Hidden Valley Lake Community Services District Local Hazard Mitigation Plan

March 2020

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Executive Summary

The Hidden Valley Lake Community Services District (HVLCSD), prepared this Local Hazard Mitigation Plan (LHMP) to guide hazard mitigation planning to better protect the people and property of the HVLCSD Planning Area from the effects of natural disasters and hazard events. This LHMP demonstrates the District's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This Plan was also developed in order for the HVLCSD to 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, 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 and vulnerabilities and strategies the HVLCSD 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) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. The 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
2) Assess Risks	
201.6(c)(2)(i)	4) Identify the Hazards

DMA Process	Modified CRS Process
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 HVLCSD 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. Once approved by Cal OES and FEMA, this LHMP will be adopted and implemented by the District over the next five years.

Risk Assessment

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

The HVLCSD is vulnerable to numerous hazards that are identified, profiled, and analyzed in this LHMP. Wildfires, floods, earthquakes, drought, dam failure, 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 LHMP.

Table ES-2 HVLCSD Hazard Identification Assessment

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Aquatic Biological Hazards: quagga mussel	Limited	Unlikely	Catastrophic	Medium	Low
Climate Change	Extensive	Likely	Critical	High	–
Dam Failure	Extensive	Unlikely	Catastrophic	High	Low
Drought and Water Shortage	Extensive	Likely/Occasional	Critical	Medium	High
Earthquake	Extensive	Highly Likely/ Occasional	Catastrophic	Medium	Low
Flood: 1%/0.2% Annual Chance	Significant	Occasional/Unlikely	Critical	High	Medium
Flood: Localized/Stormwater	Extensive	Highly Likely	Critical	High	Medium
Landslide and Debris Flows	Limited	Occasional	Limited	Low	Medium
Levee Failure	Significant	Occasional	Critical	High	Medium
Severe Weather: Extreme Cold and Freeze	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Heavy Rains, Snow, and Storms	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: High Winds	Extensive	Highly Likely	Limited	Medium	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High	High

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

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

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

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Climate Change Impact:
Low: Climate change is not likely to increase the probability of this hazard.
Medium: Climate change is likely to increase the probability of this hazard.
High: Climate change is very likely to increase the probability of this hazard.

Mitigation Strategy

Based on the results of the risk assessment, the HMPC developed a mitigation strategy for reducing the HVLCSD's risk and vulnerability to hazards. The resulting Mitigation Strategy is comprised of LHMP goals and objectives and a mitigation action plan which includes a series of mitigation action projects and implementation measures.

The goals and objectives of this LHMP are:

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

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

Table ES-3 HVLCSDs Mitigation Actions

Action Title	Responsible Agencies and Partners	Address Current Development	Address Future Development	Continued Compliance with NFIP	Mitigation Type
Multi-Hazard Mitigation Actions					
Action 1. Water Distribution System Reliability	HVLCSD	X	X		Property Protection
Action 2. Generator Projects for all Critical Facilities and Infrastructure	HVLCSD	X	X		Property Protection Emergency Services
Action 3. Establish Fully Functioning GIS Capabilities	HVLCSD	X	X		Prevention Emergency Services
Action 4. Water Storage and Materials	HVLCSD	X	X		Property Protection Structural Projects
Action 5. Establish Additional Well(s)	HVLCSD	X	X		Prevention Property Protection
Action 6. Chlorine Automatic Shut-off Valve	HVLCSD	X	X		Prevention Property Protection
Action 7. Develop Risk and Resilience Plan (RRP), and Emergency Response Plan (ERP)	HVLCSD	X	X		Prevention Emergency Services
Action 8. Improve the SCADA system	HVLCSD	X	X		Prevention Property Protection
Action 9. Public Awareness Program	HVLCSD	X	X		Public Information
Action 10. Wastewater Treatment Plant Improvements	HVLCSD	X	X		Property Protection
Action 11. Update Water Master Plan	HVLCSD	X	X	X	Prevention
Climate Change Actions					
Action 12. Develop HVLCSD Climate Action Plan	HVLCSD	X	X	X	Prevention

Action Title	Responsible Agencies and Partners	Address Current Development	Address Future Development	Continued Compliance with NFIP	Mitigation Type
Dam Failure, Flood, Localized Flood, Levee Failure Actions					
Action 13. I & I Program	HVLCSD	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 14. Update and Implement Stormwater Master Plan	HVLCSD/Lake County Water Resources Department/HVLA	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 15. Establish Cross Functional Committee and Address Levee & Stream Issues	HVLCSD/Lake County Water Resources/HVLA	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 16. Chlorine Analyzers	HVLCSD	X	X		Property Protection
Action 17. Dam Inundation Mitigation	HVLCSD/Lake County Water Resources/HVLA	X	X	X	Property Protection Structural Projects Natural Resource Protection
Drought Actions					
Action 18. Rescind the Water Moratorium	HVLCSD	X	X		Property Protection
Action 19. Hexavalent Chromium	HVLCSD	X	X		Property Protection Natural Resource Protection
Earthquake Actions					
Action 20. Earthquake Vulnerability Assessment and Retrofit	HVLCSD	X	X		Property Protection Structural Projects
Wildfire Actions					
Action 21. Fuel Mitigation	HVLCSD	X	X		Prevention Property Protection Natural Resource Protection
Action 22. Add/Improve/Fortify Fire Hydrants	HVLCSD	X	X		Prevention Property Protection Natural Resource Protection Emergency Services

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Chapters

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Abbreviations and Acronyms

Acronym	Definition
AB	Assembly Bill
AGL	Above Ground Level
AHJ	Authorities Having Jurisdiction
AHPS	Advanced Hydrologic Prediction Service
ALERT	Automated Local Evaluation in Real Time
APG	California Adaptation Planning Guide
AQI	Air Quality Index
BAM	Best Available Map
BLM	Bureau of Land Management
BMP	Best Management Practices
CA	California
CAC	Community Assistance Contact
CAV	Community Assistance Visit
CA-DWR	California Department of Water Resources
Cal OES	California Office of Emergency Services
CAP	Climate Adaptation Plan
CAS	Climate Adaptation Strategy
CBC	California Business Code
CCHPR	Climate Change and Health Profile Report
CDAA	California Disaster Assistance Act
CDBG	Community Development Block Grant
CDEC	California Data Exchange Center
CDFA	California Department of Food & Agriculture
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERT	Community Emergency Response Training
CFR	Code of Federal Regulations
CGS	California Geologic Survey
CHP	California Highway Patrol
CIP	Capital Improvements Plan
CIRA	Climate Change Impacts and Risk Analysis
CLOMR	Conditional Letter of Map Revision
COPD	Chronic Obstructive Pulmonary Disease
CNPS	California Native Plant Society
CNRA	California Natural Resource Agency
CREAT	Climate Resilience Evaluation and Awareness Tool

Acronym	Definition
CRS	(National Flood Insurance Program's) Community Rating System
CRV	Content Replacement Values
CVP	Central Valley Project
CWPP	Community Wildfire Protection Plan
DAC	Disadvantaged Community
DMA	Disaster Mitigation Act of 2000
DOF	Department of Finance
DOT	Department of Transportation
DSOD	Division of Safety of Dams
EAS	Emergency Alert System
EF	Enhanced Fujita
EPA	Environmental Protection Agency
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPS	Economic Planning Systems
EWP	Emergency Watershed Protection Program
F	Fujita
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zone
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance Program
FRA	Federal Responsibility Area
FRAP	Fire and Resource Assessment Program
FWS	US Fish and Wildlife Service
GHG	Greenhouse Gases
GIS	Geographic Information Systems
HMGP	Hazard Mitigation Grant Program
HI	Heat Index
HVLA	Hidden Valley Lake Association
HVLCSD	Hidden Valley Lake Community Services District
IBC	International Business Code
ICC	Increased Cost of Compliance
IPCC	Intergovernmental Panel on Climate Change
IRC	International Residential Code
LFPZ	Levee Flood Protection Zone
LHMP	Local Hazard Mitigation Plan
LOMA	Letter of Map Amendment
LOMR	Letter of Map Revision

Acronym	Definition
LRA	Local Responsibility Area
MGD	Million Gallons per Day
MHDP	Multi Hazards Demonstration Project
MHI	Median Household Income
MMI	Modified Mercalli Intensity Scale
MSL	Mean Sea Level
NASA	National Aerospace and Science Agency
NAVD 88	North America Vertical Datum 1988
NCDC	National Climactic Data Center
NDMC	National Drought Mitigation Center
NEHRP	National Earthquake Hazards Reduction Program
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGVD 29	National Geodetic Vertical Datum 1929
NIDIS	National Integrated Drought Information System
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPDP	National Performance of Dams Program
NPS	National Park Service
NWS	National Weather Service
OHP	Office of Historic Preservation
PDM	Pre-Disaster Mitigation Program
PM	Particulate Matter
PMR	Physical Map Revision
PPI	Program for Public Information
PRE–WERT	Pre-Watershed Emergency Response Team
PRP	Preferred Risk Policy
RAWS	Remote Automated Weather Stations
RCP	Representative Concentration Pathway
RL	Repetitive Loss
SB	Senate Bill
SBA	Small Business Administration
SDC	Seismic Design Category
SEMS	Standardized Emergency Management System
SFHA	Special Flood Hazard Area
SGMA	Sustainable Groundwater Management Act
SHBC	State Historical Building Code
SOI	Sphere of Influence
SOP	Standardized Operations Procedures

Acronym	Definition
SRA	State Responsibility Area
SRL	Severe Repetitive Loss
SWAMP	Surface Water Ambient Monitoring Program
SWRCB	State Water Resource Control Board
SWP	State Water Project
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
UCERF	Uniform California Earthquake Rupture Forecast
UHI	Urban Heat Island
ULDC	Urban Levee Design Criteria
ULOP	Urban Level of Protection Criteria
USACE	US Army Corp of Engineers
USGS	United States Geologic Survey
USDA	United States Department of Agriculture
VAR	Values at Risk
VHFHSZ	Very High Fire Hazard Severity Zone
WMP	Wildlife Hazard Management Plan
WRCC	Western Regional Climate Center
WUI	Wildland Urban Interface

Chapter 1 Introduction

1.1 Purpose

The Hidden Valley Lake Community Services District (HVLCSD or District) prepared this Local Hazard Mitigation Plan (LHMP) to guide hazard mitigation planning to better protect the people and property of the HVLCSD from the effects of hazard events. This LHMP 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 was also developed so that HVLCSD 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, 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 (National Institute of Building Science Multi-Hazard Mitigation Council 2017 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 documents the HVLCSD'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 HVLCSD LHMP is a single jurisdictional Plan 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 the 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 will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. HVLCSD has been affected by hazards in the past and is thus committed to reducing future impacts from hazard events and becoming eligible for mitigation-related federal funding.

1.3 Plan Organization

The HVLCSD LHMP 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

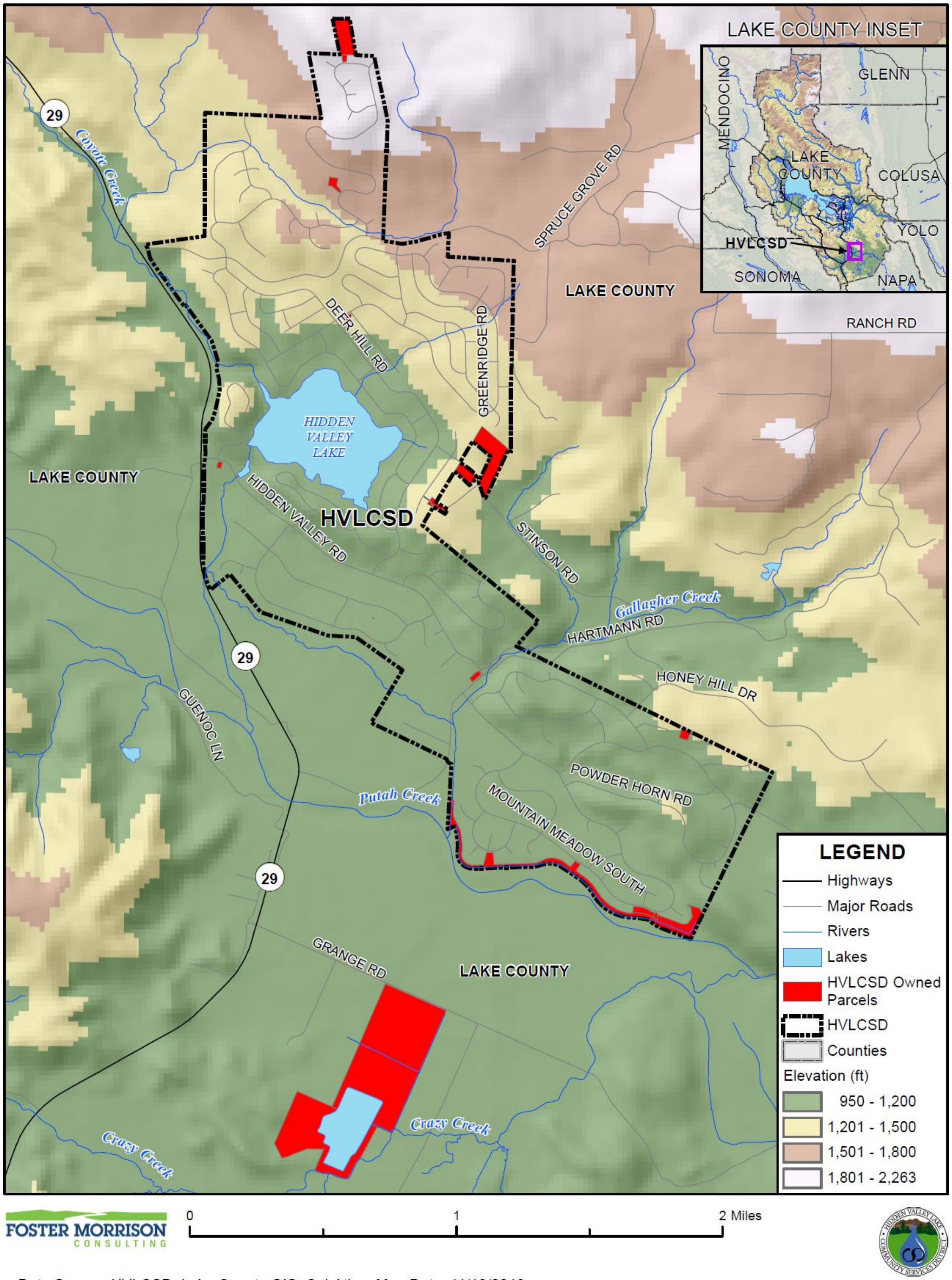
- Appendices
  - ✓ Appendix A: Planning Process
  - ✓ Appendix B: References
  - ✓ Appendix C: Mitigation Strategy
  - ✓ Appendix D: Adoption Resolution
  - ✓ Appendix E: Critical Facilities

Chapter 2 Community Profile

2.1 Hidden Valley Lake Community Services District Overview

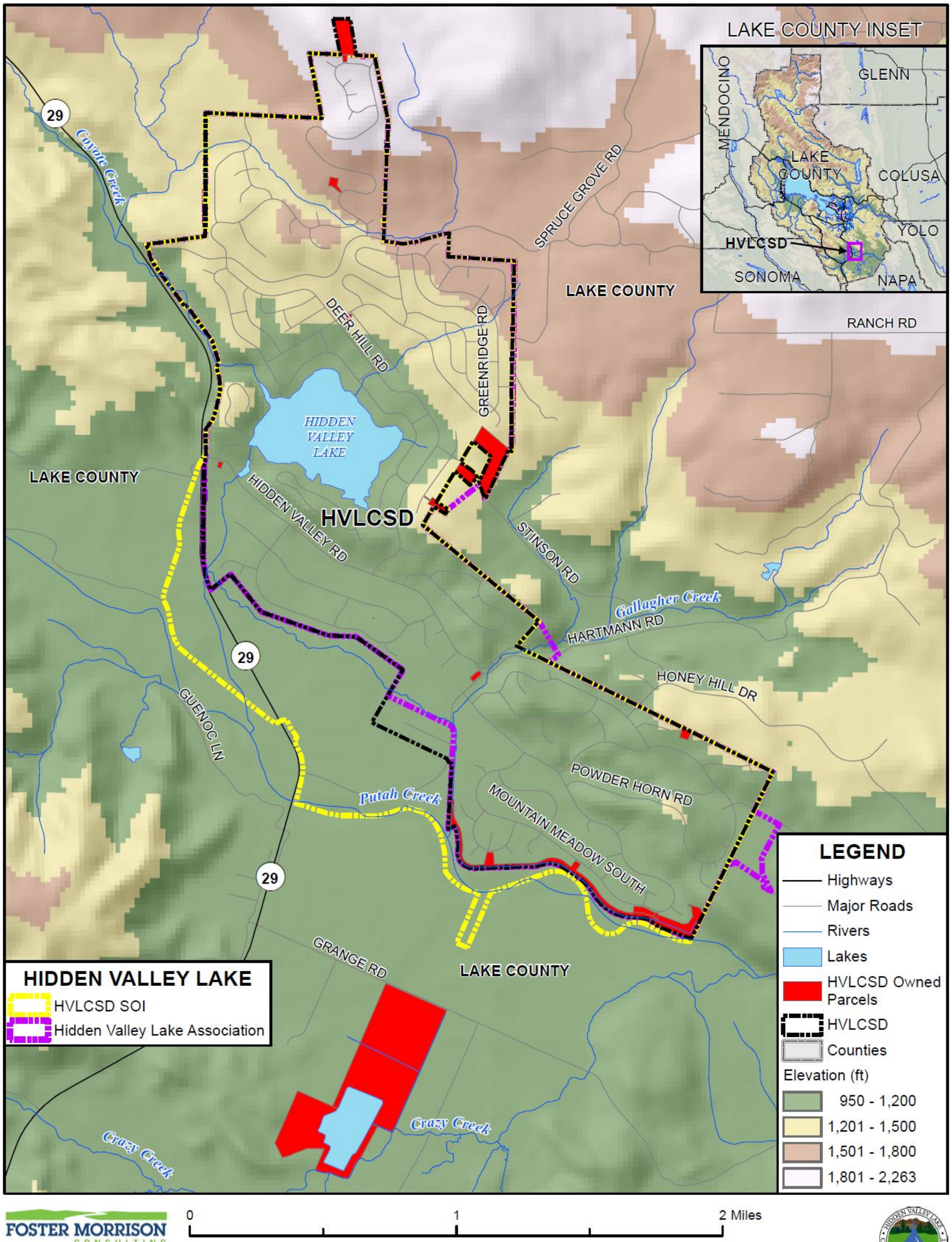
Hidden Valley Lake is a census-designated place and gated subdivision located in rural, southern Lake County, in northern California. The population was 5,579 at the 2010 census, up from 3,777 at the 2000 census. Today, it is a Common Interest Development known as Hidden Valley Lake Association (HVLA). The Hidden Valley Lake Community Service District (HVLCSD or District) services this area with water, wastewater, and reclaimed water services. The HVLCSD boundaries and owned parcels outside of their boundaries can be seen on Figure 2-1 below, while the HVLA boundaries, the HVLCSD boundaries, and the HVLCSD Sphere of Influence (SOI) can be seen on Figure 2-2.

Figure 2-1 Hidden Valley Lake Community Services District



Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Figure 2-2 HVLCSD – District Boundary, Sphere of Influence, and HVLA Boundary



Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

According to the 2013-2018 Hidden Valley Lake Community Service District Strategic Plan, the District supplies clean, safe municipal drinking water to approximately 2,400 homes and 20 businesses, and provide reliable sewer services for approximately 1,500 connections within its three-square-mile service area. Irrigation water (nearly all of which consists of reclaimed wastewater from the District's tertiary sewer treatment facility) is provided by the District for approximately 80 acres of the Hidden Valley Lake Golf Course.

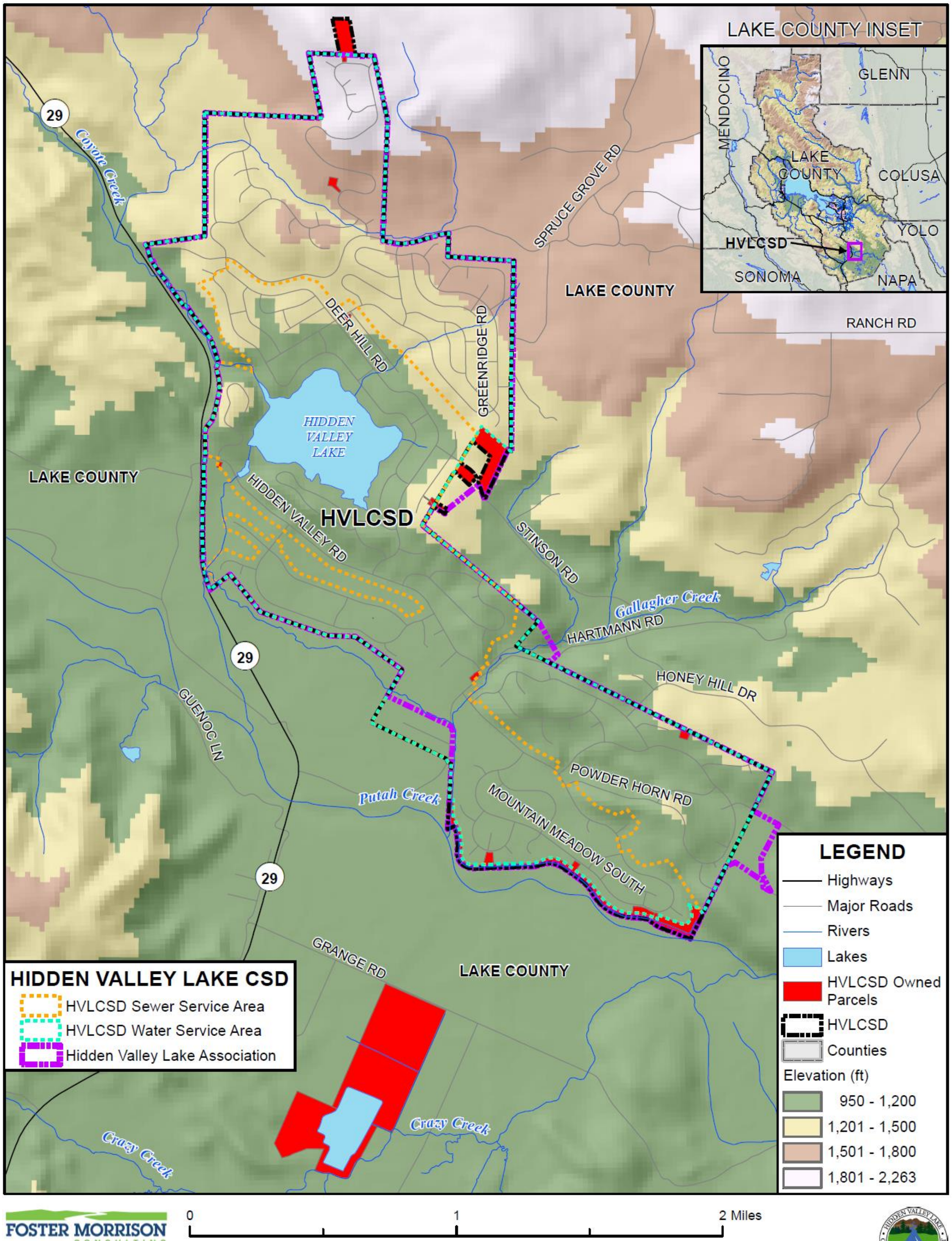
The District operates 4 ground water wells (3 are active and 1 is inactive), uses gaseous chlorine as a disinfectant, then pumps the treated water to seven elevated storage tanks. The water is distributed to 2,490 customer meters which vary in size from 5/8" to 2". The District also has an agricultural well that provides water down Putah Creek during the summer to mimic natural water flow.

HVLCSD drinking water supply comes from three wells. Collectively, the three wells have a combined maximum capacity of 2.72 million gallons per day (mgd). A fourth well provides up to1.44 mgd for irrigation purposes. Currently, the peak total daily demand for drinking water is approximately 1.7 mgd. The water distribution system includes 31 miles of pipes ranging from 4 inches to 12 inches in diameter, five booster pumps that pull water from the ground (each of which can pump up to 300 gallons per minute), and seven drinking water storage tanks with a combined storage capacity of 2.2 million gallons.

The District wastewater system provides wastewater collection, treatment, and disposal for nearly 1,500 customers. Currently, the wastewater treatment facility processes an average of 180,000 gallons per day, all of which is recycled and used to irrigate the Hidden Valley Lake Golf Course. The District sewer collection system consists of approximately 15 miles of sewer pipe ranging from 4 inches to 15 inches in diameter, 1.5 miles of forced main, and eight pumping stations.

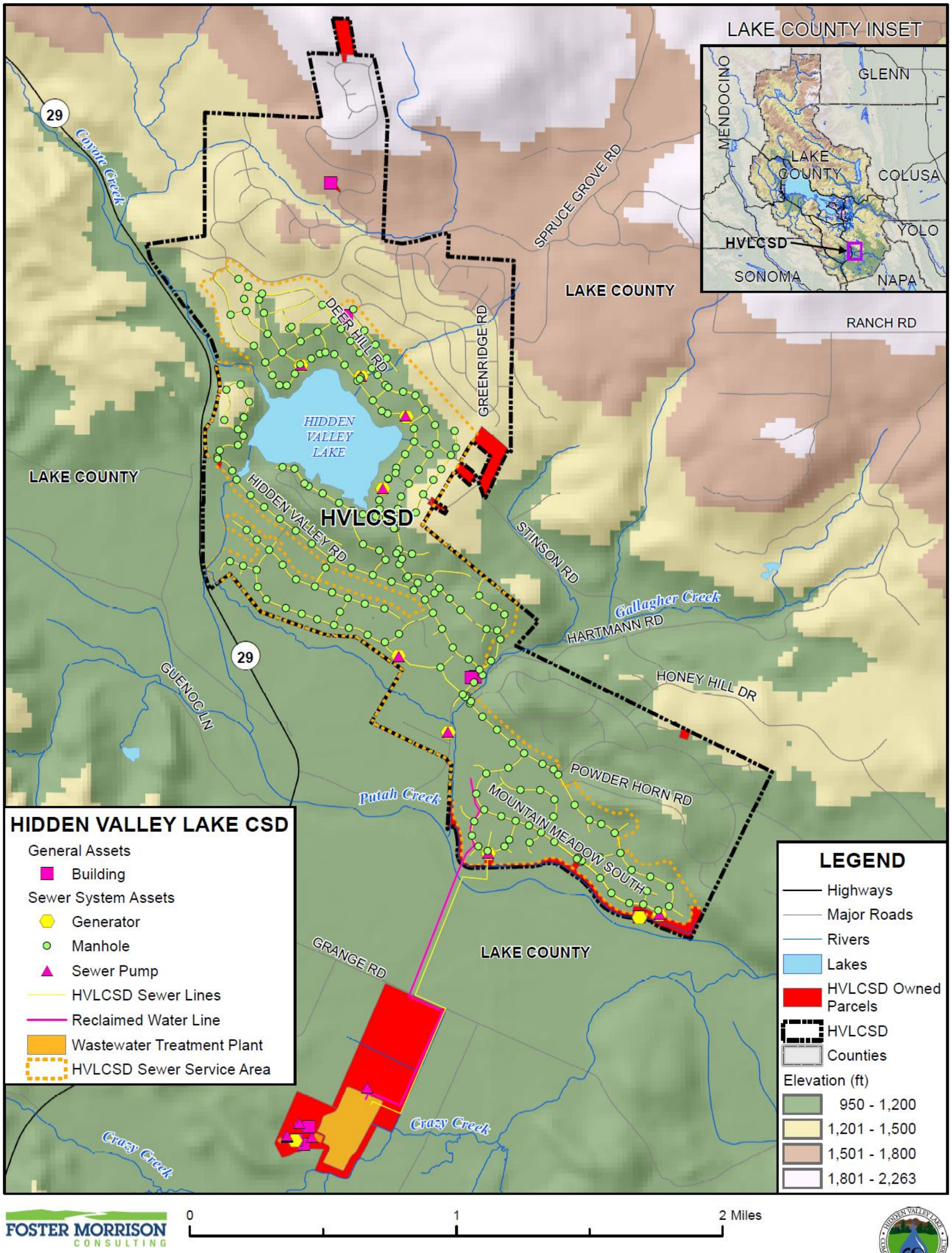
The District's overall service area can be seen on Figure 2-3. This service area is for both sewer (as seen in Figure 2-4) and for water (as seen in Figure 2-5).

Figure 2-3 HVLCSD – Overall Service Area



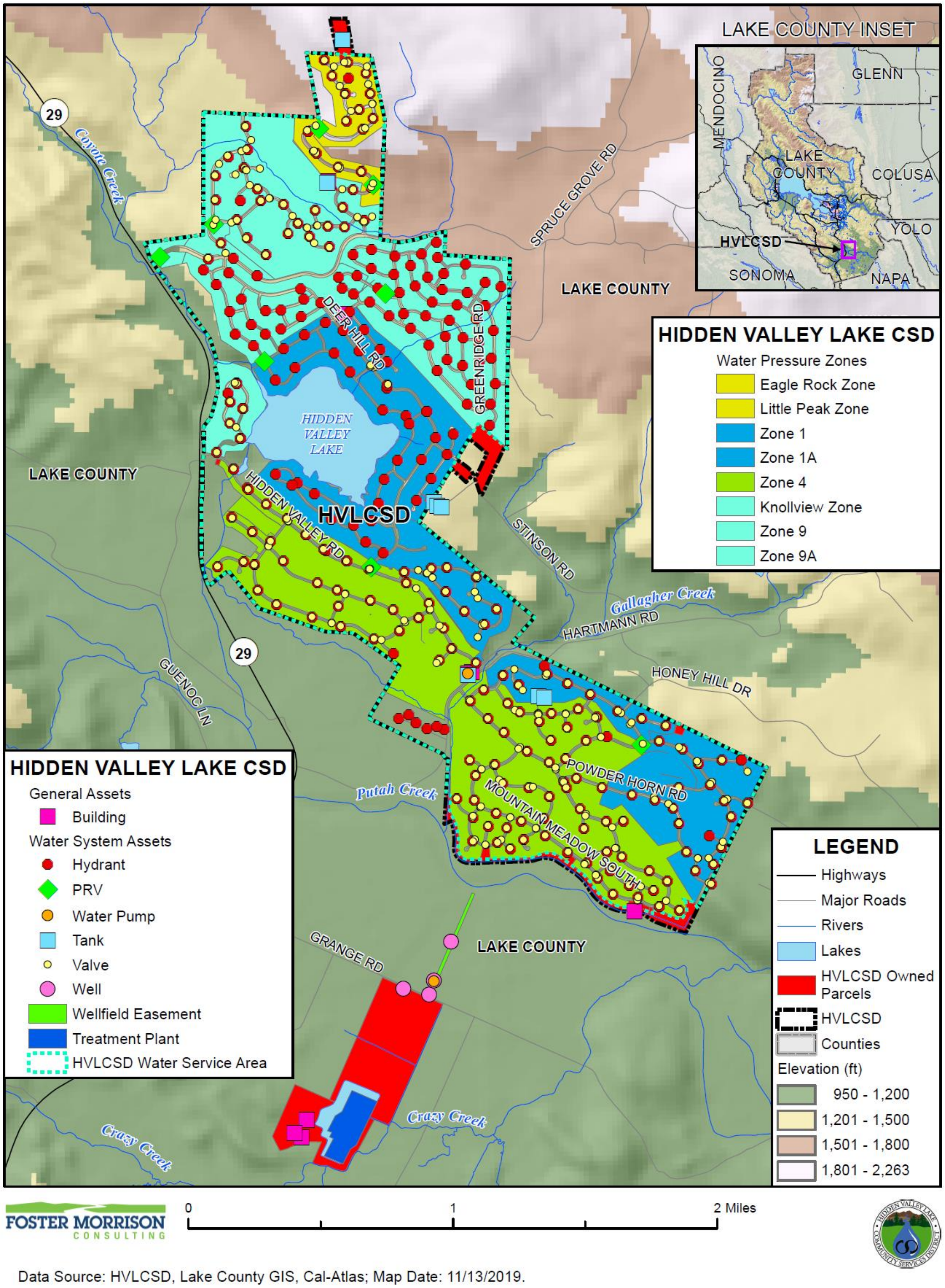
Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Figure 2-4 HVLCSD – Sewer Service Area



Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Figure 2-5 HVLCSD – Water Service Area



2.2 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 Hidden Valley Lake Homeowners Association (Homeowners Association) 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 Hidden Valley Lake Community Services District (the District) 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.

2.3 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.

2.4 HVLCSD Population and Socioeconomic Data

According to 2010 US Census Bureau estimates, the population of the Hidden Valley Lake census designated place is 5,579. This represents an increase in population from the 2000 US Census, which estimated the population at 3,777. It should be noted that this information is related to the area the District services, and not to the actual District itself. Select social and economic information for the District is shown in Table 2-1.

Table 2-1 Hidden Valley Lake Community Services District– Select Social and Economic Statistics

Statistic	Number
Populations	
Population under 5	5.4%
Population over 65	6.8%
Median Age	41.3
Racial Makeup	
White	86.6%
Black or African American	1.1%
American Indian or Alaska Native	1.4%
Asian	1.3%
Native Hawaiian or Pacific Islander	0.2%
Other Races	5.8%
Two or more races	3.5%
Income and Poverty	
Median income	$63,079
Mean Income	$73,250
Poverty rate	
All families	9.6%
All people	11.3%

Source: 2010 US Census, 2017 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 2-2.

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

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	60	2.5%
Construction	359	15.1%

Industry	Estimated Employment	Percent
Manufacturing	94	3.9%
Wholesale trade	34	1.4%
Retail trade	142	6.0%
Transportation and warehousing, and utilities	114	4.8%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	127	5.3%
Professional, scientific, and management, and administrative and waste management services	414	17.4%
Educational services, and health care and social assistance	607	25.5%
Arts, entertainment, and recreation, and accommodation and food services	253	10.6%
Other services, except public administration	57	2.4%
Public administration	120	5.0%

Source: US Census Bureau American Community Survey 2017 Estimates

Chapter 3 Planning Process

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

The Hidden Valley Lake Community Services District (HVLCSD or District) recognized the importance and need of a Local Hazard Mitigation Plan (LHMP) and initiated its development. After receiving a grant from the Federal Emergency Management Agency (FEMA), which served as the primary funding source for this Plan, the District contracted with Foster Morrison Consulting, Ltd. (Foster Morrison) to facilitate and develop the LHMP. 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 Hazard Mitigation Planning Committee (HMPC) as defined by the Disaster Mitigation Act (DMA) of 2000;
- Meet the DMA requirements as established by federal regulations and following FEMA's planning guidance;
- Support objectives under the National Flood Insurance Program's (NFIP) and the Flood Mitigation Assistance (FMA) program;
- Facilitate the entire planning process;
- Identify the data requirements that HMPC participants could provide and conduct the research and documentation necessary to augment that data;
- Assist in facilitating the public input process;
- Produce the draft and final Plan documents; and
- Coordinate with the California Office of Emergency Services (Cal OES) and FEMA Region IX plan reviews.

3.1 Local Government Participation

The HVLCSD made a commitment to the development of this 2020 multi-jurisdictional LHMP, as the single participating jurisdiction seeking FEMA approval of this LHMP. The DMA planning regulations and guidance stress that each local government (participating jurisdiction) seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

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

For this HVLCSD LHMP, "participation" meant the following:

- Providing facilities for meetings;
- Providing printed materials for meeting attendees;
- Attending and participating in the HMPC meetings;
- Completing and returning the Data Collection Worksheets;
- Collecting and providing other requested data (as available);
- Coordinating information sharing between internal and external agencies;
- Managing administrative details;
- Making decisions on plan process and content;
- Identifying mitigation actions for the Plan;
- Reviewing and providing comments on drafts of the Plan;
- Providing hardcopy Draft documents of 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 Plan;
- Coordinating, and participating in the public input process; and
- Coordinating the formal adoption of the Plan by the HVLCSD governing board.

The HVLCSD seeking FEMA approval of this LHMP met all of these participation requirements. Multiple representatives from the HVLCSD attended the HMPC meetings described in Table 3-3 and also brought together an internal planning team to help collect data, identify mitigation actions and implementation strategies, and to review and provide data on Plan drafts. Appendix A provides additional information and documentation of the planning process, including members of the HMPC. Other jurisdictions and public and private stakeholders supported the planning process through representation on the HMPC, providing data and input for the risk assessment and mitigation strategy; and reviewing and providing input on LHMP drafts prior to finalization and submittal to Cal OES and FEMA.

3.2 The 10-Step Planning Process

Foster Morrison established the planning process for the HVLCSD 2020 LHMP using the DMA planning requirements and FEMA's associated guidance. This guidance is structured around a four-phase process:

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

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

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

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

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

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 HVLCSD's Water Resource Specialist (WRS), as overall project lead, to establish the framework and organization for development of this LHMP. An initial call was held with key District representatives in November or 2018 and again in August 2019 to discuss the organizational and process aspects of this LHMP development process.

The initial kick-off meeting was held on September 10, 2019. Invitations to the kickoff meeting were extended to key District staff, the county, incorporated communities, special districts, as well as to other federal, state, and local stakeholders that might have an interest in participating in the planning process. Representatives from the District and key community stakeholders participated in this LHMP project with additional invitations extended as appropriate throughout the planning process. The list of invitees is included in Appendix A.

The HMPC, comprising key HVLCSD staff and other government, community, and stakeholder representatives developed the Plan with leadership from the HVLCSD and facilitation by Foster Morrison. Table 3-2 shows who participated on the HMPC.

Table 3-2 HMPC Participant List

Agency/Department and Title	Name
HVLCSD Water Resources Specialist	Alyssa Gordon
Public	Ann Hackett
Middletown Unified School District, Superintendent	Catherine Stone
Lake County Division of Environmental Health, Hazardous Materials Specialist	Craig Wetherbee
HVLCSD Utility Supervisor	Dennis White
Hidden Valley Lake Association General Manager	Randy Murphy
HVLCSD Water resources/Capacity building fellowship	Hannah Davidson
Public	Jeannine Anderson
HVLCSD Director - Board of Directors	Jim Freeman
Public	Louise Pagone
Hidden Valley Lake Association Director of Buildings & Grounds Maintenance	Matt Woodard
Lake County Water Resources, Project Coordinator	Marina Deligiannis
HVLCSD Administrative Assistant to the GM	Penny Cuadras
Public	Roger Anderson
Hidden Valley Lake Association Security Coordinator	Tom Strickland
Public	Sue Story
HVLCSD Full Charge Bookkeeper	Trish Wilkinson
HVLCSD Water resources/Capacity building fellowship	Zachary Gianotti

This list includes all HMPC members that attended one or more HMPC meetings detailed in Table 3-3, as well as those who provided key input into the LHMP development process. In addition to providing representation on the HMPC, the District further formulated an internal planning team to collect and provide requested data and to conduct timely reviews of the draft documents.

Meetings

The planning process officially began with an internal project planning meeting held in November 2018 and August 2019 followed by an HMPC kick-off meeting held in HVLCSD on September 10, 2019. The meetings covered the scope of work and an introduction to the DMA requirements. During the HMPC meetings, participants were provided with data collection worksheets to facilitate the collection of information necessary to support development of the LHMP. Using FEMA guidance, these worksheets were designed to capture information on past hazard events, identify hazards of concern to the District, quantify values at risk to identified hazards, inventory existing capabilities, and to identify possible mitigation actions. As part of this effort, Foster Morrison worked closely with HVLCSD staff to develop a spatial (GIS) inventory and database of HVLCSD assets. A copy of the worksheets for this project are included in Appendix A. The HVLCSD seeking FEMA approval of this LHMP completed and returned the worksheets to Foster Morrison for incorporation into this LHMP.

During the planning process, the HMPC communicated through face-to-face meetings, email, telephone conversations, Dropbox and Sharefile websites, and through a District developed webpage dedicated to the LHMP development process. This later website was developed to provide information to the HMPC, the public and all other stakeholders involved in the LHMP process. Draft documents were also posted on this website so that the HMPC members and the public could easily access and review them. The LHMP website (shown on Figure 3-1) can be accessed at: https://www.hvlcsd.org/hidden-valley-lake-community-services-district-2019-local-hazard-mitigation-plan.

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

Table 3-3 HMPC Meetings

Meeting Type	Meeting Topic	Meeting Date(s)	Meeting Location
HMPC #1 Kick-off Meeting	1) Introduction to DMA and the planning process 2) Organize Resources: the role of the HMPC, planning for public involvement, coordinating with other agencies/stakeholders 3) Introduction to Hazard Identification	September 10, 2019	HVLCSD Offices Conference Room
HMPC #2	1) Risk assessment overview and work session - Assess the Hazard - Assess the Problem -Capability Assessment	December 12, 2019	HVLCSD Offices Conference Room
HMPC #3	1) Review of risk assessment summary 2) Intro to Mitigation Action Strategy - Set Goals - Review possible activities	January 8, 2020	HVLCSD Offices Conference Room
HMPC #4	1) Review of mitigation alternatives 2) Identify updated list of mitigation actions by hazard 3) Review of mitigation selection criteria 4) Update and prioritize mitigation actions 5) Mitigation Action Strategy Implementation and Draft Action Development - Review possible activities - Draft an Action Plan	January 9, 2020	HVLCSD Offices Conference Room
HMPC #5	1) Review of final HMPC, jurisdictional and public comments and input to plan 3) Draft an Action Plan 4) Plan maintenance and Implementation Procedures	March 25, 2020	HVLCSD Offices Conference Room (held via conference call)

Planning Step 2: Involve the Public

Up-front coordination discussions with the HVLCSD established the initial plan for public involvement. Public involvement activities for this LHMP Update included press releases, social media communications, stakeholder and public meetings, development of an LHMP webpage and associated website postings, and the solicitation of public and stakeholder comments on the draft Plan through a variety of mechanisms. In addition, members of the public were invited to participate on the HMPC. Information provided to the public included an overview of the LHMP process, including a review of the hazard risk assessment and proposed mitigation strategies for this LHMP. At the planning team 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.

Public Outreach Activities

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

- Outreach on HVLCSD website
- Outreach on District Facebook site
- Press releases on the LHMP development process and Draft document review
- Publishing of notice of public meetings in the local newspaper
- Project flyer on bulletin board outside District Administration Building
- Project flyer on 4 Hidden Valley Lake Association (HVLA) community billboards
- Outreach through HVLA community emails

Images and materials for all of these outreach activities can be found in Appendix A.

The purpose of this outreach was to inform the public and other stakeholders of the HVLCSD's LHMP development project and how they could get involved and how to provide comments on the draft LHMP prior to submittal to Cal OES/FEMA. The initial outreach also invited the public and stakeholders to the public kickoff meeting for the project. Information on these outreach efforts and public comments/responses can be seen in Appendix A to this LHMP.

Public Meetings

Two public meetings for the HVLCSD LHMP were planned during key times of the LHMP development process:

Public Meeting #1: LHMP Kickoff

Public outreach for this LHMP began at the beginning of the LHMP development process with a variety of outreach methods to inform the public of the purpose of the DMA and the hazard mitigation planning process for the HVLCSD. A press release was issued at the beginning of the project to invite the public to a public meeting for the kick-off the LHMP project on September 10, 2019 at the HVLCSD Office Conference Room. In addition, outreach was performed on the District website and an article published in the Lake County Record Bee and notices placed on the HVLCSD Facebook page. Based on this initial outreach, several members of the public joined the HMPC, providing key input on broader hazard concerns and community issues within the Hidden Valley Lake area throughout the LHMP development process.

Public Meeting #2: Meeting on the Draft LHMP

The first draft of the LHMP was provided to the HMPC in January 2020, with a public review draft provided in February 2020. A public meeting was scheduled for March 24, 2020 to present the draft LHMP and to collect public comments on the LHMP prior to finalization and submittal to Cal OES/FEMA. The public meeting on the draft LHMP was advertised in a variety of ways to maximize outreach efforts to the public and included a press release to the Lake County Record Bee and others. The press 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 plan. While it is noted that the Lake County Record Bee did not publish this press release, this meetings and opportunity for public input on the LHMP Public Review Draft were also announced on the HVLCSD website and Facebook page, and numerous flyers were placed at key locations throughout the Hidden Valley Lake community as shown in Appendix A. In addition to a copy of the draft plan being placed on the HVLCSD website in advance of the public meeting, hard copies of the draft of the plan were made available to interested parties at the HVLCSD administrative office. Also as previously noted, members of the public participated in HMPC meetings for LHMP development and were actively involved in reviewing and providing input to the Draft LHMP including input on mitigation actions and projects.

Documentation to support the public meetings can be found in Appendix A. In addition to outreach for public participation, notices of meetings were sent directly to all persons on the HMPC contact list and also to other agency and key stakeholders with an interest in the HVLCSD LHMP project.

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

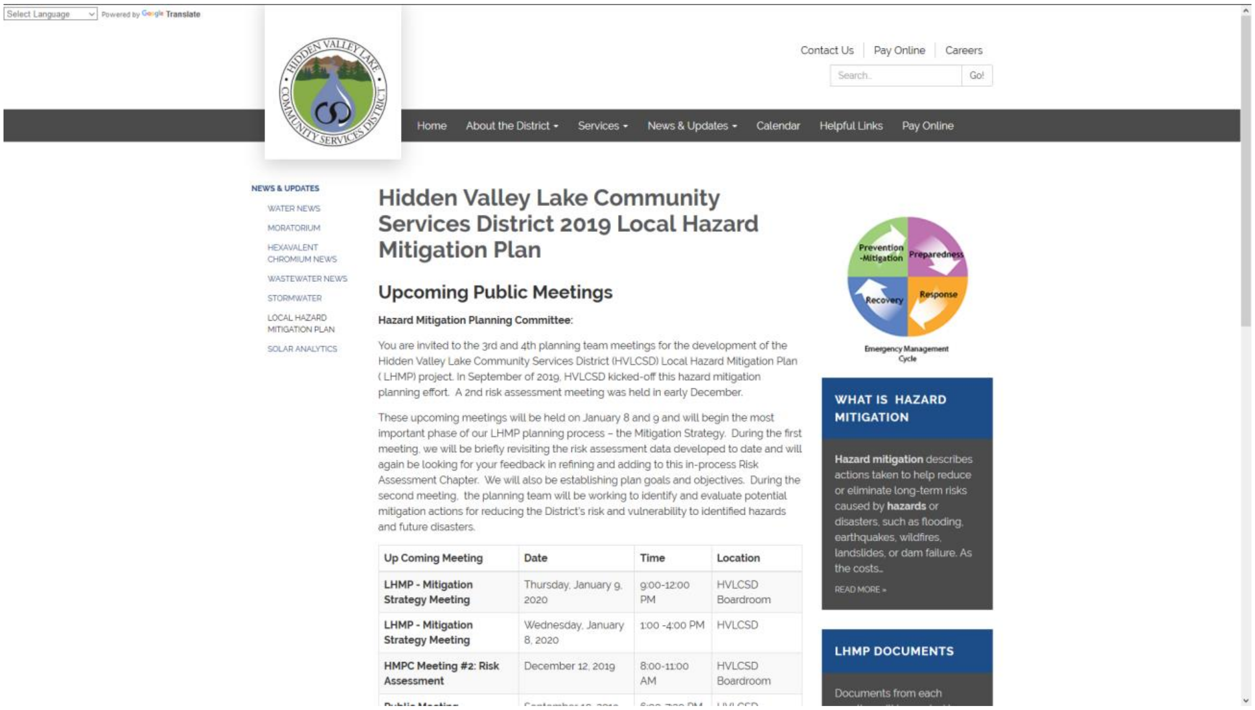
Table 3-4 Public and Stakeholder Meetings

Meeting Type	Meeting Topic	Meeting Date	Meeting Location
Public Meeting #1	1) Intro to DMA and mitigation planning 2) The HVLCSD LHMP Development Process	September 10, 2019	HVLCSD Office Conference Room
Public Meeting #2	1)Presentation of Draft LHMP and solicitation of public and stakeholder comments	March 24, 2020 (meeting cancelled due to social distancing orders for Covid-19)	HVLCSD Office Conference Room

As appropriate, stakeholder and public comments and recommendations are incorporated into the LHMP throughout the LHMP development process, including the sections that address mitigation goals and strategies. Several public comments were received on the Draft Plan. The comments received and how they were addressed are included in Appendix A. All newspaper advertisements, website postings, and public outreach efforts are on file with the HVLCSD and are included in Appendix A.

The draft LHMP is currently available online on the HVLCSD website at: https://www.hvlcsd.org/hidden-valley-lake-community-services-district-2019-local-hazard-mitigation-plan.

Figure 3-1 HVLCSD Local Hazard Mitigation Plan Website



Source: HVLCSD

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 approval would be greatly enhanced by inviting other local, state and federal agencies and organizations to participate in the process. Based on their involvement in hazard mitigation planning, their involvement in the Planning Area, and/or their interest as a neighboring jurisdiction, representatives from the following agencies were invited to participate on the HMPC:

- Big Valley Band of Pomo Indians
- Big Valley Rancheria
- CAL FIRE
- Cal OES
- Callayomi County Water District
- City of Clearlake, Public Works
- City of Lakeport
- Clearlake Police Department
- CVRWQCB
- Elem Indian Colony
- Golden State Water Company
- Habematolel Pomo of Upper Lake
- Highlands Water Co.
- HVLA
- Koi Nation
- Konocti School District
- Lake Co Grand Jury

- Lake County Air Quality District
- Lake County Board of Supervisors
- Lake County Division of Environmental Health
- Lake County Fire Protection District
- Lake County Fire Safe Council
- Lake County Office of Emergency Services
- Lake County Sheriff
- Lake Pillsbury fire
- Lake Pillsbury Ranch
- Lakeport Fire Protection District
- Lakeport Police Department
- MBK Engineering
- Middletown Rancheria
- Middletown Unified School District
- Northshore Fire Protection District
- Putah Creek Council
- Riv. Heights HOA/Firewise
- Scotts Valley Pomo Band of Indians
- Siegler Springs Firewise
- South Lake County Fire Protection District
- South Lake Fire Safe Council
- US Army Corps of Engineers VOAD
- Westside Sacramento IRWM

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

In addition, as part of the overall stakeholder and agency coordination effort, the HMPC coordinated with and utilized input to the LHMP update from the following agencies:

- Cal DWR
- CAL FIRE
- Cal OES
- Cal Trans
- California Department of Water Resources
- CGS - Earthquake Program
- FEMA Region IX - Hazard Mitigation
- FEMA Region IX - Planning
- Fire Departments
- Fish and Wildlife
- Lake County Office of Emergency Services
- Lake County Fire Safe Council
- National Weather Service

- Pacific Gas & Electric
- Red Cross
- United States Army Corps of Engineers
- USGS

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. 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 meeting and to review and comment on the LHMP prior to submittal to CAL OES and FEMA. It should be noted the HVLA and key members of the Hidden Valley Lake Community in conjunction with HVLCSD staff were instrumental in working collectively to develop the HVLCSD LHMP.

Other Community Planning Efforts and Hazard Mitigation Activities

Coordination with other community planning efforts is also paramount to the success of this LHMP. 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, such as strategic and master plans, local ordinances, and state requirements, and internal procedures to guide operations, growth and development of the HVLCSD. Integrating existing planning efforts and mitigation policies and action strategies into this LHMP establishes a credible and comprehensive plan that ties into and supports other District programs. The development of this LHMP incorporated information from the following existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities and other jurisdictions. More detail can be found in Appendix B.

- Cal-Adapt
- Cal-DWR
- CAL OES
- CAL FIRE
- CalTrans
- California Department of Conservation
- California Department of Finance
- California Department of Water Resources
- California Geological Survey
- California Office of Historic Places
- FEMA Region IX
- Lake County
- Library of Congress
- National Oceanic and Atmospheric Association
- National Performance of Dams Program
- National Register of Historic Places
- National Resource Conservation Service
- National Response Center
- National Weather Service
- United States Army Corps of Engineers
- United States Geological Survey
- Western Regional Climate Center

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 ordinances were incorporated into the risk assessment and hazard vulnerability sections of the LHMP. In accordance with DMA requirements and guidance, Best Available Data was used throughout in the development of this LHMP. Where the data from the existing studies and reports is used in this LHMP, the source document is referenced throughout this LHMP. The data was also used in determining the capability of the District in being able to implement certain mitigation strategies. Appendix B, References, provides a detailed list of references used in the preparation of this LHMP.

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 the HVLCSD Planning Area. The HMPC relied on information from the HVLCSD's Strategic Plan, the 2018 Lake County, City of Clearlake, and City of Lakeport LHMPs, the 2018 State of California Hazard Mitigation Plan, and other sources to establish the hazards list for this LHMP. 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 District'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.

Also to be noted, DMA requires an assessment of a jurisdiction's continued compliance with the NFIP as part of an LHMP. However, this applies only to eligible NFIP communities. HVLCSD as a special District to is not eligible to participate in this program. While the District does not participate in the NFIP and thus does not administer its own floodplains, it complies with the flood requirements established by the State of California and Lake County in which its facilities are located.

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 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 placed on the HVLCSD website and advertised to collect public input and comments. The HMPC integrated comments and issues from the public, as appropriate and as detailed above, along with additional internal review comments and produced a third draft for review and approval by CAL OES and FEMA Region IX, 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, the Plan was adopted by the HVLCSD governing board using the sample resolutions contained in Appendix D.

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

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

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

Chapter 4 Risk Assessment

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

As defined by 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 HVLCSD risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The process allows for a better understanding of a jurisdiction's potential risk to 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 into a four-step process:

1. Identify hazards
2. Profile hazard events
3. Inventory assets
4. Estimate losses

Data 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 Hazard Profiles** discusses the threat to the District and describes the hazard location, extent, previous occurrences of hazard events, and the likelihood of future occurrences.
- **Section 4.3 Vulnerability Assessment** assesses the District's exposure to natural hazards, considering assets at risk, critical facilities, populations, and future development trends.
- **Section 4.4 Capability Assessment** inventories existing mitigation activities and policies, regulations, and plans that pertain to mitigation in the District and can affect net vulnerability.

This risk assessment covers the entire geographical extent of the Hidden Valley Lake Community Services District (HVLCSD or District), including the HVLCSD Service Area.

4.1 Hazard Identification: Natural Hazards

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

The HMPC conducted a hazard identification study to determine the hazards that threaten the HVLCSD including its service area. This section details the methodology and results of this effort.

Data Sources

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

- HMPC input
- National Oceanic and Atmospheric Administration
- 2018 State of California Hazard Mitigation Plan
- 2018 Lake County Local Hazard Mitigation Plan
- FEMA Disaster Declaration Database

4.1.1. Methodology and Results

Using existing natural hazards data and input gained through the kickoff planning meeting, the HMPC agreed upon a list of natural hazards that could affect HVLCSD. Hazards data from the California Office of Emergency Services (Cal OES), FEMA, the National Oceanic and Atmospheric Administration (NOAA), and many other sources were examined to assess the significance of these hazards to the District. Significance of each identified hazard was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries, as well as property and economic damage. The natural hazards evaluated as part of this plan include those that have occurred historically or have the potential to cause significant human and/or monetary losses in the future.

As a starting point, the updated 2018 State of California Multi-Hazard Mitigation Plan (2018 State Plan) was consulted to evaluate the applicability of State hazards of concern to the District. Building upon this effort, hazards from the 2018 Lake County LHMP were also identified and considered.

Certain hazards were excluded from consideration for this Plan. They are shown in Table 4-1.

Table 4-1 HVLCSD – Excluded Hazards

Hazard Excluded	Why Excluded
Tsunami	The District is not on the coast.
Avalanches	The District does not have sufficient snowfall to have avalanche as a hazard.
Air Pollution	The District did consider this a hazard for the LHMP; it is dealt with in other County planning mechanisms.
Coastal Flooding, Erosion, and Sea Level Rise	The District is not on the coast.

Hazard Excluded	Why Excluded
Energy Shortage and Energy Resilience	The District did consider this a hazard for the LHMP; it is dealt with in other County and District planning mechanisms.
Insects Pests and Diseases	The District did consider this a hazard for this LHMP; it is dealt with in other County planning mechanisms. This is not an issue to the District facilities and operations.
Epidemic/Pandemic/Vector Borne Disease Hazards	This is not an issue to District facilities and operations.
Natural Gas Pipeline Hazards	The District did not consider this a hazard due to the low number of gas pipelines traversing the District.
Oil Spills	The District did not consider this a hazard, as there are few pipelines or oil wells in the District.
Radiological Accidents	There are no areas in the District at risk to this hazard.
Terrorism	The District did consider this a hazard for this LHMP; it is dealt with in other County and District planning mechanisms.
Cyber Threats	The District did consider this a hazard for this LHMP; it is dealt with in other County and District planning mechanisms.
Airline Crashes	There have been no past occurrences in the District of airplane crashes. This is not under the control of the District to address.
Civil Disturbance	The District did not consider this a hazard for this LHMP; it is dealt with in other County planning mechanisms.
Well Stimulation and Hydraulic Fracking	This is not occurring in the District.

The worksheet below was completed by the HMPC to identify, profile, and rate the significance of identified hazards. Only the more significant (or priority) hazards have a more detailed hazard profile and are analyzed further in Section 4.3 Vulnerability Assessment. Table 4-34 in Section 4.2.16 Natural Hazards Summary provides an overview of these significant hazards.

Table 4-2 HVLCSD Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Aquatic Biological Hazards: quagga mussel	Limited	Unlikely	Catastrophic	Medium	Low
Climate Change	Extensive	Likely	Critical	High	–
Dam Failure	Extensive	Unlikely	Catastrophic	High	Low
Drought and Water Shortage	Extensive	Likely/Occasional	Critical	Medium	High
Earthquake	Extensive	Highly Likely/ Occasional	Catastrophic	Medium	Low
Flood: 1%/0.2% Annual Chance	Significant	Occasional/Unlikely	Critical	High	Medium
Flood: Localized/Stormwater	Extensive	Highly Likely	Critical	High	Medium
Landslide and Debris Flows	Limited	Occasional	Limited	Low	Medium
Levee Failure	Significant	Occasional	Critical	High	Medium
Severe Weather: Extreme Cold and Freeze	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Heavy Rains, Snow, and Storms	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: High Winds	Extensive	Highly Likely	Limited	Medium	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High	High

Geographic Extent
Limited: Less than 10% of Service Area
Significant: 10-50% of Service Area
Extensive: 50-100% of Service Area

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

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

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Climate Change Impact:
Low: Climate change is not likely to increase the probability of this hazard.
Medium: Climate change is likely to increase the probability of this hazard.
High: Climate change is very likely to increase the probability of this hazard.

Source: HVLCSD

4.1.2. Disaster Declaration History

One method to identify hazards based upon past occurrences is to look at what events triggered federal and/or state disaster declarations within the District (although disaster declarations are declared on a county basis). Disaster declarations are granted when the severity and magnitude of the event's impact surpass 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, following the local agency's declaration, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state government's capacity is exceeded, a federal disaster declaration may be issued allowing for the provision of federal disaster 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. This section focuses on state and federal disaster and emergency declarations.

Lake County has experience 27 federal and 22 state declarations since 1950. 15 of the federal declarations were associated with flood events (including heavy rain and storms), 10 with wildfire, and 1 with hurricane (for evacuations stemming from Hurricane Katrina in 2005). Regarding state disaster declarations, 2 of the state declarations were associated with drought, 2 were economic, 1 with fire, 14 with flood (including heavy rain and storms), 2 with freeze, and 1 was from road damage. Details of each federal and state disaster declaration are detailed in Table 4-3. A summary of federal and state disaster declarations is shown in Table 4-4.

Table 4-3 Lake County Disaster Declarations 1950-2019

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
2019	California Severe Winter Storms, Flooding, Landslides, And Mudslides	Storms	Storms	DR-4434	–	5/17/2019
2018	Mendocino Complex Fires	Fire	Fire	DR-4382	–	8/4/2018
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	–	4/1/2017

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
2017	California Severe Winter Storms, Flooding, Mudslides	Flood	Storms	DR-4301	–	2/14/2017
2016	Clayton Fire	Fire	Fire	FM-5145	–	8/14/2016
2015	Valley Fire and Butte Fire	Fire	Fire	DR-4240	–	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	–
2012	Wye Fire	Fire	Fire	FM-5004	–	8/13/2012
2006	2006 June Storms	Flood	Storms	DR 1646	–	6/5/2006
2005/2006	2005/06 Winter Storms	Flood	Storms	DR-1628	–	2/3/2006
2005	Hurricane Katrina Evacuations	Economic	Hurricane	EM-3248 2005	–	9/13/2005
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	Proclaimed	2/19/1998
1997	1997 January Floods	Flood	Storms	DR-1155	1/2/97-1/31/97	1/4/1997
1996	Lake County Fire	Fire	Fire	DC-96-03	–	8/1/1996
1995	California Severe Winter Storms, Flooding, Landslides, Mud Flows	Flood	Storms	DR-1046	Proclaimed	3/12/1995
1995	1995 Severe Winter Storms	Flood	Storms	DR-1044	1/6/95-3/14/95	1/13/1995
1987	1987 Fires	Fire	Fire	GP	9/10/87, 9/3/87	–
1986	1986 Storms	Flood	Storms	DR-758	2/18-86-3/12/86	2/18/1986
1985	Hidden Valley Lake Fire	Fire	Fire	FM-2055	–	7/11/1985

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
1983	Winter Storms	Flood	Flood	DR-677	12/8/82-3/21/83	2/9/1983
1980	April Storms	Flood	Storms	–	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
1958	1958 February Storms and Floods	Flood	Storms	CDO 58-03	2/26/1958	–
1955	1955 Floods	Flood	Flood	DR-47	12/22/1955	12/23/1955
1950	1950 Floods	Flood	Flood	OCD 50-01	11/21/1950	–

Source: Cal OES, FEMA

Table 4-4 Lake County Disaster Declarations 1950-2019 Summarized by Disaster Type

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Drought	0	–	2	1977, 2014
Economic	0	–	2	1979, 2001
Fire	10	1985, 1996, 2012, 2015 (three times), 2016, 2017(twice), 2018	1	1987
Flood (including heavy rains and storms)	16	1955, 1958, 1963, 1964, 1970, 1983, 1986, 1995 (twice), 1997, 1998, 2005/2006, 2006, 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1963 (twice), 1970, 1980, 1983, 1986, 1995 (twice), 1997, 1998

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Freeze	0	–	2	1970, 1972
Hurricane	1	2005	0	–
Road Damage	0	–	1	2003
Totals	**27**	–	**22**	**–**

Source: Cal OES, FEMA

4.2 Hazard Profiles

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

The hazards identified in Section 4.1 Hazard Identification Natural Hazards, are profiled individually in this section. In general, information provided by planning team members is integrated into this section with information from other data sources. These profiles set the stage for Section 4.3 Vulnerability Assessment, where the vulnerability is quantified, as data allows, for each of the priority hazards.

Each hazard is profiled in the following format:

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

Section 4.2.16 Natural Hazards Summary provides an initial assessment of the profiles and assigns a level of significance or priority to each hazard. Those hazards determined to be of medium or high significance were characterized as priority hazards that required further evaluation in Section 4.3 Vulnerability Assessment. Those hazards that occur infrequently or have little or no impact on the District were determined to be of low significance and not considered a priority hazard. Significance was determined based on the hazard profile, focusing on key criteria such as frequency and resulting damage, including deaths/injuries and property, crop, and economic damage. This assessment was used by the HMPC to prioritize those hazards of greatest significance to the District, enabling HVLCSD to focus resources where they are most needed.

The following sections provide profiles of the natural hazards that the HMPC identified in Section 4.1 Hazard Identification. Given that most disasters that affect the District are directly or indirectly related to severe weather events, severe weather hazards begin this section, and the other individual hazard profiles follow alphabetically.

Data Sources

The following data sources formed the basis for this Hazard Profiles portion of the Plan:

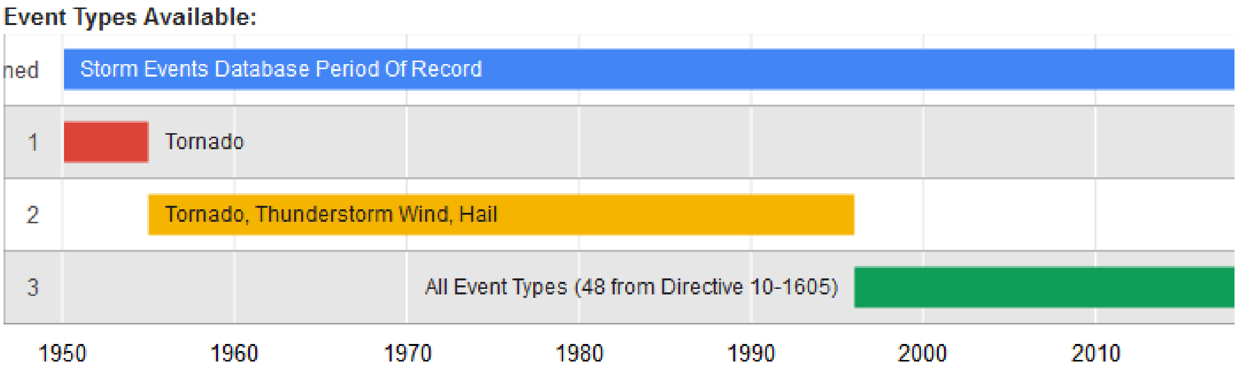
- 2000 Master Storm Drainage Plan for Hidden Valley Lake CSD
- 2006 Lake County Water Inventory
- 2008 Lake County Community Wildfire Protection Plan
- 2014 California Climate Adaptation Strategy
- 2018 HVLCSD Infiltration and Inflow Assessment
- 2018 State of California Multi-Hazard Mitigation Plan
- 2018-2019 Annual Report of the Upper Putah Creek Watershed Watermaster
- CAL FIRE
- Cal-Adapt
- California Department of Water Resources Best Available Maps
- California Department of Water Resources Division of Safety of Dams
- California Division of Mines and Geology
- California Geologic Survey
- California Natural Resource Agency
- California State Water Resources Control Board
- California's Adaptation Planning Guide: Understanding Regional Characteristics
- California's Drought of 2007-2009, An Overview. State of California Natural Resources Agency, California Department of Water Resources
- California's Fourth Climate Change Assessment
- Climate Change and Health Profile Report – Lake County
- Climate Institute
- Climate.org website (http://climate.org/algae-cyanobacteria-blooms-and-climate-change/)
- Federal Emergency Management Agency
- FEMA Lake County Flood Insurance Study 9/30/2005
- FEMA Lake County Preliminary Flood Insurance Study 6/18/2014
- FEMA Multi-Hazard Identification and Risk Assessment
- FEMA National Flood Insurance Program
- HMPC Input
- Intergovernmental Panel on Climate Change

- Lake County 2008 General Plan
- Lake County Emergency Operations Plan
- 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.
- NASA
- National Center for Atmospheric Research in Boulder, Colorado
- National Climate Assessment
- National Drought Mitigation Center
- National Integrated Drought Information System
- National Interagency Fire Center
- National Levee Database
- National Oceanic and Atmospheric Administration's National Climactic Data Center
- National Performance of Dams Program at Stanford University
- National Weather Service
- NOAA Storm Prediction Center
- Science magazine
- Southern California Association of Governments
- United State Geologic Survey, Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977
- United States Geological Survey Open File Report 2015-3009
- US Army Corps of Engineers
- US Bureau of Land Management
- US Environmental Protection Agency
- US Geological Survey
- US Geological Survey - Biological Resources Division
- US National Park Service
- US Occupational Safety and Health Administration
- USDA Climate Change and Invasive Mussels Project (https://portal.nifa.usda.gov/web/crisprojectpages/1003732-climate-change-and-invasive-mussels-interacting-effects-on-new-york-lakes.html)
- USDA Forest Service Region 5
- USGS
- USGS Publication 2014-3120
- Vaisala National Lightning Detection Network
- Western Regional Climate Center
- World Health Organization

4.2.1. Severe Weather: General

Severe weather is generally any destructive weather event, but usually occurs throughout the District as localized storms that bring heavy rain, lightning, and strong winds. The NOAA's National Climatic Data Center (NCDC) has been tracking severe weather since 1950. Their Storm Events Database contains data on the following events shown on Figure 4-1.

Figure 4-1 NCDC Storm Events Database Period of Record



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

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

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

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

Source: NCDC

This database contains severe weather events that occurred in Lake County between January 1, 1950, and May 31, 2019. These events affected the County as a whole, and most likely had some effect on the HVLCSD as well. Table 4-5 summarizes these events.

*Table 4-5 Lake County NCDC Storm Events 1/1/1950-5/31/2019**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Blizzard	1	0	0	0	0	$0	$0
Debris Flows	2	0	0	0	0	$300,000	$0
Drought	15	0	0	0	0	$0	$0
Excessive Heat	1	0	0	0	0	$0	$0
Flash Flood	2	0	0	0	0	$10,000	$0
Flood	16	1	0	4	0	$23,430,000	$0
Frost/Freeze	2	0	0	0	0	$0	$0
Hail	1	0	0	0	0	$0	$0
Heat	4	0	0	0	0	$0	$0
Heavy Rain	7	0	0	0	0	$0	$0
Heavy Snow	4	0	0	0	0	$10,000	$0
High Wind	13	0	0	0	0	$168,000	$0

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Strong Wind	1	0	0	0	0	$1,000	$0
Wildfire	13	5	1	37	9	$5,750,000	$0
Winter Storm	62	0	0	0	0	$0	$0
Winter Weather	7	0	0	0	0	$0	$0
Total	**151**	**6**	**1**	**41**	**9**	**$29,669,000**	**$0**

Source: NCDC

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

The NCDC table above summarizes severe weather events that occurred in greater Lake County. Only a few of the events actually resulted in state and federal disaster declarations. It is 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 HVLCSD's "big picture" hazard environment.

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

- Extreme Cold and Freeze
- Extreme Heat
- Heavy Rains, Snow, and Storms
- High Winds

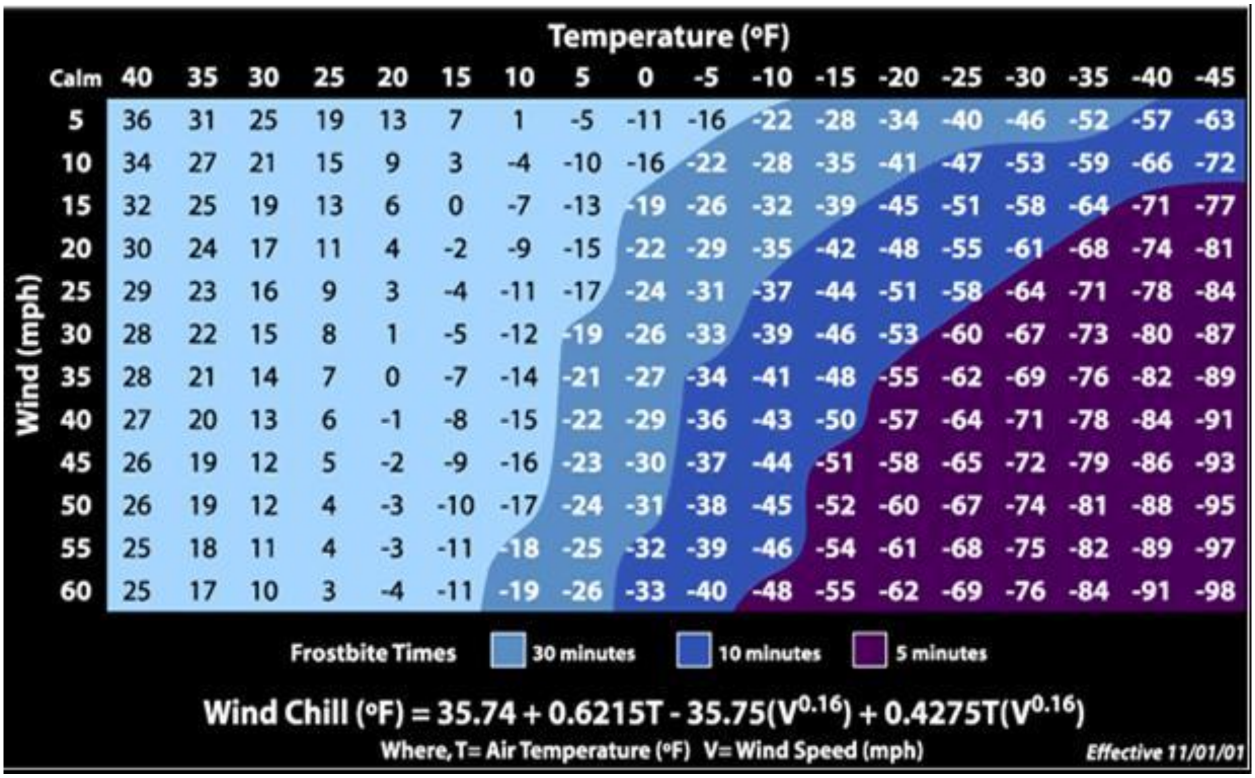
4.2.2. Severe Weather: Extreme Cold and Freeze

Hazard/Problem Description

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. Infants and the elderly are most susceptible. Pipes may freeze and burst in buildings or structures that are poorly insulated or without heat. In addition to frozen pipes and other cold related issues, the HVLCSD wastewater treatment plant (WWTP) treats wastewater by an activated sludge process. 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.

In 2001, the NWS implemented an updated Wind Chill Temperature index (shown in Figure 4-2), 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 4-2 Wind Chill Temperature Chart



Wind (mph)	Temperature (°F)																	
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

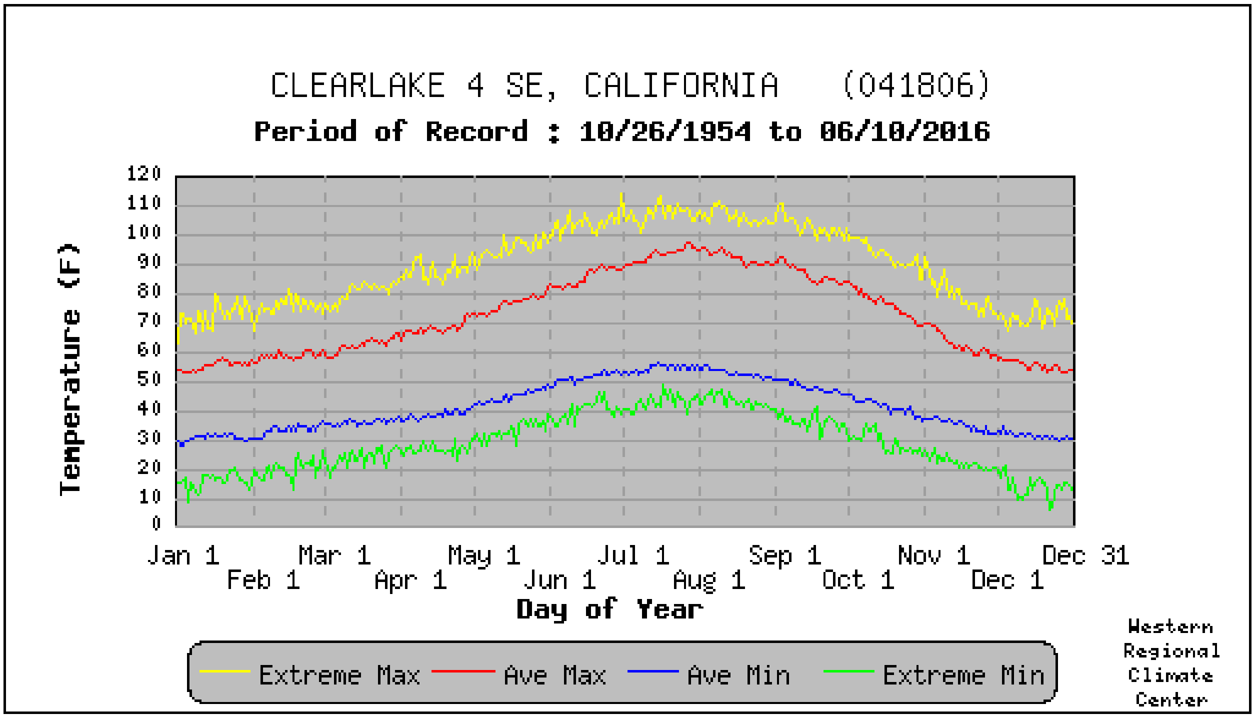
Source: National Weather Service

Information on cold from the closest Western Regional Climate Center's coop station to the District is summarized below and in Figure 4-3 and Table 4-6. This weather station was chosen due to its location near the District and the period of record. The Middletown station is closer to the District, but is missing key temperature and precipitation information. As such, the Clearlake SE 4 Weather Station will be used.

Clearlake SE 4 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 4-6 shows the record low temperatures by month for the District. Average daily temperatures for the District are shown in Figure 4-3. Snowfall occurs occasionally in the District, but accumulations are rare. Snowfall is discussed in more detail in Section 4.2.4.

Figure 4-3 HVLCSD – Daily Temperature Averages and Extremes



Source: Western Regional Climate Center

Table 4-6 HVLCSD – Record Low Temperatures 1954 to 2016

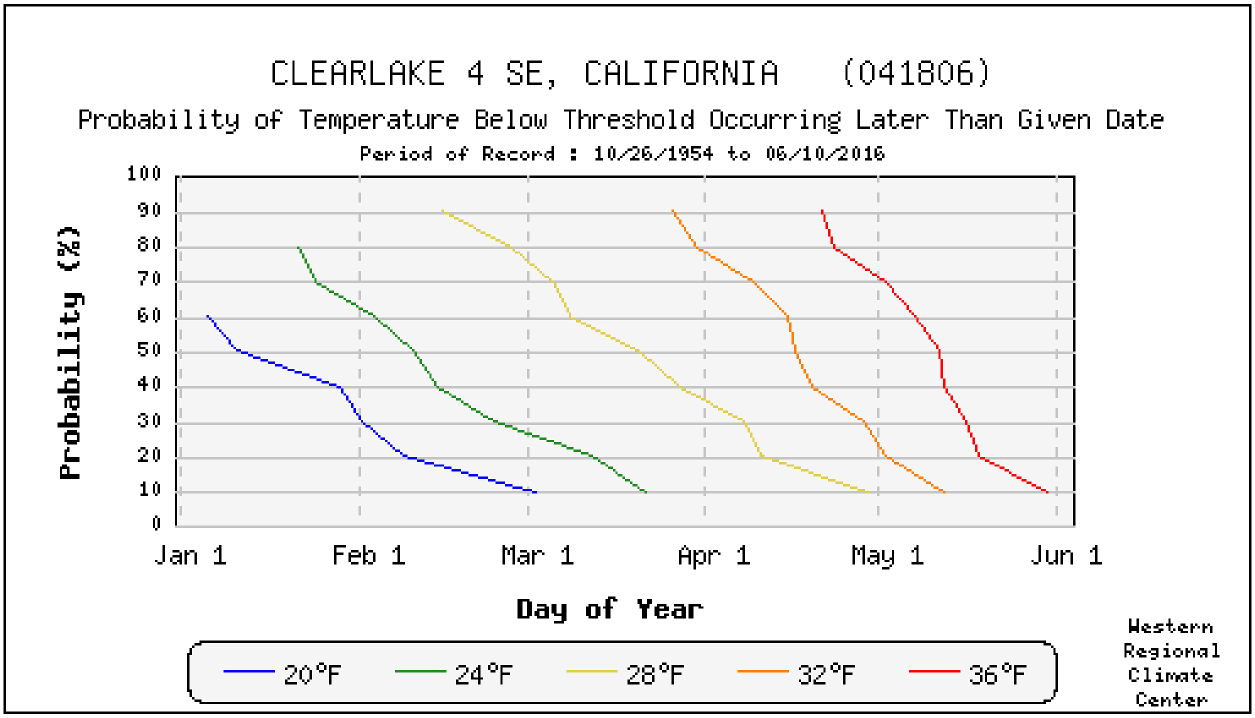
Month	Temperature	Date	Month	Temperature	Date
January	8°	1/5/1974	July	39°	7/27/1965
February	16°	2/4/1957	August	40°	8/30/1955
March	17°	3/3/1966	September	30°	9/19/1965
April	23°	4/24/1964	October	21°	10/6/1983
May	28°	5/4/1964	November	19°	11/25/1956
June	34°	6/3/1966	December	6°	12/22/1990

Source: Western Regional Climate Center

Location and Extent

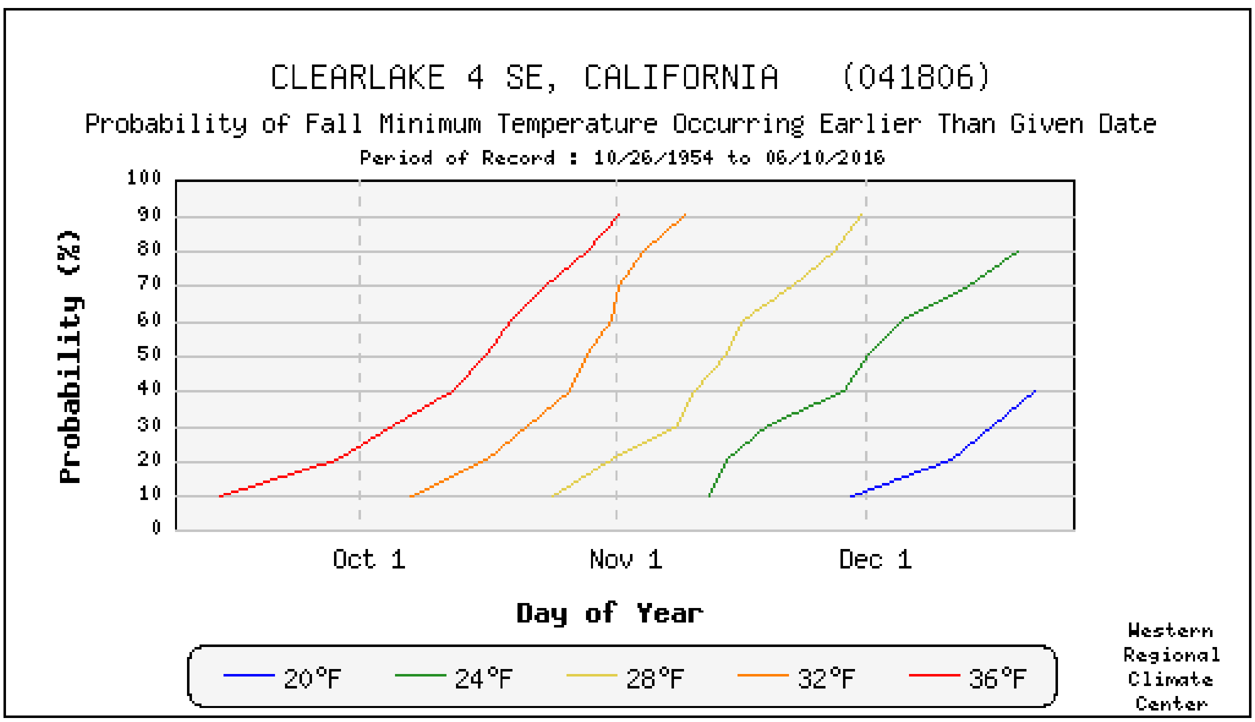
Extreme cold and freeze events occur on a regional basis. Extreme cold can occur in any location of the District, with little variation. While there is no scale (i.e. Richter, Enhanced Fujita) to measure the effects of freeze, temperature data from the County from the WRCC indicates that there are 82.1 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 4-4 and Figure 4-5 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 4-4 HVLCSD – Spring Freeze Probabilities



Source: Western Regional Climate Center

Figure 4-5 HVLCSD – Fall Freeze Probabilities



Source: Western Regional Climate Center

Past Occurrences

Disaster Declaration History

The County has had no past federal and two past state disaster declarations for extreme cold and freeze. Table 4-7 shows the dates of the disaster declarations.

Table 4-7 Lake County – State and Federal Disaster Declarations for Freeze 1950-2019

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

Source: Cal OES, FEMA

NCDC Events

The NCDC reports only two events of past extreme cold and freeze for Lake County in their database. This is most likely due to underreporting of these events to the NCDC database. Freeze events in the County are shown in Table 4-8.

*Table 4-8 Lake County NCDC Freeze and Frost Events 1/1/1996-5/31/2019**

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

Source: NCDC

*Note: Losses reflect totals for all impacted areas

HMPC Events

While the HMPC noted that cold and freeze events occur on a regular basis in the winter months in the County, the HMPC recalled that in 1971 or 1972, cold persisted for an extended period, and temperatures fell to -15°F in areas. 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. No other specific events causing damages outside of the federal and state disaster declaration years could be recalled.

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.

Climate Change and Freeze and Snow

According to the CAS, freezing spells are likely to become less frequent in California as climate temperatures increase; if emissions increase, freezing events could occur only once per decade in large portion of the State by the second half of the 21st century. According to a California Natural Resources Report in 2014, it was determined that while fewer freezing spells would decrease cold related health effects, too few freezes could lead to increased incidence of disease as vectors and pathogens do not die off.

4.2.3. Severe Weather: Extreme Heat

Hazard/Problem Description

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. According to the US Center for Disease Control, in a normal year, about 658 Americans succumb to the demands of summer heat. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died. Extreme heat can also affect the agricultural industry and can increase the risk of wildfires.

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

The HVLCSD noted that the biggest concern is with District operations when there is the potential for PG&E shutdowns, both during red flag events and those associated with proactive shutdowns in times of high usage.

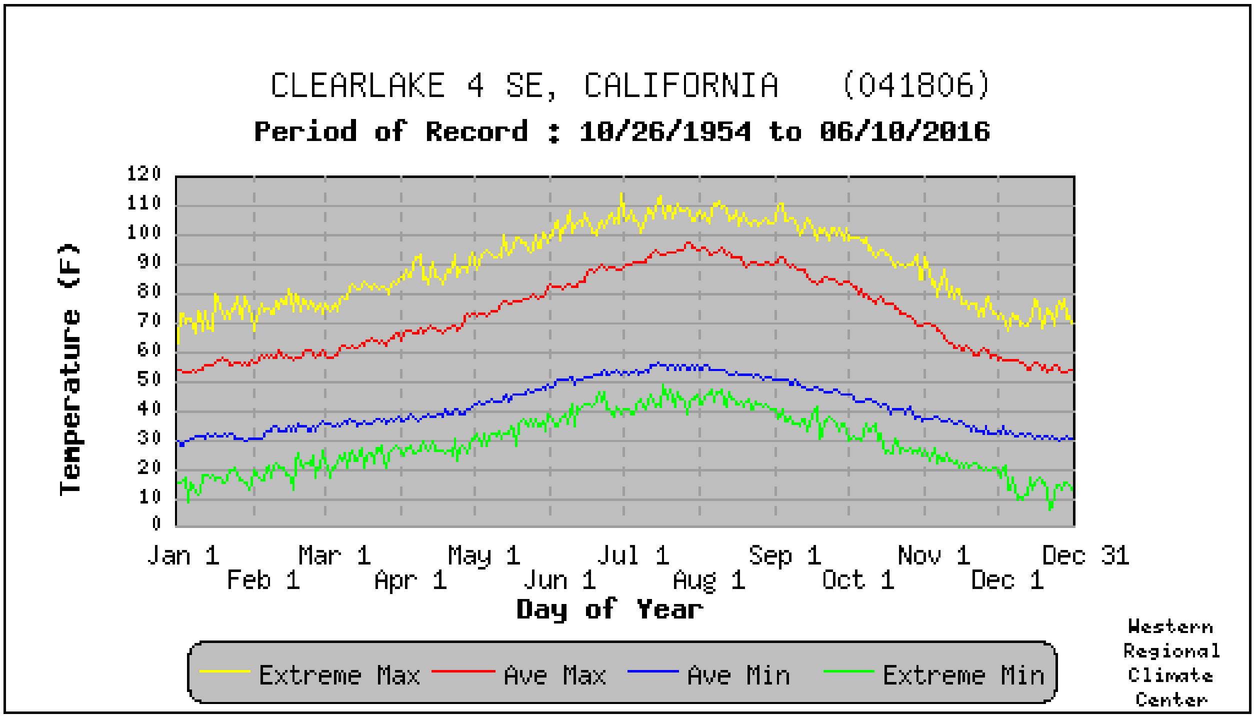
Location and Extent

Extreme heat events occur on a regional basis. The HVLCSD area has many extreme heat days due to its location. Extreme heat can occur in any location of the District. All portions of the District are at risk to extreme heat. Extreme heat occurs throughout the District primarily during the summer months. The WRCC maintains data on weather normal and extremes in the western United States. WRCC data for the District is summarized below.

City of Clearlake—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 4-6 shows the average daily high temperatures and extremes for the District. Table 4-9 shows the record high temperatures by month for the District.

Figure 4-6 HVLCSD — Daily Temperature Averages and Extremes



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

Table 4-9 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

Heat emergencies are often slower to develop, taking several days of continuous, oppressive heat before a significant or quantifiable impact is seen. The National Weather Service (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 4-10.

Table 4-10 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

Extreme heat is made worse when it is experienced over a longer duration of time.

Past Occurrences

Disaster Declaration History

There have been no FEMA or Cal OES disaster declarations in Lake County related to extreme heat, as shown in Table 4-3.

NCDC Events

The NCDC has tracked heat and extreme heat events since 1996 for Lake County. 5 events were recorded for Lake County, as shown in Table 4-11. More events have likely occurred, without being reported to the NCDC database. Specifics on damages in the District were not included in the database.

*Table 4-11 Lake County Heat Events 1/1/1996-5/31/2019**

Event Type	Date	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Heat	7/29/2000	0	0	0	0	$0	$0
Heat	7/14/2018	0	0	0	0	$0	$0
Heat	7/15/2018	0	0	0	0	$0	$0
Excessive Heat	7/24/2018	0	0	0	0	$0	$0
Heat	7/24/2018	0	0	0	0	$0	$0
Total		**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 Team Events

The HMPC noted that extreme heat is an annual occurrence, but noted no past events that caused damages, deaths or injuries. Extreme heat can introduce complexity in the wastewater treatment process, primarily in the holding pond of the recycled water. Aquatic growth can impact the pH level of the water. The HMPC noted that, in addition to the effects of extreme heat, it is often wildfires that are exacerbated during hot weather that are most damaging. They are discussed in Section 4.2.15.

The HMPC did note that the HVLCSD may be affected 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. Recent events in Oct, Nov of 2019 cost the district nearly 50% of its fuel budget on this unexpected cost, as well as costs to our 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 during their events.

Likelihood of Future Occurrences

Highly Likely—Temperature extremes are likely to continue to occur annually in the District. According to the WRCC, temperatures at or above 90°F occur on 71 summer days in the District each year.

Climate Change and Extreme Heat

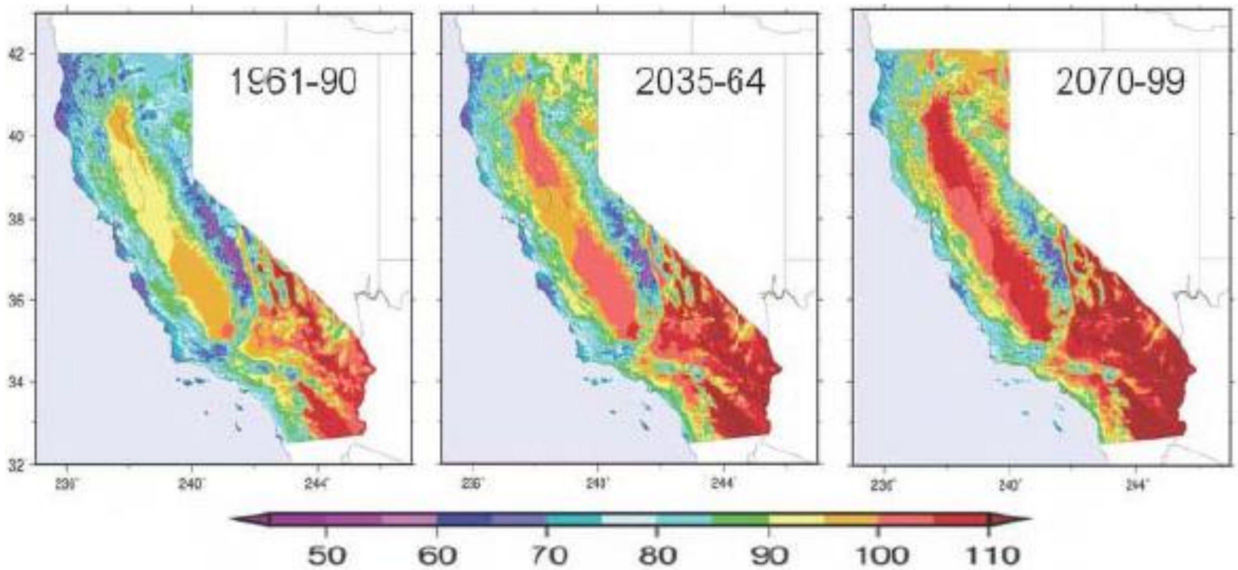
Climate change and its effect on extreme heat in and around the District is discussed by three sources:

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

Climate Adaptation Strategy

The 2014 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 4-7.

Figure 4-7 California Historical and Projected Temperature Increases – 1961 to 2099



Source: Dan Cayan; California Climate Adaptation Strategy

As temperatures increase, 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 2014 CAS report and the 2018 State 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 health issues and deaths related to extreme heat in the District.

Climate Change and Health Profile Report – Lake County

The CCHPR noted for Lake County and the District 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.

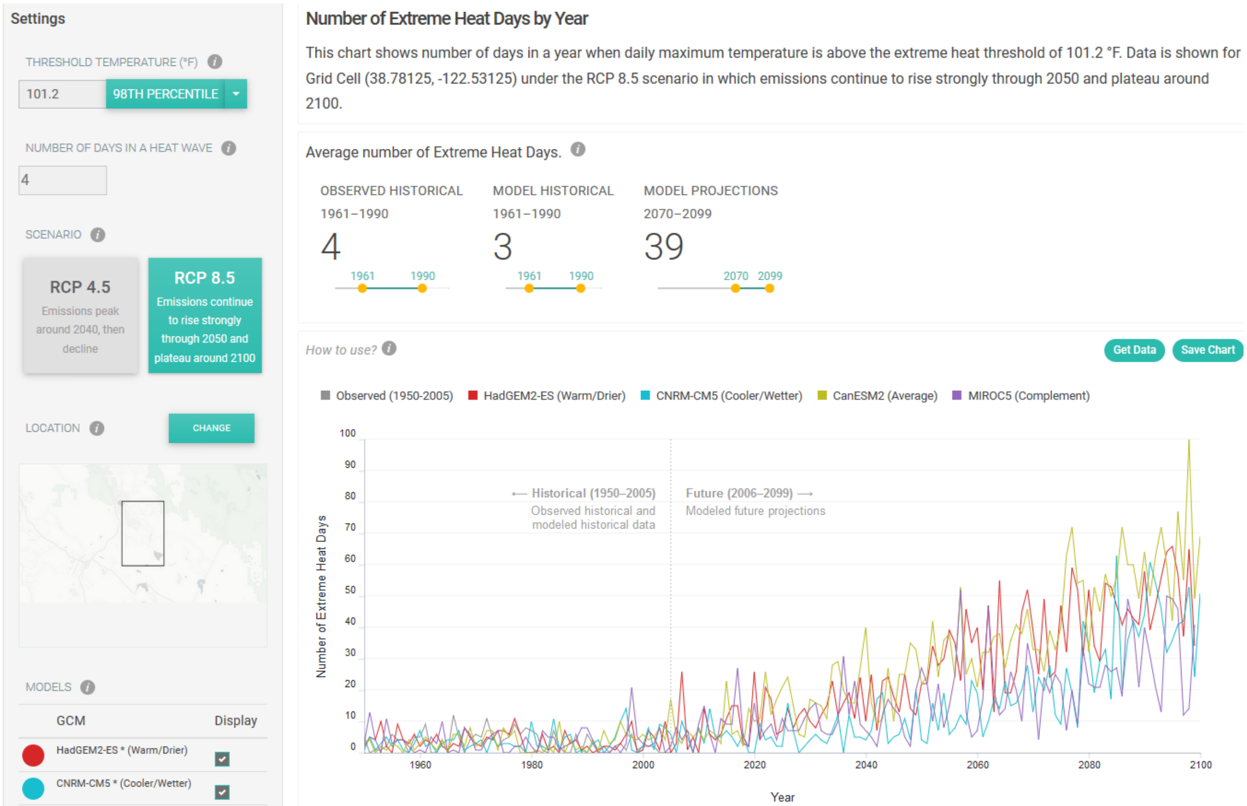
Cal-Adapt

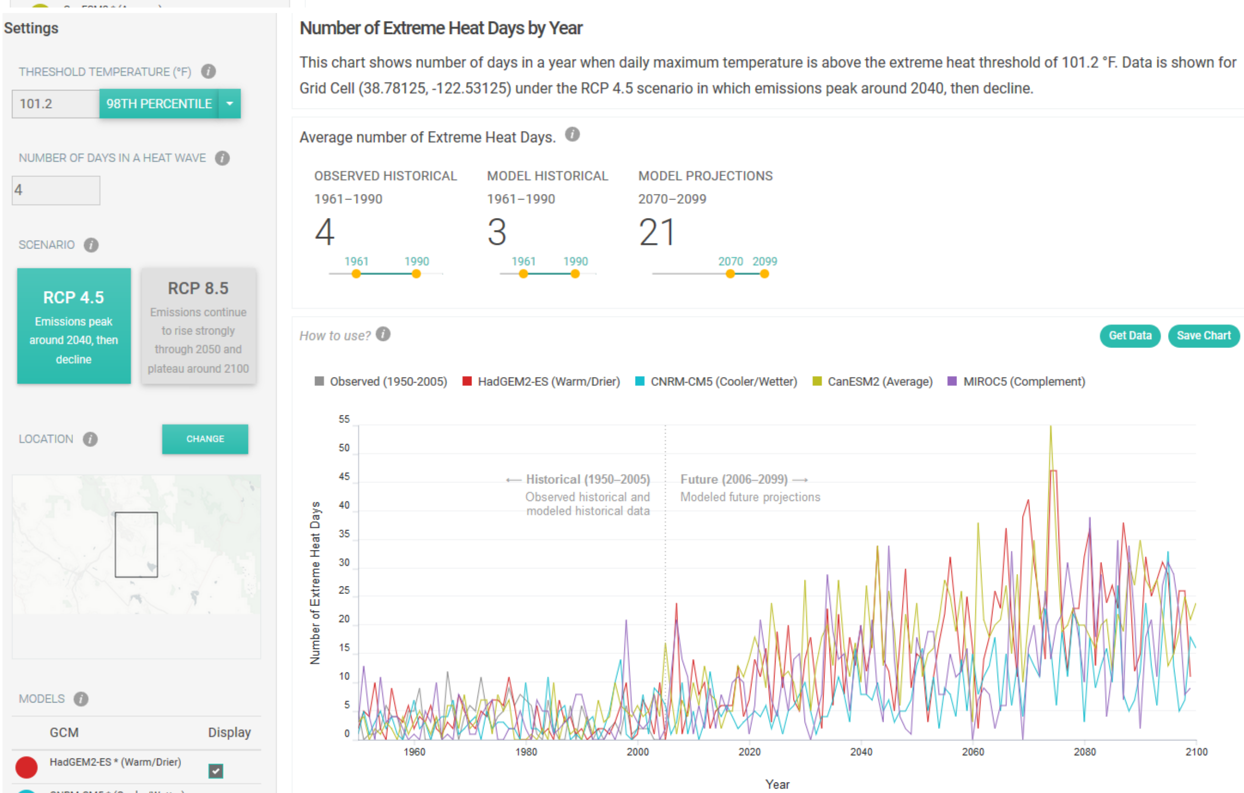
Cal Adapt also noted that overall temperatures are expected to rise substantially throughout this century. During the next few decades, scenarios project average temperature to rise between 1 and 2.3°F; however, the projected temperature increases begin to diverge at mid-century so that, by the end of the century, the temperature increases projected in the higher emissions scenario (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 4-8. It shows the following:

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

Figure 4-8 HVLCSD – Future Temperature Estimates in High and Low Emission Scenarios





Source: Cal-Adapt – Temperature: Decadal Averages Map

4.2.4. Severe Weather: Heavy Rains, Snow, and Storms

Hazard/Problem Description

Storms in the District 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. Winter storms can also bring very limited snowfall to the District.

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 Lake County General Plan noted that for Lake County and the District, 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 HMPC, 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. 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.

HVLCSD noted that sewer water enters flooded streets, 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.

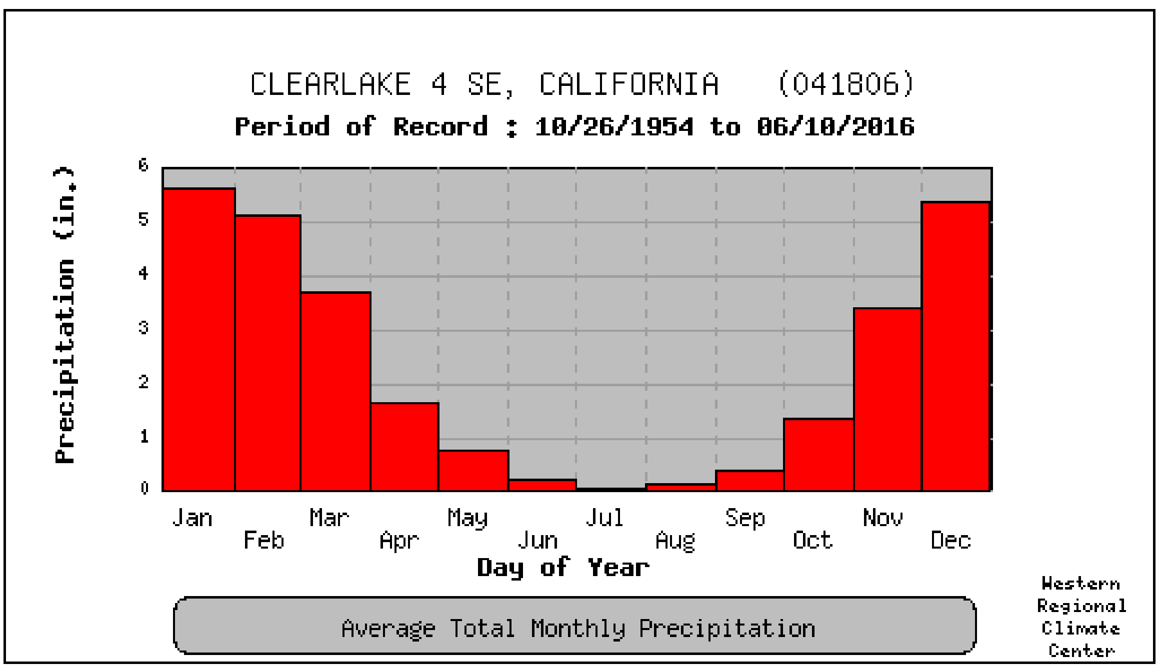
Location and Extent of Heavy Rain and Storms

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the District and County. 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 rain and storms are measured. Thunderstorms, lightning, and hail are rare in the District. 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 heavy rain and storms in California is often short, ranging from minutes to hours. Information from the WRCC station is summarized below.

City of Clearlake—Clearlake SE Weather Station, Period of Record 1954 to 2016

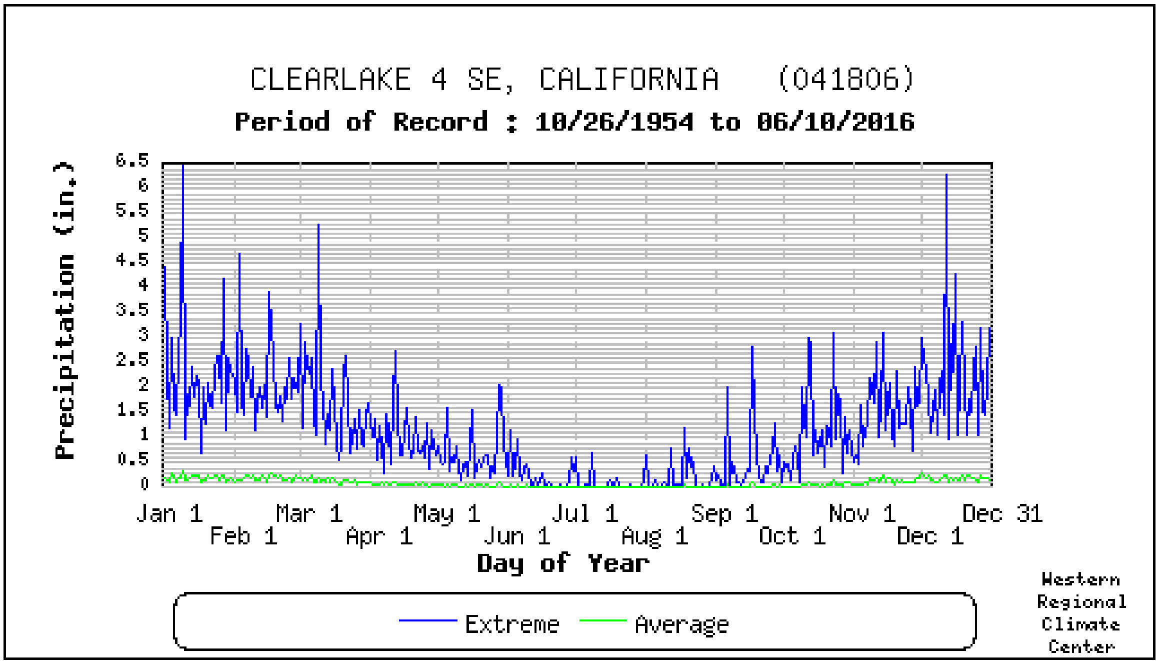
According to the WRCC, average annual precipitation in Clearlake and the District is 27.48 inches per year. The highest recorded annual precipitation is 61.88 inches in 1983; the highest recorded precipitation for a 24-hour period is 6.28 inches on January 4, 1982. The lowest recorded annual precipitation was 8.17 inches in 1976. Average monthly precipitation for Clearlake and the District is shown in Figure 4-9. Daily average and extreme precipitations are shown in Figure 4-10.

Figure 4-9 HVLCSD– Monthly Average Total Precipitation



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

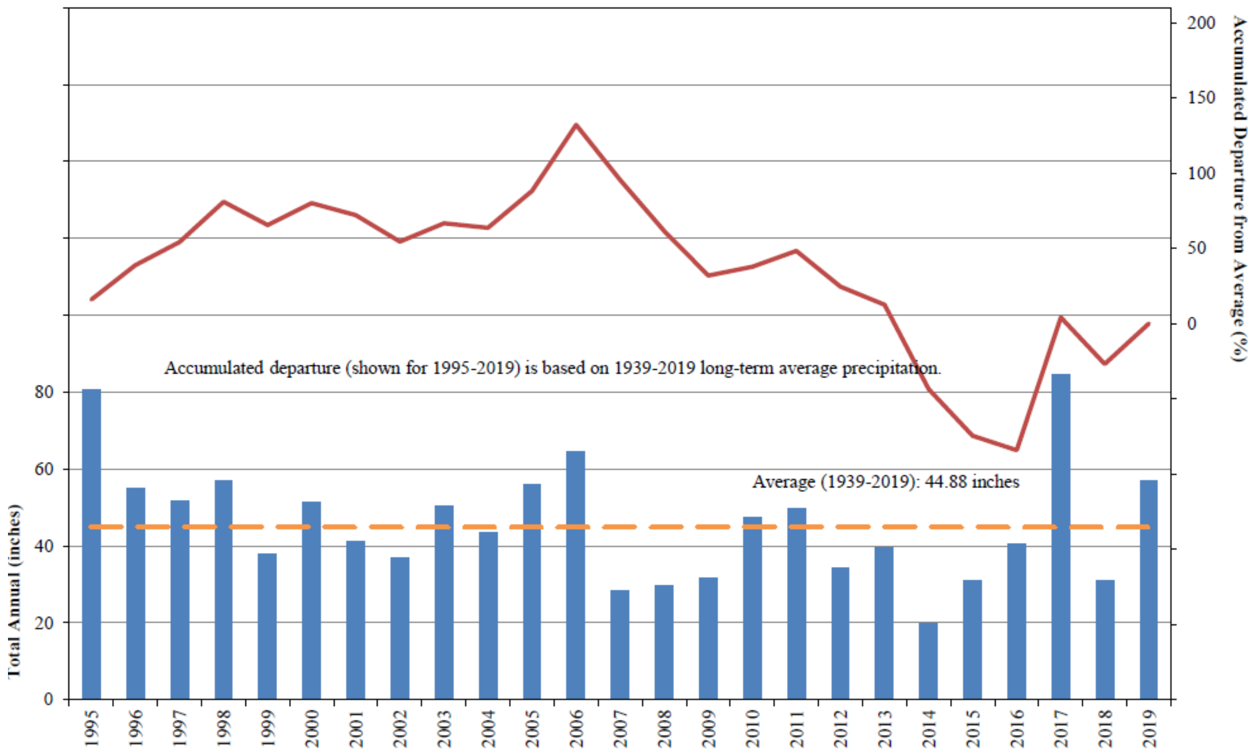
Figure 4-10 HVLCSD – Daily Average and Extreme Precipitation



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

In addition to the WRCC data above, HVLCSD provided data on precipitation received in nearby Middletown from 1995 to 2019. This is shown on Figure 4-11.

Figure 4-11 Middletown Precipitation – Total Annual and Accumulated Departure from Average from 1995-2019

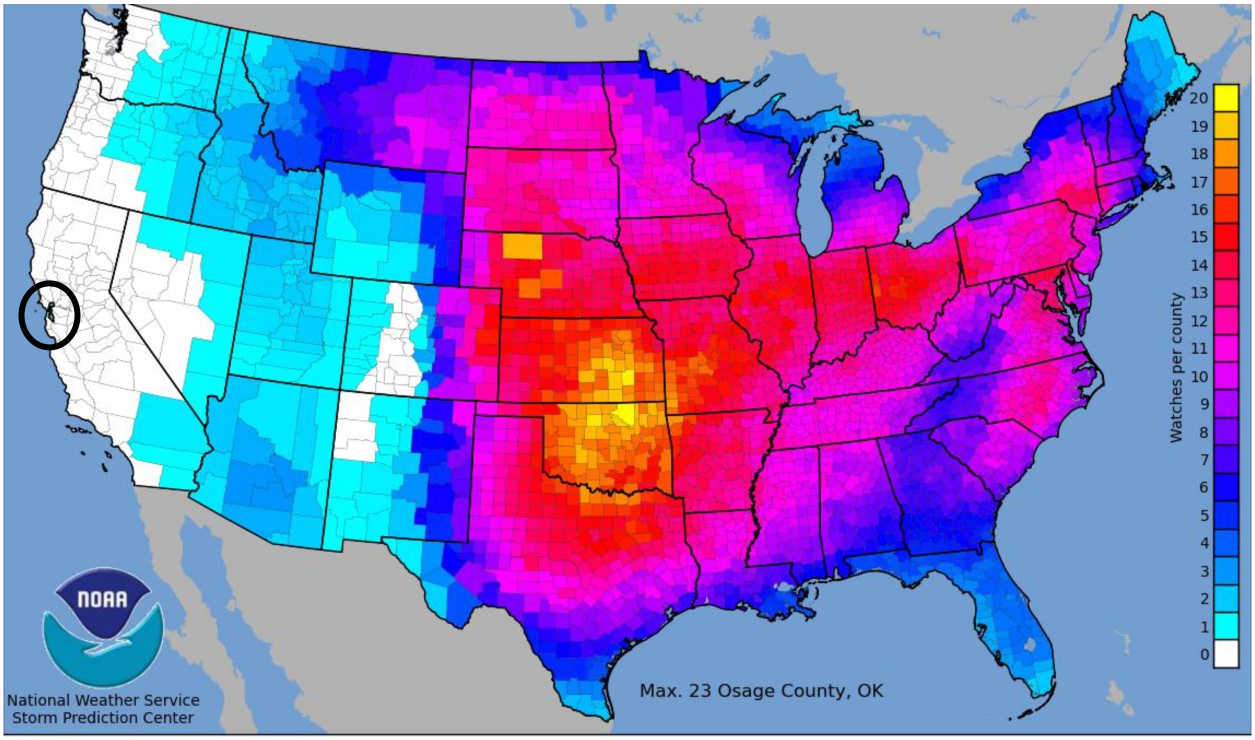


(1) Annual precipitation data for the years 2002, 2004-2007 and 2013 was estimated using data reported for the Calistoga station..
(2) Annual precipitation data for the year 2018 was estimated using data reported for the Angwin PUC station.
(3) The accumulated departure from average curve (shown here for 1995 to 2019) is a segment of the 1939 to 2019 curve in Figure 1 of this report.

Source: HVLCSD

The NOAA Storm Prediction Center tracks thunderstorm watches in the United States on a county basis. Figure 4-12 shows thunderstorm watches in the District and the United States for a 20-year period between 1993 and 2012.

Figure 4-12 HVLCSD – Average Thunderstorm Watches per Year (1993 to 2012)



Source: NOAA Storm Prediction Center.

Snow

During the winter months, the higher elevations of the County can experience snowfall. The District experiences snow occasionally, with very little accumulation. According to the NWS and the WRCC, winter snowstorms can include heavy snow, ice, and blizzard conditions. Snowfall in the District is rare, often falls in small amounts, and melts quickly; Snow in the District is more of a nuisance than a hazard.

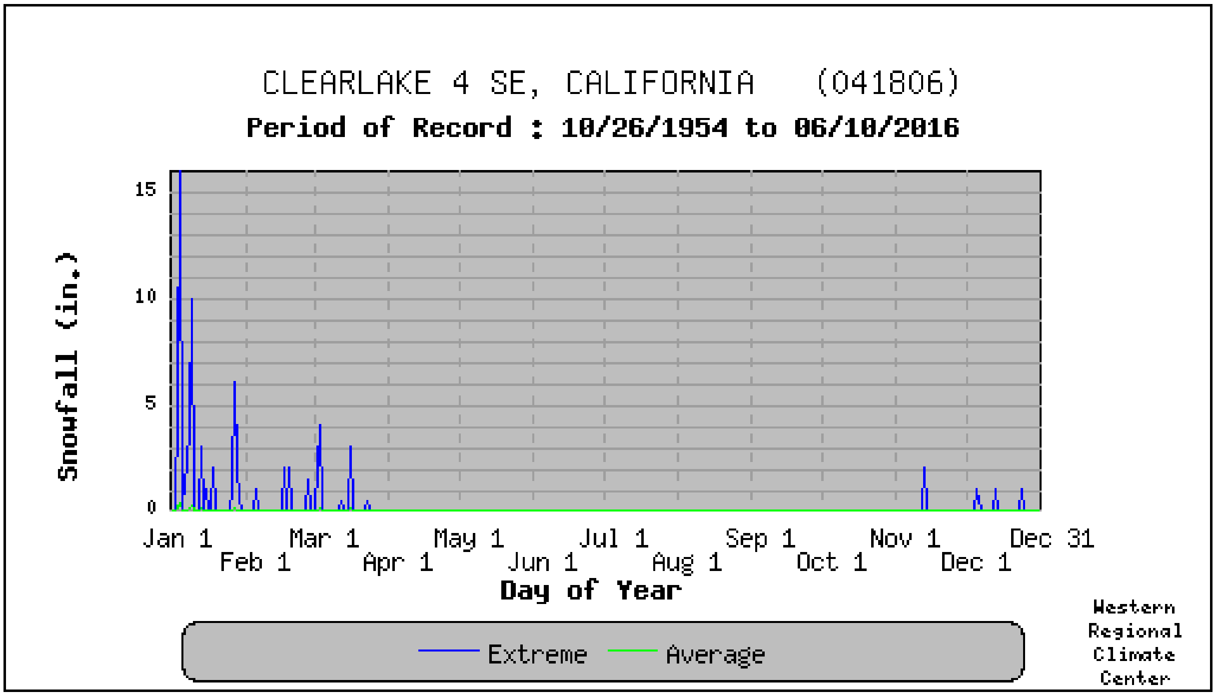
Location and Extent of Snow

Snow events occur on a regional basis. Snow can occur in any location of the District. All portions of the District are at risk to snow. Most snow in the District falls in negligible amounts that melt quickly. Snow occurs during the winter months, as discussed below. Snowfall is generally measured in snowfall depths and moisture content. The District can experience limited snowfall on a seasonal basis, mostly between the months of November through March. Records on snowfall from the Clearlake SE weather station is shown below.

