Yucaipa Valley Water District

Hazard Mitigation Plan Update

Hazard Mitigation Plan Update

FEMA Approval Date: XX-XX-XXXX

Date of District Board Approval XX-XX-XXXX

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Table of Contents

LIST OF FIGURES

LIST OF TABLES

APPENDICES

SECTION 1. - Introduction

1.0 Purpose of the Plan

Emergencies or disasters may cause death; leave people injured or displaced; cause significant damage to our communities, businesses, public infrastructure and our environment; and cost tremendous amounts in terms of response and recovery dollars and economic loss.

Hazard mitigation reduces or eliminates losses of life and property. In addition, it can protect critical facilities, reduce exposure to liability and minimize service disruption. In the past, emergency management has focused primarily on responding after the disasters. After disasters, repairs and reconstruction are often completed in such a way as to simply restore areas to pre-disaster conditions. Such efforts expedite a return to normalcy; however, the replication of pre-disaster conditions results in a cycle of damage, reconstruction, and repeated damage. Hazard mitigation helps to ensure that such cycles are broken and that post-disaster repairs and reconstruction result in a reduction in hazard vulnerability.

While we cannot prevent disasters from happening, their effects can be reduced or eliminated through awareness efforts, preparedness, and mitigation. For those hazards which cannot be fully mitigated, the District must be prepared to provide efficient and effective response and recovery.

The primary purpose of the updated Local Hazard Mitigation Plan (LHMP) developed by the Yucaipa Valley Water District is to continue to assess the significant natural that may affect the District, evaluate and incorporate ongoing mitigation activities and related programs, determine additional mitigation measures that should be undertaken, and to outline a strategy for implementation of mitigation projects. This plan is an integral part of the District's long-term plan to minimize infrastructure damage from natural disasters. The established mitigation projects provided were identified and reviewed by members of the Districts Safety Planning Committee and lead by Sturdivan Emergency Management Consulting, LLC (SEMC).

District staff, customers, and professionals active in disaster planning, response, and mitigation provided important input in the development of the plan and recommended goals and objectives, mitigation measures, and priorities for actions.

This plan fulfills the requirements of the following programs:

1. Pre-Disaster Mitigation (PDM)
2. Hazard Mitigation Grant Program (HMGP)
3. Flood Mitigation Assistance (FMA) Program
4. NFIP was not used, as YVWD is not a city, but a Special District that does not qualify for NFIP

Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5165, enacted under section 104 of the Disaster Mitigation Act of 2000, P.L. 106-390, provides new and revitalized approaches to mitigation planning. Section 322, in concert with other sections of the Act, provides a significant opportunity to reduce the Nation's disaster losses through mitigation planning and emphasizing the need for State, local and tribal entities to closely coordinate mitigation planning and implementation efforts. A major requirement of the law is the development of local hazard mitigation plans. These plans must be developed and approved by the State of California Governor's Office of Emergency Services (CalOES) and Federal Emergency Management Agency (FEMA) every 5-yeas for the local jurisdictions to be eligible for Hazard Mitigation Grant Program (HMGP) project funding from State and Presidentially declared disasters that occurs after 2001. Local mitigation plans must be reviewed, updated and re-approved by FEMA every five years to remain eligible. This Mitigation Plan has been updated to meet the requirements of the Act and the regulations established by FEMA.

1.1 Community Profile

1.1.1 Physical Setting

Located about 75 miles east of the Pacific Ocean, the District is located in San Bernardino and Riverside County's. The District is located in the upper portion of the Santa Ana Watershed approximately 40 miles west of Palm Springs, 70 miles east of Los Angeles, and 120 miles north of San Diego in a high elevation valley at the base of the San Bernardino Mountain Range. The Yucaipa Valley, including Calimesa is situated in a rural area east of Redlands and north of Beaumont and generally consists of the cities of Yucaipa and Calimesa. The District's current service area encompasses approximately 25,742 acres, or 40 square miles.

The topography of the area is characterized by alluvial highlands, rolling hills separated by deeply entrenched stream beds, namely, the Yucaipa and Wilson Creeks, with a large mesa to the west. The District includes the incorporated cities of Yucaipa and Calimesa which are in San Bernardino and Riverside Counties respectively.

The District's primary service area ranges in elevation from a low elevation of 2,044 feet above sea level to a high elevation of 5,184 feet above sea level. The range in elevation of 3,140 feet within the District requires YVWD to provide water service from 18 separate pressure zones. The sphere of influence expands the acreage to 43,525 acres, or 68 square miles.

The District's service area includes two mutual water companies the Western Heights Water Company and the South Mesa Water Company. The service area of the Western Heights Mutual Water Company is 4.53 square miles (2,902 acres) and the service area of the South Mesa Mutual Water Company is 4.00 square miles (2,561 acres). In the future, the population of Western Heights Mutual Water Company and South Mesa Water Company are expected to have limited growth as compared to the larger service area boundary of the District.

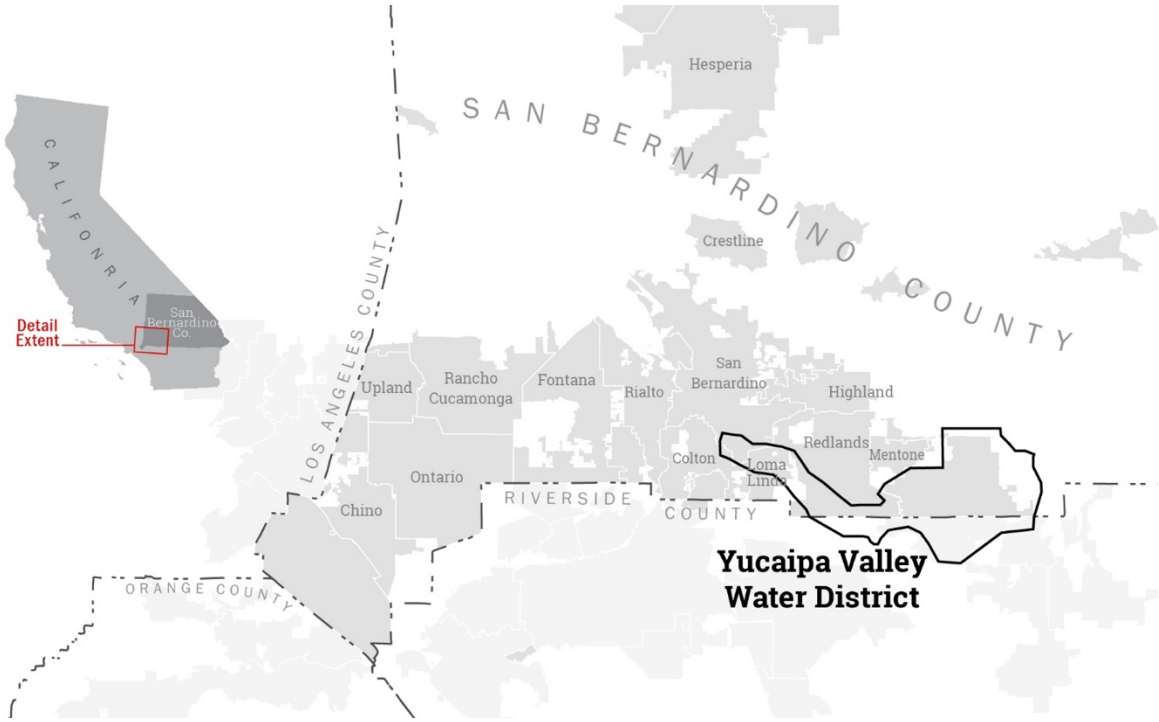


FIGURE 1. Yucaipa Valley Water District County Map.

Temperatures in the District range from an average high of 80ºF and an average low of 53ºF. The record high for the area is 117ºF and the record low is 17ºF. The annual average rainfall for the area is 15.6 inches. The climate is characterized by hot dry summers when temperatures can rise above 100º, and moderate winters, with rare freezing temperatures. A major portion of the precipitation occurs between December and March. Snow in the upper reaches of the area is possible but is not considered an important contributing factor to runoff.

The topography of the area is one of steep hills and broad, steeply sloping valleys. Wilson Creek divides into three main tributaries, with Gateway Wash as the north fork, Oak Glen Creek the south fork, and Wilson Creek located between the two. The central area of Yucaipa is divided into two main drainage systems, which are the area drained by Chicken Springs Wash (a tributary of Wilson Creek), and the area drained by Yucaipa Creek, which is tributary to Wildwood Creek. Wildwood Creek flows westerly through the southern portion of the watershed and joins Wilson Creek. The watershed also includes several additional areas. They are an area tributary to Mill Creek, a large natural area in the easterly portion which is tributary to Little San Gorgonio Creek, a relatively small area adjacent to the southerly limits (tributary to the County Line Channel) whose flows go southwesterly into Riverside County, a relatively small area in the easterly limits along the San Bernardino Freeway (I-10) (and drains into the City of Redlands), and a relatively small area in the northeasterly portion which is tributary to the unincorporated area of Crafton.

1.1.2 History

Yucaipa Valley Water District was formed as part of a reorganization, pursuant to the Reorganization Act of 1965, being Division I of Title 6 of the Government Code of the State

of California. This reorganization consisted of the dissolution of the Calimesa Water Company and formation of Improvement District No. 1 of YVWD as successor-in-interest thereto, and the dissolution of Improvement District "A" of the San Bernardino Valley Municipal Water District and the formation of Improvement District "A" of YVWD as successor-in-interest thereto. On September 14, 1971, the Secretary of State of the State of California certified and declared the formation of the District.

The District operates under the County Water District Law, being Division 12 of the State of California Water Code. Although the immediate function of the District at the time was to provide water service, service to residential, commercial and industrial customers are provided as well. These services include potable water service, drinking water treatment, recycled water service, sewer collection, sewer treatment and salinity elimination.

1.1.3 Demographics

As mentioned above, the Yucaipa Valley Water District serves two counties which divides the two cities it serves. Yucaipa is located in San Bernardino and Calimesa is within Riverside County boundaries. Demographic consistency is represented between the two counties and cities served by the District. San Bernardino County averages 3.68 person per household. Riverside County similarly averages 3.61.

1.1.4 Population

According to the Districts 2015 Urban Water Management Plan, the District served a total population of 53,254: approximately 49.2% male and 50.8% female. The median age was 38 years. Twenty-seven percent of the population was under 19 years and 15.6 % was 65 years and older.

1.1.5 Existing Land Use

Based upon current land use policies of the cities and counties within the boundaries of the District, the District projects that the undeveloped land within its boundaries will continue to be developed. The estimated population of the District in the year 2040 will be approximately 77,851. This includes portions of Yucaipa and Calimesa.

Approximately 49.8% of the land within the boundaries of the District are currently undeveloped, less than 1% of District water sales are to agricultural water users. The existing land uses within the District were initially mapped based on field trips to the area and aerial photos of the District's current development. However, the uses of the land and planning is not a YVWD function, but a function of the City of Yucaipa, Calimesa, San Bernardino, and Riverside Counties.

The District operates with 18 pressure zones due to the range in elevation of 3,140. Operation of the system becomes intricate if dealing with unexpected environmental factors. Within the various land use areas, equal attention was directed to special areas vulnerable to risks:

All facilities listed below are vulnerable to drought, earthquakes, flood and wildfire.

Table 1. Facility Vulnerability List

Facility	Drought	Earthquake	Flood	Wildfire
Administrative Office		✓	✓	
Wastewater Plant	✓	✓	✓	✓
Water Filtration Facility	✓	✓	✓	✓
Wells	✓	✓	✓	✓
Reservoirs	✓	✓	✓	✓
Pump Stations	✓	✓	✓	✓
Lift Stations	✓	✓	✓	✓

1.1.6 Development Trends

Strategically located 75 miles east of Los Angeles, the Yucaipa area offers potential development opportunities. Strong growth is projected to occur for several more decades. The area will remain a highly desirable location for new investments. Local government is business friendly and fiscally sound, there are no utility taxes levied on residents or businesses, and recent improvements to wastewater treatment and water supply systems provide adequate capacity to meet almost any need.

1.1.7 Water Development Trends

Water facilities required to accommodate new development will consist of the following components:

- Source of Supply
- Booster Pumping Plants
- Pipeline Facilities
- Water Storage Reservoirs
- Water Treatment Plants or expansion of current facilities
- Wastewater treatment plants or expansion of current facilities
- Sewer Collection Facilities

Major development will occur mostly in the Calimesa area of the District. Summer wind, Mesa Verde, and Oak Valley Partners. The dual plumbed developments will yield approximately 5,000 more single family dwelling units along with additional commercial retails businesses.

This update will afford added ability to heavily concentrate on strategic development of targeted land use, circulation, air quality, infrastructure and public facilities, and open space and conservation elements.

Project costs for pipeline facilities and water storage reservoirs will be based on costs associated with each development, adjusted to current cost levels. Project costs for booster pumping plants will be based on current cost estimates. Project costs for source of supply facilities will be based on costs provided by the District which reflect actual or projected costs.

Equivalent Dwelling Units (EDUs)

YVWD has experienced significant growth in the last 20 years as with many areas in San Bernardino and Riverside County. Within the last 2 years Yucaipa and Calimesa's growth has increased significantly, after 8-years of the Great recession in the United Sates.

As captured in the 2015 Yucaipa Valley Water District's Urban Water Management Plan, the District projects growth within each category listed above. While water use efficiency is always in the forefront of District goals, development will promote an increase in water use. From 2015 to 2040 the District projects the following increase to the drinking water sectors.

Table 2. YVWD 2015 UWMP

Water Use (AF)	2015	2040	% Increase
Single Family	6,548.6	8,522	30
Multi-Family	1,050.34	1,317	25
Commercial	298	358	20
Construction Water	30.03	34	13
Industrial	50.05	79	58
Institutional	149.61	212	42
Landscape Irrigation	456.88	668	46

SECTION 2. - Plan Adoption

2.1 Adoption by Local Governing Body

The Yucaipa Valley Water District is part of the San Bernardino Operational Area Multi-Jurisdictional Hazard Mitigation Plan.

