



Hi-Desert Water District

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Local Hazard Mitigation Plan Update

Hazard Mitigation Plan Update

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SECTION 1. INTRODUCTION

1.0 Purpose of the Plan

Emergencies and disasters can leave people injured or displaced; result in fatalities; cause significant impacts to our communities, businesses, public infrastructure and environment; and cost tremendous amounts in terms of response and recovery dollars and economic loss. Hazard mitigation reduces the risk of personal damages, loss of life, and property damages that include facilities and services crucial to the stability of the District's infrastructure that can be caused by emergencies and disasters.

Repairs and reconstruction after disasters are often completed to restore infrastructure to pre-disaster conditions. Such efforts expedite a return to normalcy; however, merely replicating pre-disaster conditions 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 a well-organized public education and awareness effort.

The purpose of this Local Hazard Mitigation Plan (LHMP) is to identify potential hazards to the Hi-Desert Water District (HDWD) and formulate mitigation measures for 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 (OES) will also allow Hi-Desert Water District to become eligible to receive federal funding assistance under the Local Hazard Mitigation Grant Program or the Pre-Disaster Mitigation program. The established mitigation projects provided were identified and reviewed by members of the District's Safety Planning Committee and lead by Sturdivan Emergency Management Consulting, LLC (SEMC).

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

This plan fulfills the requirements of the following programs:

- 1. Pre-Disaster Mitigation (PDM)**
- 2. Hazard Mitigation Grant Program (HMGP)**
- 3. Flood Mitigation Assistance (FMA) Program**
- 4. Climate Change Induced Drought**

Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5165, enacted under section 104 of the Disaster Mitigation Act of 2000, P.L. 106-390, provides new and revitalized approaches to mitigation planning. Section 322, in concert with other

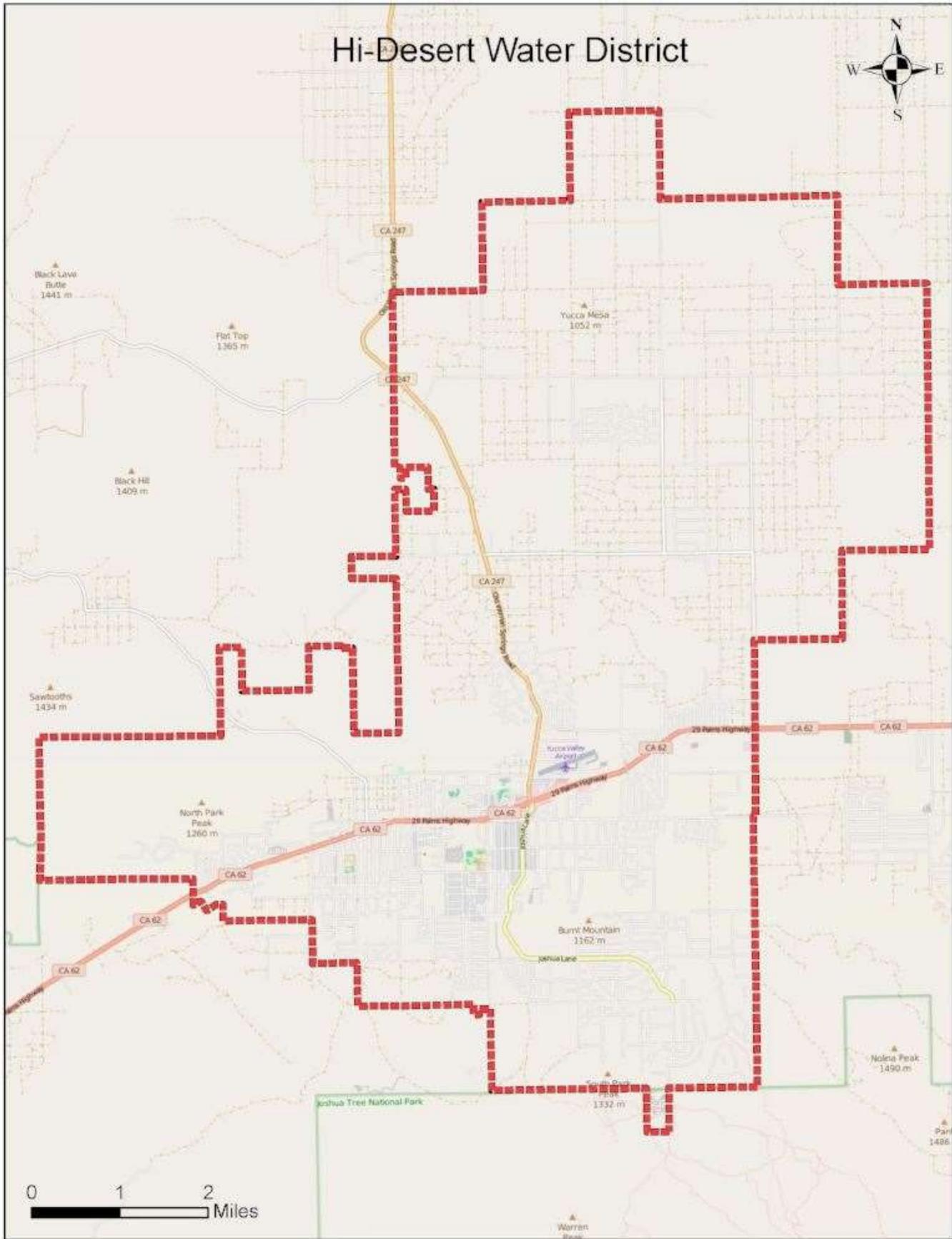
sections of the Act, provides a significant opportunity to reduce the Nation's disaster losses through mitigation planning and emphasizing the need for State, local and tribal entities to closely coordinate mitigation planning and implementation efforts. A major requirement of the law is the development of local hazard mitigation plans. These plans must be developed and approved by the State of California Governor's Office of Emergency Services (CalOES) and Federal Emergency Management Agency (FEMA) every five years for the local jurisdictions to be eligible for HMGP funding from State- and President-declared disasters that occurs after 2001. Local mitigation plans must be reviewed, updated and re-approved by FEMA every five years to remain eligible. This LHMP has been updated to meet the requirements of the Act and the regulations established by FEMA.

1.1 Service Area Physical Setting

The District is located in the State of California, San Bernardino County, High Desert area, 27 miles North of Palm Springs, 17 miles West of Twentynine Palms. Bordered on the west by The San Bernardino Mountain Range and Joshua Tree National Park. The Town of Yucca Valley and the Hi-Desert Water District are located in the Southeastern section of the Mojave Desert at an elevation of 3,300 feet above sea-level.

The Mojave Desert occupies a significant portion of Southern California and parts of Utah, Nevada, and Arizona. Named after the Mojave Native Americans, it occupies roughly 54,000 square miles in a typical Basin and Range topography. The Mojave Desert is bound in part on the western ends by the Tehachapi Mountains together with the San Gabriel and San Bernardino Mountain Ranges. The mountain boundaries are quite distinct since, they have been created by the two largest faults in California, the San Andreas and the Garlock. The desert's northern and eastern boundaries are less distinct. One way to determine location is by observing the presence of Joshua Trees. The Mojave Desert receives less than 6 inches of rain a year and is generally between 3,000 and 6,000 feet in elevation. The Mojave Desert also contains the Mojave National Preserve; Joshua Tree National Park; and the lowest-hottest place in North America: Death Valley, where the temperature can approach 120 F in late July and early August. The Mojave Desert, like all deserts in general, is known for its summer heat; however, it can be cold in the wintertime. Snow, although uncommon, does fall in parts of the Mojave Desert. Amounts range from just a trace to a foot or more of heavy wet snow, which can lead to freeway traffic closures, and the population being "snowed in." The coldest wintertime temperatures range well below freezing. Many parts of the Mojave Desert typically range from highs of around 95-105°F in the summer, to lows of around 15-30° F in the winter and may dip even lower. High winds, often above 50 miles per hour, are also a weather factor and occur frequently along the western end of the Mojave Desert.

Figure 1. HDWD Service Boundaries Map



1.2 History

Hi-Desert Water District is a consolidated Independent Special District, formed in its current name in 1980, working pursuant to California Law, under the County of San Bernardino, State of California Water Code, Chapter 107, Sections 112-1 et. Seq. Division 12 30000 et. seq.

In 1945 a group of investors, including Ted Jurling, recognized Yucca Valley's potential as a good location for subdivisions, such as those being developed in other parts of Southern California. They bought three sections of land and installed the first functional pump, forming the Yucca Water Company, Ltd. This process was repeated by other groups of developers, resulting in community water companies serving individual developments. Over time, consolidations took place. However, seven purveyors still retail water to their customers within the individual communities of Yucca Valley, Joshua Tree, Morongo Valley, Flamingo Heights, Landers, and 29 Palms.

The District was originally formed in 1962 under the name of Yucca Valley County Water District. In 1964, the District purchased the Joshua Forest Water Company and subsequently the Rancho Ramon and Mountain Mutual Water companies the following year. In 1971 the District changed its name to Hi-Desert County Water District and in 1980 to Hi-Desert Water District to avoid confusion with San Bernardino County. The District has grown through numerous assessment districts, primarily on the mesa, a portion of the District's service are located within an unincorporated area of San Bernardino County. In 1990, the District acquired the assets of Yucca Water Company, Ltd., adding an additional 3,000 service connections.

Yucca Valley lies 17 miles west of Twentynine Palms, 27 miles north of Palm Springs, 89 miles south of Barstow via State Route 247, 45 miles southeast of Lucerne Valley and 55 miles east of San Bernardino. The town is bordered by the Little San Bernardino Mountains, the San Bernardino Mountains and Joshua Tree National Park. Over two-million people visited the National Park in 2015.

The County of San Bernardino has a population of more than 2,000,000 people as of the 2020 census, which is up from the reported 1,709,434 in the 2000 census. With an area of 20,105 square miles, San Bernardino County is the largest county in the United States by area. It is larger than nine States, including New Jersey, Massachusetts, and Maryland.

Located in the southeast section of California, thinly populated deserts and mountains cover most of this vast county. The bulk of the County's population resides in two Census County Divisions, where approximately 2,194,710 people live as of the 2020 Census. San Bernardino County is bordered by the Colorado River on the east, Riverside County on the south, Los Angeles, Orange, and Kern Counties on the west and Inyo County on the north.

1.3 Demographics

The 2020 United States Census reported that Yucca Valley had a population of 21,821. The average household size was 2.49. The Per Capita income of \$27,828. 22% of the population live in poverty.

The area of Yucca Valley is listed by the State of California, as a disadvantaged community. Per the 2020 United States Census, Yucca Valley had a median household income (MHI) of \$47,901, with 22% of the population living below the federal poverty line. The MHI is approximately 73% of the State MHI of \$61,094.

1.4 Population

The District serves approximately 10,500 service connections and a population of approximately 25, 000 customers.

1.5 Existing Land Use

The existing land use is housing, commercial and light industry. The Town of Yucca Valley (which is incorporated) is responsible for land use, HDWD does not have authority to regulate land use in the area. Incorporated areas are regulated by the Town of Yucca Valley (City) and the County of San Bernardino. Based upon current land-use policies of the cities and counties within the boundaries of the District, they project that the undeveloped land within its boundaries will continue to be developed.

Approximately 65% of the land within the boundaries of HDWD are currently developed, with 35% still undeveloped.

HDWD operates with 18 pressure zones due to the range in elevation of 3,015 to 4,073. The operation of the system becomes intricate if dealing with unexpected environmental factors. Within the various land use areas, equal attention was directed to special areas vulnerable to risks:

All facilities listed below are vulnerable to Climate Change Induced Drought, Earthquakes, Floods, Windstorms, Wildfires and Freezing events.

Table 1. Facility Vulnerability List

Facility	Drought	Earthquake	Wildfires	Flood	Windstorms	Freezing
Administrative Office	X	X			X	
Wastewater Plant	X	X			X	
Water Treatment Facility	X	X	X		X	X
Wells	X	X	X	X	X	X
Reservoirs	X	X	X		X	
Pump Stations	X	X	X		X	X

1.6 Development Trends

Development of the Yucca Valley area has increased significantly with the increase of home prices in the last 8 years. Yucca Valley is seeing new housing developments that started in 2015, until 2022. The area is expected to see an increase in the housing market, which will increase the number of service connections to the District's system. In addition, the District has recently built the area's first sewer collection, treatment system in Yucca Valley. HDWD has included a Sewer System Assessment District that is managing, developing, constructing and maintaining a new sewer system and wastewater treatment plant that will serve portions of the District's service area and the Town of Yucca Valley.

HDWD does not have authority to approve any new buildings in the service area. This function is done by the City of Yucca Valley and San Bernardino County. The District insures a 'Will Serve Letter' for water and wastewater service, upon request from the builder. There has been no change to vulnerability within HDWD service area.

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

- Source of Supply
- Booster Pumping Plants
- Pipeline Facilities
- Water Storage Reservoirs
- Water Treatment Plant
- Sewage Lift Stations
- Sewer Collection, Treatment, wastewater recycle Facilities

Development has occurred mostly in the Southern section of the service area of HDWD. The new development will result in more single-family dwelling units, in addition commercial retail businesses.

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

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

SECTION 2. PLAN ADOPTION

2.1 Adoption by Local Government Body

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

2.2 Promulgation Authority

This Local Hazard Mitigation Plan was reviewed and approved by the elected members of the Hi-Desert Water District Board of Directors:

Dr. Sheldon Hough
President

Description of Involvement: President, Hi-Desert Water District Board of Directors

Mr. Scot McKone
Vice-President

Description of Involvement: Vice-President, Hi-Desert Water District Board of Director

Mr. Roger Mayes
Director

Description of Involvement: Director, Hi-Desert Water District Board of Directors.

Mr. Bob Stadum
Director

Description of Involvement: Director, Hi-Desert Water District Board of Directors

Ms. Sue Tsuda
Director

Description of Involvement: Director, Hi-Desert Water District Board of Directors

Mr. Paul Peschel
General Manager

Description of Involvement: General Manager, Hi-Desert Water District

Mr. Tony Culvert
Assistant General Manager

Description of Involvement: Assistant General Manager, Hi-Desert Water District



2.3 Primary Point of Contact

The Point of Contact for information regarding this plan is:

BEFORE FEMA APPROVAL IS:

Gary Sturdivan
gsturdivan@me.com
909-658-5974

AFTER FEMA APPROVAL IS:

Mr. Ron Wortham
Director of District Services
Hi-Desert Water District
55439 29 Palms Highway
Yucca Valley, CA 92284
760-365-8333 (Office)

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 reconsidered, replicated, or modified in future updates. Documentation of how the public was engaged throughout the process is an integral part of the planning process.

