	$590,878	97.8
Heat Wave	$137,589	Very High	Relatively Low	1.46	$198,871	63.9
Tornado	$54,945	Very High	Relatively Low	1.46	$77,664	11.4
Lightning	$19,146	Very High	Relatively Low	1.46	$26,757	15.2
Winter Weather	$9,381	Very High	Relatively Low	1.46	$13,482	17.9
Strong Wind	$4,416	Very High	Relatively Low	1.46	$6,384	2.4
Hail	$3,831	Very High	Relatively Low	1.46	$5,502	6.6
Cold Wave	$0	Very High	Relatively Low	1.46	$0	0
Avalanche	--	Very High	Relatively Low	1.46	--	--
Coastal Flooding	--	Very High	Relatively Low	1.46	--	--
Hurricane	--	Very High	Relatively Low	1.46	--	--
Ice Storm	--	Very High	Relatively Low	1.46	--	--
Tsunami	--	Very High	Relatively Low	1.46	--	--
Volcanic Activity	--	Very High	Relatively Low	1.46	--	--

Expected Annual Loss

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



Score **89.85**



90% of U.S. counties have a lower Expected Annual Loss

31% of counties in California have a lower Expected Annual Loss

Expected Annual Loss Legend

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

No Expected Annual Losses | Not Applicable | Insufficient Data

Composite Expected Annual Loss	**$38,144,373.23**
Composite Expected Annual Loss Rate National Percentile	**88.1**

Building EAL	**$27,314,305.36**	Population EAL	**0.47** fatalities
Building EAL Rate	**$1 per $520.98 of building value**	Population EAL Rate	**1 per 145.34K people**
Agriculture EAL	**$5,396,717.94**	Population Equivalence EAL	**$5,433,349.93**
Agriculture EAL Rate	**$1 per $15.27 of agriculture value**		

Expected Annual Loss for Hazard Types

Expected Annual Loss scores for hazard types are calculated using data for only a single hazard type, and reflect a community's relative expected annual loss for only that hazard type.

12 of 18 hazard types contribute to the expected annual loss for **Lake County, CA**.

Hazard Type	Expected Annual Loss Rating	EAL Value	Score
Earthquake	Relatively Moderate	$23,177,227	97.2
Wildfire	Relatively High	$7,740,511	97.4
Drought	Relatively High	$5,333,595	98.8
Riverine Flooding	Relatively Moderate	$1,231,995	74.9
Landslide	Relatively High	$431,736	97.2
Heat Wave	Relatively Low	$137,589	62.5
Tornado	Very Low	$54,945	12.3
Lightning	Very Low	$19,146	12.9
Winter Weather	Relatively Low	$9,381	18.0
Strong Wind	Very Low	$4,416	4.6
Hail	Very Low	$3,831	7.9
Cold Wave	No Expected Annual Losses	$0	0.0
Avalanche	Not Applicable	--	--
Coastal Flooding	Not Applicable	--	--
Hurricane	Not Applicable	--	--
Ice Storm	Not Applicable	--	--
Tsunami	Not Applicable	--	--

Exposure Values

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Avalanche	--	--	--	--	--
Coastal Flooding	--	--	--	--	--
Cold Wave	$0	$0	$0	0.00	$0
Drought	$71,430,347	n/a	n/a	n/a	$71,430,347
Earthquake	$804,920,747,000	$14,229,947,000	$790,690,800,000	68,163.00	n/a
Hail	$803,971,017,458	$14,230,184,852	$789,658,400,000	68,074.00	$82,432,606
Heat Wave	$803,971,017,458	$14,230,184,852	$789,658,400,000	68,074.00	$82,432,606
Hurricane	--	--	--	--	--
Ice Storm	--	--	--	--	--
Landslide	$422,233,271,104	$8,140,668,020	$414,092,603,084	35,697.64	n/a
Lightning	$803,888,584,852	$14,230,184,852	$789,658,400,000	68,074.00	n/a
Riverine Flooding	$115,284,061,963	$2,396,436,944	$112,867,088,122	9,729.92	$20,536,898
Strong Wind	$803,971,017,458	$14,230,184,852	$789,658,400,000	68,074.00	$82,432,606
Tornado	$803,971,017,458	$14,230,184,852	$789,658,400,000	68,074.00	$82,432,606
Tsunami	--	--	--	--	--
Volcanic Activity	--	--	--	--	--
Wildfire	$133,691,907,383	$2,488,044,836	$131,183,718,308	11,308.94	$20,144,239
Winter Weather	$803,971,017,458	$14,230,184,852	$789,658,400,000	68,074.00	$82,432,606

