Hazard Mitigation Plan Update

2011
Community of Arrowbear Park County Water District, CA

Adoption Date: -- April 16, 2012

Primary Point of Contact

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Planning Team and Promulgation Authority

This 2011 Hazard Mitigation Plan (HMP) for Arrowbear Park County Water District was:

Prepared by:

Signature: _____ Date:_____
Name: Seth Burt
Title: Fire Chief, Arrowbear Fire Dept.
Organization: Arrowbear Lake Volunteer Fire Department

Signature:_____ Date:_____
Name: Laura Dyberg
Title: President, Mtn. Rim Firesafe Council
Organization: Mountain Rim Firesafe Council

Signature: _____ Date:_____
Name: Terisa Bonito
Title: President, Mtn. Rim Firesafe Council, Arrowbear/ Run Spgs Chapter
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Signature: _____ Date:_____
Name: Kent Jenkins
Title: Compliance Officer
Organization: Running Springs Water District

Signature: _____ Date:_____
Name: Mark Bunyea
Title: Director, Arrowbear Park CWD
Organization: Arrowbear Park County Water District

Signature: _____ Date:_____
Name: Pat Oberlies
Title: Director, Arrowbear Park CWD
Organization: Arrowbear Park County Water District

Signature: _____ Date:_____
Name: Antoinette Weber
Title: Private Citizen
Organization: Arrowbear Lake, CA 92382

Approved by:

Signature: _____ Date:_____
Name: Rick Weber
Title: Chairperson, Arrowbear Park CWD
Organization: Arrowbear Park County Water District

Signature: _____ Date:_____
Name: Michael Scullin
Title: General Manager
Organization: Arrowbear Park County Water District

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Section 1 – Introduction

1.1 Purpose of the Plan

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

Hazard mitigation reduces or eliminates loss of life and property. After disasters, repairs and reconstruction are often completed in such a way as to simply restore to pre-disaster conditions. Such efforts expedite a return to normalcy; however, the replication of pre-disaster conditions results in a cycle of damage, reconstruction, and repeated damage. Hazard mitigation ensures that such cycles are broken and that post-disaster repairs and reconstruction result in a reduction in hazard vulnerability.

While we cannot prevent disasters from happening, their effects can be reduced or eliminated through a well-organized public education and awareness effort, preparedness and mitigation. For those hazards which cannot be fully mitigated, the community must be prepared to provide efficient and effective response and recovery.

1.2 Authority

The Disaster Mitigation Act of 2000 (DMA 2000), Section 322 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a mitigation plan that describes the process for identifying hazards, risks and vulnerabilities, identify and prioritize mitigation actions, encourage the development of local mitigation and provide technical support for those efforts. This mitigation plan serves to meet those requirements.

1.3 Community Profile

1.3.1 Physical Setting

The District covers approximately 1.65 square miles in the San Bernardino Mountains and serves water to the Arrowbear and Running Springs areas. The San Bernardino Mountains, part of the Transverse Ranges, San Bernardino co., S Calif., extends c.60 mi/97 km E-W N of San Bernardino, continuation of San Gabriel Mts. to W; 34°07'N 116°54'W. Notable peaks are San Bernardino Mt. (10,864 ft/3,311 m) and Mt. San Gorgonio (11,490 ft/3,502 m). The latitude of Arrowbear Lake is 34.210N. The longitude is -117.082W.

This region embraces the mountain resorts and recreational areas around Gregory, Arrowhead, and Big Bear lakes, in San Bernardino Natl. Forest. Mojave Desert is to the North and East.

The mountain area served by the Arrowbear Park Water District runs west to East between Running Springs on the West and the Green Valley Lake turn off along St. Highway 18 on the East. It is boarded on the north and south by the San Bernardino National Forest. The elevation ranges between 5900 and 6500 feet, with a mix of brush and conifer trees.

During the winter months the cold fronts, which approach from the southwest, release moisture as they lift over the mountains. This can often produce double digit rainfall amounts per storm. Northerly winds usually follow storm events which clear the area.

Arrowbear Lake has a unique climate for Southern California; it has four distinct seasons. In the summer, it is about twenty degrees cooler than the Valley floor with summer highs generally in the 80 to 90's. In the winter, nighttime temperatures regularly dip below freezing but are usually above freezing by 9 A.M., with an average winter high in the 50's. Average rainfall is 50 inches a year, which is three to four times typical rainfall in the Southern California area. Average snowfall is 60 inches a year starting in late November and ending in March with a surprise Mother's Day Spring storm from time to time.

1.3.2 History

The community of Arrowbear Lake dates to 1924 when Mr. M. P. Carlock leased a portion of former Brookings Sawmill land, dug a 5-acre lake, and developed the area. The post office dates to 1927 and was initially "Arrow Bear". The name was changed to Arrowbear Lake a year later. Approximately 2400 lots were established in 1924 and were intended as Vacation Lots with lot sizes of mostly 25foot widths to accommodate private ownership "tent camping". Advertisements in the Los Angeles Times listed the lots for $50 and up. The Arrowbear Park County Water District was formed April 15, 1953, for the purpose of providing water for residential and fire protection use in the Arrowbear Lake area.

1.3.3 Demographics

The local economy is driven by recreation and tourism. The Snow Valley Ski area, within the Hilltop Community Plan area, offers opportunities for skiing and snow boarding. The local lakes provide opportunities for fishing, and the National Forest provides additional opportunities for outdoor recreation such as hiking and camping. Downtown Running Springs is the primary commercial area within the community plan area and provides a mixture of retail establishments, restaurants, offices, and service uses.

Tourism is a primary economic generator for the area contributing hundreds of thousands of dollars a year, and providing full-time as well as part-time jobs for local residents. The entire resort area of the San Bernardino Mountains, from Crestline to Big Bear plays host to over five million visitors per year, primarily part-time vacation homeowners, their friends and guests, and travelers from the Southern California area.

The area offers a good selection of guest accommodations for overnight visitors as well as many individual cabin rental and property management agencies. Ski packages, weddings, and Eco-Tourism are major sources of visitor growth. The area is also popular for business conferences and inter-city cultural and educational exchanges.

1.3.4 Existing Land Use

The Arrowbear Park County Water District services approximately 15 commercial businesses within the district, including one gas station and one hardware/lumber center.

Estimates are that about 50% of the employed people who live in Arrowbear and the surrounding areas commute down the mountain on a daily basis.

The mountain area served by the Arrowbear Park Water District runs west to east between Running Springs on the West and the Green Valley Lake turn off along St. Highway 18 on

the East. It is boarded on the north and south by the San Bernardino National Forest. The elevation ranges between 5900 and 6500 feet, with a mix of brush and conifer trees.

The urban/wild land interface areas in which the San Bernardino National Forest Boundary meets the private land within the District have steep slopes, often exceeding 25%. The entire area is an extreme fire hazard area as designated by the San Bernardino County and the California Division of Forestry. Natural hazards are prevalent throughout the region.

The orientation of the San Bernardino Mountain Range provides for extreme fire weather, especially in the fall of each year. The Santa Ana winds, often in excess of 75 mile per hour produce low humidity's and transmit burning embers and firebrands ahead of the fire fronts. These winds are also responsible for high temperatures which reduce the fuel moisture of surrounding vegetation.

The local housing market has been affected by the housing market collapse experienced during the past four years and also by the destruction of 180 neighboring homes in Running Springs caused by the Slide Fire Incident of 2007. New housing starts have only been several per year due to the poor state of economy. There are no significant areas where new development is likely due to the fact that the town is surrounded by National Forest and has built out to that point.

1.3.5 Development Trends

Arrowbear Lake is surrounded by National Forest and is essentially built out. The only foreseeable development will be the eventual building on the few remaining undeveloped lots. Population has been growing slowly as evidenced from a population of 582 in 2005 increasing to an estimated 850 by 2010.

The major employers in the area are:

Rim of the World School District
Mountains Community Hospital
Goodwins Market
Jensens Market
Deer Lick Lumber Company
Running Springs Water District
Snow Valley Mountain Sports Park
Local Real Estate, Title & Mortgage Co's
Local Camp and Conference Centers
Cal Trans Maintenance Yard
San Bernardino County
US Forest Service

Section 2 Plan Adoption

2.1 Adoption by Local Governing Body

This 2011 Hazard Mitigation Plan (HMP) will be presented to the Arrowbear Park County Water District Board of Directors for adoption upon final FEMA approval of the plan. The Draft Resolution for acceptance of this local HMP as part of the San Bernardino Operational Area Multi-Jurisdictional Multi-Hazard Mitigation Plan is attached as **Exhibit 1 in Appendix C.**

2.2 Promulgation Authority

The five-member Board of Directors consists of members within the community who are elected at large. The Board of Directors serves four-year terms, with terms overlapping. The Board of Directors develops the policies that govern the District. The District's General Manager is appointed by the Board of Directors and oversees the day-to-day operations of the District.

The public is invited to join the District's Board meetings, which are held at 6:30 pm on the second Friday of each month at the District office.

2.3 Primary Point of Contact

The Point of Contact for information regarding this plan is:

Michael A. Scullin

General Manager
Arrowbear Park County Water District
P.O. Box 4045, 2365 Fir Drive
Arrowbear Lake, CA 92382-4045
(909) 867-2704 (Office)
E-mail: apcwd@eee.org

Section 3 Planning Process

The purpose of this section is to document the planning process that was taken to review, revise, and update the 2005 HMP. A comprehensive description of the planning process not only informs citizens and other readers about how the plan was developed, but also provides a permanent record of how decisions were reached so it can be replicated or adapted in future plan updates. An integral part of the planning process is documentation of how the public was engaged through the process.

This HMP was completed with the coordination and involvement in the San Bernardino Operational Area Multi-Jurisdictional Multi-Hazard Mitigation Plan Update planning efforts. The update process was done with the assistance of a local Planning Team, consisting of members within the District who had a vested interest and were appropriate for the level of knowledge required for the local HMP. For example, two members of the team are officers of the local Fire Safe Council while others are currently serving as directors of the water District and have specific knowledge and experience with district needs. This team developed and implemented the planning process.

This section includes a list of the planning team members, a summary of the meetings held, coordination efforts with surrounding communities/groups, and all Public Outreach efforts.

3.1 Preparing for the Plan

The District's local planning team reviewed the existing 2005 HMP and Crosswalk to determine which sections of the plan needed to be updated. Once the planning team had reviewed these documents and added any new hazard and mitigation program information, recommendations were presented for public review and input.

