Mission Springs Water District

Local Hazard Mitigation Plan

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SECTION 1: INTRODUCTION

1.0 Purpose of the Plan

Emergencies and disasters can leave people injured or displaced, cause significant damage to our communities, businesses, public infrastructure, and environment, result in response and recovery dollars and economic loss, and may even cause or contribute to fatalities. Hazard mitigation attempts to reduce the risk of personal damages, loss of life, and property damages caused by emergencies and disasters.

Repairs and reconstruction after disasters are often completed to simply restore infrastructure to pre-disaster conditions. Such efforts expedite a return to normalcy; however, merely replicating pre-disaster conditions often results in a cycle of damage, reconstruction, and repeated damage. Hazard mitigation attempts to break this cycle by reducing hazard vulnerability.

While we cannot prevent disasters from happening, their effects can be reduced or minimized through preparedness and mitigation. For those hazards that cannot be fully mitigated, the community must be prepared to provide an efficient and effective response and recovery to emergencies. This can be accomplished through well-organized public education and awareness efforts.

The purpose of this Local Hazard Mitigation Plan (LHMP) is to identify potential hazards to Mission Springs Water District (MSWD or District) and formulate mitigation measures for the future protection of the District's critical infrastructure and the community's safety with respect to the District's facilities and services. Approval of this LHMP by the State of California Office of Emergency Services (CalOES) will also allow the Department to become eligible to receive federal funding assistance under the Local Hazard Mitigation Grant Program or the Pre-Disaster Mitigation Program as administered by the Federal Emergency Management Agency (FEMA).

1.1 Authority

MSWD is under the District's authority operating pursuant to California Water Code Section 3000 et. Seq. and under the State of California Department of Water Resources, Drinking Water Division. The District is governed by a five-member board elected from within the District's services boundaries.

As required by FEMA, LHMPs must be updated, adopted, and approved every five years. This is the District's first LHMP.

1.2 Community Profile

MSWD serves Desert Hot Springs, a portion of Palm Springs, and the unincorporated communities of North Palm Springs, West Garnet, Painted Hills, Mission Lakes Country Club, and west to the Cabazon Indian Reservation.

For the Desert Hot Springs area, the District provides the majority of the potable water supply from the Mission Creek Subbasin to its customers. It is bounded on the north by the Mission Creek Fault and on the south by the Banning Fault. Eight deep-water wells within the Mission Creek Subbasin, three within the Indio Subbasin, and two within the San Gorgonio Pass Subbasin provide water to the District's distribution system. MSWD's western-most service area includes the West Palm Springs Village and Palm Springs Crest areas. These areas receive water produced from the Cabazon Groundwater Basin, which is in the eastern portion of the San Gorgonio Pass Subbasin and the Indio Subbasin.

1.3 Physical Setting

Located about 100 miles east of the Pacific Ocean, the District lies within the borders of Riverside County. Just 10 miles north of Palm Springs, 75 miles east of Los Angeles, 140 miles north of San Diego, and encompassed between San Bernardino National Forest and Joshua Tree National Park. The District's current service area encompasses approximately 390 miles of pipelines or 135 square miles.

The topography of the area is characterized by some of the purest hot and cold mineral springs in the world thanks to an underground aquifer beneath the city. The District's service area is on top of a multitude of subbasins. Mission Creek Subbasin being the largest, with a recharge facility located northwest of Desert Hot Springs.

1.4 Demographics

MSWD service area community is considered a disadvantaged community by the State of California. Per the 2020 United States census, the people living within the service area had a Median Household Income (MHI) of $33,046, with 33.1% of the population living below the federal poverty line. The MHI of California is $75,235.

1.5 Existing Land Use

The existing land use is housing, commercial, and light industry with a few areas fully developed. The City of Desert Hot Springs regulates land use in the city. Riverside County regulates land use in the county areas within the jurisdictional boundaries of the District's service area.

1.6 Development Trends

Strategically located 75 miles east of Los Angeles, the Desert Hot Springs 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 taxes levied on residents or businesses, and recent improvements to wastewater treatment and water supply systems provide adequate capacity to meet almost any need.

Currently, there are large housing developments under construction, and there are some infill residential properties under development in the service area. Home prices in the area are increasing at a lower rate than other communities in the Coachella Valley, and recent developments are not expected to change current demographics.

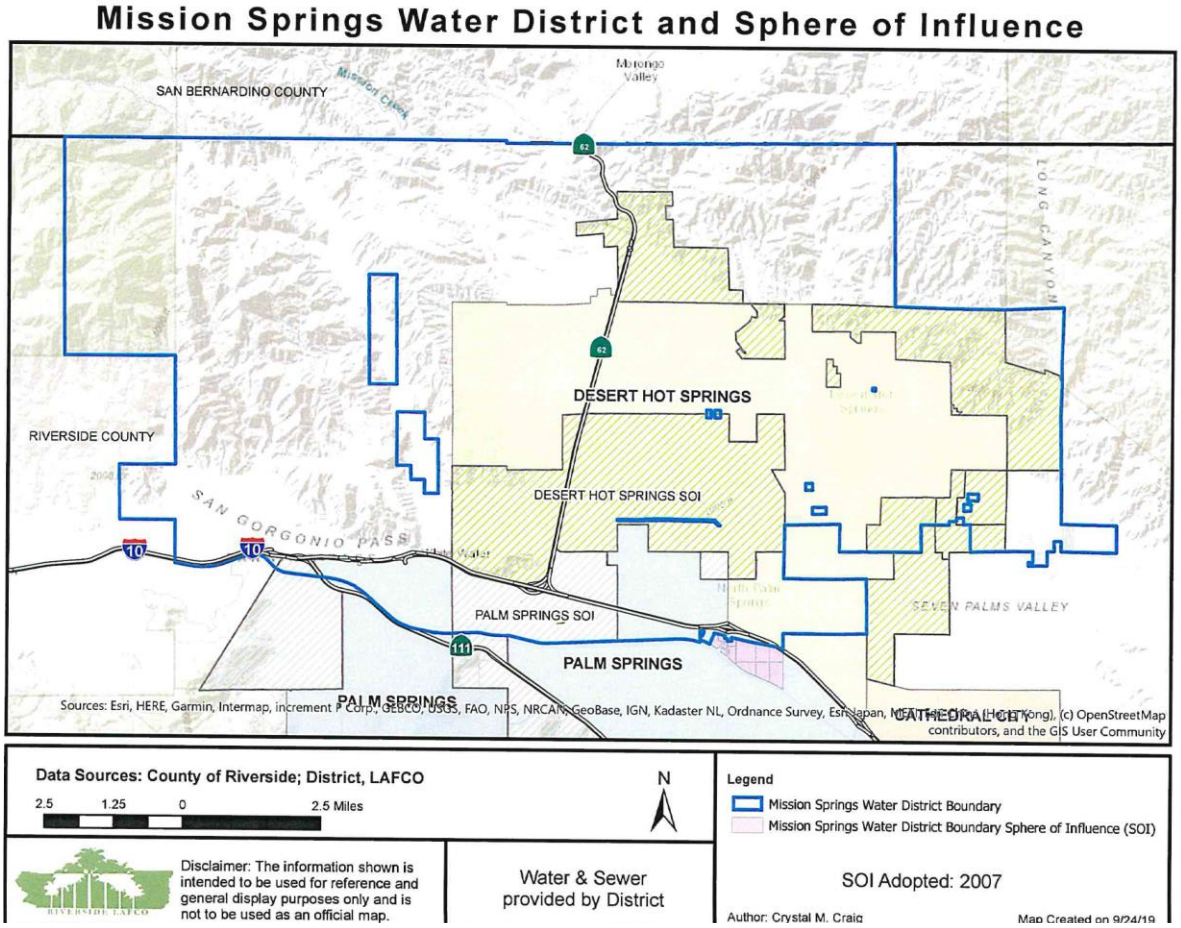


Figure 1. Mission Springs Water District Boundary

SECTION 2: PLAN ADOPTION

2.1 Adoption by Local Governing Body

The completed MSWD LHMP will be presented to the Board of Directors for adoption after CalOES and FEMA have approved the document. Upon adoption by the Resolution of the Board of Directors, the LHMP will be sent to CalOES and FEMA for their records.

The completed and adopted plan will be forwarded to the Riverside County Fire Office of Emergency Management for their use.

2.2 Promulgation Authority

This LHMP will be adopted by the District's elected Board of Directors, following approval of the plan by CalOES and FEMA:

Nancy Wright
President, Division 1

Russ Martin
Vice President, Division 3

Randy Duncan
Director, Division 2

Ivan Sewell
Director, Division 4

Steve Grasha
Director, Division 5

2.3 Primary Point of Contact

The point of contact for information regarding this plan before approval by FEMA is:

Bassam Alzammar
Mission Springs Water District
balzammar@mswd.org

Gary Sturdivan
Sturdivan Emergency Management Consulting, LLC.
gsturdivan@semcllc.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 MSWD staff and representatives from the City of Desert Hot Springs and local water agencies. These team members have a vested interest in the performance and resiliency of the District.

Riverside County Office of Emergency Services reviewed the plan for items that should be included from the County's Hazard Mitigation Plan. Riverside 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 Review Tool", where Riverside County OES supplied information on past events that affected the service area. The Planning Team also reviewed Riverside County's HMP and the City of Desert Hot Springs HMP.