Pursuant to the mitigation planning regulations, Yucaipa Valley Water District's Plan will be submitted to California Office of Emergency Services (Cal EOS) for review and approval. Cal OES will conduct a review of the Plan in accordance with the Code of Federal Regulations once this review is complete and any revisions are made CalOES will forward the plan to FEMA for another review and revisions, as FEMA requires. CalOES will notify the District when FEMA has approved the final LHMP. The final approval letter of approval will be pending adoption by the District's Board of Directors. The Board of Directors Resolution will be sent to CalOES and CalOES will submit the Resolution to FEMA. SEMC will send a copy of the LHMP and Resolution to the County of San Bernardino Office of Emergency Services and the County of Riverside Office of Emergency Management.

2.2 Promulgation Authority

This Hazard Mitigation Plan will be adopted by the YVWD elected Board of Directors, following approval of the plan by CalOES and FEMA:

Table 3. YVWD Board of Directors.

Board of Director	Division
Christopher Mann (President)	One
Bruce Granlund (Vice President)	Two
Jay Bogh (Director)	Three
Lonni Granlund (Director)	Four
Joyce McIntire (Director)	Five

2.3 Primary Point of Contact

The Point of Contact listed below:

John Wrobel, Public Works Manager
Yucaipa Valley Water District
909-797-5117 (Office)
jwrobel@yvwd.dst.ca.us

Gary Sturdivan, SEMC Consultant
909-658-5974
gsturdivan@me.com

SECTION 3. - Planning Process

This section documents the planning process used to review and compile information that leads to an effective LHMP. A comprehensive description of the planning process informs citizens and other readers how the plan was developed and provides a permanent record of how decisions were reached. These decisions can be understood, reconsidered, replicated, or modified in future updates. An integral part of the planning process is documentation of how the public was engaged throughout the process.

This LHMP was completed with the coordination and involvement of the Yucaipa Valley Water District staff and representatives from the City of Yucaipa and local water agencies. These team members have a vested interest in the performance and resiliency of the YVWD.

San Bernardino County Office of Emergency Services reviewed the plan and the contents of this plan for items that should be included from the County MJHMP. San Bernardino County Fire OES supplied hazard maps that are included in this document.

This section includes a list of the Planning Team Members, a summary of the meetings held, coordination efforts with the surrounding communities/groups, and public outreach efforts.

3.1 Preparing for the Plan

The Planning Team reviewed FEMA's "Hazard Mitigation Plan Crosswalk", the San Bernardino County HMP, and the City of Yucaipa HMP and Yucaipa Valley Water District's past LHMP.

The consultant completed a FEMA Hazard Profile of the area. All the maps included in the Yucaipa Valley Water District's LHMP were revised and are included in the District's LHMP. The Hazard Profile maps were used in the planning meetings to show past flood areas, earthquakes, flash floods and other disasters that have affected the area. Other written documentation of past events was also reviewed. The team discussed the different events that have happened in the community, such as flash flooding, earthquakes, windstorms, power outages and freezing events. Members of the planning team have been longtime residents of the community and have lived through many of these emergency events.

The planning process consisted of:

- Documenting past events
- Incorporating data
- Engaging the Planning Team
- Posting the meeting agendas, meeting minutes and draft LHMP onto the District's website and asking for public input and comments on the planning process
- Sharing information at the monthly Board of Directors meetings
- Conducting public outreach

During the planning process the Planning Team utilized the following plans to gain information on the hazards facing the area and mitigation goals of the County of San Bernardino and Riverside Counties.

The planning process consisted of:

Table 4. Plans Reviewed by Team

Study Plan	**Key Information**
Twentynine Palms Water District, approved LMHP	Layout of an LHMP for water agencies
County of Riverside, Approved LHMP	Hazard Identification, Mitigation measures
San Bernardino County HMP	Mitigation measures and goals, Hazards,
USGS Golden Guardian 2008	Earthquakes, affects, planning
San Bernardino Municipal Water Departments Approved HMP	Land use for area, future projects
2018 California HMP	Goals for the State of California
City of Yucaipa, Approved HMP	Gain information
FEMA Flood Insurance Study for S.B. County	Flood history

Table 5. Financial Resources for future Mitigation projects.

Local	Revenues	Amount
The District's Budgets and Financial Planning Documents	Water sales, new construction	Varies from year to year
FEMA Grants	None	None
State Revolving Funds Draft application	None	None
Prop 1 Funding	None	None
FEMA Mitigation Grants	District has not applied for FEMA funding in the past	As funding and approval are obtained
Future Budget Funds Considerations	Water Sales	Varies as funding is available each year

Drafting the Hazard Mitigation Plan was accomplished in 8 Phases:

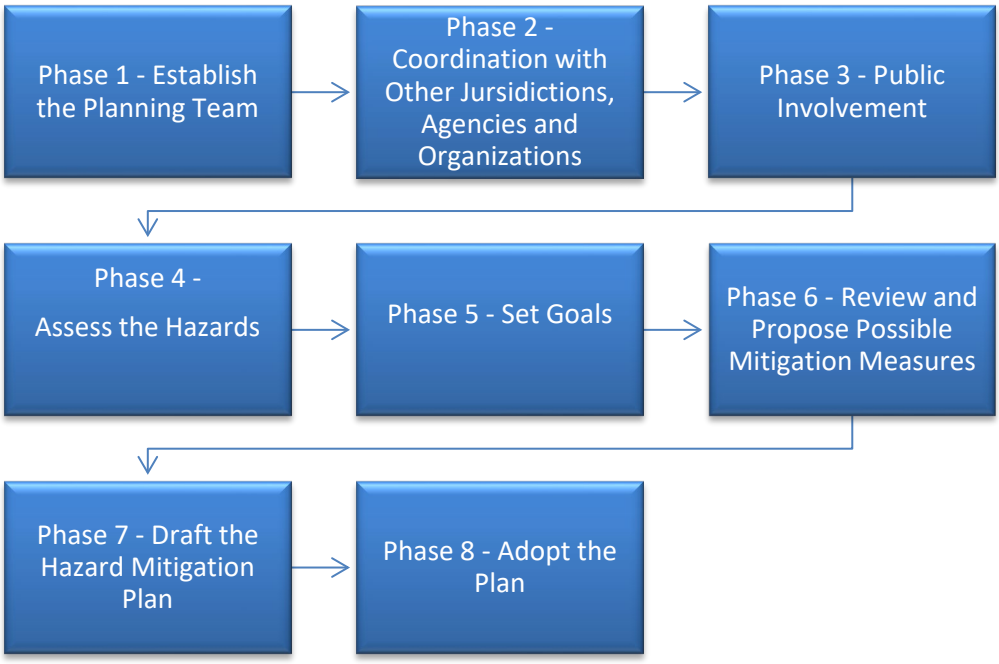


Figure 2. Flow chart for developing a Hazard Mitigation Plan.

3.1.1 The Planning Team

The Planning Team compiled information and reviewed this LHMP under the authorization of the District. The Planning Team members include:

Planning Team Committee members:

Mr. John Wrobel
Public Works Manager
Description of Involvement: Internal Planning Team Member

Ms. Jennifer Ares
Water Resources manager
Description of Involvement: Internal Planning Team Member

Mr. Matt Flordelis
Public Works
Description of Involvement: Internal Planning Team Member

Mr. Matt Hendrickson
Water Treatment Operator
Description of Involvement: Internal Planning Team Member

Ms. Chelsie Fogus
Engineering Technician
Description of Involvement: Internal Planning Team Member

Mr. Todd Madrid
Public Works
Description of Involvement: Internal Planning Team Member

Mr. Gary Sturdivan
CEO/Owner SEMC
Description of Involvement: Internal Planning Team Lead

Mr. Sturdivan, as a consultant to the District, is the Project Team Leader for the LHMP. Mr. Sturdivan develops the agendas for each LHMP meeting, leads the discussions, compiles the meeting minutes and other information for public comment, and prepares draft text for the LHMP. Mr. Sturdivan provides informational updates to the District's Board of Directors and incorporates the Board's comments into the planning process and LHMP. Mr. Sturdivan has extensive knowledge of Mitigation Planning, Grant Funding, and Emergency Management. Mr. Sturdivan worked in the water industry for 25 years.

3.2 Coordination with other jurisdictions, Agencies and Organizations

The Consultant first called the reviewers and asked for their help. The Consultant electronically send the draft document to each reviewer and gave each a week to make comments. Residents were informed and invited to participate in the meeting and come to the Board meetings once a month. The information was posted on the customer's bill each month and listed the link to the Districts Website, where the draft HMP was posted.
The Planning Team participated in monthly meetings to coordinate efforts, provide input, and receive support for the LHMP. The support included receiving technical expertise, resource materials and tools. The District facilitated the LHMP process and provided information to follow FEMA requirements for the program. The tools, resource materials, and other project related information are maintained on a project portal on the District's website www.ihhcwd.com, which allowed access to the information by all participants and the public. All Draft LHMP's were posted on the District's Website and a statement was printed on three months of customer bill, letting the customers know how to get to the plan. Mr. Gary Sturdivan's contact information was on each document for questions and concerns.

3.3 Public Involvement/Outreach

The Planning Team participated in monthly meetings on Zoom to coordinate efforts, provide input, and receive support for the LHMP. The draft LHMP was provided to the public during a 30-day review for comments period, as required by FEMA. The LHMP was posted on the District's Website for 30-day review Period (www.yvwd.dst.ca.us). All comments on the LHMP were sent to the consultant, as the consultants contact email address and phone number are listed on as the contact on the draft LHMP

The Appendices provide details of the public involvement process such as the meeting dates, purpose, agendas, sign-in sheets, and public comments, as well as a screen shot of the webpage showing requests for public participation will be attached to the copy of the LHMP to will be sent to CalOES and FEMA only as these comments are private information.

3.4 Assess the Hazards

A critical component of the LHMP process is to assess the likely hazards that may impact the District's facilities and operations. It is important to have a thorough understanding of these hazards without over-analyzing remote or highly unlikely hazards.

This LHMP has been developed through an extensive review of available information on hazards the District has faced in the past and most likely will face in the future. The Planning Team reviewed and discussed items that have happened in the State of California as well as disasters that have happened in the District's service area and in Southern California. The Team reviewed documents such as engineering drawings, photographs, and available geotechnical and geologic data both from the Internet and outside sources such as FEMA Hazard Mapping, Los Angeles County hazard maps and documents.

The Planning Team completed the assessment of the various hazards in a group setting. The Team members have many years of personal experience working in the local area and many working in a water utility. Team members know the history of past hazardous or emergency events, such as the Hector Mine 7.1 magnitude earthquake of 1999 and the Big Bear 6.5 magnitude earthquake of 1992.

3.5 Set Goals

The Planning Team set the goals for the 2020 LHMP. The team members understand the issues facing the Department with respect to the Department's Mission Statement.

Our mission is Yucaipa Valley Water District is committed to professionally managing the precious water, sewer and recycled water resources of the Yucaipa Valley in a reliable, efficient and cost effective manner in order to provide the finest service to our customers, both present and future.

The process of identifying mitigation goals began with a review and validation of damages caused by specific hazards at similar agencies in the surrounding area. Damages to other agencies outside the area were also considered. In addition, the Planning Team estimated damages using engineering budget estimates for anticipated response and replacement costs. The Planning Team completed an assessment of the likelihood and damages for each identified hazard and discussed whether each of the mitigation goals were valid. This discussion led to the opportunity to identify new goals and objectives for mitigation in the LHMP. From this, the Planning Team determined the best mitigation goals to reduce or avoid long-term vulnerabilities.

3.6 Review and Propose Mitigation Measures

A wide variety of mitigation measures that can be identified to help reduce the impact of the hazards or the severity of damage from hazards was examined. The projects were identified to help ensure the implementation of the Planning Team's goals and objectives. The following categories were used in the review of possible mitigation measures:

1. Public Information and Education - Outreach projects and technical assistance.
2. Preventive Activities - Zoning, building codes, storm water ordinances
3. Structural Projects - Detention basins, reservoirs, road and bridge improvements
4. Property Protection - Acquisition, retrofitting
5. Emergency Services - Warning, sandbagging, road signs/closures, evacuation
6. Natural Resource Protection - Wetlands, protection, best management practices.

Throughout the discussions, the Safety Committee focused on the mitigation aspects recommended by FEMA in STAPLEE (Social, Technical, Administrative, Political, Legal, Economical, and Environmental) to arrive at their opinions. The Planning Team then prioritized

the individual mitigation measures considered the most appropriate for the District. Based on STAPLEE, the Planning Team addressed the following questions to determine mitigation options:

Does the Action:

1. Solve the problem
2. Address Vulnerability Assessment?
3. Reduce the exposure or vulnerability to the highest priority hazard
4. Address multiple hazards?
5. Address more than one (1) Goal/Objective?
6. Benefits equal or exceed costs?

Can the Action:

1. Be implemented with existing funds?
2. Be implemented by existing state or federal grant programs?
3. Be completed within the 5-year life cycle of the LHMP?
4. Be implemented with currently available technologies?

Will the Action:

1. Be accepted by the community?
2. Be supported by community leaders?
3. Adversely impact segments of the population or neighborhoods?
4. Result in legal action such as a lawsuit?
5. Positively or negatively impact the environment?

Is there:

1. Sufficient staffing to undertake the project?
2. Sufficient funds to complete the project?
3. Existing authority to undertake the project?

3.7 Draft Local Hazard Mitigation Plan

The District's consultant led the Planning Team and prepared the draft LHMP with input from the Planning Team, Board of Directors, and the public. The Planning Team reviewed and commented on the draft LHMP, and subsequent changes were made before the LHMP was

finalized and adopted by the Board of Directors. All meeting agendas, meeting minutes, and draft documents were posted on the District's website. Notices were sent to all water customers in the service area stating that all LHMP documents were posted on the website and asked for comments. Each board meeting was opened with a public comment period. The consultant, Gary Sturdivan, addressed all comments and concerns.