Annualized Frequency Values

Hazard Type	Annualized Frequency	Events on Record	Period of Record
Avalanche	--	--	--
Coastal Flooding	--	--	--
Cold Wave	0 events per year	0	2005-2021 (16 years)
Drought	54.1 events per year	1,351	2000-2021 (22 years)
Earthquake	0.882% chance per year	n/a	2021 dataset
Hail	0 events per year	2	1986-2021 (34 years)
Heat Wave	2 events per year	32	2005-2021 (16 years)
Hurricane	--	--	--
Ice Storm	--	--	--
Landslide	0 events per year	6	2010-2021 (12 years)
Lightning	0.7 events per year	16	1991-2012 (22 years)
Riverine Flooding	0.5 events per year	13	1996-2019 (24 years)
Strong Wind	0 events per year	1	1986-2021 (34 years)
Tornado	0.1 events per year	0	1950-2021 (72 years)
Tsunami	--	--	--
Volcanic Activity	--	--	--
Wildfire	0.799% chance per year	n/a	2021 dataset
Winter Weather	2.9 events per year	47	2005-2021 (16 years)

Historic Loss Ratios

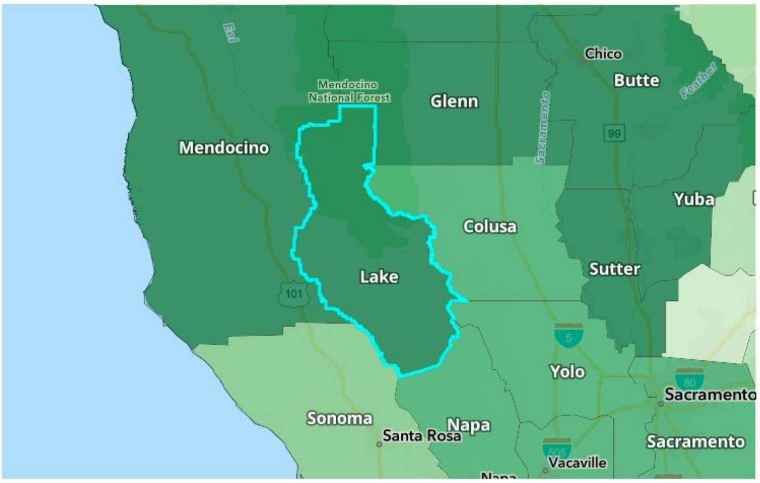
Hazard Type	Overall Rating
Avalanche	--
Coastal Flooding	--
Cold Wave	No Rating
Drought	Relatively Moderate
Earthquake	Relatively High
Hail	Relatively Low
Heat Wave	Very Low
Hurricane	--
Ice Storm	--
Landslide	Very Low
Lightning	Relatively High
Riverine Flooding	Very Low
Strong Wind	Relatively Moderate
Tornado	Very Low
Tsunami	--
Volcanic Activity	--
Wildfire	Relatively Low
Winter Weather	Very Low

Expected Annual Loss Rate

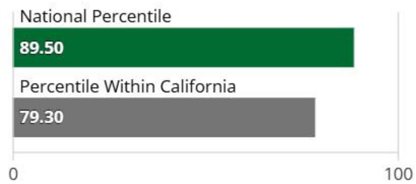
Hazard Type	Building EAL Rate (per building value)	Population EAL Rate (per population)	Agriculture EAL Rate (per agriculture value)
Avalanche	--	--	--
Coastal Flooding	--	--	--
Cold Wave	--	--	--
Drought	--	--	$1 per $15.46
Earthquake	$1 per $776.87	1 per 162.48K	--
Hail	$1 per $168.58M	1 per 247.74M	$1 per $147.44K
Heat Wave	$1 per $217.45M	1 per 6.35M	$1 per $6.23K
Hurricane	--	--	--
Ice Storm	--	--	--
Landslide	$1 per $38.25K	1 per 13.23M	--
Lightning	$1 per $31.91M	1 per 42.23M	--
Riverine Flooding	$1 per $14.52K	1 per 3.86M	$1 per $1.74K
Strong Wind	$1 per $48.75M	1 per 200.96M	$1 per $422.76K
Tornado	$1 per $305.71K	1 per 97.90M	$1 per $249.51K
Tsunami	--	--	--
Volcanic Activity	--	--	--
Wildfire	$1 per $1.87K	1 per 5.57M	$1 per $52.28K
Winter Weather	$1 per $49.03M	1 per 86.87M	$1 per $335.58B

Social Vulnerability

Social groups in **Lake County, CA** have a **Very High** susceptibility to the adverse impacts of natural hazards when compared to the rest of the U.S.



