



Town of Yucca Valley Hazard Mitigation Plan

Draft December 4, 2010

Recognition

Special Thanks

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Note: The maps in this plan were provided by the Town of Yucca Valley, County of San Bernardino, Federal Emergency Management Agency (FEMA), or were acquired from public Internet sources. Care was taken in the creation of the maps contained in this Plan, however they are provided "as is". The Town of Yucca Valley cannot accept any responsibility for any errors, omissions or positional accuracy, and therefore, there are no warranties that accompany these products (the maps). Although information from land surveys may have been used in the

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Executive Summary

The Mitigation Plan was prepared in response to Disaster Mitigation Act of 2000 (DMA 2000). DMA 2000 (also known as Public Law 106-390) requires state and local governments to prepare Mitigation Plans to document their Mitigation Planning process, and identify hazards, potential losses, mitigation needs, goals, and strategies. This type of planning supplements the City's comprehensive emergency management program.

Under DMA 2000, each state and local government must have a federally approved Mitigation Plan to be eligible for hazard mitigation grant funding.

The Disaster Mitigation Act of 2000 (DMA 2000) is intended to facilitate cooperation between state and local governments, prompting them to work together. Through collaboration, mitigation needs can be identified before disasters strike, resulting in faster allocation of resources and more effective risk reduction projects.

The following FEMA definitions are used throughout this plan:

Hazard Mitigation – “Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards”.

Planning – “The act or process of making or carrying out plans; specifically, the establishment of goals, policies, and procedures for a social or economic unit.” (Source: FEMA, 2002, *Getting Started, Building Support for Mitigation Planning*, FEMA 386-1)

Mitigation Planning Benefits

Planning ahead helps residents, businesses, and government agencies effectively respond when disasters strike; and keeps public agencies eligible for HMGP funding. The long-term benefits of mitigation planning include:

- ✓ Greater understanding of hazards faced by a community
- ✓ Use of limited resources on hazards with the greatest effect on a community
- ✓ Financial savings through partnerships for planning and mitigation
- ✓ Reduced long-term impacts and damages to human health and structures, and lower repair costs
- ✓ More sustainable, disaster-resistant communities.

Hazard Land Use Policy in California

Planning for hazards should be an integral element of any town's land use planning program. All California cities and counties have General Plans and the implementing ordinances that are required to comply with the statewide land use planning regulations.

The continuing challenge faced by local officials and state government is to keep the network of local plans effective in responding to the changing conditions and needs of California's diverse communities, particularly in light of the very active seismic region in which we live.

Planning for hazards requires a thorough understanding of the various hazards facing the Town and region as a whole. Additionally, it's important to take an inventory of the structures and contents of various Town holdings. These inventories should include the compendium of hazards facing the town, the built environment at risk, the personal property that may be damaged by hazard events and most of all, the people who live in the shadow of these hazards.

Support for Hazard Mitigation

All mitigation is local and the primary responsibility for development and implementation of risk reduction strategies and policies lies with each local jurisdiction. Local jurisdictions, however, are not alone. Partners and resources exist at the regional, state and federal levels. Numerous California state agencies have a role in hazards and hazard mitigation.

Some of the key agencies include:

- ✓ Cal EMA is responsible for disaster mitigation, preparedness, response, recovery, and the administration of federal funds after a major disaster declaration;
- ✓ The Southern California Earthquake Center (SCEC) gathers information about earthquakes, integrates information on earthquake phenomena, and communicates this to end-users and the general public to increase earthquake awareness, reduce economic losses, and save lives.
- ✓ The California Department of Forestry and Fire Protection (CalFIRE) is responsible for all aspects of wildland fire protection on private and state properties, and administers forest practices regulations, including landslide mitigation, on non-federal lands.
- ✓ The California Division of Mines and Geology (DMG) is responsible for geologic hazard characterization, public education, and the development of partnerships aimed at reducing risk.
- ✓ The California Division of Water Resources (DWR) plans, designs, constructs, operates, and maintains the State Water Project; regulates dams; provides flood protection and assists in emergency management. It also educates the public, serves local water needs by providing technical assistance
- ✓ FEMA provides hazard mitigation guidance, resource materials, and educational materials to support implementation of the capitalized DMA 2000.
- ✓ United States Census Bureau (USCB) provides demographic data on the populations affected by natural disasters.
- ✓ The United States Department of Agriculture (USDA) provides data on matters pertaining to land management.

A Hazard Mitigation Planning Team (Planning Team) consisting of Town staff from various departments used the following approach to prepare the mitigation plan:

- ✓ Develop a Planning Team
- ✓ Identify hazards posing a significant threat
- ✓ Profile these hazards
- ✓ Estimate inventory at risk and potential losses associated with these hazards
- ✓ Develop mitigation strategies and goals that address these hazards

- ✓ Develop plan maintenance procedures for implementation after the California Emergency Management Agency (Cal EMA) and the Federal Emergency Management Agency (FEMA) approve the mitigation plan.

Although the requirements of DMA 2000 only apply to natural hazards, which are the primary focus of this plan, the *Planning Team* felt it was important to also identify, profile, assess, and mitigate technological and human-caused hazards.

As required by DMA 2000, the Town informed the public about the planning process and provided opportunities for public input. In addition, key agencies and stakeholders shared their expertise during the planning process. This Mitigation Plan documents the process, outcome, and future of the Town's mitigation planning efforts.

How is the Plan Organized?

The structure of the plan enables people to use a section of interest to them and allows the Town to update sections when new data is available. The ease of incorporating new data into the plan will result in a Mitigation Plan that remains current and relevant to the Town of Yucca Valley.

Part I of the Town of Yucca Valley's Mitigation Plan consists of three sections, including the Executive Summary, Introduction, and Community Profile.

Part II of the Mitigation Plan consists of Mitigation Strategies, Planning Process, Plan Maintenance, and Risk Assessment.

Part III of the Town of Yucca Valley's Mitigation Plan consists of Earthquake, Flood, and Wildfire hazard specific analysis.

Part IV is a collection of Appendices supporting the plan.

Following is a description of each of the sections of the plan:

Part I: Background

Executive Summary

The executive summary provides an overview of the planning process.

Section 1: Introduction

The Introduction describes the background and purpose of developing the Mitigation Plan for the Town of Yucca Valley.

Section 2: Community Profile

The section presents the history, geography, demographics, and socioeconomics of the Town of Yucca Valley. It provides valuable information on the demographics and history of the region.

Part II: Mitigation Planning

Section 3: Mitigation Strategies

This section highlights 1) Mitigation Actions Matrix 2) planning approach 3) how the action items are organized 4) goals and objectives.

Section 4: Planning Process

This section describes the mitigation planning process including 1) Planning Team involvement 2) public and other stakeholder involvement; and 3) integration of existing data and plans.

Section 5: Plan Maintenance

This section provides information on plan implementation, monitoring and evaluation.

Section 6: Risk Assessment

This section provides information on hazard identification, vulnerability and risk associated with hazards in the Town of Yucca Valley.

Part III: Hazard Analysis

Hazard-Specific Analysis on the three chronic hazards is addressed in this plan. Chronic hazards occur with some regularity and may be predicted through historic evidence and scientific methods. The chronic hazards addressed in the plan include:

- Section 7: Earthquake
- Section 8: Flood
- Section 9: Wildfire/Urban Fire

Part IV: Appendices

The plan appendices are designed to provide users of the Mitigation Plan with additional information to assist them in understanding the contents of the mitigation plan, and potential resources to assist them with implementation.

Appendix A: Resource Directory

The resource directory includes Town, local, regional, state, and national resources and programs that may be of technical and/or financial assistance to the Town of Yucca Valley during plan implementation.

Mitigation Measure Categories

Following is FEMA's list of mitigation categories. The activities identified by the Planning Team are consistent with the six broad categories of mitigation actions outlined in FEMA publication 386-3 *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies*.

- ✓ **Prevention:** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning,

building codes, capital improvement programs, open space preservation, and storm water management regulations.

- ✓ **Property Protection:** Actions that involve modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- ✓ **Public Education and Awareness:** Actions to inform and educate citizens, property owners, and elected officials about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.
- ✓ **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses preserve or restore the functions of natural systems. Examples include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- ✓ **Emergency Services:** Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.
- ✓ **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, retaining walls, and safe rooms.

Plan Mission

The mission of the Mitigation Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from natural hazards. This is achieved by increasing public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the Town in creating a more sustainable community.

Mitigation Planning Process

The process for updating the 2005 Mitigation Plan started with identifying members for the Planning Team. Each team member represented different Town department and specific divisions within those departments with a role in mitigation efforts. The Planning Team met over a period of 6 months, and identified characteristics and consequences of natural hazards with significant potential to affect the Town.

Hazard mitigation strategy and goals were developed by understanding the risk posed by the identified hazards. The group also determined hazard mitigation activities and priorities to include scenarios for both present and future conditions. The final Mitigation Plan will be implemented through various projects, changes in day-to-day town operations, and through continued hazard mitigation development.

Public Input

The Plan will be available to the public through different venues and will engage the public, involve them in ongoing planning and evaluation, and facilitate communication. The *Planning Team* recognizes that community involvement increases the likelihood that hazard mitigation will become a standard consideration in the Town's evolution.

The Planning Team posted a public notice on their website, a media release on Channel XX about the meeting. The resources and information cited in the Mitigation Plan provide a strong local perspective and help identify strategies and activities to make the Town of Yucca Valley more disaster resistant.

Participating Organizations

For Mitigation Planning to be successful; like all community planning; it requires collaboration with, and support from, federal, state, local, and regional governments; citizens; the private sector; universities; and non-profit organizations. The Planning Team consulted a variety of sources to ensure that the planning process results in practicable actions tailored to local needs and circumstances.

Planning Approach

The four-step planning approach outlined in the FEMA publication, *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies* (FEMA 386-3) was used to develop this plan:

- ✓ **Develop mitigation goals and objectives** - The risk assessment (hazard characteristics, inventory, and findings), along with municipal policy documents, were utilized to develop mitigation goals and objectives.
- ✓ **Identify and prioritize mitigation actions** - Based on the risk assessment, goals and objectives, existing literature/resources, and input from participating entities, mitigation activities were identified for each hazard. Activities were 1) qualitatively evaluated against the goals and objectives, and other criteria; 2) identified as high, medium, or low priority; and 3) presented in a series of hazard-specific tables.
- ✓ **Prepare implementation strategy** - Generally, high priority activities are recommended for implementation first.
However, based on community needs and goals, project costs, and available funding, some medium or low priority activities may be implemented before some high priority items.
- ✓ **Document mitigation planning process** - The mitigation planning process is documented throughout this plan.

Mitigation Planning

As the cost of damage from disasters continues to increase nationwide, the Town of Yucca Valley recognizes the importance of identifying effective ways to reduce vulnerability to disasters. Mitigation Plans assist communities in reducing risk from hazards by identifying resources, information, and strategies for risk reduction, while helping to guide and coordinate mitigation activities throughout the Town.

The plan provides a set of action items to reduce risk from hazards such as education and outreach programs and the development of partnerships. The plan also provides for the implementation of preventative activities, including programs that restrict and control development in areas subject to damage from hazards.

The Mitigation Plan is integrated with other Town plans including the Town of Yucca Valley Emergency Operations Plan, Town of Yucca Valley General Plan, the Town of Yucca Valley Capital Improvement Plan (CIP), as well as department specific standard operating procedures.

Scope

The Town's Mitigation Plan affects the areas within the Town boundaries in addition to Town owned facilities and land.

Risk Assessment

Risk assessment is the identification of risks posed by a hazard and the corresponding impacts to the community. This process involves five steps: identify hazards, profile hazards, inventory critical assets, assess risks, and assess vulnerability of future development. The potential impact of hazards associated with the Town's location and varying terrain make the environment and population vulnerable to a spectrum of natural disaster situations. Any disaster scenario can only be assessed through careful planning and collaboration between public agencies, private sector organizations, and town residents, to make it possible to minimize loss.

Mitigation Strategy Goals

The Planning Team confirmed the five mitigation goals from the 2005 plan:

- ✓ Protect Life and Property
- ✓ Enhance Public Awareness
- ✓ Preserve Natural Systems
- ✓ Encourage Partnerships and Implementation
- ✓ Strengthen Emergency Services

These goals guided the development and implementation of specific mitigation activities. Many of the mitigation objectives and action items come from current programs. Emphasis was placed on the effectiveness of the activities with respect to their estimated cost.

Plan Adoption

The Mitigation Plan was reviewed and adopted by the Town Council after approval by Cal EMA and FEMA. A copy of the Town Council Resolution appears in Section 4: Planning Process.

Plan Maintenance

Mitigation Planning is an ongoing process involving changes as new hazards occur, as the area develops, and as more is learned about hazards and their impacts. The Planning Team will monitor changing conditions, help implement mitigation activities, annually review the plan to determine if Town goals are being met, and provide an update to Cal EMA and FEMA every five

years. In addition, the Planning Team will review After-Action Reports generated after any disaster that impacts the Town, and revise the mitigation plan if needed.

Section 1: Introduction

Why Develop a Mitigation Plan?

As the costs of damage from disasters continue to increase, the Town realizes the importance of identifying effective ways to reduce vulnerability to disasters. Mitigation plans assist communities in reducing risk from hazards by identifying resources, information, and strategies for risk reduction, while helping to guide and coordinate mitigation activities throughout the Town.

The plan provides a set of action items to reduce risks from hazards through education and outreach programs and to foster the development of partnerships, and implementation of preventative activities such as land use programs that restrict and control development in areas subject to damage from hazards.

The resources and information within the Mitigation Plan:

- ✓ Establish a basis for coordination and collaboration among agencies and the public of Town of Yucca Valley;
- ✓ Identify and prioritize future mitigation projects; and
- ✓ Assist in meeting the requirements of federal assistance programs.

The Mitigation Plan works in conjunction with other Town plans, including the Emergency Operations Plan, General Plan, and Capital Improvement Plan.

A thorough review of existing documents revealed that the Town has previously experienced or could be vulnerable to the following natural hazards earthquake, flood, wildfire, landslide, dam failure, tsunami, windstorm, terrorism, drought. The planning team utilized FEMA recommended Calculated Priority Risk Index to identify the most significant threats facing the Town: Earthquake, Flood, and Wildfire.

It is impossible to predict exactly when these disasters will occur, or the extent to which they will affect the Town. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from these natural disasters. As the population of the region continues to increase, the exposure to hazards creates an even higher risk than previously experienced.

“Floods and hurricanes happen. The hazard itself is not the disaster – it’s our habits, it’s how we build and live in those areas...that’s the disaster.”

Craig Fugate,
FEMA Administrator

Hazard Mitigation Legislation

Relevant hazard mitigation legislation and grants are highlighted below.

Hazard Mitigation Grant Program

In 1974, Congress enacted the Robert T. Stafford Disaster Relief and Emergency Act, commonly referred to as the Stafford Act. In

1988, Congress established the Hazard Mitigation Grant Program (HMGP) via Section 404 of the Stafford Act. Regulations regarding HMGP implementation based on the DMA 2000 were initially changed by an Interim Final Rule (44 CFR Part 206, Subpart N) published in the Federal Register on February 26, 2002. A second Interim Final Rule was issued on October 1, 2002.

The HMGP helps states and local governments implement long-term hazard mitigation measures for natural hazards by providing federal funding following a federal disaster declaration. Eligible applicants include state and local agencies, Indian tribes or other tribal organizations, and certain nonprofit organizations.

In California, the HMGP is administered by Cal EMA. Examples of typical HMGP projects include:

- ✓ Property acquisition and relocation projects
- ✓ Structural retrofitting to minimize damages from earthquake, flood, high wind, wildfire, or other natural hazards
- ✓ Elevation of flood-prone structures
- ✓ Vegetative management programs, such as:
- ✓ Brush control and maintenance
- ✓ Fuel break lines in shrubbery
- ✓ Fire-resistant vegetation in potential wildland fire areas

Pre-Disaster Mitigation Program

The Pre-Disaster Mitigation Program (PDM) was authorized by §203 of the Stafford Act, 42 United States Code (USC), as amended by §102 of the DMA 2000. Funding is provided through the National Pre-Disaster Mitigation Fund to help state and local governments (including Indian tribal governments) implement cost-effective hazard mitigation activities that complement a comprehensive mitigation program.

In Fiscal Year 2009, two types of grants (planning and competitive) were offered under the PDM Program. Planning grants allocate funds to each state for Mitigation Plan development. Competitive grants distribute funds to states, local governments, and federally recognized Indian tribal governments via a competitive application process. FEMA reviews and ranks the submittals based on pre-determined criteria. The minimum eligibility requirements for competitive grants include participation in good standing in the National Flood Insurance Program (NFIP) and a FEMA-approved Mitigation Plan. (Source: <http://www.fema.gov/fima/pdm.shtm>)

Flood Mitigation Assistance Program

The Flood Mitigation Assistance (FMA) Program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101). Financial support is provided through the National Flood Insurance Fund to help states and communities implement measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP.

Three types of grants are available under FMA: planning, project, and technical assistance. Planning grants are available to states and communities to prepare Flood Mitigation Plans. NFIP-participating communities with approved Flood Mitigation Plans can apply for project grants to implement measures to reduce flood losses. Technical assistance grants in the amount of 10 percent of the project grant are available to the state for program administration. Communities that receive planning and/or project grants must participate in the NFIP. Examples of eligible projects include elevation, acquisition, and relocation of NFIP-insured structures. (Source: <http://www.fema.gov/fima/fma.shtm>)

Disaster Mitigation Act of 2000

DMA 2000 (DMA 2000) was signed by President Clinton on October 30, 2000 (Public Law 106-390). Section 322 primarily deals with the development of Mitigation Plans. The Interim Final Rule for planning provisions (44 CFR Part 201) was published in the Federal Register twice: February 26, 2002 and October 1, 2002. The Mitigation Planning requirements are implemented via 44 CFR Part 201.6.

Under DMA 2000 state and local government (each city, county, and special district), and tribal government must develop a Mitigation Plan to be eligible to receive HMGP funds. Every mitigation plan, which must be reviewed by the state and approved by FEMA, should address the following items:

DMA 2000 was designed to establish a national program for pre-disaster mitigation, streamline disaster relief at the federal and state levels, and control federal disaster assistance costs. Congress believed these requirements would produce the following benefits:

- ✓ Reduce loss of life and property, human suffering, economic disruption, and disaster costs.
- ✓ Prioritize hazard mitigation at the local level with increased emphasis on planning and public involvement, assessing risks, implementing loss reduction measures, and ensuring critical facilities/services survive a disaster.
- ✓ Promote education and economic incentives to form community-based partnerships and leverage non-federal resources to commit to and implement long-term hazard mitigation activities.