The update process consisted of:

- Documenting actions since 2005;
- Incorporating new data;
- Engaging the Planning Team;
- Conducting Public Outreach; and
- Adoption of the Updated HMP.

To provide a better understanding of the Planning Process and give a timeframe of the effort, **Table 3 in Appendix C** shows the draft timeline for preparing the Draft HMP for the District and the San Bernardino County Operational Area Multi-Jurisdictional Multi-Hazard Mitigation Plan, discussed further in the following sections.

3.1.1 Planning Team

The 2011 HMP Update local planning team for the District was compiled, authored, and reviewed by the following members:

Michael Scullin
General Manager
Organization: Arrowbear Park County Water District
Description of Involvement: Team Leader and planning team coordinator.

Seth Burt
Fire Chief, Arrowbear Fire Dept.
Organization: Arrowbear Lake Volunteer Fire Department
Description of Involvement: Identify critical infrastructure for fire protection.

Laura Dyberg
President, Mtn. Rim Firesafe Council
Organization: Mountain Rim Firesafe Council
Description of Involvement: Identify community needs and hazards for fire protection.

Terisa Bonito
Title: President, Mtn. Rim Firesafe Council, Arrowbear/Run Spgs Chapter
Organization: Mountain Rim Firesafe Council
Description of Involvement: Identify community needs and hazards for fire protection.

Kent Jenkins
Compliance Officer
Organization: Running Springs Water District
Description of Involvement: Identify and prioritize critical needs for water distribution system.

Mark Bunyea
Director, Arrowbear Park CWD
Organization: Arrowbear Park County Water District
Description of Involvement: Identify and prioritize waste water critical needs in district.

Pat Oberlies
Director, Arrowbear Park CWD
Organization: Arrowbear Park County Water District
Description of Involvement: Identify and evaluate community needs.

Antoinette Weber
Private Citizen
Organization: Arrowbear Lake, CA 92382
Description of Involvement: Identify and evaluate community needs.

3.2 Coordination with Other Jurisdictions, Agencies, and Organizations

San Bernardino County Fire Department Office of Emergency Services (OES) is coordinating the update of the *San Bernardino County Operational Area Multi-Jurisdictional Multi-Mitigation Plan*. The current *San Bernardino County Operational Area Multi-Jurisdictional Multi-Hazard Mitigation Plan* process consists of information from 55 local HMPs, which are included as an annex to the County's Operational Area plan. The 55 participants include all 24 incorporated cities and towns, 30 special districts, and the unincorporated county. The District is a participating special district within the San Bernardino County OES *Multi-Jurisdictional Multi-Hazard Mitigation Plan.*

The District participated in bi-weekly meetings to coordinate and receive support for their HMP with the County's Multi-Jurisdictional Multi-Hazard Mitigation Plan. The support included receiving technical expertise, resource material and tools, not only to expedite the HMP update process, but also to ensure that the updates are in compliance with federal requirements of the program. The tools, resource material, and other project related information were maintained on a project portal (https://tmsprojects.icfi.com/sbhmpupdate/default.aspx) to ensure the same information is available to all participants.

Also, interaction with other local water purveyor's proved valuable in the development of the mitigation projects for the plan. All the water purveyors with the County of San Bernardino met to collectively discuss necessary decisions for the HMP and ideas to streamline our resources. East Valley Water District hosted the meetings at their agency headquarters and organized the process for all the water agencies. Since one such local water agency is a wholesaler of water to Arrowbear Park County Water District, a joint effort by both purveyors could provide a cost savings.

3.3 Public Involvement/Outreach

A District planning team was formed for the development of the plan and the District followed their standard plan development process which includes a public review process. Some members of the planning team also serve as officers of the local Running Springs Area Chamber of Commerce to embrace a wider spectrum of input from the community at large. All projects have to be approved by the District's Board of Directors at their regularly scheduled meetings. All Board meetings are advertised ahead of time and are open to the public and the public may ask questions at these meetings. This method was used for the 2011 HMP, as was done for the 2005 HMP.

An effort was made to solicit public input during the planning process via Board Meetings. Two individuals signed up to be on the planning team as a result of open discussion at

District Board Meetings. Information about the meetings and the HMP Plan update is posted on the District's web site (http://www.arrowbearwater.org). **Tables listing team meetings held and public outreach events are listed in Appendix A.**

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

3.4 Assess the Hazard

This HMP has been developed through an extensive review of available information on hazards: the District's 2005 HMP, the District's Emergency Response Plan, the District's Water and Wastewater Master Plan, engineering drawings, and available geotechnical and geologic data from outside sources (for example, California Geological Survey for detailed fault investigation reports).

The assessment of various hazards was completed by the planning team because they have a wealth of personal experience working for the District, living in the area, and are familiar with the history of past hazardous events.

3.5 Set Goals

The District's process of identifying mitigation goals began with assessing the 2005 HMP Goals and Objectives to determine if each of the mitigation goals were still valid. This review allowed the planning team to identify new Goals and Objectives.

The goals for the 2011 HMP were set by the planning team for the District because the members of the team knew the goals of the District with respect to its mission to provide our customers with a safe and reliable water supply, an efficient and reliable sewer collection system, and a modern competent fire protection/medical aid service delivered at a fair and effective price.

3.6 Review and propose Mitigation Measures

The process of identifying mitigation measures began with a review and validation of previous mitigation measures in the District's 2005 HMP and the San Bernardino County 2005 HMP. Using the 2005 as the basis, the District's planning team completed an assessment/discussion of whether each of the mitigation measures was still valid. This discussion also led to the opportunity to identify new mitigation measures.

The District's planning team proposed and reviewed the mitigation measures because they knew the District's mission. During one of our planning team meetings, we reviewed each of the projects from the 2005 HMP and discussed the status of each project and the reasons for why they had or had not been implemented and if we wanted to include them on the list for the 2011 HMP.

The planning team identified and analyzed a range of specific mitigation actions and projects to be considered to reduce the effects of each hazard, with particular emphasis on new and existing water facilities. The planning team also formed an action plan describing how the mitigation projects identified should be prioritized and implemented. Special consideration was given to the costs and the cost benefits of the proposed projects.

The District's implementation strategy included identifying a set of first tier objectives. These objectives are considered the highest priority and once implemented will result in substantial improvement in the overall reliability of the system.

Meetings (both in-person and virtual) were held with the planning team to solicit their input and review sections of the HMP. Each meeting focused on specific sections from the 2005 HMP, including the Introduction, Participation Information, Planning Process and Public Involvement, Risk Assessment, Mitigation Strategy, and Plan Maintenance.

3.7 Draft the Hazard Mitigation Plan

The General Manager of the District, who was on the planning team and also assisted the District in completing the 2005 HMP, drafted the HMP which was reviewed by the planning team prior to the HMP being finalized.

The updated HMPs will be reviewed against a FEMA-designed Crosswalk. The Crosswalk links the federal requirement, the section in the HMP where the information can be found, and a rating as to the level of compliance with the regulation.

3.8 Adopt the Plan

Upon finalizing the 2011 Update HMP by the Planning team, the HMP will be presented to the District's Board of Directors at a regularly scheduled monthly public Board Meeting for adoption as written. The Draft Resolution for acceptance of this local HMP as part of the San Bernardino Operational Area Multi-Jurisdictional Multi-Hazard Mitigation Plan is attached as **Exhibit 1 in Appendix C.**

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 funds spent to assist with recovery. However, mitigation should be based on risk assessment.

The purpose of this section is to describe the methodology taken to understand the hazards in the District's service area. There are generally four (4) steps in this process: 1) identify and screen the hazards; 2) profile the hazards; 3) inventory the assets; and, 4) estimate losses.

A risk assessment involves measuring the potential loss from a hazard event by assessing the vulnerability of buildings, infrastructure, and people. It identifies the characteristics and potential consequences of hazards, how much of the District could be affected by a hazard, and the identification, vulnerability analysis, and risk analysis. Technically, these are three different items, but the terms are sometimes used interchangeably.

4.1 Hazard Identification

4.1.1 Hazard Screening Criteria

The intent of screening the hazards is to help prioritize which hazard creates the greatest concern to the District. Because the previous process (in 2005) used to rank hazards (Critical Priority Risk Index (CPR) software) is not being utilized, the alternative approach

will be explained. The process that was implemented is logical and can be universally applied.

For this 2011 HMP Update, the District is utilizing a non-numerical ranking system for the hazard screening process.

A list of the natural hazards to consider was obtained from Federal Emergency Management Agency (FEMA) "State and Local Mitigation Planning how-to guide: Understanding Your Risks", (FEMA 386-1). The District's planning team reviewed each hazard on the list and using their experience with the hazards, the following conclusions were drawn.

Natural hazards considered by the District's planning team include the following:

- Wildfires
- Earthquake
- Drought
- Severe Winter Storms

The following natural hazards were considered not to affect or be a risk to the District as decided by the District's planning team:

- Dam Inundation
- Flash Flooding
- Flooding
- Extreme Heat
- High Winds/Straight Line Winds
- Lightning
- Severe Thunderstorm

4.1.2 Hazard Assessment Matrix

For this 2011 HMP Update, the District is utilizing a non-numerical ranking system for the hazard screening process. This process consists of generating a non-numerical ranking (similar to high, medium and low) rating for the probability and impact of each screened hazard. For each of the District's screened hazards:

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

Table 1 below is the screening assessment matrix used for the District's hazards. The hazards have been placed in the appropriate/corresponding box/cell of the corresponding "Hazard Matrix" based on the planning team's experience. A subset of this group of hazards is used for the prioritization of the hazards in the following section.

Table 1: Hazard Assessment Screening Matrix

Probability	*Impact*			
		Catastrophic	**Critical**	**Limited**
	Highly Likely			
	Likely			
	Somewhat Likely			

4.1.3 Hazard Prioritization

Using the hazard screening criteria and assessment matrix discussed in the previous two sections, and the District's planning team experience, the following four primary hazards were determined to be the most likely to affect the District:

1. Wildfires: Historically wildfires have impacted the District most in terms of loss of revenue and assets. Wildfires impact the revenue from water sales each time the public is evacuated due to a threatening wildfire, and assets have been lost due to damaged or destroyed structures caused by fire damage.

2. Earthquake: There are several active faults near the District which have affected the service area due to fault rupture. No major damage to District facilities have been recorded from past fault activity but the potential for catastrophic damage from a major earthquake is likely.

3. Drought Hazard: A severe drought could impact a major part of the population within the District because water sales are the primary business of the District. If there is reduced or no water to sell, the revenue to the District falls accordingly.