Riverside County OES completed a FEMA Hazard Profile of the area and provided maps to the District for use in this 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. The Planning Team discussed the different emergency 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 process, the Planning Team used the following plans to gain information on the hazards that face the service area and the mitigation goals of the District and the County of Riverside:

Table 1. Plans Reviewed by Planning Team

Study Plan	Key Information
MSWD Water/Wastewater System Comprehensive Master Plans, URS, 2008	Population, Future Infrastructure, Future Water Supply
Hi-Desert Water District HMP, 2016	HMP Layout, Subject Matter for Water Districts
Riverside County EMS HMP, 2018	Hazards Facing Local Agencies
Emergency Response Plan (ERP), 2020	Identified Hazards in HMP

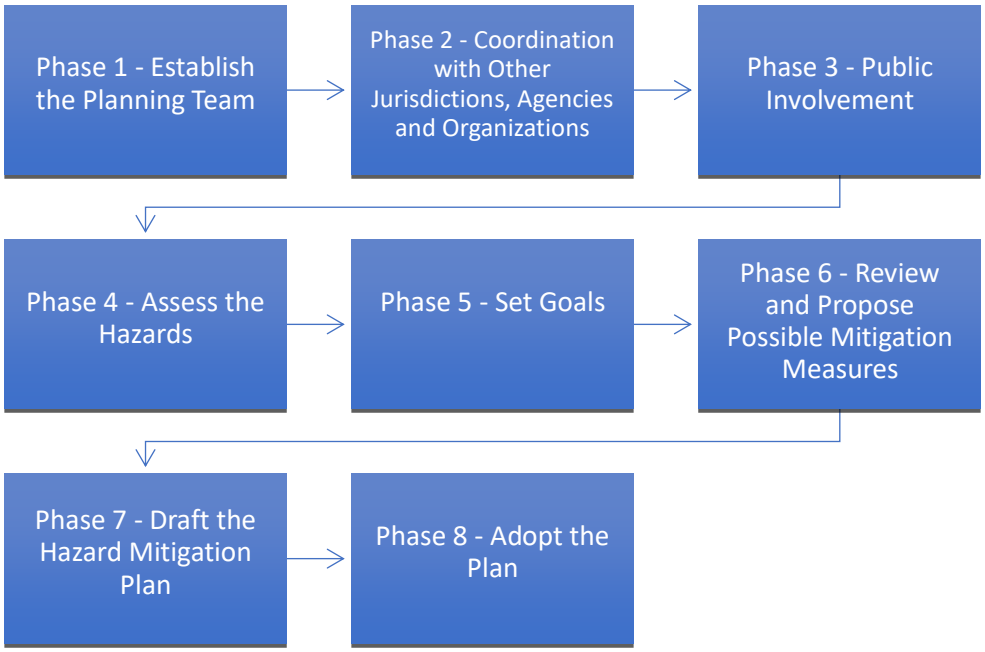


Figure 2. Flow Chart for Developing a Hazard Mitigation Plan

Table 2. Financial Resources for Future Mitigation Projects

Local	Revenues	Amount
The Department's Budgets and Financial Planning Documents	Water Sales, New Construction, Wastewater Fees and Treatment Fees	Varies from year to year
FEMA Grants	None	None
State Revolving Funds Draft Application	Construction of Wastewater treatment facilities	$45M-$55M
FEMA Mitigation Grants	LHMP Grant, 2020	$35,000
Prop. 84 Round 1 (Planning)	Update of the CV IRWM Plan	$1,000,000
	CVRWMG 2018 IRWM Plan Update	$211,982
Prop. 84 Round 1 (Implementation)	Assessment District 12, Area D-1 Sewer Construction	$1,000,000
	Assessment District 12, Area J-1 Sewer Construction	$756,500
Prop 84 Round 2 (Implementation)	Assessment District 12, Area D-2 Sewer Construction	$1,900,000

	Recycled Water Program Dev. Feasibility Study	$245,000
Prop 84 Round 3 (Drought)	Regional Turf Reduction Prog. And DAC Onsite Plumbing Retrofit Prog.	$365,000
Prop. 84 Round 4 (Implementation)	MSWD Water Supply Reliability Program (Well 42 & Advanced Metering Technology Pilot Project	$919,916
Prop. 1 Round 1(DAC Involvement)	MSWD GQPP Areas H & I Sewer Design	$372,677
Prop. 1 Round 1 (Implementation)	Assessment District 18 Area D-3 Sewer Construction	$77,000
	Regional Water Conservation Program	$75,000
AB 1318 Mitigation Fee Fund (SCAQMD)	Well 33 Solar Project	$3,300,000
Prop. 1 CV Mountains Conservancy	Willow Hole Monitoring Wells	$95,156

Environmental Protection Agency	Assessment District 12	$2,044,500 (several grants)
California Prop. 40	Assessment District 12	$1,914,413
California State Water Resources Control Board	Assessment District 12	$4,815,379
US Army Corps of Engineers – Federal Grants	Sewer Master Plan	$317,979
	Assessment District 12, Areas M, F, D-1, D-2, J, J-1 Design	$3,028,000
Bureau of Reclamation	Water Recycling Appraisal, IRWMP	$383,050
California Prop. 13	Dos Palmas Waterlines	$5,000,000

3.2 Planning Team

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

Danny Friend
Director of Engineering and Operations

Bassam Alzammar
Field Operations Manager

Amanda Lucas
Operations Administrative Assistant

Lee Boyer
Chief Plant Operator, Wastewater

April Scott
Customer Service Manager

Jeff Nutter
Construction and Maintenance Superintendent

Juan Hernandez
Water Production and Maintenance Foreperson

Victoria Llort
Programs and Public Affairs Associate

Luiz Santos
Associate Engineer

External Stakeholders Document Reviewers

Ray Kolisz
General Manager Twentynine Palms Water District

Mark Ban
General Manager Joshua Basin Water District

Mark Bassett
Riverside County Emergency Management Division

3.3 Coordination with Other Jurisdictions, Agencies, and Organizations

The consultant first called the Planning Team and asked for their input. The consultant electronically sent the draft document to each team member and gave them a week to make comments. Residents were informed and invited to participate in the meetings and come to the Board meetings once a month. The information was posted on the customers' water bill each month and listed the link to the District's website, where the draft LHMP is posted.

Outside stakeholders received the document in chapters as they were being formed; any comments were directed back to Gary Sturdivan for review. The external stakeholders made no comments. Stakeholders were invited to participate in the review meetings that were held via zoom; however, no stakeholders participated.

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, which allows access to the information by all participants and the public.

All draft revisions of the LHMP were posted on the District's website, and a statement was printed on three months of customers' water bills, letting the customer know how to get to the plan. Mr. Gary Sturdivan's contact information was on each document for any questions or concerns. The MSWD LHMP Planning Team reviewed the document and made corrections or voiced concerns to the consultant. These comments were discussed at the next Planning Team meeting, and corrections were then made to the document.

3.4 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 the comments period, as required by FEMA. The LHMP was posted on the District's website for a 30-day review period https://www.mswd.org/. Requests were made on the website for public comments, and the website included notifications that comments could be made by emailing Mr. Sturdivan at gsturdivan@semcllc.com or by calling Mr. Sturdivan at (909) 658-5974.

No public comments were received by Mr. Sturdivan or by the District's staff. The Appendices provide details of the public involvement process, such as the meeting dates, purpose, agendas, and public comments (if any), as well as a screenshot and link of the webpage showing requests for public participation.

3.5 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 other desert areas of the United States. The Planning Team reviewed documents such as engineering drawings, photographs, and available geotechnical and geologic data both from the Internet and other sources such as FEMA Hazard Maps, Riverside County Hazard Map, as well as documents from the District on past events.

The Planning Team completed the assessment of the various hazards in a group setting. The Planning Team members have many years of personal experience working in the local area and many working with a water utility. Team members know the history of past hazardous or emergency events, such as the 1992 Landers Earthquake, a 7.3 magnitude earthquake that severely impacted the region.

3.6 Set Mitigation Goals

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

"MSWD has one simple mission: Provide, protect, and preserve our most valuable resource... Water."

Those eight words capture a complex and dynamic task.
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 was 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.

3.7 Review and Propose Possible Mitigation Measures

A wide variety of mitigation measures that can be identified to help reduce the impact of the hazards or the severity of the 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. Preventative Activities – Zoning, building codes, stormwater ordinances.
3. Structural Projects – Detention basin, 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 Planning Team 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 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 five-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 the 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?

3.8 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 asking 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.

3.9 Adopt the Plan

The draft LHMP was posted on the District's website for 30 days, inviting comments from the public. The public could comment by email or telephone, as Mr. Sturdivan's email address and phone number are on the cover of the document. 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 submitted to the District's 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 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) organize the planning process and resources; 2) assess risks; 3) develop a mitigation strategy; and 4) adopt and implement the plan. 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).

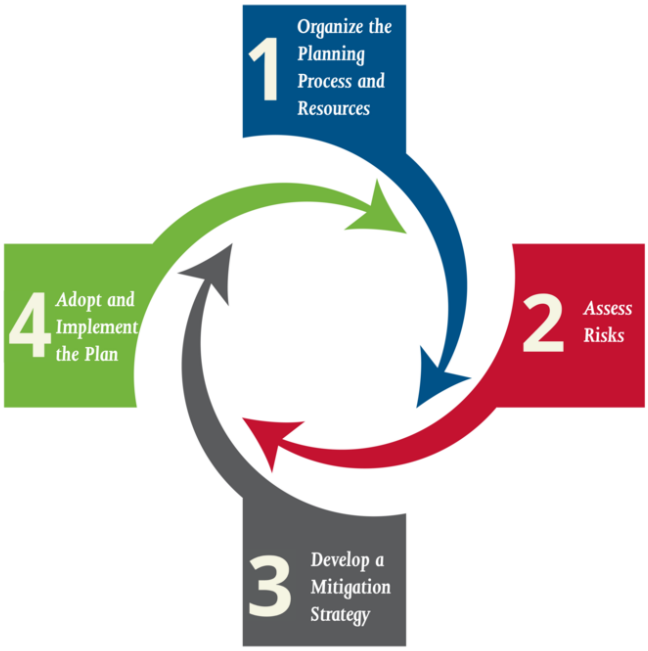


Figure 3. Risk Assessment Process

The risk assessment approach for MSWD is composed of these four steps, and each step is organized in a separate subsection of Section 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 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 District's critical facilities and infrastructure that may be affected by hazard events. This step includes a 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 Association J-100 RAMCAP was used to identify 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 District. A list of the natural hazards to consider was obtained from the 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. Windstorms cause power outages and Public Safety Power Shutoff (PSPS) events. The District has backup generators at the most critical sites.