City of Clearlake—Clearlake SE Station, Period of Record 1920 to 2012

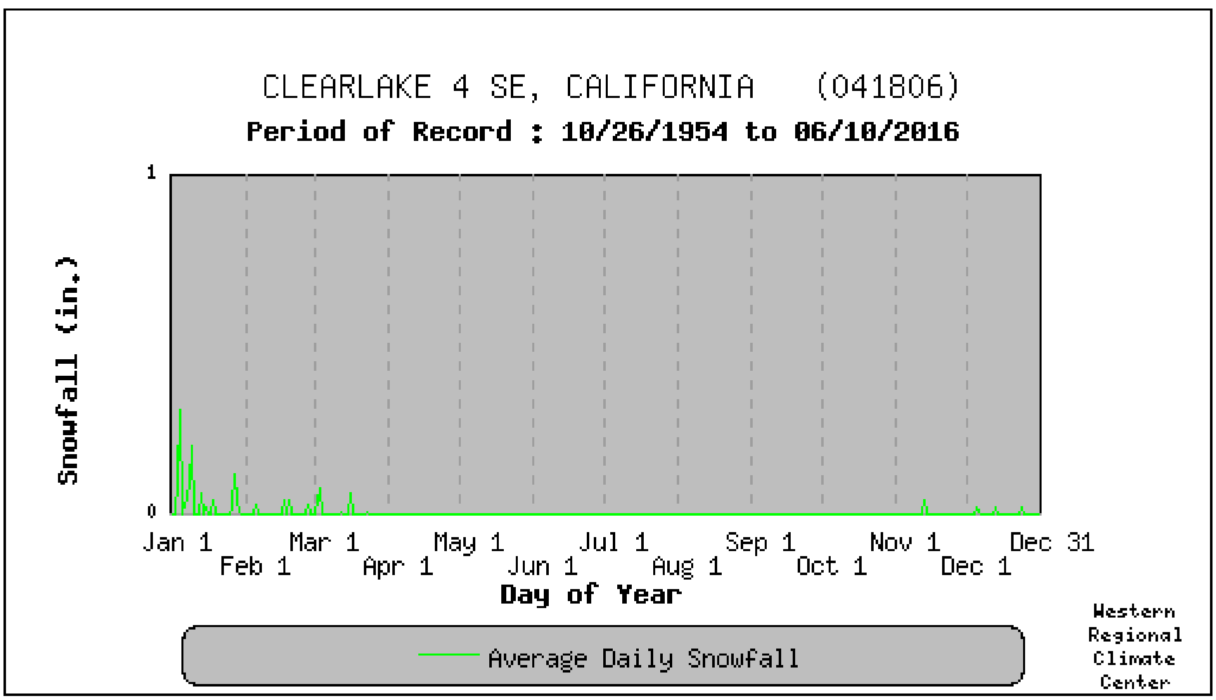
According to the WRCC, average snowfall is 1.5 inches, as shown in Figure 4-13. The highest annual and monthly snowfall fell in January 1974, when 24.5 inches fell. Highest monthly snowfall accumulation also occurred in January of 1974, when 24.5 inches fell. Average snowdepths (a measure of snow on the ground) in January through March fall at 0.1 inches. This can be seen in Figure 4-14.

Figure 4-13 HVLCSD—Snowfall Averages and Extremes



Source: Western Regional Climate Center

Figure 4-14 HVLCSD—Snowdepth Averages and Extremes



Source: Western Regional Climate Center

Hail

Hail events in the District are rare; however, hail can occur throughout the District during storm events. 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 District. 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.

Location and Extent of Hail

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 the District and in Lake County. Hail tends to be rare in California and in the District. There is no scale in which to measure hail, other than hail stone size. The National Weather Service classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 4-12 indicates the hailstone measurements utilized by the National Weather Service.

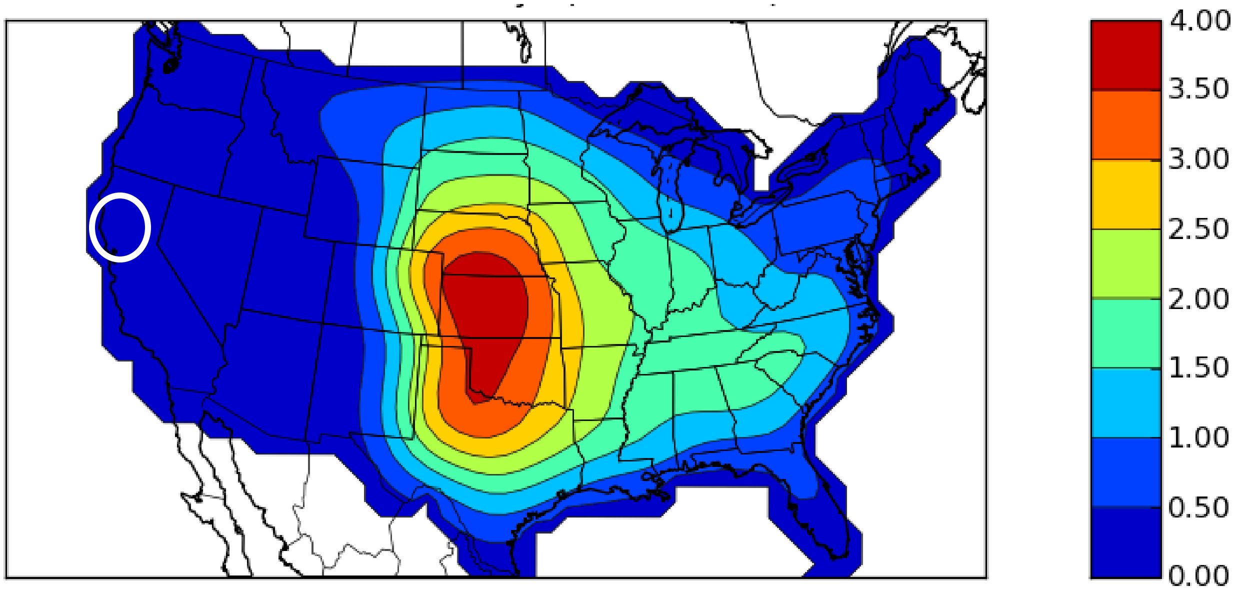
Table 4-12 Hailstone Measurements

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
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

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 4-15 shows the average days each year where hail of greater than 1" in diameter occurred during a 20-year period from 1990 to 2009. As shown in the figure, hail is rare in the District.

Figure 4-15 HVLCSD – Average Hail Days per Year (1990 to 2009)



Source: National Weather Service

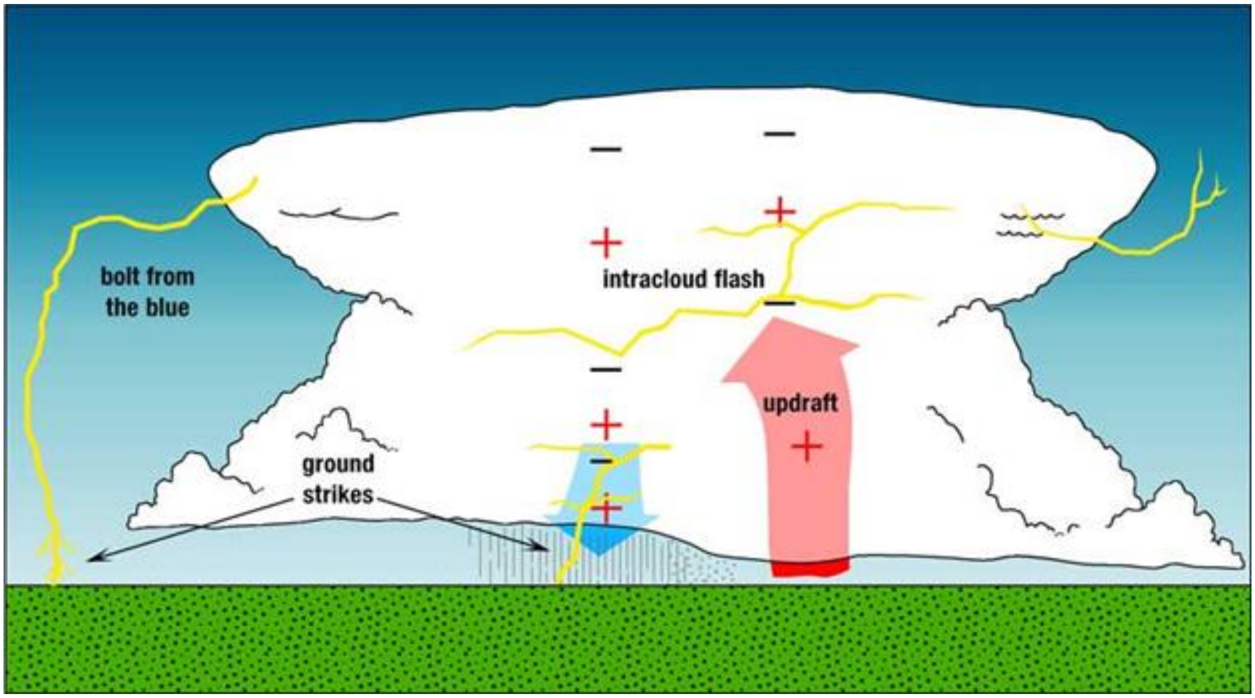
Lightning

Lightning, while rare in the District, 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 usually (but not always) accompanied by rain. Cloud-to-ground lightning can kill or injure people by direct or indirect means. Objects can be struck directly, which may result in an explosion, burn, or total destruction. Or, damage may be indirect, when the current passes through or near an object, which generally results in less damage.

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

Cloud-to-ground lightning is the most damaging and dangerous type of lightning, though it is also less common. Most flashes originate near the lower-negative charge center and deliver negative charge to earth. However, a large minority of flashes carry positive charge to earth. These positive flashes often occur during the dissipating stage of a thunderstorm's life. Positive flashes are also more common as a percentage of total ground strikes during the winter months. This type of lightning is particularly dangerous for several reasons. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike as far as 5 or 10 miles from the storm in areas that most people do not consider to be a threat (see Figure 4-16). 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 4-16 Cloud to Ground Lightning

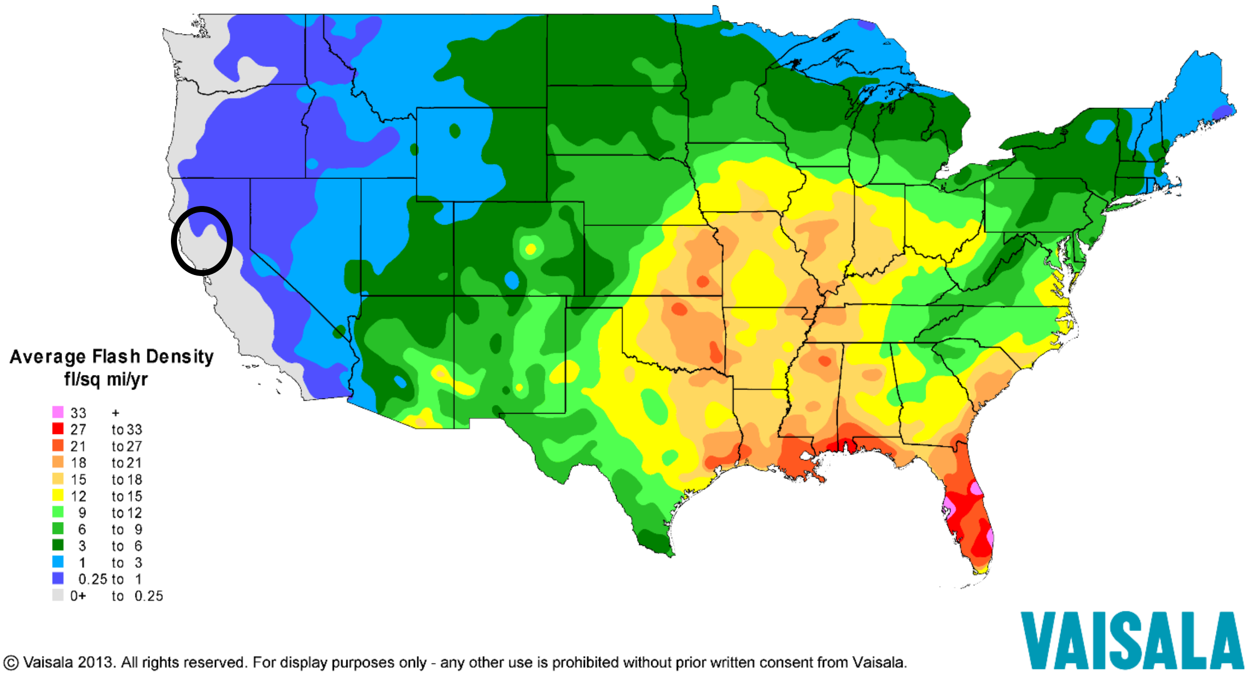


Source: National Weather Service

Location and Extent of Lightning

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 tends to be rare in the District. Lightning in the District can occur during thunderstorms. The speed of onset of thunderstorms (that 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. Vaisala maintains the National Lightning Detection Network. It tracks cloud to ground lightning incidences in the United States. Figure 4-17 shows lightning incidences in the District and the rest of the United States from 1997 to 2012.

Figure 4-17 HVLCSD – Lightning Incidence Map 1997 to 2012



Source: Vaisala National Lightning Detection Network

Past Occurrences

Disaster Declaration History

A search of FEMA and Cal OES disaster declarations turned up multiple events. Heavy rains and storms have caused flooding in the County. Events where heavy rain and storms (including the resultant flooding) resulted in a state or federal disaster declaration are shown in Table 4-13.

Table 4-13 Lake County – Disaster Declarations from Heavy Rain and Storms 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	16	1955, 1958, 1963, 1964, 1970, 1983, 1986, 1995 (twice), 1997, 1998, 2005/2006, 2006, 2017 (twice), 2019	14	1950, 1955, 1958 (twice), 1963 (twice), 1970, 1980, 1983, 1986, 1995 (twice), 1997, 1998

Source: FEMA, Cal OES

NCDC Events

The NCDC data recorded 82 blizzard, hail, heavy rain, heavy snow, winter storm, and winter weather incidents for Lake County since 1950. Many of these events also affected the District. A summary of these events is shown in Table 4-14.

*Table 4-14 NCDC Severe Weather Events in Lake County 1955-5/31/2019**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Blizzard	1	0	0	0	0	$0	$0
Hail	1	0	0	0	0	$0	$0
Heavy Rain	7	0	0	0	0	$0	$0
Heavy Snow	4	0	0	0	0	$10,0000	$0
Winter Storm	62	0	0	0	0	$0	$0
Winter Weather	7	0	0	0	0	$0	$0
Total	**82**	**0**	**0**	**0**	**0**	**$10,000**	**$0**

Source: NCDC

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

Hazard Mitigation Planning Team Events

The HMPC noted that heavy rains, snow, and storms are annual occurrences in the District. Other events are discussed in the Flood (Section 4.2.11) and Localized Flood (Section 4.2.12) past event sections.

Likelihood of Future Occurrences

Highly Likely – Based on NCDC data and HMPC input, 82 heavy rain, hail, lightning, and snow incidents over a 64-year period (1955-2018) equates to a severe storm event every year. 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.

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. 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 4-18. Figure 4-18 consists of two charts:

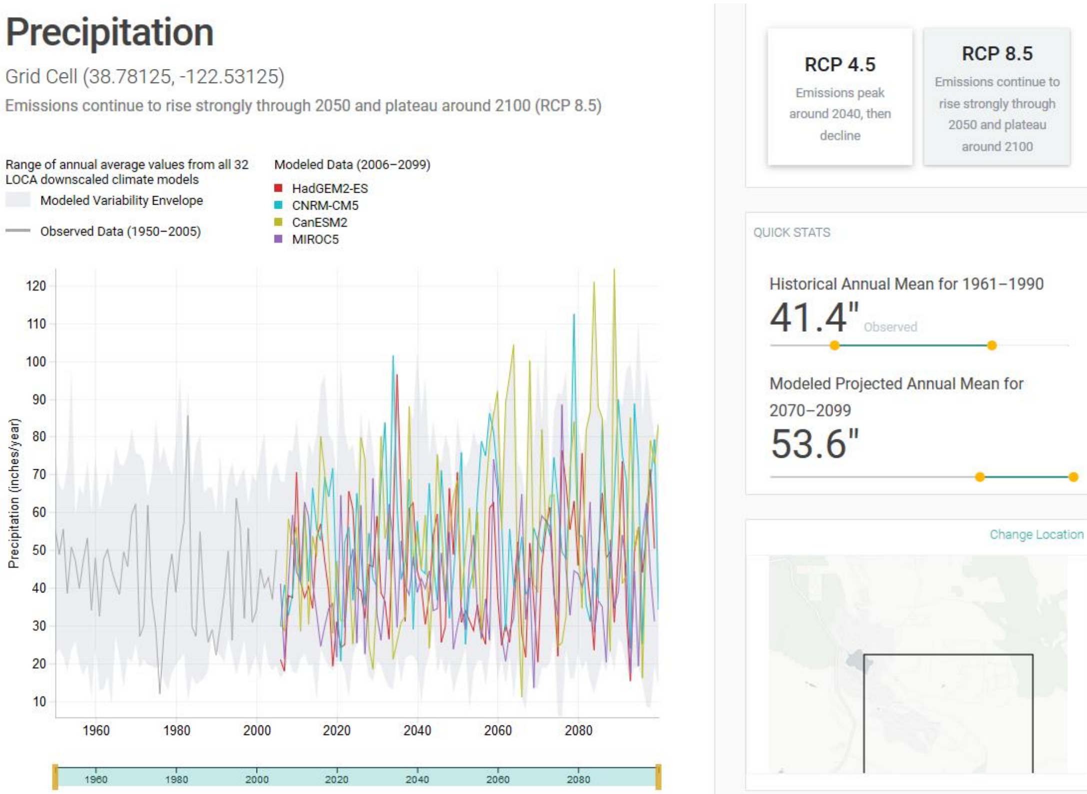
- The upper chart shows annual averages of observed and projected precipitation values for the selected area on the map under the RCP 8.5 scenario. The gray line (1950 – 2005) is observed data. The colored lines (2006 – 2100) are projections from 10 LOCA downscaled climate models selected for California.

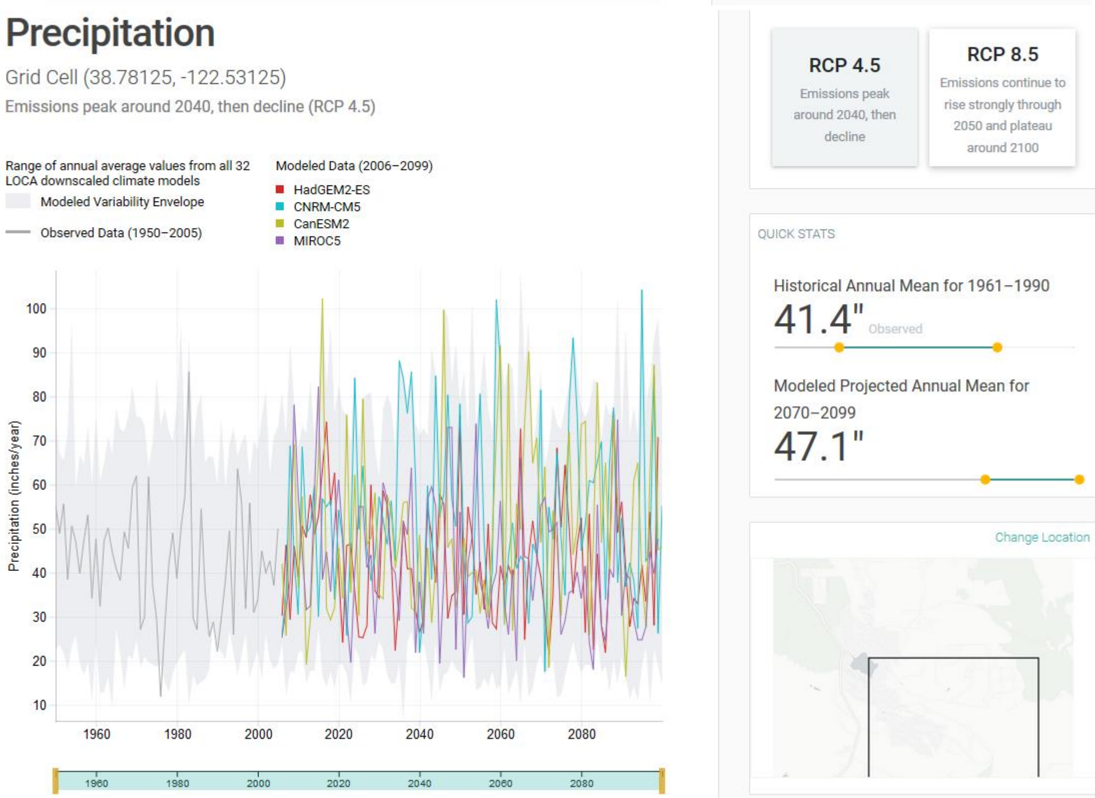
The light gray band in the background shows the least and highest annual average values from all 32 LOCA downscaled climate models.

- The lower chart shows annual averages of observed and projected precipitation values for the selected area on map under the RCP 4.5 scenario. The gray line (1950 – 2005) is observed data. The colored lines (2006 – 2100) are projections from 10 LOCA downscaled climate models selected for California. The light gray band in the background shows the least and highest annual average values from all 32 LOCA downscaled climate models.

These models have been selected by California state agencies as priority models for research contributing to California's Fourth Climate Change Assessment.

Figure 4-18 HVLCSD – Future Precipitation Estimates in High and Low Emission Scenarios





Source: Cal-Adapt

4.2.5. Severe Weather: High Winds

Hazard/Problem Description

High Winds

High winds, often accompanying severe storms and thunderstorms, can cause significant property and resource 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 push automobiles off roads, damage roofs and structures, cause utility outages, 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 District is at risk to high winds. Magnitude of winds is measured often in speed and damages. The speed of onset of both thunderstorm winds and high winds outside of thunderstorm events can be short or prolonged, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of thunderstorm 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 4-19 shows the Beaufort wind scale.

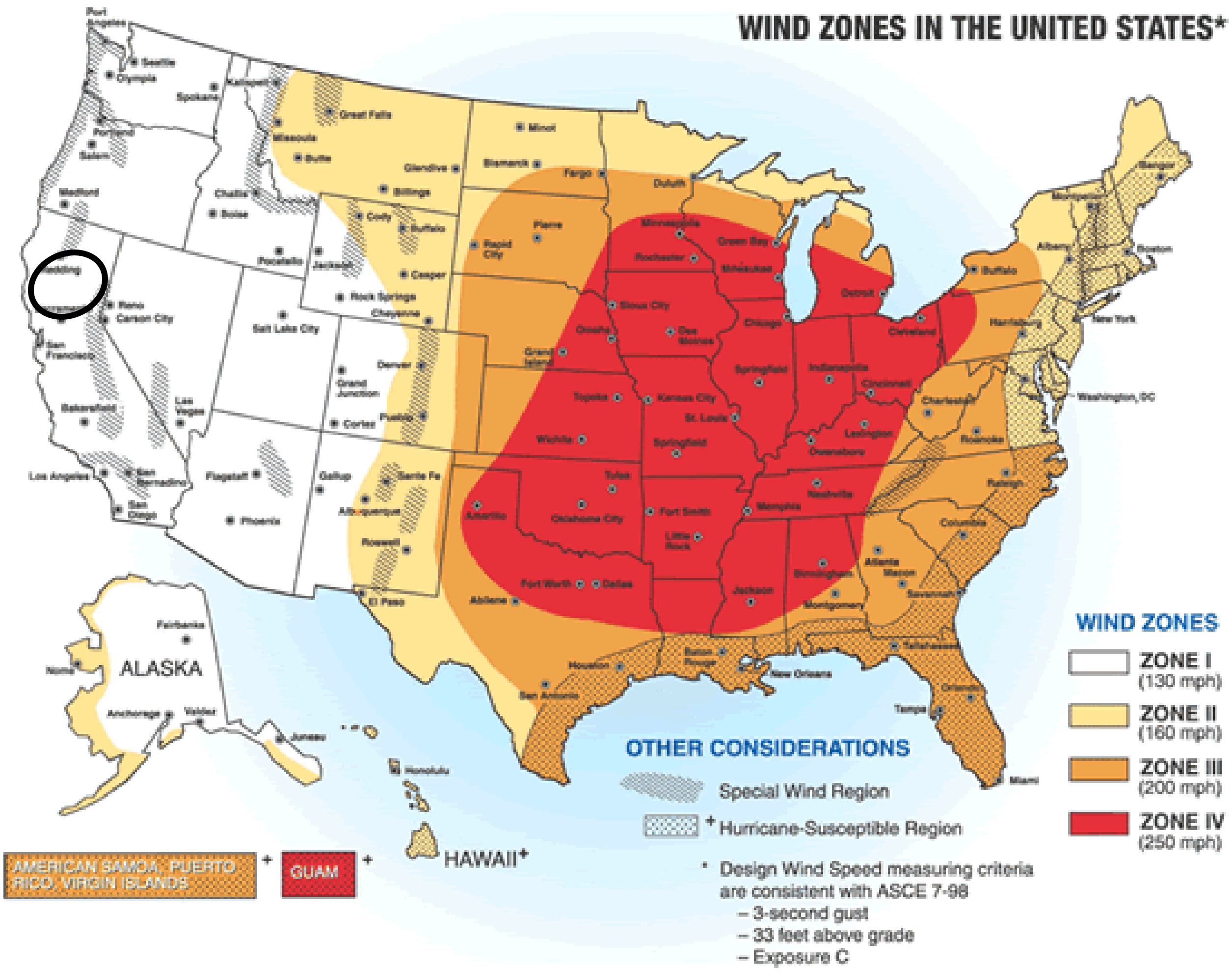
Figure 4-19 Beaufort Wind Scale

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 4-20 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 (above Beaufort Number 12).

Figure 4-20 Wind Zones in the United States



Source: FEMA

Though not included on the map above as a special wind region, the District did note that they are subject to diablo winds on a seasonal basis. Diablo wind is a name that has been occasionally used for the hot, dry wind from the northeast that typically occurs in the San Francisco Bay Area of Northern California, during the spring and fall. The Diablo wind is created by the combination of strong inland high pressure at the surface, strongly sinking air aloft, and lower pressure off the California coast. The air descending from aloft as well as from the Coast Ranges compresses as it sinks to sea level where it warms as much as 20°F, and loses relative humidity. While the Diablo wind pattern occurs in both the spring and fall, it is most dangerous in the fall, when vegetation is at its driest.

Past Occurrences

Disaster Declaration History

There have been no past federal or state disaster declarations due to high winds, according to Table 4-3.

NCDC Events

The NCDC data recorded 14 high wind incidents for Lake County since 1955. A summary of these events is shown in Table 4-15. None of these events have mapped coordinates.

*Table 4-15 NCDC High Wind Events in Lake County 1955-5/31/2019**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
High Wind	13	0	0	0	0	$168,000	$0
Strong Wind	1	0	0	0	0	$1,000	$0
Total	**14**	**0**	**0**	**0**	**0**	**$169,000**	**$0**

Source: NCDC

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

Hazard Mitigation Planning Team Events

The HMPC noted that high winds occur often in the District. No instances of significant damages or injuries from wind could be recalled. High winds can cause concern at the wastewater treatment plant, where all treatment basins and reservoir are open-air. Turbulence and chop can add complexity and overflow danger to this delicate process. The HMPC noted it is often high winds, in conjunction with heat and drought, that cause wildfire risk in the District to increase.

Likelihood of Future Occurrences

Highly Likely – Based on NCDC data and HMPC input, 14 wind incidents over a 65-year period (1955-2019) equates to a severe wind event every 4.6 years. However, as noted, this database likely doesn't capture all wind events. High winds are a well-documented seasonal occurrence that will continue to occur annually in the District.

Climate Change and High Winds

According to the 2014 CAS, while average annual rainfall may increase or decrease slightly, the intensity of individual thunderstorm events is likely to increase during the 21st century. This may bring stronger thunderstorm winds. The CAS does not discuss non-thunderstorm winds.

4.2.6. Aquatic Biological Hazards: Quagga Mussels

Hazard/Problem Description

The District is concerned with the introduction of invasive mussels into Hidden Valley Lake. Quagga and zebra mussels are an invasive species of the same genus, *Dreissena*. The two species appear similar and can be mistaken for the other. These mussels are native to Eurasia and have spread across the United States. They have the ability to multiply rapidly and have no natural predator in the United States. When established in a waterbody the mussels become an ecological and economical threat. They can remove food and nutrients necessary for other species, clog pipes, damage boat motors. Quagga and zebra mussels are the size of a thumbnail (see Figure 4-21).

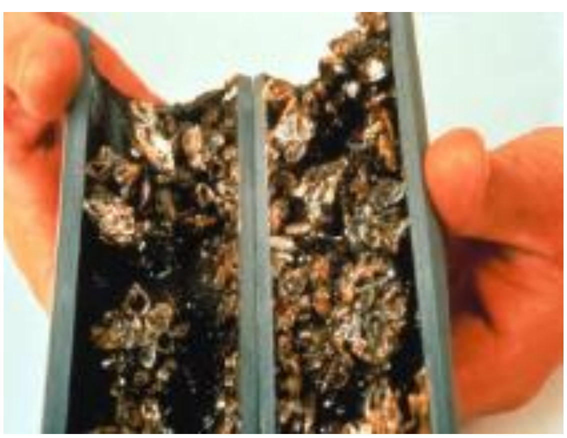
The introduction of quagga mussels (often referred to as Dreissenids) to the Pacific Southwest Region and to Hidden Valley Lake brings the potential to extend devastating impacts into a geographical area already challenged with water-related problems.

Figure 4-21 Quagga and Zebra Mussels

Source: US Fish and Wildlife Service

Zebra mussels are an invasive species first recognized in Lake St. Clair, near Detroit, Michigan, in 1988; shortly thereafter, the quagga mussel was identified. Since then, the Quagga mussel has rapidly spread across much of the western United States and in 2007 was detected at Lake Mead in Nevada. Later surveys found Quagga mussels in Lake Mohave in Nevada, Lake Havasu in Arizona, and the Colorado River Aqueduct System which serves Southern California. In California the first confirmed find of zebra mussels occurred at San Justo Lake in 2008. These mussels have the ability to survive for a number of days on land by their ability to retain moisture. As a result, there is concern these mussels can spread into Hidden Valley Lake or nearby Clear Lake by transportation on recreational boats. The mussels reproduce quickly, disrupting the ecosystem, and have the potential to clog drinking water intakes and motorboat engines, and litter beaches with jagged, foul smelling shells. Figure 4-22 is an example of mussels clogging a pipe.

Figure 4-22 Mussels Clogging a Pipe



Source: Don Schloesser, USGS, Biological Resources Division

Location and Extent

It should be noted that there have been no quagga or zebra mussels found in either Clear Lake or Hidden Valley Lake or Lake County. If they were to be found, quagga mussels would affect the whole of Clear Lake, Hidden Valley Lake, and the District and would further impact the entire County. There is not established scientific scale for quagga mussels. Magnitude is measured by the presence and counts of mussels in a Lake. Speed of onset can be short, as it takes only carelessness by a boater to introduce the mussel into local lakes. The duration of quagga mussel infestation is long. The whole of the District and Lake County could be significantly affected by these mussels.

Past Occurrences

Disaster Declaration History

There have been no federal or state disaster declarations from aquatic biological hazards, specifically quagga mussels.

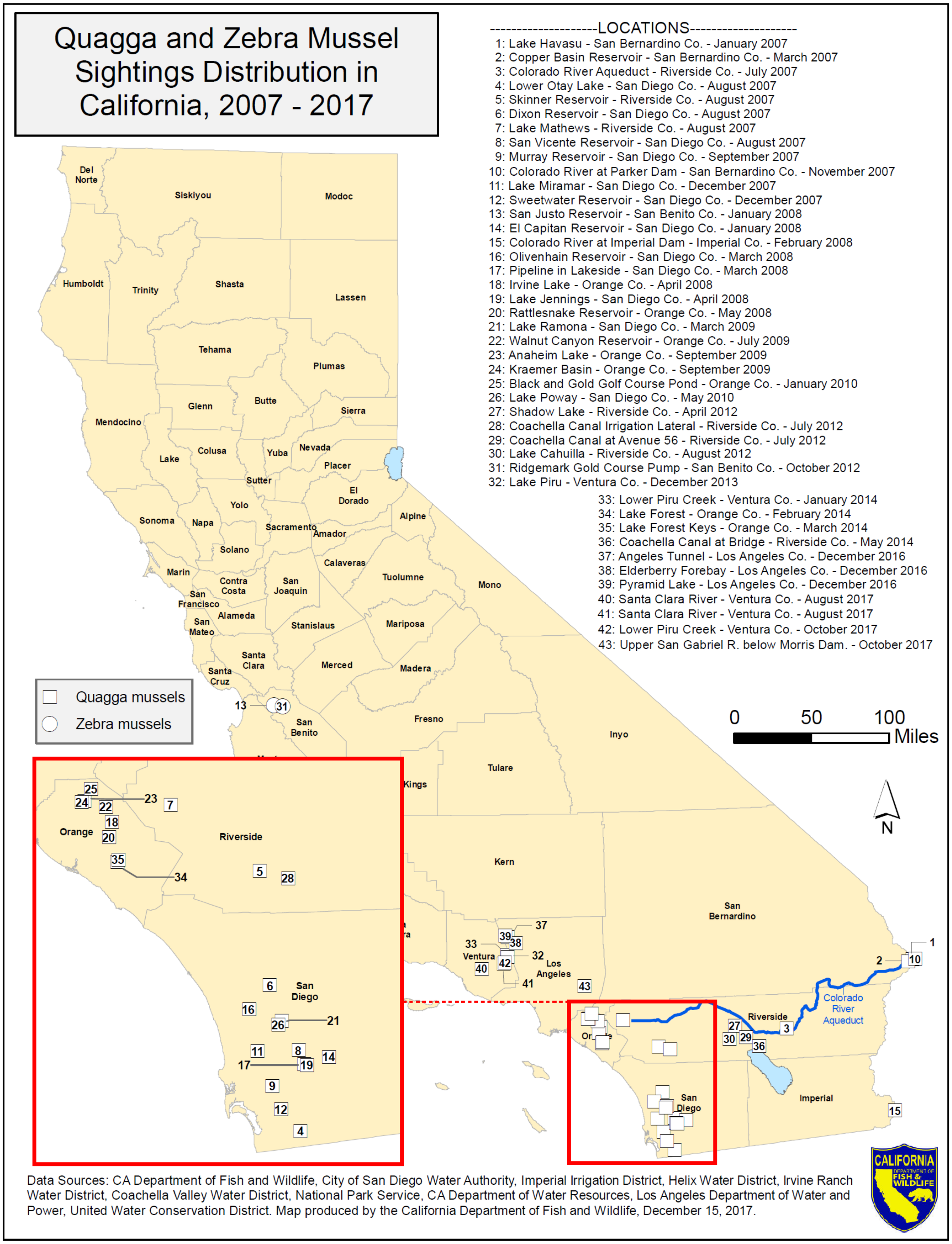
NCDC Events

The NCDC does not track aquatic biologic hazards.

Hazard Mitigation Planning Committee Events

There have been no past occurrences of these mussels in the District or Lake County, according to the County, the District, and the HMPC. Figure 4-23 illustrates the quagga and zebra mussel sightings in California as of 2017. Most of the mussel sightings are in Southern California. The nearest known infected body of water to Lake County was reported in 2008 in the San Justo Lake located in San Benito County. According to Lake County Water Resources Department and Lake County Special Districts, quagga and zebra mussels loom as potential problems in Clear Lake, Hidden Valley Lake, and other local bodies of water.

Figure 4-23 Quagga and Zebra Mussel Sightings in California 2007 to 2017



Source: California Department of Fish and Wildlife

Likelihood of Future Occurrences

Unlikely – The use of motorboats and registered watercraft can inadvertently lead to the spread of invasive mussels. Quagga and/or zebra mussels can enter into Clear Lake and Hidden Valley Lake through transport on visiting or local watercraft. Should these mussels become established in Clear Lake or Hidden Valley Lake, they would represent a potentially significant cost to the District as they have to similar water districts across the nation According to the 100th Meridian Initiative no practical technologies or biocides are available to remove these mussels once entered into a water body. As a result, preventing infected boats from entering Clear Lake and Hidden Valley Lake appears to be the only countermeasure.

Climate Change and Quagga Mussels

A report by the USDA from Cornell University research note that quagga mussels are usually restricted to the bottom of the lake and therefore depend on sedimentation and water circulation to access food. Water circulation is in turn affected by the morphometry of lakes and by temperature increases associated with climate change. These two drivers of ecological change (invasive mussels and climate change) will interact, but the degree of interactions and the magnitude of ecological change to the lakes will depend on the morphometry of the lake. Therefore, ecological forecasting requires consideration of both lake physics and lake biology. Climate change will likely affect quagga mussel proliferation, if they ever enter Clear Lake or Hidden Valley Lake.

4.2.7. Climate Change

Hazard/Problem Description

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

This LHMP is concerned with human-induced climate change that has been rapidly warming the Earth at rates unprecedented in the last 1,000 years. Since industrialization began in the 19th century, the burning of fossil fuels (coal, oil, and natural gas) at escalating quantities has released vast amounts of carbon dioxide and other greenhouse gases responsible for trapping heat in the atmosphere, increasing the average temperature of the Earth. Secondary impacts include changes in precipitation patterns, the global water cycle, melting glaciers and ice caps, and rising sea levels. According to the Intergovernmental Panel on Climate Change (IPCC), climate change will "increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems" if unchecked.

Through changes to oceanic and atmospheric circulation cycles and increasing heat, climate change affects weather systems around the world. Climate change increases the likelihood and exacerbates the severity of extreme weather – more frequent or intense storms, floods, droughts, and heat waves. Consequences for human society include loss of life and injury, damaged infrastructure, long-term health effects, loss of agricultural crops, disrupted transport and freight, and more. Climate change is not a discrete event but a long-term hazard, the effects of which communities are already experiencing.

Climate change adaptation is a key priority of the State of California. The 2018 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and earlier runoff of both snowmelt and rainwater in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

In the District, the HMPC noted that each year it seems to get a bit warmer. It was also noted that 2017 was one of the wettest 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 4-16 provides a summary of Cal-Adapt Climate Projections for the North Coast Region.

Table 4-16 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

Location and Extent

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

Past Occurrences

Disaster Declaration History

Climate change has never been directly linked to any declared disasters, as shown in Table 4-3.

NCDC Events

The NCDC does not track climate change events.

Hazard Mitigation Planning Committee Events

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

Likelihood of Future Occurrence

Likely – Climate change is virtually certain to continue without immediate and effective global action. According to NASA, 2018 one of the hottest years on record, and 15 of the 17 hottest years ever have occurred since 2000. Without significant global action to reduce greenhouse gas emissions, the IPCC concludes in its Fifth Assessment Synthesis Report (2014) that average global temperatures are likely to exceed 1.5°C by the end of the 21st century, with consequences for people, assets, economies and ecosystems, including risks from heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surges.

Climate Scenarios

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

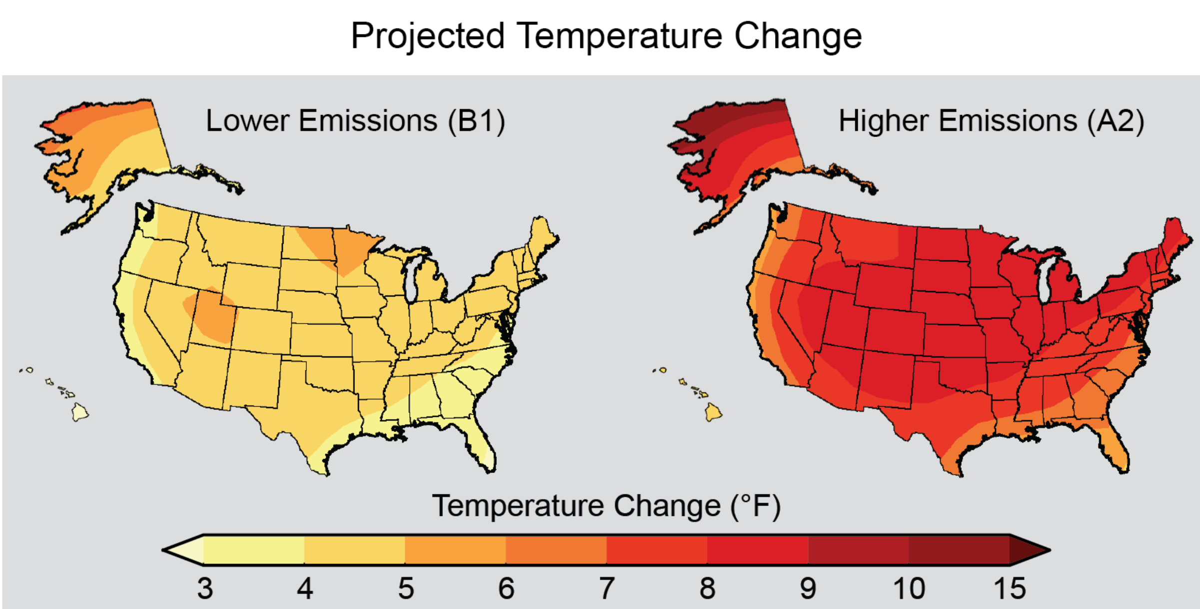
Key Uncertainties Associated with Climate Projections

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

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

Maps show projected change in average surface air temperature in the later part of this century (2071-2099) relative to the later part of the last century (1970-1999) under a scenario that assumes substantial reductions in heat trapping gases and a higher emissions scenario that assumes continued increases in global emissions. These are shown in Figure 4-24.

Figure 4-24 Projected Temperature Change – Lower and Higher Emissions Scenario



Source: National Climate Assessment

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

The CNRA's 2014 CAS delineated how climate change may impact and exacerbate natural hazards in the future, including wildfires, extreme heat, floods, and drought.:

- Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in the District and the rest of California, which are likely to increase the risk of mortality and morbidity due to heat-related illness and exacerbation of existing chronic health conditions. Those most at risk and vulnerable to climate-related illness are the elderly, individuals with chronic conditions such as heart and lung disease, diabetes, and mental illnesses, infants, the socially or economically disadvantaged, and those who work outdoors.
- Higher temperatures will melt the Sierra snowpack earlier and drive the snowline higher, resulting in less snowpack to supply water to California users.
- Droughts are likely to become more frequent and persistent in the 21st century.
- Intense rainfall events, periodically ones with larger than historical runoff, will continue to affect California with more frequent and/or more extensive flooding.
- Storms and snowmelt may coincide and produce higher winter runoff from the landward side, while accelerating sea-level rise will produce higher storm surges during coastal storms. Together, these changes may increase the probability of floods and levee and dam failures, along with creating issues related to saltwater intrusion.
- Warmer weather, reduced snowpack, and earlier snowmelt can be expected to increase wildfire through fuel hazards and ignition risks. These changes can also increase plant moisture stress and insect populations, both of which affect forest health and reduce forest resilience to wildfires. An increase in wildfire intensity and extent will increase public safety risks, property damage, fire suppression and emergency response costs to government, watershed and water quality impacts, vegetation conversions and habitat fragmentation.

4.2.8. Dam Failure

Hazard/Problem Description

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

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

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

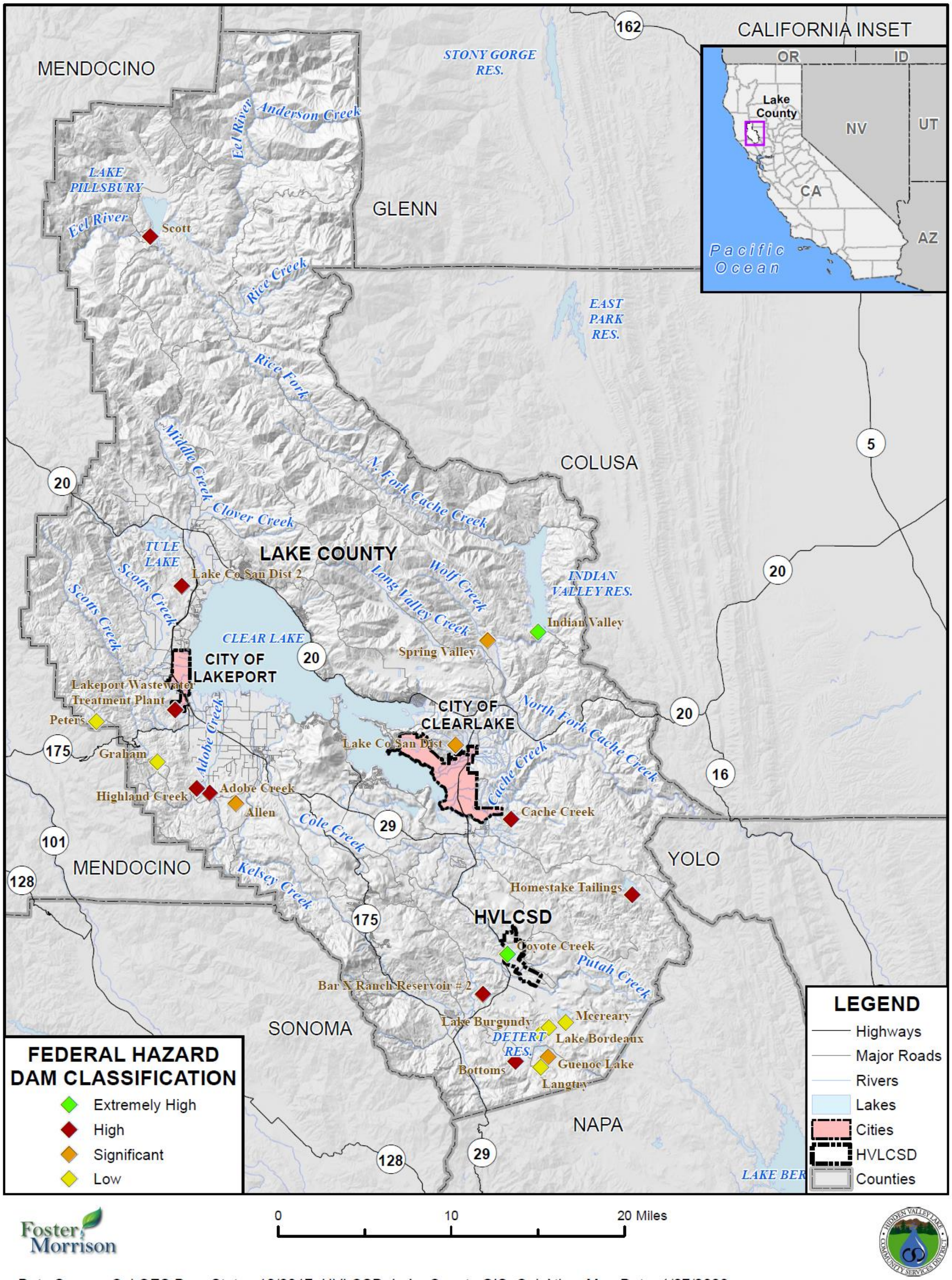
The California Department of Water Resources (Cal DWR) Division of Safety of Dams (DSOD) has jurisdiction over impoundments that meet certain capacity and height criteria. Embankments that are less than six feet high and impoundments that can store less than 15 acre-feet are non-jurisdictional. Additionally, 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, 2 were rated as Extremely High Hazard, 9 are rated as High Hazard, 4 as Significant Hazard, 6 as Low Hazard. Figure 4-25 identifies the dams in Lake County, which are also detailed in Table 4-17.

Figure 4-25 Lake County Dam Inventory



Data Source: Cal OES Dam Status 10/2017, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 1/27/2020.

Table 4-17 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	Significant	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	High	Gravity	Cache Creek	35	320,000	Y
Coyote Creek	Hidden Valley Lake Association	Extremely High	Rockfill	Coyote Creek	92	3,375	Not reported
Graham	Sue Thomason	Low	Rockfill	Tr Highland Cr	39	62	Not reported
Guenoc Lake	Langtry Farms, LLC	Significant	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	Significant	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, National Performance of Dams Program

According to data provided by Cal DWR, Cal OES, and the HVLCSD, there is one dam in the District that poses a risk. Table 4-18 identifies the dam that could affect the District.

Table 4-18 HVLCSD Dam Inventory

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	EAP
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

Coyote Creek Dam

The Coyote Creek Dam is an earthen dam owned and operated by the Hidden Valley Lake Association. 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, and is owned by the Hidden Valley Lake Association (HDVLA). The water held by the dam is owned by the HVLCSD. 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.

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, only the Coyote Creek 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, which the District thinks is unlikely. Methodologies for this analysis and maps showing extent can be found in Section 4.3.5. 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). 22.92% of all acreage in the HVLCSD falls in the dam inundation zone. This can be seen in Table 4-19.

Table 4-19 HVLCSD – Dam Inundation Geographical Extents

Dam Inundation Area / Jurisdiction	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Coyote Creek	384	20.62%	137	17.44%	248	22.92%
Outside of Dam Inundation	1,479	79.38%	647	82.56%	833	77.08%
Grand Total	**1,864**	**100.00%**	**783**	**100.00%**	**1,080**	**100.00%**

Source: Coyote Creek (Hidden Valley) Lake Dam Inundation Study

Past Occurrences

Disaster Declaration History

There have been no disasters declarations related to dam failure in Lake County, as shown in Table 4-3.

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 Team Events

The HMPC noted no past dam failure events.

Likelihood of Future Occurrences

Unlikely – There have been no recorded events of dam failure or other issues of concern with the integrity or overtopping of the Coyote Creek 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.

Climate Change and Dam Failure

Increases in precipitation in areas upstream of dams could increase the potential for dam failure and uncontrolled releases on the dam that could affect the District.

4.2.9. Drought and Water Shortage

Hazard/Problem Description

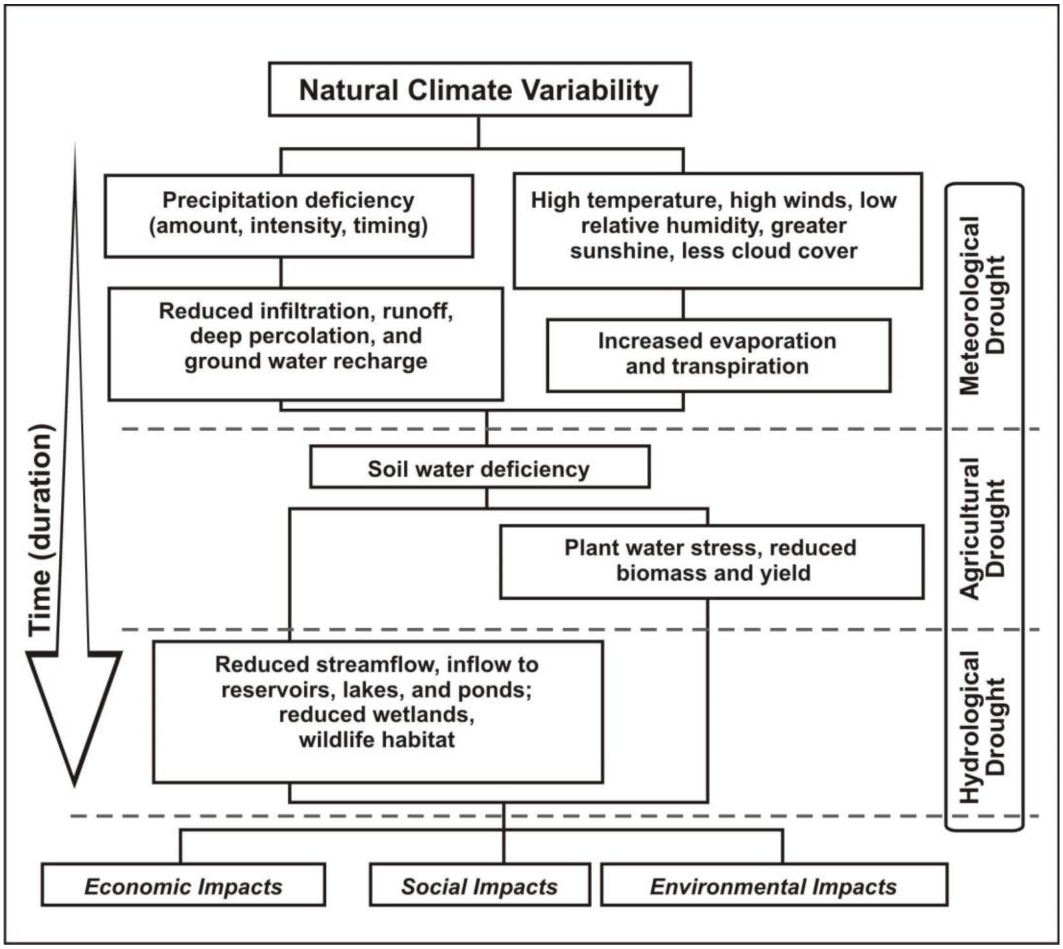
Drought

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

Drought is a complex issue involving (see Figure 4-26) 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 4-26 Causes and Impact of Drought



Source: National Drought Mitigation Center (NDMC)

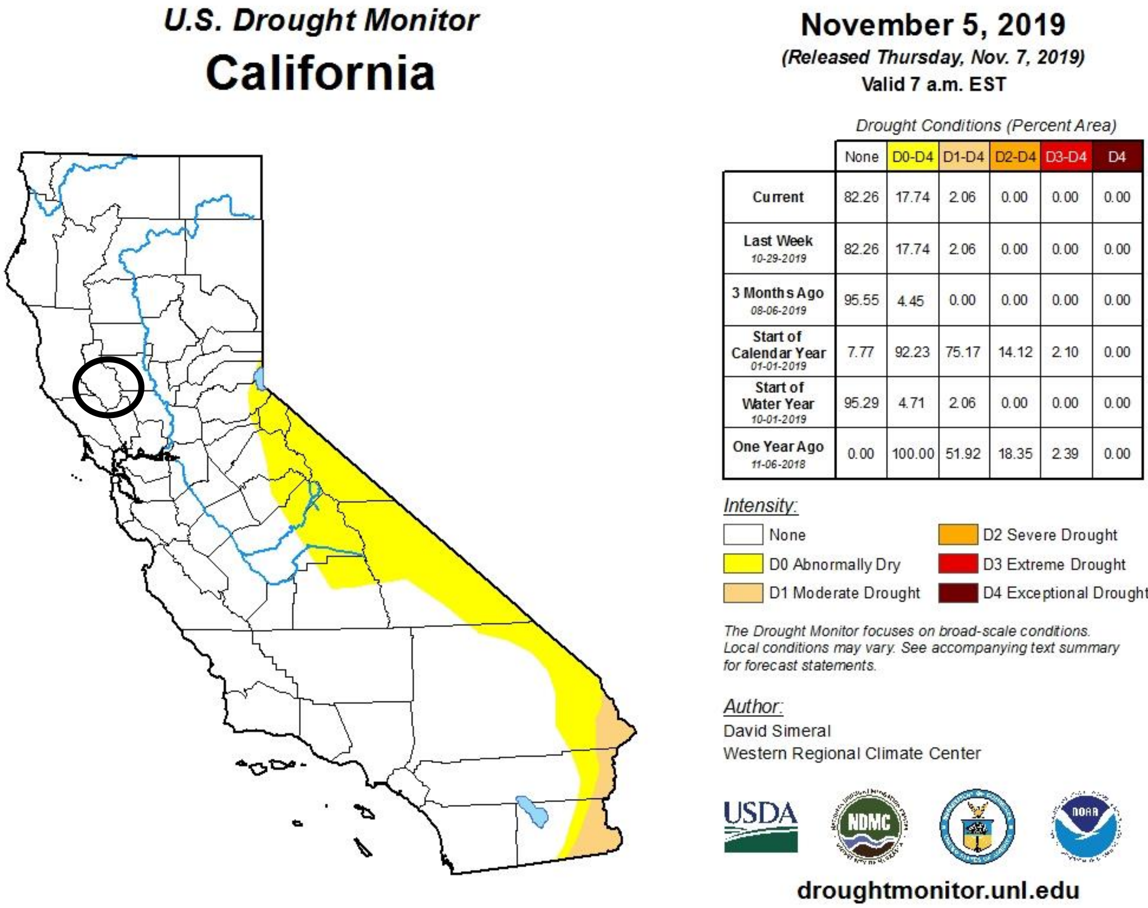
Drought can also cause increased wildfire risk. This is discussed in Section 4.2.13.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought in the District are those related to water intensive activities such as wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Also, during a drought, allocations go down and water costs increase, which results in reduced water availability. Voluntary conservation measures are a normal and ongoing part of system operations and actively implemented during extended droughts. Water quality deterioration is also a potential problem. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding and erosion.

Location and Extent of Drought

Drought is a regional phenomenon that affects the entire District. Drought in the United States is monitored by the National Integrated Drought Information System (NIDIS). A major component of this portal is the U.S. Drought Monitor. The Drought Monitor concept was developed jointly by the NOAA's Climate Prediction Center, the NDMC, and the USDA's Joint Agricultural Weather Facility in the late 1990s as a process that synthesizes multiple indices, outlooks and local impacts, into an assessment that best represents current drought conditions. The final outcome of each Drought Monitor is a consensus of federal, state, and academic scientists who are intimately familiar with the conditions in their respective regions. A snapshot of the drought conditions in California and the District can be found in Figure 4-27. Snapshots from 2015, 2016, 2017, and 2018 are shown in Figure 4-28. As seen in these figures, the District has been in and out of drought over the past five years.

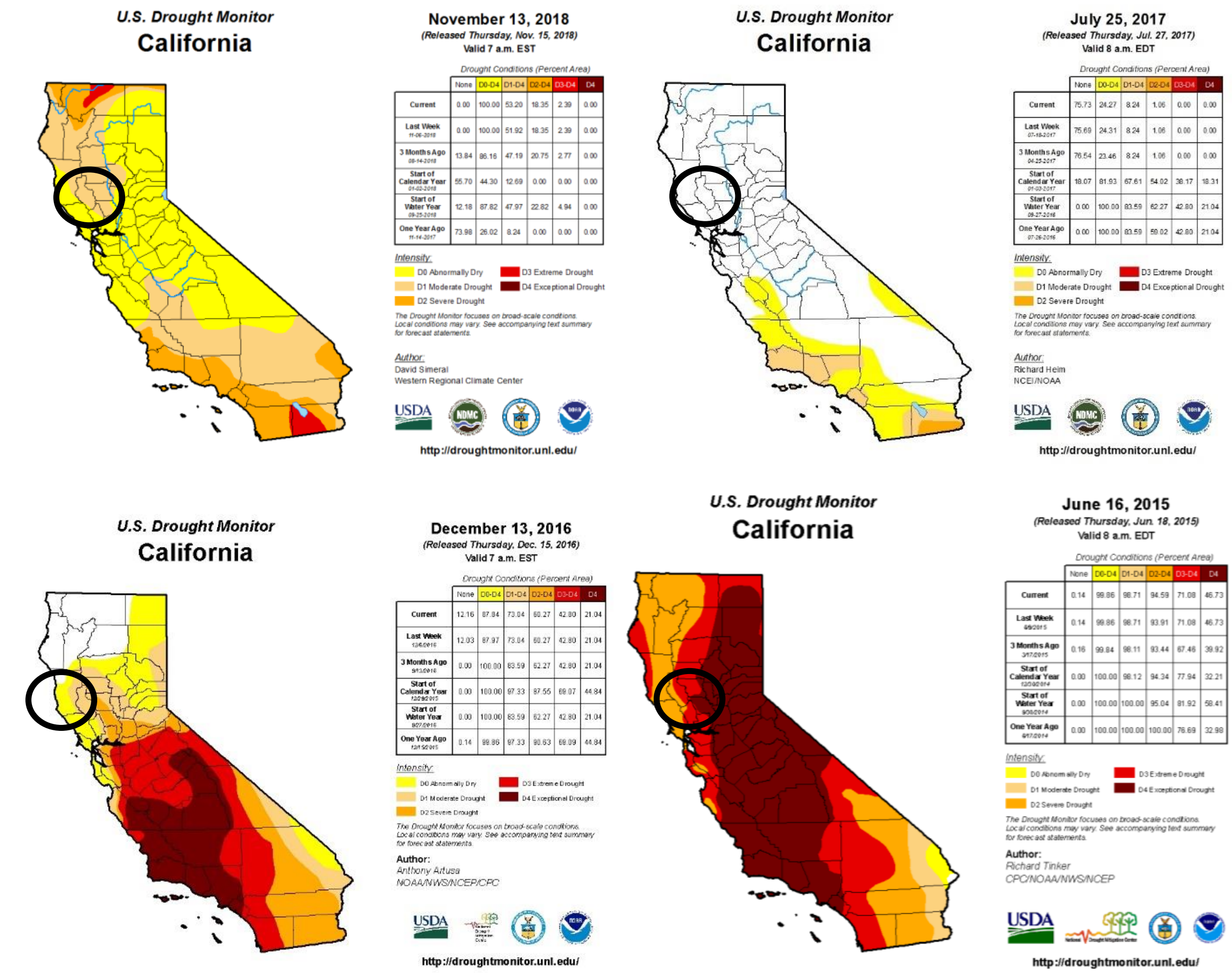
Figure 4-27 Current Drought Status in the HVLCSD



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	82.26	17.74	2.06	0.00	0.00	0.00
Last Week 10-29-2019	82.26	17.74	2.06	0.00	0.00	0.00
3 Months Ago 08-06-2019	95.55	4.45	0.00	0.00	0.00	0.00
Start of Calendar Year 01-01-2019	7.77	92.23	75.17	14.12	2.10	0.00
Start of Water Year 10-01-2019	95.29	4.71	2.06	0.00	0.00	0.00
One Year Ago 11-06-2018	0.00	100.00	51.92	18.35	2.39	0.00

Source: US Drought Monitor

Figure 4-28 Previous Drought Status in the HVLCSD



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)

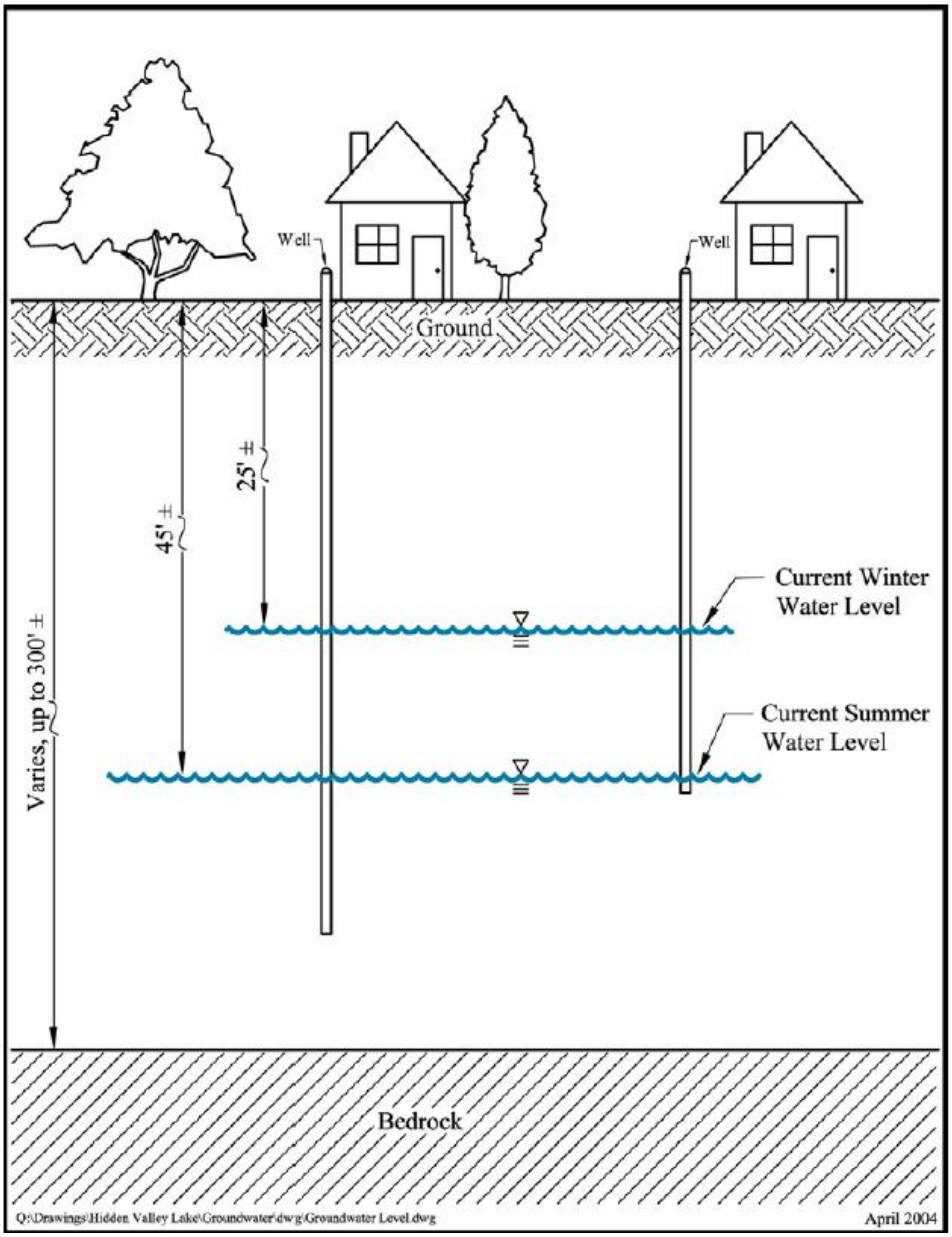
Drought has a slow onset and long duration. Drought is not initially recognized as a problem because it normally originates in what is considered good weather, which typically includes a dry late spring and summer in Mediterranean climates, such as in California. This is particularly true in Northern 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. The State has conducted some empirical studies on the economic effects of fallowed lands with regard to water purchased by the State's Water Bank; but these studies do not quantitatively address the situation in the District. It can be assumed, however, that the loss of production in one sector of the economy would affect other sectors. 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. For example, Northern California agencies, including those from Lake County, were major participants in the Governor's Drought Water Bank of 1991, 1992, and 1994.

The District 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. Although physically present and of suitable quality, the District is taking steps to maintain its current water rights to the Coyote Valley groundwater basin, and increase hydrogeologic understanding of the supply, and promote resource stewardship to ensure its sustainability. Hidden Valley Lake Community Services District 4-60 Local Hazard Mitigation Plan February 2020.

Figure 4-29 HVLCSD - Seasonal Water Level Changes Under Current Demands



Source: HVLCSD

The SWRCB Compliance Order is a significant concern to the District. It has the potential to be a big economic loss by limiting the customer base. 679 parcels are currently affected by the Compliance Order. This is discussed in more detail in the Future Development discussion in Section 4.3.1.

During years of drought, the State Water Resources Control Board's Division of Water Rights (SWRCB During years of drought, specifically in 2014 and 2015, the State Water Resources Control Board's Division of Water Rights (SWRCB DWR) issued curtailments of certain appropriative water rights to protect the valid prior rights of downstream water rights holders. HVLCSD appropriative water rights were included in that curtailment and it was directed to work with Division of Drinking Water to provided continued water service to meet minimum health and safety standards.

Location and Extent of Water Shortage

Since water shortage 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 believes it has sufficient water supply within the Coyote Valley Groundwater Basin, which reduces the extent of drought impacts in the District. The District's water rights are junior to others in the watershed, which was the basis for the SWRCB DWR curtailments in 2014 and 2015, and the SWRCB Division of Drinking Water issued Compliance Order No. 02-03-14R-004 requiring a moratorium on new water hookups in the District. This SWRCB Compliance Order is discussed in more detail in the Future Development discussion in Section 4.3.1.

Past Occurrences

Disaster Declaration History

There have been two state and no federal disaster declarations for Lake County. These are shown on Table 4-20.

Table 4-20 Lake County – State and Federal Drought Disaster Declarations 1950-2019

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Drought	0	–	2	1977, 2014

Source: Cal OES, FEMA

NCDC Events

There have been 15 NCDC drought events in Lake County. All of these were for the 2014-2016 drought, but no damages, injuries, or losses were reported in the NCDC database. This can be seen in Table 4-21.

*Table 4-21 Lake County NCDC Storm Events 1/1/1996-5/31/2019**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Drought	15	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.

Cal-DWR and Hazard Mitigation Planning Team Events

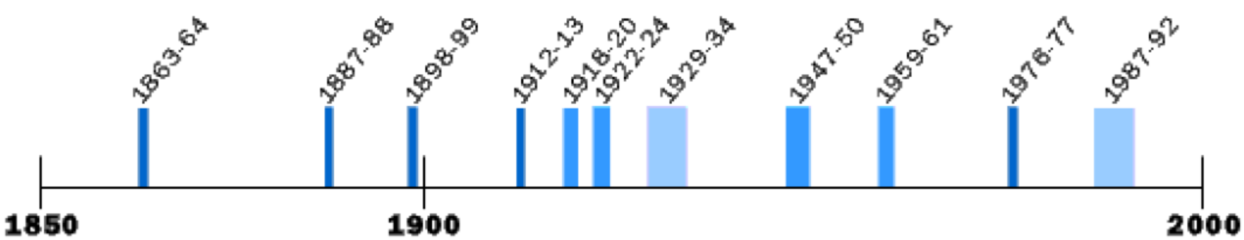
Historically, California has experienced multiple severe droughts. According to the DWR, droughts exceeding three years are relatively rare in Northern California, the source of much of the State's developed water supply. The 1929-34 drought established the criteria commonly used in designing storage capacity and yield of large northern California reservoirs. Table 4-22 compares the 1929-34 drought in the Sacramento and San Joaquin Valleys to the 1976-77, 1987-92, and 2007-09 droughts. Figure 4-30 depicts California's Multi-Year Historical Dry Periods, 1850-2000.

Table 4-22 Severity of Extreme Droughts in the Sacramento and San Joaquin Valleys

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

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

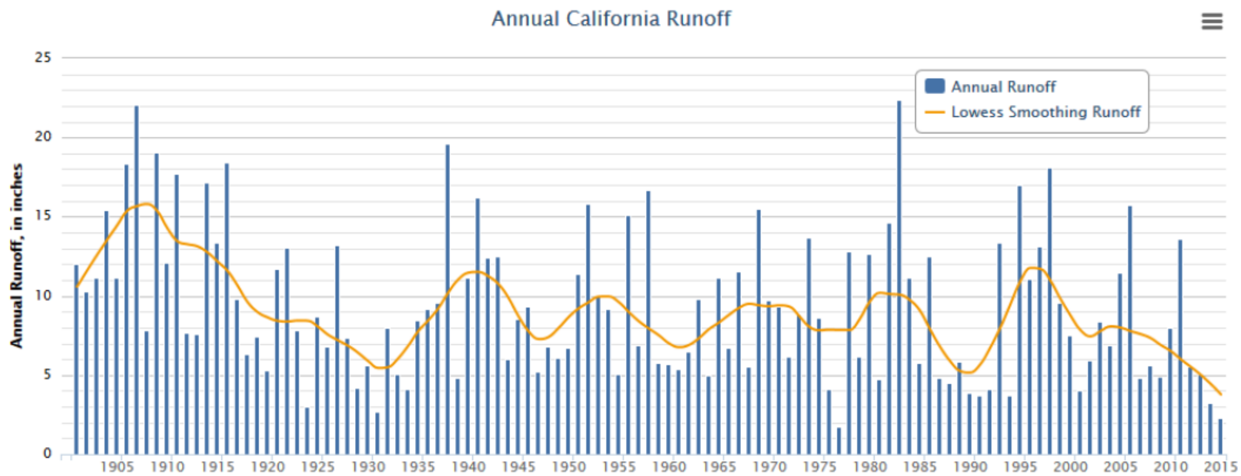
Figure 4-30 California's Multi-Year Historical Dry Periods, 1850-2000



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

Figure 4-31 depicts runoff for the State from 1900 to 2015. This gives a historical context for the 2014-2015 drought to compare against past droughts.

Figure 4-31 Annual California Runoff –1900 to 2015



Source: Cal DWR

The 2018 California State Hazard Mitigation Plan discussed the major droughts from 1900 to 2017. This discussion below appends to the tables and figures above.

The 1975-1977 Drought

From November 1975 through November 1977, California experienced one of its most severe droughts. Although people in many areas of the state are accustomed to very little precipitation during the growing season (April to October), they expect it in the winter. In 1976 and 1977, the winters brought only one-half and one-third of normal precipitation, respectively. Most surface storage reservoirs were substantially drained in 1976, leading to widespread water shortages when 1977 turned out to be even drier. 31 counties were affected, resulting in $2.67 billion in crop damage. 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

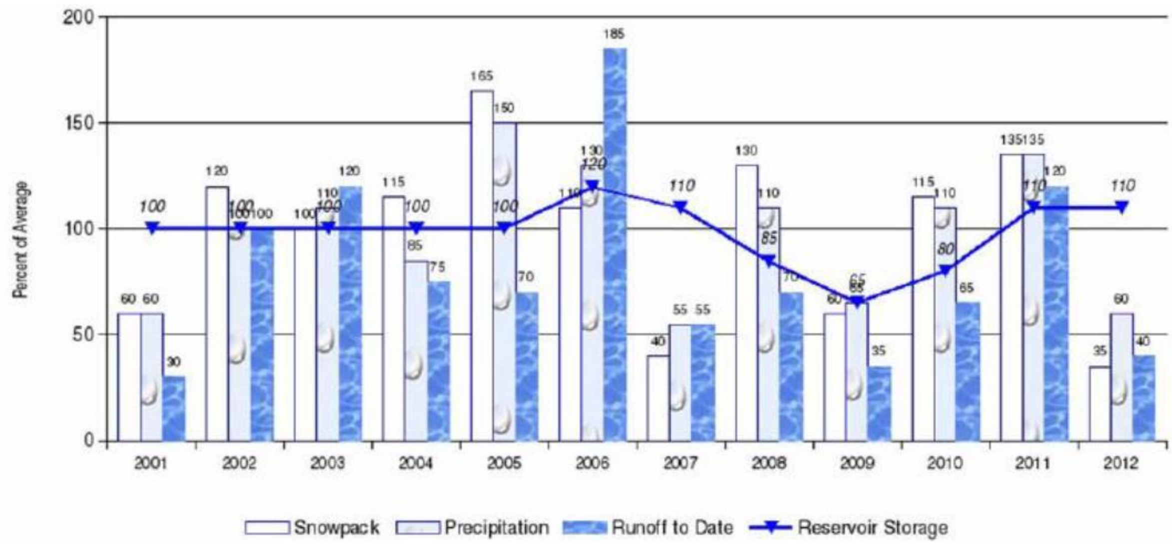
The statewide drought of 2012-2017 will be remembered as one of the most severe and costliest droughts of record in California. The drought that spanned water years 2012 through 2017 included the driest four-year statewide precipitation on record (2012-2015) and the smallest Sierra-Cascades snowpack on record (2015, with 5 percent of average). It was marked by extraordinary heat: 2014, 2015, and 2016 were California's first, second, and third warmest years in terms of statewide average temperatures. By the time the drought was declared officially over in April 2017, the state had expended $6.6 billion in drought response and mitigation programs, and had been declared a federal disaster area. This drought led to the conditions in the wildfires that struck the County in 2015 and 2016, as well as in 2018. More information on these fires can be found in Section 4.2.13.

Affects to the District were noted. First drought, then fires, then flood occurred as a result of these events. Burn scar from fires created more runoff and higher sedimentation in the waters of the HVLCSD.

Water Shortage

Figure 4-32 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 2012. The chart illustrates the cyclical nature of weather patterns in California.

Figure 4-32 Water Supply Conditions, 2007 to 2012

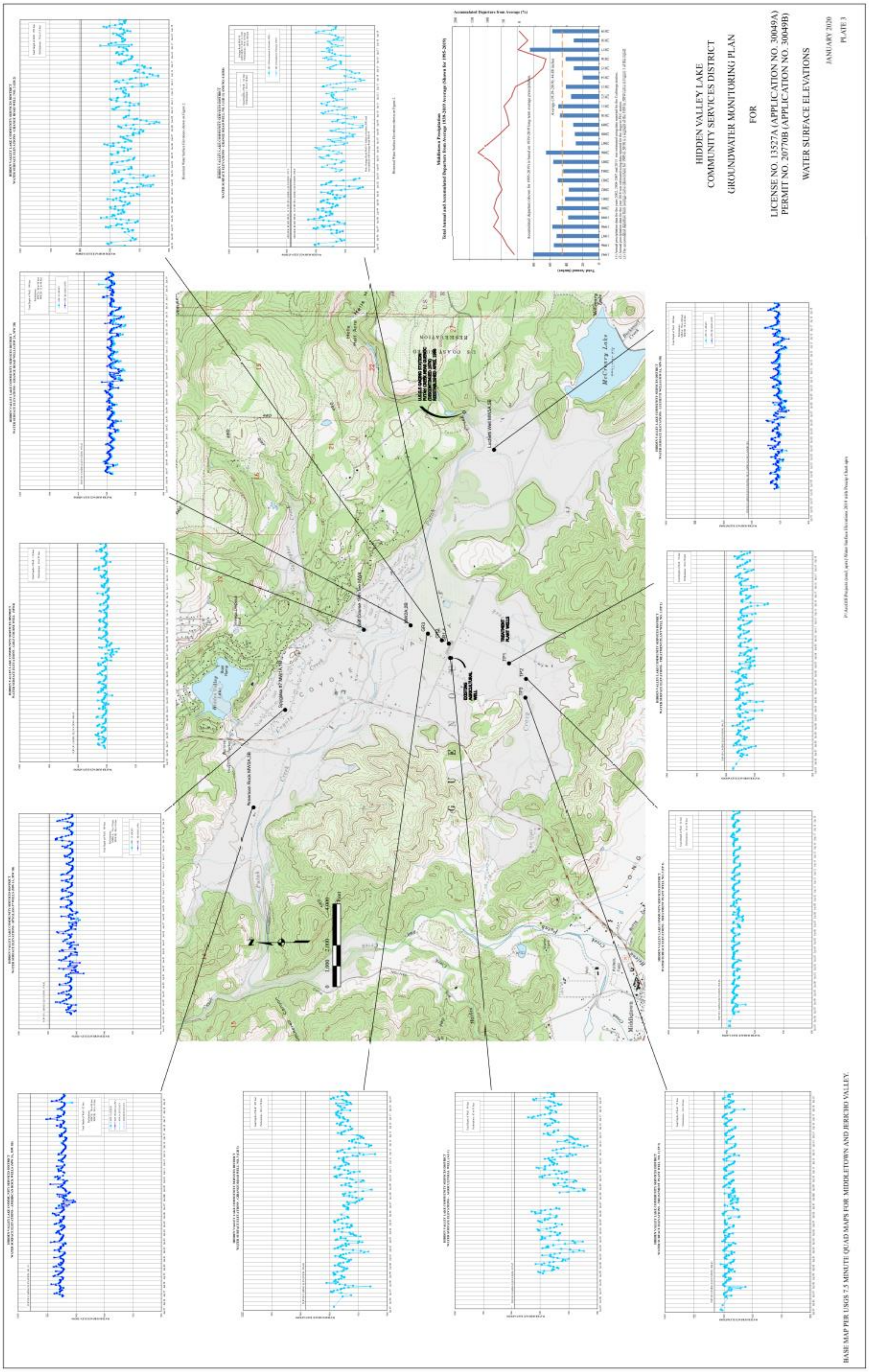


Source: 2018 State of California Hazard Mitigation Plan

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

In the District, water shortage is 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 on Figure 4-33.

Figure 4-33 HVLCSD – Monthly Water Surface Elevations in Monitoring Wells



With a reduction in water, water supply issues based on water rights becomes more evident. Drought and water supply issues will continue to be a concern to the District. The District noted that there is a need for deeper geological analysis to determine the true source of water that the District uses.

Likelihood of Future Occurrence

Drought

Likely—Historical drought data for the District and region indicate there have been 5 significant droughts in the last 85 years. This equates to a drought every 17 years on average or a 5.9 percent chance of a drought in any given year. However, based on this data and given the multi-year length of droughts, the HVLCSD determined that future drought occurrence in the District are likely.

Water Shortage

Occasional — Recent historical data for water shortage indicates that the District 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 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.

Climate Change and Drought and Water Shortage

Climate change and its effect on drought near the District has been discussed by three sources:

- CAS
- Climate Change and Health Profile Report – Lake County
- 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 2014 CAS stresses the need for public policy development addressing long term climate change impacts on water supplies. The CAS notes that climate change is likely to significantly diminish California's future water supply, stating that:

> ***California must change its water management and uses because climate change will likely create greater competition for limited water supplies needed by the environment, agriculture, and cities.***

Climate Change and Health Profile Report – Lake County

The CCHPR note that the lack of moisture, already at a severe level in California due to a current multi-year drought and decades of fuel accumulation from historical forestry and fire suppression practices, increases the risk of wildfires. Devastating wildfires like the Rim Fire of 2013 impact watersheds and increase the risk of landslides or mudslides, and sediment in run-off that reduce water quality. In addition to fire-related injuries, local and regional transport of smoke, ash, and fine particles increases respiratory and cardiovascular risks.

Increasing temperatures and changes in precipitation may lead to intensified drought conditions. Drought decreases the availability and quality of water for humans. This includes reduced water levels to fight wildfires. Drought may increase exposure to health hazards including wildfires, dust storms, extreme heat events, flash flooding, degraded water quality, and reduced water quantity.

HMPC

The HMPC noted that drought and water shortage have an effect on future development in the District Service Area. The SWRCB Compliance Order issued in 2014 is a significant concern to the District. It has the potential to be a sizeable economic loss by limiting the customer base. 679 parcels are currently affected by the Compliance Order. The Compliance Order has been lifted on District's Units 4 & 5 since those lands are considered riparian to Putah Creek and not under SWRCB permitting jurisdiction. The District is currently in discussion with the SWRCB to determine its jurisdiction over the source of water for the Grange Road Wells. The Lake County assessor has reached out and is considering reducing the assessed Hidden Valley Lake Community Services District 4-67 Local Hazard Mitigation Plan February 2020 values as a result of property holders recently selling parcels for a significant reduction from original purchase price.

4.2.10. Earthquake

Hazard/Problem Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, seiches, hazmat incidents, fires, avalanches, and landslides. The degree of damage depends on many interrelated factors. Among these are: the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction. This section briefly discusses issues related to types of seismic hazards.

Ground Shaking

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. This is discussed in greater extent in Section 4.2.12.

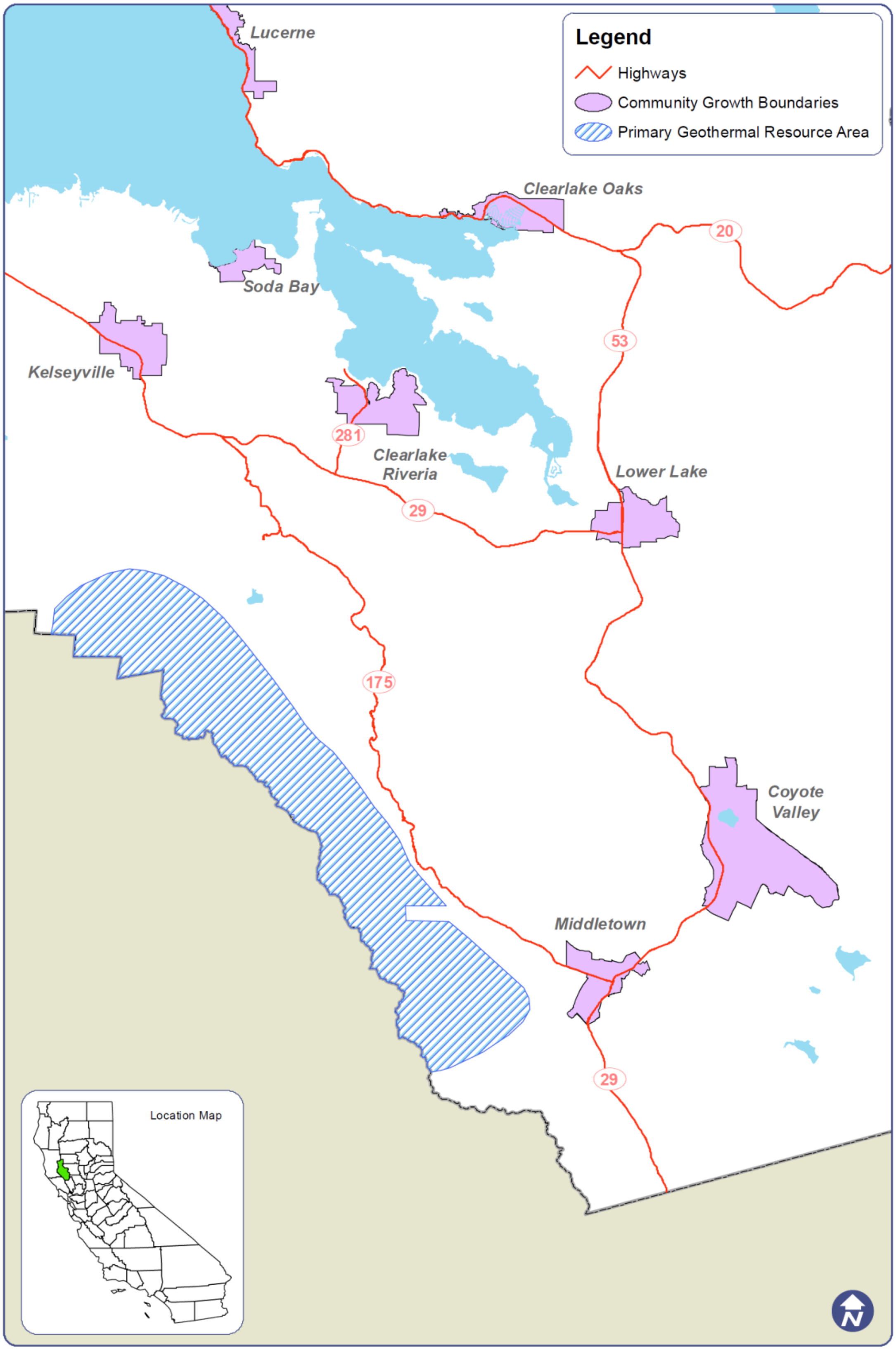
Settlement

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 4-34). 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 4-34 Geothermal Resource Areas near HVLCSD



Source: 2008 Lake County General Plan

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.

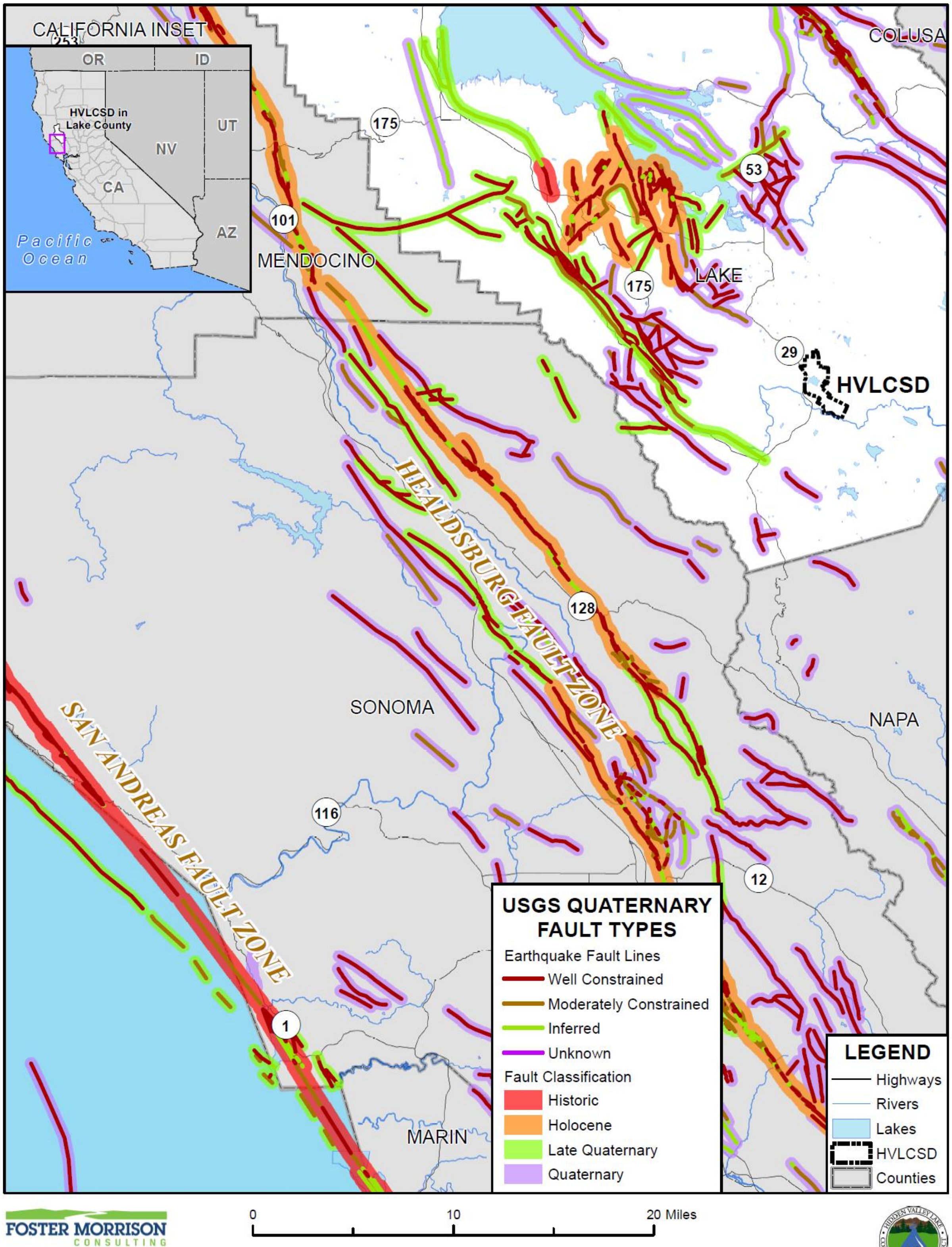
The geology of the Northern California Coastal Region is distinct from the rest of California. Geologists and seismologists find the region of special interest because of the San Andreas Fault, which is within 30 miles to the west, the Hayward fault, and Rogers fault extension into the Mayacamas fault 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 Mayacama Fault traverses the Lake and Mendocino County lines in the eastern mountains less than 20 miles from the Clear Lake basin. The Mayacama 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 4-35.

Figure 4-35 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: 11/13/2019.

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 4-23). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Table 4-23 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 4-3.

NCDC Events

The NCDC does not track earthquakes.

USGS Events

The USGS National Earthquake Information Center database contains data on earthquakes in the District. Table 4-24 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 the District. These 35 results are detailed in Table 4-25.

Table 4-24 Approximate Relationships between Earthquake Magnitude and Intensity

Richter Scale Magnitude	Maximum Expected Intensity (MM)*	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 4-25 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

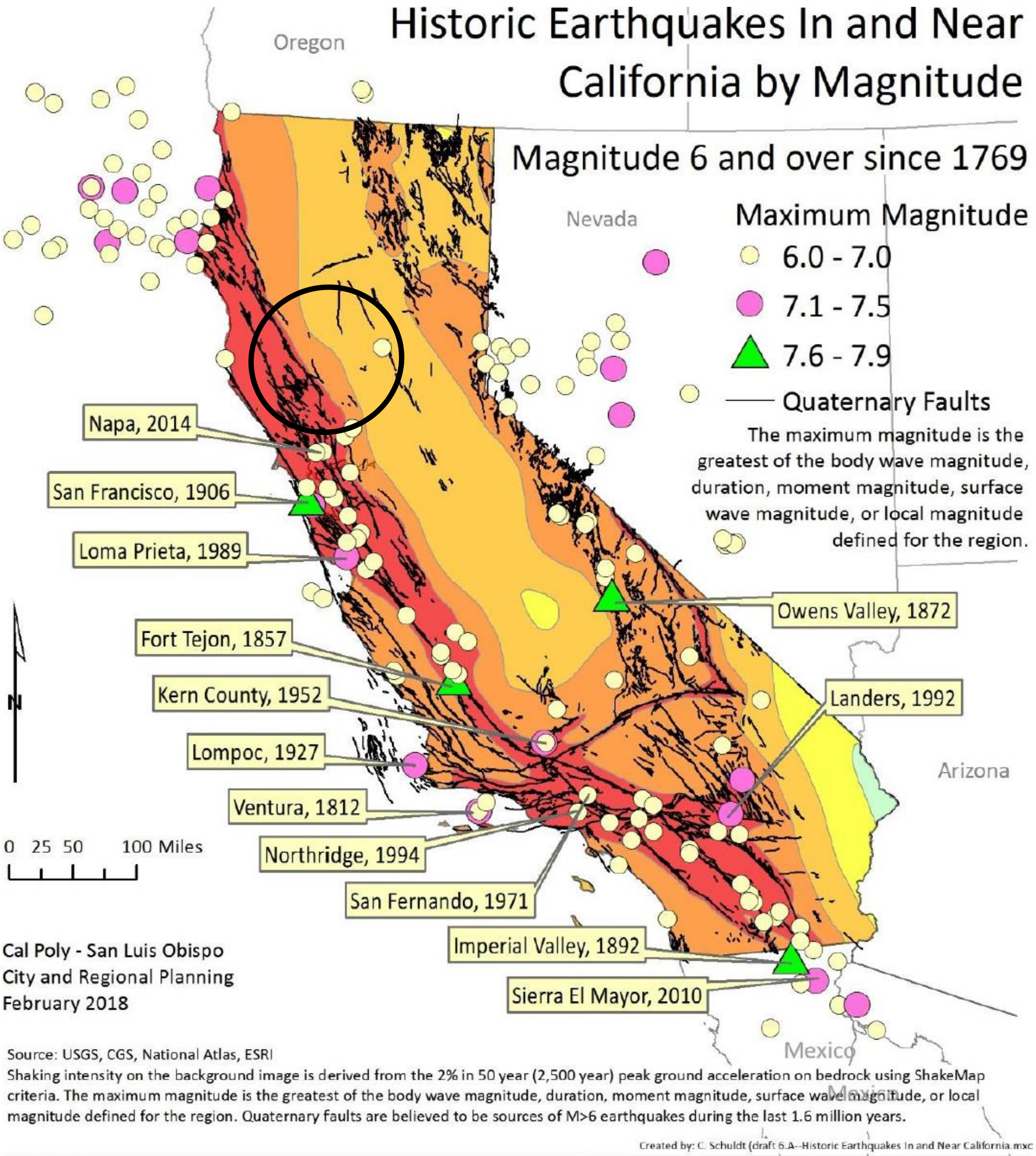
Date	Richter Magnitude	Location
4/15/1898	6.9	offshore Northern California
3/31/1898	6.2	San Francisco Bay area, California
8/9/1893.	5.1	Northern California
4/30/1892	5.5	Northern California
4/21/1892	6.2	Northern California
4/19/1892	6.4	Northern California
10/12/1891	5.5	Northern California
7/31/1889	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 January 1, 1850 – November 1, 2019

Figure 4-36 shows major historical earthquakes in California from 1769 to 2017.

Figure 4-36 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: 2018 State of California Multi-Hazard Mitigation Plan

Hazard Mitigation Planning Team 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 County. 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.

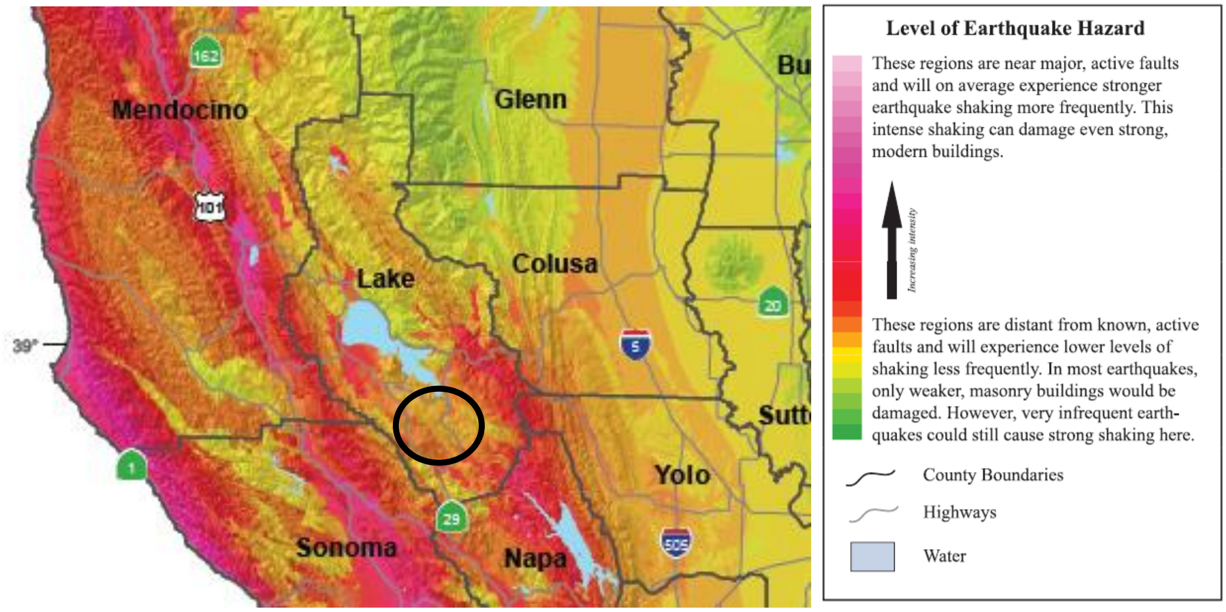
Likelihood of Future Occurrences

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.

Mapping of Future Occurrences

Maps indicating the maximum expectable intensity of ground shaking for the County and District are available through several sources. Figure 4-37, prepared by the California Division of Mines and Geology, shows the expected relative intensity of ground shaking and damage in California from anticipated future earthquakes. The shaking potential is calculated as the level of ground motion that has a 2% chance of being exceeded in 50 years, which is the same as the level of ground-shaking with about a 2,500-year average repeat time. Although the greatest hazard is in areas of highest intensity as shown on the map, no region is immune from potential earthquake damage.

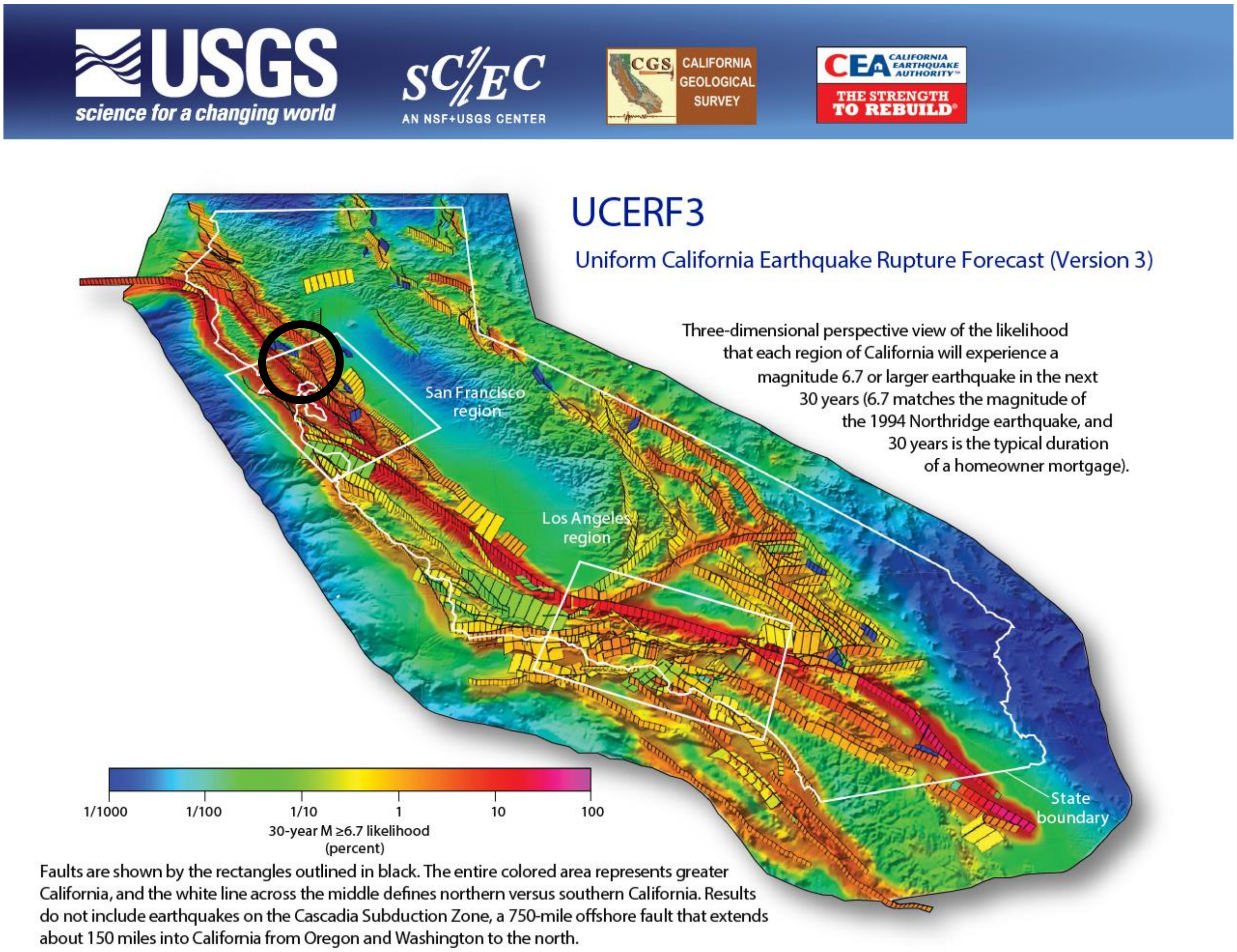
Figure 4-37 Maximum Expectable Earthquake Intensity – 2% Chance in 50 Years



Source: California Division of Mines and Geology

In 2014, the USGS and 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 4-38 and indicates that the District has a predominantly moderate to high risk of earthquake occurrence, which coincides with the likelihood of future occurrence rating of occasional.

Figure 4-38 Probability of Earthquake Magnitudes Occurring in 30 Year Time Frame



Source: United States Geological Survey Open File Report 2015-3009

Climate Change and Earthquake

Climate changes is unlikely to increase earthquake frequency or strength.

4.2.11. Flood: (1% and 0.2% Annual Chance)

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. This is one reason floods kill more people trapped in vehicles than anywhere else.

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

There are three primary types of freshwater flood events in the District: riverine and lake, flash flooding, and urban 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.
- **Stormwater/Urban** 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 4.2.11 below.

The District is also at risk to flooding resulting from dam and levee failures. Dam failure flooding is discussed separately in Section 4.2.8 of this document, while levee failures are discussed in Section 4.2.14. 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.

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.

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.

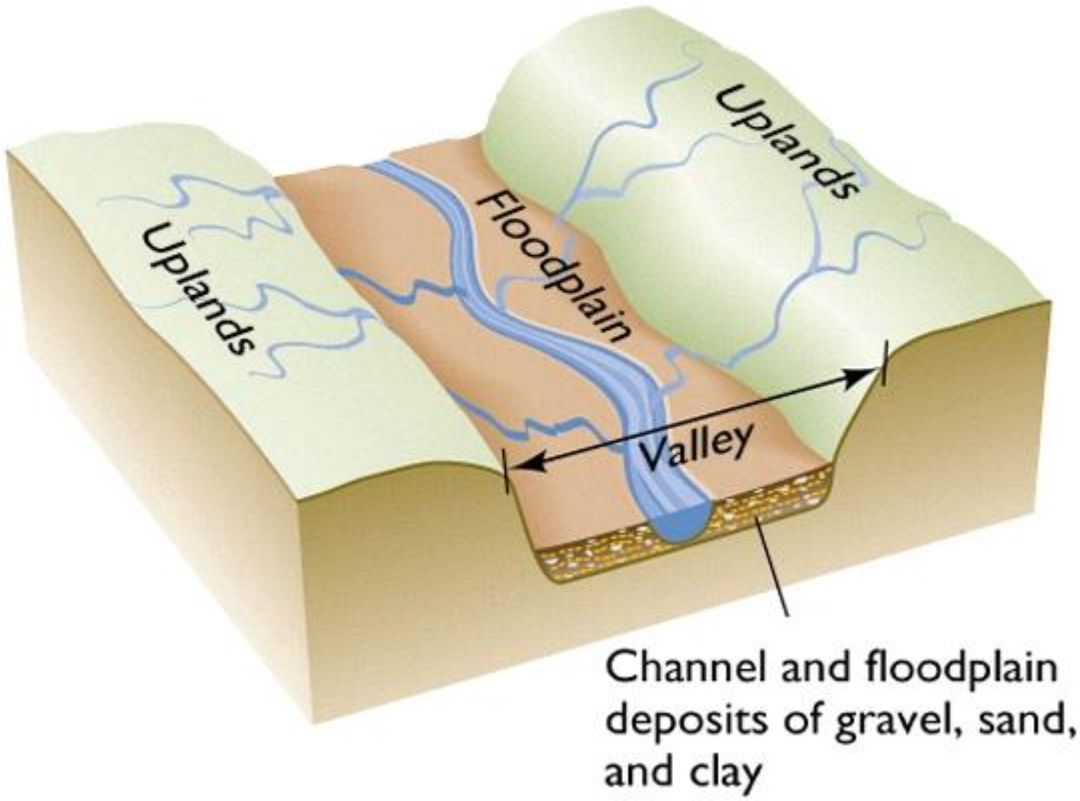
Floods are one of the more significant natural hazards impacting the District. Major floods in the District, caused by heavy rains, generally affect residential and commercial properties and also affect District facilities and operations. Streets, roads, and highways can be overtopped, washed out, or 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.

Location

The area adjacent to a channel is the floodplain (see Figure 4-39). Floodplains are illustrated on inundation maps, which show areas of potential flooding and water depths. In its common usage, the floodplain most often refers to that area that is inundated by the 100-year flood, the flood that has a one percent chance in any given year of being equaled or exceeded (1% annual chance flood). 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 percent chance of being equaled or exceeded in any given year (0.2% annual chance flood). 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 4-39 Floodplain Schematic



Source: FEMA

Hydrologic Regions

According to Cal DWR, California is divided into 10 hydrologic regions. The District is traversed by one hydrologic region – the Sacramento Hydrologic Region:

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

A map of the California's hydrological regions is provided in Figure 4-40.

Figure 4-40 California Hydrologic Regions

Source: California Department of Water Resources

HVLCSD Watersheds and Streams

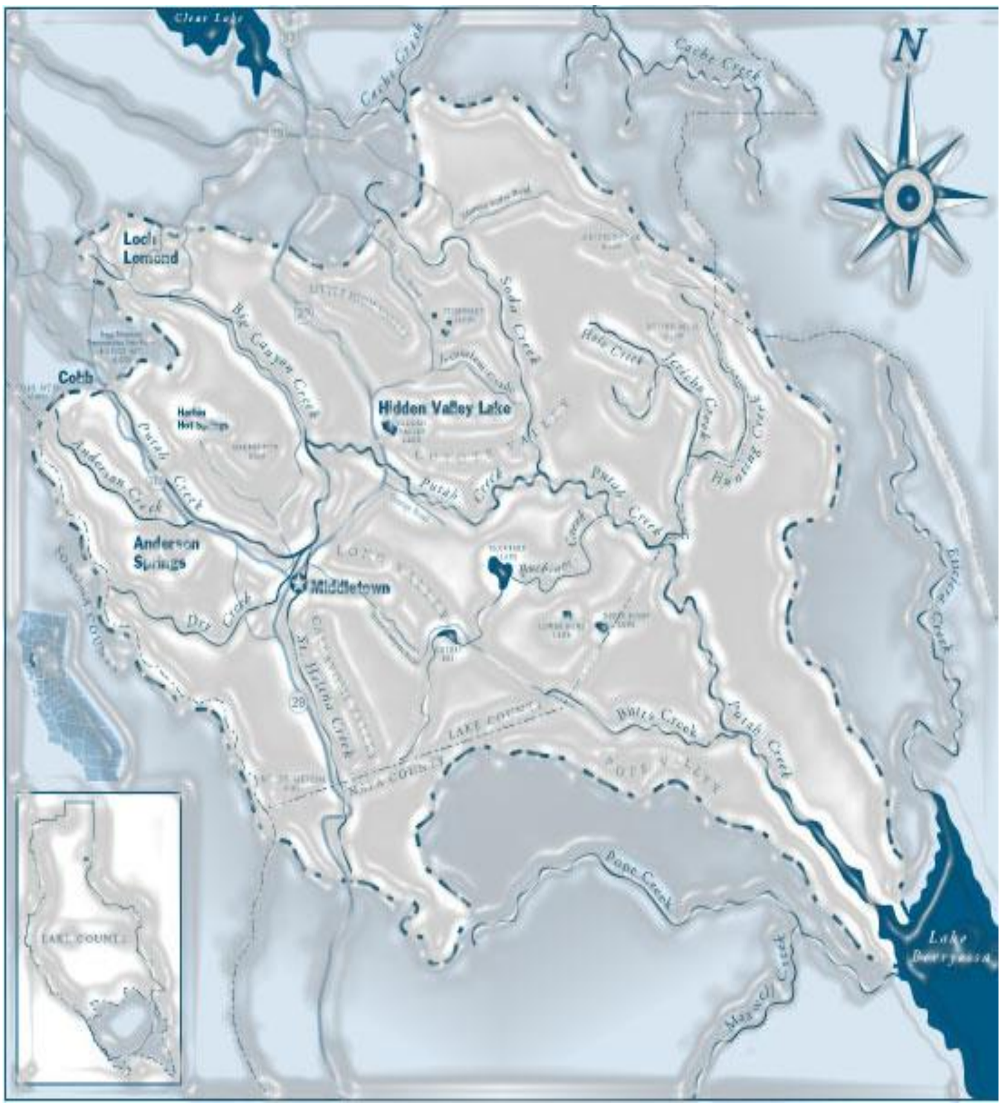
The District lies in the Upper Putah Creek watershed. The Upper Putah Creek Watershed encompasses 178,477 acres in southeast Lake County and some of Napa and Solano Counties. It is approximately 35 miles in length and 20 miles at its widest point. Elevations range from 440 feet at Lake Berryessa to 4,722 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, rolls 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 4-41.

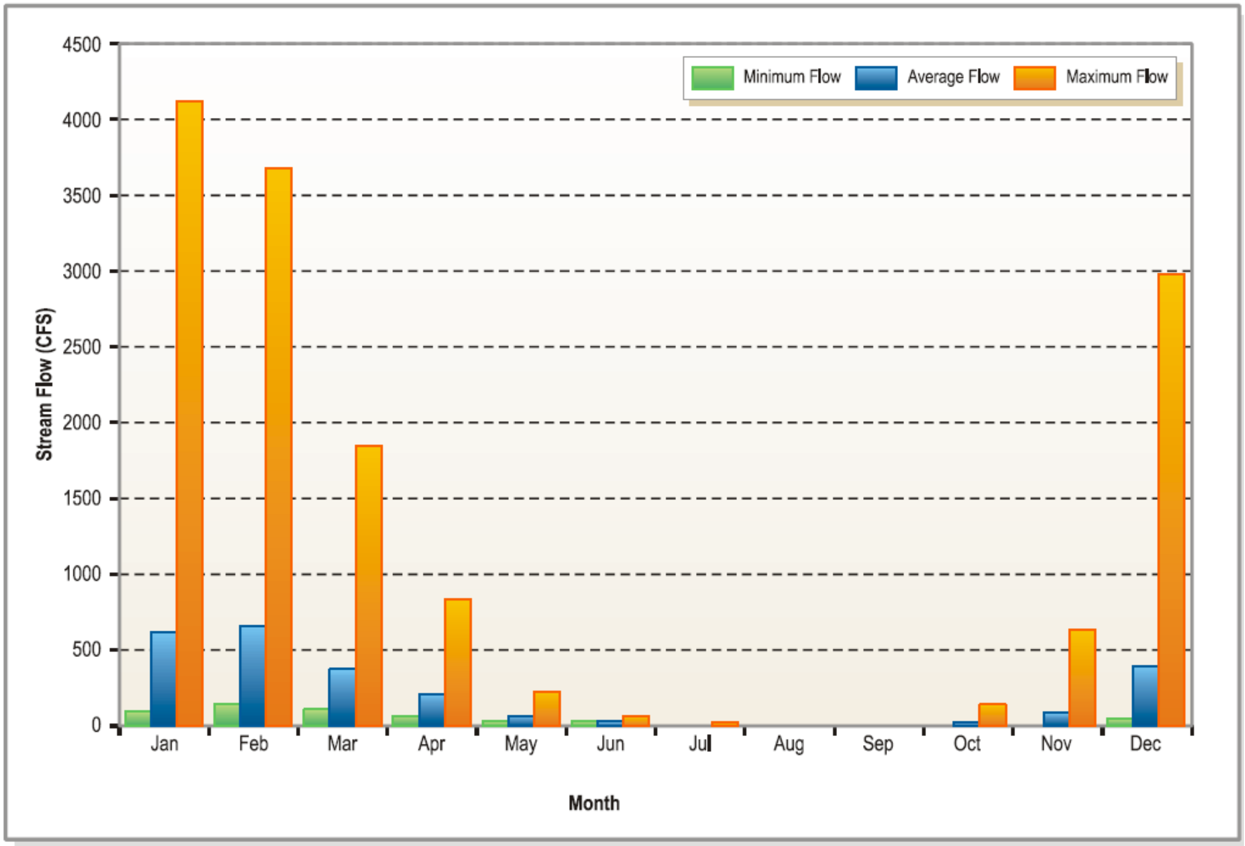
Figure 4-41 Upper Putah Creek Watershed Basin



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 4-42) and precipitation at Lakeport shows a strong correlation between rainfall and flows on Putah Creek.

Figure 4-42 Monthly Flows on Putah Creek near Guenoc – USGS Stream Gage 11453500



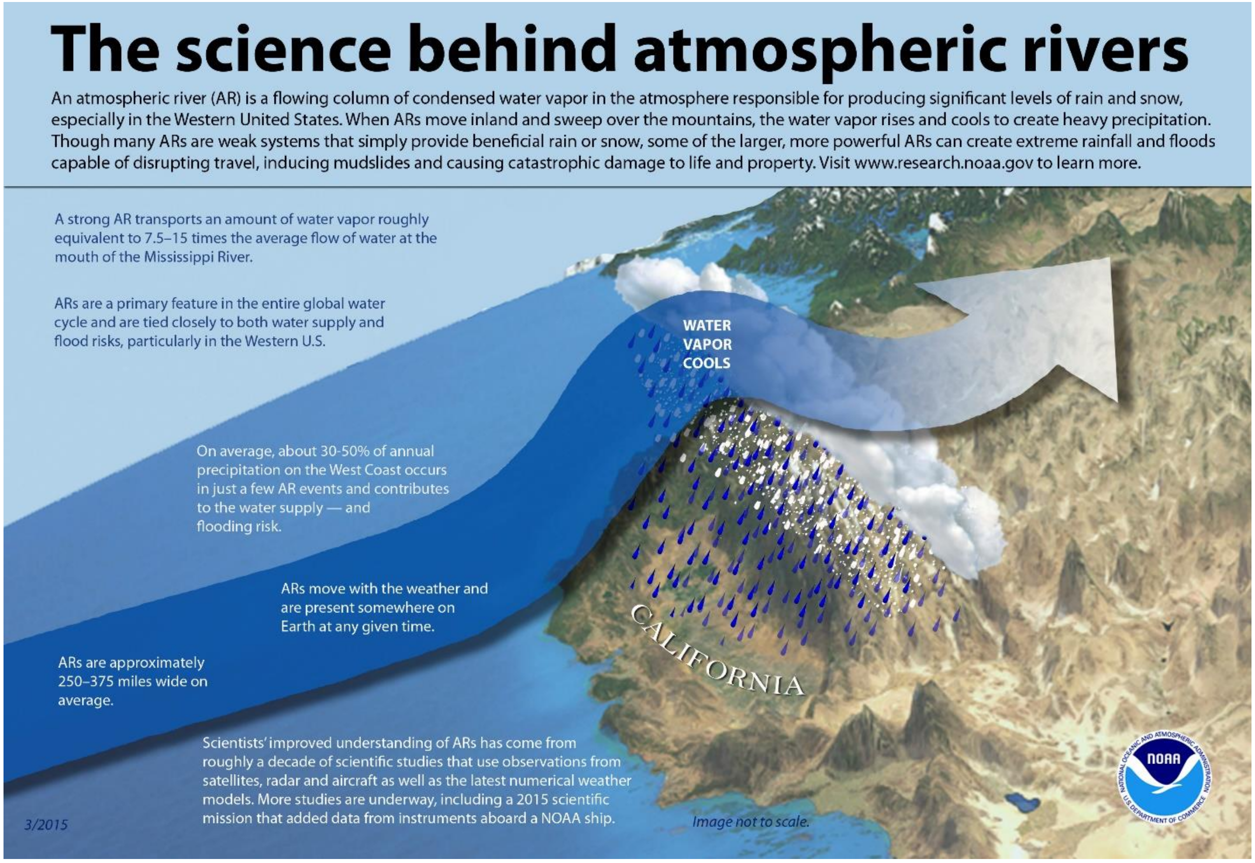
Source: Lake County Water Inventory and Analysis Report – March 2006

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 channel. Overflows at HWY 175 threaten roadway. High creek levels at Hidden Valley Lake Subdivision limit outflows through levee, causing interior flooding. This area is a repetitive loss area in the District.