4. Severe Winter Storms: Winter storms have resulted in power outages causing a temporary interruption in pumping water to fill the district's water storage tanks. Additionally, water runoff can erode soil and expose water and sewer lines, causing them to be venerable to damage.

Table 2 below presents the summary results of prioritizing each hazard based on the level of risk. The "shaded" boxes are the top ranked hazards. As can be seen from the table, the hazards in the "shaded" boxes are the District's priority (or high profile) hazards, while the hazards in the "white" boxes are the less critical/important hazards for the District.

Table 2: Hazard Prioritization Matrix

Probability	*Impact*			
		Catastrophic	**Critical**	**Limited**
	Highly Likely	Wildfires Earthquake	Drought	
	Likely			Severe Winter Storms
	Somewhat Likely			

The four high profile hazards for the District are wildfires, earthquake, severe winter storms, and drought. While other hazards are profiled in the following sections for completeness, the District's priority and focus for the mitigation projects will be for only the four high profile hazards.

4.2 Hazard Profiles

4.2.1 Wildfires Hazard

The following section describes the hazard and then details the historical events associated with this hazard for the Arrowbear Park County Water District. **See Appendix B for Fire Hazard Map.**

General Definition:

There are three different classes of wildland or wildfires. A surface fire is the most common type and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire is usually started by lightning and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees. Wildfires are usually signaled by dense smoke that fills the area for miles around. Wildfires present a significant potential for disaster in the southwest, a region of relatively high temperatures, low humidity, and low precipitation during the summer, and during the spring, moderately strong daytime winds. Combine these severe burning conditions with people or lightning and the stage is set for the occurrence of large, destructive wildfires.

Historical Profile:

The following section lists and describes the historical events associated with this hazard in the Arrowbear Park County Water District.

1. Slide Fire 10/22/2007
Size of fire: 12,789 acres
Start time: 8:02am
Homes destroyed: 201, 3 outbuildings
The Slide or Green Valley Lake Fire burned near Green Valley Lake, east of Lake Arrowhead. The Green Valley Lake, Arrowbear, and Running Springs communities were evacuated. 1,359 firefighters were assigned to the fire. The estimated cost is $1.2 million. Water pressure in local systems was lost and conditions were too extreme for fighters to continue efforts in some areas. The fire partially burned "Camp Helendade," owned by the Boy Scouts of America's local council, the California Inland Empire Council. Helendade was originally given to the council in 1960 to replace another camp that had been burned.

2. Grass Valley Fire 10/22/2007
Size of fire: 1,247 acres
Start time: 5:08am
Homes destroyed: 174, 2 outbuildings

The Grass Valley Fire started on October 22 at about 05:08am, one-mile west of Lake Arrowhead. Relative humidity was 10% and winds were north and northeast at 18 mph gusting to 27 (per Rock Camp Remote Automated Weather Station [RAWS]; one-half-mile

to the northeast). Vegetation consisted of ponderosa pine, Coulter pine, and black oak, with a Manzanita brush understory. Surface litter consisted of conifer needles, oak leaves, and branch wood. Fire behavior varied from surface fire and occasional torching to slope-driven crown runs (particularly on south and southeast facing slopes). The fire proceeded through the Grass Valley drainage, first impacting homes on the east flank, followed by homes approximately one-mile south from the point of origin.

3. Old Fire 10/25/2003
Size of fire: 91,281 acres
Acreage (59,448 ac.) in this report reflects the total historical fire spread of the Grand Prix, which has been managed as the Padua Fire. 42,515 acres of the Old Fire is currently being managed as part of the Grand Prix Fire.
211 total personnel
12 injuries
6 deaths
993 homes destroyed
10 commercial properties destroyed
Cost: $42,336,057
Hazard: Wildfires
Deaths: 6
Injuries: 12
Displaced People: 70,000
1/4 mi N/o Arrowhead Springs on Waterman cyn Rd.
San Bernardino, CA

4. Bridge Fire 9/5/2003
Bridge Fire

The Bridge Fire broke Friday afternoon 9-5-03 at 3:04pm along the west side of highway 330. The cause is under investigation and as yet undetermined. The Initial Attack Incident commander Mick McCormick reported it as five acres on arrival. By 8:30 in the evening the fire, which was called "erratic" by Forest Service Information Officer Tricia Abbas had consumed about 1500 acres. Humidity of around 50 % was causing the fire to lay down and slow the rate of spread. 65 engines and 24 hand crews made up a total manpower contingent of over 500 firefighters but more strike teams are being called in. There are already six strike teams on the mountain, plans for tonight were to get these crews rested and fed so they are prepared for whatever this fire throws at them tomorrow. As of 9:00 PM the fire was only 2% contained so there is much left to be done. Because the fire was erratic, it left many unburned islands of fuel. Crews did some burning out operations tonight when conditions were cooler with higher humidity to reduce these unburned areas.

1500 homes are potentially in the path of the fire with the leading edge of the fire only about 1 mile from the community of Fredalba. Smiley Park and Running Springs are also threatened. District Ranger for the Mountain Top District, Allison Stewart stressed that the due to the intense public information program about the high fire danger, and fire safety in these areas, "the public is scared to death" and she asked that all fire fighters be sensitive to this when dealing with local residents. Between 800 and 1000 residents have been evacuated to Rim Of The World High School but the Red Cross states that the location cannot handle this many evacuees and another location was being sought that could accommodate more people. The evacuations have been mandatory for Fredalba and Smiley Park, and voluntary for Running Springs. The San Bernardino County Sheriff is planning another evacuation sweep at 6:00 AM tomorrow. The Mountain Rim Fire Safe Council has

already been involved with communicating conditions and instructions to the residents. Tracy Martinez, San Bernardino Fire, Public Information Officer, praised their work and was very impressed with how quickly they mobilized to communicate with the community. She said their participation made her job much easier. The command team is planning a community meeting for noon tomorrow to keep residents informed about the current situation, it's expected that as many as 1500 people may attend.
Hazard: Wildfires
Deaths:
Injuries: 7
Displaced People: 1500
Hwy 330
Running Springs, CA 92376

5. Arrowhead Fire 5/31/2002
Fire started next to Arrowhead Springs Hotel at the bottom of Hwy 18. Fire consumed 2,688 acres with seven structures lost, no injuries.
Hazard: Wildfires
Deaths:
Injuries:
Displaced People:
Hwy 18
Crestline, CA 92325

6. Hemlock Fire 6/14/2001
Fire escaped from prescribed burn on the south side of Running Springs. The fire burned to Keller Peak lookout. Fire originated in brush above Seven Oaks Area. Control took until June 20, 2001 95 days. Fire burned 1074 acres.
Hazard: Wildfires
Deaths:
Injuries:
Displaced People:
Running Springs, CA 92378

7. Willow Fire 8/29/1999
The September 1999 Willow Fire was the most devastating fire in the modern history of the San Bernardino's to date. Scorching nearly 64,000 acres, the fire made its' way from Lake Arrowhead to Big Bear in a matter of days. With some of the burn area only 1/2 mile north of Deep Creek there is much concern about the fishery and some sensitive species in the surrounding ecosystem.

60 homes destroyed.
Hazard: Wildfires
Deaths:
Injuries:
Displaced People:
Lake Arrowhead, CA 92325

8. Mill Fire 9/1/1997

The September, 1997 Mill Creek Fire prompted the formation of the Front Country Alliance in 1998. The fire spanned some 1500 acres and resulted in nearly two and a half million dollars in property loss. The fire suppression cost was in excess of a million dollars, involving 1600 personnel, 21 aircraft, 170 fire engines, and 3 injured fire fighters.

Hazard: Wildfires
Deaths:
Injuries:
Displaced People:
Running Springs, CA 92378

9. Panorama Fire 11/24/1980
Hazard: Wildfires
Size of fire: 23,800acres
Homes destroyed: 280, 64 outbuildings
Deaths: 4
Injuries: 77
Cost: $41.5 million
San Bernardino/ Crestline, CA 92325

Summarizing Risk:

- Probability: **Highly Likely**
- Magnitude/Severity: **Critical**

4.2.2 Earthquake Hazard

The following section describes the hazard and then details the historical events associated with this hazard for the Arrowbear Park County Water District. **See Appendix B for Earthquake Hazard Map.**

General Definition:

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

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

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

There are 45 states and territories in the United States at moderate to very high risk from earthquakes, and they are located in every region of the country. California experiences the

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

There are three earthquake faults located near the District's service area. They are the San Andreas Fault, the San Jacinto Fault, and the Big Bear Fault.

While there have been many earthquakes in and around the District's service area, earthquakes have caused no damage to District facilities. In 1992, the Big Bear – Landers Earthquake caused minor upset with books and papers falling from office shelves but no other difficulties were noted.

Since 1992 the District has not experienced any damage to any facilities resulting from earthquakes.

Historical Profile:

Earthquake Name	Date of Earthquake	Magnitude of Quake	Damage Description
Wrightwood Earthquake	Dec. 8, 1812	7.5	40 deaths.
Cajon Pass	July 22, 1899	5.7	Landslides, heavy damage to buildings in San Bernardino. No deaths.
San Jacinto	Dec. 25 1899	6.5	San Jacinto & Hemet had severe damage. Six deaths. Chimneys thrown down and walls cracked in Riverside.
Elsinore	May 15, 1910	6	Chimney's toppled.
San Jacinto	April 21, 1918	6.8	Most damage in San Jacinto and Hemet. Several injuries, one death. Landslides, cracks in ground, roads, and canals.
North San Jacinto	July 22, 1923	6.3	Chimney's toppled, broken windows, 2 critical injuries, no deaths, San Bernardino hospital and Hall of Records badly damaged.
San Jacinto Terwilliger	March 25, 1937	6.0	Few chimneys damaged, some plaster cracked, a few windows broken. Minimal damage mostly due to sparsely populated area.
Fish Creek Mountains	Oct 21, 1942	6.6	Little damage due to remote location, felt over a large area. Rockslides
Desert Hot Springs	Dec 4, 1948	6.0	Widespread damage. In Los Angeles, 5,800 gallon water tank split, water pipes broken in Pasadena, at UCLA, and San Diego. Walls cracked in Escondido and Corona.

