City of Fontana

Local Hazard Mitigation Plan

June 2017

This document was supported by HSGP Grant No. 2015-0078 awarded by the U.S. Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA). Points of view, opinions, findings, and conclusions expressed in this document are those of the authors and do not necessarily represent the official position of policies of FEMA or DHS. DHS/FEMA reserves a royalty-free, non-exclusive, and irrevocable license to reproduce, publish, and use these materials and to authorize others to do so.

Approved & Adopted August 14, 2018 ~ CC Resolution No. 2018-072

U.S. Department of Homeland Security
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

July 13, 2018

Dawn Rowe
Associate Planner
City of Fontana
8353 Sierra Avenue
Fontana, CA 92335

Dear Ms. Rowe:

We have completed our review of the *City of Fontana Local Hazard Mitigation Plan,* and have determined that this plan is eligible for final approval pending its adoption by the City of Fontana.

Formal adoption documentation must be submitted to the FEMA Region IX office by the jurisdiction within one calendar year of the date of this letter, or the entire plan must be updated and resubmitted for review. We will approve the plan upon receipt of the documentation of formal adoption.

If you have any questions regarding the planning or review processes, please contact Alison Kearns, Senior Community Planner, at (510) 627-7125 or by email at alison.kearns@fema.dhs.gov.

Sincerely,

Juliette Hayes
Director
Mitigation Division
FEMA, Region IX

Enclosure

cc: Julie Norris, Mitigation and Dam Safety Branch Chief, California Governor's Office of Emergency Services
Jennifer Hogan, State Hazard Mitigation Officer, California Governor's Office of Emergency Services

EDMUND G. BROWN JR.
GOVERNOR

MARK S. GHILARDUCCI
DIRECTOR

Cal OES
GOVERNOR'S OFFICE
OF EMERGENCY SERVICES

August 31, 2018

Dawn Rowe
Associate Planner
City of Fontana
8353 Sierra Avenue
Fontana, California 92335

Subject: Eligibility for Additional California Disaster Assistance Act (CDAA) State Share Funding under Assembly Bill 2140 (AB 2140)

Dear Ms. Rowe:

The California Governor's Office of Emergency Services (Cal OES) has received a Resolution of Adoption from the City of Fontana to adopt their current, FEMA-approved Local Hazard Mitigation Plan (LHMP) into the Safety Element of their General Plan. Cal OES has determined that the City of Fontana is compliant with AB 2140 requirements. While funding is not automatically guaranteed, the City is now eligible to be considered for additional CDAA funding if approved by legislation following a disaster.

Please keep in mind that when the LHMP expires on September 26, 2022, the adoption into the Safety Element expires and must be renewed each time the LHMP update has received either approvable pending adoption (APA) or final approval from FEMA.

Feel free to contact me with any questions at (916) 845-8187 or Karen McCready-Hoover, Emergency Services Coordinator, at (916) 845-8177. If you have Public Assistance questions, you may contact (916) 845-8200 or DisasterRecovery@caloes.ca.gov.

Sincerely,

ADAM SUTKUS, Chief
Mitigation Planning Division

3650 SCHRIEVER AVENUE • MATHER, CA 95655
MITIGATION PLANNING DIVISION
(916) 845-8177 • (916) 845-8397

RESOLUTION NO. 2018-072

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF FONTANA APPROVING AND ADOPTING THE 2017 LOCAL HAZARD MITIGATION PLAN.

WHEREAS, the City of Fontana having gathered information and revised the City of Fontana Local Hazard Mitigation Plan to reduce or eliminate the effects of hazards to the residents and community; and

WHEREAS, the Plan has been prepared in compliance with the Disaster Mitigation Act of 2000; and

WHEREAS, the Local Advisory Task Force comprised of representatives from city departments, public service agencies, special districts, local for-profit and non-profit organizations, and citizens provided oversight of the plan development process; and

WHEREAS, the Local Advisory Task Force has sought broad public participation and affording community members and opportunity to comment and provide input regarding the Plan and the actions define within; and

WHEREAS, the City Council of the City of Fontana has reviewed the Plan and affirms the City will seek to implement the Plan subject to available funding, and maintain the Plan as required by relevant state and federal authorities; and

NOW, THEREFORE, be it resolved, determined and ordered by the City Council of the City of Fontana does hereby adopt the City of Fontana Local Hazard Mitigation Plan in accordance with the Federal Disaster Mitigation Act of 2000 there-by meeting the eligibility requirements for the potential receipt of hazard mitigation grant funds.

BE IT FURTHER RESOLVED, the FEMA approved Hazard Mitigation Plan is adopted in the safety element of the City's General Plan in compliance with AB 2140.

APPROVED AND ADOPTED this 14th day of August, 2018.

READ AND APPROVED AS TO LEGAL FORM:

DocuSigned by:
Jeff Ballinger
9656A1483C6E407...
City Attorney

Resolution No. 2018-072

I, Tonia Lewis, City Clerk of the City of Fontana, California, and Ex-Officio Clerk of the City Council, do hereby certify that the foregoing resolution is the actual resolution duly and regularly adopted by the City Council at a regular meeting thereof, held on the 14th day of August, 2018, by the following vote to wit:

AYES: Mayor Warren, Mayor Pro Tem Roberts, Council Members Tahan, Sandoval, and Armendarez
NOES:
ABSENT:
ABSTAIN:

DocuSigned by:
Toni Lewis
EBCDCFDA17754F5...
City Clerk of the City of Fontana

DocuSigned by:
Acquanetta Warren
9B476DADB90D46B...
Mayor of the City of Fontana

ATTEST

DocuSigned by:
Toni Lewis
EBCDCFDA17754F5...
City Clerk

Certificate Of Completion

Envelope Id: 1E7E9D2246DB4DD099339659C37000AA
Status: Completed
Subject: Please DocuSign: Reso 2018-072 _LHMP.pdf
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Signatures: 4
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Initials: 0
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Toni Lewis tlewis@fontana.org City Clerk City of Fontana Security Level: Email, Account Authentication (None)	DocuSigned by: Toni Lewis EBCDCFDA17754F5... Signature Adoption: Pre-selected Style Using IP Address: 76.218.56.24	Sent: 8/16/2018 10:18:29 AM Viewed: 8/16/2018 6:29:07 PM Signed: 8/16/2018 6:29:17 PM
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Kimberly Solorio ksolorio@fontana.org Security Level: Email, Account Authentication (None) **Electronic Record and Signature Disclosure:** Not Offered via DocuSign	COPIED	Sent: 8/16/2018 6:29:18 PM
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Envelope Summary Events	Status	Timestamps
Envelope Sent	Hashed/Encrypted	8/16/2018 6:29:18 PM
Certified Delivered	Security Checked	8/16/2018 6:29:18 PM
Signing Complete	Security Checked	8/16/2018 6:29:18 PM
Completed	Security Checked	8/16/2018 6:29:18 PM

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How to contact City of Fontana:
You may contact us to let us know of your changes as to how we may contact you electronically, to request paper copies of certain information from us, and to withdraw your prior consent to receive notices and disclosures electronically as follows:
To contact us by email send messages to: ctejeda@fontana.org

To advise City of Fontana of your new e-mail address
To let us know of a change in your e-mail address where we should send notices and disclosures electronically to you, you must send an email message to us at ctejeda@fontana.org and in the body of such request you must state: your previous e-mail address, your new e-mail address. We do not require any other information from you to change your email address..
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i. decline to sign a document from within your DocuSign account, and on the subsequent page, select the check-box indicating you wish to withdraw your consent, or you may;
ii. send us an e-mail to ctejeda@fontana.org and in the body of such request you must state your e-mail, full name, IS Postal Address, telephone number, and account number. We do not need any other information from you to withdraw consent.. The consequences of your withdrawing consent for online documents will be that transactions may take a longer time to process..

Required hardware and software

Operating Systems:	Windows2000? or WindowsXP?
Browsers (for SENDERS):	Internet Explorer 6.0? or above
Browsers (for SIGNERS):	Internet Explorer 6.0?, Mozilla FireFox 1.0, NetScape 7.2 (or above)
Email:	Access to a valid email account
Screen Resolution:	800 x 600 minimum
Enabled Security Settings:	•Allow per session cookies •Users accessing the internet behind a Proxy Server must enable HTTP 1.1 settings via proxy connection

** These minimum requirements are subject to change. If these requirements change, we will provide you with an email message at the email address we have on file for you at that time providing you with the revised hardware and software requirements, at which time you will have the right to withdraw your consent.

Acknowledging your access and consent to receive materials electronically
To confirm to us that you can access this information electronically, which will be similar to other electronic notices and disclosures that we will provide to you, please verify that you were able to read this electronic disclosure and that you also were able to print on paper or electronically save this page for your future reference and access or that you were able to e-mail this disclosure and consent to an address where you will be able to print on paper or save it for your future reference and access. Further, if you consent to receiving notices and disclosures exclusively in electronic format on the terms and conditions described above, please let us know by clicking the 'I agree' button below.
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- Until or unless I notify City of Fontana as described above, I consent to receive from exclusively through electronic means all notices, disclosures, authorizations, acknowledgements, and other documents that are required to be provided or made available to me by City of Fontana during the course of my relationship with you.

City of Fontana

Local Hazard Mitigation Plan

June 2017

This document was supported by HSGP Grant No. 2015-0078 awarded by the U.S. Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA). Points of view, opinions, findings, and conclusions expressed in this document are those of the authors and do not necessarily represent the official position of policies of FEMA or DHS. DHS/FEMA reserves a royalty-free, non-exclusive, and irrevocable license to reproduce, publish, and use these materials and to authorize others to do so.

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Section 1.Introduction

The LHMP update is a "living document" that should be reviewed, monitored, and updated to reflect changing conditions and new information. As required, the LHMP must be updated every five (5) years to remain in compliance with regulations and Federal mitigation grant conditions. In that spirit, this Hazard Mitigation Plan (LHMP) is an update of the CITY OF FONTANA'S HAZARD MITIGATION PLAN approved by FEMA in October 2012. This LHMP presents updated information regarding hazards being faced by THE CITY OF FONTANA.

1.1 City of Fontana

The City of Fontana was incorporated on June 25, 1952. Fontana is located in San Bernardino County with the cities of Ontario and Rancho Cucamonga to the West and Rialto and San Bernardino to the East. This 42.43 square mile community has an average elevation of 1,237 feet.

The Santa Ana River watershed is located in southern California, south and east of the City of Los Angeles. The watershed includes much of Orange County, the north western corner of Riverside County, the southwestern corner of San Bernardino County, and a small portion of Los Angeles County.

The Santa Ana River bisects the City of Colton, just to the east of the City of Fontana. It enters Colton in the Northeast corner and exits Colton in the Southwest corner.

1.2 Purpose of the Plan

The intent of hazard mitigation is to reduce and/or eliminate loss of life and property. Hazard mitigation is defined by FEMA as "*any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards*." A "hazard" is defined by FEMA as "*any event or condition with the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, environmental damage, business interruption, or other loss*."

The purpose of the Hazard Mitigation Plan (LHMP) is to demonstrate the plan for reducing and/or eliminating risk in City of Fontana. The LHMP process encourages communities to develop goals and projects that will reduce risk and build a more disaster resilient community by analyzing potential hazards.

After disasters, repairs and reconstruction are often completed in such a way as to simply restore to pre-disaster conditions. Such efforts expedite a return to normalcy; however, the restoring of things to pre-disaster conditions sometimes result in feeding the disaster cycle; damage, reconstruction, and repeated damage. Mitigation is one of the primary phases of emergency management specifically dedicated to breaking the cycle of damage. Hazard mitigation is distinguished from other disaster management functions by measures that make Fontana development and the natural environment safer and more disaster resilient. Mitigation generally involves alteration of physical environments, significantly reducing risks and vulnerability to hazards by altering the built environment so that life and property losses can be

avoided or reduced. Mitigation also makes it easier and less expensive to respond to and recover from disasters.

Also with an approved (and adopted) LHMP, City of Fontana is eligible for federal disaster mitigation funds/grants (Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Management Assistance) aimed to reduce and/or eliminate risk.

1.3 Authority

In 2000, FEMA adopted revisions to the Code of Federal Regulations. This revision is known as "Disaster Mitigation Act (DMA)." DMA 2000, Section 322 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a Hazard Mitigation Plan (LHMP) that describes the process for assessing hazards, risks and vulnerabilities, identifying and prioritizing mitigation actions, and engaging/soliciting input from the community (public), key stakeholders, and adjacent jurisdictions/agencies.

Senate Bill No. 379 will, upon the next revision of a local hazard mitigation plan on or after January 1, 2017, or, if the local jurisdiction has not adopted a local hazard mitigation plan, beginning on or before January 1, 2022, require the safety element to be reviewed and updated as necessary to address climate adaptation and resiliency strategies applicable to that city or county.

1.4 What's New

For this 2017 LHMP Update, some changes were made in the document to reflect changes in development and priorities.

1.4.1 New Hazard Profiles

In addition to the hazards profiled in the 2012 LHMP (Earthquake, Wind Surges and Wildfire) this update also recognizes Landslide, Flood, Terrorism, Climate Change and Drought as being significant hazards to the City of Fontana. This decision was based on the hazard prioritization process performed by the Task Force during Task Force Meeting #1 and is explained in detail in Section 4.1.2

1.4.2 Identifying the Problem

Before mitigation goals, objectives and actions were formulated, problem statements were created for this 2017 LHMP Update by the Task Force. Problem statements are an important step in accessing the changing priorities of the City. Problem statements can be found in Section **Error! eference source not found.**

1.4.3 Updated Mitigation Strategies

In order to reflect the progress in local mitigation efforts made since the 2012 LHMP, the mitigation actions from the 2012 LHMP were reviewed to address if they have been completed, deleted, or deferred. New mitigation actions were developed to reflect changes in priorities and this process is

explained in Section 6.3 Only the information and data still valid from the 2011 plan was carried forward as applicable into this current update of the LHMP. In fact, based in part on the issuance of new 2011 and 2013 planning guidance, this 2017 plan has been significantly updated and rewritten.

1.5 Community Profile

1.5.1 Physical Setting New

Fontana is located on an alluvial plain valley that is defined by the steeply rising range front of the eastern San Gabriel Mountains to the north, the Lytle Creek wash to the east and the Jurupa Mountains to the south. The San Bernardino and San Gabriel Mountain ranges that lie to the north of the city rise to elevations of over 9,000 feet. The Jurupa Mountains are a low lying relatively small mountain range lying to the south of the city. The Jurupa Mountains rise to elevations of approximately 3,000 feet. Elevations in Fontana range from a low of about 850 feet to about 2,000 feet in the north end.