Special Types of Flooding

HVLCSD and much 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 4-43.

Figure 4-43 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.

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 District is covered by the Lake County FIS. The current Lake County FIS is dated September 30, 2005. A preliminary FIS update for the County, dated June 18, 2014 has been released for the County, but not yet adopted.

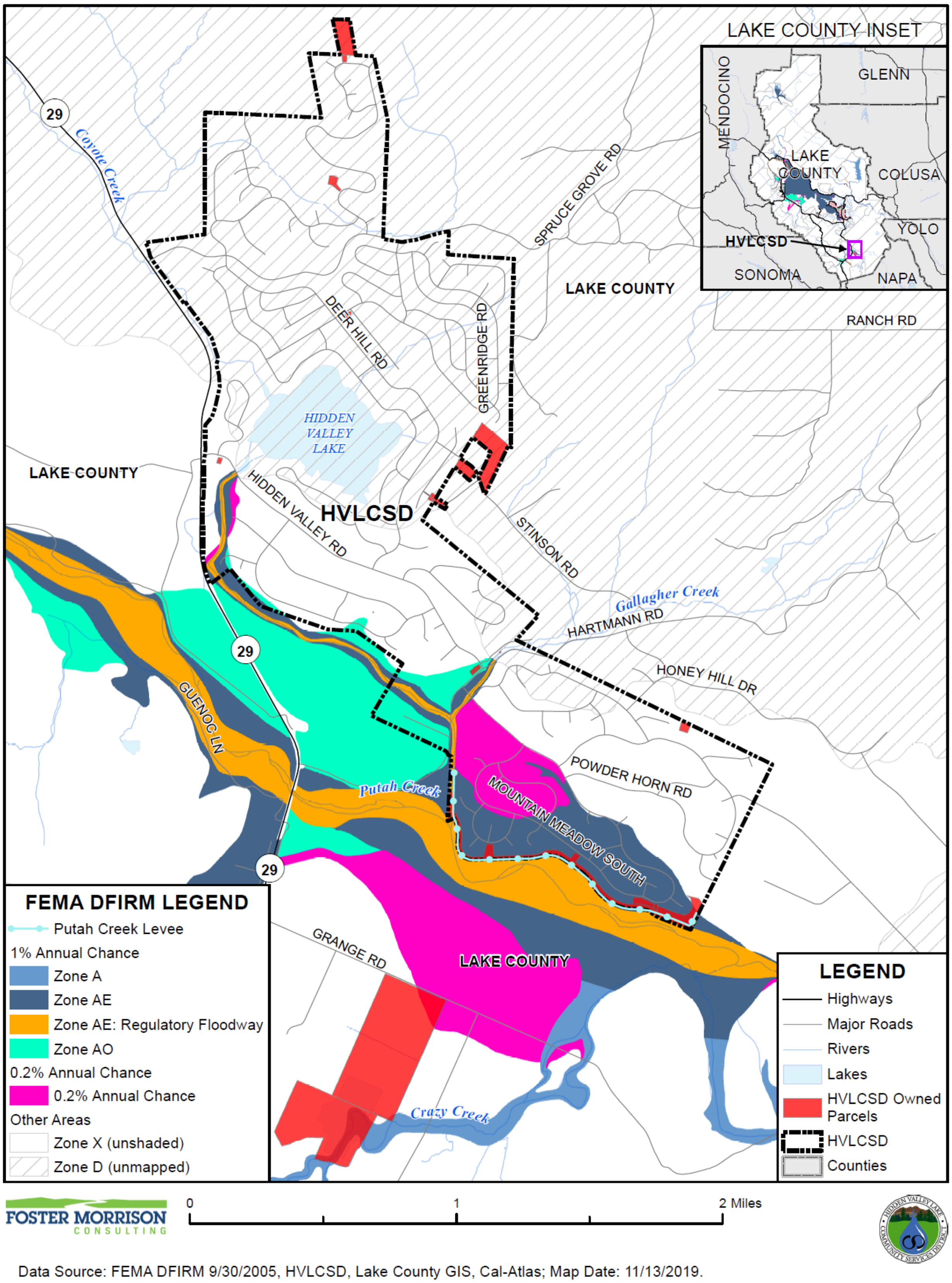
Digital Flood Insurance Rate Maps (DFIRM)

As part of its Map Modernization program, FEMA has been 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 basemaps
- Upgrade the FIRMs to a GIS database format to set the stage for future updates and to enable support for GIS analyses and other digital applications
- Solicit community participation

DFIRMs for Lake County have been developed, are dated September 30, 2005, and are being used for the flood analysis for this LHMP. This is shown in Figure 4-44.

Figure 4-44 HVLCSD – FEMA DFIRM Flood Zones



A new DFIRM update is in process. A preliminary FIS and DFIRM, dated June 18, 2014 were released. This DFIRM data has not been finalized and was not used for analysis is this Plan. Information from the preliminary 2014 FIS was used.

Department of Water Resource (DWR) Floodplain Mapping

Also to be considered when evaluating the flood risks in the District are various floodplain maps developed by Cal DWR for various areas throughout California, including Lake County and HVLCSD.

DWR Best Available Maps

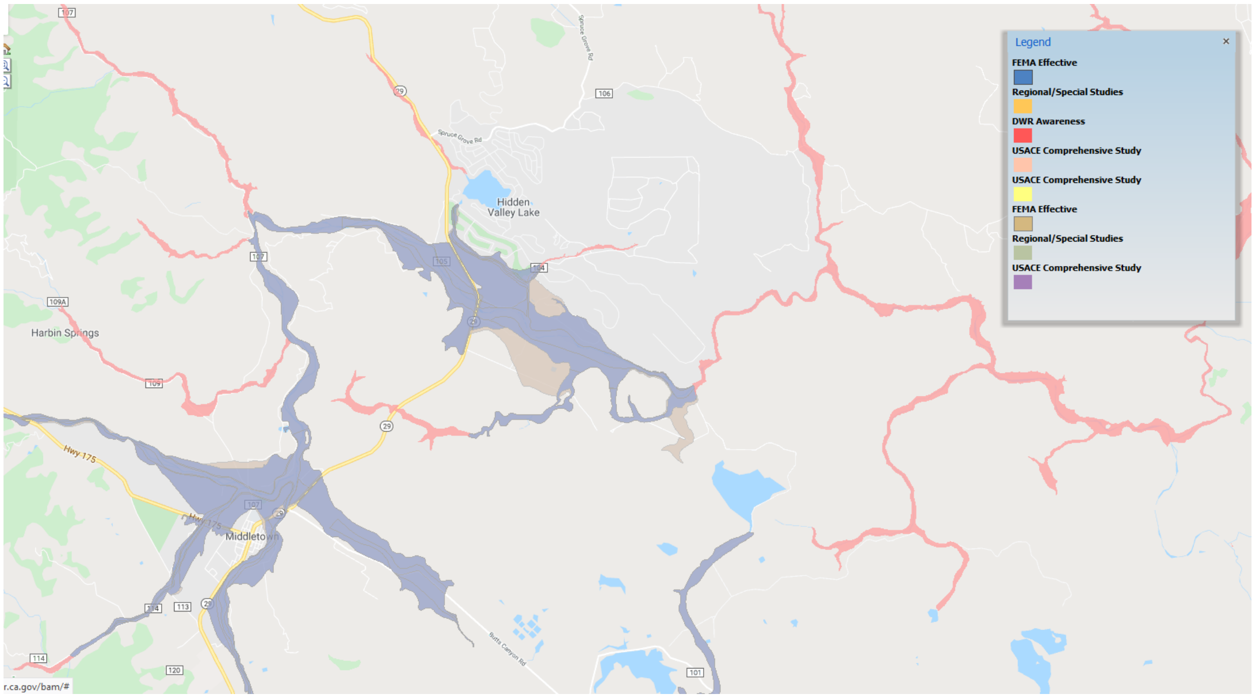
The FEMA regulatory maps provide just one perspective on flood risks in Lake County and the District. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Sacramento-San Joaquin (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 District than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 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 4-45.

Figure 4-45 HVLCSD – Best Available Map



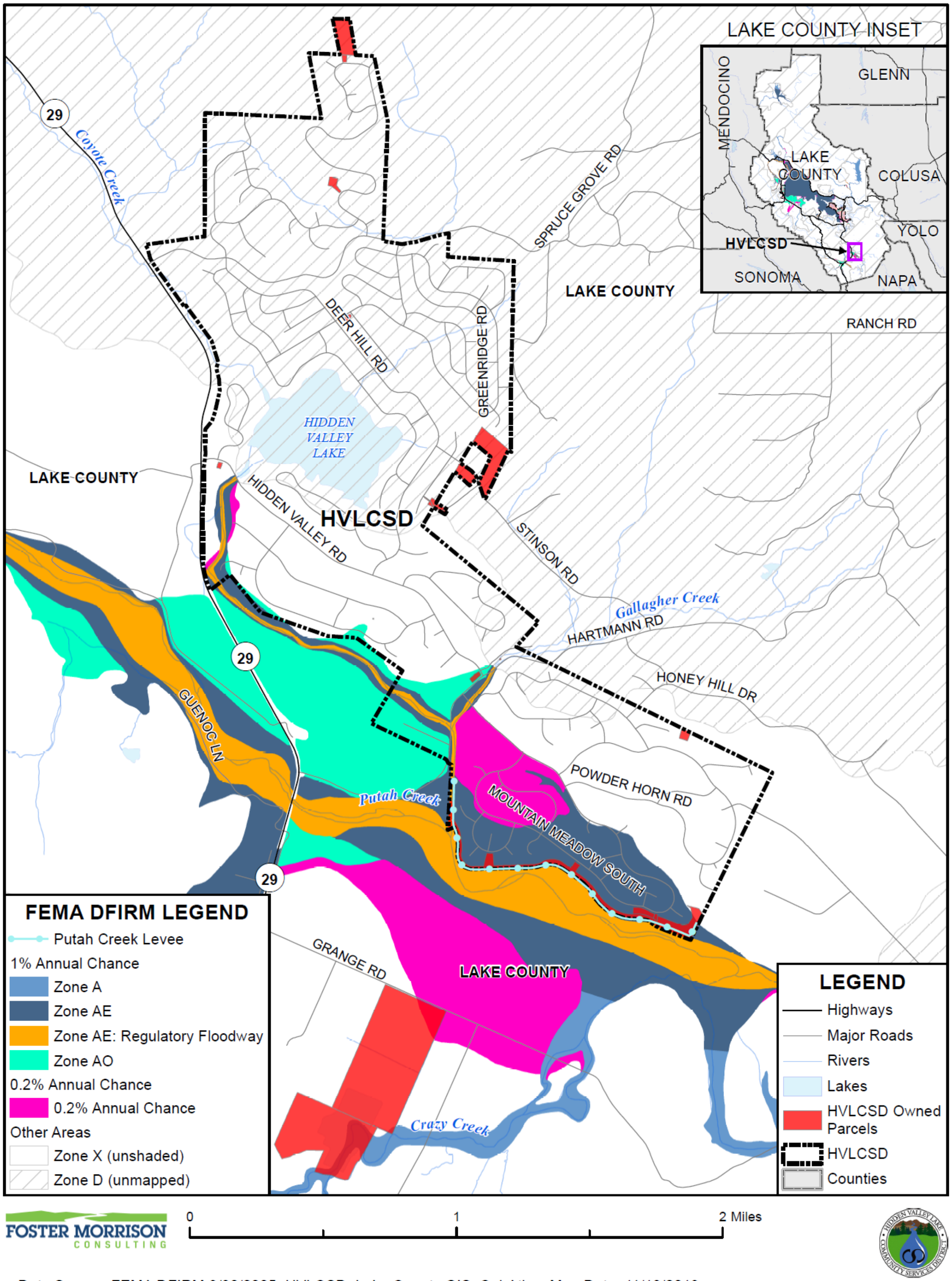
Source: California DWR, map created 11/13/2019

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).

Extent

Flood extents are usually measured in depths of flooding, aerial 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. Aerial flood extent from the FEMA DFIRMs is shown on Figure 4-46 and in Table 4-26. As shown in the table, 12.3% of the District lies in the 1% annual chance floodplain, while another 4.28% lies in the 0.2% annual chance floodplain.

Figure 4-46 HVLCSD – FEMA DFIRM Flood Zones



Data Source: FEMA DFIRM 9/30/2005, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Table 4-26 HVLCSD –Flood Hazard Geographical Extents in FEMA DFIRM Flood Zones

Flood Zone / Jurisdiction	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood Hazard	206	11.07%	75	9.61%	131	12.13%
0.2% Annual Chance Flood Hazard	75	4.02%	29	3.65%	46	4.28%
Other Areas	1,582	84.91%	679	86.73%	903	83.59%
Grand Total	**1,864**	**100.00%**	**783**	**100.00%**	**1,080**	**100.00%**

Source: FEMA September 30, 2005 DFIRM

Past Occurrences

Disaster Declaration History

There have been 16 state and 14 federal disaster declarations due to flooding, as shown in Table 4-27.

Table 4-27 Lake County Disaster Declarations 1950-2019 from Flood

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	16	1955, 1958, 1963, 1964, 1970, 1983, 1986, 1995 (two times), 1997, 1998, 2005/2006, 2006, 2017 (two times), 2019	14	1950, 1955, 1958 (twice), 1963 (twice), 1970, 1980, 1983, 1986, 1995 (twice), 1997, 1998

Source: Cal OES, FEMA

NCDC Events

The NCDC tracks flood events for the County since 1996. These are shown on Table 4-34.

*Table 4-28 Lake County NCDC Storm Events 1/1/1996-5/31/2019**

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	16	1	0	4	0	$23,430,000	$0
Total	**18**	**1**	**0**	**4**	**0**	**$23,440,000**	**$0**

Source: NCDC

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

Hazard Mitigation Planning Committee Events

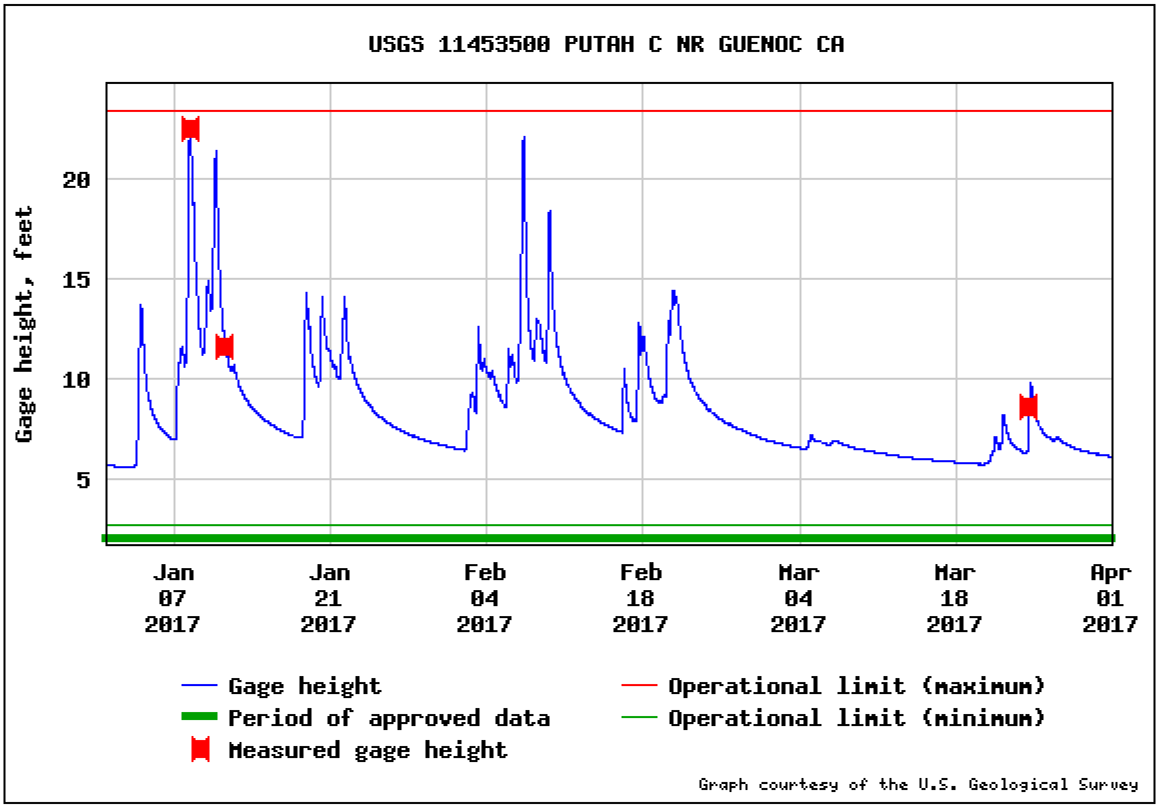
The District noted the following events that have directly affected the District:

- **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 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 4.2.15). 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 are expected to come primarily from Putah Creek, other creeks in HVL-area are 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 is made worse by the burned, barren ground that turns to a concrete-like material that allows 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 4.2.12). Figure 4-47 show the flows on Putah Creek, while Figure 4-48 shows the USGS performing flow checks on Putah Creek. Note the high water level at the bridge.

Figure 4-47 HVLCSD – Putah Creek Flows January to April 2017



Source: HVLCSD

Figure 4-48 USGS Performing Flow Checks on Putah Creek

Source: HVLCSD

The District noted, in a 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 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 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). Infiltrations to the sewer system occurred during this event. High flows also put the levee at risk. More information can be found in the Levee Failure past events (Section 4.2.14) below.

More information on many of these events can be found in the Localized Flood (Section 4.2.11) past events below.

Likelihood of Future Occurrences

1% Annual Chance Flood

Occasional—This is the flood that has a 1- percent chance of being equaled or exceeded in the District in any given year. Thus, the 1% annual chance flood could occur more than once in a relatively short period of time.

0.2% Annual Chance Flood

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

Climate Change and Flood

Climate change and its effect on flooding has been discussed by three sources:

- 2014 CAS
- Cal-Adapt
- National Center for Atmospheric Research

CAS

According to the CAS, climate change may affect flooding in California, Lake County, and the District. 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 4-18 in Section 4.2.4. 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.

4.2.12. Flood: Localized/Stormwater

Hazard/Problem Description

Localized, stormwater flooding also occurs throughout the District. 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. 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.

The Lake County FIS noted that localized flooding can occur in areas of the County, including 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 inflow of the District sewer system. Since our 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 our sewer system can cause overflows. Sewer system overflows are of great concern to the District and public health. Our treatment plant is also all open to the air and flooding from 'cloudbursts' could lead to potential inoperability due to heavy flows.

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.

Location and Extent

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 4-29. In addition to flooding, damage to these areas during heavy storms includes pavement deterioration, washouts, mudslides, debris areas, and downed trees. The frequency and type of damage or flooding that occurs varies from year to year, depending on the quantity of runoff.

Table 4-29 HVLCSD – Localized Flooding Areas

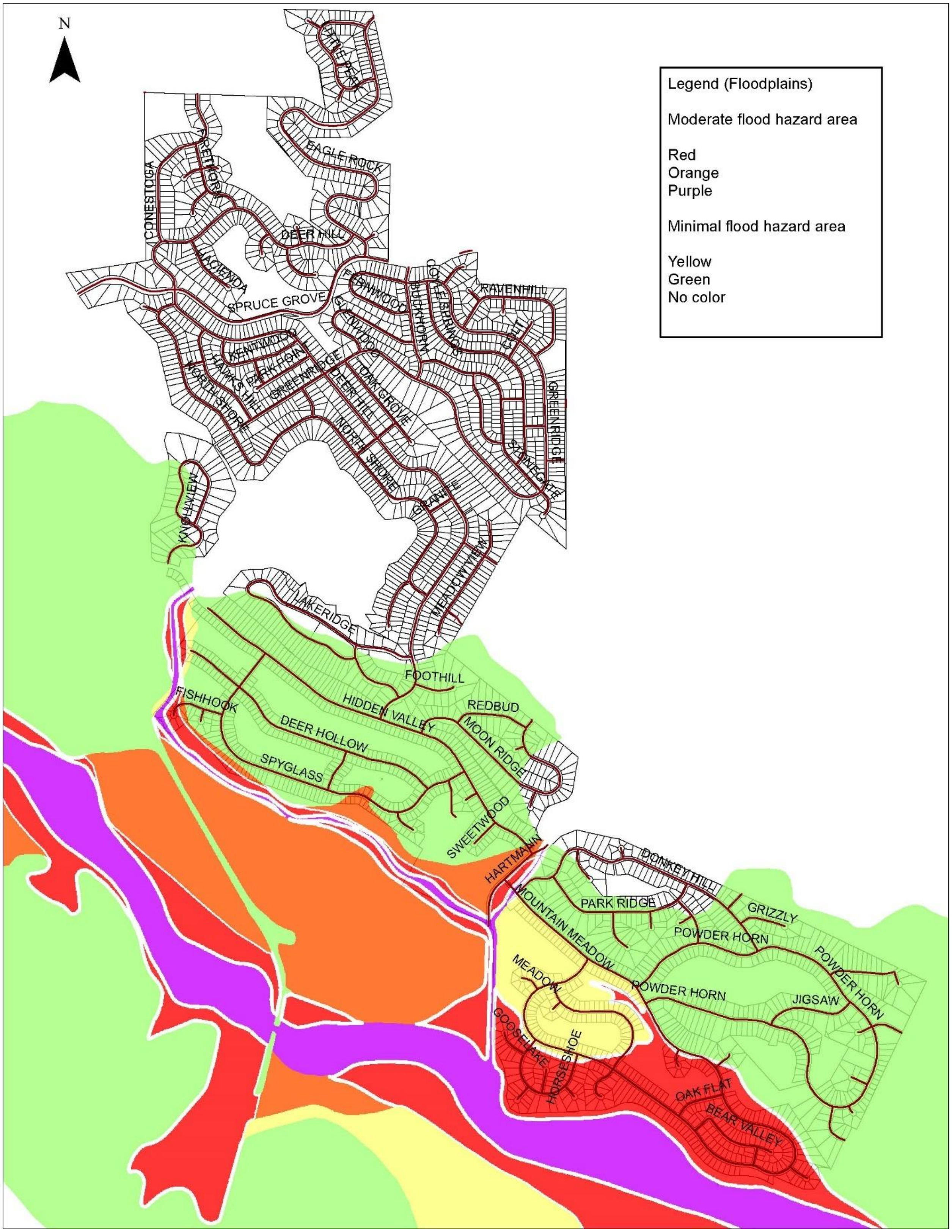
Road/Area Name	Flooding	Pavement Deterioration	Washouts	High Water/ Creek Crossing	Landslides/ Mudslides	Debris	Downed Trees
Gold Flat Ct	X					X	
Mountain Meadow North SE of Powder Horn Rd	X					X	
Oak Flat Rd	X					X	
Bear Valley Rd	X					X	
Mill Pond Rd	X					X	
Horseshoe Rd	X					X	
Gooselake Ct	X					X	
Glencove Ct	X					X	
Magnolia Ct	X					X	
Dove Ct	X					X	
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	

Source: HLCSD

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.

Issues specific to the District include the Inflow and Infiltration of stormwater into the District's wastewater collection system. Flooding over roadways and properties risk sewer 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 4-49, Figure 4-50, and Figure 4-51)

Figure 4-49 HVLCSD – Localized Flood Locations

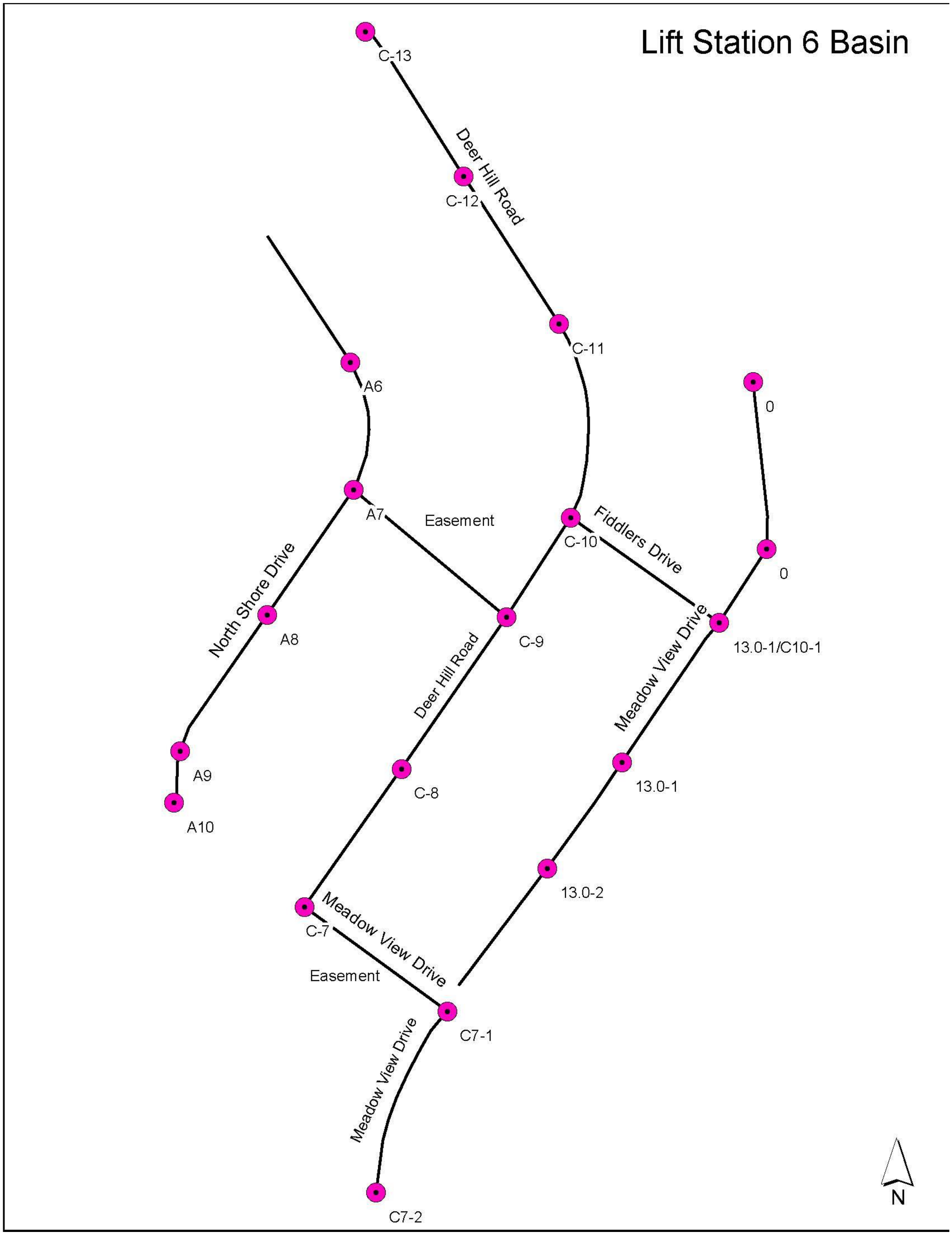


Source: HVLCSD

Figure 4-50 HVLCSD – Flood Detention Basin

Source: HVLCSD

Figure 4-51 HVLCSD – Lift Stations



Source: HVLCSD

Infiltration into the sewer system is a problem for the District. This infiltration can be seen in Figure 4-52, Figure 4-53, and Figure 4-54.

Figure 4-52 HVLCSD – Snapshot through Manhole Cover - Infiltration into Sewer Lines

Source: HVLCSD

Figure 4-53 HVLCSD – Snapshot during Rain Event, Illustrating High Flows. Presence of Stormwater in Sewer Lines.

Source: HVLCSD

Figure 4-54 HVLCSD – Sewer System Overflow

Source: HVLCSD

There is no established scientific scale or measurement system for localized flooding. Localized flooding is generally measured by depth of flooding, volume of water, runoff velocity, and the area affected. Localized flooding often happens quickly and has a short speed of onset and short duration, with flood waters receding when the storm drainage system can catch up.

Past Occurrences

Disaster Declaration History

There have been no state or federal disaster declarations related to localized flooding in Lake County and the District, according to Table 4-3.

NCDC Events

The same rainstorms that cause localized flooding in the community also inundate the Wastewater Treatment Plant, causing sludge overflow damage.

Hazard Mitigation Planning Committee Events

The HMPC noted major events that occurred in 2017 and 2019. These are discussed below.

2017

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 manholes and two private lateral cleanouts overflowed.

On 8 and 10 January 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 19 January 2017 and an update to the report on 29 March 2017. In addition to the three raw sewage spills, on 10 January 2017 the equalization basin 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 7 January and 11 January 2017 the collection system and WWTP all exceeded their design capacities. In an effort to prevent a wet weather SSO 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. HVLCSD does not have documentation regarding the amount taken out at each location.

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 4-55 and Figure 4-56.

Figure 4-55 HVLCSD – Pumping and Hauling Operations

Source: HVLCSD

Figure 4-56 HVLCSD – Pumping and Hauling Operations

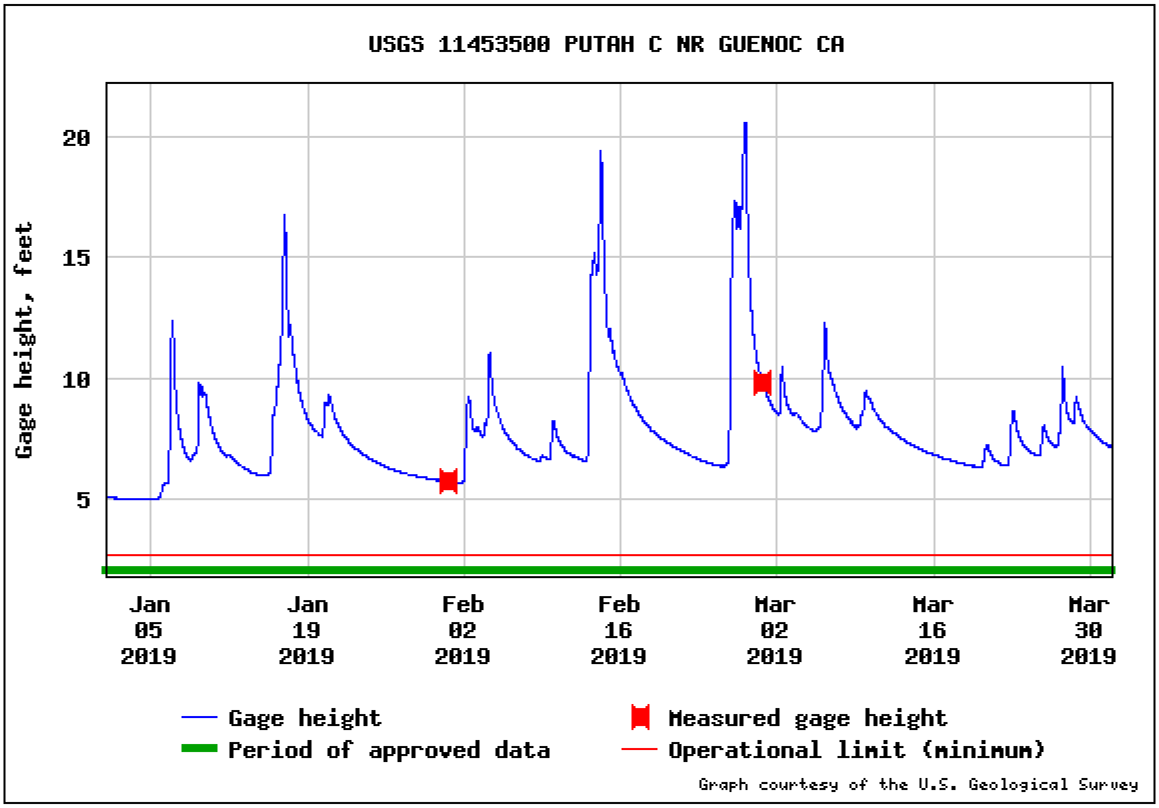
Source: HVLCSD

During 2017 there were 2 different disaster declarations (DR4301 and DR 4308) with approximately $1.4 million of damages that occurred.

2019

In 2019, heavy rains fell multiple times (see Figure 4-57).

Figure 4-57 HVLCSD Rainfall – January through March 2019.



Source: HVLCSD

These rains inundated the Wastewater Treatment Plant causing sludge overflow damage (see Figure 4-58 and Figure 4-59). A disaster declaration occurred from this flooding in Lake County (DR4434). Approximately $1.7M of damage occurred to the District.

Figure 4-58 HVLCSD – Basin After DR4434

Source: HVLCSD

Figure 4-59 HVLCSD – Basin After DR4434

Source: HVLCSD

Other past occurrences of localized flooding are included in the 1%/0.2% annual chance flood hazard profile in Section 4.2.11.

Likelihood of Future Occurrences

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.

Climate Change and Localized Flood

Cal Adapt future precipitation projections were shown in Figure 4-18 in Section 4.2.4. While average annual rainfall may decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century, increasing the likelihood of overwhelming stormwater systems built to historical rainfall averages. This makes localized flooding more likely.

4.2.13. Landslide and Debris Flows

Hazard/Problem Description

Like its earthquake-generating faults, California's mountainous terrain is also a consequence of dynamic geologic processes in operation as the North American Plate grinds past the Pacific Plate. According to the CGS, a landslide is a general term for a variety of mass-movement processes that generate a down-slope movement of mud, soil, rock, and/or vegetation. Landslides are classified into many different types based on form and type of movement. They range from slow-moving rotational slumps and earth flows, which can slowly distress structures but are less threatening to personal safety, to fast-moving rock avalanches and debris flows that are a serious threat to structures and have been responsible for most fatalities during landslide events. For the purposes of this plan, the term landslide includes mudslides, debris flows, and rockfalls that tend to occur suddenly; as well as hillside erosion, which is a similar process that tends to occur on smaller scales and more gradually, but can exacerbate landslide events.

Natural conditions that contribute to landslide, mudslides, hillside erosion, and debris flows include the following:

- Degree of slope
- Water (heavy rain, river flows, or wave action)
- Unconsolidated soil or soft rock and sediments
- Lack of vegetation (no stabilizing root structure)
- Previous wildfires and other forest disturbances (discussed in Section 4.2.13)
- Road building, excavation and grading
- Earthquake

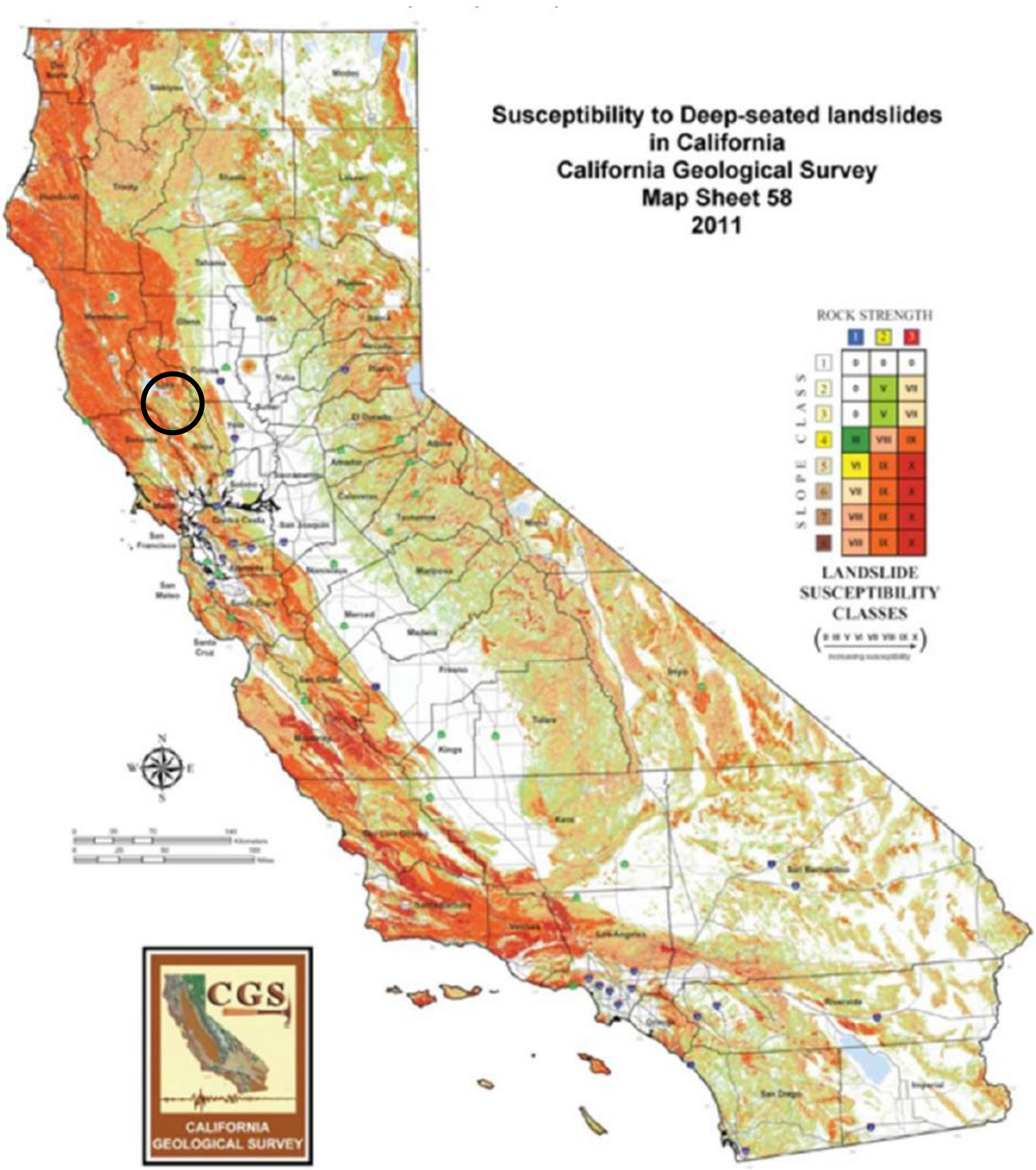
The 2018 State Plan noted that more than one third of California is mountainous terrain that generally trends parallel to the coast, forming a barrier that captures moisture from offshore storms originating in the Gulf of Alaska and Mexico. Steep topography, weak rocks, heavy winter rains, and occasional earthquakes all lead to slope failures more frequently than would otherwise occur under gravity alone. This is true in the sloped areas bordering the District where the topography is characterized by rolling hills and ridges.

In addition, on a smaller scale, the District noted that FEMA has recently defined the District's sludge overflow damage as debris flow.

Location and Extent

Destructive landslides, mudslides, and debris flows usually occur very suddenly with little or no warning time and are short in duration. The 2018 State Plan noted that although the area affected by a single landslide is less than that of earthquakes, landslides are pervasive in California's mountainous terrain and occur far more often. Figure 4-60 was included in the 2018 State Plan. It indicates that a majority of the District and surrounding area are moderate susceptibility areas for landslides.

Figure 4-60 Landslide Susceptibility Areas



Source: 2018 State Plan

Landslides can be expected in areas with steep slopes and weak soils. There are very few areas with steeps slopes in the District, though areas surrounding the District. Currently there are no known areas of concern. The District did note that post-wildfire burn areas are locations where heavy rains can cause erosion, landslides, and debris flows.

The legend on Figure 4-60 shows the measurement system that the California Geological Survey uses to show the possible magnitude of landslides. It is a combination of slope class and rock strength. The speed of onset of landslide is often short, especially in post-wildfire burn scar areas, but it can also take years for a slope to fail. Landslide duration is usually short, though digging out and repairing landslide areas can take some time.

Past Occurrences

Disaster Declaration History

There have been no disaster declarations associated with landslides in Lake County, as shown in Table 4-3.

NCDC Events

The NCDC contains no records for landslides in Lake County.

Hazard Mitigation Planning Team Events

There have been no past landslide events that have affected District property.

Likelihood of Future Occurrences

Occasional— The HMPC noted that there is no known vulnerability to landslides, mudslides or debris flow to the District. Due to the topography in and around the District and the rainfall the area receives during the winter, future occurrences of landslide, mudslide, and debris flow may occur occasionally.

Climate Change and Landslides

According to the CAS and Cal-Adapt, increased precipitation may result from climate change. Increased precipitation makes areas more vulnerable to landslide potential. More information on precipitation increases can be found in Section 4.2.4.

4.2.14. Levee Failure

Hazard/Problem Description

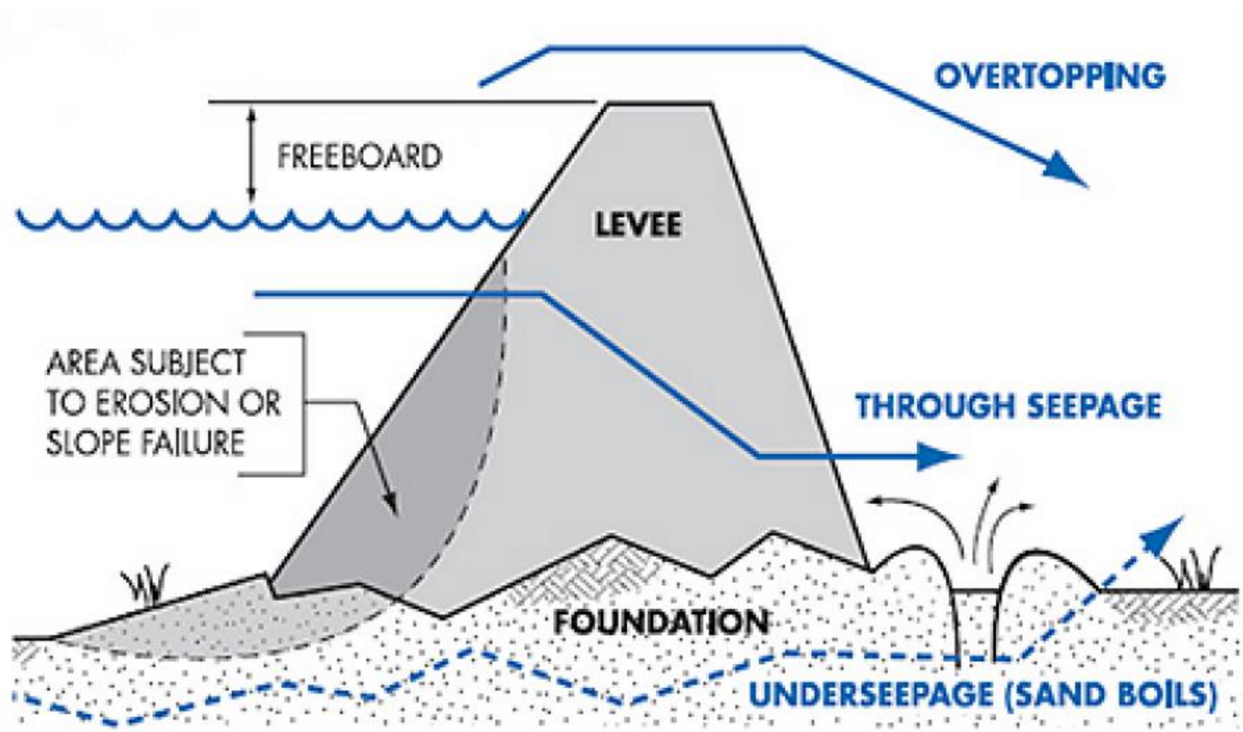
A levee is a raised area that runs along the banks of a stream or canal. Levees reinforce the banks and help prevent flooding by containing higher flow events to the main stream channel. By confining the flow to a narrower steam channel, levees can also increase the speed of the water. Levees can be natural or man-made. A natural levee is formed when sediment settles on the stream bank, raising the level of the land around the stream.

Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe weather events or dam failure. Levees reduce, not eliminate, the risk to individuals and structures located behind them. A levee system failure or overtopping can create severe flooding and high-water velocities. It'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 can also contribute to a levee failure as can erosion of the leveed area. Figure 4-61 depicts the causes of levee failure.

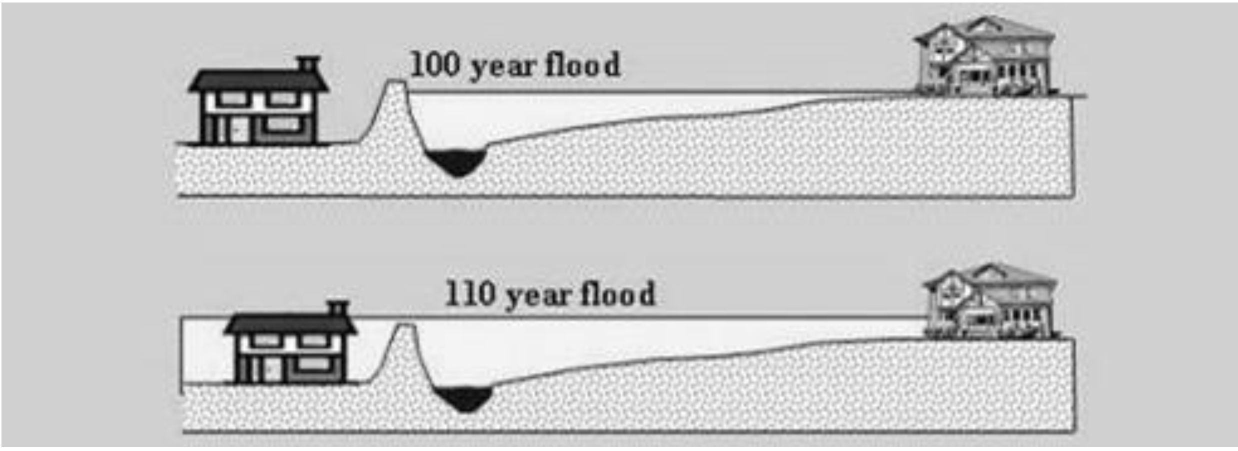
Figure 4-61 Potential Causes of Levee Failure



Source: USACE

Overtopping failure occurs when the flood water level rises above the crest of a levee. As shown in Figure 4-62, overtopping of levees can cause greater damage than a traditional flood due to the often lower topography behind the levee.

Figure 4-62 Flooding from Levee Overtopping



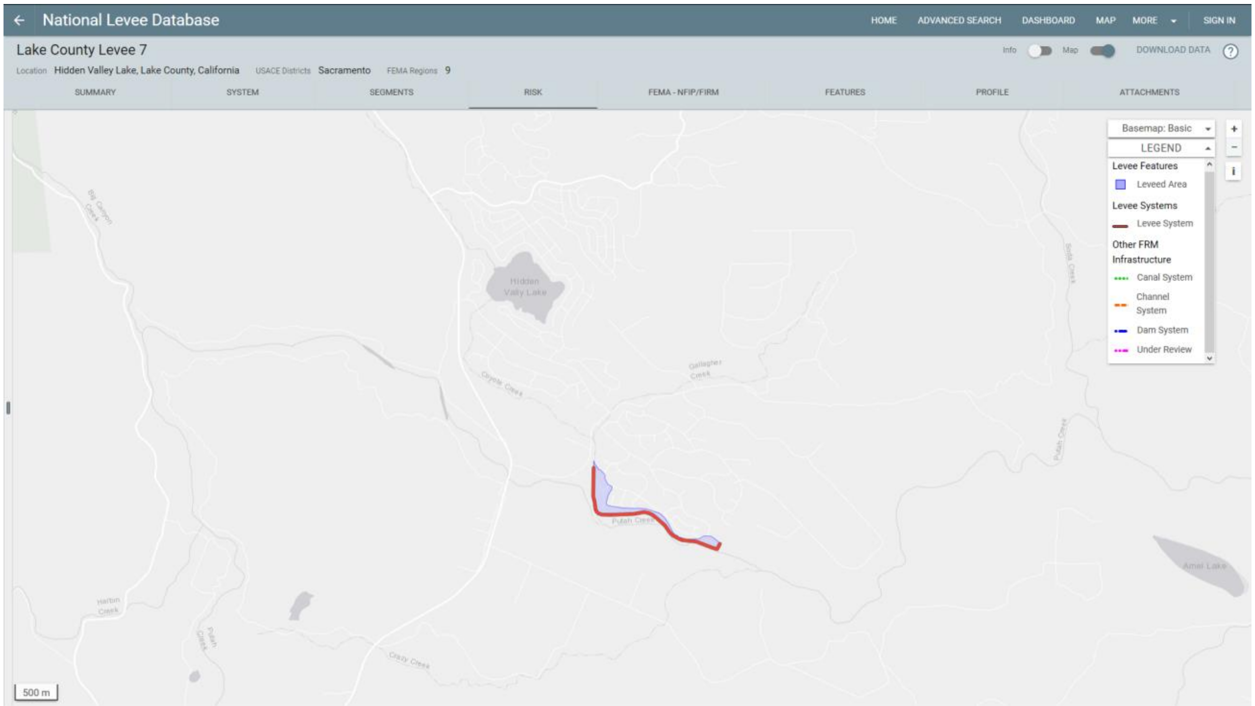
Source: Levees in History: The Levee Challenge. Dr. Gerald E. Galloway, Jr., P.E., Ph.D., Water Policy Collaborative, University of Maryland, Visiting Scholar, USACE, IWR.

The HMPC noted erosion on the river side of the levee, at the north end. Also, burrowing rodents have been observed in the levee wall. The HMPC 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 the to riparian ecostructure.

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 4-63. The red line indicates the levee system, and the purple area indicates those areas protected by the levee, if the levee system was certified. 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. 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.

Figure 4-63 HVLCSD – Levees in and Near the District



Source: National Levee Database. Map created 11/12/2019

Past Occurrences

The HMPC noted that there have been no levee failures in the District. It was noted that on February 26, 2019 that HVLA and HVLCSD were carefully monitoring flooding 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 is recommended that residents east of Oak Flat Road should consider evacuation by this evening. Other potential areas of flooding include 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.

Likelihood of Future Occurrences

Occasional – Though there is one only one leveed area located in the District the HMPC felt 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 increase the likelihood of future occurrence.

Climate Change and Levee Failure

In general, increased flood frequency in California is a predicted consequence of climate change. Mechanisms whereby climate change leads to an elevated flood risk include more extreme precipitation events and shifts in the seasonal timing of river flows. This threat may be particularly significant because recent estimates indicate the additional force exerted upon the levees is equivalent to the square of the water level rise. These extremes are most likely to occur during storm events, leading to more severe damage from waves and floods.

4.2.15. Wildfire

Hazard/Problem Description

California is recognized as one of the most fire-prone and consequently fire-adapted landscapes in the world. The combination of complex terrain, Mediterranean climate, and productive natural plant communities, along with ample natural and aboriginal ignition sources, has created conditions for extensive wildfires. Wildland fire is an ongoing concern for Lake County and the District. 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. The District noted that additional losses could occur if PG&E initiates a power shutdown. This is discussed in greater detail in Section 4.3.15.

Location

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 cause 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.

Wildfire Environment of Lake County, California

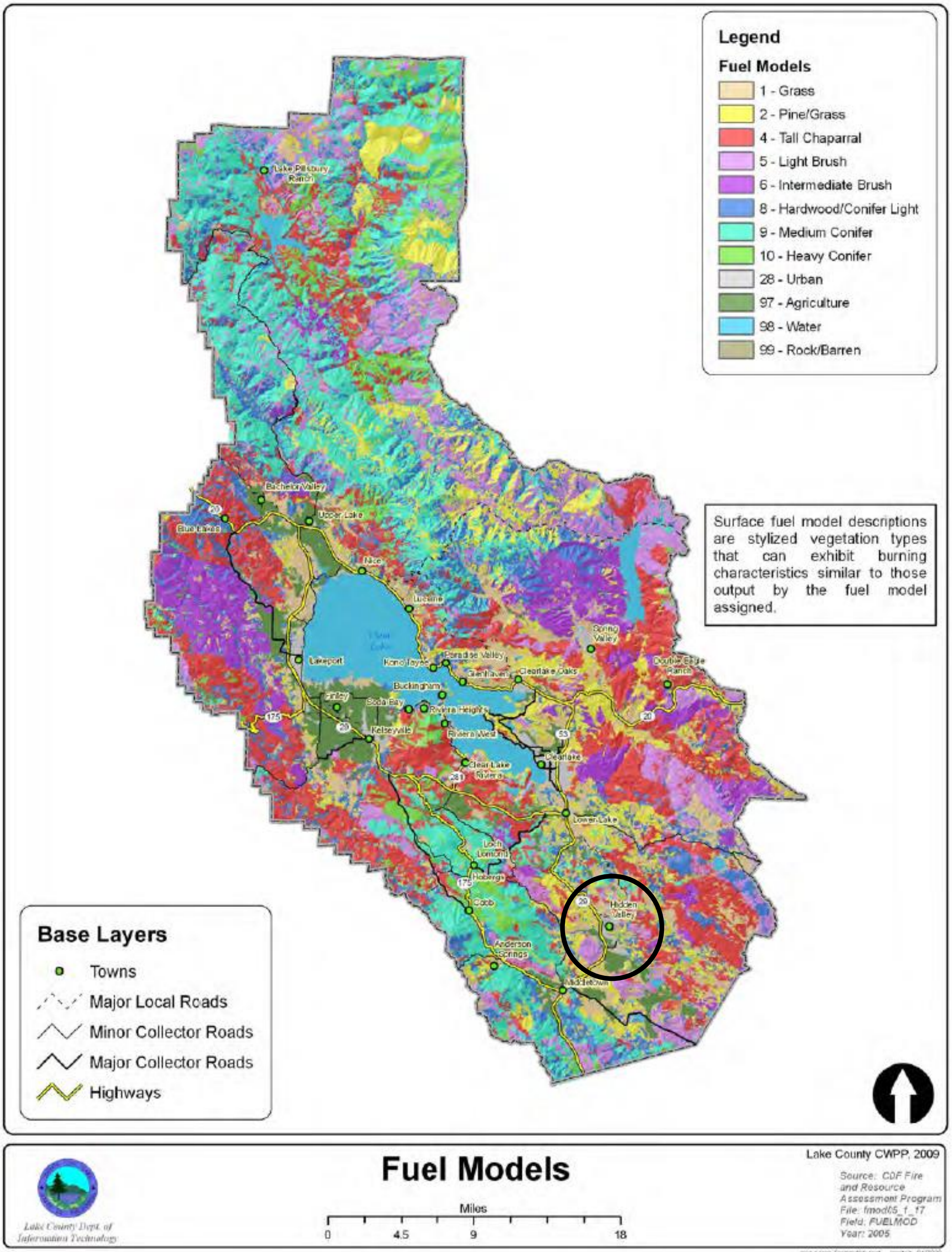
The 2008 Lake County Community Wildfire Protection Plan (CWPP) noted much about the wildfire environment in the County. From the grasslands and chaparral to the pine/oak woodlands and conifer forests, it is generally believed today that fires in the rural landscape of Lake County are less frequent and 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.

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.

One of the tools used to predict fire behavior based on vegetation type is called "fuel models." Fuel models give fire managers a general idea of the type of vegetation that can be found in a given area, and how it is expected to burn. Of the standard 13 fuel models identified in California by CAL FIRE, eight can be found in Lake County. They are: Grass, Pine/Grass, Tall Chaparral, Light Brush, Intermediate Brush, Hardwood/Conifer Light, Medium Conifer, and Heavy Conifer. This is shown on Figure 4-64 for the County, with the HVLCSD circled in black.

Figure 4-64 Lake County – Fuel Models



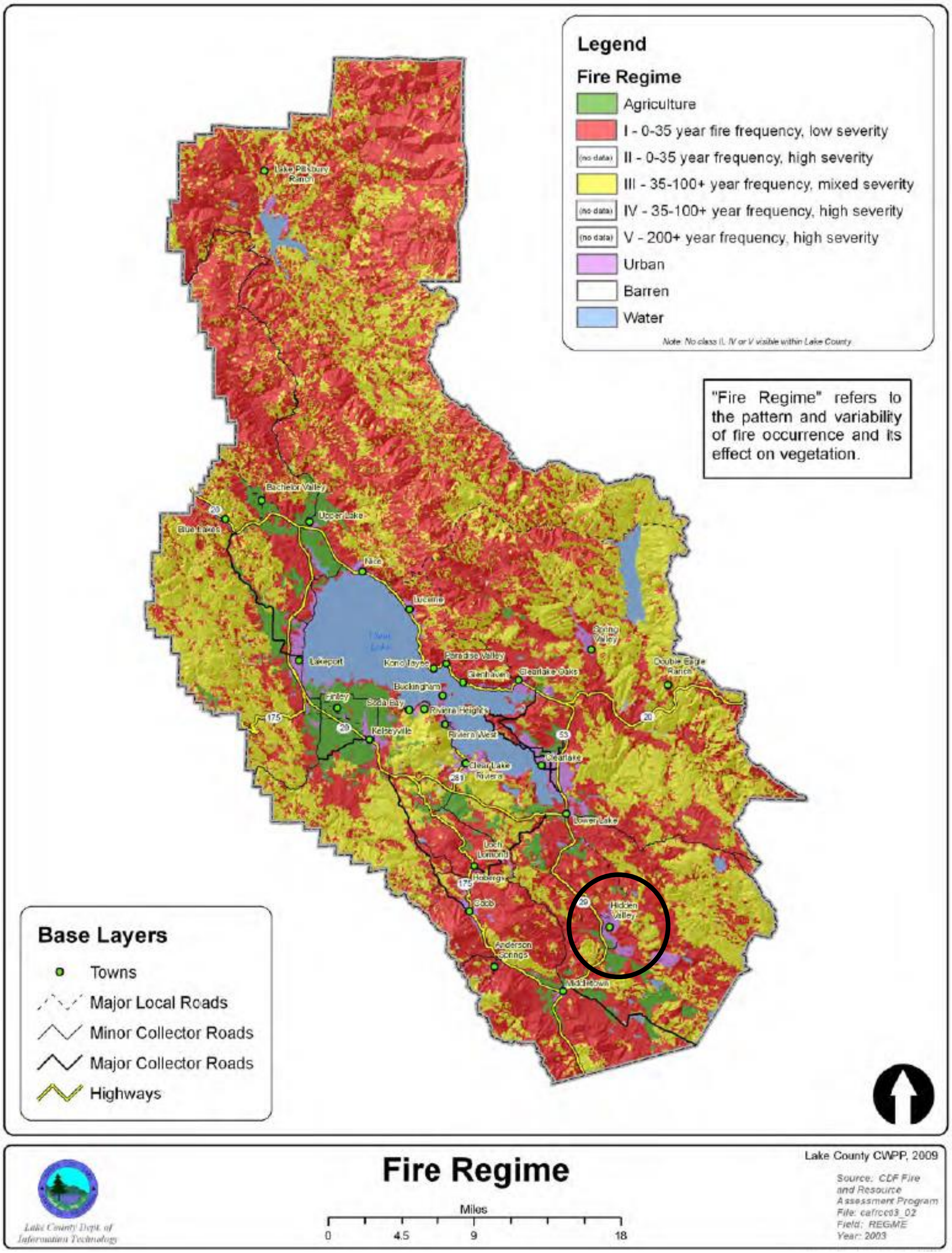
Source: 2008 Lake County CWPP

Fuel models are combined with topographic slope and fuel density information to provide a fuel hazard assessment of fire behavior under extreme conditions. CAL FIRE's recent Fire Hazard Severity Zones (FHSZ) analysis is based on fuels, terrain, and weather. Most of Lake County's wildland areas are mapped within Very High Fire Hazard Severity Zones, as are the communities of Nice, Lucerne, the Rivieras, Cobb, Lake Pillsbury, and a few others. However, most of the County's residents live in High or Moderate FHSZs around Clear Lake and the valleys. The HVLCSD falls into the Moderate, High, and Very High FHSZs.

Another tool used to understand fire is "fire regime." Fire regime is a measurement of fire's historic natural occurrence in the landscape. It includes the season, frequency, intensity, and spatial distribution of fire. In other words, it models how often fire historically would burn through a certain place and at what intensity. A standardized set of five fire regimes is used nationwide. There are two pre-settlement fire regimes found in Lake County: Fire Regime I—a natural fire-return interval between 0–35 years of low-severity fire, and Fire Regime III—a frequency of between 35–100 years of mixed-severity fire.

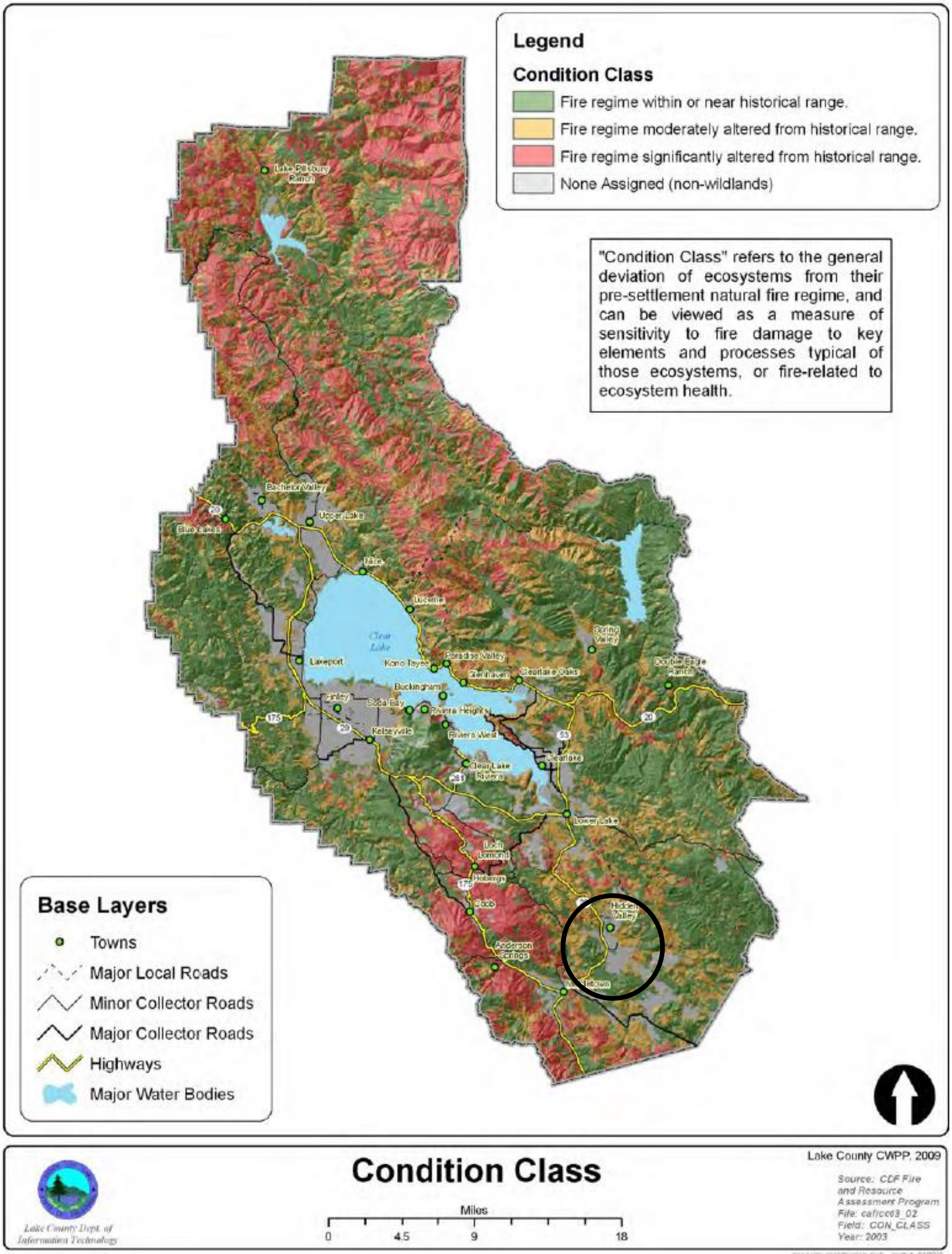
The difference in fire regime between pre- and post-European settlement is described by the "condition class," or degree of departure from the historical natural fire regime. The greater the departure from the natural fire regime, the greater the variations to ecological components and the higher the risk of losing key ecosystem components. All three condition class levels (of low, moderate, and high departure from historical conditions) are present in Lake County. The largest area in Lake County (at 45%) contains those ecosystems with a low departure from their natural fire regime, and hence low risk of key ecosystem loss. Another 22% are at a moderate departure. Those areas with a significant departure and high risk of ecosystem loss, are 20% of the county lands, and located primarily in the mountainous regions of the north and south. Finally, 13% are not classified because they are not wildlands. For more information on fire regime and condition class, see Figure 4-65 and Figure 4-66. These both show the County, with the HVLCSD area circled in black.

Figure 4-65 Lake County – Fire Regime Class



Source: 2008 Lake County CWPP

Figure 4-66 Lake County – Fire Condition Class



Source: 2008 Lake County CWPP

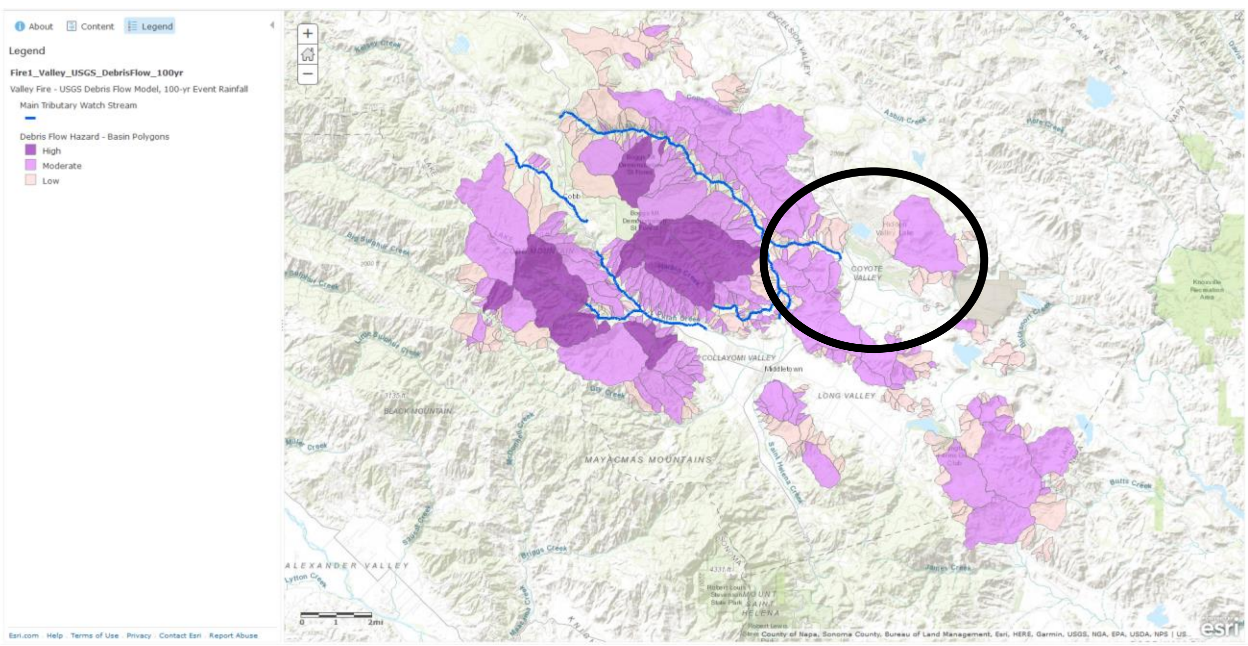
Post-Wildfire Landslides and Debris Flows

Post-wildfire landslides and debris flows are a concern in the District. Fires that burn in hilly areas, which comprise the portions of the area surrounding of the District, 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. This is captured in the discussion below.

2015 Post-Valley Wildfire Landslide Mapping

The USGS performed risk mapping of debris flows after the 2015 Valley Fire. The data in this service displays estimates of the probability of debris flow (in %), potential volume of debris flow (in m3), and combined relative debris flow hazard. These predictions are made at the scale of the drainage basin, and at the scale of the individual stream segment. Estimates of probability, volume, and combined hazard are based upon a design storm with 100-year recurrence interval (i.e., a 1 in 100 chance of a storm of that magnitude occurring in any given year). The areas mapped by the USGS are shown in Figure 4-67, with the District Service Area circled in black.

Figure 4-67 Lake Count – Valley Fire USGS Debris Flow 100 Year Risk Areas



Source: USGS. 2015 Valley Fire - Lake County, California Date of origin: September 12, 2015 Location: 38.788, -122.624 Total Area Burned: 307.8 km² 2015 Butte Fire - Amador and Calaveras Counties, California Date of origin: September 9, 2015 Location: 38.33, -120.704 Total Area Burned: 286.6 km² Source: http://landslides.usgs.gov/hazards/postfire_debrisflow/#2015 For information on how this data was derived, visit http://landslides.usgs.gov/hazards/postfire_debrisflow/background.php

Post-Wildfire Flood Flows

A report done for the County titled STARR II: Incorporation of Burned Areas in Hydrology in Lake County, California looked at the wildfires that occurred in Lake County in 2015 and 2016 and made assumptions to how those wildfires would change the flood flows in the wildfire burn scar areas. This report put together the following:

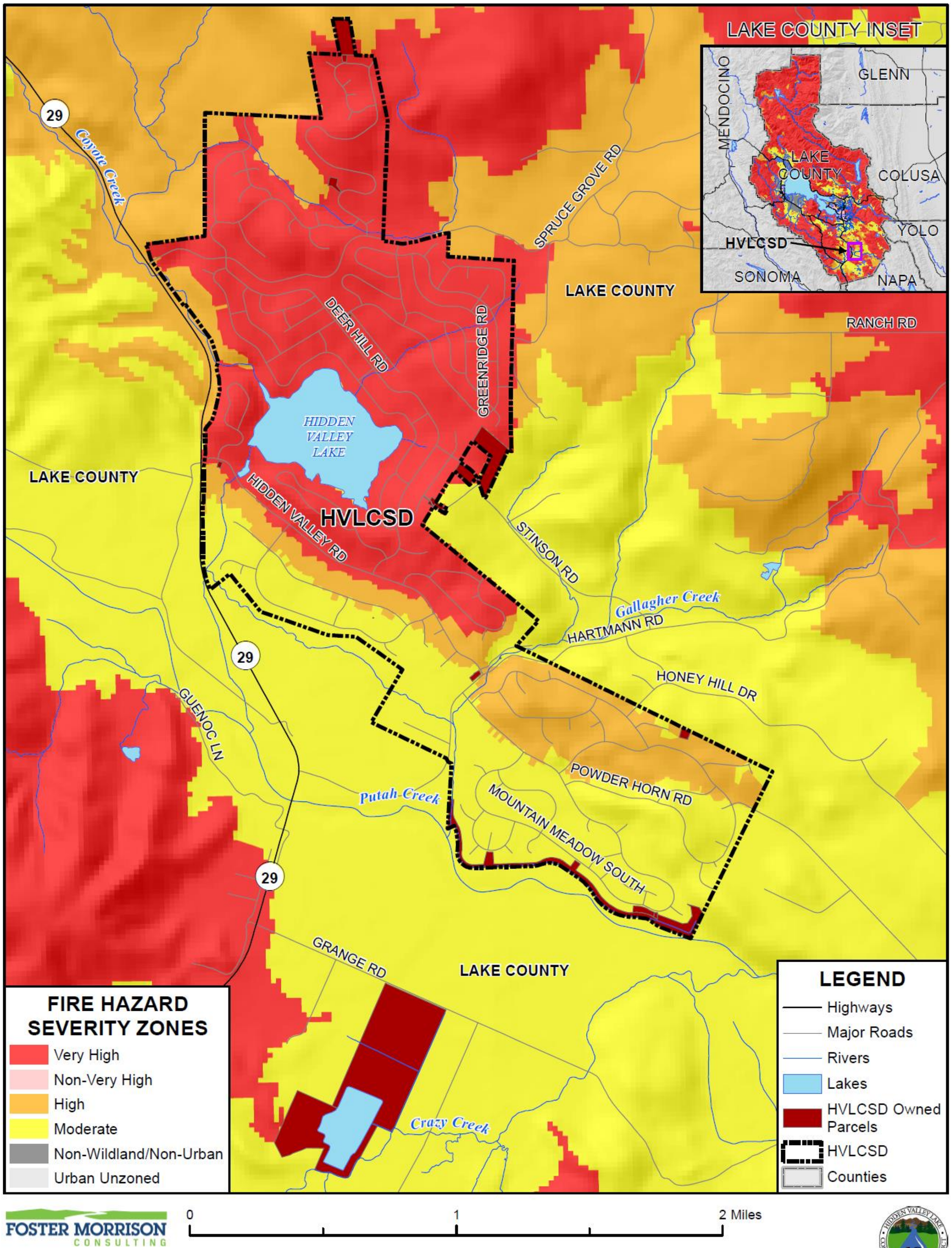
- A grid of the burn areas of the Valley, Elk, Jerusalem, and Rocky fires was created
- A flow grid was created for the input parameter (fraction of burn area) of the post-burn flow modifier
- A grid of the area-weighted basin average burn fraction was created and was used to apply the modifier to the pre-burn flow and produce a grid of post-burn peak flow of the 1% event

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.

Extent

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 areas of the District; however, CAL FIRE has mapped areas in California that are at risk to wildfire. Methodologies for this analysis and maps showing extent can be found in Section 4.3.15. GIS analysis was performed to determine what percentages of the District would be at risk to wildfire (using CAL FIRE Fire Hazard Severity Zone data) that separates risk into four risk categories as described in Table 4-30 below. 49.83% and 17.51% of all parcels in the HVLCSD fall in the CAL FIRE High or Moderate Fire Hazard Severity Zones (FHSZ), respectively. This can be seen on Figure 4-68 and in Table 4-30.

Figure 4-68 HVLCSD – Fire Hazard Severity Zones



Data Source: CAL FIRE (Adopted SRA 11/2007 - fhszs06_3_17), HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Table 4-30 HVLCSD –Geographical Extents in FHSZs

Fire Hazard Severity Zones / Jurisdiction	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Very High	929	49.83%	478	61.05%	451	41.70%
High	326	17.51%	103	13.18%	223	20.65%
Moderate	609	32.66%	202	25.77%	407	37.65%
Grand Total	**1,864**	**100.00%**	**783**	**100.00%**	**1,080**	**100.00%**

Source: CAL FIRE

Past Occurrences

Disaster Declaration History

There have been 10 federal and 1 state disaster declarations due to wildfire. This can be seen in Table 4-34.

Table 4-31 Lake County Disaster Declarations 1950-2019 from Wildfire

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	10	1985, 1996, 2012, 2015 (three times), 2016, 2017(twice), 2018	1	1987

Source: Cal OES, FEMA

NCDC Events

The NCDC has tracked wildfire events in the County dating back to 1993. The 13 events in Lake County are shown in Table 4-32.

*Table 4-32 NCDC Wildfire Events in Lake County 1993 to 5/31/2019**

Date	Event	Injuries (direct)	Deaths (direct)	Property Damage	Crop Damage	Injuries (direct)	Deaths (direct)
6/12/2008	Wildfire	0	0	$0.00	$0.00	0	0
6/21/2008	Wildfire	0	0	$0.00	$0.00	0	0
7/1/2008	Wildfire	0	0	$0.00	$0.00	0	0
9/7/2009	Wildfire	0	0	$0.00	$0.00	4	0
7/11/2014	Wildfire	1	21	$0.00	$0.00	0	0
7/29/2015	Wildfire	0	0	$0.00	$0.00	0	0
8/1/2015	Wildfire	0	0	$0.00	$0.00	0	0
8/9/2015	Wildfire	0	0	$0.00	$0.00	0	0
9/12/2015	Wildfire	4	4	$0.00	$0.00	0	0
8/13/2016	Wildfire	0	0	$1,500,000.00	$0.00	0	0
10/8/2017	Wildfire	0	0	$0.00	$0.00	0	0

Date	Event	Injuries (direct)	Deaths (direct)	Property Damage	Crop Damage	Injuries (direct)	Deaths (direct)
6/23/2018	Wildfire	0	0	$0.00	$0.00	0	0
7/27/2018	Wildfire	12	0	$56,000,000	$0.00	4	1
Totals		**17**	**25**	**$57,500,000.00**	**$0.00**	**8**	**1**

Source: NCDC

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

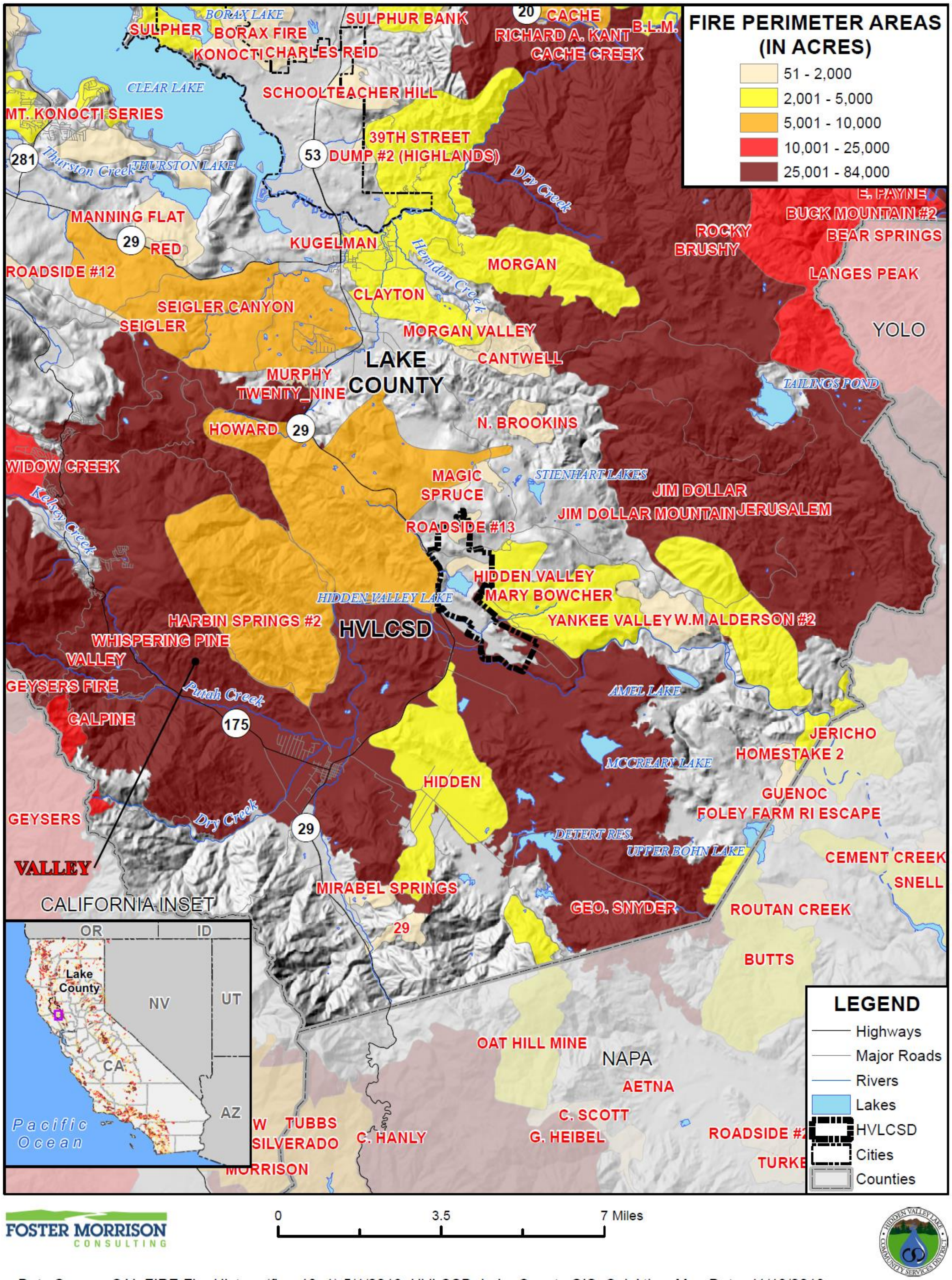
CAL FIRE Events

CAL FIRE, USDA Forest Service Region 5, Bureau of Land Management (BLM), the National Park Service (NPS), Contract Counties and other agencies jointly maintain a comprehensive fire perimeter GIS layer for public and private lands throughout the state. The data covers fires back to 1878 (though the first recorded incident for the County was in 1917). For the National Park Service, Bureau of Land Management, and US Forest Service, fires of 10 acres and greater are reported. For CAL FIRE, timber fires greater than 10 acres, brush fires greater than 50 acres, grass fires greater than 300 acres, and fires that destroy three or more residential dwellings or commercial structures are reported. CAL FIRE recognizes the various federal, state, and local agencies that have contributed to this dataset, including USDA Forest Service Region 5, BLM, National Park Service, and numerous local agencies.

Fires may be missing altogether or have missing or incorrect attribute data. Some fires may be missing because historical records were lost or damaged, fires were too small for the minimum cutoffs, documentation was inadequate, or fire perimeters have not yet been incorporated into the database. Also, agencies are at different stages of participation. For these reasons, the data should not be used for statistical or analytical purposes.

The data provides a reasonable view of the spatial distribution of past large fires in California. Using GIS, fire perimeters that intersect the District were extracted and are listed in Table 4-33. This table shows the acreage burned inside of the District. Each of them was tracked by CAL FIRE. Many more small fires have occurred, but were not included in the analysis. Figure 4-69 shows fire history for the area surrounding the District, colored by the size of the acreage burned. This map contains fires from 1950 to 2019.

Figure 4-69 HVLCSD – Wildfire History 1950 to 2019



Data Source: CAL FIRE Fire History (firep18_1) 5/1/2019, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Table 4-33 HVLCSD – Wildfire History

Start Date	Wildfire Name	Cause	Acres Burned
9/7/1985	HIDDEN VALLEY	Unknown / Unidentified	169
9/15/1951	MARY BOWCHER	Unknown / Unidentified	49
8/7/1961	ROADSIDE #13	Unknown / Unidentified	105
9/12/2015	VALLEY	Unknown / Unidentified	266

Source: CAL FIRE

Hazard Mitigation Planning Team Events

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 were felt in the District from this fire.
- **2015 Rocky Fire** (FM-5112)/**Jerusalem Fire** – In the District there were impacts. 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 in the District, with over 2,500 water connections affected in total (16 sewer connections). 1 death also occurred. In the District, 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 10 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.
  - ✓ Our 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 we 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 effected 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, the Lake County Record Bee 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. 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.

Likelihood of Future Occurrences

Highly Likely — Conventional thought states that from May to October of each year, the District faces a serious wildland fire threat. Recently, it is as though the fire threat is almost year around. Fires will continue to occur on an annual basis in the Lake County and in and near the District. 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, the District continues to be at risk from wildfire.

Climate Change and Wildfire

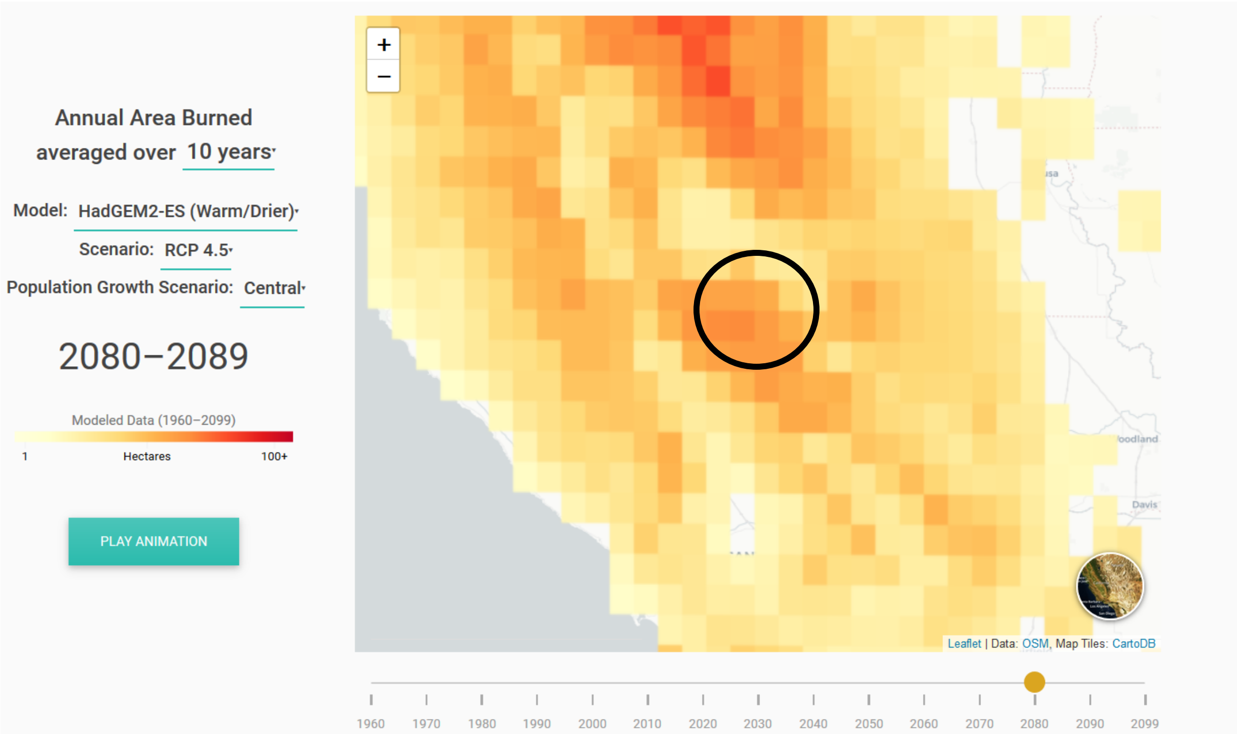
Climate change and its effect on wildfire near the District has been discussed by two sources:

- Cal-Adapt
- Climate Change and Health Report for Lake County

Cal-Adapt Predictions

Warmer temperatures can exacerbate drought conditions. Drought often kills plants and trees, which serve as fuel for wildfires. Warmer temperatures could increase the number of wildfires and pest outbreaks, such as the western pine beetle. Cal-Adapt's wildfire tool predicts the potential increase in the amount of burned areas for the year 2080-2089, as compared to recent (2010) conditions. This is shown in Figure 4-70. Based on this model, Cal-Adapt predicts that wildfire risk in Lake County will increase moderately at 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 wildfire.

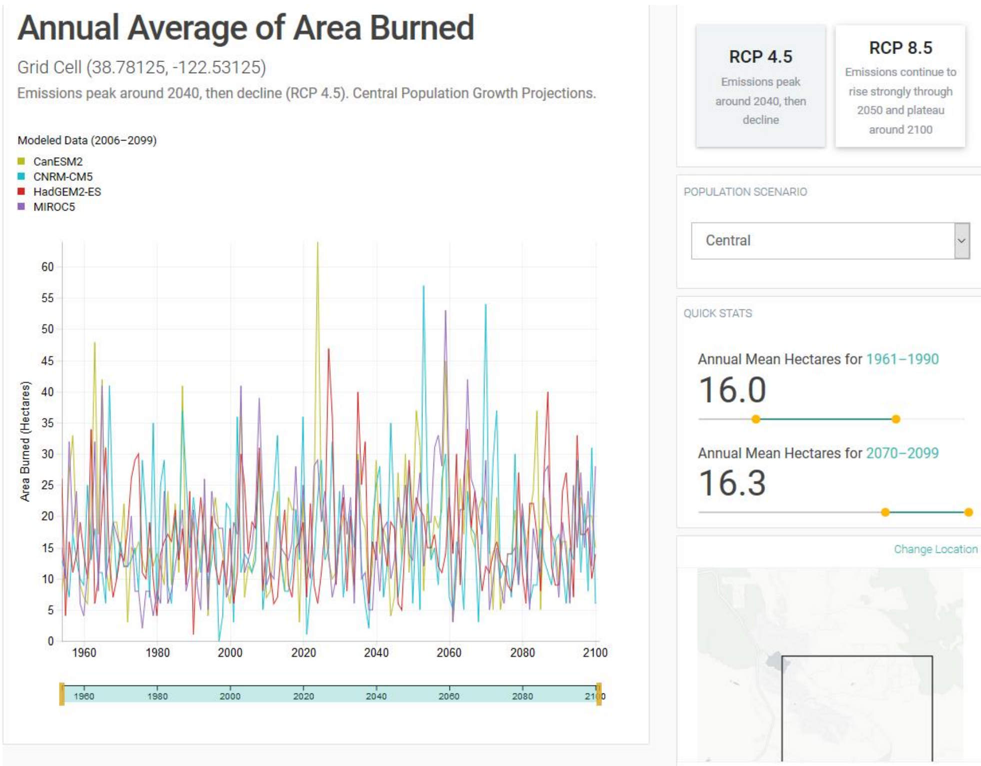
Figure 4-70 HVLCSD – Projected Increase in Wildfire Burn Areas

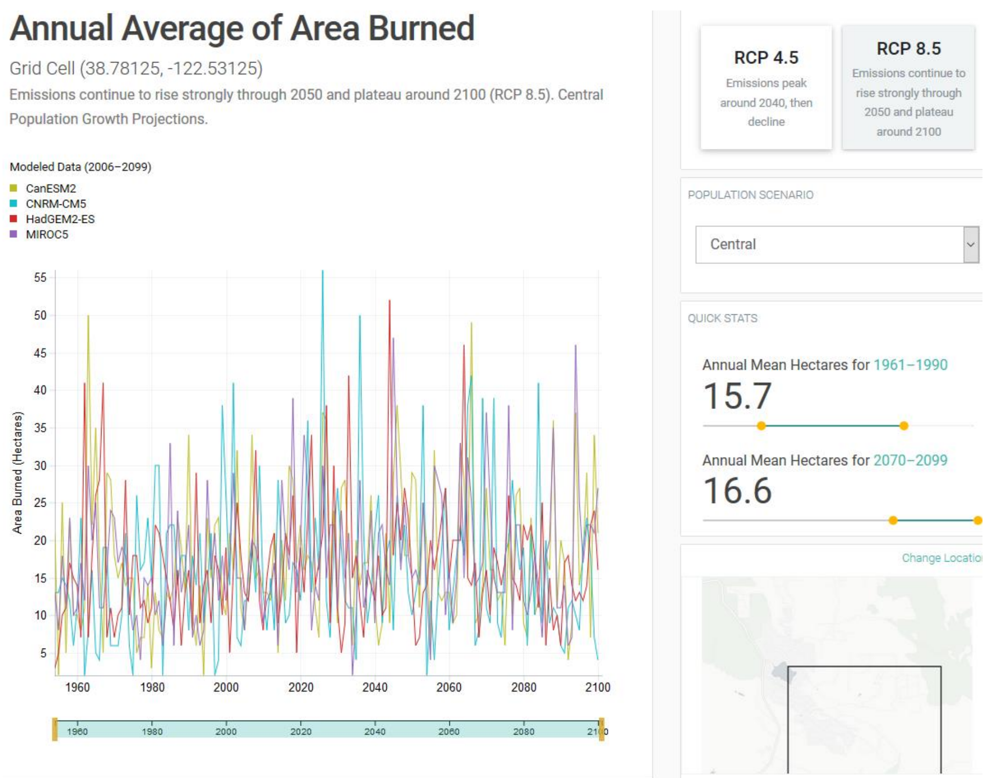


Source: Cal-Adapt

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 4-71. 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 District under the RCP 8.5 scenario.

Figure 4-71 HVLCSD – Future Annual Averages of Acres Burned under RCP 4.5 and 8.5 Scenarios



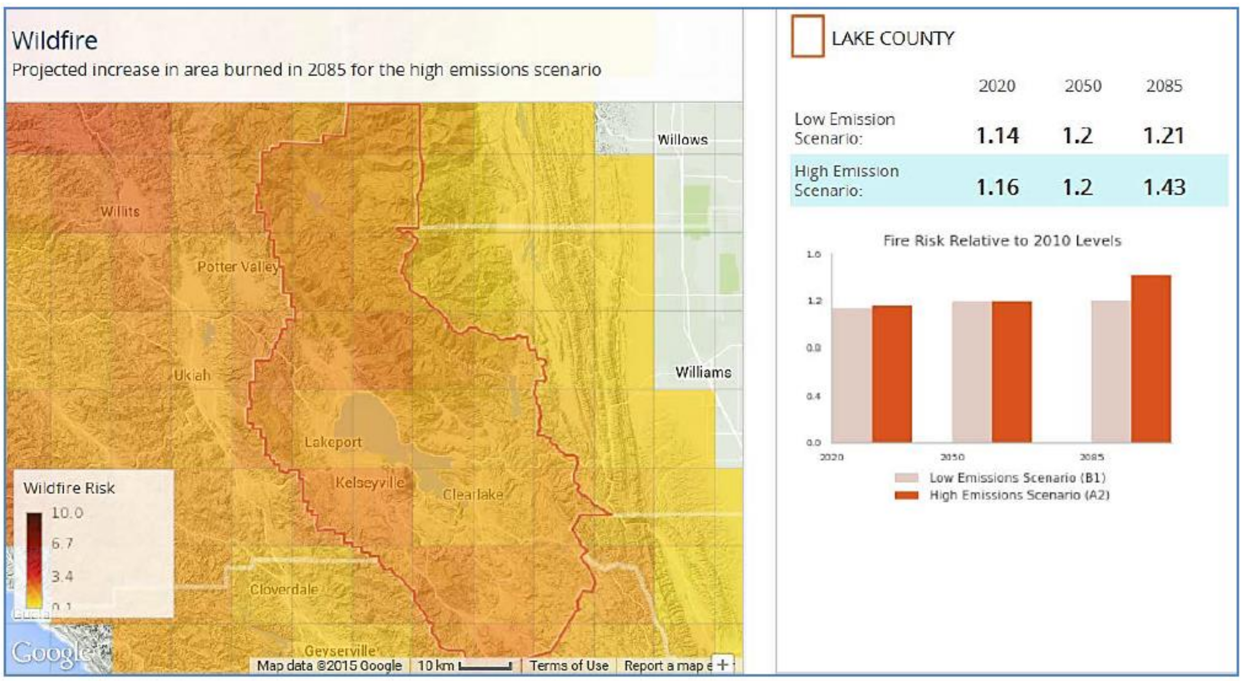


Source: Cal-Adapt

Climate Change and Health Report for Lake County Predictions

The map below (Figure 4-72) displays the projected increase or decrease in potential area burned based on projections of the Coupled Global Climate Model (version 3) for the high carbon emissions scenario in 2085. The bar graphs to the right of the map in Figure 4-72 illustrate the projected time trend over the 21st century for both the high and low emissions scenarios. Note that these data are modeled solely on climate projections and do not take landscape and fuel sources into account. The projections of acreage burned are expressed in terms of the relative increase or decrease (greater or less than 1) from a 2010 baseline for fires that consume at least 490 acres. The 2010 baseline reflects historic data from 1980 to 1989 and trends through 2010.

Figure 4-72 Lake County – Increase in Wildfire Acreage in Future Carbon Emissions Scenarios 2020 to 2085



Source: Climate Change and Health Report for Lake County

4.2.16. Natural Hazards Summary

Table 4-34 summarizes the results of the hazard identification and hazard profile for the HVLCSD based on the hazard identification data and input from the HMPC. For each hazard profiled in Section 4.2, this table includes the likelihood of future occurrence and whether the hazard is initially considered a priority hazard for the District based on the hazard profiles.

Table 4-34 Hazard Identification and Initial Determination of Priority Hazards

Hazard	Likelihood of Future Occurrence	Priority Hazard
Aquatic Biological Hazards: quagga mussel	Unlikely	Y
Climate Change	Likely	Y
Dam Failure	Unlikely	Y
Drought and Water Shortage	Likely/Occasional	Y
Earthquake	Highly Likely/ Occasional	Y
Flood: 1%/0.2% Annual Chance	Occasional/Unlikely	Y
Flood: Localized/Stormwater	Highly Likely	Y
Landslide and Debris Flows	Occasional	N
Levee Failure	Likely	Y
Severe Weather: Extreme Cold and Freeze	Highly Likely	Y
Severe Weather: Extreme Heat	Highly Likely	Y
Severe Weather: Heavy Rains, Snow, and Storms	Highly Likely	Y
Severe Weather: High Winds	Highly Likely	Y
Wildfire	Highly Likely	Y

4.3 Vulnerability Assessment

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

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

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

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

With HVLCSD's hazards identified and profiled, the HMPC conducted a vulnerability assessment to describe the impact that each priority hazard would have on the District. The vulnerability assessment quantifies, to the extent feasible using best available data, assets at risk to natural hazards and estimates potential losses. This section focuses on the risks to the District as a whole. This vulnerability assessment followed the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses*. The vulnerability assessment first describes the total vulnerability of the District and assets at risk and then discusses vulnerability by hazard.

Data Sources

Data used to support this vulnerability assessment included the following:

- 2000 Master Storm Drainage Plan for Hidden Valley Lake CSD
- 2006 Lake County Water Inventory
- 2008 Lake County Community Wildfire Protection Plan
- 2013 Lake County Drought Management Plan
- 2014 California Climate Adaptation Strategy
- 2018 HVLCSD Infiltration and Inflow Assessment
- 2018 Lake County Local Hazard Mitigation Plan
- 2018 State of California Multi-Hazard Mitigation Plan
- 2018-2019 Annual Report of the Upper Putah Creek Watershed Watermaster
- CAL FIRE GIS Datasets
- Cal OES Dam Inundation Data
- Cal-Atlas
- Cal-DWR Disadvantage Community Mapping Tool
- California Adaptation Planning Guide
- California Department of Finance
- California Department of Fish and Wildlife

- California Department of Parks and Recreation Office of Historic Preservation
- California Geological Survey
- California Natural Diversity Database
- California's Sustainable Groundwater Management Act
- FEMA - Understanding Your Risks—Identifying Hazards and Estimating Losses.
- FEMA Disaster Declaration Database
- FEMA Hazus-MH 4.2
- FEMA Lake County Digital Flood Insurance Rate Map 9/30/2005
- FEMA Lake County Flood Insurance Study 9/30/2005
- FEMA Lake County Preliminary Flood Insurance Study 6/18/2014
- FEMA NFIP Data for Lakeport
- HMPC input
- Lake County Assessor's Data
- Lake County Climate and Health Profile Report
- Lake County GIS
- National Drought Mitigation Center Drought Impact Reporter
- National Oceanic and Atmospheric Administration
- National Weather Service
- Proceedings of the National Academy of Sciences
- Public Health Alliance of Southern California
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency Climate Resilience Evaluation and Awareness Tool
- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- U.S. Geological Survey Landslide Data
- UNFCCC Conference of Parties Paris Agreement of 2015
- University of California
- US Census Bureau

4.3.1. Hidden Valley Community Service District's Vulnerability and Assets at Risk

As a starting point for analyzing the HVLCSD's vulnerability to identified hazards, the HMPC used a variety of data to define a baseline against which all disaster impacts could be compared. If a catastrophic disaster was to occur in the District, this section describes significant assets at risk. Data and analysis used in this baseline assessment include:

- Total values at risk;
- Populations at risk;
- Critical facilities;
- Natural, cultural, and historical resources; and
- Growth and development trends.

Note: in the vulnerability assessment, three terms will be used to describe vulnerability to the HVLCSD:

Total Values at Risk

Total values at risk for HVLCSD are presented in two sections:

- **HVLCSD Service Area Analysis -** A parcel analysis of areas serviced by the HVLCSD was performed. These are not HVLCSD assets per se, but represent the values of the parcels and improved structures (primarily residents) located within the HVLCSD boundary (i.e., service territory).
- **HVLCSD Asset Analysis -** An analysis of HVLCSD owned and operated assets was performed of both above ground and below ground assets, including owned parcels, buildings and assets comprising their water and sewer systems.

HVLCSD Service Area Analysis: Parcel Inventory and Assessed Values

This analysis captures the values associated with all parcels located within the HVLCSD existing Service Area boundary. 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 2018 Assessor Data and the County's GIS parcel data were used as the basis for the inventory of assessed values for both improved and unimproved parcels within the 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 nearly 2.4 million 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 3,389 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.

Utilizing this parcel dataset comprising the 3,389 parcels, GIS was used to compare parcel polygons and parcel centroids, or points, representing the center of each parcel polygon. For the purposes of this analysis, the centroids which were not coincident in locations were re-positioned to overlay on the corresponding polygons so that each assessor record (with a unique assessor parcel number) was spatially positioned on the corresponding parcel. In addition, multiple parcels polygons in the GIS data were constructed as multi-part features, of which only one centroid was representative of each parcel polygon. The position of the centroids may result in less accurate hazard analysis overlay results. The data did not contain duplicate records. Again, in total, 3,389 records were utilized for this parcel analysis.

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:

- 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

HVLCSD's assigned property use categories were used to develop estimated content replacement values (CRVs) that are potentially at loss from hazards. FEMA's standard CRV factors were utilized to develop more accurate loss estimates for all mapped hazard analyses. FEMA's CRV factors estimate value as a percent of improved structure value by property use. Table 4-35 shows the breakdown of the different property uses in HVLCSD and their estimated CRV factors.

Table 4-35 HVLCSD – Content Replacement Factors by Property Use

Property Use Categories	Hazus Property Use Categories	Hazus Content Replacement Values
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. Table 4-36 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 4-37. As shown, there are $736 million in land, structure and contents value in the Service Area, of which $722 million is residential properties.

Table 4-36 HVLCSD Service Area – Total Parcel Counts and Values at Risk

Location	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
HVLCSD Service Area	3,389	2,429	$86,882,246	$430,834,766	$218,431,623	$736,148,635
Grand Total	**3,389**	**2,429**	**$86,882,246**	**$430,834,766**	**$218,431,623**	**$736,148,635**

Source: Lake County 10/30/2018 Parcel/Assessor's Data

Table 4-37 HVLCSD Service Area – Total Parcel Counts and Values at Risk by Property Use

Location/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
HVLCSD Service Area						
Commercial	32	26	$1,087,033	$6,028,479	$6,028,479	$13,143,991
Open Space / Rural Lands	40	0	$19,597	$0	$0	$19,597
Residential	3,317	2,403	$85,775,616	$424,806,287	$212,403,144	$722,985,047
Grand Total	**3,389**	**2,429**	**$86,882,246**	**$430,834,766**	**$218,431,623**	**$736,148,635**

Source: Lake County 10/30/2018 Parcel/Assessor's Data

HVLCSD Asset Analysis: Asset Inventory and Values

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 asset values. 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 HVLCSD point assets are categorized as land, general, sewer system, and water system assets totaling 953 assets. The line assets are categorized as sewer line and reclaimed water line assets totaling 112,847 linear feet. The 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

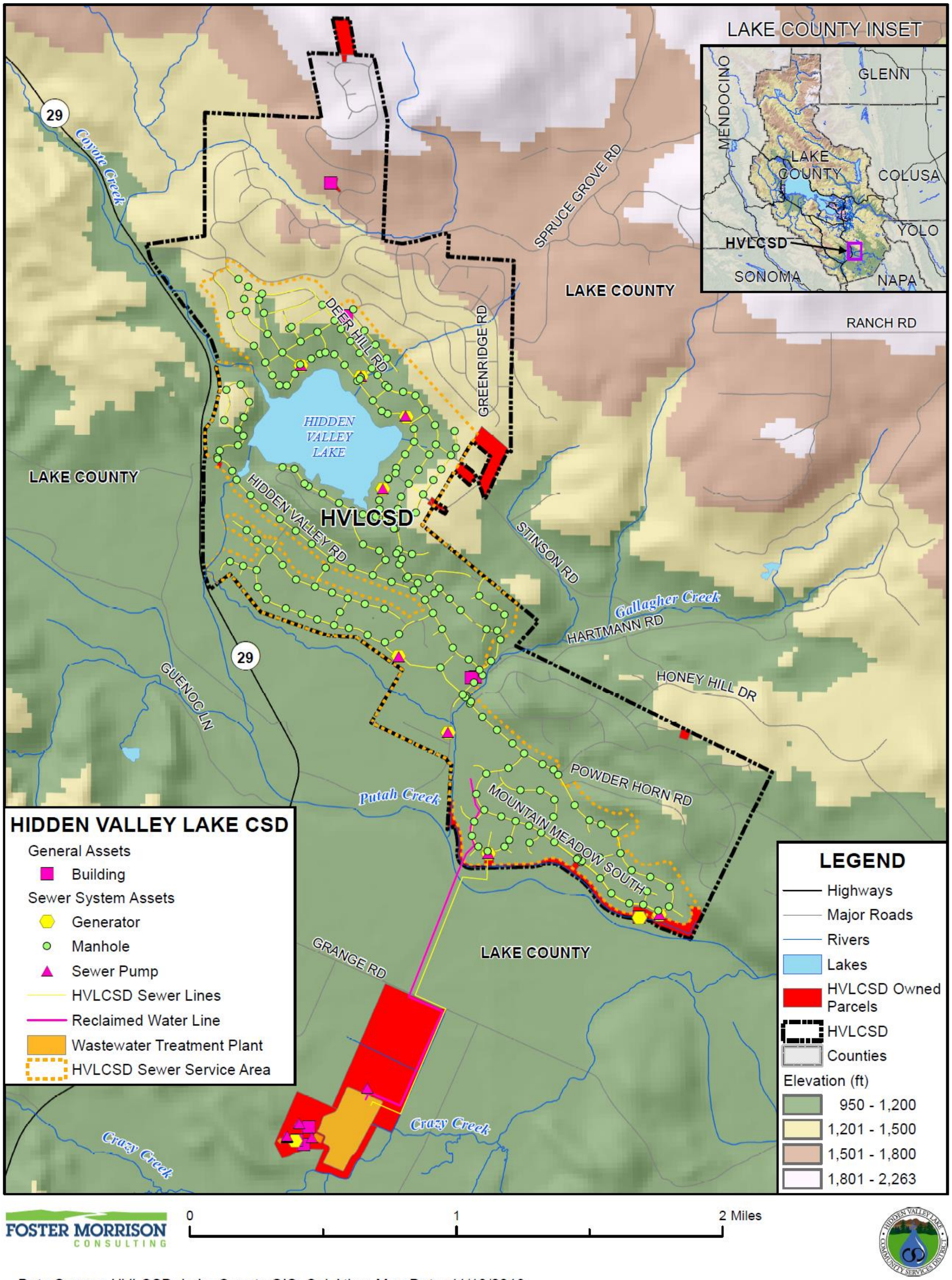
Data Limitations & Notations

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 obtains estimated fair market values of these 18 owned HVLCSD parcels.

HVLCSD Asset Analysis: Values at Risk Results

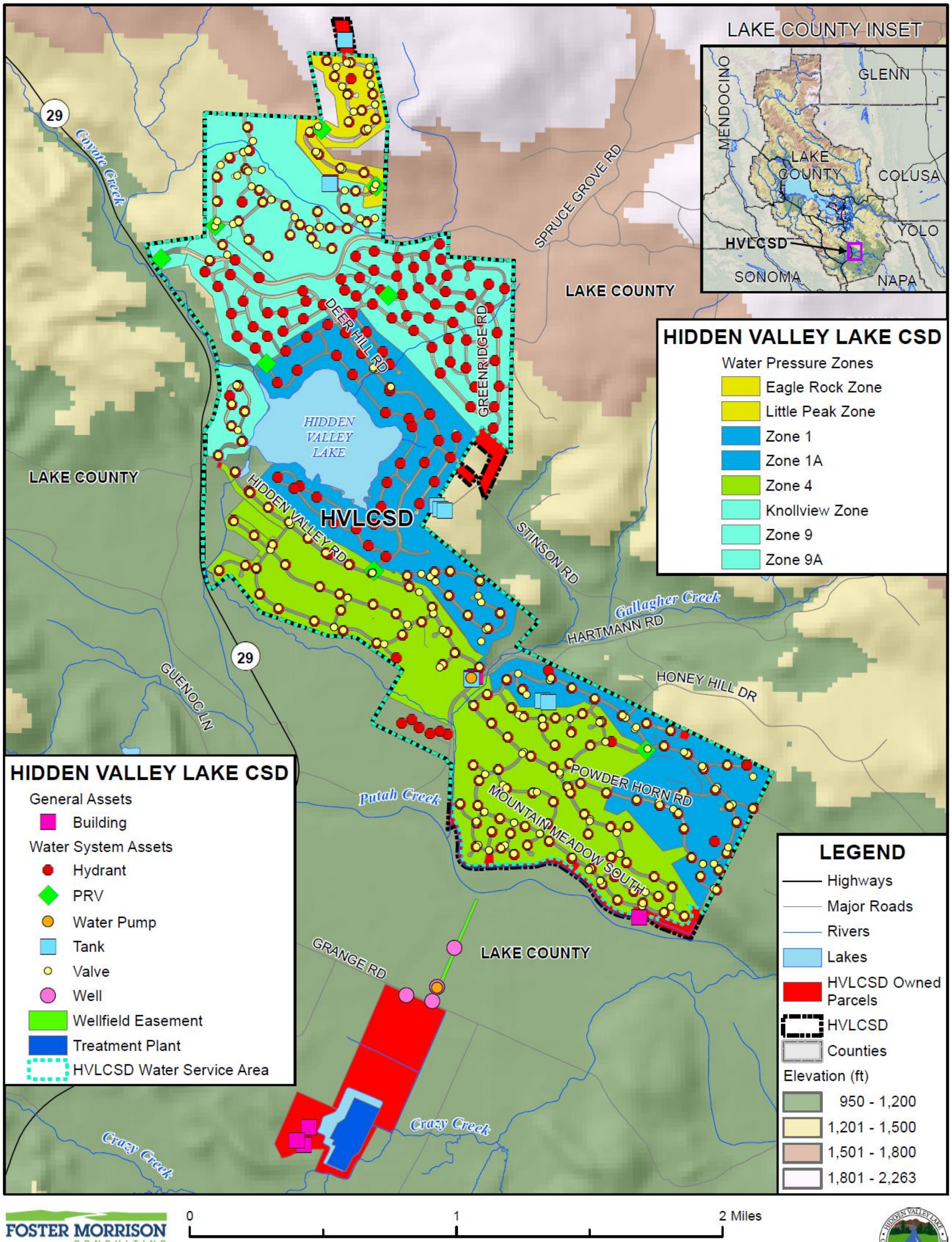
HVLCSD water, sewer, general, and land values from identified assets were identified and summed in order to determine total values at risk associated with HVLCSD owned assets. HVLCSD sewer service assets are shown on Figure 4-73, while water service assets are shown on Figure 4-74. Table 4-38 shows the total values or exposure for the point assets. Table 4-39 shows the total values or exposure for the line assets.

Figure 4-73 HVLCSD – Sewer Service Assets



Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Figure 4-74 HVLCSD – Water Service Assets



Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Table 4-38 HVLCSD –Point Asset Counts and Values

Asset	Asset Count	Asset Value	Content Value
Land Asset			
Parcel	18	$2,765,000	$0
Land Asset Total	**18**	**$2,765,000**	**$0**
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	$0
Manhole	218	$232,170	$0
Sewer Pumps	34	$513,856	$0
Sewer System Asset Total	**262**	**$1,775,910**	**$0**
Water System Asset			
Hydrant	302	$703,660	$0
PRV	8	$44,872	$0
Pump	16	$893,990	$0
Tank	8	$2,045,319	$0
Valve	326	$336,106	$0
Well	5	$915,425	$0
Water System Asset Total	**665**	**$4,939,372**	**$0**
Grand Total	**953**	**$16,975,671**	**$1,590,091**

Source: HVLCSD GIS

Table 4-39 HVLCSD –Line Asset Counts and Values

Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Sewer Line	4	$70	8,870	$620,874
	6	$90	61,001	$5,490,068
	8	$135	12,188	$1,645,407
	10	$208	16,094	$3,347,524
	12	$208	1,805	$375,453
	15	$363	4,581	$1,662,771
Sewer Line Total			**104,538**	**$13,142,096**
Reclaimed Water Line	–	$208	8,309	$1,728,316
Reclaimed Water Line Total			**8,309**	**$1,728,316**

Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
		Grand Total	**112,847**	**$14,870,413**

Source: HVLCSD GIS

In addition to those assets listed above, there are other HVLCSD assets that were not included in the above spatial analysis, but should be considered as part of the District's total assets at risk. These include:

- All lateral lines have been excluded; no values are identified for these lines.
- There are 2,484 water meters in the District worth approximately $300 each. This equates to $745,200 in value to the District.
- There are 11 vehicles worth $685,485. These are not assigned to any fixed position, and can be moved out of the path of certain hazard events.
- There is a telemetry system to remotely control wastewater and water systems. Replacement values for these systems are $185,741.00 and $108,241.90, respectively

Critical Facilities

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.

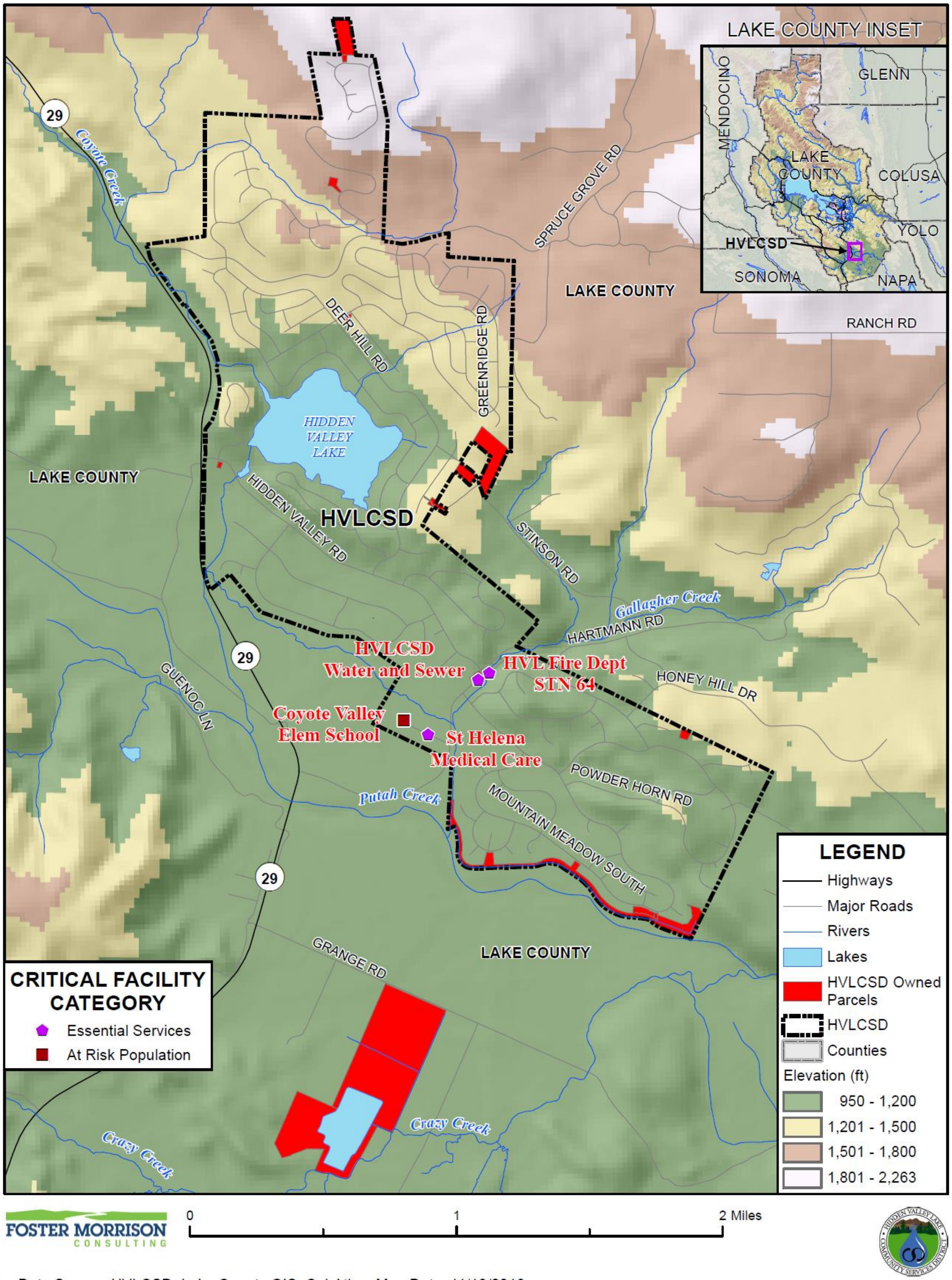
- **Essential Services Facilities** include, without limitation, public safety, emergency response, emergency medical, designated emergency shelters, communications, public utility plant facilities and equipment, and government operations. Sub-Categories:
  - ✓ Public Safety - Police stations, fire and 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, and 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.

A complete inventory of these critical facilities was noted in the Lake County 2018 LHMP Update. For hazard specific information on these critical facilities, refer to Chapter 4 and Appendix F of the 2018 Lake County LHMP. Using this definition and mapping from the Lake County 2018 LHMP, those critical facilities that fall within the HVLCSD boundary can be seen in Figure 4-75.

The HVLCSD noted that there is an unmapped Essential Services facility identified as a Treatment Plant on Grange Road that was not included in the Lake County 2018 LHMP Update. As such, no GIS analysis was performed on that facility.