Hazards:

- Earthquake = 1
- Windstorms = 1
- Drought = 2
- Flooding = 3
- Wildfires = 3

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

- Volcanoes
- Tsunami
- Landslide
- Dam Inundation

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
- For **Priority**, the ratings are: High, Medium, and Low

The hazard 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. See table 3 below.

Table 3. Hazard Assessment Matrix

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

4.1.3 Hazard Prioritization

By combining the Hazard Assessment Matrix, table 3 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**.**

Probability Ratings: Highly Likely, Likely, or Somewhat Likely
Impact Ratings: Catastrophic, Critical, or Limited

4.2 Hazard Profile

This plan is the first Hazard Mitigation Plan for the District. The Planning Team reviewed FEMA hazard maps from HAZUS (Hazards in the US), and with the Planning Team's knowledge of the area, the past events in the area, the Planning Team determined which hazards were the most likely to cause damage to the District's infrastructure. HAZUS is a FEMA program that identifies all-natural hazards throughout the United States.

Each of the hazards was ranked from Highly Likely, Likely. And somewhat likely. The impact to the agency is also ranked from Catastrophic, Critical, and Limited. The Planning Team also ranked the priority for each of the hazards as High, Medium, and Low. The reader will see each of these rankings on all the hazards identified in the document.

4.3 Earthquake

Probability: Highly Likely (1)
Impact: Catastrophic
Priority: High

General Definition: 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 water, sewer, 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 landfills 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.

Description: Mission Springs Water District is 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 throughout 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 Coachella Valley region of Riverside 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 the 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.

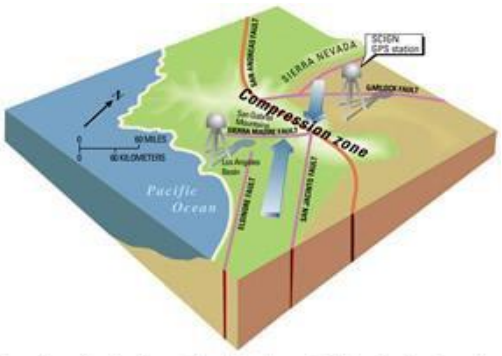
Geologic formations in the District may be grouped into three main categories-alluvium, gneiss/schist, and sandstone. Most of the District rests on alluvial deposits comprised of gravelly and sandy-washed material located on the "flatlands". These areas are further differentiated into older and younger alluvial deposits. Older deposits consist of an alluvial fan conglomerate called "fanglomerate" and other decomposed clay-rich alluvium.

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 earthquakes. 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 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 4, "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 4 - "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 4. California Earthquakes

Date of	Location	Magnitude
***2019 07 05**	Ridgecrest	M 7.1
***2019 07 04**	Ridgecrest	M 6.4
2014 08 24	South Napa	M 6.0
2014 03 28	Greater Los Angeles Area, La Habra California	M 5.1
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, CA	M 4.6
***2003 02 22**	Big Bear City, CA	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, CA	M 3.9
2002 09 03	Yorba Linda, CA	M 4.8
2002 06 17	Bayview, CA	M 5.3
2002 05 14	Gilroy, CA	M 4.9
2002 03 16	Channel Islands Beach, CA	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, CA	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	Humboldt 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

*Events with an asterisk indicate a direct effect on the District

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

The entire geographic area of California is prone to the effects of an earthquake. Figure 5 represents the fault map. As shown below, the table within the figure presents the earthquake profile findings within the District's boundaries. The ground motion findings indicate that within the District's limits, peak ground acceleration could exceed 65 percent. Typically, any acceleration over 30 percent is considered strong to severe. The USGS also reports a 97% probability that Southern California will have a 7.6 scale earthquake within the next 30 years.

Mitigation: Projects to help mitigate damage from earthquakes range from installing seismic shut-off valves on all water reservoirs in the District to flexible pipe joints that can be installed at reservoirs, wells, and booster pumps. Flexible pipe joints can also be installed in sections of water pipelines to allow the pipelines more flexibility during earth movement. Block walls can be installed around facilities to help ensure the security of critical facilities and control water that may escape from reservoirs.

Mission Springs Water District Fault Map – Alquist Priolo Fault Zones

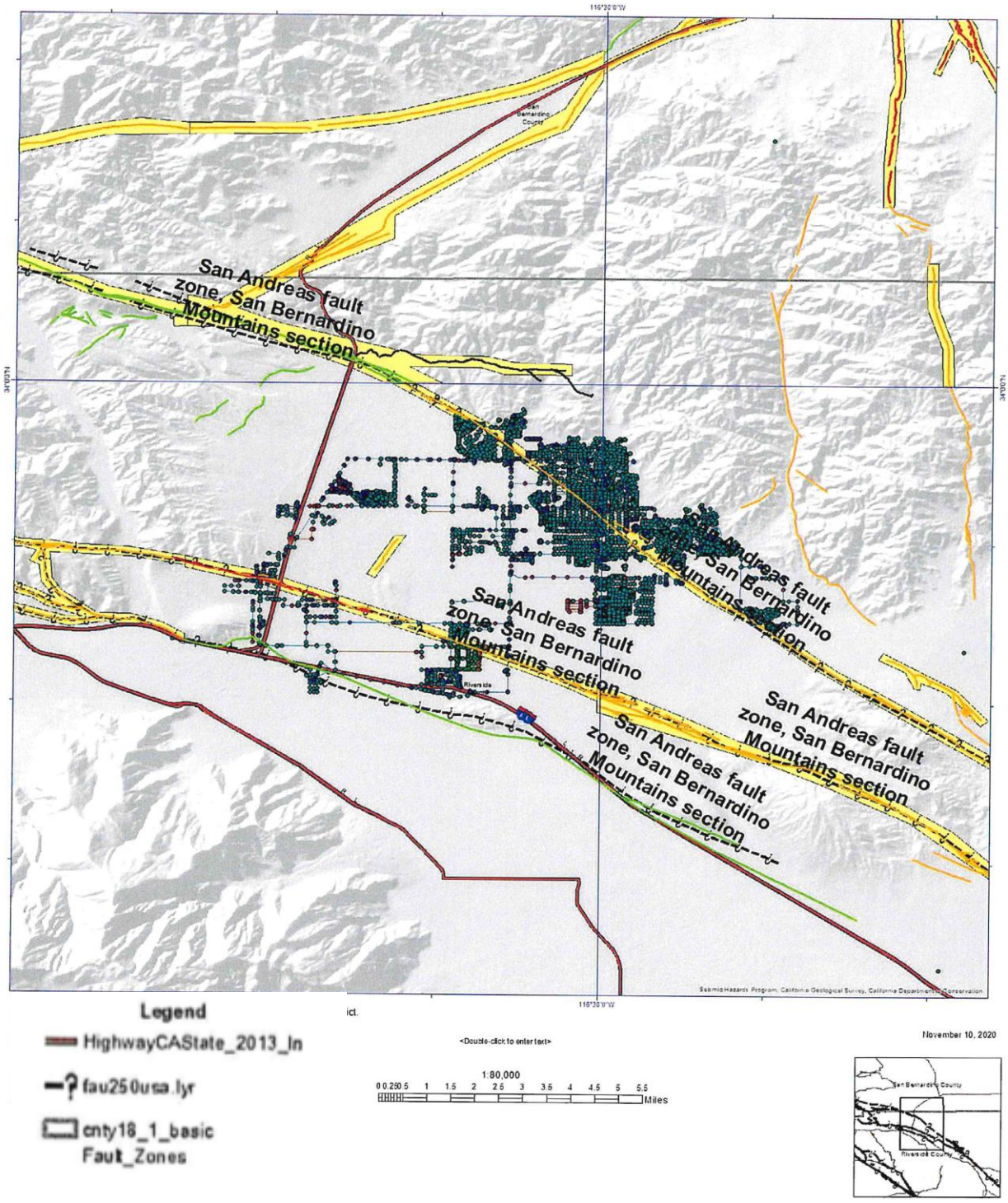
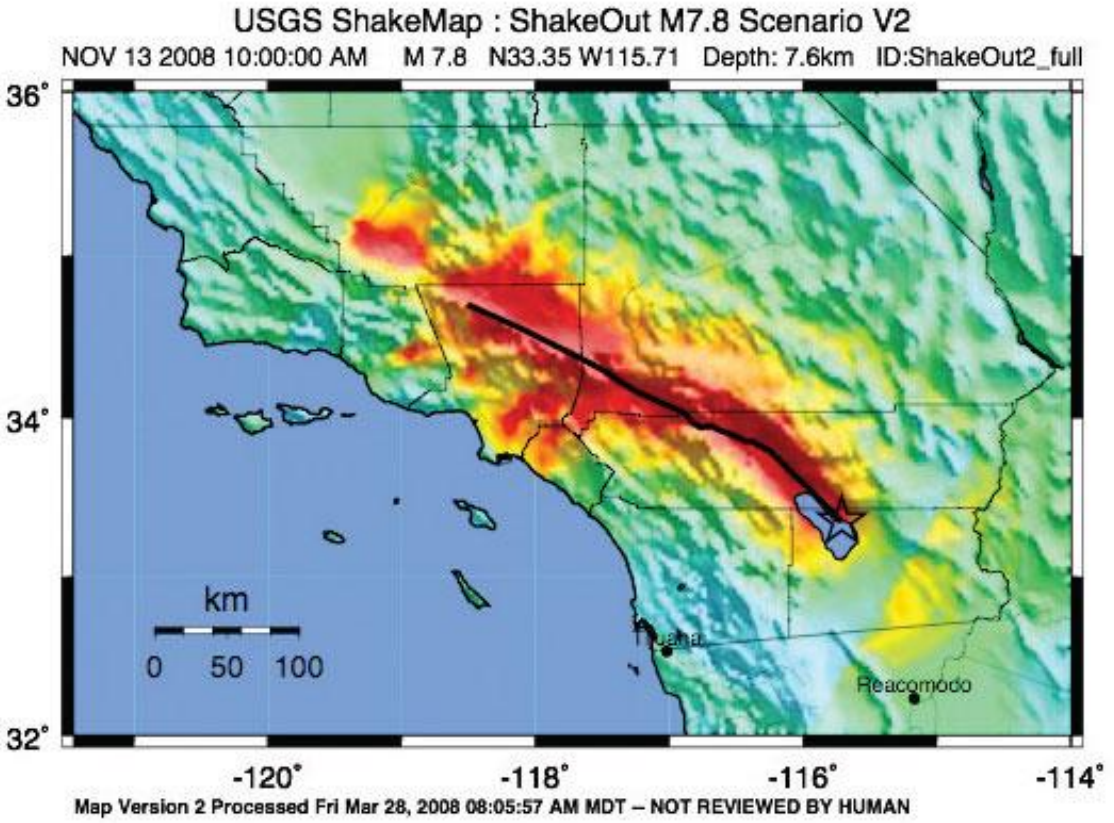