The LHMP was reviewed in comparison to the FEMA-designed Review Tool the Review Tool links the federal requirements and identifies the sections in the LHMP where the information can be found and provides a rating as to the level of compliance with the federal regulations.

3.8 Adopt the Plan

After the public review, the draft plan will be submitted to the State of California OES for review. Once the State has approved the LHMP the document will be sent to FEMA by the State. FEMA will provide the District with an "Approval Pending Adoption" letter when the Hazard Mitigation Plan update meets all federal requirements. Upon receipt of this letter, the final plan will be posted on the District's Website for a 20-day public comment period and then submitted to the Yucaipa Valley Water Board of Directors for consideration and adoption. Once adopted, the final Resolution will be submitted to FEMA for incorporation into the Hazard Mitigation Plan and a copy of the resolution will be sent to CalOES and FEMA. A copy of the final LHMP will be delivered to San Bernardino County of Emergency Services and the Riverside County Office of Emergency Management.

SECTION 4. - Risk Assessment

FEMA defines the risk assessment process as a multi-step effort in "Understanding Your Risks: Identifying Hazards and Estimating Losses (FEMA 2001) The risk assessment process provides the foundation for the rest of the mitigation planning process. The four basic components of the risk assessment are: 1) identify hazards; 2) profile hazard events; 3) inventory assets; and 4) estimate losses. This process measures the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural hazards. While many data sources and tools are available at various levels of government, academia, and the private sector, several options are listed below as a starting point for use in conducting a multi-hazard risk assessment. (see figure 3).

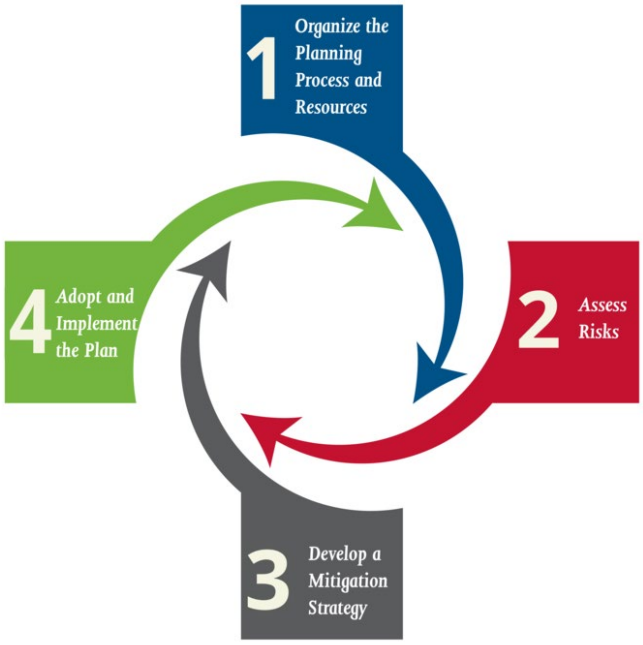


Figure 3. Risk Assessment Process

The risk assessment approach for YVWD is composed of these four steps, and each step is organized in a separate subsection of Chapter 4. Section 4.1 (step 1) includes hazard identification and screening. Even though a particular hazard may not have occurred in recent history in the study area, all hazards that may potentially affect the study area are considered. During this process, all hazards that are unlikely to occur, or for which the risk of damage is accepted as very low are the eliminated from consideration. All reasonable possible hazards affecting the study area are considered and ranked by the Planning Team and stakeholders. Section 4.2 (step 2) provides a profile for each of the significant hazards identified during the screening process. In general, hazard profiling is accomplished by describing hazards in terms of their natural history, magnitude, frequency, location, and probability. Hazards are identified through the collection of historical and anecdotal information, review of existing plans and studies and preparation of hazard maps of the study area. Hazard maps are used to determine the geographical extent of the hazard and define the approximate boundaries of areas of risk. Wherever possible the profile includes a discussion

of local characteristics and possible impacts on the community. Section 4.3 (step 3) discusses the process of creating an inventory of the Districts critical facilities and infrastructure that may be affected by hazard events. This step includes the comprehensive information gathering and prioritization process essential to perform the vulnerability assessment and loss estimation. Section 4.4 (step 4) presents the methodologies and results of loss estimation for the key hazards identified in step 2.

4.1 Hazard Identification

The Planning Team discussed potential hazards and evaluated their probability of occurrence. The following subsections describe this process and the results. The American Water Works J-100 RAMCAP to help identify the hazards and rank the hazards.

4.1.1. Hazard Screening Criteria

The intent of screening the hazards is to help prioritize which hazards create the greatest concern to the Department. A list of the natural hazards to consider was obtained from Federal Emergency Management Agency's State and Local Mitigation Planning How-to Guide: Understanding Your Risks (FEMA 386-1). The Planning Team used the Stafford Act and the California Emergency Service Act and guidance from the American Water Works Association standards, G-440 and J-100 RAMCAP. Each risk was ranked with a 1 – 4: with (1) being a "Highly Likely" event, (2) being "Likely" (3) being "Somewhat Likely" event, and (4) being "Least Likely" event. The Planning Team reviewed each hazard on the list using their experience and historical data pertaining to each hazard and developed the following ranked list.

Hazards:

- Earthquake = 1
- Wildfires = 1
- Climate Change/Drought = 1
- Flooding = 2
- Windstorms = 3
- Dam Inundation = 3

The following natural hazards were considered not to affect or not to be a risk to the utility Department and were given a ranking of 4 or not applicable to the Utility Department's location.

- Volcanoes
- Tsunami
- Landslide

4.1.2. Hazard Assessment Matrix

The Planning Team used a qualitative ranking system for the hazard screening process consisting of generating a high/medium/low style rating for the probability and impact of each screened hazard.

- For **Probability,** the ratings are: Highly Likely, likely, or Somewhat Likely
- For **Impact**, the ratings are: Catastrophic, Critical, or Limited

The screening assessment matrix is used for the District's hazards. The hazards have been placed in the appropriate/corresponding box/cell of the corresponding "Hazard Matrix" based on the Planning Team's collective experience. A subset of this group of hazards is used for the prioritization of the hazards in the following section.

Table 6. Screening Assessment Matrix.

		Impact		
		Catastrophic	**Critical**	**Limited**
Probability	**Highly Likely (1) (75 – 100%)**	Earthquake Wildfires	Climate Change/Drought	
	Likely (2) (50-75%)		Flooding	
	Somewhat Likely (3) (50 – 75%)			Windstorms Dam Inundation

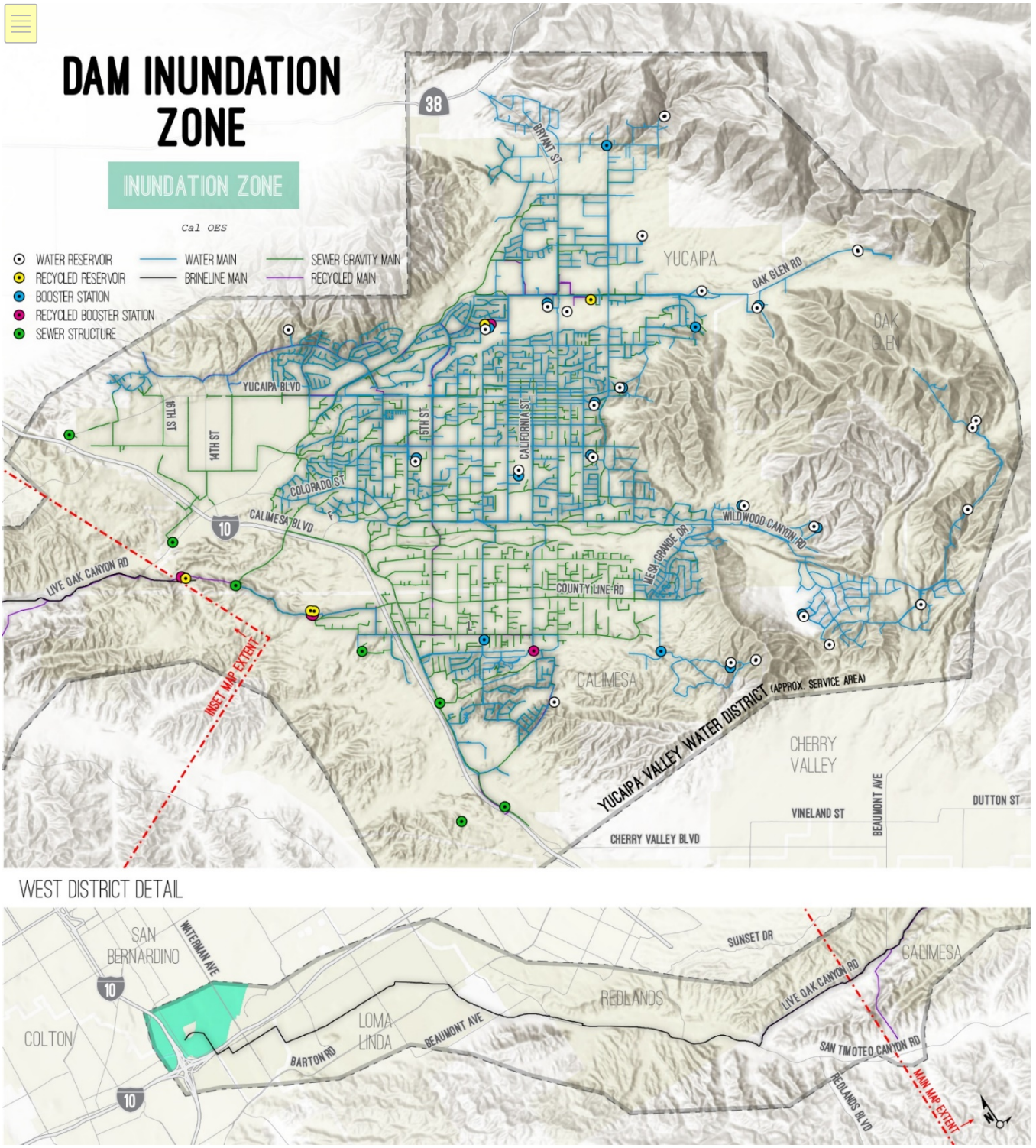


Figure 4. Dam Inundation Zone.

Table 7. Dam Inundation Exposure Point Assets Linear Assets

Infrastructure Type (Linear)	Bear Valley Dam
Brineline Main	0.50
Recycled Main	-
Sewer Gravity Main	-
Water Main	-
TOTAL	**0.50**

4.1.3 Hazard Prioritization

By combining the Hazard Assessment Matrix above showing 1) probability and 2) impact for each screened hazard and indicating the potential for implementing mitigation measures to reduce the risk, a prioritized ranking of the hazards was developed**.**

4.2 Hazard Profile

This plan is an update of the 2005 YVWD Hazard Mitigation Plan (HMP). Although it is an update, this document has been redesigned so that it looks, feels, and reads differently than the original. That is due to several factors; new hazard information has become available that drives new definitions of risk, new capabilities are now available, and the new format will allow readers to more easily understand the content. In addition, the 2005 HMP included several action items that have been completed, creating an opportunity for developing new mitigation strategies.

4.3 Hazard Definition for Earthquake

Probability: **Highly Likely**
Impact: **Catastrophic**

An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates.

Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths and injuries and extensive property damage.

Earthquakes strike suddenly, without warning. Earthquakes can occur at any time of the year and at any time of the day or night. On a yearly basis, 70 to 75 damaging earthquakes occur throughout the world. Estimates of losses from a future earthquake in the United States approach $200 billion.

There are 45 states and territories in the United States at moderate to very high risk from earthquakes, and they are in every region of the country. California experiences the most frequent damaging earthquakes; however, Alaska experiences the greatest number of large earthquakes--most located in uninhabited areas. The largest earthquakes felt in the United States were along the New Madrid Fault in Missouri, where a three-month long series of quakes from 1811 to 1812 included three quakes larger than a magnitude of 8 on the Richter Scale. These earthquakes were felt over the entire Eastern United States, with Missouri, Tennessee, Kentucky, Indiana, Illinois, Ohio, Alabama, Arkansas, and Mississippi experiencing the strongest ground shaking.

4.3.1 Geologic Setting

Yucaipa is located in a tectonically active region near the boundary of the Pacific and American crustal plates. This boundary is generally marked by the San Andreas Fault Zone, which extends through the northeastern portion of the District. The San Andreas system of faults exhibits predominantly right strike-slip movement (i.e., horizontal displacement to the right when viewed across the faults), whereby the Pacific Plate moves relatively northwest with respect to the continent. This active tectonic environment has strongly influenced the geologic and physiographic history of the District.

The valley region of San Bernardino County incorporates portions of two major physiographic provinces delineated by tectonic structures--the Transverse Ranges and Peninsular Ranges provinces. The Transverse Ranges province is a structurally complex region of east-west trending mountain ranges and valleys separated by faults. The east-west orientation of structural and physiographic features in this province is unique in California (and in much of North America) and is in marked contrast to the generally north-south trend of adjacent provinces. The origin of this unique orientation is uncertain, with the most probable explanation related to rotational stress fracturing from strike-slip (horizontal) movement along the San Andreas Fault Zone. The combined effects of movement along the San Andreas Fault Zone and the formation and displacement of transverse (east west) faults have splintered much of the province into a series of small, mobile, crustal blocks. Compressive forces related to displacement along the San Andreas Fault Zone have uplifted a number of these crustal fragments, producing the current topographic profile. These compressive forces are ongoing, with uplift of both the San Gabriel and San Bernardino Mountains continuing up to the present. This has resulted in the level alleviated basins and relatively down dropped crustal blocks which define the current topographic configuration of Yucaipa.

Geologic formations in the District may be grouped into three main categories-alluvium, gneiss/schist, and sandstone. The majority of the District rests on alluvial deposits comprised of gravelly, river-washed material located on the "flatlands" and benches. These areas are

further differentiated into older and younger alluvial deposits. Older deposits consist of alluvial fan conglomerate called "fanglomerate" and other decomposed clay-rich alluvium.