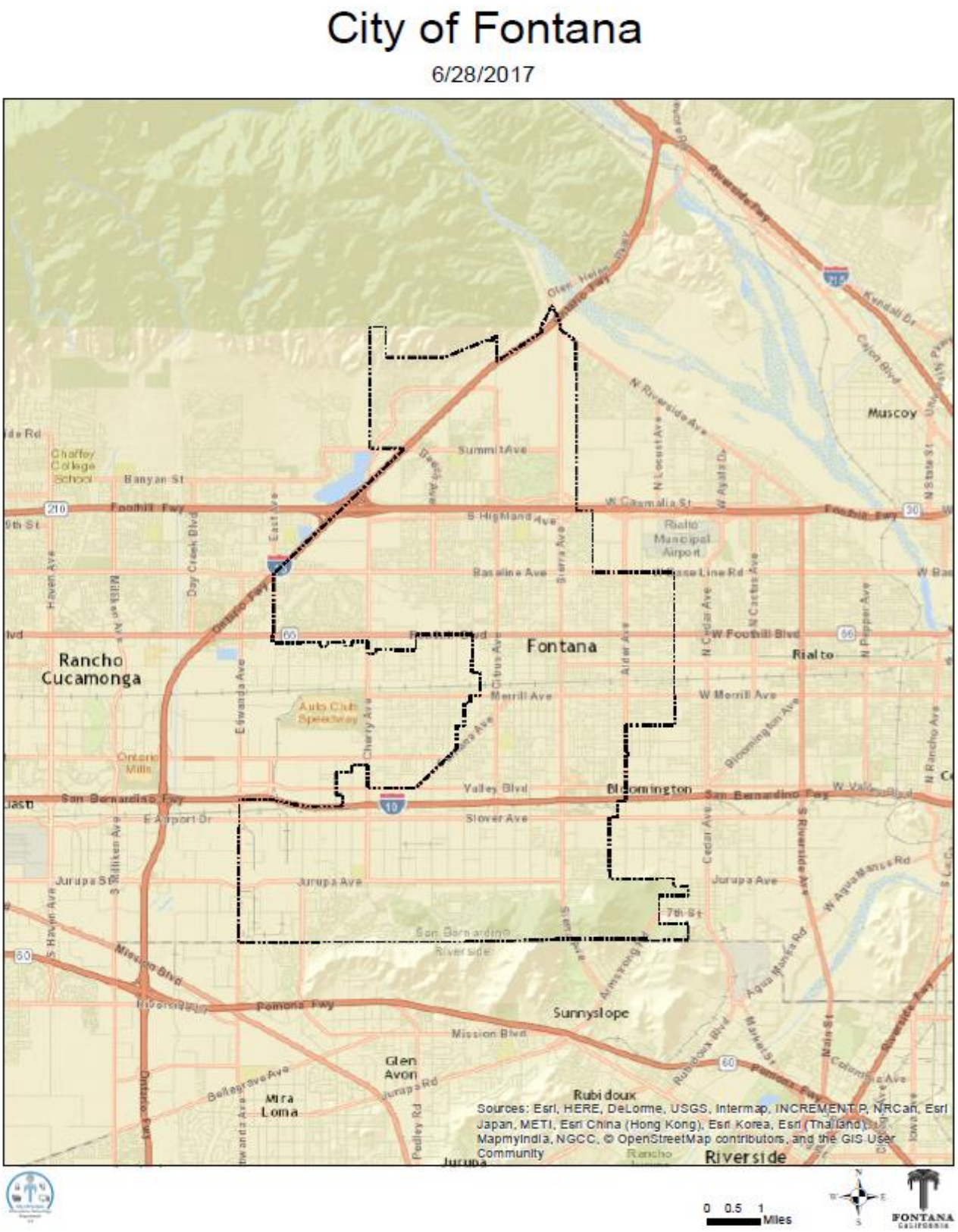


Figure 1-1: World Street Map

Fontana lies at the intersections of State Routes 10, 15 and the 210. State Routes 10 and 210 connect the northern and southern ends of Fontana to Los Angeles. State Route 15 connects Fontana to the High Desert, Las Vegas and San Diego.

The City of Fontana has gone through major transformations from its roots as a rich agricultural town where farmers planted and grew citrus and raised poultry in the 19th century, to becoming the region's leading producer of steel and steel related products in the 1940's through the 1970's. California Steel continues the industry of steel production today, where the former Kaiser steel plant was located.

Today, Fontana is both a bedroom community, with a commuting population of workers, and, due to its suburban location near several major freeway and rail transportation corridors, is also a major Inland Empire hub of warehousing and distribution centers. These uses are located primarily in the City's southern half, adjacent to the SR 10 corridor. Heavy industrial areas are also located in the south and western portions of the city.

The climate for Fontana is warm during summer when temperatures tend to be in the high 90's and cool during winter when temperatures tend to be in the 50's. The warmest month of the year is July with an average maximum temperature of 95 degrees Fahrenheit, while the coldest month of the year is December with an average minimum temperature of 44 degrees Fahrenheit. The city is frequently affected by the strong, hot, and dry Santa Ana Winds as they blow through the nearby Cajon Pass of the San Gabriel Mountains, from the Mojave Desert. The annual average precipitation is 14.77 inches.

1.5.2 History

Fontana's history dates back to 1887, when our City's precursor, the town site of Rosena was located in the area of present-day downtown. A.B. Miller, an early agricultural landowner who figures prominently in our City's founding, rededicated Rosena as Fontana in 1913. Our area was widely settled by the 1930s, from Baseline to the Santa Fe Railway. Two other rural settlements, Grapeland to the north, and the Declezville quarry to the south flanked our community in those early years.

From the beginning, the development of Fontana radiated outward from our Downtown – this may be part of the reason it remains so important to us to maintain it as the heart of the community today. The establishment of the Kaiser Steel Mill changed the character of our community from rural to industrial in 1942. The population and intensity of development in the community increased dramatically in the next decade, and the City incorporated as Fontana in 1952. Fontana is a General Law city under the Council/Manager form of government.

We have experienced waves of development since incorporation: industrial, residential and commercial, first radiating from the downtown within the core of the City, now north from SR 210 and south and east from the core. Our economy has continued to diversify, with steel production playing less of a role since the 1984 closure of Kaiser Steel, and the development of the trucking and distribution industries. The northern portion of our community, including Grapeland, was agricultural in character and remained so until the beginning of the 1980s when residential development began to move northward. We are now the fastest growing community in the Inland Empire, with residential and commercial development continuing to move northward, due in part to the supply of vacant land there, and the access provided to it by the SR 210 Freeway and Interstate 15.

1.5.3 Climate

The climate in Fontana is for the most part warm and temperate. The winter months are much rainier than the summer months. The city is frequently affected by the strong, hot and dry Santa Ana winds, since they blow through the nearby Cajon Pass of the San Gabriel Mountains, from the Mojave Desert. Fontana is very hot in the summer, reaching over 100 degrees Fahrenheit on several days of the year. The average high in July is over 95 degrees, while the average low in January is a little over 45 degrees. January is the month when Fontana receives the most rainfall, with an average of 3.5 inches, while July is the driest month with 0 inches on average. Wind speeds in the city are upwards of 20 mph several days of the year.

1.5.4 Demographics

CITYWIDE DEMOGRAPHICS		
Population		
2016 Data (3 zip codes 92335, 92336, 92337)	204,961	
Growth 2000-2010	18.78%	
2010 Census	196,069	
2000 Census	165,065	
1990 Census	114,167	
Growth 1990 - 2000	44.58%	
Households		
2021 Projection	52,004	
2016 Data	50,557	
Growth 2000-2010	15.30%	
2010 Census	49,116	
2000 Census	42,601	
1990 Census	27,343	
Growth 1990 - 2000	55.80%	
2016 Est. Population by Single Classification Race	204,961	
White Alone	94,468	46.1%
Black Alone	19,052	9.3%
American Indian Alone	1,985	1.0%

Asian Alone	14,165	6.9%
Pacific Islander Alone	559	0.3%
Some Other Race Alone	64,432	31.4%
Two or More Races	10,300	5.0%
Hispanic Origin (Any Race)	143,741	70.1%
2016 Tenure of Occupied Housing Units	50,558	
Owner Occupied	29,153	68.4%
Renter Occupied	13,448	31.6%
2016 Average Household Size	4.04	
2016 Est. Households by Household Income	50,557	
Income Less than $15,000	4,793	7.8%
Income $15,000 - $24,999	4,306	7.3%
Income $25,000 - $34,999	5,129	9.3%
Income $35,000 - $49,999	7,768	13.3%
Income $50,000 - $74,999	12,821	18.5%
Income $75,000 - $99,999	9,724	16.4%
Income $100,000 - $149,999	6,502	17.4%
Income $150,000 - $199,999	1,646	6.3%
Income More than $200,000	941	3.7%
2016 Est. Average Household Income	$79,416	
2016 Est. Median Household Income	$64,520	
2016 Est. Per Capita Income	$19,619	

Source: U.S. Bureau of the Census 2010. ESRI forecasts for 2016 for zip codes 92335, 92336, 92337

Figure 1-2: City of Fontana Demographics

1.5.5 Existing Land Use

The City of Fontana encompasses approximately 42.4 gross square miles of land area. The land use element is a driving element in the general plan. The land use element sets out land use designations and pattern and intensity of land use, the land use element affects circulation, housing, public services and infrastructure, safety, conservation/open space, parks and recreation, noise, and air quality. A land use map is included as Figure 1-3 on the following page.

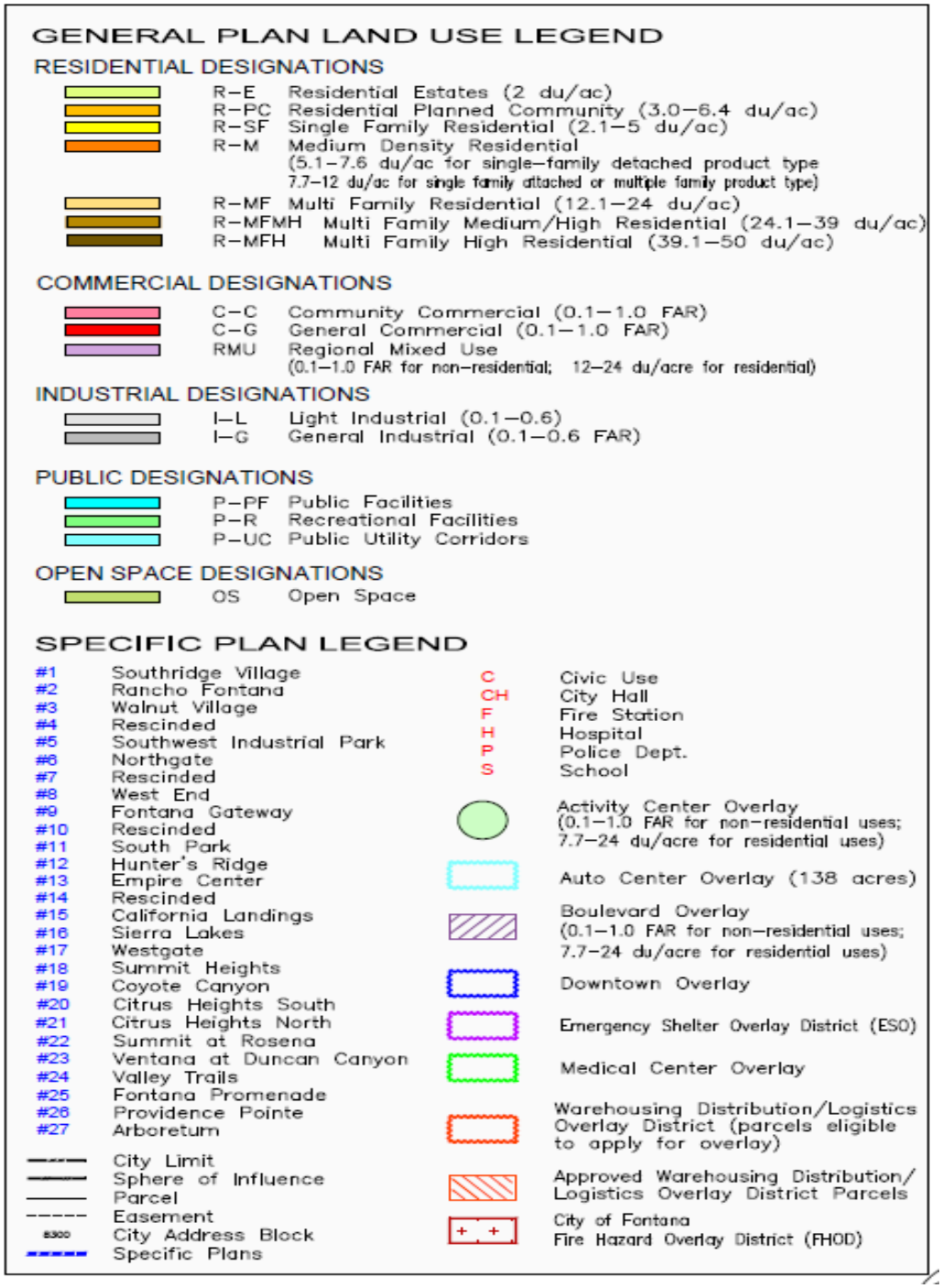


Figure 1-3: General land use map legend

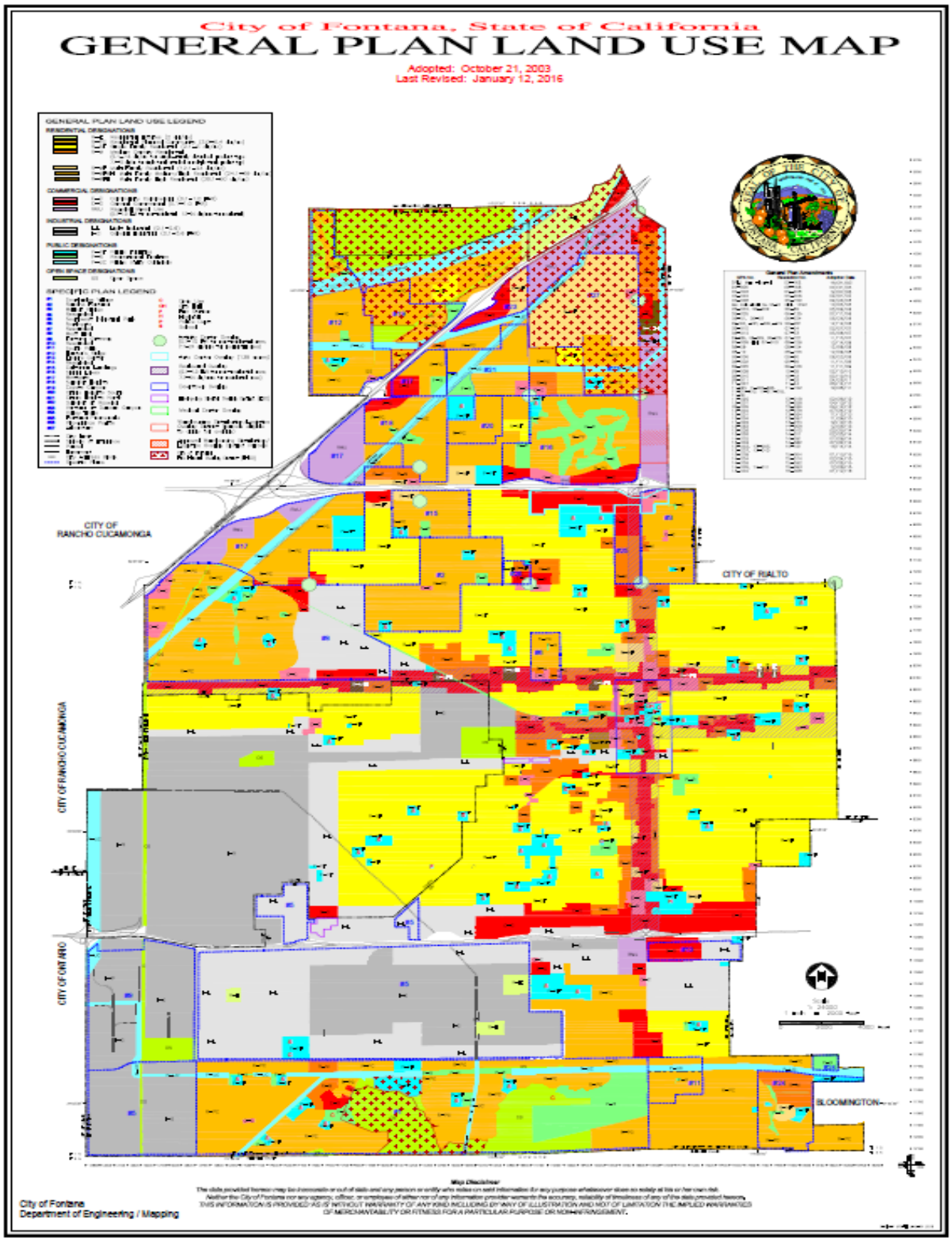


Figure 1-4: Land Use Map (Credit: City of Fontana General Plan)

The land use data in this figure is based on data obtained by the City's Engineering GIS Section. The following land use designations are as follows:

Residential – Residential land uses within the City include single-family, multi-family, mobile homes, board and care homes, and convalescent homes. The land use designation allows densities ranging from 2 to 24 dwellings units per acre.

Commercial – Commercial land uses within the City include retail development including shopping centers, restaurants, and office uses, businesses providing professional services, including legal services, financial institutions, administrative and corporate offices, medical offices, and clinics. Additionally, the general commercial designation is intended for retailing, wholesaling, and services activities, including automobile repair, automobile dealerships and malls.