Earthquake Name	Date of Earthquake	Magnitude of Quake	Damage Description
1954 San Jacinto	March 19, 1954	6.4	Minor widespread damage. Parts of San Bernardino experienced a temporary blackout.
Borrego Mountain	April 8, 1968	6.5	Largest most damaging earthquake in 16 years. Damage across most of Southern California. Landslides, huge boulders thrown.
Lytle Creek	Sept. 12, 1970	5.2	Landslides, rock falls, 4 injuries, San Bernardino radio station knocked off the air.
White Wash	Feb 25, 1980	5.5	Landslides. Windows and dishes broken. Fire broke out in Rancho Mirage due to a gas line rupture in an empty home.
1988 Upland and 1990 Upland	June 26, 1988 and Feb 28, 1990	4.7 and 5.4 respectively	Landslides, damage to San Antonio Dam, 38 minor injuries. Public-$4.87M; business-$4.7M; private-$2,4M; total-$12M; 501 homes and 115 businesses damaged or destroyed.
North Palm Springs	July 8, 1986	5.6	29 injuries. Destruction or damage of 51 homes. Landslides. Damage over $4M.
Joshua Tree	April 22, 1992	6.1	32 minor injuries.
Big Bear	June 28,1992	2 separate earthquakes – Big Bear - 6.4, Landers – 7.3.	Landslides in San Bernardino Mountains. Substantial damage in Big Bear. Landers was the largest earthquake in southern California in 40 years. Earthquake ruptured 5 separate faults. Total rupture length was 53 miles. One death, 402 injuries. Private-$47.5M; business-$17M; public-$26.6M; total-$91M; 77 homes destroyed, 4,369 homes damaged, 139 businesses damaged.
Hector Mine	Oct. 16, 1999	7.1	Very remote location. Ruptured in both directions from the epicenter.

Summarizing Risk:

- Probability: **Highly Likely**
- Magnitude/Severity: **Catastrophic**

4.2.3 Drought Hazard

The following section describes the hazard and then details the historical events associated with this hazard for the Arrowbear Park County Water District.

General Definition: A drought is a period of drier-than-normal conditions that results in water-related problems. Precipitation (rain or snow) falls in uneven patterns across the country. When no rain or only a small amount of rain falls, soils can dry out and plants can die. When rainfall is less than normal for several weeks, months, or years, the flow of streams and rivers declines. The water levels in lakes and reservoirs fall, and the depth to water in wells increases. If dry weather persists and water supply problems develop, the dry period can become a drought. The first evidence of drought usually is seen in records of rainfall. Within a short period of time, the amount of moisture in soils can begin to decrease. The effects of a drought on flow in streams and rivers or on water levels in lakes and reservoirs may not be noticed for several weeks or months. Water levels in wells may not reflect a shortage of rainfall for a year or more after the drought begins. A period of below-normal rainfall does not necessarily result in drought conditions. Some areas of the United States are more likely to have droughts than other areas. In humid, or wet, regions, a drought of a few weeks is quickly reflected in a decrease in soil moisture and in declining flow in streams. In arid, or dry, regions, people rely on ground water and water in reservoirs to supply their needs. They are protected from short-term droughts, but may have severe problems during long dry periods because they may have no other water source if wells or reservoirs go dry.

Description: Because the District is in the business of selling water, drought can be a disastrous hazard to the District. A drought is defined as a series of years with less than average rainfall and typically lasts seven years. The District is currently experiencing a drought that started in 1998.

Southern California has a history of severe droughts. There have been six severe extended droughts with the last 400 years (the most severe drought lasted from approximately 1650 to 1700). The U.S. Weather Service is forecasting 20 more years of below average rainfall.

The 2009 California Water Plan states that Water Year 2009 was the third consecutive dry year for the state. Because of losses caused by this drought, the U.S. Department of Agriculture in September designated all of the counties with the San Joaquin River, Tulare Lake, and Central Coast Hydrologic Regions as either Primary Natural Disaster Areas or Natural Disaster Areas (statewide total was 21 counties and29 counties, respectively). The state entered the 2009-2010 Water Year with its key supply reservoirs at only 68 percent of average.

The fundamental drought impact to water purveyors is a reduction in available water supplies. As a result, historic occurrences of drought have encouraged water purveyors to

review the reliability of their water supplies and to initiate planning programs addressing identified needs for improvement. In addition, public and media interest in droughts fosters heightened awareness of water supply reliability issues in the Legislature. More than 50 drought-related legislative proposals were introduced during the severe, but brief 1976-77 drought. About one-third of these eventually became law. Similar activity on drought-related legislature proposals was observed during the 1987-92drought. One of the most significant pieces of legislation was the 1991 amendment to the Urban Water Management and Planning Act, in effect since 1983 which requires water suppliers to estimate available water supplies at the end of one, two and three years, and to develop contingency plans for shortages of up to 50 percent.

If the current drought extends for the period that the U.S. Weather Service is currently forecasting, or worsens, the District could possibly have difficulty meeting its water supply demands without additional supplies. If the current drought extends for the period that the U.S. Weather Service is currently forecasting, or worsens, the District could possibly have difficulty meeting its water supply demands without additional supplies.

Summarizing Risk:

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

4.2.4 Severe Winter Storms

The following Section describes the hazard and then details the historical events associated with this hazard for the Arrowbear Park County Water District. **See Appendix B for Liquefaction Hazard Map.**

General Definition*:* A winter storm can range from moderate snow over a few hours to blizzard conditions with high winds, freezing rain or sleet, heavy snowfall with blinding wind-driven snow and extremely cold temperatures that lasts several days. Some winter storms may be large enough to affect several states while others may affect only a single community. All winter storms are accompanied by cold temperatures and blowing snow, which can severely reduce visibility. A severe winter storm is one that drops 4 or more inches of snow during a 12–hour period, or 6 or more inches during a 24 hour span. An ice storm occurs when freezing rain falls from clouds and freezes immediately on impact. All winter storms make driving and walking extremely hazardous. The aftermath of a winter storm can impact a community or region for days, weeks, and even months. Storm effects such as extreme cold, flooding, and snow accumulation can cause hazardous conditions and hidden problems for people in the affected area.

People can become stranded on the road or trapped at home, without utilities or other services. Residents, travelers and livestock may become isolated or stranded without adequate food, water and fuel supplies. The conditions may overwhelm the capabilities of a local jurisdiction. Winter storms are considered deceptive killers as they indirectly cause transportation accidents, injury, and death resulting from exhaustion/overexertion, hypothermia and frostbite from wind chill, and asphyxiation; house fires occur more frequently in the winter due to lack of proper safety precautions.

"Wind chill" is a calculation of how cold it feels outside when the effects of temperature and wind speed are combined. On November 1, 2001, the National Weather Service (NWS) implemented a replacement Wind Chill Temperature (WCT) index for the 2001/2002 winter

season. The reason for the change was to improve upon the current WCT Index, which was based on the 1945 Siple and Passel Index. A winter storm watch indicates that severe winter weather may affect your area. A winter storm warning indicates that severe winter weather conditions are definitely on the way. A blizzard warning means that large amounts of falling or blowing snow and sustained winds of at least 35 miles per hour are expected for several hours.

***Description**:* Arrowbear Park County Water District receives an average of about 60 inches of snowfall each year. During the winter months, nighttime temperatures fall into the high 20's C and low 30's C. During severe storms, temperatures can reach the teens. Extremely low temperatures can cause freezing on the water mains and customer service lines.

Historical Profile:

Recent Local Severe Winter Storms

Date	Duration	Rainfall Est.	Description
Dec. 26, 2010	Eight days	40"	Wash outs/Road Closed/Power outs
Dec 25, 2003	Three days	12"	Wash outs/Road Closed/Power outs

Summarizing Risk:

- Probability: **Likely**
- Impact: **Limited**

4.3 Inventory Assets

This section provides an overview of the assets in the Arrowbear Park County Water District and the hazards to which these facilities are susceptible. **Tables 1 and 2 in Appendix C list hazard risk assessments for selected District buildings.**

4.3.1 Population

The total population of the District service area is approximately 850.

4.3.2 Buildings

As of December, 2010 the District operates and maintains the following facilities:

Water

- 1 Pressure zone
- 4 Reservoirs with a total storage capacity of 382,900gallons
- 4 active wells with a total pumping capacity of 220 gallons per minute (gpm) or production capacity of 316,800 gallons per day
- Approximately 11.5 miles of water distribution mains ranging in size from 2 to 8 inches in diameter;
- Water district main office and shop complex

- Warehouse building for water treatment equipment

Wastewater Collections

- 1 Sewer lift station containing two 25hp pumps
- Approximately 12.5 miles of sewer collection pipelines with a diameter size of 8 inches
- Sewer Lift Station electric control house with a 70hp backup generator

Fire Department

- One fire station located within the District's service area.

4.3.3 Critical Facility List

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

Primary Contact: Michael A. Scullin, Gen Mgr.
Phone: (909) 867-2704
Fax: (909) 867-4736

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

Table 3 below summarizes the critical facilities for the District.

Name	Facility Type	Description
Water Dist. Admin Office	Main Office for business	2,400 sqft. Block Bldg.
Sewer Collection Station	Holding Tank/Pump Site	200sqft. Wood Frame
Well Site Fenced Yard	Well Site Area Pump Bldgs	4-100sqft. Wood Bldgs.
Water Treatment Bldg.	Equip. Bldg. for Treatment	1,6sqft. Steel Bldg.
Fire Station #271	Fire Station	2,400sqft. Wood Frame
Reservoirs	Water Storage Site	Steel Reservoirs (4)

4.4 Vulnerability Assessment

4.4.1 Methodology

The facility replacement costs were calculated using the District's accounting and insurance replacement values for construction of new facilities.

4.4.2 Wildfires Vulnerability Analysis

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

Critical Facilities: Approximately 67% of the District's critical facilities are vulnerable.

The specific critical facilities vulnerable in the Arrowbear Park County Water District are:

Sewer Collection Station, Well Pump Houses (4), Water District Administration Office, Fire Station. Of the 6 critical facilities, 4 are critical generating the 67%.

Estimated Losses:

The estimated economic loss from this hazard is approximately $7M.

4.4.3 Earthquake Vulnerability Analysis

Population: Approximately 75% of the District's population is vulnerable.

Critical Facilities: Approximately 100% of the District's facilities are vulnerable.

The specific critical facilities vulnerable in Arrowbear Park County Water District are:

All 6 of the District's critical facilities are considered vulnerable to Earthquake, including the water and wastewater transmission pipelines.

Estimated Losses: The estimated economic loss from this hazard is approximately $15.3M.

4.4.4 Drought Vulnerability Analysis

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

Critical Facilities: There would not be any physical structure damage to any facilities. Pumping costs would increase due to pumping water from lower levels. The District would also have to purchase additional imported water at a higher cost. Reservoirs and pipelines are not critical in drought conditions.