Younger deposits are generally associated with the river wash areas near Oak Glen Creek and Yucaipa Creek. The rugged Crafton Hills and eastern hills are mainly comprised of gneiss/schist formations which include such minerals as quartzite and marble. This metamorphic rock is distinctive in its multiple folded layers and coarse grain. Sandstone comprises the hilly area at the northern District limits and includes the Yucaipa ridge landform to the north of the District. This sandstone formation is composed of lithified (hardened) non-marine conglomerates and some limestone.

Liquefaction is a process whereby water saturated ground loses coherence and takes on a quicksand-like consistency when shaken by a seismic event. This is possible when groundwater is within approximately 40 feet of the surface, faults exist in the vicinity and geologic formations with a granular nature are present. Such a potential does exist in Yucaipa. Groundwater levels have been determined, through the monitoring of wells in the area, to range historically between over 300 feet and less than 40 feet below the surface of the ground. These levels can fluctuate by as much as 50 feet during a single season. Although the groundwater levels have generally dropped since monitoring began early this century, some areas in the vicinity of Oak Glen Creek, Wilson Creek and Wildwood Canyon have had groundwater levels within 40 feet of the surface as recently as 1984. As described in the preceding discussion of geologic factors, faults and granular (alluvium) soil formations do occur in the District. The potential for liquefaction fluctuates with the water table.

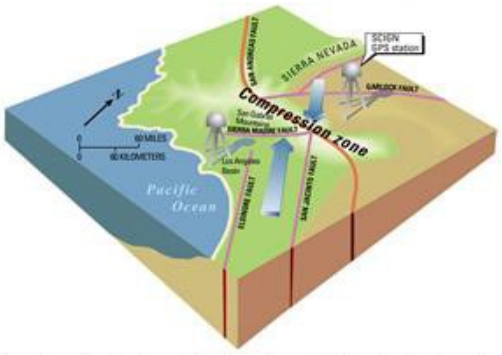
4.3.2 Previous Occurrences for Earthquake

The earthquakes of California are caused by the movement of huge blocks of the earth's crust- the Pacific and North American plates. The Pacific plate is moving northwest, scraping horizontally past North America at a rate of about 50 millimeters (2 inches) per year. About two-thirds of this movement occurs on the San Andreas Fault and some parallel faults- the San Jacinto, Elsinore, and Imperial faults. Over time, these faults produce about half of the significant earthquakes of our region, as well as many minor earthquakes.

The last significant earthquake on the Southern California stretch of the San Andreas Fault was in 1857, and there has not been a rupture of the fault along its southern end from San Bernardino to the Salton Sea since 1690. It is still storing energy for some future earthquake. Southern California has thousands of smaller earthquakes every year. A few may cause damage, but most are not even felt. And most of these are not on the major faults listed above. Earthquakes can occur almost everywhere in the region, on more than 300 additional faults that can cause damaging earthquakes, and countless other small faults.

Of the 119 California earthquakes cited in the list (below), the District is in the area of potential effect of 28 of them. This means that 24 percent of these earthquakes either had the opportunity to produce some damage to the District, or may have produced injuries, fatalities and damages to surrounding communities.

This is mostly due to the "big bend" of the San Andreas fault, from the southern end of the San Joaquin Valley to the eastern end of the San Bernardino mountain (see figure, “Big Bend” at right).



A schematic block model of Southern California showing the motion of the Pacific and North American plates, and the big bend of the San Andreas fault where the plates squeeze together.

Figure 6 - "Big Bend" Where the fault bends, the Pacific and North American plates push into each other, compressing the earth's crust into the mountains of Southern California and creating hundreds of additional faults (many more than shown in the fault map). These faults produce thousands of small earthquakes each year, and the other half of our significant earthquakes. Examples include the 1994 Northridge and 1987 Whittier Narrows earthquakes.

Table 9. California Earthquakes.

Y/M/D	Location	Magnitude
2011 04 05	Sierra El Mayor Earthquake (Northern Baja California)	M 7.2
2011 03 16	Near Pico Rivera, Los Angeles Basin	M 4.4
2011 01 10	Gorda Plate Earthquake	M 6.5
2011 01 10	Offshore Northern California	M 6.5
2009 06 08	San Francisco Bay Area, California	M 3.5
2009 05 18	Greater Los Angeles Area, California	M 4.7
2009 04 30	Northern California	M 3.5
2009 03 30	Northern California	M 4.3
2009 03 08	San Francisco Bay area, California	M 3.5
2009 01 09	Greater Los Angeles Area, California	M 4.5
2008 07 29	Greater Los Angeles area, California	M 5.5
2008 04 30	Northern California	M 5.4
2007 10 31	San Francisco Bay Area, California	M 5.6
2007 08 09	Greater Los Angeles area, California	M 4.4
2007 07 20	San Francisco Bay area, California	M 4.2
2007 07 02	Central California	M 4.3
2007 05 09	Offshore Northern California	M 5.2
2006 10 20	Northern California	M 4.5
2005 09 22	Central California	M 4.7

2005 06 17	Off the Coast of Northern California	M 6.6
2005 06 16	Greater Los Angeles Area, California	M 4.9
2005 06 15	Off the Coast of Northern California	M 7.2
2005 06 12	Southern California	M 5.2
2005 05 06	Central California	M 4.1
2004 09 28	Central California	M 6.0
2004 05 30	Pine Mountain Club, California	M 3.0
2003 12 22	San Simeon, California	M 6.6 Fatalities 2
2003 10 19	near Orinda, California	M 3.5
2003 10 07	near Imperial Beach, California	M 3.6
2003 09 13	near Simi Valley, California	M 3.4
2003 09 05	near Piedmont, California	M 4.0
2003 08 27	Val Verde, California	M 3.9
2003 08 15	Humboldt Hill, California	M 5.3
2003 05 26	Seven Trees, California	M 3.8
2003 05 26	Muir Beach, California	M 3.4
2003 05 25	Santa Rosa, California	M 4.2
2003 05 24	Brawley, California	M 4.0
2003 03 11	Twentynine Palms Base, California	M 4.6
2003 02 22	Big Bear City, California	M 5.2
2003 02 02	Dublin, CA, Swarm	M 4.1
2003 01 25	Keene, California	M 4.7
2002 12 24	Pacifica, California	M 3.6
2002 11 24	Swarm near San Ramon, California	M 3.9
2002 09 03	Yorba Linda, California	M 4.8
2002 06 17	Bayview, California	M 5.3
2002 05 14	Gilroy, California	M 4.9
2002 03 16	near Channel Islands Beach, California	M 4.6
2000 09 03	Napa, California	M 5.0
1999 10 16	Hector Mine, California	M 7.1
1994 09 01	Cape Mendocino, California	M 7.0
1994 01 17	Northridge, California	M 6.7 Fatalities 60
1992 06 28	Landers, California	M 7.3 Fatalities 3
1992 06 28	Big Bear, California	M 6.5
1992 04 25	Cape Mendocino, California	M 7.2
1992 04 23	Joshua Tree	M 6.2
1991 08 17	Honeydew, California	M 7.0
1991 06 28	Sierra Madre, California	M 5.6 Fatalities 2
1989 10 18	Loma Prieta, California	M 6.9 Fatalities 63
1989 08 08	Santa Cruz County, California	M 5.4 Fatalities 1

1987 11 24	Superstition Hills, California	M 6.7
1987 11 24	Superstition Hills, California	M 6.5 Fatalities 2
1987 10 04	Whittier Narrows, California	M 5.6 Fatalities 1
1987 10 01	Whittier Narrows, California	M 5.9 Fatalities 8
1986 07 21	Chalfant Valley, California	M 6.2
1986 07 08	North Palm Springs, California	M 6.1
1984 11 23	Round Valley, California	M 5.8
1984 04 24	Morgan Hill, California	M 6.2
1983 05 02	Coalinga, California	M 6.4
1980 11 08	Humboldt County, California	M 7.2
1980 05 27	Mammoth Lakes, California	M 6.0
1980 05 25	Mammoth Lakes, California	M 6.2
1980 01 27	Livermore, California	M 5.8
1980 01 24	Livermore Valley, California	M 5.8
1979 10 15	Imperial Valley, Mexico - California Border	M 6.4
1979 08 06	Coyote Lake, California	M 5.7
1975 08 01	Oroville, California	M 5.8
1971 02 09	San Fernando, California	M 6.6 Fatalities 65
1969 10 02	Santa Rosa, California	M 5.7 Fatalities 1
1966 09 12	Truckee, California	M 5.9
1966 06 28	Parkfield, California	M 6.1
1957 03 22	Daly City, California	M 5.3 Fatalities 1
1955 10 24	Concord, California	M 5.4 Fatalities 1
1954 12 21	Eureka, California	M 6.5 Fatalities 1
1952 08 22	Kern County, California	M 5.8 Fatalities 2
1952 07 21	Kern County, California	M 7.3 Fatalities 12
1940 05 19	Imperial Valley, California	M 7.1 Fatalities 9
1934 06 08	Parkfield, California	M 6.1
1933 03 11	Long Beach, California	M 6.4 Fatalities 115
1932 06 06	Eureka, California	M 6.4 Fatalities 1
1927 11 04	Lompoc, California	M 7.1
1926 10 22	Monterey Bay, California	M 6.1
1926 06 29	Santa Barbara, California	M 5.5 Fatalities 1
1925 06 29	Santa Barbara, California	M 6.8 Fatalities 13
1923 01 22	Humbolt County, California	M 7.2
1922 03 10	Parkfield, California	M 6.1
1922 01 31	Eureka, California	M 7.3
1918 04 21	San Jacinto, California	M 6.8 Fatalities 1
1915 06 23	Imperial Valley, California	M 6.3 Fatalities 6
1911 07 01	Calaveras fault, California	M 6.5
1906 04 18	San Francisco, California	M 7.8 Fatalities 3000
1901 03 03	Parkfield, California	M 6.4
1899 12 25	San Jacinto, California	M 6.7 Fatalities 6
1899 04 16	Eureka, California	M 7.0
1898 04 15	Mendocino County, California	M 6.8
1898 03 31	Mare Island, California	M 6.3

1897 06 20	Calaveras fault, California	M 6.3
1892 04 21	Winters, California	M 6.4
1892 04 19	Vacaville, California	M 6.4 Fatalities 1
1892 02 24	Imperial Valley, California	M 7.8
1890 02 24	Corralitos, California	M 6.3
1873 11 23	California - Oregon Coast	M 7.3
1872 03 26	Owens Valley, California	M 7.4 Fatalities 27
1868 10 21	Hayward, California	M 6.8 Fatalities 30
1865 10 08	Santa Cruz Mountains, California	M 6.5
1857 01 09	Fort Tejon, California	M 7.9 Fatalities 1
1838 06 09	San Francisco area, California	M 6.8
1836 06 10	South San Francisco Bay region, California	M 6.5
1812 12 21	West of Ventura, California	M 7.1 Fatalities 1
1812 12 08	Southwest of San Bernardino County, California	M 6.9 Fatalities 40

4.3.3 Hazard Summary for Earthquake

The following provides information on the probability of future events. In addition, the data provides an overall summary of the District's vulnerability and impact of each hazard.

The entire geographic area of California is prone to the effects of an earthquake. Figure 7 represents the UCERF probabilities of having a nearby earthquake rupture (within 3 or 4 miles) of magnitude 6.7 or larger in the next 30 years. As shown in the table, the chance of having such an event somewhere in California exceeds 99%. The 30-year probability of an even more powerful quake of magnitude 7.5 or larger is about 46%. **Figure 7.** Earthquake Probability Mapping

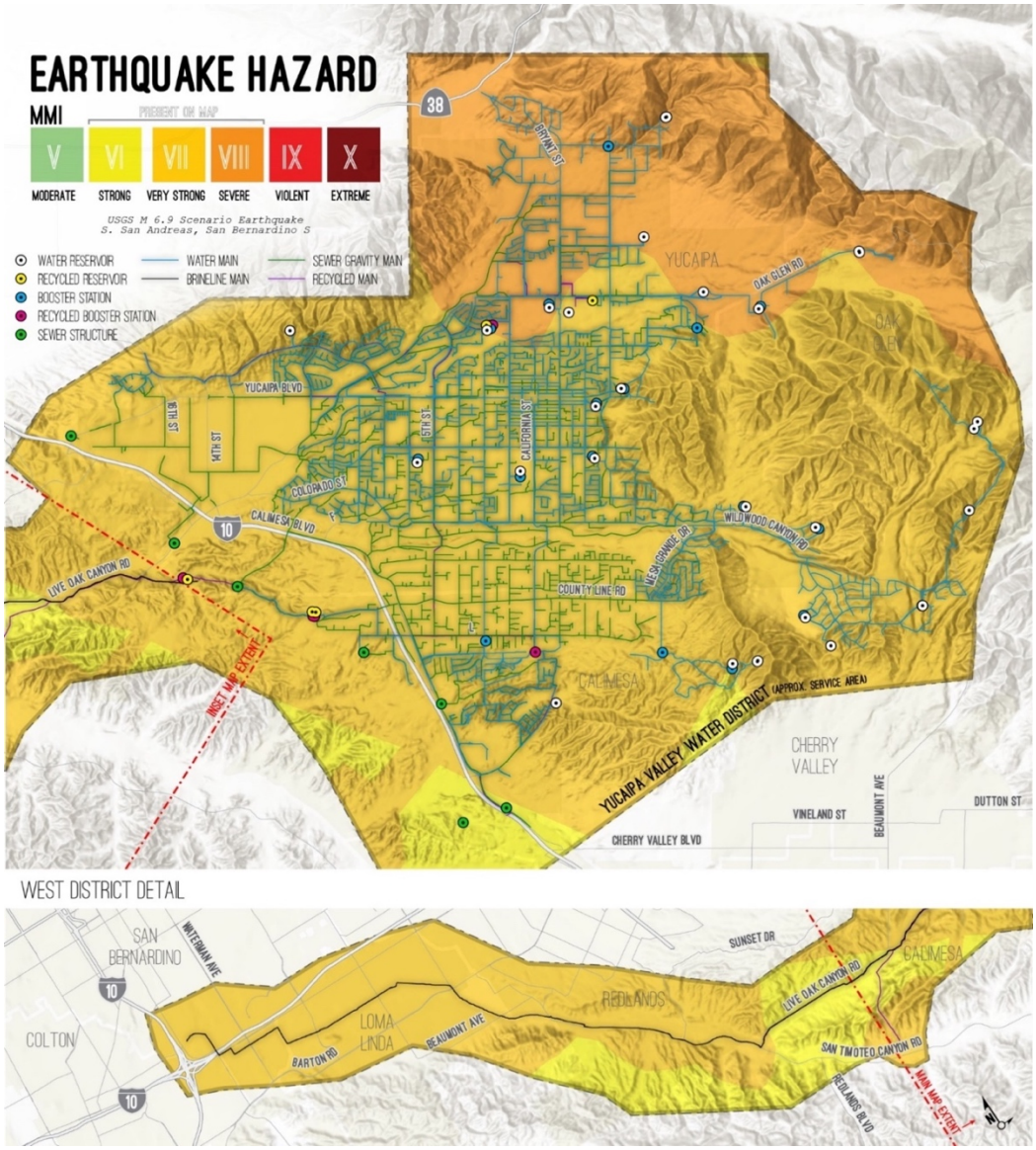


Figure 7. Fault Rupture Hazard Zone.