Industrial – Industrial designated lands within the City allow more intensive uses, such as business parks, research and development, technology centers, corporate and support offices, clean industry and supporting retail uses, auto, truck and equipment sales and related services. Moreover, the General Industrial designation may include: manufacturing, fabrication, assembly, processing, trucking, equipment, warehousing and distribution, automobile and truck sales and services.

Public Designations – The Public Facilities designation identifies the location of properties in public or quasi-public ownership, such as existing schools; the facilities of public and quasi-public agencies such as the City, County water and sewer districts, and fire protection districts; and the locations of hospitals and quasi-public institutions. The Recreation Facilities designation is used for regional and local parks, and any recreational facility operated by a public or quasi-public agency. The Public Utility Corridors designation is used to indicate lands that contain easements for public utilities. The Open Space areas, which for environmental reasons have been planned to remain in its natural condition, including the Jurupa Hills and the foothills of the San Gabriel Mountains bordering the National Forest.

Land Use	Acres	Percent of City
Residential	14,772	58.0
Commercial	3,244	12.7
Industrial	4,589	17.9
Public Facilities	2,909	11.4
Total	25,514	100.0

Figure 1-5: City Land Use

1.5.6 Development Trends

The City of Fontana has been one of the fastest growing cities in San Bernardino County. Fontana is a young, rapidly-growing and ethnically diverse community. The City of Fontana is a vibrant city, with multiple opportunities for new development, with large portions of undeveloped land. Much of the remaining land in the northern portion of Fontana was approved for development through specific plans and associated development agreements that remain in place. The southern portion of Fontana continues to thrive with the development of several large industrial buildings, as well

as commercial and retail development that provides services to the residential development existing in that area. In addition, there are many opportunities for infill development and even redevelopment in Fontana's established neighborhoods in the core/central area of Fontana.

All future development/redevelopment projects will be constructed to occur in accordance with the General Plan Land Use Element and will consider all potential hazards identified within this plan. Additionally, all development will be incompliance with all Fire, Flood, and Seismic codes of the City and State at the time of development, as well as the current design standards and building codes, and are not expected to contribute to community vulnerability from natural or technological hazards.

Section 2. Plan Adoption

2.1 Adoption by Local Governing Body

The City of Fontana City Council is responsible for the review, approval, and adoption of the Local Hazard Mitigation Plan (LHMP) update for the City of Fontana. It is also the intent of the City of Fontana City Council to take appropriate actions to ensure the updated LHMP remains as a part of the City of Fontana General Plan.

2.2 Promulgation Authority

The Promulgator Authority for the adoption of the Hazard Mitigation Plan for City of Fontana and incorporation of the LHMP into the City of Fontana General Plan is:

Acquanetta Warren – City Mayor

Jesus "Jesse" Sandoval – Mayor Pro Tem

John Roberts – Council Member

Michael Tahan – Council Member

Jesse Armendarez – Council Member

2.3 Primary Point of Contact

The Primary Point of Contact for information regarding this plan is:

William P. Green
Chief of Police
Fontana Police Department
17005 Upland Avenue
Fontana, CA 92335
(909) 350-7701
Email: bgreen@fontana.org

Jeff Birchfield
Assistant Chief, Division
San Bernardino County Fire Department
17001 Upland Avenue
Fontana, CA 92335
(909) 349-3048
Email: jbirchfield@sbcfire.org

Debbie Brazill
Deputy City Manager
City of Fontana
8353 Sierra Avenue
Fontana, CA 92335
(909) 350-6727
Email: dbrazill@fontana.org

Zai Abubakar
Director of Community Development
City of Fontana
8353 Sierra Avenue
Fontana, CA 92335
(909) 350-7625
Email: zabubakar@fontana.org

Dawn Rowe
Senior Planner
City of Fontana
8353 Sierra Avenue
Fontana, CA 92335
(909) 350-6694 Email: drowe@fontana.org

Section 3. Planning Process

3.1 Preparing for the Plan

For the update to the Local Hazard Mitigation Plan, the City of Fontana joined with San Bernardino County Fire Department Office of Emergency Services (OES) who coordinated the update of the San Bernardino County Operational Area Multi-Jurisdictional Multi-Hazard Mitigation Plan. As required by the Department of Homeland Security's Federal Emergency Management Agency (DHS-FEMA), all Hazard Mitigation Plans (LHMP) must be updated, adopted, and approved every five (5) years. The purpose of the update is to validate and incorporate new information into the plan and identify progress that has been made since the last approval of the plan. It should also be noted that an approved LHMP is require to receive federal assistance under the Hazard Mitigation Grant Program (HMGP or Pre-Disaster Mitigation (PDM) programs.

San Bernardino County Fire OES hired a consultant to support the County, Cities, and Special Districts to update six (6) San Bernardino County jurisdictional plans, as well as thirty-one (31) single-jurisdictional plans. The support provided by OES, as well as the consultant, offers experience, field-tested Hazard Mitigation and a planning professional who have developed similar comprehensive LHMP's. This support includes providing technical expertise, resource material and tools, not only to expedite the LHMP updated process, but also to ensure that the updates are in compliance with federal requirements of the program. The tools, resource material, and other project related information are being maintained on a project portal to ensure the same information is available to all participants.

The City initiated its plan update by meeting the requirements of Title 44, Code of Federal Regulations, and Part 201 (44CFR201.6) through the initial implementation of the 2005 Local Hazard Mitigation Plan.

The following regulations (44CFR 201.6) were adhered to:

1. Organize resources: The Local Advisory Task Force identified resources, including city staff, agencies, and local community members that could provide technical expertise and historical information needed in the development of the LHMP.

2. Risk assessment: The Task Force identified the hazards specific to the City, and developed the risk assessment for the four identified hazards. The Task Force reviewed the risk assessment, including the vulnerability assessment, prior to and during the development of the mitigation strategies.

3. Community capability assessment: The Task Force reviewed current administrative and technical, legal and regulatory, and fiscal capabilities to determine whether existing provisions and requirements adequately address relevant hazards.

4. Develop mitigation strategies: After reviewing the risks posed by each hazard, the Task Force developed a comprehensive range of potential mitigation goals, objectives, and projects. Subsequently, the Task Force identified and prioritized the actions to be implemented.

5. Monitor progress: The Task Force developed an implementation process to ensure the success of an ongoing program to minimize hazard impacts to the community.

The City of Fontana is in the process of implementing a comprehensive revision to the General Plan, which is anticipated to be completed by the end of 2017. Reference to the Local Hazardous Mitigation Plan is included in the Safety Element of the General Plan.

3.1.1 Planning Team

The Fontana Police Department was the lead agency for the development of the initial LHMP; as part of the update to the LHMP, the City formed an internal/external planning team to include representatives from city departments, external stakeholders/agencies, and the general public. The following planning team developed and implemented the update to the City of Fontana Local Hazard Mitigation Plan, and represented a liaison and an oversight committee between internal/external groups where appropriate.

Core Planning Team Members included:

Deputy City Manager Debbie Brazill, City of Fontana Development Services

Chief Jeff Birchfield, San Bernardino County Fire Department

Chief Robert Ramsey, City of Fontana Police Department

Director of Community Development, Zai AbuBakar, City of Fontana Development Services

Fire Marshall Brian Headley, San Bernardino County Fire Department

Charles Hays, City of Fontana Public Works Director

Dan West, City of Fontana Public Works Manager

Luis Villalobos, City of Fontana Park Development Coordinator

Gil Estrada, City of Fontana, Building Official

Sergeant Kevin Goltara, City of Fontana Police Department

Cheryl Nagy, San Bernardino County Fire Department, OES

Dawn Rowe, City of Fontana Planning Department, Project Manager

Daisy Jimenez, City of Fontana Planning Department Planning Intern

Olga Hernandez, City of Fontana Police Department

Heather Howard, City of Fontana Police Department

Amber Smith, City of Fontana Police Department

Harry Katchadoorian, City of Fontana Engineering Department GIS Technician

Ray Cancel, CERT Class Instructor/Coordinator

The planning process for the City of Fontana Local Hazard Mitigation Plan update began with the San Bernardino County Kick-Off meeting on June 1, 2016. Additional meetings of the core planning team were held, as well as correspondence via e-mail and phone conversations.

3.2 Coordination with Other External Jurisdictions, Agencies, and Organizations

The primary mechanism for ensuring coordination with other agencies and organizations that could support mitigation plan development and implementation was the Local Advisory Task Force. At the beginning of the planning process, the Task Force identified a number of departments, organizations, businesses, special districts and non-governmental entities to be invited to participate in the plan development. All of the organizations were contacted via email or telephone and invited to participate as members of the Local Advisory Task Force. Those who responded positively were included as part of the Task Force.

3.3 Public Involvement/Outreach

The Local Advisory Task Force used a number of venues to inform the public of the planning effort and to solicit their input. The Task Force discussed several alternatives to the public input process that included:

1. Host targeted community-based stakeholder workshops
2. General Plan Open House Forum and stakeholders meetings
3. Attend various local community meetings
4. Presentation to Planning Commission
5. Host Community Fair, and
6. Public review on city web page

There were two community-based stakeholder workshops held at the Fontana Police Department. These workshops were advertised on the city website and through flyers at various customer service windows throughout the City. At the beginning of the workshops, an overview of the local hazard mitigation planning process and a risk analysis of the natural and human- caused hazards facing the City of Fontana was presented. The citizens then provided their input about their concerns about each hazard, what they are doing to prepare for and to mitigate high risk hazards and what activities the City should engage to prepare for, mitigate, and respond to the highest risk hazards. The same local hazard mitigation planning process overview was presented to various local community meetings that are included in Appendix A.

In addition, the City of Fontana is updating the General Plan, to include an update to the Safety Element as well as the Open Space Element. During several community meetings discussion in regards to the Safety Element were held with residents as well as local business owners who were given an overview of what the proposed update entailed.

A hazard mitigation plan public survey was conducted to gather information from residents about hazard related concerns. A copy of the survey and the summary of key results are included in Appendix C.

The city continues to hold many public meetings and provides notice of the meetings through posted agendas and through the City's web site. Once completed and prior to Council adoption of the Local Hazard Mitigation Plan, the item will be agendized for public hearing and posted for public review on the City's web site. The Task Force will determine how public comment, if offered, will be included in the draft plan prior to final adoption.

3.4 Assess the Hazard

In accordance with FEMA requirements, the 2017 LHMP Local Advisory Task Force identified and prioritized the natural and manmade hazards affecting Fontana and assessed the vulnerability from them. Results from this phase of the LHMP planning process aided subsequent identification of appropriate mitigation actions to reduce risk in specific locations from hazards. A comprehensive list of (7) natural and human-caused hazards was considered for analysis.

Natural Hazards Considered:

Earthquake	Flood/Winter Storms	Landslide
Wildfire	Wind Surge	

Human-caused Hazards Considered:

Terrorism

Climate Change/Drought

These hazards were ranked as low, medium or high based upon the perceived threat to the City. The analysis of these hazards is described in Section 4 of this plan. Initial hazard ranks were developed and presented to the Local Advisory Task Force. The ranks were adjusted based on data provided by the team. The hazards with significant potential for damage to Fontana are earthquake, wildfire, flood / winter storms, and wind surge.

3.5 Set Goals

The goals of the Local Hazard Mitigation Plan describe the overall direction the City of Fontana, through its departments, agencies, organizations, and citizens can take toward reducing its risk to natural and human-caused hazards. Part of the main goals of the Fontana's Mitigation Plan are:

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

3.5.1.2 Reduce losses and repetitive damage for chronic hazard events while promoting mitigation measures and insurance coverage for catastrophic hazards.

3.5.1.3 Coordinate with existing ongoing plans and programs so that high priority initiatives and projects to mitigate possible disaster impacts would be funded and implemented.

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

3.5.1.5 Strengthen communication and participation among and within public agencies, citizens, non-profit organizations, businesses, and industry to gain a vested interest in the implementation of mitigation measures to reduce the impact of natural hazards.

3.5.1.6 Reinforce emergency operations by increasing collaboration and coordination among public agencies, non-profit organization, business, and industry.

3.6 Review and Propose Mitigation Measures

The Plan will be regularly monitored and evaluated to measure its success in achieving its goals once implementation begins. A variety of mitigation measures that can affect hazards or the damage from hazards were examined. The mitigation activities are organized by hazard and fall within one of the following four categories:

3.6.1.1 Protect Life, Property, and the Environment

3.6.1.2 Public Awareness

3.6.1.3 Partnerships and Implementation

3.6.1.4 Emergency Services

Once the projects were identified, the Local Advisory Task Force utilized the STAPLEE methodology to assess and prioritize the projects.

STAPLEE stands for the following:

3.6.1.5 **Social:** Social criteria ae based on the idea that community consensus is a necessary precondition for successful implementation of mitigation measures (e.g. measures should be supported and accepted by the entire community). This also means that measures should not affect adversely a particular segment of the population or a particular neighborhood, or adversely impact local cultural values or resources.

3.6.1.6 **Technical**: Technical criteria address the technical feasibility of the proposed measures, in terms of effectiveness, secondary impacts, and the technical capabilities of the community to implement and sustain these measures.

3.6.1.7 **Administrative**: Administrative criteria address the administrative capabilities required to implement each mitigation measure. For example, does the City have the necessary organization, staff, and funding sources to implement and sustain the mitigation process?

3.6.1.8 **Political**: Political criteria consider the need for political support for mitigation measures. This means that all stakeholders in the political process, especially political organizations and institutions both inside and outside of the community, should support the measure.

3.6.1.9 **Legal**: Legal criteria are used to determine the appropriate legal authority necessary to implement each mitigation measure and whether such an authority can be delegated. The mitigation measure is examined from the standpoint of current statutes, codes, ordinances, and other regulations, as well as the possible legal ramifications of the measure's implementation.

3.6.1.10 **Economic:** Economic criteria address the cost-effectiveness of the proposed measure and its economic impact on the community. It is only reasonable to expect that the benefits of implementation will exceed the costs incurred. Economic considerations also consider the economic impact on the community's future development.

3.6.1.11 **Environmental:** Environmental criteria have become an important consideration in examining mitigation options. Although most mitigation measures are usually beneficial for the environment, some measures may have adverse effects, which must be considered and addressed.

Based on STAPLEE, the Local Advisory Task Force addressed the following questions to determine mitigation options:

Does the Action:

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

Can the Action:

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

Will the Action:

1. Be accepted by the community? 2. Be supported by community leaders? 3. Adversely impact segments of the population or neighborhoods? 4. Require a change in local ordinances or zoning laws?	5. Result in legal action such as a lawsuit? 6. Positively or negatively impact the environment? 7. Comply with all local, state and federal environmental laws and regulations?

Is there:

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

3.7 Draft the Hazard Mitigation Plan

The Local Hazard Mitigation Plan Update was drafted by the Project Manager, based on input and comments provided by the Planning Team. The Planning Team used the 2012 LHMP as a starting point but revised it to reflect updated information and the new Table of Contents (TOC). The proposed TOC is closely related to the 2012 LHMP format. The Planning Team also used the FEMA Guidance and materials provided by the County Fire Department Office of Emergency Services. This material aided in the Planning Team's understanding of the level of detail and type of information that is provided in each section.

This process started with the City Departments providing information to the Planning Team through their liaison on the Planning Team. The Planning Team then worked together to produce the draft LHMP. Each section was reviewed and updated as necessary, and the entire LHMP was reviewed by the members of the Planning Team, which was coordinated by the Planning Team Project Manager.

3.8 Adopt the Plan

The Local Hazard Mitigation Plan will be submitted for courtesy review to Dynamic Planning, a hired contractor for the San Bernardino County Fire Department Office of Emergency Services (OES). Additional revisions will be made based on recommendations by Dynamic Planning. The plan will then be formally submitted to the California Emergency Management Agency (Cal FEMA) and the Federal Emergency Management Agency (FEMA) for final review and approval. FEMA will provide the City with an "Approval Pending Adoption" letter if the plan update meets all federal

requirements. Upon receipt of this letter, the final plan will be submitted to the Fontana City Council for consideration and adoption.