State and Federal Support

While local jurisdictions have primary responsibility for developing and implementing hazard mitigation strategies, they are not alone. Various state and federal partners and resources can help local agencies with mitigation planning.

Cal EMA is the lead agency for mitigation planning support to local governments. In addition, FEMA offers grants, tools, and training.

The Mitigation Plan was prepared in accordance with the following regulations and guidance:

- ✓ DMA 2000 (Public Law 106-390, October 10, 2000)
- ✓ 44 CFR Parts 201 and 206, Mitigation Planning and Hazard Mitigation Grant Program, Interim Final Rule, October 1, 2002

- ✓ 44 CFR Parts 201 and 206, Mitigation Planning and Hazard Mitigation Grant Program, Interim Final Rule, February 26, 2002
- ✓ How-To Guide for Using HAZUS-MH for Risk Assessment, (FEMA 433), February 2004
- ✓ Mitigation Planning “How-to” Series (FEMA 386-1 through 9 available at: <http://www.fema.gov/fima/planhowto.shtml>)
- ✓ Getting Started: Building Support For Mitigation Planning (FEMA 386-1)
- ✓ Understanding Your Risks: Identifying Hazards and Estimating Losses (FEMA 386-2)
- ✓ Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies (FEMA 386-3)
- ✓ Bringing the Plan to Life: Implementing the Mitigation Plan (FEMA 386-4)
- ✓ Using Benefit-Cost Review in Mitigation Planning (FEMA 386-5)
- ✓ Integrating Historic Property and Cultural Resource Considerations into Mitigation Planning (FEMA 386-6)
- ✓ Integrating Manmade Hazards Into Mitigation Planning (FEMA 386-7)
- ✓ Multi-Jurisdictional Mitigation Planning (FEMA 386-8)

HAZUS-MH uses

Geographic Information

System technology to
produce detailed maps and
analytical reports on

physical damage to
building stock, critical

facilities, transportation

systems, and utilities.

- ✓ Using the Mitigation Plan to Prepare Successful Mitigation Projects (FEMA 386-9)
- ✓ State and Local Plan Interim Criteria Under the DMA 2000, July 11, 2002, FEMA
- ✓ Mitigation Planning Workshop For Local Governments- Instructor Guide, July 2002, FEMA
- ✓ Report on Costs and Benefits of Natural Hazard Mitigation, Document #294, FEMA
- ✓ LHMP Development Guide – Appendix A - Resource, Document, and Tool List for Local Mitigation Planning, December 2, 2003, Cal EMA

Hazards U.S. – Multi-Hazard

In 1997, FEMA developed a standardized model for estimating losses caused by an earthquake. Hazards U.S. (HAZUS) addressed the need for more effective national, state, and local planning and the need to identify areas that face the highest risk and potential for loss.

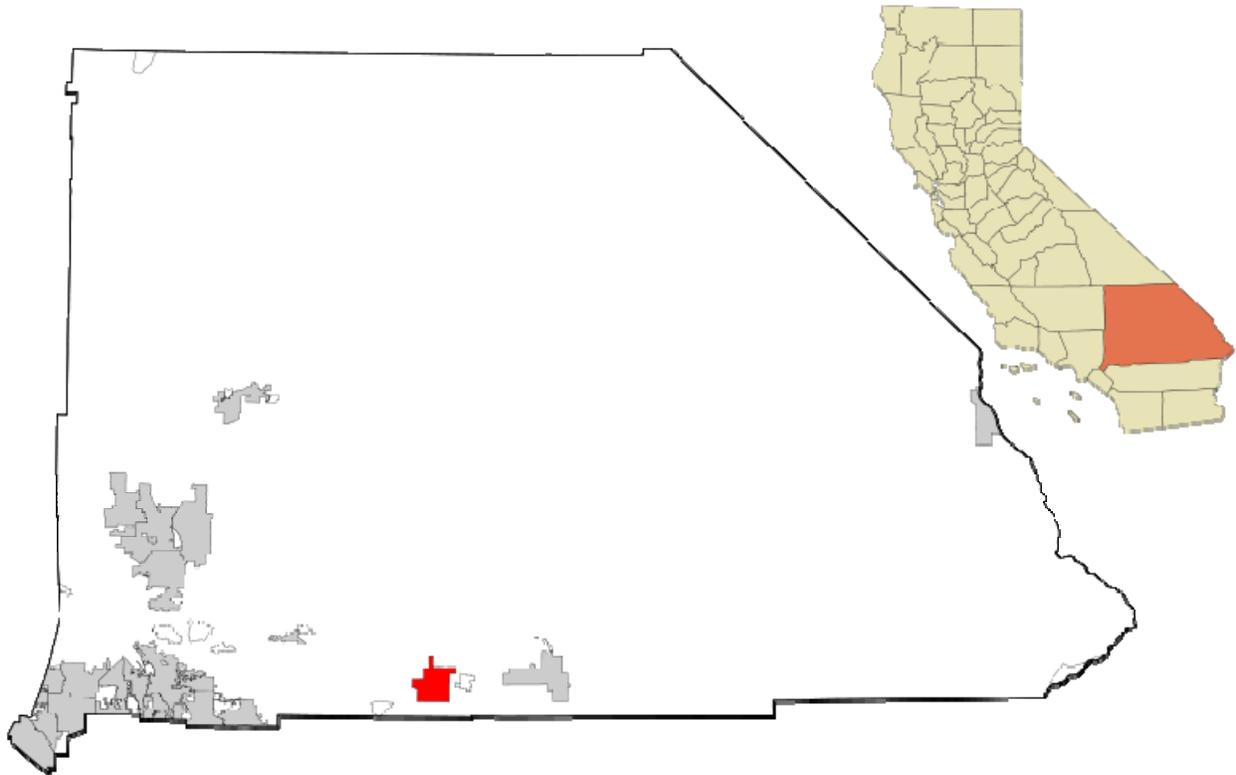
Hazards U.S. Multi-Hazard (HAZUS-MH) provides models to estimate potential losses from floods (coastal and riverine) and winds (hail, hurricane, tornado, tropical cyclone, and thunderstorm). HAZUS-MH applies engineering and scientific risk calculations developed by hazard and information technology experts to provide defensible damage and loss estimates. This methodology provides a consistent framework for assessing risk across a variety of hazards.

HAZUS-MH uses Geographic Information System technology to produce detailed maps and analytical reports on physical damage to building stock, critical facilities, transportation systems, and utilities. The damage reports cover induced damage (debris, fire, hazardous material, and inundation) and direct economic and social losses (casualties, shelter requirements, and economic impacts), promoting standardization.

Who Does the Mitigation Plan Affect?

The Mitigation Plan affects the areas within the Town of Yucca Valley boundaries and Town owned facilities and land. This plan provides a framework for planning for natural hazards. The resources and background information in the plan are applicable Town-wide and to Town-owned facilities outside of the boundaries, and the goals and recommendations provide groundwork for local mitigation plans and partnerships. Map 1-1: Map of Town of Yucca Valley shows the regional proximity of the Town to its adjoining communities.

Map 1-1: Map of Town of Yucca Valley
(Source: Wikipedia)



Section 2: Community Profile

Topography:

The Town of Yucca Valley is located on the southern edge of the Mojave Desert. Bordered on the west by the San Bernardino Mountains and the south by the Joshua Tree National Park, the community sits at 3,220 feet above sea level.

Climate:

Average summer temperatures stay in the upper-90s during the day and in the mid-70s at night. The winter months bring daytime temperatures down into the mid-40s and nights into the low-30s. The town of Yucca Valley has a subtropical, high desert climate. Mean annual rainfall is very low, averaging less than 4 inches annually. Most rainfall occurs during the cooler months of November through March, but occasional high-intensity thunderstorms and tropical storms occur in late summer and early fall.

Major River/Watersheds:

There are no rivers in the Morongo Basin where Yucca Valley is located. Several areas within the town are subject to sheet flow and channelized drainage. Occasionally, intense thunderstorms and tropical storms can generate high volumes of runoff which can erode channel banks and transport large volumes of sand and gravel onto roads and properties.

Population/Demographics

According to California State Department of Finance estimates, the Town had 8,366 households and a population of 21,268 in the year 2009. The San Bernardino County Demographic Profile for 2009 sets the median household income at \$37,901 and the median age at 40.2 years old.

Economy

Yucca Valley is considered to be the economic hub of the Morongo Basin. With several major financial institutions and a broad base of retail operations, the community serves the needs of the Morongo Basin. Over the past few years, the Town has seen a steady increase in its retail sales base, as additional retail providers enter the Yucca Valley market to serve the increasing population. Recently however, the slowing housing market has had a nominal impact on consumer spending.

The Marine Corps Air Ground Combat Center, the largest Marine Corps base in the world (932 square miles) is located 25 miles to the east of Yucca Valley. The base is home to more than 17,000 service members and dependants.

Joshua Tree National Park, a stunning backdrop on Yucca Valley's southern border, attracts more than one million visitors each year. People choose to relocate to the Morongo Basin to take advantage of the clean air and pleasant climate.

Industry

Yucca Valley is the commercial center of the Morongo Basin and California's southern Mojave Desert through its links to Interstate 10 via State Highway 62, and Interstate 15 via State Highway 247.

Yucca Valley's west-end "Gateway" business district features many long-time locally owned businesses, and opportunities remain in this area for a variety of commercial development. The Civic Center business area of Yucca Valley offers a mixture of businesses and a variety of services. This area provides much of the Town's neighborhood and community scale commercial development, with important remaining undeveloped highway frontage property. Most recently the east end of Yucca Valley has seen substantial retail and industrial growth.

It is the goal of the Town to provide for a balanced mix of lands and facilities for the expansion of non-polluting, clean industrial development that broadens the economic/employment base of the Town, and assures compatible integration with other, non-industrial land uses.

PART II: MITIGATION PLANNING

Section 3: Mitigation Strategies

Goals

The Planning Team developed mitigation goals to avoid or reduce long-term vulnerabilities to hazards. These general principles clarify desired outcomes.

The goals are based on the risk assessment and Planning Team input, and represent a long-term vision for hazard reduction or enhanced mitigation capabilities. They are compatible with community needs and goals expressed in other planning documents prepared by the Town.

FEMA defines **Goals** as general guidelines that explain what you want to achieve. They are usually broad policy-type statements, long-term, and represent global visions.

FEMA defines **Mitigation Activities** as specific actions that help you achieve your goals and objectives.

Each goal is supported by mitigation action items. The Planning Team developed these action items through its knowledge of the local area, risk assessment, review of past efforts, identification of mitigation activities, and qualitative analysis.

The five mitigation goals and descriptions are listed below.

Protect Life and Property

Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from natural, human-caused, and technological hazards.

Improve hazard assessment information to make recommendations for avoiding new development in high hazard areas and encouraging preventative measures for existing development in areas vulnerable to natural, human-caused, and technological hazards.

Enhance Public Awareness

Develop and implement education and outreach programs to increase public awareness of the risks associated with natural, human-caused, and technological hazards.

Provide information on tools; partnership opportunities, and funding resources to assist in implementing mitigation activities.

Preserve Natural Systems

Support management and land use planning practices with hazard mitigation to protect life.

Preserve, rehabilitate, and enhance natural systems to serve hazard mitigation functions.

Encourage Partnerships and Implementation

Strengthen communication and coordinate participation with public agencies, citizens, non-profit organizations, business, and industry to support implementation.

Encourage leadership within the Town and public organizations to prioritize and implement local and regional hazard mitigation activities.

Strengthen Emergency Services

Establish policy to ensure mitigation projects for critical facilities, services, and infrastructure.

Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry.

Coordinate and integrate hazard mitigation activities where appropriate, with emergency operations plans and procedures.

The Planning Team also developed hazard-specific mitigation goals, which appear in Section 2: Mitigation Strategies.

How are the Mitigation Action Items Organized?

The action items are a listing of activities in which Town agencies and citizens can be engaged to reduce risk. Each action item includes an estimate of the timeline for implementation.

The action items are organized within the following Mitigation Actions Matrix, which lists all of the multi-hazard (actions that reduce risks for more than one specific hazard) and hazard-specific action items included in the mitigation plan. Data collection and research and the public participation process resulted in the development of these action items (Section 4: Planning Process). The Matrix includes the following information for each action item:

Funding Source

The action items can be funded through a variety of sources, possibly including: operating budget/general fund, development fees, Community Development Block Grant (CDBG), Hazard Mitigation Grant Program (HMGP), other Grants, private funding, Capital Improvement Plan, and other funding opportunities.

Coordinating Organization

The Mitigation Actions Matrix (Table 3-1) assigns primary responsibility for each of the action items. The hierarchies of the assignments vary – some are positions, others departments, and other committees. The primary responsibility for implementing the action items falls to the entity shown as the “Coordinating Organization”. The coordinating organization is the agency with regulatory responsibility to address hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring, and evaluation. Coordinating organizations may include local, county, or regional agencies that are capable of or responsible for implementing activities and programs.

Plan Goals Addressed

The plan goals addressed by each action item are included as a way to monitor and evaluate how well the mitigation plan is achieving its goals once implementation begins.

Prioritizing Mitigation Action Items

The following tool was used by the Planning Team to rank the various mitigation action items.

Mitigation Action Item Number _____

Instructions: If the answer is yes, check the box.

Does the Action:

- solve the problem?
- address Vulnerability Assessment?
- reduce the exposure or vulnerability to the highest priority hazard?
- address multiple hazards?
- benefits equal or exceed costs?
- implement a goal, policy, or project identified in the General Plan or Capital Improvement Plan?

Can the Action:

- be implemented with existing funds?
- be implemented by existing state or federal grant programs?
- be completed within the 5-year life cycle of the LHMP?
- be implemented with currently available technologies?

Will the Action:

- be accepted by the community?
- be supported by community leaders?
- adversely impact segments of the population or neighborhoods?
- require a change in local ordinances or zoning laws?
- positive or neutral impact on the environment?
- comply with all local, state and federal environmental laws and regulations?

Is there:

- sufficient staffing to undertake the project?
- existing authority to undertake the project?

Now tally the total number of "checks".

Number of checks: _____

Now using the following scale determine the priority level:

- 1-6 = Low priority
- 7-12 = Medium priority
- 13-18 = High priority

Priority: _____ (Low, Medium, High)

Following is Table 3-1: Mitigation Actions Matrix which identifies the existing and future mitigation activities developed by the Planning Team.

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
Multi-Hazard Action Items										
MH #1	Acquire emergency generator for the Town Hall Complex including Community Services	Town of Yucca Valley Grant Resources	2 years	X			X	X	*	H
MH #2	Identify the HMP in the next General Plan Update	Town of Yucca Valley	2 years	X	X	X			*	H
MH #3	Coordinate sheltering for evacuees	American Red Cross, Town of Yucca Valley	1 year	X	X		X	X	*	L
MH #4	General Plan Update Hazards assessment Infrastructure Needs	Town	2 years	X	X	X	X	X	*	H
MH #5	Advisory Radio System	Town of Yucca Valley	5 years or if funding becomes available	X	X		X	X	*	L
MH #6	Reverse 911	Town of Yucca Valley	5 years or sooner if funding becomes available.	X	X	X	X	X	*	L
MH #7	Development Code Update	Community Development/Town	5 years	X	X	X	X		*	H

Mitigation Actions Matrix

Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
		Hall								
MH #8	Tract Map Standards for fuel modification landscape standards	Community Development/Town Hall	5 years	X	X	X	X		*	M
MH #9	Evacuation Plans	Town of Yucca Valley, SBC Fire, SBC Sheriff	2 years	X	X		X	X	*	H
MH #10	Building Material Standards	Town of Yucca Valley	2 years	X	X	X	X		*	M
MH #11	Establish MOU and Mutual Aid Agreement with Marine Corps Base – City of 29 Palms, Copper Mountain College and SB County Public Health.	All Departments within Town Organization	1-2 years	X	X		X	X	*	H
MH #12	PIO procedures updates including contact lists and MOS	Community Services	1 year	X	X		X	X	*	M
MH #13	CERT Program – 72 hour rule	SBC Fire/Town of Yucca Valley	Ongoing	X	X		X	X	*	L
MH #14	Develop Website/Community Services Guide and CATV programming	Community Services	1 year	X	X		X	X	*	L
MH #15	Review all industrial development proposals with a focus on public	Town Community Development	Ongoing	X					*	

Mitigation Actions Matrix

Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	health and safety issues to ensure that the type and intensity of the use is appropriate for the proposed location and compatible with surrounding land uses.	Department								
MH #16	Restrict Higher intensity uses in areas subject to flooding, seismic hazards, airport safety hazards and wildland fires.	Community Development, Planning	Ongoing	X				*		
MH #17	Reconstruction with 4 inch asphalt concrete including 6 inch asphalt concrete dikes, pulverization of existing pavement, grading and related work necessary for the rehabilitation of Church Street from Onaga Trail to Joshua Drive. Capital Improvement Plan	Town of Yucca Valley	1 year	X				*	H	
MH #18	Install traffic signal at SR62/Camino del Cielo intersection and construct raised landscaped median island. Capital Improvement Plan	Town of Yucca Valley and CalTrans	September 2011				X	*	H	
MH #19	Hot mix asphalt repair and seal coat rehabilitation of Onga Trail.	Town of Yucca Valley	2011-2012				X	*	H	

Mitigation Actions Matrix

Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	Capital Improvement Plan									
MH #20	Realign an existing segment of SR62, around Old Town. Limited to SR62 from Camino del Cielo to Palm Ave. Capital Improvement Plan	Town of Yucca Valley and CalTrans	2016					X	*	H
MH #21	Installation of cape seal, hot mix asphalt repairs and replace street striping, markings and legends. Limited to yucca Mesa from SR62 to Buena Vista. Capital Improvement Plan	Town of Yucca Valley	2013-2014	X				X	*	H
MH #22	SR62 widening, raised median islands, sidewalk, street lighting, drainage improvement and curb & gutter. Limited to SR62 from Palm to Airway and Fairway to Camino del. Capital Improvement Plan	Town of Yucca Valley/CalTrans	January 2013	X				X	*	H
MH #23	Construction of medians on the north, south and west legs of the intersection and extended left turn storage lanes on the south and west legs of the intersection. In addition, the signalization will be	Town of Yucca Valley and CalTrans	2010-2011					X	*	H

Mitigation Actions Matrix

Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	upgraded to provide a protected left turn for traffic traveling north from Joshua Lane and turning west on SR62 and a protected left turn lane for traffic traveling south from SR247 and turning east on SR62. Capital Improvement Plan									
MH #24	Synchronization of four (4) traffic signals on SR62 at the intersections of Camino del Cielo, Kickapoo Trail, Deer Trail/Pioneertown Road, Acoma/Mowhawk to mitigate and reduce traffic congestion and delay through improved traffic signal timing, improved traffic flow and reduction on idling time resulting in improved air quality through a reduction in VOC, NOx, PMx, and CO emissions. Capital Improvement Plan	Town of Yucca Valley and CalTrans		X				X	*	H
MH #25	Construct or relocate new police sub- station and/or permanent facilities as replacement for existing sub-standard structure.	Town of Yucca Valley	As funding permits	X				X	*	H