This LHMP was completed with the coordination and involvement of the Hi-Desert Water District staff and representatives from the City of Yucca Valley and local agencies (Twentynine Palms Water District, Joshua Basin Water District and Mission Springs Water District.). These team members have a vested interest in the performance and resiliency of the District. The consultant contacted these agencies via email, and phone calls asking for each agencies help; and provided a draft of final LHMP to receive comments on the document. The public was notified of the public comment period and of the survey by the District Newsletter, on Facebook, Instagram. All public comments would be listed underneath Appendix C, however there were no public comments. There is only one response to the survey, the results are in Appendix C.

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

3.1 Preparing for the Plan

The Planning Team reviewed FEMA’s “Hazard Mitigation Plan Crosswalk,” the San Bernardino County HMP, and the Hi-Desert Water District’s newly adopted LHMP.

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

The planning process consisted of:

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

During the planning process, the Planning Team utilized the following plans to gain information on the hazards facing the area and mitigation goals of Los Angeles County.

The planning process consisted of:

Table 2. Plans Reviewed by Team

<u>Study Plan</u>	<u>Key Information</u>
Quarts Hill Water District’s LHMP	Layout of an LHMP for water agencies
Town of Yucca Valley LHMP	Hazard Identification, Mitigation measures
San Bernardino County HMP	Mitigation measures and goals, Hazards,
USGS Golden Guardian 2008	Earthquakes, affects, planning
Hi-Desert Water District Water Master Plan	Land use for area, future projects
2018 California HMP	Goals for the State of California
San Bernardino County Flood Control	Gain information on future flood control projects
FEMA Flood Insurance Study for S.B. County	Flood history

Table 3. Financial Resources for future Mitigation projects.

Local	Revenues	Amount
HDWD Budgets and Financial Planning Documents	Water sales, Sewer sales and new construction	Varies from year to year
FEMA Grants	None	None
State Revolving Funds Draft application	None	None
FEMA Mitigation Grants	HDWD has applied for FEMA funding in the past. A 5% grant for a generator	Funding has never been obtained.
Future Budget Funds Considerations	Water and Sewer Sales	Varies as funding is available each year

Drafting the Hazard Mitigation Plan was accomplished in 8 Phases:

Figure 2. Flow Chart for developing a Hazard Mitigation Plan



3.2 The Planning Team

Name: Tony Culver
Title: Assistant General Manger
Description of Involvement: Internal Planning Team Member

Name: Ron Wortham
Title: Director of District Services
Description of Involvement: Internal Planning Team Member

Name: Jennifer Cusack
Title: Director of Public and Government Affairs
Description of Involvement: Internal Planning Team Member

Name: Bonnie Bilger
Title: Human Resources: Director of Human Resources and Risk Management
Description of Involvement: Internal Planning Team Member

Name: Tanya Gruwell
Title: Chief Financial Officer
Description of Involvement: Internal Planning Team Member

External Team Members

Name: Matt Schragge

Title: General Manager

Description of Involvement: Twentynine Palms Water District External Planning Team Member

Name: Sarah Johnson

Title: Genal Manager

Description of Involvement: Joshua Basin Water District External Planning Team Member

Name: Marina West

Title: General Manager

Description of Involvement: Bighorn Desert View Water District External Planning Team Member

3.3 Coordination with other Jurisdiction, Agencies and Organizations.

The Internal and External Planning Teams include five people from Hi-Desert Water District, and three people from local water agencies. The County of San Bernardino OES was invited to be on the Planning Team, but they were unable to attend, however, they reviewed that plans content. San Bernardino County OES has, provided the hazard maps attached to this document. In Appendix A is the meeting matrix outlining the subjects covered and the attendees.

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 which follows FEMA requirements for the program. The tools, resource materials, and other project related information are maintained on a project portal on the District's website www.hdwd.com which allowed access to the information by all participants and the public, screenshots are located under Appendix B. All Draft LHMP's were posted on the District's Website, and a statement was posted on Facebook, letting the customers know how to get to the plan. Mr. Gary Sturdivan's contact information was on each document for questions and concerns. The Planning Team reviewed the document and made corrections or voiced concerns to the consultant. These comments were discussed at the next Team meeting, and corrections were then made to the document, these meetings were not publicly held.

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 (www.hdwd.com). All comments on the LHMP were sent to the consultant, as the consultant's contact email address was listed as the contact on the draft LHMP. The Appendices provide details of the public involvement process such as the

meeting dates, purpose, agendas, sign-in sheets, and public comments, However, there were no public comments received. There is a screenshot of the webpage showing requests for public participation.

3.5 Asses the Hazard

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 HDWD has faced in the past and most likely will face in the future. The Planning Team reviewed and discussed items that have happened in the State of California as well as disasters that have happened in the District’s service area and in Southern California. The Team reviewed documents such as engineering drawings, photographs, and available geotechnical and geologic data both from the Internet and outside sources such as FEMA Hazard Mapping, San Bernardino County hazard maps, and documents.

The Planning Team completed the assessment of the various hazards in a group setting. The Team members have many years of personal experience working in the local area and many working in a water utility. Team members know the history of past hazardous or emergency events, such as the 1992 Landers Earthquake - a 7.3 magnitude earthquake that severely impacted the region. This earthquake’s epicenter was only 6 miles north of Yucca Valley in the area of Landers and Flamingo Heights, California. This earthquake impacted the District and is still remembered by many residents. The Planning Team members have also experienced wildfires, floods, and other events.

3.6 Set Goals

The Planning Team set the goals for the 2023 LHMP Update. The team members understand the issues facing the Department with respect to the District’s Mission Statement.

“To provide a safe, reliable water supply and wastewater reclamation system for the customers of the Hi-Desert Water District in an efficient and financially responsible manner.”

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 Mitigation Measures

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

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

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

Based on STAPLEE, the Planning Team addressed the following questions to determine mitigation options:

Does the Action:

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

Can the Action:

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

Will the Action:

1. Be accepted by the community?
2. Be supported by community leaders?

3. Adversely impact segments of the population or neighborhoods?
4. Result in legal action such as a lawsuit?
5. Positively or negatively impact the environment?

Is there:

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

3.8 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, outside water district in the area, 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 draft documents were posted on the District’s website. Notices were sent to all water customers in the service area, via. Public Updates, Public social media that HDWD has at its disposal. stating that all LHMP documents were posted on the website and asked for comments.

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.

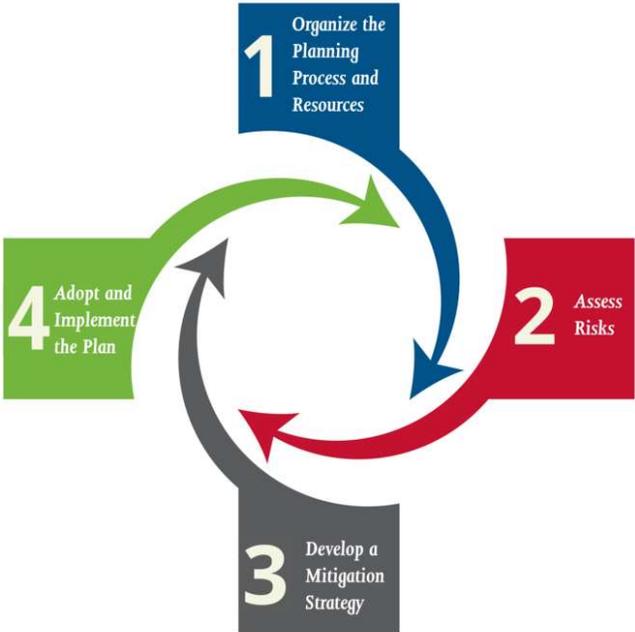
3.9 Adopt the Plan

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

SECTION 4. RISK ASSESSMENT

The goal of mitigation is to reduce the future impacts of a hazard including property damage, disruption to local and regional economies, and the amount of public and private funds spent for recovery. Mitigation decisions are based on risk assessments where the probability of an event is evaluated with respect to the anticipated damages caused by such an event.

The purpose of this section is to understand the hazards and their risks in Hi-Desert Water District service area. There are generally four steps in this process: 1) Hazard Identification 2) Vulnerability Analysis 3) Risk Analysis and 4) Vulnerability Assessment, including an estimation of potential losses. These are four different items; however, the terms can be used interchangeably.



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.

4.2 Hazard Screening Criteria

The intent of screening the hazards is to help prioritize which hazards create the greatest concern to HDWD. A list of natural hazards to consider was obtained from Federal Emergency Management Agency’s (FEMA) State and Local Mitigation Planning How-to Guide: Understanding Your Risks (FEMA 386-1). The team used the Stafford Act, the California

Emergency Service Act and STEPLEE (Social, Technical, Administrative, Political, Legal, Economic, and Environmental feasibility) criteria to help rank each risk. The risks were ranked with from 1 – 4: with (1) being a “Highly Likely” event, (2) being a “Likely” event (3) being a “Somewhat Likely” event, and (4) being a "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 in table 4.

Table 4. Hazard Risk Rankings

Hazard	Risk Ranking (1-4)
Earthquake	1
Climate Change Induced Drought	2
Wildfire	3
Flooding	3
Freezing events	3
Windstorm	3
Volcanoes	4
Tsunami Liquification	4
Landslides	4

The natural hazards that were considered not to affect or be a risk to HDWD were given a ranking of 4 and are not considered applicable to HDWD for mitigation.

Hazard Assessment Matrix

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

Probability Ratings: Highly Likely, Likely, or Somewhat Likely

Impact Ratings: Catastrophic, Critical, or Limited

Screening Assessment Matrix

The screening assessment matrix was used for HDWD’s hazards. The hazards have been placed in the appropriate cell of the corresponding “Screening Assessment Matrix” based on the Planning Team’s collective experience. The hazard screening assessment is shown in Table 5. Prioritization of the hazards is discussed in the following section. The Probability/Impact rating

is based on a 5-year occurrence. The percentages represent the likelihood within the 5-year occurrence.

Table 5. Screening Assessment Matrix

	Impact			
	Probability/Impact Rating	Catastrophic	Critical	Limited
Probability	Highly Likely (1) (75 – 100%)	Earthquake (1)		
	Likely (2) (50-75%)		Climate Change Induced Drought (2)	
	Somewhat Likely (3) (25 – 50%)			Wildfire (3) Flooding (3) Freezing Events (3) Windstorm (3)

4.3 Hazard Profiles

This section looks at all the hazards identified by the Planning Team that may impact HDWD within its boundaries. This section gives an overview of each hazard, the definition of each hazard, and a description of how each hazard is expected to affect HDWD’s service and/or service area using observed hazards in HDWD’s service area, the hazards identified on the FEMA website, and the FEMA software program known as HAZUS (Hazards United States). HAZUS contains models of natural disasters and the effects the disasters can have on a region.

4.3.1 Earthquakes

Probability: (75-100%)

Impact: Catastrophic

Priority: Highly Likely

* This section looks at all the hazards affecting the District within its boundaries and identified by the Planning Team.

General Definition: An earthquake is defined as 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's surface. As the plates move slowly over, under, and past each other to create mountains, valleys, and all other geological formations. Usually, the movement is gradual; however, increased movement occurs when the plates become 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 plates meet; however, some earthquakes occur in the middle of plates.

Ground shaking from earthquakes can collapse buildings and bridges, disrupt gas, electric, water utilities, and phone service; Additionally, earthquakes can trigger landslides, avalanches, fires, and destructive ocean waves such as tsunamis. Buildings with foundations resting on unconsolidated fill material and other unstable soil, as well as homes not tied to their foundations, are at risk because they can be shaken off their mountings even during a mild earthquake. When an earthquake occurs in a populated area, it may cause deaths, injuries, and/or extensive property damage.

Earthquakes strike suddenly at any given time of year and without warning. On a yearly basis, 70 to 75 damaging earthquakes occur throughout the world. Estimates of losses from a 7.8 magnitude earthquake in the southern section of the San Andreas Fault System (located in the regional area near Los Angeles County) could easily reach \$200 billion in damages. This information was pulled from the California Great ShakeOut© USGS scenario.

Earthquakes pose a moderate to very high risk for 45 states and territories in the United States of America, and earthquakes occur in every region of the Country. California experiences the most frequent damaging earthquakes of the 45 states and territories of the United States; however, Alaska experiences the greatest number of large earthquakes, most located in uninhabited areas. The nearby southern section of the San Andreas Fault is ranked in the top five (5) most likely faults to cause major damage in the United States by United States Geological Survey (USGS).

The source for the earthquake profile is a report that describes a new earthquake rupture forecast for California developed by the 2007 Working Group on California Earthquake Probabilities (WGCEP 2007). The Earthquake Working Group was organized in September 2005 by the USGS, the California Geological Survey (CGS), and the Southern California Earthquake Center (SCEC) to better understand the locations of faults in California. The group produced a revised, time-independent forecast for California for the National Seismic Hazard Map.

Description: There are several earthquake faults located within the District's service area. While there have been many earthquakes in and around the District's service area, the 1992 Landers/Big Bear earthquakes damaged above ground reservoirs, miles of pipelines in the distribution system, and groundwater wells.

A source for the earthquake profile was a report that describes a new earthquake rupture forecast for California developed by the 2007 Working Group on California Earthquake Probabilities (WGCEP 2007). The Earthquake Working Group was organized in September 2005, by the U.S. Geological Survey (USGS), the California Geological Survey (CGS), and the Southern



California Earthquake Center (SCEC) too better- understand the locations of faults in California. The group produced a revised, time independent forecast for California for the National Seismic Hazard Map.