The City of Fontana City Council is responsible for the review, approval, and adoption of the Local Hazard Mitigation Plan (LHMP) update for the City of Fontana. It is also the intent of the City of Fontana City Council to ensure the LHMP update remains a part of the City of Fontana General Plan.

After Cal OES and Cal FEMA have approved the LHMP update, it will be adopted by the City of Fontana City Council through a public hearing process. The LHMP will be listed on the agenda with the plan being made available electronically to the general public for at least three (3) business days prior to the City Council's meeting date. Any member of the public can make comments on the Plan during the meeting prior to any action by the City Council. ***This section will be completed after approval by Cal OES and FEMA.***

Section 4. Risk Assessment

The risk assessment is the process of measuring the potential impact to life, property and economic impacts resulting from natural hazards. The intent of the Risk Assessment is to identify, as much as practicable given existing/available data, the qualitative and quantitative vulnerabilities of a community. The results of the risk assessment allow for a better understanding of the impacts of natural hazards to the community and provides a foundation in which to develop and prioritize mitigation actions to reduce damage from natural disasters through increased preparedness and response times and the better allocation of resources to areas of greatest vulnerability.

This Risk Assessment Section evaluates the potential loss from a hazard event by assessing the vulnerability of buildings, infrastructure, and people. It identifies the characteristics and potential consequences of hazards, how much of the unincorporated areas of the County could be affected by a hazard, and the impact on unincorporated County area assets. The Risk Assessment approach consists of three (3) components:

- Hazard Identification – Identification and screening of hazards (Section 4.1)
- Hazard Profiles – Review of historic occurrences and assessment of the potential for future events (Section 4.2)
- Vulnerability Assessment – Determination of potential losses or impacts to buildings, infrastructure and population (Section 4.3)

4.1 Hazard Identification

Per FEMA Guidance, the first step in developing the Risk Assessment is identifying the hazards, which was completed by the Local Advisory Task Force. The Hazard identification is the process of recognizing natural and human-caused events that threaten an area. Natural hazards result from unexpected or uncontrollable natural events of sufficient magnitude to cause damage. Even though a particular hazard may not have occurred in recent history in the study area, all hazards that may potentially affect the study area have been considered. Hazards were ranked as low, medium or high based upon the perceived threat to the City. A threat category of low designates hazards unlikely to occur. A hazard in the medium category has some likelihood of occurrence but does not pose a significant threat to the community. A designation of high is assigned to hazards when a significant threat is identified.

4.1.1 Hazard Screening Criteria

The initial threat assessment of each hazard is based upon the following sources:

1. Historic occurrence of the hazard – Assessment is based on frequency, magnitude and potential impact of the hazard.
2. Mitigation potential for the hazard – This criterion considers if there are mitigation or counter measures possible to prevent or alleviate the risk. For example, although the south end of Fontana is located beneath the landing path of the Ontario International Airport (ONT) and there are significant concerns over an airplane crash, an airplane crash is not the sort of hazard for which mitigation plans have proved successful.

3. Expert opinion – Evaluation of threats includes a literature review and the expertise of the Local Advisory Task Force.
4. Published data and information – Assessment is based on data and/or information from credible publications or websites (for example; U.S. Geological Survey, California Geological Survey, National Weather Services, or academic publication).

Rankings used for the hazard screening follows:

High – There may or may not have been historic occurrences of the hazard in the community or region but experts feel it is likely the hazard will occur in the community and the risk is significant. Citizens feel there is a likelihood of occurrence and the consequences will be significant in terms of building damage and loss of life.

Medium – There may or may not have been a historic occurrence of the hazard in the community or region but experts feel it is possible the hazard could occur in the community. Citizens may feel there is a likelihood of occurrence but the consequences will be negligible in terms of building damage and loss of life.

Low – There has been no historic occurrences of the hazard in the community or region and experts feel it is highly unlikely the hazard will occur in the community. The citizens agree.

4.1.2 Hazard Assessment Matrix

The results of the screening process are presented as a hazard assessment matrix in Table 4-1 below. The matrix illustrates the nature and potential of threats from natural and human-caused disasters to the City of Fontana. The Local Advisory Task Force developed the preliminary matrix, which was reviewed and modified through a series of meetings. As a part of the screening process, the Task Force developed a series of hazard maps from publicly available sources. (See Appendix E for hazard screening maps and sources).

	Hazard	Historic Occurrence	Mitigation Potential	High	Medium	Low
1	Earthquake	Yes	Yes	X		
2	Wildfire	Yes	Yes	X		
3	Flood / Winter Storms	Yes	Yes	X		
4	Terrorism	No	Yes		X	
5	Wind Surge	Yes	Yes	X		
6	Climate Change-Drought	Yes	Yes		X	
7	Landslide	No	Yes			X

Table 4-1: Hazard Assessment Matrix

This section provides an explanation of the final rankings presented in the matrix and, where applicable, identifies the use of maps used during the ranking process.

1. **Flood / Winter Storm** ranked high. Winter storm flooding occurs in the city occasionally, but with little or no consequence to property or human life. Appendix E Map 2, shows the delineated flood zone in the region and demonstrates that it falls outside the city boundary.

2. **Wildfire** ranked high. The City is surrounded by foothills that have steep terrain and light, flashy fuels, and the predominate weather patterns feature high temperatures, low humidity, as well as seasonal high speed Santa Ana winds. These factors together, with many homes that are built near or in the interface zone, have created a potential for significant damage due to wildfire.

3. **Earthquake** ranked high. Earthquake hazard maps and the history of large, damaging earthquakes in the Southern California region, indicate high risk for the City of Fontana. Appendix E – Map 1 shows the Cucamonga, San Andreas, and San Jacinto fault zones intersecting the city. Appendix E – Maps 7, 8, and 9 show landslide and liquefaction susceptibility.

4. **Landslide –** ranked low, however is dependent on other factors including earthquake, wildfire, and flooding. These other identified hazards have a direct link to the vulnerability and creation of landslides which could significantly change the rating factor.

5. **Climate Change/Drought-**ranked medium. Fontana will potentially be affected not only by direct climate change impacts within its own borders, but by indirect impacts resulting from changes taking place in the mountains, the deserts, and the coast. The major projected impact of climate change in Fontana is expected to be more days of extreme heat over longer periods. Drought severity depends on numerous factors, including duration, intensity, and geographic extent, as well as regional water supply demands by humans and vegetation.

6. **Terrorism** ranked medium. Due to the proximity of the Ontario International Airport and several other potential priority targets of terrorists, the project team ranked this factor as a medium threat.

7. **Wind Surge** ranked high. Historical data shows that many damaging wind events have been documented in the Inland Empire area and in Southern California as a whole.

4.1.3 Hazard Prioritization

The Local Advisory Task Force approach combines historical data, local knowledge, and consensus opinions to produce numerical values that allow identified hazards to be ranked against one another. These criteria are used to evaluate hazards and identify the highest risk hazard in the City of Fontana. As shown in Table 4-1.2 , there are four hazards that were given a high threat rating: flood/winter storm, earthquake, wildfire, and wind surge. Two hazards were identified as a medium threat rating: climate change/drought and terrorism, and landslides was ranked low as a threat to the City of Fontana.

4.2 Hazard Profiles

The natural hazard profiles in this section provide a baseline definition and description in relation to the City. The hazards symbolized below are profiled individually in this section and are in order by priority. For reference, each hazard symbol is placed at the beginning of each profile. The hazard profiles in this section provide a baseline for the Vulnerability Assessment, where the vulnerability is quantified in terms of population and assets affected for each of the priority hazards.

FLOOD

CLIMATE CHANGE
DROUGHT

FIRE

EARTHQUAKE

LANDSLIDE

TERRORISM

4.3 Flood Hazard Profile

Floods are the second most common and widespread of all natural disasters faced by the region and cities like City of Fontana. Most communities in the United States have experienced some kind of flooding during or after spring rains, heavy thunderstorms, winter snow thaws, or summer thunderstorms.

A flood, as defined by FEMA's National Flood Insurance Program (NFIP) is: "A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is the policyholder's property) from:

- Overflow of inland or tidal waters, or
- Unusual and rapid accumulation or runoff of surface waters from any source, or
- Mudflow, or
- Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels."

Floods can be slow or fast rising but generally develop over a period of hours or days. Mitigation includes any activities that prevent an emergency, reduce the chance of an emergency happening, or lessen the damaging effects of unavoidable emergencies. Investing in mitigation measures now, engaging in floodplain management activities, constructing barriers such as levees, and purchasing flood insurance will help reduce the amount of structural damage and financial loss from other types of property damage should a flood or flash flood occur.

The standard for flooding is the 1% annual chance flood, commonly called the 100-year flood, the benchmark used by the FEMA to establish a standard of flood control in communities throughout the country. The 1% annual chance flood is also referred to as the base flood.

The 1% annual chance flood is the flood that has a 1% chance of being equaled or exceeded in any given year and it could occur more than once in a relatively short period of time. By comparison, the 10% flood (10-year flood) means that there is a 10% chance for a flood of its size to occur in any given year.

4.3.1 Regulatory Environment

National Flood Insurance Act and Flood Disaster Protection Act

The Federal Emergency Management Agency (FEMA) is mandated by the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 to evaluate flood hazards and provide Flood Insurance Rate Maps (FIRMs) for local and regional planners to promote sound land use and floodplain development. The Flood Disaster Protection Act requires owners of all structures in identified Special Flood Hazard Areas to purchase and maintain flood insurance as a condition of receiving Federal or federally related financial assistance, such as mortgage loans from federally insured lending institutions. The National Flood Insurance Reform Act of 1994 further strengthened the National Flood Insurance Program (NFIP) by providing a grant program

for State and community flood mitigation projects. The act also established a system (Community Rating System - CRS) for crediting communities that implement measures to protect the natural and beneficial functions of their floodplains, as well as managing the erosion hazard. The City of Fontana has participated in the NFIP since 1987 (City ID No. – 060274); however, Fontana is not currently listed in FEMA's CRS of cities.

How can the City minimize the damage caused by flooding?

The city of Fontana sits primarily on alluvial sediments shed from the San Gabriel and Jurupa Mountains, and carried downslope onto the valley floor by a series of ephemeral streams, including Duncan, San Sevaine, Morse, and Henderson Creeks, and several smaller unnamed streams. Any rainwater that does not infiltrate the valley sediments makes its way as runoff into the East Etiwanda Creek Channel or the Etiwanda – San Sevaine Channel. Except for the Santa Ana River, most of the streams in the valley have significant flow only during the wet winter months, when they may carry large amounts of runoff for short periods of time. Average yearly precipitation in the Fontana area is 26.6 inches. However, rainfall is extremely variable from year to year.

The city of Fontana is not vulnerable to flooding associated with the Santa Ana River and its larger tributaries. However, the smaller channels and alluvial fans within or immediately adjacent to the city do pose a flooding potential. The most current flood maps prepared by FEMA show that several sections in the study area are subject to 100- and 500-year flooding. Several existing critical facilities are situated within these flood boundaries, as well as numerous hazardous materials sites.

The City has undertaken a significant capital improvement program that includes the construction and retrofitting of storm drains and other flood control structures throughout the area. These structures are anticipated to reduce the flood boundaries as presently shown on the FIRM maps. Once documentation has been submitted to and has been reviewed by FEMA, new FIRM maps for this area will be issued. This area has not seen a 100-year flood in many years, the smaller 10-year and 25-year storms that have occurred did strain the area's flood control system. To compound this, the area has experienced tremendous growth in the last few years, and many more developments are currently in the construction or design phases. These projects will increase the amount of impervious surface area and place more people and structures within the floodplain, with a resultant increase in the flood risk.

There is no major dam located upstream from the Fontana area, therefore, the city is currently not susceptible to dam inundation. However, other smaller flood control improvements, such as canals, culverts, levees, and retention basins may crack and suffer some structural damage during an earthquake, especially in areas prone to ground failure.

4.3.1.1 National Flood Insurance Program (NFIP)

The NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. As a participating member of the NFIP, City of Fontana is dedicated to protecting more than 434 homes with policies currently in force. Like most communities participating in NFIP, FEMA has prepared a detailed Flood Insurance Study (FIS) for areas of San Bernardino County, including the City of Fontana. The study presents water surface elevations for floods of various magnitudes, including the 1-percent annual chance

of flood (the 100-year flood) and the 0.2-percent annual chance of flood (the 500-year flood). Base flood elevations and the boundaries of the 100- and 500-year floodplains are shown on FIRMs. More information on location and geographic extent of the Flood Insurance Rate Maps (FIRMs) are provided in this section.

The City of Fontana entered the regular phase of the NFIP on June 2, 1974. As a participant in the NFIP, the City of Fontana is dedicated to regulating development in the FEMA planned floodplain areas in accordance with NFIP criteria. Before a permit to build in a floodplain area is issued, the City of Fontana ensures that two basic criteria are met:

- All new buildings and developments undergoing substantial improvements must, at a minimum, be elevated to protect against damage by the 100-year flood.
- New floodplain developments must not aggravate existing flood problems or increase damage to other properties.

Structures permitted or built in the County/City before the NFIP regulatory requirements were incorporated into the City of Fontana ordinances (before the effective date of the City of Fontana's FIRM) are called "pre-FIRM" structures. For the City of Fontana, pre-FIRM structures are those permitted or built before June 2, 1974.

Extensive FEMA NFIP databases are used to track claims for every participating community including City of Fontana. NFIP insurance data provided by FEMA indicates that as of September 2, 2016, there were 434 policies in the City of Fontana, resulting in $109,977,600 of insurance in force; this amounts to $406,842 in total premiums. Of the 434 policies, only 317 are for structures located within the 1% annual chance flood zones, while the remaining 117 policies are for structures located outside of the FEMA identified floodplain.

There have been 20 closed paid losses totaling $127,426. Of the closed 20 paid losses there has been (1) one substantial damage claim. Substantial damage" means damage of any origin sustained by a structure whereby the cost of restoring the structure to it's before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Based on this analysis of insurance coverage, the City of Fontana has significant assets at risk to the 100-year flood. Of the 573 improved parcels within the 100-year floodplain, only 409 of those parcels maintain flood insurance[1]. These uninsured structures located in mapped floodplain areas are especially vulnerable.

Currently, the City of Fontana contains (1) one RL property under their jurisdictional umbrella. The total dollar amount of claims paid to date by the NFIP is $127,426. The City of Fontana also contains 0 Severe Repetitive Loss structure.

Most of the RL properties that have experienced flooding in of the City of Fontana are due to overbank flooding in localized areas. Every loss claim is seasonal in nature as all loss claims have been in December, January or February. Some mitigation on these properties has been

[1] An improved property owner may not carry flood insurance for a number of reasons; not everyone is required to carry flood insurance. Structures carrying federally-backed mortgages that are in a SFHA are required to carry flood insurance in the City of Fontana. Owners who have completed the terms of the mortgage or who purchased their property outright may not choose to carry flood insurance and instead bear the costs of recovery on their own.

conducted and the City of Fontana is currently tracking mitigation actions through standardized forms as required by FEMA. Of the (1) repetitive loss properties, all have been mitigated.

A property does not have to be currently carrying a flood insurance policy to be considered a RL or SRL property. Often homes in communities are not carrying flood insurance but are still on the community's repetitive loss list. The "repetitive loss" designation follows a property from owner to owner; from insurance policy to no insurance policy, and even after the property has been mitigated. Having an insurance policy and making claims that fall into the repetitive loss criteria will put a property on the RL list. Even after the policy on a property has lapsed or been terminated, the property will remain on City of Fontana's RL list.

The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data are used for floodplain management, mitigation, or research purposes. Therefore, this plan does not identify the repetitive loss properties or include claims data for any individual property.