Figure 4-75 HVLCSD– Critical Facilities Inventory



Data Source: HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Natural, Historical, and Cultural Resources

Assessing the vulnerability of the HVLCSD 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

The District area contains a variety of natural resources. The sections below discuss the natural resources that fall within the HVLCSD boundary.

Wetlands: Natural and Beneficial Functions

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

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

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.

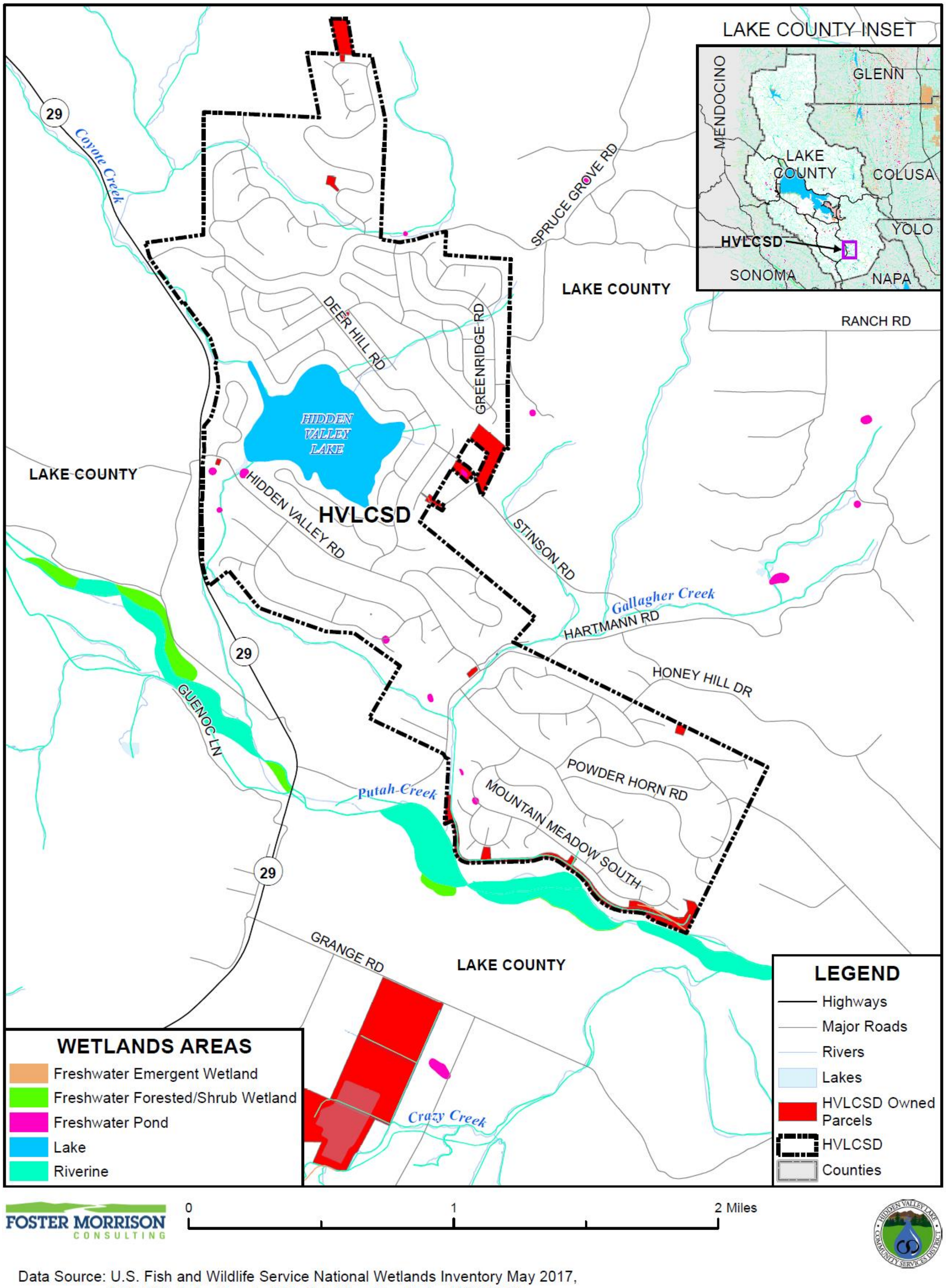
Wetlands, and other riparian and sensitive areas, provide habitat for insects and other invertebrates that are critical food sources to a variety of wildlife species, particularly birds. There are species that depend on these areas during all parts of their lifecycle for food, overwintering, and reproductive 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.

The National Wetlands inventory indicates that small wetland areas are located within the District. Wetlands in the District are shown in Figure 4-76.

Figure 4-76 HVLCSD – Wetland Locations



Data Source: U.S. Fish and Wildlife Service National Wetlands Inventory May 2017, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Critical Species

To further understand natural resources that may be particularly vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to identify at-risk species (i.e., endangered species) in the District. 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 contained 42 species. These species are listed in Table 4-40.

Table 4-40 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

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
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
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
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

Historical and Cultural Resources

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

- The **National Register of Historic Places** is the nation's official list of cultural resources worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of the Interior.
- The **California Register of Historical Resources** program encourages public recognition and protection of resources of architectural, historical, archeological, and cultural significance and identifies historical resources for state and local planning purposes; determines eligibility for state historic preservation grant funding; and affords certain protections under the California Environmental Quality Act. The Register is the authoritative guide to the state's significant historical and archeological resources.
- **California Historical Landmarks** are sites, buildings, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Landmarks #770 and above are automatically listed in the California Register of Historical Resources.
- **California Points of Historical Interest** are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Points designated after December 1997 and recommended by the State Historical Resources Commission are also listed in the California Register.

There is one historic property in the District. This is shown in Table 4-46.

Table 4-41 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/

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

Growth and Development Trends

As part of the planning process, the HMPC looked at changes in growth and development, both past and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability. Information from the HVLCSD, the US Census Bureau, and Data USA form the basis of this discussion.

Past Growth and Current Population in the HVLCSD Service Area

As shown in Table 4-42, there has been steady growth in the HVLCSD Service Area boundaries. Growth has recently slowed due to the 2014 SWRCB Compliance Order. This is discussed in greater detail in the Future Development discussion in Section 4.3.1 below

Table 4-42 HVLCSD – Past and Current Populations

Year	Population	Population Change
2000	3,777	–
2010	5,579	1,802
2017	5,735	156

Source: HVLCSD, US Census Bureau, Data USA

HVLCSD Staff and Facility Populations

In addition to the population of the HVLCSD Service territory, 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.

Vulnerable Populations

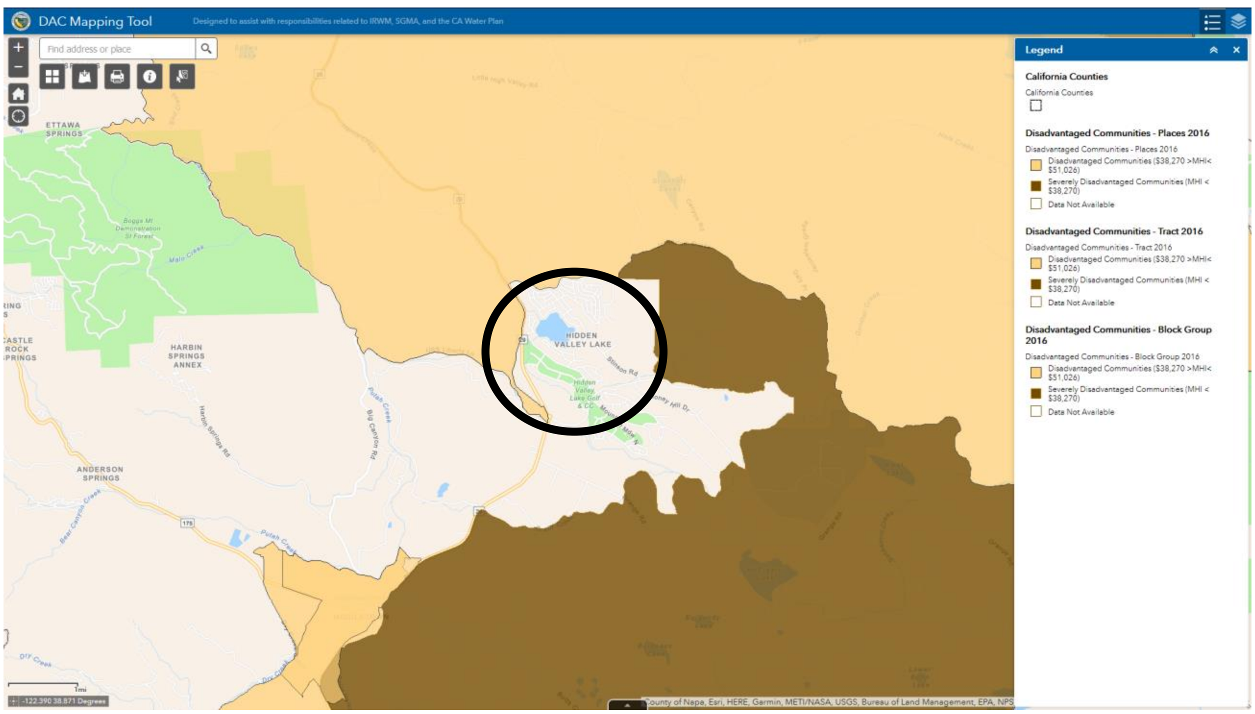
The vulnerable populations discussion is based on the following two sources:

➢ Cal-DWR Disadvantage Community Mapping Tool
➢ HMPC Input

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 and around the District considered disadvantaged are shown in Figure 4-77.

Figure 4-77 HVLCSD – Disadvantaged Areas



Source: Cal DWR DAC Mapping Tool – Map Date 11/20/2019

HMPC Input

The HMPC noted that, while there are special populations in surrounding Lake County, there are no special populations in the District. This coincides with the Cal DWR findings in Figure 4-77 above.

Future Populations

The HVLCSD has an established Sphere of Influence (SOI), where new development is anticipated that will expand the existing HVLCSD boundary/service area and increase the number of water and sewer hookups. The SOI is detailed further below in the future development discussion. The Valley Oaks development project within the SOI has been permitted and is expected to add future populations to the

HVLCSD service area. However, there is a SWRCB Compliance Order this is currently putting some restrictions on other future development in the District based on issues related to water rights. Future population estimates for the HVLCSD service area are currently in question, until the Compliance Order on future development is lifted.

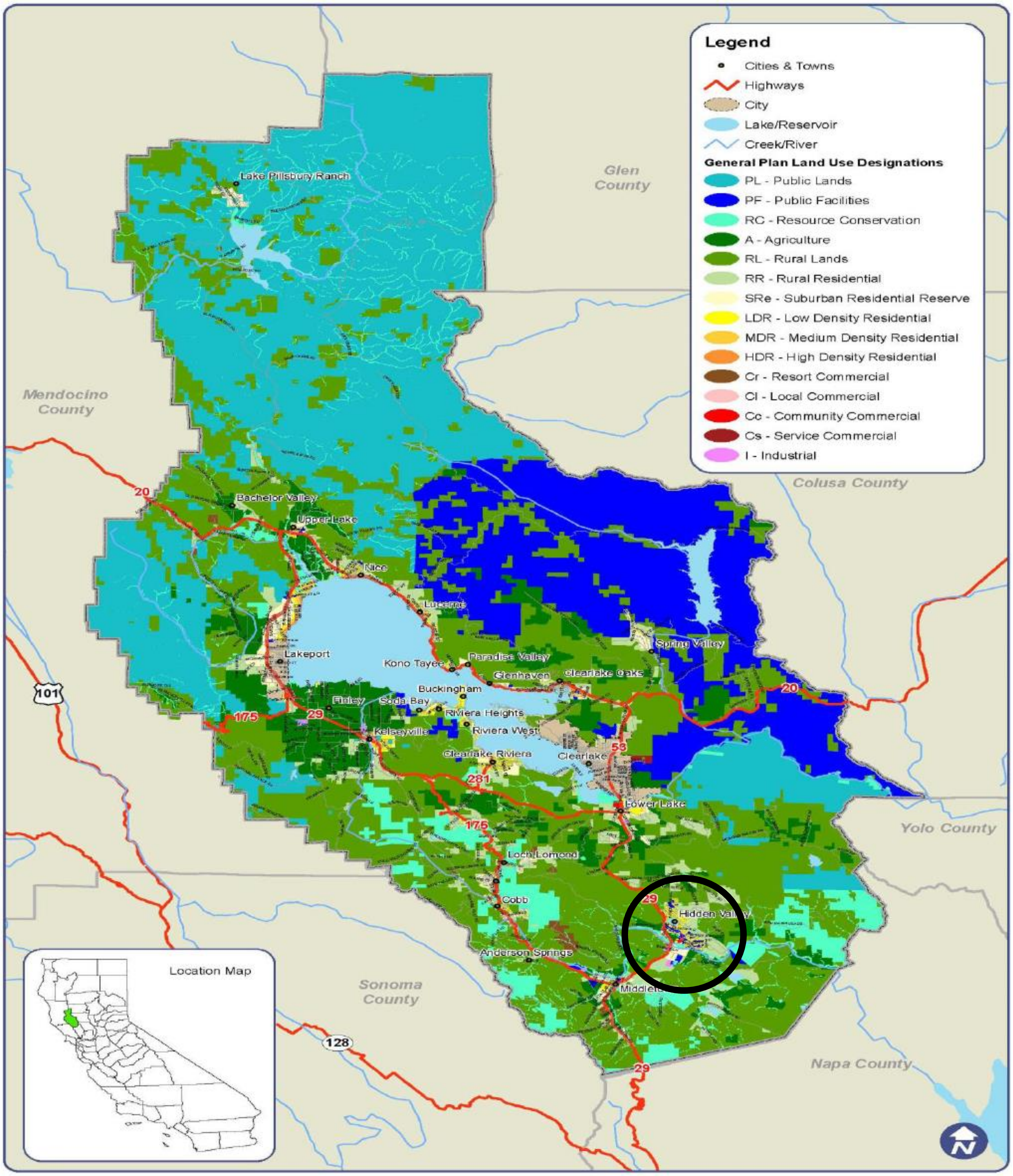
Future Land Use

The Lake County General Plan (2008), Land Use Chapter identifies the Hidden Valley Lake Community as the Coyote Valley Community Growth Boundary (Figure 4-78). Land use designations for the community are comprised of mostly Low Density Residential and a small portion of Community Commercial (Figure 4). Areas identified as Rural Residential are not served by the HVLCSD water/wastewater infrastructure. As per this General Plan,

> ***"Each of the Community Growth Boundaries contain enough vacant or underutilized land to accommodate a high, 3 percent average growth rate through the year 2030. However, not all land within these Boundaries is currently serviceable with water and wastewater services, and growth within the Boundaries is subject to the availability of capacity and funding for such services."***

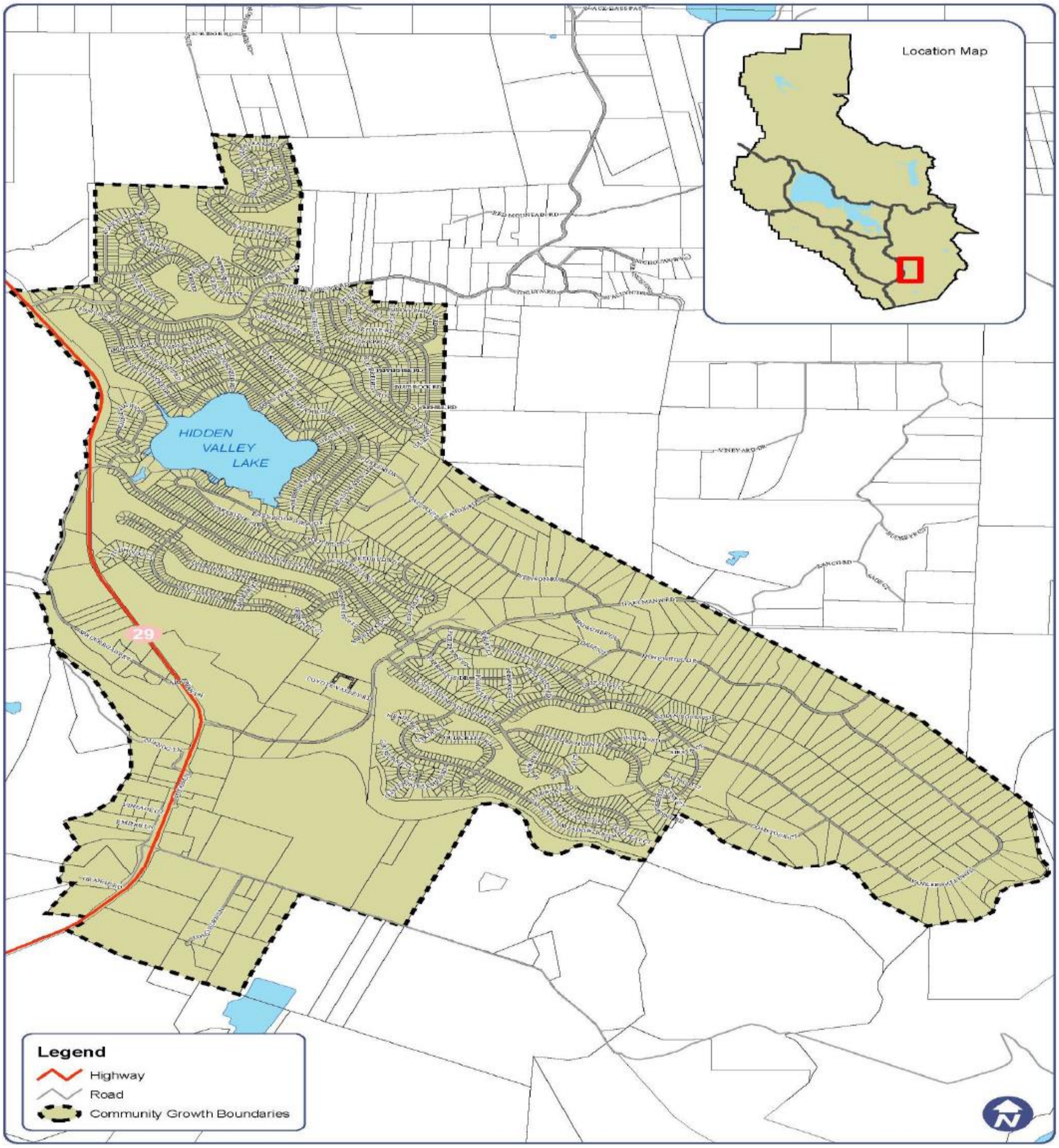
The General Plan Land Use Map as shown in Figure 4-78 and the Community Growth Boundary is shown in Figure 4-79. More detailed information on the future growth in the HVLCSD Service Area can be found in the Future Development discussion and GIS analysis below.

Figure 4-78 Lake County and HVLCSD– Land Use Diagram



Source: Lake County 2008 General Plan

Figure 4-79 HVLCSD – Growth Boundary



Source: HVLCSD I&I Engineering Report

Future Development

The HMPC noted that expected new development in the District is low. This is due to the State Water Resource Control Board compliance order of October 2014 (i.e., the Compliance Order). HVLCSD has a confluence of both subterranean streams and groundwater. It was thought that all water in the District came from their wells. However, in 1994 it was determined that the underground source was not groundwater, but a subterranean stream, thus the District is really accessing surface water which they share with downstream users, some of which have a higher water rights priority. The SWRCB Compliance Order is a significant concern to the District. It has the potential to be a big economic loss by limiting the customer base. 679 parcels are currently affected by the Compliance Order.

One development possibility in a newly annexed area for the District is allowable under the compliance order due to Riparian Rights to Coyote Creek. This is the Valley Oaks subdivision.

GIS Analysis

There are two areas where development and an expansion of the HVLCSD can occur.

- The HLVCSD SOI – areas of future growth should the Compliance Order be lifted.
- The Valley Oaks area – this is a permitted project not affected by the SWRCB Compliance Order. The development plan for this area noted that it would be comprised of approximately 380 single-family residential parcels restricted for senior housing (age 55+), a medium density residential bulk parcel restricted for senior housing, a medium density senior housing parcel, a residential care parcel, 4 commercial parcels, and integrated recreational and project open space.

The SOI and Valley Oaks areas can be seen on Figure 4-80 and details provided in Table 4-43 and Table 4-44.

Figure 4-80 HVLCSD– Future Development Areas

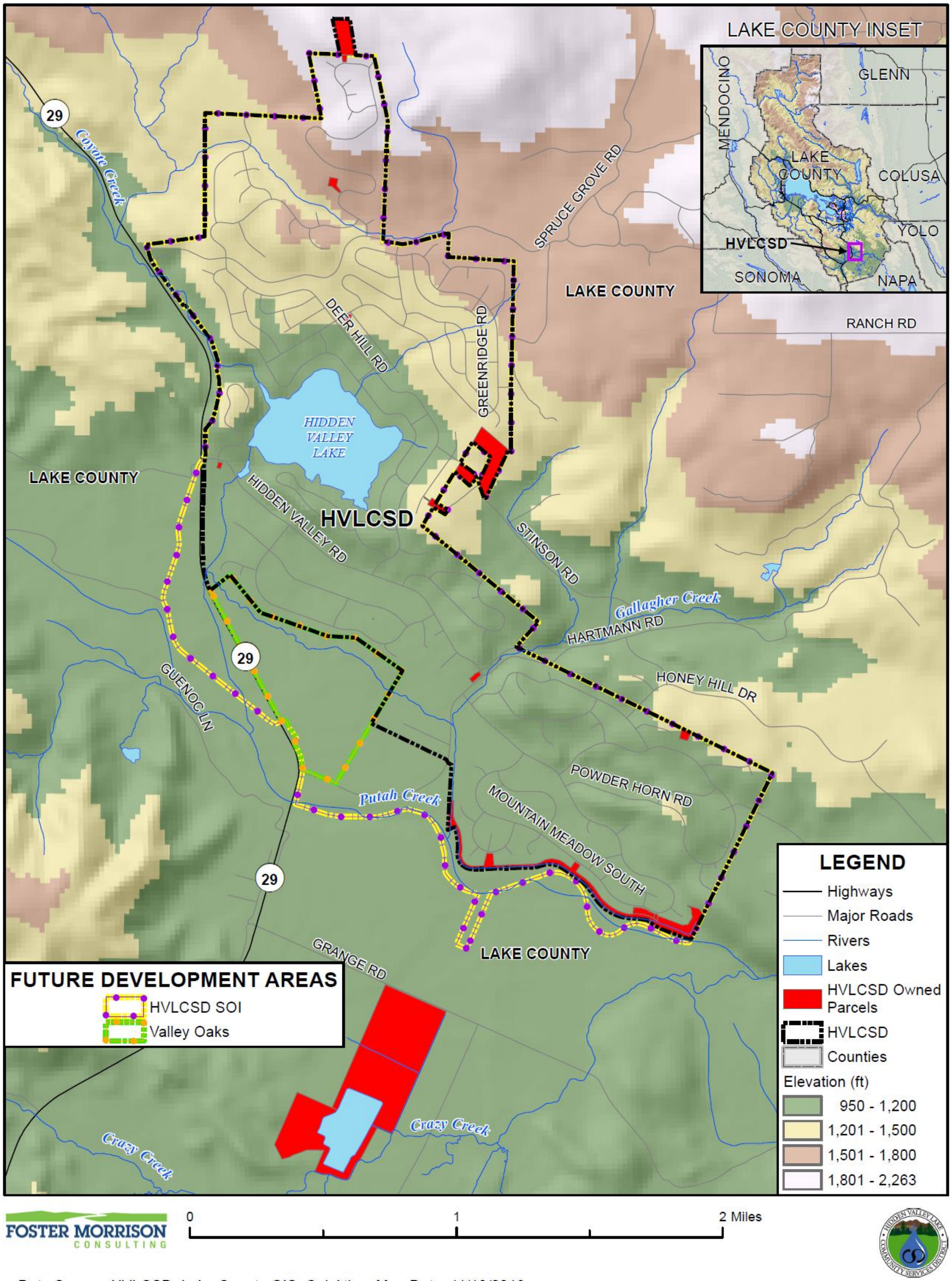


Table 4-43 HVLCSD– Future Development Parcels and Acreage Count Summary

Future Development Areas	Total Parcel Count	Total Acres	Improved Parcel Count	Total Improved Acres	Unimproved Parcel Count	Total Unimproved Acres
HVLCSD SOI	19	189	13	104	6	85
Valley Oaks	2	150	1	47	1	103
Grand Total	**21**	**339**	**14**	**151**	**7**	**188**

Source: HVLCSD GIS

Table 4-44 HVLCSD – Future Development Parcels and Acreage Count by Property Use

Future Development Areas	Total Parcel Count	Total Acres	Improved Parcel Count	Total Improved Acres	Unimproved Parcel Count	Total Unimproved Acres
HVLCSD SOI						
Agricultural	2	38	2	38		
Commercial	6	62	3	41	3	21
Open Space / Rural Lands	2	42	0	0	2	42
Residential	9	47	8	25	1	22
HVLCSD SOI Total	**19**	**189**	**13**	**104**	**6**	**85**
Valley Oaks						
Agricultural	0	0	0	0	0	
Commercial	1	47	1	47	0	
Open Space / Rural Lands	0	0	0	0	0	0
Residential	1	103	0	0	1	103
Valley Oaks Total	**2**	**150**	**1**	**47**	**1**	**103**
Grand Total	**21**	**339**	**14**	**151**	**7**	**188**

Source: HVLCSD GIS

4.3.2. HVLCSD's Vulnerability to Specific Hazards

DMA 2000 regulations require that the HMPC evaluate the risk and vulnerability associated with priority hazards identified in the planning process. This section summarizes the possible impacts and quantifies, where data permits, the HVLCSD's vulnerability to each of the hazards identified as a priority hazard in Section 4.2.16 Natural Hazards Summary. The priority hazards evaluated further as part of this vulnerability assessment include:

- Aquatic Biological Hazards: quagga mussel
- Climate Change
- Dam Failure
- Drought and Water Shortage
- Earthquake (major/minor)

- 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, Snow, and Storms
- Severe Weather: High Winds
- Wildfire

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

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

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the HVLCSD Service Area Parcel Analysis and Owned Assets Analysis subject to the identified hazard can be counted and their values tabulated. This information conveys the impact, or vulnerability, of the HVLCSD to that hazard.

The HMPC identified five hazards in the District for which specific geographical hazard areas have been defined and for which sufficient data exists to support a quantifiable vulnerability analysis. These five hazards are dam failure, earthquake, flood, landslide, and wildfire. Because these hazards have discrete hazard risk areas, their risk varies throughout the District. For dam failure, flood, landslide, and wildfire, the HMPC inventoried the following, to the extent possible, to quantify vulnerability in identified hazard areas:

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

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

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

4.3.3. Aquatic Biological Hazards: Quagga Mussels

Likelihood of Future Occurrence—Occasional
Vulnerability—Medium

Quagga and zebra mussels are an invasive, non-native species that breed very fast, have no known predators, and can quickly colonize new areas within California waters. Once established, these mussels can clog water intake and delivery pipes; dam intake gates and pipes; adhere to boats, pilings, and most hard and some soft substrates, and litter beaches and shores with jagged, foul smelling shells.

The most serious measurable economic impacts are suffered by water districts and other users of lake water who may have increased maintenance costs due to plugged water pipes, intake screens, and possible damage to pumps and other equipment. It even impacts citizens who don't use the lakes through increased costs for drinking water and food prices passed along to consumers by the water and agriculture industries brought on by their increased costs in maintenance and equipment repair. It impacts the local fisheries, and in some lakes, has caused a collapse in the populations of sport fish.

These mussels have the ability to tolerate a wide range of conditions and are extremely adaptable. Once they have infected a water body, they cannot be eradicated. They have no predators native to the US. They cannot be prevented from spreading into downstream waters. Should quagga mussels reach Hidden Valley Lake, the economic impacts would be substantial to the District.

The HMPC noted that no mussels have been found in any water bodies in Lake County including Hidden Valley Lake. The HVLA has measures in place to prevent quagga mussels from entering the Lake. The HVLA uses a type of metal/ionic plates located in and around the lake that attract mussels and will alert the Association to the presence of mussels. The HVLA also uses a sticker and monitoring program for all boats entering the Lake. The HVLCSD noted that the biggest potential impact to the District would be clogging of pipes which would significantly impact the ability and costs of providing water and sewer services to its customers.

Note: After the hazard profile and vulnerability assessment were completed, the District noted that based on the HVLCSD operations, it is unclear how mussels could actually enter any pipes. The District does not discharge or pull from the Lake. All water used by District is groundwater from wells; no surface water is utilized. While in 2014, the District considered utilizing the lake as a surface water source; it did not happen and there are no plans to do so in the future. This is a non-priority hazard for mitigation strategy planning.

Future Development

With regards to the quagga and zebra mussels, public education and monitoring programs must continue into the future (and possibly expand) so this hazard can continue to be prevented in Hidden Valley Lake. Should Hidden Valley Lake become infested, future development in the District may be adversely affected.

4.3.4. Climate Change Vulnerability Assessment

Likelihood of Future Occurrence—Likely
Vulnerability—High

HVLCSD Climate Change Impacts

The discussion on impacts to the District and Lake County come from four sources:

- US Environmental Protection Agency (EPA) Climate Resilience Evaluation and Awareness (CREAT) Tool
- Lake County Climate Change and Health Profile Report
- California Adaptation Planning Guide
- Proceedings of the National Academy of Sciences

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 2020 to 2100, which aligns with the 2060 projected climate and sea level data provided in CREAT. The HVLCSD ran the CREAT tool on the drinking water services it provides. The HVLCSD input the following into the tool:

- Combined Water: a combined utility with a focus on drinking water assets
- 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

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 4-45 (for the baseline scenario) and Table 4-46 (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 4-45 HVLCSD – Economic Consequences of Baseline Scenario

	Current Measures	Selected Plan
Economic Consequences	$1,133,395 - $4,083,250	$165,550 - $2,830,660

Source: EPA CREAT Tool

*Table 4-46 HVLCSD – Economic Consequences of Warmer, Wetter and Stormier Future Conditions**

	Current Measures	Selected Plan
Economic Consequences	> $3,477,235	$683,575 - $3,424,390

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 4-47. The plan described in this report is at the top with any other plans considered in this CREAT analysis listed below.

Table 4-47 HVLCSD – Monetized Risk Reduction

Plan	Total Cost	Baseline Scenario	Warmer, Wetter and Stormier Future Conditions
All Potential Measures	$0	$310,310 - $1,910,125	> $845,970

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 4-48.

Table 4-48 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

Lake County Climate Change and Health Profile Report Impacts

According to the Lake County CCHPR, all Californians are vulnerable to the health impacts of climate change. Even if one is fortunate to live, work, study, or play in a place without direct contact with wildfires, flooding, or sea level rise, no one can entirely avoid excessive heat or the indirect effects of extreme weather events. Based on medical reviews of individuals who died during heat waves and other extreme weather events, those who are particularly vulnerable to the direct effects of climate change include the very old and very young, individuals who have chronic medical conditions and psychiatric illness, people taking multiple medications, people without means for evacuation (no access to public transit or private cars), people who are socially isolated, medically fragile people, and people living in institutions. 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 medical conditions.

Researchers have examined the pathways in which increased temperatures and hydrologic extremes can impact health and generally recognize three main pathways: direct exposures, indirect exposures, and socioeconomic disruption. Based on the review of weather-related natural disasters and historical patterns and scientific judgment, public health researchers have suggested the nature and direction of health harms or benefits.

- **Extreme Weather-Related Injury, Mental Health, and Displacement Extreme weather events (storms, flooding)** – These events can cause fatal and nonfatal injuries from drowning, being struck by objects, fire, explosions, electrocution, or exposure to toxic materials. A widespread weather-related natural disaster may destroy or ruin housing, schools and businesses and cause temporary or permanent displacement. Individuals and families may experience post-traumatic stress, depression, and increased risk of suicide.
- **Vector-borne Illnesses** – Climatic changes alter the range, biogeography, and growth of microbes and the vectors of food, water, and vector-borne illnesses. This includes the changes in aquatic environments that could increase harmful algal blooms and lead to increases in foodborne and waterborne illnesses.
- **Food Insecurity** – Climate change is expected to have global impacts on food production and distribution systems. This can cause food prices to increase, which makes food less affordable and increases food insecurity, obesity, and malnutrition in economically constrained households.
- **Sea Level Rise, Mold, and Indoor Air Quality** – Through sea level rise, saltwater may intrude into coastal aquifers thus reducing quality and quantity of water supply. Water intrusion into buildings can result in mold contamination leading to indoor air quality problems.
- **Socioeconomic Disruption** – Widespread social and economic disruption includes damage to the infrastructure for the delivery of health services and for general economic well-being. Health care facilities, water treatment plants, and roads for emergency responders and transportation for health care personnel can be damaged in climate-related extreme weather events. Increased burden of disease and injury will test the surge capacity of health care facilities. Economic disruption can lead to income loss, income insecurity, food insecurity, housing insecurity, and mental health problems, which in turn may increase substance abuse, suicide and other health problems. Energy production and distribution is also threatened by heat and wildfires through loss of efficiency, generating capacity, and fires disrupting transmission lines. California's ports that provide the gateway to goods for California, national, and international markets are at risk from sea level rise and coastal storms.

In addition to the bulleted points above, drought, extreme heat, and wildfire are also exacerbated by climate change. This will be discussed further in Section 4.3.5 (Drought), Section 4.3.10 (Extreme Heat), and Section 4.3.15 (Wildfire). All Californians are vulnerable to the health impacts of climate change. Even if one is fortunate to live, work, study, or play in a place without direct contact with wildfires, flooding, or sea level rise, no one can entirely avoid excessive heat or the indirect effects of extreme weather events.

California Adaptation Planning Guide Impacts

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. The APG: Defining Local and Regional Impacts focuses on understanding the ways in which climate change can affect a community. According to this APG, climate change impacts (temperature, precipitation, sea level rise, ocean acidification, and wind) affect a wide range of community structures, functions and populations in the District. These impacts further defined by regional and local characteristics are discussed by secondary impacts and seven sectors found in local communities: Public Health, Socioeconomic, and equity impacts; Ocean and Coastal Resources; Water Management; Forest and Rangeland; Biodiversity and Habitat; Agriculture; and Infrastructure. The APG: Understanding Regional Characteristics identified the following impacts specific to the North Coast region in which the District is part of:

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

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

Agriculture. Each of the products will be affected by climate change differently. The District should collaborate closely with local agricultural organizations to best support and prepare for changes in this economic sector.

Ecosystems and Biodiversity. Exacerbated by new development in the region, climate change can cause habitats to shift, creating conditions that stress ecosystems and endemic species. Continued changes in hydrologic flow regimes and increased temperatures will further stress these systems regional habitats supporting many special-status species.

Snowpack and Flooding. Climate-related decrease in snowpack can have significant consequences on the areas that depend on this water. In addition, a decrease in snowpack can increase impacts from flooding, landslide, and loss of economic base related to a drop in tourism. This can result impacts to hotels, restaurants, and second home development. Increases in flood events can further stress the region and increase flood related impacts and damages.

Water Management. Depending on location, parts of this region are projected to experience between 6 inches and 15 inches less rainfall by 2100. Specifics for the District were not given in this report. Reduced rainfall, combined with reductions in snowpack and existing diversions, could result in an altered flow regime in the region. This change would be particularly challenging due to its impact on fish, as well as the Hidden Valley Lake water level. Reduced flow, altered timing of flows, and periodic extreme events can result in reduced water quality, habitat destruction, and/or isolation of habitats. The District will need to carefully assess local aquatic ecosystems for vulnerability to these changes.

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

Public Health, Socioeconomic, and Equity Impact. The foothills of the North Sierra Region show higher ozone levels and increased temperatures causing vulnerable populations to be at greater risk to these issues.

Proceedings of National Academy of Sciences Impacts

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

Future Development

HVLCSD could see population fluctuations as a result of climate impacts relative to those experienced in other regions, and these fluctuations are expected to impact demand for housing and other development. For example, extended drought can have an effect on Hidden Valley Lake Other interior western states may experience an exodus of population due to challenges in adapting to heat even more extreme than that which is projected to occur here. While there are currently no formal studies of specific migration patterns expected to impact the District and Lake County region, climate-induced migration was recognized within the UNFCCC Conference of Parties Paris Agreement of 2015 and is expected to be the focus of future studies.

Climate change, coupled with shifting demographics and market conditions, could impact both the location of desired developments and the nature of development. Demand may increase for smaller dwellings that are less resource intensive, more energy efficient, easier to maintain and can be more readily adapted or even moved in response to changing conditions. Higher flood risks, especially if coupled with increased federal flood insurance rates, may decrease market demand for housing and other types of development in floodplains, while increased risk of wildfires may do the same for new developments in the urban-wildland interface. Flood risks may also inspire new development and building codes that elevate structures while maintaining streetscapes and neighborhood characteristics.

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

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

Climate change will affect transportation. The transportation network is vital to the District and the region's economy, safety, and quality of life. While it is widely recognized that emissions from transportation have impacts on climate change, climate will also likely have significant impacts on transportation infrastructure and operations. Climate change impacts considered in the plan include: extreme temperatures; increased precipitation, runoff and flooding; increased wildfires; and landslides. Although landslides are not a direct result of climate change, these events are expected to increase in frequency due to increased rainfall, runoff, and wildfire. These events have the potential to cause injuries or fatalities, environmental damage, property damage, infrastructure damage, and interruption of operations.

Climate change will affect land uses and planning. Climate change coupled with shifting demographics and market conditions, could impact both the location of desired developments and the nature of development. The value of open space, urban greening, green infrastructure, tree canopy expansion and pressure to preserve it will likely increase, due in part to its restorative, recreational, environmental, and habitat, and physical and mental health benefits but also for its ability to sequester carbon and cool the surrounding environment.

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

Addressing heat events. During heat waves in the District, a heat alert is issued and news organizations are provided with tips on how vulnerable people can protect themselves. Programs used by health departments to engage with thousands of block captains to check on elderly and other vulnerable residents, along with public cooling places extending their hours, or local businesses welcoming residents into their businesses for purposes of staying cool are examples of programs and services that will be necessary. Other programs to consider that could further involve hospitals and clinics are operating a "heatline" with nurses or other healthcare professionals ready to assist callers with heat-related health problems.

4.3.5. Dam Failure Vulnerability Assessment

Likelihood of Future Occurrence—Unlikely
Vulnerability—High

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

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

Based on an inventory of dams in Lake County, one dam was identified as a dam of concern in the District, and its inundation area dataset was obtained from the HVLA as owners of the dam. As such, inundation analysis was performed on the following dam:

- **Coyote Creek Dam**

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 Mayacama 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.

Based on 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 4-49.

Table 4-49 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

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 HVLA did note that if a large earthquake were to occur close to the dam, there is a concern regarding dam failure. The District noted the Middletown Area Plan discussed dam failure inundation in the District. That report 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. 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.

Impacts and Additional Risk Factors

Impacts from dam failure flooding include property damage, critical facility damage, infrastructure damage, erosion on creek and riverbanks, and life safety.

The District noted that the biggest concern related to dam failure are loss of homes and lives in the HVLCSD Service Area. This also translates to loss of customers and operational monies to the District. Other concerns from a dam failure are releases that cause extensive erosion around District pipes and other assets, as well as direct impacts to District facilities. Additionally, currently most manholes are open to air. 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.

The District provides water service to 2,475 connections. The District's water storage system consists eight water storage tanks (see Table 4-56 in Section 4.3.5) Should a catastrophic event, such as dam failure flooding, occur that would cause any of these tanks to fail (and given their poor condition, this could occur in the near future), the District is at risk of being unable to provide water for fire protection for the District's entire service area.

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 dam failure 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 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.

Values at Risk

Values 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)
- 2020 Coyote Creek Dam Inundation GIS Analyses (GIS analysis of HLVCSD Service Area Parcel Analysis and HVLCSD point and line assets at risk using the 2019 Coyote Creek Dam Inundation layers)

2019 Coyote Creek Dam Inundation Analysis

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. The NED dataset was converted from meters to feet, and imported into HEC-RAS. In HEC-RAS, a 2D-Flow area was built outlining the downstream areas in which overland flow calculations are performed. A grid size of 60 feet by 60 feet was selected for the 2D grid. Breaklines in the 2D flow area were used to represent features in the terrain that the grid may not have detailed. Breaklines were drawn along Interstate Highway 29 and Hidden Valley Road because they have raised elevations to the adjacent terrain, which prevents water from freely flowing across the roads. Culverts were added for the road crossings over Coyote Creek. Breaklines were also added at channel banks and sudden changes in topography as needed to provide a more stable model. A time step of one second was used as the computational interval for the simulation and a simulation time window of 5 hours was used.

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.

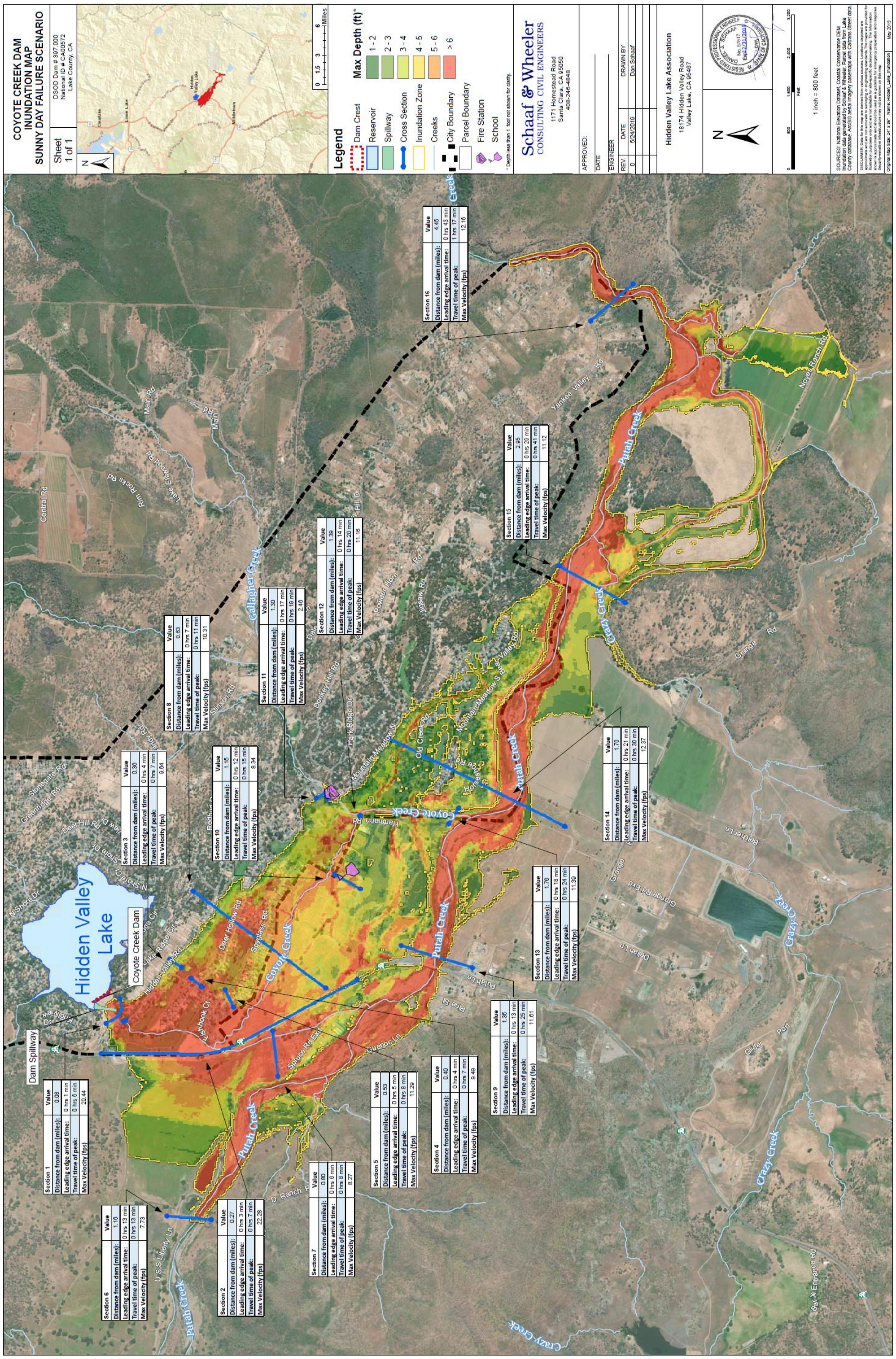
The breach parameters chosen for the Coyote Creek Dam assumed a completely and nearly instantaneous loss of the dam, which resulted in the worst case breach hydrograph and inundation extents. The maximum certified water surface elevation of 1,082 feet (NAVD88) was used as the starting water surface in the sunny day failure scenario. Piping failure was assumed to begin at the centerline of the dam's jurisdictional face at an elevation of 1,050 feet (NAVD88), which is approximately one third the height of the dam. This elevation was assumed as a likely location for piping to begin. The final bottom breach width was set to 410 feet, and the final bottom elevation was 1,029 feet (NAVD88) after 0.1 hours. The width of 580 feet represents the entire width of the dam, and elevation 1,029 is close to the bottom of the lake with minimal storage below that elevation. The bottom of the dam breach was kept above the reservoir bottom to reduce instabilities in the hydraulic model. Results are as follows:

- Modeled failure of Coyote Creek Dam occurs over 0.1 hours with a final breach width of 410 feet. This scenario is intended to represent an instantaneous and complete failure of the dam. The peak flow from instantaneous failure is approximately 248,300 cfs.
- After Coyote Creek Dam fails, breach discharge travels quickly south and east following the alignment Coyote Creek, through the Hidden Valley Lake Association neighborhood. Peak flows range from approximately 5,000 cfs to 16,000 cfs on these residential roads.
- Flow continues south along Coyote Creek where water is split between a diversion south towards Putah Creek and east along the main Coyote Creek channel. The Coyote Creek main channel breach flow path continues to follow the residential roads.
- The second flow path, the diversion channel, conveys water towards Highway 29 where approximately 5,610 LF of the road is overtopped as water flows towards Putah Creek. It takes approximately 7 minutes for peak flows of 130,000 cfs to reach Highway 29 from the time of the breach via the diversion channel. The road begins overtopping after approximately 3 minutes from the dam failure. There is a 5-foot arch-culvert under Highway 29 at the Coyote Creek diversion crossing; however, this crossing is not able to pass the Coyote Creek Dam breach discharge. Approximately 400 cfs is conveyed through the arch culvert.
- The diversion channel outfalls into Putah Creek south of Highway 29, and water continues southeast along Putah Creek where it crosses Highway 29 again. Highway 29 is not overtopped at this location during the sunny day breach. The peak flow attenuates through Putah Creek to approximately 35,000 cfs peak discharge, at 35 minutes after failure downstream of Highway 29.
- Coyote Creek and Putah Creek convey the breach discharge parallel until Coyote Creek outfalls into Putah Creek approximately 3,000 LF downstream of Highway 29. Peak discharge is approximately 70,000 cfs, and the flood wave arrival time is approximately 31 min after breach failure downstream of the confluence of the two creeks. The results show that the levee on the north bank of Putah Creek would be overtopped during a sunny day breach analysis in both the channel and from the overbanks.
- Historical stream gage data for Putah Creek was obtained from the United States Geological Survey (USGS) that showed negligible average flows on during the dry season, or during sunny day conditions, at the Guenoc Gage near Yankee Valley Road. The breach discharge in the channel 8,000 LF downstream of Putah Creek Highway 29 crossing during the dry season is therefore approximately

43,500 cfs, with a water surface elevation of approximately 932.3 feet, NAVD 88 (assuming normal depth boundary conditions). The breach discharge is contained in channel at this location. Putah Creek continues through canyons until its outfall into Lake Berryessa.

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 4-81.

Figure 4-81 Modeled Coyote Dam Inundation Areas



Source: Hidden Valley Lake Dam Inundation Study 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.

2020 Coyote Creek Inundation GIS Analysis

HVLCSD had identified 1 dam/inundation area of concern: the Coyote Creek dam inundation. HVLCSD has mapped dam inundation data for this dam. GIS was used to determine the possible impacts of a dam failure to HVLCSD. Specifically, this analysis focused on values at risk to the dam inundation areas included in dam inundation dataset. This analysis is broken out into two parts:

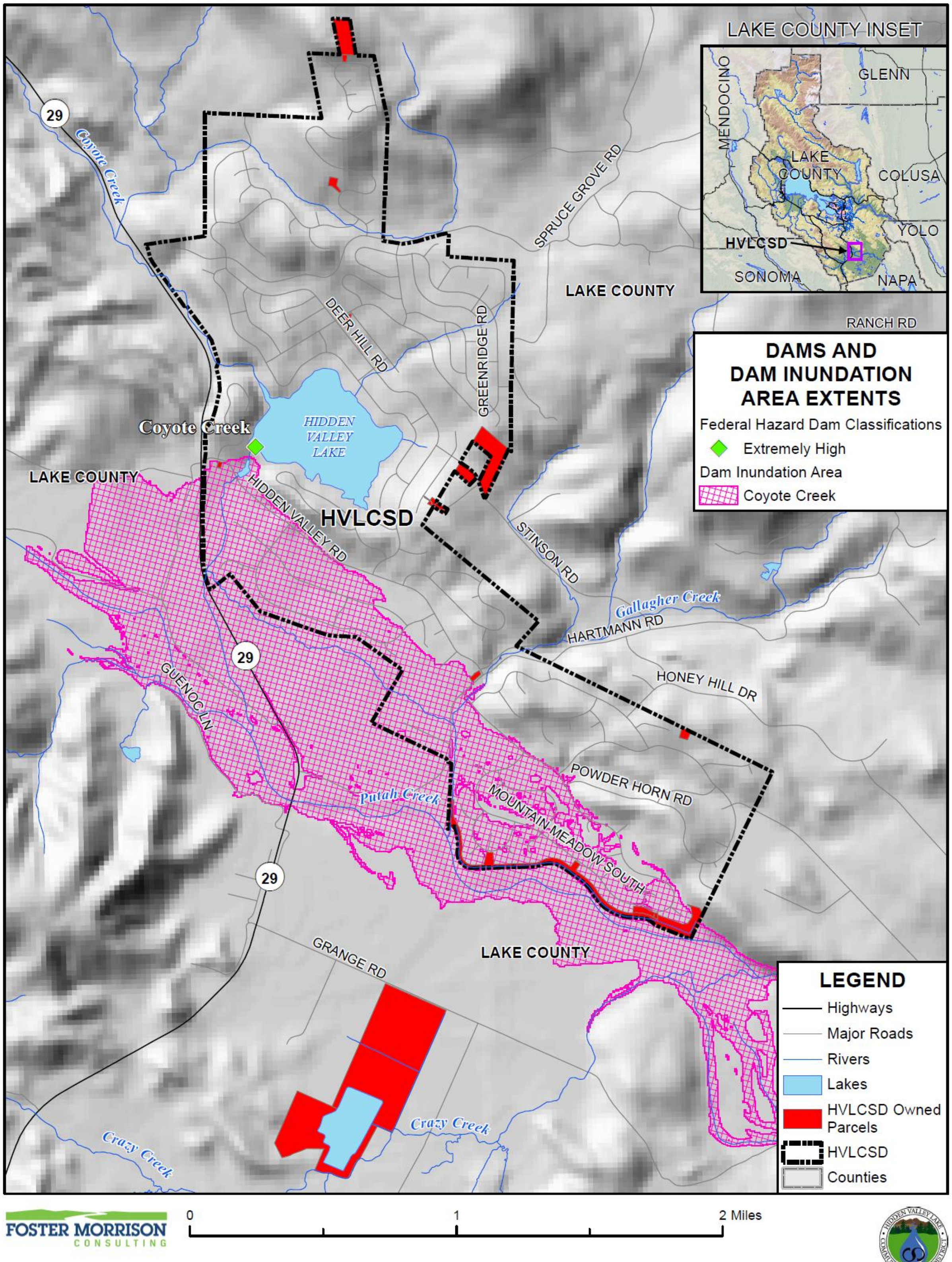
- HVLCSD Service Area Parcel Analysis – for parcels located within the HVLCSD Service Area
- Asset Analysis of HVLCSD owned assets

As detailed in Section 4.2.8, the HVLCSD Planning Area is most vulnerable to the Coyote Creek dam inundation area. An updated Dam Inundation layer for the Coyote Creek dam was provided by the dam owner, the Hidden Valley Lake Association. This data, as created by Schaaf & Wheeler Consulting Civil Engineers in a report named Coyote Creek (Hidden Valley) Lake Dam Inundation Study (April 2019) was used for this analysis. The depth of flooding due to the failure of a dam is unknown.

HVLCSD Service Area Parcel Analysis

Lake County's 2018 Assessor Data and the County's GIS parcel data were used as the basis for the inventory of assessed values for both improved and unimproved parcels within 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, 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

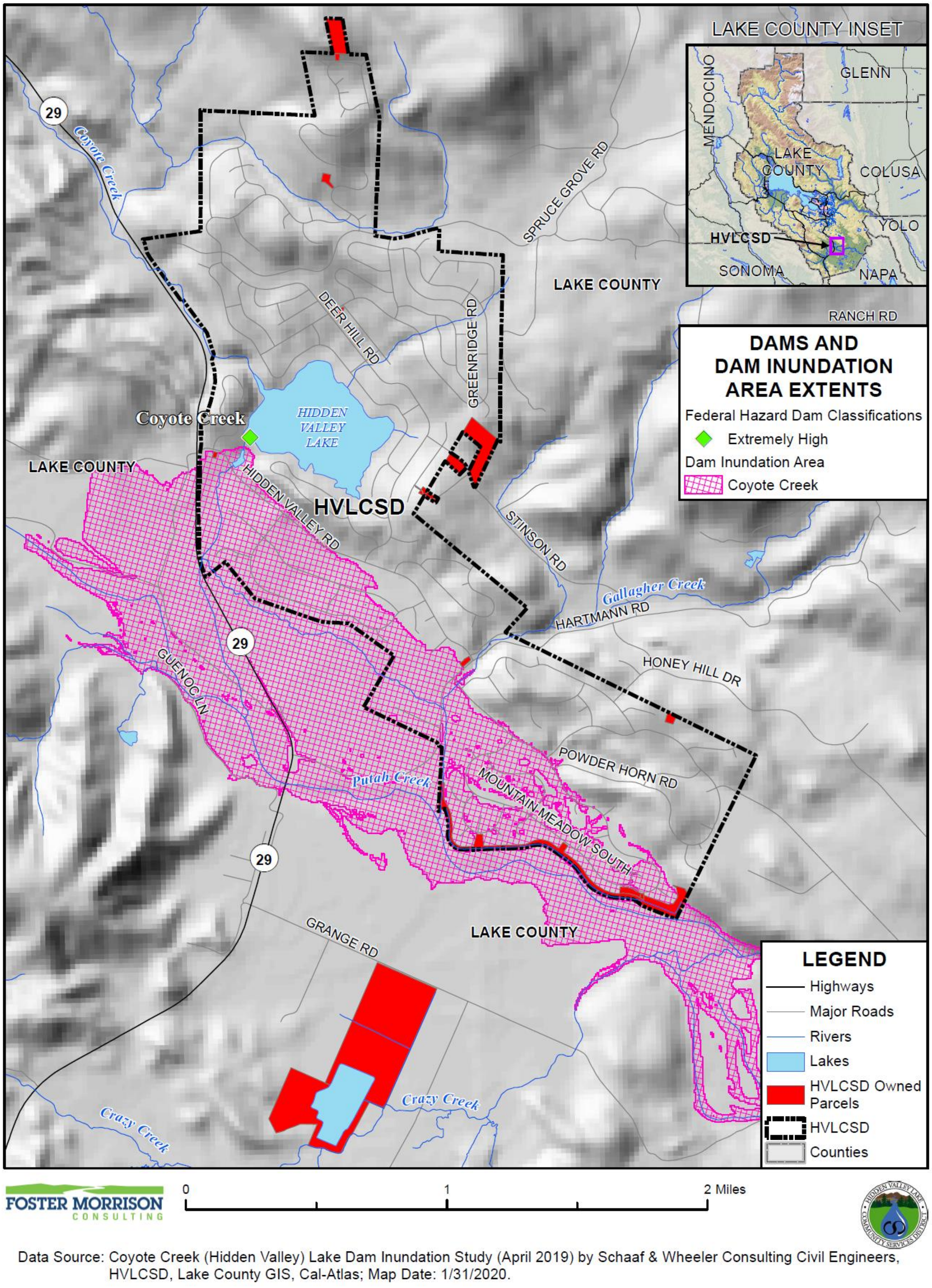
and the GIS parcel layer. Figure 4-82 shows the dam inundation area of concern for the HVLCSD area.
Figure 4-82 HVLCSD – Coyote Creek Dam Inundation Area



Data Source: Coyote Creek (Hidden Valley) Lake Dam Inundation Study (April 2019) by Schaaf & Wheeler Consulting Civil Engineers, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 1/31/2020.

Table 4-50 identifies parcels and associated in the HVLCSD Service Area in dam inundation areas identified by the HVLCSD Dam Inundation Study.

Figure 4-82 HVLCSD – Coyote Creek Dam Inundation Area



Data Source: Coyote Creek (Hidden Valley) Lake Dam Inundation Study (April 2019) by Schaaf & Wheeler Consulting Civil Engineers, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 1/31/2020.

Table 4-50 HVLCSD Service Area – Count and Value of Parcels in Coyote Creek Dam Inundation Area

Dam Inundation Area/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
HVLCSD Service Area						
Coyote Creek Dam Inundation Area						
Commercial	30	26	$1,087,033	$6,028,479	$6,028,479	$13,143,991
Open Space / Rural Lands	9	0	$0	$0	$0	$0
Residential	616	529	$15,897,021	$89,730,051	$44,865,026	$150,492,098
Coyote Creek Total	**655**	**555**	**$16,984,054**	**$95,758,530**	**$50,893,505**	**$163,636,089**
Outside of Dam Inundation						
Commercial	2	0	$0	$0	$0	$0
Open Space / Rural Lands	31	0	$19,597	$0	$0	$19,597
Residential	2,701	1,874	$69,878,595	$335,076,236	$167,538,118	$572,492,949
Outside of Dam Inundation Total	**2,734**	**1,874**	**$69,898,192**	**$335,076,236**	**$167,538,118**	**$572,512,546**
Grand Total	**3,389**	**2,429**	**$86,882,246**	**$430,834,766**	**$218,431,623**	**$736,148,635**

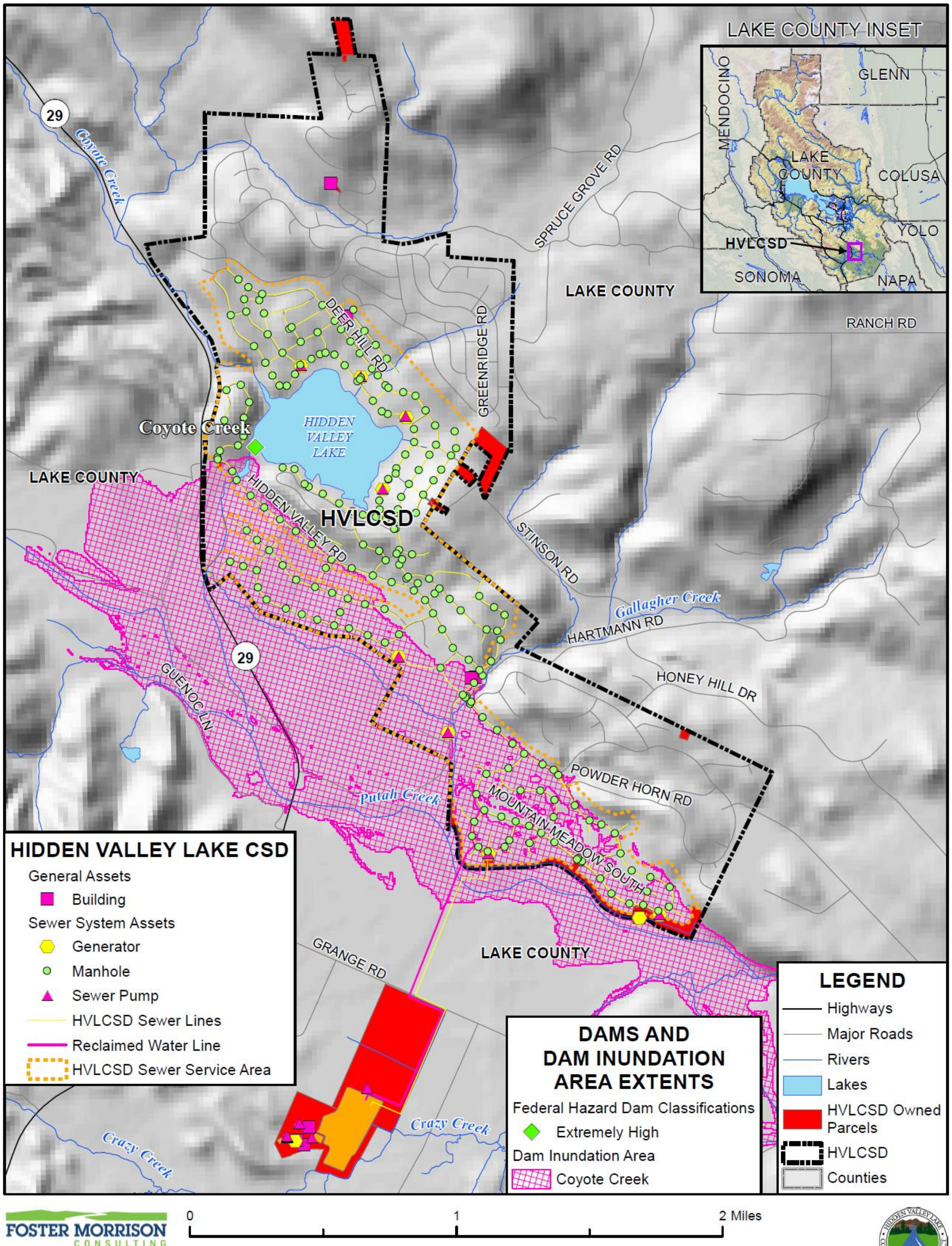
Source: HVLCSD Dam Inundation Study, HVLCSD GIS, Lake County Parcel/Assessor's Data 10/31/2018

HVLCSD Assets Analysis

HVLCSD's sewer, water, general, and land assets were used as the basis for the inventory of HVLCSD asset values. Each of the assets, their values, and their contents values, whether a single point location or a linear asset, were intersected by the dam inundation data and designated either within the Coyote Creek dam inundation area or outside of the dam inundation area. In order to summarize and overlay the HVLCSD assets data, they were all created as points (the 18 parcel assets were converted to centroid points) to see if they fell directly into the dam inundation area. For the lines data, they were dissected at each boundary between zones and the lengths recalculated, so that all lines within each hazard area are represented. Analysis on HVLCSD assets at risk to dam inundation is provided below. Two maps were created to depict this analysis. Figure 4-83 shows the HVLCSD Dam Inundation Study inundation areas overlayed on the sewer lines and infrastructure. Figure 4-84 shows the HVLCSD Dam Inundation Study inundation areas overlayed on the water lines and infrastructure.

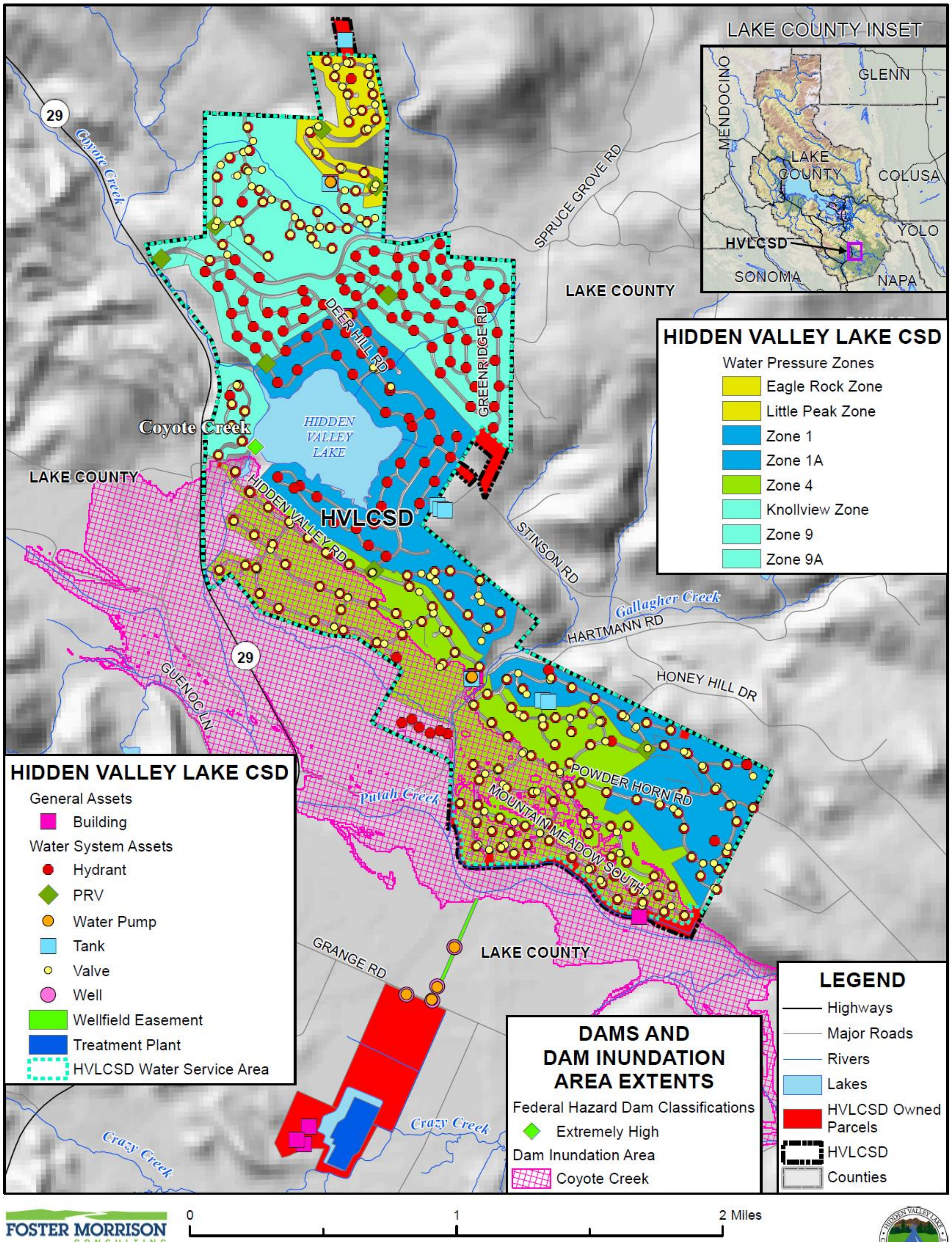
Two tables were created to identify parcels in the HVLCSD Service Area or HVLCSD assets in the dam inundation area. Table 4-51 identifies HVLCSD point counts and assets in dam inundation areas identified the HVLCSD Dam Inundation Study. Table 4-52 identifies HVLCSD line counts and assets in dam inundation areas identified the HVLCSD Dam Inundation Study. Detailed tables showing each individual asset and which dam inundation area they lie in are shown in Appendix F.

Figure 4-83 HVLCSD – Sewer 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, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 1/31/2020.

Figure 4-84 HVLCSD – Water 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, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 1/31/2020.

Table 4-51 HVLCSD – Count and Value of Point Assets in Coyote Creek Dam Inundation Area

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Coyote Creek			
Land Asset			
Parcel	5	$284,000	$0
Land Asset Total	5	$284,000	$0
General Asset			
Building	2	$218,656	$591,774
General Asset Total	**2**	**$218,656**	**$591,774**
Sewer System Asset			
Generator	5	$485,860	$0
Manhole	64	$68,160	$0
Sewer Pumps	11	$282,500	$0
Sewer System Asset Total	**80**	**$836,520**	**$0**
Water System Asset			
Hydrant	59	$137,470	$0
Pump	2	$36,400	$0
Valve	84	$86,604	$0
Water System Asset Total	**145**	**$260,474**	**$0**
Outside of Dam Inundation Area			
Land Asset			
Parcel	13	$2,481,000	$0
Land Asset Total	13	$2,481,000	$0
General Asset			
Building	6	$7,276,733	$998,317
General Asset Total	**6**	**$7,276,733**	**$998,317**
Sewer System Asset			
Generator	5	$544,024	$0
Manhole	154	$164,010	$0
Sewer Pumps	23	$231,356	$0
Sewer System Asset Total	**182**	**$939,390**	**$0**
Water System Asset			
Hydrant	243	$566,190	$0
PRV	8	$44,872	$0
Pump	14	$857,590	$0
Tank	8	$2,045,319	$0
Valve	242	$249,502	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Well	5	$915,425	$0
Water System Asset Total	**520**	**$4,678,898**	**$0**
Grand Total	**953**	**$16,975,671**	**$1,590,091**

Source: HVLCSD Dam Inundation Study, HVLCSD GIS

Table 4-52 HVLCSD – Count and Value of Line Assets in Coyote Creek Dam Inundation Area

Dam Inundation Area	Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Coyote Creek	Sewer Line	4	$70	47	$3,286
		6	$90	21,271	$1,914,429
		8	$135	5,571	$752,096
		10	$208	3,770	$784,119
		12	$208	337	$70,053
		15	$363	2,650	$962,131
	Sewer Line Total			**33,647**	**$4,486,114**
	Reclaimed Water Line		$208	1,955	$406,648
	Reclaimed Water Line Total			**1,955**	**$406,648**
Coyote Creek Total				**35,602**	**$4,892,763**
Outside of Dam Inundation Area	Sewer Line	4	$70	8,823	$617,588
		6	$90	39,729	$3,575,638
		8	$135	6,617	$893,311
		10	$208	12,324	$2,563,404
		12	$208	1,468	$305,400
		15	$363	1,930	$700,640
	Sewer Line Total			**70,892**	**$8,655,981**
	Reclaimed Water Line		$208	6,354	$1,321,668
	Reclaimed Water Line Total			**6,354**	**$1,321,668**
Outside of Dam Inundation Area Total				**77,246**	**$9,977,649**
Grand Total				**112,847**	**$14,870,413**

Source: HVLCSD Dam Inundation Study, HVLCSD GIS

Population at Risk in HVLCSD Service Area

As previously stated, HVLCSD staff and contractors come and go from HVLCSD owned buildings during the day. An analysis of staff in hazard areas was not practical due to the movement in and out of buildings during the day.

As such, this population at risk analysis evaluates the population residing in the HVLCSD Service Area. Should a dam failure occur, those that reside in the dam inundation area would be at risk. This also translates to loss of customers and operational monies to the District. Those residential parcel centroids that intersect the dam inundation areas were counted and multiplied by the 2010 Census Bureau average household factors for the Hidden Valley Lake census designated place (2.63). According to this analysis, there is a total population of 1,328 that reside in the dam inundation area in the HVLCSD Service Area. This is shown in Table 4-53.

Table 4-53 HVLCSD – Count of Residential Parcels and Population in Coyote Creek Dam Inundation Area

Inundation Area	Improved Residential Parcels	Population
Coyote Creek	505	1,328

Source: HVLCSD Coyote Creek Dam Inundation Study, US Census Bureau, Lake County 10/30/2018 Parcel/Assessor's Data

Overall HVLCSD (Community) Impact

Dam failure floods and their impacts vary by location and severity of any given dam breach event and will likely only affect certain areas of the District and the area it serves. Based on the risk assessment, it is evident that a dam failure flood could have potentially devastating economic impacts to certain areas of the District. Impacts that are not quantified, but can be anticipated in future dam failure events, include:

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

Future Development

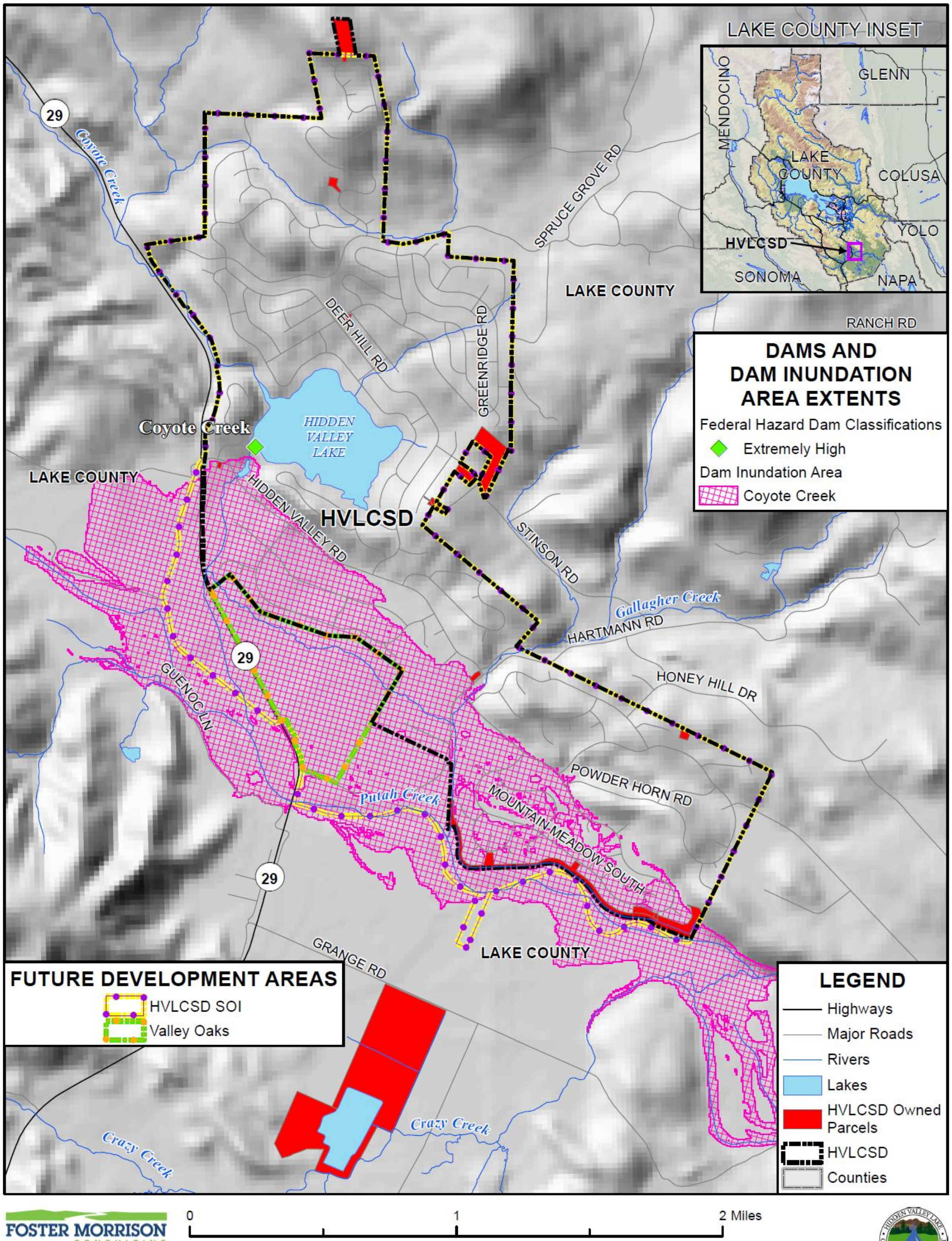
Although new growth and development would mostly fall in the area flooded by a dam failure of the Coyote Creek Dam, given the limited potential of total dam failure and the large area that a dam failure would affect, development in the dam inundation area will continue to occur. More information on dam failure and future development can be seen in the GIS analysis below.

GIS Analysis

Lake County's GIS parcel layer was used as the basis for the countywide inventory of parcels. In this analysis, the parcel data was converted to a point layer using a centroid conversion process, in which each parcel was identified by a central point containing the assessor's data. In addition, HVLCSD provided a GIS spatial file identifying the future development areas for which the analysis was to be performed. Utilizing the future development spatial layer, the parcel centroid data was intersected to determine the parcel counts within the future development areas. The HVLCSD Coyote Creek Dam Inundation Study dam inundation layers were collected to perform the analysis. Some of this future development could be affected by the SWRCB Compliance Order, previously discussed in the future development discussion in Section 4.3.1.

Inundation areas intersecting these future development areas can be seen in Figure 4-85. Table 4-54 shows the breakdown of the future development parcel counts in the HVLCSD Service Area and their acreages by dam inundation.

Figure 4-85 HVLCSD– Future Development in Coyote Creek Dam Inundation Area



Data Source: Coyote Creek (Hidden Valley) Lake Dam Inundation Study (April 2019) by Schaaf & Wheeler Consulting Civil Engineers, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 1/31/2020.

Table 4-54 HVLCSD– Future Development Parcels and Acreage Counts in Coyote Creek Dam Inundation Area

Dam Inundation/ Future Development	Total Parcel Count	Total Acres	Improved Parcel Count	Total Improved Acres	Unimproved Parcel Count	Total Unimproved Acres
Coyote Creek						
HVLCSD SOI	18	183	12	98	6	85
Valley Oaks	2	150	1	47	1	103
Outside of Dam Inundation						
HVLCSD SOI	1	6	1	6	0	0
Valley Oaks	0	0	0	0	0	0
Grand Total	**21**	**339**	**14**	**151**	**7**	**188**

Source: HVLCSD Coyote Creek Dam Inundation Study, HVLCSD GIS

4.3.6. Drought and Water Shortage Vulnerability Assessment

Likelihood of Future Occurrence—Likely/Occasional
Vulnerability—Medium

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

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 4-55 show drought impacts for the District and Lake County from 1850 to November 2019. The data represented is skewed, with the majority of these impacts from records within the past ten years. It is anticipated that drought impacts to the District Service Area would be similar to those experienced in the County, though on a smaller scale.

Table 4-55 Lake County Drought Impacts 1850-11/1/2019

Category	Number of Impacts
General Awareness	68
Agriculture	138
Business and Industry	7
Energy	5
Fire	130
Plants & Wildlife	39

Category	Number of Impacts
Relief, Response, and Restrictions	232
Society and Public Health	90
Tourism and Recreation	7
Water Supply and Quality	215
Total	**931**

Source: National Drought Mitigation Center

The vulnerability of HVLCSD to drought is Districtwide, but impacts may vary and include reduction in water supply, and an increase in dry fuels. Mandatory conservation measures are typically implemented during extended droughts. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. Droughts impact the District in a variety of ways. The District encourages conservation which causes the District to raise rates. Droughts create an economic impact to the District based on less water usage.

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 diverts water from the Coyote Valley Groundwater Basin. In 2014 and 2015, the State Water Resources Control Board's Division of Water Rights (SWRCB DWR) issued curtailments of junior rightholders in order to protect the valid prior rights of downstream water rights holders. SWRCB Division of Drinking Water Order 02-03-14R-004 (Compliance Order) was issued in October of 2014 placing a moratorium on future connection development in the Hidden Valley Lake community (discussed in more detail below). To the extent there are future curtailments, a new groundwater well would improve economic recovery as wildfire victims continue to rebuild and provide a tangible resilience factor for water supply. As previously mentioned, 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.

Impacts from SWRCB Compliance Order

The HMPC noted that Hidden Valley Lake is vulnerable to drought conditions due to the SWRCB DWR's distinction of the community's water source as being derived from a subterranean stream, rather than percolating groundwater from Coyote Valley Groundwater Basin. In 2014, SWRCB DDW imposed Compliance Order 02_03_14R_004 on HVLCSD prohibiting new water service connections. In February 2015, SWRCB DDW amended the compliance order to allow new service connections in Units 4 and 5 of the community which have riparian rights not under the jurisdiction of the SWRCB. The 2014 Compliance Order has had a negative economic impact on HVLCSD. Without the normal amount of new service connections, normal maintenance and repair activities have been reduced, shortening the useful life of existing infrastructure. Without the ability to continue developing houses in the community, capital improvement plans to the HVLCSD infrastructure are vulnerable to deferment. The economic impact of an aging infrastructure has a compounding effect on all of HVLCSD's listed hazards.

The HMPC also noted that given the cumulative effect of water diversion from Putah Creek water right holders, there is a concern of finding equity for downstream water rights holders during times of drought. In 2019, HVLCSD undertook a subterranean stream evaluation to evaluate the geologic and hydrologic characteristics of the Coyote Basin and the District's Grange Road wells. Accordingly, it made a request to the SWRCB that the Compliance Order be rescinded based on the following three premises; 1) The source of water from the Grange Road Well 4 and the Ag Well are not located in a subterranean stream and not subject to the SWRCB's water right permitting jurisdiction; , 2) that groundwater is available in the Coyote Valley Basin at the District's wells under all hydrologic conditions, and 3) that the capacity of the District's wells is more than sufficient to meet peak and annual water demands.

The District have monitored groundwater levels within the Coyote Valley Basin since 1990, which underscores the long-standing health of the local aquifer. Annual Groundwater Reports have been provided to the SWRCB since 1997

Impacts to Storage Tanks

The District provides water service to 2,487 connections. The District's water storage system consists eight water storage tanks (see Table 4-56) with the Little Peak Tank serving a very small number of connections (79). Five of the remaining seven tanks are constructed of redwood and in poor condition. The age of the redwood tanks ranges from 30 to 50 years, which is the life expectancy of redwood tanks. Patches have been installed on these tanks to cover over holes. These five tanks provide water for fire protection to the District's entire service area. Should a catastrophic event, such as a flood, earthquake, fire, or terrorist activity, occur that would cause any of these tanks to fail (and given their poor condition, this could occur in the near future), the District is at risk of being unable to provide water for fire protection for the District's entire service area.

Table 4-56 HVLCSD – Storage Tank Inventory

Tank Name	Pressure Zone	Capacity (MG)	Date Constructed	Material	Condition
Little Peak	Little Peak	0.50	1988	Steel	Fair
9	9	0.15	1968	Redwood	Poor
1A	1	0.15	1968	Redwood	Poor
1B	1	0.20	1992	Redwood	Poor
1C	1	0.50	2004	Steel	Good
4A	4	0.15	1968	Redwood	Poor
4B	4	0.50	2004	Steel	Good
Admin Office	4	0.031	1984	Redwood	Poor

Source: HVLCSD

Other Impacts

The CCHPR for Lake County also discussed how climate change may increase the impact of drought. Lack of moisture, already at a severe level in California due to a current multi-year drought and decades of fuel accumulation from historical forestry and fire suppression practices, increases the risk of wildfires. Devastating wildfires like the Valley Fire of 2015, Mendocino Complex Fire of 2018, and others impacted watersheds and increase the risk of landslides or mudslides, and sediment in run-off that reduce water quality. In addition to fire related injuries, local and regional transport of smoke, ash, and fine particles increases respiratory and cardiovascular risks. Increasing temperatures and changes in precipitation may lead to intensified drought conditions. Drought decreases the availability and quality of water for humans. This includes reduced water levels to fight wildfires. Drought may increase exposure to health hazards including wildfires, dust storms, extreme heat events, flash flooding, degraded water quality, and reduced water quantity. Dust storms associated with drought conditions have been associated with increased incidents of Valley Fever, a fungal pathogen.

The District also noted that Hex Chromium levels appear to increase during periods of drought.

Tree Mortality

One of the specific vulnerabilities of drought in the District and surrounding Lake County is the increased risk to trees from beetle kill and other tree mortality issues. Drought weakens trees and makes them more susceptible to insect infestation. Bark beetles mine the inner bark (the phloem-cambial region) on twigs, branches, or trunks of trees and shrubs. Insects, such as bark beetles, frequently attack trees weakened by drought, disease, injuries, or other factors that may stress the tree. Bark beetles and other insects can contribute to the decline and eventual death of trees; however only a few aggressive beetle species are known to be the sole cause of tree mortality (see Figure 4-86).

Figure 4-86 Monterey Pine Killed by Engraver Beetles

Source: University of California

In addition to attacking larger limbs, some species such as cedar and cypress bark beetles feed by mining twigs up to 6 inches back from the end of the branch, resulting in dead tips. These discolored shoots hanging on the tree are often referred to as “flagging” or “flags.” (see Figure 4-87) Adult elm bark beetles feed on the inner bark of twigs before laying eggs. If an adult has emerged from cut logs or a portion of a tree that is infected by Dutch elm disease, the beetle’s body will be contaminated with fungal spores. When the adult beetle feeds on twigs, the beetle infects healthy elms with the fungi that cause Dutch elm disease. Elms showing yellowing or wilting branches in spring may be infected with Dutch elm disease.

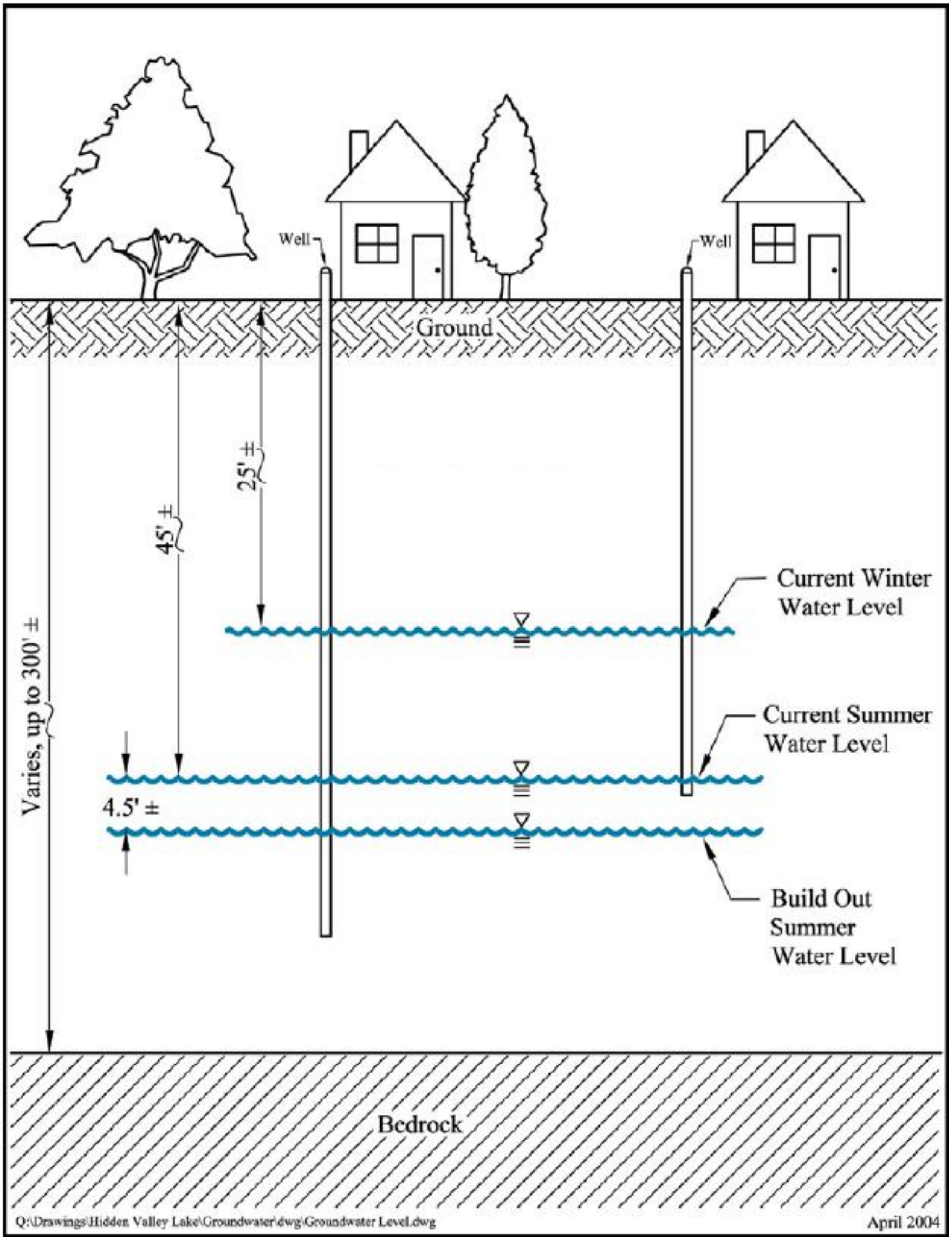
Figure 4-87 Flag Tips from Cypress Bark Beetle Feeding

Source: University of California

Future Development

According to the HMPC, the District has access to large quantities of water through its groundwater. However, population growth in the District will add additional pressure to the HVLCSD as a water company during periods of drought and water shortage. The HVLCSD will need to continue to plan for and add infrastructure capacity for population growth. A plan for growth should assume there will be an eventual solution to the current compliance order. Also, developers protected by Riparian rights (such as the Valley Oaks project) are not subject to the restrictions of this order. 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 4-88).

Figure 4-88 HVLCSD – Estimated Average Drawdown of Groundwater Level at Buildout



Source: HVLCSD

4.3.7. Earthquake Vulnerability Assessment

Likelihood of Future Occurrence—Occasional(major)/Highly Likely (minor)
Vulnerability—Extremely High

Earthquakes occur when a slip in the fault releases built up energy. Energy travels in waves through the earth's crust and causes ground shaking. Secondary hazards resulting from seismic activity include ground rupture along the fault, liquefaction of soils, settlement from sinking soils, and seismically induced landslides. The geologic conditions along streambeds and Hidden Valley Lake suggest these areas are most likely to be affected by liquefaction and settlement.

The District is located in an active earthquake area and the potential exists for a significant seismic event in the future. There are potentially active rupture zones nearby. Potentially active rupture zones are faults which have been active in the past 2,000 years. However, within the past 200 years, no major earthquakes have occurred along faults in Lake County.

Impacts and Additional Risk Factors

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, and threatens the safety of the public by exposing diluted wastewater to the surface. 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 meter replacement.

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 (5 out of 8 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. Two older buildings, located on Eagle Rock Rd, and Knollview Rd, were built in 1968, and would be the only buildings with structural vulnerability.

The District provides water service to 2,475 connections. The District's water storage system consists eight water storage tanks (see Table 4-56 in Section 4.3.5) Should a catastrophic event, such as an earthquake, occur that would cause any of these tanks to fail (and given their poor condition, this could occur in the near future), the District is at risk of being unable to provide water for fire protection for the District's entire service area.

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.

2020 Earthquake Scenarios

HAZUS-MH 4.2 was utilized to model potential earthquake losses for the HVLCSD. Specifically, the probable magnitude used for HVLCSD utilized two scenarios based on data from the District and from the Lake County General Plan.

- 8.5 San Andreas Earthquake
- 6.75 Healdsburg Fault Earthquake

Level 1 analyses were run, meaning that only the default data was used and not supplemented with local building inventory or hazard data. There are certain data limitations when using the default data, so the results should be interpreted accordingly; this is a planning level analysis.

The methodology for running the 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.

Both HAZUS scenarios used the two census tracts that contain the HVLCSD. The geographical size of the region is 267.23 square miles and contains 2 census tracts. These two census tracts can be seen on Figure 4-89 and Figure 4-90. These tracts cover the HVLCSD Service Area as well as some of the surrounding community. Thus this analysis includes an area much greater than the HVLCSD. Collectively in these two census tracts, there are over 4,000 households in this region which has a total population of 10,773 people (2010 Census Bureau data). There are an estimated 5,000 buildings in the region with a total building replacement value (excluding contents) of $1,530,000,000. Approximately 95.00% of the buildings (and 88.00% of the building value) are associated with residential housing. The replacement value of the transportation and utility lifeline systems is estimated to be $521,000,000 and $598,000,000, respectively.

8.5 San Andreas Earthquake Results

The results of the deterministic scenario are captured in Table 4-57. Maps showing total losses for the two census tracts that contain the HVLCSD are shown in Figure 4-89. Key losses included the following:

- Total economic loss estimated for the earthquake was $64.72 million, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $28.75 million.
- Over 6 percent of the buildings in the two census blocks were at least moderately damaged. 13 buildings were completely destroyed.
- Over 67 percent of the building- and income-related losses were residential structures.
- 12 percent of the estimated losses were related to business interruptions.
- The mid-day earthquake caused the most casualties: 1
- No households experienced a loss of potable water or electricity from the earthquake.

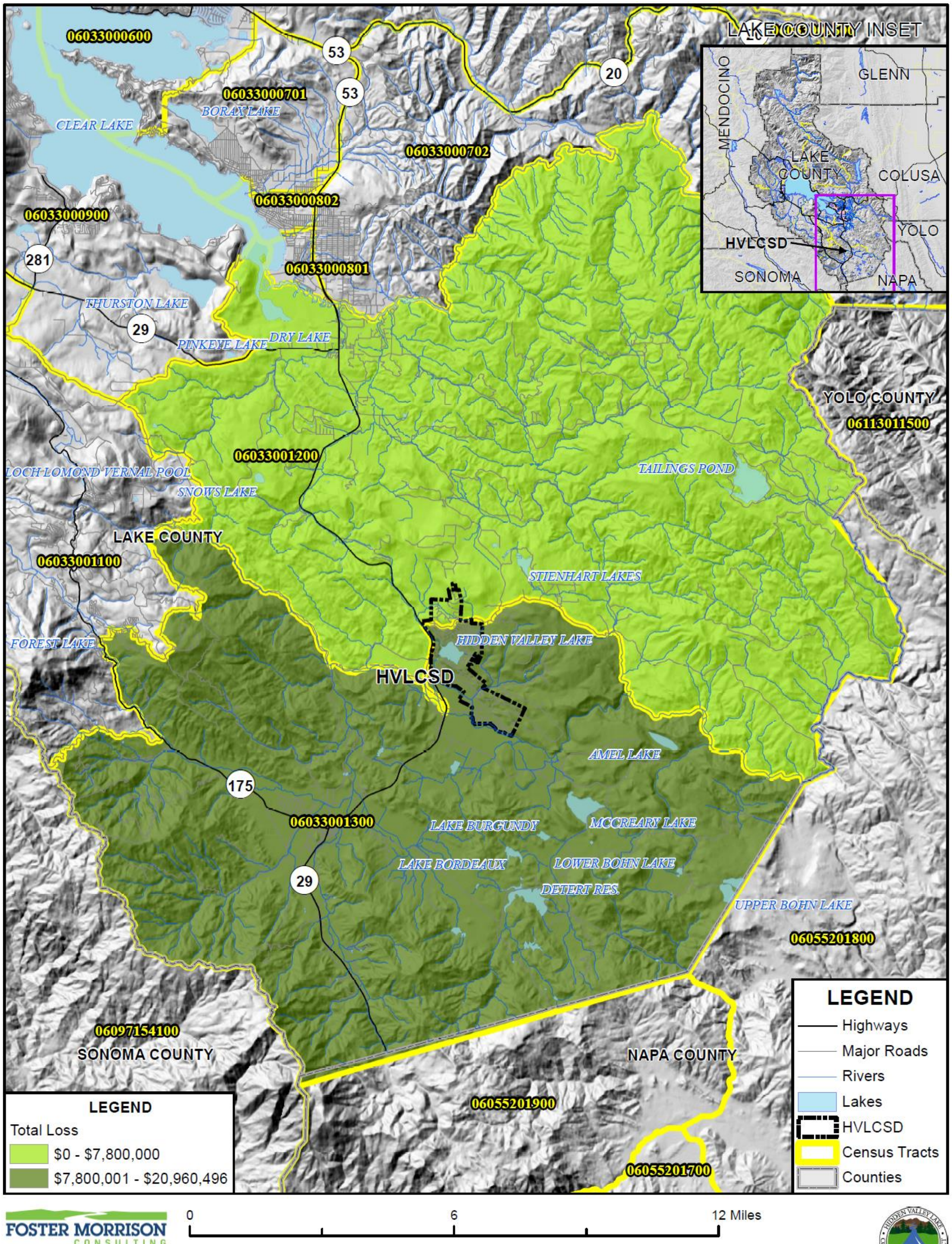
Table 4-57 HVLCSD (2 Census Tracts) – HAZUS-MH 8.5 San Andreas Earthquake Scenario Results

Earthquake Impacts	8.5 Magnitude Earthquake (San Andreas Fault)	
Residential Buildings Damaged (Based upon 4,218 buildings)	Slight: 826 Moderate: 240 Extensive: 49 Complete: 13	
Building Related Loss	$28,750,000	
Total Economic Loss	$64,720,000	
Injuries (Based upon 2am time of occurrence)	Without requiring hospitalization: 4 Requiring hospitalization: 0 Life Threatening: 0 Fatalities: 0	
Injuries (Based upon 2pm time of occurrence)	Without requiring hospitalization: 11 Requiring hospitalization: 2 Life Threatening: 0 Fatalities: 1	
Injuries (Based upon 5pm time of occurrence)	Without requiring hospitalization: 6 Requiring hospitalization: 1 Life Threatening: 0 Fatalities: 0	
Essential Facility Damage (Based upon 17 buildings)	None with at least moderate damage.	
Transportation and Utility Lifeline Damage	None with at least moderate damage. 194 potable water leaks, and 49 breaks 98 wastewater leaks and 24 breaks 33 natural gas leaks and 8 breaks.	
Households w/out Power & Water Service (Based upon 4,288 households)	Water loss @ Day 1: 0 Water loss @ Day 3: 0 Water loss @ Day 7: 0 Water loss @ Day 30: 0 Water loss @ Day 90: 0	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

Earthquake Impacts	8.5 Magnitude Earthquake (San Andreas Fault)
Displaced Households	3 displaced households
Shelter Requirements	2 persons
Debris Generation	4,000 tons

Source: HAZUS-MH 4.2

Figure 4-89 HVLCSD – Hazus Total Loss Areas from San Andreas 8.5 Earthquake Scenario



Data Source: Hazus-MH 4.2, US Census Bureau 2019, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

6.75 Healdsburg Scenario

The results of the probabilistic scenario are captured in Table 4-68. Maps showing total losses for the two census tracts that contain the HVLCSD are shown in Figure 4-90. Key losses included the following:

- Total economic loss estimated for the earthquake was $38.94 million, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $14.67 million.
- Over 3 percent of the buildings in the 2 census tracts were at least moderately damaged, with 1 building completely destroyed.
- Over 77 percent of the building- and income-related losses were residential structures.
- 10 percent of the estimated losses were related to business interruptions.
- No households experienced a loss of potable water or electricity from the earthquake.

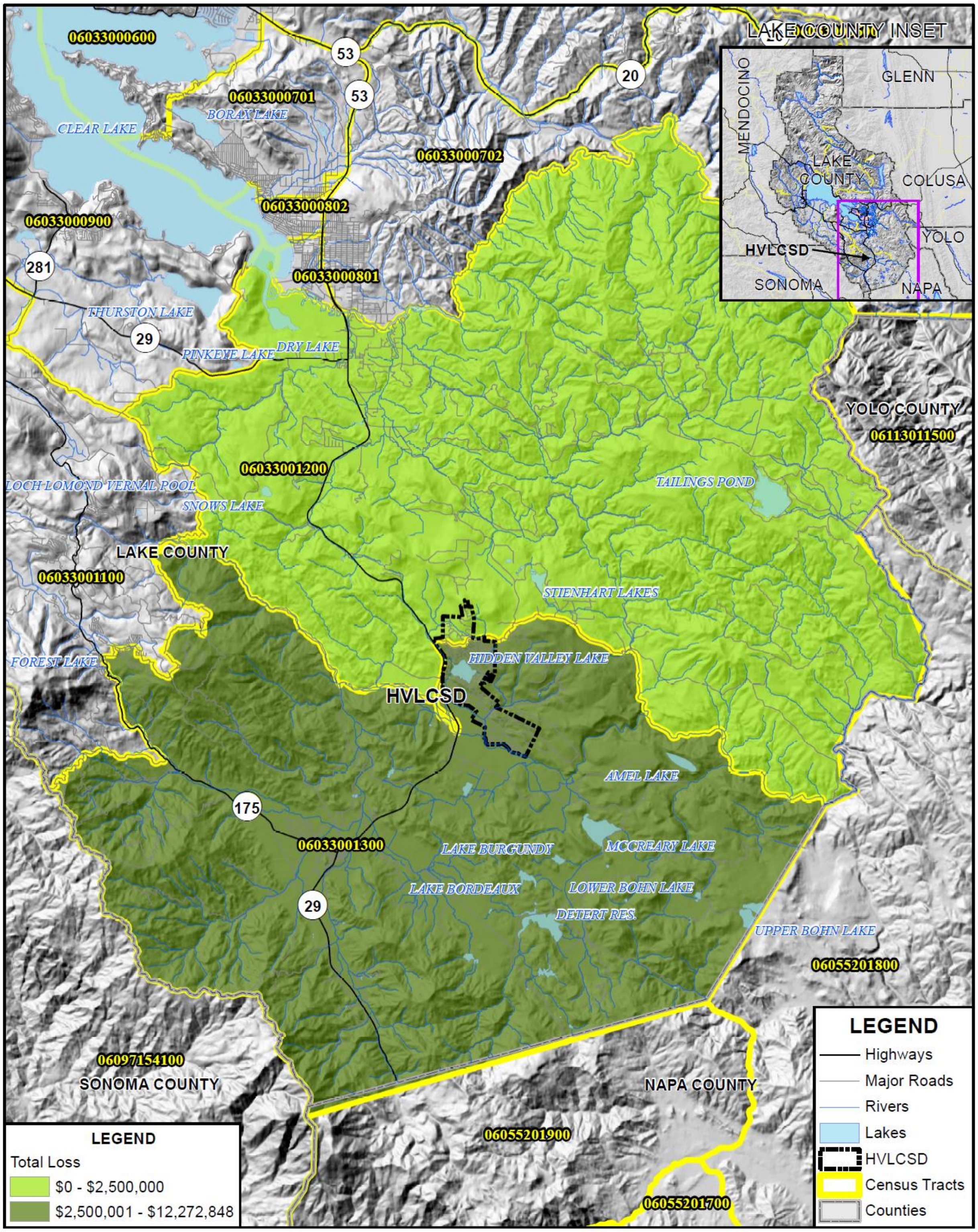
Table 4-58 HVLCSD (2 Census Tracts)– HAZUS-MH 2,500-year Earthquake Scenario Results

Impacts/Earthquake	6.75 Magnitude Earthquake (Healdsburg Fault)	
Residential Buildings Damaged (Based upon 4,699 buildings)	Slight: 597 Moderate: 130 Extensive: 9 Complete: 1	
Building Related Loss	$14,670,000	
Total Economic Loss	$38,940,000	
Injuries (Based upon 2am time of occurrence)	Without requiring hospitalization: 1 Requiring hospitalization: 0 Life Threatening: 0 Fatalities: 0	
Injuries (Based upon 2pm time of occurrence)	Without requiring hospitalization: 2 Requiring hospitalization: 0 Life Threatening: 0 Fatalities: 0	
Injuries (Based upon 5pm time of occurrence)	Without requiring hospitalization: 2 Requiring hospitalization: 0 Life Threatening: 0 Fatalities: 0	
Essential Facility Damage (Based upon 17 buildings)	None with at least moderate damage.	
Transportation and Utility Lifeline Damage	None with at least moderate damage. 39 potable water leaks, and 10 breaks 19 wastewater leaks and 5 breaks 7 natural gas leak and 2 breaks.	
Households w/out Power & Water Service (Based upon 4,288 households)	Water loss @ Day 1: 0 Water loss @ Day 3: 0 Water loss @ Day 7: 0 Water loss @ Day 30: 0 Water loss @ Day 90: 0	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
Displaced Households	1 displaced household	

Impacts/Earthquake	6.75 Magnitude Earthquake (Healdsburg Fault)
Shelter Requirements	0 persons
Debris Generation	1,000 tons

Source: Hazus MH 4.2

Figure 4-90 HVLCSD – Hazus Total Loss Areas from Healdsburg 6.75 Earthquake Scenario



Data Source: Hazus-MH 4.2, US Census Bureau 2019, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Comparison of Earthquake Scenarios

The results of the two earthquake scenarios were compared, as shown on Table 4-59. As shown, the San Andreas fault is expected to cause more damage in the HVLCSD.

Table 4-59 HVLCSD (2 Census Tracts)– HAZUS-MH 2,500-year Earthquake Scenario Comparison Results

<table>
<tr><th>Impacts/Earthquake</th><th colspan="2">6.75 Magnitude Earthquake (Healdsburg Fault)</th><th colspan="2">8.5 Magnitude Earthquake (San Andreas Fault)</th></tr>
<tr><td>Residential Buildings Damaged
(Based upon 4,699 buildings)</td><td colspan="2">Slight: 597
Moderate: 130
Extensive: 9
Complete: 1</td><td colspan="2">Slight: 826
Moderate: 240
Extensive: 49
Complete: 13</td></tr>
<tr><td>Building Related Loss</td><td colspan="2">$14,670,000</td><td colspan="2">$28,750,000</td></tr>
<tr><td>Total Economic Loss</td><td colspan="2">$38,940,000</td><td colspan="2">$64,720,000</td></tr>
<tr><td>Injuries
(Based upon 2am time of occurrence)</td><td colspan="2">Without requiring hospitalization: 1
Requiring hospitalization: 0
Life Threatening: 0
Fatalities: 0</td><td colspan="2">Without requiring hospitalization: 4
Requiring hospitalization: 0
Life Threatening: 0
Fatalities: 0</td></tr>
<tr><td>Injuries
(Based upon 2pm time of occurrence)</td><td colspan="2">Without requiring hospitalization: 2
Requiring hospitalization: 0
Life Threatening: 0
Fatalities: 0</td><td colspan="2">Without requiring hospitalization: 11
Requiring hospitalization: 2
Life Threatening: 0
Fatalities: 1</td></tr>
<tr><td>Injuries
(Based upon 5pm time of occurrence)</td><td colspan="2">Without requiring hospitalization: 2
Requiring hospitalization: 0
Life Threatening: 0
Fatalities: 0</td><td colspan="2">Without requiring hospitalization: 6
Requiring hospitalization: 1
Life Threatening: 0
Fatalities: 0</td></tr>
<tr><td>Essential Facility Damage
(Based upon 17 buildings)</td><td colspan="2">None with at least moderate damage.</td><td colspan="2">None with at least moderate damage.</td></tr>
<tr><td>Transportation and Utility Lifeline Damage</td><td colspan="2">None with at least moderate damage.
39 potable water leaks, and 10 breaks
19 wastewater leaks and 5 breaks
7 natural gas leak and 2 breaks.</td><td colspan="2">None with at least moderate damage.
194 potable water leaks, and 49 breaks
98 wastewater leaks and 24 breaks
33 natural gas leaks and 8 breaks.</td></tr>
<tr><td>Households w/out Power & Water Service (Based upon 4,288 households)</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><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><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>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></tr>
<tr><td>Displaced Households</td><td colspan="2">1 displaced household</td><td colspan="2">3 displaced households</td></tr>
<tr><td>Shelter Requirements</td><td colspan="2">0 persons</td><td colspan="2">2 persons</td></tr>
<tr><td>Debris Generation</td><td colspan="2">1,000 tons</td><td colspan="2">4,000 tons</td></tr>
</table>

Source: Hazus MH 4.2

Overall HVLCSD (Community) Impact

The overall impact to the HVLCSD community from earthquake includes:

- Injury and loss of life;
- Damage to District facilities and infrastructure
- Commercial and residential structural and property damage;
- Damage to natural resource habitats and other natural resources;
- Disruption of and damage to public infrastructure and services;
- Loss of water, power, roads, phones, and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents;
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures; and
- Negative impact on commercial and residential property values.

Future Development

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.

4.3.8. Flood: (1% and 0.2% Annual Chance) Vulnerability Assessment

Likelihood of Future Occurrence—Occasional/Unlikely
Vulnerability—High

Given the environment, floods have been a part of the HVLCSD's historical past and will continue to be so in the District's future. The Hidden Valley Lake area within Lake County 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. Predominantly, the effects of flooding are generally confined to areas near the waterways. Structural foundation undercutting is the most prevalent form of damage to structures. District facilities can also be damaged from trees falling as a result of water-saturated soils. Electrical power outages happen, and the interruption of power causes major problems to District pumps. Loss of power is usually a precursor to closure of governmental offices and community businesses.

Health Hazards from Flooding

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

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

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

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If a 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.

HVLCSD Flood Vulnerability

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.

The District provides water service to 2,475 connections. The District's water storage system consists eight water storage tanks (see Table 4-56 in Section 4.3.5) Should a catastrophic event, such as a flood, occur that would cause any of these tanks to fail (and given their poor condition, this could occur in the near future), the District is at risk of being unable to provide water for fire protection for the District's entire service area.

In addition, the HMPC noted that the southerly service boundary of the District is adjacent to Putah Creek. The District provides drainage services to 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 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. 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 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.

Values at Risk

Lake County and the District have 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 HVLCSD. The following methodology was followed in determining improved parcel counts and assets at risk to the 1% annual chance flood event and 0.2% annual chance flood events.

Each of the DFIRM flood zones that begins with the letter 'A' depict the Special Flood Hazard Area, or the 1% annual chance flood event (commonly referred to as the 100-year flood). Table 4-60 explains the difference between DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the Hidden Valley Lake area of Lake County. The effective DFIRM map for this area of the County including the HVLCSD Service Area are shown on Figure 4-91.

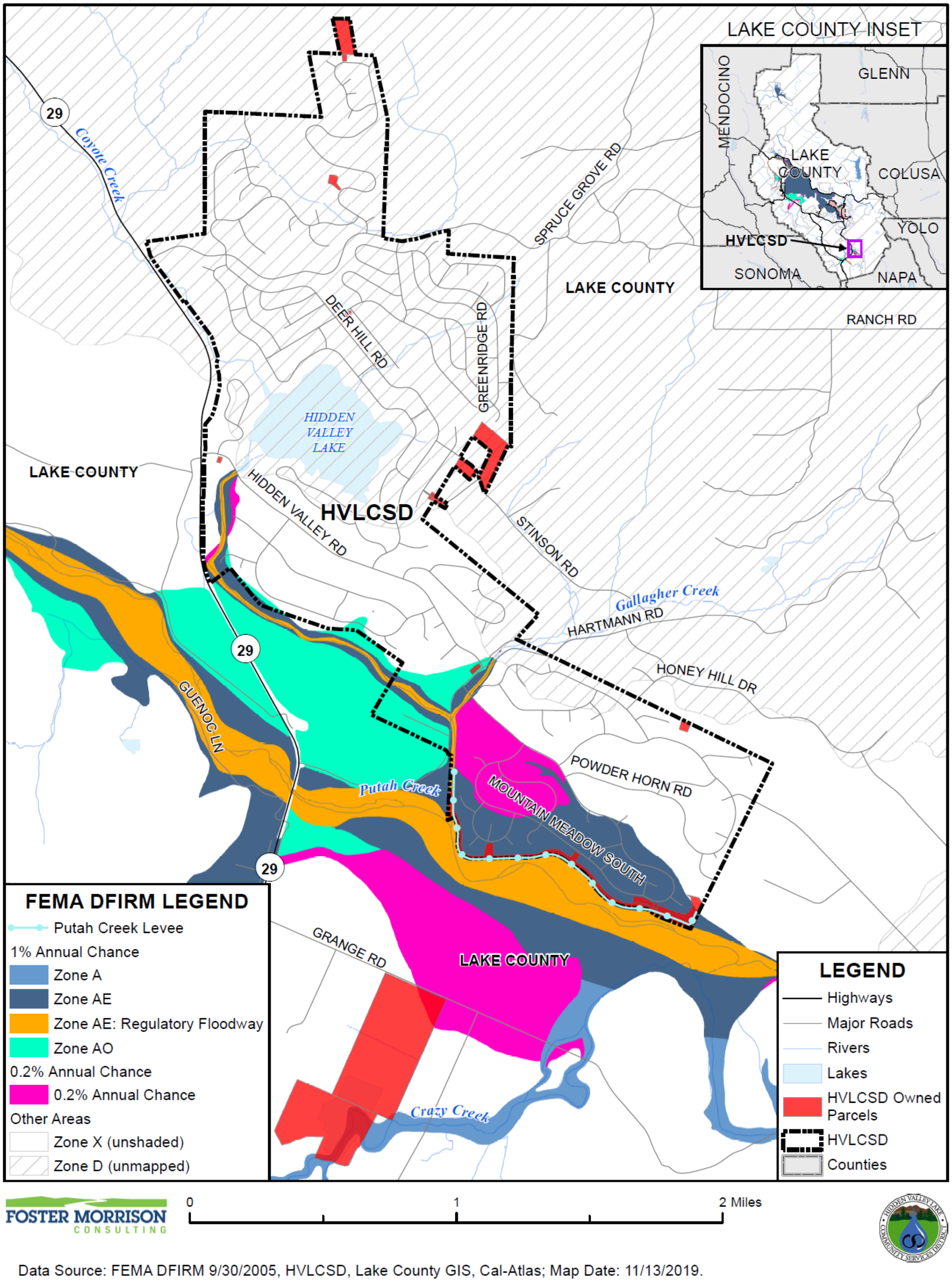
Table 4-60 Lake County and HVLCSD – FEMA DFIRM Flood Zones

Flood Zone	Description
AE	1% annual chance flood: Base flood elevations provided
AE Floodway*	1% annual chance flood: Regulatory floodway; Base flood elevations provided
AO	1% annual chance flood: River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet.
Shaded X	0.2% annual chance flood: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood
X (unshaded)	No flood hazard
D	Unmapped Areas

Source: FEMA

*In Lake County and the HVLCSD the floodway is defined as the channel of any water course and adjacent lands that must be reserved in order to discharge the base flood without increasing the water surface elevation more than one foot.

Figure 4-91 HVLCSD – FEMA DFIRM Flood Zones



Limitations

It also should be noted that the resulting flood asset value analysis may actually be more or less than that presented in the below tables as HVLCSD may include structures located within the 1% or 0.2% annual chance floodplain that are elevated at or above the level of the base flood elevation, according to local floodplain development requirements.

HVLCSD Flood Analysis Results

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:

- Parcel Analysis of parcels located within the HVLCSD Service Area
- Asset Analysis of HVLCSD owned assets

HVLCSD Service Area DFIRM Flood Parcel Count and Value Analysis Results

An analysis was performed on the parcels and values located in the HCLCSD Service area. Methodology and results are presented below.

Methodology for HVLCSD Service Area Parcel Analysis and Results

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. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessors database and the GIS parcel layer. Analysis on values at risk to floods 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.

Table 4-61 and Table 4-62 contain flood analysis results for the HVLCSD 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 4-61 shows a summary of the value of improved parcels by 1% and 0.2% annual chance flood zone. Table 4-62 shows the improved parcels by property use category in each flood zone for the District.

*Table 4-61 HVLCSD Service Area – Count and Value of Parcels by FEMA DFIRM 1% and 0.2% Annual Chance Flood Zones**

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
HVLCSD Service Area						
1% Annual Chance Flood Hazard	341	284	$8,589,207	$49,846,038	$27,937,259	$86,372,504
0.2% Annual Chance Flood Hazard**	132	124	$3,647,572	$20,354,275	$10,177,138	$34,178,985
Other Areas	2,916	2,021	$74,645,467	$360,634,453	$180,317,227	$615,597,147
Grand Total	**3,389**	**2,429**	**$86,882,246**	**$430,834,766**	**$218,431,623**	**$736,148,635**

Source: FEMA September 30, 2005 DFIRM, Lake County 10/30/2018 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 4-62 HVLCSD Service Area– Count and Value of Parcels by Detailed FEMA DFIRM Flood Zones and Property Use**

Flood Zone/Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
HVLCSD Service Area						
1% Annual Chance Flood Hazard						
Zone AE Floodway						
Commercial	10	9	$188,032	$707,542	$707,542	$1,603,116
Residential	5	5	$100,390	$925,186	$462,593	$1,488,169
Zone AE Floodway Total	**15**	**14**	**$288,422**	**$1,632,728**	**$1,170,135**	**$3,091,285**
Zone AE						
Commercial	10	9	$572,751	$4,853,939	$4,853,939	$10,280,629
Open Space / Rural Lands	2	0	$0	$0	$0	$0

Flood Zone/Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Residential	281	233	$6,811,879	$40,021,178	$20,010,589	$66,843,646
Zone AE Total	**293**	**242**	**$7,384,630**	**$44,875,117**	**$24,864,528**	**$77,124,275**
Zone AO						
Commercial	10	8	$326,250	$466,998	$466,998	$1,260,246
Open Space / Rural Lands	2	0	$0	$0	$0	$0
Residential	21	20	$589,905	$2,871,195	$1,435,598	$4,896,698
Zone AO Total	**33**	**28**	**$916,155**	**$3,338,193**	**$1,902,596**	**$6,156,944**
1% Annual Chance Flood Hazard Total	**341**	**284**	**$8,589,207**	**$49,846,038**	**$27,937,259**	**$86,372,504**
0.2% Annual Chance Flood Hazard**						
Zone X (shaded)						
Open Space / Rural Lands	3	0	$0	$0	$0	$0
Residential	129	124	$3,647,572	$20,354,275	$10,177,138	$34,178,985
0.2% Annual Chance Flood Hazard Total	**132**	**124**	**$3,647,572**	**$20,354,275**	**$10,177,138**	**$34,178,985**
Other Areas						
Zone D (unmapped)						
Commercial	1	0	$0	$0	$0	$0
Open Space / Rural Lands	20	0	$9,261	$0	$0	$9,261
Residential	1,860	1,264	$48,810,503	$230,046,759	$115,023,380	$393,880,642
Zone D (unmapped) Total	**1,881**	**1,264**	$48,819,764	$230,046,759	$115,023,380	$393,889,903
Zone X (unshaded)						
Commercial	1	0	$0	$0	$0	$0
Open Space / Rural Lands	13	0	$10,336	$0	$0	$10,336
Residential	1,021	757	$25,815,367	$130,587,694	$65,293,847	$221,696,908
Zone X (unshaded) Total	**1,035**	**757**	**$25,825,703**	**$130,587,694**	**$65,293,847**	**$221,707,244**
Other Areas Total	**2,916**	**2,021**	**$74,645,467**	**$360,634,453**	**$180,317,227**	**$615,597,147**
Grand Total	**3,389**	**2,429**	**$86,882,246**	**$430,834,766**	**$218,431,623**	**$736,148,635**

Source: FEMA September 30, 2005 DFIRM, Lake County 10/30/2018 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 4-63 shows a summary table of loss estimates by flood zone for the HVLCSD Service Area, and gives potential losses summarized by the 1% and 0.2% annual chance flood event with loss estimate and loss ratios for the HVLCSD Service Area. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the Service Area) and displayed as a percentage of loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a flood. The District and HVL HOA should keep in mind that the loss ratio could increase with additional development in the 1% and 0.2% annual chance floodplain unless development is elevated in accordance with the local floodplain management ordinance.