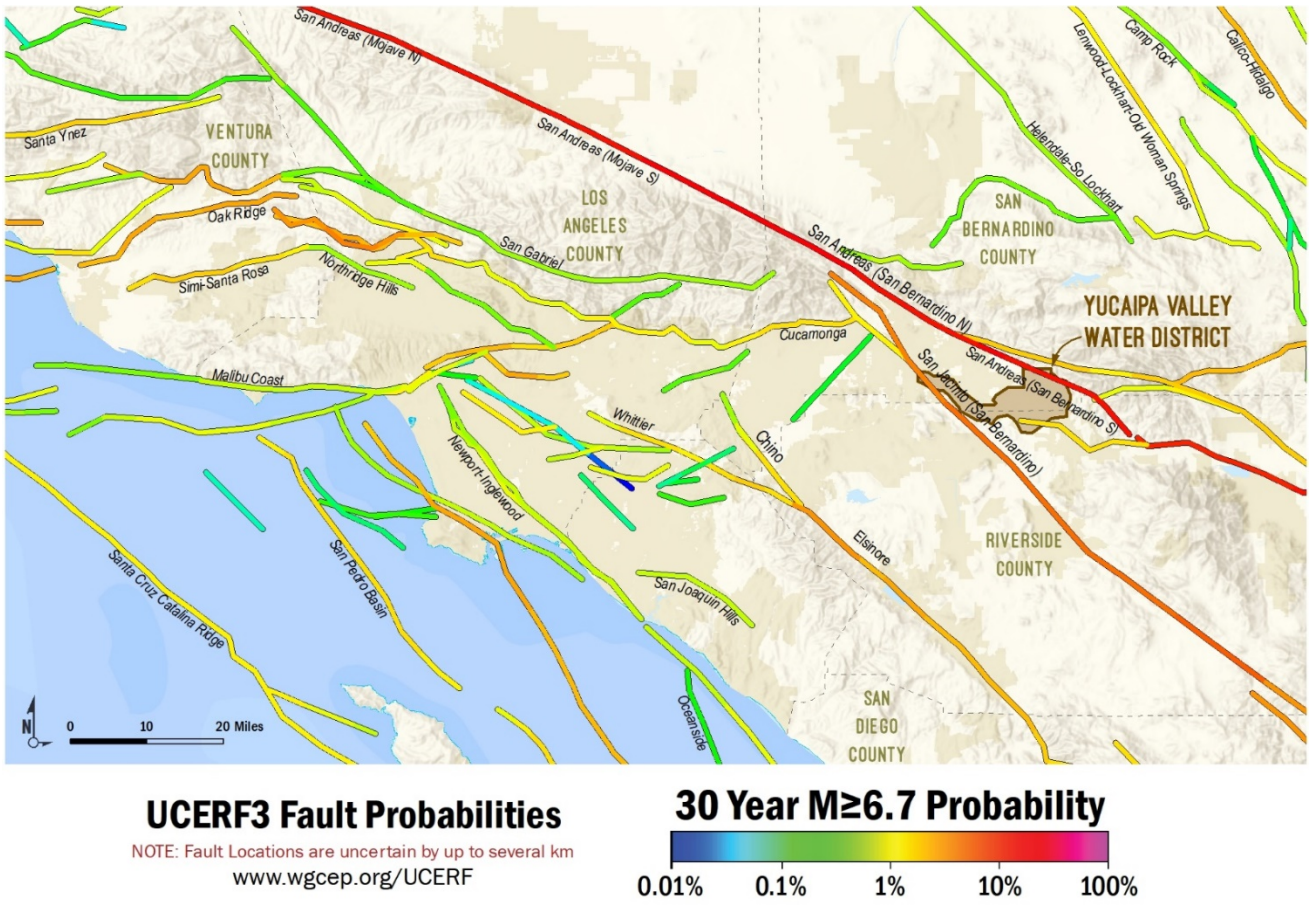


Figure 8. UCERF Fault Probabilities.

Table 10. Point Assets for Earthquakes.

Infrastructure Exposure M 6.9 Scenario Earthquake - S. San Andreas San Bernardino S.			
Infrastructure Type (Point)	VIII- Severe	VII - Very Strong	VI- Strong
Recycled Booster Station	2	5	-
Recycled Reservoir	1	4	-
Sewer Newer Structure	-	5	2
Water Booster Station	4	13	-
Water Reservoir	9	19	-
TOTAL	**16**	**46**	**2**

Table 11. Linear Features.

Linear Infrastructure Exposure (miles) M 6.9 Scenario Earthquake - S. San Andreas San Bernardino S.			
Infrastructure Type (Linear)	VIII - Severe	VII - Very Strong	VI- Strong
Brineline Main	-	11.64	2.33
Recycled Main	2.37	23.05	3.82
Sewer Gravity Main	17.91	191.91	0.63
Water Main	37.13	183.36	0.24
TOTAL	**57.40**	**409.96**	**7.02**

4.4 Hazard Definition for Wildfires

Probability: **Highly Likely**
Impact: **Catastrophic**

A wildland fire is a type of fire that spreads through all types of vegetation. It often begins unnoticed, spreads quickly, and is usually signaled by dense smoke that may be visible from miles around. Wildland fires can be caused by human activities (such as arson or campfires) or by natural events such as lightning. Wildland fires often occur in forests or other areas with ample vegetation. In addition to wildland fires, wildfires can be classified as urban fires, interface or intermix fires, and prescribed burns.

The following three factors contribute significantly to wildland fire behavior and can be used to identify wildland fire hazard areas:

1. Topography: As slope increases, the rate of wildland fire spread typically increases. South facing slopes are also subject to more solar radiation, making them drier and thereby intensifying wildland fire behavior. However, ridge tops may mark the end of wildland fire spread since fire spreads more slowly or may even be unable to spread downhill.
2. Fuel: The type and condition of vegetation plays a significant role in the occurrence and spread of wildland fires. Certain types of plants are more susceptible to burning or will burn with greater intensity. Dense or overgrown vegetation increases the amount of

combustible material available to fuel the fire (referred to as the "fuel load"). The ratio of living to dead plant matter is also important. The risk of fire is increased significantly during periods of prolonged drought as the moisture content of both living and dead plant matter decreases. The fuel's continuity, both horizontally and vertically, is also an important factor.

3. Weather: The most variable factor affecting wildland fire behavior is weather. Temperature, humidity, wind, and lightning can affect chances for ignition and spread of fire. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildland fire activity. By contrast, cooling and higher humidity often signals reduced wildland fire occurrence and easier containment.

4.4.1 Fire Hazard Severity

The frequency and severity of wildland fires is also dependent upon other hazards, such as lightning, drought, and infestations (such as the recent Bark Beetle infestation in the San Bernardino National Forest). If not promptly controlled, wildland fires may grow into an emergency or disaster. Even small fires can threaten lives and resources and destroy improved properties. In addition to affecting people, wildland fires may severely affect livestock and pets. Such events may require emergency watering/feeding, evacuation, and shelter.

The indirect effects of wildland fires can be catastrophic. High temperatures, low humidity, and clear sunny days characterize summer months. Thunderstorms from July through September can create lightning strikes, erratic high winds and, sometimes, heavy rains. The City of Yucaipa is bordered by hills, mountains, open fields, and undeveloped lots contiguous to residential development. Residential landscaping, fencing and outbuildings increase fuel loading, spotting and fire intensity.

4.4.2 Previous Occurrences of Wildfires

Wildland fires are a threat in any fire season. In 2010, several wildfires in the hills in the northeast portion of the District burned the natural vegetation for roughly 2,500 acres of land. One structure and one outbuilding were destroyed, and the loss of vegetation resulted in considerable debris being washed down over roads onto streets. In 2009, two separate fires in the hills in the eastern part of the District burned over 1,900 acres resulting in the loss of natural vegetation and causing significant damage from mud and debris in subsequent winter storms. In 2006 a fire in the Crafton Hills in the northwest part of Yucaipa burned natural vegetation in about 60 acres. In 1997, a fire in the hills in the northeast portion of Yucaipa burned the natural vegetation in about 20,000 acres of land. Although no homes were destroyed, the loss of vegetation resulted in considerable debris being washed down over roads on into a park.

Yucaipa Wildfires

Table #15. Yucaipa Wildfires

Date	Event Name
9-23-2009	Crafton Fire

8-31-2009	Pendleton Fire
8-30-2009	Oak Glen 3 Fire
5-7-2009	Park Fire
10-26-2007	Jefferson Fire
7-3-2007	Ridge Fire
8-15-2003	Aug 2003 Wildfire
10-21-2001	Oct 2001 Fire
7-8-2001	Bryant Fire
8-31-1998	Aug 1998 Fire
10-29-21997	Fremont Fire
10-17-1995	Bluff Fire
10-27-1993	Mill Creek Fire
7-17-1987	Wash Fire

4.4.3 Hazard Summary for Wildfires

Fire prevention strategies concentrate on educating the public and enforcement of fire codes. Fire suppression strategies focus around containment and control while protecting structures in the threatened areas. Suppression activities may utilize natural firebreaks; direct suppression of the fire by hose lines, aircraft, bulldozers, and hand crews; increasing defensible spaces around homes; utilizing fire suppression foams; and mop up and total extinguishment of the fire.

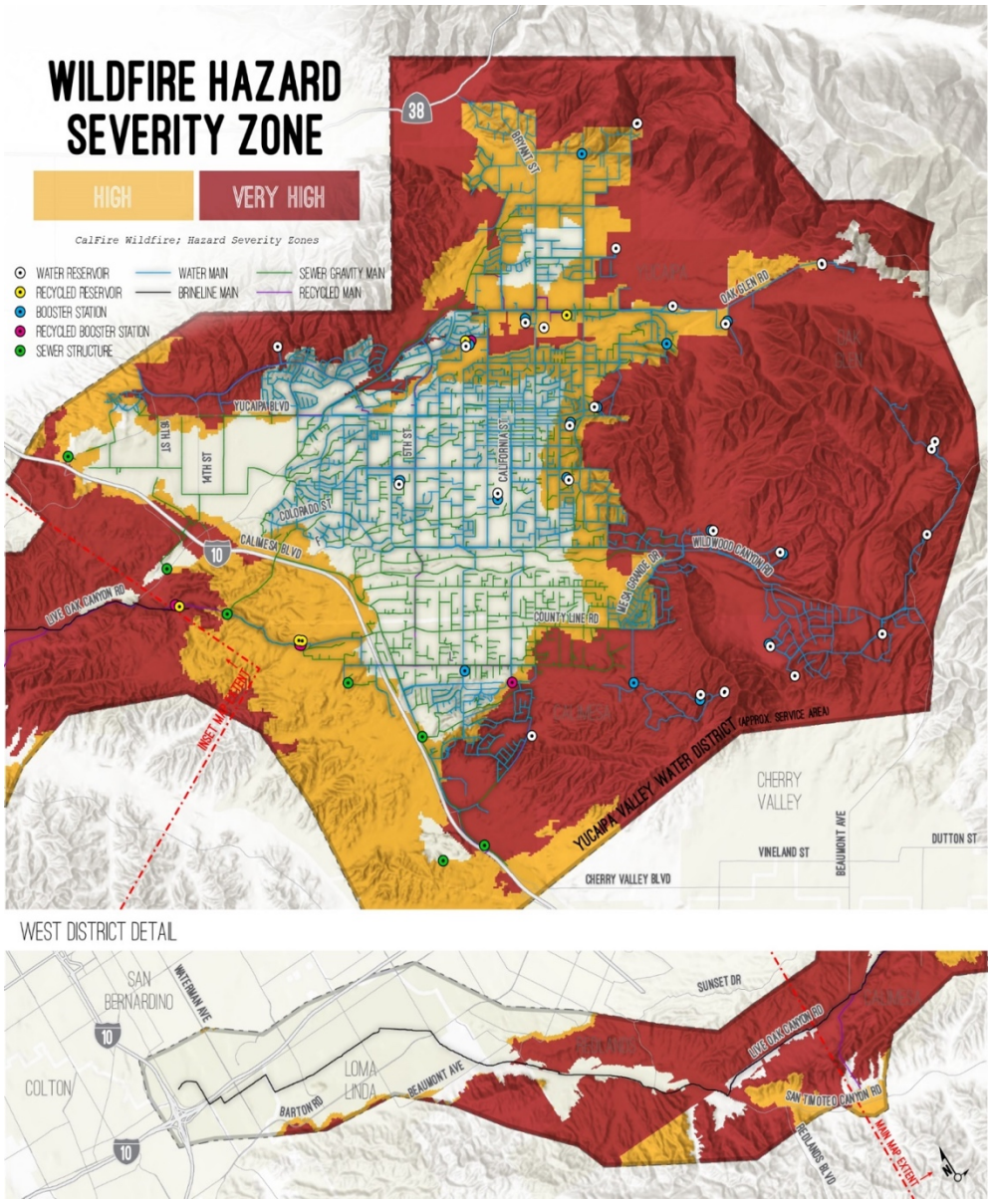


Figure 10. Fire Hazard Severity Zones

Table 16. Wildfire Exposure Point Assets

Infrastructure Exposure - Wildfire Severity Zone			
Infrastructure Type (Point)	**Very High**	**High**	**Moderate**
Recycled Booster Station	2	5	-
Recycled Reservoir	1	4	-
Sewer Newer Structure	1	4	-
Water Booster Station	7	7	-
Water Reservoir	19	7	-
TOTAL	**30**	**27**	**-**

Table 17. Wildfire Linear Features

Linear Infrastructure Exposure (miles) - Wildfire Severity Zone			
Infrastructure Type (Linear)	Very High	High	Moderate
Brineline Main	3.93	-	4.05
Recycled Main	10.39	6.45	4.06
Sewer Gravity Main	22.49	60.35	18.15
Water Main	55.09	71.16	15.63
TOTAL	**91.90**	**137.95**	**41.89**

4.5 Hazard Definition for Drought

Probability: **Highly Likely**
Impact: **Critical**

The period between late 2011 and 2014 was the driest in California history since record keeping began. In May 2015, a state resident poll conducted by Field Poll found that two out of three respondents agreed that it should be mandated for water agencies to reduce water consumption by 25%.