Estimated Losses: The estimated economic loss from this hazard is approximately $236,000.

4.4.5 Severe Winter Storms

Population: Approximately 50% of the District's population is vulnerable.

Critical Facilities: Approximately 10% of the District's facilities are vulnerable.

Estimated Losses: The estimated economic loss from this hazard is approximately $290,000.

Section 5 Community Capability Assessment

5.1 Agencies and People

This section describes the resources (staffing, agencies, departments, equipment) and tools (existing plans, policies, regulations, and ordinances), the District has in place that can assist promote and implement mitigation actions in the District's service area. These capabilities generally fall into the following broad categories:

- Agencies and People
- Existing Plans
- Regulations, Codes, Policies, and Ordinances
- Fiscal Resources

The District is located in the San Bernardino Mountains within San Bernardino County. The District's service area covers approximately 1.65 square miles and provides water to the communities of Arrowbear Lake and Running Springs.

Other information regarding the District is as follows:

Storm Water Management Ordinances: No
Stream Management Ordinances: No
Zoning Management Ordinances: Yes
Subdivision Management Ordinances: No
Erosion Management Ordinances: No
Floodplain Management Ordinances: No
Floodplain Management Plan Published Date:
Floodplain Management Last Delineation Date:
Elevation Certificates Maintained: No
National Flood Insurance Program Community: No
National Flood Insurance Join Date:
NFPI Number:
NFPI Rating:
NFPI Rating Date:
Land Use Plan:
Land Use Plan Last Update:
Community Zoned: Yes
Zoned Date:
Established Building Codes: Yes
Building Codes Last Updated: 11/1/2002
Type of Building Codes: 1998 California Building Code
Local Electric Utilities: Southern California Edison
Local Water Utilities: Arrowbear Park County Water District
Local Sewage Treatment Utilities: Running Springs Water District
Local Natural Gas Utilities: Southern California Gas
Local Telephone Utilities: Verizon
Fire Insurance Rating: Insurance Services Office, Inc. evaluated the area the District serves in June 1998. The majority of the District is Class 5.
Flood Insurance Claims:

5.2 Existing Plans

This section describes the existing plans for the Arrowbear Park County Water District.

The District has a Master Plan that has been prepared in 1999. The Master Plan identifies areas of needed improvement within the District to include but not limited to:

- More efficient water/wastewater operations.
- Infrastructure repair/improvement, construction for increased fire flow capability.
- New water production development.
- Infrastructure repair/improvement, construction for increased wastewater treatment capability.

Additionally, the District is subject to the following San Bernardino County Plans as it is located in an unincorporated County area:

The San Bernardino County General Plan, Development Code, Hilltop Community Plan, and specific mountain overlay requirements give guidelines for community development and land use. A general description of each is listed below.

SAN BERNARDINO GENERAL PLAN: The San Bernardino County General Plan is a constitution for development. It utilizes both text delineating policy and maps to provide a guide for land use. It represents the county's official position on development and resource management. The position is expressed in goals, policies and actions regarding the physical, social, and economic environments, both now and in the long-range future (5 to 20 years).

SAN BERNARDINO COUNTY GENERAL PLAN UPDATE: The General Plan is a policy document that guides all aspects of land use within the County. The current San Bernardino County General Plan is the product of a comprehensive update completed in June of 1989, which was a major overhaul of the previous General Plan. The 1989 General Plan established land use policies for a 20-year planning horizon. In addition to being available on-line, copies of the General Plan text are available at County libraries throughout the County, as well as Land Use Services Department offices.

Recognizing a need to update the 1989 General Plan, the Board of Supervisors has approved a General Plan Update (GPU) process that consists of two phases, the first of which was completed in 2002. During Phase I of the GPU, the Hogle-Ireland consultant team conducted a strategic analysis of the 1989 General Plan and Environmental Impact Report (EIR). The results of the Phase I consultant's analysis can be found in their report, Evaluation for County of San Bernardino General Plan/EIR. The comprehensive recommendations contained in the Executive Summary (July 1, 2002) to this Report serve as the basis for the scope of work to be accomplished in Phase II of the General Plan Update.

PHASE II: The actual General Plan Update, Phase II, is anticipated to be a three-year process which began in mid-2003.

SAN BERNARDINO COUNTY DEVELOPMENT CODE: The San Bernardino County Development Code implements the goals and policies of the General Plan by regulating land uses within

the unincorporated areas of the County. Each piece of property is assigned a "zone" or "land use district" which describes the rules under which that land may be used. These districts, such as "RS" for single-family residential or "CG" for general commercial, cover in general terms the range of uses allowable within the land use district that has been assigned to the property. The Code also establishes specific development standards for each district and the procedures to follow in order to approve a particular use.

FIRE SAFETY (FS) OVERLAY DISTRICT as adopted by County Ordinance 3918. The Fire Safety Overlay District is created to provide greater public safety in areas prone to wildland brush fires, by establishing additional development standards for these areas.

Fire Safety Overlay Area 1 applies to Mountain area and provides construction requirements and mitigation requirements for hazardous fire area.

5.3 Regulations, Codes, Policies, and Ordinances

During extended droughts, the District may not be able to meet ultimate peak day summer demand for water supply. The District adopted a Water Conservation Plan on August 9, 1992 which established the policy and conservation measures required during drought conditions.

5.4 Mitigation Programs

This section serves to identify the Previous Mitigation Plans, Projects, and Actions.

The District reviews all new construction plans to ensure that clearances from all district infrastructure is adequate, and determine if cross connection control protection is required. The Fire Department also reviews the plans to ensure that all new construction meets county fire code requirements for fire hydrant location and access, adequate fire suppression equipment access, and to ensure fire sprinkler code is followed.

All new District buildings have been designed and constructed to current building code standards.

The District's Master Plan identifies areas of needed improvement for more efficient water/wastewater operations, infrastructure repair/improvement, and for increased fire flow capability.

Since 2004 the District has supported a Dead and Dying Tree Removal Program to aid in the removal of dead and dying trees that pose a fire hazard due to the Bark Beetle Infestation. This project has been very successful for the District and helped mitigate the high fire hazard presented by the mass die-off of pine trees around structures in the community.

The District has been aggressively complying with the San Bernardino County Fuel Reduction and Abatement Program.

The District maintains emergency potable water supplies, meals ready to eat, sleeping bags, blankets, and cots for employee and employee family use during a time of emergency to help ensure adequate District staffing during such an emergency.

The District maintains multiple emergency stand-by generators for emergency electrical power needs at the Sewer Lift Station, Fire Station, District Office Complex, and at the District's well house/water treatment complex.

5.5 Fiscal Resources

Fiscal resources for the District include the following:

- Revenue from water sales and wastewater collection.
- Fees for new construction water/sewer service hook-up.
- A percentage of local Property Taxes
- If necessary, local bond measures

Section 6 Mitigation Strategies

6.1 Overview

The purpose of this analysis was to identify projects (actions) that helped the District meet the Goals and Objectives for each priority hazard. By going through this process, the District has identified hazards in our community, assessed which hazards pose the most significant risk, and identified projects to help reduce and/or eliminate the risk.

6.2 Mitigation 5-Year Progress Report

The District's planning team reviewed each of the projects from the 2005 HMP and discussed the status of each project and reasons why they had or had not been implemented. This updated 2011 HMP identifies the completed, deleted, or deferred actions or activities from the 2005 approved plan as shown in table 5 as a benchmark for progress.

The updated plan includes in its prioritization, any new mitigation actions identified since the previous plan was approved or through the plan update process.

Table 4

Project	Mitigation Action	Completed	Deferred	Comments
1	Wildfire- Replace pipeline in specific vulnerable areas	Yes- 900' 2" replaced with 8" plus 2 hydrants		Ongoing goal. Additional areas studied for update goals.
2	Wildfire/Winter Storms- Emergency Generators	In Process		2 facilities now equipped. Remaining areas studied and goals set.
3	Drought- Upgraded emergency connection and pump station.	Yes- Pump and valve facility built		Upgraded facility to provide emergency water to 100% of District customers.
4	Wildfire- Replace pipeline on Cougar Lane to 8"dia	No	Yes	Budget constraints delayed project.

6.3 Mitigation Goals, Objectives, and Projects

Section 3.5 discusses the process of identifying goals with a preview and validation of the Goals and Objectives in the District's 2005 HMP and the San Bernardino County's 2005 Operational Area HMP. Using 2005 as the basis, the District's planning team completed an

assessment/discussion to determine if each goal was still valid. This discussion also led to the opportunity to identify new Goals and Objectives. The District Master Plan was used as a guide for mitigation projects.

The four high profile hazards for the District are wildfire, earthquake, drought, and severe winter storms. While other hazards were profiled in previous sections, the District's priority and focus for the mitigation projects will be only for the four high profile hazards.

6.3.1 Wildfires

Description: The goal is to avoid or reduce damages to property. The District feels that strengthening structures, building new structures to current fire code, and fuel reduction to surrounding properties are critical to reducing the hazard wildfires present. These building codes help in the design and construction of District facilities that resist the forces of the fire hazard and help safety. Infrastructure improvements designed to improve fire flow capacity, increase available water supply, and more efficiently move the water from production to storage facilities is another critical area that will benefit mitigation capability.

Objectives:

- Update and improve water/wastewater infrastructure to eliminate old and outdated pipelines, increase pipeline size to increase flow capability.
- Improve existing structures and surroundings to be more resistant to fire hazard.
- Ensure all new facility construction and structure surroundings to be more resistant to the wildfire hazard.
- Continue to support fire fuels reduction programs in the District.

Mitigation Projects:

- Pipeline upgrading and upsizing.
- Water reservoir maintenance and inlet/outlet seismic upgrades.
- Construct new groundwater wells to increase water production capability.
- Increase sewer lift station efficiency and overflow capacity to reduce sewer spill hazard.

6.3.2 Earthquakes

Description: Goal is to avoid or reduce damages to District and public property. Newer building codes designed to strengthen structures against seismic activity is critical for new construction, and upgrading existing structures where applicable is a priority for the District. These modern building codes and system upgrading will help the District's structures/infrastructure resist the forces of nature and help ensure safety throughout the District's service area.

Objectives:

- Plan/encourage property protection measures for all District structures located in hazardous areas.
- Reduce or eliminate repetitive property losses attributed to wildfire and earthquake hazards.
- Research, develop, and adopt, cost-effective standards to protect District properties beyond the minimum.

Mitigation Projects:

- Pipeline upgrading and upsizing
- Water reservoir maintenance and inlet/outlet seismic upgrades.
- Increase sewer lift station efficiency and overflow capacity to reduce sewer spill hazard.