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	Capital Improvement Plan									
MH #26	Construction of new animal shelter per master plan and 3PA actions. Capital Improvement Plan	Town of Yucca Valley and County 3PA	3 years-ongoing	X			X	X	*	H
MH #27	Appoint a liaison with CalTrans to facilitate the establishment of emergency evacuation routes, and to provide for the development of an emergency response plan that assures the timely repair of state highways damaged by earthquakes, flooding or other disasters. Consult with CalTrans, the Federal Highway Administration, FEMA and the US Department of Defense regarding funding assistance for the construction, repair and/or upgrading of bridges, floodway crossings, cut slopes and other structures to minimize the potential isolation of the community and surrounding facilities from ground-based assistance. General Plan	Town Manager and Community Development Department	Ongoing	X					*	H

Mitigation Actions Matrix

Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
MH #28	The Seismic Safety and Flooding and Hydrology Elements of the General Plan shall be regularly reviewed and updated to assure the seismic and flooding hazards are fully addressed in the Emergency Plan. The town shall periodically review and update the Seismic Safety and Flooding and Hydrology Elements of the General Plan with the latest information and data available on the various seismic and flooding threats facing the community. This process shall assure that additional or refined measures are systematically incorporated into these elements to protect lives and property. General Plan	Town Council and Community Development Department	Ongoing						*	H
MH #29	Cooperate and coordinate with San Bernardino County, the Hi-Desert Water District and other agencies and utilities in the preparation of public information materials to assist residents and	Town Manager, Community Development Department, and Community Services	Ongoing						*	H

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	business owners in responding to local disasters. General Plan									
MH #30	Coordinate with and integrate both commercial and private radio operators, including ham radio operators, to establish a Radio Amateur Civil Emergency Service. General Plan	Town RACES	Ongoing		X			X	*	H
MH #31	Thoroughly consider and assess vulnerability to natural and man-made disasters when reviewing proposals for the siting and development of critical and essential public/quasi-public facilities. General Plan	Community Development Department	Ongoing						*	H
MH #32	Take every action to assure the availability of emergency power generators in essential Town facilities, and shall encourage the installation of these backup facilities in other important public and private facilities. General Plan	Town Council	1 year						*	H
MH #33	The Yucca Valley Airport shall be integrated into emergency	Town Council and Community							*	H

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	preparedness planning in the Town of Yucca Valley as an important possible alternative means of access into the community; in the event of a local disaster. General Plan	Development Department								
MH #34	Promote hazard mitigation as a public value in recognition of its importance to the health, safety, and welfare of the population.	Town of Yucca Valley	Ongoing						*	M
MH #35	Conduct interim planning to locate, set up, and manage temporary sites where business and government functions can continue their operations during recovery.	Town of Yucca Valley and San Bernardino County Fire Department	Ongoing	X				X	*	H
MH #36	Compile a directory of out-of-area contractors to help with repairs/reconstruction so that restoration occurs in a timely manner.	Town of Yucca Valley and Community Development Department	Ongoing	X			X	X	*	M
MH #37	Mandate the avoidance of development in designated high hazard areas.	Community Development Department	2 years	X	X		X		*	H
MH #38	Review development regulations	Town of Yucca	2 years	X	X		X		*	M

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	to ensure that adequate zoning regulations are in place to reduce future development in high hazard areas.	Valley								
MH #39	Coordinate and integrate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures.	Town of Yucca Valley	Ongoing	X	X	X		X	*	H
MH #40	Encourage development and enforcement of hazard-resistant building sites and construction codes.	Town of Yucca Valley	2 years	X	X			X	*	M
MH #41	Require that new structures or structures undergoing significant renovation meet code requirements in accordance with the International Building Code.	Town of Yucca Valley	2 years	X	X				*	H
MH #42	-Identify and inspection critical infrastructure -reinforce identified weaknesses -Endure reserve water supply for dunking and firefighting -I.D. risks to transportation corridors	High Desert Water Cal Trans SCE Town of Yucca SBCOFD	5 year	X			X	X	*	H

Mitigation Actions Matrix

Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
MH #43	-Adopt current UBC -Provide Public Education -Seek grant funding for reduction measures	Town of Yucca Valley	Immediate/Continuing						*	H
MH #44	-Use of local radio and print media to spread hazard awareness	Town of Yucca Valley, SBCOFD	Ongoing	X	X		X		*	M
MH #45	-Create use agreement with Copper Mountain College for EOC- primary site	CMC, Town of Yucca Valley, TWP, Public Safety Agencies	EDT by 2011	X			X	X	*	H
MH #46	-Evaluate facility history and utilities affected by major events -Develop Alternate Sites	Town of Yucca Valley Community	Based on Personnel Availability	X			X		*	L-M
MH #47	-Training and preparation of HMP topics	Town of Yucca Valley, SBCOFD, Sheriff	Ongoing	X	X		X		*	M
MH #48	-Natural hazards-all risk -Identify hazard mitigation relative to response history in problematic area -implement measures to reduce	Town of Yucca Valley, SBCOFD	Ongoing	X	X	X	X	X	*	L
MH #49	-Create database of building and infrastructures -Provide for immediate mitigation	Town of Yucca Valley Community Development	Ongoing	X			X	X	*	M

Mitigation Actions Matrix

Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	to reduce simple hazards -Seek budget approval for items of higher costs									
MH #50	-Ensure critical facilities have back up power (Town, EOC, Fire, and LE) -Use CDBG grants to approve	Town of Yucca Valley, SBCOFD, SBSD	Within 2 years	X			X	X	*	M-H
MH #51	-Seek alternate storage: static source of backup power to well site. Fire Department Connections. Above ground distribution systems	Town of Yucca Valley, Water Districts, SBCOFD	5 year	X			X	X	*	H
MH #52	-No immediate properties I.D. -Amend building codes for buildings planned to use bridges for site access	Town of Yucca Valley Community Development		X	X				*	L
MH #53	-Identify primary and alternate facilities for communication operations -Back up or secured power and communication	Town of Yucca Valley, SCE, Verizon, SBCOFD, Sheriff, AREIS/ECS	Ongoing				X	X	*	H
MH #54	-Organize emergency, generated for Town Center Complex background	Town	2 years	X				X	*	H

Mitigation Actions Matrix

Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
MH #55	Update Building Standards	Town of Yucca Valley	2 years	X	X			X	*	M
MH #56	-Development Plan Update	Town of Yucca Valley	2 years	X	X	X	X		*	H
MH #57	-Many of Towns cabinets, bookcases, and shelving are strapped or secured to walls.	Town of Yucca Valley	Ongoing	X				X	*	L
MH #58	-Buildings and Offices are on higher ground.	Town of Yucca Valley	Ongoing	X				X	*	L
MH #59	-California Building Adoption		6mo-1yr	X	X		X		*	H
MH #60	-Develop outreach program for grant funding	Town of Yucca Valley, HDWD, CMC, SBCO Fire	Ongoing		X		X		*	H
MH #61	-Public Info Activities -P.A. Campaign	Town of Yucca Valley	1-2 years		X				*	L
MH #62	-Public Awareness of known hazards	Town of Yucca Valley, HD Hospital District, Health Care	Ongoing	X	X			X	*	M
MH #63	Conduct a study of damaged vital public facilities and utilities and determine if they should be redesigned or relocated to avoid future service disruptions.	Town of Yucca Valley	5 years	X				X	*	L

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
MH #64	Allocate City resources and assistance to mitigation projects when possible.	Town of Yucca Valley	Ongoing		X				*	
MH #65	Determine the economic feasibility of mitigating natural hazards that can provide decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.	Town of Yucca Valley	Ongoing		X				*	M
MH #66	Investigate and apply for the National Weather Service designation of StormReady.	Town of Yucca Valley	2013	X				X	*	M
MH #67	Establish policy to ensure mitigation projects are in place to safeguard critical facilities.	Town of Yucca Valley	2 years	X			X	X	*	H
MH #68	Monitor trees and branches in public areas at risk of breaking or falling in wind and sand storms. Prune or thin trees or branches when they would pose an immediate threat to property, utility lines or other significant structures or critical facilities in the	Town of Yucca Valley, Public Works	Ongoing	X					*	M

Mitigation Actions Matrix

Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	Community.									
MH #69	Review current building codes and standards to determine adequacy for disaster mitigation.	Town of Yucca Valley	Ongoing	X	X	X			*	H
MH #70	Coordinate and integrate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures.	Town of Yucca Valley, Sheriff Dept, SBC Fire	Ongoing	X			X	X	*	H
MH #71	Develop inventories of at-risk buildings and infrastructure and prioritize mitigation projects.	Town of Yucca Valley, Building Safety	Annual	X				X	*	H
MH #72	Encourage development and enforcement of hazard-resistant building sites and construction codes.	Town of Yucca Valley, Building Safety	Every 3 years	X				X	*	H
MH #73	Develop strategies to mitigate risk to City owned transportation and infrastructure facilities.	Town of Yucca Valley Engineering/Public Works	2013/2014	X				X	*	M
MH #74	Integrate the Mitigation Plan into future Capital Improvement Plans and General Plan updates to ensure that development does not encroach on known hazard areas.	Town of Yucca Valley, Community Development	At time of updated CIP and General Plan	X	X	X		X	*	H

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
MH #75	Establish pre-disaster priorities for restoration of the community's infrastructure and vital public facilities following a disaster.	Town of Yucca Valley	With next update	X	X			X	*	H
Earthquake Action Items										
EQ #1	Continuous evaluation of building codes and updates to ensure that new buildings conform to latest standards.	YV Community Development	Ongoing	X					*	H
EQ #2	Ongoing lines of communications shall be established between the Town and the US Geological Survey to assure the provision of earthquake predictions which may impact the Town and surrounding area.	Town Manager, Community Development Department, and USGS	Ongoing						*	M
EQ #3	Periodically contact the California Division of Mines and geology to develop and maintain updated Alquist-Priolo Earthquake Fault Zoning maps and other information on seismic and other geological hazards affecting the community. Consult and cooperate with San	Community Development Department and State and Federal Agencies	Ongoing						*	H

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	Bernardino County, surrounding unincorporated communities and applicable State and Federal agencies, in an on-going program to improve and update the database and other information on regional geologic/seismic conditions. General Plan									
EQ #4	In accordance with State law, development proposals within designated Alquist-Priolo Earthquake Fault Zones shall be accompanied by appropriate geological analysis. General Plan	Community Development Department	Ongoing						*	H
EQ #5	Development in areas identified as being subject to a rockfall or landslide hazard shall be avoided. General Plan	Community Development Department and City engineer	Ongoing						*	H
EQ #6	Limit activities in identified potential and historical landslide areas through regulation and public outreach.	Town of Yucca Valley, Community Development	Next General Update	X				X	*	M
EQ #7	Establish a liaison with the appropriate office of the US	Town of Yucca Valley, Community	Ongoing						*	H

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	Geological Survey and establish a procedure by which the USGS contacts and informs the Town of earthquake predictions which may affect the Town and surrounding areas. General Plan	Development, USGS								
Flood Action Items										
FLD #1	Code Compliance – Proactive mitigation of wash debris to allow free flow of runoff in contained channels.	Town of YV	Ongoing	X					*	M
FLD #2	Capital Improvement Projects in Long Canyon	Community Development	Long-term Capital Project (only done Feasibility at this point)	X		X		X	*	H
FLD #3	Construction of Brchm Park as a component of Towns flood control master plan to prevent downstream/upstream flood potential. Capital Improvement Plan	Town of Yucca Valley	3-5 years	X			X		*	H

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
FLD #4	Construct long canyon basin to control/impede downstream flows. Capital Improvement Plan	Town of Yucca Valley and San Bernardino County and Corp	5 years	X			X	X	*	H
FLD #5	Construct high school channel to prevent flooding damage. Capital Improvement Plan	Town of Yucca Valley	5 years	X				X	*	L
FLD #6	Construct deer trail channel. Capital Improvement Plan	Town of Yucca Valley	5 years						*	M
FLD #7	Construct Kickapoo drain in coordination with flood planning at Blue Skies area. Capital Improvement Plan	Town of Yucca Valley	5 years	X				X	*	H
FLD #8	Feasibility study addressing flood risk management along 1.5 mile segment of Long Canyon Wash to determine flood protection measures and water and habitat quality. Capital Improvement Plan	Town of Yucca Valley and San Bernardino County Flood Control		X					*	H
FLD #9	Understand the National Flood Insurance Program (NFIP) requirements for new construction and substantially improved	Community Development		X				X	*	H

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	buildings.									
FLD #10	Following a disaster, review observed damage with a view toward revising codes to help mitigate damage from future disasters.	Town of Yucca Valley	Ongoing	X			X	X	*	H
FLD #11	Revise the Zoning and Subdivision Ordinance to require the utilization of various pervious surfaces within the floodplain in order to reduce storm water runoff. This should include utilizing the use of various pervious surfaces in parking lots in recreational areas near the floodplain.	Town of Yucca Valley	2012	X				X	*	M
FLD #12	Assure that an updated and effective Master Drainage Plan is implemented for the near and long-term protection of the community and its residents. General Plan	Community Development Department, Hi-Desert Water District, and San Bernardino Transportation/Flood Control Department	Ongoing						*	H

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
FLD #13	Provide for the implementation of drainage controls and improvements that enhance local conditions and are consistent with and complement the Master Drainage Plan. General Plan	Community Development Department	Ongoing						*	H
FLD #14	Proactively pursue the securing of a conditional Letter of Map Amendment (CLOMA) and final map amendment recognizing the re-designation of the 100-year floodplain within the Town boundaries. General Plan	Community Development Department, FEMA, and County Flood Control	Ongoing						*	H
FLD #15	The mandates set forth in the Emergency Preparedness and Health Services Element shall be implemented through the Flooding and Hydrology Element and the Master Drainage Plan. General Plan	Community Development Department, County Flood Control, and CalTrans	Ongoing						*	H
FLD #16	Major drainage facilities, including debris basins and flood control washes and channels, shall be designed to maximize their enhancement as wildlife habitat,	Community Development Department, Community Services Department, and	Ongoing						*	H

Mitigation Actions Matrix

Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	consistent with the functional requirements of these facilities. General Plan	County Flood Control District								
FLD #17	Pursue all credible sources of funding for local and area-wide drainage improvements needed to provide flood control protection, and to achieve related General Plan goals and policies. General Plan	Community Development Department and San Bernardino County Flood Control District	Ongoing						*	H
FLD #18	Identify and pursue funding opportunities to develop and implement local mitigation activities.	Town of Yucca Valley	Ongoing	X					*	H
FLD #19	Promote the wise use of floodplains to reduce flood losses, and protect the natural and cultural resources and functions of floodplains.	Town of Yucca Valley and Community Development Department	Ongoing						*	M
FLD #20	Recommend revisions to requirements for development within the floodplain, where appropriate.	Town of Yucca Valley	2 years	X	X	X	X		*	H
FLD #21	-Identify alternate means of water	Town of Yucca	5-10 years	X			X	X	*	H

Mitigation Actions Matrix										
Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	source -Development of secondary containment and delivery systems	Valley, Water District, SBCOFD								
FLD #22	-Develop better flood warning and notification systems	Public Works, Police Dept	2 years	X	X			X	*	H
FLD #23	-Identify and map flood-prone areas of the city	Public Works, Police Dept	3 years	X	X			X	*	H
FLD #24	-Monitoring spotty flood plan management ordinance	Town of Yucca Valley, Community Development	Annual	X				X	*	H
Wildfire Action Items										
WF #1	Education of the public regarding defensible space for fire safety.	SBC FD/Town of Yucca Valley	Annually – every October	X	X		X	X	*	M
WF #2	Code compliance weed and fire/fuel module abatement proactive outreach.	Town of Yucca Valley	Ongoing	X	X		X		*	M
WF #3	General Code Compliance practices to mitigate the vacant buildings in Town	Town of Yucca Valley	Ongoing	X	X	X	X	X	*	M
WF #4	Coordinate with the appropriate agencies and service providers to assure that emergency preparedness plans include	Town of Yucca Valley, CalFire, and San Bernardino County Fire	Ongoing	X			X	X	*	M

Mitigation Actions Matrix

Action Item Identifier	Action Item	Coordinating Organization	Timeline	Plan Goals Addressed					Funding Source (*=not yet identified)	Ranking future actions (L=Low, M=Med, H=High, n/a=not applicable)
				Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services		
	contingencies for large-scale urban and wildland fires.	Department								
WF #5	-Fire prevention week typically addresses all the same components	SBCOFD	Annually					*	M	
WF #6	-Coordinate w/ SBCO Fire	Town of Yucca Valley	2-5 years	X	X	X	X	*	M	
WF #7	-Coordinate w/ SBC Fire	Town of Yucca Valley	Ongoing	X	X		X	*	H	
WF #8	-Work with SBC Fire, Chamber of Commerce	Town of Yucca Valley	Ongoing	X	X		X	*	M	
WF #9	-Clerks office w/ original documents- 2 hour fire safe room/ May want to create another similar area in CD/PW	Town of Yucca Valley	Completed	X				*	L	

Section 4: Planning Process

Plan Methodology

DMA 2000 emphasizes the importance of participatory planning in the development of Mitigation Plans. This Mitigation Plan was written using the best available information from a wide variety of sources.

Throughout the planning process, the City made a concerted effort to gather information from city and county departments, as well as state and federal agencies, the local business community, and other stakeholders.

<p style="text-align: center;">Disaster Mitigation Act of 2000</p> <p>Requirement §201.6(c) (1) [The plan shall include...:]</p> <p>the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.</p>	<p>The Planning Team solicited information from agencies and people with specific knowledge of natural hazards and past historical events, as well as planning and zoning codes, ordinances, and recent planning decisions. The hazard mitigation strategies contained in this plan were developed through an extensive planning process involving local businesses and residents.</p> <p>The rest of this section describes the mitigation planning process including 1) Planning Team involvement, 2) extended Planning Team support, 3) public and other stakeholder involvement; and 4) integration of existing data and plans.</p>
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Planning Team Involvement

The Executive Summary included a detailed chronological list of planning process tasks. Following is an accounting of specific participation. (Sign in sheets are attached to this section).