Figure 5. Fault Map



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	*<.17*	*.17-1.4*	*1.4-3.9*	*3.9-9.2*	*9.2-18*	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	*8.1-16*	*16-31*	*31-60*	*60-116*	*>116*
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Figure 6. USGS ShakeMap and Table for Shakeout M7.8 Scenario V2

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest,especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Figure 7. USGS Modified Mercalli Intensity Scale

4.4 Windstorms

Probability: Highly Likely (1)
Impact: Critical
Priority: High

General Definition: High-speed and dangerous winds that periodically kick up and blow from the mountains to the coast in Southern California are referred to as Santa Ana winds.

These northeasterly winds blow from the coast ranges to the beaches as areas of strong high-pressure build across the interior West. The phenomenon typically peaks in October but can occur anytime from late to early Spring.

Figure 8. Santa Ana Winds

Table 5. Beaufort Wind Scale

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 ft) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (30-45 ft) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	

Description: The wind speed can be magnified as air tries to squeeze over mountain passes and rush downhill through the canyons that are aligned in a northeast to southwest direction in Desert Hot Springs, causing impacts across the entire District area. As the air descends in elevation, it becomes compressed and heats up, and dries out even more.

Moderate Santa Ana winds can often break tree limbs, send unsecured debris flying into windows, raise clouds of dust and cause wildfires to ignite and spread rapidly. In addition to a heightened risk of wildfires, whole trees, and high-profile vehicles can be knocked over, and sporadic power outages are likely in more extreme cases.

When winds aloft become aligned from the same direction as that of the winds near the surface, the strongest gusts occur. Sometimes wind gusts can reach the force of a hurricane (74 mph or greater). Gusts during this setup can lead to extensive property damage and widespread power outages. The winds do not cause any damage to the water of wastewater infrastructure; however,

these winds cause Public Safety Power Shut-off events; in PSPS, the electric supplier turns off power to the grid to stop downed power lines from starting wind-driven wildfires. The power outages mean the District can't run wells, booster stations without having generators in place.

Mitigation: Projects to help mitigate damage from windstorms include public education regarding trimming trees around power lines (Southern California Edison will normally clear tall trees from powerlines for free) and develop a plan in conjunction with Southern California Edison to inform the residents. Develop plans with Southern California Edison on Public Safety Power Shut-off (PSPS) programs. The PSPS program would also help inform Edison on which homes must have power for emergency medical needs. Additionally, the District will purchase more generators to energize critical infrastructure.

Table 6. Desert Hot Springs Windstorm History

Date	Max Gust Wind MPH	Max Wind MPH
*April 1975	61	66
*June 1975	75	46
October 1979	46	29
December 1982	35	29
March 1986	29	23
*March 1990	40	53
May 1994	44	32
*June 1999	36	58
October 2002	43	24
December 2007	40	25
July 2011	31	22
April 2015	37	29
*January 2019	48	33
*October 2021	53	31

*Events with an asterisk indicate a direct effect on the District.

4.5 Drought

Probability: Likely (2)
Impact: Critical
Priority: Medium

General Definition: 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 bringing 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 the 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, 2018.

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 connection to the SWP.
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.

Drought could increase water demands while lowering the groundwater table. This would result in increased pumping costs and may require installing deeper water supply wells. Extreme weather events will increase runoff and flash flooding while reducing groundwater recharge.

With droughts causing water shortages, there is an effect on the drinking water supply; thus, affecting the whole service area. This could result in higher utility bill rates, water shortages, and lowering wells to meet lower water levels in the aquifer.

Mitigation: Construct more water storage capacity as well as 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. Specific sites that are vulnerable to damage from droughts are hard to quantify; however, most damage would be to all wells in the jurisdiction area that are at risk of drought. Damage to wells can run from the well's shaft being extended further into the ground to complete ruin of the well shaft, well casing, motor, and bowels. There are 13 wells in the District that would need to be assessed; this information would vary wildly. One would need to know the water level in each well during each drought timeline. This information would vary from the location in the system. The damage could only be assessed after knowing all the variables. The average cost of replacement for each well is estimated between $150,000 - $250,000.

MSWD can have public outreach water conservation programs and explore alternative options for water supplies.

The maps below are taken from https://droughtmonitor.unl.edu/Maps/MapArchive.aspx and show the drought differences in the period between 2011, 2016, and 2020, which vary wildly from year to year.