The 2015 prediction of El Niño to bring rains to California raised hopes of ending the drought. In the spring of 2015, the National Oceanic and Atmospheric Administration named the probability of the presence of El Niño conditions until the end of 2015 at 80%. Historically, sixteen winters between 1951 and 2015 had created El Niño. Six of those had below-average rainfall, five had average rainfall, and five had above-average rainfall. However, as of May 2015, drought conditions had worsened, and above average ocean temperatures had not resulted in large storms. The drought led to Governor Jerry Brown's instituting mandatory 25 percent water restrictions in June 2015.

Many millions of California trees died from the drought - approximately 102 million, including 62 million in 2016 alone. By the end of 2016, 30% of California had emerged from the drought, mainly in the northern half of the state, while 40% of the state remained in the extreme or exceptional drought levels. Heavy rains in January 2017 were expected to have a significant benefit to the state's northern water reserves, despite widespread power outages and erosional damage in the wake of the deluge. Among the casualties of the rain was 1,000 year-old Pioneer Cabin Tree in Calaveras Big Trees State Park, which toppled on January 8, 2017.

The winter of 2016–17 turned out to be the wettest on record in Northern California, surpassing the previous record set in 1982–83. Floodwaters caused severe damage to Oroville Dam in early February. Which prompted the temporary evacuation of nearly 200,000 people north of Sacramento in response to the heavy precipitation, which flooded multiple rivers and filled most of the state's major reservoirs, Governor Brown declared an official end to the drought on April 7.

Description: The District is not as affected by drought because it receives most of the water supply from groundwater and is dependent on underground water aquifers. The District does purchase water from the State Water Project (SWP) and has a physical connection to the SWP. The District's underground aquifers are in overdraft, a portion of the District's wells have elevated levels hexavalent chromium. It is challenging for the District to find alternative water supplies from underground aquifers that meet California's water quality standards without constructing additional water treatment facilities.

Mitigation: Construct more water storage capacity. Drill more wells. Develop ways to capture rainwater from the higher elevations during flash flooding events and divert these waters to percolation ponds to recharge the underground aquifers. Increase purchases of State water project water to recharge the aquifer.

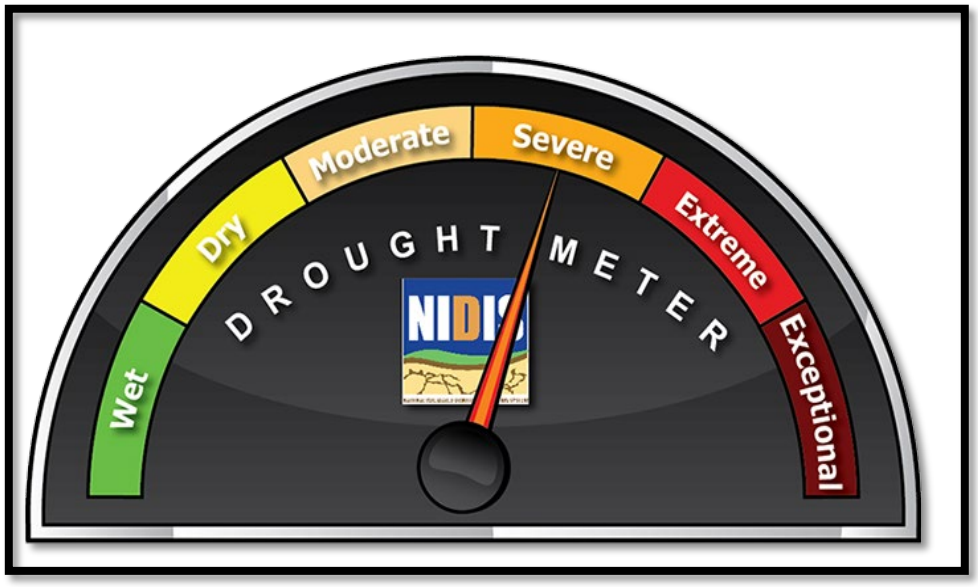


Figure 5. Current Drought Condition for Yucaipa, May 19, 2018.

4.5.1 Previous Occurrences of Drought

Table 8. California Drought History *(extracted from USGS, California Drought History)*

1841	The drought was so bad that "a dry Sonoma was declared entirely unsuitable for agriculture"[1]
1864	This drought was preceded by the torrential floods of 1861-1862, showing the fluctuation in climate back in the 1800s.
1924	This drought encouraged farmers to start using irrigation more regularly because of the fluctuation in California weather the need for consistent water availability was crucial for farmers.
1929–1934	This drought was during the infamous Dust Bowl period that ripped across the plains of the United States in the 1920s and 1930s. The Central Valley Project was started in the 1930s in response to drought.
1950s	The 1950s-drought contributed to the creation of the State Water Project.

1976–77	1977 had been the driest year in state history to date. According to the Los Angeles Times, "Drought in the 1970s spurred efforts at urban conservation and the state's Drought Emergency Water Bank came out of drought in the 1980s."
1986–1992	California endured one of its longest droughts ever observed from late 1986 through early 1992. Drought worsened in 1988 as much of the United States also suffered from severe drought. In California, the six-year drought ended in late 1992 as a significant El Niño event in the Pacific Ocean (and the eruption of Mount Pinatubo in June 1991) most likely caused unusual persistent heavy rains.
2007–2009	2007–2009 saw three years of drought conditions, the 12th worst drought period in the state's history, and the first drought for which a statewide proclamation of emergency was issued. The drought of 2007–2009 also saw greatly reduced water diversions from the state water project. The summer of 2007 saw some of the worst wildfires in Southern California history.
2011-2017	From December 2011 to March 2017, the state of California experienced one of the worst droughts to occur in the region on record. The period between late 2011 and 2014 was the driest in California history since record keeping began.

4.5.2 Hazard Summary of Drought

The fundamental drought impact to water agencies is a reduction in available water supplies. As a result, historic occurrences of drought have encouraged water agencies to review the reliability of their water supplies and to initiate planning programs addressing identified needs for improvement. In addition, public and media interest in droughts fosters heightened awareness of water supply reliability issues in the Legislature. More than 50 drought-related legislative proposals were introduced during the severe, but brief 1976-77 drought. About one-third of these eventually became law. Similar activity on drought-related legislative proposals was observed during the 1987-92 drought. One of the most significant pieces of legislation was the 1991 amendment to the Urban Water Management and Planning Act, in effect since 1983, which requires water suppliers to estimate available water supplies at the end of one, two, and three years, and to develop contingency plans for shortages of up to 50 percent. The District's 2005 Urban Water Management Plan (UWMP) (YVWD, 2006) presents water supply to demand comparisons through 2030. The 2010 UWMP will be completed by June 30, 2011 and will update any demand and supplies documented in the 2005 UWMP and will also require all water agencies to reduce their water demand by 20 percent by the year 2020. The plan also presents water supply to demand comparisons for single dry to multiple dry year scenarios. The comparisons show that the District has adequate supply through 2030.

If the current drought extends for the period that the U.S. Weather Service is currently forecasting, the District will have difficulty in meeting its water supply demands without additional supplies. Groundwater basins would experience significant loss of production over and above the significant loss of production that they are currently experiencing. The Yucaipa Valley groundwater basin is experiencing the lowest groundwater levels in 40 years. If this condition continues, the District will need to expand the existing water treatment plant and purchase more State Project water to supply the average demand of 10.72 million gallons day (MGD), 16.16 (MGD) summer and 5.28 (MGD) winter.

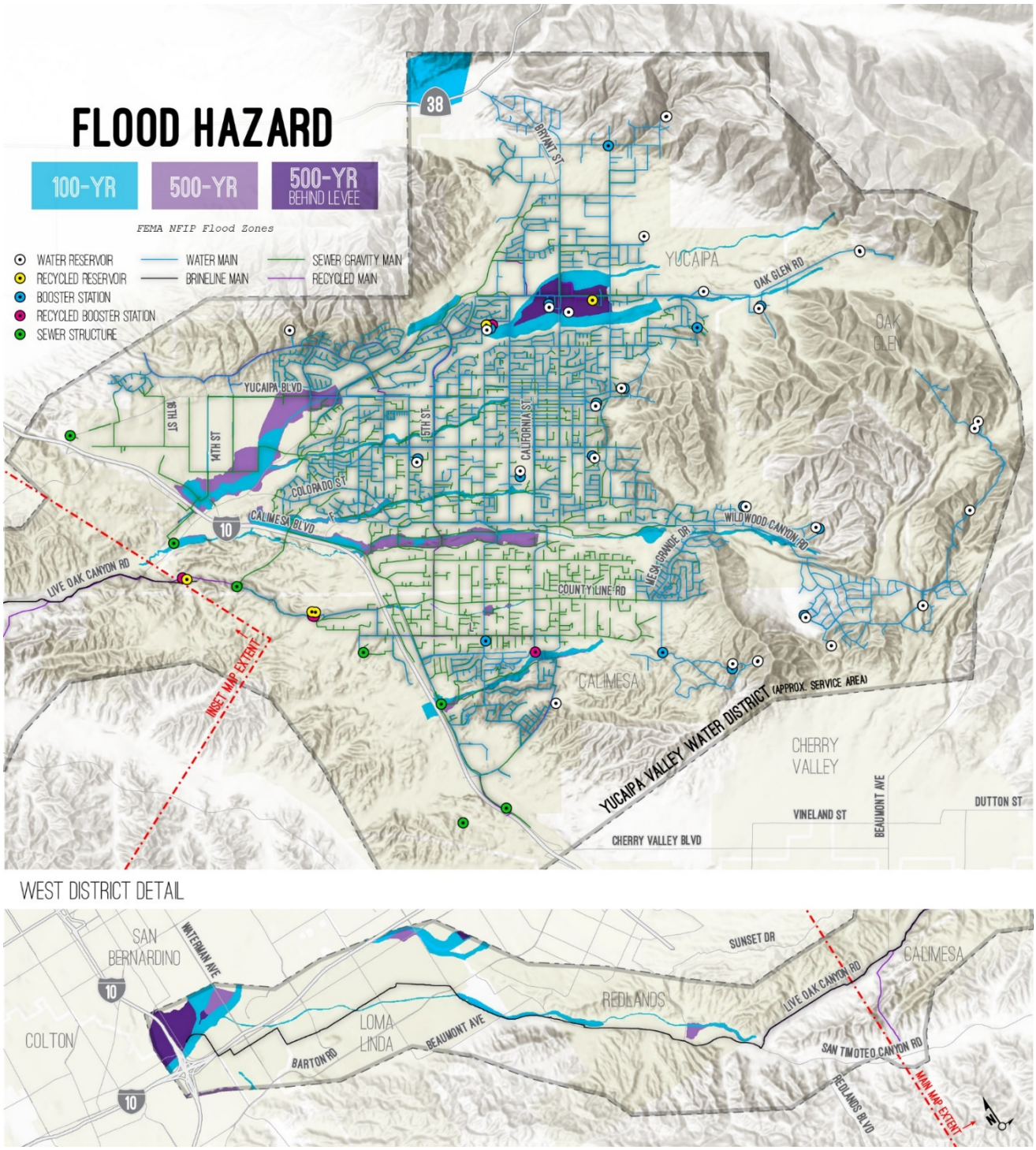


Figure 9. Yucaipa Earthquake Fault Zones (Fault Zone Data Source: California Geological Survey).

4.6 Hazard Definition for Flooding

Probability: **Likely**
Impact: **Critical**

Flooding ranked critical hazard. Areas subject to flooding in Yucaipa are adjacent to the Wilson and Wildwood Creeks. Wilson Creek flows from the North/East to the South/West corner of the Yucaipa City boundary and Wildwood Creek flows in the East to West direction. Floodway areas adjacent to these creeks may be subject to damage and isolation during storm events. Winter storms in the past have caused waters in one or more of the natural drainage channels to overflow onto City streets, parks and private property. Street embankments adjacent to the storm channels have been damaged and required road closure. Normal traffic flow is significantly affected by water and silt deposits in the seven low water crossings.

Floods are the most common and widespread of all- n a t u r a l disasters--except fire. Most communities in the United States have experienced flooding, after spring rains, heavy thunderstorms, or winter snow thaws.

A flood, as defined by the National Flood Insurance Program is:

"A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is your property) from:

*Overflow of inland or tidal waters, *Unusual and rapid accumulation or runoff of surface waters from any source, or a mudflow.

The collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical *levels that result in a flood."* Floods can be slow or fast rising but generally develop over a period of days. Mitigation includes any activities that prevent an emergency, reduce the chance of an emergency happening, or lessen the damaging effects of unavoidable emergencies. Investing in mitigation steps now, such as engaging in floodplain management activities, constructing barriers such as levees, and purchasing flood insurance will help reduce the amount of structural damage to your home and financial loss from building and crop damage should a flood or flash flood occur.