*Table 4-63 HVLCSD Service Area – Flood Loss Estimate Summary**

Property Use / Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate	Loss Ratio
HVLCSD Service Area								
1% Annual Chance Flood Hazard Total	341	284	$8,589,207	$49,846,038	$27,937,259	$77,783,297	$15,556,659	18.87%
0.2% Annual Chance Flood Hazard Total**	132	124	$3,647,572	$20,354,275	$10,177,138	$30,531,413	$6,106,283	7.41%
HVLCSD Service Area Total	473	408	**$12,236,779**	**$70,200,313**	**$38,114,396**	**$108,314,709**	**$21,662,942**	**26.28%**

Source: FEMA September 30, 2005 DFIRM, Lake County 10/30/2018 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.

According to the information in Table 4-61 through Table 4-63, the HVLCSD Service Area has 284 improved parcels and roughly $77.8 million of structure and contents value in the 1% annual chance floodplain. There are an additional 124 improved parcels and roughly $30.5 million of structure and contents value in the 0.2% annual chance flood event. A loss ratio of 18.87% and 7.41% indicates that the HVLCSD Service Area has significant assets at risk in the FEMA regulated floodplains, which would make recovery moderately difficult.

HVLCSD DFIRM Flood Analysis - Point and Line Analysis Results

In addition to the parcels at risk in the territory served by the HVLCSD, an analysis was performed on the assets that the District owns.

Methodology for HVLCSD Asset Analysis and Results

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, their values, and their contents 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. In order to summarize and overlay the HVLCSD assets data, they were created as points (the 18 parcel assets were converted to centroid points) and fell directly into a unique (hazard) zone. For the line data, they were dissected at each boundary between zones and the lengths recalculated, so that all lines within each zone are represented. Analysis on HVLCSD assets at risk to floods is provided below.

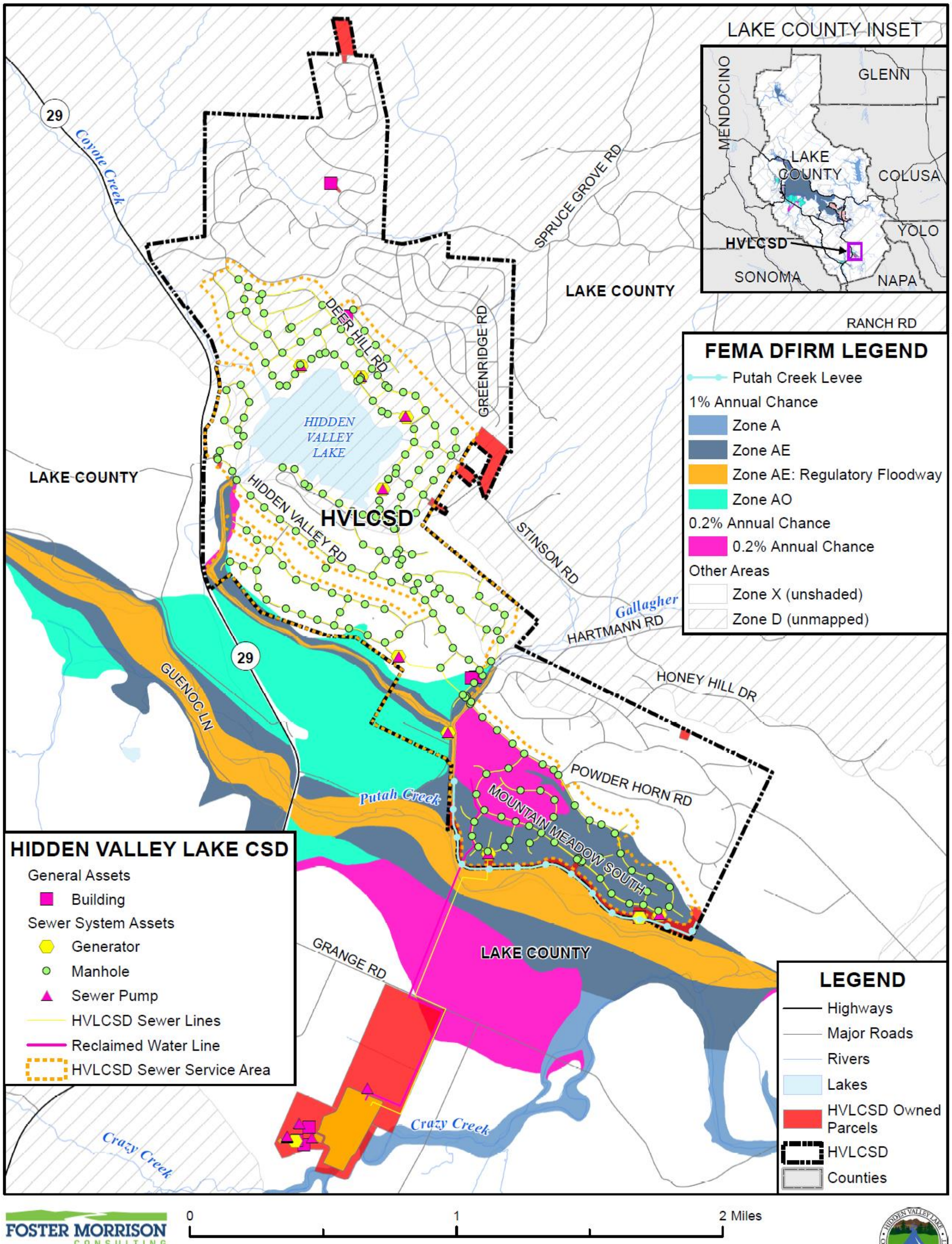
For the HVLCSD asset analysis, the lines, points, and HVLCSD owned parcels were spatially located. The DFIRM flood zones were overlaid over these points to determine if HVLCSD assets were located in the DFIRM flood zones, and if so, what flood zone they were located in. Two maps were created to depict this analysis:

- Figure 4-92 shows the DFIRM flood zones overlayed on the sewer lines and infrastructure points.
- Figure 4-93 shows the DFIRM flood zones overlayed on the water lines and infrastructure points.

Four tables were created to identify HVLCSD assets in either the DFIRM flood zones. Detailed tables showing each individual asset, and which detailed flood zone they lie in are shown in Appendix F.

- Table 4-64 identifies HVLCSD point assets summarized into 1% and 0.2% annual chance DFIRM flood zones.
- Table 4-65 identifies HVLCSD point counts and assets in detailed DFIRM flood zones.
- Table 4-66 identifies HVLCSD line counts and assets summarized into 1% and 0.2% annual chance DFIRM flood zones.
- Table 4-67 identifies HVLCSD line counts and assets in detailed DFIRM flood zones.

Figure 4-92 HVLCSD – Sewer Assets in FEMA DFIRM Flood Zones



Data Source: FEMA DFIRM 9/30/2005, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Figure 4-93 HVLCSD – Water Assets in FEMA DFIRM Flood Zones

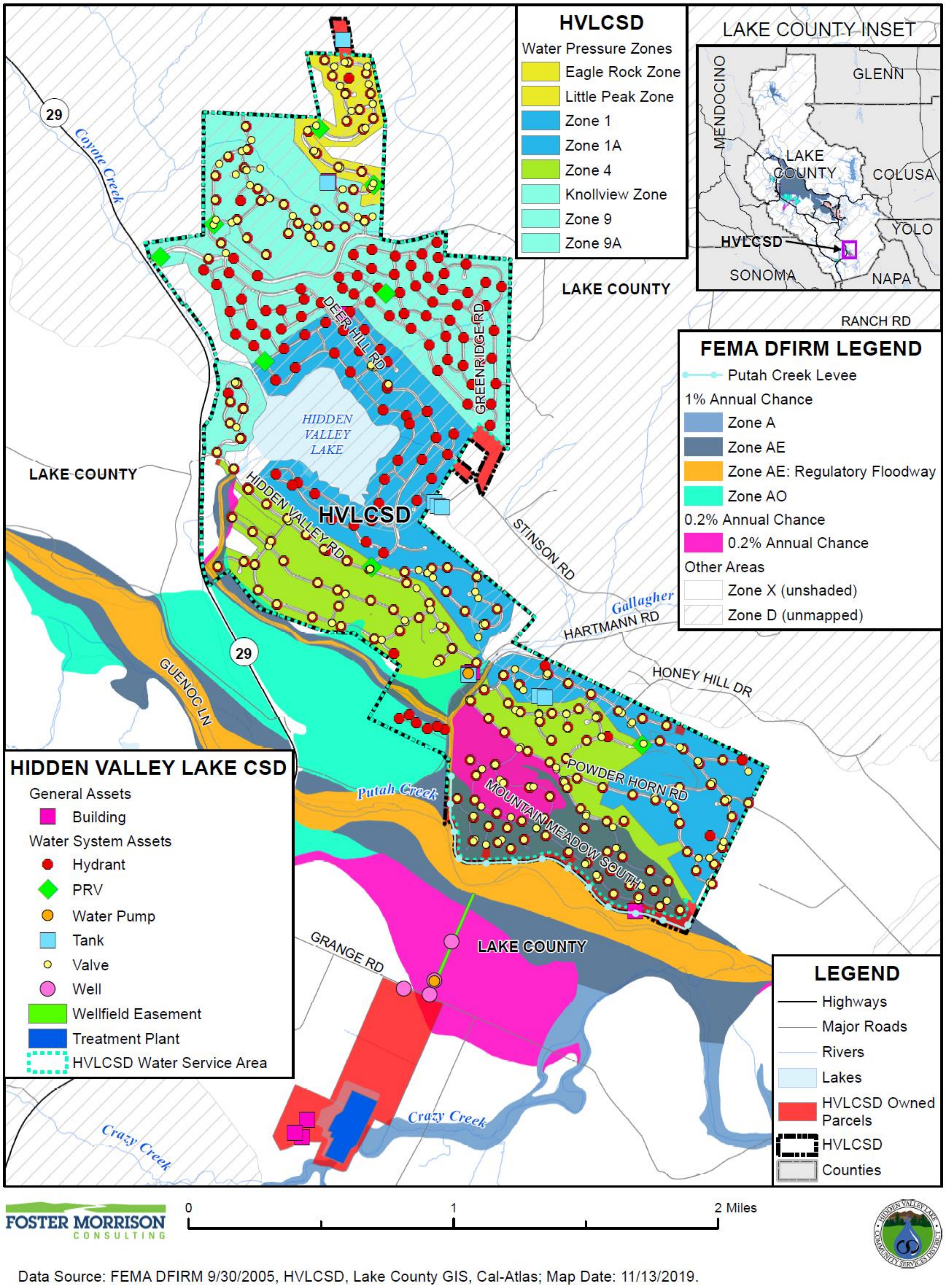


Table 4-64 HVLCSD – Point Assets in 1% and 0.2% Annual Chance FEMA DFIRM Flood Zones

Flood Zone	Asset Count	Asset Value	Content Value
1% Annual Chance Flood Hazard	148	$2,151,231	$877,471
0.2% Annual Chance Flood Hazard	54	$1,361,290	$0
Other Areas	751	$13,463,150	$712,620
Grand Total	**953**	**$16,975,671**	**$1,590,091**

Source: DFIRM 9/30/2005, HVLCSD GIS

Table 4-65 HVLCSD –Point Assets in 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	4	$404,000	$0
General Asset	3	$698,998	$877,471
Sewer System Asset	50	$708,558	$0
Water System Asset	91	$339,675	$0
1% Annual Chance Flood Hazard Total	**148**	**$2,151,231**	**$877,471**
0.2% Annual Chance Flood Hazard			
Sewer System Asset	17	$18,105	$0
Water System Asset	37	$1,343,185	$0
0.2% Annual Chance Flood Hazard Total	**54**	**$1,361,290**	**$0**
Other Areas			
Land Asset	14	$2,361,000	$0
General Asset	5	$6,796,391	$712,620
Sewer System Asset	195	$1,049,247	$0
Water System Asset	537	$3,256,512	$0
Other Areas Total	**751**	**$13,463,150**	**$712,620**
Grand Total	**953**	**$16,975,671**	**$1,590,091**

Source: DFIRM 9/30/2005, HVLCSD GIS

Table 4-66 HVLCSD – Line Assets in 1% and 0.2% Annual Chance FEMA DFIRM Flood Zones

Flood Zone	Asset Count	Asset Value
1% Annual Chance Flood Hazard	21,892	$3,223,927
0.2% Annual Chance Flood Hazard	14,157	$3,080,536
Other Areas	76,798	$8,565,950

Flood Zone	Asset Count	Asset Value
Grand Total	**112,847**	**$14,870,413**

Source: DFIRM 9/30/2005, HVLCSD GIS

Table 4-67 HVLCSD – Line Assets in 1% and 0.2% Annual Chance FEMA DFIRM Flood Zones by Asset Type

Flood Hazard Area	Flood Zone	Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
1% Annual Chance Flood Hazard	Zone AE	Sewer Line	6	$90	10,565	$950,831
			8	$135	3,056	$412,511
			10	$208	2,146	$446,458
			12	$208	18	$3,791
			15	$363	1,202	$436,362
		Sewer Line Total			**16,987**	**$2,249,953**
		Reclaimed Water Line		$208	1,467	$305,096
		Reclaimed Water Line Total			**1,467**	**$305,096**
	Zone AE Floodway	Sewer Line	6	$90	78	$6,999
			10	$208	985	$204,913
			15	$363	131	$47,642
		Sewer Line Total			**1,194**	**$259,554**
		Reclaimed Water Line		$208	488	$101,553
		Reclaimed Water Line Total			**488**	**$101,553**
	Zone AO	Sewer Line	6	$90	304	$27,348
			8	$135	294	$39,681
			10	$208	454	$94,391
			12	$208	704	$146,353
		Sewer Line Total			**1,755**	**$307,773**
1% Annual Chance Flood Hazard Total					**21,892**	**$3,223,927**
0.2% Annual Chance Flood Hazard	Zone X (shaded)	Sewer Line	6	$90	2,906	$261,534
			8	$135	279	$37,609
			10	$208	4,155	$864,175
			15	$363	3,220	$1,168,765
		Sewer Line Total			**10,559**	**$2,332,083**
		Reclaimed Water Line		$208	3,598	$748,453
		Reclaimed Water Line Total			**3,598**	**$748,453**
0.2% Annual Chance Flood Hazard Total					**14,157**	**$3,080,536**
Other Areas		Sewer Line	4	$70	5,211	$364,773

Flood Hazard Area	Flood Zone	Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
	Zone D (unmapped)		6	$90	28,219	$2,539,746
			8	$135	4,378	$591,007
			10	$208	3,360	$698,927
			15	$363	28	$10,002
		Sewer Line Total			**41,196**	**$7,284,991**
	Zone X (unshaded)	Sewer Line	4	$70	3,659	$256,101
			6	$90	18,929	$1,703,610
			8	$135	4,182	$564,599
			10	$208	4,994	$1,038,660
			12	$208	1,083	$225,309
		Sewer Line Total			**32,847**	**$3,788,279**
		Reclaimed Water Line		$208	2,756	$573,216
		Reclaimed Water Line Total			**2,756**	**$573,216**
Other Areas Total					**76,798**	**$8,565,950**
Grand Total					**112,847**	**$14,870,413**

Source: DFIRM 9/30/2005, HVLCSD GIS

Population at Risk

As previously stated, HVLCSD staff and contractors come and go from HVLCSD owned buildings during the day. An analysis of staff in hazard areas was not practical due to the movement in and out of buildings during the day.

This population at risk analysis evaluates the population residing in the HVLCSD Service Area. Should a flood occur, those that reside in the DFIRM flood zones would be at risk. Should people lose their homes or have significant damages, this can also translate to loss of customers and operational monies to the District. Those residential parcel centroids that intersect the DFIRM flood zones were counted and multiplied by the 2010 Census Bureau average household factors for the Hidden Valley Lake census designated place (2.63). According to this analysis, there is a total population of 679 and 326 residents that reside in the HVLCSD Service Area in 1% annual chance and 0.2% annual chance floodplains, respectively. This is shown in Table 4-68. It should be noted that all of the residents in the 1% annual chance floodplain would also fall in the 0.2% annual chance floodplain.

Table 4-68 HVLCSD Service Area – Count of Residential Parcels and Population by FEMA DFIRM Flood Zone

Flood Zone	Improved Residential Parcels	Population
1% Annual Chance Flood Zone	258	679
0.2% Annual Chance Flood Zone	124	326

Flood Zone	Improved Residential Parcels	Population
Total	**382**	**1,005**

Source: FEMA September 30, 2005 DFIRM, US Census Bureau, Lake County 10/30/2018 Parcel/Assessor's Data

Overall HVLCSD (Community) Impact

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

- Injury and loss of life
- Damage to District facilities and infrastructure
- Sewer system overflows and infiltration of or rainwaters
- Commercial and residential structural and property damage
- Damage to natural resource habitats and other natural resources
- Disruption of and damage to public infrastructure and services
- Loss of water, power, roads, phones, and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures
- Negative impact on commercial and residential property values.

Future Development

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 will be sited in such a way as to reduce the risk from flooding to the facility.

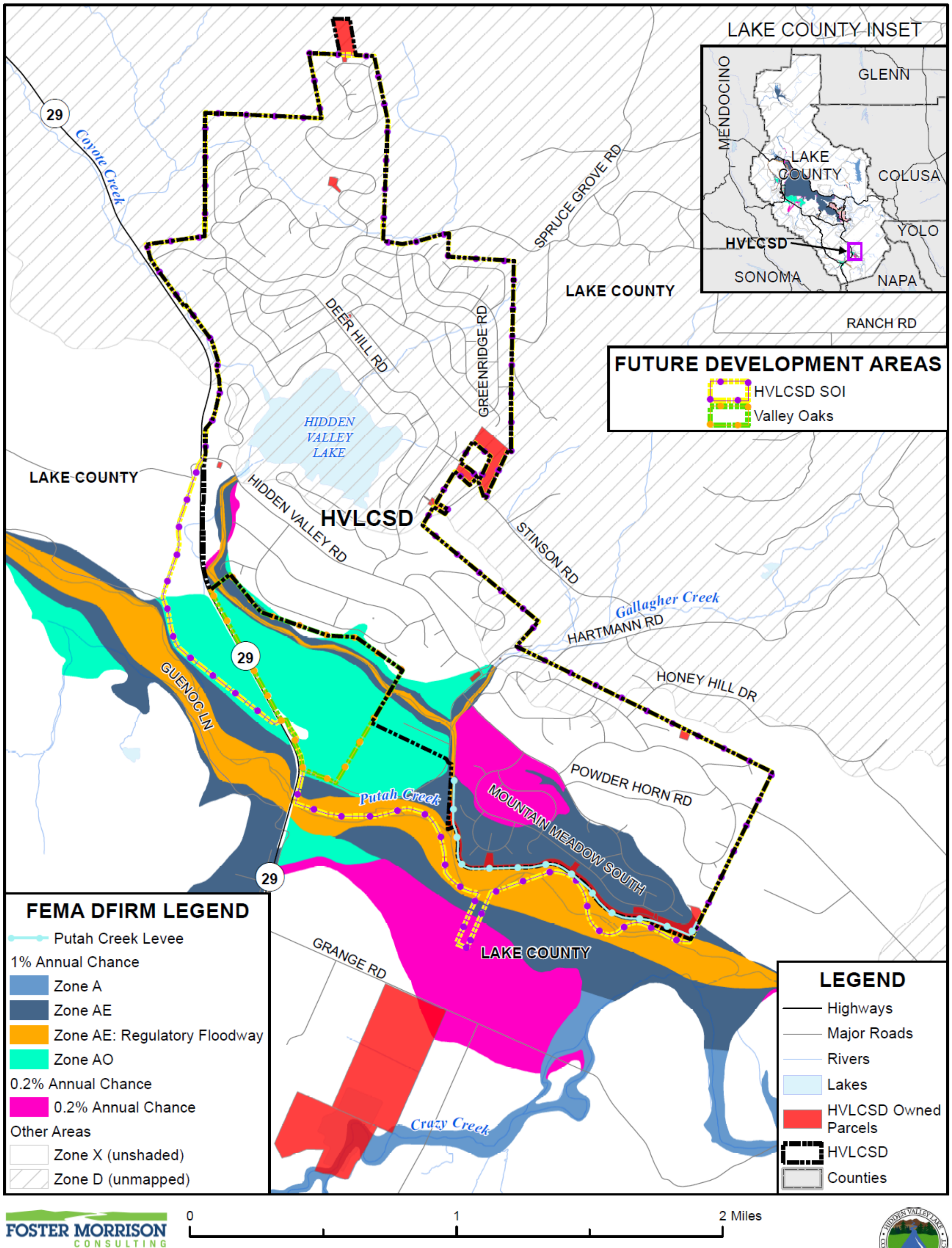
Future Development: GIS Analysis

Lake County's GIS parcel layer was used as the basis for the countywide inventory of parcels. In this analysis, the parcel data was converted to a point layer using a centroid conversion process, in which each parcel was identified by a central point containing the assessor's data. In addition, a GIS spatial file was provided by LAFCO identifying the future development areas for which the analysis was to be performed. Utilizing the future development spatial layer, the parcel centroid data was intersected to determine the parcel counts within each development. Lake County has an effective FEMA DFIRM dated September 30, 2005, which was utilized to perform the flood analysis.

In some cases, there are future development areas in multiple flood zones, such as Zone A, Zone AE, the 2% Annual Chance Zone, or Zone X. GIS was used to intersect the DFIRM flood data with the development areas. For the purposes of this analysis, the development polygon that intersected any flood zones was assigned the flood zones for the entire development polygon. The development areas were segregated and analyzed in this fashion for the HVLCSD Service Area.

Future development in the District in DFIRM flood zones is shown on Figure 4-94. Table 4-69 shows the breakdown of the HVLCSD future development parcel counts and their acreages for both of the future development areas. Some of this future development could be affected by the SWRCB Compliance Order, previously discussed in the future development discussion in Section 4.3.1.

Figure 4-94 HVLCSD– Future Development Areas in FEMA DFIRM Flood Zones



Data Source: FEMA DFIRM 9/30/2005, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Table 4-69 HVLCSD– Future Development Parcels and Acreage Count in FEMA DFIRM Flood Zones

Future Development / Flood Zone	Total Parcel Count	Total Acres	Improved Parcel Count	Total Improved Acres	Unimproved Parcel Count	Total Unimproved Acres
HVLCSD SOI						
1% Annual Chance Flood Hazard	16	166	10	81	6	85
0.2% Annual Chance Flood Hazard	1	6	1	6	0	0
Other Areas	2	17	2	17	0	0
HVLCSD SOI Total	**19**	**189**	**13**	**104**	**6**	**85**
Valley Oaks						
1% Annual Chance Flood Hazard	2	150	1	47	1	103
0.2% Annual Chance Flood Hazard	0	0	0	0	0	0
Other Areas	0	0	0	0	0	0
Valley Oaks Total	**2**	**150**	**1**	**47**	**1**	**103**
Grand Total	**21**	**339**	**14**	**151**	**7**	**188**

Source: FEMA DFIRM 9/30/2005, HVLCSD GIS

4.3.9. Flood: Localized/Stormwater Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—High

Historically, the District has been at risk to flooding primarily during the winter and spring months when stream systems in the County and District swell with heavy rainfall. In addition to the 1% and 0.2% annual chance flooding described in the previous section, localized flooding also occurs throughout the District at various times throughout the year with several areas of primary concern. In addition to flooding, damage to these areas during heavy storms includes road closures, pavement deterioration, washouts, landslides/mudslides, debris areas, and downed trees. The amount and type of damage or flooding that occurs varies from year to year, depending on the quantity of runoff. These areas and the types of damage are presented in Table 4-29 in Section 4.2.12.

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
- 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.

Localized Flood Impacts noted by the HMPC

The HMPC noted a letter from the Lake County Supervisor s (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 Homeowners Association and the HVLCSD respectively.

The HMPC 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 wastewater collection and treatment present 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. Replacement of the basin's gate valve with newer technology of the tideflex valve can help bring stormwater management back to a level of feasibility.

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.

Future Development

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 ensured at new development locations. The HVLCSD noted that a number of alternatives have been investigated. Replacing the gate valve with the newer technology of the tideflex valve, was found to have a higher cost than benefit. Other solutions such as culverts or a weir remain to be fully vetted.

4.3.10. Levee Failure

Likelihood of Future Occurrence—Occasional
Vulnerability—High

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 facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions.

The HVLCSD noted that the southerly service boundary of the District is adjacent to Putah Creek. The District provides drainage services to 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 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.

Impacts and Additional Risk Factors

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. The HVLA and HVLCSD are working together to determine ownership. The County parcel centerline falls along the crest of the levee. The District maintains the levee from the outside to top centerline. It is unclear if or the extent to which the Association maintains the levee from the top of the levee to the creek. On District side, they inspect, weed whack, work on defensible space. The water side of levee has been repaired in 2017 when excessive rains caused levee erosion. The HMPC noted some past damage has occurred on waterside due to erosion caused by high flows.

The HMPC noted that climate change and wildfire can cause issues with levee failure. The District is concerned where trees have burned down on the levee system and the root systems are dying and creating vulnerabilities in levee system. When the roots die back a void is left which can compromise the integrity of the levee system.

The District provides water service to 2,475 connections. The District's water storage system consists eight water storage tanks (see Table 4-56 in Section 4.3.5) Should a catastrophic event, such as a levee failure, occur that would cause any of these tanks to fail (and given their poor condition, this could occur in the near future), the District is at risk of being unable to provide water for fire protection for the District's entire service area.

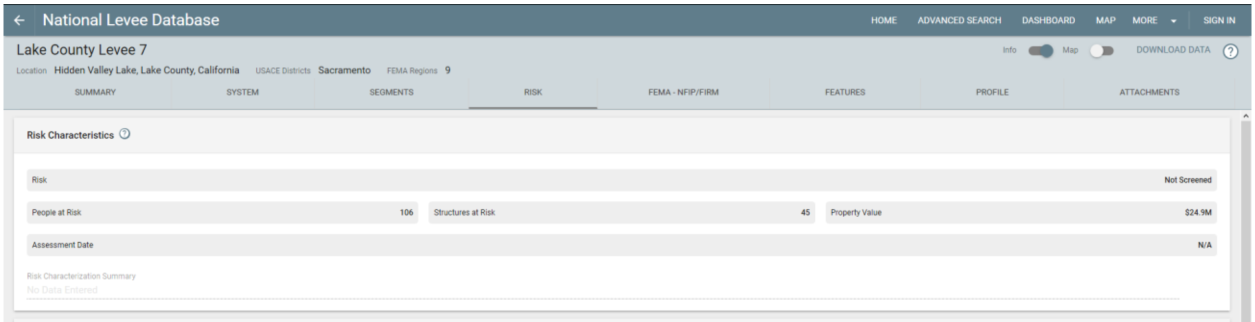
The HVLCSDs water supply consists of three wells, localized in one area south of the District's service area. Should a catastrophic event, such as a levee failure occur that would damage the wells, two water distribution mains, water treatment plant, or the booster pump station, the District would be 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 levee 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.

USACE Analysis

There is no available mapped Levee GIS data for this levee; thus, no GIS analysis could be performed. However, the National Levee Database (NLD), developed by the USACE contains information on the majority of levees within the USACE program. The NLD contains a levee system near the District known as Lake County Levee 7 as previously discussed in Section 4.2.14. It is not accredited by FEMA as providing protection against the 1% annual chance flood. The NLD performed an analysis of the area protected by Lake County Levee 7. The analysis regarding populations, structures, and values in the levee protected area is shown on Figure 4-95. As shown, there are 45 structures worth $24.9 million in the levee protected area. Since it is unknown as to the date of this information, the population in the levee protected area may have increased.

Figure 4-95 HVLCSD – National Levee Database



Source: National Levee Database. Map created 11/12/2019

Populations at Risk

The NLD estimates there are 106 people who reside in the levee protected area.

Critical Facilities at Risk

No critical facility analysis was completed, as there are no GIS boundaries of expected levee failure flood areas provided by the NLD.

Overall HVLCSD (Community) Impact

Floods and their impacts vary by location and severity of any given a levee failure flood event and will likely only affect certain areas of the HVLCSD during specific times. Based on the risk assessment, it is evident that levee failure floods could have potentially devastating economic impacts to certain areas of the HVLCSD. Impacts that are not quantified, but can be anticipated in large future levee failure events, include:

- Injury and loss of life
- Damage to District facilities and infrastructure
- Commercial and residential structural and property damage
- Damage to natural resource habitats and other natural resources
- Disruption to local schools (like the community elementary school)
- Disruption of and damage to public infrastructure and services
- Loss of water, power, roads, phones, and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures
- Negative impact on commercial and residential property values

Future Development

Any future development that occurs in areas behind levees must conform to the Lake County Floodplain Ordinance as with all new development. This ensures that future development in these areas will be elevated above the base flood elevation as needed.

4.3.11. Severe Weather: Extreme Cold and Freeze

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Extreme cold and freeze events occur on an annual basis in the District. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat. Freezing temperatures and ice can cause utility outages, accidents, road closures, and interruption in businesses and schools. Delays in emergency response services can be of significant concern. Vulnerable populations to cold and freeze include:

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

In addition to frozen pipes and other cold related issues as described above, the HVLCSD WWTP treats wastewater by an activated sludge process. 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.

Future Development

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 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.

4.3.12. Severe Weather: Extreme Heat Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Extreme heat happens in the District each year. Extreme heat normally does not impact structures as there may be a limited number of days where the temperatures stay high which gives the structure periodic relief between hot and cool temperature cycles. Vulnerable populations to extreme heat include:

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

Extreme heat may also be a secondary effect of droughts, or may cause drought-like conditions in a temporary setting. For example, several weeks of extreme heat increases evapotranspiration and reduces moisture content in vegetation, leading to higher wildfire vulnerability for that time period even if the rest of the season is relatively moist.

Extreme heat may overload demands for electricity to run air conditioners in homes and businesses during prolonged periods of exposure and presents health concerns to individuals outside in the temperatures. The HVLCSD noted that extreme heat has caused brownout conditions in the past. A brownout is a reduction in or restriction on the availability of electrical power in a particular area. When brownouts happen during extreme heat, the risk of heat related illnesses and deaths increases. The District noted that there are backup generators for the wastewater facilities. However, there is no backup power at water boosters stations, nor at the administration building. In addition to the inability to provide potable water without a grid-tied power source, the telemetry that remotely controls key infrastructure is at risk of failure without a temperature controlled environment.

The HVLCSD noted that the biggest concern is with District operations when there is the potential for PG&E shutdowns, both during red flag events and those associated with proactive shutdowns in times of high usage. The HVLCSD also noted that once the wastewater treatment process is complete, one by-product is recycled water. The reclamation pond is a 412 Acre foot storage facility for this recycled water. During periods of extreme heat, aquatic life can become abundant in this pond. Warner temperatures that follow a rainy winter in which sludge overflow occurred, will also increase the amount of aquatic life. The overflowed sludge becomes a nutrient rich environment for aquatic weeds. Aquatic life can impede the flow of recycled water to its destination, the HVL Golf Course. Also, aquatic life can alter the results of pH testing that occurs twice a day. PH levels must stay within a specific range to meet the WWTP's regulatory requirements.

Additionally, the inhospitable work environment would cause employees to be sent home, impacting District productivity.

Future Development

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 5000 sq ft building at the plant also serves as a cooling center for employees. 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.

4.3.13. Severe Weather: Heavy Rains, Snow, and Storms Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

According to historical hazard data, heavy rain and storms are an annual occurrence in the District. Damage and disaster declarations related to severe storm events have occurred and will continue to occur in the future. Heavy rains are the most frequent type of severe weather occurrences in the District, with thunderstorms occurring more occasionally. Wind often accompanies these storms and have caused damage in the past. Hail and lightning are rare in the District, as is snow. 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. The secondary hazards occurring along with storm events, such as floods and high winds, also can have a significant impact (road damage, utility damage, power outages, etc.) on the District and District operations. The risk and vulnerability associated with these secondary hazards are discussed in other sections of this Plan (Section 4.3.8 Flood: 1%/0.2% Annual Chance and Section 4.2.12 Flood: Localized Stormwater).

Future Development

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 4.2.12 Flood: Localized Stormwater. They also noted that new critical facilities and other development should be built to withstand severe storms and thunderstorm winds.

4.3.14. Severe Weather: High Winds Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Lake County and HVLCSD are subject to potentially destructive straight-line winds. High winds are common throughout the area and can happen during most times of the entire year. Straight line winds are primarily a public safety and economic concern. Windstorms can cause damage to structures and power lines which in turn can create hazardous conditions for people. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered. Diablo winds can occur, which increases fire risk.

Impacts and losses from straight line winds include:

- Increased wildfire risk
- Erosion (soil loss)
- Downed trees
- Power line impacts and economic losses from power outages (including the impacts that PSPS events have to the pumps in the District)
- Occasional building damage, primarily to roofs

During periods of heavy rains, the HVLCSD noted that when ponds are full, high winds can cause the ponds to overflow. Overhead power lines are vulnerable, with power outages causing problems with District pumps. The greatest threat to the District from wind is not necessarily damage from the winds themselves, but from the spread of wildfires during windy days. Wind can cause both power lines to arc, as well as quickly spreading the fire that is started by sparks.

Future Development

Future District development projects should consider windstorm hazards at the planning, engineering, and architectural design stage with the goal of reducing vulnerability. Development of new District facilities are not expected to increase vulnerability to the hazard.

4.3.15. Wildfire Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Extremely High

Risk and vulnerability to the HVLCSD from wildfire is of significant concern. Wildfire is not the only hazard that the HVLCSD faces, but it is likely to be one of the most significant hazards, based on the number, severity, and proximity of wildfires to the District over the last several years. Wildfire has had a devastating effect on Lake County and the Hidden Valley Lake community, and continues to present the risk of loss of human life, quality and quantity of water supplies, and economic losses to the District. Higher average temperatures with low humidity, geologically challenging terrain, flammable vegetation, and human interaction are all factors that contribute to this hazard. The periphery of the Hidden Valley Lake community is a wildland urban interface (WUI) area where structures are at significant risk to fire. A number of environmental variables influence District exposure to wildfires. Dense vegetation, and its proximity to the dense housing development, high seasonal heat, winds, and low humidity, make the HVLCSD vulnerable to wildfire, and are key variables determining the duration and severity of fires.

Community impacts from a significant wildfire event can include traffic delays/detours from road and bridge closures and loss of electric power, potable water, and wastewater services. Fires can also cause major damage to power plants and power lines needed to distribute electricity to operate facilities. Fires have caused evacuations and school closures, which have put economic strain on nearby communities who receive the residents who have had to evacuate.

Impacts and Additional Risk Factors noted by the District

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 District provides water service to 2,475 connections. The District's water storage system consists eight water storage tanks (see Table 4-56 in Section 4.3.5). Should a catastrophic event, such as a wildfire, occur that would cause any of these tanks to fail (and given their poor condition, this could occur in the near future), the District is at risk of being unable to provide water for fire protection for the District's entire service area.

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 even, 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.

Firefighting Issues in the District

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. Without backup electricity generation, water and wastewater cannot be conveyed. Water quality will also suffer if water treatment functionality is compromised. Wooden water tanks are not an ideal storage solution in the event of a wildfire. 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.

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.

Wildfire and Climate Change Impacts in the District

Additionally, the HVLCSD noted that climate change is expected to contribute to the wildfire hazard. They noted issues include those related to the fire snaking down dry riverbeds. There are environmental constraints to clearing vegetation in creek beds which makes mitigation difficult in these riverbeds. Fuels in and near riverbed can pose a risk to the District wells which are located along riverbed. As such, vegetation management in these areas are important to protect wells. The District is also concerned where trees have burned down on the levee system and the root systems are dying and creating vulnerabilities in levee system. When the roots die back a void is left which can compromise the integrity of the levee system (discussed in more detail in Section 4.3.10).

Public Safety Power Shutoff (PSPS)

Recent wildfires in California have started as a result of downed power lines or electrical equipment. This was the case for the Camp Fire in nearby Butte County in 2018, as well as for the Kincade Fire in Sonoma County in 2019. As a result, California's three largest energy companies (including PG&E), at the direction of the California Public Utilities Commission (CPUC), are coordinating 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).

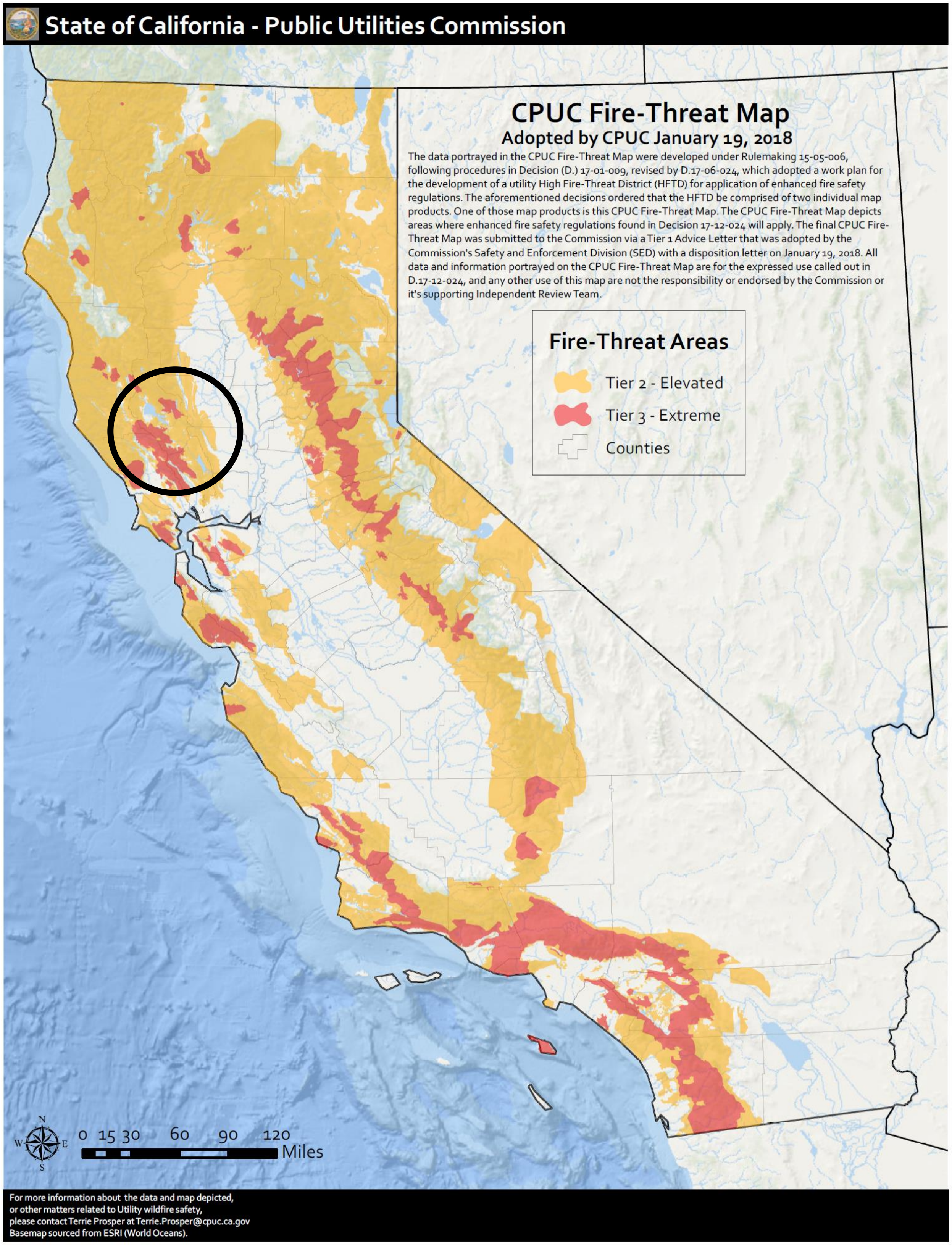
Public Safety Power Shutoff Criteria

The Wildfire Safety Operations Center (WSOC) monitors fire danger conditions across PG&E service area and evaluates whether to turn off electric power lines in the interest of safety. While no single factor will drive a Public Safety Power Shutoff, some 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 California Public Utilities Commission (CPUC) as at elevated (Tier 2) or extreme (Tier 3) risk for wildfire (seen on Figure 4-96). The District sits in Tier 2. 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 public safety power outage.

Figure 4-96 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

The Public Safety Power Shutoff Policy initiated by Pacific Gas and Electric are likely to take place during weather conditions that pose the highest risk of wildfire. The HMPC noted that the District's water distribution system consists of three booster pump stations and three wells. None of these stations and well sites are equipped with backup power supply. These three booster pump stations fill the District's eight water storage tanks that provide fire protection to the District's entire service area. Should a catastrophic event, such as a flood, earthquake, fire, power outage, or terrorist activity, occur, the District is unable to produce water and refill the water storage tanks and at risk of being unable to provide water for fire protection for the District's entire service area.

Wildfire and Electrical Impacts to District

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. 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.

Communities at Risk to Wildfire

The National Fire Plan is a cooperative, long-term effort between various government agency partners with the intent of actively responding to severe wildland fires and their impacts to communities while ensuring sufficient firefighting capacity for the future. For purposes of the National Fire Plan, CAL FIRE generated a list of California communities at risk for wildfire. The intent of this assessment was to evaluate the risk to a given area from fire escaping off federal lands. Three main factors were used to determine the wildfire threat in the wildland-urban interface areas of California: fuel hazards, probability of fire, and areas of suitable housing density that could create wildland urban interface fire protection strategy situations. The preliminary criteria and methodology for evaluating wildfire risk to communities is published in the Federal Register, January 4, 2001. Hidden Valley Lake is considered a Community at Risk.

Values at Risk

Lake County and the HVLCSD have mapped CAL FIRE data which provides a variety of fire hazard information for California communities. Utilizing this data from CAL FIRE, GIS was used to determine the risk of wildfire within HVLCSD and how the wildfire risk varies throughout the HVLCSD. Two primary CAL FIRE datasets and associated analysis was used for this plan:

- Fire Responsibility Areas
- Fire Hazard Severity Zones

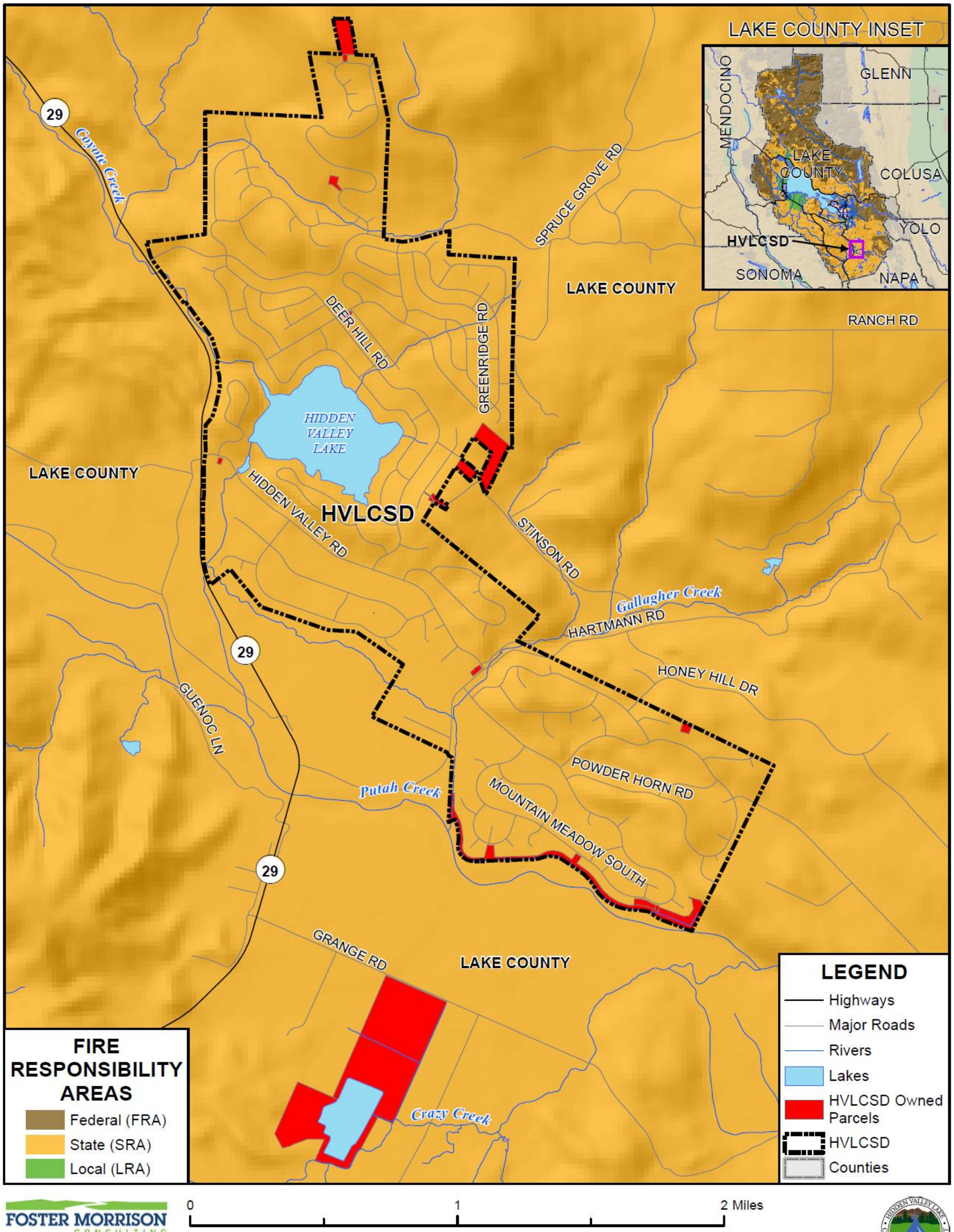
Fire Responsibility Areas

There are numerous state and federal wildland fire protection agencies that have responsibility within Lake County and the HVLCSD, including the USDA Forest Service (FS), the Bureau of Land Management (BLM), and CAL FIRE. There are also numerous local fire departments and fire protection districts that serve local areas, many of whom have mutual aid agreements with each other as well as state and federal agencies for fire suppression and protection. Fire Responsibility Areas are generally categorized by Federal Responsibility Areas (FRA), State Responsibility Areas (SRA) and Local Responsibility Areas (LRA).

Methodology

CAL FIRE has a legal responsibility to provide fire protection on all SRA lands, which are defined based on land ownership, population density and land use. CAL FIRE's State Responsibility Area layer was used in this analysis to show HVLCSD's parcel counts and values by FRA, SRA, and LRA. GIS was used to create a centroid, or point representing the center of the District's parcel polygons. The FRA, SRA, and LRA areas were then overlaid on the parcel centroids. For the purposes of this analysis, the wildfire responsibility area that intersected a parcel centroid was assigned for the entire parcel. Locations of each responsibility area are shown in Figure 4-97. As shown, the entirety of the HVLCSD falls in the State Responsibility Area.

Figure 4-97 HVLCSD – Fire Responsibility Areas by FRA, SRA, LRA



Data Source: CAL FIRE (SRA 19_1) 10/1/2018, HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Fire Hazard Severity Zone Analysis

As part of the Fire and Resource Assessment Program (FRAP), CAL FIRE was mandated to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones (FHSZ), then define the application of various mitigation strategies to reduce risk associated with wildland fires.

Fire hazard is a way to measure the physical fire behavior so that people can predict the damage a fire is likely to cause. Fire hazard measurement includes the speed at which a wildfire moves, the amount of heat the fire produces, and most importantly, the burning fire brands that the fire sends ahead of the flaming front.

The fire hazard model developed by CAL FIRE considers the wildland fuels. Fuel is that part of the natural vegetation that burns during the wildfire. The model also considers topography, especially the steepness of the slopes. Fires burn faster as they burn up-slope. Weather (temperature, humidity, and wind) has a significant influence on fire behavior. The model recognizes that some areas of California have more frequent and severe wildfires than other areas. Finally, the model considers the production of burning fire brands (embers) how far they move, and how receptive the landing site is to new fires.

In 2007, CAL FIRE updated its Fire Hazard Severity Zone (FHSZ) maps for the State of California to provide updated map zones, based on new data, science, and technology that will create more accurate zone designations such that mitigation strategies are implemented in areas where hazards warrant these investments. The zones will provide specific designation for application of defensible space and building standards consistent with known mechanisms of fire risk to people, property, and natural resources. The program is still ongoing with fire hazard severity zone maps being updated based on designated responsibility areas: FRA, SRA, and LRA.

The CAL FIRE data, detailing FHSZs within the HVLCSD, was utilized to determine the locations, numbers, types, and values of land and structures falling within each FHSZ. The following sections provide details on the methodology and results for this analysis.

Methodology

As previously described, CAL FIRE mapped the SRA Fire Hazard Severity Zones (FHSZs), or areas of significant fire hazard, based on fuels, terrain, weather, and other relevant factors. Within the HVLCSD, the Recommended LRA (c17fhszl06_3) dataset dated 7/2009 was utilized for the analysis and contained Very High and Non-Very High hazard classes. In all areas surrounding the HVLCSD, the Adopted SRA (fhszs06_3_17) dataset dated 11/2007 was used to get a complete coverage of Fire Hazards.

Analysis was performed using only the Recommended FHSZ datasets, and using GIS, the parcel layer was overlaid on the Recommended FHSZ layers. Since it is possible for any given parcel to intersect with multiple FHSZs, 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 HVLCSD Service Area were determined and further broken out by property use and included information on both land and improved values.

For the HVLCSD asset analysis, the lines, points, and HVLCSD owned parcels were spatially located. The FHSZs were overlaid over these assets to determine what HVLCSD assets were located in FHSZs, and if so, which FHSZ they fell in.

FHSZ Analysis Results

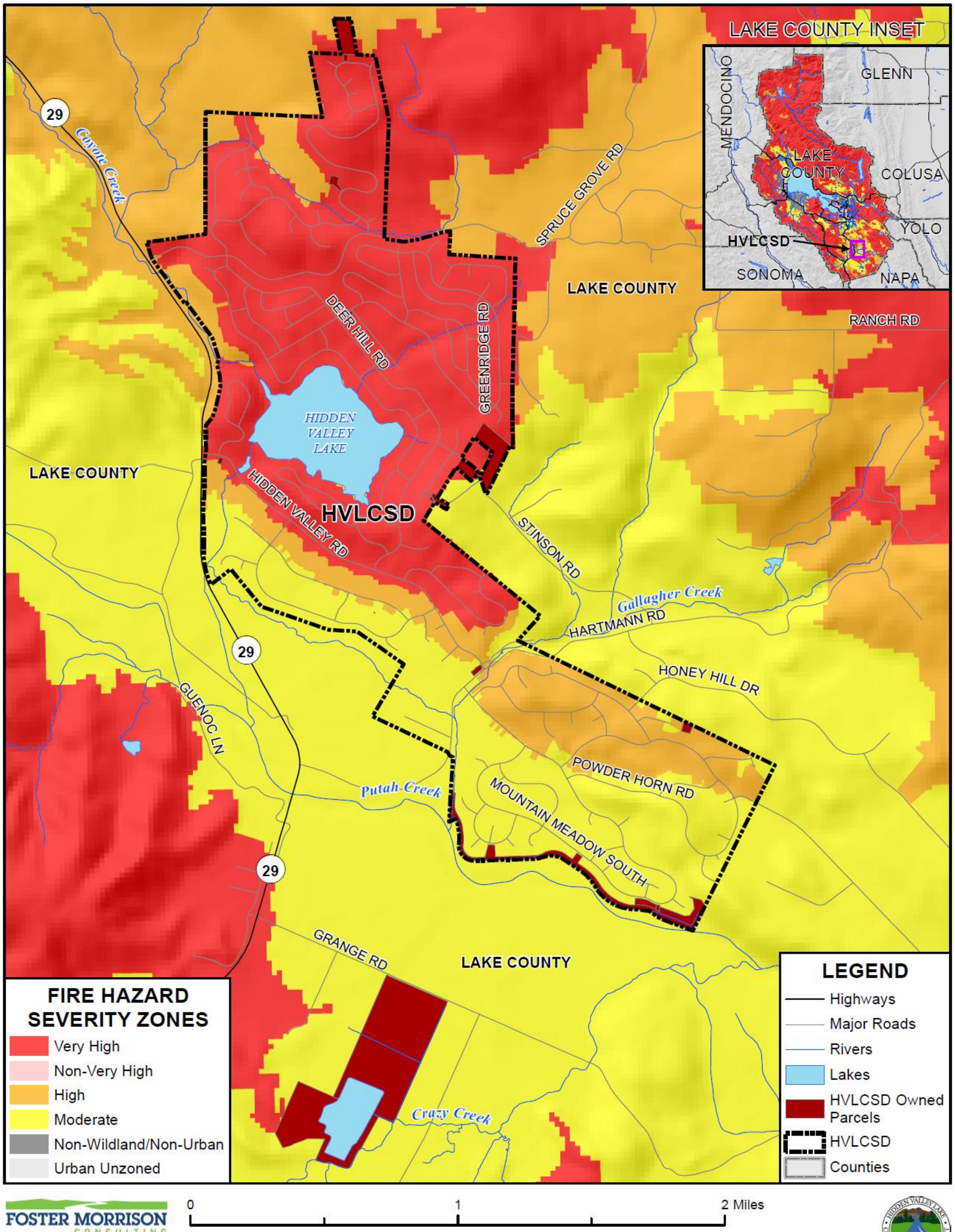
Analysis results for the CAL FIRE FHSZs in the HVLCSD are presented in two parts:

- An analysis of HVLCSD Service Area parcels. These areas are not owned by the District, but are areas serviced by the District.
- An analysis of HVLCSD owned assets, lines, and infrastructure.

HVLCSD Service Area - Fire Hazard Severity Zones Parcel Analysis Results

The FHSZs are shown in Figure 4-98. Analysis results for the HVLCSD Service Area is summarized in Table 4-70, which summarizes total parcel counts, improved parcel counts, and their improved and land values and the estimated contents replacement values based on the CRV factors detailed in Table 4-35, as well as the percentage of parcels affected by each FHSZ. As shown on Table 4-35, there are 1,435 improved parcels in the Very High FHSZ, with a total value in excess of $448 million in the HVLCSD Service Area.

Figure 4-98 HVLCSD Service Area – Fire Hazard Severity Zones



Data Source: CAL FIRE (Adopted SRA 11/2007 - fhszs06_3_17), HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Table 4-70 HVLCSD Service Area – Count and Value of Parcels in Fire Hazard Severity Zones by Property Use

Fire Hazard Severity Zone/ Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value*
HVLCSD Service Area						
Very High						
Commercial	2	0	0	$0	$0	$0
Open Space / Rural Lands	17	0	$9,261	$0	$0	$9,261
Residential	2,066	1,435	$54,924,210	$262,324,643	$131,162,322	$448,411,175
Very High Total	**2,085**	**1,435**	**$54,933,471**	**$262,324,643**	**$131,162,322**	**$448,420,436**
High						
Commercial	1	0	$0	$0	$0	$
Open Space / Rural Lands	8	0	$10,336	$0	$0	$10,336
Residential	436	285	$9,648,857	$45,779,748	$22,889,874	$78,318,479
High Total	**445**	**285**	**$9,659,193**	**$45,779,748**	**$22,889,874**	**$78,328,815**
Moderate						
Commercial	29	26	$1,087,033	$6,028,479	$6,028,479	$13,143,991
Open Space / Rural Lands	15	0	$0	$0	$0	$0
Residential	815	683	$21,202,549	$116,701,896	$58,350,948	$196,255,393
Moderate Total	**859**	**709**	**$22,289,582**	**$122,730,375**	**$64,379,427**	**$209,399,384**
Grand Total	**3,389**	**2,429**	**$86,882,246**	**$430,834,766**	**$218,431,623**	**$736,148,635**

Source: CAL FIRE, Lake County 10/30/2018 Parcel/Assessor's Data

*Land, structure, and contents values

HVLCSD Fire Hazard Severity Zone - Asset Analysis Results

In addition to the parcels at risk in the territory served by the HVLCSD, an analysis was performed on the assets that the District owns. For the HVLCSD asset analysis, the lines, points, and HVLCSD owned parcels were spatially located. CAL FIRE FHSZs were overlaid over these points to determine if HVLCSD assets were located in the FHSZs, and if so, what FHSZ they were located in. Two maps were created to depict this analysis. Figure 4-99 shows the CAL FIRE FHSZs overlayed on the sewer lines and infrastructure. Figure 4-100 shows the CAL FIRE FHSZs overlayed on the water lines and infrastructure. Two tables were created to identify HVLCSD assets in either the CAL FIRE FHSZs. Table 4-71 identifies HVLCSD point counts and assets in detailed DFIRM flood zones. Table 4-72 identifies HVLCSD line counts and assets in detailed DFIRM flood zones. Detailed tables showing each individual asset, and which detailed FHSZ they lie in are shown in Appendix F.

Figure 4-99 HVLCSD – Sewer Assets in Fire Hazard Severity Zones

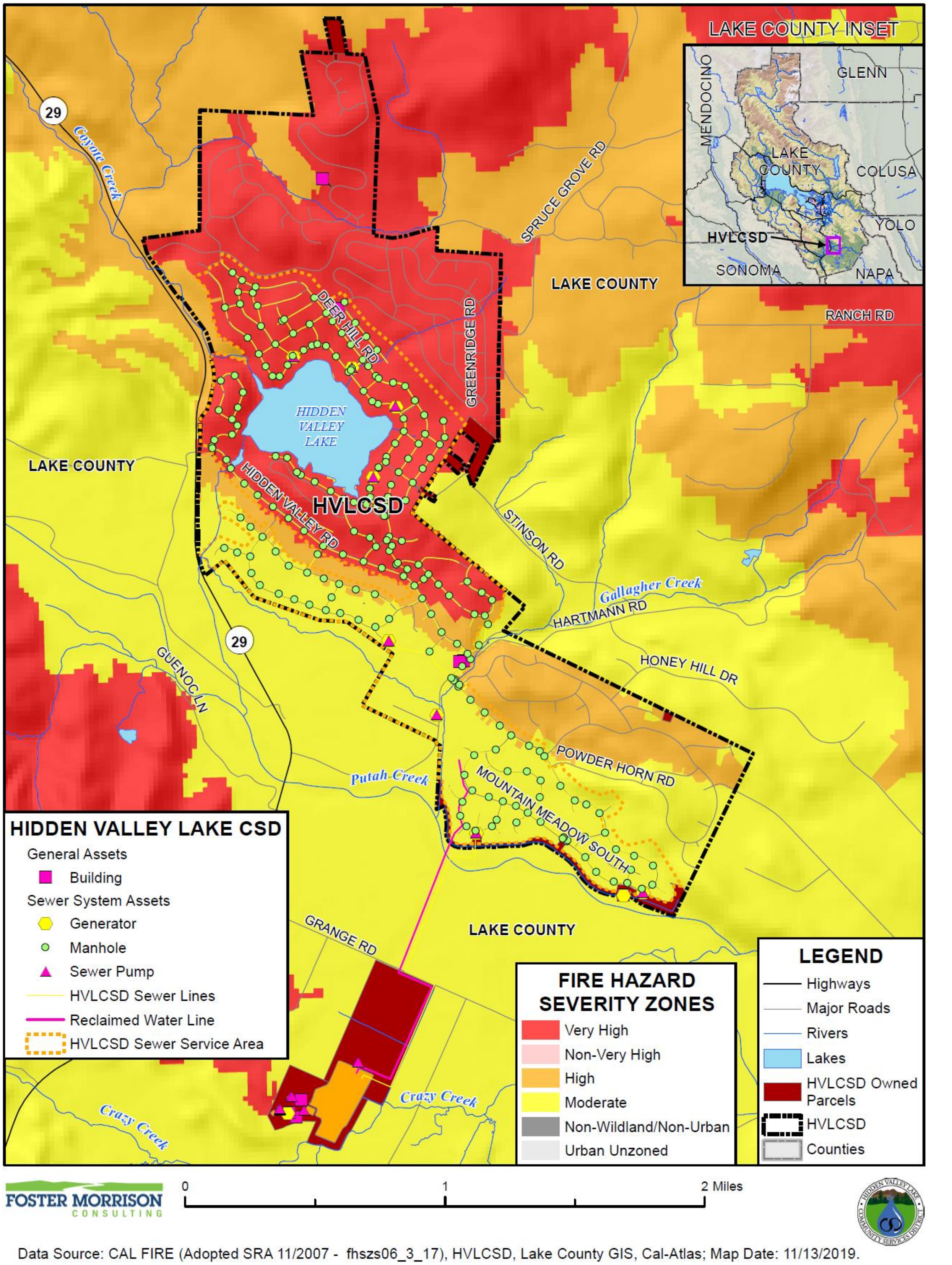
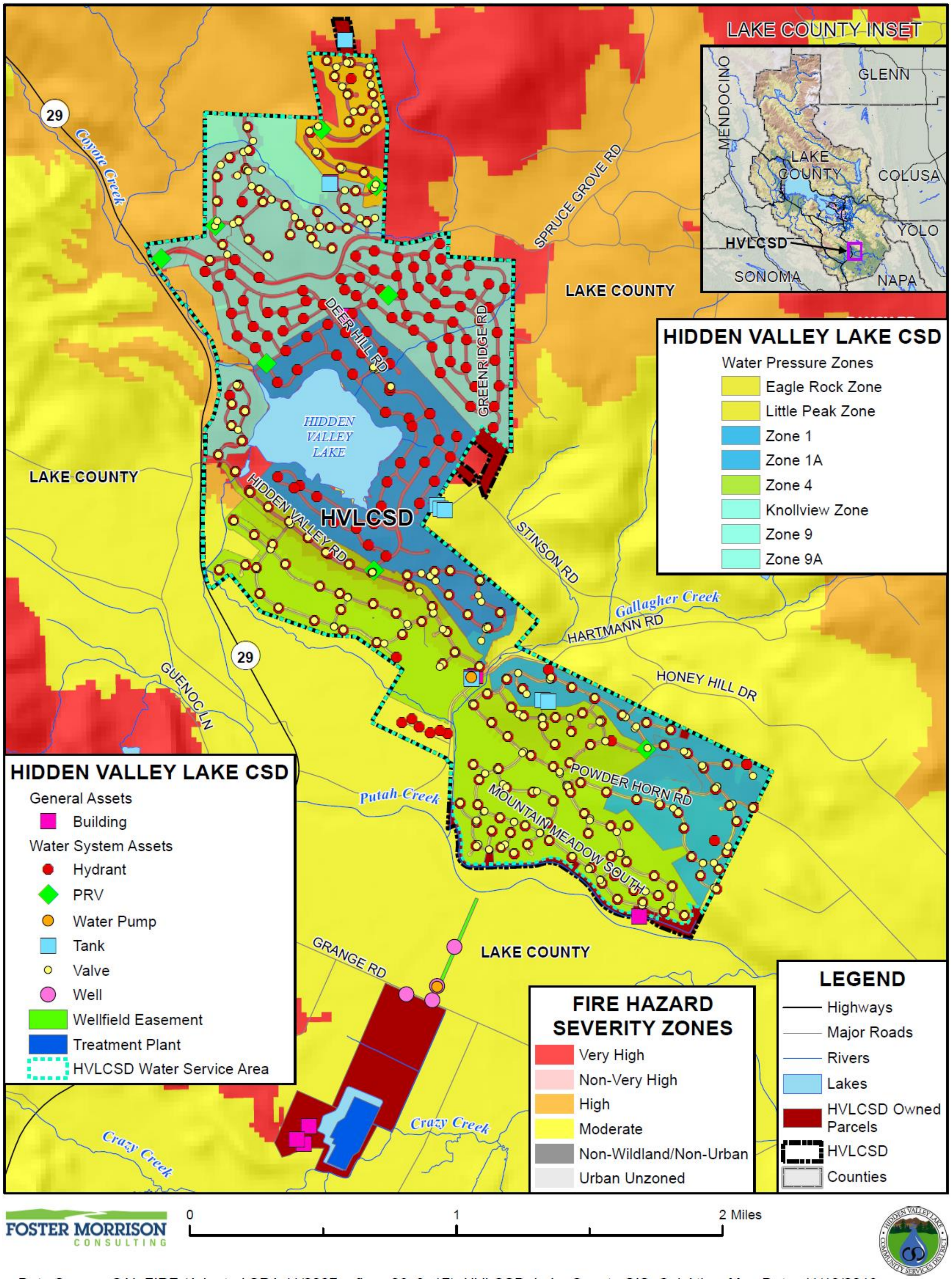


Figure 4-100 HVLCSD – Water Assets in Fire Hazard Severity Zones



Data Source: CAL FIRE (Adopted SRA 11/2007 - fhszs06_3_17), HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Table 4-71 HVLCSD – 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	8	$321,000	$0
Land Asset Total	**8**	**$321,000**	**$0**
General Asset			
Building	2	$183,713	$401,160
General Asset Total	**2**	**$183,713**	**$401,160**
Sewer System Asset			
Generator	4	$292,936	$0
Manhole	130	$138,450	$0
Sewer Pumps	11	$141,300	$0
Sewer System Asset Total	**145**	**$572,686**	**$0**
Water System Asset			
Hydrant	181	$421,730	$0
PRV	6	$33,654	$0
Pump	5	$55,150	$0
Tank	5	$1,340,181	$0
Valve	128	$131,968	$0
Water System Asset Total	**325**	**$1,982,683**	$0
Very High Total	**480**	**$3,060,082**	**$401,160**
High			
Land Asset			
Parcel	1	$10,000	$0
Land Asset Total	**1**	**$10,000**	**$0**
Sewer System Asset			
Manhole	15	$15,975	$0
Sewer System Asset Total	**15**	**$15,975**	**$0**
Water System Asset			
Hydrant	41	$95,530	$0
PRV	2	$11,218	$0
Tank	2	$582,733	$0
Valve	72	$74,232	$0
Water System Asset Total	**117**	**$763,713**	**$0**
High Total	**133**	**$789,688**	**$0**

Fire Hazard Severity Zone / Asset	Asset Count	Asset Value	Content Value
Moderate			
Land Asset			
Parcel	9	$2,434,000	$0
Land Asset Total	**9**	**$2,434,000**	$0
General Asset			
Building	6	$7,311,676	$1,188,931
General Asset Total	**6**	**$7,311,676**	**$1,188,931**
Sewer System Asset			
Generator	6	$736,948	$0
Manhole	73	$77,745	$0
Sewer Pumps	23	$372,556	$0
Sewer System Asset Total	**102**	**$1,187,249**	**$0**
Water System Asset			
Hydrant	80	$186,400	$0
Pump	11	$838,840	$0
Tank	1	$122,405	$0
Valve	126	$129,906	$0
Well	5	$915,425	$0
Water System Asset Total	**223**	**$2,192,976**	**$0**
Moderate Total	**340**	**$13,125,901**	**$1,188,931**
Grand Total	**953**	**$16,975,671**	**$1,590,091**

Source: CAL FIRE, HVLCSD GIS

Table 4-72 HVLCSD – Line Assets in Fire Hazard Severity Zones by Asset Type

Fire Hazard Severity Zone	Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Very High	Sewer Line	4	$70	8,870	$620,874
		6	$90	36,907	$3,321,622
		8	$135	4,378	$591,007
		10	$208	5,299	$1,102,292
		15	$363	28	$10,002
	Sewer Line Total			**55,481**	**$5,645,797**
Very High Total				**55,481**	**$5,645,797**
High	Sewer Line	6	$90	3,959	$356,341
		8	$135	386	$52,137
		10	$208	449	$93,383

Fire Hazard Severity Zone	Asset	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
		12	$208	1,315	$273,464
		15	$363	920	$333,917
	Sewer Line Total			**7,029**	**$6,755,039**
High Total				**7,029**	**$1,109,242**
Moderate	Sewer Line	6	$90	20,134	$1,812,105
		8	$135	7,424	$1,002,262
		10	$208	10,345	$2,151,849
		12	$208	490	$101,988
		15	$363	3,633	$1,318,853
	Sewer Line Total			**42,028**	
	Reclaimed Water Line		$208	8,309	$1,728,316
	Reclaimed Water Line Total			**8,309**	**$1,728,316**
Moderate Total				**50,337**	**$8,115,374**
Grand Total				**112,847**	**$14,870,413**

Source: CAL FIRE, HVLCSD GIS

Population at Risk in HVLCSD Service Area

As previously stated, HVLCSD staff and contractors come and go from HVLCSD owned buildings during the day. An analysis of staff in hazard areas was not practical due to the movement in and out of buildings during the day.

This population at risk analysis evaluates the population residing in the HVLCSD Service Area. Should a wildfire occur, those that reside in the higher FHSZs would be at risk. This also translates to loss of customers and operational monies to the District. Those residential parcel centroids that intersect the FHSZs were counted and multiplied by the 2010 Census Bureau average household factors for the Hidden Valley Lake census designated place (2.63). According to this analysis shown in Table 4-73, there is a population of 90 and 256 that reside in the High and Moderate FHSZ categories in the HVLCSD Service Area, respectively.

Table 4-73 HVLCSD Service Area – Count of Residential Parcels and Population at Risk in Moderate or Higher Fire Hazard Severity Zones

Fire Hazard Severity Zones	Improved Residential Parcels	Population
Very High	1,435	3,774
High	285	750
Moderate	683	1,797
Total	**2,403**	**6,321**

Source: USGS, US Census Bureau 2010 Estimates, Lake County 10/30/2018 Parcel/Assessor's Data

** Census Bureau 2010 average household sizes were used

Overall HVLCSD (Community) Impact

The overall impact to the community from a severe wildfire includes:

- Injury and loss of life
- Damage to District facilities and infrastructure
- Commercial and residential structural and property damage
- Damage to natural resource habitats and other natural resources
- Disruption of and damage to public infrastructure and services
- Loss of water, power, roads, phones, and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures
- Negative impact on commercial and residential property values

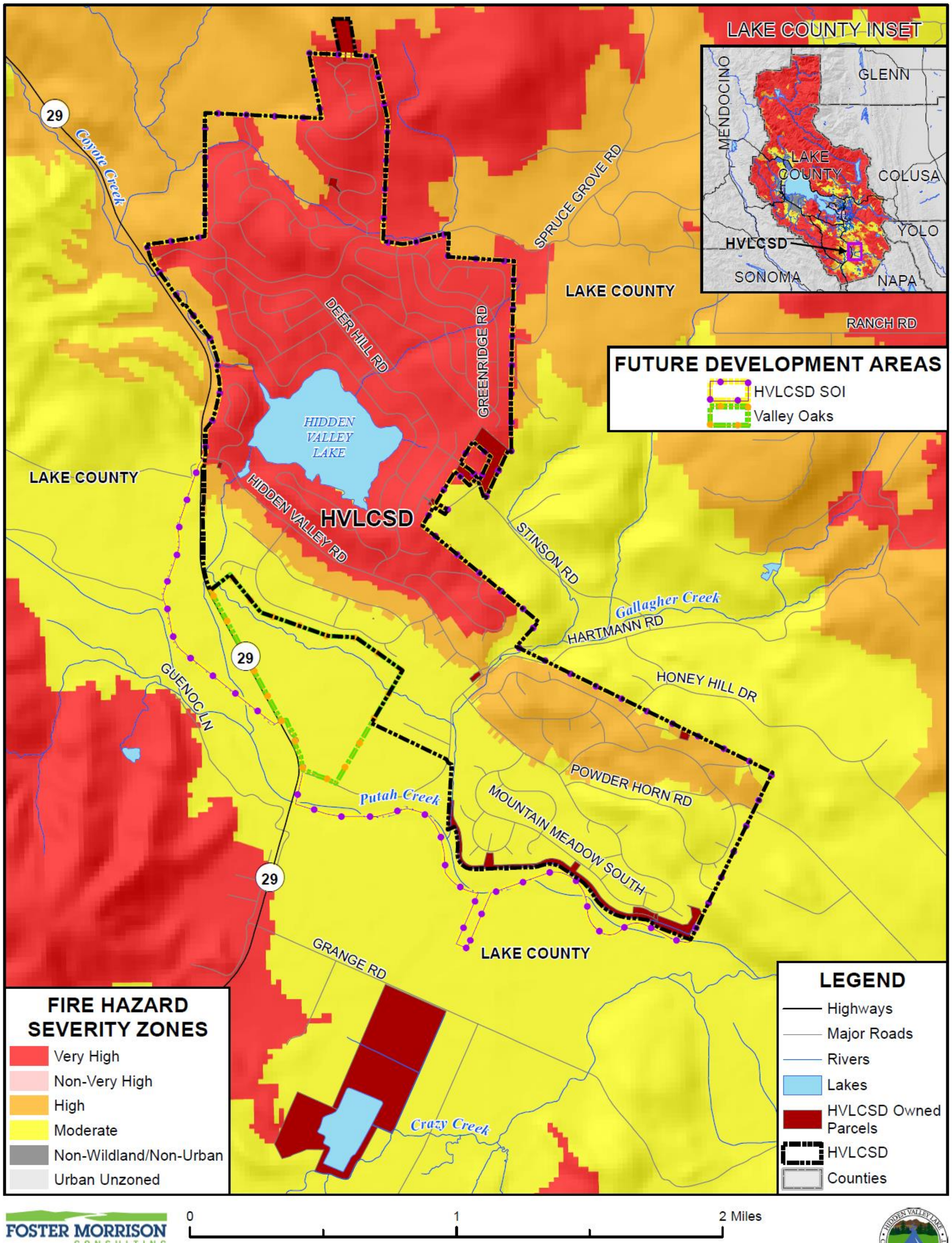
Future Development

Future HVLCSD facilities will take wildfire into account when siting new facilities. Fire hydrants, defensible space, well production, water storage, and on-going maintenance are all fire suppression considerations when assessing future development. New facilities will be built to the most current CBC standards, which take wildfire into account when building. In addition, the District is replacing older redwood tanks with steel tanks, making the District systems more fire resilient.

Future Development GIS Analysis

Lake County's GIS parcel layer was used as the basis for the countywide inventory of parcels. In this analysis, the parcel data was converted to a point layer using a centroid conversion process, in which each parcel was identified by a central point containing the assessor's data. The HVLCSD provided a GIS spatial file identifying the future development areas for which the analysis was to be performed. Utilizing the future development spatial layer, the parcel centroid data was intersected to determine the parcel counts within each development. The CAL FIRE FHSZ data was used to perform the analysis. Future development in the HVLCSD in FHSZs is shown on Figure 4-101. Table 4-74 shows the breakdown of the future development parcel counts for the HVLCSD and their acreages by FHSZ. Some of this future development could be affected by the SWRCB Compliance Order, previously discussed in the future development discussion in Section 4.3.1.

Figure 4-101 HVLCSD– Future Development and Fire Hazard Severity Zones



Data Source: CAL FIRE (Adopted SRA 11/2007 - fhszs06_3_17), HVLCSD, Lake County GIS, Cal-Atlas; Map Date: 11/13/2019.

Table 4-74 HVLCSD– Future Development Parcels and Acreage Count in Fire Hazard Severity Zones

Fire Hazard Severity Zone/ Future Development Area	Total Parcel Count	Total Acres	Improved Parcel Count	Total Improved Acres	Unimproved Parcel Count	Total Unimproved Acres
Moderate FHSZ						
HVLCSD SOI	19	189	13	104	6	85
Valley Oaks	2	150	1	47	1	103
Grand Total	**21**	**339**	**14**	**151**	**7**	**188**

Source: CAL FIRE, HVLCSD GIS

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.

A two-step approach was used to conduct this assessment for the District. First, an inventory of common mitigation activities was made through the use of matrixes. The purpose of this effort was to identify policies and programs that were either in place, needed improvement, or could be undertaken if deemed appropriate. Second, the HMPC conducted an inventory and review of existing policies, regulations, plans, and programs to determine if they contributed to reducing hazard-related losses or if they inadvertently contributed to increasing such losses.

This section presents the District's mitigation capabilities. These are in addition to, and supplement, the many plans, reports, and technical information reviewed and used for this LHMP as identified in Chapter 3 and in Chapter 4.

Similar to the effort to describe hazards, risks, and vulnerability of the District, this mitigation capability assessment describes the District's existing capabilities, programs, and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This assessment is divided into four sections: regulatory mitigation capabilities are discussed in Section 4.4.1; administrative and technical mitigation capabilities are discussed in Section 4.4.2; fiscal mitigation capabilities are discussed in Section 4.4.3; and mitigation education, outreach, and partnerships are discussed in Section 4.4.4. A discussion of other mitigation efforts follows in Section 4.4.5.

4.4.1. HVLCSD Regulatory Mitigation Capabilities

Table 4-75 lists planning and land management tools 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.

Table 4-75 HVLCSD Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
General Plan	N	The District maintains a Strategic Plan – It does identify mitigation strategies in the form of continuous improvement.
Capital Improvements Plan	Y 18/19-22/23	Identifies projects, to be used in mitigation actions.
Economic Development Plan	Y	A municipal services review (MSR) is sent to the Local Agency Formation Commission (LAFCO)
Local Emergency Operations Plan	Y	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.
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
Transportation Plan	N	
Stormwater Management Plan/Program	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
Engineering Studies for Streams	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.
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	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
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N/A	Not District's authority
Building Code Effectiveness Grading Schedule (BCEGS) Score	N/A	Not District's authority
Fire department ISO rating:	N/A	Not District's authority
Site plan review requirements	Y	Yes

Land Use Planning and Ordinances	Y/N	Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Zoning ordinance	N/A	Not District's authority
Subdivision ordinance	N/A	Not District's authority
Floodplain ordinance	N/A	Not District's authority
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N/A	Not District's authority
Flood insurance rate maps	N/A	Not District's authority
Elevation Certificates	N/A	Not District's authority
Acquisition of land for open space and public recreation uses	N/A	Not District's authority
Erosion or sediment control program	N/A	Not District's authority
Other		
How can these capabilities be expanded and improved to reduce risk?		
1. Act upon identified mitigation opportunities. 2. Lift moratorium to expand capital funding		

As indicated in the tables above, HVLCSD has several plans and programs that guide the District's mitigation of development of hazard-prone areas. Some of these are described in more detail below.

Other Plans/Studies/Programs

Lake County Climate Change and Health Profile Report (2017)

The Climate Change and Health Profile Report seeks to provide a county-level summary of information on current and projected risks from climate change and potential health impacts. This report represents a synthesis of information on climate change and health for California communities based on recently published reports of state agencies and other public data.

The content of this report was guided by a cooperative agreement between CDPH and the CDC Climate-Ready States and Cities Initiative's program Building Resilience Against Climate Effects (BRACE). The goals of BRACE are to assist state health departments to build capacity for climate and health adaptation planning. This includes using the best available climate science to project likely climate impacts, identifying climate-related health risks and populations vulnerable to these impacts, assessing the added burden of disease and injury that climate change may cause, identifying appropriate interventions, planning more resilient communities, and evaluating to improve the planning effort. Communities with economic, environmental, and social disadvantages are likely to bear disproportionate health impacts of climate change.

This Climate Change and Health Profile Report is intended to inform, empower, and nurture collaboration that seeks to protect and enhance the health and well-being of all California residents. This report is part of a suite of tools that is being developed by the California Department of Public Health to support local, regional, and statewide efforts of the public health sector to build healthy, equitable, resilient, and adaptive communities ready to meet the challenges of climate change. Along with a county-level climate change and health vulnerability assessment and state guidance documents, such as Preparing California for Extreme Heat: Guidance and Recommendations, the profile provides a knowledge base for taking informed action to address climate change.

HVLCSD Master Storm Drainage Plan (2000)

This Storm Water Master Plan has been prepared to provide a detailed overview of the adequacy of the storm drainage facilities serving the Hidden Valley Lake Subdivision. This Storm Water Master Plan provides the following review of the hydrology and hydraulics of the watershed:

- An assessment of the carrying capacity and existing facilities,
- Preliminary recommendations on upgrades required, and
- The cost of these upgrades.
- Encroachment Standards.
- Storm Water Best Management Practices.

This Storm Water Master Plan began with the development of a watershed tributary to the Hidden Valley Lake Subdivision and the design storm. The design storms were developed using the Hydrology Design Standards, Lake County. These standards allow for use of a 10-year storm for watersheds less than one square mile in area and a 25-year storm for watershed more than one square mile in area. The 100-year design storm was also routed through critical drainage systems.

HVLCSD Strategic Plan 2013-2018

The District put together a Strategic Plan to guide operations. The overarching goal is to provide affordable, high-quality water and wastewater services to our customers. The ability to achieve this overarching goal is dependent, at least in part, on the District's ability to achieve additional goals pertaining to innovation, financial stability, governance and administrative processes, and education and outreach:

- Deliver High-Quality Water and Wastewater Services -We will continue to deliver the highest quality water and wastewater services.
- Maintain Financial Stability -We will maintain financial stability and equitable rates.
- Expand Education and Outreach -We will expand education and outreach programs to enhance customer awareness of District services and to promote government transparency.
- Offer Innovative Services -We will innovate to maximize value to the community.
- Refine Governance and Administrative Processes -We will continuously refine our governance and administrative processes to promote efficiency, transparency, and customer service.

Risk Management Plan for the Wastewater Reclamation Plant (2018)

The Hidden Valley Lake Community Services District (District) operates a Wastewater Reclamation Plant that treats domestic wastewater from the community of Hidden Valley Lake, California. The stationary source covered by this Risk Management Plan (RMP) is the Wastewater Reclamation Plant operated by the Hidden Valley Lake Community Services District (District). The only substance used at the Wastewater

Reclamation Plant that is regulated by the RMP requirements is chlorine gas. The process that uses the regulated substance is the chlorine gas storage and distribution system that adds primary 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.

Lake County Water Inventory and Analysis (2006)

Like much of California, Lake County is facing water supply challenges. County residents use water for multiple purposes including urban, agricultural, environmental, and recreational needs. These water demands are growing, which places increasing pressure on the County's surface and groundwater supplies.

In 2004, to further its objective to help with water resource planning in the County, the District applied for an AB303 grant from the California Department of Water Resources (DWR). DWR awarded funding to the District to complete this Inventory and Analysis Report and a Countywide Groundwater Management Plan that is also underway. In addition to providing funding, DWR Northern District helped complete the Inventory and Analysis.

Water, Sewer, & Recycled Water Rate Study Report (2019)

In 2014, the Hidden Valley Lake Community Services District ("District") retained NBS to complete a water and sewer rate study which resulted in a March 2015 rate study report, and new rates were implemented soon afterwards. However, within a month, the San Juan Capistrano court decision was issued; this decision had significant implications for how tiered rates are designed. Essentially, the decision required water agencies to "demonstrate that the tiers correspond to the actual cost of providing service at a given level of usage." In addition, severe drought and mandated conservation throughout California prompted the District to replace its four-tiered rates with a new uniform (single tier) rate and new drought surcharges.

Since then, the District has been evaluating changes in consumption patterns, water supply limitations, future CIP funding requirements, and the desire to continue to improve the fairness and equity of rates. In light of these considerations, an updated rate study was needed. This revised rate study presents significant changes related to funding assumptions for planned water and sewer capital projects along with significant increases in recorded commercial water consumption due to meter reading issues.

This re-evaluation of the District's water, sewer and recycled water rates is intended to ensure these rates meet basic Proposition 218 (Prop 218) requirements, industry standards, reflect the District's current priorities, and promote transparent communications between the District and its ratepayers.

Ordinances

The District has put forth ordinances relating to mitigation of natural hazards in the District. These include the following:

Regulations for Water Discharge and Sewer Use (Ordinance 59.1)

It is the intent of this Ordinance to protect from any actual or threatened discharge which reasonably appears to present an imminent or substantial danger to the health or welfare of any Person or to the environment, or which reasonably appears to present imminent or substantial interference with the Public Owned Treatment Works (POTW), or which reasonably may cause HVLCSD to violate any condition of its regulatory permits.

Water Conservation Ordinance (Ordinance 55)

During periods of drought, the District may enact the Water Conservation Ordinance. In 2014, the following took effect when the ordinance took effect and was in place:

Outdoor irrigation of ornamental landscapes or turf with potable water shall be limited to no more than two days per week, with the following "irrigation day" restrictions:

- All properties with even-numbered street addresses shall limit outdoor irrigation of ornamental landscapes or turf to no more than two of the following days: Sunday, Tuesday, Thursday and Saturday.
- All properties with odd-numbered street addresses shall limit outdoor irrigation of ornamental landscapes or turf to no more than two of the following days: Monday, Wednesday, Friday and Saturday.

The above outdoor irrigation restrictions shall become effective immediately upon adoption of this Ordinance and shall remain in effect until rescinded.

4.4.2. HVLCSD Administrative/Technical Mitigation Capabilities

Table 4-76 identifies the District personnel responsible for activities related to mitigation and loss prevention in the District.

Table 4-76 HVLCSD Administrative/Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N/A	
Mitigation Planning Committee	Y	Board of Directors, District Engineers, General Manager.
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Managed by General Manager and Utility Supervisor
Mutual aid agreements	Y	District is member of CalWARN
Other	Y	It should be noted that several individuals at the District have been certified in FEMA ICS 100, 200, 700 and 800
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	Jurisdiction of Lake County

Floodplain Administrator	N	Jurisdiction of Lake County
Emergency Manager	Y	The General Manager is trained, and coordinates with Lake County Managers.
Community Planner	N	
Civil Engineer	Y	Professional Services Agreement with Civil Engineering firm. The firm's staff is trained and coordinates with District staff.
GIS Coordinator	Y	Currently understaffed for this position, utilizing CivicSpark fellowship program to expand this capability.
Other		
Technical	**Y/N**	**Describe capability** **Has capability been used to assess/mitigate risk in the past?**
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Website, FB page, and door to door notification if necessary. Adherence to state regulatory requirements (boil water notice, etc.). Always room for improvement. There is also a CERT Team that is active.
Hazard data and information	Y	Developing LHMP, RMP approved 4-30-18, Several NOIs and Subapplication. Always room for improvement
Grant writing	Y	Submitted applications to DWSRF, CWSRF, IRWM, USBR, FEMA HMGP, FEMA RPA. Always room for improvement.
Hazus analysis	N	
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. Enhanced GIS capabilities inhouse.		

4.4.3. HVLCSD Fiscal Mitigation Capabilities

Table 4-77 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table 4-77 HVLCSD Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Past telemetry improvements, collection system generators. Currently contributing to both water and wastewater capital funds in anticipation for future mitigation actions.
Authority to levy taxes for specific purposes	N	

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Fees for water, sewer, gas, or electric services	Y	Water & 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	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	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.
Incur debt through private activities		
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.
Other federal funding programs	Y	Used and will continue to use when appropriate FEMA/CalOES RPA, FEMA HMGP, USBR, USDA
State funding programs	Y	Applied, and will continue to apply when appropriate CWSRF, DWSRF FEMA/CalOES RPA
Other	Y	CivicSpark fellowship program, Volunteers, In kind services, Donations
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 Mitigation Education, Outreach, and Partnerships

Table 4-78 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 4-78 HVLCSD Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	Participant in local emergency preparedness organizations.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Website, local event participation (Firewise, Concerts on the Green) "Friday Flush" Facebook page weekly updates

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Natural disaster or safety related school programs	Y	Annual "jog a thon" sponsored by the District, and incorporates Water Conservation artwork on jog a thon T-shirts.
StormReady certification	N	
Firewise Communities certification	Y	
Public-private partnership initiatives addressing disaster-related issues	Y	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 (State Legislative Committee), Electronic Annual Report (Input forum), Community Organizations Active in Disaster, Volunteer Organizations Active in Disaster, PG&E, Integrated Regional Water Management
Other		
How can these capabilities be expanded and improved to reduce risk?		
These capabilities are currently at a 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 has sought and completed many other mitigation activities not captured above. These include:

- 1994 Water Distribution Improvements – New booster pumping stations and water tanks
- 2012 – 2014 SCADA Improvements – New PLC installations
- 2016 Wastewater Collection System Improvements – Generators installed at all Lift Stations
- 2017 Disaster Repair to Wastewater Treatment Plant – EQ basin, filtration basin, and chlorination basin, telemetry, pump, and road repair
- 2017 I&I remediation – Water Balance report, Assessment, Manhole lid replacement, Sewer line point repairs
- 2017 HMGP NOIs – Water Distribution improvements, Water Storage improvements, Water Supply improvements, Backup Power improvements, Fire Suppression improvements, Flood Control improvements
- 2018 HMGP Subapplication LHMP
- 2019 – HMGP Subapplications Tank Replacement, Water system Generators
- 2019 HMGP NOI – Collection System Improvements
- Climate Change
    - ✓ District will consider a Climate Action Plan, Master Water Plan, etc. to address climate change

- The District has a climate resiliency video on their website to educate District staff and clientele as to the risks of climate change to HVLCSD water supplies.

- Multi-Hazard – -Established a SCADA system
- Dam Failure
  - New EAP, and inundation study and mapping
  - warning systems in place (sirens)
  - ongoing inspection and maintenance
- Earthquake – Install seismic hold-down straps on 1-ton chlorine cylinders to reduce chance of chlorine release during seismic shaking events.
- Drought and Water Shortage
  - The Hidden Valley Lake Association uses treated effluent to spray irrigate the community golf course within the Hidden Valley Lake Subdivision. The golf course is approximately 135 acres and is owned by the HVLA.
  - Ongoing monitoring and studies of 12+ wells over 30+ years to establish sustainability of water supply
  - Ongoing updating of Water Master Plan
  - Participation in IRWMP
  - The District is examining and evaluating existing well sources for rehabilitation or reworking to increase production capabilities. The District's water distribution system consists of 31 miles of water main, including the raw water distribution mains from the Grange Well cluster to the District's water treatment plant. The District is also working toward increasing the efficiency of water delivery. Data evaluation of water production versus water sold has identified that the water distribution system has areas prone to leakage. Inspections, looking for water waste, reducing system pressures, and increasing the frequency of system checks are all being researched.
- Dam Failure – The dam is inspected and monitored by the HVLA Owners Association.
- Extreme Heat - ongoing (5-year) project to lower ph.
- Severe Weather: Heavy Rains and Storms – ongoing project to seal/retrofit manholes (new concrete, replacing lines, some new piping)
- Levee failure/ High Winds/Flooding – HVLA has initiated a no wake rule throughout the Lake
- The HMPC noted that portions of the Lake County General Plan apply to the District. Appropriate setbacks from areas that flood as well as drainage mitigation measures should be included in all new development proposals. The Lake County General Plan calls for restrictions on development within designated floodway and floodway fringe areas and recommend the following guidelines:
  - Critical facilities (those facilities that should be open and accessible during emergencies) should not be permitted.
  - Passive recreational activities (those requiring no development or non-intensive development, such as hiking, horseback riding and picnicking) are permissible.
  - New development and divisions of land, especially residential subdivisions, shall be developed to minimize flood risk to structures, risk to infrastructure, and ensure safe access during flood conditions.
  - The County shall impose stringent controls on approvals of septic systems where there is a substantial likelihood of infiltration of floodwater into the systems, and/or the discharge from the systems into floodwaters.

  - ✓ All buildings and utilities must be designed to conform to the County Floodplain Management Ordinance (Chapter 25 of the Lake County Municipal Code) and the County Storm Water Management Ordinance (Chapter 29 of the Lake County Municipal Code).
- The District completed a Emergency Notification Plan in May of 2019.

Chapter 5 Mitigation Strategy

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

This section describes the mitigation strategy process and mitigation action plan for this 2020 HVLCSD LHMP. It describes how the District 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 HVLCSD and the Hazard Mitigation Planning Committee (HMPC) led to the mitigation strategy and mitigation action plan for this LHMP.

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

- **Communicate** the hazard information collected and analyzed through this planning process as well as success stories so that the community better understands what can happen where and what they themselves can do to be better prepared.
- **Implement** the action plan recommendations of this LHMP.
- **Use/enforce** existing rules, regulations, policies, and procedures already in existence.
- **Monitor** multi-objective management opportunities so that funding opportunities may be shared and packaged, and broader constituent support may be garnered.

5.1.1. Continued Compliance with NFIP

To participate in the National Flood Insurance Program (NFIP), a community must adopt and enforce floodplain management regulations that meet or exceed the minimum requirements of the Program. These requirements are intended to prevent loss of life and property and to reduce taxpayer's costs for disaster relief as well as minimize economic and social hardships that result from flooding. A community, as defined for the NFIP's purposes, is any state, area, or political subdivision; any Indian tribe, authorized tribal organization, or Alaska native village; or authorized native organization that has the authority to adopt and enforce floodplain management ordinances for the area under its jurisdiction. In most cases, a community is an incorporated city, town, township, borough, or village, or an unincorporated area of a county or parish.

Since the District does not meet the NFIP definition of a community, it does not administer its own floodplain management program under the NFIP, but instead, complies with the flood requirements established by the State of California and Lake County in which its facilities are located. As such, the District is committed to reducing flood loss through compliance with these established floodplain management regulations. Further evidence of the District's commitment to reducing flood loss is included in the flood mitigation actions contained in this LHMP that support their ongoing efforts to minimize the risk and vulnerability of the District to their flood hazard and to enhance their overall internal floodplain management program. The HVLCSD will continue to manage their existing and future facilities in continued compliance with the NFIP as established by the State of California and Lake County.

5.1.2. Integration of Mitigation with Post Disaster Recovery and Mitigation Strategy Funding Opportunities

Hazard Mitigation actions are essential to weaving long-term resiliency into all community and HVLCSD recovery efforts so that at-risk infrastructure, development, and other District assets are stronger and more resilient for the next severe storm or hazard 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 jurisdictions become more resilient and sustainable. It is often most efficient to fund all eligible infrastructure mitigation through FEMA's Public Assistance mitigation program if the asset was damaged in a storm or other hazard 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 as part of post disaster redevelopment and mitigation policies and procedures.

The District, 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 establish a recovery system in order to return the HVLCSD to its normal state of affairs. Mitigation is emphasized as a major component of recovery efforts.

Mitigation Strategy Funding Opportunities

An understanding of the various funding streams and opportunities will enable the 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 pre- and post-funding opportunities include the following.

FEMA HMA Grants

Cal OES administers three main types of HMA grants: (1) Hazard Mitigation Grant Program, (2) Pre-Disaster Mitigation Program, and (3) Flood Mitigation Assistance Program. Eligible applicants for the HMA include state and local governments, certain private non-profits, and federally recognized Indian tribal governments. While private citizens cannot apply directly for the grant programs, they can benefit from the programs if they are included in an application sponsored by an eligible applicant.

FEMA Public Assistance Section 406 Mitigation

The Robert T. Stafford Disaster Relief and Emergency Assistance Act provides FEMA the authority to fund the restoration of eligible facilities that have sustained damage due to a presidentially declared disaster. The regulations contain a provision for the consideration of funding additional measures that will enhance a facility's ability to resist similar damage in future events.

Community Development Block Grants

The California Department of Housing and Community Development administers the State's Community Development Block Grant (CDBG) program with funding provided by the U.S. Department of Housing and Urban Development. The program is available to all non-entitlement communities that meet applicable threshold requirements. All projects must meet one of the national objectives of the program – projects must benefit 51 percent low- and moderate-income people, aid in the prevention or clearance of slum and blight or meet an urgent need. Grant funds can generally be used in federally declared disaster areas for CDBG eligible activities including the replacement or repair of infrastructure and housing damaged during, or as a result of, the declared disaster.

Small Business Loans

SBA offers low-interest, fixed-rate loans to disaster victims, enabling them to repair or replace property damaged or destroyed in declared disasters. It also offers such loans to affected small businesses to help them recover from economic injury caused by such disasters. Loans may also be increased up to 20 percent of the total amount of disaster damage to real estate and/or leasehold improvements to make improvements that lessen the risk of property damage by possible future disasters of the same kind.

Increased Cost of Compliance

Increased Cost of Compliance (ICC) coverage is one of several resources for flood insurance policyholders who need additional help rebuilding after a flood. It provides up to $30,000 to help cover the cost of mitigation measures that will reduce flood risk. ICC coverage is a part of most standard flood insurance policies available under NFIP.

5.2 Goals and Objectives

Requirement §201.6(c)(3)(i): [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 and HMPC has organized resources, assessed hazards and risks, and documented mitigation capabilities. The resulting goals, objectives, and mitigation actions were developed based on these tasks. The HMPC held a series of meetings and exercises designed to achieve a collaborative mitigation strategy as described further throughout this section. Appendix C documents the information covered in these mitigation strategy meetings, including information on the goal's development and the identification and prioritization of mitigation alternatives by the HMPC.

During the initial goal-setting meeting, the HMPC reviewed the results of the hazard profiles, 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.

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

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

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

HMPC members were provided with the list of sample goals to consider. They were told that they could use, combine, or revise the statements provided or develop new ones, keeping the risk assessment in mind. Each member was given three index cards and asked to write a goal statement on each. Goal statements were collected and grouped into similar themes during the meeting. The goal statements were then grouped into similar topics. New goals from the HMPC were discussed until the team came to consensus. Some of the statements were determined to be better suited as objectives or actual mitigation actions and were set aside for later use. Next, the HMPC developed objectives that summarized strategies to achieve each goal.

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

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

5.3 Identification and Analysis of Mitigation Actions

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

In order to identify and select mitigation actions to support the mitigation goals, each hazard identified in Section 4.1 was evaluated. Only those hazards that were determined to be a priority hazard for purposes of mitigation action development were considered further in the development of hazard-specific mitigation actions.

These priority hazards (in alphabetical order) are:

- Climate Change
- Dam Failure
- Drought and Water Shortage
- 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, Snow, and Storms
- Severe Weather: High Winds
- Wildfire

The HMPC eliminated the hazards identified below from further consideration in the development of mitigation actions because the risk of a hazard event in the District is unlikely or nonexistent, the vulnerability of the District is low, capabilities are already in place to mitigate negative impacts, or the District does not have the authority or control over mitigation of the hazard. The eliminated hazards are:

- Aquatic Biological Hazards: quagga mussel (originally a hazard of concern, but dropped from consideration after review of the hazard profile and vulnerability assessment)
- Landslide and Debris Flows

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

Once it was determined which hazards warranted the development of specific mitigation actions, the HMPC analyzed viable mitigation options that support the identified goals and objectives. The HMPC was provided with the following list of categories of mitigation actions, which originate from the NFIP's 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 development in considering possible mitigation actions. A facilitated discussion then took place to examine and analyze the options. Appendix C provides a detailed review and discussion of the six mitigation categories to assist in the review and identification of possible mitigation activities or projects. Also utilized in the review of possible mitigation measures is FEMA's publication on Mitigation Ideas, by hazard type. Prevention type mitigation alternatives were discussed for each of the priority hazards. This was followed by a brainstorming session that generated a list of preferred mitigation actions by hazard.

5.3.1. Prioritization Process

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

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

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

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

The Mitigation Strategy Meeting Handout, which included hazard summaries, mitigation action categories, sample hazard actions, and prioritization criteria is included in Appendix C.

With these criteria in mind, HMPC members were each given a set of nine colored dots, three each of red, blue, and green. The dots were assigned red for high priority (worth five points), blue for medium priority (worth three points), and green for low priority (worth one point). The team was asked to use the dots to prioritize actions with the above criteria in mind. The point score for each action was totaled. Appendix C contains the total score given to each identified mitigation action.

The process of identification and analysis of mitigation alternatives allowed the HMPC to come to consensus and to prioritize recommended mitigation actions. During the voting process, emphasis was placed on the importance of a benefit-cost review in determining project priority; however, this was not a quantitative analysis. The team agreed that prioritizing the actions collectively enabled the actions to be ranked in order of relative importance and helped steer the development of additional actions that meet the more important objectives while eliminating some of the actions which did not garner much support.

Benefit-cost was also considered in greater detail in the development of the Mitigation Action Plan detailed below in Section 5.4. The cost-effectiveness of any mitigation alternative will be considered in greater detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this LHMP.

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

5.4 Mitigation Action Plan

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

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

Table 5-1 identifies the HVLCSD mitigation actions for this LHMP. For each mitigation action item included in Table 5-1 the section that follows includes a detailed mitigation implementation strategy by mitigation action for all District actions.

Table 5-1 identifies the mitigation actions for the HVLCSD. Following this summary table of mitigation actions, a detailed implementation description is included for each mitigation action identified in the table. The implementation of any mitigation action in this Plan is subject to available funding of the District as the primary implementing jurisdiction for this LHMP.

As described throughout this LHMP, the HVLCSD 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 District to consider for implementation over the next 5-years covered by this LHMP. 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 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 District has numerous existing, detailed action descriptions, which include benefit-cost estimates, in other planning documents and programs, such as their Strategic Plan, stormwater plan, 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 HMPC also realizes that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions, as necessary, as long as they conform to the overall goals of this LHMP.

Further, it should be clarified that the actions included in this mitigation strategy are subject to further review and refinement; alternatives analyses; reprioritization due to funding availability and/or other criteria; and District board approval. 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.

It should be noted that some of these mitigation efforts are collaborative efforts among multiple local, state, and federal agencies. **In addition, the public outreach and education action, as well as many of the emergency services and other multi-hazard actions, apply to all hazards regardless of hazard priority.** Collectively, this HVLCSD multi-hazard mitigation strategy includes only those actions and projects which reflect the actual priorities and capacity of the District to implement over the next 5-years covered by this LHMP.

Table 5-1 HVLCSD's Mitigation Actions

Action Title	Responsible Agencies and Partners	Address Current Development	Address Future Development	Continued Compliance with NFIP	Mitigation Type
Multi-Hazard Mitigation Actions					
Action 1. Water Distribution System Reliability	HVLCSD	X	X		Property Protection
Action 2. Generator Projects for all Critical Facilities and Infrastructure	HVLCSD	X	X		Property Protection Emergency Services
Action 3. Establish Fully Functioning GIS Capabilities	HVLCSD	X	X		Prevention Emergency Services
Action 4. Water Storage and Materials	HVLCSD	X	X		Property Protection Structural Projects
Action 5. Establish Additional Well(s)	HVLCSD	X	X		Prevention Property Protection
Action 6. Chlorine Automatic Shut-off Valve	HVLCSD	X	X		Prevention Property Protection
Action 7. Develop Risk and Resilience Plan (RRP), and Emergency Response Plan (ERP)	HVLCSD	X	X		Prevention Emergency Services
Action 8. Improve the SCADA system	HVLCSD	X	X		Prevention Property Protection
Action 9. Public Awareness Program	HVLCSD	X	X		Public Information
Action 10. Wastewater Treatment Plant Improvements	HVLCSD	X	X		Property Protection
Action 11. Update Water Master Plan	HVLCSD	X	X	X	Prevention
Climate Change Actions					
Action 12. Develop HVLCSD Climate Action Plan	HVLCSD	X	X	X	Prevention

Action Title	Responsible Agencies and Partners	Address Current Development	Address Future Development	Continued Compliance with NFIP	Mitigation Type
Dam Failure, Flood, Localized Flood, Levee Failure Actions					
Action 13. I & I Program	HVLCSD	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 14. Update and Implement Stormwater Master Plan	HVLCSD/Lake County Water Resources Department/HVLA	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 15. Establish Cross Functional Committee and Address Levee & Stream Issues	HVLCSD/Lake County Water Resources/HVLA	X	X	X	Property Protection Structural Projects Natural Resource Protection
Action 16. Chlorine Analyzers	HVLCSD	X	X		Property Protection
Action 17. Dam Inundation Mitigation	HVLCSD/Lake County Water Resources/HVLA	X	X	X	Property Protection Structural Projects Natural Resource Protection
Drought Actions					
Action 18. Rescind the Water Moratorium	HVLCSD	X	X		Property Protection
Action 19. Hexavalent Chromium	HVLCSD	X	X		Property Protection Natural Resource Protection
Earthquake Actions					
Action 20. Earthquake Vulnerability Assessment and Retrofit	HVLCSD	X	X		Property Protection Structural Projects
Wildfire Actions					
Action 21. Fuel Mitigation	HVLCSD	X	X		Prevention Property Protection Natural Resource Protection
Action 22. Add/Improve/Fortify Fire Hydrants	HVLCSD	X	X		Prevention Property Protection Natural Resource Protection Emergency Services

Multi-Hazard Actions

Action 1. Water Distribution System Reliability

Hazards Addressed: Climate Change, Drought and Water Shortage, Flood: 1%/0.2%; Flood: Localized Stormwater Flooding; Earthquake; Wildfire

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background: The delivery of safe drinking water is dependent upon the safety of the water conveyance system. Buried underground the community of Hidden Valley Lake lies 20 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.

- Hidden Valley Lake is located in a "Very High" earthquake hazard zone.
- The frequency and intensity of winter storms is increasing.
- 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, to cracks, to 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. service.

Similarly, the loss of drinking water during times of drought is an unacceptable consequence of natural events, and an irresponsible position for HVLCSD.

Project Description: The Water Distribution System Reliability project will address the above mentioned hazards with three different facets of mitigation.

- Water Meters – At the nexus of the HVLCSD distribution systems and the individual household, these devices will be upgraded to modern standards of efficiency and leak detection. Water meters will also be installed at previously un-metered locations within the distribution system, such as fire hydrants. As is identified in the AWWA standards document for water meters, M6, Edition #5. Newer water meters provide the utility with the best protection against natural events and water loss.
- Correlators – Noise correlation techniques can pinpoint leaks within the 20 miles of pipeline throughout the community with a very high degree of accuracy. The identification process of identifying weak spots within the distribution system would then lead to prioritization of repair and replacement activities to mitigate the most vulnerable areas.
- 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.

Other Alternatives: The alternatives are either to replace pipes based on the date of install, 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, 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

Project Priority: High

Cost Estimate: $5,500,000

Benefits (Losses Avoided):

- Threat to public safety (insufficient water supply, landslide)
- Wildfire conflagration (insufficient water supply)
- Damage to property (subsidence, landslide, wildfire)
- GHG reduction (insufficient water supply)

Potential Funding: In-kind services, Water Use Fees, Capital funds, Federal and State grant funding

Timeline: 36 months

Action 2. Generator Projects for all Critical Facilities and Infrastructure

Hazards Addressed: Dam Failure, Earthquake, Flood (1%/0.2%), Levee Failure, Localized Flood, Severe Weather: Heavy Rains and Storms, Wildfire

Goals Addressed: 1, 2, 3, 4, 5, 6

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, Hidden Valley Lake Community Services District's (HVLCSD) ability to deliver drinking water to the community will be compromised. Three groundwater wells, and three pump stations draw electricity to deliver drinking water to the community. None of these locations have redundant power capabilities. These key areas of the water distribution system represent a risk to the water delivery of approximately 2500 connections. As a municipality, the day-to-day operations of administrative staff are crucial to the fiscal health and longevity of the business, which is also rendered inoperable during a power loss.

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 four water delivery pump stations. In order for water to be made available for households and firefighters, electricity required to pump up to 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.

Four generators in these key locations 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 the firefighting community 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 generators available to keep the water and operations flowing, or a wrong-sized generator. Neither of these possibilities would be a fiscally responsible plan.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Water Master Plan, 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

Project Priority: High

Cost Estimate: $2.6M

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

Timeline: 30 Months

Action 3. Establish Fully Functioning GIS Capabilities

Hazards Addressed: Climate Change, Dam Failure, Drought & Water Supply, Flood, Localized Flood, Levee Failure, Severe Weather, Wildfire, and any other natural hazards affecting infrastructure.

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background: Hidden Valley Lake was built in 1968 and was mapped on paper by a drafter. These initial maps that are more than a half a century old, are the most recent complete maps of the sewer and water infrastructure of HVLCSD. Over time some of these maps have been lost, there are no complete records of the spatial location of the infrastructure from those maps at HVLCSD or at the office of the developer that built them.

In recent years some GIS work has been conducted, mapping a portion of the above ground assets in the community as well as some of the sewer infrastructure. This project has more mapping to be done. The underground water infrastructure has not been documented in GIS at all.

During a drought, a reliable water supply is extremely important. In the event of a severe water leak, the speed in which that leak is resolved can depend on the accuracy of spatial information. If field personnel are not aware of the location of valves within the water conveyance system, more time is necessary to find a way to isolate that leak, and consequently more water is lost.

Preventative measures for flooding events include infrastructure upgrades such as manholes. Without an accurate spatial depiction of manhole replacements, the value of the project is diminished.

The severity of natural hazards is contingent upon how it may interact with the topography of the land, the natural features, and the human made developments. It is therefore crucial for these developments to be accurately mapped and rendered in a three-dimensional fashion to understand their potential impacts during an extreme event such as drought, flood, or wildfire.

Project Description: The Establish Fully Functioning GIS Capabilities project would resolve this issue by completing the needed mapping of all HVLCSD infrastructure. This mapping would take place in a cooperative effort between field personnel and administrative staff. The magnitude and complexity of the information that needs to be gathered and organized may also require outsourced assistance.

In the event of a break of a mainline, time is of the essence. A complete map of the water infrastructure would help staff quickly locate the valves to turn off the main in the field, instead of spending precious time looking for paper representations of valves, or relying on individual memories.

A complete map also lends itself to a streamlined, and easily accessible source of asset management activities. Initial asset assessments would be a benchmark for ongoing preventative maintenance such as hydrant flushing, which ensures water is available for fire-fighters. Geo-spatial maintenance documentation can also highlight areas where underground flood prevention work has been done and where it has not.

Spatial understanding of water and wastewater infrastructure is of vital importance to a water utility. This understanding helps in keeping up to date with infrastructure repairs from natural disasters as well as incorporating new technologies. GIS, or Geographic Information Systems, are the modern standard for mapping.

Not only would this project update the maps of HVLCSD, it would also get the utility to a place that can record upgrades and maintenance in a spatial fashion. A record of work done, spatially, enables staff to recognize where problem areas are and how they relate to other areas that receive less attention. Understanding the spatial aspects of a system can lead to more effective ways of solving issues.

Other Alternatives: No additional updates to GIS database and rely on dated maps with faulty information. Much of the information needed to understand the impacts of past natural disasters are not recorded and are stored solely in the minds of staff. Without updates to the GIS database historical information will be lost with the loss of staff.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Water Master Plan, Strategic Plan, staffing to meet goals, Five-year budget plan for Operations and Capital Funds, Contracting agreement.

Responsible Office/Partners: Hidden Valley Lake Community Services District

Project Priority: High

Cost Estimate: $.4M

Benefits (Losses Avoided): Mapping of assets, easy to spatially update maintenance, and enables the furthering of other projects. This project would increase and maintain wildfire prevention and protection. This project would 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 would minimize risk and vulnerability of HVLCSD to hazards and protect lives and prevent losses to property and the environment.

Potential Funding: FEMA HMGP 404 and 406 Grant Funding, Water and Sewer Use Fees, In-kind services, and State Funding

Timeline: 30 Months (and ongoing)

Action 4. Water Storage and Materials

Hazards Addressed: Wildfire/Drought & Water Supply/Earthquake/Heavy Rains and Storms, Localized Flooding

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background: The very real 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 five redwood tanks with four modern steel tanks. Steel will significantly reduce the potential damages 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. Ensuring increased storage capacity not only aids in firefighting, but also guards against potential drought conditions. Meeting our 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, 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

Project Priority: High

Cost Estimate: $5.4M

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

Timeline: 36 Months

Action 5. Establish Additional Well(s)

Hazards Addressed: Wildfire/Drought & Water Supply/ Flood 1%/0.2%

Goals Addressed: 1, 2, 3, 4, 5, 6

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. The three groundwater wells that provide drinking water for the Hidden Valley Lake Community are adjacent to Putah Creek, and are all within approximately 1000 feet of each other. Electrical service, pumping capabilities, water main tie-ins, and regular maintenance activities serve as benefits for having the wells in close 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.

A result of Putah Creek adjudication, the Settlement Agreement of 1995, closely monitors water rights users' consumption according to their permits. Since the Hidden Valley Lake Community Services District's groundwater wells are defined as being under the influence of surface water, there does not currently exist an alternate source of water during extreme climactic events of drought or water shortage.

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, and not under the influence of Putah Creek. 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, Hidden Valley Lake Community Services District (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, 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

Cost Estimate: $4M

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

Timeline: 36 Months

Project Priority: Medium

Action 6. Chlorine Automatic Shut-off Valve

Hazards Addressed: Wildfire/Earthquake

Goals Addressed: 1, 2, 3, 4, 6

Issue/Background: Hidden Valley Lake Community Services District (HVLCSD) treats wastewater from Hidden Valley Lake, California by several processes, once of which utilizes 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 latest edition of the RMP (2018), updated every 5 years, there is a recommendation to install an automatic shut-off valve of the chlorine feed lines that would protect employees and the public in the event of a chlorine gas leak.

The chemical CL2 is an oxidant that is toxic to eyes, skin, and by inhalation. Immediate danger to life and health (IDLH) is recognized at concentrations of at least 10 ppm. With the potential maximum of 4,000 pounds of chlorine gas contained at the wastewater treatment plant, every precaution is taken to protect against accidental release.

Section 5 of the RMP identifies protections against accidental release. Further examination of potential release scenarios is located in Appendix D, Checklist. Installing automatic shut-off valves in feed lines, in addition to the existing vacuum alarms was identified as a protective measure.

The community of Hidden Valley Lake is located in an Earthquake Hazard Zone of "Very High", which is the highest rating the EPA provides. An accidental release could occur in the event of ground subsistence due an earthquake.

Hidden Valley Lake is located in an "Elevated" fire threat zone as illustrated in the CPUC Fire-Threat Map of 2019. 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.

Safety to employees and the community is of the utmost importance to HVLCSD, and is therefore committed to following through with improvement opportunities identified in this Risk Management publication.

Project Description: HVLCSD follows the regulations set forth by the Federal Occupational Safety and Health Administration, California Occupational Safety and Health Administration, and the California Accidental Release Prevention Program, as detailed in their Risk Management Plan for the Wastewater Reclamation Plant (RMP). To fulfill amendments to the plan made in 2018 HVLCSD will seek out a contractor to install automatic shut-off valves in the chlorine feed lines.

HVLCSD will utilize their partnership with their contracted engineers to adjust their current chlorine treatment operation. This adjustment will involve the addition of two valves at chlorination feed lines.

With the addition of this new safety feature wastewater treatment plant operators, as part of the field operation team, will be trained in the new procedures surrounding the new equipment, and added to the annual training requirement. This RMP will subsequently be amended by this newest improvement.

Other Alternatives: The alternative is to implement an automatic shut-off valve. The lack of a chlorine automatic shut-off valve does not keep HVLCSD's employees and surrounding community as save as possible against accidental chlorine releases in the event of a natural disaster.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Strategic Plan, Risk Management Plan, staffing to meet goals, Five-year budget plan for Operations and Capital Funds, Contracting agreement, and Wastewater Operations and Maintenance.

Responsible Office/Partners: Hidden Valley Lake Community Services District

Project Priority: High

Cost Estimate: $46K

Benefits (Losses Avoided): This project would minimize risk and vulnerability of HVLCSD to hazards and protect lives and prevent losses to property and the environment by preventing chlorine gas from threatening the health of people and the environment.

This project would 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. By installing automatic shut-off valves, chlorine gas leaks will not create, or compound the effects of, a disaster.

This project would help HVLCSD increase and maintain wildfire prevention and protection by keeping chlorine leaks away from common chemicals, ammonia and turpentine, that it can react with and form an explosion.