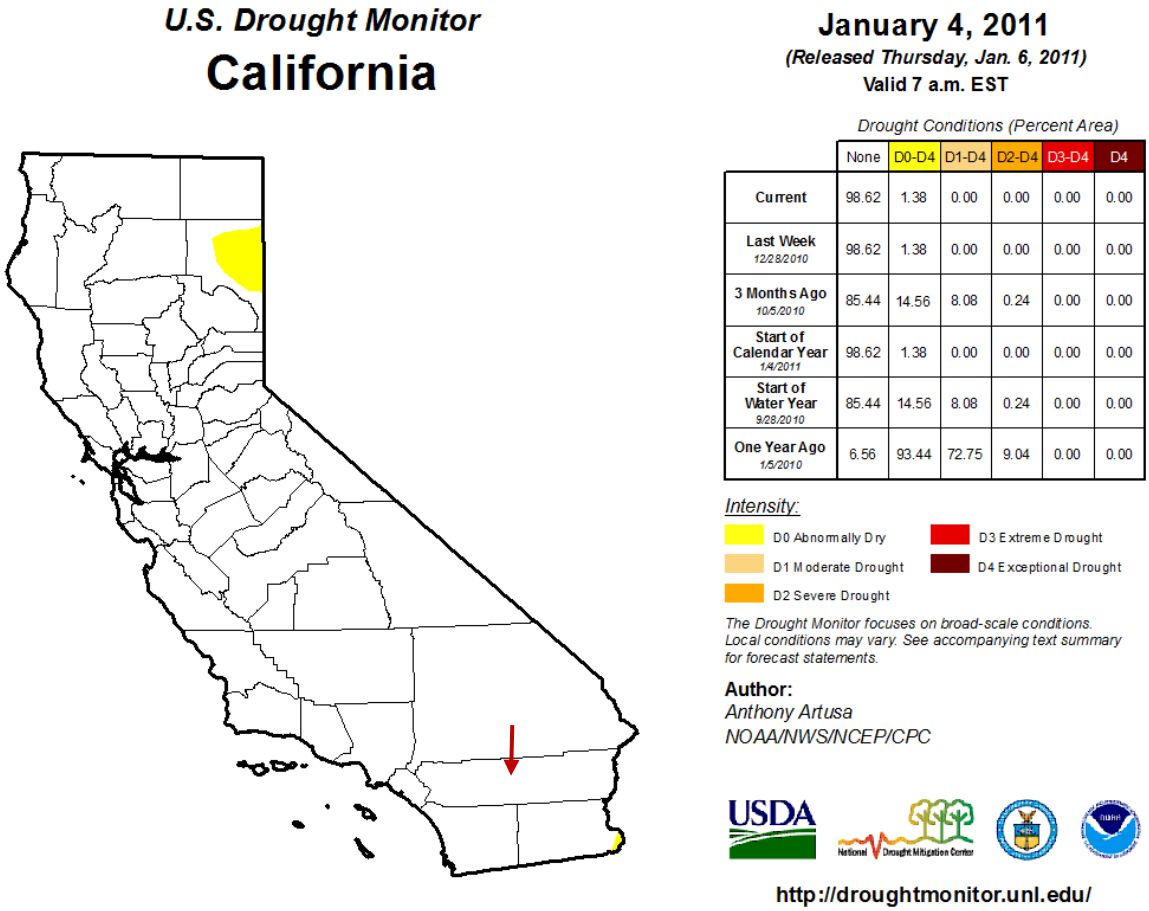


Figure 9A. 2011 Drought Monitor

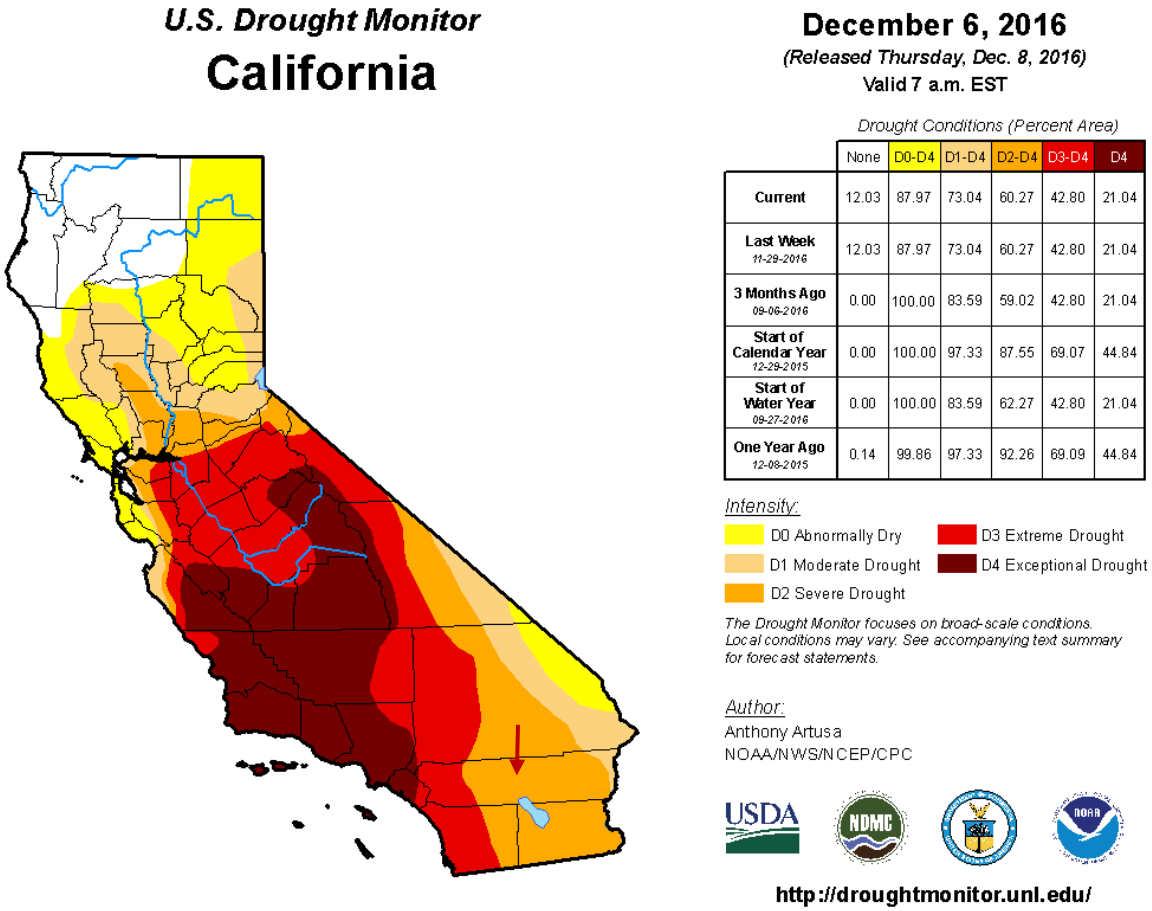


Figure 9B. 2016 Drought Monitor

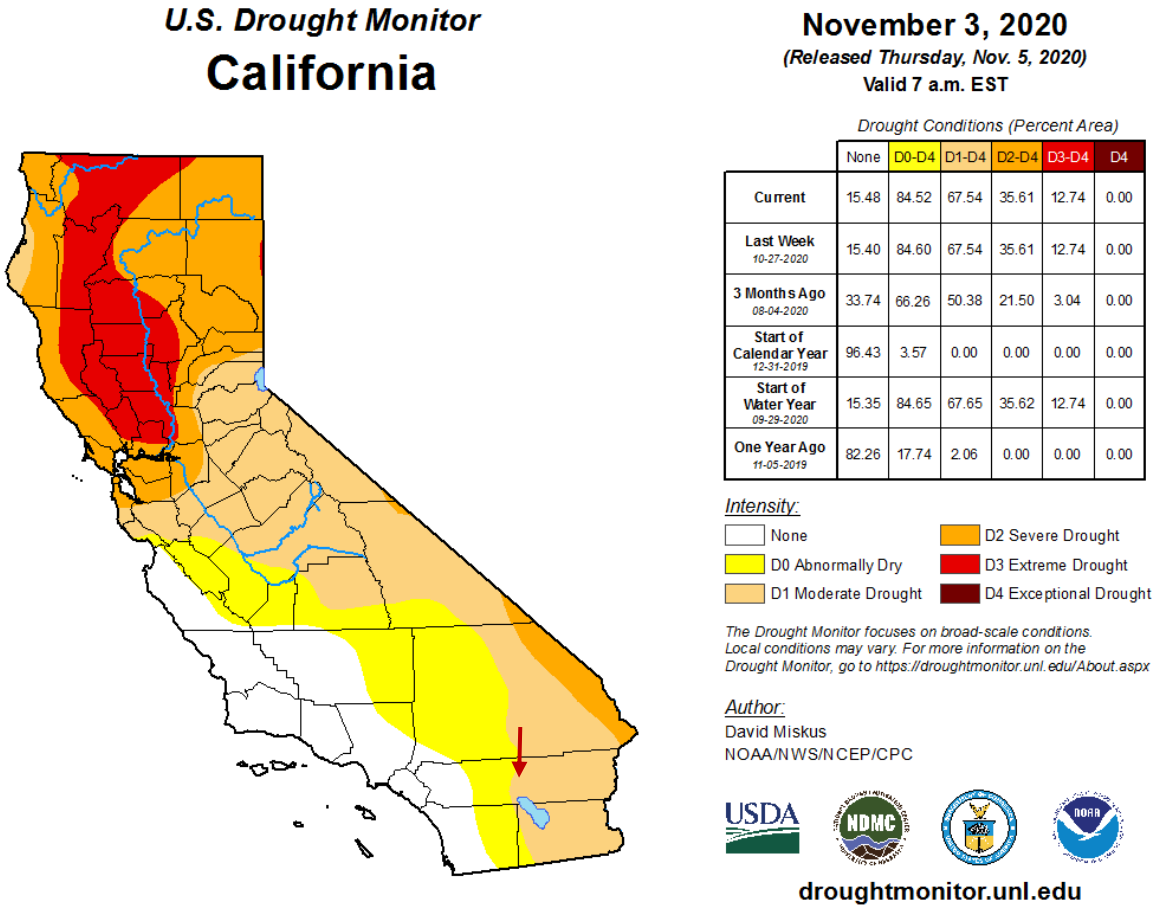


Figure 9C. Current Drought Condition for Southern CA for 2020

Table 7. 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".
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.

*Events with an asterisk indicate a direct effect on the District.

The fundamental drought impact on water agencies is a reduction in available water supplies. As a result, historical 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 and response actions. In addition, public and media interest in droughts foster 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 participating in a regional Urban Water Management Plan (UWMP) for 2020. The draft in progress 2020 Regional UWMP presents water supply to demand comparisons through 2045. The 2020 Regional UWMP will be completed by July 1, 2021 and will update any demand and supplies documented in the 2015 UWMP and confirm that the District is in compliance with the Water Conservation Act of 2009 (Senate Bill X7-7) in reducing their per capita urban 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. Lastly, the 2020 Regional UWMP includes a comprehensive update to the District's Water Shortage Contingency Plan, aligning with the State's proposed six water shortage stages. The draft 2020 Regional UWMP shows that the District has exceeded the SB X7-7 compliance goal and has adequate supplies to meet projected demands through 2045.

The District recently made it through the worst drought in California's recorded history that stretched from 2012-16. During that time, the State passed emergency executive orders in response.

At that time, the District adopted the state's orders, which aided in reducing water consumption and maintained adequate water supplies to meet demand. The District exclusively relies on the Mission Creek, Indio, and San Gorgonio Pass Sub-Basins to meet demand, which is currently 6,800 acre-feet per year. These Sub-Basins serve as large conjunctive use reservoirs, replenished by surface water runoff and artificial recharge. During extended drought conditions, the District can rely on groundwater supplies to meet demand; however, if the groundwater supplies aren't replenished, it may lead to long-term impacts (e.g., chronic lowering of groundwater levels, land subsidence, etc.). As such, while the District may not have difficulty in meeting its short-term water supply demands, additional supplemental supplies are needed to replenish the basin during non-drought periods to maintain its beneficial uses long-term. Of note, the Desert Hot Springs Sub-Basin contains hot mineral (non-potable) groundwater, which supports the spas and resorts in the area. Drought conditions have a minimal effect on this Sub-Basin.

As noted above, the last drought cycle in the District's service area didn't cause any damage to the District's facilities or to the public. The Public was asked to conserve water, and the District never ran out of water during the drought. The infrastructures that may be potentially affected by drought are the District's wells, which, if groundwater levels dropped significantly, would most likely have to be pulled out of the ground, and the shaft would be extended to allow the bowels of the well to reach deeper into the aquifer. Again, during a drought period, voluntary and/or mandatory water conservation measures would be required of the public to minimize long-term impacts to the groundwater aquifer system.