Figure 3. 2023 HDWD Fault Map

Hi-Desert Water District - Quaternary Faults

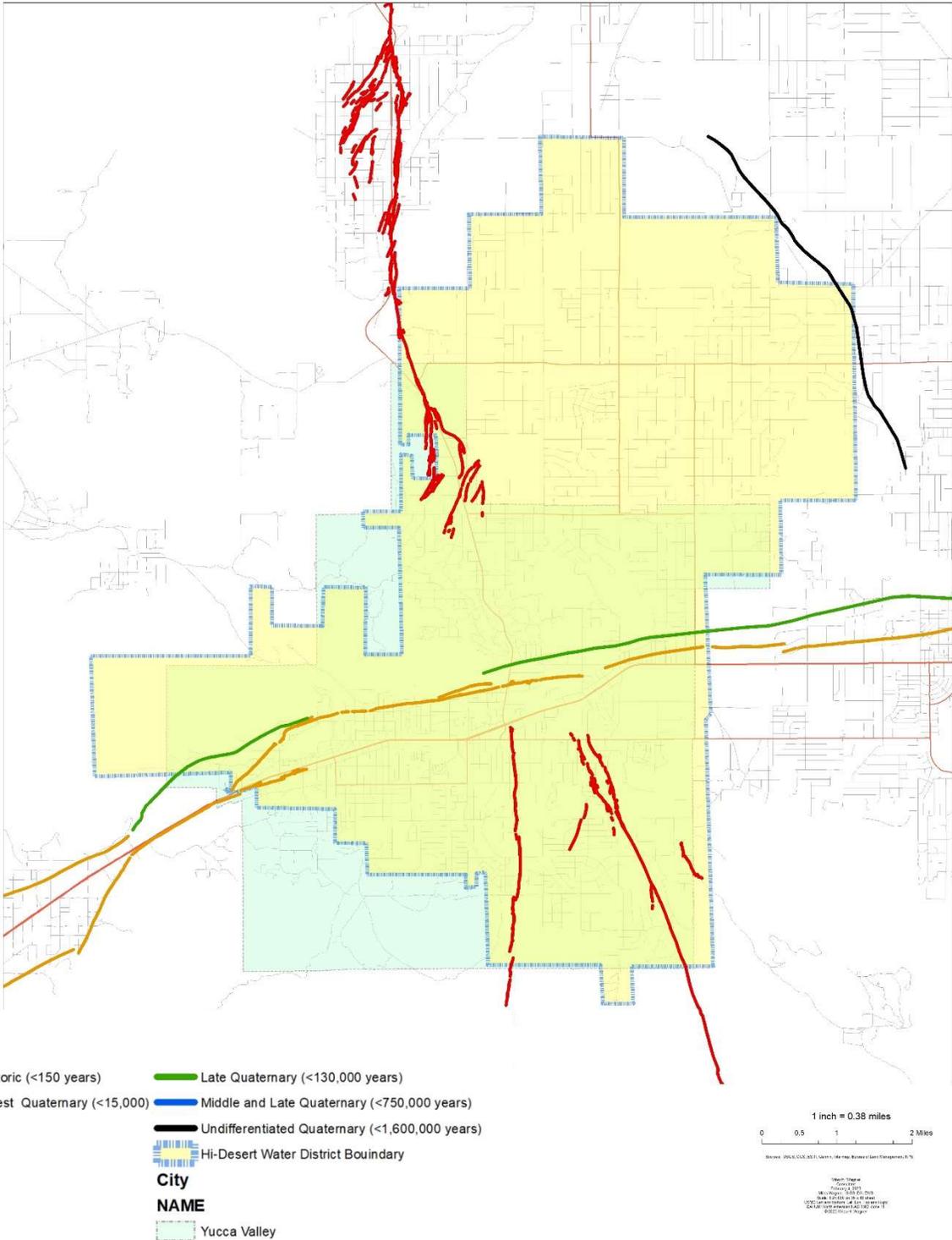


Figure 4. Hi-Desert Water District, USGS ShakeOut Map

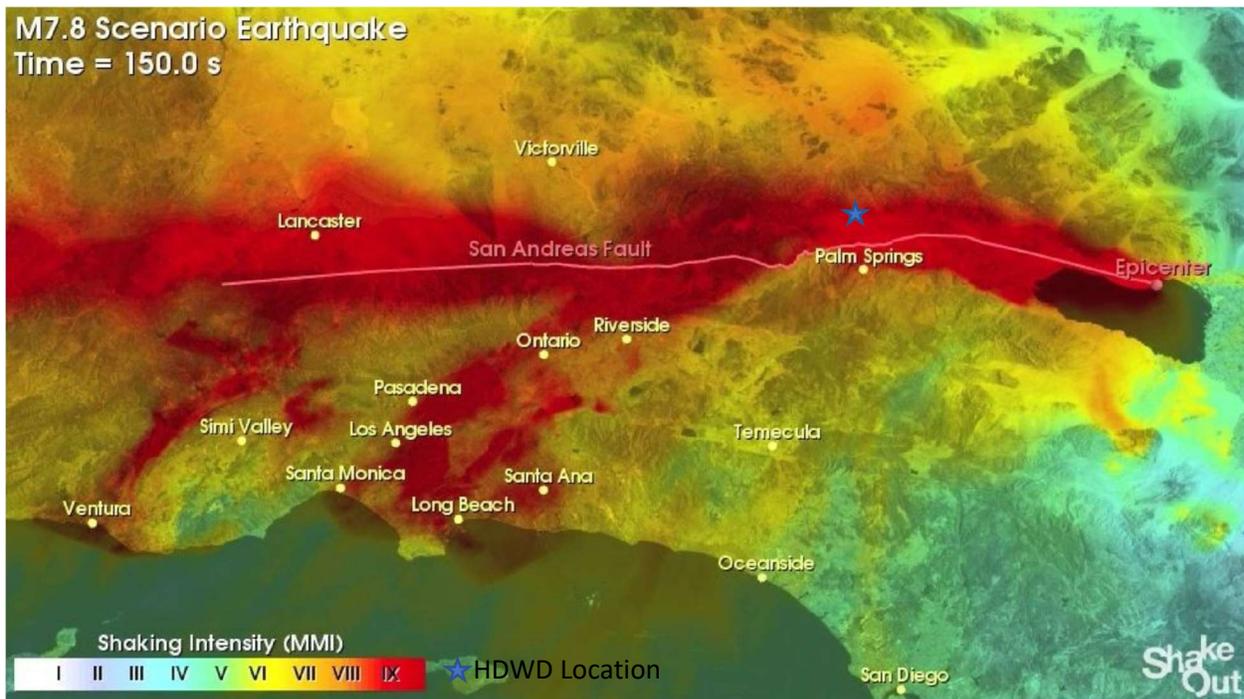


Figure 5. USGS Modified Mercalli Intensity Scale

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.

The greatest earthquake threat in the United States is along tectonic plate boundaries and seismic fault lines located in the central and western states; however, the Eastern United State does face moderate risk to less frequent, less intense earthquake events.

Figure 6. United States Earthquake Hazard Map

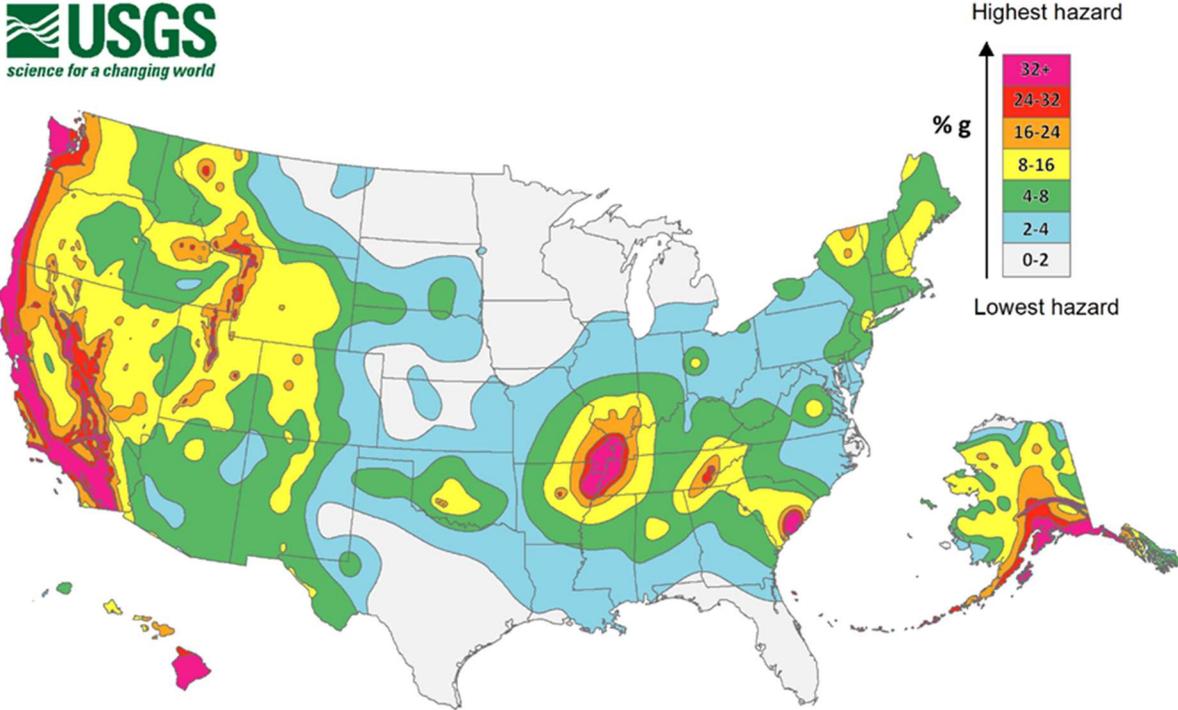


Table 6. Significant California Earthquakes

Date	Area	Location	Mag	MI	Total damage / notes
4/5/2019	Kern/SB	Ridgecrest/Trona	7.1 M _w	VI	Unknown
7/4/2019	Kern/SB	Ridgecrest	6.72M _w	VIII	Limited
7/29/2008	Los Angeles Area	Chino Hills Earthquake	5.5 M _w	VI	Limited
10/16/1999	Eastern	Hector Mine Earthquake	7.1 M _w	VII	Limited
1/17/1994	Los Angeles Area	Northridge Earthquake	6.7 M _w	IX	\$13–\$40 billion
6/28/1992	Inland Empire	Big Bear Earthquake	6.5 M _w	VIII	Moderate/Triggered
*6/28/1992	Inland Empire	Landers Earthquake	7.3 M _w	IX	\$92 million
4/22/1992	Inland Empire	Corona	6.3 M _s	VII	Light–moderate
6/28/1991	Los Angeles Area	Sierra Madre Earthquake	5.6 M _w	VII	\$33.5–40 million
2/28/1990	Los Angeles Area	Upland Earthquake	5.7 M _w	VII	\$12.7 million
11/24/1987	Imperial Valley		6.5 M _w	VII	Triggered
11/23/1987	Imperial Valley		6.1 M _w	VI	\$3 million
10/1/1987	Los Angeles Area	Whittier Narrows Earthquake	5.9 M _w	VIII	\$213–358 million
7/21/1986	Eastern	Chalfant Valley Earthquake	6.2 M _w	VI	\$2.7 million / sequence

7/13/1986	South Coast		5.8 M _w	VI	\$700,000
*7/8/1986	Inland Empire	North Palm Springs Earthquake	6.0 M _w	VII	\$4.5–6 million
4/26/1981	Imperial Valley	Calexico	5.9 M _w	VII	\$1–3 million
5/25/1980	Eastern	Salton Sea	6.2 M _w	VII	\$1.5 million/Swarm

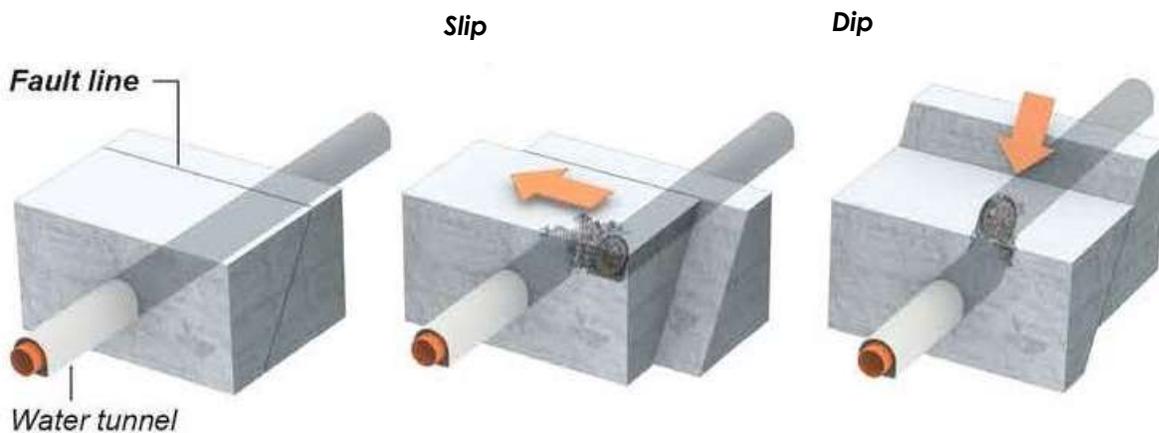
*Events with an asterisk indicate a direct effect on Hi-Desert Water District.

Impact Statement: A significant earthquake could have devastating impacts on HDWD and its assets. Shaking during earthquakes can cause structural failures, while ground displacement and liquefaction can cause infrastructure to sink, sag, float, rupture, or sever completely. Access to all assets may be impeded if the roads needed to access them are damaged and impassable. An extended loss of power or widespread damage to a system could impair the District’s ability to provide service, especially if generators are compromised. This could in turn lead to not only a loss service but also a loss of revenue during a time while costly repairs are being made. Fires following earthquakes are also a significant concern and could impact operations. Direct impacts to employees are possible, including injury, death, and an impeded ability of essential personnel to report for duty may also hinder operations.

Domestic Water Assets: Ground shaking, displacement, and liquefaction may cause structural failure of steel reservoirs (e.g., elephant foot buckling), as demonstrated by Landers Earthquake. Water treatment plants and wells could also fail due to severe shaking or when the ground beneath them becomes displaced.

Breaks in piping (water mains, laterals) can not only cause physical damage to pipes but can also cause loss of pressure needed to keep a system functioning. **Figure 8** shows how different types of ground displacement can severe pipes. Cast iron pipes have the highest susceptibility to breaking during earthquake events. Asbestos cement pipes have moderate to high susceptibility to breaking and are particularly vulnerable to liquefaction. Pipes are most prone to breaking at connections to above-ground structures, such as reservoirs, treatment plants, or booster stations. To mitigate this vulnerability, HDWD has installed flexible pipe fittings, seismic valves, hubble connections, and flexible pipe joints on most of their reservoirs, pipelines, tanks, and booster stations.

Figure 7. How Ground Displacement Can Sever Pipes



Liquefaction may cause buried domestic water pipes to sink, impacting gravity-fed systems. Once liquefied soils re-solidify after a quake, they will have to be dug up and repaired. Lateral spreading may damage wells and percolation ponds.

HDWD could experience a loss of water from damaged systems. HDWD has installed earthquakes shutoff valves that will automatically stop water from being released from its reservoirs if seismic shaking above a magnitude 5.0 is detected to help mitigate potential water loss at reservoirs.

Irrigation assets similar to water pipelines, ground shaking, displacement, and liquefaction may cause irrigation canals and laterals to crack, sever and otherwise fail.

Building Facilities: Shaking, ground displacement, and liquefaction have the potential to cause structural failure to buildings, including the office buildings at the District’s administrative buildings. Less catastrophic events may cause unanchored furniture and items on shelves to fall. If an event was to occur during working hours, failure may result in employee and customer deaths and injuries. Further, crews out in the field may also be injured or killed.

Energy Storage and Power Failure: An adequate supply of energy is critical for HDWD to maintain its daily processes and functions. Power failures occur when the reliable, uninterrupted supply of energy to all or part of service area is disrupted, causing detriment to the HDWD’s ability to provide service.