Potential Funding: In-kind services, Water Use Fees, Capital funds, Federal and State grant funding

Timeline: 12 months

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

Hazards Addressed: Multi-hazard

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background: In accordance with America's Water Infrastructure Act (AWIA) of October 23, 2018, Section 2013, HVLCSD must create and certify an RRP and ERP. There is currently no risk assessment for this community water system for malevolent acts, and this must be included in the RRP.

The procedures and protocols of an HVLCSD emergency, that calls upon the utility's Incident Command Structure (ICS) is only partially completed. The existing Risk Management Plan's (RMP) focus is solely on the event of a chlorine gas release. There are no documented plans in place for other types of emergencies. The certification deadline for these plans is 2021.

Project Description: The RPP and ERP project will be conducted in three phases, RPP development, development of the ERP document, then finally certification of these documents with the USEPA.

Upon the completion and acceptance of the LHMP, the RPP phase of this project will utilize the risks identified in the LHMP and add threats for malevolent acts. These threats are categorized in the "Baseline Information on Malevolent Acts for Community Water Systems" by the USEPA are also referenced in the AWWA J100-10 "Risk and Resilience Management of Water and Wastewater Systems". Considerations for contamination, assault, and cyberattacks are amongst the topics for analysis. These three sources will provide guidelines, structure and milestones for the RPP.

The ERP phase of this project will also build upon existing capabilities within HVLCSD. The RMP ERP accepted in 2018 by LC EHS, identifies a straightforward Incident Command Structure specific to a release of chlorine gas. The Emergency Notification Plan (ENP) accepted in 2019 by SWRCB DDW illustrates the method and timelines for customer notification in the event of a water quality emergency. Additional development will be required to identify strategies, resources, plans, and procedures for other types of emergencies. The threats and risks from the RPP will be the building blocks for this response and recovery document, the ERP. Coordination with the Local Emergency Planning Committee (LEPC) and the development of a plan for resources in accordance with the AWWA Water Sector Resource Typing will be key performance indicators in this process.

The AWIA requirements are unique to the community water systems across the nation but can find similarities in Emergency Operations Plan (EOP) documents required for emergency managers in cities and counties, and Emergency Action Plan (EAP) documents for the private industry. As such, HVLCSD will incorporate the framework of California Standardized Emergency Management System (SEMS), and the Federal National Incident Management System (NIMS) when developing these documents.

The document deadlines are RRP 6/30/2021, and ERP 12/31/2021. The scheduled update of these documents (2026) is in line with the five-year LHMP schedule.

Other Alternatives: To not build upon the knowledge gained from the LHMP process and to no adhere to the law established under the AWIA of 2018 would be a disservice to HVLCSD, and could incur enforcement action for non-compliance.

Existing Planning Mechanism(s) through which Action Will Be Implemented: LHMP, Strategic Plan, RMP, ENP, Water Master Plan, Staffing plan, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District

Project Priority: High

Cost Estimate: $.2M

Benefits (Losses Avoided): Minimizing risks and vulnerabilities to the District from hazards. Protection of life, the environment, and property. An increased capability of the District to defend from hazardous events.

Potential Funding: FEMA, Water and Sewer Use Fees, HMGP Funding, In-kind services, and State Funding

Timeline: 12 Months

Action 8. Improve the SCADA system

Hazards Addressed: Wildfire/Flood/Earthquake

Goals Addressed: 1, 2, 3, 4, 5, 6

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 conflagration. The loss of the flood pumping station PLCs also subverted the area's future ability to protect against flooding caused by excessive runoff in the Valley Fire burn scar 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 this municipality presents unique challenges in the protection against natural hazards. Standard operations and maintenances of the complex, and continually changing technology of SCADA can lead to staffing gaps that leave a level of exposure to HVLCSD and the community it serves.

Project Description: The project to improve the SCADA system would 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: 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

Project Priority: High

Cost Estimate: $1M

Benefits (Losses Avoided): Achieving LHMP Goals of:

- 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: 24 Months

Action 9. Public Awareness Program

Hazards Addressed: Multi-Hazard

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 & 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 & 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 the 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
- Nixle alerts – Integrate efforts for a consistent message with the HVLA Nixle 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

Cost Estimate: $.2M

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 and District budgeting

Timeline: 12 months (And ongoing)

Action 10. Wastewater Treatment Plant Improvements

Hazards Addressed: Freeze & Cold/Extreme Heat/Heavy Rain

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background: Extreme weather poses a threat to the successful operations of the HVLCSD wastewater treatment plant. In the absence of a successfully operating wastewater treatment plant, inundation events are likely, which expose the public to viruses, bacteria, and parasites. Other harmful solids and chemicals in sewage can damage bodies of water that support wildlife.

The tertiary treatment at HVLCSD is designed to produce recycled water, fit for irrigation purposes. The five-step treatment process takes place in five open-air basins. Exposure to heavy rain events can overwhelm these processes and render an impure output, not fit for irrigation.

In extreme heat, the five open-air basins react to temperature fluctuations and can increase pH levels. A higher pH is not in compliance with the treatment plant's waste discharge orders and is an indicator of an impure recycled water product.

In extreme cold, the five open-air basins react to temperature fluctuations with a general "slowing down" of the settling process. Operators must offset this effect in order to keep up with flows in the winter months. This offset has the negative impact of increasing the risk of a sludge overflow. Sludge overflows destroy downstream treatment mechanisms, contribute to sewer system overflows, and essentially result in a loss of function of wastewater treatment. Overworked pumps decrease the useful life of this key infrastructure element. Freezing temperatures have caused frozen pipes which also cause a loss of function of wastewater treatment.

Project Description: A key component of the wastewater treatment process is the de-watering of sludge. One wastewater treatment plant improvement would be to cover the sludge drying beds. While the wastewater treatment plant continues to operate within its design standards, extreme weather events and excessive rains continue to push the plant's capacity. An increase in the amount of pumping power would help mitigate against the increased flow through the plant. An increase in the size of overflow storage also temps manage wastewater in times of high flow. The equalization is basin 1.2M gallons and could be doubled in size. This would allow for the wastewater treatment plant to remain the same, but also be able to manage a wider range of flow, by providing diurnal storage.

Existing Planning Mechanism(s) through which Action Will Be Implemented: RMP, Strategic Plan, Regional Waterboards Waste Discharge requirement 5-00-019, Staffing plan, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District/Central Valley Regional Water Quality Control Board

Project Priority: Medium

Cost Estimate: $6M

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.

Potential Funding: In-kind services, Sewer Use Fees, Capital funds, Federal and State grant funding

Timeline: 10 Year

Action 11. Update Water Master Plan

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background: The current Water Master Plan for HVLCSD was written in 2001. With the myriad 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 agencies responsibilities and change procedures are listed in the California Water Code, California Health & Safety Code, and the California Code of Regulations. A water 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 has 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: Some bills that have been enacted into law, AB685, SB200, AB401, SB998, AB 668, SB606, have significantly changed the manner in which water agencies are allowed to conduct business. As good stewards of this natural resource, and having a commitment to its mission statement, HVLCSD should be including these and other relevant laws in the narrative of the new Water Master Plan. This narrative and adherence will help maintain the agency's regulatory compliance.

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 new 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 recent 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, Strategic Plan, LAFCO, Staffing plan, Five-year budget plan for Operations and Capital Funds.

Responsible Office/Partners: Hidden Valley Lake Community Services District

Project Priority: Medium

Cost Estimate: 100k

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

Climate Change Actions

Action 12. Develop HVLCSD Climate Action Plan

Hazards Addressed: Climate Change

Goals Addressed: 1, 2, 3, 6

Issue/Background: In accordance with SB379, local governments of California are required to plan for climate change by integrating considerations into a General Plan or adopting a separate Climate Action Plan. As water/wastewater utility, HVLCSD will adopt a separation Climate Action Plan. The California Governor's Office of Planning Research (OPR) provides recommendations for communities to satisfy this requirement which remain consistent with the messaging in the LHMP guidance materials, the California State Hazard Mitigation Plan, and the California State General Plan. Climate change requirements must be implemented by the next LHMP update.

Project Description: The HVLCSD Climate Action Plan project will meet this state requirement and receive guidance from the California General Plan guidelines. This plan will target greenhouse gas emissions (GHG), inventory these emissions and establish reduction targets. Energy expenditure at this water/wastewater utility includes pumping for both water conveyance and wastewater collection. Energy consumption during the process of wastewater treatment has been sourced by photovoltaic energy since 2012. Policies and measures will be developed, and the plan will include the tasks necessary to monitor and verify emissions reduction results.

Other Alternatives: The alternative of not developing a climate action plan puts HVLCSD in a position of non-compliance, and therefore at risks of enforcement actions and penalties.

Existing Planning Mechanism(s) through which Action Will Be Implemented: LHMP, CAP, Water Master Plan, Staffing plan, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District

Project Priority: Medium

Cost Estimate: $.2M

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: FEMA, Water and Sewer Use Fees, HMGP Funding, In-kind services, and State Funding

Timeline: 12 Months

Dam Failure, Flood, Localized Flood, Levee Failure Actions

Action 13. I & I Program

Hazards Addressed: Flooding, Localized Flood, Heavy Rains and Storms/Earthquake

Goals Addressed: 1, 2, 3, 5, 6

Issue/Background: The Hidden Valley Lake Community Services District (HVLCSD) has first-hand knowledge of the vulnerabilities it faces during extreme weather events. In the past three years, three disaster declarations, 4301, 4308, and 4434 have caused significant damage to the sewer collections system and the Wastewater Treatment Plant. This damage is reoccurring to the same equipment. 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.

A Sewer System Overflow is a critical vulnerability that HVLCSD is committed to addressing. Additionally, the inundation effect of Infiltration and Inflow from the sewer lines into the Wastewater Treatment Plant can cause of loss of function for this utility.

When the sewer system overflows onto land, the public as well as the local ecology, 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 disasters 4301 4308 and 4434, stormwater is entering the sewer collection system, and pushing this collection system, as well as 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. The Infiltration & Inflow (I & I) 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 Infiltration & Inflow Reduction project is divided into two categories that correspond to the name of the project:

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.

In recognition and commitment to the Governor's Executive order N-10-19, this resilience will be achieved through the most contemporary and innovative means that meet a multitude of benefits, such as cost effectiveness, and the long-term sewer collection needs of the community.

Other Alternatives: An alternative of Equalization Basin expansion 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) than the cause (collections system I&I).

Existing Planning Mechanism(s) through which Action Will Be Implemented: Master Storm Drainage Plan, 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

Project Priority: High

Cost Estimate: $1M

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

Timeline: 31 Months (and ongoing)

Action 14. Update and Implement Stormwater Master Plan

Hazards Addressed: Localized Flooding and Levee issues

Goals Addressed: 1, 2, 3, 5, 6

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 to be more of a challenge. Localized flooding has increased in frequency and intensity in recent years.

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 waterways of the US. At the wastewater treatment plant, inundation has caused an interruption in the processing of waste.

Stormwater is of great concern to HVLCSD as our 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 project would clearly 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.

The determination of urgency may need to change based on the changing weather patterns, which may also change the scope of each project. 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 agencies, 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 plan 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), 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

Project Priority: High

Cost Estimate: $10M

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 404 and 406 Grant Funding, Water and Sewer Use Fees, In-kind **services**, County Funding, tax base establishment, and State Funding.

Timeline: 10 years

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

Hazards Addressed: Levee failure/Flood

Goals Addressed: 1, 2, 3, 5, 6

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 creekbeds 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 (riprap) 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, 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

Project Priority: High

Cost Estimate: TBD

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: TBD

Action 16. Chlorine Analyzers

Hazards Addressed: Heavy Rain & Storms

Goals Addressed: 1, 2, 3, 5, 6

Issue/Background: Hidden Valley Lake Community Services District (HVLCSD) treats wastewater from Hidden Valley Lake, California by several processes, once of which utilizes 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 is 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.

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) of HVLCSD. 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 & 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 EQ 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: RMP, LHMP, Strategic Plan, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District

Project Priority: Medium

Cost Estimate: $100k

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

Timeline: 6 months

Action 17. Dam Inundation Mitigation

Hazards Addressed: Dam Failure

Goals Addressed: 1, 2, 3, 5, 6

Issue/Background: HVLCSD is as risk of severe infrastructure damage in the event of a complete dam breach.

As part of their Emergency Action Plan (EAP), the Hidden Valley Lake Association (HVLA) recently conducted a dam inundation study of the Coyote Creek dam in the community. This study is required by the California Division of Dam Safety and is a key element of the EAP. The 3500 AF lake has a typical water surface elevation of 1082 feet.

Using widely accepted modelling equations, a complete breach of this dam will flow at approximately 250,000 cubic feet per second (CFS) and will travel to the south and east areas of the Hidden Valley Lake community. The pressure of this water will decrease as the water flows to the southeast, but the water will have a velocity of 20 feet per second (fps) at the initial point of failure.

This initial velocity will cause an infrastructure failure at the fire hydrants located in the immediate vicinity. A single hydrant failure will cause a loss of pressure in an entire pressure zone and will risk air and vacuum in the otherwise pressurized drinking water conveyance system. Tanks supplying drinking water to this zone will quickly be depleted, and result in a loss of function for this zone.

The dam inundation simulation has calculated the speed in which this wall of water will travel through the community and at what height. Within the first 41 minutes of the initial dam breach, a 6-foot wall of water will have flooded multiple elements of the sewer collection system within the southeast portion of the Hidden Valley Lake community. Approximately 100 manholes, and 4 lift stations would be affected by this inundation event. Direct inflow of this water into the sewer system will cause the sewer collection system to overflow, and deposit sewerage onto land, and likely into bodies of water. It is believed that although the dam breach will travel primarily across the top of land, these particular elements of the sewer system (manholes, lift stations), serve as holes on the top of the land into the underground sewer system, and are therefore subject to flooding and overflow.

Project Description: The dam inundation project will help reduce the effects to the HVLCSD infrastructure in the event of a dam breach.

A key component of mitigation is the inclusion of HVLCSD into the HVLA EAP, communication portion. In the event of a dam emergency, the notification process will be executed with the first few seconds or minutes of detection. Crucial mitigation steps to protect infrastructure can be taken by HVLCSD staff that will significantly improve the effects of this inundation to the drinking water system. Before, or immediately following damage to the fire hydrants in the direct path of this water, staff can isolate the loss of water at the water storage tank. Preventing a complete loss of water in this pressure zone prevents the loss of chlorine residual, which would have led to the lack of safe drinking water.

Traditional manholes lids are not airtight, and the mitigation activity of replacing manholes lids with newer airtight technology within the inundation zone will help reduce the effect of water reaching the sewer system, and overflowing. A current capability of HVLCSD is the manhole lid replacement project. Over time and within budget, manhole lids are being replaced. To protect against the effects of dam inundation, this activity would place a higher priority on replacement activities downstream of the dam. This renewed priority must incorporate a timeline more aggressive than the current activity, and more of a fiscal commitment.

The lift stations are collection points of the sewer system. They are installed at ground level, consisting of two submersible pumps, a wet well, and a concrete slab. All lift stations in Hidden Valley Lake are equipped with generators. To protect against the damaging effect of a dam breach, a significant retrofit of this equipment would be in order. To withstand the wall of water, a floodwall around the lift station and an extension of the wet well would be required. The generators would also need to be raised to a height above base flood elevation, as indicated in the "Pumping Station Improvements in Floodplains and Floodways" article found at www.ncsafewater.org

Other Alternatives: An alternative to this project may be to take no action. The Coyote Creek (Hidden Valley) Lake Dam Inundation Study states:

> *"The theoretical flooding from a failure of the Coyote Creek Dam presented in this document far exceeds any recorded, historical flooding in this area."*

Existing Planning Mechanism(s) through which Action Will Be Implemented: EAP(HVLA), RPP(HVLCSD), ERP(HVLCSD), LHMP, Strategic Plan, Storm Master Drainage Plan (HVLA, HVLCSD, Lake County Water Resources), Staffing plan, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District/Hidden Valley Lake Association

Project Priority: Low

Cost Estimate: TBD

Benefits (Losses Avoided): Provide protection and reduce damages to HVLCSD critical infrastructure and services and minimize disruption. Establish and maximize cross-functional and multi-agency cooperation and use of shared resources

Potential Funding: FEMA, Water and Sewer Use Fees, HMGP Funding, In-kind services, and State Funding

Timeline: TBD

Drought and Water Supply

Action 18. Rescind the Water Moratorium

Hazards Addressed: Drought & Water Supply

Goals Addressed: 1, 2, 3, 6

Issue/Background: In 2014 and 2015, severe drought conditions pushed the State Water Resources Control Board, Division of Water Rights (SWRCB DWR) to issue curtailments of diversions by more junior water right holders to protect the valid prior rights of downstream right holders. In October 2014, SWRCB Division of Drinking Water issued Compliance Order no. 02_03_14R_004 to HVLCSD. The primary directive of this order was that "[HVLCSD] shall not make any additional service connections to its water system". Colloquially known as "the moratorium", this Compliance Order continues to be in effect. SWRCB DWR contends that HVLCSD is in violation of the California Health and Safety Code Section 116555 because of drought conditions and senior water right demands. Section 116555 states that "[a water system] shall ensure that the system does…the following…Provide a reliable and adequate supply of pure, wholesome, healthful, and potable water."

The Compliance Order was predicated on the notion that the District was not providing a reliable and adequate supply of water due to the curtailment of diversion under the District's water rights due to drought conditions, and potential demands from downstream diverters having prior rights.

There is an economic hardship that has ensued from the moratorium issued over five years ago as it curtails HVLCSD's ability to adequately maintain its infrastructure and fully meet its mission statement "To provide, maintain and protect our community's water". The cost of a water meter helps cover HVLCSD's debt service to the California Infrastructure and Economic Development Bank as well as the on-going repair, replacement, and maintenance of the water system. No longer successful in its mission, the HVLCSD cannot adequately protect, maintain, and certainly not provide water under this moratorium.

Larger scale economic effects of this moratorium have reached individual lot owners, and the county tax assessor's office. Lot owners that are unable to build, yet still subject to homeowner association dues, is yielding a negative return on investment on the land. Consideration to sell an unimproved lot must bear the market effect of this compliance order. The market effect for these lots is that the owners must sell at a significant reduction in value than prior to the moratorium. Selling at a loss affects the property taxes for the county. Lake County is now enduring a hardship with less tax revenue.

Project Description: The request to the SWRCB to rescind the Compliance Order includes data that HVLCSD is not in violation of the California Health and Safety Code Section 116555. If successful in its request, it will protect the community from actions related to drought curtailments.

In November of 2001 the SWRCB issued License 13527A (Application 30049A) allowing annual diversion of 651 acre-feet and Permit 20770B (Application 30049B) allowing annual diversion of up to 1,659 acre-feet on behalf of HVLCSD. These rights allow for the diversion of underflow of Putah Creek by means of its Grange Road and ag wells.

Since HVLCSD's Grange Road wells are adjacent to Putah Creek, the source of this water has been in question. HVLCSD has undertaken a subterranean stream evaluation to evaluate the geologic and hydrologic characteristics of the Coyote Basin and the District's Grange Road wells. The evaluation concludes that Grange Road Well 4 and the Ag Well are not located in a subterranean stream. The report further states that the Grange Road Well 4 and Ag Well produce percolating groundwater and are not subject to the SWRCB's water right permitting authority.

The subterranean stream evaluation revealed that while the wells were in close proximity to Putah Creek, that there is a lack of a well-defined channel. The wells therefore do not meet the four-part criteria as set forth in SWRCB Decision 1639 for what constitutes a subterranean stream.

The Compliance Order requires the District "…requires you to…secure a reliable long-term supply of water." Percolating groundwater from the Coyote Valley Basin is a secure long-term supply. The District's annual Coyote Valley Basin Groundwater Reports demonstrate that groundwater is available at the District's wells under all hydrologic conditions, and that the source is not subject to curtailment by the SWRCB. Further, the capacity of the District wells is more than sufficient to meet peak and annual water demands.

The Coyote Valley Basin has long since been defined as a low-priority basin by the California Department of Water Resources Bulletin 118. Groundwater monitoring activities over several decades have also underscored the robust nature of the Coyote Valley Basin. The HVLCSD's subterranean evaluation is currently under review by the SWRCB DWR. The results of the SWRCB DWR analysis will dictate the next steps of this project.

Other Alternatives: Other alternatives to this project would adversely affect the costs of services to all ratepayers of HVLCSD. Drilling a new well or obtaining a new water right permit to use water stored in Hidden Valley Lake for meeting municipal demands are two extremely expensive potential projects. Also present in the California Water Code Section 106.3 is that "event human being has the right to safe, clean, affordable and accessible water" These alternate projects do not meet the "affordable" aspect of this law.

Existing Planning Mechanism(s) through which Action Will Be Implemented: LHMP, Strategic Plan, Water Master Plan, Staffing plan, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District

Project Priority: High

Cost Estimate: $1M

Benefits (Losses Avoided): Continued improvements to infrastructure, equipment, and facilities. Improve sustainability and resiliency of HVLCSD

Potential Funding: Hidden Valley Lake Community Services District

Action 19. Hexavalent Chromium

Hazards Addressed: Drought & Water Supply

Goals Addressed: 1, 2, 3, 6

Issue/Background: Hexavalent Chromium (CR6) is a known carcinogen when present in the air. Concentrations of CR6 in drinking water has recently been under scrutiny in the state of California. It is present in the Coyote Valley aquifer due to the presence of serpentine rock formations in the valley. The water source for HVLCSD is located within this valley. This naturally occurring mineral is imparted into the water that is served to the Hidden Valley Lake community.

It has been observed that higher concentrations have been detected during the drier months of the year. During periods of drought when the aquifers are not as fully replenished, and water shortages last across multiple summers, the CR6 content in the water could reach levels that are of a health concern to members of the Hidden Valley Lake community.

A 10-fold reduction in the maximum contaminant level (MCL) was recently imposed on water agencies in California. The 10 ppm MCL was met with vigorous opposition and was temporarily rescinded. The State Water Resources Control Board (SWRCB) plans to re-establish an MCL to protect Californians at a level more aggressive than the EPA which is set at 100ppm.

For Hidden Valley Lake, the threat of drought coincides with the health concerns of higher levels of CR6. The primary well providing drinking water to the community currently reaches CR6 levels near 30ppm in the summer months.

Project Description: Rural water districts like HVLCSD will need to treat drinking water to the MCL that becomes the new standard. The technology of CR6 treatment continues to evolve on the eve of the new MCL requirement. HVLCSD will need to evaluate the best available treatment plan that keeps their ratepayers safe, while not over burdening water use costs to these ratepayers.

Ion exchange is a more mature technology that is very effective at removing CR6 but leaves a toxic waste product that is costly to remove. Another technology utilizing the sacrificial anode concept incorporates stannous chlorine in an electrically charged environment to alter the composition of CR6 to CR3. This compound is not hazardous yet leaves flocculent build-up in water tanks over time.

HVLCSD has been pro-active in researching existing and emerging technologies to find the most beneficial solution to ratepayers. A pilot program for the stannous chloride solution was recently conducted at HVLCSD that helped discover the side-effect of CR3 in a production environment.

Meeting the threat of drought-induced water contamination with the best treatment solution is of high priority to HVLCSD and will need to be completed in a timely manner.

Other Alternatives: There are several alternative methods to CR6 treatment. The EPA has set the following "best available technologies" for the removal of chromium (total) to below 0.1 mg/L or 100 ppb: a) coagulation/filtration, (b) ion exchange, (c) lime softening, and (d) reverse osmosis membrane processes.

Part of the discovery process of this project will be to determine the best solution for the anticipated Californian MCL

Existing Planning Mechanism(s) through which Action Will Be Implemented: SWRCB regulations compliance, Strategic Plan, Water Master Plan, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District/State Water Resources Control Board

Project Priority: Medium

Cost Estimate: $2M

Benefits (Losses Avoided): Losses avoided: Threat to public health

Potential Funding: Grant funding prop1 Capital funding, water/wastewater budget line items

Timeline: 60 Months

Earthquake Actions

Action 20. Earthquake Vulnerability Assessment and Retrofit

Hazards Addressed: Earthquake

Goals Addressed: 1, 2, 3, 6

Issue/Background: Hidden Valley Lake Community Services District is in a "Very High" Relative Earthquake Hazard 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 at risk of a significant earthquake 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 is brittle and 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 at HVLCSD 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, in both areas of drinking water and wastewater.

The infrastructure of HVLCSD was built between fifty and twenty years ago. 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 their assets.

Project Description: Assessment will involve the application of American Society of Civil Engineers (ASCE) Standard 7-16 and rehabilitation Standard 41-06 to HVLCSD's buildings and other structures. The results of this assessment will shape the remaining scope of the Earthquake Vulnerability Assessment and Retrofit project. Given the wide span of structure age (from 20-50 yrs), the detail of mitigation activities will be varied. The unique nature of the community's geography and geology are considerations that will add complexity to both the assessment and the mitigation.

An existing capability of HVLCSD is its participation in the California-wide mutual aid organization called the California Water and Wastewater Agency Response Network (Cal WARN). This membership shall remain and be available 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 RRP (Risk and Resilience Plan), and ERP (Emergency Response Plan) for water and wastewater agencies, as well as the HVLA EAP (Emergency Action Plan) and the Lake County Operations of Emergency Services (OES). Agencies will also work together to maintain a consist message to the public is regards to preparedness and response.

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: Strategic Plan, staffing plan to meet partner timelines, Service Agreement Contract, Five-year budget plan for Operations and Capital Funds.

Responsible Office/Partners: Hidden Valley Lake Community Services District

Project Priority: High

Cost Estimate: $5M

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: FEMA HMGP 404 Grant Funding, Water and Sewer Use Fees, In-kind services, and State Funding.

Timeline: 48 months

Wildfire Actions

Action 21. Fuel Mitigation

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 6

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 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, 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 project will help HVLCSD and the community of Hidden Valley Lake 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 project will develop and implement a defensible space around critical and essential facilities. To continue to be able to provide water to fire-fighters, 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: Strategic Plan, staffing to meet partnership timelines, Service Agreement contract, Five-year budget plan for Operations and Capital Funds

Responsible Office/Partners: Hidden Valley Lake Community Services District

Project Priority: High

Cost Estimate: $0.4 million

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.

Timeline: 6 Months, and ongoing

Action 22.   Add/Improve/Fortify Fire Hydrants

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 6

Issue/Background: Hidden Valley Lake is located in an "Elevated" fire threat zone as illustrated in the CPUC Fire-Threat Map of 2019. 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 of 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 in order to provide the most protection against wildfire. The hydrants in Hidden Valley Lake were implemented long before these standards were developed and are a vulnerability to life and property within the community.

Project Description: The hydrant project would replace 350 standpipe, wet barrel, 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 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 place closer to each 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 un-improved 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, 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

Cost Estimate: $4.1 million

Benefits (Losses Avoided): Losses avoided: Threat to public safety and property

Potential Funding: In-kind services, Water Use Fees, Capital funds, Federal and State grant funding

Timeline: 36 Month

Project Priority: High

Chapter 6 Plan Adoption

Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, county commissioner, Tribal Council).

The purpose of formally adopting this LHMP is to secure buy-in from the HVLCSD, raise awareness of the Plan, and formalize the Plan's 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 2020 Local Hazard Mitigation Plan by passing a resolution. A copy of the generic resolution is included in Appendix D: Adoption Resolutions.

Chapter 7 Plan Implementation and Maintenance

Requirement §201.6(c)(4): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Implementation and maintenance of this 2020 HVLCSD LHMP is critical to the overall success of hazard mitigation planning. This is Planning Step 10 of the 10-step planning process. This chapter provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the Plan. The chapter also discusses incorporating the LHMP into existing planning mechanisms and how to address continued public involvement.

7.1 Implementation

Once adopted, this LHMP faces the truest test of its worth: implementation. While this LHMP contains many worthwhile actions, the HVLCSD will need to decide which action(s) to undertake first. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful LHMP implementation.

An important implementation mechanism that is highly effective and low-cost is incorporation of the LHMP recommendations and their underlying principles into other plans and mechanisms, such as strategic and operational plans, stormwater plans, Community Wildfire Protection Plans (CWPPs), Emergency Operations Plans (EOPS), Standard Operating Procedures (SOPs), and other hazard and emergency management planning efforts for the District. The HVLCSD already implement policies and programs to reduce losses to life and property from hazards. This LHMP builds upon the momentum developed through previous and related planning efforts and mitigation efforts and recommends implementing actions, where possible, through these other District mechanisms.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of the District. Implementation can be accomplished by adhering to the schedules identified for each action and through constant, pervasive, and energetic efforts to network and highlight the multi-objective, win-win benefits to each program and the HVLCSD community and its stakeholders. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of programs for coordination and multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This could include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available, the HVLCSD will be in a better position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal programs and earmarked funds, benefit assessments, and other state and federal grant programs, including those that can serve or support multi-objective applications.

Responsibility for Implementation of Goals and Activities

The HVLCSD department heads and staff are charged with implementation of various activities in this LHMP. During the annual reviews as described later in this section, an assessment of progress on each of the goals and activities in this LHMP should be determined and noted. At that time, recommendations were made to modify timeframes for completion of activities, funding resources, and responsible entities. On an annual basis, the priority standing of various activities may also be changed. Some activities that are found not to be doable may be deleted from this LHMP entirely and activities addressing problems unforeseen during development of the Plan may be added.

7.1.1. Role of Hazard Mitigation Planning Committee (HMPC) in Implementation and Maintenance

With adoption of this LHMP, the HVLCSD Water Resource Specialist (WRS) will be responsible for LHMP implementation and maintenance. The General Manager will delegate responsibility of implementation and maintenance of this LHMP. The HMPC identified in Appendix A (or a similar committee) will reconvene annually each year to ensure mitigation strategies are being implemented and the District continues to maintain compliance with applicable mitigation programs. As such, HVLCSD will continue its relationship with the HMPC, and:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Ensure hazard mitigation remains a consideration for District 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 LHMP;
- Report on Plan progress and recommended changes to the District’s governing board; and
- Inform and solicit input from the public.

The primary duty of the HVLCSD is to see this LHMP successfully carried out and to report to their governing board and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the District website.

7.2 Maintenance

Plan maintenance implies an ongoing effort to monitor and evaluate Plan implementation and to update this LHMP as progress, roadblocks, or changing circumstances are recognized.

7.2.1. Maintenance Schedule

The HVLCSD WRS is responsible for initiating LHMP 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 LHMP annually and following a hazard event. The HMPC will meet annually to review progress on LHMP implementation. The HMPC will also submit a five-year written update to the State and FEMA Region IX, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. With this LHMP anticipated to be fully approved and adopted in 2020, the next LHMP Update for the HVLCSD will occur in 2025.

7.2.2. Maintenance Evaluation Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in this LHMP. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or
- Increased vulnerability as a result of new development;
- Increased vulnerability resulting from unforeseen or new circumstances.

Updates to this LHMP 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 LHMP to accommodate 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 as well during the monitoring and update of this LHMP to determine feasibility of future implementation. Updating of this LHMP will be by written changes and submissions, as the HMPC deems appropriate and necessary, and as approved by the HVLCSD governing board. In keeping with the five-year update process, the HMPC will convene public meetings to solicit public input on this LHMP and its routine maintenance and the final product will be again adopted by the the HVLCSD governing board.

Annual Plan Review Process

For this LHMP review process, HVLCSD General Manager, as project lead, will be responsible for facilitating, coordinating, and scheduling reviews and maintenance of this LHMP. The LHMP is intended to be a living document. The review of this 2020 LHMP will normally occur on an annual basis each year and will be conducted by the HMPC as follows:

- HVLCSD will place an advertisement in the local newspaper advising the public of the date, time, and place for each annual review of the LHMP and will be responsible for leading the meeting to review this LHMP.
- Notices will be mailed 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.
- HVLCSD 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 website.
- After the review meeting, minutes of the meeting and an annual report will be prepared by the HMPC and forwarded to the news media (public) and all HVLCSD staffs. The report will also be presented to the HVLCSD Board for review, and a request will be made that the Board take action to recognize and adopt any changes resulting from the review.
- A copy of the 2020 LHMP will be continually posted on the HVLCSD's website as will the annual status report.

Criteria for Annual Reviews

The criteria recommended in 44 CFR 201 and 206 will be utilized in reviewing and updating this LHMP. More specifically, the reviews should include the following information:

- HVLCSD growth or change in the past year.
- The number of substantially damaged or substantially improved structures by flood zone.
- The renovations to HVLCSD infrastructure including water, sewer, drainage, roads, bridges, gas lines, and buildings.
- Natural hazard occurrences that required activation of the local Emergency Operations Center (EOC) and whether or not the event resulted in a presidential disaster declaration.
- Natural hazard occurrences that were not of a magnitude to warrant activation of the EOC or a federal disaster declaration but were severe enough to cause damage to the HVLCSD or closure of offices or public services.
- The dates of hazard events descriptions.
- Documented damages due to the event.
- Closures of HVLCSD and the number of days closed.
- Road or bridge closures and other access routes due to the hazard and the length of time closed.
- Assessment of the number of HVLCSD buildings and assets damaged and whether the damage was minor, substantial, major, or if buildings and assets were totally destroyed.
- 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 LHMP.
- Review of the status of implementation of projects and actions (mitigation strategies) including projects completed will be noted. Projects behind schedule will include a reason for delay of implementation.

7.2.3. Incorporation into Existing Planning Mechanisms

Another important implementation mechanism that is highly effective and low-cost is incorporation of this 2020 LHMP recommendations and their underlying principles into other HVLCSD plans and mechanisms. Where possible, the HVLCSD 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 LHMP 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:

- District strategic and operational plans
- District Emergency Operations Plans and other emergency management efforts
- District SOPs
- Climate plans
- Fire plans
- Flood/stormwater plans
- Capital improvement plans and budgets
- Other plans and policies outlined in the capability assessment
- Other plans, regulations, and practices with a mitigation focus

HMPC members involved in these other planning mechanisms will be responsible for integrating the findings and recommendations of this LHMP 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 budget meetings for District program opportunities.

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs and the identification of other local, state, and federal mitigation partners for coordination and multi-objective opportunities that promote a safe, sustainable community.

Examples of incorporation of the LHMP into existing programs and planning mechanisms include:

1. Integration of hazard mitigation goals and actions identified in this LHMP mitigation strategy into the next update of the HVLCSD Strategic Plan. Key staff responsible for compliance with and updating of the Strategic Plan participated in this LHMP Update. Future updates of both documents should work together to promote mitigation planning as a primary goal of the HVLCSD.
2. Integration of this LHMP into District and Community Stormwater and Flood plans. It is anticipated that this LHMP will be used to inform any stormwater and flood plan updates and conversely risk and vulnerability data and flood mitigation strategies contained in these other plans will be integrated into future updates of this LHMP for the District.
3. Use of the LHMP risk assessment and other information to update the hazard analysis in development and future updates of the District's Emergency Operations Plan, SOPs and other emergency planning efforts for the District.

Efforts should continuously be made to monitor the progress of mitigation actions implemented through these other program and 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 imperative to the overall success of this LHMP's implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stories from the LHMP implementation and seek additional public comment. The LHMP maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated District meetings, web postings, press releases to local media, and through public hearings.

Public Involvement Process for Annual Reviews

The public will be noticed by placing an advertisement in the newspaper specifying the date and time for the review and inviting public participation. The HMPC, local, state, and regional agencies will be notified and invited to attend and participate.

Public Involvement for Five-year Update

When the HMPC reconvenes for the 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 this LHMP. In reconvening, the HMPC will identify a public outreach strategy involving the greater public. The strategy will include a plan for public involvement and will be responsible for disseminating information through a variety of media channels detailing the plan update process. As part of this effort, public meetings will be held and public comments will be solicited on the next LHMP update draft.

Appendix A Planning Process

A.1 Lists of HMPC Invites/Stakeholders

Table A-1 Initial LHMP Invite List

Name	Email	Agency	Title/Dept
Augustin Garcia	a.garcia@elemindiancolony.org	Elem Indian Colony	
Andrew Britton	abritton@cityoflakeport.com	City of Lakeport	
Adeline Brown	abrown@clearlake.ca.us	City of Clearlake, Public Works	Public Works
Adckinjo Esutoki	adckinjo@att.net	Lake Co Grand Jury	Grand Jury
Alan Flora	aflora@clearlake.ca.us	City of Clearlake, City Manager	City Manager
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Byron Turner DNE		LC Dev/Planning	

Name	Email	Agency	Title/Dept
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Kent Anderson DNE		Putah Creek Council	Executive Director
Karen Jensen DNE		HVLCSD	Sr. Accounts Representative
Linda Herndon DNE		HVLCSD	President - Board of Directors
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Table A-2 HMPC Participant List

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Trish Wilksinson	twilkinson@hvlcsd.org	HVLCSD	Full Charge Bookkeeper
Zachary Gianotti	zgianotti@hvlcsd.org	HVLCSD	Water resources/Capacity building fellowship

A.2 Website for Hazard Mitigation Plan

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NEWS & UPDATES

- WATER NEWS
- MORATORIUM
- HEXAVALENT CHROMIUM NEWS
- WASTEWATER NEWS
- STORMWATER
- LOCAL HAZARD MITIGATION PLAN
- SOLAR ANALYTICS

Hidden Valley Lake Community Services District 2019 Local Hazard Mitigation Plan

Upcoming Public Meetings

Hazard Mitigation Planning Committee:

You are invited to the 3rd and 4th planning team meetings for the development of the Hidden Valley Lake Community Services District (HVLCSD) Local Hazard Mitigation Plan (LHMP) project. In September of 2019, HVLCSD kicked-off this hazard mitigation planning effort. A 2nd risk assessment meeting was held in early December.

These upcoming meetings will be held on January 8 and 9 and will begin the most important phase of our LHMP planning process – the Mitigation Strategy. During the first meeting, we will be briefly revisiting the risk assessment data developed to date and will again be looking for your feedback in refining and adding to this in-process Risk Assessment Chapter. We will also be establishing plan goals and objectives. During the second meeting, the planning team will be working to identify and evaluate potential mitigation actions for reducing the District's risk and vulnerability to identified hazards and future disasters.

Up Coming Meeting	Date	Time	Location
LHMP - Mitigation Strategy Meeting	Thursday, January 9, 2020	9:00-12:00 PM	HVLCSD Boardroom
LHMP - Mitigation Strategy Meeting	Wednesday, January 8, 2020	1:00 -4:00 PM	HVLCSD
HMPC Meeting #2: Risk Assessment	December 12, 2019	8:00-11:00 AM	HVLCSD Boardroom
Public Meeting	September 10, 2019	6:00-7:30 PM	HVLCSD Boardroom
Stakeholder Meeting	September 10, 2019	1:00-4:00PM	HVLCSD Boardroom

Opportunities for Input

Members of the community have a very important role in this process. A draft of the 2019 LHMP will be available on this website in the spring of 2020 for review and comment by the public and all interested stakeholders.

Planning team and public meetings will also be held as part of the plan development process. In addition to plan participation by the HVLCSD and stakeholders from other local, state and federal agencies, the public is encouraged to attend and participate in our upcoming public meetings. Information on specific meeting times and locations are detailed below.

Local Hazard Mitigation Planning

The Hidden Valley Lake Community Services District is currently taking steps to develop a Hazard Mitigation Plan according to federal and state guidelines.
We will continue to update this webpage as part of our ongoing effort and encourage

WHAT IS HAZARD MITIGATION

Hazard mitigation describes actions taken to help reduce or eliminate long-term risks caused by **hazards** or disasters, such as flooding, earthquakes, wildfires, landslides, or dam failure. As the costs...

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LHMP DOCUMENTS

Documents from each meeting will be posted here for public review. Worksheets requesting public input will be attached with an explanation and deadline.

READ MORE »

LHMP PRESENTATIONS

READ MORE »

A.3 Kickoff Meeting

A.3.1. Kickoff Meeting Invite to Stakeholders

From: Alyssa Gordon <agordon@hvlcsd.org>
Sent: Wednesday, August 28, 2019 11:46 AM
To: Steven.Hajik@lakecountyca.gov; dougg@lcaqmd.net; william.davidson@lakecountyca.gov; melanie.fgarrett@gmail.com; Juan.M.Gonzalez@usace.army.mil; Richard.Ford@lakecountyca.gov; sryan@big-valley.net; ajack@big-valley.net; rudy.baltazar@fire.ca.gov; sohara@fire.ca.gov; chris.vallerga@fire.ca.gov; jodi.traversaro@caloes.ca.gov; greg.bertelli@fire.ca.gov; chris.vallerga@fire.ca.gov; sohara@fire.ca.gov; ccwdhamner@att.net; Concepcion.Chavez@CalOES.ca.gov; Victoria.LaMar-Haas@CalOES.ca.gov; peter.crase@caloes.ca.gov; james.lishman@caloes.ca.gov; apyeatt@clearlake.ca.us; ddeakins@clearlake.ca.us; aflora@clearlake.ca.us; gfolsom@clearlake.ca.us; jburrow@clearlake.ca.us; abrown@clearlake.ca.us; dherren@clearlake.ca.us; msilveira@cityoflakeport.com; abritton@cityoflakeport.com; nwalker@cityoflakeport.com; rladd@cityoflakeport.com; awhite@clearlakepd.org; thobbs@clearlakepd.org; tcelli@clearlakepd.org; llambert@clearlakepd.org; william.davidson@lakecountyca.gov; Christopher.Veach@lakecountyca.gov; centralvalleysacramento@waterboards.ca.gov; Chelsea.Spier@water.ca.gov; kkaarolaepa@gmail.com; a.garcia@elemindiancolony.org; jasjit.kang@lakecountyca.gov; gina.rock@associates.fema.dhs.gov; christopher.nelson@fema.dhs.gov; chief500@lakeportfire.com; chris.morrison@fostermorrison.com; jeanine.foster@fostermorrison.com; kahart@gswater.com; lrosas@hpultribe-nsn.gov; streppa@hpultribe-nsn.gov; jaredhendricks@pacific.net; jdavis@highlandswater.com; brenna@brennahowell.com; gm@hvla.com; maintdir@hvla.com; dpsdir@hvla.com; Kirk Cloyd <kcloyd@hvlcsd.org>; Penny Cuadras <pcuadras@hvlcsd.org>; Alyssa Gordon <agordon@hvlcsd.org>; Trish Wilkinson <twilkinson@hvlcsd.org>; Karen Jensen <kjensen@hvlcsd.org>; Marty Rodriguez <mrodriguez@hvlcsd.org>; Dennis White <dwhite@hvlcsd.org>; Barry Silva <bsilva@hvlcsd.org>; Sam Garcia <sgarcia@hvlcsd.org>; Craig Shields <cshields@hvlcsd.org>; Harley Sells <hsells@hvlcsd.org>; Brandon Bell <bbell@hvlcsd.org>; Hannah-CSD <davidsonh373@gmail.com>; Zach - CSD <zgianotti@gmail.com>; Linda Herndon <lherndon@hvlcsd.org>; Judy Mirbegian <jmirbegian@hvlcsd.org>; Jim Freeman <jfreeman@hvlcsd.org>; Carolyn Graham <cgraham@hvlcsd.org>; Jim lieberman <jlieberman@hvlcsd.org>; kn@koination.com; kn@koination.com; mary.ann.heywood@konoctiusd.org; QRSRSPeace@gmail.com; katherine.vanderwall@lakecountyca.gov; adckinjo@att.net; firesafelc@gmail.com; lars.ewing@lakecountyca.gov; denise.pomeroy@lakecountyca.gov; christopher.veach@lakecountyca.gov; moke.simon@lakecountyca.gov; craig.wetherbee@lakecountyca.gov; karentait@lakecountyca.gov; fdchf700@yahoo.com; lon.sharp@lakecountyca.gov; Teresa.Stewart@lakecountyca.gov; Chris.Macedo@lakecountyca.gov; dale.carnathan@lakecountyca.gov; brian.martin@lakecountyca.gov; janet.coppinger@lakecountyca.gov; scott.deleon@lakecountyca.gov; beef8458@aol.com; mrsleeannmckay@gmail.com; msilveira@cityoflakeport.com; dchance@cityoflakeport.com; kingram@cityoflakeport.com; brasmussen@lakeportpolice.org; mhumphrey@cityoflakeport.com; pharris@cityoflakeport.com; byron.turner@lakecountyca.gov; ryoung@lakecoe.org; LPFPD953@gmail.com; chief500@lakeportfire.com; GScottDTM@mediacombb.net; vancamp@mbkengineers.com; cnegrete@middletownrancheria.com; michelle.mead@noaa.gov; chief800@northshorefpd.com; txfr@pge.com; brian.bottari@pge.com; martye08@yahoo.com; dgrider@cityoflakeport.com; donnaonthemountain@gmail.com; kent@putahcreekcouncil.org; kathylandre@yahoo.com; ej@rrrc.com; mschaver@robinsonrancheria.org; iquitiquit@svpomo.org; gray@svpomo.org; magdalenavh@sscra.org; Battalion Chief Mike Wink (mike.wink@fire.ca.gov) <mike.wink@fire.ca.gov>; liz@southlakefirecouncil.org; sonialal14@gmail.com; sheri.miller@waterboards.ca.gov; Erik Ekdahl (erik.ekdahl@waterboards.ca.gov) <erik.ekdahl@waterboards.ca.gov>; speterson@middletownrancheria.com; jfruzell@ucanr.edu;

elisa.sabatini@yolocounty.org; Jeanette Wrysinski <wrysinski@yolorcd.org>
Subject: Hidden Valley Lake Community Services District Hazard Mitigation Planning Committee invite

All,

You are invited to the Hidden Valley Lake Community Services District (HVLCSD) Local Hazard Mitigation Plan (LHMP) Kickoff Meeting as a member of the Hazard Mitigation Planning Committee (HMPC). This meeting is scheduled for **Tuesday, September 10, 2019 1:00PM**, at HVLCSD's Conference Room. Please see attached document for further information and scheduling. An RSVP is requested.

Thank you,
Alyssa Gordon
Hidden Valley Lake Community Services District
707-987-9201

A.3.2. Kickoff Meeting Agenda

HIDDEN VALLEY LAKE COMMUNITY SERVICES DISTRICT
LOCAL HAZARD MITIGATION PLAN (LHMP)
HMPC MEETING #1
September 28, 2019

1. Introductions
2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements
3. The Role of the Hazard Mitigation Planning Committee (HMPC)
4. Planning for Public Input
5. Coordinating with other Agencies
6. Hazard Identification
7. Schedule
8. Data Needs
9. Questions and Answers

A.3.3. Kickoff Meeting Sign-in Sheets

SIGN-IN SHEET
Hidden Valley Lake Community Services District
LOCAL HAZARD MITIGATION PLANNING PROJECT
Public Meeting #1
September 10, 2019

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Hannah Davidson	hdavidson@hvlcsd.org	760-216-2446	Water Resources (CivicSpark)

A.4 Risk Assessment Meetings

A.4.1. Emailed Invites to Risk Assessment Meetings

From: Alyssa Gordon <agordon@hvlcsd.org>
Sent: Tuesday, November 12, 2019 5:53 PM
To: a.garcia@elemindiancolony.org; abritton@cityoflakeport.com; abrown@clearlake.ca.us; adckinjo@att.net; aflora@clearlake.ca.us; Alyssa Gordon <agordon@hvlcsd.org>; aha@pacific.net; ajack@big-valley.net; amber.madero@lakecountyca.gov; awhite@clearlakepd.org; Brandon Bell <bbell@hvlcsd.org>; beef8458@aol.com; brasmussen@lakeportpolice.org; brenna@brennahowell.com; brian.martin@lakecountyca.gov; brian@sfcard.org; Barry Silva <bsilva@hvlcsd.org>; byron.turner@lakecountyca.gov; catherine.stone@middletownusd.org; ccwdhamner@att.net; centralvalleysacramento@waterboards.ca.gov; Carolyn Graham <cgraham@hvlcsd.org>; charrison@hpultribe-nsn.gov; Chelsea.Spier@water.ca.gov; chief500@lakeportfire.com; chief500@lakeportfire.com; chief800@northshorefpd.com; Chris.Macedo@lakecountyca.gov; Chris Morrison <chris.morrison@fostermorrison.com>; chris.vallerga@fire.ca.gov; christopher.nelson@fema.dhs.gov; Christopher.Veach@lakecountyca.gov; clintonheise@gmail.com; cobbrainbowfairies@gmail.com; communityandpartnershipservices@yahoo.com; Concepcion.Chavez@CalOES.ca.gov; craig.wetherbee@lakecountyca.gov; Craig Shields <cshields@hvlcsd.org>; dale.carnathan@lakecountyca.gov; davidthurber@tcbk.com; dbelger@redwoodcoastrc.org; dchance@cityoflakeport.com; ddeakins@clearlake.ca.us; denise.pomeroy@lakecountyca.gov; dgrider@cityoflakeport.com; dogulin@lakecoe.org; donnaonthemountain@gmail.com; doug.berman@yahoo.com; dougg@lcaqmd.net; dpsdir@hvla.com; Dennis White <dwhite@hvlcsd.org>; ej@rrrc.com; elisa.sabatini@yolocounty.org; epi-center@sbcglobal.net; Erik Ekdahl (erik.ekdahl@waterboards.ca.gov) <erik.ekdahl@waterboards.ca.gov>; erin.gustafson@lakecountyca.gov; fdchf700@yahoo.com; firesafelc@gmail.com; garrett.thomsen@caloes.ca.gov; gina.rock@associates.fema.dhs.gov; glenda@hardestersmarkets.com; gm@hvla.com; gray@svpomo.org; greg.bertelli@fire.ca.gov; GScottDTM@mediacombb.net; hdavidson <hdavidson@hvlcsd.org>; heather@sfcard.org; hihohiho@outlook.com; hssc.3245@mediacombb.net; iquitiquit@svpomo.org; james.lishman@caloes.ca.gov; janet.coppinger@lakecountyca.gov; jaredhendricks@pacific.net; jasjit.kang@lakecountyca.gov; jburrow@clearlake.ca.us; jdavis@highlandswater.com; Jeanine Foster <jeanine.foster@fostermorrison.com>; Jim Freeman <jfreeman@hvlcsd.org>; jgalvan@srcharities.org; Jim lieberman <jlieberman@hvlcsd.org>; Judy Mirbegian <jmirbegian@hvlcsd.org>; Juan.M.Gonzalez@usace.army.mil; julie.breakwell@usw.salvationarmy.org; kahart@gswater.com; katherine.vanderwall@lakecountyca.gov; kathylandre@yahoo.com; Kirk Cloyd <kcloyd@hvlcsd.org>; kent@putahcreekcouncil.org; kingram@cityoflakeport.com; Karen Jensen <kjensen@hvlcsd.org>; kn@koination.com; lakecountydart.org@gmail.com; lars.ewing@lakecountyca.gov; lhart@lakecoe.org; Linda Herndon <IMCEAEX-_o=ExchangeLabs_ou=Exchange+20Administrative+20Group+20+28FYDIBOHF23SPDLT+29_cn=Recipients_cn=17f95d0f0c2c4f65865c2b66a8f3f3bc-lherndon@namprd13.prod.outlook.com>; llambert@clearlakepd.org; lon.sharp@lakecountyca.gov; lpagone@pacbell.net; LPFPD953@gmail.com; lrosas@hpultribe-nsn.gov; magdalenavh@sscra.org; maintdir@hvla.com; marina.deligiannis@lakecountyca.gov; martye08@yahoo.com; mary.ann.heywood@konoctiusd.org; mbaker@clearlake.ca.us; melanie.fgarrett@gmail.com; melissaf@svdp-lake.org; mhumphrey@cityoflakeport.com; michelle.mead@noaa.gov; Battalion Chief Mike Wink (mike.wink@fire.ca.gov) <mike.wink@fire.ca.gov>; moke.simon@lakecountyca.gov; mountainlionsclub@gmail.com; mreece@srcharities.org; Marty Rodriguez <mrodriguez@hvlcsd.org>; mrsleeannmckay@gmail.com; mschaver@robinsonrancheria.org; msilveira@cityoflakeport.com; nwalker@cityoflakeport.com; Penny Cuadras <pcuadras@hvlcsd.org>; peter.crase@caloes.ca.gov; pharris@cityoflakeport.com; phyllis@sfcard.org; poday@ncoinc.org; rbera@ncoinc.org; Richard.Ford@lakecountyca.gov; rladd@cityoflakeport.com; rosemarycordova@sbcglobal.net;

rudy.baltazar@fire.ca.gov; ryoung@lakecoe.org; scott.deleon@lakecountyca.gov; sdyer@ncoinc.org; seccoord@hvlc.com; Sam Garcia <sgarcia@hvlcsd.org>; sheri.miller@waterboards.ca.gov; sohara@fire.ca.gov; sonialal14@gmail.com; sonjaeb@calnevumc.org; speterson@middletownrancheria.com; sryan@big-valley.net; stephsband@yahoo.com; Steven.Hajik@lakecountyca.gov; storybook@mchsi.com; streppa@hpultribe-nsn.gov; talakszay@ncoinc.org; tavi.granger@lakecountyca.gov; tcelli@clearlakepd.org; Teresa.Stewart@lakecountyca.gov; thobbs@clearlakepd.org; tuckerchorjel@gmail.com; Trish Wilkinson <twilkinson@hvlcsd.org>; txfr@pge.com; vancamp@mbkengineers.com; vcox@ncoinc.org; Victoria.LaMar-Haas@CalOES.ca.gov; wcollins2731@hotmail.com; wildfiredonations4u@gmail.com; william.davidson@lakecountyca.gov; Jeanette Wrysinski <wrysinski@yolorcd.org>; zgianotti <zgianotti@hvlcsd.org>
Subject: LHMP - Risk Assessment Meeting December 12, 2019

HVLCSD Hazard Mitigation Planning Committee:

You are invited to the second planning team meeting – The Risk Assessment Meeting - for the development of Hidden Valley Lake Community Services District's (HVLCSD) Local Hazard Mitigation Plan (LHMP). Earlier this year, HVLCSD initiated its hazard mitigation planning effort, with support of Foster Morrison Consulting. Many of you attended the planning team kickoff meeting in September of this year. Over the past few months, the Foster Morrison team has been working with the District to collect data to develop Chapter 4 of our LHMP, the Risk Assessment Chapter.

This upcoming meeting will be held on Thursday, December 12. During this meeting, we will be reviewing the risk assessment data developed to date and will be looking for your feedback in refining and adding to this in-process Risk Assessment Chapter.

The meeting will be held as follows:

Thursday, December 12 at: HVLCSD's Conference Room from 9:00 am to 12:00 pm

Please RSVP and plan on attending or delegating attendance to this Risk Assessment Meeting for the LHMP Update. Your ongoing participation and input is critical to the success of this project.

Thank you,

Jeanine Foster
Foster Morrison Consulting
(303) 717-7171

A.4.2. Risk Assessment Meeting Agenda

Hidden Valley Lake Community Services District
Local Hazard Mitigation Plan (LHMP) Update
Risk Assessment Meeting
December 12, 2019

1. Introductions
2. Status of the DMA Planning Process
3. Review (and discussions/input) of the Risk Assessment
4. Review of Data Needs
5. Next Steps

A.4.3. Risk Assessment Meeting Sign in Sheets

Meeting Sign In

Hidden Valley Lake Community Services District
Local Hazard Mitigation Plan (LHMP)
HMPC Meeting #2: Risk Assessment
12-Dec-19

PRINT NAME	ORGANIZATION	TITLE	PHONE	EMAIL
1. Randy Murphy	HVLA	GM		GM@HVLA.com
2. Ann Hackett	Homeowner			aha@pacific.net
3. Hennen Davidson	HVLCSD	GM		hdavidson@hvlcsd.org
4. Zach Gianotti	HVLCSD			zgianotti@hvlcsd.org
5. Trish Wilkinson	HVLCSD	Full Charge Bkpr		twilkinson@hvlcsd.org
6. Alyssa Gordon	"	WRS		agordon@hvlcsd.org
7. Dennis White	"	Supervisor		dwhite@hvlcsd.org
8. Craig Wetherbee	Lake County Environmental Health	HAZ MAT	263-1164	craig.wetherbee@lakecountyca.gov
9. Tom Stricklin	HVLA	LT.		
10. Penny Cuadras	HVLCSD	A. A		pcuadras@hvlcsd.org
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				

A.5 Mitigation Strategy Meetings

A.5.1. Email Invites to Mitigation Strategy Meetings

From: Alyssa Gordon <agordon@hvlcsd.org>
Sent: Monday, January 6, 2020 3:01 PM
To: a.garcia@elemindiancolony.org; abritton@cityoflakeport.com; abrown@clearlake.ca.us; adckinjo@att.net; aflora@clearlake.ca.us; Alyssa Gordon <agordon@hvlcsd.org>; aha@pacific.net; ajack@big-valley.net; amber.madero@lakecountyca.gov; awhite@clearlakepd.org; Brandon Bell <bbell@hvlcsd.org>; beef8458@aol.com; brasmussen@lakeportpolice.org; brenna@brennahowell.com; brian.martin@lakecountyca.gov; brian@sfcard.org; Barry Silva <bsilva@hvlcsd.org>; catherine.stone@middletownusd.org; ccwdhamner@att.net; centralvalleysacramento@waterboards.ca.gov; Carolyn Graham <cgraham@hvlcsd.org>; charrison@hpultribe-nsn.gov; Chelsea.Spier@water.ca.gov; chief500@lakeportfire.com; chief500@lakeportfire.com; chief800@northshorefpd.com; Chris.Macedo@lakecountyca.gov; Chris Morrison <chris.morrison@fostermorrison.com>; chris.vallerga@fire.ca.gov; christopher.nelson@fema.dhs.gov; Christopher.Veach@lakecountyca.gov; clintonheise@gmail.com; cobbrainbowfairies@gmail.com; communityandpartnershipservices@yahoo.com; Concepcion.Chavez@CalOES.ca.gov; craig.wetherbee@lakecountyca.gov; Craig Shields <cshields@hvlcsd.org>; dale.carnathan@lakecountyca.gov; davidthurber@tcbk.com; dbelger@redwoodcoastrc.org; dchance@cityoflakeport.com; ddeakins@clearlake.ca.us; denise.pomeroy@lakecountyca.gov; dgrider@cityoflakeport.com; dogulin@lakecoe.org; donnaonthemountain@gmail.com; doug.berman@yahoo.com; dougg@lcaqmd.net; dpsdir@hvla.com; Dennis White <dwhite@hvlcsd.org>; ej@rrrc.com; elisa.sabatini@yolocounty.org; epi-center@sbcglobal.net; Erik Ekdahl (erik.ekdahl@waterboards.ca.gov) <erik.ekdahl@waterboards.ca.gov>; erin.gustafson@lakecountyca.gov; fdchf700@yahoo.com; firesafelc@gmail.com; garrett.thomsen@caloes.ca.gov; gina.rock@associates.fema.dhs.gov; glenda@hardestersmarkets.com; gm@hvla.com; gray@svpomo.org; greg.bertelli@fire.ca.gov; GScottDTM@mediacombb.net; hdavidson <hdavidson@hvlcsd.org>; heather@sfcard.org; hihohiho@outlook.com; hssc.3245@mediacombb.net; iquitiquit@svpomo.org; james.lishman@caloes.ca.gov; janet.coppinger@lakecountyca.gov; jaredhendricks@pacific.net; jasjit.kang@lakecountyca.gov; jburrow@clearlake.ca.us; jdavis@highlandswater.com; Jeanine Foster <jeanine.foster@fostermorrison.com>; Jim Freeman <jfreeman@hvlcsd.org>; jgalvan@srcharities.org; Jim lieberman <jlieberman@hvlcsd.org>; Judy Mirbegian <jmirbegian@hvlcsd.org>; Juan.M.Gonzalez@usace.army.mil; julie.breakwell@usw.salvationarmy.org; kahart@gswater.com; katherine.vanderwall@lakecountyca.gov; kathylandre@yahoo.com; Kirk Cloyd <kcloyd@hvlcsd.org>; kent@putahcreekcouncil.org; kingram@cityoflakeport.com; Karen Jensen <kjensen@hvlcsd.org>; kn@koination.com; lakecountydart.org@gmail.com; lars.ewing@lakecountyca.gov; lhart@lakecoe.org; llambert@clearlakepd.org; lon.sharp@lakecountyca.gov; lpagone@pacbell.net; LPFPD953@gmail.com; lrosas@hpultribe-nsn.gov; magdalenavh@sscra.org; maintdir@hvla.com; marina.deligiannis@lakecountyca.gov; martye08@yahoo.com; mary.ann.heywood@konoctiusd.org; mbaker@clearlake.ca.us;

; melanie.fgarrett@gmail.com; melissaf@svdp-lake.org; mhumphrey@cityoflakeport.com; michelle.mead@noaa.gov; Battalion Chief Mike Wink (mike.wink@fire.ca.gov) <mike.wink@fire.ca.gov>; moke.simon@lakecountyca.gov; mountainlionsclub@gmail.com; mreece@srcharities.org; Marty Rodriguez <mrodriguez@hvlcsd.org>; mrsleeannmckay@gmail.com; mschaver@robinsonrancheria.org; msilveira@cityoflakeport.com; nwalker@cityoflakeport.com; Penny Cuadras <pcuadras@hvlcsd.org>; peter.crase@caloes.ca.gov; pharris@cityoflakeport.com; phyllis@sfcard.org; poday@ncoinc.org; rbera@ncoinc.org; Richard.Ford@lakecountyca.gov; rladd@cityoflakeport.com; rosemarycordova@sbcglobal.net; rudy.baltazar@fire.ca.gov; ryoung@lakecoe.org; scott.deleon@lakecountyca.gov; sdyer@ncoinc.org; seccoord@hvlc.com; Sam Garcia <sgarcia@hvlcsd.org>; sheri.miller@waterboards.ca.gov; sohara@fire.ca.gov; sonialal14@gmail.com; sonjaeb@calnevumc.org; speterson@middletownrancheria.com; sryan@big-valley.net; stephsband@yahoo.com; Steven.Hajik@lakecountyca.gov; storybook@mchsi.com; streppa@hpultribe-nsn.gov; talakszay@ncoinc.org; tavi.granger@lakecountyca.gov; tcelli@clearlakepd.org; Teresa.Stewart@lakecountyca.gov; thobbs@clearlakepd.org; tuckerchorjel@gmail.com; Trish Wilkinson <twilkinson@hvlcsd.org>; txfr@pge.com; vancamp@mbkengineers.com; vcox@ncoinc.org; Victoria.LaMar-Haas@CalOES.ca.gov; wcollins2731@hotmail.com; wildfiredonations4u@gmail.com; Jeanette Wrysinski <wrysinski@yolorcd.org>; zgianotti <zgianotti@hvlcsd.org>; Roger Anderson <rognbean@att.net>; mferrell@calruralwater.org
Subject: LHMP - Mitigation Strategy Meeting January 8 & 9, 2020

Hazard Mitigation Planning Committee:

You are invited to the 3rd and 4th planning team meetings for the development of the Hidden Valley Lake Community Services District (HVLCSD) Local Hazard Mitigation Plan (LHMP) project. In September of 2019, HVLCSD kicked-off this hazard mitigation planning effort. A 2nd risk assessment meeting was held in early December.

These upcoming meetings will be held on January 8 and 9, and will begin the most important phase of our LHMP planning process – the Mitigation Strategy. During the first meeting, we will be briefly revisiting the risk assessment data developed to date and will again be looking for your feedback in refining and adding to this in-process Risk Assessment Chapter. We will also be establishing plan goals and objectives. During the second meeting, the planning team will be working to identify and evaluate potential mitigation actions for reducing the District's risk and vulnerability to identified hazards and future disasters.

The meetings will be held as follows:

Wednesday, January 8 at: Hidden Valley Lake Community Services District, 19400 Hartmann Road, Hidden Valley Lake, CA 954667, 1:00 am till 4:00 pm
Thursday, January 9 at: Hidden Valley Lake Community Services District, 19400 Hartmann Road, Hidden Valley Lake, CA 954667, 9:00 am till 12:00pm

Please RSVP and plan on attending or delegating attendance to these important meetings. Everyone with mitigation project ideas should attend. District and stakeholder participation and coordination is a requirement of an approved plan, as is the inclusion of any hazard data, information, and mitigation projects you may want to see included in the plan. Your continued participation and input is critical to the success of this project.

A.5.2. Mitigation Strategy Meeting Agenda

Hidden Valley Lake Community Services District
Local Hazard Mitigation Plan (LHMP)
Mitigation Strategy Meetings
January 8 & 9, 2020

HMPC Meeting #3:

1. Introductions
2. Status of the DMA Planning Process
3. Risk Assessment Status
4. Develop Updated Plan Goals and Objectives
5. Identify and Review Mitigation Alternatives/Projects

HMPC Meeting #4:

1. Introductions
2. Identify and discuss Mitigation Alternatives/Projects
3. Review Mitigation Selection Criteria
4. Prioritize Mitigation Projects
5. Review of Schedule/Next Steps

A.5.3. Mitigation Strategy Meeting Sign in Sheets

SIGN-IN SHEET
Hidden Valley Lake Community Services District
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Kickoff Meeting #3
January 8, 2020

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
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Roger Anderson	ROBNBEAN@ATT.NET	(707) 987-1995	
Jeannine Anderson	" " "	(707) 987-1995	
Zach Gianotti	zgianotti@hvlcsd.org		HVLCSD
Penny Cuadras	pcuadras@hvlcsd.org	707-987-9201	HVLCSD
Tish Wilkinson	twilkinson@hvlcsd.org	707-987-9201	HVLCSD
Dennis White	dwhite@hvlcsd.org	(707) 533 3498	HVLCSD
Alyssa Gordon	agordon@hvlcsd.org	707 987-9201	"
Tom Stricklin	seccoord@hvla.com	707 987-3138-123	HVLA Security
Hannah Davidson	hdavidson@hvlcsd.org		HVLCSD

SIGN-IN SHEET
Hidden Valley Lake Community Services District
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Kickoff Meeting #3
January 8, 2020

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Hannah Davidson CivicSpark Fellow	hdavidson@hvlcsd.org		HVLCSD
JEANNINE ANDERSON		(707) 987-1995	
ROGER ANDERSON	ROGNBEAN@ATT.NET	"	
Ann Hackett	ahra@pacific.net	533-9803	
Tom Stricklin	seccoord@hvla.com	707 987-3138-123	HVLA
Penny Cuadras	pcuadras@hvlcsd.org	707-987-9201	HVLCSD

A.6 Final Team Meeting

A.6.1. Final Team Meeting Invite

From: Alyssa Gordon <agordon@hvlcsd.org>
Sent: Tuesday, March 3, 2020 9:01 AM
To: a.garcia@elemindiancolony.org; abritton@cityoflakeport.com; abrown@clearlake.ca.us; adckinjo@att.net; aflora@clearlake.ca.us; Alyssa Gordon <agordon@hvlcsd.org>; aha@pacific.net; ajack@big-valley.net; amber.madero@lakecountyca.gov; awhite@clearlakepd.org; Brandon Bell <bbell@hvlcsd.org>; beef8458@aol.com; brasmussen@lakeportpolice.org; brenna@brennahowell.com; brian.martin@lakecountyca.gov; brian@sfcard.org; Barry Silva <bsilva@hvlcsd.org>; catherine.stone@middletownusd.org; ccwdhamner@att.net; centralvalleysacramento@waterboards.ca.gov; Carolyn Graham <cgraham@hvlcsd.org>; charrison@hpultribe-nsn.gov; Chelsea.Spier@water.ca.gov; chief500@lakeportfire.com; chief500@lakeportfire.com; chief800@northshorefpd.com; Chris.Macedo@lakecountyca.gov; Chris Morrison <chris.morrison@fostermorrison.com>; chris.vallerga@fire.ca.gov; christopher.nelson@fema.dhs.gov; Christopher.Veach@lakecountyca.gov; clintonheise@gmail.com; cobbrainbowfairies@gmail.com; communityandpartnershipservices@yahoo.com; Concepcion.Chavez@CalOES.ca.gov; craig.wetherbee@lakecountyca.gov; dale.carnathan@lakecountyca.gov; davidthurber@tcbk.com; dbelger@redwoodcoastrc.org; dchance@cityoflakeport.com; ddeakins@clearlake.ca.us; denise.pomeroy@lakecountyca.gov; dgrider@cityoflakeport.com; Dominic Hernandez <dhernandez@hvlcsd.org>; donnaonthemountain@gmail.com; doug.berman@yahoo.com; dougg@lcaqmd.net; dpsdir@hvla.com; dwdist03@waterboards.ca.gov; Dennis White <dwhite@hvlcsd.org>; ej@rrrc.com; elisa.sabatini@yolocounty.org; epi-center@sbcglobal.net; Erik Ekdahl (erik.ekdahl@waterboards.ca.gov) <erik.ekdahl@waterboards.ca.gov>; erin.gustafson@lakecountyca.gov; fdchf700@yahoo.com; firesafelc@gmail.com; garrett.thomsen@caloes.ca.gov; gina.rock@associates.fema.dhs.gov; glenda@hardestersmarkets.com; gm@hvla.com; gray@svpomo.org; greg.bertelli@fire.ca.gov; GScottDTM@mediacombb.net; hdavidson <hdavidson@hvlcsd.org>; heather@sfcard.org; hihohiho@outlook.com; hssc.3245@mediacombb.net; iquitiquit@svpomo.org; james.lishman@caloes.ca.gov; janet.coppinger@lakecountyca.gov; jaredhendricks@pacific.net; jasjit.kang@lakecountyca.gov; jburrow@clearlake.ca.us; jdavis@highlandswater.com; Jeanine Foster <jeanine.foster@fostermorrison.com>; Jim Freeman <jfreeman@hvlcsd.org>; jgalvan@srcharities.org; Jim lieberman <jlieberman@hvlcsd.org>; Judy Mirbegian <jmirbegian@hvlcsd.org>; Juan.M.Gonzalez@usace.army.mil; julie.breakwell@usw.salvationarmy.org; kahart@gswater.com; katherine.vanderwall@lakecountyca.gov; kathylandre@yahoo.com; kingram@cityoflakeport.com; kn@koination.com; lakecountydart.org@gmail.com; lars.ewing@lakecountyca.gov; lhart@lakecoe.org; lhavener@hvcsd.org; llambert@clearlakepd.org; lon.sharp@lakecountyca.gov; lpagone@pacbell.net; LPFPD953@gmail.com; lrosas@hpultribe-nsn.gov; magdalenavh@sscra.org; maintdir@hvla.com; marina.deligiannis@lakecountyca.gov; martye08@yahoo.com; mary.ann.heywood@konoctiusd.org; mbaker@clearlake.ca.us; melanie.fgarrett@gmail.com; melissaf@svdp-lake.org; mhumphrey@cityoflakeport.com; michelle.mead@noaa.gov; Battalion Chief Mike Wink (mike.wink@fire.ca.gov) <mike.wink@fire.ca.gov>; moke.simon@lakecountyca.gov; mountainlionsclub@gmail.com; mreece@srcharities.org; Marty Rodriguez <mrodriguez@hvlcsd.org>;

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Subject: HVLCSD LHMP: Public Review Draft

Hello Everyone,

Please see below information on the final steps for our LHMP Update:

LHMP Public Review Draft and Public Meeting. The LHMP Public Review Draft is up on the HVLCSD website for public review and comment at: https://www.hvlcsd.org/lhmp-documents. It is also located on the project dropbox at https://www.dropbox.com/sh/orhhf1w1rajmvml/AADMHs2uRdtYhpdRY4HmLCOia?dl=0. A hard copy will also be available soon for review at the HVLCSD Administrative office.

A public meeting on the Draft LHMP Update will be held Wednesday, March 25 from 6-7:30 pm at the Hidden Valley Lake Community Services District Conference Room, 19400 Hartmann Rd, Hidden Valley Lake, CA 95467. A press release is being issued by the HVLCSD. Please help get the word out to the public.

Final HMPC Meeting. Our final planning team meeting is scheduled for Thursday March 26 from 9 – 11am, at the Hidden Valley Lake Community Services District Conference Room, 19400 Hartmann Rd, Hidden Valley Lake, CA 95467. It is important that everyone attend this final meeting to address any public comments received and to finalize all input to the plan.

Final LHMP Input. The LHMP Public Review Draft can be obtained from the HVLCSD website or from the project Dropbox as detailed above. On the project dropbox, you will see the Public Review Draft folder. Here is what is currently in the folder:

A complete copy of the LHMP Public Review Draft
A pdf of Executive Summary and all Chapters
A pdf of Appendices

Note that there are still a few areas with yellow highlights where we need input from the District. The green highlighted areas will be filled in by Foster Morrison.

If you have any questions, please contact myself or Jeanine.foster@fostermorrison.com or 303.717.7171.

A.6.2. Final Team Meeting Cancellation Email

From: Alyssa Gordon <agordon@hvlcsd.org>
Sent: Thursday, March 19, 2020 11:18 AM
To: a.garcia@elemindiancolony.org; abritton@cityoflakeport.com; abrown@clearlake.ca.us; adckinjo@att.net; aflora@clearlake.ca.us; Alyssa Gordon <agordon@hvlcsd.org>; aha@pacific.net; ajack@big-valley.net; amber.madero@lakecountyca.gov; awhite@clearlakepd.org; Brandon Bell <bbell@hvlcsd.org>; beef8458@aol.com; brasmussen@lakeportpolice.org; brenna@brennahowell.com; brian.martin@lakecountyca.gov; brian@sfcard.org; Barry Silva <bsilva@hvlcsd.org>; catherine.stone@middletownusd.org; ccwdhamner@att.net; centralvalleysacramento@waterboards.ca.gov; Carolyn Graham <cgraham@hvlcsd.org>; charrison@hpultribe-nsn.gov; Chelsea.Spier@water.ca.gov; chief500@lakeportfire.com; chief500@lakeportfire.com; chief800@northshorefpd.com; Chris.Macedo@lakecountyca.gov; Chris Morrison <chris.morrison@fostermorrison.com>; chris.vallerga@fire.ca.gov; christopher.nelson@fema.dhs.gov; Christopher.Veach@lakecountyca.gov; clintonheise@gmail.com; cobbrainbowfairies@gmail.com; communityandpartnershipservices@yahoo.com; Concepcion.Chavez@CalOES.ca.gov; craig.wetherbee@lakecountyca.gov; Craig Shields <cshields@hvlcsd.org>; dale.carnathan@lakecountyca.gov; davidthurber@tcbk.com; dbelger@redwoodcoastrc.org; dchance@cityoflakeport.com; ddeakins@clearlake.ca.us; denise.pomeroy@lakecountyca.gov; dgrider@cityoflakeport.com; Dominic Hernandez <dhernandez@hvlcsd.org>; donnaonthemountain@gmail.com; doug.berman@yahoo.com; dougg@lcaqmd.net; dpsdir@hvla.com; dwdist03@waterboards.ca.gov; Dennis White <dwhite@hvlcsd.org>; ej@rrrc.com; elisa.sabatini@yolocounty.org; epi-center@sbcglobal.net; Erik Ekdahl (erik.ekdahl@waterboards.ca.gov) <erik.ekdahl@waterboards.ca.gov>; erin.gustafson@lakecountyca.gov; fdchf700@yahoo.com; firesafelc@gmail.com; garrett.thomsen@caloes.ca.gov; gina.rock@associates.fema.dhs.gov; glenda@hardestersmarkets.com; gm@hvla.com; gray@svpomo.org; greg.bertelli@fire.ca.gov; GScottDTM@mediacombb.net; hdavidson <hdavidson@hvlcsd.org>; heather@sfcard.org; hihohiho@outlook.com; hssc.3245@mediacombb.net; iquitiquit@svpomo.org; james.lishman@caloes.ca.gov; janet.coppinger@lakecountyca.gov; jaredhendricks@pacific.net; jasjit.kang@lakecountyca.gov; jburrow@clearlake.ca.us; jdavis@highlandswater.com; Jeanine Foster <jeanine.foster@fostermorrison.com>; Jim Freeman <jfreeman@hvlcsd.org>; jgalvan@srcharities.org; Jim lieberman <jlieberman@hvlcsd.org>; Judy Mirbegian <jmirbegian@hvlcsd.org>; Juan.M.Gonzalez@usace.army.mil; julie.breakwell@usw.salvationarmy.org; kahart@gswater.com; katherine.vanderwall@lakecountyca.gov; kathylandre@yahoo.com; kingram@cityoflakeport.com; kn@koination.com; lakecountydart.org@gmail.com; lars.ewing@lakecountyca.gov; lhart@lakecoe.org; Leo Havener <lhavener@hvlcsd.org>; llambert@clearlakepd.org; lon.sharp@lakecountyca.gov; lpagone@pacbell.net; LPFPD953@gmail.com; lrosas@hpultribe-nsn.gov; magdalenavh@sscra.org; maintdir@hvla.com; marina.deligiannis@lakecountyca.gov; martye08@yahoo.com; mary.ann.heywood@konoctiusd.org; mbaker@clearlake.ca.us; melanie.fgarrett@gmail.com; melissaf@svdp-lake.org; mhumphrey@cityoflakeport.com; michelle.mead@noaa.gov; Battalion Chief Mike Wink (mike.wink@fire.ca.gov) <mike.wink@fire.ca.gov>; moke.simon@lakecountyca.gov; mountainlionsclub@gmail.com; mreece@srcharities.org; Marty Rodriguez <mrodriguez@hvlcsd.org>; mrsleeannmckay@gmail.com; mschaver@robinsonrancheria.org; msilveira@cityoflakeport.com; Nikolaus Hendricks <nhendricks@hvlcsd.org>; nwalker@cityoflakeport.com; Penny Cuadras <pcuadras@hvlcsd.org>; peter.crase@caloes.ca.gov; pharris@cityoflakeport.com; phyllis@sfcard.org; rbera@ncoinc.org; Richard.Ford@lakecountyca.gov; rladd@cityoflakeport.com; rognbean@att.net; rosemarycordova@sbcglobal.net; rudy.baltazar@fire.ca.gov; ryoung@lakecoe.org; scott.deleon@lakecountyca.gov; sdyer@ncoinc.org; seccoord@hvlc.com; Sam Garcia <sgarcia@hvlcsd.org>; sohara@fire.ca.gov; sonjaeb@calnevumc.org;

spеterson@middletownrancheria.com; sryan@big-valley.net; stephsband@yahoo.com; Steven.Hajik@lakecountyca.gov; storybook@mchsi.com; streppa@hpultribe-nsn.gov; talakszay@ncoinc.org; tavi.granger@lakecountyca.gov; tcelli@clearlakepd.org; Teresa.Stewart@lakecountyca.gov; thobbs@clearlakepd.org; tuckerchorjel@gmail.com; Trish Wilkinson <twilkinson@hvlcsd.org>; txfr@pge.com; vancamp@mbkengineers.com; vcox@ncoinc.org; Victoria.LaMar-Haas@CalOES.ca.gov; wcollins2731@hotmail.com; wildfiredonations4u@gmail.com; Jeanette Wrysinski <wrysinski@yolorcd.org>; zgianotti <zgianotti@hvlcsd.org>; pwhealen@wbecorp.com
Subject: Public Meeting Cancelled HVLCSD LHMP: Public Review Draft

Team,

In light of the recent Shelter in Place order issued by the County of Lake Health Officer, we will be cancelling the in-person meetings scheduled for March 25 and March 26.

We do however urge you to consider reviewing and commenting on the LHMP Draft available online (see hyperlink in the message below).

If you have any questions, please contact myself or Jeanine.foster@fostermorrison.com or 303.717.7171.

Thank you for your continued engagement in the process.

Alyssa Gordon

A.7 Public Involvement

A.7.1. Kickoff Meeting Press Release

Get Involved!

HELP YOUR DISTRICT BE HAZARD-READY!

Hidden Valley Lake Community Services District, CA: A Local Hazard Mitigation Plan is being developed by the Hidden Valley Lake Community Services District (District). Fires, drought, floods, and severe weather are just a few of the hazards to be addressed in the plan. While hazards such as these cannot be prevented, a Hazard Mitigation Plan forms the foundation for the District's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Additionally, only jurisdictions with a FEMA-approved Hazard Mitigation Plan are eligible to apply for both pre- and post-disaster mitigation grant funding.

Nationwide, taxpayers pay billions of dollars annually helping communities, agencies, businesses, and individuals recover from disaster. Some disasters are predictable and, in many cases, much of the damage can be reduced or even eliminated through hazard mitigation planning.

The people most aware of potential hazards are the people that live and work in the affected area. In addition to plan participation by local, state and federal agencies, the District is seeking all interested community members to hear more about our Local Hazard Mitigation Planning project. We encourage attendance and participation from the general public at our upcoming public meeting to kick off the project:

September 10, 2019

Public Meeting: 6-7:30

District Conference Room
19400 Hartmann Road
Hidden Valley Lake, CA 95467
For additional information, please contact Alyssa Gordon at (707) 987-9201
or email at agordon@hvlcsd.org

A.7.2. Proof of Press Release Run from Ukiah Daily Journal

Advertising Order Confirmation

The Ukiah DAILY JOURNAL

08/29/19 11:05:30AM
Page 1

Ad Order Number 0006391809	*Customer* HIDDEN VALLEY LAKE CSD	*Payor Customer* HIDDEN VALLEY LAKE CSD	*PO Number*
Sales Representative Molly Morandi/LCRB	*Customer Account* 2110207	*Payor Account* 2110207	*Ordered By*
Order Taker Susan Fullbright	*Customer Address* PENNY CUADRAS 19400 HARTMANN RD HIDDEN VALLEY LAKE, CA 95467-8371	*Payor Address* PENNY CUADRAS 19400 HARTMANN RD HIDDEN VALLEY LAKE, CA 95467-8371	*Customer Fax*
Order Source Select Source	*Customer Phone* 707-987-9201	*Payor Phone* 707-987-9201	*Customer EMail* pcuadras@HVLCSD.org

Current Queue Ready		*Invoice Text*			
Tear Sheets 0	*Affidavits* 0	*Blind Box*	*Materials*	*Promo Type*	*Special Pricing*

A.7.3. Kickoff Meeting Public Meeting Invite– HVLCSD Website

NEWS & UPDATES
- WATER NEWS
- MORATORIUM
- HEXAVALENT CHROMIUM NEWS
- WASTEWATER NEWS
- STORMWATER
- LOCAL HAZARD MITIGATION PLAN
- SOLAR ANALYTICS

Hidden Valley Lake Community Services District 2019/2020 Local Hazard Mitigation Plan

Upcoming Public Meetings

Up Coming Meeting	Date	Time	Location
Final HMPC Meeting.	Thursday March 26, 2020	9 – 11:00 AM	HVLCSD Boardroom
Draft LHMP Update	Wednesday, March 25, 2020	6-7:30 pm	HVLCSD Boardroom
LHMP - Mitigation Strategy Meeting	Thursday, January 9, 2020	9:00-12:00 PM	HVLCSD Boardroom
LHMP - Mitigation Strategy Meeting	Wednesday, January 8, 2020	1:00 -4:00 PM	HVLCSD
HMPC Meeting #2: Risk Assessment	December 12, 2019	8:00-11:00 AM	HVLCSD Boardroom
Public Meeting	September 10, 2019	6:00-7:30 PM	HVLCSD Boardroom
Stakeholder Meeting	September 10, 2019	1:00-4:00PM	HVLCSD Boardroom

Hazard Mitigation Planning Committee:

You are invited to the 3rd and 4th planning team meetings for the development of the Hidden Valley Lake Community Services District (HVLCSD) Local Hazard Mitigation Plan (LHMP) project. In September of 2019, HVLCSD kicked-off this hazard mitigation planning effort. A 2nd risk assessment meeting was held in early December.

These upcoming meetings will be held on January 8 and 9 and will begin the most important phase of our LHMP planning process – the Mitigation Strategy. During the first meeting, we will be briefly revisiting the risk assessment data developed to date and will

Emergency Management Cycle

WHAT IS HAZARD MITIGATION

Hazard mitigation describes actions taken to help reduce or eliminate long-term risks caused by **hazards** or disasters, such as flooding, earthquakes, wildfires, landslides, or dam failure. As the costs...

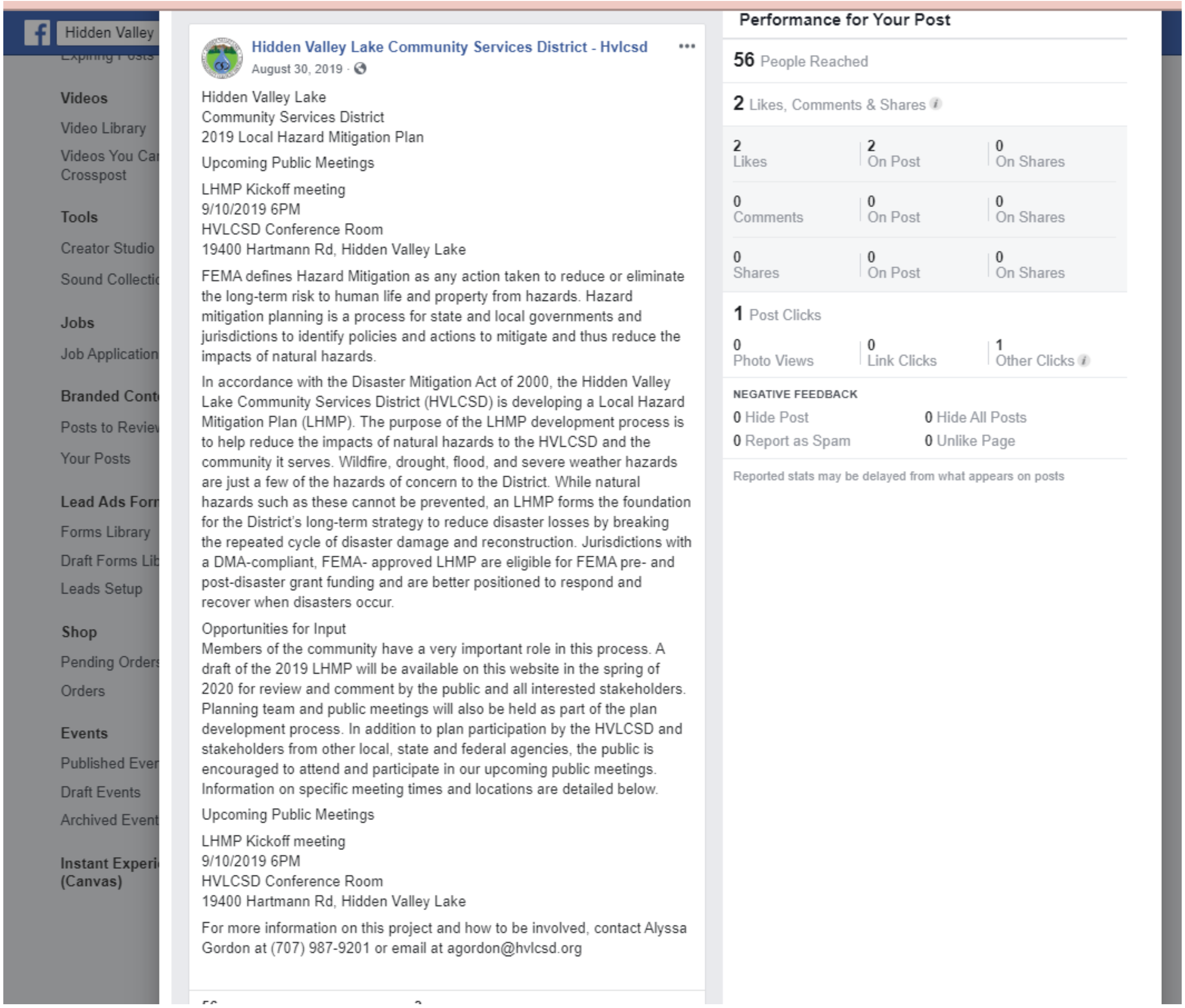
READ MORE »

LHMP DOCUMENTS

The Public Review Draft is here!

READ MORE »

A.7.4. Kickoff Meeting Invite on Facebook on August 30, 2019



Hidden Valley

Videos

Video Library

Videos You Ca

Crosspost

Tools

Creator Studio

Sound Collecti

Jobs

Job Application

Branded Cont

Posts to Review

Your Posts

Lead Ads Forr

Forms Library

Draft Forms Lib

Leads Setup

Shop

Pending Orders

Orders

Events

Published Ever

Draft Events

Archived Event

Instant Experi (Canvas)

Hidden Valley Lake Community Services District - Hvlcsd

August 30, 2019 ·

Hidden Valley Lake
Community Services District
2019 Local Hazard Mitigation Plan

Upcoming Public Meetings

LHMP Kickoff meeting
9/10/2019 6PM
HVLCSD Conference Room
19400 Hartmann Rd, Hidden Valley Lake

FEMA defines Hazard Mitigation as any action taken to reduce or eliminate the long-term risk to human life and property from hazards. Hazard mitigation planning is a process for state and local governments and jurisdictions to identify policies and actions to mitigate and thus reduce the impacts of natural hazards.

In accordance with the Disaster Mitigation Act of 2000, the Hidden Valley Lake Community Services District (HVLCSD) is developing a Local Hazard Mitigation Plan (LHMP). The purpose of the LHMP development process is to help reduce the impacts of natural hazards to the HVLCSD and the community it serves. Wildfire, drought, flood, and severe weather hazards 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 District's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Jurisdictions with a DMA-compliant, FEMA- approved LHMP are eligible for FEMA pre- and post-disaster grant funding and are better positioned to respond and recover when disasters occur.

Opportunities for Input
Members of the community have a very important role in this process. A draft of the 2019 LHMP will be available on this website in the spring of 2020 for review and comment by the public and all interested stakeholders. Planning team and public meetings will also be held as part of the plan development process. In addition to plan participation by the HVLCSD and stakeholders from other local, state and federal agencies, the public is encouraged to attend and participate in our upcoming public meetings. Information on specific meeting times and locations are detailed below.

Upcoming Public Meetings

LHMP Kickoff meeting
9/10/2019 6PM
HVLCSD Conference Room
19400 Hartmann Rd, Hidden Valley Lake

For more information on this project and how to be involved, contact Alyssa Gordon at (707) 987-9201 or email at agordon@hvlcsd.org

Performance for Your Post

56 People Reached

2 Likes, Comments & Shares

2 Likes	2 On Post	0 On Shares
0 Comments	0 On Post	0 On Shares
0 Shares	0 On Post	0 On Shares

1 Post Clicks

0 Photo Views	0 Link Clicks	1 Other Clicks

NEGATIVE FEEDBACK

0 Hide Post	**0** Hide All Posts
0 Report as Spam	**0** Unlike Page

Reported stats may be delayed from what appears on posts

A.7.5. Kickoff Meeting – Public Agenda

HIDDEN VALLEY LAKE COMMUNITY SERVICES DISTRICT
LOCAL HAZARD MITIGATION PLAN (LHMP)
PUBLIC MEETING #1
SEPTEMBER 10, 2019

1. Introductions
2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements
3. Hazard Identification and Profiles
4. Opportunities for Public Participation and Input
5. Schedule
6. Questions and Answers

A.7.6. Kickoff Meeting – Public Sign in Sheets

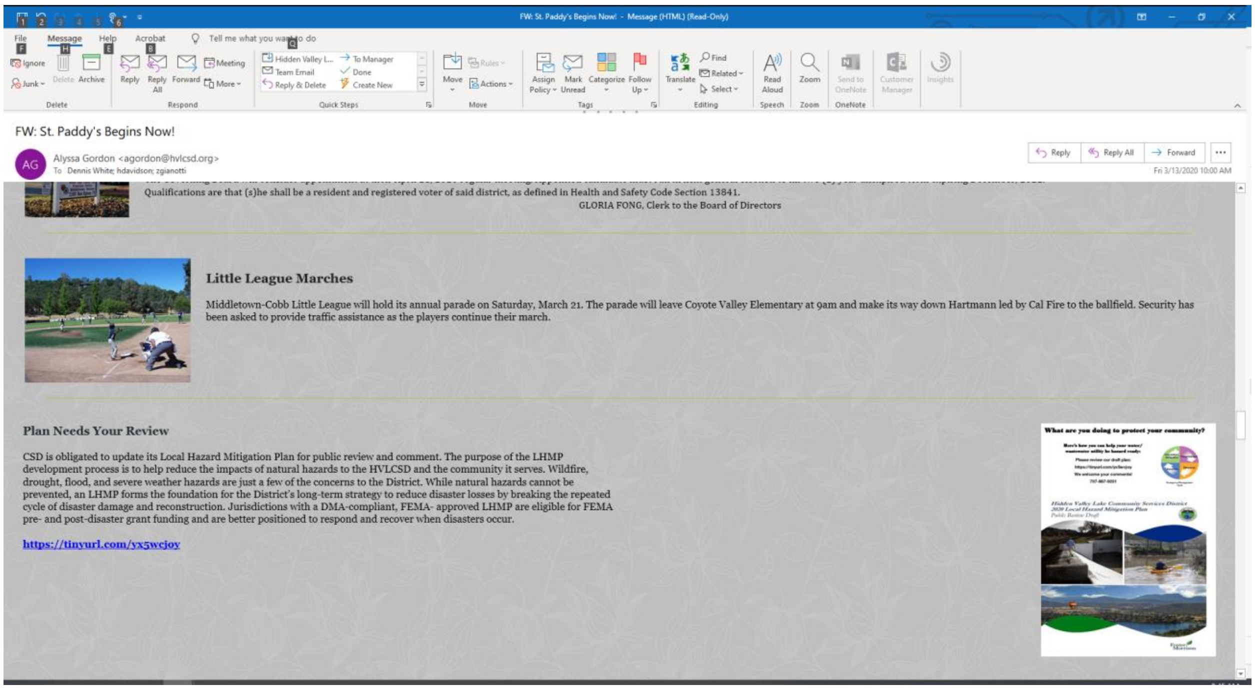
SIGN-IN SHEET
Hidden Valley Lake Community Services District
LOCAL HAZARD MITIGATION PLANNING PROJECT
Public Meeting #1
September 10, 2019

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Marina Deligiannis Program Coordinator	Marina.Deligiannis@lakecountyca.gov	707-263-2344	Lake County Water Resources
Zach Gianotti CivicSpark Fellow	zgianotti@hvlcsd.org	907 723 4602	CivicSpark HVLCSD
Hannah Davidson CivicSpark Fellow	hdavidson@hvlcsd.org	760-216-2446	Water Resources CivicSpark
Alyssa Gordon	agordon@hvlcsd.org	707-533-9073	Water Res. Spec.

A.7.7. Invite to Final Review of Plan – Public

Due to the Shelter in Place order issued by the County of Lake Health Officer, the Public meeting scheduled for March 25 and March 26 was cancelled.

A.7.8. Invite in HVLA Clear Lines of Communication Publication



FW: St. Paddy's Begins Now!

Alyssa Gordon <agordon@hvlcsd.org>
To Dennis White; hdavidson; zgianotti

Fri 3/13/2020 10:00 AM

Qualifications are that (s)he shall be a resident and registered voter of said district, as defined in Health and Safety Code Section 13841.
GLORIA FONG, Clerk to the Board of Directors

Little League Marches

Middletown-Cobb Little League will hold its annual parade on Saturday, March 21. The parade will leave Coyote Valley Elementary at 9am and make its way down Hartmann led by Cal Fire to the ballfield. Security has been asked to provide traffic assistance as the players continue their march.

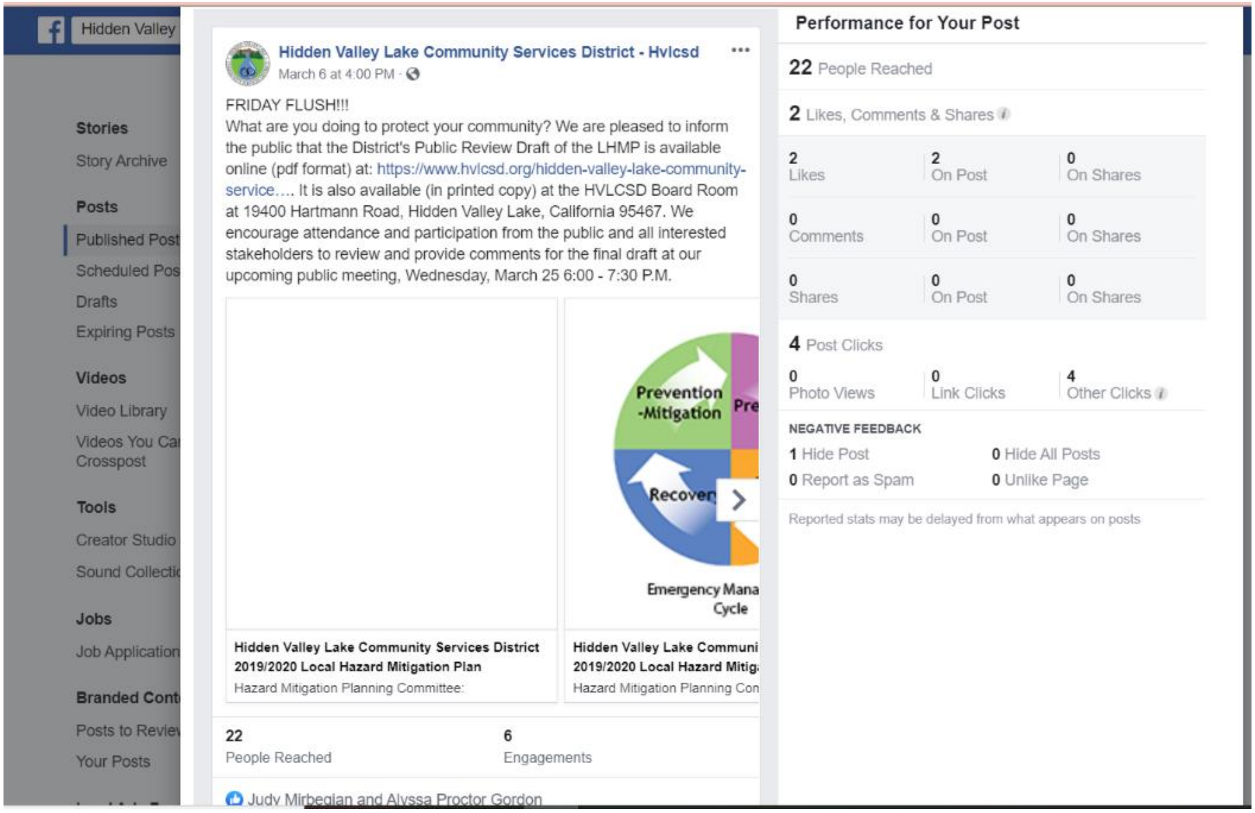
Plan Needs Your Review

CSD is obligated to update its Local Hazard Mitigation Plan for public review and comment. The purpose of the LHMP development process is to help reduce the impacts of natural hazards to the HVLCSD and the community it serves. Wildfire, drought, flood, and severe weather hazards are just a few of the concerns to the District. While natural hazards cannot be prevented, an LHMP forms the foundation for the District's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Jurisdictions with a DMA-compliant, FEMA- approved LHMP are eligible for FEMA pre- and post-disaster grant funding and are better positioned to respond and recover when disasters occur.

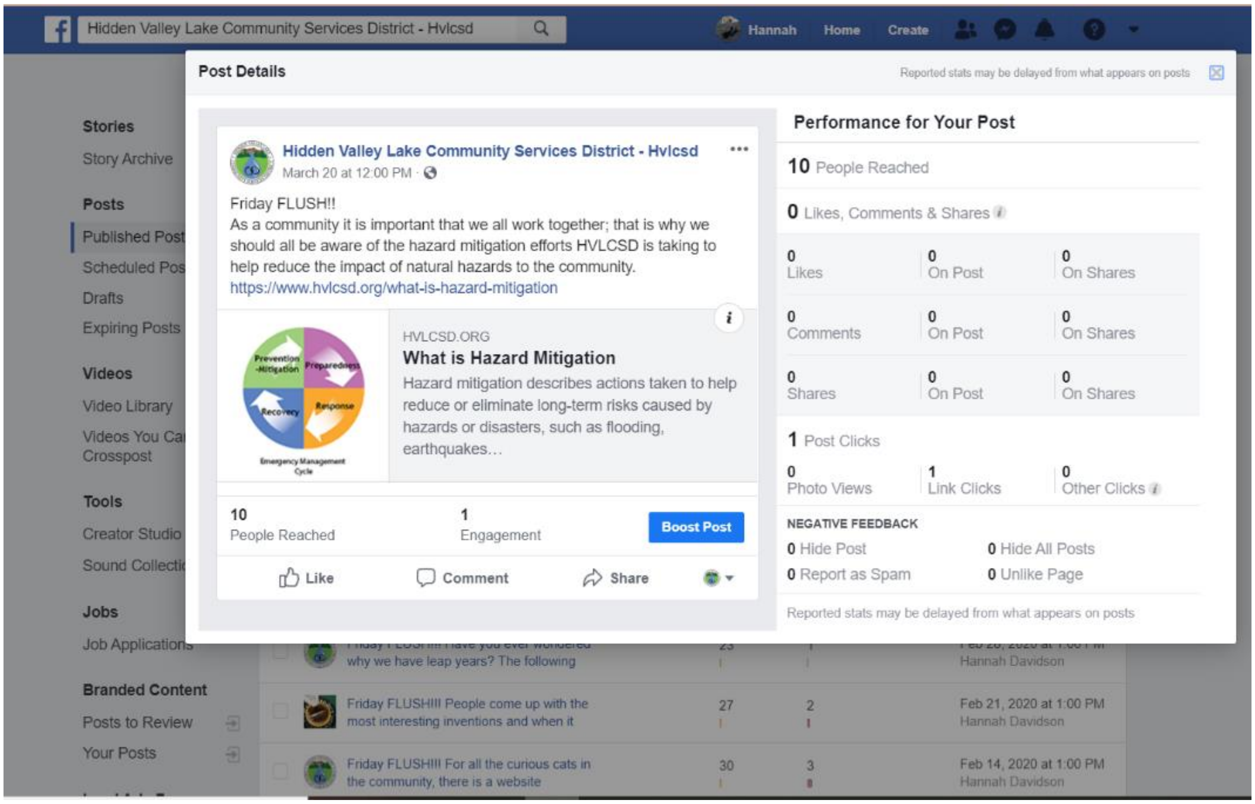
https://tinyurl.com/yx5wcjoy

What are you doing to protect your community?

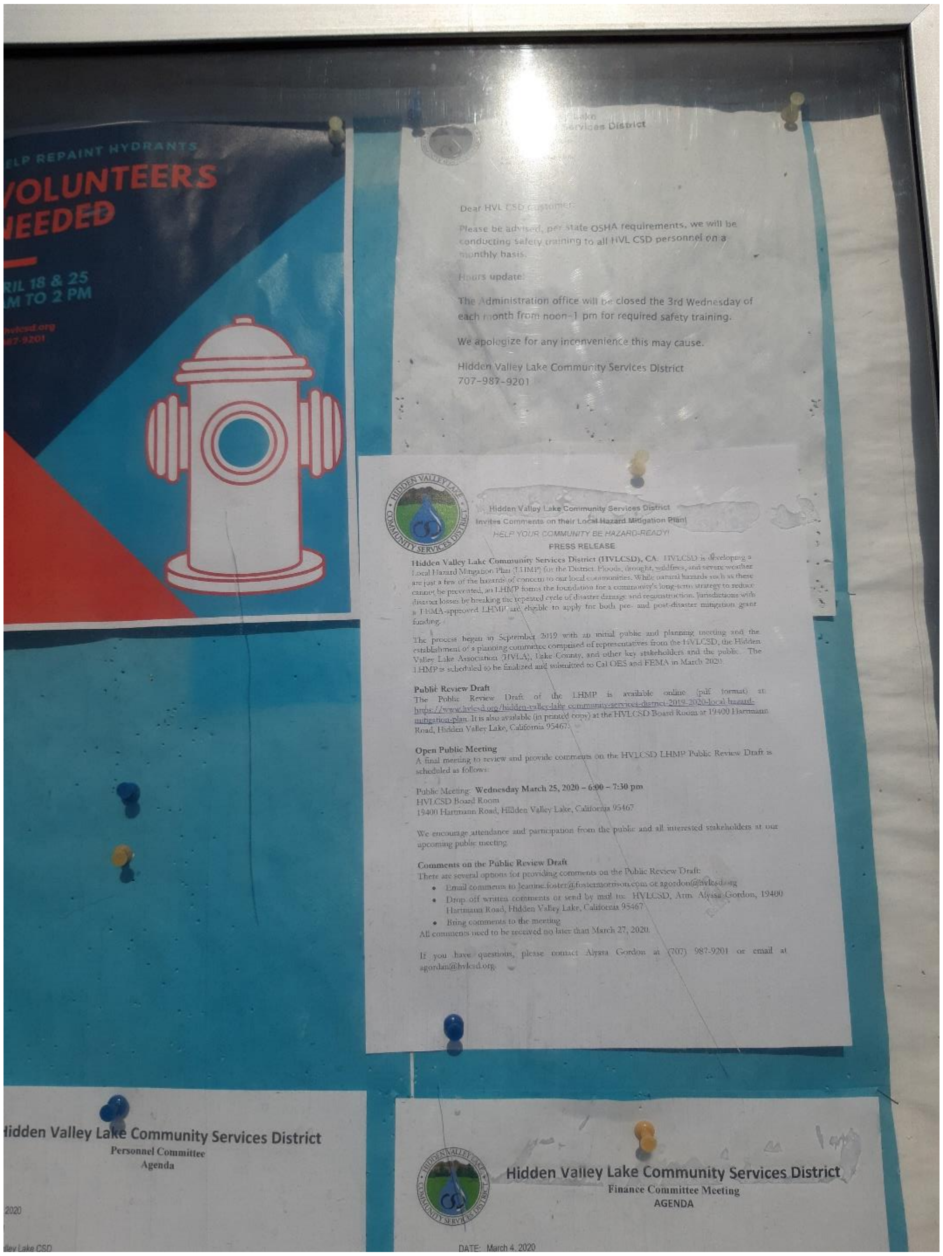
A.7.9. Invitation on District Facebook Page on March 6, 2020



A.7.10. Invitation on District Facebook Page on March 20, 2020

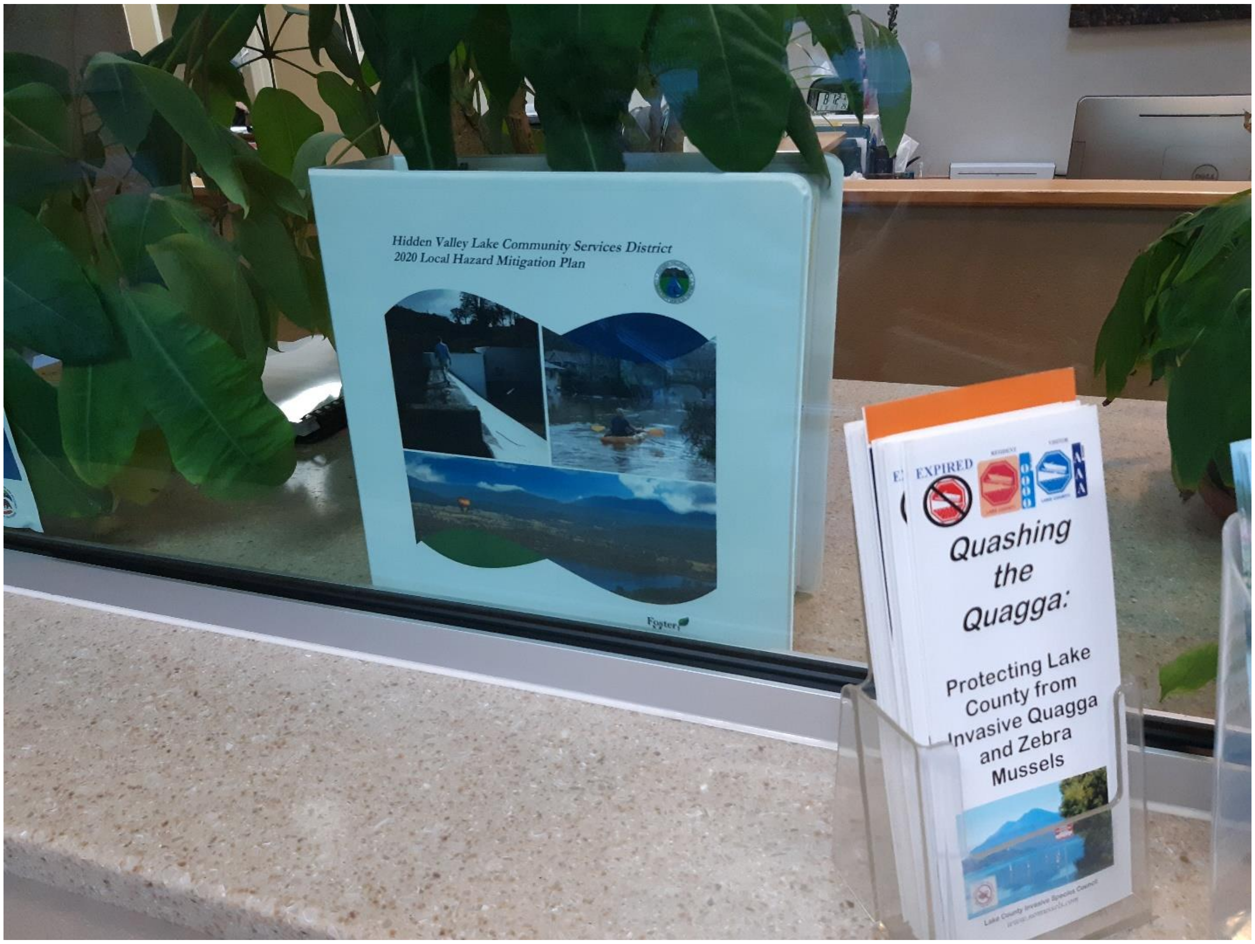


A.7.11. Invitation on Bulletin Board outside District Administration Building at 19400 Hartman Road

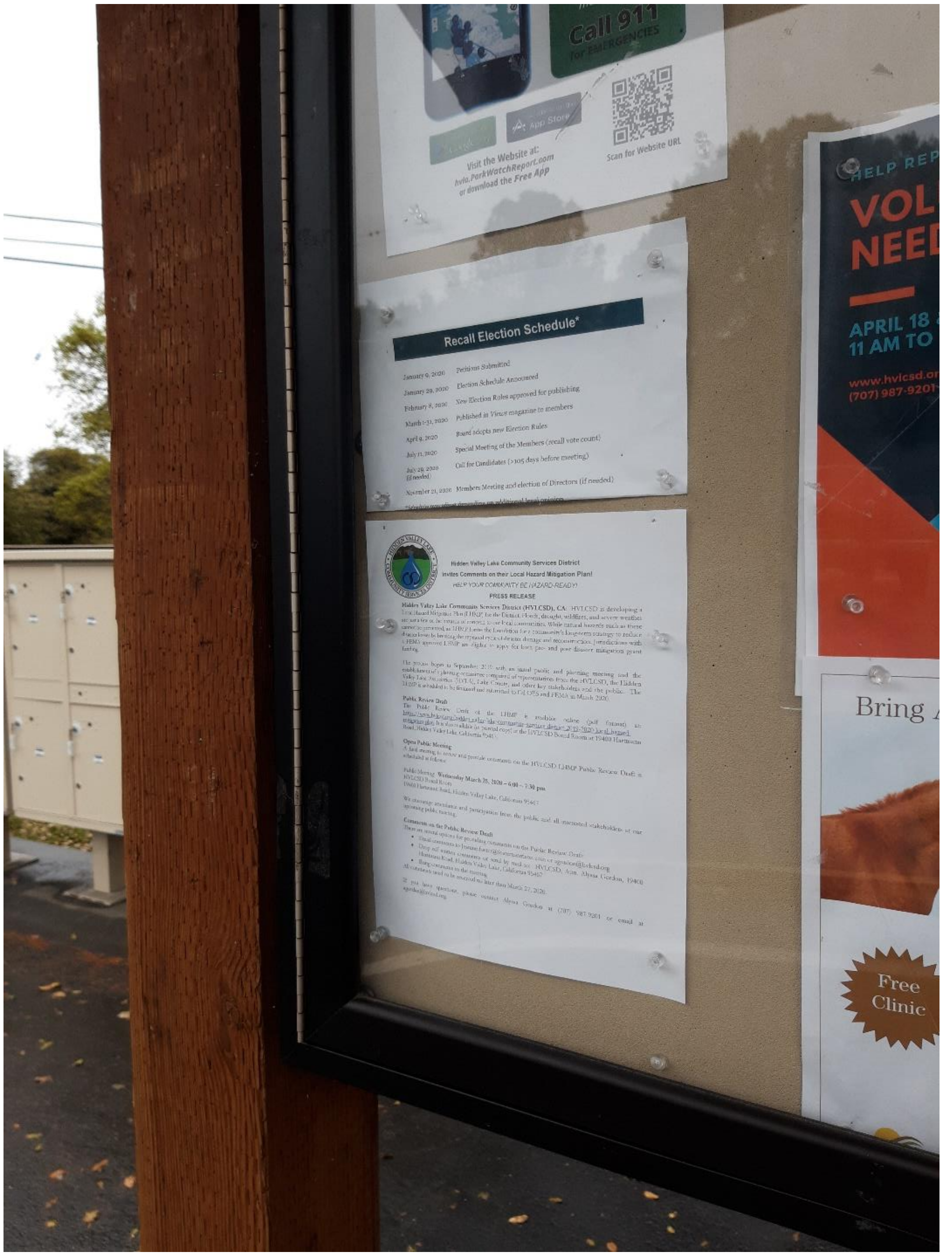


A.7.12. Invitation on Bulletin Board at the Middletown USPS at 21177 Calistoga Road

A.7.13. A Copy of the LHMP Available at the Front Desk Area of the District Administration Building at 19400 Hartmann Road

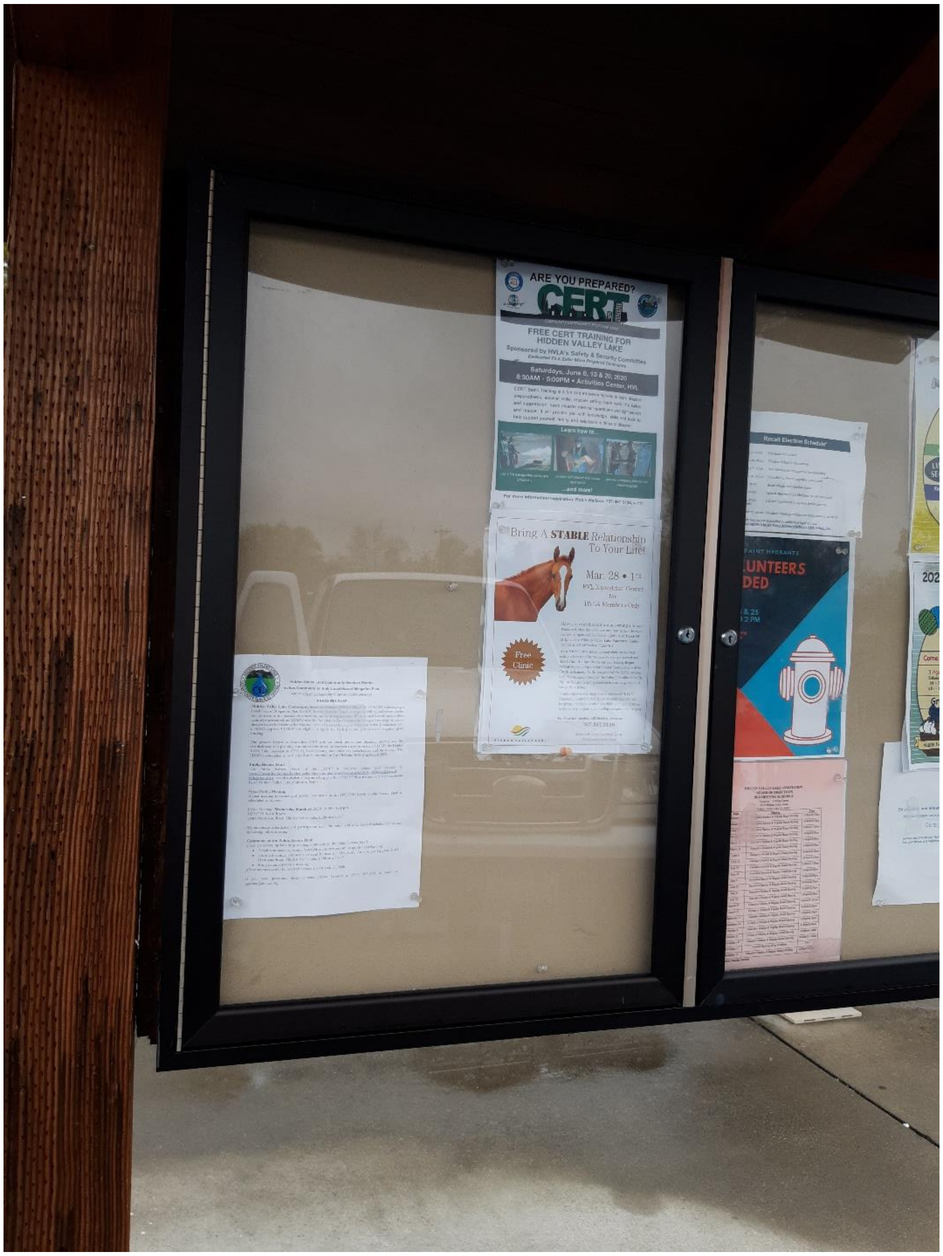


A.7.14. Invitation on HVLA Community Billboard on Spruce Grove Road

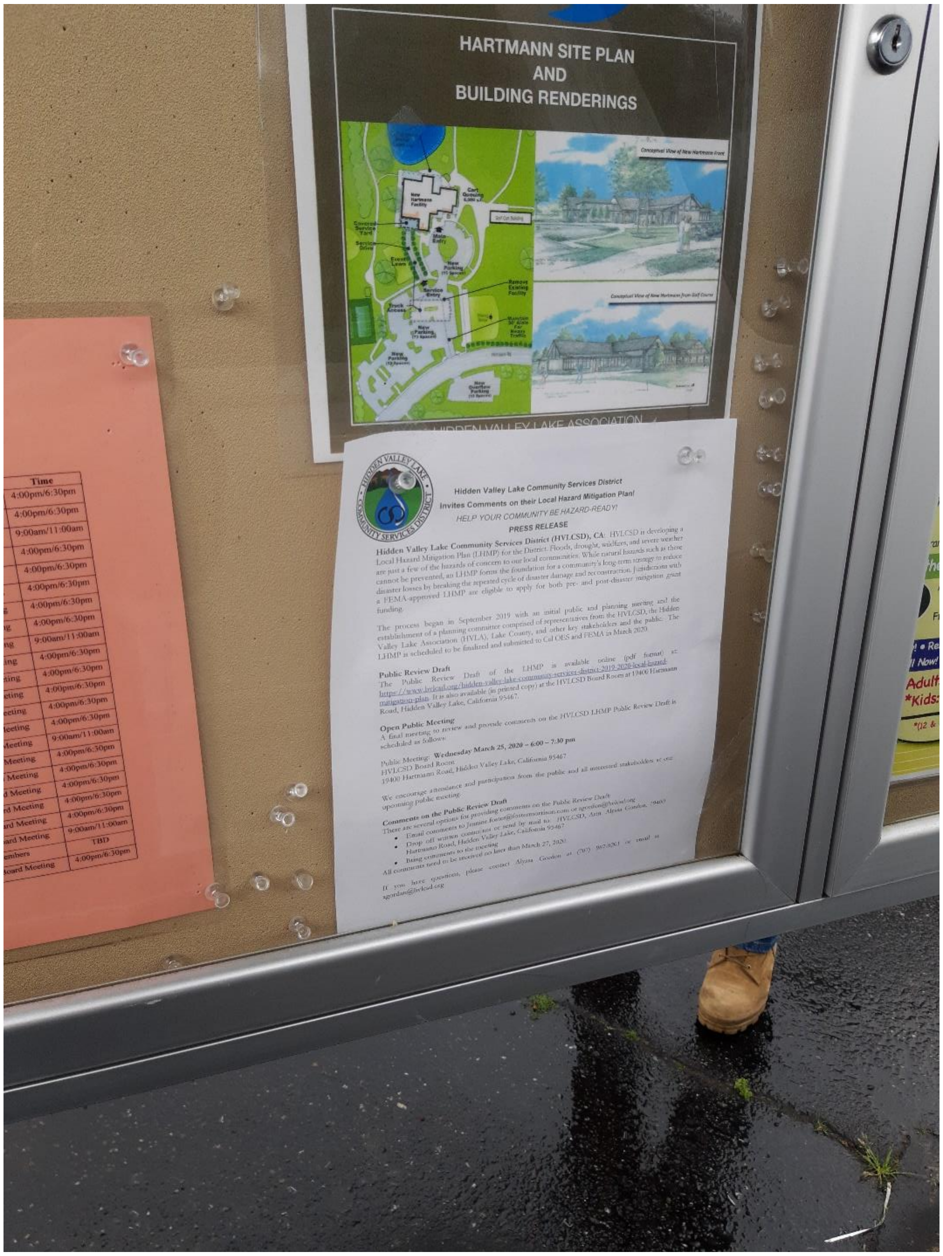


A.7.15. Invitation on HVLA Community Billboard on Ravenhill Road

A.7.16. Invitation on HVLA Community Billboard on Hidden Valley Road



A.7.17. Invitation on HVLA Community Billboard on Hartmann Road



A.7.18. Press Release for Final Meeting (prior to cancellation) in Lake County Record Bee

Hidden Valley Lake Community Services District
Invites Comments on their Local Hazard Mitigation Plan!
HELP YOUR COMMUNITY BE HAZARD-READY!
PRESS RELEASE

Hidden Valley Lake Community Services District (HVLCSD), CA: HVLCSD is developing a Local Hazard Mitigation Plan (LHMP) for the District. Floods, drought, wildfires, and severe weather are just a few of the hazards of concern to our local communities. While natural hazards such as these cannot be prevented, an LHMP forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Jurisdictions with a FEMA-approved LHMP are eligible to apply for both pre- and post-disaster mitigation grant funding.