4.3.2 Past Flood Occurrences

- 1969 Fontana Area Flood – The mountain tributaries of Cucamonga, Deer, Day and Cajon Creeks damaged or destroyed, as a result of scour or erosion, several miles of improved channels, roads, bridges and railroad lines. The 1969 floods exceeded the capacity of the storm drains and flood-control channels, overflowing onto residential areas. About 1,000 people were reportedly evacuated from the Cucamonga area.
- March 30, 1983 Fontana Flood – The President declared San Bernardino County a federal disaster area for public agencies as a result of the storms between January 21, 1983 and March 30, 1983. The City of Fontana incurred damage to public improvements during this time period. City Council Resolution number is 83-76. All other information is unknown.
- February 28, 1993 – The President declared San Bernardino County a federal disaster area for public agencies as a result of the storms between December 28, 1992 and February 28, 1993 (FEMA-979-DR). The City of Fontana incurred damage to public improvements during this time period. City Council Resolution number is 93-90. All other information is unknown.
- January 1, 1995 – The President declared San Bernardino County a federal disaster area for public agencies as a result of storm related flood damage occurred in January 1995 (FEMA-1044-DR). The City of Fontana incurred damage. City Council Resolution number is 95-29. All other information is unknown.
- February 28, 1995 – The President declared San Bernardino County a federal disaster are for public agencies as a result of storm related flood damage occurred in February – March, 1995 (FEMA-1046-DR). The City of Fontana incurred damage. City Council Resolution number is 95-30. All other information is unknown.
- October 19 – 20, 2004 – The City of Fontana received heavy rain fall resulting in heavy urban flooding. The San Sevaine wash was completely overrun at the Railroad undercrossing just north of Slover Avenue. The resulting flooding waters washed out the train tracks, causing a railcar full of chlorine to derail and puncture a jet fuel gas line underground adjacent to the tracks.
- December 31, 2004 – At 1:25 pm the Fire Department/Rescue Squad declared that Etiwanda Avenue had to be closed due to flash flooding. There were no deaths or injuries reported.

- January 9, 2005 – At 11:52 am law enforcement declared that the roadway at Sierra Avenue and Armstrong Road was completely flooded due to a flash flood. There were no deaths or injuries reported.
- January 19, 2010 – Heavy rain caused minor flooding in areas with poor drainage in Fontana and Redlands. In Fontana, a home was filled with several inches of water after sandbags surrounding the home failed. In Redlands, a clogged drain caused an apartment parking lot to flood, damaging several cars.
- October 11, 2012 – A warehouse roof collapsed on the 11000 block of Mulberry Avenue in Fontana due to accumulation of over 1 foot of water. Drains were plugged allowing the water to accumulate. An alert gauge approximately 2 miles north of the location reported 1.02 inches of rain in 25 minutes between 1545 and 1610 PST.

Since the update of the LHMP in 2012, no major disasters due to flooding have occurred within the City of Fontana.

4.3.3 Location/ Geographic Extent

The Federal Flood Emergency Management Agency (FEMA) updates the Flood Insurance Rate Maps (FIRM) which are utilized and identify areas of concern for potential flooding. For the City of Fontana, FEMA updated the FIRM Maps based on the significant storm drain and flood control infrastructure built in the area within the last decade.

The process of updating the FEMA FIRM Maps required coordination with city and county staff to determine areas of potential flooding. Areas lacking infrastructure are reviewed for flooding potential in infrastructures identified. In the last 10 years, the City of Fontana and the San Bernardino County Flood Control District has constructed facilities within the City which have substantially alleviated food potential.

Additionally, scattered areas throughout the City may exist with minor vulnerability to flooding. However, the local flooding has been minimized in the City of Fontana due to recent infrastructure built in combination with the 210 Freeway construction (Highland Channel) thereby minimizing flood potential.

In urban areas, flood problems are intensified because new homes and other structures, and new streets, driveways, parking lots, and other paved areas decrease the amount of open land available to absorb rainfall and runoff, thus increasing the volume of water that must be carried away by waterways.

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

The FIRM maps not only identify the flood hazard zones for insurance and floodplain management purposes, but also provide a statement of probability of future occurrence.

A 500-year flood has a 0.2-percent chance of occurring in any given year; a 100-year flood has a 1-percent chance, a 50-year flood has a 2-percent chance, and a 10-year flood has a 10-percent chance of occurrence. Although the recurrence interval represents the long-term average period between floods of specific magnitude, significant floods could occur at shorter intervals or even

within the same year. The FIRM maps typically identify components of the 500-year and 100-year floodplains.

Figure 4-1 shows 100-year and 500-year floodplain zones, which are estimated inundation areas based on a flood that has a 1-percent (100-year) and 2-percent (500-year) chance of occurring in any given year. City of Fontana contains over 3,000 acres of identified flood hazard areas. Table 4-2 provides the total area for both the 100-year and 500-yr. flood hazard areas.

A majority of the flood risk within City of Fontana is specifically subject to inundation as a result of heavy rainfall and resulting stream and drainage canal overflows. The extent of flooding associated with a 1-percent annual probability of occurrence (the base flood or 100-year flood) is used as the regulatory boundary by many agencies, and helps identify the location and extent of flooding in areas across the City of Fontana. This area is also referred to as the SFHA, and is a convenient tool for assessing vulnerability and risk in flood-prone communities.

Figure 4-1 shows 100-year and 500-year floodplain zones, which are estimated inundation areas based on a flood that has a 1-percent (100-year) and 2-percent (500-year) chance of occurring in any given year. City of Fontana contains over 3,000 acres of identified flood hazard areas. Table 4-2 provides the total area for both the 100-year and 500-yr. flood hazard areas.

Flood Hazard Type	Sum of Acres	Sum of Square Miles
100-Year Flood	320	0.50
100-Year, Floodway	25	0.04
500-Year Flood	1,779	2.78
500-Year, Protected by Levee	1,059	2
Total	**3,183**	**4.97**

Table 4-2: Special Flood Hazard Area

Source: FEMA Published DFIRM Data

4.3.4 Magnitude/ Severity

In urban areas like City of Fontana, flood problems are intensified because new homes and other structures, and new streets, driveways, parking lots, and other paved areas decrease the amount of open land available to absorb rainfall and runoff, thus increasing the volume of water that must be carried away by waterways.

4.3.4.1.1 Flash Flooding (From San Bernardino County Operational Area Plan)

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

The desert area contains many mountain ranges that are steep and experience summer thunder storms causing flash floods in many dry washes on the desert floor. The water collects in dry lake

beds throughout the desert area. Environmental permit processing has delayed or prohibited work in the washes to provide flow lines to many bridges on county highways. Many highways do not have bridges but convey water across the road with dip crossings. Flash flooding cause's road and bridge wash outs and erosion of earthen channels and basins when they occur near these facilities. Cities and towns often experience street closures for several days due to sediment transport and road damage. Because of the sheet flow character of the desert, many private properties experience erosion and sediment deposits. The urban valley also can experience flash flooding in its narrow canyons and within the many unimproved creeks and interim channels feeding the Santa Ana River. The valley floor in many areas is very flat so even minor rain events can produce flooding of roads and private property. In coordination with local jurisdictions, the County of San Bernardino Flood Control District has prepared Master Drainage plans for many cities and towns to provide a plan for reducing flooding due to minor storms. Maps can be found on the County's Department of Public Works website here:

http://cms.sbcounty.gov/dpw/FloodControl/Planning/MPD.aspx

However, local resources are not sufficient to cover the cost of the construction of the drainage systems. The densely populated (75% of the county population) urban valley region contains the headwaters of the Santa Ana River. The San Gabriel and San Bernardino Mountains border the North side of the valley are steep reaching 5,000 feet with alluvial fans which are developed and densely populated.

4.3.5 Frequency/ Probability of Future Occurrences

The FIRM maps not only identify the flood hazard zones for insurance and floodplain management purposes, but also provide a statement of probability of future occurrence.

A 500-year flood has a 0.2-percent chance of occurring in any given year; a 100-year flood has a 1-percent chance, a 50-year flood has a 2-percent chance, and a 10-year flood has a 10-percent chance of occurrence. Although the recurrence interval represents the long-term average period between floods of specific magnitude, significant floods could occur at shorter intervals or even within the same year. The FIRM maps typically identify components of the 500-year and 100-year floodplains.

Figure 4-1 shows FEMA 100-year and 500-year flood zones.

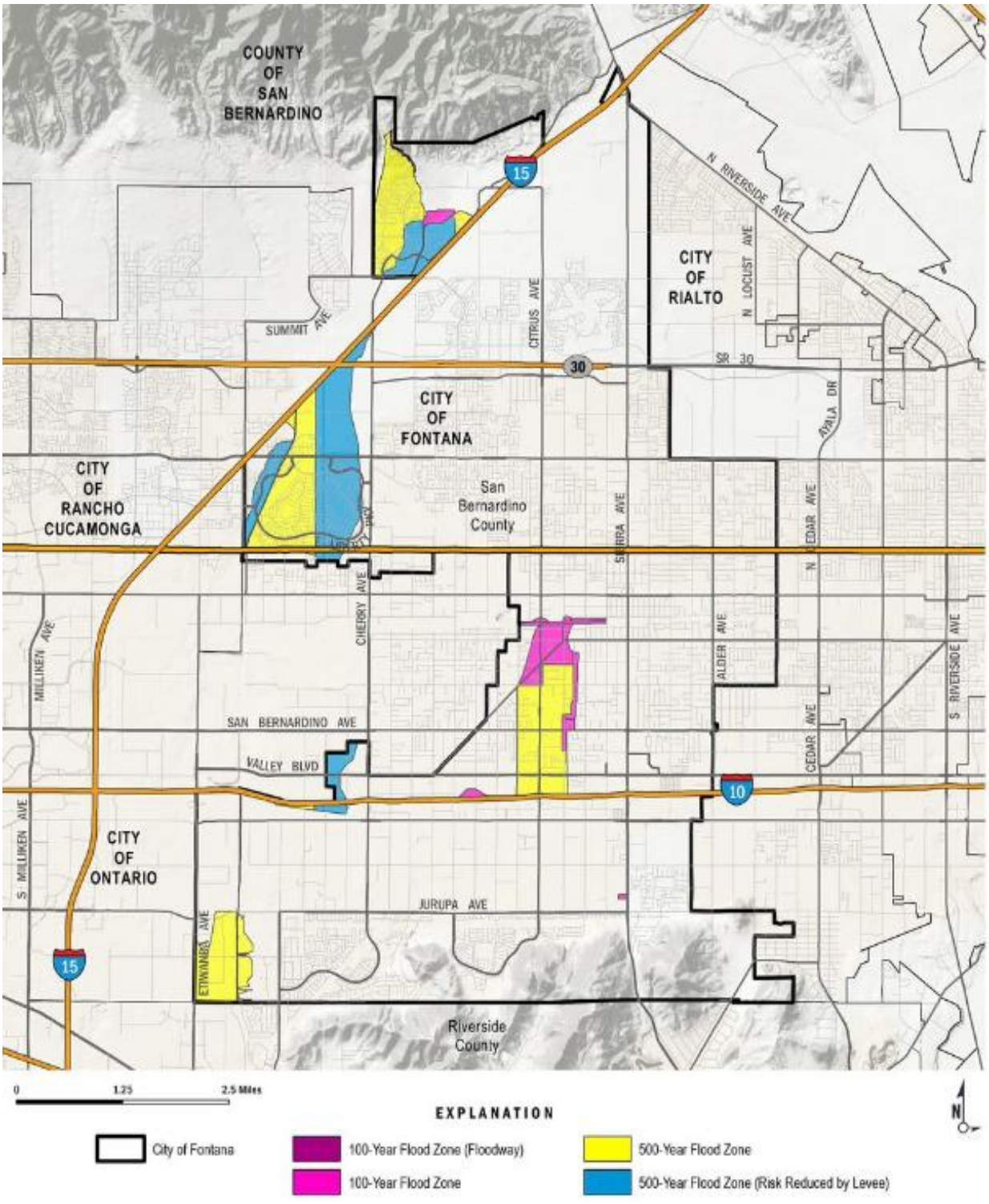


Figure 4-1: Flood Hazard Map

Source: FEMA

4.3.6 Flooding due to Dam Inundation

Dams or reservoirs may fail for seismic or geologic reasons, which could potentially lead to damage of infrastructure and property located immediately and downstream from these dams and reservoirs. Inundation areas for the City of Fontana and nearby jurisdictions as provided by the San Bernardino County Land Use Services map are shown in Figure 4-2. The map identifies some areas of dam inundation within adjacent jurisdictions; however none exist within the jurisdiction or upstream from the City of Fontana. Therefore, no potential for dam inundation exists.

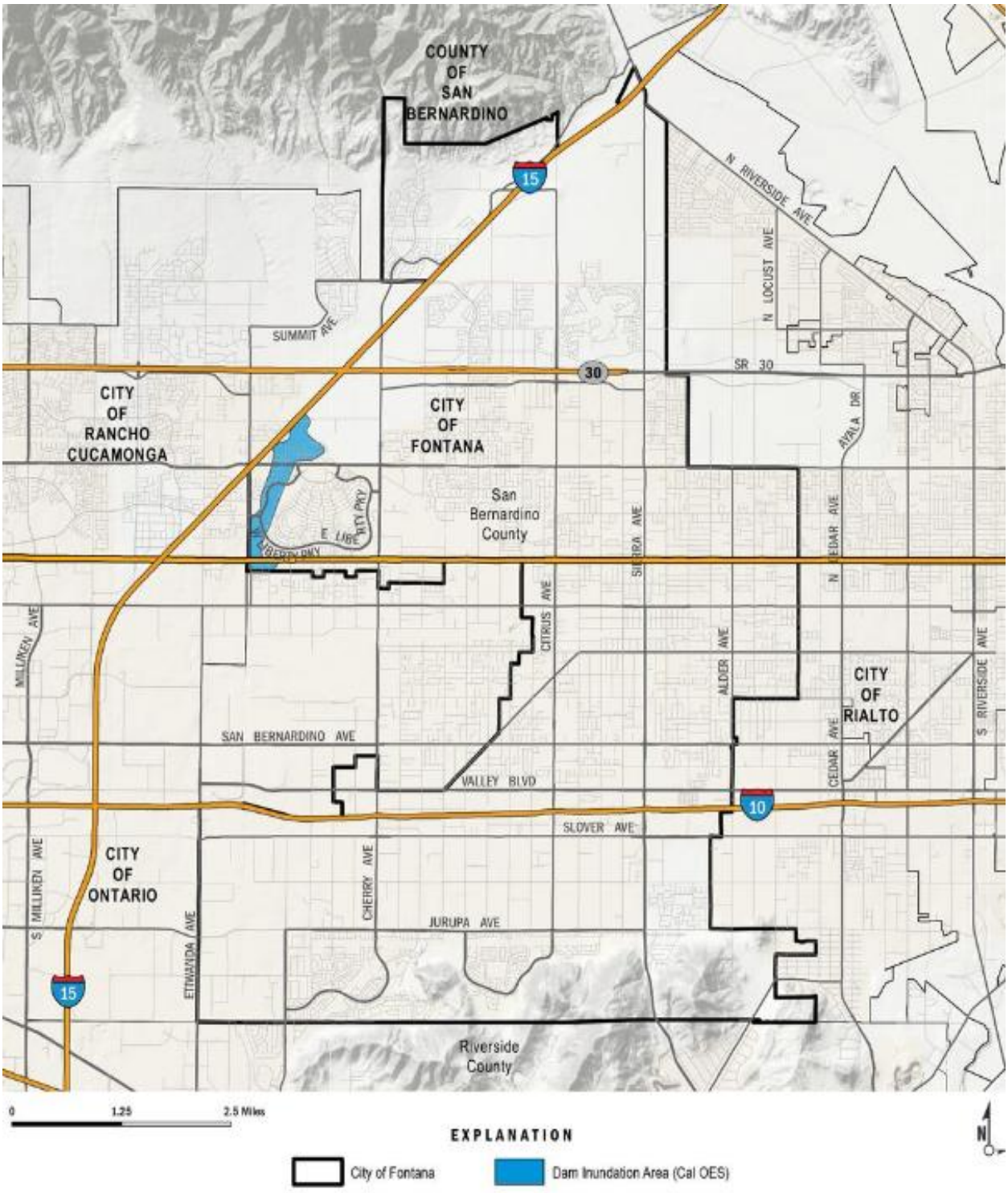


Figure 4-2: Dam Inundation Areas in Fontana

Source: Cal OES

4.4 Wildfire Hazard Profile

As defined in the California Fire Protection (CAL FIRE) 2010 Strategic Fire Plan, a wildfire event is an unwanted wildland fire including unauthorized human-caused fires, escaped wildfire use events, escaped prescribed wildfire projects, and all other wildfires.