In summary, the entire District, inclusive of all current and future assets (infrastructure, buildings, critical facilities, and population), are considered at-risk to earthquake events.

4.3.2 Climate Change Induced Drought

Probability: (50-75%)

Impact: Critical

Priority: Likely

* This section looks at all the hazards affecting the District within its boundaries and identified by the Planning Team.

General Definition: A drought is a period of below-average precipitation in a given region resulting in prolonged shortages in its water supply, surface water, or ground water. Climatic factors such as high temperatures, high wind, and low relative humidity are often associated with drought. Drought occurs in virtually all climatic zones, varying significantly from one region to another. Droughts occur when there are long periods of inadequate rainfall. The cycle of droughts and wet periods are often part of El Niño and La Niña weather cycles.

The severity of a drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. It is generally difficult to pinpoint the beginning and the end of a drought. In California, a few dry months do not typically constitute a drought. Because the impacts of a drought accumulate slowly at first, a drought may not be recognized until it has become well established. Even during a drought there may be one or two months with above average precipitation totals. These wet months do not necessarily signal the end of a drought and generally do not have a major impact on moisture deficits. Droughts can persist for several years before regional climate conditions return to normal. While drought conditions can occur at any time throughout the year, the most apparent time is during the summer months.

Research supports that climate change will have significant impacts on drought frequency and intensity, which will vary by region. Higher temperatures lead to increased evaporation rates, including more loss of moisture through plant leaves. Even in regions where precipitation does not decrease, increases in surface evaporation will lead to more rapid drying of soil if not offset by other changing factors, such as reduced wind speed or humidity. As soil dries out, a larger proportion of the sun's incoming heat will go toward heating soil and adjacent air rather than evaporating moisture, resulting in hotter temperatures and drier conditions.ⁱ

Measuring Droughts: There are several quantitative methods for measuring drought in the United States. The U.S. Drought Monitor is a relatively new index that combines quantitative measures with input from experts in the field.

U.S. Drought Monitor: The U.S. Drought Monitor is designed to provide the general public, media, government officials, and others with an easily understandable overview of weekly drought conditions across a county throughout the United States. The U.S. Drought Monitor is unique because it assesses multiple numeric measures of drought, including the PDSI and three other indices, as well as the interpretations of experts to create a weekly map depicting drought conditions across the United States. The U.S. Drought Monitor uses five drought intensity categories, D0 through D4, to identify areas of drought.

Table 7. U.S. Drought Monitor

D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies

A drought is a regional event that is not confined to geographic or political boundaries; it can affect several areas at once. It can also range in severity across those areas. Drought is now one of the main concerns in California, as the State has been in a drought period for the last eight years. Northern California experienced some relief in the winter of 2016; however, the El Niño effect that was expected to relieve the statewide drought did not materialize in Southern California. The lack of rain and, most importantly, the lack of snowfall in the Sierra Nevada Mountain range severely impacted most residents of California. HDWD’s service area is at risk to drought occurrence and impacts.

Description: Climate change can be expected to increase drought frequency and severity in the HDWD’s service area. Warmer temperatures cause drought conditions by reducing soil moisture. Increased evapotranspiration and reduced snowpack projected with warmer temperatures is expected to result in reduced flows.

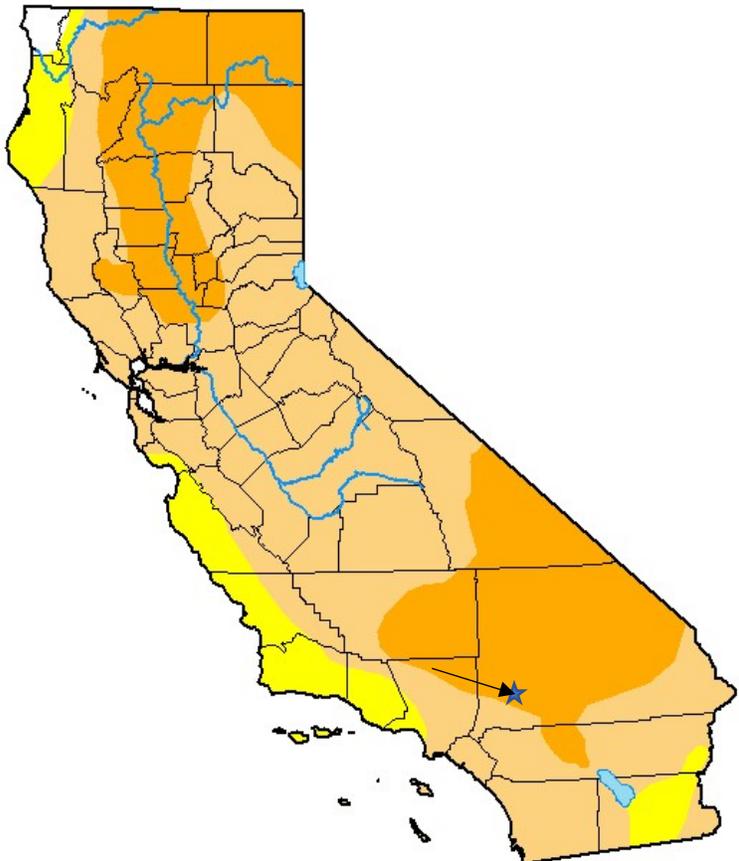
The National Integrated Drought Information System (NIDIS) is a tool that measures the drought-related risks in certain areas of the country. Figure 9, 10, and 11 below shows that San Bernardino County (as with most of California) is right on the line of another severe drought and was moving to a severe drought until rains of 2020 provided relief.

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 2021, which vary wildly from year to year.

Figure 8. 2023 California Drought Monitor

U.S. Drought Monitor California

January 31, 2023
(Released Thursday, Feb. 2, 2023)
Valid 7 a.m. EST



★ HDWD Location

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Rocky Bilotta
NCEI/NOAA



droughtmonitor.unl.edu

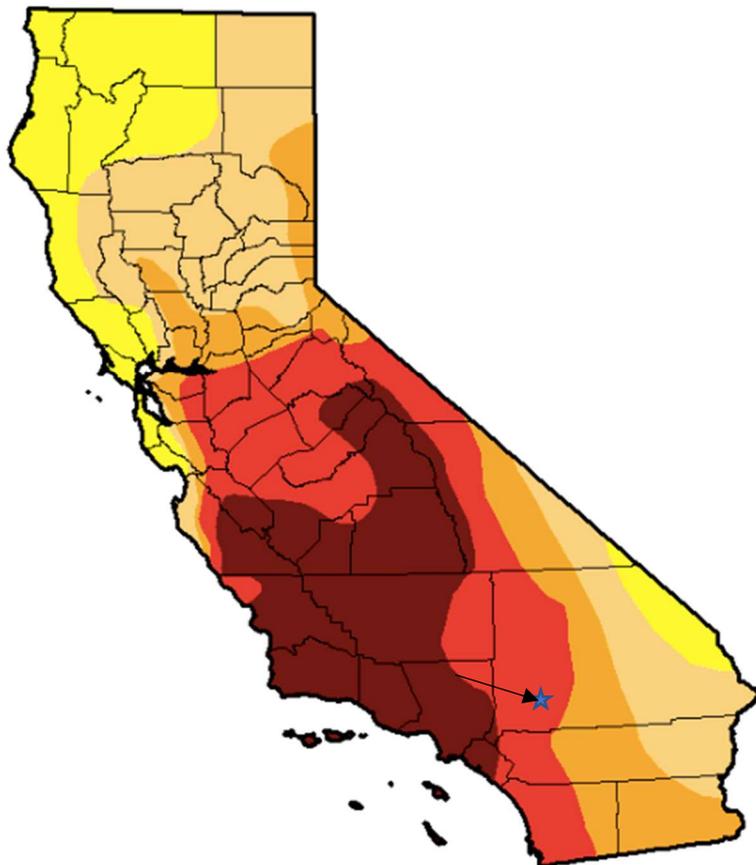
Figure 9. 2016 California Drought Monitor

U.S. Drought Monitor California

August 16, 2016
(Released Thursday, Aug. 18, 2016)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	83.59	59.02	42.80	21.04
Last Week 8/9/2016	0.00	100.00	83.59	59.02	42.80	21.04
3 Months Ago 5/17/2016	5.50	94.50	86.39	63.57	42.99	21.04
Start of Calendar Year 12/29/2015	0.00	100.00	97.33	87.55	69.07	44.84
Start of Water Year 9/29/2015	0.14	99.86	97.33	92.36	71.08	46.00
One Year Ago 8/18/2015	0.14	99.86	97.35	92.36	71.08	46.00



Intensity

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought
- HDWD Location

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
David Miskus
NOAA/NWS/NCEP/CPC



<http://droughtmonitor.unl.edu/>

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

Year	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.
1976–1977	1977 had been the driest year in state history to date. According to the <i>Los Angeles Times</i> , “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.
2020 - 2022	January and February 2020 were dry to record dry in several areas (central CA and Northern CA-NV). The past three water years combined- was California’s driest such period on record.

Progression of the drought from December 2013 to July 2014 (extracted from USGS, California Drought History)

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

The 2015 prediction of El Niño to bring rains to California raised hopes of ending the drought. In the spring of 2015, the National Oceanic and Atmospheric Administration (NOAA) 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% water restrictions in June 2015.

Approximately 102 million of trees in California died from the 2011 – 2016 drought of which 62 million died 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.

The winter of 2016–17 turned out to be the wettest on record in Northern California, surpassing the previous record set in 1982–83. Governor Brown declared an official end to the drought on April 7, 2017. Drought affects all of San Bernardino County including HDWD. HDWD water consumers have been affected by HDWD's low water accessibility during droughts and are asked to conserve water. Currently, HDWD is listed by the California Governor under the severe drought county list. All 58 counties are listed in the Governors severe drought impact. The winter of 2022 has had more rainfall and snow in California then the last 20 years alone

Impact Statement: Water is also needed to manage structural and wildfires. A lack of, or limited, water supply presents wildfire management vulnerability. Substantial water is needed to fight wildfires, which are also more frequent in dry conditions. While water for firefighting is a priority and no restrictions are in place, a lack of availability could slow this capability.

The entire planning area is equally at risk of this hazard. The majority of drought impacts, however, are not structural but societal in nature. A drought's impacts on society, and thus the HDWD's service area, result from the interplay between a natural event and the demand people place on water supply. HDWD is the entity in charge of supplying potable and non-potable water within its service area; therefore, it would be greatly impacted, both fiscally and politically, if it was unable to provide a reliable water supply due to drought conditions. Economically, water restrictions imposed during drought periods could result in lost revenue for HDWD.

4.3.3 Wildfires

Probability: (25-50%)

Impact: Limited

Priority: Somewhat Likely

* This section looks at all the hazards affecting the District within its boundaries and identified by the Planning Team.

General Definition: A wildfire is any fire occurring in a wildland area (i.e., grassland, forest, brush land) except for fire under prescription or under control fire, undertaken by land management agencies is the process of igniting fires under selected conditions, in accordance with strict parameters. Wildfires are part of the natural management of forest ecosystems but may also be caused by human factors.

Nationally, over 80 percent of forest fires are started by negligent human behavior such as smoking in wooded areas or improperly extinguishing campfires. The second most common cause for wildfire is lightning. Downed utility poles or power lines are also a common cause of wildfires.

There are three classes of wildland fires: surface fire, ground fire, and crown fire. A surface fire is the most common of these three classes and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire (muck fire) is usually started by lightning or human carelessness and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees. Wildland fires are usually signaled by dense smoke that fills the area for miles around.

Wildfire probability depends on local weather conditions, outdoor activities such as camping, debris burning, and construction, and the degree of public cooperation with fire prevention measures. Drought conditions and other natural hazards (such as tornadoes, severe winds, etc.) increase the probability of wildfires by producing fuel in both urban and rural settings. Cyclical climate events, such as El Niño-La Niña, can also have a dramatic effect on the risk of wildfires. Fewer fires are typically seen during El Niño (when more rain is present) and larger, more frequent fires are typical during La Nina events.

California is highly susceptible to wildfires, especially during the fall and summer months. Southern California experiences Santa Ana winds that develop mostly in the late summer and fall seasons. These winds are known for their high speeds and drying effect, which turn the natural grasses brown and dry. These winds are also capable of blowing down power lines that can start fires in the mountains and hills. The fires are driven by the high winds and can become large events that destroy large areas including towns and cities and cause loss of life and millions of dollars in property damage. In the jurisdictional boundaries, brush fires are known to jump from place to place due to patches of vegetation and winds. The Santa Ana Winds are known to cause or spread wildfires.

The fires that burned in and around the Santa Clarita Valley in October of 2003 were made far more dangerous by Santa Ana winds which continually changed directions and allowed the fire to spread extremely quickly. Eventually the fire threatened thousands of homes in the western Santa Clarita Valley before firefighters gained control of the blaze.

Description: Local facility fires are a significant concern. The District's office facilities, computer systems, SCADA system, and operating pump stations are susceptible to fire damage. The consequences include loss of life, buildings, equipment, and property damage.