Score	89.5



90% of U.S. counties have a lower Social Vulnerability

79% of counties in California have a lower Social Vulnerability

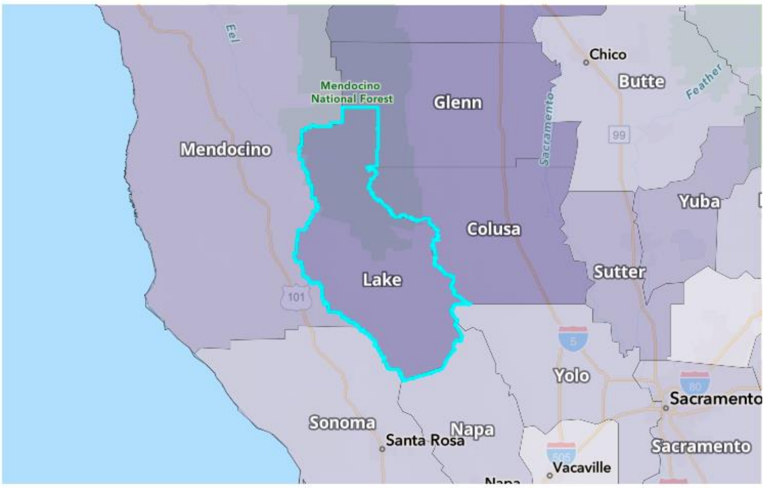
Social Vulnerability Legend

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

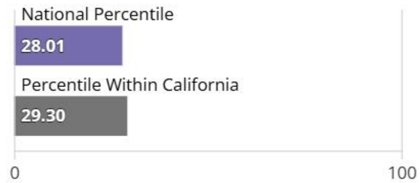
Data Unavailable

Community Resilience

Communities in **Lake County, CA** have a **Relatively Low** ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions when compared to the rest of the U.S.



Score	28.01



72% of U.S. counties have a higher Community Resilience

71% of counties in California have a higher Community Resilience

Community Resilience Legend

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

Data Unavailable

About the National Risk Index

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for 18 natural hazards: Avalanche, Coastal Flooding, Cold Wave, Drought, Earthquake, Hail, Heat Wave, Hurricane, Ice Storm, Landslide, Lightning, Riverine Flooding, Strong Wind, Tornado, Tsunami, Volcanic Activity, Wildfire, and Winter Weather.

The National Risk Index leverages available source data for Expected Annual Loss due to these 18 hazard types, Social Vulnerability, and Community Resilience to develop a baseline relative risk measurement for each United States county and Census tract. These measurements are calculated using average past conditions, but they cannot be used to predict future outcomes for a community. The National Risk Index is intended to fill gaps in available data and analyses to better inform federal, state, local, tribal, and territorial decision makers as they develop risk reduction strategies.

Explore the National Risk Index Map at **hazards.fema.gov/nri/map**.

Visit the National Risk Index website at **hazards.fema.gov/nri/learn-more** to access supporting documentation and links.

Calculating the Risk Index

Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability and Community Resilience:

Risk Index = Expected Annual Loss × Social Vulnerability ÷ Community Resilience

Risk Index scores are presented as a composite score for all 18 hazard types, as well as individual scores for each hazard type.

For more information, visit **hazards.fema.gov/nri/determining-risk**.

Calculating Expected Annual Loss

Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios for 18 hazard types:

Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio

Expected Annual Loss scores are presented as a composite score for all 18 hazard types, as well as individual scores for each hazard type.

For more information, visit **hazards.fema.gov/nri/expected-annual-loss**.

Calculating Social Vulnerability

Social Vulnerability is measured using the Social Vulnerability Index (SVI) published by the Centers for Disease Control and Prevention (CDC).

For more information, visit **hazards.fema.gov/nri/social-vulnerability**.

Calculating Community Resilience

Community Resilience is measured using the Baseline Resilience Indicators for Communities (HVRI BRIC) published by the University of South Carolina's Hazards and Vulnerability Research Institute (HVRI).

For more information, visit **hazards.fema.gov/nri/community-resilience**.

How to Take Action

There are many ways to reduce natural hazard risk through mitigation. Communities with high National Risk Index scores can take action to reduce risk by decreasing Expected Annual Loss due to natural hazards, decreasing Social Vulnerability, and increasing Community Resilience.

For information about how to take action and reduce your risk, visit **hazards.fema.gov/nri/take-action**.

Disclaimer

The National Risk Index (the Risk Index or the Index) and its associated data are meant for planning purposes only. This tool was created for broad nationwide comparisons and is not a substitute for localized risk assessment analysis. Nationwide datasets used as inputs for the National Risk Index are, in many cases, not as accurate as available local data. Users with access to local data for each National Risk Index risk factor should consider substituting the Risk Index data with local data to recalculate a more accurate risk index. If you decide to download the National Risk Index data and substitute it with local data, you assume responsibility for the accuracy of the data and any resulting data index. Please visit the **Contact Us** page if you would like to discuss this process further.

The methodology used by the National Risk Index has been reviewed by subject matter experts in the fields of natural hazard risk research, risk analysis, mitigation planning, and emergency management. The processing methods used to create the National Risk Index have produced results similar to those from other natural hazard risk analyses conducted on a smaller scale. The breadth and combination of geographic information systems (GIS) and data processing techniques leveraged by the National Risk Index enable it to incorporate multiple hazard types and risk factors, manage its nationwide scope, and capture what might have been missed using other methods.

The National Risk Index does not consider the intricate economic and physical interdependencies that exist across geographic regions. Keep in mind that hazard impacts in surrounding counties or Census tracts can cause indirect losses in your community regardless of your community's risk profile.

Nationwide data available for some risk factors are rudimentary at this time. The National Risk Index will be continuously updated as new data become available and improved methodologies are identified.

The National Risk Index Contact Us page is available at **hazards.fema.gov/nri/contact-us**.