Table 4-1: Planning Team Timeline

	July 2010	August	September	October	November	December	January 2011	February	March
Planning Team participated in stakeholder meetings	X	X	X	X	X	X			
Planning Team meeting to review hazards			X						
Planning Team meeting to identify mitigation action items including review of General Plan and Capital Improvement Plan				X					
Consultant prepared the draft plan update			X	X	X				
Planning Team reviewed draft plan					X	X			

	July 2010	August	September	October	November	December	January 2011	February	March
Submit draft plan to San Bernardino County Operational Area					X				
Revise plan based on input from the County					X	X			
Submittal of the Final plan to San Bernardino County Operational Area						X			
County submits Multi-Jurisdictional Hazard Mitigation Plan to Cal EMA and FEMA for approval						X			
Cal EMA and FEMA review and revisions as necessary						X	X	X	
Submit approved plan to Town Council for adoption									X

Table 4-2: Planning Team Level of Participation

	Dani Lassetter, Chair	Jamie Anderson	Jim Schooler	Richard Boswell	Curtis Yakimow	Shane Stuecle	Michael Snow	Jeannie Lindberg	Carolyn Harshman, Consultant
Planning Team participated in 9/29/10 stakeholder meeting – hazard analysis	X	X	X	X	X	X	X	X	X
Planning Team participated in 10/13/10 stakeholder meeting – mitigation action items	X	X	X	X	X	X	X	X	X
Consultant prepared the draft plan update									X
Planning Team reviewed draft plan	X	X	X	X	X	X	X	X	

	Dani Lassetter, Chair	Jamie Anderson	Jim Schooler	Richard Boswell	Curtis Yakimow	Shane Stuecle	Michael Snow	Jeannie Lindberg	Carolyn Harshman, Consultant
Submit draft plan to San Bernardino County Operational Area									X
Revise plan based on input from the County	X	X	X	X	X	X	X	X	X
Submittal of the Final plan to San Bernardino County Operational Area									X
Revise plan as necessary based on FEMA review	X	X	X	X	X	X	X	X	X
Submit approved plan to Town Council for adoption	X								

The Planning Team was responsible for the following tasks:

- ✓ Establish plan development goals
- ✓ Prepare timetable for plan completion
- ✓ Ensure plan meets DMA 2000 requirements, and federal and state guidelines
- ✓ Organize and oversee public involvement
- ✓ Solicit participation of government agencies, businesses, residents, and other stakeholders
- ✓ Gather information (such as existing data and reports)
- ✓ Develop, write, adopt, and maintain plan

The Planning Team, with support from other Town staff and local organizations, identified and profiled hazards; determined hazard rankings; estimated potential exposure or losses; evaluated development trends and specific risks; and developed mitigation goals, objectives, and activities.

During its meetings, the Planning Team gathered and shared information, assessed risks, identified critical facilities, developed mitigation strategies, and provided continuity throughout plan development to ensure the plan addresses jurisdiction-specific hazard vulnerabilities and mitigation strategies. Members communicated regularly by phone and email between group meetings.

The Planning Team will meet annually after the plan is adopted. Members will provide project direction and oversight, assist with plan evaluation, and convene supplementary meetings as-needed.

Outside Agency Involvement

A variety of agencies and individuals provided data and expertise during plan development. The agencies were informed of the availability of the draft mitigation plan. Any comments received have been incorporated into the final document. A list of external reviewers is included at the end of this section. Following is a summary of input gathered from the review process.

Table 4-3: Existing Processes and Programs

Process	Action	Implementation of Plan
Administrative	Departmental or organizational work plans, policies, and procedural changes	<ul style="list-style-type: none"> ✓ Town Manager's Office ✓ Planning Department ✓ Public Works Department ✓ Other departments as appropriate
Administrative	Other plans	<ul style="list-style-type: none"> ✓ Reference plan in Emergency Operations Plan ✓ Address plan findings and incorporate mitigation activities in General Plan
Budgetary	Capital and operational budgets	<ul style="list-style-type: none"> ✓ Include line item mitigation measures in budget as appropriate
Regulatory	Executive orders, ordinances, and other directives	<ul style="list-style-type: none"> ✓ Building Code ✓ Capital Improvement Plan (Require hazard mitigation in design of new construction) ✓ Comprehensive Planning (Institutionalize hazard mitigation in land use and new construction) ✓ National Flood Insurance Program ✓ Storm Water Management Plan ✓ Zoning Ordinance
Funding	Traditional and nontraditional sources	<ul style="list-style-type: none"> ✓ Once plan is approved, seek authority to use bonds, fees, loans, and taxes to finance projects ✓ Seek assistance from federal and state government, foundation, nonprofit, and private sources, such as Hazard Mitigation Grant Program ✓ Research grant opportunities through U.S. Department of Housing and Urban Development, Community Development Block Grant

Process	Action	Implementation of Plan
Partnerships	Creative funding and initiatives	<ul style="list-style-type: none"> ✓ Community volunteers ✓ In-kind resources ✓ Public-private partnerships ✓ State support
Partnerships	Advisory bodies and committees	<ul style="list-style-type: none"> ✓ Disaster Council (city and county) ✓ Emergency Management Ad Hoc Committee ✓ Inter-Agency Coordination Group ✓ Safety Committee

Use of Existing Documents

The Planning Team gathered and reviewed existing data and plans during plan development:

- ✓ Town of Yucca Valley General Plan, (1995)
- ✓ County of San Bernardino Multi-Jurisdictional Mitigation Plan, (2005)
- ✓ HAZUS reports
- ✓ Historic GIS maps and local inventory data
- ✓ Local Flood Insurance Rate Maps
- ✓ Census data
- ✓ FEMA “How To” Mitigation Series (386-1 to 386-9)
- ✓ National Oceanic and Atmospheric Administration statistics

Plan Adoption

Adoption of the plan by the local governing body demonstrates the Town’s commitment to meeting mitigation goals and objectives. Governing body approval legitimizes the plan and authorizes responsible agencies to execute their responsibilities.

The Town Council must adopt the Mitigation Plan before it is reviewed by Cal EMA and approved by FEMA. The resolution of adoption by the Town Council is in Section 4: Planning Process.

Town Council Public Meeting

Town of Yucca Valley conducted one public meeting concerning the update to the Mitigation Plan. The Town Council heard the item on _____.

Invitation Process

The Planning Team identified possible public notice sources. The Mitigation Plan was posted on the Town website. The Town Council meeting agenda was posted at Town Hall on _____. The Town Council meeting agenda packet was posted on the Town’s website. The

local community access cable television channels carried the meeting Town Council meeting announcement.

Results

The Planning Team presentation to the Town Council on _____ began with an overview of the project objectives. The Planning Team Chair presented the staff report on the Plan, including an overview of the Hazard Analysis, Mitigation Goals, and Mitigation Actions.

The staff presentation concluded with a summary of the input received during the public review of the document. The meeting participants were encouraged to present their views and make suggestions on possible mitigation actions. The Planning Team Chair then fielded questions from the Town Council. The meeting lasted approximately _____ minutes and was aired on local community access cable television channels (Channels ___ and _____) for approximately _____ (period of time).

The Council was supportive of the overall goal established by the Planning Team to become a more disaster resistant community. The Council commended the Planning Team representatives for its dedication and efforts to satisfy the DMA 2000 requirements. The Town Council voted _____ (results) for the adoption of the update to the Mitigation Plan.

Attachment 4-1: Town Council Resolution

Attachment 4-2: Planning Team Sign-In Sheets – October 13, 2010

YUCCA VALLEY TWENTYNINE PALMS (Jurisdiction)
 HAZARD MITIGATION (Meeting)
 10/13 (Date)

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Jamie Anderson	YV Town Clerk
TIM SCHOLER	DIRECTOR COMMUNITY SVCS
Richard Bisswell	YV + 29 Police Dept / SB County Sheriff
CHARLES LACLAIRE	CITY OF TWENTYNINE PALMS, COM. DEVELOPMENT
JOSE NIEVES	CITY OF TWENTYNINE PALMS, P/W
Ron Peck	CITY OF 29 PALMS,
Chris Yalowitz	YV
Stam Studdo	TYV
Dave Spentler	Yucca Valley
MICHAEL SWAN	SBCO FIRE

Emergency Planning Consultants

Attachment 4-3: Planning Team Sign-In Sheets – September 29, 2010

Section 5: Plan Maintenance

The Plan Maintenance section of this document details the formal process that will ensure that the Mitigation Plan remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the Plan annually and producing a plan revision every five years. This section describes how the Town will integrate public participation throughout the plan maintenance process.

Convener

The Town Council will adopt the Mitigation Plan and the Human Resources and Risk Manager will take responsibility for plan maintenance and implementation and will serve as the Convener. The Convener will facilitate the Planning Team meetings, and will assign tasks such as updating and presenting the Plan to the members of the Planning Team. Plan implementation and evaluation will be a shared responsibility among all of the Planning Team members.

Planning Team

The Planning Team will be responsible for coordinating implementation of plan action items and undertaking the formal review process. The convener will assign representatives from Town departments, divisions, and agencies, including, but not limited to, the current Planning Team.

In order to make the Planning Team as broad and useful as possible, the Town Manager may choose to involve other relevant organizations and agencies in hazard mitigation. These additional appointments could include:

- ✓ A representative from the American Red Cross
- ✓ A representative from a county government emergency response agency

The Planning Team will meet at least once a year. Meeting dates will be scheduled once the final Planning Team has been established. These meetings will provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the sustainability of the mitigation plan.

Implementation through Existing Programs

Town of Yucca Valley addresses statewide planning goals and legislative requirements through its General Plan, CIP, and City Building and Safety Codes the Mitigation Plan provides a series of recommendations - many of which are closely related to the goals and objectives of existing planning programs. The Town of Yucca Valley will have the opportunity to implement recommended mitigation action items through existing programs and procedures.

The Town of Yucca Valley Planning Department is responsible for adhering to the State of California's Building and Safety Codes. In addition, the Planning Team will work with other agencies at the state level to review, develop and ensure Building and Safety Codes are adequate to mitigate or prevent damage by hazards. This is to ensure that life-safety criteria are met for new construction.

Some of the goals and action items in the Mitigation Plan may be achieved through activities recommended in the CIP. Various city departments develop the CIP and review it on an annual

basis. Upon annual review of the CIP, the Planning Team will work with the city departments to identify areas that the Mitigation Plan action items are consistent with CIP goals and integrate them where appropriate.

Within one year of formal adoption of the Mitigation Plan, the recommendations listed above will be incorporated into the process of existing planning mechanisms at the Town level. The meetings of the Planning Team will provide an opportunity for Planning Team members to report back on the progress made on the integration of mitigation planning elements into Town planning documents and procedures.

Economic Analysis of Mitigation Projects

FEMA's approach to identify the costs and benefits associated with hazard mitigation strategies, measures, or projects fall into two general categories: benefit/cost analysis and cost-effectiveness analysis.

Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later.

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating hazards can provide decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

Given federal funding, the Planning Team will use a FEMA-approved benefit/cost analysis approach to identify and prioritize mitigation action items. For other projects and funding sources, the Planning Team will use other approaches to understand the costs and benefits of each action item and develop a prioritized list.

The Mitigation Actions Matrix includes a Low, Medium, High ranking for each project. See the Mitigation Strategies for a discussion on the ranking process.

Evaluating and Updating the Plan

Formal Review Process

The Mitigation Plan will be evaluated on an annual basis to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation priorities. The evaluation process includes a firm schedule and timeline, and identifies the agencies and organizations participating in plan evaluation. The Convener or designee will be responsible for contacting the Planning Team members and organizing the annual meeting. Planning Team members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the Plan.

The Planning Team will review the goals and action items to determine their relevance to changing situations in the Town, as well as changes in State or Federal policy, and to ensure they are addressing current and expected conditions. The Planning Team will also review Section 3: Risk Assessment portion of the Plan to determine if this information should be updated or modified, given any new available data. The coordinating organizations responsible for the various action items will report on the status of their projects, the success of various

implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised.

The Convener will assign the duty of updating the Plan to one or more of the Planning Team members. The designated Planning Team members will have three months to make appropriate changes to the Plan before submitting it to the Planning Team members. The Planning Team will also notify all holders of the Town plan when changes have been made. Every five years the updated plan will be submitted to the State Hazard Mitigation Officer at the California Emergency Management Agency and the Federal Emergency Management Agency for review. The Town Manager is authorized to approve future updates and amendments to the Mitigation Plan.

Continued Public Involvement

The Town of Yucca Valley is dedicated to involving the public directly in the continual review and updates to the Mitigation Plan. Copies of the plan will be available at the Town of Yucca Valley, _____ office, _____ Library, _____ Library, and _____ Library. Each year, after the Planning Team evaluates the mitigation activities, a notice regarding the location of copies of the plan will be publicized via the Town's website (www.yucca-valley.org). This site will also contain an email address and phone number where people can direct their comments and concerns. A public meeting will also be held after each evaluation or when deemed necessary by the Planning Team. The meetings will provide the public a forum in which they can express their concerns, opinions, or ideas about the Plan.

The Convener will be responsible for using Town resources to publicize the annual public meetings and maintain public involvement through the public access channel, web page, and newspapers.

Section 6: Risk Assessment

What is a Risk Assessment?

Conducting a risk assessment can provide information regarding: the location of hazards; the value of existing land and property in hazard locations; and an analysis of risk to life, property, and the environment that may result from natural hazard events. Specifically, the five levels of a risk assessment are as follows:

1. Hazard Identification
2. Profiling Hazard Events
3. Vulnerability Assessment/Inventory of Existing Assets
4. Risk Analysis
5. Assessing Vulnerability/Analyzing Development Trends

1) Hazard Identification

This section is the description of the geographic extent, potential intensity, and the probability of occurrence of a given hazard. Maps are used in this plan to display hazard identification data. The Town of Yucca Valley identified three major hazards that affect this geographic area. These hazards – earthquake, flood, and wildfire- were identified through an extensive process involving research of existing documents and input from the Planning Team. The geographic extent of each of the identified hazards has been identified by the Town of Yucca Valley utilizing the maps and data contained in the General Plan and Emergency Operations Plan. Utilizing FEMA’s Calculated Priority Risk Index (CPRI) ranking technique, the Planning Team concluded that all of the identified hazards posed a significant threat against the Town. The hazard ranking system is described in Table 6-1: Calculated Priority Risk Index, while the actual ranking is shown in Table 6-2: Calculated Priority Risk Index Ranking.

Table 6-1: Calculated Priority Risk Index
(Source: Federal Emergency Management Agency)

CPRI Category	Degree of Risk Chart			Assigned Weight Factor
	Level ID	Description	Index Value	
Probability	Unlikely	<ul style="list-style-type: none"> • Extremely rare with no documented history of occurrences or events • Annual probability of less than 1 in 1,000 years. 	1	45%
	Possible	<ul style="list-style-type: none"> • Extremely rare with no documented history of occurrences or events. • Annual probability of between 1 in 100 years and 1 in 1,000 years. 	2	
	Likely	<ul style="list-style-type: none"> • Occasional occurrence with at least two or more documented historic events. • Annual probability of between 1 in 10 years and 1 in 100 years. 	3	

	Highly Likely	<ul style="list-style-type: none"> • Frequent events with a well documented history of occurrence. • Annual probability of greater than 1 every year. 	4	
Magnitude / Severity	Negligible	<ul style="list-style-type: none"> • Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). • Injuries or illnesses are treatable with first aid and there are not deaths. • Negligible quality of life lost. • Shut down of critical facilities for less than 24 hours. 	1	30%
	Limited	<ul style="list-style-type: none"> • Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructures) • Injuries and illnesses do not result in permanent disability and there are no deaths. • Moderate quality of life lost. • Shut down of critical facilities for more than 1 day and less than 1 week. 	2	
	Critical	<ul style="list-style-type: none"> • Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructures) • Injuries or illnesses result in permanent disability and at least one death. • Shut down of critical facilities for more than 1 week and less than 1 month. 	3	
	Catastrophic	<ul style="list-style-type: none"> • Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). • Injuries or illnesses result in permanent disability and multiple deaths. • Shut down of critical facilities for more than 1 month. 	4	
	Warning Time	More than 24 hours	• Population will receive greater than 24 hours of warning.	1
12 to 24 hours		• Population will receive between 12-24 hours of warning.	2	
6 to 12 hours		• Population will receive between 6-12 hours of warning.	3	
Less than 6 hours		• Population will receive less than 6 hours of warning.	4	
Duration	Less than 6 hours	• Disaster event will last less than 6 hours.	1	10%
	Less than 24 hours	• Disaster event will last between 6-24 hours.	2	
	Less than one week	• Disaster event will last between 24 hours and 1 week.	3	

	More than one week	<ul style="list-style-type: none"> Disaster event will last more than 1 week. 	4	
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Table 6-2: Calculated Priority Risk Index Ranking for the Town of Yucca Valley

Hazard	Probability	Weighted 45%	Magnitude Severity	Weighted 30%	Warning Time	Weighted 15%	Duration	Weighted 10%	CPRI Ranking
Earthquake - South San Andreas Fault	3	1.35	4	1.2	4	0.6	3	0.3	3.45
Wildland Fire	4	1.8	1	0.3	4	0.6	3	0.3	3
Flood	4	1.8	2	0.6	2	0.3	2	0.2	2.9

2) Profiling Hazard Events

This process describes the causes and characteristics of each hazard and what part of the Town's facilities, infrastructure, and environment may be vulnerable to each specific hazard. A profile of each identified hazard discussed in this plan is provided in the Risk Assessment. Table 6-3 indicates a generalized perspective of the community's vulnerability of the various hazards according to extent (or degree), location, and probability.

Table 6-3: Vulnerability: Location, Extent, and Probability for the Town of Yucca Valley

Hazard	Location (Where)	Extent (How Big an Event)	Probability (Unlikely, Possible, Likely, Highly Likely)
Earthquake	Entire Project Area	The Southern California Earthquake Center (SCEC) in 2007 concluded that there is a 99.7 % probability that an earthquake of M6.7 or greater will hit California within 30 years. ¹	Moderate
Flood	Central low-lying areas from east to west	Urban Flooding from Severe Weather	Moderate
Wildfire	Eastern Portion of the Project Area	Moderate/High/Severe/Extreme FRAP Ratings.	High

¹ Uniform California Earthquake Rupture Forecast

3) Vulnerability Assessment/Inventory of Existing Assets

This is a combination of hazard identification with an inventory of the existing (or planned) property development(s) and population(s) exposed to a hazard. Critical facilities are of particular concern because these locations provide essential equipment or provide services to the general public that are necessary to preserve important public safety, emergency response, and/or disaster recovery functions. The critical facilities have been identified and are illustrated in Table 6-5: Town of Yucca Valley Critical Facilities Vulnerable to Hazards.