Flooding tends to occur in the summer and early fall because of the monsoon and is typified by increased humidity and high summer temperatures.

The standard for flooding is the so-called "100-year flood," a benchmark used by the Federal Emergency Management Agency to establish a standard of flood control in communities throughout the country. Thus, the 100-year flood is also referred to as the "regulatory" or "base" flood. There is little difference between a 100-year flood and what is known as the 10-year flood. Both terms are really" statements of probability" that scientists and engineers use to describe how one flood compares to others that are likely to occur.

What the 100-year flood means is that there is a one percent chance of a flood of that intensity and elevation happening in any given year. And it could occur more than once in a relatively short period of time. (By comparison, the 10-year flood means that there is a ten percent chance for a flood of its intensity and elevation to happen in any given year.) Rod Bolin, The Ponca City News, July 18, 2002. Page 5-A Identification of Flood-Prone Areas.

Substantial floodplain areas in the District are generally associated with the dry river washes known as Gateway Wash, Wilson Creek, Oak Glen Creek and Wildwood Creek, as well as Chicken Springs Wash and Yucaipa Creek. These areas have been mapped by the Federal Emergency Management Agency (FEMA) on their Flood Insurance Rate Maps (FIRM). The first version of these maps was prepared in March of 1996 and are reflected in the Fire and Flood Hazard Zones. In August of 2008, FEMA revised the FIRMS to reflect the Letters of Map Revisions (CLOMRS) that have been recorded and affected the Flood Prone areas within the District. There are two categories of flood zones in Yucaipa; FP1 indicates areas inside the 100-year floodplain, while FP2 indicates areas inside the 500-year floodplain. The majority of the floodplains in the District are categorized as FP1 and comprise over 1,225 acres. FP2 areas cover over 300 acres.

Floods are generally classed as either slow-rise or flash floods. Slow-rise floods may be preceded by a warning time lasting from hours, to days, or possibly weeks. Evacuation and sandbagging for a slow-rise flood may lessen flood related damage. Conversely, flash floods are the most difficult to prepare for, due to the extremely short warning time, if available at all. Flash flood warnings usually require immediate evacuation within the hour.

Areas subject to flooding are adjacent to the Wilson and Wildwood Creeks. Wilson Creek flows from the North/East to the South/West corner of the Yucaipa Water District boundary and Wildwood Creek flows in the East to West direction. Floodway areas adjacent to these creeks may be subject to damage and isolation during storm events.

4.6.1 Previous Occurrences of Flooding

Winter storms in the past have caused waters in one or more of the natural drainage channels to overflow onto City streets, parks and private property. Street embankments adjacent to the storm channels have been damaged and required road closure. Normal traffic flow is significantly affected by water and silt deposits in the seven low water crossings.

The only dam in the District is at the Yucaipa Regional Park. A second dam was constructed in the east extremity of the Crafton Hills in 2001 and is in the process of being expanded to the northwest. The limited inundation areas for both dams pose only a small hazard.

Table 12. Previous Occurrences of Flooding.

Date	Flooding Event Name
1-22-11	Jan 2011 Flash Flood/Mud Slides
11-30-02	Nov 2002 Stream Flood

7-11-99	Aug 1999 Flash Flood
11-1-95	Feb. 2 Storm
2-2-1993	Jan. 1 Storm
2-25-69	Feb 1969 Flood
1-25-69	Jan 1969 Flood
8-23-67	Aug 1967 Flood
12-18-66	Dec 1966 Flood
8-14-65	Aug 1965 Flood
4-10-65	April 1965 Flood
7-1-1+50	July 1950 Flood

4.6.2 Hazard Summary for Flooding

The following map illustrates FEMA Flood Hazards located within Yucaipa Valley Water District.

Table 13. Point Assets for Floods.

Infrastructure Type (Point)	Flood Fringe	Floodway	100-YR Total	500-YR sans 100-YR	500-YR Total
Recycled Booster Station	-	-	-	-	-
Recycled Reservoir	-	-	-	1	1
Sewer Newer Structure	1	1	2	-	2
Water Booster Station	-	-	-	1	1
Water Reservoir	-	-	-	2	2
TOTAL	**1**	**1**	**2**	**4**	**6**

Table 14. Linear Features for Flood Risk Exposure.

Linear Infrastructure - Flood Risk Exposure (miles)					
Infrastructure Type (linear)	Flood Fringe	Floodway	100-YR Total	500-YR sans 100-YR	500-YR Total
Brineline Main	0.79	0.19	0.98	0.10	1.09
Recycled Main	0.32	0.11	0.42	2.41	2.84
Sewer Gravity Main	6.44	1.73	8.17	6.51	14.67
Water Main	2.84	0.49	3.33	3.34	6.67
TOTAL	**10.38**	**2.52**	**12.90**	**12.36**	**25.26**

4.7 Inventory Assets

Step three in the risk assessment process involves inventorying assets located in the Yucaipa Valley Water District. Section 4.1 profiled the hazards in the District. This information was

used to identify the assets at risk from those hazards. Some hazards (such as earthquakes) may affect the entire District while some affect limited areas (flooding incidents). This section provides a description of the inventory development and prioritization process.

4.7.1 Population

The population statistics for the Yucaipa Valley Water District are based on US Census data. The District has a total population of 54,959 and an average household size of 2.9 people. Approximately 27% of the population is under the age of 18 and 12% is over the age of 65.

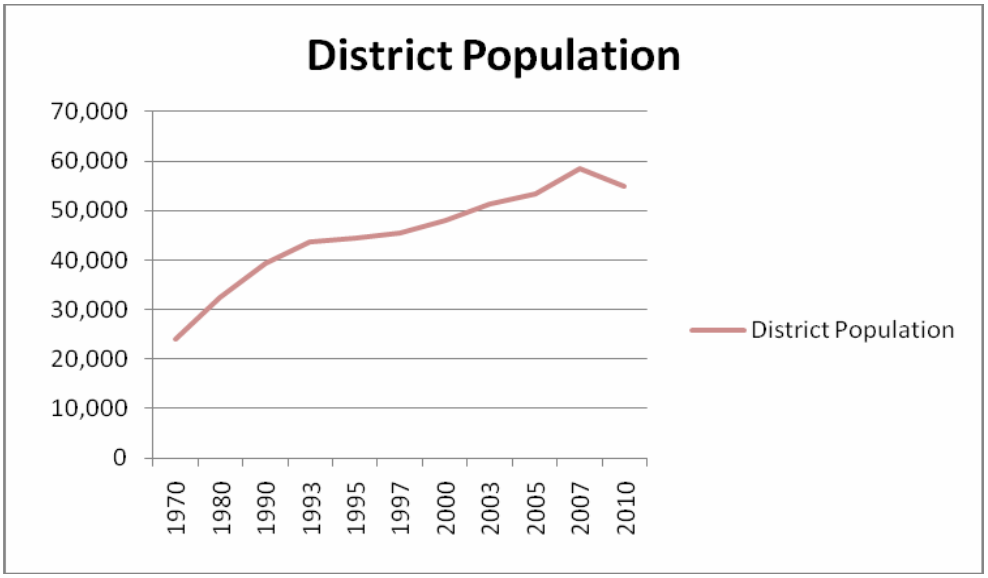


Figure 11. Yucaipa Water District Population 1970-2010 –Source: US Census Bureau

4.7.2 Buildings

As of November 2010, the District operates and maintains the following:

- Facilities: 18 pressure zones
- 29 potable reservoirs with a total capacity of 34 .3 million gallons (MG)
- 2 recycle reservoirs with a total capacity of 6 million gallons a day (MGD)
- 39 active wells with a total capacity of 18 million gallons a day (MGD)
- 204 miles of water mains
- 9 pump station structures
- 35 boosters at 17 locations
- 2 water treatment plants
- 1 water reclamation plant
- 1 administration office
- 1 environmental control building 1 garage
- 1 warehouse
- 1 old office building
- 6 lift stations

- 9 sewer bridges
- 234 miles of sewer mains

4.7.3 Critical Facility List

This section provides a listing of the critical facilities in the Yucaipa Valley Water District. The primary contact for all District facilities is the following:

Because the District's exact location of facilities is extremely sensitive, especially due to increased concerns for national security, only general locations and descriptions have been included in this section.

Table 18. Critical Facilities Exposure.

Facility Type	Facility Name
Government Facilities	Administration Office
Government Facilities	Environmental Control
Government Facilities	Garage
Government Facilities	Public Works Warehouse
Government Facilities	Shop
Government Facilities	S1 Storage Building
Government Facilities	Old District Office
Treatment Plant	Crystal Creek
Treatment Plant	Oak Glen Filter Plant
Treatment Plant	Henry N. Wochholz RWRF
Lift Station	Lift Station 1
Lift Station	Lift Station 2
Lift Station	Lift Station 3
Lift Station	Lift Station 4
Lift Station	Lift Station 5
Lift Station	Lift Station 8
Sewer Bridge	Sewer Bridge 1
Sewer Bridge	Sewer Bridge 2
Sewer Bridge	Sewer Bridge 3
Sewer Bridge	Sewer Bridge 4
Sewer Bridge	Sewer Bridge 5
Sewer Bridge	Sewer Bridge 6
Sewer Bridge	Sewer Bridge 7
Sewer Bridge	Sewer Bridge 8

Sewer Bridge	Sewer Bridge 9
Well	Well 2
Well	Well 10
Well	Well 12
Well	Well 14
Well	Well 16
Well	Well 18
Well	Well 24
Well	Well 25
Well	Well 26
Well	Well 27
Well	Well 28
Well	Well 37
Well	Well 44
Well	Well 46
Well	Well 48
Well	Well 51
Well	Well 53
Well	Well 55
Well	Well 56
Well	Well 61
Well	Well 66
Well	Well 67
Well	Well 68
Well	Well 69
Well	Well 70
Well	Well 71
Well	Well 72
Well	Well 73
Well	Well 74
Well	Well 75
Well	Well 76
Reservoir	R-11.1
Reservoir	R-11.2
Reservoir	R-12.1
Reservoir	R-12.2
Reservoir	R-13.1

Reservoir	R-13.2
Reservoir	R-13.3
Reservoir	R-14.2
Reservoir	R-15.1
Reservoir	R-15.2
Reservoir	R-15.3
Reservoir	R-16.2
Reservoir	R-16.5
Reservoir	R-16.6
Reservoir	R-17.11
Reservoir	R-17.12
Reservoir	R-17.2
Reservoir	R-17.3
Reservoir	R-17.4
Reservoir	R-17.51
Reservoir	R-18.3
Reservoir	R-18.4
Reservoir	R-19.11
Reservoir	R-20.2
Reservoir	R-21.2
Reservoir	R-22.1
Reservoir	F-1
Reservoir	G-1
Pump Station	Pump Station 11.2
Pump Station	Pump Station 12.2
Pump Station	Pump Station 13.3
Pump Station	Pump Station 14.2
Pump Station	Pump Station 15.3
Pump Station	Pump Station 15.3 B
Pump Station	Pump Station 16.5
Pump Station	Pump Station 17.3
Pump Station	Pump Station 17.4
Booster Location	B-11.21
Booster Location	B-11.22
Booster Location	B-11.23
Booster Location	B-12.1
Booster Location	B-12.21

Booster Location	B-12.22
Booster Location	B-12.23
Booster Location	B-12.31
Booster Location	B-12.32
Booster Location	B-13.2
Booster Location	B-13.31
Booster Location	B-13.32
Booster Location	B-13.33
Booster Location	B-14.21
Booster Location	B-14.22
Booster Location	B-14.23
Booster Location	B-15.1
Booster Location	B-15.21
Booster Location	B-15.22
Booster Location	B-15.31
Booster Location	B-15.32
Booster Location	B-15.34
Booster Location	B-15.35
Booster Location	B-16.2
Booster Location	B-16.51
Booster Location	B-16.52
Booster Location	B-16.61
Booster Location	B-16.62
Booster Location	B-17.2
Booster Location	B-17.31
Booster Location	B-17.41
Booster Location	B-17.42
Booster Location	B-17.43
Booster Location	B-18.31
Booster Location	B-18.32

4.8 Vulnerability Assessment

The team reviewed pictures of each of the District's facilities. The pictures were presented with a map of the area to convey the location within the system as well as the site-specific characteristics of the facility. The Planning Team has a long history in the area and knowledge of the potential disasters and emergencies that can occur in and around the community. The Planning Team has the knowledge to assess the system and give valuable input into the assessment and vulnerabilities to the system.

4.8.1 Methodology

The Planning Team reviewed the District's facilities and applied their local and operational knowledge to evaluate how vulnerable each facility is to a potential hazard. The team ranked the facilities by their importance to the District's production and delivery of drinking water. The team then used this ranking to develop an estimate of potential economic impacts that could be caused by the high priority hazards. A percentage based on ranking was applied to the Utility Department's projected 2019-2020 annual water revenue ($7.8 million) to assess the annual economic impact for each facility.

SECTION 5. - Community Capability Assessment

5.1 Agencies and People

The District is in the Southwestern section of the Bernardino County. The District serves the city of Yucaipa, part of the City of Calimesa, unincorporated area in San Bernardino and Riverside Counties. The District serves approximately 14,000 water service connections, 16,000 sewer connections with a population of approximately 52,000 customers.

To help mitigate the potential impacts of disasters, both small and large the District joined CalWARN and is a member of ERINIE both of which, are mutual aid agreements.

The Utility employs 72 full time employees in the water, sewer, and administrative office. With the capabilities of CalWARN, the Utility has the potential of having hundreds of mutual aid workers at its disposal within hours of an emergency.