The process began in September 2019 with an initial public and planning meeting and the establishment of a planning committee comprised of representatives from the HVLCSD, the Hidden Valley Lake Association (HVLA), Lake County, and other key stakeholders and the public. The LHMP is scheduled to be finalized and submitted to Cal OES and FEMA in March 2020.

Public Review Draft

The Public Review Draft of the LHMP is available online (pdf format) at: https://www.hvlcsd.org/hidden-valley-lake-community-services-district-2019-2020-local-hazard-mitigation-plan. It is also available (in printed copy) at the HVLCSD Board Room at 19400 Hartmann Road, Hidden Valley Lake, California 95467.

Open Public Meeting

A final meeting to review and provide comments on the HVLCSD LHMP Public Review Draft is scheduled as follows:

Public Meeting: Wednesday March 25, 2020 – 6:00 – 7:30 pm
HVLCSD Board Room
19400 Hartmann Road, Hidden Valley Lake, California 95467

We encourage attendance and participation from the public and all interested stakeholders at our upcoming public meeting.

Comments on the Public Review Draft

There are several options for providing comments on the Public Review Draft:

- Email comments to Jeanine.foster@fostermorrison.com or agordon@hvlcsd.org
- Drop off written comments or send by mail to: HVLCSD, Attn. Alyssa Gordon, 19400 Hartmann Road, Hidden Valley Lake, California 95467
- Bring comments to the meeting

All comments need to be received no later than March 27, 2020.

If you have questions, please contact Alyssa Gordon at (707) 987-9201 or email at agordan@hvlcsd.org.

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A.7.19. Public Comments

The table below includes comments received from the public during the LHMP creation.

Date	Name	Comment	Comment incorporation
3/27	Roger Anderson	My wife and I are residents whose property has been affected by the flooding issues in 2017 and 2019. There was an effort made by CSD GM Kirk Cloyd in 2017 to obtain funding from FEMA to replace the outdated flap in the levee behind the storm water catch basin. His proposal was to install a tide flex valve, which would allow water to drain into Putah Creek even after the creek level rises. The problem being that the existing flap shuts, and no longer allows water to drain into the creek once the creek reaches a certain level. Kirk originally advised us he had funding authorized from FEMA for 75%($450,000) of the cost to install the tide flex valve. During the 4th quarter of 2017, Kirk advised us that the FEMA funding was not available because the previous CSD GM had not signed up with Lake County and a storm water management district. I am also attaching some photos of the catch basin and Putah Creek taken recently for your review. The last photo is of the flap that opens to allow water to drain into the creek taken in 2017. Notice the piece of wood keeping the flap partially open.	Pics were added to flooding section. Information was added to flood profile.
3/25/2020	Ann Hackett	My computer is having issues at the moment so I can't see the report. I'll just reference my notes that I took during a cursory reading. Table ES-3 Dam Failure, Flood, Localized Flood, Levee Failure Actions. Should Actions 16 through 221 all have HVLA and Lake County included as Responsible Agencies and Partners? 4-118 or 4-119 Levee failure in the District would likely have a short onset, and the duration would be short…………If the levee failed during an Atmospheric River Storm, the duration would not be short as those events can last for days. Occasional – Though there is one only one leveed area located in the District the HMPC felt the likelihood of levee failure is occasional. This rating was in part determined due to issues surrounding ownership and maintenance of the levee system…..Given the other potential hazardous such as: earthquakes, floods, and fires with their cumulative impact and increased frequency along with the maintenance neglect, the likelihood of levee failure might be greater. By the way, just had a 4.1 today at the Geysers today. Populations at Risk The NLD estimates there are 106 people who reside in the levee protected area. I don't know the year of the NLD but I believe the population number is in the hundreds. Is it possible to add the community elementary school to the levee flood failure impacts?	Items were added to actions in Chapter 5. Items were added to localized flood, levee failure, earthquake, and flood sections.
3/24/2020	Ann Hackett	Congratulations to you and your team on the amazing LHMP draft. I may be too late to comment as I have been extremely busy. Do I still have time for input if I'm able to review? Regarding Community Impact, I know that localized flood events are absolutely not more of a nuisance than a disaster.	Comments added to localized flooding profile.

Date	Name	Comment	Comment incorporation
2/3/ 2020	Randy Murphy	for purposes of discussion, I believe that the CSD owns the water in the dam, so, in the event of a catastrophic failure, they would lose that asset as well. I don't recall the exact number of acre feet held in the dam, but it's pretty substantial. Shouldn't that cost be included? Also, the 3rd paragraph on pg 23 of the 'Chapters Only' document says, "Hidden Valley Lake CSD drinking water supply comes from three wells which draw groundwater from the Coyote Valley groundwater basin and Putah Creek underflow." Please check with CSD staff to determine if this is accurate. I only bring it up because of the moratorium and the State's insistence that we draw from Putah Creek. Any reference to suggest that may be so could be problematic in their attempt to rescind the moratorium. Let's talk about the History section that begins on page 27 of that document. Some incomplete thoughts, other misstatements. I've asked Jim Freeman (a CSD Board member but also a HVL staff member) for his input, so you should hear something from him.	Items were added to Chapter 2, as well as to the flood profile, dam profile, and drought profile.
1/14/ 2020	Sonja Edd-Bennett	Hi Alyssa. Thanks for sharing this great information – and for the impressive work you are doing. Can you please identify who the initials in the 'responsible' column belong to, and which agency they are with? Also – the United Methodist Committee on Relief (UMCOR) has available an excellent preparedness training through its Connecting Neighbors curriculum. It comes in 3 modules: Ready Congregants, Ready Churches, and Ready Communities. I will attach a brochure for your information. The training is free and though it is designed through the United Methodist Church and uses some church language, it is regularly adapted for the entire community and can be interfaith and involve other community partners as well. Let me know if you would like more information or to discuss how the UMC can be of any help!	Items were added to capabilities section.
1/17/ 2020	Ann Hackett	Hi Jeanine, I came across 2 more articles last night. Thanks so much for the kind words of appreciation. It takes a team!!! Ann https://www.record-bee.com/2015/12/11/el-nio-hidden-valley-rushes-to-prepare-for-flooding/ https://www.sfchronicle.com/science/article/Fire-scarred-Lake-County-fears-mudslides-6746668.php	These were placed in past occurrences of flooding.
1/12/ 2020	Ann Hackett	The following is taken from a Middletown Area Plan that is no longer available online. I realized when reading it that there was little or no discussion of Coyote and Gallagher Creeks during the Planning meetings. They currently are the source of flood risk for the critical facilities (CSD, the fire station, the elementary school), HVLA's restaurant and golf facilities, and 2 commercial centers. I've never heard any discussion about planned mitigation for this flooding. It would be of great benefit to the community/CSD if major improvements to these creeks could be added to the LHMP.	Items were added to flood, localized flood, dam failure, and levee failure sections.

A.8 Meeting Handouts

Below are the handouts for each meeting. Handouts specific to the Risk Assessment Meeting can be found in Appendix C.

A.8.1. Kickoff Meeting Handouts for Public and HMPC Meetings

Lake County State and Federal Disaster Declarations, 1950-2019

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
2019	California Severe Winter Storms, Flooding, Landslides, And Mudslides	Flood	Storms	DR-4434	-	5/17/2019
2018	Mendocino Complex Fires	Fire	Fire	DR-4382	–	8/4/2018
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	–	4/1/2017
2017	California Severe Winter Storms, Flooding, Mudslides	Flood	Storms	DR-4301	–	2/14/2017
2016	Clayton Fire	Fire	Fire	FM-5145	–	8/14/2016
2015	Valley Fire and Butte Fire	Fire	Fire	DR-4240	–	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	–
2012	Wye Fire	Fire	Fire	FM-5004	–	8/13/2012
2006	2006 June Storms	Flood	Storms	DR 1646	–	6/5/2006
2005/2006	2005/06 Winter Storms	Flood	Storms	DR-1628	–	2/3/2006
2005	Hurricane Katrina Evacuations	Economic	Hurricane	EM-3248 2005	–	9/13/2005
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	Proclaimed	2/19/1998

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
1997	1997 January Floods	Flood	Storms	DR-1155	1/2/97-1/31/97	1/4/1997
1996	Lake County Fire	Fire	Fire	DC-96-03	–	8/1/1996
1995	California Severe Winter Storms, Flooding, Landslides, Mud Flows	Flood	Storms	DR-1046	Proclaimed	3/12/1995
1995	1995 Severe Winter Storms	Flood	Storms	DR-1044	1/6/95-3/14/95	1/13/1995
1987	1987 Fires	Fire	Fire	GP	9/10/87, 9/3/87	–
1986	1986 Storms	Flood	Storms	DR-758	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	12/8/82-3/21/83	2/9/1983
1980	April Storms	Flood	Storms	–	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
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

Lake County – State and Federal Disaster Declarations Summary 1950-2019

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Drought	0	–	2	1977, 2014
Economic	0	–	2	1979, 2001
Fire	10	1985, 1996, 2012, 2015 (three times), 2016, 2017(twice), 2018	1	1987
Flood (including heavy rains and storms)	16	1955, 1958, 1963, 1964, 1970, 1983, 1986, 1995 (two times), 1997, 1998, 2005/2006, 2006, 2017 (two times), 2019	14	1950, 1955, 1958 (twice), 1963 (twice), 1970, 1980, 1983, 1986, 1995 (twice), 1997, 1998
Freeze	0	–	2	1970, 1972
Hurricane	1	2005	0	–
Road Damage	0	–	1	2003
Totals	**27**	–	**22**	**–**

Source: Cal OES, FEMA

*Lake County NCDC Storm Events 1/1/1950-5/31/2019**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Blizzard	1	0	0	0	0	$0	$0
Debris Flows	2	0	0	0	0	$300,000	$0
Drought	15	0	0	0	0	$0	$0
Excessive Heat	1	0	0	0	0	$0	$0
Flash Flood	2	0	0	0	0	$10,000	$0
Flood	16	1	0	4	0	$23,430,000	$0
Frost/Freeze	2	0	0	0	0	$0	$0
Hail	1	0	0	0	0	$0	$0
Heat	4	0	0	0	0	$0	$0
Heavy Rain	7	0	0	0	0	$0	$0
Heavy Snow	4	0	0	0	0	$10,000	$0
High Wind	13	0	0	0	0	$168,000	$0
Strong Wind	1	0	0	0	0	$1,000	$0
Wildfire	13	5	1	37	9	$5,750,000	$0
Winter Storm	62	0	0	0	0	$0	$0
Winter Weather	7	0	0	0	0	$0	$0
Total	**151**	**6**	**1**	**41**	**9**	**$29,669,000**	**$0**

Source: NCDC

*Note: Losses reflect totals for all impacted areas

Hidden Valley CSD Hazard Identification Table

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Aquatic Biological Hazards: quagga mussel					Low
Climate Change					–
Dam Failure					Low
Drought and Water Shortage					High
Earthquake					Low
Flood: 1%/0.2% Annual Chance					Medium
Flood: Localized/Stormwater					Medium
Hazardous Materials Transport					Low
Landslide and Debris Flows					Medium
Levee Failure					Medium
Severe Weather: Extreme Cold and Freeze					Medium
Severe Weather: Extreme Heat					Medium
Severe Weather: Heavy Rains, Snow, and Storms					Medium
Severe Weather: High Winds					Medium
Volcano					Low
Wildfire					High

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

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

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

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Climate Change Impact:
Low: Climate change is not likely to increase the probability of this hazard.
Medium: Climate change is likely to increase the probability of this hazard.
High: Climate change is very likely to increase the probability of this hazard.

Hidden Valley Lake Community Services District
2020 Local Hazard Mitigation Plan
Participating Jurisdiction: Vulnerability & Capability Worksheets

Risk and Vulnerability Questions

Localized/Stormwater Flooding

1. Please describe the localized/stormwater flood issue specific to your jurisdiction in paragraph form. In addition, please complete a table similar to the below example detailing types and location of localized/stormwater flooding problems. If available, also attach a map of problem areas.

Text Description

Localized Flooding Areas

Road Name	Flooding	Pavement Deterioration	Washouts	High Water/ Creek Crossing	Landslides/ Mudslides	Debris	Downed Trees

Landslides, Mudslides, and Debris Flow

1. Please describe the landslide, mudslide, hillside erosion and debris flow issues specific to the District in paragraph form. In addition, please complete a table similar to the below example detailing types and location of landslide, mudslide, and debris flow problems. If available, also provide a map of problem areas.

Text Description:

Table 2 Landslides, Mudslides, and Debris Flow Areas

Location	Detail Nature and Extent of Landslide Issues

Earthquake Vulnerability

1. Number of unreinforced masonry buildings. If available, please provide an inventory of URM buildings specific to your jurisdiction. Include any tables and/or maps. Is this a layer available in GIS?

Special Populations

1. Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, low-income, or migrant farm workers.

Development Trends

1. Describe development trends and expected growth areas and how they relate to hazard areas and vulnerability concerns/issues. Please provide zoning maps and maps and tables detailing areas targeted for future development within your jurisdiction.

CAPABILITY ASSESSMENT

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.

Planning and Regulatory

The following planning and land management tools are typically used by local jurisdictions to implement hazard mitigation activities. Please indicate which of the following your jurisdiction has in place. If your jurisdiction does not have this capability or authority, please indicate in the comments column if a higher level of government has the authority.

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
General Plan		
Capital Improvements Plan		
Economic Development Plan		
Local Emergency Operations Plan		
Continuity of Operations Plan		
Transportation Plan		
Stormwater Management Plan/Program		
Engineering Studies for Streams		
Community Wildfire Protection Plan		
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code		
Building Code Effectiveness Grading Schedule (BCEGS) Score		
Fire department ISO rating:		
Site plan review requirements		
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance		
Subdivision ordinance		
Floodplain ordinance		

Natural hazard specific ordinance (stormwater, steep slope, wildfire)	
Flood insurance rate maps	
Elevation Certificates	
Acquisition of land for open space and public recreation uses	
Erosion or sediment control program	
Other	
How can these capabilities be expanded and improved to reduce risk?	

Administrative/Technical

Identify the technical and personnel resources responsible for activities related to hazard mitigation/loss prevention within your jurisdiction. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, please indicate so in the comments column.

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission		
Mitigation Planning Committee		
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)		
Mutual aid agreements		
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official		
Floodplain Administrator		
Emergency Manager		
Community Planner		
Civil Engineer		
GIS Coordinator		
Other		
Technical	**Y/N**	**Describe capability Has capability been used to assess/mitigate risk in the past?**
Warning systems/services (Reverse 911, outdoor warning signals)		

Hazard data and information
Grant writing
Hazus analysis
Other
How can these capabilities be expanded and improved to reduce risk?

Fiscal

Identify whether your jurisdiction has access to or is eligible to use the following financial resources for hazard mitigation

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding		
Authority to levy taxes for specific purposes		
Fees for water, sewer, gas, or electric services		
Impact fees for new development		
Storm water utility fee		
Incur debt through general obligation bonds and/or special tax bonds		
Incur debt through private activities		
Community Development Block Grant		
Other federal funding programs		
State funding programs		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Education and Outreach

Identify education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.		
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)		
Natural disaster or safety related school programs		
StormReady certification		
Firewise Communities certification		
Public-private partnership initiatives addressing disaster-related issues		
Other		
How can these capabilities be expanded and improved to reduce risk?		

National Flood Insurance Program (NFIP) Worksheet

Use this worksheet to collect information on your community's participation in and continued compliance with the NFIP, as well as identify areas for improvement that could be potential mitigation actions.

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	
How many structures are exposed to flood risk within the community?	
Describe any areas of flood risk with limited NFIP policy coverage	
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	
What are the barriers to running an effective NFIP program in the community, if any?	
Compliance History	
Is the community in good standing with the NFIP?	
Are there any outstanding compliance issues (i.e., current violations)?	
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	
Is a CAV or CAC scheduled or needed?	
Regulation	
When did the community enter the NFIP?	
Are the FIRMs digital or paper?	
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	
Provide an explanation of the permitting process.	
Community Rating System	
Does the community participate in CRS?	
What is the community's CRS Class Ranking?	
What categories and activities provide CRS points and how can the class be improved?	
Does the plan include CRS planning requirements?	

Prepared by:	Date	Email	Phone

HISTORIC HAZARD EVENTS WORKSHEET

Please fill out one sheet for each significant hazard event with as much detail as possible. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of event	
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Opinion on likelihood of occurring again	
Source of information	
Comments	

	Please return worksheets by mail, email, or fax to: Jeanine Foster, Foster Morrison 5628 West Long Place Littleton, CO 80123 fax: (720) 893-0863 email: jeanine.foster@fostermorrison.com
Prepared by:	
Phone:	
Email:	
Date:	

A.8.2. Risk Assessment Meeting Handouts for HMPC Meeting

Hazard Identification & Profiles: HVLCSD

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Aquatic Biological Hazards: quagga mussel	Limited	Occasional	Catastrophic	Medium	Low
Climate Change	Extensive	Likely	Critical	Medium	–
Dam Failure	Extensive	Unlikely	Catastrophic	High	Low
Drought and Water Shortage	Extensive	Likely/Occasional	Critical	Medium	High
Earthquake	Extensive	Highly Likely/ Occasional	Catastrophic	Medium	Low
Flood: 1%/0.2% Annual Chance	Significant	Occasional/Unlikely	Critical	High	Medium
Flood: Localized/Stormwater	Extensive	Highly Likely	Critical	High	Medium
Landslide and Debris Flows	Limited	Occasional	Limited	Medium	Medium
Levee Failure	Significant	Occasional	Critical	High	Medium
Severe Weather: Extreme Cold and Freeze	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Heavy Rains, Snow, and Storms	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: High Winds	Extensive	Highly Likely	Limited	Medium	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area
Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid
Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact
Climate Change Impact:
Low: Climate change is not likely to increase the probability of this hazard.
Medium: Climate change is likely to increase the probability of this hazard.
High: Climate change is very likely to increase the probability of this hazard.

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

Aquatic Biological Hazards: Quagga Mussel

- Quagga and zebra mussels are an invasive non-native species that breed very fast, have no known predators, and can quickly colonize new areas within California waters. Once established, these mussels can clog water intake and delivery pipes, dam intake gates and pipes, adhere to boats, pilings, and most hard and some soft substrates.
- While Quagga Mussels have not been found in Clear Lake or Hidden Valley Lake, they have been found in 43 water bodies in California since 2008. Most of these are in the southern part of the state.
- ANY UNIQUE ISSUES/IMPCATS/CONCERNS TO THE DISTRICT?
- Likelihood of Future Occurrence: Likely
- Vulnerability: High
- Priority Hazard

Climate Change

- The 2018 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. Wildfire occurrence and intensity is also on the increase. Climate Change has the potential to alter the nature and frequency of most hazards.
- In Lake County, 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.
- ANY INPUT ON CLIMATE CHANGE ISSUES IN HIDDEN VALLEY?
- Likelihood of Future Occurrence: Likely
- Vulnerability: Medium
- Priority Hazard

Dam failure

- According to data provided by Cal OES and National Performance of Dam's data, there are 21 dams in Lake County constructed for flood control, storage, electrical generation, and recreational purposes. Of these, 1 is extremely high, 10 are high hazard, 4 are significant hazard, and 6 are low hazard.
- Dams of concern to the District includes only one dam: Coyote Creek Dam on Hidden Valley Lake, owned by the Hidden Valley Lake Association.
- ARE THERE ANY PAST OCCURRENCES OF DAM FAILURES OR RELATED ISSUES? CAN WE GET THE NEW INUNDATION MAPPING FOR THIS DAM?
- WHAT WOULD A FAILURE OF THIS DAM DO TO DISTRICT FACILITIES AND OPERATIONS?
- 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.
- Since 2012, snowpack levels in California had dropped dramatically. 2015 estimates place snowpack as 5 percent of normal levels. However, snowpack levels increased in 2016 and in 2017 snowpack levels were the highest they've been in 22 years. However, drought has started to creep back in to the Northern California area, but recent winters continue to keep drought conditions at bay in Lake County.
- 2 disaster declarations (1977 and 2014) for Lake County since 1950. There have been 15 NCDC drought events in Lake County. All of these were for the 2014-2016 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 3 primary groundwater wells and other sources.
- CAN YOU PROVIDE DAMAGES OR RESTRICTIONS THAT HAVE OCCURRED IN THE DISTRICT RECENTLY DUE TO THE MOST RECENT DROUGHT. WHAT HAS BEEN IMPACTED THE MOST?
- WHAT INPUT DOES THE DISTRICT HAVE ON FUTURE WATER SUPPLY, ESPECIALLY IN LIGHT OF THE BUILDING MORETORIUM.
- Likelihood of Future Occurrence: 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. The San Andreas fault and the Mayacama /Healdsburg fault are two significant faults of concern to the District. Both of these faults have been responsible for moderate to major seismic events in the past. The maximum earthquake magnitudes observed to date are 8.5 for the San Andreas fault and 6.75 (Richter Scale1) for the Mayacama/Healdsburg fault.
- 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. No major earthquakes have been recorded within the County; although the County has felt ground shaking from earthquakes with epicenters located elsewhere.
- WERE THERE ISSUES/DAMAGES IN THE DISTRICT FROM THE HISTORICAL EARTHQUAKES? DO DISTRICT BUILDINGS AND ASSETS NEED TO BE EVALUATED FOR EARTHQUAKE RETROFITS?
- Likelihood of Future Occurrence: Unlikely – large, damaging earthquake; Likely – minor earthquake
- Vulnerability: Medium
- Priority Hazard

Flood Hazards

100/500 year

- 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.
- 14 state and 15 federal declarations were for severe winter weather, storms, heavy rains, or flooding. Flooding is an ongoing issue for the planning area.
- PROVIDE INFORMATION ON FLOOD EVENTS SPECIFIC TO THE DISTRICT.
- WHAT ARE THE DISTRICT CONCERNS TO DISTRIC FACILITIES AND OPERATIONS FROM FLOODS?
- 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.
- PROVIDE DETAILS ON PAST OCCURRENCES IN THESE LOCALIZED FLOOD AREAS? PICTURES/DESCRIPTIONS.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Landslides and Debris Flows

- There have been no disaster declarations associated with landslides in Lake County. The NCDC contains no records of landslides.
- WHAT SPECIFIC AREAS OF THE DISTRICT ARE AT RISK TO LANDSLIDES – BOTH SLOPED AREAS WITHIN THE DISTRICT AND AREAS THAT MIGHT BE AFFECTED BY LANDSLIDING FROM AREAS WITHIN THE COUNTY?
- CAN THE DISTRICT PROVIDE INFORMATION ON PAST LANDSLIDE EVENTS?
- Likelihood of Future Occurrence: Likely
- Vulnerability: Medium
- Non-Priority Hazard

Levee Failure

- Agricultural and engineer 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?
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Medium
- Priority Hazard

Severe weather

Extreme Cold and Freeze

- Annual occurrences of cold temperatures. 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.
- Only 2 extreme cold and freeze event (NCDC) from 1993-2019; No state or federal disaster declarations
- PLEASE PROVIDE DETAILS ON EXTREME COLD AND FREEZE EVENTS IN THE DISTRICT. ISSUES/CONCERNS/IMPACTS TO DISTRICT FACILITIES?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Extreme Heat

- Annual occurrences of hot temperatures. The highest recorded daily extreme was 109°F on September 2, 1950. In a typical year, maximum temperatures exceed 90°F on 71 days.
- Only 1 extreme heat event (NCDC) from 1993-2019; No state or federal disaster declarations
- PLEASE PROVIDE DETAILS ON EXTREME HEAT EVENTS IN THE DISTRICT. ISSUES/CONCERNS/IMPACTS TO DISTRICT FACILITIES?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Low
- Non-Priority Hazard

Heavy rains and storms

- Significant County/District history: annual occurrences. Snow is rare.
- The NCDC data recorded 78 hail, heavy rains, and storms events for Lake County since 1950.
- There have been 15 federal declarations since 1950 for flooding and severe storms, including winter storms. NCDC has 82 recorded storm events since 1950.
- PLEASE PROVIDE DETAILS ON HEAVY RAIN AND STORM EVENTS IN THE DISTRICT. ISSUES/CONCERNS/IMPACTS FOR RAIN, HAIL, LIGHTNING, SNOW?
- Severe storms/heavy rains are the primary cause of most major flooding
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

High Winds

- Annual occurrences of high winds in the District
- The NCDC data recorded 14 high wind events for Lake County since 1950.
- PLEASE PROVIDE DETAILS ON HIGH WIND EVENTS IN THE DISTRICT. ISSUES/CONCERNS/IMPACTS?
- High winds exacerbate wildfires; creates PSPS issues
- 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.
- 10 federal disaster declarations for Wildfire since 1950 in the County; 8 of these since 2012
- The Valley Fire was the most significant fire in terms of direct impacts and damages to the District
- HAS THE DISTRICT BEEN IMPACTED BY OTHER SIGNIFICANT FIRES?
- 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

Review of Key Items to date:

- Hazard-specific data (from today's risk assessment review)
  - ✓ Historic Hazard Worksheets or list of past hazard occurrences and impacts to District by hazard
  - ✓ Information on key items identified above in the hazard summary; primary focus is on concerns, issues, impacts of hazards specifically to District facilities, assets, and operations
- Any other plans, studies, data, etc. related to the identified natural hazards to the City

Other Data Items:

- Land Value Methodology: Need to determine a source/methodology for determining land values associated with the 18 parcels owned by HVLCSD. They have no assessed values in the County database. Many of these parcels have a code 003 which is for non-taxable government parcels.
- Coyote Dam: Need GIS files for new inundation mapping developed for this dam.
- Still need some asset valuation data for HVLCSD (FM to provide list)
- Photos of problem areas, past events, etc.

A.8.3. Mitigation Strategy Meeting Handouts

These can be found in Appendix C of this Plan.

A.8.4. Final Meeting Handouts for HMPC

These meetings were cancelled due to the Shelter in Place order by Lake County Public Health.

A.8.5. Final Meeting Handouts for Public

These meetings were cancelled due to the Shelter in Place order by Lake County Public Health.

Appendix B References

2000 Master Storm Drainage Plan for Hidden Valley Lake CSD

2006 Lake County Water Inventory

2008 Lake County Community Wildfire Protection Plan

2013 Lake County Drought Management Plan

2014 California Climate Adaptation Strategy

2018 HVLCSD Infiltration and Inflow Assessment

2018 Lake County Local Hazard Mitigation Plan

2018 State of California Multi-Hazard Mitigation Plan

2018-2019 Annual Report of the Upper Putah Creek Watershed Watermaster

CAL FIRE

CAL FIRE GIS Datasets

Cal OES Dam Inundation Data

Cal-Adapt

Cal-Atlas

Cal-DWR Disadvantage Community Mapping Tool

California Adaptation Planning Guide

California Department of Finance

California Department of Fish and Wildlife

California Department of Parks and Recreation Office of Historic Preservation

California Department of Water Resources Best Available Maps

California Department of Water Resources Division of Safety of Dams

California Division of Mines and Geology

California Geologic Survey

California Geological Survey

California Natural Diversity Database

California Natural Resource Agency

California State Water Resources Control Board

California's Adaptation Planning Guide: Understanding Regional Characteristics

California's Drought of 2007-2009, An Overview. State of California Natural Resources Agency, California Department of Water Resources

California's Fourth Climate Change Assessment

California's Sustainable Groundwater Management Act

Climate Change and Health Profile Report – Lake County

Climate Institute

Climate.org website (http://climate.org/algae-cyanobacteria-blooms-and-climate-change/)

Federal Emergency Management Agency

FEMA - Understanding Your Risks—Identifying Hazards and Estimating Losses.

FEMA Disaster Declaration Database

FEMA Hazus-MH 4.2

FEMA Lake County Digital Flood Insurance Rate Map 9/30/2005

FEMA Lake County Flood Insurance Study 9/30/2005

FEMA Lake County Preliminary Flood Insurance Study 6/18/2014

FEMA Multi-Hazard Identification and Risk Assessment

FEMA National Flood Insurance Program

FEMA NFIP Data for Lakeport

HMPC Input

Intergovernmental Panel on Climate Change

Lake County 2008 General Plan

Lake County Assessor's Data

Lake County Climate and Health Profile Report

Lake County Emergency Operations Plan

Lake County GIS

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.

NASA

National Center for Atmospheric Research in Boulder, Colorado

National Climate Assessment

National Drought Mitigation Center

National Drought Mitigation Center Drought Impact Reporter

National Institute of Building Science Multi-Hazard Mitigation Council 2017 Interim Report

National Integrated Drought Information System

National Interagency Fire Center

National Levee Database

National Oceanic and Atmospheric Administration

National Oceanic and Atmospheric Administration's National Climactic Data Center

National Performance of Dams Program at Stanford University

National Weather Service

NOAA Storm Prediction Center

Proceedings of the National Academy of Sciences

Public Health Alliance of Southern California

Science magazine

Southern California Association of Governments

U.S. Army Corps of Engineers

U.S. Fish and Wildlife Service

U.S. Geological Survey

U.S. Geological Survey Landslide Data

UNFCCC Conference of Parties Paris Agreement of 2015

United State Geologic Survey, Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977

United States Geological Survey Open File Report 2015-3009

University of California

US Army Corps of Engineers

US Bureau of Land Management

US Census Bureau

US Environmental Protection Agency

US Environmental Protection Agency Climate Resilience Evaluation and Awareness Tool

US Geological Survey

US Geological Survey - Biological Resources Division

US National Park Service

US Occupational Safety and Health Administration

USDA Climate Change and Invasive Mussels Project (https://portal.nifa.usda.gov/web/crisprojectpages/1003732-climate-change-and-invasive-mussels-interacting-effects-on-new-york-lakes.html)

USDA Forest Service Region 5

USGS

USGS Publication 2014-3120

Vaisala National Lightning Detection Network

Western Regional Climate Center

World Health Organization

Appendix C Mitigation Strategy

Hidden Valley Lake Community Services District
Local Hazard Mitigation Plan
Mitigation Strategy Meetings
January 8 & 9, 2020

Table of Contents:

Agenda

Day 1:

Day 2:

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AGENDA

Hidden Valley Lake Community Services District
Local Hazard Mitigation Plan (LHMP)
Mitigation Strategy Meetings
January 8 & 9, 2020

HMPC Meeting #3:

1. Introductions
2. Status of the DMA Planning Process
3. Risk Assessment Status
4. Develop Plan Goals and Objectives
5. Identify and discuss Mitigation Alternatives/Actions/Projects

HMPC Meeting #4:

1. Introductions
2. Identify and discuss Mitigation Alternatives/Actions/Projects
3. Review Mitigation Selection Criteria
4. Prioritize Mitigation Projects
5. Review of Schedule/Data Needs

Mitigation Strategy Meetings

Day 1

Hazard Identification & Profiles

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Aquatic Biological Hazards: quagga mussel	Limited	Unlikely	Catastrophic	Low	Low
Climate Change	Extensive	Likely	Critical	Medium	–
Dam Failure	Extensive	Unlikely	Catastrophic	High	Low
Drought and Water Shortage	Extensive	Likely/Occasional	Critical	Medium	High
Earthquake	Extensive	Highly Likely/ Occasional	Catastrophic	Medium	Low
Flood: 1%/0.2% Annual Chance	Significant	Occasional/Unlikely	Critical	High	Medium
Flood: Localized/Stormwater	Extensive	Highly Likely	Critical	High	Medium
Landslide and Debris Flows	Limited	Occasional	Limited	Low	Medium
Levee Failure	Significant	Occasional	Critical	High	Medium
Severe Weather: Extreme Cold and Freeze	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Heavy Rains, Snow, and Storms	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: High Winds	Extensive	Highly Likely	Limited	Medium	Medium
Wildfire	Extensive	Highly Likely	Catastrophic	High	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area
Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid
Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact
Climate Change Impact:
Low: Climate change is not likely to increase the probability of this hazard.
Medium: Climate change is likely to increase the probability of this hazard.
High: Climate change is very likely to increase the probability of this hazard.

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

Aquatic Biological Hazards: Quagga Mussel

- Quagga and zebra mussels are an invasive non-native species that breed very fast, have no known predators, and can quickly colonize new areas within California waters. Once established, these mussels can clog water intake and delivery pipes, dam intake gates and pipes, adhere to boats, pilings, and most hard and some soft substrates.
- While Quagga Mussels have not been found in Clear Lake or Hidden Valley Lake, they have been found in 43 water bodies in California since 2008. Most of these are in the southern part of the state.
- Biggest concern to the District is clogging of pipes. However, based on HVLCSD operations, it is unclear how the mussels would enter any pipes; the District does not discharge or pull from the Lake. HVLA also has measures in place to prevent mussels from entering the Lake.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: High
- Non-Priority Hazard

Climate Change

- The 2018 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. Wildfire occurrence and intensity is also on the increase. Climate Change has the potential to alter the nature and frequency of most hazards.
- In Lake County, 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. Significant concern is the exacerbation of other hazards such as drought and wildfire.
- Likelihood of Future Occurrence: Likely
- Vulnerability: High
- 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, 2 are extremely high, 9 are high hazard, 4 are significant hazard, and 6 are low hazard.
- Dams of concern to the District includes only one dam: Coyote Creek Dam on Hidden Valley Lake, owned by the Hidden Valley Lake Association; it has been raised to an Extremely High classification.
- No past occurrences of dam failures or related issues
- Biggest concern is loss of lives and impacts to structures in service area which also results in loss of customers/operational monies to District. A dam failure could also cause extensive erosion around

District pipes and other fixtures and can cause backups and overwhelm the treatment plan. Fish kills and habitat loss can also occur.

- 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.
- Since 2012, snowpack levels in California had dropped dramatically. 2015 estimates place snowpack as 5 percent of normal levels. However, snowpack levels increased in 2016 and in 2017 snowpack levels were the highest they've been in 22 years. However, drought has started to creep back in to the Northern California area, but recent winters continue to keep drought conditions at bay in Lake County.
- 2 disaster declarations (1977 and 2014) for Lake County since 1950. There have been 15 NCDC drought events in Lake County. All of these were for the 2014-2016 drought, but no damages, injuries, or losses were reported in the NCDC database.
- Based on data provided by the District, the District has a reliable, robust water supply that consists of 3 primary groundwater wells and other sources. Even during periods of drought, the District has noted negligible effects on the groundwater table.
- Conservation measures implemented during times of Drought creates an economic impact to the District based on less water usage.
- The District is also working through the moratorium placed on new development based on junior water rights to downstream users.
- Drought contributes to increased tree mortality and wildfire conditions.
- Likelihood of Future Occurrence: 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. The San Andreas fault and the Mayacama /Healdsburg fault are two significant faults of concern to the District. Both of these faults have been responsible for moderate to major seismic events in the past. The maximum earthquake magnitudes observed to date are 8.5 for the San Andreas fault and 6.75 (Richter Scale1) for the Mayacama/Healdsburg fault.
- 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 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. No major earthquakes have been recorded within the County; although the County has felt ground shaking from earthquakes with epicenters located elsewhere.

- A major earthquake located under or near the District could have significant concerns. District assets, including all those located on concrete structures and others are potentially at risk. Power outages, road closures and other related issues are also a significant issue to District operations.
- Likelihood of Future Occurrence: Unlikely – large, damaging earthquake; Likely – minor earthquake
- Vulnerability: Extremely High
- Priority Hazard

Flood Hazards

100/500 year

- 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.
- 14 state and 15 federal declarations were for severe winter weather, storms, heavy rains, or flooding.
- Flooding is an ongoing issue for the District. Concern is water entering the man holes and sewer system overwhelming the WWTP causing backups. Also the dirt and debris that enters the systems can also cause significant issues with the treatment system. The basins are also at risk to damage during high rains and significant flood events.
- 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.
- Several areas of key concern to localized flooding events.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

Landslides and Debris Flows

- There have been no disaster declarations associated with landslides in Lake County. The NCDC contains no records of landslides.
- There are very few areas with severe slopes located withing the District. Biggest concern is associated with post-fire areas. Currently the District does not have any areas of concern.
- Likelihood of Future Occurrence: Occasional
- Vulnerability: Low
- Non-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.
- Some past damage has occurred on waterside due to erosion caused by high flows.

- Vegetation and trees on and near levee tha have burned in past fires adds to the erosion, integrity issue of the levee.
- The District owns the levee from the outside to top centerline and Association owns from the top of the levee to the creek.
- On District side, they inspect, weed whack, work on defensible space. Water side of levee is not really getting any regular maintenance.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Medium
- Priority Hazard

Severe weather

Extreme Cold and Freeze

- Annual occurrences of cold temperatures. 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.
- Only 2 extreme cold and freeze event (NCDC) from 1993-2019; No state or federal disaster declarations
- Biggest concern to District is frozen pipes and other related issues.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard?

Extreme Heat

- Annual occurrences of hot temperatures. The highest recorded daily extreme was 109°F on September 2, 1950. In a typical year, maximum temperatures exceed 90°F on 71 days.
- Only 1 extreme heat event (NCDC) from 1993-2019; No state or federal disaster declarations
- Extreme heat can affect ph levels which can interfere with District operations
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Heavy rains and storms

- Significant County/District history: annual occurrences. Snow is rare.
- The NCDC data recorded 78 hail, heavy rains, and storms events for Lake County since 1950.
- There have been 15 federal declarations since 1950 for flooding and severe storms, including winter storms. NCDC has 82 recorded storm events since 1950.
- Heavy rains can cause flooding and overwhelm District systems. Hail is very rare, lightning rare as well.
- Severe storms/heavy rains are the primary cause of most major flooding
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

High Winds

- Annual occurrences of high winds in the District. The area experiences Devil winds.
- The NCDC data recorded 14 high wind events for Lake County since 1950.
- Concerns to the District include trees knocking down, damage to buildings and power outages. Winds can also be an issue during periods of heavy rains – when ponds are high, rains can cause them to overflow.
- High winds exacerbate wildfires; creates PSPS issues
- 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.
- 10 federal disaster declarations for Wildfire since 1950 in the County; 8 of these since 2012
- The Valley Fire was the most significant fire in terms of direct impacts and damages to the District
- District to provide list of impacts/damages from past wildfires
- Fire flows always need to be ready and sufficient, thus sufficient water supply to hydrants is critical
- PSPS and other power outages an issue. Without power, cannot operate; need generators.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Extremely High
- Priority Hazard

HVLCSD Priority Hazards

- Climate Change
- Dam Failure
- Drought & Water Shortage
- Earthquake
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Levee Failure
- Severe Weather: Extreme Freeze and Cold
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (wind, hail, lightning)
- Severe Weather: High Winds
- Wildfire

Non-Priority Hazards:

- Aquatic: Quagga Mussels
- Landslides, Mudslides, and Debris Flows

Data Needs

Review of Key Items to date:

- Hazard-specific data (from today's risk assessment review)
  - Historic Hazard Worksheets or list of past hazard occurrences and impacts to District by hazard
  - Information on key items identified above in the hazard summary; primary focus is on concerns, issues, impacts of hazards specifically to District facilities, assets, and operations
- Any other plans, studies, data, etc. related to the identified natural hazards to the City
- Land Value Methodology: Need to determine a source/methodology for determining land values associated with the 18 parcels owned by HVLCSD. They have no assessed values in the County database. Many of these parcels have a code 003 which is for non-taxable government parcels.
- Still need some asset valuation data for HVLCSD based on excel spreadsheet provided by FM
- Get District SOPs to help with specific issues and concerns from hazards.
- Photos of problem areas, past events, etc.

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. Action (Implementation) Plan

Mitigation Goals

Up to now, the HMPC has been involved in collecting and providing data for the HVLCSD Local Hazard Mitigation Plan. 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 us to incorporating these improvements into the Mitigation Strategy portion of the plan. Our planning goals should provide direction for what loss reduction activities can be undertaken to make the planning area more disaster resistant.

Mitigation Goals are general guidelines that represent the community's vision for reducing or avoiding losses from identified hazards. Goals are stated without regard for achievement, that is, implementation cost, schedule, and means are not considered. Goals are public policy statements that:

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

While goals are not specific (quantitative), they should not be so general as to be meaningless or unachievable.

Goals statements will form the basis for objectives. They should be stated in such a way as to develop one or more objectives related to each goal.

The key point in writing goals is to remember that they must deal with results, not the activities that produce those results.

Finally, before we formulate our goals, we should discuss other planning area goals from other regional/county/city programs and priorities. This keeps us from "reinventing the wheel," as well as being consistent with Multi-Objective Management --- or "MOM" --- where communities strive for efficiency by combining projects/needs that are similar in nature or location. Utilizing "MOM" effectively can result in identifying multiple sources of funding that can be "packaged" and broadening the supporting constituency base by including "outcomes" desired by various stakeholder groups.

Types/Sources of other area mitigation plans and programs include:

- General Plans
- Stormwater Program and Plans
- Flood/Watershed Management Plans and Studies
- Drought Plans
- Community Wildfire Protection Plans
- Strategic Fire Plans
- Dam Emergency Action Plans
- Emergency Operations Plans
- Climate Adaptation Plans
- Other?

Sample Goals from other Plans

Goals from the 2018 California State Hazard Mitigation Plan

1. Significantly reduce life loss and injuries.

2. Minimize damage to structures and property, as well as minimizing interruption of essential services and activities.

3. Protect the environment.

4. Promote community resilience through integration of hazard mitigation with public policy and standard business practices.

Goals from HVLCSD Strategic Plan 2013-2018

- Goal 1: Deliver High-Quality Water and Wastewater Services
  - ✓ 1A. Secure and protect the water supply
  - ✓ 1B. Maintain and enhance sewer infrastructure
  - ✓ l C. Maintain and enhance water infrastructure
  - ✓ 1D. Enhance site security for all facilities and infrastructure
  - ✓ 1E. Evaluate flood control

- Goal 2: Maintain Financial Stability
  - ✓ 2A. Update fiscal policies to promote financial stability
  - ✓ 2B. Adopt fixed asset management plan
  - ✓ 2C. Expand our ability to track and manage financial data
  - ✓ 2D. Ensure rates are equitable and promote financial
  - ✓ 2E. Identify sustainable funding mechanism for flood control facilities

- Goal 3: Expand Education and Outreach
  - ✓ 3A. Expand customer education about the District and our services

- 3B. Educate customers about resource conservation and pollution prevention
- 3C. Expand customer service training for employees

- Goal 4: Offer Innovative Services
  - 4A. Leverage District resources to generate revenue
  - 4B. Pursue partnerships and strategic alliances to develop revenue-generating activities

- Goal 5: Refine Governance and Administration
  - 5A. Update governance procedures to promote efficiency and transparency
  - 5B. Update administrative processes to enhance customer service
  - 5C. Conduct customer satisfaction surveys
  - 5D. Continuously update human resources policies and practices to recruit and retain skilled employees
  - 5E. Review organizational structure and staffing needs

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 nmoff that can be expected to occur.
- Evaluating the capacities of the existing storrnwater facilities.
- Developing and evaluating solutions to capacity deficiencies.
- Estimating the costs of implementing the solutions.
- Prioritizing the required improvements

Lake County Community Wildfire Protection Plan (CWPP), 2009: Purpose

- To identify priority projects that reduce risks and hazards from wildfire while protecting conservation values in Lake County. Goals are to be achieved principally through prioritization and implementation of fuel hazard reduction, fire safety, community education, and fire-protection projects and activities.
- To provide community priorities for conservation-based fuel reduction on public lands, and to provide community direction for federal land management in Lake County.
- To provide conservation-based, fire-safety educational information to residents of Lake County.
- To provide a positive balance among fire prevention, conservation, and wildlife protection.
- To coordinate fire protection strategies across property boundaries, including evacuation planning and preparation.
- To encourage the integration of private land management goals with community needs and expectations for fire safety.
- To create ecologically sustainable biomass utilization and removal projects within Lake County.
- To provide a guiding document for future actions of the Lake County Fire Safe Council, land management agencies, private landowners, and local emergency service providers.

- To provide a guiding document for governmental agencies in developing fire safe practices and policies.
- To meet the requirements under the National Fire Plan and other government funding sources.

Goals Development

You will each be given 3 sticky notes. On each note you will write what you think the goals for this mitigation planning effort should be. To get you started, provided below are possible goals for this mitigation plan. You may reword these or develop your own. These goal statements should serve as examples. It is vital that our Hazard Mitigation Planning Committee establish its own goals. Use one note card for each goal. The purpose of the goal development is to reach a consensus on plan goals.

- Minimize risk and vulnerability from natural hazards
- Increase communities' awareness of vulnerability to hazards
- Increase the use of shared resources
- Improve communities' capabilities to mitigate losses
- Maintain coordination of disaster plans with changing DHS/FEMA needs
- Maintain FEMA eligibility/position jurisdictions for grant funding
- Maintain/enhance the flood mitigation program to provide 200/500-year flood protection
- Maintain current service levels
- Provide protection for existing buildings from hazards
- Provide protection for future development from hazards
- Provide protection for natural and cultural resources from hazard impacts
- Provide protection for people's lives from hazards
- Provide protection for public health
- Provide protection for critical services (fire, police, etc.) from hazard impacts
- Provide protection for critical lifeline utilities from hazard impacts
- Reduce exposure to hazard related losses
- Reduce the number of emergency incidents
- Make better use of technology

When done, we will:

- Pin/tape them to the wall/easel-chart and arrange them by category
- Combine and reword them into 3-4 goals for the plan.

Mitigation Strategy Meetings
Day 2

Mitigation Strategy: Actions

Mitigation Actions are specific projects and activities that help achieve the goals and accomplish risk reduction in the community.

Categories of Mitigation Measures

PREVENTION: Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open Space Preservation
- Land Development Regulations
  - ✓ Subdivision regulations
  - ✓ Building Codes
    - Fire-Wise Construction
  - ✓ Floodplain development regulations
  - ✓ Geologic Hazard Areas development regulations (for roads too!)
- Storm Water Management
- Fuels Management, Fire-Breaks

EMERGENCY SERVICES: protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (flooding, tornadoes, winter storms, geologic hazards, fire)
  - ✓ NOAA Weather Radio
  - ✓ Sirens
  - ✓ "Reverse 911" (Emergency Notification System)
- Emergency Response
  - ✓ Evacuation & Sheltering
  - ✓ Communications
  - ✓ Emergency Planning
    - Activating the EOC (emergency management)
    - Closing streets or bridges (police or public works)
    - Shutting off power to threatened areas (utility company)
    - Holding/releasing children at school (school district)
    - Ordering an evacuation (mayor)
    - Opening emergency shelters (Red Cross)
    - Monitoring water levels (engineering)
    - Security and other protection measures (police)
- Critical Facilities Protection (Buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)

- ✓ Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
  - ✓ Lifeline Utilities Protection
- ➢ Post-Disaster Mitigation
- ➢ Building Inspections
  - ✓ ID mitigation opportunities & funding before reconstruction

PROPERTY PROTECTION: Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

- ➢ Retrofitting/disaster proofing
  - ✓ Floods
    - Wet/Dry floodproofing (barriers, shields, backflow valves)
    - Relocation/Elevation
    - Acquisition
    - Retrofitting
  - ✓ High Winds/Tornadoes
    - Safe Rooms
    - Securing roofs and foundations with fasteners and tie-downs
    - Strengthening garage doors and other large openings
  - ✓ Winter Storms
    - Immediate snow/ice removal from roofs, tree limbs
    - "Living" snow fences
  - ✓ Geologic Hazards (Landslides, earthquakes, sinkholes)
    - Anchoring, bracing, shear walls
    - Dewatering sites, agricultural practices
    - Catch basins
  - ✓ Drought
    - Improve water supply (transport/storage/conservation)
    - Remove moisture competitive plants (Tamarisk/Salt Cedar)
    - Water Restrictions/Water Saver Sprinklers/Appliances
    - Grazing on CRP lands (no overgrazing-see Noxious Weeds)
    - Create incentives to consolidate/connect water services
    - Recycled wastewater on golf courses
  - ✓ Wildfire, Grassfires
    - Replacing building components with fireproof materials
    - Roofing, screening
    - Create "Defensible Space"
    - Installing spark arrestors
    - Fuels Modification

- ✓ Noxious Weeds/Insects
    - Mowing
    - Spraying
    - Replacement planting
    - Stop overgrazing
    - Introduce natural predators
- Insurance

NATURAL RESOURCE PROTECTION: Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- storage of floodwaters
- absorption of flood energy
- reduction in flood scour
- infiltration that absorbs overland flood flow
- groundwater recharge
- removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- habitat for flora and fauna
- recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Wetlands Protection
- Riparian Area/Habitat Protection/Threatened-Endangered Species
- Erosion & Sediment Control
- Best Management Practices

Best management practices ("BMPs") are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project's design to permanently address nonpoint source pollutants. There are three general categories of BMPs:

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 Strategy: Action Plan

The mitigation action plan describes how the mitigation actions will be implemented, including how those actions will be prioritized, administered, and incorporated into the community's existing planning mechanism. Each participating jurisdiction must have a mitigation action(s) and an action plan specific to that jurisdiction and its priority hazards and vulnerabilities.

Mitigation Criteria

For use in selecting and prioritizing Proposed Mitigation Measures

1. STAPLEE

Social: Does the measure treat people fairly? (different groups, different generations)

- Community Acceptance
- Effect on Segment of Population
- Social Benefits

Technical: Will it work? (Does it solve the problem? Is it feasible?)

- Technical Feasibility
- Reduce Community Risk
- Long Term Solution/Sustainable
- Secondary Impacts

Administrative: Do you have the capacity to implement & manage project?

- Staffing
- Funding Allocated
- Maintenance/Operations

Political: Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support?

- Political Support
- Local Champion
- Public Support
- Achieves Multiple Objectives
- Supported by a broad array of Stakeholders

Legal: Does your organization have the authority to implement? Is it legal? Are there liability implications?

- Existing Local Authority
- State Authority
- Potential Legal Challenges

Economic: Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development?

- Benefit of Action
- Cost of Action
- Cost Effective/Economic Benefits
- Economically Viable
- Outside Funding Required

Environmental: Does it comply with Environmental regulations?

- Effect on Land/Water
- Effect on Endangered Species
- Effect on Cultural Resources
- Effect on Hazmat sites
- Consistent with Community Environmental Goals
- Consistent with Environmental Laws
- Environmental Benefits

2. SUSTAINABLE DISASTER RECOVERY

- Quality of Life
- Social Equity
- Hazard Mitigation
- Economic Development
- Environmental Protection/Enhancement
- Community Participation

3. SMART GROWTH PRINCIPLES

- Infill versus Sprawl
- Efficient Use of Land Resources
- Full Use of Urban Resources
- Mixed Uses of Land
- Transportation Options
- Detailed, Human-Scale Design

4. OTHER

- Does measure address area with highest risk?
- Does measure protect …
  - ✓ The largest # of people exposed to risk?
  - ✓ The largest # of buildings?
  - ✓ The largest # of jobs?
  - ✓ The largest tax income?
  - ✓ The largest average annual loss potential?
  - ✓ The area impacted most frequently?

    - ✓ Critical Infrastructure (access, power, water, gas, telecommunications)
- ➢ Timing of Available funding
- ➢ Visibility of Project
- ➢ Community Credibility

Mitigation Action Prioritization Instructions

Our Team recommendations are listed on flip-chart paper around the room.

You each have 3 sets of colored dots:

- 3 red dots
- 3 blue dots
- 3 green dots

The red dots are for high priority (5 points each)

The blue dots are for medium priority (3 points each)

The green dots are for low priority (1 point each)

Place your dots on the recommendations, using the different colors to indicate your priority. You may use as many of your dots, of any color, on any recommendation --- or you may spread them out using as few of your dots as you wish. The dots will indicate the consensus of the team.

Use your list of criteria to help you make your determinations.

After the totals are counted, we will discuss them further to confirm or change any of the results as we see fit.

Mitigation Action Worksheet

Jurisdiction:	
Mitigation Action/Project Title:	
Hazards Addressed:	
Issue/Background:	
Project Description:	
Other Alternatives:	
Existing Planning Mechanism(s) through which Action Will Be Implemented:	
Responsible Office/Partners:	
Cost Estimate:	
Benefits (Losses Avoided):	
Potential Funding:	
Timeline:	
Project Priority:	

Worksheet completed by:	
Name and Title:	
Phone:	

HVLCSD
Local Hazard Mitigation Plan
Mitigation Strategy Meetings: Mitigation Actions v/1
January 8 & 9, 2020

Responsible Department/ Staff	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
	Public awareness, education, outreach, and preparedness program enhancements for all hazards (multi-media, educate and clarify various emergency systems, messaging and training; promote self- responsibility)	Multi-hazard	24
	Generator projects for all critical facilities and infrastructure	Multi-hazard	37
	Develop Emergency Operations Plan (EOP)	Multi-hazard	10
	Procure radios to run off HVLA repeater	Multi-hazard	6
	Nixel integration with HVLA	Multi-hazard	0
	Establish fully functioning GIS capabilities	Multi-hazard	15
	Establish a SCADA system	Multi-hazard	15
	I & I Program	Multi-Hazar	32
	Develop HVLCSD Climate Action Plan	Climate Change	4
	Address ongoing seepage problems in Dam (key issue, rodents, ground squirrels)	Dam Failure	5
	Install surveillance cameras and other monitoring equipment	Dam Failure	0
	Dam rehabilitation projects (valves, gates, spillway)	Dam Failure	0
	Conduct geologic study of Coyote Basin to establish nature of water rights (to address moratorium)	Drought & Water Supply	10
	Continue Conservation Efforts	Drought & Water Supply	0
	Continued monitoring/study of 12+ wells for long term supply	Drought & Water Supply	0
	Continued Updates to Water Master Plan	Drought & Water Supply	0
	Continued participation in Integrated Regional Water Management Plan (IRWMP)	Drought & Water Supply	0
	Establish/Continue to manage Hex Chromium levels during periods	Drought & Water Supply	4
	Establish additional well(s) from different water source (water supply redundancy), and to get them out of the Fire snake to reduce vulnerability during wildfires	Drought & Water Supply/ Wildfire	16
	Increase capacity of Water Storage with larger (and more) storage tanks	Drought & Water Supply/ Earthquake	5
	Upgrade/retrofit water meters	Drought & Water Supply/ Earthquake	21

Responsible Department/ Staff	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
	Water Distribution System Reliability	Drought & Water Supply/ Earthquake	8
	Air Vac/Air Relief to prevent line collapse	Earthquake	4
	Evaluate assets and systems for earthquake vulnerability and implement necessary retrofits (to include generators/booster stations, and other assets on concrete pads)	Earthquake	5
	Replacement of redwood water storage tanks (Water system storage reliability)	Earthquake/	
	Wildfire	40	
	Construct a second spillway on backside of levee (note: Comstock 25% match)	Levee Failure/Flood	42
	Tide Flex	Flood	0
	Develop Tax Assessment District	Flood	3
	Update and implement stormwater master plan	Flood/levee	15
	Creek cleanout and maintenance	Flood	5
	Flood control reliability	Flood	0
	Determine pump ownership and implement improvements	Flood/levee	6
	Fish Hook and Coyote Creek Flood Solution (Valley Oak project?)	Flood/levee	5
	Identify Drainage issues relative to creeks and levee	Flood/levee	
	Establish a Flood Control District	Flood/levee	
	Aerate (Blue Frog) reclamation pond	Extreme Heat	3
	Ongoing (5-year) project ongoing to lower ph	Extreme Heat	5
	Enclose areas around wells, water treatment basin, other basins, and other infrastructure prone to freeze	Freeze and Cold/ Heavy Rain and Storms	7
	Hydrants – drain?	Freeze and Cold	3
	Pump enhancements/replacements	Heavy rains and storms	5
	Reduce sediment in streams, culverts, etc to improve drainage	Heavy rains and storms	4
	Erosion Repair on stream and creek banks and levee	High Winds/ Levee Failure	12
	Certify Levee to 100-year level of protection	Levee Failure	11
	Establish cross functional committee to address levee issues	Levee Failure	19
	Establish a regular maintenance program	Levee Failure	18
	Determine Levee ownership	Levee Failure	50
	Fuels Mitigation (weed whacking), Detention basins, riparian areas, old sewer ponds to protect wells	Wildfire	8

Responsible Department/ Staff	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
	Add additional and updated hydrants (increase fire flows, multiple trees)	Wildfire	25

*N/A – scoring is not applicable; project added after mitigation strategy meetings

Appendix D Adoption Resolution

Note to Reviewers: When this plan has been reviewed and approved pending adoption by FEMA Region IX, the adoption resolutions will be signed by the HVLCSD and added to this appendix. A model resolution is provided below

Resolution # ______

Sample Resolution: Hidden Valley Lake Community Services District

Resolution # ______

Adopting the Hidden Valley Lake Community Services District (HVLCSD) Local Hazard Mitigation Plan

Whereas, HVLCSD recognizes the threat that natural hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

Whereas, the U.S. Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

Whereas, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments;

Whereas, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, HVLCSD fully participated in the FEMA-prescribed mitigation planning process to prepare this local hazard mitigation plan; and

Whereas, the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials have reviewed the Colusa County Local Hazard Mitigation Plan and approved it contingent upon this official adoption of the participating governing body;

Whereas, the HVLCSD desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Colusa County Local Hazard Mitigation Plan;

Whereas, adoption by the governing body for the HVLCSD, demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this Local Hazard Mitigation Plan.

Whereas, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

Now, therefore, be it resolved, that the HVLCSD adopts the Local Hazard Mitigation Plan as an official plan; and

Be it further resolved, HVLCSD will submit this adoption resolution to the California Office of Emergency Services and FEMA Region IX officials to enable the plan's final approval in accordance with the requirements of the Disaster Mitigation Act of 2000.

Passed:___________________________
(date)

____
Certifying Official

Appendix E Detailed Assets in Hazard Areas

Additional detailed analysis was performed for the HVLCSD. These tables add additional detail to the assets at risk, and give additional detail on how those assets are at risk to hazards. These are shown in the following:

Assets Tables

- Table E-1 is a summary of the assets in HVLCSD
- Table E-2 details the assets in the dam inundation zones from Cal OES
- Table E-3 details the assets in the dam inundation zones from the HVLCSD Coyote Creek Dam Inundation Study
- Table E-4 details the assets in the DFIRM flood zones
- Table E-5 details the assets in the CAL FIRE FHSZ by zone

Lines Tables

- Table E-6 is a summary table of lines in the HVLCSD
- Table E-7 details the lines in the dam inundation zones from Cal OES
- Table E-8 details the lines in the dam inundation zones from the HVLCSD Coyote Creek Dam Inundation Study
- Table E-9 details the lines in the DFIRM Flood Zones
- Table E-10 details the lines in the CAL FIRE FHSZ by zone

Table E-1 HVLCSD – Assets Summary Table

Asset	Asset Count	Asset Value	Content Value
Land Asset			
Parcel			
013-060-05	1	$125,000	$0
014-270-10	1	$900,000	$0
014-280-19	1	$1,000,000	$0
141-033-01	1	$10,000	$0
141-081-27	1	$8,000	$0
141-231-02	1		$0
141-311-25	1	$130,000	$0
141-361-03	1	$5,000	$0
141-411-28	1	$10,000	$0
141-611-03	1	$15,000	$0
141-611-07	1	$250,000	$0
141-732-01	1	$9,000	$0
142-113-01	1	$6,000	$0
142-363-23	1	$7,000	$0
142-401-07	1	$5,000	$0
144-011-02	1	$95,000	$0
144-011-04	1	$125,000	$0
144-011-09	1	$65,000	$0
Parcel Total	**18**	**$2,765,000**	**$0**
Land Asset Total	**18**	**$2,765,000**	**$0**
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	$0
Unit 9 Pump Station	1	$52,310	$218,022
Waste Water Treatment Plant	1	$5,825,227	$0
Water Plant	1	$166,346	$487,954
Building Total	**8**	**$7,495,389**	**$1,590,091**

Asset	Asset Count	Asset Value	Content Value
General Asset Total	**8**	**$7,495,389**	**$1,590,091**
Sewer System Asset			
Generator			
Generator - Flood Control Basin	1	$125,544	$0
Generator - Lift Station 1	1	$172,000	
Generator - Lift Station 2	1	$62,772	
Generator - Lift Station 3	1	$62,772	$0
Generator - Lift Station 4	1	$104,620	$0
Generator - Lift Station 5	1	$62,772	$0
Generator - Lift Station 6	1	$62,772	$0
Generator - Lift Station 7	1	$62,772	$0
Generator - Lift Station Hardesters	1	$62,772	$0
Generator - WWTP Lab	1	$251,088	$0
Generator Total	**10**	**$1,029,884**	**$0**
Manhole			
(blank)	218	$232,170	$0
Manhole Total	**218**	**$232,170**	**$0**
Sewer Pumps			
400s	2	$13,800	$0
500s	4	$4,156	$0
600s	2	$33,600	$0
700s	2	$17,000	$0
800s	2	$21,500	$0
Lift Station #1	3	$193,500	$0
Lift Station #2	3	$37,500	$0
Lift Station #3	3	$37,500	$0
Lift Station #4	3	$37,500	$0
Lift Station #5	3	$52,500	$0
Lift Station #6	3	$37,500	$0
Lift Station #7	2	$13,800	$0
Lift Station Hardesters	2	$14,000	$0
Sewer Pumps Total	**34**	**$513,856**	**$0**
Sewer System Asset Total	**262**	**$1,775,910**	**$0**
Water System Asset			
Hydrant			
(blank)	302	$703,660	$0

Asset	Asset Count	Asset Value	Content Value
Hydrant Total	**302**	**$703,660**	**$0**
PRV			
16128 Eagle Rock Road	1	$5,609	$0
16329 Eagle Rock Road	1	$5,609	$0
17028 Spruce Grove Road	1	$5,609	$0
17972 Deer Hill Road	1	$5,609	$0
18317 North Shore Drive	1	$5,609	$0
18535 Glenwood Road	1	$5,609	$0
18726 Hidden Valley Road	1	$5,609	$0
19895 Donkey Hill Road	1	$5,609	$0
PRV Total	**8**	**$44,872**	**$0**
Pump			
Ag Well	1	$183,085	$0
Greenridge 501	1	$10,400	$0
Greenridge 502	1	$10,400	$0
Unit 9 901	1	$11,450	$0
Unit 9 902	1	$11,450	$0
Unit 9 903	1	$11,450	$0
Water Treatment Plant - Well 2 - Wellfield	1	$183,085	$0
Water Treatment Plant 101	1	$18,200	$0
Water Treatment Plant 102	1	$18,200	$0
Water Treatment Plant 103	1	$18,200	$0
Water Treatment Plant 401	1	$7,300	$0
Water Treatment Plant 402	1	$7,300	$0
Water Treatment Plant 403	1	$17,300	$0
Well 3	1	$183,085	$0
Wellfield TP Booster	1	$20,000	$0
Wellfield Well 4	1	$183,085	$0
Pump Total	**16**	**$893,990**	**$0**
Tank			
Detention tank	1	$122,405	$0
Little Peak storage tank	1	$436,265	$0
Tank 1a	1	$146,468	$0
Tank 1b	1	$174,715	$0
Tank 1c	1	$436,265	$0
Tank 4a	1	$146,468	$0

Asset	Asset Count	Asset Value	Content Value
Tank 4b	1	$436,265	$0
Unit 9 Storage Tank	1	$146,468	$0
Tank Total	**8**	**$2,045,319**	**$0**
Valve			
15509 Little Peak Road	1	$1,031	$0
15542 Plateau Court	1	$1,031	$0
15589 Little Peak Road	1	$1,031	$0
15603 Eagle Rock Road	1	$1,031	$0
15605 Little Peak Road	1	$1,031	$0
15653 Little Peak Road	1	$1,031	$0
15717 Little Peak Road	1	$1,031	$0
15783 Eagle Rock	1	$1,031	$0
15822 Little Peak Road & Sentinel Court, 09-10-37	1	$1,031	$0
15868 Littel Peak Road	1	$1,031	$0
15989 Eagle Rock Road	1	$1,031	$0
16038 Conestoga Road	1	$1,031	$0
16041 Eagle Rock Road	1	$1,031	$0
16049 Eagle Rock Road	1	$1,031	$0
16116 Conestoga Road	1	$1,031	$0
16121 Eagel Rock Road	1	$1,031	$0
16136 Eagle Rock Road	1	$1,031	$0
16176 Eagle Rock Road	1	$1,031	$0
16184 Eagle Rock Road	1	$1,031	$0
16193 Eagle Rock Road	1	$1,031	$0
16198 Conestoga Road	1	$1,031	$0
16236 Eagle Rock Road	1	$1,031	$0
16273 Firethorn Road	1	$1,031	$0
16284 Eagle Rock Road	1	$1,031	$0
16290 Conestoga Road	1	$1,031	$0
16329 Eagle Rock Road	1	$1,031	$0
16345 Eagle Rock Road	1	$1,031	$0
16369 Eagle Rock Road	1	$1,031	$0
16369 Firethorn Road	1	$1,031	$0
16385 Eagle Rock Road	1	$1,031	$0
16402 Conestoga Road	1	$1,031	$0
16428 Eagle Road Road	1	$1,031	$0

Asset	Asset Count	Asset Value	Content Value
16476 Eagle Rock Road & Deer Hill Road	1	$1,031	$0
16481 Deer Hill Road	1	$1,031	$0
16490 Deer Hill Road	1	$1,031	$0
16506 Cresent Court	1	$1,031	$0
16536 Ridgecreat Court	1	$1,031	$0
16542 Cresent Court	1	$1,031	$0
16578 Hacienda Road	1	$1,031	$0
16602 Round Hill Court	1	$1,031	$0
16910 Knollview Drive	1	$1,031	$0
16950 Knollview Drive	1	$1,031	$0
17030 Knollview Drive	1	$1,031	$0
17090 Knollview Drive	1	$1,031	$0
17221 Knollveiw Drive	1	$1,031	$0
17305 Knollview Drive	1	$1,031	$0
17398 Deer Hill Road	1	$1,031	$0
17496 Deer Hill Road	1	$1,031	$0
17524 Deer HIll Road & Sweetwater Court	1	$1,031	$0
17706 Deer Hill Road	1	$1,031	$0
17783 Deer Hill Road	1	$1,031	$0
17895 Deer Hill Rad	1	$1,031	$0
17945 Bunker Road	1	$1,031	$0
17986 Deer Hill Road	1	$1,031	$0
18042 Deer Hill Road	1	$1,031	$0
18057 Spyglass Road	1	$1,031	$0
18112 Deer Hollow Road	1	$1,031	$0
18118 Hidden Valley Road	1	$1,031	$0
18121 Spyglass Road	1	$1,031	$0
18126 Fishhook Court	1	$1,031	$0
18126 Sweetwood Court	1	$1,031	$0
18150 Sweetwood Court	1	$1,031	$0
18170 Bobcat Court	1	$1,031	$0
18174 Hidden Valley Road	1	$1,031	$0
18190 Fishhook Court	1	$1,031	$0
18215 Tigerwood Court	1	$1,031	$0
18224 Deer Hollow Road	1	$1,031	$0
18249 Spyglass Road	1	$1,031	$0

Asset	Asset Count	Asset Value	Content Value
18272 Hidden Valley Road	1	$1,031	$0
18310 Grizzley Court	1	$1,031	$0
18310 Pinnacle Court	1	$1,031	$0
18374 Hidden Valley Road	1	$1,031	$0
18377 Pinewood Court	1	$1,031	$0
18377 Spyglass Road	1	$1,031	$0
18378 Deer Hollow Road	1	$1,031	$0
18380 Grizzley Court	1	$1,031	$0
18380 Pinnacle Court	1	$1,031	$0
18438 Sweetwater Court	1	$1,031	$0
18474 Hidden Valley Road	1	$1,031	$0
18520 Hacienda Road	1	$1,031	$0
18540 Deer Hollow Road	1	$1,031	$0
18541 Sentinel Court	1	$1,031	$0
18553 Spyglass Road	1	$1,031	$0
18572 Hidden Valley Road	1	$1,031	$0
18606 Pine Flat Court & Little Peak Road, 09-10-29	1	$1,031	$0
18616 Pin Oak Court & Eagle Rock Road	1	$1,031	$0
18650 Maple Leaf Court	1	$1,031	$0
18668 Deer Hollow Road	1	$1,031	$0
18670 Hidden Valley Road	1	$1,031	$0
18678 Horseshoe Road	1	$1,031	$0
18690 Magnolia Court	1	$1,031	$0
18710 Maple Leaf Court & Mt Meadow North	1	$1,031	$0
18717 Deer Hill Road	1	$1,031	$0
18726 Deer Hill Road & Hidden Valley Road	1	$1,031	$0
18726 Hidden Valley Road	1	$1,031	$0
18729 Spyglass Road	1	$1,031	$0
18745 Fairway Point	1	$1,031	$0
18755 Glencove Court	1	$1,031	$0
18790 Horseshoe Road	1	$1,031	$0
18794 Deer Hill Road	1	$1,031	$0
18820 Timber Point Road	1	$1,031	$0
18828 Deer Hollow Road	1	$1,031	$0

Asset	Asset Count	Asset Value	Content Value
18835 Lynx Court	1	$1,031	$0
18838 Dove Court	1	$1,031	$0
18846 Horseshoe Road	1	$1,031	$0
18862 Moon Ridge Road	1	$1,031	$0
18873 Spyglass Road	1	$1,031	$0
18905 Bear Valley Road	1	$1,031	$0
18918 Hidden Valley Road	1	$1,031	$0
18924 Deer Hollow Road	1	$1,031	$0
18932 Moon Ridge Road	1	$1,031	$0
18932 Timber Point Road	2	$2,062	$0
18941 Mt Meadow South	1	$1,031	$0
18960 Redbud Road	1	$1,031	$0
18965 Spyglass Road	1	$1,031	$0
18966 Hidden Valley Road	1	$1,031	$0
19018 Hidden Valley Road	1	$1,031	$0
19032 Moon Ridge Road	1	$1,031	$0
19049 Spyglass Road	1	$1,031	$0
19056 Redbud Road	1	$1,031	$0
19088 Moon Ridge Road	1	$1,031	$0
19112 Hidden Valley Road	1	$1,031	$0
19116 Gooselake Court	1	$1,031	$0
19151 Sweetwood Court	1	$1,031	$0
19152 Moon Ridge Road	1	$1,031	$0
19172 Moon Ridge Road	1	$1,031	$0
19195 Meadow Court	1	$1,031	$0
19204 Mt Meadow North	1	$1,031	$0
19204 Mt Meadow North & Donkey Hill Road	1	$1,031	$0
19242 Moon Ridge Road	1	$1,031	$0
19276 Mt Meadow North	1	$1,031	$0
19287 Mt Meadow South	1	$1,031	$0
19324 Donkey Hill Road	1	$1,031	$0
19335 Mt Meadow South	1	$1,031	$0
19336 Moon Ridge Road	1	$1,031	$0
19360 Mt Meadow North	1	$1,031	$0
19385 Old Creek Road	1	$1,031	$0
19389 Donkey Hill Road	1	$1,031	$0

Asset	Asset Count	Asset Value	Content Value
19398 Park Ridge Road	1	$1,031	$0
19407 Mt Meadow South	1	$1,031	$0
19420 Mt Meadow North	1	$1,031	$0
19426 Park Ridge Road	1	$1,031	$0
19440 Park Ridge Road	1	$1,031	$0
19456 Hidden Valley Road	1	$1,031	$0
19456 Mt Meadow North	1	$1,031	$0
19464 Picture Point Court	1	$1,031	$0
19465 Old Creek Road	1	$1,031	$0
19481 Picture Point Court	1	$1,031	$0
19492 Moon Ridge Road	1	$1,031	$0
19503 Mt Meadow South	1	$1,031	$0
19524 Park Ridge Drive	1	$1,031	$0
19540 Mt Meadow North	1	$1,031	$0
19552 Mt Meadow North & Powder Horn	1	$1,031	$0
19552 Powder Horn Road	1	$1,031	$0
19571 Donkey Hill Road	1	$1,031	$0
19575 Mt Meadow South	1	$1,031	$0
19575 Old Creek Road	1	$1,031	$0
19608 Park Ridge Drive	1	$1,031	$0
19614 Mt Meadow North	1	$1,031	$0
19625 Old Creek Road	1	$1,031	$0
19655 Donkey Hill Road	1	$1,031	$0
19664 Powder Horn Road	1	$1,031	$0
19671 Mt Meadow South	1	$1,031	$0
19674 Mt Meadow North	1	$1,031	$0
19675 Old Creek Court	1	$1,031	$0
19686 Mt Meadow North & Fairway Point	1	$1,031	$0
19734 Park Hill Road	1	$1,031	$0
19759 Oak Flat Road	1	$1,031	$0
19767 Donkey Hill Road	1	$1,031	$0
19767 Mt Meadow South	1	$1,031	$0
19776 Mt Meadow North	1	$1,031	$0
19787 Bear Valley Road	1	$1,031	$0
19840 Mt Meadow South	1	$1,031	$0
19854 Mt Meadow North	1	$1,031	$0

Asset	Asset Count	Asset Value	Content Value
19857 Bear Valley Road	1	$1,031	$0
19857 Mt Meadow South	1	$1,031	$0
19897 Mt Meadow South	1	$1,031	$0
19908 Mt Meadow North	1	$1,031	$0
19936 Powder Horn Road	1	$1,031	$0
19944 Mt Meadow North	1	$1,031	$0
19963 Mt Meadow South	1	$1,031	$0
19968 Bear Valley Road	1	$1,031	$0
20019 Jigsaw Road	1	$1,031	$0
20032 Powder Horn Road	1	$1,031	$0
20048 Powder Horn Road	1	$1,031	$0
20144 Powder Horn Road	1	$1,031	$0
20191 Gold Flat Court	1	$1,031	$0
20249 Jigsaw Road	1	$1,031	$0
20250 Indian Rock Road	1	$1,031	$0
20297 Siesta Court	1	$1,031	$0
20400 Powder Horn Road	1	$1,031	$0
20402 Powder Horn Road	1	$1,031	$0
20652 Powder Horn Road	1	$1,031	$0
20700 Powder Horn Road	1	$1,031	$0
20796 Powder Horn Road	1	$1,031	$0
20812 Powder Horn Road	1	$1,031	$0
20892 Powder Horn Road	1	$1,031	$0
20972 Powder Horn Road	1	$1,031	$0
21084 Powder Horn Road	1	$1,031	$0
21164 Powder Horn Road	1	$1,031	$0
21212 Mt Meadow North	1	$1,031	$0
21212 Mt Meadow North & Powder Horn	1	$1,031	$0
Bear Valley Road & Mt Meadow South	1	$1,031	$0
Bobcat Court & Donkey Hill Road	1	$1,031	$0
Boxwood Court & Firethorn Road	1	$1,031	$0
Bunker Road & Deer Hollow Road	1	$1,031	$0
Bunker Road & Spyglass Road	1	$1,031	$0

Asset	Asset Count	Asset Value	Content Value
Conestoga Road	2	$2,062	$0
Conestoga Road & Deer Hill Road	1	$1,031	$0
Conestogar Road & Firethorn Road	1	$1,031	$0
Cresent Court	1	$1,031	$0
Cresent Court & Deer Hill Road	1	$1,031	$0
Deer Hill & Bunker Road	1	$1,031	$0
Deer Hill & Crescent Court	1	$1,031	$0
Deer Hill & Marine View Road	1	$1,031	$0
Deer Hill Road	2	$2,062	$0
Deer Hill Road & 16476 Eagle Rock Road	1	$1,031	$0
Deer Hill Road & Firethorn Road	1	$1,031	$0
Deer Hill Road & Hidden Valley Road	1	$1,031	$0
Deer Hollow Road & Spyglass Road	2	$2,062	$0
Donkey Hill & Bobcat Court	1	$1,031	$0
Donkey Hill Road	1	$1,031	$0
Donkey Hill Road & Honey Hill	1	$1,031	$0
Donkey Hill Road & Mt Meadow North	1	$1,031	$0
Dove Court & Horseshoe Road	1	$1,031	$0
Eagle Rock Road	2	$2,062	$0
Eagle Rock Road & 18616 Pin Oak Court	1	$1,031	$0
Eagle Rock Road & Little Peak Road	1	$1,031	$0
Fairway Point & Mt Meadow North	1	$1,031	$0
Firethorn Road & Conestoga Road	1	$1,031	$0
Firethorn Road & Deer Hill Road	1	$1,031	$0
Fishhook Court & Spyglass Road	1	$1,031	$0

Asset	Asset Count	Asset Value	Content Value
Glencove Court & Horseshoe Road	1	$1,031	$0
Gold Flat Court & Mt Meadow North	1	$1,031	$0
Gooselake Court & Horseshoe Road	1	$1,031	$0
Green Point Court & Spyglass Road	1	$1,031	$0
Grizzly Court & Donkey Hill Road	1	$1,031	$0
Heartwood Court & Powder Horn Road	1	$1,031	$0
Hidden Valley Road & Deer Hill Road	1	$1,031	$0
Hidden Valley Road & Spyglass Road	2	$2,062	$0
Honey Hill & Donkey Hill Road	1	$1,031	$0
Horseshoe Road & Magnolia Court	1	$1,031	$0
Horseshoe Road & Mt Meadow South	2	$2,062	$0
Huckleberr Court & Hidden Valley Road	1	$1,031	$0
Indian Rock Road & Powder Horn Road	1	$1,031	$0
Jigsaw Road & Powder Horn	1	$1,031	$0
Jigsaw Road & Powder Horn Road	1	$1,031	$0
Knollview Drive	1	$1,031	$0
Knollview Drive - Knollview Drive	1	$1,031	$0
Little Peak Road & Eagle Rock Road	1	$1,031	$0
Lynx Court & Powder Horn Road	1	$1,031	$0
Magnolia Court & Horseshoe Road	1	$1,031	$0
Marine View Road & Deer Hill	1	$1,031	$0
Meadow Court & Mt Meadow South	1	$1,031	$0

Asset	Asset Count	Asset Value	Content Value
Mill Pond Road & Mt Meadow South	1	$1,031	$0
Moon Hill Court & Moon Ridge Road	1	$1,031	$0
Moon Ridge Road & Redbud Road	2	$2,062	$0
Moon Ridge Road & Vista Point Court	1	$1,031	$0
Mt Meadow North & Gold Flat	1	$1,031	$0
Mt Meadow South & Bear Valley Road	1	$1,031	$0
Mt Meadow South & Horseshoe Road	2	$2,062	$0
Mt Meadow South & Meadow Court	1	$1,031	$0
Mt Meadow South & Mill Pond Road	1	$1,031	$0
Mt Meadow South & Mt Meadow North	1	$1,031	$0
Mt Meadow South & Oak Flat Road	1	$1,031	$0
Mt Meadow South & Old Creek Road	1	$1,031	$0
Mt Meadwo North & Oak Flat Road	1	$1,031	$0
Mt Medow South & Old Creek Road	1	$1,031	$0
Oak Flat Road & Mt Meadow North	1	$1,031	$0
Oak Flat Road & Mt Meadow South	1	$1,031	$0
Old Creek Court & Mt Meadow South	1	$1,031	$0
Old Creek Road	1	$1,031	$0
Old Creek Road & Mt Meadow South	2	$2,062	$0
Park Hill Road & Powder Horn Road	1	$1,031	$0
Park Hill Road & Sugarwood Court	1	$1,031	$0
Park Ridge Drive & Pinewood Court	1	$1,031	$0

Asset	Asset Count	Asset Value	Content Value
Park Ridge Drive & Pinnacle Court	2	$2,062	$0
Picture Point Court & Donkey Hill Road	1	$1,031	$0
Pin Oak Court	1	$1,031	$0
Pine Flat Court	1	$1,031	$0
Pinewood Court & Park Ridge Drive	1	$1,031	$0
Pinnacle Court & Park Ridge Drive	2	$2,062	$0
Plateau Court	1	$1,031	$0
Powder Horn & 21212 Mt Meadow North	1	$1,031	$0
Powder Horn & Donkey Hill Road	1	$1,031	$0
Powder Horn & Jigsaw Road	1	$1,031	$0
Powder Horn Road	1	$1,031	$0
Powder Horn Road & 19552 Mt Meadow North	1	$1,031	$0
Powder Horn Road & Indian Rock Road	1	$1,031	$0
Powder Horn Road & Jigsaw Road	1	$1,031	$0
Powder Horn Road & Park Hill Road	1	$1,031	$0
Powder Horn Road & Timber Point Court	1	$1,031	$0
Redbud Road & Moon Ridge Road	2	$2,062	$0
Ridgecreat Court & Deer Hill Road	1	$1,031	$0
Rock Ridge Court	1	$1,031	$0
Saddleback Court & Little Peak Road	1	$1,031	$0
Siesta Court & Powder Horn Road	1	$1,031	$0
Spyglass Road & Bunker Road	1	$1,031	$0
Spyglass Road & Deer Hollow Road	2	$2,062	$0
Spyglass Road & Hidden Valley Road	2	$2,062	$0

Asset	Asset Count	Asset Value	Content Value
Sugarbush Court	1	$1,031	$0
Sugarbush Court & Firethorn Road	1	$1,031	$0
Sweetwood Court & Hidden Valley Road	1	$1,031	$0
Tigerwood Court & Firethorn Road	1	$1,031	$0
Timber Point Court & Powder Horn Road	1	$1,031	$0
Unit 9 Gate	1	$1,031	$0
Verde Court & Old Creek Road	1	$1,031	$0
Vista Point	1	$1,031	$0
Vista Point Court & Moon Ridge Road	1	$1,031	$0
Yankee Valley & Powder Horn Road	1	$1,031	$0
Yankee Valley Road	1	$1,031	$0
Valve Total	326	$336,106	$0
Well			$0
Ag Well	1	$183,085	$0
Wellfield Well 2	1	$183,085	$0
Wellfield Well 4	1	$183,085	$0
Wells 3	2	$366,170	$0
Well Total	**5**	**$915,425**	**$0**
Water System Asset Total	**665**	**$4,939,372**	**$0**
Grand Total	**953**	**$16,975,671**	**$1,590,091**

Source: HVLCSD GIS

Table E-2 HVLCSD – Assets in Cal OES Dam Inundation Zones

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Coyote Creek			
Land Asset			
Parcel			
141-231-02	1	$0	$0
141-611-07	1	$250,000	$0
Parcel Total	**2**	**$250,000**	**$0**
Land Asset Total	**2**	**$250,000**	**$0**
Sewer System Asset			
Generator			
Generator - Lift Station 1	1	$172,000	$0
Generator - Lift Station 3	1	$62,772	$0
Generator - Lift Station Hardesters	1	$62,772	$0
Generator Total	**3**	**$297,544**	**$0**
Manhole			
(blank)	65	$69,225	$0
Manhole Total	**65**	**$69,225**	**$0**
Sewer Pumps			
Lift Station #1	3	$193,500	$0
Lift Station #3	3	$37,500	$0
Lift Station Hardesters	2	$14,000	$0
Sewer Pumps Total	**8**	**$245,000**	**$0**
Sewer System Asset Total	**76**	**$611,769**	**$0**
Water System Asset			
Hydrant			
(blank)	53	$123,490	$0
Hydrant Total	**53**	**$123,490**	**$0**
Valve			
17945 Bunker Road	1	$1,031	$0
18057 Spyglass Road	1	$1,031	$0
18112 Deer Hollow Road	1	$1,031	$0
18118 Hidden Valley Road	1	$1,031	$0
18121 Spyglass Road	1	$1,031	$0
18126 Fishhook Court	1	$1,031	$0
18150 Sweetwood Court	1	$1,031	$0
18174 Hidden Valley Road	1	$1,031	$0
18190 Fishhook Court	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
18224 Deer Hollow Road	1	$1,031	$0
18249 Spyglass Road	1	$1,031	$0
18374 Hidden Valley Road	1	$1,031	$0
18377 Spyglass Road	1	$1,031	$0
18378 Deer Hollow Road	1	$1,031	$0
18474 Hidden Valley Road	1	$1,031	$0
18540 Deer Hollow Road	1	$1,031	$0
18553 Spyglass Road	1	$1,031	$0
18668 Deer Hollow Road	1	$1,031	$0
18678 Horseshoe Road	1	$1,031	$0
18690 Magnolia Court	1	$1,031	$0
18729 Spyglass Road	1	$1,031	$0
18755 Glencove Court	1	$1,031	$0
18790 Horseshoe Road	1	$1,031	$0
18828 Deer Hollow Road	1	$1,031	$0
18838 Dove Court	1	$1,031	$0
18846 Horseshoe Road	1	$1,031	$0
18873 Spyglass Road	1	$1,031	$0
18965 Spyglass Road	1	$1,031	$0
19116 Gooselake Court	1	$1,031	$0
19195 Meadow Court	1	$1,031	$0
19287 Mt Meadow South	1	$1,031	$0
19335 Mt Meadow South	1	$1,031	$0
19385 Old Creek Road	1	$1,031	$0
19407 Mt Meadow South	1	$1,031	$0
19465 Old Creek Road	1	$1,031	$0
19503 Mt Meadow South	1	$1,031	$0
19575 Mt Meadow South	1	$1,031	$0
19575 Old Creek Road	1	$1,031	$0
19625 Old Creek Road	1	$1,031	$0
19671 Mt Meadow South	1	$1,031	$0
19675 Old Creek Court	1	$1,031	$0
19767 Mt Meadow South	1	$1,031	$0
19840 Mt Meadow South	1	$1,031	$0
19857 Mt Meadow South	1	$1,031	$0
Bear Valley Road & Mt Meadow South	1	$1,031	$0
Bunker Road & Deer Hollow Road	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Bunker Road & Spyglass Road	1	$1,031	$0
Deer Hill & Bunker Road	1	$1,031	$0
Deer Hollow Road & Spyglass Road	1	$1,031	$0
Dove Court & Horseshoe Road	1	$1,031	$0
Fishhook Court & Spyglass Road	1	$1,031	$0
Glencove Court & Horseshoe Road	1	$1,031	$0
Gooselake Court & Horseshoe Road	1	$1,031	$0
Green Point Court & Spyglass Road	1	$1,031	$0
Hidden Valley Road & Spyglass Road	1	$1,031	$0
Horseshoe Road & Magnolia Court	1	$1,031	$0
Horseshoe Road & Mt Meadow South	2	$2,062	$0
Magnolia Court & Horseshoe Road	1	$1,031	$0
Meadow Court & Mt Meadow South	1	$1,031	$0
Mt Meadow South & Bear Valley Road	1	$1,031	$0
Mt Meadow South & Horseshoe Road	2	$2,062	$0
Mt Meadow South & Meadow Court	1	$1,031	$0
Mt Meadow South & Mt Meadow North	1	$1,031	$0
Mt Meadow South & Oak Flat Road	1	$1,031	$0
Mt Meadow South & Old Creek Road	1	$1,031	$0
Mt Medow South & Old Creek Road	1	$1,031	$0
Oak Flat Road & Mt Meadow South	1	$1,031	$0
Old Creek Court & Mt Meadow South	1	$1,031	$0
Old Creek Road	1	$1,031	$0
Old Creek Road & Mt Meadow South	2	$2,062	$0
Spyglass Road & Bunker Road	1	$1,031	$0
Spyglass Road & Deer Hollow Road	1	$1,031	$0
Spyglass Road & Hidden Valley Road	1	$1,031	$0
Verde Court & Old Creek Road	1	$1,031	$0
Valve Total	**77**	**$79,387**	**$0**
Water System Asset Total	**130**	**$202,877**	**$0**
Coyote Creek Total	**208**	**$1,064,646**	**$0**
Outside of Dam Inundation Area			
Land Asset			
Parcel			
013-060-05	1	$125,000	$0
014-270-10	1	$900,000	$0
014-280-19	1	$1,000,000	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
141-033-01	1	$10,000	$0
141-081-27	1	$8,000	$0
141-311-25	1	$130,000	$0
141-361-03	1	$5,000	$0
141-411-28	1	$10,000	$0
141-611-03	1	$15,000	$0
141-732-01	1	$9,000	$0
142-113-01	1	$6,000	$0
142-363-23	1	$7,000	$0
142-401-07	1	$5,000	$0
144-011-02	1	$95,000	$0
144-011-04	1	$125,000	$0
144-011-09	1	$65,000	$0
Parcel Total	**16**	**$2,515,000**	**$0**
Land Asset Total	**16**	**$2,515,000**	**$0**
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	$0
Generator - Lift Station 2	1	$62,772	$0
Generator - Lift Station 4	1	$104,620	$0
Generator - Lift Station 5	1	$62,772	$0
Generator - Lift Station 6	1	$62,772	$0
Generator - Lift Station 7	1	$62,772	$0
Generator - WWTP Lab	1	$251,088	$0
Generator Total	**7**	**$732,340**	**$0**

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Manhole			
(blank)	153	$162,945	$0
Manhole Total	**153**	**$162,945**	**$0**
Sewer Pumps			
400s	2	$13,800	$0
500s	4	$4,156	$0
600s	2	$33,600	$0
700s	2	$17,000	$0
800s	2	$21,500	$0
Lift Station #2	3	$37,500	$0
Lift Station #4	3	$37,500	$0
Lift Station #5	3	$52,500	$0
Lift Station #6	3	$37,500	$0
Lift Station #7	2	$13,800	$0
Sewer Pumps Total	26	$268,856	$0
Sewer System Asset Total	**186**	**$1,164,141**	**$0**
Water System Asset			
Hydrant			
(blank)	249	$580,170	$0
Hydrant Total	**249**	**$580,170**	**$0**
PRV			
16128 Eagle Rock Road	1	$5,609	$0
16329 Eagle Rock Road	1	$5,609	$0
17028 Spruce Grove Road	1	$5,609	$0
17972 Deer Hill Road	1	$5,609	$0
18317 North Shore Drive	1	$5,609	$0
18535 Glenwood Road	1	$5,609	$0
18726 Hidden Valley Road	1	$5,609	$0
19895 Donkey Hill Road	1	$5,609	$0
PRV Total	**8**	**$44,872**	**$0**
Pump			
Ag Well	1	$183,085	$0
Greenridge 501	1	$10,400	$0
Greenridge 502	1	$10,400	$0
Unit 9 901	1	$11,450	$0
Unit 9 902	1	$11,450	$0
Unit 9 903	1	$11,450	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Water Treatment Plant - Well 2 - Wellfield	1	$183,085	$0
Water Treatment Plant 101	1	$18,200	$0
Water Treatment Plant 102	1	$18,200	$0
Water Treatment Plant 103	1	$18,200	$0
Water Treatment Plant 401	1	$7,300	$0
Water Treatment Plant 402	1	$7,300	$0
Water Treatment Plant 403	1	$17,300	$0
Well 3	1	$183,085	$0
Wellfield TP Booster	1	$20,000	$0
Wellfield Well 4	1	$183,085	$0
Pump Total	**16**	**$893,990**	**$0**
Tank			
Detention tank	1	$122,405	$0
Little Peak storage tank	1	$436,265	$0
Tank 1a	1	$146,468	$0
Tank 1b	1	$174,715	$0
Tank 1c	1	$436,265	$0
Tank 4a	1	$146,468	$0
Tank 4b	1	$436,265	$0
Unit 9 Storage Tank	1	$146,468	$0
Tank Total	**8**	**$2,045,319**	**$0**
Valve			
15509 Little Peak Road	1	$1,031	$0
15542 Plateau Court	1	$1,031	$0
15589 Little Peak Road	1	$1,031	$0
15603 Eagle Rock Road	1	$1,031	$0
15605 Little Peak Road	1	$1,031	$0
15653 Little Peak Road	1	$1,031	$0
15717 Little Peak Road	1	$1,031	$0
15783 Eagle Rock	1	$1,031	$0
15822 Little Peak Road & Sentinel Court, 09-10-37	1	$1,031	$0
15868 Littel Peak Road	1	$1,031	$0
15989 Eagle Rock Road	1	$1,031	$0
16038 Conestoga Road	1	$1,031	$0
16041 Eagle Rock Road	1	$1,031	$0
16049 Eagle Rock Road	1	$1,031	$0
16116 Conestoga Road	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
16121 Eagel Rock Road	1	$1,031	$0
16136 Eagle Rock Road	1	$1,031	$0
16176 Eagle Rock Road	1	$1,031	$0
16184 Eagle Rock Road	1	$1,031	$0
16193 Eagle Rock Road	1	$1,031	$0
16198 Conestoga Road	1	$1,031	$0
16236 Eagle Rock Road	1	$1,031	$0
16273 Firethorn Road	1	$1,031	$0
16284 Eagle Rock Road	1	$1,031	$0
16290 Conestoga Road	1	$1,031	$0
16329 Eagle Rock Road	1	$1,031	$0
16345 Eagle Rock Road	1	$1,031	$0
16369 Eagle Rock Road	1	$1,031	$0
16369 Firethorn Road	1	$1,031	$0
16385 Eagle Rock Road	1	$1,031	$0
16402 Conestoga Road	1	$1,031	$0
16428 Eagle Road Road	1	$1,031	$0
16476 Eagle Rock Road & Deer Hill Road	1	$1,031	$0
16481 Deer Hill Road	1	$1,031	$0
16490 Deer Hill Road	1	$1,031	$0
16506 Cresent Court	1	$1,031	$0
16536 Ridgecreat Court	1	$1,031	$0
16542 Cresent Court	1	$1,031	$0
16578 Hacienda Road	1	$1,031	$0
16602 Round Hill Court	1	$1,031	$0
16910 Knollview Drive	1	$1,031	$0
16950 Knollview Drive	1	$1,031	$0
17030 Knollview Drive	1	$1,031	$0
17090 Knollview Drive	1	$1,031	$0
17221 Knollveiw Drive	1	$1,031	$0
17305 Knollview Drive	1	$1,031	$0
17398 Deer Hill Road	1	$1,031	$0
17496 Deer Hill Road	1	$1,031	$0
17524 Deer HIll Road & Sweetwater Court	1	$1,031	$0
17706 Deer Hill Road	1	$1,031	$0
17783 Deer Hill Road	1	$1,031	$0
17895 Deer Hill Rad	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
17986 Deer Hill Road	1	$1,031	$0
18042 Deer Hill Road	1	$1,031	$0
18126 Sweetwood Court	1	$1,031	$0
18170 Bobcat Court	1	$1,031	$0
18215 Tigerwood Court	1	$1,031	$0
18272 Hidden Valley Road	1	$1,031	$0
18310 Grizzley Court	1	$1,031	$0
18310 Pinnacle Court	1	$1,031	$0
18377 Pinewood Court	1	$1,031	$0
18380 Grizzley Court	1	$1,031	$0
18380 Pinnacle Court	1	$1,031	$0
18438 Sweetwater Court	1	$1,031	$0
18520 Hacienda Road	1	$1,031	$0
18541 Sentinel Court	1	$1,031	$0
18572 Hidden Valley Road	1	$1,031	$0
18606 Pine Flat Court & Little Peak Road, 09-10-29	1	$1,031	$0
18616 Pin Oak Court & Eagle Rock Road	1	$1,031	$0
18650 Maple Leaf Court	1	$1,031	$0
18670 Hidden Valley Road	1	$1,031	$0
18710 Maple Leaf Court & Mt Meadow North	1	$1,031	$0
18717 Deer Hill Road	1	$1,031	$0
18726 Deer Hill Road & Hidden Valley Road	1	$1,031	$0
18726 Hidden Valley Road	1	$1,031	$0
18745 Fairway Point	1	$1,031	$0
18794 Deer Hill Road	1	$1,031	$0
18820 Timber Point Road	1	$1,031	$0
18835 Lynx Court	1	$1,031	$0
18862 Moon Ridge Road	1	$1,031	$0
18905 Bear Valley Road	1	$1,031	$0
18918 Hidden Valley Road	1	$1,031	$0
18924 Deer Hollow Road	1	$1,031	$0
18932 Moon Ridge Road	1	$1,031	$0
18932 Timber Point Road	2	$2,062	$0
18941 Mt Meadow South	1	$1,031	$0
18960 Redbud Road	1	$1,031	$0
18966 Hidden Valley Road	1	$1,031	$0
19018 Hidden Valley Road	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
19032 Moon Ridge Road	1	$1,031	$0
19049 Spyglass Road	1	$1,031	$0
19056 Redbud Road	1	$1,031	$0
19088 Moon Ridge Road	1	$1,031	$0
19112 Hidden Valley Road	1	$1,031	$0
19151 Sweetwood Court	1	$1,031	$0
19152 Moon Ridge Road	1	$1,031	$0
19172 Moon Ridge Road	1	$1,031	$0
19204 Mt Meadow North	1	$1,031	$0
19204 Mt Meadow North & Donkey Hill Road	1	$1,031	$0
19242 Moon Ridge Road	1	$1,031	$0
19276 Mt Meadow North	1	$1,031	$0
19324 Donkey Hill Road	1	$1,031	$0
19336 Moon Ridge Road	1	$1,031	$0
19360 Mt Meadow North	1	$1,031	$0
19389 Donkey Hill Road	1	$1,031	$0
19398 Park Ridge Road	1	$1,031	$0
19420 Mt Meadow North	1	$1,031	$0
19426 Park Ridge Road	1	$1,031	$0
19440 Park Ridge Road	1	$1,031	$0
19456 Hidden Valley Road	1	$1,031	$0
19456 Mt Meadow North	1	$1,031	$0
19464 Picture Point Court	1	$1,031	$0
19481 Picture Point Court	1	$1,031	$0
19492 Moon Ridge Road	1	$1,031	$0
19524 Park Ridge Drive	1	$1,031	$0
19540 Mt Meadow North	1	$1,031	$0
19552 Mt Meadow North & Powder Horn	1	$1,031	$0
19552 Powder Horn Road	1	$1,031	$0
19571 Donkey Hill Road	1	$1,031	$0
19608 Park Ridge Drive	1	$1,031	$0
19614 Mt Meadow North	1	$1,031	$0
19655 Donkey Hill Road	1	$1,031	$0
19664 Powder Horn Road	1	$1,031	$0
19674 Mt Meadow North	1	$1,031	$0
19686 Mt Meadow North & Fairway Point	1	$1,031	$0
19734 Park Hill Road	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
19759 Oak Flat Road	1	$1,031	$0
19767 Donkey Hill Road	1	$1,031	$0
19776 Mt Meadow North	1	$1,031	$0
19787 Bear Valley Road	1	$1,031	$0
19854 Mt Meadow North	1	$1,031	$0
19857 Bear Valley Road	1	$1,031	$0
19897 Mt Meadow South	1	$1,031	$0
19908 Mt Meadow North	1	$1,031	$0
19936 Powder Horn Road	1	$1,031	$0
19944 Mt Meadow North	1	$1,031	$0
19963 Mt Meadow South	1	$1,031	$0
19968 Bear Valley Road	1	$1,031	$0
20019 Jigsaw Road	1	$1,031	$0
20032 Powder Horn Road	1	$1,031	$0
20048 Powder Horn Road	1	$1,031	$0
20144 Powder Horn Road	1	$1,031	$0
20191 Gold Flat Court	1	$1,031	$0
20249 Jigsaw Road	1	$1,031	$0
20250 Indian Rock Road	1	$1,031	$0
20297 Siesta Court	1	$1,031	$0
20400 Powder Horn Road	1	$1,031	$0
20402 Powder Horn Road	1	$1,031	$0
20652 Powder Horn Road	1	$1,031	$0
20700 Powder Horn Road	1	$1,031	$0
20796 Powder Horn Road	1	$1,031	$0
20812 Powder Horn Road	1	$1,031	$0
20892 Powder Horn Road	1	$1,031	$0
20972 Powder Horn Road	1	$1,031	$0
21084 Powder Horn Road	1	$1,031	$0
21164 Powder Horn Road	1	$1,031	$0
21212 Mt Meadow North	1	$1,031	$0
21212 Mt Meadow North & Powder Horn	1	$1,031	$0
Bobcat Court & Donkey Hill Road	1	$1,031	$0
Boxwood Court & Firethorn Road	1	$1,031	$0
Conestoga Road	2	$2,062	$0
Conestoga Road & Deer Hill Road	1	$1,031	$0
Conestogar Road & Firethorn Road	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Cresent Court	1	$1,031	$0
Cresent Court & Deer Hill Road	1	$1,031	$0
Deer Hill & Crescent Court	1	$1,031	$0
Deer Hill & Marine View Road	1	$1,031	$0
Deer Hill Road	2	$2,062	$0
Deer Hill Road & 16476 Eagle Rock Road	1	$1,031	$0
Deer Hill Road & Firethorn Road	1	$1,031	$0
Deer Hill Road & Hidden Valley Road	1	$1,031	$0
Deer Hollow Road & Spyglass Road	1	$1,031	$0
Donkey Hill & Bobcat Court	1	$1,031	$0
Donkey Hill Road	1	$1,031	$0
Donkey Hill Road & Honey Hill	1	$1,031	$0
Donkey Hill Road & Mt Meadow North	1	$1,031	$0
Eagle Rock Road	2	$2,062	$0
Eagle Rock Road & 18616 Pin Oak Court	1	$1,031	$0
Eagle Rock Road & Little Peak Road	1	$1,031	$0
Fairway Point & Mt Meadow North	1	$1,031	$0
Firethorn Road & Conestoga Road	1	$1,031	$0
Firethorn Road & Deer Hill Road	1	$1,031	$0
Gold Flat Court & Mt Meadow North	1	$1,031	$0
Grizzly Court & Donkey Hill Road	1	$1,031	$0
Heartwood Court & Powder Horn Road	1	$1,031	$0
Hidden Valley Road & Deer Hill Road	1	$1,031	$0
Hidden Valley Road & Spyglass Road	1	$1,031	$0
Honey Hill & Donkey Hill Road	1	$1,031	$0
Huckleberr Court & Hidden Valley Road	1	$1,031	$0
Indian Rock Road & Powder Horn Road	1	$1,031	$0
Jigsaw Road & Powder Horn	1	$1,031	$0
Jigsaw Road & Powder Horn Road	1	$1,031	$0
Knollview Drive	1	$1,031	$0
Knollview Drive - Knollview Drive	1	$1,031	$0
Little Peak Road & Eagle Rock Road	1	$1,031	$0
Lynx Court & Powder Horn Road	1	$1,031	$0
Marine View Road & Deer Hill	1	$1,031	$0
Mill Pond Road & Mt Meadow South	1	$1,031	$0
Moon Hill Court & Moon Ridge Road	1	$1,031	$0
Moon Ridge Road & Redbud Road	2	$2,062	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Moon Ridge Road & Vista Point Court	1	$1,031	$0
Mt Meadow North & Gold Flat	1	$1,031	$0
Mt Meadow South & Mill Pond Road	1	$1,031	$0
Mt Meadwo North & Oak Flat Road	1	$1,031	$0
Oak Flat Road & Mt Meadow North	1	$1,031	$0
Park Hill Road & Powder Horn Road	1	$1,031	$0
Park Hill Road & Sugarwood Court	1	$1,031	$0
Park Ridge Drive & Pinewood Court	1	$1,031	$0
Park Ridge Drive & Pinnacle Court	2	$2,062	$0
Picture Point Court & Donkey Hill Road	1	$1,031	$0
Pin Oak Court	1	$1,031	$0
Pine Flat Court	1	$1,031	$0
Pinewood Court & Park Ridge Drive	1	$1,031	$0
Pinnacle Court & Park Ridge Drive	2	$2,062	$0
Plateau Court	1	$1,031	$0
Powder Horn & 21212 Mt Meadow North	1	$1,031	$0
Powder Horn & Donkey Hill Road	1	$1,031	$0
Powder Horn & Jigsaw Road	1	$1,031	$0
Powder Horn Road	1	$1,031	$0
Powder Horn Road & 19552 Mt Meadow North	1	$1,031	$0
Powder Horn Road & Indian Rock Road	1	$1,031	$0
Powder Horn Road & Jigsaw Road	1	$1,031	$0
Powder Horn Road & Park Hill Road	1	$1,031	$0
Powder Horn Road & Timber Point Court	1	$1,031	$0
Redbud Road & Moon Ridge Road	2	$2,062	$0
Ridgecreat Court & Deer Hill Road	1	$1,031	$0
Rock Ridge Court	1	$1,031	$0
Saddleback Court & Little Peak Road	1	$1,031	$0
Siesta Court & Powder Horn Road	1	$1,031	$0
Spyglass Road & Deer Hollow Road	1	$1,031	$0
Spyglass Road & Hidden Valley Road	1	$1,031	$0
Sugarbush Court	1	$1,031	$0
Sugarbush Court & Firethorn Road	1	$1,031	$0
Sweetwood Court & Hidden Valley Road	1	$1,031	$0
Tigerwood Court & Firethorn Road	1	$1,031	$0
Timber Point Court & Powder Horn Road	1	$1,031	$0
Unit 9 Gate	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Vista Point	1	$1,031	$0
Vista Point Court & Moon Ridge Road	1	$1,031	$0
Yankee Valley & Powder Horn Road	1	$1,031	$0
Yankee Valley Road	1	$1,031	$0
Valve Total	**249**	**$256,719**	**$0**
Well			
Ag Well	1	$183,085	$0
Wellfield Well 2	1	$183,085	$0
Wellfield Well 4	1	$183,085	$0
Wells 3	2	$366,170	$0
Well Total	**5**	**$915,425**	**$0**
Water System Asset Total	**535**	**$4,736,495**	**$0**
Outside of Dam Inundation Area Total	**745**	**$15,911,025**	**$1,590,091**
Grand Total	**953**	**$16,975,671**	**$1,590,091**

Source: Cal OES, HVLCSD GIS

Table E-3 HVLCSD – Assets in Dam Inundation from HVLCSD Coyote Creek Dam Inundation Study