4) Risk Analysis

Estimating potential losses involves assessing the damage, injuries, and financial costs likely to be sustained in a geographic area over a given period of time. This level of analysis involves using mathematical models. The two measurable components of risk analysis are magnitude of the harm that may result and the likelihood of the harm occurring. Describing vulnerability in terms of dollar losses provides the community and the state with a common framework in which

to measure the effects of hazards on assets. For each hazard where data was available, quantitative estimates for potential losses have been included in the hazard assessment. Data was not available to make vulnerability determinations in terms of dollar losses for all of the identified hazards. The Mitigation Actions Matrix (Section 3: Mitigation Strategies) includes an action item to conduct such an assessment in the future.

5) Assessing Vulnerability/ Analyzing Development Trends

This step provides a general description of Town’s facilities and contents in relation to the identified hazards so that mitigation options can be considered in land use planning and future land use decisions. This Mitigation Plan provides comprehensive description of the character of the Town of Yucca Valley in Section 2: Community Profile. This description includes the geography and environment, population and demographics, land use and development, housing and community development, employment and industry, and transportation and commuting patterns. Analyzing these components of the Town of Yucca Valley can help in identifying potential problem areas and can serve as a guide for incorporating the goals and ideas contained in this mitigation plan into other community development plans.

Critical and Essential Facilities

Facilities critical to government response activities (i.e., life safety and property and environmental protection) include: local government 9-1-1 dispatch centers, local government emergency operations centers, local police and fire stations, local public works facilities, local communications centers, schools (shelters), and hospitals. Also, facilities that, if damaged, could cause serious secondary impacts are also considered "critical". A hazardous materials facility is one example of this type of critical facility.

Essential facilities are those facilities that are vital to the continued delivery of key Town services or that may significantly impact the Town’s ability to recover from the disaster.

Table 6-4: Town of Yucca Valley Critical Facilities Vulnerable to Hazards illustrates the critical facilities and the vulnerability of those facilities to the identified hazards.

Table 6-4: Town of Yucca Valley Critical Facilities Vulnerable to Hazards

Name of Critical Facility	Earthquake	Flood	Wildfire
Town Hall	X		

San Bernardino County Fire Department Stations	X		
San Bernardino Sheriff's Substation	X		

Summary

Hazard mitigation strategies can reduce the impacts concentrated at large employment and industrial centers, public infrastructure, and critical facilities. Hazard mitigation for industries and employers may include developing relationships with emergency management services and their employees before disaster strikes, and establishing mitigation strategies together. Collaboration among the public and private sector to create mitigation plans and actions can reduce the impacts of hazards.

Section 7: Earthquake Hazards

Why Are Earthquakes a Threat to the Town of Yucca Valley?

The Town of Yucca Valley is located within an area of high seismic activity. The region is also a transitional geological zone that forms the boundary between the Transverse Range, which includes the San Bernardino and Little San Bernardino Mountains, and the Mojave Desert geologic regions. The area is characterized by an east-west trending valley bounded by the Little San Bernardino Mountains on the south and the Sawtooth Mountains on the north.

Landers Earthquake – June 28, 1992

On June 28, 1992, the Town of Yucca Valley and the surrounding area were rocked by the strongest earthquake to occur in California in the past 40 years. The epicenter of the 7.6 magnitude quake, known as the Landers Earthquake, was on the Johnson Valley Fault, north of the Town limits, with associated ground rupture extending about 1.25 miles into the Town limits. This earthquake consisted of two sub-events that occurred about 19 miles apart, and were distributed along a series of generally north-south trending faults, including two previously unknown faults (Burnt Mountain and Eureka Peak Faults).

Hector Mine Earthquake – October 16, 1999

The magnitude 7.1 Hector Mine Earthquake occurred October 16, 1999. The event caused minimal damage because it was located in a remote, sparsely-populated part of the Mojave Desert approximately 47 miles east-southeast of Barstow. Twelve foreshocks magnitude 1.9-3.8, preceded the main shock during the previous 12 hours. The occurrence of the Hector Mine earthquake within seven years and only about 30 km or approximately 19 miles east of the 1992 magnitude 7.6 Landers Earthquake suggests that the closely spaced surface faults in the ECSZ are mechanically related.

Local Conditions

Earthquakes are considered a major threat to the Town of Yucca Valley due to the proximity of several fault zones, notably including the Southern San Andreas Fault. A recent Southern California Earthquake Center (SCEC) report (SCEC, 1995) indicated that the probability of an earthquake of magnitude 7 or larger in southern California before the year 2024 is 80 to 90%. A significant earthquake along one of the major faults could cause substantial casualties, extensive damage to buildings, roads and bridges, fires, and other threats to life and property. The effects could be aggravated by aftershocks and by secondary effects such as fire, landslides and dam failure. A major earthquake could be catastrophic in its effect on the population, and could exceed the response capability of the local communities and even the State.

Impact of Earthquakes in the Town of Yucca Valley

Based on the risk assessment, it is evident that earthquakes will continue to have potentially devastating economic impacts to certain areas of the town. Impacts that are not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life;

- ✓ Commercial and residential structural damage;
- ✓ Disruption of and damage to public infrastructure;
- ✓ Secondary health hazards e.g. mold and mildew;
- ✓ Damage to roads/bridges resulting in loss of mobility;
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community;
- ✓ Negative impact on commercial and residential property values; and
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed

Historic Events in the Region

Refer to Section 6: Risk Assessment of the 2010 San Bernardino County Operational Area Multi-Jurisdictional Hazard Mitigation Plan (separate document).

Regulatory Background

The State regulates development within California to reduce or mitigate potential hazards from earthquakes or other geologic hazards. Development in potentially seismically active areas is also governed by the Alquist-Priolo Earthquake Fault Zoning Act and the Seismic Hazards Mapping Act.

Chapter 16A, Division IV of the California Building Code (CBC), titled “Earthquake Design.” states that “The purpose of the earthquake provisions herein is primarily to safeguard against major structural failures or loss of life.” The CBC and the Uniform Building Code (UBC) regulate the design and construction of excavations, foundations, building frames, retaining walls, and other building elements to mitigate the effects of seismic shaking and adverse soil conditions. The procedures and limitations for the design of structures are based on site characteristics, occupancy type, configuration, structural system, height, and seismic zonation. Seismic zones are mapped areas (Figure 16A-2 of the CBC and Figure 16-2 of the UBC) that are based on proximity to known active faults and the potential for future earthquakes and intensity of seismic shaking. Seismic zones range from 0 to 4, with areas mapped as Zone 4 being potentially subject to the highest accelerations due to seismic shaking and the shortest recurrence intervals.

The 1933 Long Beach Earthquake resulted in the Field Act, affecting school construction. The 1971 Sylmar Earthquake brought another set of increased structural standards. Similar re-evaluations occurred after the 1989 Loma Prieta Earthquake and 1994 Northridge Earthquake. These code changes have resulted in stronger and more earthquake resistant structures.

The purpose of the Alquist-Priolo Earthquake Fault Zoning Act of 1972 (renamed in 1994) is “to regulate development near active faults so as to mitigate the hazard of surface fault rupture.” The State Geologist (chief of the Division of Mines and Geology) is required to delineate Earthquake Fault Zones (formerly known as “Special Studies Zones”) along known active faults. As defined by the California Division of Mines and Geology (DMG), an active fault is one which has had surface displacement within Holocene time (roughly the last 11,000 years) and/or has an instrumental record of seismic activity. Potentially active faults are those which show evidence of surface displacement during Quaternary time (roughly the last 2 million years), but for which evidence of Holocene movement has not been established. The DMG evaluates faults on an individual basis to determine if a fault will be classified as an Alquist-Priolo Earthquake Fault Zone. In general, faults must meet certain DMG criteria, including seismic

activity, historic rupture, and geologic evidence to be zoned as an Earthquake Fault Zone. Cities and counties affected by the zones must regulate certain development within the zones. They must withhold development permits for sites within the zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting. Typically, structures for human occupancy are not allowed within 50 feet of the trace of an active fault.

The Seismic Hazard Mapping Act was adopted in 1990 for the purpose of protecting public safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure caused by earthquakes. The Seismic Hazard Mapping Act requires that the State Geologist delineate the various seismic hazard zones. Cities, counties, or other permitting authorities are required to regulate certain development projects within the zones. They must withhold development permits for a site within a zone until the geologic conditions are investigated and appropriate mitigation measures, if any, are incorporated into the development plans. In addition, sellers (and their agents) of real property within a mapped hazard zone must disclose that the property lies within such a zone at the time of sale.

When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter.

Earthquake Characteristics

Measuring and Describing Earthquakes

An earthquake is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of the Earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. They usually occur without warning and, after just a few seconds, can cause massive damage and extensive casualties. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure. Ground motion is the vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter. Soft soils can further amplify ground motions. The severity of these effects is dependent on the amount of energy released from the fault or

epicenter. One way to express an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. The acceleration due to gravity is often called "g". A ground motion with a peak ground acceleration of 100%g is very severe. Peak Ground Acceleration (PGA) is a measure of the strength of ground motion. PGA is used to project the risk of damage from future earthquakes by showing earthquake ground motions that have a specified probability (10%, 5%, or 2%) of being exceeded in 50 years. These ground motion values are used for reference in construction design for earthquake resistance. The ground motion values can also be used to assess relative hazard between sites, when making economic and safety decisions.

Another tool used to describe earthquake intensity is the Magnitude Scale. The Magnitude Scale is sometimes referred to as the Richter Scale. The two are similar but not exactly the same. The Magnitude Scale was devised as a means of rating earthquake strength and is an indirect measure of seismic energy released. The Scale is logarithmic with each one-point increase corresponding to a 10-fold increase in the amplitude of the seismic shock waves generated by the earthquake. In terms of actual energy released, however, each one-point

increase on the Richter scale corresponds to about a 32-fold increase in energy released. Therefore, a Magnitude 7 (M7) earthquake is 100 times (10 X 10) more powerful than a M5 earthquake and releases 1,024 times (32 X 32) the energy.

An earthquake generates different types of seismic shock waves that travel outward from the focus or point of rupture on a fault. Seismic waves that travel through the earth's crust are called body waves and are divided into primary (P) and secondary (S) waves. Because P waves move faster (1.7 times) than S waves, they arrive at the seismograph first. By measuring the time delay between arrival of the P and S waves and knowing the distance to the epicenter, seismologists can compute the magnitude for the earthquake.

The Modified Mercalli Scale (MMI) is another means for rating earthquakes, but one that attempts to quantify intensity of ground shaking. Intensity under this scale is a function of distance from the epicenter (the closer to the epicenter the greater the intensity), ground acceleration, duration of ground shaking, and degree of structural damage. This rates the level of severity of an earthquake by the amount of damage and perceived shaking (Table 7-1: Modified Mercalli Intensity Scale).

Table 7-1: Modified Mercalli Intensity Scale

MMI Value	Description of Shaking Severity	Summary Damage Description Used on 1995 Maps	Full Description
I			Not Felt
II			Felt by persons at rest, on upper floors, or favorably placed.
III			Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
IV			Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motorcars rock. Windows, dishes, doors rattle. In the upper range of IV, wooden walls and frame creak.
V	Light	Pictures Move	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clock stop, start, change rate.
VI	Moderate	Objects Fall	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked.
VII	Strong	Nonstructural Damage	Difficult to stand. Noticed by drivers of motorcars. Hanging objects quiver. Furniture broken. Damage to masonry, including cracks. Weak chimneys broken at roofline. Fall of plaster, loose bricks, stones, tiles, cornices. Some cracks in masonry C. Small slides and caving in along sand or gravel

Table 7-1: Modified Mercalli Intensity Scale

MMI Value	Description of Shaking Severity	Summary Damage Description Used on 1995 Maps	Full Description
			banks. Concrete irrigation ditches damaged.
VIII	Very Strong	Moderate Damage	Steering of motorcars affected. Damage to masonry C, partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, and elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Cracks in wet ground and on steep slopes.
IX	Very Violent	Extreme Damage	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land.
X			Rails bent greatly. Underground pipelines completely out of services.
XII			Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into air.

Severity

A major earthquake occurring in or near Town of Yucca Valley could cause many deaths and injuries, extensive property damage, fires, hazardous material spills, and other dangers. Aftershocks and the secondary effects of fire, hazardous material/chemical accidents, and possible failure of dams and waterways could aggravate the situation.

The time of day and season of the year would have a profound impact on the number of dead and injured and the amount of property damage. Such an earthquake could exceed the response capabilities of the individual cities, San Bernardino County Operational Area, and the State of California Emergency Management Agency. Support of damage control and disaster relief could be required from other local governments and private organizations, as well as the state and federal governments.

Extensive search and rescue operations could be required to assist trapped persons. Mass evacuation could be essential to save lives, particularly in areas downwind from hazardous material releases. Emergency medical care, food, and temporary shelter could be required by injured or displaced persons.

Many families could be separated, particularly if the earthquake occurs during working hours. A personal inquiry or locator system could be essential to maintain morale. Emergency

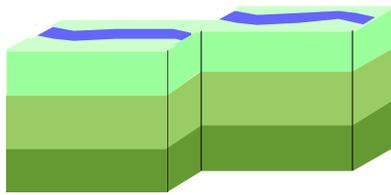
operations could be seriously hampered by a loss of communications, damage to transportation routes, and/or disruption of public utilities and services.

The economic impact on the City could be considerable in terms of lost employment and lost tax base. A major earthquake could disrupt, damage, or destroy computer facilities, which could curtail the operations of banks, insurance companies, and other elements of the financial community for several days or weeks. This could affect the ability of local government, business, and residents to make payments and purchases. (Source: California Division of Mines and Geology, Special Publication 60, *Earthquake Planning Scenario for a Magnitude 8.3 Earthquake on the San Andreas Fault in Southern California*, 1982)

Causes of Earthquakes in the Region

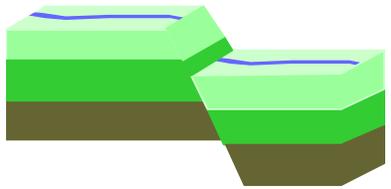
Earthquake Faults

A fault is a fracture along between blocks of the earth's crust where either side moves relative to the other along a parallel plane to the fracture.



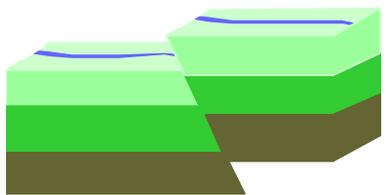
Strike-slip Faults

Strike-slip faults are vertical or almost vertical rifts where the earth's plates move mostly horizontally. From the observer's perspective, if the opposite block looking across the fault moves to the right, the slip style is called a right lateral fault; if the block moves left, the shift is called a left lateral fault.



Dip-slip Faults

Dip-slip faults are slanted fractures where the blocks mostly shift vertically. If the earth above an inclined fault moves down, the fault is called a normal fault, but when the rock above the fault moves up, the fault is called a reverse fault.

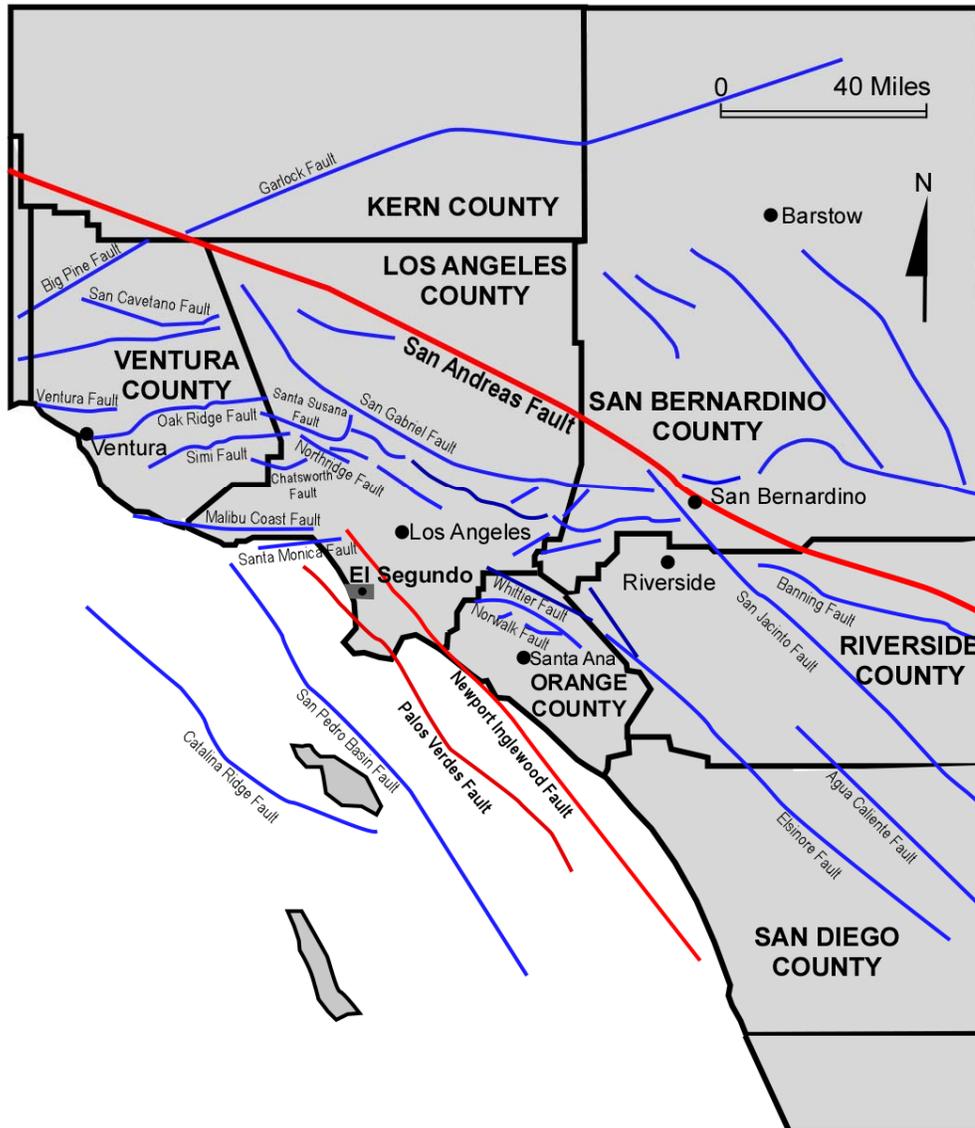


Thrust Faults

Thrust faults have a reverse fault with a dip of 45 ° or less.

Map 7-1: Regional Fault Location Map

Southern California Earthquake Fault Map



Earthquake Related Hazards

Ground shaking, landslides, liquefaction, and amplification are the specific hazards associated with earthquakes. The severity of these hazards depends on several factors, including soil and slope conditions, proximity to the fault, earthquake magnitude, and the type of earthquake.