4.6 Flooding

Probability: Somewhat Likely (3)
Impact: Limited
Priority: Low

General Definition: Flooding ranked a limited hazard. Areas subject to flooding in Mission Springs Water Districts service area include the Garnet wash, Dry Mongo wash, and the little and big Morongo Wash. These areas are normally dry; however, these dry wash areas turn into raging water way during heavy downpours in the local Little San Bernardino Mountains and the high desert regions north of Desert Hot Springs. These floods happen in winter or during Monsoon Session. 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 require a 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-natural 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. MSWD is not part of the NFIP.

The collapse or subsidence of land along the shore of a lake or a similar body of water because 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.

Description: 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.

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.

Mitigation: The District has wells and booster stations in the flood plains; however, the well motors and boosters have been elevated on concrete pads to keep critical equipment out of the floodwaters. Some pipelines, both water, and wastewater are in the flood areas and can sustain damage in flooding events. There are no dams that would affect the District's infrastructure; therefore, dam inundation is not an issue for the District.

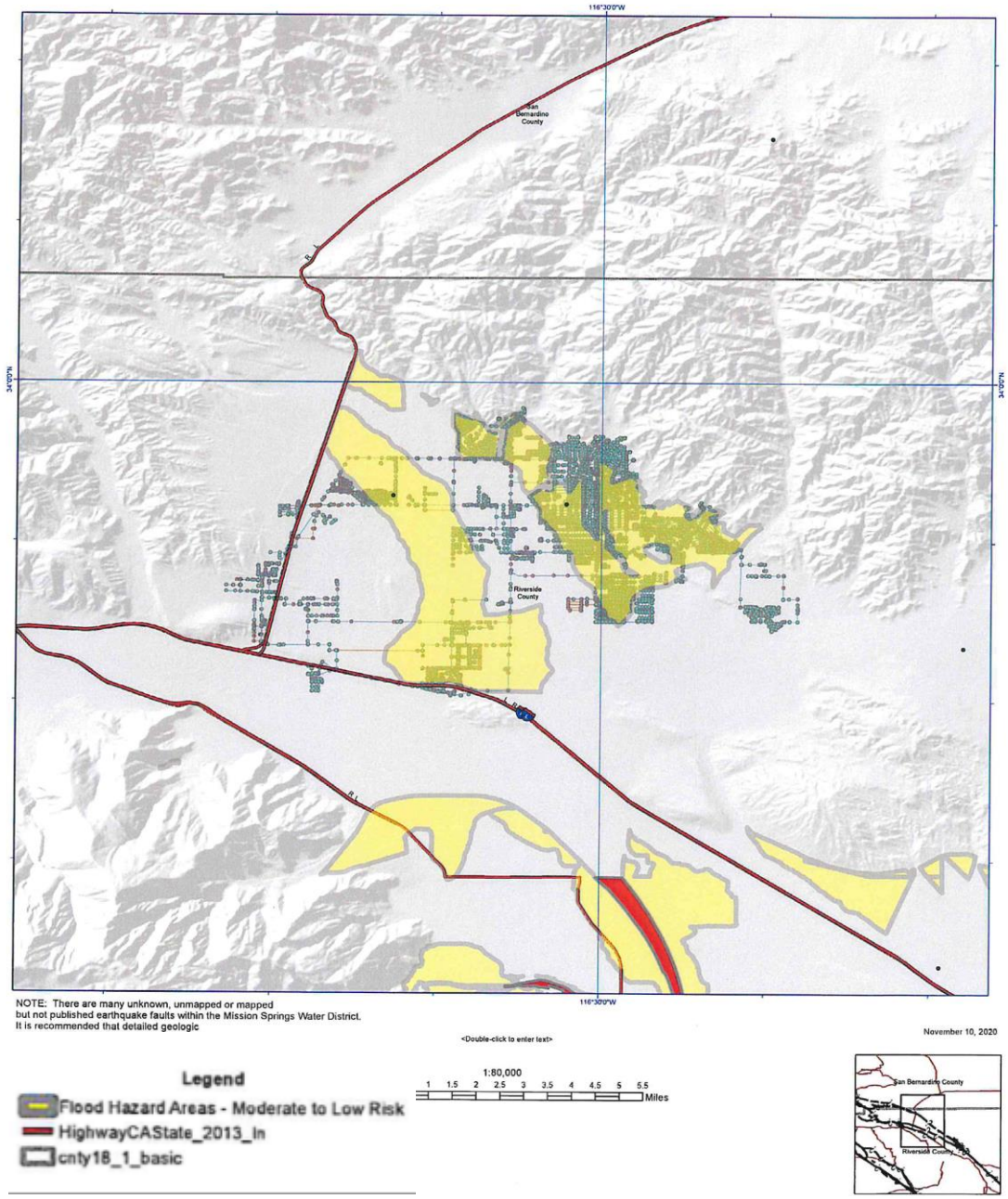


Figure 10. Flood Zone

Table 8. Previous Occurrences of Flooding.

Date	Flooding Events Name
January 2017	California Flood
8/2014	Hurricane Marie
1/22/2011	Jan 2011 Flash Flood/Mud Slides
*11/30/2002	Nov 2002 Stream Flood
*7/11/1999	Aug 1999 Flash Flood
*1/1/1997	New Year's Day Flood
11/1/1995	February Storm
3/1995	California Flood
1/1995	California Flood
2/2/1993	Jan. 1 Storm
2/11/1986	California and Western Nevada Floods
1/3-5/1982	Northern California Flood
September 1976	Ocotillo Flash Flood
*2/25/1969	Feb 1969 Flood
*1/25/1969	Jan 1969 Flood
8/23/1967	Aug 1967 Flood
12/18/1966	Dec 1966 Flood
8/14/1965	Aug 1965 Flood
4/10/1965	April 1965 Flood
12/19-24/1964	Christmas Flood
March 1964	North Coast California Tsunami
12/24/1955	California Flood
11/21/1955	California Flood
7/1/1950	July 1950 Flood
September 1939	Los Angeles River
2/27-3/1 1938	Los Angeles Flood of 1938
December 1937	Northeast California Flood
2/4 -7/1937	Santa Ana Flood
12/1933 – 1/1934	Crescenta Valley Flood
1909	California Flood
12/1861 - 1/1862	California's Great Flood
October 1858	1858 San Diego Hurricane
January 1850	1850 Flood
1825	Los Angeles flood of 1825

*Events with an asterisk indicate a direct effect on the District.

4.7 Wildfires

Probability: Somewhat Likely (3)

Impact: Limited

Priority: Low

General Definition: 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 the 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 play 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 the 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 signal reduced wildland fire occurrence and easier containment.

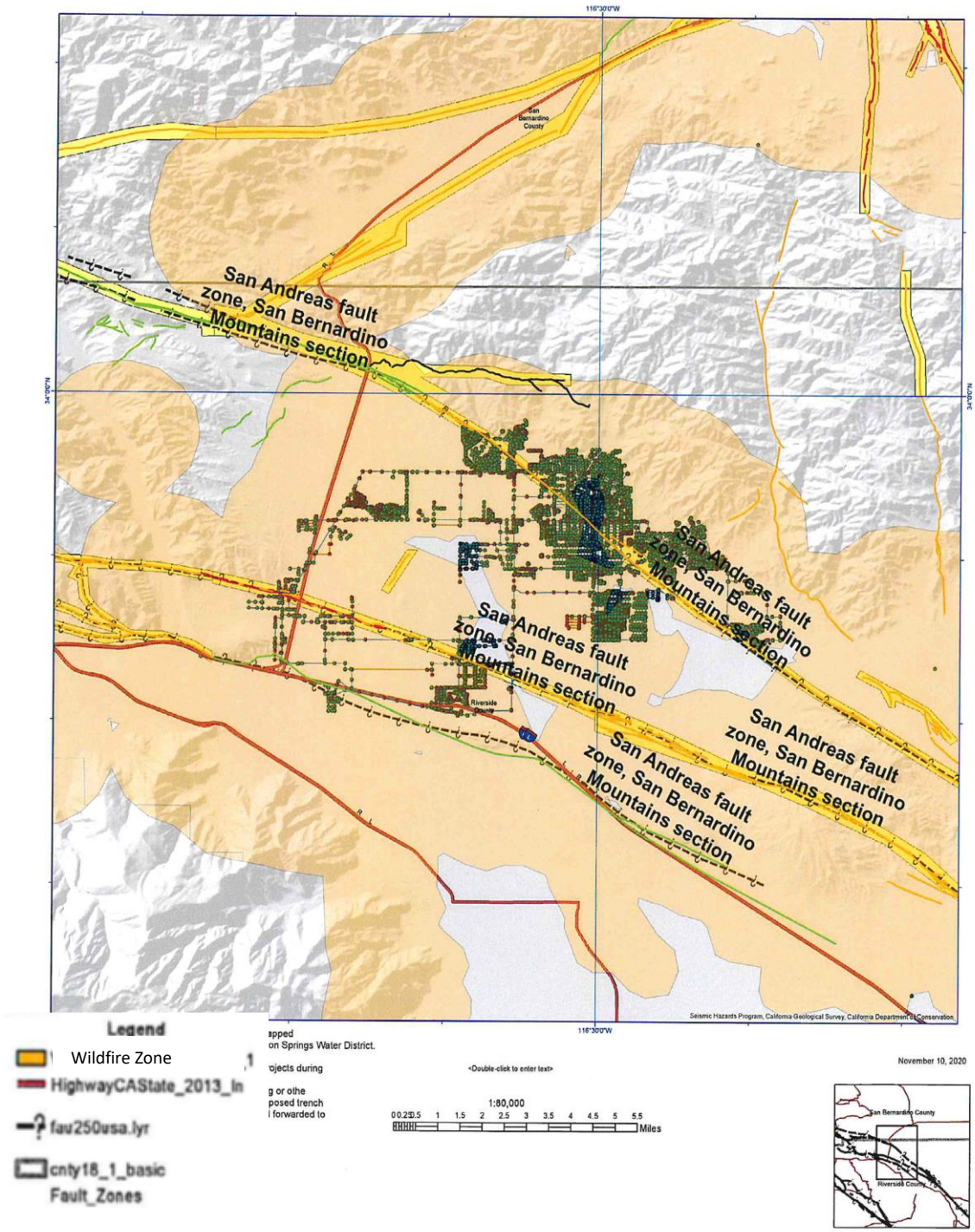


Figure 11. Wildland Urban Interface

Description: The frequency and severity of wildland fires are 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 the summer months. Thunderstorms from July through September can create lightning strikes, erratic high winds, and sometimes heavy rains. The District's service areas are 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.