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Coyote Creek			
Land Asset			
Parcel			
141-231-02	1	$0	$0
141-611-07	1	$250,000	$0
Parcel Total	**2**	**$250,000**	**$0**
Land Asset Total	**2**	**$250,000**	**$0**
Sewer System Asset			
Generator			
Generator - Lift Station 1	1	$172,000	$0
Generator - Lift Station 3	1	$62,772	$0
Generator - Lift Station Hardesters	1	$62,772	$0
Generator Total	**3**	**$297,544**	**$0**
Manhole			
(blank)	65	$69,225	$0
Manhole Total	**65**	**$69,225**	**$0**
Sewer Pumps			
Lift Station #1	3	$193,500	$0
Lift Station #3	3	$37,500	$0
Lift Station Hardesters	2	$14,000	$0
Sewer Pumps Total	**8**	**$245,000**	**$0**
Sewer System Asset Total	**76**	**$611,769**	**$0**
Water System Asset			
Hydrant			
(blank)	53	$123,490	$0
Hydrant Total	**53**	**$123,490**	**$0**
Valve			
17945 Bunker Road	1	$1,031	$0
18057 Spyglass Road	1	$1,031	$0
18112 Deer Hollow Road	1	$1,031	$0
18118 Hidden Valley Road	1	$1,031	$0
18121 Spyglass Road	1	$1,031	$0
18126 Fishhook Court	1	$1,031	$0
18150 Sweetwood Court	1	$1,031	$0
18174 Hidden Valley Road	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
18190 Fishhook Court	1	$1,031	$0
18224 Deer Hollow Road	1	$1,031	$0
18249 Spyglass Road	1	$1,031	$0
18374 Hidden Valley Road	1	$1,031	$0
18377 Spyglass Road	1	$1,031	$0
18378 Deer Hollow Road	1	$1,031	$0
18474 Hidden Valley Road	1	$1,031	$0
18540 Deer Hollow Road	1	$1,031	$0
18553 Spyglass Road	1	$1,031	$0
18668 Deer Hollow Road	1	$1,031	$0
18678 Horseshoe Road	1	$1,031	$0
18690 Magnolia Court	1	$1,031	$0
18729 Spyglass Road	1	$1,031	$0
18755 Glencove Court	1	$1,031	$0
18790 Horseshoe Road	1	$1,031	$0
18828 Deer Hollow Road	1	$1,031	$0
18838 Dove Court	1	$1,031	$0
18846 Horseshoe Road	1	$1,031	$0
18873 Spyglass Road	1	$1,031	$0
18965 Spyglass Road	1	$1,031	$0
19116 Gooselake Court	1	$1,031	$0
19195 Meadow Court	1	$1,031	$0
19287 Mt Meadow South	1	$1,031	$0
19335 Mt Meadow South	1	$1,031	$0
19385 Old Creek Road	1	$1,031	$0
19407 Mt Meadow South	1	$1,031	$0
19465 Old Creek Road	1	$1,031	$0
19503 Mt Meadow South	1	$1,031	$0
19575 Mt Meadow South	1	$1,031	$0
19575 Old Creek Road	1	$1,031	$0
19625 Old Creek Road	1	$1,031	$0
19671 Mt Meadow South	1	$1,031	$0
19675 Old Creek Court	1	$1,031	$0
19767 Mt Meadow South	1	$1,031	$0
19840 Mt Meadow South	1	$1,031	$0
19857 Mt Meadow South	1	$1,031	$0
Bear Valley Road & Mt Meadow South	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Bunker Road & Deer Hollow Road	1	$1,031	$0
Bunker Road & Spyglass Road	1	$1,031	$0
Deer Hill & Bunker Road	1	$1,031	$0
Deer Hollow Road & Spyglass Road	1	$1,031	$0
Dove Court & Horseshoe Road	1	$1,031	$0
Fishhook Court & Spyglass Road	1	$1,031	$0
Glencove Court & Horseshoe Road	1	$1,031	$0
Gooselake Court & Horseshoe Road	1	$1,031	$0
Green Point Court & Spyglass Road	1	$1,031	$0
Hidden Valley Road & Spyglass Road	1	$1,031	$0
Horseshoe Road & Magnolia Court	1	$1,031	$0
Horseshoe Road & Mt Meadow South	2	$2,062	$0
Magnolia Court & Horseshoe Road	1	$1,031	$0
Meadow Court & Mt Meadow South	1	$1,031	$0
Mt Meadow South & Bear Valley Road	1	$1,031	$0
Mt Meadow South & Horseshoe Road	2	$2,062	$0
Mt Meadow South & Meadow Court	1	$1,031	$0
Mt Meadow South & Mt Meadow North	1	$1,031	$0
Mt Meadow South & Oak Flat Road	1	$1,031	$0
Mt Meadow South & Old Creek Road	1	$1,031	$0
Mt Medow South & Old Creek Road	1	$1,031	$0
Oak Flat Road & Mt Meadow South	1	$1,031	$0
Old Creek Court & Mt Meadow South	1	$1,031	$0
Old Creek Road	1	$1,031	$0
Old Creek Road & Mt Meadow South	2	$2,062	$0
Spyglass Road & Bunker Road	1	$1,031	$0
Spyglass Road & Deer Hollow Road	1	$1,031	$0
Spyglass Road & Hidden Valley Road	1	$1,031	$0
Verde Court & Old Creek Road	1	$1,031	$0
Valve Total	**77**	**$79,387**	**$0**
Water System Asset Total	**130**	**$202,877**	**$0**
Coyote Creek Total	**208**	**$1,064,646**	**$0**
Outside of Dam Inundation Area			
Land Asset			
Parcel			
013-060-05	1	$125,000	$0
014-270-10	1	$900,000	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
014-280-19	1	$1,000,000	$0
141-033-01	1	$10,000	$0
141-081-27	1	$8,000	$0
141-311-25	1	$130,000	$0
141-361-03	1	$5,000	$0
141-411-28	1	$10,000	$0
141-611-03	1	$15,000	$0
141-732-01	1	$9,000	$0
142-113-01	1	$6,000	$0
142-363-23	1	$7,000	$0
142-401-07	1	$5,000	$0
144-011-02	1	$95,000	$0
144-011-04	1	$125,000	$0
144-011-09	1	$65,000	$0
Parcel Total	**16**	**$2,515,000**	**$0**
Land Asset Total	**16**	**$2,515,000**	**$0**
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	$0
Unit 9 Pump Station	1	$52,310	$218,022
Waste Water Treatment Plant	1	$5,825,227	$0
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	$0
Generator - Lift Station 2	1	$62,772	$0
Generator - Lift Station 4	1	$104,620	$0
Generator - Lift Station 5	1	$62,772	$0
Generator - Lift Station 6	1	$62,772	$0
Generator - Lift Station 7	1	$62,772	$0
Generator - WWTP Lab	1	$251,088	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Generator Total	7	$732,340	$0
Manhole			
(blank)	153	$162,945	$0
Manhole Total	**153**	**$162,945**	**$0**
Sewer Pumps			
400s	2	$13,800	$0
500s	4	$4,156	$0
600s	2	$33,600	$0
700s	2	$17,000	$0
800s	2	$21,500	$0
Lift Station #2	3	$37,500	$0
Lift Station #4	3	$37,500	$0
Lift Station #5	3	$52,500	$0
Lift Station #6	3	$37,500	$0
Lift Station #7	2	$13,800	$0
Sewer Pumps Total	**26**	**$268,856**	**$0**
Sewer System Asset Total	**186**	**$1,164,141**	**$0**
Water System Asset			
Hydrant			
(blank)	249	$580,170	$0
Hydrant Total	**249**	**$580,170**	**$0**
PRV			
16128 Eagle Rock Road	1	$5,609	$0
16329 Eagle Rock Road	1	$5,609	$0
17028 Spruce Grove Road	1	$5,609	$0
17972 Deer Hill Road	1	$5,609	$0
18317 North Shore Drive	1	$5,609	$0
18535 Glenwood Road	1	$5,609	$0
18726 Hidden Valley Road	1	$5,609	$0
19895 Donkey Hill Road	1	$5,609	$0
PRV Total	8	$44,872	$0
Pump			
Ag Well	1	$183,085	$0
Greenridge 501	1	$10,400	$0
Greenridge 502	1	$10,400	$0
Unit 9 901	1	$11,450	$0
Unit 9 902	1	$11,450	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Unit 9 903	1	$11,450	$0
Water Treatment Plant - Well 2 - Wellfield	1	$183,085	$0
Water Treatment Plant 101	1	$18,200	$0
Water Treatment Plant 102	1	$18,200	$0
Water Treatment Plant 103	1	$18,200	$0
Water Treatment Plant 401	1	$7,300	$0
Water Treatment Plant 402	1	$7,300	$0
Water Treatment Plant 403	1	$17,300	$0
Well 3	1	$183,085	$0
Wellfield TP Booster	1	$20,000	$0
Wellfield Well 4	1	$183,085	$0
Pump Total	**16**	**$893,990**	**$0**
Tank			
Detention tank	1	$122,405	$0
Little Peak storage tank	1	$436,265	$0
Tank 1a	1	$146,468	$0
Tank 1b	1	$174,715	$0
Tank 1c	1	$436,265	$0
Tank 4a	1	$146,468	$0
Tank 4b	1	$436,265	$0
Unit 9 Storage Tank	1	$146,468	$0
Tank Total	8	$2,045,319	$0
Valve			
15509 Little Peak Road	1	$1,031	$0
15542 Plateau Court	1	$1,031	$0
15589 Little Peak Road	1	$1,031	$0
15603 Eagle Rock Road	1	$1,031	$0
15605 Little Peak Road	1	$1,031	$0
15653 Little Peak Road	1	$1,031	$0
15717 Little Peak Road	1	$1,031	$0
15783 Eagle Rock	1	$1,031	$0
15822 Little Peak Road & Sentinel Court, 09-10-37	1	$1,031	$0
15868 Littel Peak Road	1	$1,031	$0
15989 Eagle Rock Road	1	$1,031	$0
16038 Conestoga Road	1	$1,031	$0
16041 Eagle Rock Road	1	$1,031	$0
16049 Eagle Rock Road	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
16116 Conestoga Road	1	$1,031	$0
16121 Eagel Rock Road	1	$1,031	$0
16136 Eagle Rock Road	1	$1,031	$0
16176 Eagle Rock Road	1	$1,031	$0
16184 Eagle Rock Road	1	$1,031	$0
16193 Eagle Rock Road	1	$1,031	$0
16198 Conestoga Road	1	$1,031	$0
16236 Eagle Rock Road	1	$1,031	$0
16273 Firethorn Road	1	$1,031	$0
16284 Eagle Rock Road	1	$1,031	$0
16290 Conestoga Road	1	$1,031	$0
16329 Eagle Rock Road	1	$1,031	$0
16345 Eagle Rock Road	1	$1,031	$0
16369 Eagle Rock Road	1	$1,031	$0
16369 Firethorn Road	1	$1,031	$0
16385 Eagle Rock Road	1	$1,031	$0
16402 Conestoga Road	1	$1,031	$0
16428 Eagle Road Road	1	$1,031	$0
16476 Eagle Rock Road & Deer Hill Road	1	$1,031	$0
16481 Deer Hill Road	1	$1,031	$0
16490 Deer Hill Road	1	$1,031	$0
16506 Cresent Court	1	$1,031	$0
16536 Ridgecreat Court	1	$1,031	$0
16542 Cresent Court	1	$1,031	$0
16578 Hacienda Road	1	$1,031	$0
16602 Round Hill Court	1	$1,031	$0
16910 Knollview Drive	1	$1,031	$0
16950 Knollview Drive	1	$1,031	$0
17030 Knollview Drive	1	$1,031	$0
17090 Knollview Drive	1	$1,031	$0
17221 Knollveiw Drive	1	$1,031	$0
17305 Knollview Drive	1	$1,031	$0
17398 Deer Hill Road	1	$1,031	$0
17496 Deer Hill Road	1	$1,031	$0
17524 Deer HIll Road & Sweetwater Court	1	$1,031	$0
17706 Deer Hill Road	1	$1,031	$0
17783 Deer Hill Road	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
17895 Deer Hill Rad	1	$1,031	$0
17986 Deer Hill Road	1	$1,031	$0
18042 Deer Hill Road	1	$1,031	$0
18126 Sweetwood Court	1	$1,031	$0
18170 Bobcat Court	1	$1,031	$0
18215 Tigerwood Court	1	$1,031	$0
18272 Hidden Valley Road	1	$1,031	$0
18310 Grizzley Court	1	$1,031	$0
18310 Pinnacle Court	1	$1,031	$0
18377 Pinewood Court	1	$1,031	$0
18380 Grizzley Court	1	$1,031	$0
18380 Pinnacle Court	1	$1,031	$0
18438 Sweetwater Court	1	$1,031	$0
18520 Hacienda Road	1	$1,031	$0
18541 Sentinel Court	1	$1,031	$0
18572 Hidden Valley Road	1	$1,031	$0
18606 Pine Flat Court & Little Peak Road, 09-10-29	1	$1,031	$0
18616 Pin Oak Court & Eagle Rock Road	1	$1,031	$0
18650 Maple Leaf Court	1	$1,031	$0
18670 Hidden Valley Road	1	$1,031	$0
18710 Maple Leaf Court & Mt Meadow North	1	$1,031	$0
18717 Deer Hill Road	1	$1,031	$0
18726 Deer Hill Road & Hidden Valley Road	1	$1,031	$0
18726 Hidden Valley Road	1	$1,031	$0
18745 Fairway Point	1	$1,031	$0
18794 Deer Hill Road	1	$1,031	$0
18820 Timber Point Road	1	$1,031	$0
18835 Lynx Court	1	$1,031	$0
18862 Moon Ridge Road	1	$1,031	$0
18905 Bear Valley Road	1	$1,031	$0
18918 Hidden Valley Road	1	$1,031	$0
18924 Deer Hollow Road	1	$1,031	$0
18932 Moon Ridge Road	1	$1,031	$0
18932 Timber Point Road	2	$2,062	$0
18941 Mt Meadow South	1	$1,031	$0
18960 Redbud Road	1	$1,031	$0
18966 Hidden Valley Road	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
19018 Hidden Valley Road	1	$1,031	$0
19032 Moon Ridge Road	1	$1,031	$0
19049 Spyglass Road	1	$1,031	$0
19056 Redbud Road	1	$1,031	$0
19088 Moon Ridge Road	1	$1,031	$0
19112 Hidden Valley Road	1	$1,031	$0
19151 Sweetwood Court	1	$1,031	$0
19152 Moon Ridge Road	1	$1,031	$0
19172 Moon Ridge Road	1	$1,031	$0
19204 Mt Meadow North	1	$1,031	$0
19204 Mt Meadow North & Donkey Hill Road	1	$1,031	$0
19242 Moon Ridge Road	1	$1,031	$0
19276 Mt Meadow North	1	$1,031	$0
19324 Donkey Hill Road	1	$1,031	$0
19336 Moon Ridge Road	1	$1,031	$0
19360 Mt Meadow North	1	$1,031	$0
19389 Donkey Hill Road	1	$1,031	$0
19398 Park Ridge Road	1	$1,031	$0
19420 Mt Meadow North	1	$1,031	$0
19426 Park Ridge Road	1	$1,031	$0
19440 Park Ridge Road	1	$1,031	$0
19456 Hidden Valley Road	1	$1,031	$0
19456 Mt Meadow North	1	$1,031	$0
19464 Picture Point Court	1	$1,031	$0
19481 Picture Point Court	1	$1,031	$0
19492 Moon Ridge Road	1	$1,031	$0
19524 Park Ridge Drive	1	$1,031	$0
19540 Mt Meadow North	1	$1,031	$0
19552 Mt Meadow North & Powder Horn	1	$1,031	$0
19552 Powder Horn Road	1	$1,031	$0
19571 Donkey Hill Road	1	$1,031	$0
19608 Park Ridge Drive	1	$1,031	$0
19614 Mt Meadow North	1	$1,031	$0
19655 Donkey Hill Road	1	$1,031	$0
19664 Powder Horn Road	1	$1,031	$0
19674 Mt Meadow North	1	$1,031	$0
19686 Mt Meadow North & Fairway Point	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
19734 Park Hill Road	1	$1,031	$0
19759 Oak Flat Road	1	$1,031	$0
19767 Donkey Hill Road	1	$1,031	$0
19776 Mt Meadow North	1	$1,031	$0
19787 Bear Valley Road	1	$1,031	$0
19854 Mt Meadow North	1	$1,031	$0
19857 Bear Valley Road	1	$1,031	$0
19897 Mt Meadow South	1	$1,031	$0
19908 Mt Meadow North	1	$1,031	$0
19936 Powder Horn Road	1	$1,031	$0
19944 Mt Meadow North	1	$1,031	$0
19963 Mt Meadow South	1	$1,031	$0
19968 Bear Valley Road	1	$1,031	$0
20019 Jigsaw Road	1	$1,031	$0
20032 Powder Horn Road	1	$1,031	$0
20048 Powder Horn Road	1	$1,031	$0
20144 Powder Horn Road	1	$1,031	$0
20191 Gold Flat Court	1	$1,031	$0
20249 Jigsaw Road	1	$1,031	$0
20250 Indian Rock Road	1	$1,031	$0
20297 Siesta Court	1	$1,031	$0
20400 Powder Horn Road	1	$1,031	$0
20402 Powder Horn Road	1	$1,031	$0
20652 Powder Horn Road	1	$1,031	$0
20700 Powder Horn Road	1	$1,031	$0
20796 Powder Horn Road	1	$1,031	$0
20812 Powder Horn Road	1	$1,031	$0
20892 Powder Horn Road	1	$1,031	$0
20972 Powder Horn Road	1	$1,031	$0
21084 Powder Horn Road	1	$1,031	$0
21164 Powder Horn Road	1	$1,031	$0
21212 Mt Meadow North	1	$1,031	$0
21212 Mt Meadow North & Powder Horn	1	$1,031	$0
Bobcat Court & Donkey Hill Road	1	$1,031	$0
Boxwood Court & Firethorn Road	1	$1,031	$0
Conestoga Road	2	$2,062	$0
Conestoga Road & Deer Hill Road	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Conestogar Road & Firethorn Road	1	$1,031	$0
Cresent Court	1	$1,031	$0
Cresent Court & Deer Hill Road	1	$1,031	$0
Deer Hill & Crescent Court	1	$1,031	$0
Deer Hill & Marine View Road	1	$1,031	$0
Deer Hill Road	2	$2,062	$0
Deer Hill Road & 16476 Eagle Rock Road	1	$1,031	$0
Deer Hill Road & Firethorn Road	1	$1,031	$0
Deer Hill Road & Hidden Valley Road	1	$1,031	$0
Deer Hollow Road & Spyglass Road	1	$1,031	$0
Donkey Hill & Bobcat Court	1	$1,031	$0
Donkey Hill Road	1	$1,031	$0
Donkey Hill Road & Honey Hill	1	$1,031	$0
Donkey Hill Road & Mt Meadow North	1	$1,031	$0
Eagle Rock Road	2	$2,062	$0
Eagle Rock Road & 18616 Pin Oak Court	1	$1,031	$0
Eagle Rock Road & Little Peak Road	1	$1,031	$0
Fairway Point & Mt Meadow North	1	$1,031	$0
Firethorn Road & Conestoga Road	1	$1,031	$0
Firethorn Road & Deer Hill Road	1	$1,031	$0
Gold Flat Court & Mt Meadow North	1	$1,031	$0
Grizzly Court & Donkey Hill Road	1	$1,031	$0
Heartwood Court & Powder Horn Road	1	$1,031	$0
Hidden Valley Road & Deer Hill Road	1	$1,031	$0
Hidden Valley Road & Spyglass Road	1	$1,031	$0
Honey Hill & Donkey Hill Road	1	$1,031	$0
Huckleberr Court & Hidden Valley Road	1	$1,031	$0
Indian Rock Road & Powder Horn Road	1	$1,031	$0
Jigsaw Road & Powder Horn	1	$1,031	$0
Jigsaw Road & Powder Horn Road	1	$1,031	$0
Knollview Drive	1	$1,031	$0
Knollview Drive - Knollview Drive	1	$1,031	$0
Little Peak Road & Eagle Rock Road	1	$1,031	$0
Lynx Court & Powder Horn Road	1	$1,031	$0
Marine View Road & Deer Hill	1	$1,031	$0
Mill Pond Road & Mt Meadow South	1	$1,031	$0
Moon Hill Court & Moon Ridge Road	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Moon Ridge Road & Redbud Road	2	$2,062	$0
Moon Ridge Road & Vista Point Court	1	$1,031	$0
Mt Meadow North & Gold Flat	1	$1,031	$0
Mt Meadow South & Mill Pond Road	1	$1,031	$0
Mt Meadwo North & Oak Flat Road	1	$1,031	$0
Oak Flat Road & Mt Meadow North	1	$1,031	$0
Park Hill Road & Powder Horn Road	1	$1,031	$0
Park Hill Road & Sugarwood Court	1	$1,031	$0
Park Ridge Drive & Pinewood Court	1	$1,031	$0
Park Ridge Drive & Pinnacle Court	2	$2,062	$0
Picture Point Court & Donkey Hill Road	1	$1,031	$0
Pin Oak Court	1	$1,031	$0
Pine Flat Court	1	$1,031	$0
Pinewood Court & Park Ridge Drive	1	$1,031	$0
Pinnacle Court & Park Ridge Drive	2	$2,062	$0
Plateau Court	1	$1,031	$0
Powder Horn & 21212 Mt Meadow North	1	$1,031	$0
Powder Horn & Donkey Hill Road	1	$1,031	$0
Powder Horn & Jigsaw Road	1	$1,031	$0
Powder Horn Road	1	$1,031	$0
Powder Horn Road & 19552 Mt Meadow North	1	$1,031	$0
Powder Horn Road & Indian Rock Road	1	$1,031	$0
Powder Horn Road & Jigsaw Road	1	$1,031	$0
Powder Horn Road & Park Hill Road	1	$1,031	$0
Powder Horn Road & Timber Point Court	1	$1,031	$0
Redbud Road & Moon Ridge Road	2	$2,062	$0
Ridgecreat Court & Deer Hill Road	1	$1,031	$0
Rock Ridge Court	1	$1,031	$0
Saddleback Court & Little Peak Road	1	$1,031	$0
Siesta Court & Powder Horn Road	1	$1,031	$0
Spyglass Road & Deer Hollow Road	1	$1,031	$0
Spyglass Road & Hidden Valley Road	1	$1,031	$0
Sugarbush Court	1	$1,031	$0
Sugarbush Court & Firethorn Road	1	$1,031	$0
Sweetwood Court & Hidden Valley Road	1	$1,031	$0
Tigerwood Court & Firethorn Road	1	$1,031	$0
Timber Point Court & Powder Horn Road	1	$1,031	$0

Dam Inundation Area/ Asset	Asset Count	Asset Value	Content Value
Unit 9 Gate	1	$1,031	$0
Vista Point	1	$1,031	$0
Vista Point Court & Moon Ridge Road	1	$1,031	$0
Yankee Valley & Powder Horn Road	1	$1,031	$0
Yankee Valley Road	1	$1,031	$0
Valve Total	249	$256,719	$0
Well			
Ag Well	1	$183,085	$0
Wellfield Well 2	1	$183,085	$0
Wellfield Well 4	1	$183,085	$0
Wells 3	2	$366,170	$0
Well Total	5	$915,425	$0
Water System Asset Total	535	$4,736,495	$0
Outside of Dam Inundation Area Total	745	$15,911,025	$1,590,091
Grand Total	953	$16,975,671	$1,590,091

Source: HVLCSD Dam Inundation Study, HVLCSD GIS

Table E-4 HVLCSD – Assets in DFIRM Flood Zones

Asset / Flood Zone	Asset Count	Asset Value	Content Value
1% Annual Chance Flood Hazard			
Zone AE			
Land Asset			
Parcel			
141-611-03	1	$15,000	$0
141-611-07	1	$250,000	$0
141-732-01	1	$9,000	$0
Parcel Total	**3**	**$274,000**	**$0**
Land Asset Total	**3**	**$274,000**	**$0**
General Asset			
Building			
Flood Control Pump Station	1	$52,310	$103,820
Building Total	**1**	**$52,310**	**$103,820**
General Asset Total	**1**	**$52,310**	**$103,820**
Sewer System Asset			
Generator			
Generator - Flood Control Basin	1	$125,544	$0
Generator - Lift Station 1	1	$172,000	$0
Generator - Lift Station 2	1	$62,772	$0
Generator - Lift Station Hardesters	1	$62,772	$0
Generator Total	**4**	**$423,088**	**$0**
Manhole			
(blank)	33	$35,145	$0
Manhole Total	**33**	**$35,145**	**$0**
Sewer Pumps			
Lift Station #1	3	$193,500	$0
Lift Station #2	3	$37,500	$0
Lift Station Hardesters	2	$14,000	$0
Sewer Pumps Total	**8**	**$245,000**	**$0**
Sewer System Asset Total	**45**	**$703,233**	**$0**
Water System Asset			
Hydrant			
(blank)	30	$69,900	$0
Hydrant Total	**30**	**$69,900**	**$0**
Valve			
18190 Fishhook Court	1	$1,031	$0

Asset / Flood Zone	Asset Count	Asset Value	Content Value
18678 Horseshoe Road	1	$1,031	$0
18690 Magnolia Court	1	$1,031	$0
18710 Maple Leaf Court & Mt Meadow North	1	$1,031	$0
18745 Fairway Point	1	$1,031	$0
18755 Glencove Court	1	$1,031	$0
18790 Horseshoe Road	1	$1,031	$0
18838 Dove Court	1	$1,031	$0
18846 Horseshoe Road	1	$1,031	$0
18905 Bear Valley Road	1	$1,031	$0
18941 Mt Meadow South	1	$1,031	$0
19116 Gooselake Court	1	$1,031	$0
19204 Mt Meadow North & Donkey Hill Road	1	$1,031	$0
19575 Mt Meadow South	1	$1,031	$0
19625 Old Creek Road	1	$1,031	$0
19671 Mt Meadow South	1	$1,031	$0
19675 Old Creek Court	1	$1,031	$0
19759 Oak Flat Road	1	$1,031	$0
19767 Mt Meadow South	1	$1,031	$0
19776 Mt Meadow North	1	$1,031	$0
19787 Bear Valley Road	1	$1,031	$0
19840 Mt Meadow South	1	$1,031	$0
19854 Mt Meadow North	1	$1,031	$0
19857 Bear Valley Road	1	$1,031	$0
19857 Mt Meadow South	1	$1,031	$0
19897 Mt Meadow South	1	$1,031	$0
19908 Mt Meadow North	1	$1,031	$0
19944 Mt Meadow North	1	$1,031	$0
19963 Mt Meadow South	1	$1,031	$0
19968 Bear Valley Road	1	$1,031	$0
20191 Gold Flat Court	1	$1,031	$0
Bear Valley Road & Mt Meadow South	1	$1,031	$0
Donkey Hill Road & Mt Meadow North	1	$1,031	$0
Dove Court & Horseshoe Road	1	$1,031	$0
Glencove Court & Horseshoe Road	1	$1,031	$0
Gold Flat Court & Mt Meadow North	1	$1,031	$0
Gooselake Court & Horseshoe Road	1	$1,031	$0
Horseshoe Road & Magnolia Court	1	$1,031	$0

Asset / Flood Zone	Asset Count	Asset Value	Content Value
Magnolia Court & Horseshoe Road	1	$1,031	$0
Mill Pond Road & Mt Meadow South	1	$1,031	$0
Mt Meadow North & Gold Flat	1	$1,031	$0
Mt Meadow South & Bear Valley Road	1	$1,031	$0
Mt Meadow South & Mill Pond Road	1	$1,031	$0
Mt Meadow South & Oak Flat Road	1	$1,031	$0
Mt Meadow South & Old Creek Road	1	$1,031	$0
Mt Meadwo North & Oak Flat Road	1	$1,031	$0
Oak Flat Road & Mt Meadow North	1	$1,031	$0
Oak Flat Road & Mt Meadow South	1	$1,031	$0
Old Creek Court & Mt Meadow South	1	$1,031	$0
Old Creek Road & Mt Meadow South	1	$1,031	$0
Valve Total	**50**	**$51,550**	**$0**
Water System Asset Total	**80**	**$121,450**	**$0**
Zone AE Total	**129**	**$1,150,993**	**$103,820**
Zone AE Floodway			
Sewer System Asset			
Manhole			
(blank)	2	$2,130	$0
Manhole Total	**2**	**$2,130**	**$0**
Sewer System Asset Total	**2**	**$2,130**	**$0**
Zone AE Floodway Total	**2**	**$2,130**	**$0**
Zone AO			
Land Asset			
Parcel			
141-311-25	1	$130,000	$0
Parcel Total	1	$130,000	$0
Land Asset Total	**1**	**$130,000**	**$0**
General Asset			
Building			
Hidden Valley Lake Community Services District	1	$480,342	$285,697
Water Plant	1	$166,346	$487,954
Building Total	**2**	**$646,688**	**$773,651**
General Asset Total	**2**	**$646,688**	**$773,651**
Sewer System Asset			
Manhole			
(blank)	3	$3,195	$0

Asset / Flood Zone	Asset Count	Asset Value	Content Value
Manhole Total	**3**	**$3,195**	**$0**
Sewer System Asset Total	**3**	**$3,195**	**$0**
Water System Asset			
Hydrant			
(blank)	4	$9,320	$0
Hydrant Total	**4**	**$9,320**	**$0**
Pump			
Water Treatment Plant 101	1	$18,200	$0
Water Treatment Plant 102	1	$18,200	$0
Water Treatment Plant 103	1	$18,200	$0
Water Treatment Plant 401	1	$7,300	$0
Water Treatment Plant 402	1	$7,300	$0
Water Treatment Plant 403	1	$17,300	$0
Pump Total	**6**	**$86,500**	**$0**
Tank			
Detention tank	1	$122,405	$0
Tank Total	**1**	**$122,405**	**$0**
Water System Asset Total	**11**	**$218,225**	**$0**
Zone AO Total	**17**	**$998,108**	**$773,651**
1% Annual Chance Flood Hazard Total	**148**	**$2,151,231**	**$877,471**
0.2% Annual Chance Flood Hazard			
Zone X (shaded)			
Sewer System Asset			
Manhole			
(blank)	17	$18,105	$0
Manhole Total	17	$18,105	$0
Sewer System Asset Total	**17**	**$18,105**	**$0**
Water System Asset			
Hydrant			
(blank)	9	$20,970	$0
Hydrant Total	**9**	**$20,970**	**$0**
Pump			
Water Treatment Plant - Well 2 - Wellfield	1	$183,085	$0
Well 3	1	$183,085	$0
Wellfield TP Booster	1	$20,000	$0
Wellfield Well 4	1	$183,085	$0
Pump Total	**4**	**$569,255**	**$0**

Asset / Flood Zone	Asset Count	Asset Value	Content Value
Valve			
18112 Deer Hollow Road	1	$1,031	$0
19195 Meadow Court	1	$1,031	$0
19287 Mt Meadow South	1	$1,031	$0
19335 Mt Meadow South	1	$1,031	$0
19385 Old Creek Road	1	$1,031	$0
19407 Mt Meadow South	1	$1,031	$0
19465 Old Creek Road	1	$1,031	$0
19503 Mt Meadow South	1	$1,031	$0
19575 Old Creek Road	1	$1,031	$0
Horseshoe Road & Mt Meadow South	2	$2,062	$0
Meadow Court & Mt Meadow South	1	$1,031	$0
Mt Meadow South & Horseshoe Road	2	$2,062	$0
Mt Meadow South & Meadow Court	1	$1,031	$0
Mt Meadow South & Mt Meadow North	1	$1,031	$0
Mt Medow South & Old Creek Road	1	$1,031	$0
Old Creek Road	1	$1,031	$0
Old Creek Road & Mt Meadow South	1	$1,031	$0
Verde Court & Old Creek Road	1	$1,031	$0
Valve Total	**20**	**$20,620**	**$0**
Well			
Wellfield Well 2	1	$183,085	$0
Wellfield Well 4	1	$183,085	$0
Wells 3	2	$366,170	$0
Well Total	**4**	**$732,340**	**$0**
Water System Asset Total	**37**	**$1,343,185**	**$0**
Zone X (shaded) Total	**54**	**$1,361,290**	**$0**
0.2% Annual Chance Flood Hazard Total	**54**	**$1,361,290**	**$0**
Other Areas			
Zone X (unshaded)			
Land Asset			
Parcel			
014-270-10	1	$900,000	$0
014-280-19	1	$1,000,000	$0
141-033-01	1	$10,000	$0
141-231-02	1	$0	$0
141-411-28	1	$10,000	$0

Asset / Flood Zone	Asset Count	Asset Value	Content Value
Parcel Total	**5**	**$1,920,000**	**$0**
Land Asset Total	**5**	**$1,920,000**	**$0**
General Asset			
Building			
Maintenance Building	1	$684,894	$311,460
Storage	1	$102,557	$0
Waste Water Treatment Plant	1	$5,825,227	$0
Building Total	**3**	**$6,612,678**	**$311,460**
General Asset Total	**3**	**$6,612,678**	**$311,460**
Sewer System Asset			
Generator			
Generator - Lift Station 3	1	$62,772	$0
Generator - WWTP Lab	1	$251,088	$0
Generator Total	**2**	**$313,860**	**$0**
Manhole			
(blank)	67	$71,355	$0
Manhole Total	**67**	**$71,355**	**$0**
Sewer Pumps			
400s	2	$13,800	$0
500s	4	$4,156	$0
600s	2	$33,600	$0
700s	2	$17,000	$0
800s	2	$21,500	$0
Lift Station #3	3	$37,500	$0
Sewer Pumps Total	**15**	**$127,556**	**$0**
Sewer System Asset Total	**84**	**$512,771**	**$0**
Water System Asset			
Hydrant			
(blank)	100	$233,000	$0
Hydrant Total	**100**	**$233,000**	**$0**
PRV			
18726 Hidden Valley Road	1	$5,609	$0
19895 Donkey Hill Road	1	$5,609	$0
PRV Total	**2**	**$11,218**	**$0**
Pump			
Ag Well	1	$183,085	$0
Pump Total	**1**	**$183,085**	**$0**

Asset / Flood Zone	Asset Count	Asset Value	Content Value
Valve			
17090 Knollview Drive	1	$1,031	$0
17305 Knollview Drive	1	$1,031	$0
17945 Bunker Road	1	$1,031	$0
18057 Spyglass Road	1	$1,031	$0
18118 Hidden Valley Road	1	$1,031	$0
18121 Spyglass Road	1	$1,031	$0
18126 Fishhook Court	1	$1,031	$0
18126 Sweetwood Court	1	$1,031	$0
18150 Sweetwood Court	1	$1,031	$0
18174 Hidden Valley Road	1	$1,031	$0
18224 Deer Hollow Road	1	$1,031	$0
18249 Spyglass Road	1	$1,031	$0
18272 Hidden Valley Road	1	$1,031	$0
18310 Grizzley Court	1	$1,031	$0
18310 Pinnacle Court	1	$1,031	$0
18374 Hidden Valley Road	1	$1,031	$0
18377 Pinewood Court	1	$1,031	$0
18377 Spyglass Road	1	$1,031	$0
18378 Deer Hollow Road	1	$1,031	$0
18380 Grizzley Court	1	$1,031	$0
18380 Pinnacle Court	1	$1,031	$0
18474 Hidden Valley Road	1	$1,031	$0
18540 Deer Hollow Road	1	$1,031	$0
18553 Spyglass Road	1	$1,031	$0
18572 Hidden Valley Road	1	$1,031	$0
18650 Maple Leaf Court	1	$1,031	$0
18668 Deer Hollow Road	1	$1,031	$0
18670 Hidden Valley Road	1	$1,031	$0
18726 Deer Hill Road & Hidden Valley Road	1	$1,031	$0
18726 Hidden Valley Road	1	$1,031	$0
18729 Spyglass Road	1	$1,031	$0
18820 Timber Point Road	1	$1,031	$0
18828 Deer Hollow Road	1	$1,031	$0
18835 Lynx Court	1	$1,031	$0
18862 Moon Ridge Road	1	$1,031	$0
18873 Spyglass Road	1	$1,031	$0

Asset / Flood Zone	Asset Count	Asset Value	Content Value
18918 Hidden Valley Road	1	$1,031	$0
18924 Deer Hollow Road	1	$1,031	$0
18932 Moon Ridge Road	1	$1,031	$0
18932 Timber Point Road	2	$2,062	$0
18960 Redbud Road	1	$1,031	$0
18965 Spyglass Road	1	$1,031	$0
18966 Hidden Valley Road	1	$1,031	$0
19018 Hidden Valley Road	1	$1,031	$0
19032 Moon Ridge Road	1	$1,031	$0
19049 Spyglass Road	1	$1,031	$0
19056 Redbud Road	1	$1,031	$0
19088 Moon Ridge Road	1	$1,031	$0
19112 Hidden Valley Road	1	$1,031	$0
19151 Sweetwood Court	1	$1,031	$0
19152 Moon Ridge Road	1	$1,031	$0
19172 Moon Ridge Road	1	$1,031	$0
19204 Mt Meadow North	1	$1,031	$0
19276 Mt Meadow North	1	$1,031	$0
19324 Donkey Hill Road	1	$1,031	$0
19360 Mt Meadow North	1	$1,031	$0
19389 Donkey Hill Road	1	$1,031	$0
19398 Park Ridge Road	1	$1,031	$0
19420 Mt Meadow North	1	$1,031	$0
19426 Park Ridge Road	1	$1,031	$0
19440 Park Ridge Road	1	$1,031	$0
19456 Hidden Valley Road	1	$1,031	$0
19456 Mt Meadow North	1	$1,031	$0
19492 Moon Ridge Road	1	$1,031	$0
19524 Park Ridge Drive	1	$1,031	$0
19540 Mt Meadow North	1	$1,031	$0
19552 Mt Meadow North & Powder Horn	1	$1,031	$0
19552 Powder Horn Road	1	$1,031	$0
19614 Mt Meadow North	1	$1,031	$0
19664 Powder Horn Road	1	$1,031	$0
19674 Mt Meadow North	1	$1,031	$0
19686 Mt Meadow North & Fairway Point	1	$1,031	$0
19734 Park Hill Road	1	$1,031	$0

Asset / Flood Zone	Asset Count	Asset Value	Content Value
19767 Donkey Hill Road	1	$1,031	$0
19936 Powder Horn Road	1	$1,031	$0
20019 Jigsaw Road	1	$1,031	$0
20032 Powder Horn Road	1	$1,031	$0
20048 Powder Horn Road	1	$1,031	$0
20144 Powder Horn Road	1	$1,031	$0
20249 Jigsaw Road	1	$1,031	$0
20250 Indian Rock Road	1	$1,031	$0
20297 Siesta Court	1	$1,031	$0
20400 Powder Horn Road	1	$1,031	$0
20402 Powder Horn Road	1	$1,031	$0
20652 Powder Horn Road	1	$1,031	$0
20700 Powder Horn Road	1	$1,031	$0
20796 Powder Horn Road	1	$1,031	$0
20812 Powder Horn Road	1	$1,031	$0
20892 Powder Horn Road	1	$1,031	$0
20972 Powder Horn Road	1	$1,031	$0
21084 Powder Horn Road	1	$1,031	$0
21164 Powder Horn Road	1	$1,031	$0
21212 Mt Meadow North	1	$1,031	$0
21212 Mt Meadow North & Powder Horn	1	$1,031	$0
Bunker Road & Deer Hollow Road	1	$1,031	$0
Bunker Road & Spyglass Road	1	$1,031	$0
Deer Hill & Bunker Road	1	$1,031	$0
Deer Hill Road & Hidden Valley Road	1	$1,031	$0
Deer Hollow Road & Spyglass Road	2	$2,062	$0
Donkey Hill Road	1	$1,031	$0
Donkey Hill Road & Honey Hill	1	$1,031	$0
Fairway Point & Mt Meadow North	1	$1,031	$0
Fishhook Court & Spyglass Road	1	$1,031	$0
Green Point Court & Spyglass Road	1	$1,031	$0
Grizzly Court & Donkey Hill Road	1	$1,031	$0
Heartwood Court & Powder Horn Road	1	$1,031	$0
Hidden Valley Road & Deer Hill Road	1	$1,031	$0
Hidden Valley Road & Spyglass Road	2	$2,062	$0
Honey Hill & Donkey Hill Road	1	$1,031	$0
Huckleberr Court & Hidden Valley Road	1	$1,031	$0

Asset / Flood Zone	Asset Count	Asset Value	Content Value
Indian Rock Road & Powder Horn Road	1	$1,031	$0
Jigsaw Road & Powder Horn	1	$1,031	$0
Jigsaw Road & Powder Horn Road	1	$1,031	$0
Lynx Court & Powder Horn Road	1	$1,031	$0
Moon Hill Court & Moon Ridge Road	1	$1,031	$0
Moon Ridge Road & Redbud Road	2	$2,062	$0
Park Hill Road & Powder Horn Road	1	$1,031	$0
Park Hill Road & Sugarwood Court	1	$1,031	$0
Park Ridge Drive & Pinewood Court	1	$1,031	$0
Park Ridge Drive & Pinnacle Court	2	$2,062	$0
Pinewood Court & Park Ridge Drive	1	$1,031	$0
Pinnacle Court & Park Ridge Drive	2	$2,062	$0
Powder Horn & 21212 Mt Meadow North	1	$1,031	$0
Powder Horn & Donkey Hill Road	1	$1,031	$0
Powder Horn & Jigsaw Road	1	$1,031	$0
Powder Horn Road	1	$1,031	$0
Powder Horn Road & 19552 Mt Meadow North	1	$1,031	$0
Powder Horn Road & Indian Rock Road	1	$1,031	$0
Powder Horn Road & Jigsaw Road	1	$1,031	$0
Powder Horn Road & Park Hill Road	1	$1,031	$0
Powder Horn Road & Timber Point Court	1	$1,031	$0
Redbud Road & Moon Ridge Road	2	$2,062	$0
Rock Ridge Court	1	$1,031	$0
Siesta Court & Powder Horn Road	1	$1,031	$0
Spyglass Road & Bunker Road	1	$1,031	$0
Spyglass Road & Deer Hollow Road	2	$2,062	$0
Spyglass Road & Hidden Valley Road	2	$2,062	$0
Sweetwood Court & Hidden Valley Road	1	$1,031	$0
Timber Point Court & Powder Horn Road	1	$1,031	$0
Yankee Valley & Powder Horn Road	1	$1,031	$0
Yankee Valley Road	1	$1,031	$0
Valve Total	**150**	**$154,650**	**$0**
Well			
Ag Well	1	$183,085	$0
Well Total	**1**	**$183,085**	**$0**
Water System Asset Total	**254**	**$765,038**	**$0**
Zone X (unshaded) Total	**346**	**$9,810,487**	**$311,460**

Asset / Flood Zone	Asset Count	Asset Value	Content Value
Zone D (unmapped)			
Land Asset			
Parcel			
013-060-05	1	$125,000	$0
141-081-27	1	$8,000	$0
141-361-03	1	$5,000	$0
142-113-01	1	$6,000	$0
142-363-23	1	$7,000	$0
142-401-07	1	$5,000	$0
144-011-02	1	$95,000	$0
144-011-04	1	$125,000	$0
144-011-09	1	$65,000	$0
Parcel Total	**9**	**$441,000**	**$0**
Land Asset Total	**9**	**$441,000**	**$0**
General Asset			
Building			
Greenridge Pump Station	1	$131,403	$183,138
Unit 9 Pump Station	1	$52,310	$218,022
Building Total	**2**	**$183,713**	**$401,160**
General Asset Total	**2**	**$183,713**	**$401,160**
Sewer System Asset			
Generator			
Generator - Lift Station 4	1	$104,620	$0
Generator - Lift Station 5	1	$62,772	$0
Generator - Lift Station 6	1	$62,772	$0
Generator - Lift Station 7	1	$62,772	$0
Generator Total	**4**	**$292,936**	**$0**
Manhole			
(blank)	96	$102,240	$0
Manhole Total	96	$102,240	$0
Sewer Pumps			
Lift Station #4	3	$37,500	$0
Lift Station #5	3	$52,500	$0
Lift Station #6	3	$37,500	$0
Lift Station #7	2	$13,800	$0
Sewer Pumps Total	11	$141,300	$0
Sewer System Asset Total	**111**	**$536,476**	**$0**

Asset / Flood Zone	Asset Count	Asset Value	Content Value
Water System Asset			
Hydrant			
(blank)	159	$370,470	$0
Hydrant Total	159	$370,470	$0
PRV			
16128 Eagle Rock Road	1	$5,609	$0
16329 Eagle Rock Road	1	$5,609	$0
17028 Spruce Grove Road	1	$5,609	$0
17972 Deer Hill Road	1	$5,609	$0
18317 North Shore Drive	1	$5,609	$0
18535 Glenwood Road	1	$5,609	$0
PRV Total	**6**	**$33,654**	**$0**
Pump			
Greenridge 501	1	$10,400	$0
Greenridge 502	1	$10,400	$0
Unit 9 901	1	$11,450	$0
Unit 9 902	1	$11,450	$0
Unit 9 903	1	$11,450	$0
Pump Total	**5**	**$55,150**	**$0**
Tank			
Little Peak storage tank	1	$436,265	$0
Tank 1a	1	$146,468	$0
Tank 1b	1	$174,715	$0
Tank 1c	1	$436,265	$0
Tank 4a	1	$146,468	$0
Tank 4b	1	$436,265	$0
Unit 9 Storage Tank	1	$146,468	$0
Tank Total	**7**	**$1,922,914**	**$0**
Valve			
15509 Little Peak Road	1	$1,031	$0
15542 Plateau Court	1	$1,031	$0
15589 Little Peak Road	1	$1,031	$0
15603 Eagle Rock Road	1	$1,031	$0
15605 Little Peak Road	1	$1,031	$0
15653 Little Peak Road	1	$1,031	$0
15717 Little Peak Road	1	$1,031	$0
15783 Eagle Rock	1	$1,031	$0

Asset / Flood Zone	Asset Count	Asset Value	Content Value
15822 Little Peak Road & Sentinel Court, 09-10-37	1	$1,031	$0
15868 Littel Peak Road	1	$1,031	$0
15989 Eagle Rock Road	1	$1,031	$0
16038 Conestoga Road	1	$1,031	$0
16041 Eagle Rock Road	1	$1,031	$0
16049 Eagle Rock Road	1	$1,031	$0
16116 Conestoga Road	1	$1,031	$0
16121 Eagel Rock Road	1	$1,031	$0
16136 Eagle Rock Road	1	$1,031	$0
16176 Eagle Rock Road	1	$1,031	$0
16184 Eagle Rock Road	1	$1,031	$0
16193 Eagle Rock Road	1	$1,031	$0
16198 Conestoga Road	1	$1,031	$0
16236 Eagle Rock Road	1	$1,031	$0
16273 Firethorn Road	1	$1,031	$0
16284 Eagle Rock Road	1	$1,031	$0
16290 Conestoga Road	1	$1,031	$0
16329 Eagle Rock Road	1	$1,031	$0
16345 Eagle Rock Road	1	$1,031	$0
16369 Eagle Rock Road	1	$1,031	$0
16369 Firethorn Road	1	$1,031	$0
16385 Eagle Rock Road	1	$1,031	$0
16402 Conestoga Road	1	$1,031	$0
16428 Eagle Road Road	1	$1,031	$0
16476 Eagle Rock Road & Deer Hill Road	1	$1,031	$0
16481 Deer Hill Road	1	$1,031	$0
16490 Deer Hill Road	1	$1,031	$0
16506 Cresent Court	1	$1,031	$0
16536 Ridgecreat Court	1	$1,031	$0
16542 Cresent Court	1	$1,031	$0
16578 Hacienda Road	1	$1,031	$0
16602 Round Hill Court	1	$1,031	$0
16910 Knollview Drive	1	$1,031	$0
16950 Knollview Drive	1	$1,031	$0
17030 Knollview Drive	1	$1,031	$0
17221 Knollveiw Drive	1	$1,031	$0
17398 Deer Hill Road	1	$1,031	$0

Asset / Flood Zone	Asset Count	Asset Value	Content Value
17496 Deer Hill Road	1	$1,031	$0
17524 Deer HIll Road & Sweetwater Court	1	$1,031	$0
17706 Deer Hill Road	1	$1,031	$0
17783 Deer Hill Road	1	$1,031	$0
17895 Deer Hill Rad	1	$1,031	$0
17986 Deer Hill Road	1	$1,031	$0
18042 Deer Hill Road	1	$1,031	$0
18170 Bobcat Court	1	$1,031	$0
18215 Tigerwood Court	1	$1,031	$0
18438 Sweetwater Court	1	$1,031	$0
18520 Hacienda Road	1	$1,031	$0
18541 Sentinel Court	1	$1,031	$0
18606 Pine Flat Court & Little Peak Road, 09-10-29	1	$1,031	$0
18616 Pin Oak Court & Eagle Rock Road	1	$1,031	$0
18717 Deer Hill Road	1	$1,031	$0
18794 Deer Hill Road	1	$1,031	$0
19242 Moon Ridge Road	1	$1,031	$0
19336 Moon Ridge Road	1	$1,031	$0
19464 Picture Point Court	1	$1,031	$0
19481 Picture Point Court	1	$1,031	$0
19571 Donkey Hill Road	1	$1,031	$0
19608 Park Ridge Drive	1	$1,031	$0
19655 Donkey Hill Road	1	$1,031	$0
Bobcat Court & Donkey Hill Road	1	$1,031	$0
Boxwood Court & Firethorn Road	1	$1,031	$0
Conestoga Road	2	$2,062	$0
Conestoga Road & Deer Hill Road	1	$1,031	$0
Conestogar Road & Firethorn Road	1	$1,031	$0
Cresent Court	1	$1,031	$0
Cresent Court & Deer Hill Road	1	$1,031	$0
Deer Hill & Crescent Court	1	$1,031	$0
Deer Hill & Marine View Road	1	$1,031	$0
Deer Hill Road	2	$2,062	$0
Deer Hill Road & 16476 Eagle Rock Road	1	$1,031	$0
Deer Hill Road & Firethorn Road	1	$1,031	$0
Donkey Hill & Bobcat Court	1	$1,031	$0
Eagle Rock Road	2	$2,062	$0

Asset / Flood Zone	Asset Count	Asset Value	Content Value
Eagle Rock Road & 18616 Pin Oak Court	1	$1,031	$0
Eagle Rock Road & Little Peak Road	1	$1,031	$0
Firethorn Road & Conestoga Road	1	$1,031	$0
Firethorn Road & Deer Hill Road	1	$1,031	$0
Knollview Drive	1	$1,031	$0
Knollview Drive - Knollview Drive	1	$1,031	$0
Little Peak Road & Eagle Rock Road	1	$1,031	$0
Marine View Road & Deer Hill	1	$1,031	$0
Moon Ridge Road & Vista Point Court	1	$1,031	$0
Picture Point Court & Donkey Hill Road	1	$1,031	$0
Pin Oak Court	1	$1,031	$0
Pine Flat Court	1	$1,031	$0
Plateau Court	1	$1,031	$0
Ridgecreat Court & Deer Hill Road	1	$1,031	$0
Saddleback Court & Little Peak Road	1	$1,031	$0
Sugarbush Court	1	$1,031	$0
Sugarbush Court & Firethorn Road	1	$1,031	$0
Tigerwood Court & Firethorn Road	1	$1,031	$0
Unit 9 Gate	1	$1,031	$0
Vista Point	1	$1,031	$0
Vista Point Court & Moon Ridge Road	1	$1,031	$0
Valve Total	**106**	**$109,286**	**$0**
Water System Asset Total	**283**	**$2,491,474**	**$0**
Zone D (unmapped) Total	**405**	**$3,652,663**	**$401,160**
Other Areas Total	**751**	**$13,463,150**	**$712,620**
Grand Total	**953**	**$16,975,671**	**$1,590,091**

Source: FEMA DFIRM DATE, HVLCSD GIS

Table E-5 HVLCSD – Assets in CAL FIRE FHSZs

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
Very High			
Land Asset			
Parcel			
013-060-05	1	$125,000	$0
141-033-01	1	$10,000	$0
141-081-27	1	$8,000	$0
142-113-01	1	$6,000	$0
142-363-23	1	$7,000	$0
142-401-07	1	$5,000	$0
144-011-02	1	$95,000	$0
144-011-09	1	$65,000	$0
Parcel Total	**8**	**$321,000**	**$0**
Land Asset Total	**8**	**$321,000**	**$0**
General Asset			
Building			
Greenridge Pump Station	1	$131,403	$183,138
Unit 9 Pump Station	1	$52,310	$218,022
Building Total	**2**	**$183,713**	**$401,160**
General Asset Total	**2**	**$183,713**	**$401,160**
Sewer System Asset			
Generator			
Generator - Lift Station 4	1	$104,620	$0
Generator - Lift Station 5	1	$62,772	$0
Generator - Lift Station 6	1	$62,772	$0
Generator - Lift Station 7	1	$62,772	$0
Generator Total	**4**	**$292,936**	**$0**
Manhole			
(blank)	130	$138,450	$0
Manhole Total	**130**	**$138,450**	**$0**
Sewer Pumps			
Lift Station #4	3	$37,500	$0
Lift Station #5	3	$52,500	$0
Lift Station #6	3	$37,500	$0
Lift Station #7	2	$13,800	$0
Sewer Pumps Total	**11**	**$141,300**	**$0**
Sewer System Asset Total	**145**	**$572,686**	**$0**

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
Water System Asset			
Hydrant			
(blank)	181	$421,730	$0
Hydrant Total	**181**	**$421,730**	**$0**
PRV			
16128 Eagle Rock Road	1	$5,609	$0
16329 Eagle Rock Road	1	$5,609	$0
17972 Deer Hill Road	1	$5,609	$0
18317 North Shore Drive	1	$5,609	$0
18535 Glenwood Road	1	$5,609	$0
18726 Hidden Valley Road	1	$5,609	$0
PRV Total	**6**	**$33,654**	**$0**
Pump			
Greenridge 501	1	$10,400	$0
Greenridge 502	1	$10,400	$0
Unit 9 901	1	$11,450	$0
Unit 9 902	1	$11,450	$0
Unit 9 903	1	$11,450	$0
Pump Total	**5**	**$55,150**	**$0**
Tank			
Little Peak storage tank	1	$436,265	$0
Tank 1a	1	$146,468	$0
Tank 1b	1	$174,715	$0
Tank 1c	1	$436,265	$0
Unit 9 Storage Tank	1	$146,468	$0
Tank Total	**5**	**$1,340,181**	**$0**
Valve			
15509 Little Peak Road	1	$1,031	$0
15542 Plateau Court	1	$1,031	$0
15589 Little Peak Road	1	$1,031	$0
15603 Eagle Rock Road	1	$1,031	$0
15605 Little Peak Road	1	$1,031	$0
15653 Little Peak Road	1	$1,031	$0
15717 Little Peak Road	1	$1,031	$0
15783 Eagle Rock	1	$1,031	$0
15822 Little Peak Road & Sentinel Court, 09-10-37	1	$1,031	$0

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
15868 Littel Peak Road	1	$1,031	$0
15989 Eagle Rock Road	1	$1,031	$0
16038 Conestoga Road	1	$1,031	$0
16041 Eagle Rock Road	1	$1,031	$0
16049 Eagle Rock Road	1	$1,031	$0
16116 Conestoga Road	1	$1,031	$0
16121 Eagel Rock Road	1	$1,031	$0
16136 Eagle Rock Road	1	$1,031	$0
16176 Eagle Rock Road	1	$1,031	$0
16184 Eagle Rock Road	1	$1,031	$0
16193 Eagle Rock Road	1	$1,031	$0
16198 Conestoga Road	1	$1,031	$0
16236 Eagle Rock Road	1	$1,031	$0
16273 Firethorn Road	1	$1,031	$0
16284 Eagle Rock Road	1	$1,031	$0
16290 Conestoga Road	1	$1,031	$0
16329 Eagle Rock Road	1	$1,031	$0
16345 Eagle Rock Road	1	$1,031	$0
16369 Eagle Rock Road	1	$1,031	$0
16369 Firethorn Road	1	$1,031	$0
16385 Eagle Rock Road	1	$1,031	$0
16402 Conestoga Road	1	$1,031	$0
16428 Eagle Road Road	1	$1,031	$0
16476 Eagle Rock Road & Deer Hill Road	1	$1,031	$0
16481 Deer Hill Road	1	$1,031	$0
16490 Deer Hill Road	1	$1,031	$0
16506 Cresent Court	1	$1,031	$0
16536 Ridgecreat Court	1	$1,031	$0
16542 Cresent Court	1	$1,031	$0
16578 Hacienda Road	1	$1,031	$0
16602 Round Hill Court	1	$1,031	$0
16910 Knollview Drive	1	$1,031	$0
16950 Knollview Drive	1	$1,031	$0
17030 Knollview Drive	1	$1,031	$0
17090 Knollview Drive	1	$1,031	$0
17221 Knollveiw Drive	1	$1,031	$0
17305 Knollview Drive	1	$1,031	$0

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
17398 Deer Hill Road	1	$1,031	$0
17496 Deer Hill Road	1	$1,031	$0
17524 Deer Hill Road & Sweetwater Court	1	$1,031	$0
17706 Deer Hill Road	1	$1,031	$0
17783 Deer Hill Road	1	$1,031	$0
17895 Deer Hill Rad	1	$1,031	$0
17986 Deer Hill Road	1	$1,031	$0
18042 Deer Hill Road	1	$1,031	$0
18118 Hidden Valley Road	1	$1,031	$0
18215 Tigerwood Court	1	$1,031	$0
18272 Hidden Valley Road	1	$1,031	$0
18374 Hidden Valley Road	1	$1,031	$0
18438 Sweetwater Court	1	$1,031	$0
18474 Hidden Valley Road	1	$1,031	$0
18520 Hacienda Road	1	$1,031	$0
18541 Sentinel Court	1	$1,031	$0
18572 Hidden Valley Road	1	$1,031	$0
18606 Pine Flat Court & Little Peak Road, 09-10-29	1	$1,031	$0
18616 Pin Oak Court & Eagle Rock Road	1	$1,031	$0
18670 Hidden Valley Road	1	$1,031	$0
18717 Deer Hill Road	1	$1,031	$0
18726 Deer Hill Road & Hidden Valley Road	1	$1,031	$0
18726 Hidden Valley Road	1	$1,031	$0
18794 Deer Hill Road	1	$1,031	$0
18862 Moon Ridge Road	1	$1,031	$0
18918 Hidden Valley Road	1	$1,031	$0
18932 Moon Ridge Road	1	$1,031	$0
18960 Redbud Road	1	$1,031	$0
18966 Hidden Valley Road	1	$1,031	$0
19018 Hidden Valley Road	1	$1,031	$0
19032 Moon Ridge Road	1	$1,031	$0
19056 Redbud Road	1	$1,031	$0
19088 Moon Ridge Road	1	$1,031	$0
19152 Moon Ridge Road	1	$1,031	$0
19172 Moon Ridge Road	1	$1,031	$0
19242 Moon Ridge Road	1	$1,031	$0

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
19336 Moon Ridge Road	1	$1,031	$0
19492 Moon Ridge Road	1	$1,031	$0
Boxwood Court & Firethorn Road	1	$1,031	$0
Conestoga Road	2	$2,062	$0
Conestoga Road & Deer Hill Road	1	$1,031	$0
Conestogar Road & Firethorn Road	1	$1,031	$0
Cresent Court	1	$1,031	$0
Cresent Court & Deer Hill Road	1	$1,031	$0
Deer Hill & Crescent Court	1	$1,031	$0
Deer Hill & Marine View Road	1	$1,031	$0
Deer Hill Road	2	$2,062	$0
Deer Hill Road & 16476 Eagle Rock Road	1	$1,031	$0
Deer Hill Road & Firethorn Road	1	$1,031	$0
Deer Hill Road & Hidden Valley Road	1	$1,031	$0
Eagle Rock Road	2	$2,062	$0
Eagle Rock Road & 18616 Pin Oak Court	1	$1,031	$0
Eagle Rock Road & Little Peak Road	1	$1,031	$0
Firethorn Road & Conestoga Road	1	$1,031	$0
Firethorn Road & Deer Hill Road	1	$1,031	$0
Hidden Valley Road & Deer Hill Road	1	$1,031	$0
Hidden Valley Road & Spyglass Road	2	$2,062	$0
Knollview Drive	1	$1,031	$0
Knollview Drive - Knollview Drive	1	$1,031	$0
Little Peak Road & Eagle Rock Road	1	$1,031	$0
Marine View Road & Deer Hill	1	$1,031	$0
Moon Hill Court & Moon Ridge Road	1	$1,031	$0
Moon Ridge Road & Redbud Road	2	$2,062	$0
Moon Ridge Road & Vista Point Court	1	$1,031	$0
Pin Oak Court	1	$1,031	$0
Pine Flat Court	1	$1,031	$0
Plateau Court	1	$1,031	$0
Redbud Road & Moon Ridge Road	2	$2,062	$0
Ridgecreat Court & Deer Hill Road	1	$1,031	$0
Saddleback Court & Little Peak Road	1	$1,031	$0
Spyglass Road & Hidden Valley Road	1	$1,031	$0
Sugarbush Court	1	$1,031	$0
Sugarbush Court & Firethorn Road	1	$1,031	$0

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
Tigerwood Court & Firethorn Road	1	$1,031	$0
Unit 9 Gate	1	$1,031	$0
Vista Point Court & Moon Ridge Road	1	$1,031	$0
Valve Total	**128**	**$131,968**	**$0**
Water System Asset Total	**325**	**$1,982,683**	**$0**
Very High Total	**480**	**$3,060,082**	**$401,160**
High			
Land Asset			
Parcel			
141-411-28	1	$10,000	$0
Parcel Total	**1**	**$10,000**	**$0**
Land Asset Total	**1**	**$10,000**	**$0**
Sewer System Asset			
Manhole			
(blank)	15	$15,975	$0
Manhole Total	**15**	**$15,975**	**$0**
Sewer System Asset Total	**15**	**$15,975**	**$0**
Water System Asset			
Hydrant			
(blank)	41	$95,530	$0
Hydrant Total	**41**	**$95,530**	**$0**
PRV			
17028 Spruce Grove Road	1	$5,609	$0
19895 Donkey Hill Road	1	$5,609	$0
PRV Total	**2**	**$11,218**	**$0**
Tank			
Tank 4a	1	$146,468	$0
Tank 4b	1	$436,265	$0
Tank Total	**2**	**$582,733**	**$0**
Valve			
18057 Spyglass Road	1	$1,031	$0
18170 Bobcat Court	1	$1,031	$0
18174 Hidden Valley Road	1	$1,031	$0
18224 Deer Hollow Road	1	$1,031	$0
18310 Grizzley Court	1	$1,031	$0
18310 Pinnacle Court	1	$1,031	$0
18377 Pinewood Court	1	$1,031	$0

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
18378 Deer Hollow Road	1	$1,031	$0
18380 Grizzley Court	1	$1,031	$0
18380 Pinnacle Court	1	$1,031	$0
18668 Deer Hollow Road	1	$1,031	$0
18828 Deer Hollow Road	1	$1,031	$0
18924 Deer Hollow Road	1	$1,031	$0
19049 Spyglass Road	1	$1,031	$0
19112 Hidden Valley Road	1	$1,031	$0
19151 Sweetwood Court	1	$1,031	$0
19276 Mt Meadow North	1	$1,031	$0
19324 Donkey Hill Road	1	$1,031	$0
19360 Mt Meadow North	1	$1,031	$0
19389 Donkey Hill Road	1	$1,031	$0
19398 Park Ridge Road	1	$1,031	$0
19426 Park Ridge Road	1	$1,031	$0
19440 Park Ridge Road	1	$1,031	$0
19456 Hidden Valley Road	1	$1,031	$0
19456 Mt Meadow North	1	$1,031	$0
19464 Picture Point Court	1	$1,031	$0
19481 Picture Point Court	1	$1,031	$0
19524 Park Ridge Drive	1	$1,031	$0
19552 Powder Horn Road	1	$1,031	$0
19571 Donkey Hill Road	1	$1,031	$0
19608 Park Ridge Drive	1	$1,031	$0
19655 Donkey Hill Road	1	$1,031	$0
19664 Powder Horn Road	1	$1,031	$0
19734 Park Hill Road	1	$1,031	$0
19767 Donkey Hill Road	1	$1,031	$0
19936 Powder Horn Road	1	$1,031	$0
20032 Powder Horn Road	1	$1,031	$0
20048 Powder Horn Road	1	$1,031	$0
20144 Powder Horn Road	1	$1,031	$0
20249 Jigsaw Road	1	$1,031	$0
20250 Indian Rock Road	1	$1,031	$0
Bobcat Court & Donkey Hill Road	1	$1,031	$0
Deer Hollow Road & Spyglass Road	1	$1,031	$0
Donkey Hill & Bobcat Court	1	$1,031	$0

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
Donkey Hill Road	1	$1,031	$0
Donkey Hill Road & Honey Hill	1	$1,031	$0
Grizzly Court & Donkey Hill Road	1	$1,031	$0
Honey Hill & Donkey Hill Road	1	$1,031	$0
Huckleberr Court & Hidden Valley Road	1	$1,031	$0
Indian Rock Road & Powder Horn Road	1	$1,031	$0
Jigsaw Road & Powder Horn	1	$1,031	$0
Park Hill Road & Powder Horn Road	1	$1,031	$0
Park Hill Road & Sugarwood Court	1	$1,031	$0
Park Ridge Drive & Pinewood Court	1	$1,031	$0
Park Ridge Drive & Pinnacle Court	2	$2,062	$0
Picture Point Court & Donkey Hill Road	1	$1,031	$0
Pinewood Court & Park Ridge Drive	1	$1,031	$0
Pinnacle Court & Park Ridge Drive	2	$2,062	$0
Powder Horn & Donkey Hill Road	1	$1,031	$0
Powder Horn & Jigsaw Road	1	$1,031	$0
Powder Horn Road	1	$1,031	$0
Powder Horn Road & Indian Rock Road	1	$1,031	$0
Powder Horn Road & Park Hill Road	1	$1,031	$0
Rock Ridge Court	1	$1,031	$0
Siesta Court & Powder Horn Road	1	$1,031	$0
Spyglass Road & Deer Hollow Road	1	$1,031	$0
Spyglass Road & Hidden Valley Road	1	$1,031	$0
Sweetwood Court & Hidden Valley Road	1	$1,031	$0
Vista Point	1	$1,031	$0
Yankee Valley & Powder Horn Road	1	$1,031	$0
Valve Total	72	$74,232	$0
Water System Asset Total	117	$763,713	$0
High Total	**133**	**$789,688**	**$0**
Moderate			
Land Asset			
Parcel			
014-270-10	1	$900,000	$0
014-280-19	1	$1,000,000	$0
141-231-02	1		
141-311-25	1	$130,000	$0
141-361-03	1	$5,000	$0

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
141-611-03	1	$15,000	$0
141-611-07	1	$250,000	$0
141-732-01	1	$9,000	$0
144-011-04	1	$125,000	$0
Parcel Total	**9**	**$2,434,000**	**$0**
Land Asset Total	**9**	**$2,434,000**	**$0**
General Asset			
Building			
Flood Control Pump Station	1	$52,310	$103,820
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**	**$7,311,676**	**$1,188,931**
General Asset Total	**6**	**$7,311,676**	**$1,188,931**
Sewer System Asset			
Generator			
Generator - Flood Control Basin	1	$125,544	$0
Generator - Lift Station 1	1	$172,000	$0
Generator - Lift Station 2	1	$62,772	$0
Generator - Lift Station 3	1	$62,772	$0
Generator - Lift Station Hardesters	1	$62,772	$0
Generator - WWTP Lab	1	$251,088	$0
Generator Total	**6**	**$736,948**	**$0**
Manhole			
(blank)	73	$77,745	$0
Manhole Total	73	$77,745	$0
Sewer Pumps			
400s	2	$13,800	$0
500s	4	$4,156	$0
600s	2	$33,600	$0
700s	2	$17,000	$0
800s	2	$21,500	$0
Lift Station #1	3	$193,500	$0
Lift Station #2	3	$37,500	$0

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
Lift Station #3	3	$37,500	$0
Lift Station Hardesters	2	$14,000	$0
Sewer Pumps Total	**23**	**$372,556**	**$0**
Sewer System Asset Total	**102**	**$1,187,249**	**$0**
Water System Asset			
Hydrant			
(blank)	80	$186,400	$0
Hydrant Total	**80**	**$186,400**	**$0**
Pump			
Ag Well	1	$183,085	$0
Water Treatment Plant - Well 2 - Wellfield	1	$183,085	$0
Water Treatment Plant 101	1	$18,200	$0
Water Treatment Plant 102	1	$18,200	$0
Water Treatment Plant 103	1	$18,200	$0
Water Treatment Plant 401	1	$7,300	$0
Water Treatment Plant 402	1	$7,300	$0
Water Treatment Plant 403	1	$17,300	$0
Well 3	1	$183,085	$0
Wellfield TP Booster	1	$20,000	$0
Wellfield Well 4	1	$183,085	$0
Pump Total	**11**	**$838,840**	**$0**
Tank			
Detention tank	1	$122,405	$0
Tank Total	1	$122,405	$0
Valve			
17945 Bunker Road	1	$1,031	$0
18112 Deer Hollow Road	1	$1,031	$0
18121 Spyglass Road	1	$1,031	$0
18126 Fishhook Court	1	$1,031	$0
18126 Sweetwood Court	1	$1,031	$0
18150 Sweetwood Court	1	$1,031	$0
18190 Fishhook Court	1	$1,031	$0
18249 Spyglass Road	1	$1,031	$0
18377 Spyglass Road	1	$1,031	$0
18540 Deer Hollow Road	1	$1,031	$0
18553 Spyglass Road	1	$1,031	$0
18650 Maple Leaf Court	1	$1,031	$0

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
18678 Horseshoe Road	1	$1,031	$0
18690 Magnolia Court	1	$1,031	$0
18710 Maple Leaf Court & Mt Meadow North	1	$1,031	$0
18729 Spyglass Road	1	$1,031	$0
18745 Fairway Point	1	$1,031	$0
18755 Glencove Court	1	$1,031	$0
18790 Horseshoe Road	1	$1,031	$0
18820 Timber Point Road	1	$1,031	$0
18835 Lynx Court	1	$1,031	$0
18838 Dove Court	1	$1,031	$0
18846 Horseshoe Road	1	$1,031	$0
18873 Spyglass Road	1	$1,031	$0
18905 Bear Valley Road	1	$1,031	$0
18932 Timber Point Road	2	$2,062	$0
18941 Mt Meadow South	1	$1,031	$0
18965 Spyglass Road	1	$1,031	$0
19116 Gooselake Court	1	$1,031	$0
19195 Meadow Court	1	$1,031	$0
19204 Mt Meadow North	1	$1,031	$0
19204 Mt Meadow North & Donkey Hill Road	1	$1,031	$0
19287 Mt Meadow South	1	$1,031	$0
19335 Mt Meadow South	1	$1,031	$0
19385 Old Creek Road	1	$1,031	$0
19407 Mt Meadow South	1	$1,031	$0
19420 Mt Meadow North	1	$1,031	$0
19465 Old Creek Road	1	$1,031	$0
19503 Mt Meadow South	1	$1,031	$0
19540 Mt Meadow North	1	$1,031	$0
19552 Mt Meadow North & Powder Horn	1	$1,031	$0
19575 Mt Meadow South	1	$1,031	$0
19575 Old Creek Road	1	$1,031	$0
19614 Mt Meadow North	1	$1,031	$0
19625 Old Creek Road	1	$1,031	$0
19671 Mt Meadow South	1	$1,031	$0
19674 Mt Meadow North	1	$1,031	$0
19675 Old Creek Court	1	$1,031	$0
19686 Mt Meadow North & Fairway Point	1	$1,031	$0

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
19759 Oak Flat Road	1	$1,031	$0
19767 Mt Meadow South	1	$1,031	$0
19776 Mt Meadow North	1	$1,031	$0
19787 Bear Valley Road	1	$1,031	$0
19840 Mt Meadow South	1	$1,031	$0
19854 Mt Meadow North	1	$1,031	$0
19857 Bear Valley Road	1	$1,031	$0
19857 Mt Meadow South	1	$1,031	$0
19897 Mt Meadow South	1	$1,031	$0
19908 Mt Meadow North	1	$1,031	$0
19944 Mt Meadow North	1	$1,031	$0
19963 Mt Meadow South	1	$1,031	$0
19968 Bear Valley Road	1	$1,031	$0
20019 Jigsaw Road	1	$1,031	$0
20191 Gold Flat Court	1	$1,031	$0
20297 Siesta Court	1	$1,031	$0
20400 Powder Horn Road	1	$1,031	$0
20402 Powder Horn Road	1	$1,031	$0
20652 Powder Horn Road	1	$1,031	$0
20700 Powder Horn Road	1	$1,031	$0
20796 Powder Horn Road	1	$1,031	$0
20812 Powder Horn Road	1	$1,031	$0
20892 Powder Horn Road	1	$1,031	$0
20972 Powder Horn Road	1	$1,031	$0
21084 Powder Horn Road	1	$1,031	$0
21164 Powder Horn Road	1	$1,031	$0
21212 Mt Meadow North	1	$1,031	$0
21212 Mt Meadow North & Powder Horn	1	$1,031	$0
Bear Valley Road & Mt Meadow South	1	$1,031	$0
Bunker Road & Deer Hollow Road	1	$1,031	$0
Bunker Road & Spyglass Road	1	$1,031	$0
Deer Hill & Bunker Road	1	$1,031	$0
Deer Hollow Road & Spyglass Road	1	$1,031	$0
Donkey Hill Road & Mt Meadow North	1	$1,031	$0
Dove Court & Horseshoe Road	1	$1,031	$0
Fairway Point & Mt Meadow North	1	$1,031	$0
Fishhook Court & Spyglass Road	1	$1,031	$0

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
Glencove Court & Horseshoe Road	1	$1,031	$0
Gold Flat Court & Mt Meadow North	1	$1,031	$0
Gooselake Court & Horseshoe Road	1	$1,031	$0
Green Point Court & Spyglass Road	1	$1,031	$0
Heartwood Court & Powder Horn Road	1	$1,031	$0
Horseshoe Road & Magnolia Court	1	$1,031	$0
Horseshoe Road & Mt Meadow South	2	$2,062	$0
Jigsaw Road & Powder Horn Road	1	$1,031	$0
Lynx Court & Powder Horn Road	1	$1,031	$0
Magnolia Court & Horseshoe Road	1	$1,031	$0
Meadow Court & Mt Meadow South	1	$1,031	$0
Mill Pond Road & Mt Meadow South	1	$1,031	$0
Mt Meadow North & Gold Flat	1	$1,031	$0
Mt Meadow South & Bear Valley Road	1	$1,031	$0
Mt Meadow South & Horseshoe Road	2	$2,062	$0
Mt Meadow South & Meadow Court	1	$1,031	$0
Mt Meadow South & Mill Pond Road	1	$1,031	$0
Mt Meadow South & Mt Meadow North	1	$1,031	$0
Mt Meadow South & Oak Flat Road	1	$1,031	$0
Mt Meadow South & Old Creek Road	1	$1,031	$0
Mt Meadwo North & Oak Flat Road	1	$1,031	$0
Mt Medow South & Old Creek Road	1	$1,031	$0
Oak Flat Road & Mt Meadow North	1	$1,031	$0
Oak Flat Road & Mt Meadow South	1	$1,031	$0
Old Creek Court & Mt Meadow South	1	$1,031	$0
Old Creek Road	1	$1,031	$0
Old Creek Road & Mt Meadow South	2	$2,062	$0
Powder Horn & 21212 Mt Meadow North	1	$1,031	$0
Powder Horn Road & 19552 Mt Meadow North	1	$1,031	$0
Powder Horn Road & Jigsaw Road	1	$1,031	$0
Powder Horn Road & Timber Point Court	1	$1,031	$0
Spyglass Road & Bunker Road	1	$1,031	$0
Spyglass Road & Deer Hollow Road	1	$1,031	$0
Timber Point Court & Powder Horn Road	1	$1,031	$0
Verde Court & Old Creek Road	1	$1,031	$0
Yankee Valley Road	1	$1,031	$0

Asset / Fire Hazard Severity Zone	Asset Count	Asset Value	Content Value
Valve Total	**126**	**$129,906**	**$0**
Well			
Ag Well	1	$183,085	$0
Wellfield Well 2	1	$183,085	$0
Wellfield Well 4	1	$183,085	$0
Wells 3	2	$366,170	$0
Well Total	**5**	**$915,425**	**$0**
Water System Asset Total	**223**	**$2,192,976**	**$0**
Moderate Total	**340**	**$13,125,901**	**$1,188,931**
Grand Total	**953**	**$16,975,671**	**$1,590,091**

Source: CAL FIRE, HVLCSD GIS

Table E-6 HVLCSD Lines Summary

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
		Total			**16,382**	**$2,608,864**
	Gravity	1.0	10	$208	2,520	$524,122
			12	$208	1,805	$375,453
			15	$363	4,553	$1,652,770
		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	557	$50,114
		1.4	6	$90	429	$38,569
		1.5	6	$90	332	$29,849
		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

Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
			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	$22,212

Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
		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	$94,843
		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	$363	28	$10,002
		Total			**88,156**	**$10,533,237**
Sewer Line Total					**104,538**	**$13,142,096**
Reclaimed Water Line	Unknown	(blank)		$208	8,309	$1,728,316
	Unknown Total				**8,309**	**$1,728,316**

Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
Reclaimed Water Line Total					**8,309**	**$1,728,316**
Grand Total					**112,847**	**$14,870,413**

Source: HVLCSD GIS

Table E-7 Lines Dam Inundation Cal OES

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	886	$79,721
			4.0	6	$90	1,284	$115,562
			(blank)	10	$208	491	$102,070
		Force Total				**2,661**	**$297,353**
		Gravity	1.0	12	$208	33	$6,820
				15	$363	3,846	$1,396,020
			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
			1.2	6	$90	390	$35,123
			1.3	6	$90	557	$50,114
			1.4	6	$90	429	$38,569
			1.5	6	$90	332	$29,849
			1.7	6	$90	1	$91
				10	$208	711	$147,879
			2.0	6	$90	1,430	$128,686
				8	$135	2,510	$338,880
			2.1	6	$90	455	$40,972
			2.2	6	$90	2,124	$191,152
				8	$135	1,296	$174,938
			2.2.1	6	$90	599	$53,868
			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	1,312	$118,065
			3.2	6	$90	49	$4,416
			3.3	6	$90	227	$20,442
			4.0	6	$90	376	$33,797
			7.0	6	$90	86	$7,699
			8.0	6	$90	3,291	$296,229
			8.1	4	$70	46	$3,219

Dam Inundation Area	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
		Gravity Total				**26,657**	**$3,991,921**
	Sewer Line Total					**29,318**	**$4,289,274**
	Reclaimed Water Line	Unknown	(blank)		$208	2,005	$417,116
		Unknown Total				**2,005**	**$417,116**
	Reclaimed Water Line Total					**2,005**	**$417,116**
Coyote Creek Total						**31,323**	**$4,706,387**
Outside of Dam Inundation Area	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	11	$995
			4.0	6	$90	1,345	$121,073
			(blank)	10	$208	6,659	$1,385,031
		Force Total				**13,721**	**$2,311,512**
		Gravity	1.0	10	$208	2,520	$524,122
				12	$208	1,772	$368,633
				15	$363	707	$256,750
			1.10	6	$90	598	$53,855
			1.7	6	$90	330	$29,724
			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

Dam Inundation Area	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
			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
			2.1	6	$90	287	$25,820
			2.2.1	6	$90	517	$46,533
			3.0	6	$90	1,249	$112,444
			3.1	6	$90	647	$58,197
			3.1.1	6	$90	204	$18,354
			3.2	6	$90	619	$55,713
			3.3	6	$90	329	$29,619
			4.0	6	$90	330	$29,693
				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	$22,212
			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	$94,843
			6.1	6	$90	1,281	$115,266
			6.1.1	4	$70	156	$10,922
			7.0	6	$90	1,536	$138,260
			7.1	6	$90	1,377	$123,946
			8.0	6	$90	390	$35,066
			8.1	4	$70	699	$48,959

Dam Inundation Area	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
			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	$363	28	$10,002
		Gravity Total				**61,499**	**$6,541,315**
	Sewer Line Total					**75,221**	**$8,852,827**
	Reclaimed Water Line	Unknown	(blank)		$208	6,304	$1,311,201
		Unknown Total				**6,304**	$1,311,201
	Reclaimed Water Line Total					**6,304**	$1,311,201
Outside of Dam Inundation Area Total						**81,524**	**$10,164,026**
Grand Total						**112,847**	**$14,870,413**

Table E-8 Lines – Dam Inundation from HVLCSD Inundation Study

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	2,629	$236,635
			(blank)	10	208	1,590	$330,663
		Force Total				**5,116**	**$648,013**
		Gravity	1.0	12	208	337	$70,053
				15	363	2,650	$962,131
			1.1	10	208	1,397	$290,679
			1.1.1	6	90	184	$16,523
			1.1.3	6	90	554	$49,900
			1.1.4	6	90	908	$81,685
			1.1.4.1	6	90	177	$15,899
			1.2	6	90	390	$35,123
			1.3	6	90	557	$50,114
			1.4	6	90	429	$38,569
			1.5	6	90	332	$29,849
			1.7	6	90	1	$91
				10	208	711	$147,879
			2.0	6	90	1,430	$128,686
				8	135	2,510	$338,880
			2.1	6	90	455	$40,972
			2.2	6	90	2,124	$191,152
				8	135	1,296	$174,938
			2.2.1	6	90	511	$45,988
			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	278	$24,997
			3.1.1	6	90	204	$18,354
			3.2	6	90	668	$60,129
			3.3	6	90	227	$20,442
			4.0	6	90	705	$63,490
				8	135	1,765	$238,278
				10	208	72	$14,899

Dam Inundation Area	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
			4.1	6	90	328	$29,484
			7.0	6	90	86	$7,699
			8.0	6	90	3,417	$307,548
			8.1	4	70	47	$3,286
		Gravity Total				**28,531**	**$3,838,104**
	Sewer Line Total					**33,647**	**$4,486,117**
	Reclaimed Water Line	Unknown	(blank)		208	1,955	$406,648
		Unknown Total				**1,955**	**$406,648**
	Reclaimed Water Line Total					**1,955**	**$406,648**
Coyote Creek Total						**35,602**	**$4,892,763**
Outside of Dam Inundation Area	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
			(blank)	10	208	5,560	$1,156,438
		Force Total				**11,266**	**$1,960,851**
		Gravity	1.0	10	208	2,520	$524,122
				12	208	1,468	$305,400
				15	363	1,903	$690,639
			1.1	10	208	398	$82,826
			1.1.2	10	208	618	$128,466
			1.1.4	6	90	1,103	$99,237
			1.10	6	90	598	$53,855
			1.7	6	90	330	$29,724
			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

Dam Inundation Area	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
				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
			2.1	6	90	287	$25,820
			2.2.1	6	90	605	$54,413
			3.1	6	90	369	$33,200
			3.3	6	90	329	$29,619
			4.0	8	135	2,239	$302,304
			4.2	6	90	324	$29,148
			4.3	6	90	247	$22,212
			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	$94,843
			6.1	6	90	1,281	$115,266
			6.1.1	4	70	156	$10,922
			7.0	6	90	1,536	$138,260
			7.1	6	90	1,377	$123,946
			8.0	6	90	264	$23,748
			8.1	4	70	698	$48,893
			8.1.1	4	70	1,402	$98,157
			9.0	6	90	930	$83,742

Dam Inundation Area	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
				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	363	28	$10,002
		Gravity Total				**59,626**	**$6,695,135**
	Sewer Line Total					**70,892**	**$8,655,986**
	Reclaimed Water Line	Unknown	(blank)		208	6,354	$1,321,668
		Unknown Total				**6,354**	**$1,321,668**
	Reclaimed Water Line Total					**6,354**	**$1,321,668**
Outside of Dam Inundation Area Total						**77,246**	**$9,977,649**
Grand Total						**112,847**	**$14,870,413**

Source: HVLCSD GIS, HVLCSD Dam Inundation Study

Table E-9 Lines – DFIRM Flood Zones

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	4.0	6	$90	2,629	$236,635
				(blank)	10	$208	605	$125,750
			Force Total				**3,234**	**$362,385**
			Gravity	1.0	12	$208	18	$3,791
					15	$363	1,202	$436,362
				1.1	10	$208	1,452	$302,120
				1.1.1	6	$90	184	$16,523
				1.1.3	6	$90	554	$49,900
				1.1.4	6	$90	280	$25,186
				1.2	6	$90	390	$35,123
				1.3	6	$90	557	$50,114
				1.4	6	$90	429	$38,569
				1.7	10	$208	18	$3,689
				2.3	6	$90	169	$15,198
				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	8	$135	3,056	$412,511
					10	$208	72	$14,899
				4.1	6	$90	328	$29,484
				4.2	6	$90	107	$9,625
				4.3	6	$90	219	$19,735
				8.0	6	$90	83	$7,489
			Gravity Total				**13,753**	**$1,887,568**
		Sewer Line Total					**16,987**	**$2,249,953**
		Reclaimed Water Line	Unknown	(blank)		$208	1,467	$305,096
			Unknown Total				**1,467**	**$305,096**
		Reclaimed Water Line Total					**1,467**	**$305,096**
	Zone AE Floodway	Sewer Line	Force	(blank)	10	$208	985	$204,913
			Force Total				**985**	**$204,913**
			Gravity	1.0	15	$363	131	$47,642
				8.0	6	$90	78	$6,999

Flood Hazard Area	Flood Zone	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
			Gravity Total				**209**	**$54,641**
		Sewer Line Total					**1,194**	**$56,641**
		Reclaimed Water Line	Unknown	(blank)		$208	488	$101,553
			Unknown Total				**488**	**$101,553**
		Reclaimed Water Line Total					**488**	**$101,553**
	Zone AO	Sewer Line	Gravity	1.0	12	$208	704	$146,353
				1.7	10	$208	454	$94,391
				2.0	8	$135	294	$39,681
				2.3	6	$90	87	$7,817
				5.0	6	$90	217	$19,531
			Gravity Total				**1,755**	**$307,773**
		Sewer Line Total					**1,755**	**$307,773**
1% Annual Chance Flood Hazard Total							**21,892**	**$3,223,927**
0.2% Annual Chance Flood Hazard	Zone X (shaded)	Sewer Line	Force	(blank)	10	$208	3,194	$664,324
			Force Total				**3,194**	**$664,324**
			Gravity	1.0	15	$363	3,220	$1,168,765
				1.1	10	$208	343	$71,385
				1.1.2	10	$208	618	$128,466
				1.1.4	6	$90	1,730	$155,736
				1.1.4.1	6	$90	177	$15,899
				1.5	6	$90	332	$29,849
				2.2	6	$90	61	$5,521
				4.0	6	$90	606	$54,529
					8	$135	279	$37,609
			Gravity Total				**7,365**	**$1,667,759**
		Sewer Line Total					**10,559**	**$2,332,083**
		Reclaimed Water Line	Unknown	(blank)		$208	3,598	$748,453
			Unknown Total				**3,598**	**$748,453**
		Reclaimed Water Line Total					**3,598**	**$748,453**
0.2% Annual Chance Flood Hazard Total							**14,157**	**$3,080,536**
Other Areas	Zone D (unmapped)	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

Flood Hazard Area	Flood Zone	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
			Force Total				**5,706**	**$804,413**
			Gravity	1.0	10	$208	132	$27,375
				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	222	$19,961
				14.1	6	$90	414	$37,240
				15.0	6	$90	1,253	$112,757
				18.0	6	$90	1,977	$177,936
				18.1	6	$90	2,506	$225,510
				5.0	6	$90	1,612	$145,044
				5.1	6	$90	453	$40,802
				5.1.1	6	$90	258	$23,239
				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

Flood Hazard Area	Flood Zone	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
				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	$363	28	$10,002
			Gravity Total				**35,490**	**$3,400,044**
		Sewer Line Total					**41,196**	**$4,204,457**
	Zone X (unshaded)	Sewer Line	Force	2.0	6	$90	897	$80,715
				(blank)	10	$208	2,366	$492,114
			Force Total				**3,263**	**$572,829**
			Gravity	1.0	10	$208	2,388	$496,747
					12	$208	1,083	$225,309
				1.10	6	$90	598	$53,855
				1.7	6	$90	331	$29,815
					10	$208	239	$49,799
				1.8	6	$90	211	$18,975
				1.9	6	$90	321	$28,874
				14.0	6	$90	482	$43,352
				14.1	6	$90	577	$51,912
				15.0	6	$90	304	$27,385
				2.0	6	$90	1,430	$128,686
					8	$135	2,216	$299,199
				2.1	6	$90	742	$66,792
				2.2	6	$90	2,063	$185,630
					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	578	$52,055
				2.3.1	6	$90	171	$15,407
				4.0	6	$90	100	$8,961

Flood Hazard Area	Flood Zone	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
					8	$135	670	$90,462
				4.2	6	$90	217	$19,523
				4.3	6	$90	28	$2,477
				5.0	6	$90	586	$52,781
				5.2	6	$90	163	$14,637
				6.0	4	$70	1,355	$94,843
				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	3,520	$316,808
				8.1	4	$70	745	$52,178
				8.1.1	4	$70	1,402	$98,157
			Gravity Total				**29,584**	**$3,215,452**
		Sewer Line Total					32,847	**$3,788,281**
		Reclaimed Water Line	Unknown	(blank)		$208	2,756	$573,216
			Unknown Total				**2,756**	**$573,216**
		Reclaimed Water Line Total					**2,756**	**$573,216**
Other Areas Total							**76,798**	**$8,565,950**
Grand Total							**112,847**	**$14,870,413**

Source: HVLCSD GIS, FEMA DFIRM DATE

Table E-10 Lines – CAL FIRE FHSZs

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
			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
		Force Total				**5,706**	**$804,413**
		Gravity	1.0	10	$208	2,071	$430,739
			1.10	6	$90	598	$53,855
			1.9	6	$90	6	$584
			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
			5.0	6	$90	1,304	$117,385

Fire Hazard Severity Zone	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
			5.1	6	$90	453	$40,802
			5.1.1	6	$90	61	$5,454
			5.2	6	$90	163	$14,637
			6.0	4	$70	1,355	$94,843
			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	2,783	$250,425
			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	$363	28	$10,002
		Gravity Total				**49,775**	**$4,841,384**
	Sewer Line Total					**55,481**	**$5,645,797**
Very High Total						**55,481**	**$5,645,797**
High	Sewer Line	Gravity	1.0	10	$208	449	$93,383
				12	$208	1,315	$273,464
				15	$363	920	$333,917

Fire Hazard Severity Zone	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
			1.7	6	$90	117	$10,570
			1.8	6	$90	211	$18,975
			1.9	6	$90	314	$28,290
			2.1	6	$90	116	$10,465
			2.2	6	$90	312	$28,104
				8	$135	386	$52,137
			2.2.1	6	$90	773	$69,538
			2.2.2	6	$90	216	$19,401
			4.0	6	$90	316	$28,466
			5.0	6	$90	498	$44,841
			5.1.1	6	$90	198	$17,785
			8.0	6	$90	888	$79,907
		Gravity Total				**7,029**	**$1,109,243**
	Sewer Line Total					**7,029**	**$1,109,243**
					High Total	7,029	$1,109,242
Moderate	Sewer Line	Force	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				**10,676**	**$2,913,693**
		Gravity	1.0	12	$208	490	$101,988
				15	$363	3,633	$1,318,853
			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
			1.2	6	$90	390	$35,123
			1.3	6	$90	557	$50,114
			1.4	6	$90	429	$38,569
			1.5	6	$90	332	$29,849
			1.7	6	$90	214	$19,245
				10	$208	711	$147,879
			2.0	6	$90	1,430	$128,686
				8	$135	2,510	$338,880

Fire Hazard Severity Zone	Asset	Line Type	Line Name	Diameter (inches)	Value per Linear Foot	Asset Length (ft)	Total Value
			2.1	6	$90	626	$56,327
			2.2	6	$90	1,812	$163,048
				8	$135	910	$122,801
			2.2.1	6	$90	343	$30,863
			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	389	$35,023
				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	$22,212
			5.0	6	$90	613	$55,129
			8.0	6	$90	11	$964
		Gravity Total				**31,352**	**$4,582,607**
	Sewer Line Total					**42,028**	b
	Reclaimed Water Line	Unknown	(blank)		$208	8,309	$1,728,316
		Unknown Total				**8,309**	**$1,728,316**
	Reclaimed Water Line Total					**8,309**	$1,728,316
Moderate Total						**50,337**	**$8,115,374**
Grand Total						**112,847**	**$14,870,413**

Source: HLCSD GIS, CAL FIRE

Appendix F CREAT Tool Report

The CREAT Report for Climate Change and Flooding for the District is on the following pages.

CONTENTS

Background

This report summarizes the potential for reducing consequences that Hidden Valley Lake Community Services District may experience due to current and projected climate conditions. These consequences are the foundation of the risk that climate conditions may pose to those assets defined as vulnerable by the assessor.

System type	Combined Water
Volume treated (Million Gallons per Day)	0.77
Population served	7,500

The focus of this report is the All Potential Measures, defined as the following: This plan includes all defined potential adaptive measures.. In each case, where consequences were assessed, the potential gains of implementing this plan were determined in comparison to current resilience to these same conditions. The ability to protect assets today is described in the Current Measures plan, where those practices and infrastructure protections that currently exist provide some level of consequence reduction in the face of assessed threats.

For each asset, a guided risk assessment was conducted based on the occurrence of multiple scenarios of the same threat; please see Attachment A. For example, the possible consequences to a pump station due to flooding could be assessed across several scenarios of historical or projected changes in precipitation. The time period over which to consider both threats and the ability to implement plans is a critical component of this assessment. The time period selected for this analysis was from 2020 to 2100, which aligns with the 2060 projected climate and sea level data provided in CREAT.

The types of consequences considered by the assessor in the risk assessment summarized in this report were selected based on the types of losses anticipated for those threats and assets being considered;

please see Attachment B. For each type of economic consequence, a monetary scale was selected to define levels of consequence to use during risk assessment.

This report was generated based on the assessment conducted by Alyssa Gordon (agordon@hvlcsd.org).

Utility Information

This assessment covers a specific list of Hidden Valley Lake Community Services District assets and climate-related threats. These assets may include both physical infrastructure and natural resources. The results in this report only consider losses associated with these assets and threats; the scope of conditions can be expanded by revising the assessment in CREAT.

Assets	Floods
Adminstration Bldg - Staff, billing, projects, meetings	✓
Collection And Treated Wastewater Conveyance Systems - Collection system	✓
Scada - PLCs	✓
Distribution System - Water Conveyance	✓
Drinking Water Treatment Plant - Booster pumps, detention tank	✓
Managed Species - Yellow legged frog	✓
Wetlands, Flood Plain - A, AO, AE ; Flood detention basin and equipment	✓
Aquifers - Coyote Valley Basin	✓
Power Supply - Booster pumps, SCADA	✓
Raw And Purchased Water Conveyance System - Wellfield	✓
Streams And Rivers - Putah Creek underflow	✓
Wastewater Treatment Plant - Tertiary treatment, recycled water	✓
Telecommunications / Data Network - desktops, server, modem, router, printers	✓

Adaptation Planning

Utility assets can be protected by adaptive measures that effectively reduce the consequences if a threat were to occur. Both current measures, those already in place, and the potential plan described below, can afford some level of protection. Examples of measures include new infrastructure and changes in operation or practices.

Measures already in place represent the current resilience of a utility to projected changes in climate, even if these measures were implemented for reasons unrelated to climate change. The All Potential Measures plan provides some risk reduction that can be compared with the cost of implementing these adaptive measures. For a comparison of how the selected plan compares to all plans included in this assessment, please see Attachment C.

Current Measures	Relevant Threats
Current Measures – Existing adaptive measures.	Floods
Adaptive Measures	**Total Cost**
Wetlands For Flood Protection - Construct and manage wetlands for flood protection. Flood protection from wetlands can provide many additional benefits where environmental conditions are favorable and property is available. Consider the types of floods expected to ensure wetland area is properly managed to provide flood protection. Additional benefits from wetlands (for example, water quality, species habitat, development trade-off) should be accounted for in costs and benefits and rationale for selecting this measure.	$47,000 - $1,543,000
Wet Repair - Develop procedures and policies for post-flood repairs when inundation persists and repairs are needed in flooded areas. Recognition of vulnerable assets and specialized techniques prior to events is critical to executing needed repairs during events.	$100,000 - $200,000
Weather Forecast Monitoring - Integrate weather forecast monitoring into operations. Experience with responding to current weather conditions and extreme events can be applicable to plans for projected climate conditions. Discerning the limits of your system resilience will reveal areas to address when preparing for climate change.	$10,000 - $20,000
System Performance Models - Build flow and treatment models that accommodate climate change impacts. These models could predict changes in performance or service interruptions and assess responses to damage or changing water quality.	$200,000 - $500,000
Stakeholder Engagement - Develop stakeholder dialogues, relationships, trust and shared decision-making tools to improve responses to events. Stakeholders should include other water-dependent sectors, communities, and government agencies.	$10,000 - $100,000
Source Control Measures - Implement or retrofit source control measures to alter influent flow and quality. Designs should account for projected climate change impacts and should be informed by models and monitoring when practical.	$100,000 - $500,000
Sludge Monitoring - Monitor sludge quality to determine treatment responses to changing influent characteristics. Monitoring can be used in concert with treatment alterations to assess performance and measure the acceptability of sludge for disposal or other uses.	$10,000 - $20,000
Silt Removal - Remove sediment from reservoirs, dams, and spillways to increase storage capacity, limit overtopping risk, and may improve ability to manage cold water and stored water quality. Reducing silt inputs also attains similar benefits and could be done in concert with removal operations.	$5,000,000 - $20,000,000

Sewer / Collection Models - Build and use models for sewage flow, quality, and combined sewer overflow frequency. These models could be directed at the assessment of current capabilities of your utility to handle influent scenarios or as a means to evaluate infrastructure improvements and climate-related changes. These models, linked to hydrologic models, can provide information on storage needs and the potential for flood events.	\$500,000 - \$2,000,000
Reservoir Level And Water Quality Monitoring - Monitor reservoir conditions and incorporate results into overall performance monitoring and assessment. Data collection would support projections of how the reservoir may respond to projected changes in climate.	\$10,000 - \$20,000
Pressure Monitoring - Deploy pressure monitoring in system to assess system performance and detect leakage or other metrics to evaluate efficiency of current practices. This monitoring can be used in preparation for or in concert with the implementation of pressure management.	\$10,000 - \$50,000
Optimized Pumping - Review facilities to optimize power requirements for pumping. As an overall energy efficiency goal, the optimization of power use for pumping requires careful consideration of current practices, simulation of impacts of changes in practices and assessment of capability to refine networks to reduce power needs.	\$10,000 - \$100,000
Municipal Water Re-Use System - Potable - Implement a municipal water re-use system for potable use - either through direct potable re-use or indirect potable re-use. This type of program should be coupled with models to assess the impact of reduced demand to ensure system performance is not detrimentally impacted by program.	\$640,000 - \$1,600,000
Municipal Water Re-Use System - Non-Potable - Implement a municipal water re-use system for non-potable re-use. Typically involves irrigation customers for commercial or municipal uses. Scale of system deployed can vary from isolated portions of service array (for example, identify large irrigation arrays for consumers) or gradually be deployed system-wide. This type of program should be coupled with models to assess the impact of reduced demand to ensure system performance is not detrimentally impacted by program.	\$15,000 - \$100,000
Levee - Construct levees for flood protection. This measure may require property acquisition and environmental costs that limit development. Construction and design must consider projected flood magnitudes and local hydrography that may generate critical points of vulnerability. You may want to consider several designs and locations in assessments.	\$560,000 - \$1,540,000
Leakage Reduction - Reduce leakage from water distribution system. Saves energy and treatment chemicals costs. Detection and remediation of leakage provides opportunities to inspect and limit asset degradation.	\$80,000 - \$160,000

Land Acquisition - Acquire land for expansion or natural resource management. The identification and acquisition of land may include purchases, leasing or trading or mergers of systems. Use for land may include new facilities, ecosystems for water resource protection, terrestrial sequestration, or future development of water resource on land.	$30,000 - $55,000
Insurance Adjustments - Amend insurance policies to align with climate change response strategy (in other words, balance expectations with acceptability of losses). The revision of policies to accommodate climate change could increase financial resilience when information regarding future climate and water resource conditions becomes comparable in certainty as other factors considered in insurance decisions.	$10,000 - $50,000
Infrastructure Monitoring - Deploy monitoring on structures to complement inspections and inform assessments. Additional data from monitoring should improve analyses of climate change impacts on asset life and performance.	$10,000 - $20,000
Infrastructure Inspection - Conduct inspections of structures throughout your system that may be compromised due to climate-related changes in event frequency, duration or magnitude. Inspections should be part of any assessment of failure risk under projected climate conditions.	$10,000 - $50,000
Infiltration Reduction - Reduce infiltration into collection system to reduce excess influent volumes during times where soil is saturated from storms or floods. Effective strategies include replacing laterals, inspection, and monitoring.	$1,500,000 - $7,500,000
Increased Storage - Increase reservoir and raw water storage capacity to insulate supply or buffer system capacity. Storage additions could be designed to handle peaks in service demand or increase baseline capabilities for future climate conditions.	$5,000 - $4,000,000
Increased Capacity - Wastewater / Stormwater - Increase system capacity for increased influent volumes, particularly for combined sewer systems. Constructing storage for diversion of peaks flows is one strategy to increase effective capacity by decreasing peak loads during storms.	$1,000,000 - $3,000,000
Hydrologic Barrier - Develop hydrologic barriers to counter flooding, surges, or sea-level rise. Manipulating natural landscapes to absorb or redirect flooding is often more aesthetic that structures, however, similar property acquisition and environmental costs that limit development may exist. Construction and design must consider projected flood magnitudes and local hydrography that may generate critical points of vulnerability.	$500,000 - $2,000,000
Heat Stress Tests (Wastewater Treatment) - Conduct heat stress testing on biological systems in wastewater treatment to assess tolerance to heat. Subject biological systems or bench-top simulations of systems to elevated temperatures and monitor the impacts of heat on treatment processes.	$10,000 - $50,000

Groundwater Monitoring - Monitor groundwater data for aquifer water level, changes in chemistry and detection of saltwater intrusions and incorporate data into models to predict future supply. Changes in water quality may challenge current treatment practices or limit the use of water resources. Early detection of the changes improves the ability to adjust treatment or switch to other water resources.	$10,000 - $50,000
Groundwater / Aquifer Recharge With Possible Conjunctive Use - Implement ground water recharge to buffer water table and limit withdrawal stress on aquifer sources and decrease episodes of water shortages due to drought or water quality challenges. This process represents a means to reinforce supply with a more diverse set of water resources, or simply storing seasonal excesses of surface water flows in aquifers. Recharge may also provide benefits as a barrier to saltwater intrusion into coastal aquifers. Infrastructure needed for aquifer storage and recovery includes percolation basins or injection wells. Conjunctive use can be managed solely by your system or facilitated at larger scales through stormwater management and other residential or urban policies.	$72,000 - $880,000
Flood Risk Management Plan - Develop phased, adaptive risk management plan for urban flood risks and treatment requirements. These plans should prioritize the ability to limit or prevent damage to facilities and water resources during floods. Integrating observations, process models, and decision frameworks provides a powerful suite of tools to anticipate potential flood scenarios and deal with flood damage.	$100,000 - $200,000
Flood Models - Build integrated flood models for catchments, shorelines (with sea level rise), and urban drainage. Beyond many current hydrologic and flood models, these new models should ensure that perturbations due to climate change can be accommodated in models and that these models include topographic information (GIS) and risk assessment components.	$200,000 - $500,000
Fire Management - Develop, practice, and regularly update management plans to reduce fire risk. Controlled burns, thinning, and weed and invasive plant control help to reduce the frequency and severity of wildfires in fire-prone areas.	$132,000 - $300,000
Erosion and Sediment Control - Use erosion and sediment management in the watershed upstream of the utility in order to reduce sediment load and improve water quality. Projects could include streambank stabilization or stream restoration.	$84,000 - $12,250,000
Energy Efficiency Improvements - Develop energy management plan to evaluate options to reduce power consumption, possibly by upgrading to more efficient equipment or providing backup power sources for the most critical systems in a facility. Plan could identify short-term benefits along with a path towards a net-zero goal. Efficiency measures reduce energy use, costs and vulnerability to electricity shortfalls due to high demand or service disruptions from natural disasters.	$100,000 - $200,000

Emergency Response Plan - Flooding - Develop emergency response and recovery plans as part of overall flooding strategy. These plans should focus on flood frequencies and magnitudes that may become more frequent under projected future climate conditions, especially those that the community has limited experience dealing with. Plans should be coupled with other measures to limit consequences when possible.	$100,000 - $200,000
Effluent Re-Use - Implement sewage effluent re-use at your utility. This action should be conducted following assessment and modeling of the impacts of re-use on operations. Potential costs include the need for infrastructure and the ability to generate and meet demand for the effluent.	$100,000 - $1,000,000
Drought Contingency Plan - Develop or update plans for drought to prepare for possible reductions in water supply. Plans could include the use of alternative water supplies and the adoption of water use restrictions for households, businesses and other water users. These plans should be updated regularly to remain consistent with current operations and assets.	$100,000 - $200,000
Dissolved Oxygen Management - Implement practices to manage dissolved oxygen in water storage, particularly reservoirs. Some water bodies may experience larger areas or greater frequency of hypoxia due to climate change. Measures including sluices, pumps, or injections of gases into these reservoirs could mitigate impacts of low oxygen water.	$500,000 - $1,000,000
Discharge Schedule - Implement discharge schedule in response to altered receiving water and loading conditions. By adjusting the timing of discharge, your utility may be able to expand the range of receiving water conditions that are acceptable for discharge. Be sure to consider the operational capability of your facility to accomplish scheduled discharge, including increased storage and pumping needs.	$10,000 - $100,000
Dam / Flood Control Inspection - Conduct inspections of structures designed to control floods or store water within your system. Inspections should be part of any assessment of failure risk under projected flow conditions.	$10,000 - $100,000
Community Outreach - Use outreach (for example, town halls, sponsored events) to engage customers in decision making and build dialog regarding collaborations necessary to adjust demand for service in response to other priorities.	$10,000 - $100,000
Combined Sewer Overflow Strategies - Implement combined sewer overflow storage and design standards. For systems going through repairs and upgrades, some designs are suited to being retrofit for overflow prevention at the same time. In addition to storage options, flow diversions and isolation of stormwater in areas vulnerable to high peak runoff volumes can be deployed to limit influent volumes to treatment plant.	$100,000 - $500,000

Biosolids Management - Assess and adjust sludge treatment and disposal to meet the needs of agricultural demand and uses for biosolids. These plans should account for climate-related changes in the agricultural sector and transportation of biosolids to users. Needs for process and sludge monitoring should be identified in plans.	$100,000 - $1,000,000
Back-Up Power - Establish alternate or on-site backup power supply or electrical switching equipment.	$375,000 - $1,200,000
Alternate Water Supplies - Develop redundant capabilities and options for water supply including water storage, water sources, treatment plants, intakes, and distribution system. Development or replacement could include entire facility or just critical portions to support operations when damage or loss occurs.	$1,500,000 - $5,000,000
Alternate Wastewater / Stormwater Capabilities - Develop redundant capabilities and options for stormwater and wastewater facilities including treatment plants, discharge points, collection and distribution systems, and receiving water resources. Development or replacement could include entire facility or just critical portions to support operations when damage or loss occurs.	$500,000 - $2,000,000
Total Plan Cost	**$14,480,000 - $71,958,000**

Potential Plan	Relevant Threats
All Potential Measures – This plan includes all defined potential adaptive measures.	
Adaptive Measures	Total Cost
Total Plan Cost	**$0**

Risk Assessment Results

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 relative to the resilience already provided by Current Measures. Total risk, as shown in the tables below, is the sum of assessments made for asset-threat pairs, assigned based on the determination that an asset is imperiled by the assigned threat.

Baseline Scenario

	Current Measures	Selected Plan
Economic Consequences	$1,133,395 - $4,083,250	$165,550 - $2,830,660

Warmer, Wetter and Stormier Future Conditions – 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.

	Current Measures	Selected Plan
Economic Consequences	> $3,477,235	$683,575 - $3,424,390

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

Monetized Risk Reduction			
Plan	**Total Cost**	**Baseline Scenario**	**Warmer, Wetter and Stormier Future Conditions**
All Potential Measures	$0	$310,310 - $1,910,125	> $845,970

Next Steps

This report documents the risk reduction possible from implementing the All Potential Measures adaptation plan at Hidden Valley Lake Community Services District. These results are a useful input into the decision making process, either as metrics supporting the decision to implement or defer taking action or as a documentation of additional data and information needed to make an informed decision.

If results indicate that more information is needed, please consider the following approaches for re-visiting the analysis to refine or improve results:

- Investigate costs of adaptation options to reduce uncertainty in plan costs;
- Review consequence level definitions to narrow ranges based on utility- or region-specific economic factors;
- Expand the number of assets assessed to better characterize risk posed to the system; and
- Collect additional data on the influence of climate on threats being assessed to ensure definitions are well-informed and detailed enough to compare with thresholds for asset damage or loss.

Once CREAT results meet the expectations of decision makers and partners, consider a strategy for integrating risk reduction results into overall planning in a way that ensures climate adaptation can be combined with other priorities to support holistic prioritization and selection of plans. This strategy will be a powerful tool for using risk assessment frameworks, like CREAT, as new threats present themselves and as an increasing number of assets may be vulnerable to these threats.

Beyond the CREAT risk assessment process, there are opportunities to learn from other water utilities through the exchange of information and experience. Sharing the results of your assessment and planning activities with others could benefit similar utilities that may be facing similar challenges. One way to share your progress and lessons learned is to contribute your story to the Adaptation Case Study and Information Exchange Map. This map contains stories from utilities across the Nation, each contributed to help other water sector utilities with their own adaptation planning processes and decision-making.

Attachment A – Scenario Data

At a minimum, each assessment will consider a single ‘Baseline’ scenario, often based on historical climate data provided in CREAT for the utility location. This data is from daily observations of temperature and precipitation from local climate stations (see CREAT Methodology Guide for more details on sources and methods). MIDDLETOWN 4SE was used as the climate station for Hidden Valley Lake Community Services District.

If additional scenarios are listed below, these conditions are also defined based on the same measurements; however, the basis for these scenarios are possible changes in climate, based on climate model data in CREAT or other information or previously determined critical thresholds. The following measurements and data were selected to define the scenarios in this assessment:

Scenarios	Threats
Baseline Scenario	, Floods
Warmer, Wetter and Stormier Future Conditions – 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.	, Floods

Measurement	Baseline	Warmer, Wetter and Stormier Future Conditions
Annual Average Temperature (Fahrenheit)	58.16	--
Annual Degree Change in temperature (Fahrenheit)	--	2.97
Annual Total Precipitation (Inches)	42.65	--
Annual % Change in precipitation (%)	--	19.44
100-year storm event (Inches/24hr)	10.28	--
100-year storm event (Inches/72hr)	14.85	--
100-year storm event (%)	--	26.70
2100 Sea Level Rise* (Inches)	--	0.00

* Baseline relative sea-level rise (SLR) is typically a rate based on vertical land movement (VLM), if available

Attachment B – Consequence Definitions

CREAT provides the user the ability to assess economic consequences across specific categories often used by water utilities to gauge the value of assets. The default names for these categories are:

- Utility Business Impacts,
- Utility/Equipment Damage,
- Source/Receiving Water Impacts, and
- Environmental Impacts.

Each category is assessed on a scale with four levels, each with a range of monetized loss that quantifies the impact of a threat to each vulnerable asset. For Hidden Valley Lake Community Services District, the default values for these monetary losses were provided based on population served, ownership, system type and capacity (see CREAT Methodology Guide for details on data sources and methods).

Economic Consequences

Consequence Category	Low	Medium	High	Very High
Utility Business Impacts – Operating revenue loss evaluated in terms of the magnitude and recurrence of service interruptions. Consequences range from long-term loss of expected operating revenue to minimal potential for any loss.	Minimal potential for loss of revenue or operating income $0 - $123,200	Minor and short-term reductions in expected revenue $123,200 - $246,400	Seasonal or episodic compromise of expected revenue or operating income $246,400 - $369,600	Long-term or significant loss of expected revenue or operating income > $369,600
Utility Equipment Damage – Costs of replacing the service equivalent provided by a utility or piece of equipment evaluated in terms of the magnitude of damage and financial impacts. Consequences range from complete loss of the asset to minimal damage to the equipment.	Minimal damage to equipment $0 - $42,350	Minor damage to equipment $42,350 - $106,260	Significant damage to equipment $106,260 - $255,640	Complete loss of asset > $255,640
Environmental Impacts – Evaluated in terms of environmental damage or loss, aside from water resources, and compliance with environmental regulations. Consequences range from significant environmental damage to minimal impact or damage.	No impact or environmental damage $0 - $7,125	Short-term damage, compliance can be quickly restored $7,125 - $17,925	Persistent environmenta l damage $17,925 - $42,975	Significant environmen tal damage > $42,975
Source/Receiving Water Impacts – Degradation or loss of source or receiving water quality or quantity evaluated in terms of recurrence. Consequences range from long-term compromise to no more than minimal changes to water quality or quantity.	No more than minimal changes to water quality $0 - $30,675	Temporary impact on source water quality or quantity $30,675 - $76,725	Seasonal or episodic compromise of source water quality or quantity $76,725 - $184,050	Long-term compromis e of source water quality or quantity > $184,050

Attachment C – Plan Comparison

As part of deciding which plan provides the most benefit for the investment, the comparison of costs to risk reduction in this report is only one factor. Based on entries by the assessor, the table below summarizes the other factors that may be important in selecting a plan to implement. The plan described in this report is at the top with any other plans considered in this CREAT analysis listed below.

Plan	Total Cost	Energy Impacts	Socio-economic Impacts	Community Public Health Impact
All Potential Measures	$0	BENEFICIAL	NEUTRAL	NEUTRAL

Attachment D – Likelihood Sensitivity

For each scenario, there may be a range of likelihood where the cost of implementing All Potential Measures is comparable to the monetized risk reduction attainable after the potential adaptive measures have been implemented. To explore the influence that scenario likelihood would have on the comparison of costs to benefit, CREAT provides the ranges of likelihood where the intersections of cost and risk reduction represent “break even” points for utilities to consider in their planning. The following table lists the comparison of plan cost to risk reduction for each scenario.

Scenario	Wait and See	Consider Implementing Plan	Implement Plan
Baseline Scenario	0.00% - 0.00%	0.00% - 0.00%	0.00% - 100.00%
Warmer, Wetter and Stormier Future Conditions	0.00% - 0.00%	0.00% - 0.00%	0.00% - 100.00%

The definitions for the possible conclusions following comparison of cost with risk reduction are defined as follows:

- ***Wait and See*** - The range of implementation costs of the selected plan exceed the entire range of possible risk reduction for the threats in the selected scenario. Based on the current assessment, there would be a negative return on investment. It is possible that, based on additional experience and improved data, a later assessment may reduce this range of likelihood and support implementation;

- ***Consider Implementing Plan*** - The range of implementation costs for the selected plan overlap with the range of possible risk reduction for the threats in the selected scenario. Based on the current assessment, there would be an uncertain return on investment. Consider additional benefits from implementing this plan or return to conduct another assessment to support your decision regarding implementation of this plan; and

- ***Implement Plan*** - The entire range of implementation costs of this selected plan is below the entire range of possible risk reduction for the threats in the selected scenario. Based on the current assessment, there would be a positive return on investment. The monetized risk reduction alone provides adequate benefit to support your decision regarding implementation of this plan.

Potential future climate conditions for Hidden Valley Lake Community Services District

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 your utility's location and each future has unique challenges to consider:

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

The Climate Resilience Evaluation and Awareness Tool (CREAT) is a risk assessment and scenario-based planning application for water, wastewater, and combined utilities of all sizes. CREAT provides users with access to basic climate science information and a framework to gauge climate-related risk reduction following the implementation of different adaptation strategies. Results can be incorporated into asset planning and water-resource management efforts to build resilience at their utility.

Please review the Climate Change Scenarios and Data chapter in the CREAT Methodology Guide for more information on the climate science data provided in the tool, which incorporates the same models and overall conclusions in the U.S. Global Change Research program's 2014 National Climate Assessment, as well as methods used to provide projections in CREAT.

For more information on CREAT, visit EPA's Creating Resilient Water Utilities initiative.

Consequences and Assets for Hidden Valley Lake Community Services District

Changing climate conditions may impact utility assets that can have a number of different consequences, including loss of operating revenue and equipment damage, water quality, environmental and health consequences. The assets and consequences listed below were identified by Hidden Valley Lake Community Services District for consideration in assessing the potential impacts from climate change.

Utility Information

System Type:	Combined Water
Volume Treated (Million Gallons per day [MGD]):	0.77
Population Served:	7,500
Financial Condition:	Good

Asset/Threat List for Hidden Valley Lake Community Services District

Asset Name	Assigned Threat
Adminstration Bldg	**Floods**
Collection And Treated Wastewater Conveyance Systems	**Floods**
Scada	**Floods**
Distribution System	**Floods**
Drinking Water Treatment Plant	**Floods**
Managed Species	**Floods**
Wetlands, Flood Plain	**Floods**
Aquifers	**Floods**
Power Supply	**Floods**
Raw And Purchased Water Conveyance System	**Floods**
Streams And Rivers	**Floods**
Wastewater Treatment Plant	**Floods**
Telecommunications / Data Network	**Floods**

Economic Consequence Matrix for Hidden Valley Lake Community Services District

Levels	Utility Business Impacts Operating revenue loss evaluated in terms of the magnitude and recurrence of service interruptions. Consequences range from long-term loss of expected operating revenue to minimal potential for any loss.	Utility Equipment Damage Costs of replacing the service equivalent provided by a utility or piece of equipment evaluated in terms of the magnitude of damage and financial impacts. Consequences range from complete loss of the asset to minimal damage to the equipment.	Environmental Impacts Evaluated in terms of environmental damage or loss, aside from water resources, and compliance with environmental regulations. Consequences range from significant environmental damage to minimal impact or damage.	Source/Receiving Water Impacts Degradation or loss of source or receiving water quality or quantity evaluated in terms of recurrence. Consequences range from long-term compromise to no more than minimal changes to water quality or quantity.
Very High	Long-term or significant loss of expected revenue or operating income	Complete loss of asset	Significant environmental damage	Long-term compromise of source water quality or quantity
	> $369,600	**> $255,640**	**> $42,975**	**> $184,050**
High	Seasonal or episodic compromise of expected revenue or operating income	Significant damage to equipment	Persistent environmental damage	Seasonal or episodic compromise of source water quality or quantity
	$246,400 - $369,600	**$106,260 - $255,640**	**$17,925 - $42,975**	**$76,725 - $184,050**
Medium	Minor and short-term reductions in expected revenue	Minor damage to equipment	Short-term damage, compliance can be quickly restored	Temporary impact on source water quality or quantity
	$123,200 - $246,400	**$42,350 - $106,260**	**$7,125 - $17,925**	**$30,675 - $76,725**
Low	Minimal potential for loss of revenue or operating income	Minimal damage to equipment	No impact or environmental damage	No more than minimal changes to water quality
	$0 - $123,200	**$0 - $42,350**	**$0 - $7,125**	**$0 - $30,675**

Public Health Consequences

Public health impacts are assessed in terms of number of fatalities and number of injuries. CREAT records a Value of Statistical Life (VSL) per fatality and Value of Statistical Injury (VSI) per injury in order to monetize public health impacts.

Value of Statistical Injury (VSI) = **$74,000**
Value of Statistical Injury (VSI) is the value attributed to each injury assessed due to the occurrence of a threat to a particular asset.

Value of Statistical Life (VSL) = **$7,400,000**
Value of Statistical Life (VSL) is the value attributed to each fatality assessed due to the occurrence of a threat to a particular asset.

Scenarios and Threats for Hidden Valley Lake Community Services District

Changing climate conditions are expected to impact a utility's ability to meet its basic goals. The scenarios presented below capture current and future risk profiles for specific threat(s) to Hidden Valley Lake Community Services District. These scenarios will inform decision-making and planning to mitigate potential future climate impacts.

Baseline Scenario - The Baseline Scenario captures historical data for the analysis location to assist in defining Hidden Valley Lake Community Services District's current risk profile.

THREAT(S) IDENTIFIED AND DEFINED FOR THIS SCENARIO:

Floods: High flow events

Definition: Changes in precipitation patterns, particularly greater storm intensities, may generate additional floods associated with high flow events. These flooding events may challenge current infrastructure for water management and flood control. When these protections fail, inundation may damage infrastructure such as water treatment plants, intake facilities and water conveyance and distribution systems. More extreme events can lead to combined sewer overflows and reduce the capacity of sewer systems already impacted by inflow and infiltration.

Warmer, Wetter and Stormier Future Conditions (2060) - The Warmer, Wetter and Stormier Future Conditions uses projected climate data for the utility's time period (2020 – 2100) to assist in defining Hidden Valley Lake Community Services District's potential future risk profile.

THREAT(S) IDENTIFIED AND DEFINED FOR THIS SCENARIO:

Floods: High flow events

Definition: Changes in precipitation patterns, particularly greater storm intensities, may generate additional floods associated with high flow events. These flooding events may challenge current infrastructure for water management and flood control. When these protections fail, inundation may damage infrastructure such as water treatment plants, intake facilities and water conveyance and distribution systems. More extreme events can lead to combined sewer overflows and reduce the capacity of sewer systems already impacted by inflow and infiltration.

Climate Data for Hidden Valley Lake Community Services District

Measurement	Baseline	Warmer, Wetter and Stormier Future Conditions
Annual Average Temperature (Fahrenheit)	58.16	--
Annual Degree Change in temperature (Fahrenheit)	--	2.97
Annual Total Precipitation (Inches)	42.65	--
Annual % Change in precipitation (%)	--	19.44
100-year storm event (Inches/24hr)	10.28	--
100-year storm event (Inches/72hr)	14.85	--
100-year storm event (%)	--	26.70
2100 Sea Level Rise* (Inches)	--	0.00

* Baseline relative sea-level rise (SLR) is typically a rate based on vertical land movement (VLM), if available

Scenarios and Threats Report

The Climate Resilience Evaluation and Awareness Tool (CREAT) is a risk assessment and scenario-based planning application for water, wastewater, and combined utilities of all sizes. CREAT guides utility owners and operators through the development of potential climate-related threat scenarios and assessment of the subsequent risk for their utilities.

CREAT provides users with access to basic climate science information and a framework to gauge climate-related risk reduction following the implementation of different adaptation strategies. Results can be incorporated into asset planning and water-resource management efforts to build resilience at their utility. For more information, go to creat.epa.gov.

This report is based on the assessment conducted by Hidden Valley Lake Community Services District for 19400 Hartmann Rd, Hidden Valley Lake, California 95467 using the MIDDLETOWN 4SE NOAA climate station to generate intense precipitation and number of hot days data.

Resources:
EPA's Creating Resilient Water Utilities initiative – epa.gov/crwu
2014 National Climate Assessment – nca2014.globalchange.gov