Ground Shaking

Ground shaking is the motion felt on the earth's surface caused by seismic waves generated by the earthquake. It is the primary cause of earthquake damage. The strength of ground shaking depends on the magnitude of the earthquake, the type of fault, and distance from the epicenter (where the earthquake originates). Buildings on poorly consolidated and thick soils will typically see more damage than buildings on consolidated soils and bedrock.

Seismic activity along nearby or more distant fault zones are likely to cause ground shaking within the City limits. Based on a Probabilistic Seismic Hazard Assessment for the Western United States, issued by the United States Geological Survey (1999), the horizontal peak ground acceleration having a 10 percent probability of being exceeded in 50 years ranges from approximately (0.35g to 0.56g within the City limits).

Soil liquefaction is a seismically induced form of ground failure, which has been a major cause of earthquake damage in southern California.

Fault Rupture

The potential for ground rupture due to fault movement is related to the seismic activity of known fault zones. Recognized active fault zones are generally located outside the Town of Yucca Valley. Faults such as the El Modeno Fault or the Peralta Hills Fault could conceivably cause ground rupture within the City. Compared with the more active recognized fault zones, the potential for ground rupture due to seismic activity in the City is considered low.

Earthquake-Induced Landslides

Earthquake-induced landslides are secondary earthquake hazards that occur from ground shaking. They can destroy the roads, buildings, utilities, and other critical facilities necessary to respond and recover from an earthquake. Many communities in Southern California have a high likelihood of encountering such risks, especially in areas with steep slopes.

Liquefaction

Liquefaction occurs when ground shaking causes wet granular soils to change from a solid state to a liquid state. This results in the loss of soil strength and the soil's ability to support weight. Buildings and their occupants are at risk when the ground can no longer support these structures. Liquefaction generally occurs during significant earthquake activity, and structures located on soils such as silt or sand may experience significant damage during an earthquake due to the instability of structural foundations and the moving earth. Many communities in Southern California are built on ancient river bottoms and have sandy soil. In some cases this ground may be subject to liquefaction, depending on the depth of the water table.

Soil liquefaction is a seismically-induced form of ground failure, which has been a major cause of earthquake damage in southern California. During the 1971 San Fernando and 1994 Northridge earthquakes, significant damage to roads, utility pipelines, buildings, and other structures in the San Bernardino area were caused by liquefaction. Research and historical data indicate that loose, granular materials situated at depths of less than 50 feet with fines (silt and clay) contents of less than 30 percent, which are saturated by a relatively shallow groundwater table are most susceptible to liquefaction. These geological and groundwater conditions exist in parts of southern California and Town of Yucca Valley, typically in valley regions and alluviated floodplains.

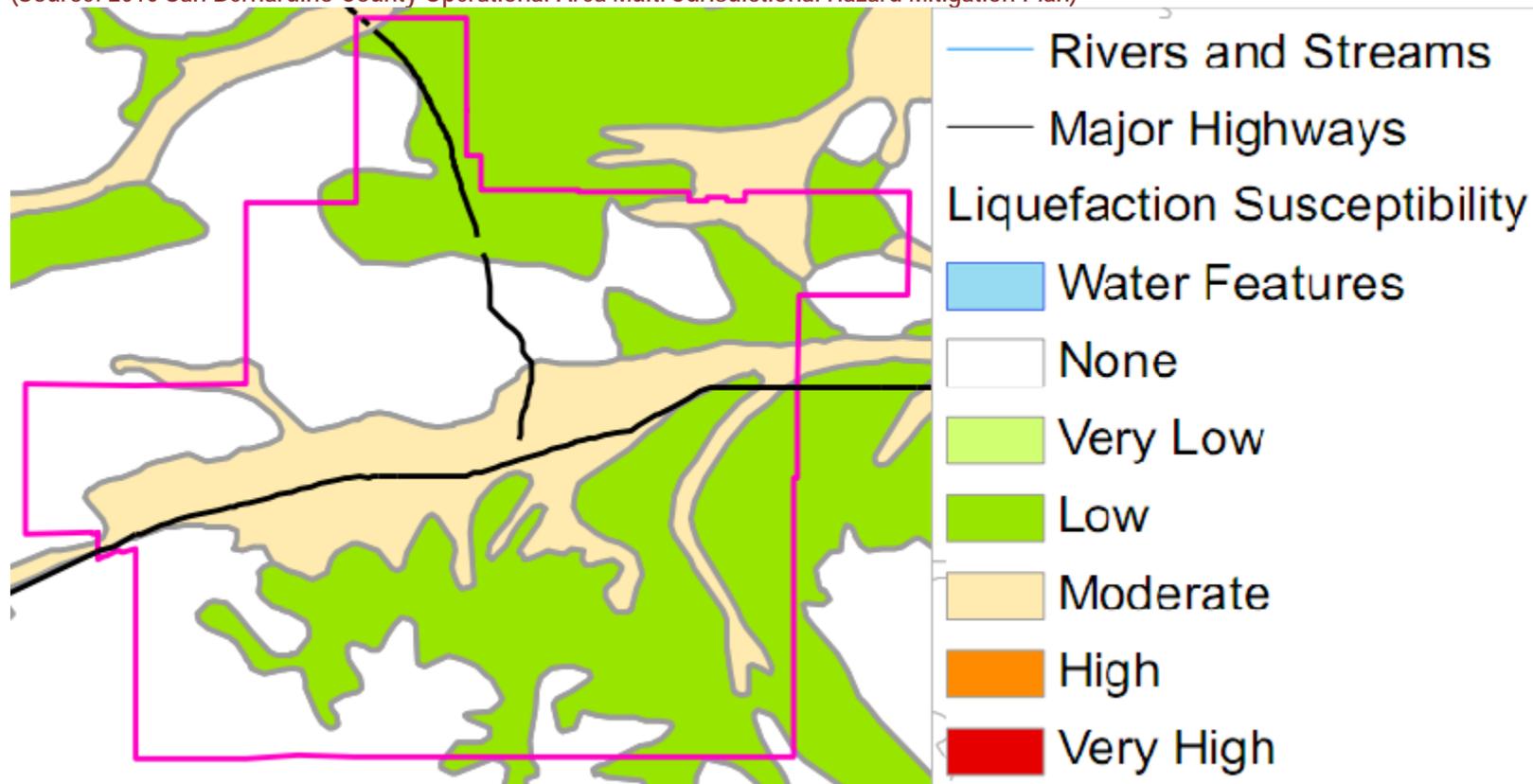
For liquefaction to occur, three general conditions must be met. The first condition – strong ground shaking of relatively long duration – can be expected to occur in the Town of Yucca Valley area as a result of an earthquake on any of the several active faults in the region. The second condition – loose, or unconsolidated, recently deposited sediments consisting primarily of silt and sand – occurs in a large portion of the valley floors, and in the larger canyon bottoms prevalent throughout San Bernardino County. The third condition is water saturated sediments within about 50 feet of the surface.

The California Geological Survey has identified areas most vulnerable to liquefaction. Liquefaction occurs when ground shaking causes wet granular soils to change from a solid state to a liquid state. This results in the loss of soil strength and the soil's ability to support weight. Buildings and their occupants are at risk when the ground can no longer support these buildings and structures. Map 7-6: Liquefaction and Earthquake Landslide-Induced Areas in the Town of Yucca Valley identified areas in the vicinity that are subject to liquefaction and landslides associated with earthquake activities.

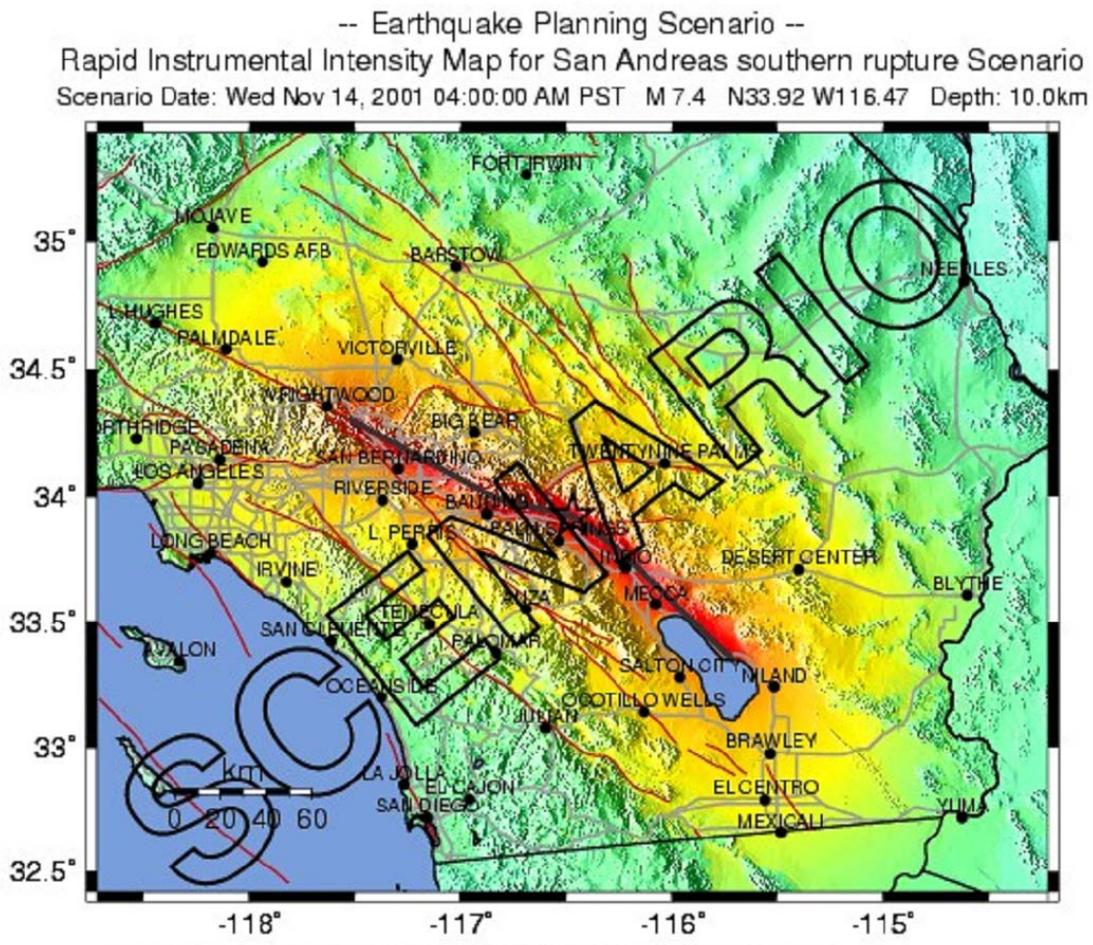
Amplification

Soils and soft sedimentary rocks near the earth's surface can modify ground shaking caused by earthquakes. One of these modifications is amplification. Amplification increases the magnitude of the seismic waves generated by the earthquake. The amount of amplification is influenced by the thickness of geologic materials and their physical properties. Buildings and structures built on soft and unconsolidated soils can face greater risk. Amplification can also occur in areas with deep sediment filled basins and on ridge tops.

Map 7-2: Liquefaction and Earthquake Landslide-Induced Areas
(Source: 2010 San Bernardino County Operational Area Multi-Jurisdictional Hazard Mitigation Plan)



Map 7-3: Seismic Shaking Intensities for the Southern San Andreas Fault
 (Source: State of California Department of Conservation, <http://www.consrv.ca.gov/cgs/rghm/loss/index.htm>)



PLANNING SCENARIO ONLY -- Processed: Mon Jan 12, 2004 10:55:42 AM PST

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

S15 San Andreas Fault - Southern Scenario M 7.4

Section 8: Flood Hazards

Why are Floods a Threat to the Town of Yucca Valley?

The Town of Yucca Valley and the Morongo Basin have a subtropical, high desert climate. Mean annual rainfall is very low, averaging less than 10 inches. Most of the rainfall occurs during the cooler months of November through March, but occasional high-intensity thunderstorms and tropical storms occur in late summer and early fall. Although the ground may be generally dry at the beginning of a storm, sufficient amounts and intensities of rainfall can saturate the sandy surface, thereby eliminating percolation and increasing runoff. Development also increases runoff by creating large areas of impervious surfaces. Increased runoff upstream can be a significant contributor to damage downstream.

Local Conditions

The size and frequency of a flood in a particular area, depends on a complex combination of conditions, including the amount, intensity, and distribution of rainfall previous moisture condition and drainage patterns.

The magnitude of a flood is measured in terms of its peak discharge, which is the maximum volume of water passing a point along a channel in a given amount of time, usually expressed in cubic feet per second (cfs). Floods are usually referred to in terms of their chance of occurrence. For example, a 100-year flood has a 1% chance of occurring in any given year.

The Federal Emergency Management Agency (FEMA) establishes base flood heights and inundation areas for 100-year and 500-year flood zones. The 100-year flood zone is defined as the area that could be inundated by the flood which has a one percent probability of occurring in any given year. The 500-year flood is defined as the flood which has a 0.2 percent probability of occurring in any given year.

The City participates in the National Flood Insurance Program (NFIP). Created by Congress in 1968, the NFIP makes flood insurance available in communities that enact minimum floodplain management rules consistent with the Code of Federal Regulations §60.3.

Local Mapping

FEMA flood maps are not entirely accurate. These studies and maps represent flood risk at the point in time when FEMA completed the studies, and does not incorporate planning for floodplain changes in the future due to new development. Although FEMA is considering changing that policy, it is optional for local communities. The FEMA FIRM maps for the District were last updated 8/28/2008.

Repetitive Loss Properties

According to FEMA records there are no repetitive loss properties located within the boundaries of the district.

Impact of Flooding in the Town of Yucca Valley

Floods and their impacts vary by location and severity of any given flood event, and likely only affect certain areas of the county during specific times. Based on the risk assessment, it is evident that floods will continue to have devastating economic impact to certain areas of the town.

Impact that is not quantified, but anticipated in future events includes:

- ✓ Injury and loss of life;
- ✓ Commercial and residential structural damage;
- ✓ Disruption of and damage to public infrastructure;
- ✓ Secondary health hazards e.g. mold and mildew
- ✓ Damage to roads/bridges resulting in loss of mobility
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values and
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.

Historic Flooding in the Region

Refer to Section 6: Risk Assessment of the 2010 San Bernardino County Operational Area Multi-Jurisdictional Hazard Mitigation Plan (separate document).

Flood Risk Factors

El Niño

El Niño is a disruption of the ocean-atmosphere system in the tropical Pacific having important consequences. Among these consequences is increased rainfall across the southern tier of the US and in Peru, which has caused destructive flooding, and drought in the West Pacific, sometimes associated with devastating brush fires in Australia. Observations of conditions in the tropical Pacific are considered essential for the prediction of short term (a few months to 1 year) climate variations.

El Niño (Spanish name for the male child), initially referred to a weak, warm current appearing annually around Christmas time along the coast of Ecuador and Peru, and lasting only a few weeks, to a month or more. Every three to seven years, an El Niño event can last for many months, having significant economic and atmospheric consequences worldwide. During the past forty years, ten of these major El Niño events have been recorded, the worst of which occurred in 1997-1998. Previous to this, the El Niño event in 1982-1983 was the strongest. Some of the El Niño events have persisted more than one year.

Table 8-1: El Niño Storm Event Years

El Niño Years			
1902-1903	1925-1926	1953-1954	1982-1983
1905-1906	1930-1931	1957-1958	1986-1987

1911-1912	1932-1933	1965-1966	1991-1992
1914-1915	1939-1940	1969-1970	1997-1998
1918-1919	1941-1942	1972-1973	
1923-1924	1951-1952	1976-1977	

Severity

Floods threaten life and property. People and animals can drown; structures and their contents destroyed; roads, bridges, and railroad tracks can be washed out; and crops ruined. Floods can create health hazards due to the discharge of raw sewage from damaged septic tank leach fields, sewer lines, and sewage treatment plants; or due to hazardous materials carried off by raging waters. Vital public services are disrupted.

Geography and Geology

The region is the product of rainstorms and erosion occurring over millennia. Most of the mountains surrounding the valleys and coastal plain are deeply fractured faults. As the mountains grew taller, their brittle slopes eroded. Rivers and streams carried boulders, rocks, gravel, sand, and silt down these slopes to the valleys and coastal plain. Today, much of the coastal plain rests on the ancient rock debris and sediment washed down from the mountains.

This sediment can act like a sponge, absorbing vast quantities of rain in years when heavy rains follow a dry period. Like a sponge near saturation, the same soil fills up rapidly when heavy rain follows a period of relatively wet weather. Even so, in some years of heavy rain, flooding is minimal because the ground is relatively dry, yet the same amount of rain following a wet period causes extensive flooding.

Flood Terminology

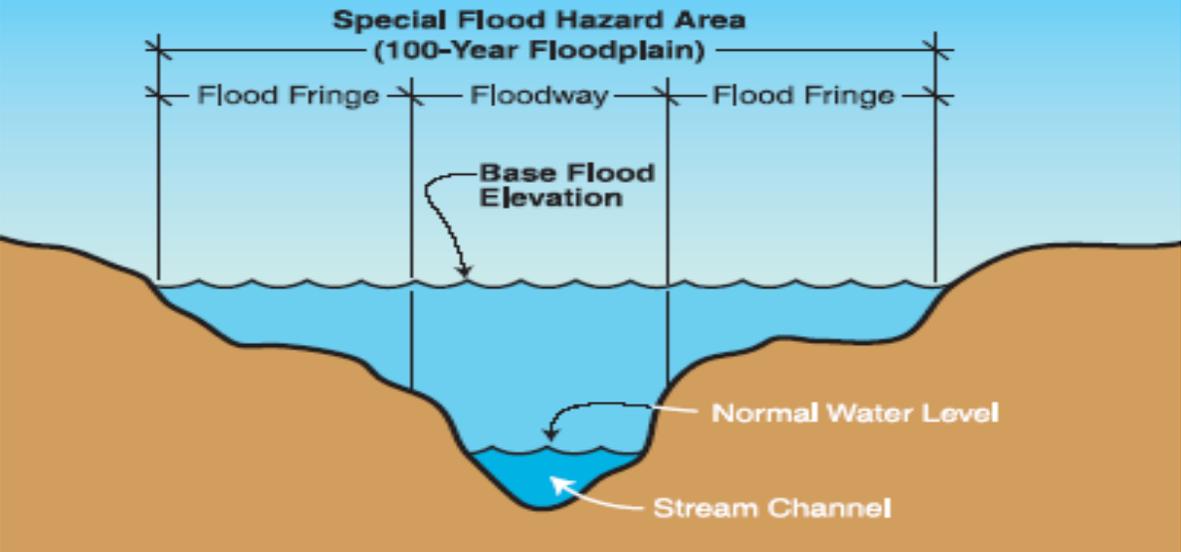
Floodplain

A floodplain is a land area adjacent to a river, stream, lake, estuary, or other water body that is subject to flooding. This area, if left undisturbed, acts to store excess flood water. The floodplain is made up of two sections: the floodway and the flood fringe.