6.3.3 Drought

Description: The goal is to improve drought preparedness, and to address the drought hazard through mitigation over long term planning.

Objectives:

- Increase water supply through new water supply development and production.
- Provide emergency power availability to pump station for use if power outage occurs during a drought period.
- Reduce water demand. Water conservation is a viable long term mitigation strategy to reduce water demand overall and in emergency situations.

Mitigation Projects:

- Construct new groundwater wells, pump stations, and transmission pipelines.
- Pipeline upgrading and upsizing.
- Increase public awareness and knowledge regarding drought conditions and the importance of water conservation throughout the community.
- Continue funding a reserve account for eventual construction of additional storage reservoir facilities.

6.3.4 Severe Winter Storms

Description: The goal is to improve severe winter storm preparedness, and improve the District's ability to be more mobile during and after a severe winter storm. This can be accomplished through cold weather training, and acquiring updated equipment capable of accessing remote sites.

Objectives:

- Improve ability to mobilize during severe winter weather.
- Research equipment capable of safely accessing remote sites.
- Reduce employee exposure to severe winter weather elements.

Mitigation Projects:

- Improved cold weather PPE for employees.
- Purchase reliable equipment to safely transport employees to remote sites during and following severe winter weather hazardous conditions.

6.4 Mitigation Priorities

The District's implementation strategy included identifying a set of primary mitigation objectives. These objectives are considered the highest priority and once implemented will result in substantial improvement in the overall reliability of the District's operating system. The remaining objectives, not included in the primary objectives, are considered desirable and will further enhance the operating reliability once the primary objectives are met. The District's objectives have been prioritized based on the following:

- Impact to the District's system from the identified vulnerability. The planning team's decision has included cost in the hazard mitigation strategy.
- Overall cost/benefit of the mitigation strategy was primary factor in the mitigation goals. The District was looking for a high benefit to cost ratio in the planning process.

The District's primary mitigation objectives include:

1. Water/wastewater pipeline upgrades and upsizing.

2. Constructing new groundwater wells for increased water production/storage capability.

3. Water Reservoir maintenance, and inlet/outlet seismic upgrades.

4. Increase sewer lift station efficiency and overflow capacity.

5. Improve severe winter weather remote site access capability.

6. Reducing wildfire exposure and damage to District facilities.

6.5 Implementation Strategy

For the successful mitigation of hazards identified in this plan and to meet the District's goals within a reasonable time frame, an implementation strategy has been developed. The strategy includes identification of objectives, planning and development, cost estimates, and time frame for implementation.

For each project, the benefits and costs were identified and each project prioritized. The benefits include risk reduction, District goals, available funding, and time frame for implementation.

Arrowbear Park County Water District is a small organization and the implementation of the 2011 HMP will be a District wide activity and incorporated into the District's plan of operation.

The implementation strategy has been developed based on the District's Master Plan for capital improvements. Once these objectives are achieved, the secondary objectives can be developed in future revisions to the plan. Table 5 below lists the mitigation projects.

Table 5

Mitigation Projects	Funding Source	Time Frame	Priority Ranking	Estimated Cost
New Well	Dist. Reserves	2011/ 2012	1	$352,000
Cougar Lane Pipeline	Water Revenues	2012- 2015	1	$241,600
Emergency Generator	Water Revenues	2013	2	$22,000
New Reservoir	Dist. Reserves	2015-2016	2	$440,000
CSA 79 Crossover	Wastewater Revenues	2012-2013	1	$80,000

Section 7 Plan Maintenance

7.1 Monitoring, Evaluating, and Updating the Plan

The Arrowbear Park County Water District will conduct an annual review of this Hazard Mitigation plan and will seek the input from representatives of local agencies, citizen representatives, and the San Bernardino County Office of Emergency Services.

Plan Last Updated March, 2005:

Description of Plan Maintenance Procedures: The HMP is a living document that reflects the District's ongoing hazard mitigation activities. The process of monitoring, evaluating, and updating it will be critical to the effectiveness of hazard mitigation in the District's service area.

Because of the high priority of the HMP, the mitigation actions are being included in the District's Plan of Operation. The HMP will be incorporated into the District's yearly budget planning process which will help to monitor progress towards HMP goals. This plan will be updated every five years. The District will also update the plan if there is a significant change in the basic assumptions, for example a major hazard event that highlights vulnerabilities in a system not anticipated at the present time. The District's Board of Directors will review and recommend for approval any plan updates proposed by the planning team.

7.2 Implementation Through Existing Programs

The District currently plans capital improvements using the District Master Plan and the annual budget planning process.

After the District officially adopts the HMP, the District will use the Master Plan mechanism to have the mitigation strategies integrated into it. Specifically, the capital improvement planning that occurs in the future will contribute to the goals in the HMP. The planning team for the HMP will integrate capital improvement planning to implement high benefit low cost mitigation projects.

7.3 Continued Public Involvement

The District will continue to involve the public during the plan maintenance process over the next five years. The District, with its decision to integrate the HMP with the Master Plan, has ensured continued public involvement in this plan. Project approval is an open public process whereby the project is presented to the District's Board of Directors in an open public meeting and by virtue of this; progress towards achieving the District's goals and objectives identified in the HMP will also be open for public review and comment.

The District will continue to provide educational information to the public on our website to aid in conserving water to keep people informed of the drought and other hazards.

Appendix A

Table A.1- Planning Process & Public Involvement

Table A.2 Public Involvement/Outreach

Table A.1 Planning Process

The District's planning team meetings and coordination with other jurisdictions meetings consisted of the following:

Date	Activity
10 June 2010	Mitigation Plan Kick-Off Meeting with County of San Bernardino OES to discuss how multi-jurisdictional, multi-functional HMP Update 2010 process was to work.
01 July 2010	HMP Coordination Conference Call – County of San Bernardino OES – Rolled out Website portal for various cities and special districts to use to update their 2005 HMPs for 2010.
07 July 2010	SB County HMP Water Agency Coordination Meeting – Met with all Water District's within the County, at East Valley Water District, to discuss draft 2010 HMP report.
15 July 2010	HMP Coordination Meeting – County of San Bernardino OES – Met to review various chapters of 2010 report.
29 July 2010	HMP Coordination Conference Call – County of San Bernardino OES – Discussed plan update requirements and guidance for report.
30 July 2010	HMP Water Agency Coordination Meeting – Met with all Water District's within the County, at East Valley Water District, to discuss HMP progress and updates for 2010 HMP.
12 August 2010	HMP Coordination Meeting – County of San Bernardino OES – Met to discuss 2010 report.
26 August 2010	HMP Coordination Conference Call – County of San Bernardino OES – Discussed plan update requirements and guidance for report.
23 September 2010	HMP Coordination Conference Call – County of San Bernardino OES – Discussed plan update requirements and guidance for report.
07 October 2010	HMP Coordination Conference Call – County of San Bernardino OES – Discussed plan update requirements and guidance for report.
12 October 2010	HMP Water Agency Coordination Meeting – Met with all Water District's within the County, at East Valley Water District, to discuss HMP progress and updates for 2010 HMP.
28 October 2010	HMP Coordination Conference Call – County of San Bernardino OES – Discussed plan update requirements and guidance for report.
02 December 2010	HMP Coordination Conference Call – County of San Bernardino OES – Discussed plan update requirements and guidance for report.
11 January 2011	HMP Coordination Conference Call – County of San Bernardino OES – Discussed plan update requirements and guidance for report.
07 December 2010	HMP Coordination Meeting with Running Springs Water Dist. Reviewed maps, hazards, strategies.

Date	Activity
20 January 2011	HMP Coordination Conference Call - County of San Bernardino OES – Discussed plan update requirements and guidance for report.

Table A.2 Public Involvement/Outreach

Other public involvement consisted of the following meetings:

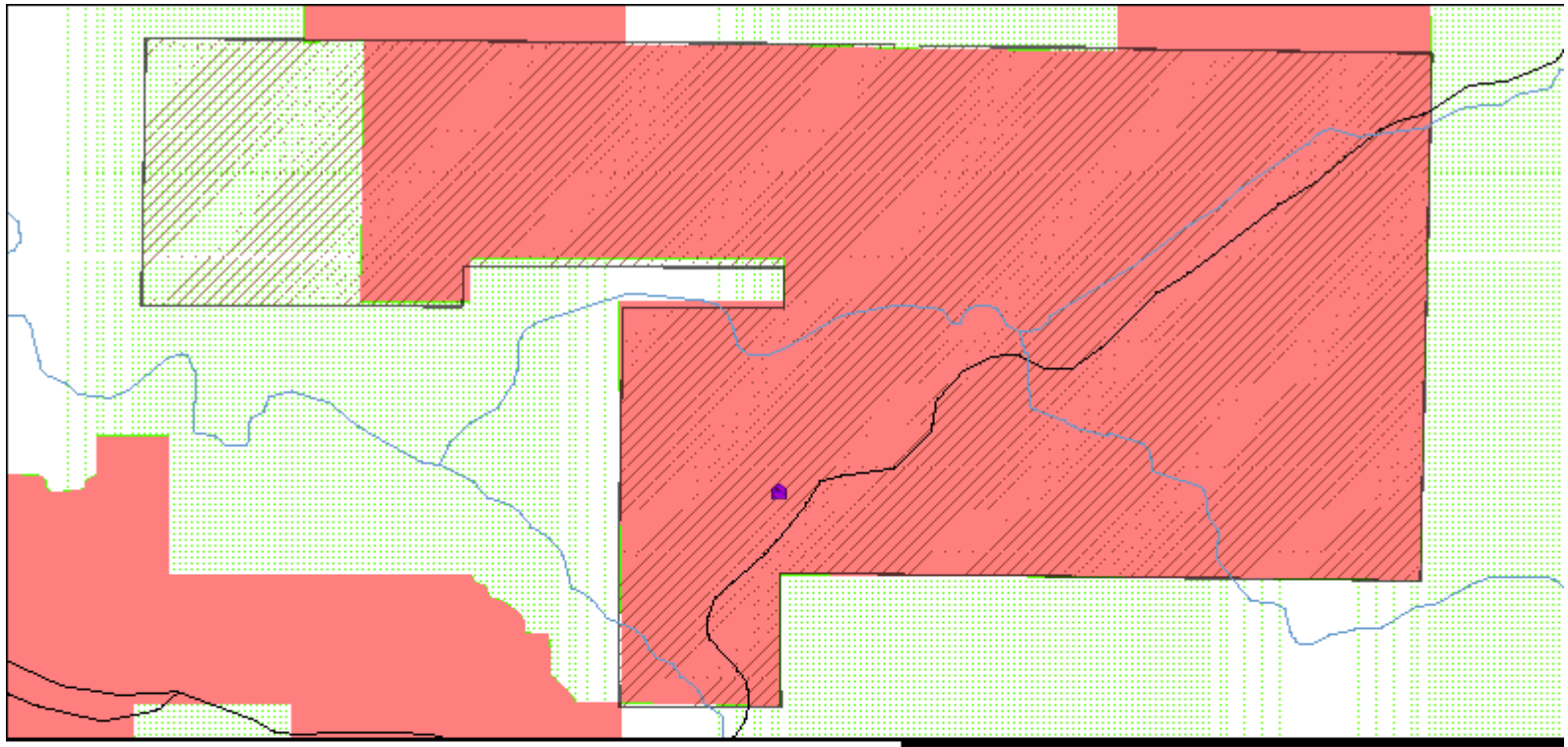
Date	Activity
06 August 2010	District Board Meeting – Public Meeting – Board of Directors Introduced HMP Update and strategy, invited involvement
08 October 2010	District Board Meeting – Public Meeting – Board of Directors Introduced HMP Update and strategy, invited involvement
09 October 2010	Wildfire Awareness Week Public Open house – Co-hosted with Running Springs Water District –Public discussion and input.
17 December 2010	District Board Meeting – Public Meeting – Board of Directors Gave status report update. Invited involvement.
14 January 2011	District Board Meeting – Public Meeting – Board of Directors Introduced HMP Update and strategy, invited involvement
08 February 2011	Added web page tab for Draft 2011 HMP Update and invited comments.