Since Mission Springs Water District is in the lower California desert, wildfires have less of an impact on the agency. The low desert of Coachella Valley is where there is not a substantial fire risk, as vegetation is small plants and trees spaced farther apart than one would find in forested areas in the lush green forests in California.

There is not a significant fire danger to the water of wastewater infrastructure; therefore, wildfire ranks low on the hazard list. The list below is from all wildfires in California.

Table 9. Local Wildfires

Date	Event Name
9/05/2020	El Dorado Fire
7/03/2020	Apple Fire
10/10/2019	Sandalwood Fire
8/3/2019	La Brisa Fire
8/03/2017	Bryant Fire
*5/01/2013	Summit Fire
9/11/2013	Live Oak Fire
9/23/2009	Crafton Fire
8/31/2009	Pendleton Fire
8/30/2009	Oak Glen 3 Fire
5/07/2009	Park Fire
10/26/2007	Jefferson Fire
7/03/2007	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
10/29/1997	Fremont Fire

10/17/1995	Bluff Fire
10/27/1993	Mill Creek Fire

*Events with an asterisk indicate a direct effect on the District.

Mitigation: Fire prevention strategies concentrate on educating the public and enforcement of fire codes. Fire suppression strategies focus on 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.

4.8 Population

The population statistics for Mission Springs Water District are based on available US Census data. The District has a total population of 39,574 and an average household size of 2.9 people. Approximately 29% of the population is under the age of 18, and 14% is over the age of 65.

4.9 Buildings

As of November 2020, the District operates and maintains the following:

- 24 potable water reservoirs
- 13 water wells
- 25 booster pump stations
- Main Office/Administration Building
- Corporate Yard
- Two wastewater treatment plants
- One wastewater lift station
- MSWD solar field

4.10 Critical Facility List

This section provides a listing of the critical facilities in the Mission Springs Water District. 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. All costs were arrived at via insurance replacement costs and cost estimates from the Planning Team.

Table 10. Critical Facilities Exposure

Facility Name	Facility Function	Replacement Cost
Mission Lakes Res.	Storage Reservoir	$4.5 Million
Terrace 1 Res.	Storage Reservoir	$4.0 Million
Terrace 2 Res.	Storage Reservoir	$4.0 Million
Terrace 3 Res.	Storage Reservoir	$4.0 Million
Low Northridge Res.	Storage Reservoir	$2.0 Million
High Northridge Res.	Storage Reservoir	$3.5 Million
Vista Res.	Storage Reservoir	$2.0 Million
Redbud Res.	Storage Reservoir	$2.5 Million
Highland Res.	Storage Reservoir	$2.0 Million
Valley View Res.	Storage Reservoir	$2.5 Million
Overhill Res.	Storage Reservoir	$2.0 Million
Gateway Res.	Storage Reservoir	$2.0 Million
Cottonwood Res.	Storage Reservoir	$2.0 Million
High Desert View 1 Res.	Storage Reservoir	$4.5 Million
High Desert View 2 Res.	Storage Reservoir	$2.0 Million
Two Bunch Palm 1 Res.	Storage Reservoir	$2.0 Million
Two Bunch Palm 2 Res.	Storage Reservoir	$4.5 Million
Annandale Res.	Storage Reservoir	$6.0 Million
Quail Road Res.	Storage Reservoir	$4.5 Million
Little Morongo Res.	Storage Reservoir	$1.0 Million
Worsley Res.	Storage Reservoir	$6.0 Million
Woodridge Res.	Storage Reservoir	$3.0 Million
Well 22	Well	$3.5 Million
Well 24	Well	$4.0 Million
Well 25	Well	$2.0 Million
Well 25A	Well	$2.0 Million
Well 26	Well	$2.0 Million
Well 26A	Well	$2.5 Million
Well 27	Well	$3.0 Million
Well 29	Well	$3.5 Million
Well 31	Well	$3.5 Million
Well 32	Well	$3.0 Million
Well 33	Well	$3.5 Million
Well 34	Well	$3.0 Million
Well 37	Well	$3.5 Million
Administration Building	Administration, Finance Engineering, Support	$9.0 Million
Corporate Yard	Field Staff and Equipment	$6.0 Million
Horton WWTP	Sewer Treatment	$30.0 Million
Desert Crest WWTP	Sewer Treatment	$8.0 Million
Dos Palmas Lift Station	Sewer Lift Station	$2.0 Million
MSWD Solar	Solar Field	$25 Million

4.11 Vulnerability Assessment

The Planning 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.

4.12 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 Planning Team ranked the facilities by their importance to the District's production and delivery of drinking water. The Planning 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 the ranking was applied to the District'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 Southeastern section of Riverside County. The District serves Desert Hot Springs, a portion of Palm Springs, and the unincorporated communities of North Palm Springs, West Garnet, Painted Hills, Mission Lakes Country Club, and west to the Cabazon Indian Reservation. The District serves approximately 13,000 water service connections, 8,700 sewer connections with a population of approximately 38,000 customers.

To help mitigate the potential impacts of disasters, both small and large, the District joined CalWARN, which is a mutual aid agreement. CalWARN has training sessions on the function of mutual assistance, FEMA, CalOES, and County interactions to help water and wastewater agencies and the public to learn and share ideas two times a year. These meetings are also open to the public. Meeting and training sessions are held twice a year in the spring and fall. District staff attends these sessions on a regular basis. During COVID, CalWARN has held many virtual sessions.

The District employs 49 full-time employees in the water, sewer, and administrative departments. With the capabilities of CalWARN, the District has the potential of having hundreds of mutual aid workers at its disposal within hours of an emergency. This is a public water district and does not have jurisdiction over overbuild codes, land use, or people in the service area. The City of Desert Hot Springs, Riverside County, and the City of Palm Springs have this duty. However, MSWD can issue "Will Serve" letters to new tracks within its service area. If the District cannot serve a development, the developer will find alternative water resources to supply their development.

5.2 Existing Plans

The following emergency-related plans apply as appropriate. The following plans are updated yearly. The ERP is updated every five years. During the process, all plans are updated to include new information, hazards, facilities, and old facilities are removed.

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

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

Public Outreach

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 strategies for water districts and how to prevent the impacts of hazards on the District's infrastructure. CalWARN shares information from past experiences, what utility leaders experience during emergencies, and what they should have done differently to mitigate this hazard from happening 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) is anticipated to be completed in June 2021. 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, Groundwater Sustainability Plans, and others.

The District has an Emergency Response Plan that details how the District will respond to various emergencies and disasters. The District 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 District is also required to follow the 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 District has completed some mitigation programs. The California Department of Water Resources (DWR) required the District to raise well pump motors and other wellhead assemblies above the 500-year flood plain elevation. This is being accomplished by installing the motors and wellheads on elevated concrete foundations.

5.5 Fiscal Resources

Fiscal resources for the District include the following:

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

Through the California DWR, 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 aid to 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 were used as input when priorities were decided. All priorities are based on the 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. Only City's, **not** special districts, are allowed to join NFIP.

6.2 Mitigation Goals, Objectives, and Projects

As stated before, this is the first Hazard Mitigation Plan for the District. The process of identifying goals began with a review and validation of the FEMA Hazard Maps for the District and surrounding agencies in Riverside County. The Planning Team completed an assessment and discussion of whether each of the goals was valid. These discussions led to the opportunity to identify Goals and Objectives. In reviewing the mitigation objectives and actions, it was the Planning Team's consensus that the following goals should be included in the LHMP.

6.3 Earthquake

Goal: To protect life and property in Mission Springs Water District in the event of an earthquake.

Objective: *The goal is to avoid injury, loss of life, and damages to property*. The District agrees that strengthening of buildings and fire codes is critical to the protection of property, life, and the reduction of seismic-caused damages. These codes help water utilities design and construct reservoirs, pump stations, groundwater wells, and pipelines to resist the forces of nature. Design all new facilities to Seismic use Group III (Risk Category IV) structure by default per AWWA D100. 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 non-government agencies.

Mitigation Projects:
Below you will find the priority of the project, the department that will be responsible for this action, and the source of funding.

- Evaluate and construct seismic retrofit of critical facilities $10 Million **(10 years) High. HMGP. Engineering.**
- Install generators at wells and booster sites $2.5 Million **(2 years) High. HMGP. Engineering.**
- Evaluate all underground infrastructure material $10 Million **(8 years) Low. HMGP. Engineering.**

6.4 Windstorms

Goal: To protect life and property in Mission Springs Water District in the event of a windstorm.

Objective: *The goal is to protect life, property, and the water system.* The Santa Ana winds are notorious in Southern California for wreaking havoc during the fall and winter months each year. The winds are known for their hot, dry weather and bring the lowest relative humidity of the year. The Santa Ana winds easily reach speeds of over 40 miles per hour with a gust of over 60 miles per hour. These winds topple trees, power lines, start wildfires, and generally cause havoc throughout the region. This has caused Southern California Edison and other power providers in California to cut power in regions during these wind events, which are called Public Safety Shutoff events.