100-Year Flood

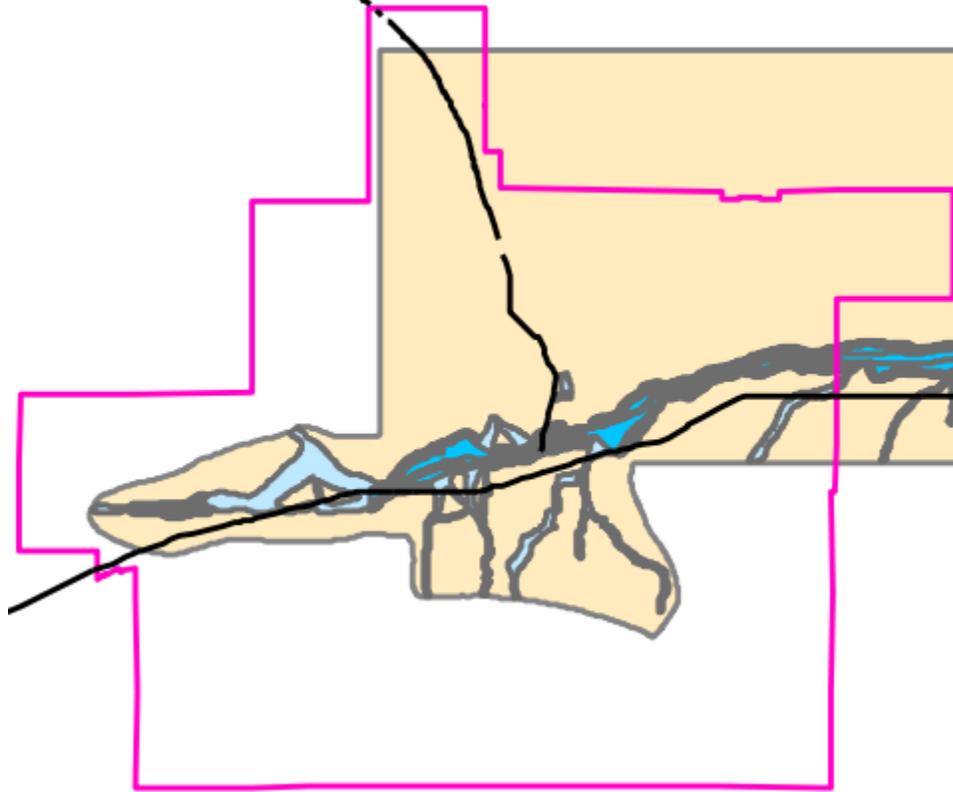
The 100-year flooding event is the flood having a one percent chance of being equaled or exceeded in magnitude in any given year. Contrary to popular belief, it is not a flood occurring once every 100 years. The 100-year floodplain is the area adjoining a river, stream, or watercourse covered by water in the event of a 100-year flood. Schematic 8-1: Floodplain and Floodway shows the relationship of the floodplain and the floodway.

Schematic 8-1: Floodplain and Floodway
 (Source: FEMA How-To-Guide Assessing Hazards)



Map 8-1: Flood Hazard Areas

(Source: 2010 San Bernardino County Operational Area Multi-Jurisdictional Hazard Mitigation Plan)



— Rivers and Streams

— Major Highways

Special Flood Hazard Areas

Subject to Inundation by the 1% Annual Chance Flood

Zone A (No Base Flood Elevations Determined)

Zone AE (Base Flood Elevations Determined)

Zone AH (Flood Depths of 1 to 3 feet, usually areas of ponding; Base Flood Elevations Determined)

Zone AO (Flood Depths of 1 to 3 feet, usually sheet flow on sloping terrain; Average depths determined)

Other Flood Areas

Zone X (Shaded) - 0.2% Annual chance (500yr) Flood

Zone X Protected by Levee - areas protected from the 1% annual chance flood

Other Areas

Zone D - areas in which flood hazards are undetermined, but possible

Zone X (unshaded) - areas determined to be outside the 0.2% annual chance (500-year) floodplain

Floodway

The floodway is one of two main sections that make up the floodplain. Floodways are defined for regulatory purposes. Unlike floodplains, floodways do not reflect a recognizable geologic feature. For NFIP purposes, floodways are defined as the channel of a river or stream, and the overbank areas adjacent to the channel. The floodway carries the bulk of the flood water downstream and is usually the area where water velocities and forces are the greatest. NFIP regulations require that the floodway be kept open and free from development or other structures that would obstruct or divert flood flows onto other properties.

The Town of Yucca Valley regulations prohibit all development in the floodway. The NFIP floodway definition is "the channel of a river or other watercourse and adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot. Floodways are not mapped for all rivers and streams but are generally mapped in developed areas.

Base Flood Elevation (BFE)

The term "Base Flood Elevation" refers to the elevation (normally measured in feet above sea level) that the base flood is expected to reach. Base flood elevations can be set at levels other than the 100-year flood. Some communities use higher frequency flood events as their base flood elevation for certain activities, while using lower frequency events for others. For example, for the purpose of storm water management, a 25-year flood event might serve as the base flood elevation; while the 500-year flood event serves as base flood elevation for the tie down of mobile homes. The regulations of the NFIP focus on development in the 100-year floodplain.

Types of Flooding

Urban Flooding

As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Urbanization of a watershed changes the hydrologic systems of the basin. Heavy rainfall collects and flows faster on impervious concrete and asphalt surfaces. The water moves from the clouds, to the ground, and into streams at a much faster rate in urban areas. Adding these elements to the hydrological systems can result in flood waters that rise very rapidly and peak with violent force.

The Town of Yucca Valley has a high concentration of impermeable surfaces that either collect water, or concentrate the flow of water in unnatural channels. During periods of urban flooding, streets can become swift moving rivers and basements can fill with water.

Riverine Flooding

Riverine flooding is the overbank flooding of rivers and streams. The natural processes of riverine flooding add sediment and nutrients to fertile floodplain areas. Flooding in large river systems typically results from large-scale weather systems that generate prolonged rainfall over a wide geographic area, causing flooding in hundreds of smaller streams, which then drain into the major rivers.

Shallow area flooding is a special type of riverine flooding. FEMA defines shallow flood hazards as areas that are inundated by the 100-year flood with flood depths of only one to three feet. These areas are generally flooded by low velocity sheet flows of water.

What is the Effect of Development on Floods?

When structures or fill are placed in the floodway or floodplain, water is displaced. Development raises the river levels by forcing the river to compensate for the flow space obstructed by the inserted structures and/or fill. When structures or materials are added to the floodway or floodplain and no fill is removed to compensate, serious problems can arise. Flood waters may be forced away from historic floodplain areas. As a result, other existing floodplain areas may experience flood waters that rise above historic levels. Displacement of only a few inches of water can mean the difference between no structural damage occurring in a given flood event, and the inundation of many homes, businesses, and other facilities. Careful attention should be given to development that occurs within the floodway to ensure that structures are prepared to withstand base flood events. In highly urbanized areas, increased paving can lead to an increase in volume and velocity of runoff after a rainfall event, exacerbating the potential flood hazards. Care should be taken in the development and implementation of storm water management systems to ensure that these runoff waters are dealt with effectively.

How are Flood-Prone Areas Identified?

Flood maps and Flood Insurance Studies (FIS) are often used to identify flood-prone areas. The NFIP was established in 1968 as a means of providing low-cost flood insurance to the nation's flood-prone communities. The NFIP also reduces flood losses through regulations that focus on building codes and sound floodplain management. NFIP regulations (44 Code of Federal Regulations Chapter 1, Section 60, 3) require that all new construction in floodplains must be elevated at or above base flood level.

FIRM and FIS Floodplain maps are the basis for implementing floodplain regulations and for delineating flood insurance purchase requirements. A FIRM is the official map produced by FEMA which delineates Special Flood Hazard Area (SFHA) in communities where NFIP regulations apply. FIRMs are also used by insurance agents and mortgage lenders to determine if flood insurance is required and what insurance rates should apply.

Water surface elevations are combined with topographic data to develop FIRMs. FIRMs illustrate areas that would be inundated during a 100-year flood, floodway areas, and elevations marking the 100-year-flood level. In some cases, they also include BFEs and areas located within the 500-year floodplain.

Flood Insurance Studies and FIRMs produced for the NFIP provide assessments of the probability of flooding at a given location. FEMA conducted many Flood Insurance Studies in the late 1970s and early 1980s. These studies and maps represent flood risk at the point in time when FEMA completed the studies. However, it is important to note that not all 100-year or 500-year floodplains have been mapped by FEMA.

Section 9: Wildland Fire Hazards

Why are Wildfires a Threat to the Town of Yucca Valley?

As devastating as it may appear, fire is a natural process, and Joshua Tree National Park and the surrounding area has endured centuries of lightning caused and human-caused fires. Although, fire in the deserts have been less common than in forests because shrubs and trees are widely spaced in deserts and grasses are not as abundant as in wetter areas.

The number and intensity of lightning fires has increased over the past 50 years. Prior to 1965 most lightning fires burned less than one-quarter (1/4) acre. After 1965 more large fires and more frequent fires have been recorded. In 1979 the Quail Mountain fire burned 6,000 acres; in 1995 the Covington fire burned 5,158 acres. In 1999 the largest fire in Joshua Tree National Park history, Juniper Complex fire, adjacent to the Town of Yucca Valley, burned 13,894 acres. Joshua Tree National Park maintains fire records dating back to 1945. Most of these fires occurred between May 18 and September 20 when desert vegetation was very dry. Seventy-four percent (74%) of the fires were ignited by lightning; the remaining twenty-six percent (26%) were human caused. Most recent fires with the greatest potential for impact on the Town of Yucca Valley were the Juniper Complex Fire, May, 1999 (13,893 acres, lightning caused) and the Millard/Sawtooth Complex Fire, July, 2006 (69,000 ± acres, lightning caused).

Fires can occur in urban environments and can also impact unpopulated areas that may contain brush or grasslands. The central and western portions of Town of Yucca Valley are highly urbanized and relatively built out. As a result, the Town must continue to address the growing need to defend both persons and property from urban and wildland fires.

In urban areas, the effectiveness of fire protection efforts is based upon several factors, including the age of structures, efficiency of circulation routes that ultimately affect response times and availability of water resources to combat fires. In wildland areas, taking the proper precautions, such as the use of fire resistant building materials, a pro-active Fire Prevention inspection program, and the development of defensible space around structures where combustible vegetation is controlled, can protect developed lands from fires and, therefore, reduce the potential loss of life and property.

Other factors contribute to the severity of fires including weather and winds. Specifically, winds commonly referred to as Santa Ana winds, which occur during fire season (typically from June to the first significant rain in November) are particularly significant. Such “fire weather” is characterized by several days of hot dry weather and high winds, resulting in low fuel moisture in vegetation.

California experiences large, destructive wildland fires almost every year, and San Bernardino County is no exception. Wildland fires have occurred within the county, particularly in the fall of the year, ranging from small, localized fires to disastrous fires covering thousands of acres. The most severe fire protection problem in the area is wildland fire during Santa Ana wind conditions.

A wildfire is an uncontrolled fire spreading through vegetative fuels and exposing or possibly consuming structures. They often begin unnoticed and spread quickly. Naturally occurring and non-native species of grasses, brush, and trees fuel wildfires. A Wildland Fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines

and similar facilities. A Wildland/Urban Interface Fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels. Development in Yucca Valley is located along canyon ridges at the wildland/urban interface. Areas that have experienced prolonged droughts or are excessively dry are at risk of wildfires.

People start more than 80% of wildfires, usually as debris burns, arson, or carelessness. Lightning strikes are the next leading cause of wildfires. Wildfire behavior is based on three primary factors: fuel, topography, and weather. The type, and amount of fuel, as well as its burning qualities and level of moisture affect wildfire potential and behavior. The continuity of fuels, expressed in both horizontal and vertical components is also a determinant of wildfire potential and behavior. Topography is important because it affects the movement of air (and thus the fire) over the ground surface. The slope and shape of terrain can change the speed at which the fire travels, and the ability of firefighters to reach and extinguish the fire. Weather affects the probability of wildfire and has a significant effect on its behavior. Temperature, humidity and wind (both short and long term) affect the severity and duration of wildfires. Yucca Valley's topography, consisting of a semi-arid coastal plain and rolling highlands, when fueled by shrub overgrowth, occasional Santa Ana winds and high temperatures, creates an ever-present threat of wildland fire. Extreme weather conditions such as high temperature, low humidity, and/or winds of extraordinary force may cause an ordinary fire to expand into one of massive proportions.

Local Conditions

Fire hazards threaten lives, property, and natural resources, and impact vegetation and wildlife habitats.

Weather

Weather conditions have many complex and important effects on fire intensity and behavior. Wind is of prime importance; as wind increases in velocity, the rate of fire spread also increases. Relative humidity (i.e., relative dryness of the air) also has a direct effect, the drier the air, and the drier the vegetation; the more likely the vegetation will ignite and burn. Precipitation (annual total, seasonal distribution and storm intensity) further affects the moisture content of dead and living vegetation, which influences fire ignition and behavior.

In addition to winds, structural development within or adjacent to wildland exposures represents an extreme fire protection problem due to flying embers and the predominance of combustible roof coverings.

Topography

Topography affects wildland fire behavior, and the ability of firefighters and their equipment to take action to suppress those fires. One example is a fire starting in the bottom of a canyon may expand quickly to the ridge top before initial attack forces can arrive. Rough topography greatly limits road construction, road standards, and accessibility by ground equipment. Steep topography also channels airflow, creating extremely erratic winds on lee slopes and in canyons. Water supply for fire protection to structures at higher elevations is frequently dependent on pumping units. The source of power for such units is usually from overhead distribution lines, which are subject to destruction by wildland fires.

Vegetation

A key to effective fire control and the successful accommodation of fire in wildland management is the understanding of fire and its environment. Fire environment is the complex of fuel, topographic, and air mass factors, that influence the inception, growth, and behavior of a fire. The topography and weather components are, for all practical purposes, beyond man's control, but it is a different story with fuels, which can be controlled before the outbreak of fires. In terms of future urban expansion, finding new ways to control and understand these fuels can lead to possible fire reduction.

Of these different vegetation types, coastal sage scrub, chaparral, and grasslands reach some degree of flammability during the dry summer months and, under certain conditions, during the winter months. For example, as chaparral gets older, twigs and branches within the plants die and are held in place. A stand of brush 10- to 20-years of age usually has enough dead material to produce rates of spread about the same as in grass fires when the fuels have dried out. In severe drought years, additional plant material may die, contributing to the fuel load. There will normally be enough dead fuel accumulated in 20- to 30-year old brush to give rates of spread about twice as fast as in a grass fire. Under moderate weather conditions that produce a spread rate of one-half foot per second in grass, a 20- to 30-year old stand of chaparral may have a rate of fire spread of about one foot per second. Fire spread in old brush (40 years or older) has been measured at eight times as fast as in grass, about four feet per second. Under extreme weather conditions, the fastest fire spread in grass is 12 feet per second or about eight miles per hour.

As seen in Map 9-1 Wildfire/Urban Interface Threat, the majority of the northeast quadrant of the City is vulnerable to fire. This area contains several critical facility buildings.

Impact of Wildfire in the Town of Yucca Valley

Wildfires and their impact varies by location and severity of any given wildfire event, and will likely only affect certain areas of the county during specific times. Based on the risk assessment, it is evident that wildfires will have potentially devastating economic impact to certain areas of the city. Impact that is not quantified, but can be anticipated in future events, includes:

- ✓ Injury and loss of life
- ✓ Commercial and residential structural damage
- ✓ Disruption of and damage to public infrastructure
- ✓ Secondary health hazards e.g. mold and mildew
- ✓ Damage to roads/bridges resulting in loss of mobility
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed

Historic Events in the Region

Refer to Section 6: Risk Assessment of the 2010 San Bernardino County Operational Area Multi-Jurisdictional Hazard Mitigation Plan (separate document).



Table 9-1: 20 Largest California Wildland Fires (By Acreage Burned)

(Source: www.fire.ca.gov)

Fire Name	Date	County	Acreage	Structures	Deaths
13 BIG BAR COMPLEX (LIGHTNING)	August 1999	TRINITY	140	0	0
14 CAMPBELL COMPLEX (POWERLINES)	August 1990	TEHAMA	125	27	0
15 WHEELER (ARSON)	July 1985	VENTURA	118	26	0
ZACA (HUMAN)	July 2007	SANTA	118	1	0
16 SIMI (UNDER INVESTIGATION)	October 2003	VENTURA	108	300	0
17 UNIVIS (VEHICLE)	August 1996	SAN LUIS OBISPO	106	13	0
WITCH (POWERLINES)	October 2007	SAN DIEGO	197	1,650	2
18 IRON ALPS Klamath Theater Complex (LIGHTNING)	June 2008	TRINITY SISKIYOU	105	0	10
19 CLAMPTON MARBLE CONE (POWERLINES)	September 1970	LOS ANGELES	199	86	1
20 BAR COMPLEX LAGUNA (LIGHTNING)	July 2006	TRINITY SAN DIEGO	199	382	0
BASIN COMPLEX (LIGHTNING)	June 2008	MONTEREY	162	58	0
DAY FIRE (HUMAN)	September 2006	VENTURA	162	11	0
10 STATION FIRE (HUMAN)	August 2009	LOS ANGELES	160	209	2
11 MCNALLY (HUMAN)	July 2002	TULARE	150	17	0
12 STANISLAUS COMPLEX (LIGHTNING)	August 1987	TUOLUMNE	145	28	1

Wildfire Characteristics

There are three categories wildland/urban interface fire: The classic wildland/urban interface exists where well-defined urban and suburban development presses up against open expanses of wildland areas; the mixed wildland/urban interface is characterized by isolated homes, subdivisions, and small communities situated predominantly in wildland settings. The occluded wildland/urban interface exists where islands of wildland vegetation occur inside a largely urbanized area. Certain conditions must be present for significant interface fires to occur. The most common conditions include: hot, dry and windy weather; the inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm committed resources; and a large fuel load (dense vegetation). Once a fire has started, several conditions influence its behavior, including fuel topography, weather, drought, and development.

Southern California has two distinct areas of risk for wildland fire. The foothills and lower mountain areas are most often covered with scrub brush or chaparral. The higher elevations of mountains also have heavily forested terrain. The lower elevations covered with chaparral create one type of exposure.