A wildfire [or "wildland" fire] is a type of fire that spreads through open land, burning all types of vegetation and threatening buildings and structures. It often begins unnoticed, spreads quickly, and is usually signaled by dense smoke that may be visible from miles around. Wildfires can be caused by human activities (such as arson or campfires) or by natural events, such as lightning. Wildfires often occur in undeveloped forests, grasslands or other such areas with ample vegetation and spread to developed areas, threatening life, safety, and property. If wildfires are not promptly controlled, they may quickly grow into a small or large-scale disaster. Even small fires can threaten lives and resources and destroy improved properties. The indirect effects of wildfires to the citizens and businesses in the City can also be catastrophic.

Wildfire Behavior

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

1. ***Topography****:* As slope increases, the rate of wildfire spread typically increases. South facing and west facing slopes are also subject to more solar radiation, making the vegetation drier and thereby intensifying wildfire behavior. These and other certain features, such as a depression in ridgeline (called a "saddle") a narrow canyon enclosed on three sides (called a "chimney") in the topography of the foothills surrounding Fontana create a special hazard in that they can increase the intensity and the unpredictability of wildfires.

2. ***Fuel:*** The type and condition of vegetation plays a significant role in the occurrence and spread of wildfires. Certain types of plants are more susceptible to burning or will burn with greater intensity. For example, the open space areas within and surrounding Fontana contain fuels that range from light grasses which can flash quickly in a wildfire scenario, to some moderate to thick brush and trees that feed a fire in the treetops (called an "aerial" fire.) Dense or overgrown vegetation increases the amount of combustible material available to fuel the fire (referred to as the "fuel load"). The ratio of living to dead plant matter is also important. The risk of fire is increased significantly during periods of prolonged drought as the moisture content of both living and dead plant matter decreases. Lastly, the fuel's continuity, both horizontally and vertically, is also an important factor.

3. ***Weather:*** The most variable and often most profound factor affecting wildfire behavior is weather. Temperature, relative humidity, wind, and lightning can affect chances for ignition and spread of fire. The City of Fontana has experienced extreme weather, such as high winds, high temperatures and low humidity, which can and has led to extremely volatile and dangerous wildfire activity. By contrast, cooling and higher humidity often signals reduced wildfire occurrence and easier containment.

The above factors make up a "Fire Behavioral Triangle" that is illustrated in Figure 4-3. The frequency and complexity of wildfires is also dependent upon other factors, such as lightning, drought, and infestations (such as the recent Bark Beetle infestation in the San Bernardino National Forest).

Figure 4-3: Fire Behavior Triangle

4.4.1 Regulatory Environment

Wildfire regulatory requirements are mandated by the State of California and the City of Fontana.

Fire Regulations

Assembly Bill 337 (the Bates Bill, adopted September 29, 1992) was a direct result of the great loss of lives and homes in the Oakland Hills "Tunnel Fire" of 1991. The Bates Bill Process is used to identify Very High Fire Hazard Severity Zones in Local Responsibility Areas. **Government Code Section 51178** specifies that the Director of the California Department of Forestry (CDF), in cooperation with local fire authorities, shall identify areas that are Very High Fire Hazard Severity Zones (VHFHSZs) in Local Responsibility areas (LRAs), based on consistent statewide criteria and the expected severity of fire hazard. State Responsibility Areas (SRAs) include all lands regardless of ownership, except for cities and federal lands. Although the State has financial responsibility for SRAs, it is not the State's responsibility to provide fire protection services to any building or structure located within a wildland area, unless the CDF has entered into a cooperative agreement with a local agency for those purposes pursuant to **Public Resources Code Section 4142**. Under **Assembly Bill 3819**, passed in 1994 (AB 3819 – Willie Brown), "Class A" roofing, minimum clearances of 30 feet around structures, and other fire defense improvements are

required in VHFHSZs. Many communities require vegetation management zones far wider than 30 feet; in the designated VHFHSZ of Fontana, 300 feet is recommended.

Government Code Section 51178 states that a local agency may, at its discretion, exclude from the requirements of Section 51182 an area identified as a VHFHSZ by the CDF. This requires a finding, supported by substantial evidence, that the requirements of Section 51182 are not necessary for effective fire protection within the area. Conversely, local agencies may include areas not identified as a VHFHSZ by the CDF, following a finding that the requirements of Section 51182 are necessary for effective fire protection. According to **Section 51182**, such changes made by a local agency shall be final and cannot be rebutted by the CDF.

Wildland areas require disclosure for real-estate transactions. Specifically, Assembly Bill 6 (AB6) requires that both types of fire hazard areas (SRAs and VHFHSZs) be disclosed in real estate transactions. **Civil Code Section 1103(c) (6)** also requires real estate sellers to inform prospective buyers whether or not a property is located within a wildland area that could contain substantial fire risks and hazards.

Public Resources Code Section 4290 requires minimum statewide fire safety standards pertaining to:

- Road standards for fire equipment access;
- Standards for signs identifying streets, roads, and buildings;
- Minimum private water supply reserves for emergency fire use; and
- Fuel breaks and greenbelts.

Wildland fire areas are also subject to **Public Resources Code Sections 4291 through 4299**, which require property owners in such areas to conduct maintenance in order to reduce the fire danger.

The **California Emergency Services Act, Section 8568**, states that “the State Emergency Plan shall be in effect in each political subdivision of the State, and the governing body of each political subdivision shall take such action as may be necessary to carry out the provision thereof.” The act provides the basic authorities for conducting emergency operations following the proclamations of emergencies by the Governor or appropriate local authority, such as a City Manager.

The City of Fontana uses the California Fire Code with amendments and several other fire ordinances to further reduce the City’s vulnerability to structural and wildland fires. For example, since 1986, fire sprinklers and smoke detectors have been required for all new homes in Fontana.

Mitigation Efforts

Many major vegetation fires have occurred historically in the Fontana area; some of these destroyed homes and other structures. These fires have occurred mostly in the northwesterly area of the city, but a few fires have also occurred in the Jurupa Mountains. In fact, the fire history indicates that a major fire occurs approximately once every ten years in the area. In all fires where structures were lost, the structures were unprotected buildings without fire sprinklers and without vegetation management zones around them.

The northwestern corner of the city has high hazard chaparral vegetation and steep slopes. This area is also subject to high, hot Santa Ana (or Santana) winds that blow from the north-northeast down the Cajon Pass. Fire models indicate that a fire in this area can have a major impact on the fire-fighting forces in Fontana and neighboring communities. The Jurupa Mountains, located in the southern portion of Fontana, have high grasses and locally steep slopes. A major fire in this area also has the potential to tax the fire forces of Fontana and adjacent communities, and to result in major traffic congestion as residents attempt to evacuate while onlookers try to enter the area. In addition to the two areas identified above, flat, grassy vacant properties in the city are also susceptible to vegetation fires.

Most structural fires occur in residences, and most fatalities in fires occur in residences. Residential developments located next to high fire hazard areas are at high risk of being impacted by fire, especially if the structures are not properly protected and there is inadequate vegetation management. Since 1986 all new homes in Fontana have been equipped with fire sprinkler systems and smoke detectors, and homes constructed since 1980 have proven to withstand fires better than older homes. In the older, low-income residential neighborhoods, however, structural fire is a concern because the houses are not protected with sprinklers, the buildings are often in a state of disrepair, and it is not uncommon for multiple families, or several unrelated persons to share a home together. An analysis of historical fires in the Fontana area indicates that the city's risk to structural fire can be classified as low probability / high consequence.

Similar comments can be made about the older commercial facilities in the city. These are also lack fire sprinklers, and where several buildings adjoin each other, there is the potential for a multi-occupancy fire that could destroy several buildings due to lack of fire separations. Older portions of the Kaiser
Permanente Hospital and associated buildings are not fitted with sprinklers. Given the large patient population, many of them non-ambulatory, a fire in the hospital can be considered the worst-case scenario for a structural fire in the city, with the potential for major loss of life. Structural fires in several of the large industrial facilities in the city are a concern, especially in facilities that use or store hazardous materials.

Public water supply for fire flow in the city is reportedly adequate. The water is supplied from 20 interconnected reservoirs that feed six supply zones using 16-inch diameter water mains. In the event of an earthquake on a nearby fault, however, water lost from damaged tanks could significantly reduce the water resources available to suppress earthquake-induced fires. Damaged tanks and water mains could also limit the amount of water available to residents. Furthermore, groundwater wells can be damaged during an earthquake, also limiting the water available to the community after an earthquake. Therefore, it is of paramount importance that the water storage tanks in the area retain their structural integrity during an earthquake, so water demands after an earthquake can be met. In addition to evaluating and retrofitting water reservoirs to meet current standards, this also requires that the tanks be kept at or near full capacity at all times.

4.4.1.1 State

Wildfire State Responsibility Area (SRA) Fire Safe Regulations outline basic wildland fire protection standards for local jurisdictions. SRA Fire Safe Regulations (if policed) can decrease the risk of wildfire events in the wildland interface. SRA Fire Safe Regulations do not supersede

local regulations, which equal or exceed minimum state regulations. The State statute for wildfire protection is Public Resources Code, Section 4290. Requirements in the code include information on the following (CA Fire Alliance n.d.):

1. Road Standards for Fire Equipment Access
2. Standards for Signs Identifying Streets, Roads and Buildings
3. Minimum Private Water Supply Reserves for Emergency Fire Use
4. Fuel Breaks and Greenbelts

4.4.1.2 Local

The City of Fontana is located in a Local Responsibility Area. Fire protection for the City of Fontana is the responsibility of the City of Fontana. The City of Fontana Fire Department is comprised of 33 staff members. Emergency response personnel are deployed from 7 fire stations located strategically throughout the City.

4.4.2 Past Occurrences

Wildfire events are of major concern to the City of Fontana. Cal FIRE maintains a database of wildfire perimeters. Table 4-3 gives the dates and fire names of the historical wildfires that have burned within City of Fontana limits. Figure 4-4 shows where those historical burn areas in the City of Fontana have occurred. In the past five years there have been a number of significant wildland fires that affected the City of Fontana. These fires are listed inTable 4-3, and several of the more damaging fires are discussed below.

Date	Name	Acres	Structure Loss	Personnel Assigned	Dollar Loss
Oct 2003	Grand Prix Fire	59,448	198	1,851	$14 million
Nov 2006	Sierra Fire	640	2	150	$1.2 million
Dec 2006	Citrus Fire	300	0	138	±$30,000
May 2007	Jurupa Fire	100	0	42	$18,091
Oct 2007	Cajon Fire	100	0	53	±$15,000
Oct 2008	Foxborough Fire	250	0	400	$33,190
May 2010	Glen Avon Fire	856	0	209	$232,066
August 2011	Kenwood Fire	375	0	200	N/A
June 2013	Mills Fire	534	1	282	N/A
August 2013	Cleghorn Fire	110	0	400	N/A
September 2013	Sierra Fire	200	0	397	N/A

June 2015	Sterling Fire	100	N/A	N/A	N/A
June 2015	Lake Fire	31,359	4	2,116	$32.5 million
July 2015	North Fire	4,250	23	215	N/A
August 2016	Blue Cut Fire	39,000	318	2,684	$18 million
August 2016	Pilot Fire	8,110	N/A	1,746	$16 million

Table 4-3: Wildfire Occurrences 2003-2016

The largest fire of recent date was the Blue Cut Fire, which started on August 16, 2016 at 10:36 AM in the Cajon Pass along Old Cajon Blvd. north of Kenwood Avenue west of Interstate 15. The fire quickly spotted across Cajon Creek and grew into a large wildland fire. During the course of the fire fight, railroad lines, local roads, highway 138 and Interstate 15 were closed along with a large evacuation area that included Lytle Creek, Wrightwood, Summit Valley, Baldy Mesa, Phelan and Oak Hills. The fire ravaged rural communities on the edges of vast open spaces so quickly that there was little firefighters could do. California's five-year drought, which has left brush bone-dry, as well as hot, windy weather conditions was blamed. The fire destroyed 105 homes and 213 other structures. At the peak of the fire, more than 80,000 people were ordered to evacuate. About 100 of these evacuees spent nights at Jessie Turner Community Center for Health and Fitness. Destructive wildfires like these continue to be a threat to Fontana every season.

Since August of 2016, no major disasters due to wildfire have occurred within the City of Fontana.

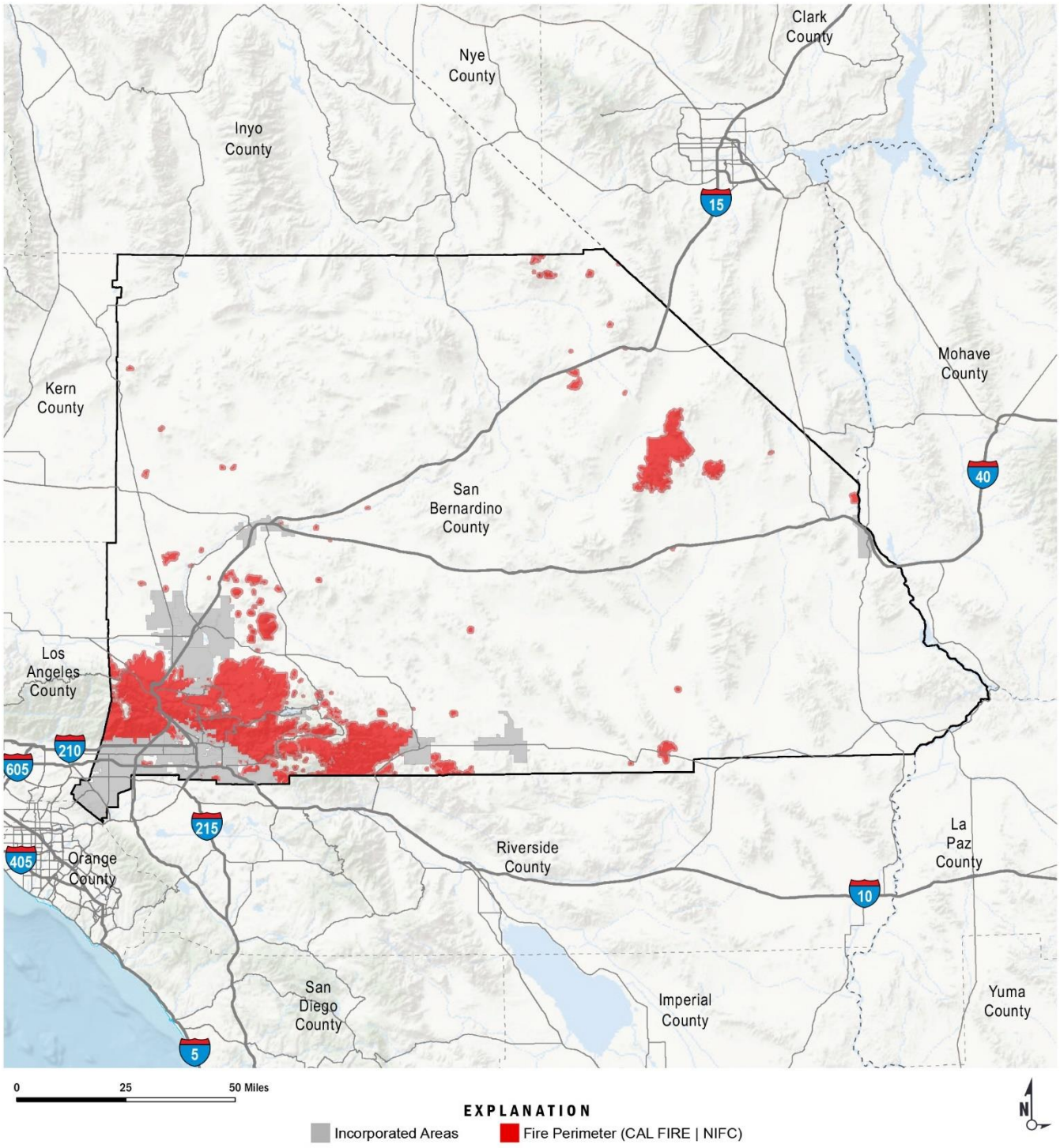


Figure 4-4: Wildfire History Map

Source: Cal Fire/ NFIC

4.4.3 Location/Geographic Extent

Using information from the California Department of Forestry (CAL FIRE) Figure 4-5 illustrates the areas at risk to a wildfire event. The areas with the highest risk of wildfire are the in the southern and northern portions of the City of Fontana. Current development of residential and commercial buildings have moved the urban wildland interface (the area where human development meets undeveloped wildland) closer to higher-risk wildfire hazard areas, increasing the number of people and buildings at risk as compared to the previously adopted LHMP. The remainder of the City of Fontana (the Central Core) is urbanized and generally built out with established commercial and residential development.