Appendix B
Hazard Zone Maps- Arrowbear Lake, CA

Fire Hazard Map

Earthquake Faults Hazard Map

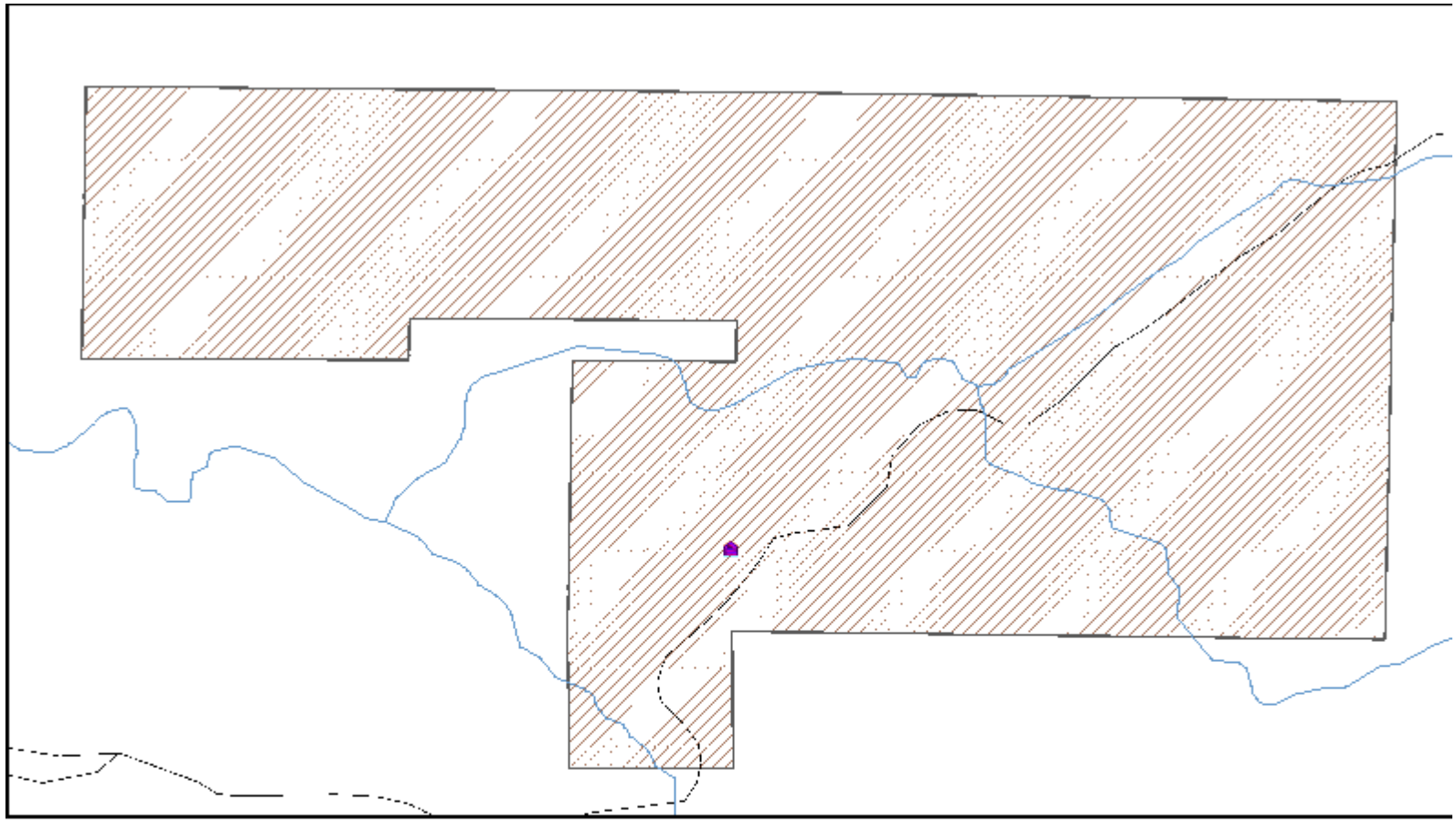
Liquefaction Hazard Map



Arrowbear Park County Water District

CAL FIRE Fire Hazard Severity Zones

Fire hazard data source:
CAL FIRE Fire Resource and Assessment Program (FRAP) Data,
Recommended County Maps of Very High Fire Hazard Severity Zones in Local Responsibility Areas (LRA) 5/2008
Draft Fire Hazard Severity Zones in Local Responsibility Areas (LRA) 9/2007
Adopted Fire Hazard Severity Zones for State Responsibility Areas (SRA) 11/2007
Map creation date: November 29, 2010



Arrowbear Park County Water District

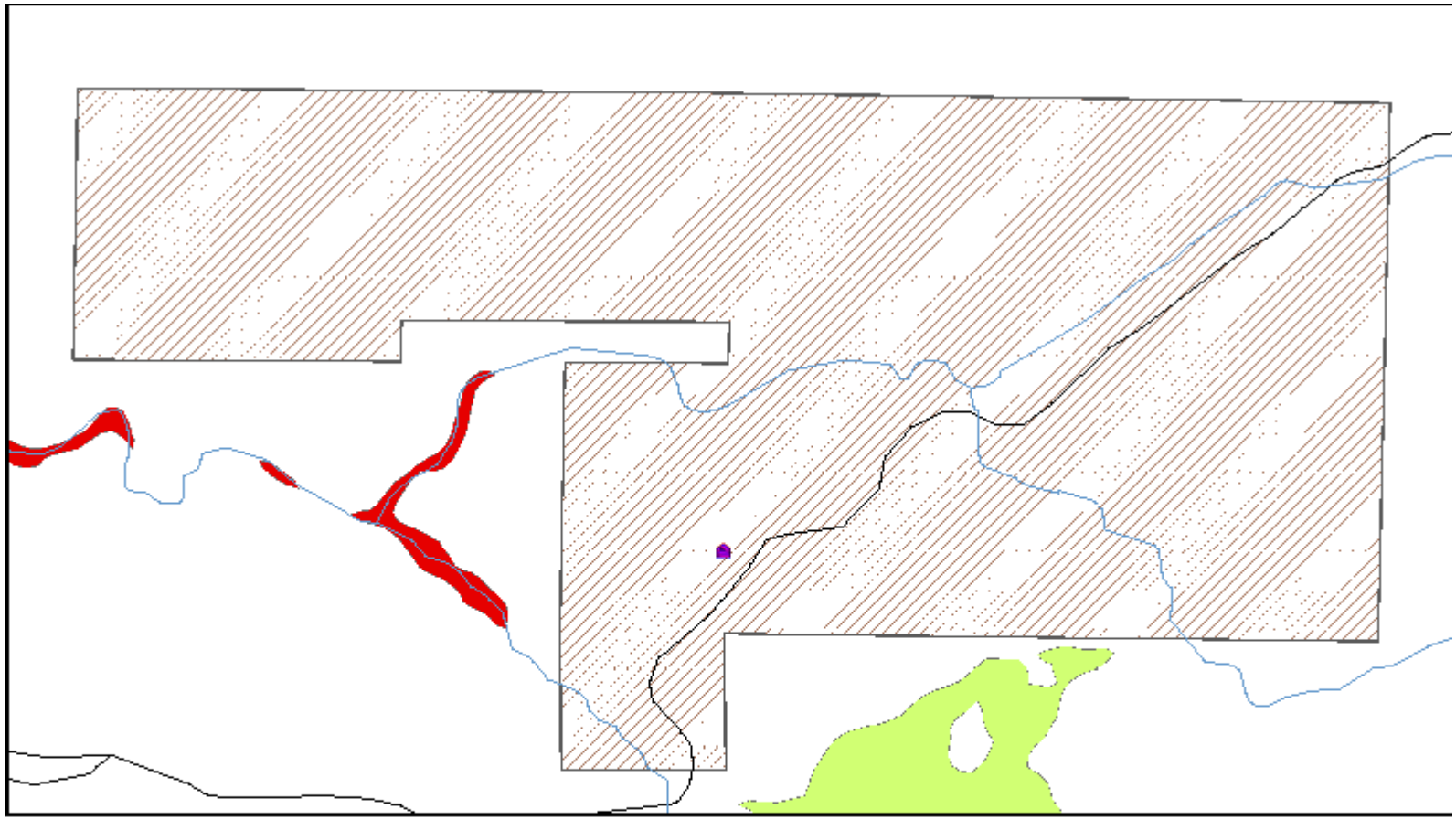
State of California Earthquake Fault Zones

Fault zone data source:
California Geological Survey
Alquist-Priolo Earthquake Fault Zones in California - Statewide Collection (2000)
New and Revised Earthquake Fault Zones (May 1, 2003)
Map creation date: November 29, 2010

N
W
E
S

Arrowbear Lake Fire
APCWD Boundary
Rivers and Streams
Major Highways

Active Faults
fault, certain
fault, approximately located
fault, inferred
fault, concealed
fault, additional uncertainty
Earthquake Fault Zone Boundaries