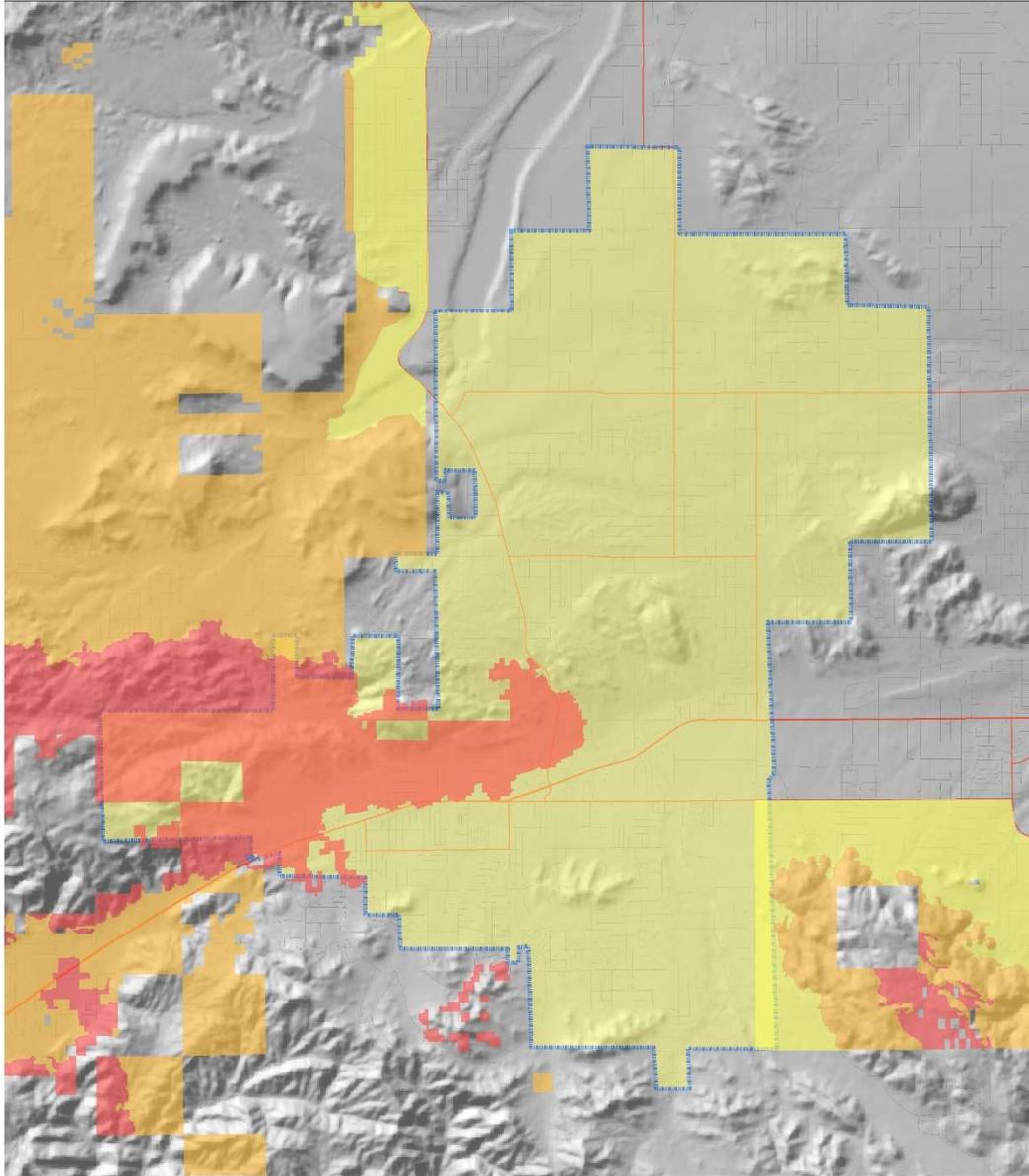
California is very susceptible to wildfires, especially during the fall and summer months. Southern California has the Santa Anna Winds that develop mostly in the late summer and fall. These winds are known for their high speeds and drying effect, which turn the natural grasses brown and dry the southwest natural vegetation. These winds are also capable of blowing down power lines that are known to start fires in the mountains and hills. The fires are driven by the high winds and the fires become large events that destroy large areas within cities and towns and cause millions of dollars in damage to property and loss of life.

Wildfires are not expected to affect the water infrastructure system because most of the infrastructure is underground and constructed of non-flammable materials. In addition, the local vegetation is such that wildfires are not expected to occur within the District boundaries.

There are issues from wildfires that affect the District. During large wildfires, firefighting personnel may draw large amounts of water and strain the water supply system. The fires also burn through electrical power lines and the District can lose power in critical areas. Without power the District cannot pump groundwater from the aquifer or pump additional water to needed areas.

Figure 10. HDWD 2023 Fire Hazard Zones

Hi-Desert Water District - Fire Hazard Zones



Legend

CALFIRE Fire Hazard Severity Zones in SRA

HAZ_CODE
 Moderate

High

Very High

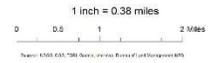
CALFIRE Fire Hazard Severity Zones in LRA

HAZ_CODE
 Moderate

High

Very High

District Boundary



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Figure 12 above shows that 80-90 percent of HDWD boundaries have a Very High to High fire threat.

Table 9. Yucca Valley Wildfires

Fire Name	Date	Acres Burned
Matz Fire	05/2017	16
Fairview Fire	06/2017	26
La Barisa Fire	08/2019	26
Elk Fire	05/2022	431

Impact Statement: Wildfire events have the potential to cause a variety of impacts to HDWD and its assets. Wildfires could directly damage above-ground assets that are burned or melted by fires. In addition, wildfires have the potential to cause damage to underground pipes in domestic water systems, as demonstrated in Santa Rosa, where heat from a wildfire melted underground pipes, causing benzene to leech into the water supply. Wildfires may also impede access to assets that need maintenance or repair or pose life safety threats to employees. HDWD will also need to supply water for fighting fires, which could impact available supply.

In addition, wildfires also have the potential to result in indirect, or cascading, hazards to HDWD. Wildfires can cause power outages if utility lines are damaged, and burned areas are much more susceptible to landslides, as demonstrated by the 2018 mudflows in Montecito, CA.

A power outage has the potential to disrupt services provided in the service area. HDWD relies on an adequate energy source to power many of its assets, including booster stations, lift stations, reclamation plants, water treatment plants, and any other asset that requires an electrical component. HDWD has back-up power supplies located on many of its critical assets to minimize the impacts of power outages. However, long term outages may exceed fuel required to power back-up generators. This could compromise nearly all of services including domestic water delivery, water treatment, and irrigation. Administrative buildings also require an energy source and disruptions could compromise operations, billing, and communications. A loss of power resulting in the inability of HDWD to provide essential services could have direct impacts in terms of revenue loss and reputational impacts, in addition to far-reaching community impacts.

In summary, the entire service area, inclusive of all current and future assets (infrastructure, buildings, critical facilities, and population), are considered at-risk to wildfire events. All current and future above-ground assets, drinking water systems, and populations (e.g., employees) are considered to be most at-risk to wildfire.

4.3.4 Flooding

Probability: (25-50%)

Impact: Limited

Priority: Somewhat Likely

* This section looks at all the hazards affecting the District within its boundaries and identified by the Planning Team.

General Definition: An unusually heavy rain in a concentrated area, over a short or long period of time that collects on the ground in low areas of the land. Flooding occurs when there are large amounts of rainfall in areas where the water runs off to lower elevations. Flooding is a very frequent, dangerous, and costly hazard. Globally, it accounts for 40 percent of all natural disasters and results in an average of over 6,500 deaths annually. In the U.S., flooding results in an average of 86 deaths annually. Nearly 90 percent of all presidential disaster declarations result from natural events where flooding was a major component. On average, flooding causes more than \$2 billion in property damage each year in the United States. Floods cause utility damage and outages, infrastructure damage, structural damage to buildings, crop loss, decreased land values and impede travel.

Flooding is the most common environmental hazard, due to the widespread geographical distribution of valleys and coastal areas, and the population density in these areas. The severity of a flooding event is typically determined by a combination of several major factors, including: stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surface. Flooding events can be brought on by severe (heavy) rain.

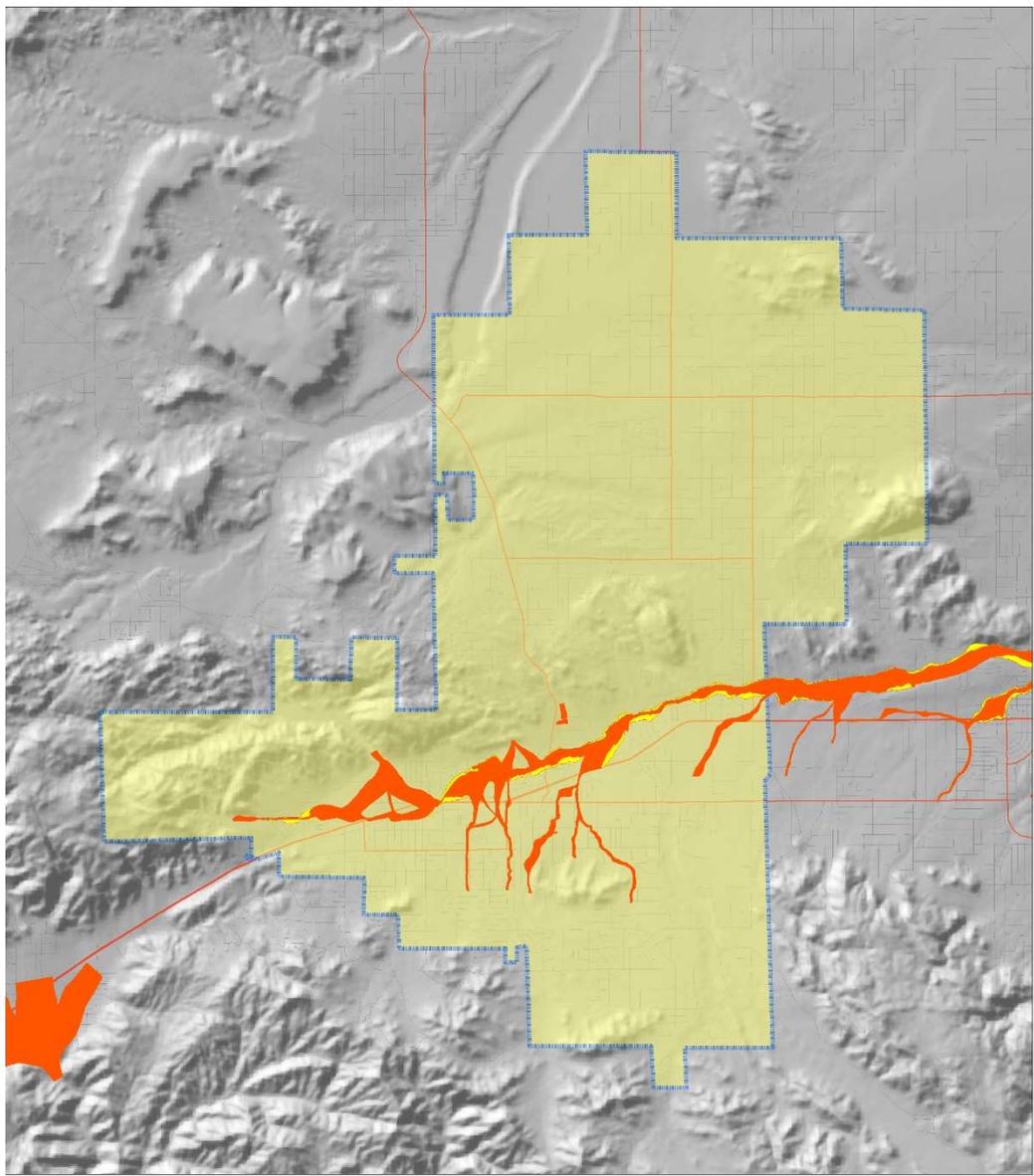
Flash Flooding: Flash floods occur within a few minutes or hours of heavy amounts of rainfall and can destroy buildings, uproot trees, and scour out new drainage channels. Heavy rains that produce flash floods can also trigger mudslides and landslides. Most flash flooding is caused by slow-moving thunderstorms or repeated thunderstorms in a local area, or by heavy rains from hurricanes and tropical storms. Although flash flooding often occurs in mountainous areas, it is also common in urban centers where much of the ground is covered by impervious surfaces.

Wildfires can exacerbate flooding conditions, when infiltration is affected, and limited vegetation is in place. Major wildfires are known to contribute to major flooding, as the vegetation is burned away, allowing the rainwater to runoff of the hills onto the valleys below. While the recent drought conditions have resulted in a lack of rain events, the potential for future flooding still exists.

Description: Flash flooding can occur in the summer as well as the winter. During Monsoon Season is typically in June and July of each year. During Monsoons, heavy rainstorms that form in the Gulf of Mexico move into Arizona, New Mexico, Texas, and the Deserts of California. These storms bring powerful winds and heavy rains within a short period of time and can produce two to five inches of rain within a half-hour period. There is no flood control infrastructure in this area of San Bernardino County. Many roads in the District's service area are unpaved, dirt roads.

Figure 11. FEMA Flood Zones 2023.

Hi-Desert Water District - FEMA Flood Zones



Legend

- Moderate to Low Flood Zone
- High Risk Flood Zone
- District Boundary
- demshd3099_1 Value
- demshd9099_1 Value

1 inch = 0.38 miles
 0 0.5 1 2 Miles

Source: USGS, 100-Foot Digital Elevation Model (DEM) of the District
 District Boundary
 FEMA Flood Zones 2023
 DEMSHD3099_1 Value
 DEMSHD9099_1 Value
 District Boundary

Table 10. USGS Flooding History

Date of event	Type of Damage	Amount of Damage	Statewide or Local
*Dec- 2010	FEMA Disaster No 1952 Severe storms, flooding, debris flows, and mudslides	\$75 M	Local
Feb-1998	17 deaths	\$550 M	Various
*Feb-1995	17 deaths	Public property \$190.6 M; individual \$122.4 M; business \$46.9 M; highways \$79 M; ag \$651.6 M; TOTAL approximately \$1.1 billion; damage to homes: major- 1,322; minor-2,299; destroyed 267	57 counties (all except Del Norte)
Jan-1995	11 deaths	Public \$299.6 M; individual \$128.4 M; businesses \$58.4 M; highways \$158 M; ag-\$97 M; TOTAL \$741.4 M; damage to homes: major-1,883; minor 4, 179; destroyed-370.	Various
Dec-1992	Snow, rain, and high winds, 20 deaths, 10 injuries	Total - \$600 M	Various
*Feb-1992	Flash Flooding, rainstorms, mud slides; 5 deaths	Public-\$95 M; private-\$18.5 M; business \$8.5 M, agricultural \$1.5 M; TOTAL \$123 M	Los Angeles, Ventura, Kern, Orange, San Bernardino Counties
Feb-1980	Rain, wind, mud slides, and flooding	18M to 20M	Various
*January 1980	FEMA Disaster No 615 Severe storms, flooding, debris flows, and mudslides	N/A	Local
Winter 1966	Abnormally heavy and continuous rainfall.	Public- \$14.6 M; private \$14 M; Total \$28.7 M	Various

Date of event	Type of Damage	Amount of Damage	Statewide or Local
Winter 1969	Storms, flooding, 47 dead, 161 injured. An alluvial flood and debris flow on Deer Creek in San Bernardino County killed 11 people.	Public \$185 M, Private -\$115 M; Total \$300 M	Various
Winter 1978	14 dead, at least 21 injured	Public \$73 M; private-\$44 M; Total \$117 M; 2,538 homes destroyed	Various
Winter 1982-1983	Heavy rains, high winds, flooding, levee breaks	Public \$151 M; private \$159 M; agricultural \$214 M; Total \$524 M	Various

*Events with an asterisk indicate a direct effect on Hi-Desert Water District.