The higher elevations of Southern California's mountains are typically heavily forested. The magnitude of the 2003 fires is the result of three primary factors: (1) severe drought, accompanied by a series of storms that produce thousands of lightning strikes and windy conditions; (2) an infestation of bark beetles that has killed thousands of mature trees; and (3) the effects of wildfire suppression over the past century that has led to buildup of brush and small diameter trees in the forests.

The Interface

One challenge Southern California faces regarding the wildfire hazard is from the increasing number of houses being built on the urban/wildland interface. Every year the growing population expands further into the hills and mountains, including forest lands. The increased "interface" between urban/suburban areas, and the open spaces created by this expansion, produces a significant increase in threats to life and property from fires, and pushes existing fire protection systems beyond original or current design and capability. Property owners in the interface are not aware of the problems and fire hazards or risks on their own property. Furthermore, human activities increase the incidence of fire ignition and potential damage.

Fuel

Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is classified by volume and by type. Volume is described in terms of "fuel loading," or the amount of available vegetative fuel.

The type of fuel also influences wildfire. Chaparral is a primary fuel of Southern California wildfires. Chaparral habitat ranges in elevation from near sea level to over 5,000' in Southern California. Chaparral communities experience long dry summers and receive most of their annual precipitation from winter rains. Although chaparral is often considered as a single species, there are two distinct types; hard chaparral and soft chaparral. Within these two types are dozens of different plants, each with its own particular characteristics.

Topography

Topography influences the movement of air, thereby directing a fire course. For example, if the percentage of uphill slope doubles, the rate of spread in wildfire will likely double. Gulches and canyons can funnel air and act as chimneys, which intensify fire behavior and cause the fire to spread faster. Solar heating of dry, south-facing slopes produces up slope drafts that can complicate fire behavior. Unfortunately, hillsides with hazardous topographic characteristics are also desirable residential areas in many communities. This underscores the need for wildfire hazard mitigation and increased education and outreach to homeowners living in interface areas.

Weather

Weather patterns combined with certain geographic locations can create a favorable climate for wildfire activity. Areas where annual precipitation is less than 30 inches per year are extremely fire susceptible. High-risk areas in Southern California share a hot, dry season in late summer and early fall when high temperatures and low humidity favor fire activity. The so-called “Santa Ana” winds, which are heated by compression as they flow down to Southern California from Utah, create a particularly high risk, as they can rapidly spread what might otherwise be a small fire.

Drought

Recent concerns about the effects of climate change, particularly drought, are contributing to concerns about wildfire vulnerability. The term ‘drought’ is applied to a period in which an unusual scarcity of rain causes a serious hydrological imbalance. Unusually dry winters, or significantly less rainfall than normal, can lead to relatively drier conditions and leave reservoirs and water tables lower. Drought leads to problems with irrigation and contributes to additional fires, or increased difficulty in fighting fires.

Development

Growth and development in scrubland and forested areas is increasing the number of human-caused structures in Southern California interface areas. Wildfire affects development, yet development can also influence wildfire. Owners often prefer homes that are private with scenic views, nestled in vegetation, and use natural materials. A private setting is usually far from public roads, or hidden behind a narrow, curving driveway. These conditions, however, make evacuation and fire fighting difficult. The scenic views found along mountain ridges can also mean areas of dangerous topography. Natural vegetation contributes to scenic beauty, but it may also provide a ready trail of fuel leading a fire directly to the combustible fuels of the home itself.

Severity

The primary effects of fire, such as loss of life, injury, destruction of buildings and wildlife, are generally well known. Fire also has a number of secondary effects, such as strained public utilities, depleted water supplies, downed power lines, disrupted telephone systems, and closed roads. In addition, flood control facilities are overtaxed by the increased flow from bare hillsides, and the resulting debris that washes down. Affected recreation areas may have to close or restrict operations. Moreover, buildings destroyed by fire are usually eligible for property tax reassessment, which reduces revenue to local government.

A fire is usually extinguished within a few days, but its effects last much longer. Grassland re-sprout the following spring, a chaparral community regenerate in three to five years, and an oak woodland with most of its seedlings and saplings destroyed will start a new crop within five to ten years. Coniferous timber stands are most susceptible to long-term damage, taking as much as 50 to 100 years to reestablish a forest.

Fire destroys surface vegetation, leaving the soil bare and subject to erosion, when the rains begin in the fall and winter. Raindrops hit the surface with undiminished impact, splashing particles of soil loose that move downhill and are carried away by running water. Fire also destroys most of the roots that hold the soil in place, allowing running water to wash the soil away. Mudslides and mudflows can result from these processes.

Growth and Development in the Interface

The hills and mountainous areas of Southern California are considered to be interface areas. The development of homes and other structures is encroaching onto the wildlands and is expanding the wildland/urban interface. The interface neighborhoods are characterized by a diverse mixture of varying housing structures, development patterns, ornamental and natural vegetation and natural fuels.

In the event of a wildfire, vegetation, structures and other flammables can merge into unwieldy and unpredictable events. Factors important to the fighting of such fires include access, firebreaks, proximity of water sources, distance from a fire station and available firefighting personnel and equipment. Reviewing past wildland/urban interface fires shows that many structures are destroyed or damaged for one or more of the following reasons:

- ✓ Combustible roofing material
- ✓ Wood construction
- ✓ Structures with no defensible space
- ✓ Fire department has poor access to structures
- ✓ Subdivisions located in heavy natural fuel types
- ✓ Structures located on steep slopes covered with flammable vegetation
- ✓ Limited water supply
- ✓ Winds over 30 miles per hour

Road Access

Road access is a major issue for all emergency service providers. As development encroaches into the rural areas of the county, the number of houses without adequate turn-around space is increasing. In many areas, there is not adequate space for emergency vehicle turnarounds in single-family residential neighborhoods, obstructing emergency workers because they cannot access houses. Fire trucks are large, and firefighters are challenged by narrow roads and limited access. When there is inadequate turn around space, the fire fighters can only work to remove the occupants, but cannot safely remain to save the threatened structures.

Water Supply

Fire fighters in remote and rural areas are faced by limited water supply and lack of hydrant taps. Rural areas are characteristically outfitted with small diameter pipe water systems, inadequate for providing sustained fire fighting flows.

Interface Fire Education Programs and Enforcement

Fire protection in urban/wildland interface areas may rely heavily more on the landowner's personal initiative to take measures to protect his or her own property. Therefore, public education and awareness plays a greater role in interface areas. In those areas with strict fire codes, property owners who resist maintaining the minimum brush clearances can be cited for failure to clear brush.

PART IV: APPENDIX

Appendix A: Resource Directory

The Resource Directory provides contact information for local, regional, state, and federal programs that are currently involved in hazard mitigation activities. The Planning Team may look to the organizations on the following pages for resources and technical assistance. The Resource Directory provides a foundation for potential partners in action item implementation.

The Planning Team will continue to add contact information for organizations currently engaged in hazard mitigation activities. This section may also be used by various city members interested in hazard mitigation information and projects.

American Public Works Association (APWA)

Level: National	Hazard: Multi	http://www.apwa.net
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2345 Grand Boulevard, Suite 500
Kansas City, MO 64108-2641

Notes: The American Public Works Association is an international educational and professional association of public agencies, private sector companies, and individuals dedicated to providing high quality public works goods and services.

Association of State Floodplain Managers (ASFM)

Level: Federal	Hazard: Flood	www.floods.org
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2809 Fish Hatchery Road
Madison, WI 53713

Notes: The Association of State Floodplain Managers is an organization of professionals involved in floodplain management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning and recovery

Building Seismic Safety Council (BSSC)

Level: National	Hazard: Earthquake	www.bssconline.org
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1090 Vermont Ave., NW, Suite 700
Washington, DC 20005

Notes: The Building Seismic Safety Council (BSSC) develops and promotes building earthquake risk mitigation regulatory provisions for the nation.

California Department of Conservation: Southern California Regional Office

Level: State	Hazard: Multi	www.consrv.ca.gov
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655 S. Hope Street, #700
Los Angeles, CA 90017-2321

Notes: The Department of Conservation provides services and information that promote environmental health, economic vitality, informed land-use decisions and sound management of our state's natural resources.

California Department of Forestry and Fire Protection (CalFIRE)

Level: State	Hazard: Multi	http://www.fire.ca.gov/php/index.php
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210 W. San Jacinto
Perris, CA 92570

Notes: The California Department of Forestry and Fire Protection (CalFIRE) protects over 31 million acres of California's privately-owned wildlands. CalFIRE emphasizes the management and protection of California's natural resources.

California Department of Transportation (CalTrans)

Level: State	Hazard: Multi	http://www.dot.ca.gov/
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120 S. Spring Street
Los Angeles, CA 90012

Notes: CalTrans is responsible for the design, construction, maintenance, and operation of the California State Highway System, as well as that portion of the Interstate Highway System within the state's boundaries. Alone and in partnership with Amtrak, CalTrans is also involved in the support of intercity passenger rail service in California.

California Department of Water Resources (DWR)

Level: State	Hazard: Flood	www.dwr.water.ca.gov
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1416 9th Street
Sacramento, CA 95814

Notes: The Department of Water Resources manages the water resources of California in cooperation with other agencies, to benefit the State's people, and to protect, restore, and enhance the natural and human environments.

California Division of Mines and Geology (DMG)

Level: State	Hazard: Multi	www.consrv.ca.gov/cgs/index.htm
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801 K Street, MS 12-30
Sacramento, CA 95814

Notes: The California Geological Survey develops and disseminates technical information and advice on California's geology, geologic hazards, and mineral resources.

California Emergency Management Agency (Cal EMA)

Level: State	Hazard: Multi	www.calema.ca.gov
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3650 Schriever Ave
Mather, CA 95655

Notes: California Emergency Management Agency coordinates overall state agency response to major disasters in support of local government. The office is responsible for assuring the state's readiness to respond to and recover from natural, manmade, and war-caused emergencies, and for assisting local governments in their emergency preparedness, response and recovery efforts.

California Environmental Resources Evaluation System (CERES)

Level: State	Hazard: Multi	http://ceres.ca.gov/
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900 N St., Suite 250
Sacramento, CA 95814

Notes: CERES is an excellent website for access to environmental information and websites.

California Planning Information Network

Level: State	Hazard: Multi	www.calpin.ca.gov
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Notes: The Governor's Office of Planning and Research (OPR) publishes basic information on local planning agencies, known as the California Planners' Book of Lists. This local planning information is available on-line with new search capabilities and up-to-the-minute updates.

California Resources Agency

Level: State	Hazard: Multi	http://resources.ca.gov/
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1416 Ninth Street, Suite 1311
Sacramento, CA 95814

Notes: The California Resources Agency restores, protects and manages the state's natural, historical and cultural resources for current and future generations using solutions based on science, collaboration and respect for all the communities and interests involved.

Community Rating System (CRS)

Level: Federal	Hazard: Flood	www.fema.gov/nfip/crs.shtm
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500 C Street, S.W.
Washington, D.C. 20472

Notes: The Community Rating System (CRS) recognizes community floodplain management efforts that go beyond the minimum requirements of the NFIP. Property owners within the County would receive reduced NFIP flood insurance premiums if the County implements floodplain management practices that qualify it for a CRS rating. For further information on the CRS, visit FEMA's website.

Environmental Protection Agency (EPA), Region 9

Level: Regional	Hazard: Multi	http://www.epa.gov/region9/
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75 Hawthorne Street
San Francisco, CA 94105

Notes: The mission of the U.S. Environmental Protection Agency is to protect human health and to safeguard the natural environment through the themes of air and global climate change, water, land, communities and ecosystems, and compliance and environmental stewardship.

Federal Emergency Management Agency (FEMA), Region IX

Level: Federal	Hazard: Multi	www.fema.gov
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1111 Broadway, Suite 1200
Oakland, CA 94607

Notes: The Federal Emergency Management Agency is tasked with responding to, planning for, recovering from and mitigating against disasters.

Federal Emergency Management Agency (FEMA), Mitigation Division

Level: Federal	Hazard: Multi	www.fema.gov/fima/planhowto.shtm
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500 C Street, S.W.
Washington, D.C. 20472

Notes: The Mitigation Division manages the National Flood Insurance Program and oversees FEMA's mitigation programs. It has of a number of programs and activities of which provide citizens Protection, with flood insurance; Prevention, with mitigation measures and Partnerships, with communities throughout the country.

Floodplain Management Association

Level: Federal	Hazard: Flood	www.floodplain.org
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P.O. Box 50891
Sparks, NV 89435-0891

Notes: The Floodplain Management Association is a nonprofit educational association. It was established in 1990 to promote the reduction of flood losses and to encourage the protection and enhancement of natural floodplain values. Members include representatives of federal, state and local government agencies as well as private firms.

Landslide Hazards Program, USGS

Level: Federal	Hazard: Landslide	http://landslides.usgs.gov/index.html
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12201 Sunrise Valley Drive, MS 906
Reston, VA 20192

Notes: The NLIC website provides good information on the programs and resources regarding landslides. The page includes information on the National Landslide Hazards Program Information Center, a bibliography, publications, and current projects. USGS scientists are working to reduce long-term losses and casualties from landslide hazards through better understanding of the causes and mechanisms of ground failure both nationally and worldwide.

National Fire Protection Association (NFPA)

Level: National	Hazard: Wildfire	www.nfpa.org/catalog/home/index.asp
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1 Battery March Park
Quincy, MA 02169-7471

Notes: The mission of the international nonprofit NFPA is to reduce the worldwide burden of fire and other hazards on the quality of life. It does this by providing and advocating scientifically-based consensus codes and standards, research, training, and education.

National Floodplain Insurance Program (NFIP)

Level: Federal	Hazard: Flood	www.fema.gov/nfip/
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500 C Street, S.W.
Washington, D.C. 20472

Notes: The Mitigation Division manages the National Flood Insurance Program and oversees FEMA's mitigation programs. It has of a number of programs and activities of which provide citizens Protection, with flood insurance; Prevention, with mitigation measures and Partnerships, with communities throughout the country.

National Oceanic and Atmospheric Administration (NOAA)

Level: Federal	Hazard: Multi	www.noaa.gov
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14th Street and Constitution Ave NW, Rm 6013
Washington, DC 20230

Notes: NOAA's historic role has been to predict environmental changes, protect life and property, provide decision makers with reliable scientific information, and foster global environmental stewardship.

National Resources Conservation Service (NRCS)

Level: Federal	Hazard: Multi	www.nrcs.usda.gov/
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14th and Independence Ave., SW, Room 5105-A
Washington, DC 20250

Notes: NRCS assists owners of America's private land with conserving their soil, water, and other natural resources, by delivering technical assistance based on sound science and suited to a customer's specific needs. Cost shares and financial incentives are available in some cases.

National Weather Service (NWS)

Level: Federal	Hazard: Multi	www.nws.noaa.gov/
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520 North Elevar Street
Oxnard, CA 93030

Notes: The National Weather Service is responsible for providing weather service to the nation. It is charged with the responsibility of observing and reporting the weather and with issuing forecasts and warnings of weather and floods in the interest of national safety and economy. Briefly, the priorities for service to the nation are: 1. protection of life, 2. protection of property, and 3. promotion of the nation's welfare and economy.

National Weather Service, Office of Hydrologic Development (OHD)

Level: Federal	Hazard: Flood	http://www.nws.noaa.gov/
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1325 East West Highway, SSMC2
Silver Spring, MD 20910

Notes: The Office of Hydrologic Development (OHD) enhances National Weather Service products by infusing new hydrologic science, developing hydrologic techniques for operational use, managing hydrologic development by NWS field office, providing advanced hydrologic products to meet needs identified by NWS customers.

Southern California Association of Governments (SCAG)

Level: Regional	Hazard: Multi	www.scaq.ca.gov
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818 W. Seventh Street, 12th Floor
Los Angeles, CA 90017

Notes: The Southern California Association of Governments functions as the Metropolitan Planning Organization for six counties: Los Angeles, Orange, San Bernardino, Riverside, Ventura and Imperial. As the designated Metropolitan Planning Organization, the Association of Governments is mandated by the federal government to research and draw up plans for transportation, growth management, hazardous waste management, and air quality.

Southern California Earthquake Center (SCEC)

Level: Regional	Hazard: Earthquake	www.scec.org
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3651 Trousdale Parkway, Suite 169
Los Angeles, CA 90089-0742

Notes: The Southern California Earthquake Center (SCEC) gathers new information about earthquakes in Southern California, integrates this information into a comprehensive and predictive understanding of earthquake phenomena, and communicates this understanding to end-users and the general public in order to increase earthquake awareness, reduce economic losses, and save lives.

State Fire Marshal (SFM)

Level: State	Hazard: Wildfire	http://osfm.fire.ca.gov
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1131 "S" Street
Sacramento, CA 95814

Notes: The Office of the State Fire Marshal (SFM) supports the mission of the California Department of Forestry and Fire Protection (CalFIRE) by focusing on fire prevention. SFM regulates buildings in which people live, controls substances which may cause injuries, death and destruction by fire; provides statewide direction for fire prevention within wildland areas; regulates hazardous liquid pipelines; reviews regulations and building standards; and trains and educates in fire protection methods and responsibilities.

US Army Corps of Engineers (USACE)

Level: Federal	Hazard: Multi	www.usace.army.mil
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P.O. Box 532711
Los Angeles CA 90053-2325

Notes: The United States Army Corps of Engineers work in engineering and environmental matters. A workforce of biologists, engineers, geologists, hydrologists, natural resource managers and other professionals provide engineering services to the nation including planning, designing, building, and operating water resources and other civil works projects.

US Geological Survey (USGS)

Level: Federal	Hazard: Multi	www.usgs.gov
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345 Middlefield Road
Menlo Park, CA 94025

Notes: The USGS provides reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

US Geological Survey (USGS), Water Resources

Level: Federal	Hazard: Multi	http://water.usgs.gov
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6000 J Street, Placer Hall
Sacramento, CA 95819-6129

Notes: The USGS Water Resources mission is to provide water information that benefits the Nation's citizens: publications, data, maps, and applications software.

Western States Seismic Policy Council (WSSPC)

Level: Regional	Hazard: Earthquake	www.wsspc.org/home.html
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125 California Avenue, Suite D201, #1
Palo Alto, CA 94306

Notes: WSSPC is a regional earthquake consortium funded mainly by FEMA. Its website is a great resource, with information clearly categorized – from policy to engineering to education.

Westside Economic Collaborative c/o Pacific Western Bank

Level: Regional	Hazard: Multi	www.westside-la.or
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120 Wilshire Boulevard
Santa Monica, CA 90401

Notes: The Westside Economic Development Collaborative is the first Westside regional economic development corporation. The Westside EDC functions as an information gatherer and resource center, as well as a forum, through bringing business, government, and residents together to address issues affecting the region: economic diversity, transportation, housing, workforce training and retraining, lifelong learning, tourism, and embracing diversity.