Mitigation Projects:
Below you will find the priority of the project, the department that will be responsible for this action, and the source of funding.

- Install generators at wells and booster stations $1 Million **(3 years) Operations Manager. HMGP, BRIC. Medium.**
- Develop customer's notification on water conservation during events $5,000 **(Annual) General Manager. High.**
- Develop better communication with Edison $5,000 **(Annual) General Manager. CIP. High.**

6.5 Drought

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

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, monitoring the available water resources, and implementing water

conservation measures and/or specific drought response actions.

Mitigation Projects:
Below you will find the priority of the project, the department that will be responsible for this action, and the source of funding

- Development of Regional Urban Water Management Plan $50,000 **(1 year) High. CIP. Engineering.**
- Update Water Shortage Contingency Plan $25,000 **(1 year) High. CIP. Engineering.**
- Increase water supply drilling new wells $ 10 Million **(5 years) High. BRIC. Engineering and Administration.**
- Improve operational efficiency/water transfers $500,00 **(2 years) High. CIP. Engineering and Operations.**
- Educational programs $20,000 **(1 year) Medium. CIP. Administration.**
- Promote water conservation programs $50,000 **(2 years) Low. HMGP. Operations.**
- Groundwater basin recharge $ 500,000 **(3 years) Medium. HMGP. Operations.**

6.6 Flooding

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

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. Mission Springs Water District is fortunate to not 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, watertight 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.

Mitigation Projects:
Below you will find the priority of the project, the department that will be responsible for this action, and the source of funding

- Identify and replace vulnerable vitrified clay pipe sewer main $4 Million **(5 years) High. FMA. Engineering.**
- Install flood walls, regrade, and install riprap around facilities and on owned access roads. $5 Million **(5 years) Medium. FMA. Engineering.**
- Erosion Control at well and reservoir sites $1 Million **(1 year) Medium. FMA. Engineering.**

6.7 Wildfire

Goal: To help protect the residents from wind damage and the effects of power outages.

Objective(s): Because there is no way to plan to reduce or stop the Santa Ana winds in Southern California, the objective is to lessen the damage the winds cause within the District's boundaries.

Mitigation Projects:
Below you will find the priority of the project, the department that will be responsible for this action, and the source of funding

- Install generators at wells and booster sites $ 2.5 Million **(2 years) High. BRIC. Operations and Maintenance.**
- Coordinate and foster better communications with fire and County OES $25,000 **(ongoing yearly) Medium. CIP. Operations.**
- Develop a fuel plan for generator $5,000 **(6 months) High. CIP. Operations.**

6.8 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. The highest priority rankings were assigned to those mitigation measures that met three primary criteria:

1. The greatest potential for protecting water and wastewater infrastructure, life, and property
2. The greatest potential for maintaining critical District functions and operability following a disaster
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, earthquakes clearly 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 to 10 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)

6.9 Implementation Strategy

The implementation strategy is intended to successfully mitigate the hazards identified in this plan within a reasonable amount of time. The District 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. District Staff will review the LHMP each year before obtaining the next year's Fiscal Budget. The plan will also be reviewed by the Board of Directors for items to be included in the new fiscal budget. District staff will also look for ways to obtain Hazard Mitigation Grants each year to offset the impacts on the fiscal budget and to show some relief for the residents of a disadvantaged community. The General Manager or his/her assignee is responsible for implementing or administering all mitigation projects. Listed below is a benefit-cost analysis formula that is required by FEMA.

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

Mitigation Projects Funding Source

There is currently no mitigation money in the District's budget. The District will include mitigation into the budgeting process when funding becomes available and look at what mitigation projects could be funded in future budget cycles. Also, the District will utilize the BRIC (Building Resilient Infrastructure in Communities), FMA (Flood Mitigation Assistance), HMGP (Hazard Mitigation Grant Program), and other grant funding arms to obtain the mitigation and address the shortfalls in the District's Capital Improvement Program (CIP).

Timeframe

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

The District will apply for mitigation grants as opportunities become available in the State of California, or in the County of Riverside each year. The District 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 the General Manager or his/her assignee each year, and progress will be reported as part of the annual budget workshop. The General Manager or his/her assignee will evaluate the plan on an annual basis and consider whether new hazards have emerged, community vulnerability has changed, and goals and objectives are still relevant to current conditions. Annually, the General Manager or his/her appointee 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 or his/her assignee 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 additions and removal of mitigated items. The General Manager or his/her assignee will keep track of all mitigation grants received by the District and when mitigation items from the LHMP are included in the CIP for mitigation.

A full review of the plan will be performed at five-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 Desert Hot Springs 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 annual budget and any updates to the LHMP.

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 a Notice of Intent 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 implementing the LHMP and ensuring the recommended goals and objectives are met. The General Manager or his/her appointee will be responsible for placing the LHMP on the District's website and incorporate the LHMP into the annual budget workshops. The District will start the update process one and a half years before the expiration date on this document. The approved LHMP will be included in all project planning stages throughout the District. This will clarify the hazards in the District regarding the 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 LHMP will be reviewed each year to ensure the LHMP identified projects are completed.

7.3 Continued Public Involvement

During the annual budget cycle, Directors, Managers, and staff meet to discuss and formulate a new budget. It is the responsibility of the Director of Engineering and Operations or his/her assignee to bring a copy of the current LHMP to the budget meetings. The LHMP will be consulted during these meetings to formulate how the District will fund different mitigation items listed in the LHMP. These items will be identified as items that will be funded either in the budget or through grant writing opportunities. Once the budget is formulated, the budget is taken to the Board for adoption.

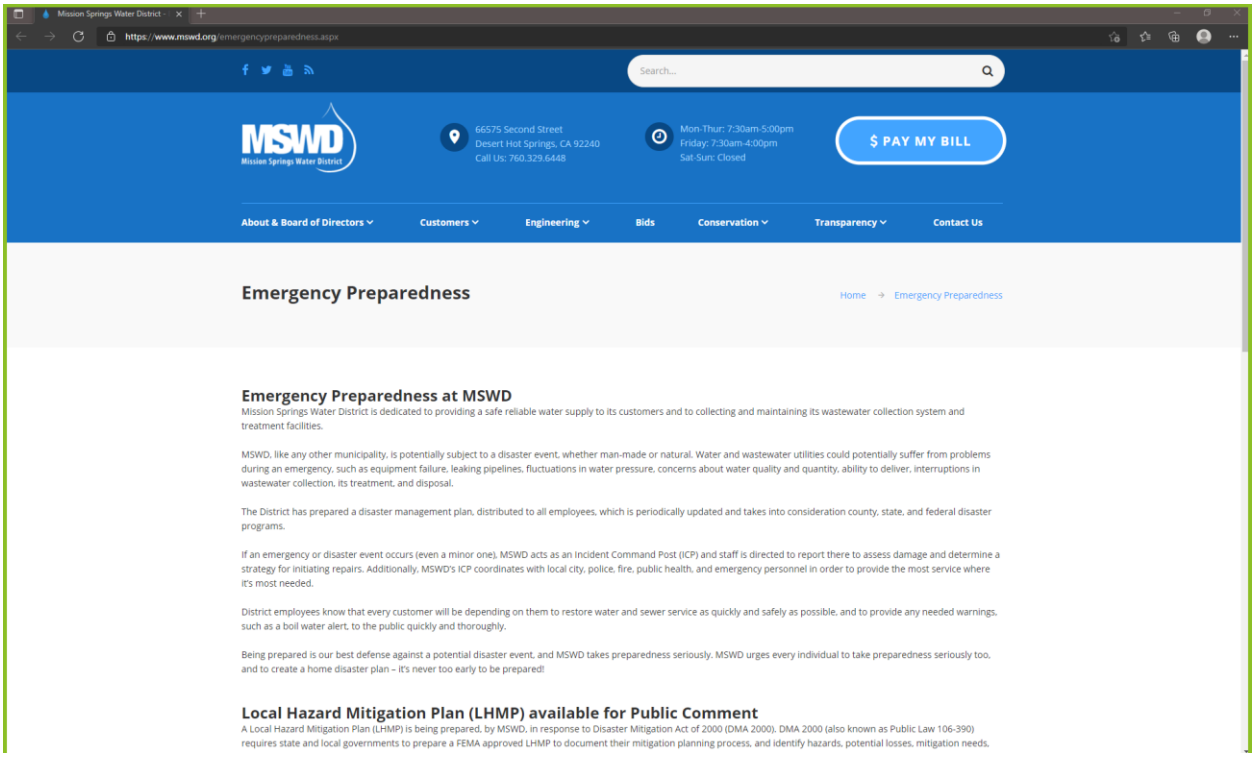
APPENDIX A

Meeting Matrix

Name	8/2020 Forming Planning Team	9/2020	10/2020	11/2020	03/2021	04/2021
Amanda Lucas	X	X	X	X	X	X
April Scott	X	X		X	X	
Bassam Alzammar	X	X	X	X	X	X
Danny Friend	X		X			
Gary Sturdivan	X	X	X	X	X	X
Jeff Nutter	X			X	X	X
Juan Hernandez	X	X		X		X
Lee Boyer	X		X	X	X	
Mark Ban						
Ray Kolisz						
Mark Bassett						
Luiz Santos	X	X		X		X
Victoria Llort	X	X			X	X

APPENDIX B

Screenshot of
Mission Springs Water District
Website LHMP Page



https://www.mswd.org/emergencypreparedness.aspx

APPENDIX C

Public Comments

No Public Comments Submitted.