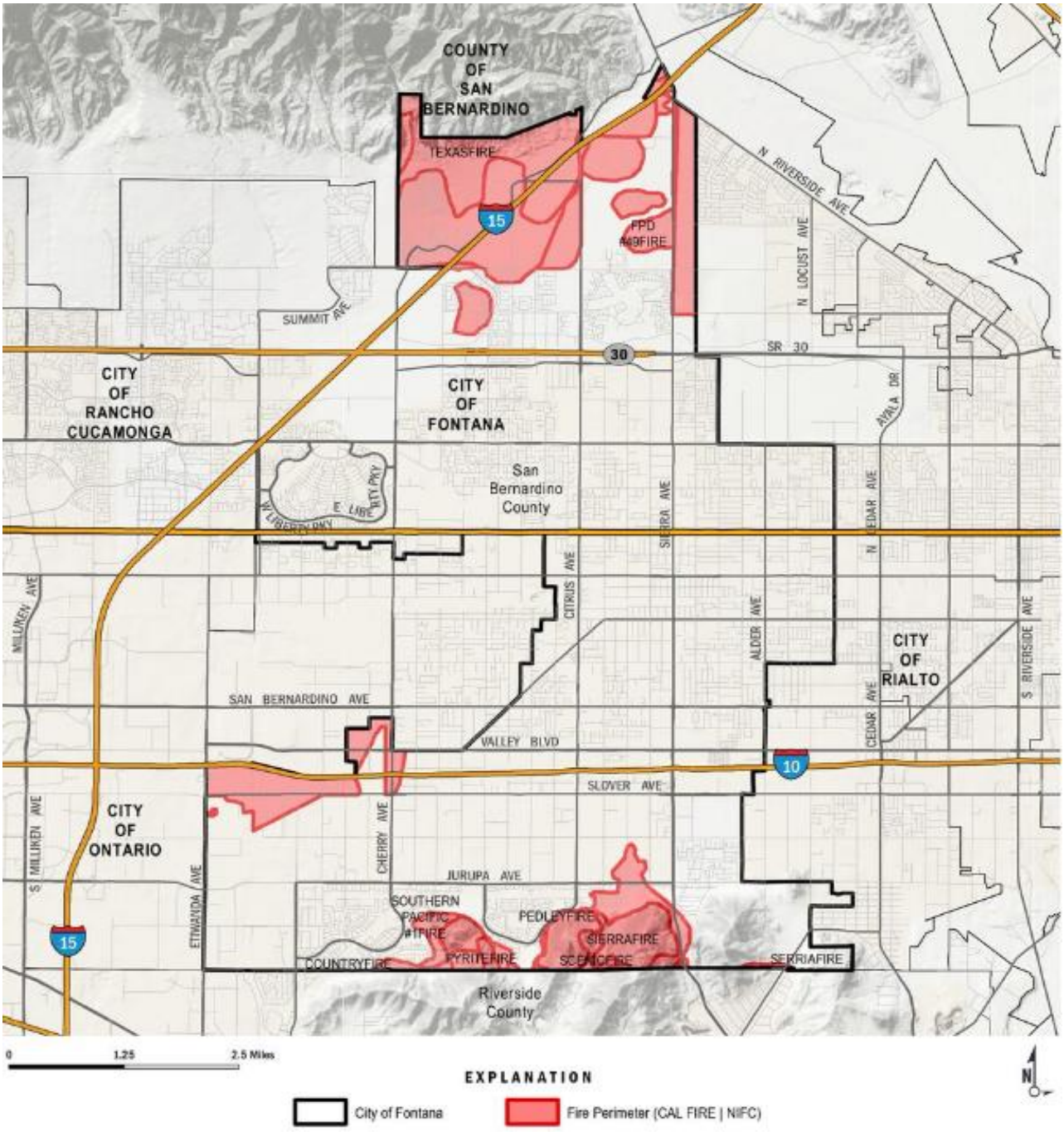


Figure 4-5: Fire Perimeter City of Fontana

Source: Cal Fire/ NFIC

4.4.4 Magnitude/Severity

The magnitude and severity of a wildfire event is measured by calculating the number of acres burned in a specific wildfire event. CAL FIRE adopted Fire Hazard Severity Zone maps for LRA

In June 2008. The Fire Severity Zones for City of Fontana identify areas of Very High, High, and Moderate fire hazard severity throughout the County and are mapped in Figure 4-6.

Fire Severity Zones are used in determining additional protective measures required when building new structures or remodeling older structures within the particular zone. Additional measures must be taken on the property around a structure in the higher ranked fire Severity Zones.

Fire hazard mapping is a way to measure the physical fire behavior to predict the damage a fire is likely to cause. Fire hazard measurement includes vegetative fuels, probability of speed at which a wildfire moves the amount of heat the fire produces, and most importantly, the burning fire brands that the fire sends ahead of the flaming front.

The model used to develop the information in accounts for topography, especially the steepness of the slopes (fires burn faster as they burn up-slope.). Weather (temperature, humidity, and wind) also has a significant influence on fire behavior. The areas depicted as moderate and high in are of particular concern and potential fire risk in these are constantly increasing as human development, and the wildland urban interface areas expand.

4.4.5 Frequency/Probability of Future Occurrences

In San Bernardino County, wildfire season commences in the summer when temperatures are high, humidity is low, and conditions remain dry. The season continues into the fall, when the County experiences high velocity, very dry winds coming out of the desert. A statewide drought beginning in 2011 has caused the state to be the driest it's been since record keeping began back in 1895 (California 2016). This has caused extremely dry conditions in unincorporated areas of the County creating plentiful fuel sources for wildfires.

USGS LANDFIRE (Landscape Fire and Resource Management Planning Tools), is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior, providing landscape scale geo-spatial products to support cross-boundary planning, management, and operations. Historical fire regimes, intervals, and vegetation conditions are mapped using the Vegetation Dynamics Development Tool (VDDT). This USGS data supports fire and landscape management planning goals in the National Cohesive Wildland Fire Management Strategy, the Federal Wildland Fire Management Policy, and the Healthy Forests Restoration Act.

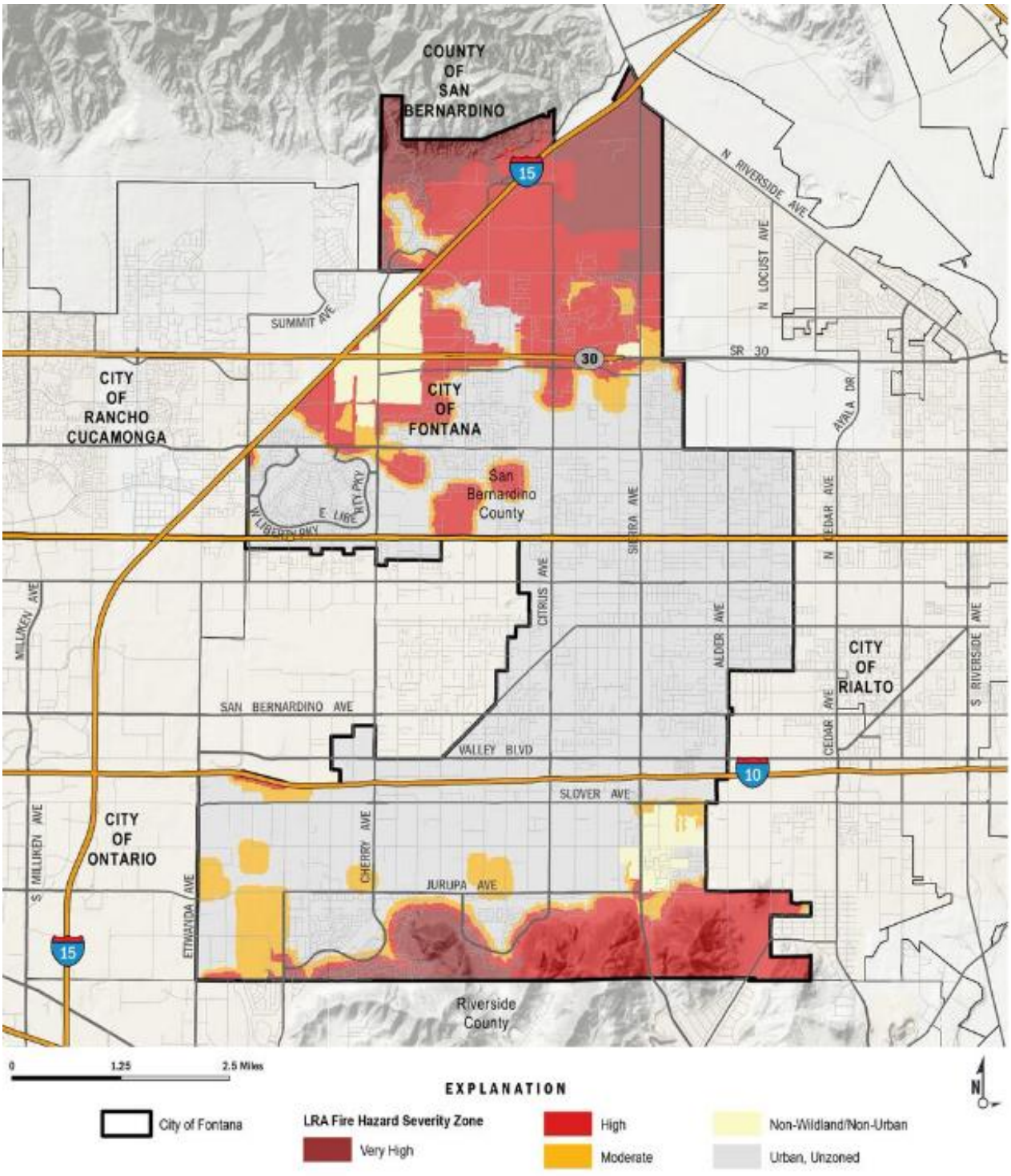


Figure 4-6: Wildfire Hazard Severity Zones

Source: Cal Fire

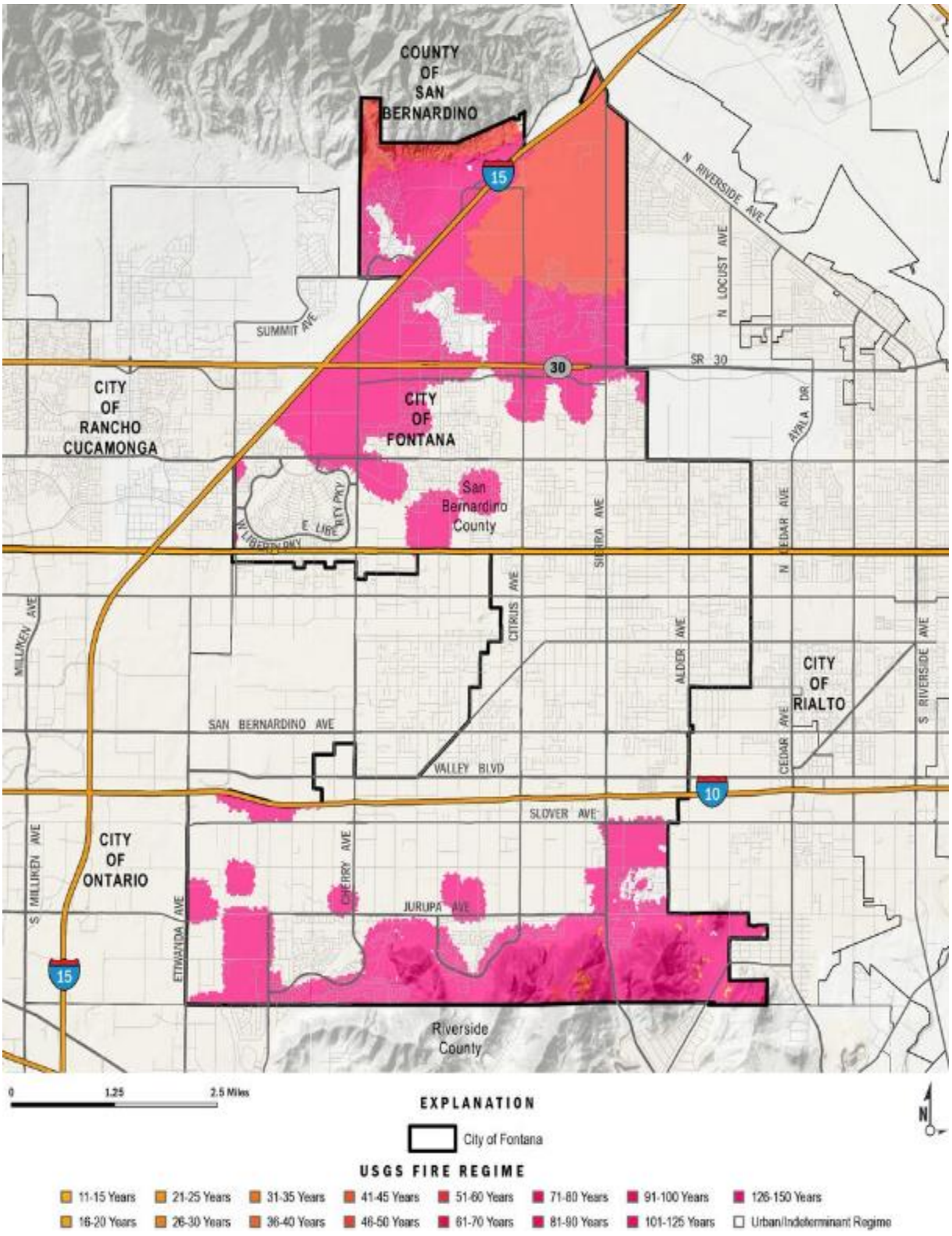


Figure 4-7: Wildfire Return Interval Map

Source: USGS LandFire

As part of the USGS Landfire data sets, the Mean Fire Return Interval (MFRI) layer quantifies the average period between fires under the presumed historical fire regime. MFRI is intended to describe one component of historical fire regime characteristics in the context of the broader historical time period represented by the LANDFIRE Biophysical Settings (BPS) layer and BPS Model documentation.

MFRI is derived from the vegetation and disturbance dynamics model VDDT (Vegetation Dynamics Development Tool) (LF_1.0.0 CONUS only used the vegetation and disturbance dynamics model LANDSUM). This layer is created by linking the BpS Group attribute in the BpS layer with the Refresh Model Tracker (RMT) data and assigning the MFRI attribute. This geospatial product should display a reasonable approximation of MFRI, as documented in the RMT. See Figure 4-7 for predicted fire return interval for the jurisdictional area.

4.4.6 Future Development in High Fire Hazard Severity Zones

The future impacts of wildfire on the City based on anticipated future development are significant. This is because of the fact that, of the existing land that is yet to be developed within the City, a large portion of it is in the High and Very High Fire Hazard Severity Zones (FHSZ.) This will result in many new residential homes and some commercial buildings being exposed to these same wildfire hazards and conditions that have already been discussed. In addition, much of the land that is within the LAAFCO Sphere of Influence, and will eventually be annexed, is within wildfire prone areas. For instance, adjacent to the northern portion of the City, the entire 661 acre portion within the Sphere of Influence, part of which may be annexed and developed as early as five years from now, is within the FHSZ.