Impact Statement:

- Flooding can result in a variety of impacts, such as death and injury, asset damage, inability to access facilities or assets and road closures. Normal operations may be interrupted due to flooding. Some impacts from flooding include:
- Floodwater often contains bacteria and chemicals. Flooding of wells or reservoirs may result in water contamination, resulting in boil water advisories or reduced service.
- Floodwaters can prevent normal access to assets and facilities. This presents a danger when motorists and pedestrians attempt to traverse floodwaters. Motor vehicles and pedestrians can get swept up in flood currents, increasing the risk for drowning. Even in shallow waters, fast-moving currents can carry individuals or vehicles into deeper waters, where pressure from flowing water can prevent drivers from escaping submerged vehicles. As little as six inches of floodwater can move a vehicle, and as little as two inches can move a person.
- Replenishment facilities, including percolation ponds, may be washed out by flooding, resulting in damages.
- Assets with electrical parts or motors may be damaged by flooding if these parts are submerged.
- Structures exposed to flooding, including critical facilities, can be severely damaged. Building contents can be lost, damaged, or destroyed, and structures themselves can be compromised by floodwaters. Pressure from floodwater, especially as seepage through soil, can damage foundations.
- Buildings exposed to floodwaters may develop mold or wood rot.

4.3.5 Freezing Events

Probability: (25-50%)

Impact: Limited

Priority: Somewhat Likely

General Definition: The temperature range in the Morongo Basin is quite extreme. Temperatures range from a low of 20 degrees in the winter to a high of 115 degrees in the summer months. The District had a major freezing event during the winter of 2010 and 2013 that froze water in the pipes coming out of a wellhead. Freezing can cause damage to the pump motor and rupture the pipe.

Description: High desert locations are known to have a wide range between summer and winter temperatures. It is not uncommon to have summer temperatures in the low 100's and winter temperatures below 30 degrees. Winter storms coming down from Alaska cause rain and cold temperatures, but in the high desert these storms cause snow and freezing temperatures. The high desert is at an elevation of between 3,300 to 3,500 feet above sea level. Cold winter storms can drive the temperatures below 20 degrees, freezing water pipes coming out of wells, in homes and businesses. The freezing temperatures cause pipes to burst or restricting water flow to residents and businesses. The District can become inundated with "no water" calls from customers- because of the frozen pipes. The District warns customers each year to protect their pipes from freezing. The District receives hundreds of calls during a freezing event, which takes manpower away from other issues and directs resources to customer calls. Freezing events shown and included in this HMP area are for the entire service area of the Hi-Desert Water District.

Impact Statement: All of the service area within HDWD has freezing events, the entire planning area is equally at risk to this hazard. Freezing events often have negative effects on the District. It often leads to frozen pipes and limiting water distribution to their customers. Insulating above ground piping is an option for the District to help mitigate the issue. There is also an option for the district to install pipeline heating systems to keep the water in the wellhead and output pipelines from freezing.

4.3.6 Windstorms

Probability: (25-50%)

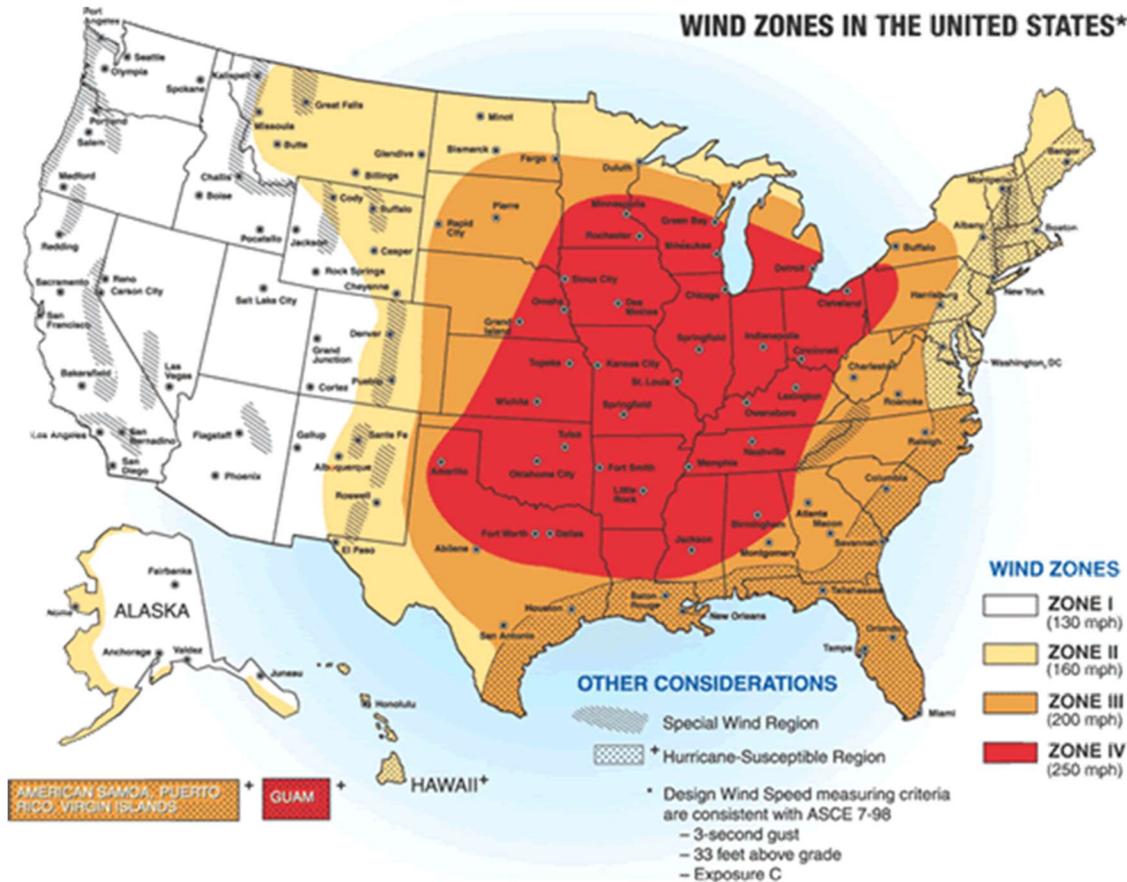
Impact: Limited

Priority: Somewhat Likely

* This section looks at all the hazards affecting the District within its boundaries and identified by the Planning Team.

General Definition: There are several types of wind hazards that affect the planning area. These include high or strong wind events, typically associated with Santa Ana winds, and thunderstorm wind events (including straight line winds and microbursts). High Wind definitions can vary by region. In general, high wind events are those events greater than normal averages and have damage potential. Wind events are common throughout the United States. However, the severity varies depending on location. Windstorms are not recorded in Yucca Valley. Santa Ana Winds occur thought-out September through November of each year.

Figure 12. Wind Zones in the United States



Description: Santa Ana Winds are a regional wind hazard specific to southern California. Santa Ana Winds are known to cause large amounts of damage and increase the spread of wild and structural fires. Santa Ana winds are generally defined as warm, dry winds that blow from the east. The complex topography of Southern California combined with various atmospheric conditions creates numerous scenarios that may cause widespread or isolated Santa Ana events. Santa Ana windstorms are common during the late summer and fall months in Southern California. Winds are caused by a low-pressure system over the southern coastline and a high pressure over the Great Basin in Nevada. When the high pressure turns counterclockwise the warm, dry air is pulled to the low-pressure zone and out to the Pacific Ocean. Santa Ana Winds are quick and effective at spreading wildfires. Combination of windstorm activity with the major fires that occur every few years creates the greatest danger to urban/wild land interface. Santa Ana winds spread the flames in even greater speed than in times of calm wind conditions.

The National Weather Service Center normally issues a high wind advisory or warning depending on the following criteria: A wind advisory is issued when conditions are favorable for the development of high winds over all or part of the forecast area, but the occurrence is still

uncertain. The criteria of a wind advisory are sustained winds of 31 to 39 mph and/or gusts 46 to 57 mph for any duration. A high wind warning is issued when sustained winds from 40 or higher are expected for at least one hour or any wind gusts are expected to reach 58 mph or more. Forecasters at the National Weather Service in Oxnard and San Diego usually place speed minimums on these winds and reserve the use of "Santa Ana" for winds greater than 25 knots (approximately 29 miles per hour). Table 10 is a Beaufort wind scale that shows the appearance of wind effects based on the knots of wind and its classification.

Table 11. Beaufort Wind Scale

Beaufort grade	Kind of wind	Knots		km/h		Effects		Height of waves (metre)
		Min	Max	Min	Max	Earth	Sea	
0	Calm	<1		<1		Smoke rises vertical	Flat sea	-
1	Very light	1	3	1	5	The wind bends smoke	Small ripples with no white foamy crests.	0.1
2	Light breeze	4	6	6	11	It can be felt on face	Small wavelets, with unbroken crests.	0.2 - 0.3
3	Gentle breeze	7	10	12	19	It shakes leaves	Very small crests; crests begin to break.	0.6 - 1
4	Moderate breeze	11	16	20	28	It lifts dust and papers	Small waves that begin to grow longer; spuma più frequente e più evidente.	1 - 1.5
5	Fresh breeze	17	21	29	38	It shakes branches	Moderate waves that grow longer in shape; possible spray.	2 - 2.5
6	Strong breeze	22	27	39	49	It shakes big branches	Bigger waves; white foamy crests are longer everywhere.	3 - 4
7	Near gale	28	33	50	61	It impedes walking	The sea swells up; white foam forms when waves break up.	4 - 5.5
8	Gale	34	40	62	74	It shakes big trees	Medium-high, longer waves; crests start to break up in sprays.	5.5 - 7.5
9	Strong gale	41	47	75	88	Chimney pots and slated removed	High waves; tight strips of foam form in the direction of the wind.	7 - 10
10	Storm	48	55	89	102	It uproots trees	Very high waves with long crests; the sea looks completely white; waves fall down violently, visibility is reduced.	9 - 12.5
11	Violent storm	56	63	103	117	Serious devastation	Exceptionally high waves (small and medium tonnage ships disappear for a few seconds); visibility is still more reduced.	11.5 - 16
12	Hurricane	>64		>118		Very serious catastrophes	Air is filled with foam and sprays; sea is completely white because of foam; visibility is greatly reduced.	>14

Impact Statement: All of the service area within HDWD has windstorm events, the entire planning area is equally at risk to this hazard. Severe wind has the potential to damage reservoirs, treatment plant facilities, wells, and ponds. Structures can also be damaged including blown off shingles, siding, awnings, and other features off buildings and overturning of trees. Objects picked up by wind, including palm fronds and litter, can be hurled through the air, damaging assets and structures when contact is made. In some cases, structures may be blown off foundations or infrastructure, such as reservoirs, may be blown off their base. In addition, mobile or modular units (such as those installed for temporary uses) are considered at a higher risk to severe wind. Severe winds can cause damage to communications infrastructure, utility poles, and above ground power lines, resulting in loss of power. Falling trees also contribute to

power line disruptions. When strong winds reach a force great enough to threaten above ground facilities, power pole lines and power outages may be experienced. These events are known as Public Safety Power Shutoffs (PSPS). PSPS are temporary and are meant to keep the community safe. PSPS events only happen during periods of high winds. There have not been any PSPS events in the last 5 years that have had a negative affect or loss of water in the Hi-Desert Water Districts service area.

The entire service area, including all current and future assets (infrastructure, buildings, critical facilities, and population), is vulnerable to annual severe wind due to the topography and movement of weather fronts through the area. Exposed (e.g., above-ground) assets are considered most at risk to severe winds.

4.4 Inventory Assets Hazard Susceptibility

The following sections provide an overview of the assets owned by Hi-Desert Water District and the hazards to which these facilities are susceptible.

Table 12. Facilities Owned Overview

Facilities	Owned by HDWD
Reservoirs	16
Wells	11
Booster Stations	9
Administrative Office	2
Plant Operations Yard	1
Wastewater Treatment Plant	1
Lift Stations	3
Encelia Treatment Plant / Sunnyslope Treatment Plant	2

Vulnerability Assessment

The Planning Team reviewed USGS, FEMA HAUS maps for each of HDWD’s hazards. The maps were overlaid with the infrastructures in place to present the potential impacts for each hazard. The Planning Team has extensive knowledge of the area and knowledge of the potential disasters and emergencies that can occur in and around HDWD’s boundaries. The team has the knowledge to assess the system and give valuable input into the assessment and vulnerabilities to HDWD.

Methodology

The Planning Team reviewed HDWD’s infrastructure and applied their local and operational knowledge to evaluate the vulnerability of each facility for a potential hazard. The team ranked the facilities and infrastructure by their importance to HDWD. The team then used this ranking and insurance documents provided by HDWD to develop an estimate of potential economic

impacts that could be caused by the high priority hazards. Based on the ranking of annual revenue projected for 2022-2023, a percentage was used to assess the annual economic impact for each hazard.

4.4.1 Earthquake Vulnerability Analysis

Population: Approximately 100% of HDWD is vulnerable.

Critical Facilities: Approximately 100% of HDWD critical facilities are vulnerable.

All facilities are vulnerable in the event of a major earthquake within HDWD's boundaries. There are many nearby faults that could affect HDWD's facilities: San Andreas, and the San Fernando fault. If any of these faults experience a rupture of 6.5 magnitude or more, it will have a negative effect on HDWD's facilities and pipelines.

Estimated Losses: The economic loss resulting from this hazard is approximately \$50 million. The loss from damage to structures and pipelines from this hazard is approximately \$75 million.

Losses are estimated assuming: Proposed well \$ is based on \$420/gpm + \$865,000 for equipping. Proposed reservoir \$ based on \$1.20/gallon and proposed booster \$ based on current Front Western Hills booster proposal of \$1.6 million.

4.4.2 Wildfire Vulnerability Analysis

Population: Approximately 25% HDWD population is vulnerable.

Critical Facilities: Approximately 10% of HDWD critical facilities are vulnerable.

Estimated Losses: The economic loss resulting from this hazard is approximately \$5 million. The loss from damage to structures from this hazard is approximately \$1 million.

4.4.3 Drought Vulnerability Analysis

Population: Approximately 100% of HDWD population is vulnerable to drought.

Critical Facilities: Approximately 50% of HDWD critical facilities are vulnerable.

Of the critical facilities listed, 11 are wells. Currently, all of these wells are operating without significant hardship during the ongoing drought. Reservoirs are not considered critical in a drought, however Pipelines can collapse, if the system is left with no water.

Estimated Losses: The economic loss resulting from this hazard is approximately \$18 million. The loss from damage to structures from this hazard is approximately \$3 million.

4.4.4 Flooding Vulnerability Analysis

Population: Approximately 5% of the HDWD population is vulnerable.

Critical Facilities: Approximately 20% of HDWD critical facilities are vulnerable.

Flooding only happens when heavy and concentrated rains occur in steep basin areas where runoff is channeled through limited areas. District is located in the foothills where water runs off from higher mountainous areas on its way to the dry lake areas on the desert floor. These waters are very dangerous because they can originate many miles away and travel at fast speeds. Flash flood waters rage through the service area from the west to east and collect in the wash area.

Estimated Losses: The economic loss resulting from this hazard is approximately \$1 million. The loss from damage to structures from this hazard is approximately \$3 million.