5.2 Existing Plans

The following emergency related plans apply as appropriate:

- CalWARN Emergency Operations Plan
- The District's Illness Injury Prevention Plan (IIPP)
- The District's Urban Water Master Plan
- Past Hazard Mitigation Plan

The Utility has a mutual aid agreement with CalWARN, that covers most water wastewater agencies in California. As a government entity (Special District, within California Law), the Utility can access the Emergency Managers Mutual Aid (EMMA) and the Emergency Management Assistance Compact (EMAC) for national mutual aid and the National WARN System though the American Water Works Association.

CalWARN holds workshops twice a year for the members and the water agencies. CalWARN plans to start sending invitations to the public, so the public has a better understanding of hazard mitigation planning in their communities. These workshops promote mitigation and how to prevent the impacts of hazards on the utility's infrastructure. CalWARN has shown from past experiences from utilities leaders, what they experience were during emergencies and what they should have done differently to mitigate this hazard from happening in the past, or in the future.

5.3 Regulations, Codes, Policies, and Ordinances

The Urban Water Management and Planning Act was passed in 2010 and requires water suppliers to estimate water demands and available water supplies. The District's updated Urban Water Management Plan (UWMP) was completed in January 2017. UWMPs are required to

evaluate the adequacy of water supplies including projections of 5, 10, and 20 years. These plans are also required to include water shortage contingency planning for dealing with water shortages, including a catastrophic supply interruption.

UWMPs are intended to be integrated with other urban planning requirements and management plans. Some of these plans include city and county General Plans, Water Master Plans, Recycled Water Master Plans, Integrated Resource Plans, Integrated Regional Water Management Plans, Groundwater Management Plans, Emergency Response Plans, and others.

The Utility has an Emergency Response Plan that details how the Utility will respond to various emergencies and disasters. The Utility must be prepared to respond to a variety of threats that require emergency actions, including:

- Operational incidents, such as power failure or bacteriological contamination of water associated with the District's facilities.
- Outside or inside malevolent acts, such as threatened or intentional contamination of water, intentional damage/destruction of facilities, detection of an intruder or intruder alarm, bomb threat, or suspicious mail.
- Natural disasters, such as earthquakes or floods and power failures.
- Water Conservation Regulations

The Utility is also required to follow Standard Emergency Management System (SEMS) and the National Incident Management System (NIMS) and the Incident Command System (ICS) when responding to emergencies.

5.4 Mitigation Programs

The Utility has completed some mitigation programs. The California Department of Water Resources required the Utility to raise well pump motors and other wellhead assemblies above the 500-year flood plain elevation. This was accomplished by installing the motors and wellheads on elevated concrete foundations.

5.5 Fiscal Resources

Fiscal resources for the Utility include the following:

- Revenue from water sales
- Monthly Service Charge fee
- Water Availability Assessment (On Property Taxes)
- Meter Installation Fee
- If necessary, local bond measures and property taxes

Through the California Department of Water Resources, local grants and/or loans are available for water conservation, groundwater management, studies and activities to enhance local water supply quality and reliability. Project eligibility depends on the type of organization(s) applying and participating in the project, and the specific type of project. More than one grant or loan may be appropriate for a proposed activity. Completing the LHMP will facilitate and obtain grant funding in the future.

SECTION 6. - Mitigation Strategies

6.1 Overview

The District's mitigation strategy is derived from the in-depth review of the existing vulnerabilities and capabilities outlined in previous sections of this plan, combined with a vision for creating a disaster resistant and sustainable system for the future. This vision is based on informed assumptions, recognizes both mitigation challenges and opportunities, and is demonstrated by the goals and objectives outlined below. The mitigation measures identified under each objective include an implementation plan for each measure. The measures were individually evaluated during discussions of mitigation alternatives and the conclusions used as input when priorities were decided. All priorities are based on consensus of the Planning Team.

Mitigation measures are categorized generally for all hazards and specifically for the four high risk hazards facing the District that were extensively examined in the risk assessment section: drought, earthquakes, floods, and wildfires. Because mitigation strategies are required to include the District's involvement in the National Flood Insurance Program (NFIP), that is discussed in Section 6.3.4 of this section.

6.2 Mitigation Goals, Objectives, and Projects

This plan is an update of the 2005 YVWD Hazard Mitigation Plan (HMP). Although it is an update, this document has been redesigned so that it looks, feels and reads differently than the original. That is due to several factors; new hazard information has become available that drives new definitions of risk, new capabilities are now available, and the new format will allow readers to more easily understand the content. In addition, the 2005 HMP included several action items that have been completed, creating an opportunity for developing new mitigation strategies. The process of identifying goals began with a review and validation of the Goals and Objectives in the District's 2005 HMP and the San Bernardino County's 2005 Operational Area HMP. Using the 2005 HMP as the basis, the District's Planning Team completed an assessment/discussion of whether each of the goals was still valid. In reviewing and updating mitigation objectives and actions, it was the Planning Team's consensus that these goals remain in this Plan update. This discussion also led to the opportunity to identify new Goals and Objectives.

6.2.1 Emergency Preparedness Goals

6.2.2 Earthquake

Goal: Identify and mitigate any potential damage to District property and infrastructure.

Objective

- Design all new facilities to withstand an 8.0 earthquake.
- Establish property protection measures and retrofit programs for facilities in high hazard

areas.

- Continuously integrate new data on natural and manmade hazards into all projects and existing facilities.
- Establish a partnership with all levels of government and nongovernment agencies.

Earthquake Mitigation Projects

- Construct seismic retrofit of critical facilities $2.0 Million (5 years)
- Seismic shut-off valves at all reservoir inlets and outlets $1.0 Million (2 years)
- Replace all A/C and steel pipeline material 8 Million (5 years)
- Install generators at wells and booster sites $1.5 Million (3 years)

6.2.3 Wildfire

Wildfire Mitigation Projects

- Install generators at wells and booster sites $ 2 Million (5 years)
- Clear brush and trees 25 feet back from all facilities $250,00 (1 year)
- Retrofit fire-resistant coatings on critical reservoirs and facilities $800.00 (1 year)
- Coordinate and foster better communications with fire and County OES $25,000 (on going yearly)
- Develop fuel plan for generator $5,000 (6 month)

6.2.4 Drought

Objectives: The overriding objective of the long–term actions is adjustments to drought conditions, even under normal situations, as a proactive and preparatory measure. This includes, for instance, the increase of water storage capacity, the adoption of water saving technology, the recharge of groundwater and monitoring the available water resources.

Drought Mitigation Projects

- Increase water supply drilling new wells $ 1.5 Million (5 years)
- Improve operational efficiency/water transfers $500,00 (2 years)
- Educational programs $20,000 (1 year)
- Promote water conservation programs $50,000 (2 years)
- Ground water basin recharge $ 500,000 (3 years)

6.2.5 Flood

The District is not a member of the National Flood Insurance Program (NFIP), as water agencies are not allowed to be part of the NFIP. Fortunate not to have any identifiable Repetitive and Severe Repetitive Properties.

Objective: Require identification, improvement and upgrading of critical facilities in flood hazard areas through such measures as anchorage to prevent flotation, water tight barriers over openings, reinforcement of walls to resist water pressures, use of materials to reduce wall seepage and installation of pumping facilities for internal and subsurface drainage.

Projects: To coordinate and support the State of California Multi-Hazard Mitigation Plan Strategies to reduce risks, the District proposes the following projects:
Flooding Projects

- Identify and replace vulnerable clay sewer main with HDPE $4.0 Million (4 years)
- Installation flood walls, regrade and install riprap, around facilities and on owned access roads. $1.3 Million (2 years)
- Erosion Control at well and reservoir sites 1.0 Million (1 year)
- Replace sewer pipelines crossing rivers and creeks on suspension bridges to keep them away from flooding event. $3.5 Million (4 years)

6.3 Mitigation Priorities

During the development of the risk assessment for the District, the Planning Team proposed and discussed alternative mitigation goals, objectives, and specific mitigation measures that the District should undertake to reduce the risk from the four high risk hazards facing the District.

Multiple factors were considered to establish the mitigation priorities included in this plan. Highest priority rankings were assigned to those mitigation measures that met three primary criteria:

1. Greatest potential for protecting water and wastewater infrastructure life and property
2. Greatest potential for maintaining critical District functions and operability following a disaster; and
3. Achievability in terms of customer support and cost effectiveness

All rankings were determined by the consensus of the Planning Team. As described in the previous section on hazard and risk assessment, clearly earthquakes have the potential to affect the largest number of people, critical facilities, and buildings and to cause the greatest economic losses. This fact, combined with the relatively high probability of an earthquake occurrence in the next several decades, makes increasing disaster resistance and readiness to earthquakes a high priority. Given the extreme importance of maintaining critical

functions in times of disaster and the large number of customers who depend and rely on District services and infrastructure, those mitigation measures that improve disaster resistance, readiness, or recovery capacity are generally given higher priority.

Drought, earthquake, flooding, and wildfire mitigation actions are identified and assigned a priority according to their importance, cost, funding availability, to what degree project planning has been completed, and the anticipated time to implement the measures.

Using the above rationale for establishing mitigation priorities, each mitigation measure is assigned a priority ranking as follows:

- High – Projects that will be the primary focus of implementation over the next five years
- Medium – Projects that may be implemented over the next five years
- Low – Projects that will not be implemented over the next five years unless conditions change (new program/funding source)

6.4 Implementation Strategy

The implementation strategy is intended to successfully mitigate the hazards identified in this plan within a reasonable amount of time. The Utility is currently operating within its annual budget and has been fortunate that the recession of the past 10 years didn't cause major issues with the budget or revenue. The District's revenues have remained strong throughout the recession. Capital improvement projects have remained a priority. The Utility Staff will review the Mitigation Plan each year before obtaining the next years Fiscal Budget. The plan will also be reviewed by the Board of Directors for items to be included in the new fiscal budget. Utility staff will also look for ways to obtain Hazard Mitigation Grants each year to off-set the impacts to the fiscal budget and to show some relief for the residents of a disadvantaged community.

$$B/C = \left[\frac{B_0}{(1+i)^0} + \ldots + \frac{B_T}{(1+i)^T}\right] \div \left[\frac{C_0}{(1+i)^0} + \ldots + \frac{C_T}{(1+i)^T}\right]$$

Mitigation Projects Funding Source

There is currently no mitigation money in the District's budget. The Utility will include mitigation into the budgeting process when funding becomes available and look at what mitigation projects could be funded in future budget cycles.

Timeframe

Over the next five years, the Utility will incorporate mitigation into all capital improvement projects that the Utility undertakes. The Utility has a Capital Improvement Program. When money is available for CIP, the Utility replaces outdated pipelines, reservoirs, wells, and buildings.

The Utility will apply for mitigation grants as the opportunities become available in the State of California, County of San Bernardino each year. The Utility will consider all mitigation items during the annual budget workshops, conducted each spring.

SECTION 7. - Plan Maintenance

7.1 Monitoring, Evaluating, and Updating the Plan

The LHMP will be monitored and evaluated by staff during the year and progress will be reported as part of the annual budget workshop each spring. Annually, staff and the Board of Directors will review funding and determine the Capital Improvement Projects to be included in the next fiscal year's budget. The General Manager will include the LHMP in all budget workshops and grant planning meetings. This will allow open discussion, evaluation, and assessment of the plan to achieve goals, allowing addition and removal of mitigated items.

A full review of the plan will be performed at 5-year intervals by staff in the same manner as the initial LHMP. Progress in reaching mitigation goals, assessment of new and existing hazards, development of new mitigation strategies and goals will be tackled by a planning team that will include the District's staff and the community served by the District. The public and the City of Yucaipa will be asked to participate in the update process. The District's budget is a public document and is reviewed by the public before the Board of Directors adopts the yearly budget and any updates to the LMHP.

7.2 Implementation through Existing Programs

Once the State of California OES and FEMA approve the LHMP, the District will incorporate the LHMP into capital improvement projects, capital replacement programs, building design, and any updates or repairs to the water distribution system. The District will submit Notice of Intents to the State of California to help facilitate funding opportunities in obtaining FEMA and State funding to mitigate hazards within the service area.

The District's General Manager or his/her appointee will be responsible for the implementation of the LHMP and ensuring the LHMP's recommended goals and objectives are met. The General Manager or his/her appointee will be responsible to place the LHMP on the District's website and incorporate the LHMP into the annual budget workshops. The General Manager or his/her appointee will verify that the LHMP is updated and rewritten on a 5-year cycle. The District will start the update process one and a half years before the expiration date on this document. The approved HMP will be included in all project planning stages throughout the district planning. This will clarify the hazards in the District in regard to location of infrastructure and hazards. This will ensure that new or revamping infrastructure is built to withstand the hazards at different locations in the service area. The HMP will be reviewed each year to ensure the HMP identified projects are completed. The District Engineering Department and the General Manager are responsible for maintaining the HMP.

7.3 Continued Public Involvement

In the spring of each year at the District's Board of Directors' budget workshop, public comments will be taken regarding the LHMP, and projects will be considered that could possibly be included in the next year's budget. It is the responsibility of the General Manager or his/her designee to ensure the LHMP is included in each budget year staff workshops and Board of Directors Budget meetings. It is also, the General Managers \or his/her responsibility to ensure new facilities are incorporated into the LHMP and the LHMP is updated to include new facilities, as well removing facilities from the LHMP that are no longer used, removed from service or the hazard has been mitigated.

APPENDIX A

APPENDIX B

APPENDIX C

Website Request for Hazard Mitigation Feedback

The Yucaipa Valley Water District Hazard Mitigation Planning Committee is in the process of updating the District's Hazard Mitigation Plan. The Hazard Mitigation Plan is required by the federal Disaster Mitigation Act of 2000.

The Plan details the risks of both natural and manmade hazards in our service area and includes programs and projects that can help reduce the exposure of District residents and businesses should an event occur. An approved Plan also makes the District eligible for federal pre-disaster and post-disaster assistance.

In order to identify and plan for future disasters, we need your input! We would appreciate your feedback with any comments and/or suggestions. The information you provide will help the District coordinate activities to reduce the risk of injury or property damage in the future.

Your comments are completely confidential. We very much appreciate your participation in this survey which will be an integral part of our updated plan.

APPENDIX D

Stakeholder Meeting Agendas