Arrowbear Park County Water District

USGS Liquefaction Susceptibility Zones

Liquefaction Susceptibility data source:
Liquefaction susceptibility data developed for the "ShakeOut" Scenario,
USGS Open File Report 2008-1150, Chap. 3C (p. 48-87)
Map creation date: November 29, 2010

N
W E
S

Arrowbear Lake Fire
APCWD Boundary
Rivers and Streams
Major Highways

Liquefaction Susceptibility
Water Features
None
Very Low
Low
Moderate
High
Very High

Appendix C

C. Table 1- Hazard Identification Matrix

C. Table 2- Essential Facilities Risk Assessment

C. Table 3- Essential Facilities Risk Assessment Timeline

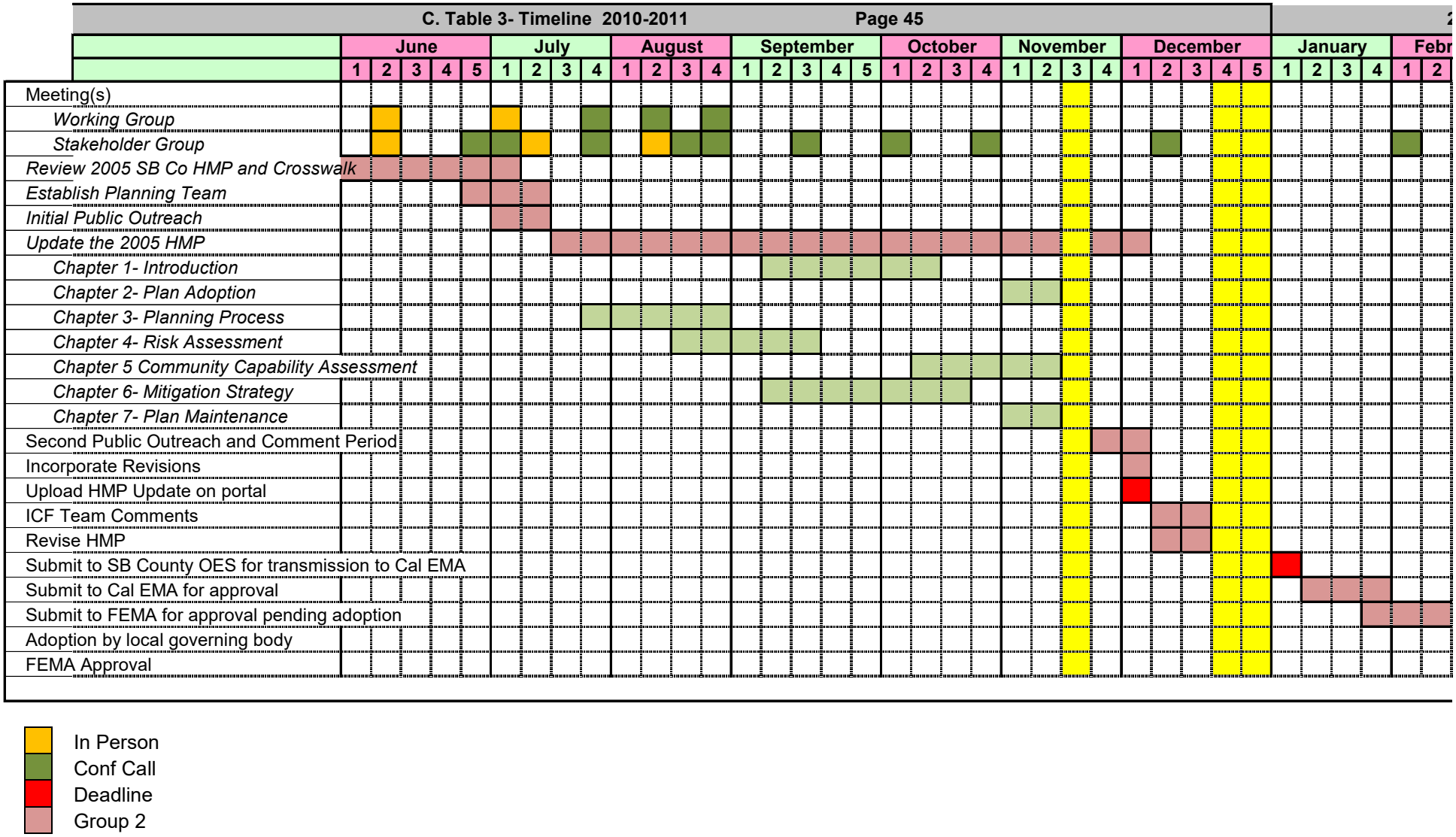
C. Exhibit 1- Draft Resolution for 2011 HMP Update

C. Table 1- Hazard Identification Matrix

		OWNER	Arrowbear Lake Fire Protection District	
		FACILITY TYPE	Fire Stations	
			#	%
		Total # of Buildings	1	
Fire Hazards	Fire Hazard Severity Zones - Local Responsibility Area	Very High	0	0%
	Fire Hazard Severity Zones - State Responsibility Area	Very High	1	100%
		High	0	0%
		Moderate	0	0%
Flood Hazards	Special Flood Hazard Areas Subject to Inundation by the 1% Annual Chance (100-year) Flood	Zone A - no base flood elevations determined	0	0%
		Zone AE - base flood elevations determined	0	0%
		Zone AH - Flood depths of 1 - 3 feet (usually areas of ponding); base flood elevations determined	0	0%
		Zone AO - Flood depths of 1 - 3 feet (usually sheet flow on sloping terrain); average depths determined.	0	0%
	Other flood areas	Zone X (Shaded) - areas of 0.2% annual chance (500 yr) flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile.	0	0%
		Zone X Protected by Levee - areas protected by levees from the 1% annual chance flood	0	0%
	Other Areas	Zone D - areas in which flood hazards are undetermined, but possible	1	100%
		Zone X (Unshaded) - areas determined to be outside the 0.2% annual chance (500-year) floodplain	0	0%
Dam Inundation		In mapped dam inundation area	0	0%
Earthquake Hazards	Liquefaction Susceptibility	None	1	100%
		Very Low	0	0%
		Low	0	0%
		Moderate	0	0%
		High	0	0%
		Very High	0	0%
	Alquist-Priolo Earthquake Fault Zone	Inside mapped fault zone	0	0%

C. Table 2- Essential Facilities Risk Assessment

	Earthquake Scenario		
FACILITY TYPE	**M7.8 ShakeOut Scenario (including Liquefaction)**	**M6.7 San Jacinto Fault (including Liquefaction)**	**M6.7 Chino Hills Fault (including Liquefaction)**
Arrowbear Lake Fire Protection District			
Total Number of Buildings	**1**		
Damage:			
# Buildings with >50% Probability of Moderate or Greater Damage	0	0	0
# Buildings with >50% Probability of Complete Damage	0	0	0
Functionality:			
Functionality < 50 % on Day 1	0	0	0
Functionality 50 - 75% on Day 1	1	0	0
Functionality >75% Day 1	0	1	1


June
July
August
September
October
November
December
January
Febr
1 2 3 4 5 1 2 3 4 1 2 3 4 1 2 3 4 5 1 2 3 4 1 2 3 4 1 2 3 4 5 1 2 3 4 1 2
Meeting(s)
Working Group
Stakeholder Group
Review 2005 SB Co HMP and Crosswalk
Establish Planning Team
Initial Public Outreach
Update the 2005 HMP
Chapter 1- Introduction
Chapter 2- Plan Adoption
Chapter 3- Planning Process
Chapter 4- Risk Assessment
Chapter 5 Community Capability Assessment
Chapter 6- Mitigation Strategy
Chapter 7- Plan Maintenance
Second Public Outreach and Comment Period
Incorporate Revisions
Upload HMP Update on portal
ICF Team Comments
Revise HMP
Submit to SB County OES for transmission to Cal EMA
Submit to Cal EMA for approval
Submit to FEMA for approval pending adoption
Adoption by local governing body
FEMA Approval
In Person
Conf Call
Deadline
Group 2

C. Exhibit 1-

SAN BERNARDINO COUNTY OPERATIONAL AREA
MULTI-JURISDICTIONAL HAZARD MITIGATION 2011 UPDATE PLAN

RESOLUTION NO. _____

A RESOLUTION OF THE ARROWBEAR PARK COUNTY WATER DISTRICT ADOPTING AND AUTHORIZING REVISIONS TO THE LOCAL HAZARD MITIGATION PLAN WHICH IS PART OF THE SAN BERNARDINO COUNTY OPERATIONAL AREA'S MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the Disaster Mitigation Act of 2000 (DMA 2000) (Public Law 106-390) amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Act) by repealing the previous mitigation planning section (Section 409) and replacing it with Section 322;

WHEREAS. to implement the DMA 2000 planning requirement, the Federal Emergency Management Agency (FEMA) published Interim Final Rules (IFRs) in the Federal Register on February 26, 2002 and October 1, 2002;

WHEREAS, these Interim Final Rules established the mitigation planning requirements for local governments and required that in order to remain eligible to receive federal funding for both pre-disaster and post-disaster mitigation project funding, a local government must have a FEMA approved and locally adopted Local Hazard Mitigation Plan written in accordance with Section 322 of the act;

WHEREAS. the Federal Emergency Management Agency has endorsed both Local and Multi-Jurisdictional Hazard Mitigation Plans as a partnership encouraging multi hazard approaches to disaster resistant communities;

WHEREAS, the ARROWBEAR PARK COUNTY WATER DISTRICT has established both a local and multi-jurisdictional partnership with the County of San Bernardino to include their specific risks, hazards, current and future mitigation measures and goals and objectives;

BE IT THEREFORE RESOLVED that the ARROWBEAR PARK COUNTY WATER DISTRICT adopt Resolution No. _____, adopting the Local Hazard Mitigation 2011Update Plan and its inclusion in the County of San Bernardino Multi-Jurisdictional Hazard Mitigation Plan.

ADOPTED, SIGNED AND APPROVED this _____day of __2011__.

_____
_____, President
Board of Directors

Resolution No. _____

Regular Meeting _____

ATTEST:

_____
Clerk of the Governing Board

I, _____Clerk of the Governing Board, hereby certify that the foregoing resolution was adopted by the Arrowbear Park County Water District at a regular meeting thereof, held on the _____day of _____2011 by the following vote:

AYES:

NOES:

ABSENT:

_____
Clerk of the Governing Board