4.4.5 Windstorm Vulnerability Analysis

Population: Approximately 25% of HDWD's population is vulnerable.

Critical Facilities: Approximately 20% of HDWD's critical facilities are vulnerable.

Above grade facilities are vulnerable in the event of a Santa Ana wind event within HDWD's boundaries. These events can down power lines and cause long-term power outages. When a potable water utility loses power during a long-term power outage and cannot maintain a system pressure of 25 psi, the water in the system is no longer potable. Windstorms can affect the entire service area.

Estimated Losses: The economic loss resulting from this hazard is approximately \$2 million. The loss from damage to structures from this hazard is approximately \$1 million.

4.4.6 Freezing

Population: Approximately 100% of HDWD's population is vulnerable.

Critical Facilities: Approximately 40% of HDWD's critical facilities are vulnerable.

Freezing events occur most every winter. During these events water in well heads, pipelines that are above ground, water backflow valves, and fire hydrants can freeze. The community of Yucca Valley can get unexpected snow falls two or three times a winter, sometimes there can be two or three feet of snow.

Estimated Losses: The economic loss resulting from this hazard is approximately \$1 million. The loss from damage to structures from this hazard is approximately \$500 thousand.

SECTION 5. COMMUNITY CAPABILITY ASSESSMENT

5.1 Introductions

The purpose of conducting the capability assessment is to determine the ability of HDWD to implement a comprehensive mitigation strategy and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects.

The capability assessment has two components:

- 1) an inventory of the existing relevant plans, ordinances, or programs already in place and
- 2) an analysis of HDWD's capacity to bring them to fruition. A capability assessment highlights the positive mitigation activities already in place within HDWD and will detect the potential gaps.

5.2 Emergency Management

HDWD is in the Southwestern section of the Mojave Desert within San Bernardino County. The District serves the Town of Yucca Valley and some areas of the County of San Bernardino. The District serves approximately 11,500 service connections and a population of approximately 24,200 customers.

The General Manager has over 36 years of experience in water. He has been with HDWD for 2 years. Throughout his career, he has been mitigating fire, earthquake, flood, and drought impacts that face water utilities. The Director of District Services has worked with the district for over 28 years and has experience in fire, drought, and earthquake mitigations. HDWD also utilizes engineering consultants who design infrastructure to mitigate earthquake, fire, wind, and landslides at district reservoir sites. The Director of District Services is also the Director of Emergency management and Safety.

To help mitigate the potential impacts of disasters, HDWD joined CalWARN. 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. In addition, the National WARN System through the American Water Works Association can be accessed.

CalWARN holds workshops twice a year for water agency members. CalWARN has been planning public outreach, so the public has a better understanding of hazard mitigation planning in their communities. These workshops promote mitigation and how to prevent the impacts of hazards on the utility's infrastructure. CalWARN has access to utility leaders and their past experiences during emergencies and lessons learned on what they should have done differently. Sharing ideas and experiences is key to understanding mitigation in the future.

HDWD employs approximately 46 full-time staff members and 5 board members, and by joining CalWARN, the District has the potential of having hundreds of mutual aid workers at its disposal within hours of an emergency.

Emergency Response Plan: An emergency response plan outlines responsibility and how resources are deployed during and following an emergency or disaster. The primary objective of the plan is to guide the identification of potential emergencies, a timely and effective response, and the protection of the health and safety of the community. The ERP guides the process when an emergency occurs, including being a blueprint for the general operations during a disaster, distributing and managing of responsibilities among authorities, and identifying liability.

HDWD Emergency Response Plan (ERP) was last revised in December 2021 and details how the District will respond to various emergencies and disasters. HDWD 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
- 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, cyber security, or suspicious mail.
- Natural disasters, such as earthquakes or floods and power failures.
- Communications with critical customers, media outreach, and public notification process

HDWD 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.

Emergency Operations Center (EOC): An EOC provides a location, on or off-site, from which an agency coordinates a disaster response operation. In times of non-disasters, EOCs typically provide a centralized hub for communication and security oversight. HDWD currently uses a board room as an EOC during events, with a backup meeting at the wastewater treatment plant.

Emergency Management Training and Staff: Dedicated emergency management staff and regular training help prepare an agency for events and guide effective response and recovery.

HDWD conducts regular emergency exercises, following their emergency training plan. Through this training, the staff is trained across divisions within each department to assist with emergency response operations. HDWD has on-call 24/7 access to the executive authority. Additionally, HDWD has a well-developed emergency notification process for critical staff.

5.3 Planning and Regulatory Capability

Planning and regulatory capability is based on the implementation of plans, policies, and programs that demonstrate HDWD's commitment to guiding and managing growth while maintaining the general welfare of the community. It includes emergency response and mitigation planning, master planning, capital planning, and enforcement of design and

construction standards. Although conflicts can arise, these planning initiatives present significant opportunities to integrate hazard mitigation principles into HDWD’s decision-making process.

The Urban Water Management and Planning Act requires water suppliers to estimate water demands and available water supplies. HDWD updated Urban Water Management Plan (UWMP) was 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 impacts of climate change and water shortage contingency planning for dealing with shortages, including a catastrophic supply interruption.

The Water Supply Reliability Assessment is a section of the plan that aims to understand the ability to satisfy the water demand during different types of years (e.g., years with average rainfall versus drier years).

Water Shortage Contingency Plan (WSCP)

Certain elements of the WSCP are required by California Water Code (Water Code), including five specific response actions that align with six standard water shortage levels based on HDWD’s water supply conditions and shortages resulting from catastrophic supply interruptions. The WSCP also contains HDWD procedures for conducting an annual water supply and demand assessment, which is the written decision-making process for determining supply reliability each year, along with the data and methods used to evaluate reliability.

The WSCP is implemented through a series of ordinances of water use restriction in different stages. For instance, stage 1 requires 10% of water use restriction, and stage 5 requires a 50% of water use restriction. The main method to reduce water use is by using water budget-based tiered rate structures and penalties for overuse.

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

5.4 Existing Plans

The following emergency-related plans apply as appropriate:

- CalWARN Emergency Operations Plan – Updated every 10 years
- The District’s Illness Injury Prevention Plan (IIPP) – Updated annually
- The District’s Urban Water Master Plan – Updated every 5 years
- Water Shortage Contingency Plan (WSCP)– Updated every 5 years
- San Bernardino County Fire Master Plan- Updated annually
- San Bernardino County Flood Master Plan- Updated annually
- USEPA PSPS SOP for Public Water Systems

5.5 Mitigation Programs

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

HDWD employees have experience with past hazard mitigation and hazard planning and can enhance their hazard mitigation skills by participating in training offered by other agencies or regional governments.

5.6 Fiscal Resources

The ability of HDWD to act is closely associated with the amount of fiscal resources available to implement mitigation policies and projects. This may take the form of outside grant funding awards or district-based revenue and financing. The cost of mitigation policy and project implementation vary widely. In some cases, mitigation actions are tied primarily to staff time or administrative costs associated with creation and monitoring of a given program. In other cases, direct expenses are linked to an actual project, such as installing backup power generators and sustainable energy resources, which can require a substantial commitment from HDWD, state, and federal funding sources. HDWD has made fiscal commitments to the mitigation of hazards through its capital improvement program.

The fiscal resources for HDWD include the following:

- Facility Capacity Fee Revenues
- Grants and Reimbursements
- Revenue from water sales
- Monthly Service Charge fee
- Meter Standby Assessment
- Meter Acquisition Fee
- One-Percent Property Tax Revenues

Through the California Department of Water Resources, local grants and/or loans are available for water conservation, groundwater management, studies, and activities to enhance local water supply quality and reliability. Project eligibility depends on the type of organization(s) applying and participating in the project, as well as the specific type of project. More than one grant or loan may be appropriate for a proposed activity. Completing the LHMP will facilitate and obtain grant funding in the future. For instance, BRIC, HMGP, or FMA grants. Grant opportunities will be reviewed each year to ensure there will be funding available for specific mitigation items.

5.7 Capabilities Assessment

A Capability Assessment examines HDWD's capabilities to detect any existing gaps or weaknesses within ongoing activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. The conclusions of the Risk Assessment and Capability Assessment serve as the foundation for the development of a meaningful hazard mitigation strategy. The list below outlines key capabilities HDWD will consider in the Mitigation Strategy.

1. **Coordinate** with the San Bernardino County Emergency Management and the City of Yucca Valley to achieve interoperability of Web EOC software and representations in appropriate EOCs;
2. **Provide** necessary staffing and software for GIS department for ongoing maintenance of asset management program data;
3. **Add funding** for hazard mitigation actions to the District's Capital Improvement Program planning efforts
4. **Incorporate** projects from the capital improvement program into the mitigation strategy (and vice versa).
5. **Expand** Public outreach and education on emergency management. This allows HDWD to form a plan to continually educate their customers regarding natural hazards and the effects these hazards have on drinking water systems. They educate the residents on the importance of mitigation of these hazards to build a more resilient community.
6. **Broaden** staff training: HDWD employees have experience with past hazard mitigation and hazard planning and can improve their hazard mitigation skills by participating in training offered by other agencies or other regional governments. This plan should begin with educating grade K-12 in the local schools and on HDWD Website.

SECTION 6: MITIGATION STRATEGIES

6.1 Overview

HDWD derived its mitigation strategy 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 that recognize both mitigation challenges and opportunities and is demonstrated by the goals and objectives outlined below. Additionally, 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 inputs when priorities were decided. All priorities are based on consensus of the Planning Team.

Mitigation measures are categorized generally for all hazards and specifically for the six high-risk hazards facing cities that were extensively examined in the risk assessment section. These hazards include earthquakes, climate change induced drought, wildfires, flooding, freezing events and windstorms.

6.2 Mitigation Goals, Objectives, and Projects

The process of identifying goals began with a review and validation of the FEMA Hazard Maps for HDWD and surrounding cities in San Bernardino County. The 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.

Overall, the primary objective is to protect lives and prevent damages to infrastructure that disrupts water services. Global measures that apply across all hazards include:

- Continually improve the community's understanding of potential impacts due to hazards and the measures needed to protect lives and critical infrastructure.
- HDWD communications should provide public outreach to inform the public of the hazards identified to the drinking water system in emergencies - how to conserve water in the event of a disaster and how to obtain drinking water when water may not be available.
- Continually provide State and Local Agencies with updated information about hazards, vulnerabilities, and mitigation measures at HDWD.
- Review and verify that the District's owned and operated infrastructure meet minimum standards for safety.
- Review the District's facilities and developments in high-risk areas to verify that these areas are appropriately protected for potential hazards.
- Identify and mitigate imminent threats to life safety and facility damage.

- The six high profile hazards for HDWD are earthquakes, climate change induced drought, wildfires, flooding, freezing events and windstorms. While other hazards were profiled in previous sections, HDWD priority and focus for the mitigation projects will be for the six high profile hazards.

From 2016 LHMP mitigation items are completed or continuing:

Earthquake Mitigation Projects:

- Flexible pipe joints at wellheads, pump stations, and reservoirs (*Continuing*)
- Seismic shut-off valves (*Continuing*) Automatically shut off water piping in events of ground movement
- Bolt down reservoirs (Completed) Bolting reservoirs to concrete
- Tie down equipment (*Continuing*)
- Generator hook-up (*Continuing*) allows

Flooding Mitigation Projects:

- Install block or concrete diversion walls (*Continuing*)
- Deepen pipelines (*Continuing*)
- Install concrete protection of pipelines at critical locations (*Continuing*)

Freezing Event Mitigation Projects:

- Lower pipelines that are susceptible to freezing below the frost line (*Continuing*)
- Install automatic electric heaters on pipes and wells that are above ground (*Continuing*)
- Build heated structures around wells and booster pump stations (*Continuing*)
- Public Outreach to educate public to expect outages and on ways to stop pipes from freezing on private property (*Continuing*)

Climate Change Drought Mitigation Projects:

- Increase public awareness of water conservation (*Continuing*)
- Monitor groundwater elevations and evaluate trends (*Continuing*)
- Increase water pumping capabilities (*Continuing*)
- Increase groundwater supplies (*Continuing*)
- Provide interties with other water systems in the area (Completed)
- Generator hook-ups (*Continuing*)
- Find new ways of cutting costs to the District, during conservation, the District's revenue falls. (*Continuing*)

Windstorms and Wildfires Mitigation Projects:

- Purchase generators and transfer switches that can power critical facilities during a power failure. (*Continuing*)
- Public education to promote water conservation during power outages. (*Continuing*)

- Communication/Conservation officer should develop outreach to the public to educate residents on the hazards to the utility and operation of the utility in emergency generator hook-up (*Continuing*)

6.3 Earthquake

Goal: To protect life and property in Hi-Desert Water District in the event of an earthquake.

Description: *The goal is to avoid injury, loss of life, and damages to property.* HDWD agrees that strengthening of buildings and fire codes are 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.

Objectives:

- Design new facilities and upgrade existing facilities to withstand a 7.0 earthquake. HDWD is in a high-risk earthquake area with many geologic fault zones.
- Adopt cost-effective standards to protect life, properties and critical infrastructure.
- Establish partnerships with other levels of government and business community to improve and implement methods to protect property.
- Automatic Shut off valves, help keep water in the system pipe and reservoirs during earthquakes. Bolt down reservoir, bolt reservoirs to the ground. Mitigation to reservoirs tipping over, elephant footing or collapsing.
- Bolt down reservoir, bolt reservoirs to the ground. Mitigation to reservoirs tipping over, elephant footing or collapsing.
- Tie down equipment, mitigation of falling or flying objects.

Mitigation Projects:

Below you will find the priority of the project, department that will be responsible for this action, and the source of funding. Further analysis will be required for each mitigation project to provide a more accurate cost estimate when ready to implement. The identified projects and current costs estimate include:

- Flexible pipe joints at wellheads, pump stations, and reservoirs \$1.5 Million (2 Years) Operation Department. HMGP, BRIC. High. Flexible pipe joints allow pipes in the ground to move with earthquake movement, mitigating broken pipes.
- Seismic shut-off valves \$1 Million (2 Years) Operations Department. HMGP, BRIC. High.
- Tie-down equipment \$10,000 (1 Year) Operations Department. HMGP, CIP. Medium.
- Generator hook ups and Transfer panels. Mitigation of loss of power, always well, booster and pumps to keep water in the system.

- Develop customers notification in events of emergencies, better protect public health, awareness.

6.4 Climate Change Induced Drought

Goal: To protect life and property in Hi-Desert Water District in the event of a drought.

Description: *The goal is to avoid injury, loss of life, and damages to property.* Due to Global Warming, there are more extremes in the weather, which means the summers can be hotter, the winters colder, periods of rain can become less wet or wetter, which causes flooding. It is expected that there will be greater fluctuations in weather patterns, including prolonged dry periods and the drought hazard, which can be mitigated over the long-term.

Mitigation Projects:

Below you will find the priority of the project, department that will be responsible for this action, and the source of funding. Further analysis will be required for each mitigation project to provide a more accurate cost estimate when ready to implement. The identified projects and current costs estimates include:

- Improve operational efficiency system leaks \$1 Million (5 Years) Operations Department HMGP, BRIC, CIP. High.
- Public water conservation education \$2,500.00 (1 Year) Operation Department. CIP. Low.
- Water Conservations. During drought years, educate the public in ways to conserve water during droughts, before, during and after.
- Increase water pumping capabilities \$1.5 Million (2 Years) Operations Department. BRIC, HMGP. Medium.
- Interties allow other water systems to give HDWD water in times of need, allow HDWD to receive water from other systems. (Already two exist)

6.5 Wildfires

Goal: To protect life and property in Hi-Desert Water District in the event of a wildfire.

Description: *The goal is to avoid injury, loss of life, damage to property, and to maintain water flow for firefighting efforts.* HDWD knows it is a matter of time before the hills in the service area have a major fire. The only hope is this fire does not happen during a Santa Ana Wind condition, as this condition will drive the fire down the hills into the valley. The roads in the service area are narrow roads, most of which can only handle one-way traffic. HDWD goal is to ensure there is enough water available in the distribution system for firefighters.

Mitigation Projects:

Below you will find the priority of the project, department that will be responsible for this action, and the source of funding. Further analysis will be required for each mitigation project to provide a more accurate cost estimate when ready to implement. The identified projects and current costs estimates include:

- Install Generators at all Booster Stations, \$1 Million (3 years) Medium. Operations Department. HMGP, BRIC.
- Generator hook ups and Transfer panels. Mitigation of loss of power, always well, booster and pumps to keep water in the system.
- Install Heli-Hydrant, \$2.3 Million (2 years) Operation Department. HMGP, BRIC. High. Install Heli-Hydrant (1) Heli pads are large structures, built into the ground, which allow water dropping helicopters to open a valve by remote control. Therefore, water dropping helicopters can fill up tanks with water.
- Retrofit all paint and tank coating to fire-retardant, \$5 Million. (3 Years) Operations Department. HMGP, BRIC. Medium.
- Foster better communication programs with the fire department \$5,000 (Annual) Director of Public and Government Affairs. CIP. Medium.
- Develop a refueling plan for generators, \$3,000 (Semi-annual) Operations Department. CIP. High.
- Develop customers notification in events of emergencies, better protect public health, awareness.

6.6 Flooding

Goal: To protect life and property in Hi-Desert Water District in the event of a wildfire.

HDWD is **not** a participant under the National Flood Insurance Program (NFIP).

Description: *The goal is to avoid injury, loss of life, and damages to property.* A localized flood of great volume and short duration, typically caused by unusually heavy rain in a semiarid area. Floods can reach its peak volume in a matter of a few minutes and often carry large loads of mud and rock fragments.

Mitigation Projects:

Below you will find the priority of the project, department that will be responsible for this action, and the source of funding. Further analysis will be required for each mitigation project to provide a more accurate cost estimate when ready to implement. The identified projects and current costs estimates include:

- Install retaining walls around vulnerable and critical facilities. This is estimated at \$500,000. (2 years) Medium priority. Operations Department, BRIC HMG
- Block wall diversion walls, Mitigation to divert flood waters and/or debris follows away from homes, water, and wastewater sites.
- Develop customers notification in events of emergencies, better protect public health, awareness.
- Retaining walls, building retaining walls on reservoirs will keep soil in place in the events of heavy rain events. They also stop erosion of the sounding land under the reservoirs

6.7 Freezing Events

Goal: To protect life and property in Hi-Desert Water District in the event of a freezing event.

Description: *The goal is to avoid injury, loss of life, and damages to property.* Freezing events occur most every winter. During these events water in well heads, pipelines that are above ground, water backflow valves, and fire hydrants can freeze. The community of Yucca Valley can get unexpected snow falls two or three times a winter, sometimes there can be two or three feet of snow.

Mitigation Projects:

Below you will find the priority of the project, department that will be responsible for this action, and the source of funding. Further analysis will be required for each mitigation project to provide a more accurate cost estimate when ready to implement. The identified projects and current cost estimates include:

- Lower pipelines that are susceptible to freezing below the frost line \$1.5 million. (5 years) Medium priority. Operations Department. HMGP
- Install automatic electric heaters on pipes and wells that are above ground \$500,000. (4 years) Medium. Operations Department. HMGP
- Build heated structures around wells and booster pump stations \$5 million. (3 years) Medium. Operation Department. HMGP, BRIC
- Public Outreach to educate the public to expect outages and on ways to stop pipes from freezing on private property. \$2,500. (Annual) High. Director of Public and Government Affairs. HMGP
- Develop customers notification in events of emergencies, better protect public health, awareness.
- Lower pipelines in the ground stop the pipes from freezing in the winter months. Mitigating loss of water.
- Automatic electric heaters on pipe, stops pipes from freezing in winter, mitigating broken pipelines.
- Build heated structures, also stops pipes and wells from freezing in winter, mitigating broken wells, pumps and pipes from freezing.
- Public Outreach to educate on freezing on public property, during winter months.

6.8 Windstorms

Goal: To protect life and property in Hi-Desert Water District in the event of windstorms.

Description: *The goal is to avoid injury, loss of life, and damages to property.* 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 department that will be responsible for this action, and the source of funding. Further analysis will be required for each mitigation project to provide a more accurate cost estimate when ready to implement. The identified projects and current costs estimate include:

- Install generators at wells and booster stations \$1 Million (3 years) Operations Department. HMGP, BRIC. Medium.
- Generator hook ups and Transfer panels. Mitigation of loss of power, always well, booster and pumps to keep water in the system.
- Develop customers notification on water conservation during events \$5,000 (Annual) Director of District Services. High. General fund.

- Develop customers notification in events of emergencies, better protect public health, awareness.

6.9 Mitigation Priorities

During the development of the risk assessment for HDWD, the Planning Team proposed and discussed alternative mitigation goals, objectives, and specific mitigation measures that HDWD should undertake to reduce the risk from the five high risk hazards facing the District. Priorities from the 2016 LHMP have not changed for the 2023 plan.

The team considered multiple factors to establish the mitigation priorities included in this plan. It assigned the highest priority rankings to those mitigation measures that met three primary criteria:

- Greatest potential for protecting life and safety
- Greatest potential for maintaining critical District functions and operability following a disaster
- Achievability in terms of residents' 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, it is clear that earthquakes have the potential to affect the largest number of people, damage 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 HDWD services and infrastructure, those mitigation measures that improve disaster resistance, readiness, or recovery capacity are generally given higher priority.

Earthquakes, climate change induced drought, wildfires, flooding, freezing events and windstorms mitigation actions are identified and assigned a priority according to their importance, cost, funding availability, degree that project planning has been completed, and the anticipated time to implement the measures.

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

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

6.10 Implementation Strategy

The implementation strategy is intended to successfully mitigate the hazards identified in this plan within a reasonable amount of time. HDWD is currently operating within its annual budget

and has been fortunate that the recession of the past ten years didn't cause major issues with the budget or revenue. HDWD revenues have remained strong throughout the recession, and capital improvement projects have remained a priority. HDWD staff will review the Mitigation Plan each year before developing 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. HDWD staff will also look for ways to obtain Hazard Mitigation Grants each year to off-set the impacts on the fiscal budget and to show some relief for the residents. The following equations below is the cost benefit analysis equation that is used for ensuring that the cost benefit to the district is within FEMA guidelines. When completing a cost benefit analysis with FEMA the formula is all in electronic form but resembles the formula below.

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

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.

Timeframe

Over the next five years, the District will incorporate mitigation into all capital improvement projects that the District undertakes. The District is replacing a large amount of potable water mains, to mitigate damage to the pipelines when the sewer mains are installed. The pipelines that have been replaced will help mitigate damage to the pipelines in the event of an earthquake, as the new pipelines meet new and improved building standards.

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

1. Retaining walls, building retaining walls on reservoirs will keep soil in place in the events of heavy rain events. They also stop erosion of the sounding land under the reservoirs.
2. Lower pipelines in the ground stop the pipes from freezing in the winter months. Mitigating loss of water.
3. Automatic electric heaters on pipe, stops pipes from freezing in winter, mitigating broken pipelines.

SECTION 7: PLAN MAINTENANCE

7.1 Monitoring, Evaluating and Updating the Plan

The Director of District Services 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. The LHMP will be reviewed as part of the Annual Budget Workshop in the spring of each year and whenever there is new infrastructure updates within HDWD. The Director of District Services will ensure the LHMP is reviewed annually, and any items that have been mitigated will be removed from the plan. At that time, staff and elected Board of Directors will review funding and capital improvement projects in the next fiscal year's budget. Annually, the Director of District Services and the Board of Directors will review funding and determine the projects to be included in the next fiscal year's Capital Improvement Plan (CIP) budget. The Director of District Services will include the LHMP in all budget workshops and grant planning meetings. This will allow open discussion, evaluation, and assessment of the LHMP to achieve goals, allowing the addition and removal of mitigated items.

The Director of District Services and Operations Department will lead a full review of the LHMP at a three and a half-year interval in the same manner as the initial LHMP. At this time, progress in reaching mitigation goals, assessment of new and existing hazards, development of new mitigation strategies and goals will be addressed by the Planning Team that will include the Director of District Services. The consumers within the boundaries of Hi-Desert Water District and the District's personnel will be asked to participate in the update process. There has been little development within the service area within the last 5 years. In the 2016 LHMP the plan was incorporated into planning documents for the sewer system and updates on water mains.

7.2 Implementation through Existing Programs

Once the State of California OES and FEMA approve the LHMP, HDWD will incorporate the LHMP into capital improvement projects, capital replacement program, building design, and any updates or repairs to the water distribution system. HDWD will submit a Notice of Intent to the State of California to help facilitate opportunities in obtaining FEMA and State funding to mitigate hazards within the service area. The Director of District Services will be responsible for implementing the LHMP and ensuring the LHMP recommended goals and objectives are met. The Director of District Services will be responsible to place the LHMP on the District's website and incorporate the LHMP into the annual budget workshops. The Director of District Services will verify that the LHMP is updated and rewritten on a 5-year cycle. HDWD will start the update process at three and a half years, before the expiration date on this document.

7.3 Continued Public Involvement

The approved LHMP will be posted on the HDWD's website with contact information in the spring of each year at the District's Board of Directors budget workshop. The Director of District Services is responsible for ensuring the LHMP is brought before the Board of Directors each year. Public comments will be taken regarding the LHMP, when the plan is updated in 2028,



and projects that could be included in next year's budget will be considered. As new facilities are incorporated into HDWD, the LHMP will be updated to include new facilities and new hazards, if warranted. When the LHMP is rewritten and updated, a public committee will be utilized to review and coincide with the document's changes. It is the Director of District Services responsibility to ensure the LHMP is updated throughout the year, as well as ensuring the LHMP is updated every 5 years.

Appendix A

Meeting Matrix

Table 13. Meeting Matrix and the attendees

Meeting Matrix/ Attendees	6/21/2022 Introduction meeting (Zoom)	8/8/22 Working Session (Zoom)	9/13/22 Working Session (Zoom)	10/11/22 Working Session /Review (Zoom)	11/21/22 Review (Zoom)	1/12/23 Final Planning Meeting (In-Person)
Ron Wortham	X	X	X	X	X	X
Jennifer Cusack	X			X	X	X
Bonnie Bilger	X		X			X
Gary Sturdivan	X	X	X	X	X	X
Tanya Gruwell	X		X	X	X	X
Tony Culver	X	X				X

Appendix B

Screenshots of Hi-Desert Water District front page showing Public Survey, Public Comments and the draft LHMP.

Figure 13. Draft LHMP Public Availability

DROUGHT ALERT Customers Asked to Step up Water Savings Amid Worsening Drought [Read On...](#)

[Your Water](#) [Customer Care](#) [Sewer Project](#) [Connect](#) [About Us](#)

Facebook Twitter Instagram YouTube

I'm Looking For... 🔍

Pay My Bill

Meetings & Agendas

Fats, Oils and Grease (FOG)
Commercial Program

Contact Us

Request Service

NEWS & EVENTS

HI-DESERT WATER DISTRICT
LOCAL HAZARD MITIGATION PLAN UPDATE
WE NEED YOUR INPUT

LOCAL HAZARD MITIGATION PLAN UPDATE

Hi-Desert Water District is currently in the process of updating the Hazard Mitigation Plan and would like the community's input.

[More information...](#)

FALL NEWSLETTER

Learn about our latest news and information, project updates, and District milestones!

[View Newsletter](#)

JANUARY 2023

SUN	MON	TUE	WED	THU	FRI	SAT
01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	01	02	03	04

Wed Jan. 18

[Regular Board of Directors Meeting](#)
Read On

Wed Feb. 15

[Regular Board of Directors Meeting](#)
Read On

Mon Feb. 13

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Appendix C

Public Comments

There were no public comments received for the LHMP and one response to the Public Survey



Below are the results from the one public survey answered. Public edits were made to the LHMP word document for suggestions.

Local Hazard Mitigation Plan (LHMP) Survey

Local Hazard Mitigation Plan (LHMP) Survey

While hazards are not always preventable, a hazard mitigation plan establishes the foundation for a long-term community strategy to reduce disaster losses. Your answers can assist with our plan.

1. Are you within the HDWD service area?

Please select one. Yes

2. Please select the top hazards you think are the greatest threat to your community.

Please select three. Extreme heat, Flood (incl. hurricanes, tropical storms), Severe wind (thunderstorm, Santa Ana, dust storm)

3. Have you ever experienced or been impacted by a disaster?

If yes, please explain. Yes

Explanation: Had house flood, wind has blown trees and caused damage to home.

4. How concerned are you about the possibility of your community being

impacted by a future disaster?

Please select one. A little

5. Does your home carry insurance for flooding?

Please select one. No

6. How concerned are you about the possibility of your community being impacted by climate change?

Please select one. A moderate amount

7. Which aspects of climate change are the highest threats to your community, in your opinion?

Please select three. Habitat disruption, Increased heat wave intensity and frequency, More extreme/frequent rainfall events (more flooding)

Other: *Field not completed.*

8. In your opinion, what is HDWD currently doing that should be continued to reduce or eliminate the risk of future hazard/climate change impacts?

Response: Not sure.

9. In your opinion, what else could HDWD be doing to reduce or eliminate the risk of future hazard/climate change impacts?

Response: Not sure

10. What offices or agencies do you contact for information about reducing your risks to hazards or climate change in our area?

Please select all that apply. News media, Fire Department

Other: *Field not completed.*

Thank you for your assistance.