The type of development that the City anticipates will occur within the FHSZ is predominately residential, both single family dwellings (tract houses) and multiple family dwellings such as apartments and condominiums. This creates a greater potential impact because these structures are the least fire resistive in their construction and the population groups that inhabit them are the least prepared to evacuate in a large scale wildfire event. Currently there are two very large master-planned residential developments that lie partially or mostly within the FHSZ, which together are proposing the construction of more than 2,500 residential dwelling units. These and other projects that are slated to be developed in these areas are medium or higher densities, where property setbacks are minimal and construction is extremely lightweight, further increasing the vulnerability from wildfire.

4.5 Earthquake /Geologic Hazard Profile

An earthquake is both the sudden slip on an active fault and the resulting shaking and radiated seismic energy caused by the slip (USGS 2016). The majority of major active faults in the City of Fontana area are strike-slip faults. For this type of fault, during an earthquake event, one side of a fault line slides past the other. The rupture from this type of fault extends almost vertically into the ground.

Earthquakes are a significant concern to the City of Fontana**.** The area around City of Fontana is seismically active since it is situated on the boundary between two tectonic plates. Earthquakes can cause serious structural damage to buildings, overlying aqueducts, transportation facilities, utilities, and can lead to loss of life. In addition, earthquakes can cause collateral emergencies including dam and levee failures, fires, and landslides. Seismic shaking is by far the single greatest cause of damage from an earthquake in City of Fontana followed by liquefaction.

Liquefaction occurs when loosely packed sandy or silty materials saturated with water are shaken hard enough to lose strength and stiffness. Liquefied soils behave like a liquid and are responsible for tremendous damage in an earthquake. For example, it can cause buildings to collapse, pipes to leak, and roads to buckle.

Faults

According to the California Geological Survey (CGS), a fault is defined as "*a fracture or zone of closely associated fractures along which rocks on one side have been displaced with respect to those on the other side* (Bryant and Hart, 2007)." CGS describes faults and fault zones as follows: "*Most faults are the result of repeated displacement that may have taken place suddenly and/or by slow creep. A fault is distinguished from those fractures or shears caused by landslides or other gravity-induced surface failures. A fault zone is an area of related faults that are commonly braided and subparallel, but may be branching and divergent. A fault zone has significant width (with respect to the scale at which the fault is being considered, portrayed, or investigated), ranging from a few feet to several miles* (SP42, CGS 2007)*."*

The City of Fontana contains both active and potentially active faults. According to the USGS in 2008, "there is a 99% probability in the next 30 years there will be an earthquake 6.7 or larger in California." Southern California is a seismically active region and commonly experiences ground shaking from earthquakes along active faults. The State Mining and Geology Board define an active fault as one which has "*had surface displacement within Holocene time (about the last 11,000 years)".* Figure 4-9 and Map 1 in Appendix E show the location of faults and their fault zones in Fontana. The three faults that dominate the seismic hazard for the City of Fontana are the San Andreas, San Jacinto and Cucamonga faults.

Surface rupture

Surface rupture occurs when the ground surface is broken due to fault movement during a seismic event. The location of surface rupture generally can be assumed to be along an active major fault trace. Since there are no preventive measures to stop surface rupture, faults are identified with

the purpose of delineating zones over the surface tract of potentially hazardous faults where construction should be avoided.

The San Andreas and San Jacinto faults are both right-lateral, strike-slip faults, which means the primary sense of movement is for the two sides of the fault to slide horizontally past each other along the fault plane. In contrast, the Cucamonga fault is a thrust fault. It dips (slopes) northward beneath the San Gabriel Mountains. The San Gabriel Mountains have been uplifted and thrusted southward over the valley by past movement on the Cucamonga fault.

The San Andreas Fault is the longest fault in California, and as such it is capable of producing a larger earthquake than any other fault in California. During the brief period of recorded history, the San Andreas Fault has produced two great earthquakes, one in 1906 in northern California and the other in 1857 in south-central California. The rupture zones of these two earthquakes are separated by the creeping segment of the San Andreas Fault, along which stress is being relieved gradually and continuously, and no great earthquake is expected. Therefore, simultaneous rupture of the portions of the fault north and south of the creeping segment is not likely. Nonetheless, the portion of the San Andreas fault that is south of the creeping segment is 545 kilometers long, which makes it capable of producing a Mw8.0 or larger earthquake if that entire portion were to rupture in a single earthquake (Wells and Coppersmith, 1994).

Smaller earthquakes produced by rupture of shorter segments of the San Andreas Fault are also possible. For example, if the 78 kilometer long segment of the San Andreas Fault that extends along the northern side of San Bernardino were to rupture by itself, it would produce an earthquake with a magnitude of about Mw 7.2.

The San Jacinto fault also represents a significant seismic hazard for the City of Fontana. The conditional probability for rupture of this segment is estimated to be 37 percent within the next 30 years (WGCEP, 1995). If this segment were to rupture by itself it would produce a Mw 6.8 earthquake. If it ruptured in conjunction with other segments of the San Jacinto fault to the southeast it could produce an earthquake as large as Mw7.4 to 7.9 (WGCEP, 1995).

The Cucamonga fault forms the eastern end of the larger Sierra Madre thrust fault system, which extends westward from Cajon Pass along the southern flank of the San Gabriel Mountains. If the Cucamonga fault were to rupture its 20 to 28 kilometer length suggests that it would produce an earthquake of about Mw6.6 to 6.75 (average size of historical earthquakes with this length) to Mw6.9 to 7.0 (average size plus one standard deviation) (Wells and Coppersmith, 1994).

Figure 4-8: Surface Rupture

Ground shaking

Ground shaking is a general term referring to all aspects of motion of the earth's surface resulting from an earthquake, and is normally the major cause of damage in seismic events. The extent of ground shaking is controlled by the magnitude and intensity of the earthquake, distance from the epicenter, and local geologic conditions. Magnitude is a measure of the energy released by an earthquake; it is assessed by seismographs. Intensity is a subjective measure of the perceptible effects of seismic energy at a given point and varies with distance from the epicenter and local geologic conditions. Intensity can also be quantitatively measured using accelerometers (strong motion seismographs) through Peak Ground Acceleration (PGA) that record ground acceleration at a specific location, a measure of force applied to a structure under seismic shaking. Acceleration is measured as a fraction or percentage of the acceleration under gravity (g). The Modified Mercalli Intensity (MMI) scale is a subjective ranking scale that illustrates the relationship between shaking intensity and the potential damage to man-made structures.

Ground shaking is the primary cause of damage and injury during earthquakes and can result in surface rupture, liquefaction, land-slides, lateral spreading, differential settlement, tsunamis, building failure, and broken gas and other utility lines, leading to fire and other collateral damage. The intensity and severity of ground motion is dependent on the earthquake's magnitude, distance from the epicenter and underlying soil and rock properties. Areas underlain by thick, saturated, unconsolidated soils will experience greater shaking motion than areas underlain by firm bedrock.

Fires and structural failure are the most hazardous results of ground shaking. Most earthquake-induced fires start because of ruptured power lines and gas or electrically-powered stoves and equipment, while structural failure is generally the result of age and type of building construction.

4.5.1 Regulatory Environment

Numerous building and zoning codes exist at a state and local level to decrease the impact of an earthquake event and resulting liquefaction on residents and infrastructure. Building and zoning codes include the Alquist-Priolo Earthquake Fault Zoning Act of 1972, Seismic Hazards Mapping Act of 1990, 2013 California Standards Building Code (CSBC), and City of Fontana General Plan. To protect lives and infrastructure in the City of Fontana, the following building and zoning codes are used.

There are several Federal and State programs and regulations pertaining to public safety that provide the legal framework to the Local Hazard Mitigation Plan. These programs provide the minimum guidelines and criteria that must be complied with – local jurisdictions can choose to go beyond the Federal or State requirements and implement more stringent regulations.

California Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was signed into law in 1972 with its primary purpose being to mitigate the hazard of fault rupture by prohibiting the location of structures for human occupancy across the trace of an active fault. The Act requires the State Geologist to delineate "Earthquake Fault Zones" along faults that are "sufficiently active" and "well defined." The Act dictates that cities and counties withhold development permits for projects within an Earthquake Fault Zone within their jurisdiction until geologic investigations demonstrate that the projects are not threatened by surface displacements from future earthquakes. Projects include all land divisions and most structures for human occupancy. State law exempts single-family wood-frame and steel-frame dwellings that are less than three stories and are not part of a development of four units or more. However, local agencies can be more restrictive than the State.

California Seismic Hazards Mapping Act

The goal of the Seismic Hazards Mapping Act of 1990 is to minimize loss of life and property by identifying and mitigating seismic hazards. The act addresses non-surface fault rupture earthquake hazards, including strong ground shaking, liquefaction, and seismically induced landslides. The State agency charged with implementation of the Act is the California Geological Survey (CGS). The CGS prepares and provides local governments with seismic hazard zone maps that identify areas susceptible to amplified shaking, liquefaction, earthquake-induced landslides, and other ground failures. The seismic hazard zones delineated by the CGS are referred to as “zones of required investigation” because site-specific geological investigations are required for construction projects located within these areas.

4.5.1.1 State

The 1971 San Fernando Earthquake resulted in the destruction of numerous structures built across its path. This led to passage of the Alquist-Priolo Earthquake Fault Zoning Act. This Act prohibits the construction of buildings for human occupancy across active faults in the State of California. Similarly, extensive damage caused by ground failures during the 1989 Loma Prieta Earthquake focused attention on decreasing the impacts of landslides and liquefaction. This led to the creation of the Seismic Hazards Mapping Act. This Act increases construction standards at locations where ground failures are probable during earthquakes. Active faults in San Bernardino County have been included under the Alquist-Priolo Geologic Hazards Zones Act and Seismic Hazards Mapping Act.

4.5.1.2 Local

The 2013 California Building Standards Code (also known as Title 24) became effective for the County on January 1st, 2014. Title 24 includes CBC Section 3417: Earthquake Evaluation and Design for Retrofit of Existing Buildings which can be viewed at http://www.documents.dgs.ca.gov/bsc/2015TriCycle/Pre-Cycle-2015/CBC-CEBC/BSC-0X-15-ET-Pt10-Agenda-4d.pdf.

The 2013 CSBC is based on the International Building Codes (IBC), which is widely used throughout the United States. CSBC was modified for California's conditions to include more detailed and stringent building requirements. The City of Fontana, utilizes the 2016 CSBC to regulate the infrastructure in the City of Fontana. This includes unreinforced masonry (URM) buildings. For new buildings, City of Fontana includes earthquake safety provisions, with enhancements for essential services buildings, hospitals, and public schools.

4.5.1.3 General Plan Geologic Hazard Reduction Policies

What can the City do to minimize seismic hazards?

The Cucamonga and San Jacinto faults, two of the most active faults in southern California, extend across the northern portion of the city of Fontana. Three possible faults have been mapped at depth under the city of Fontana and its area of interest. Two of these form groundwater barriers (Barrier H and Barrier J). The third feature (Fontana Seismic Trend) is delineated by a pronounced concentration of small earthquakes, and may be expressed at the surface by a series of northeast-trending lineaments that have not been investigated previously.

The city of Fontana also lies within a few miles of the San Andreas Fault. As a result, the entire study area is susceptible to very strong ground shaking, and some areas of the city can be impacted by surface fault rupture. Given that ground water may occur within 40 feet of the surface in that portion of the Lytle Creek channel located within the city, the channel is considered susceptible to liquefaction. Other areas in the southern portion of the city may also have a moderate susceptibility to liquefaction due to seasonal saturation of the near-surface sediments.

A maximum magnitude earthquake on any of the three faults close to the city (Cucamonga, San Jacinto and San Andreas faults) has the potential to generate significant damage to wood-frame, reinforced concrete and steel structures, and to mobile homes. Most of the casualties anticipated in the area as a result of any of these earthquakes are thought to be associated with collapse of reinforced concrete and steel structures common in the commercial and industrial sections of the city. Mobile homes are expected to suffer extensive to complete damage. In all, nearly 50 percent of the structures in the area are expected to experience at least moderate damage.

Damage to the local hospital is expected to be significant; given the number of people in the Fontana area that are expected to require hospitalization after any of these earthquakes, the existing hospital, even if fully operational, is not expected to be able to handle the demand. The models suggest that the local potable water and electric power systems will be severely taxed during an earthquake on any of the major earthquake sources nearby. HAZUS estimates that 96 percent of the schools in the area will experience at least moderate damage, although none will be completely damaged. The model also estimates that none of the schools in the area will be more than 50 percent functional one day after the earthquake. All police stations and fire stations are anticipated to suffer at least moderate damage.

4.5.2 Past Occurrences

The LHMP Planning Team noted the following regional and local events for the seismic activity in City of Fontana.

Date	Magnitude (Mw) & Location	Fatalities
05/15/1910	Mw 6.0 – Elsinore, California	0
04/21/1918	Mw 6.9 – San Jacinto, California	1
07/22/1923	Mw 6.3 – 7 miles south of San Bernardino, east-southeast of Fontana, California	0
12/04/1948	Mw 6.0 – Desert Hot Springs, California	0
03/19/1954	Mw 6.4 – 15 miles west of Salton City, about 30 miles south of Indio, California	0
09/12/1970	Mw 5.2 – Lytle Creek, California	0
02/09/1971	Mw 6.6 – San Fernando, California	65
07/08/1986	Mw 5.6 – N. Palm Springs, California	0
02/28/1990	Mw 5.4 – Upland, California	0
04/22/1992	Mw 6.1 – Joshua Tree, California	0
06/28/1992	Mw 7.3 – Landers, California	3
06/28/1992	Mw 6.5 – Big Bear, California	0
01/17/1994	Mw 6.7 – Northridge, California	60
10/16/1999	Mw 7.1 – 32 miles north of the town of Joshua Tree / 47	0
02/22/2003	Mw 5.2 – Big Bear City, California	0
07/29/2008	Mw 5.5 – Chino Hills, California	0
04/04/2010	Mw 7.2 – Baja California	4
07/07/2010	Mw 5.4 – Borrego Springs, California	0
08/26/2012	Mw 5.4 – Brawley, California	0
03/28/2014	Mw 5.4 – Brea, California	0
06/10/2016	Mw 5.2 – Borrego	0

Table 4-4: Earthquake Historical Occurrences

1910 Elsinore Earthquake

Not a particularly strong or damaging quake -- though it did topple chimneys in Corona, Temecula, and Wildomar, and caused some alarm among the citizens of Los Angeles and San Diego, as well as those in towns closer to the epicenter. What is notable about this quake is that best estimates place its epicenter as somewhere along the Elsinore fault zone, a fault zone along which no other earthquakes as large as or greater than magnitude 6 have been historically recorded.

1918 San Jacinto Earthquake

Major damage occurred in San Jacinto. Several residents were injured, and one was killed. In the business section of San Jacinto, a town of about 1,000 population, only one new concrete building and one frame building remained standing after the earthquake. Most of the ruined buildings were of poor construction, however. Many lengthwise cracks were observed in the highway between San Jacinto and Hemet, but cracks were not observed at the sides of this highway.

1923 North San Jacinto Fault Earthquake

Damage from this quake, which awoke sleepers across southern California, was greatest in San Bernardino and Redlands, though it consisted primarily of minor damage -- chimneys thrown down, broken windows, and the like. Two people were critically injured, but no one was killed.

Those buildings which sustained significant damage in the shaking were generally of poor construction. The San Bernardino County Hospital and the Hall of Records were badly damaged. Probably the greatest damage occurred at the State Hospital at Patton. Trees fell in the nearby San Bernardino Mountains.

1948 Desert Hot Springs Earthquake

The Desert Hot Springs earthquake not only was felt over a large area (as far away as central Arizona, parts of Mexico, Santa Catalina Island, and Bakersfield), but also managed to cause notable damage in regions far from the epicenter. In the Los Angeles area, a 5800-gallon water tank split open, water pipes were broken at UCLA and in Pasadena, and plaster cracked and fell from many buildings. In San Diego, a water main broke. In Palm Springs, the city hit hardest by the quake, thousands of dollars of merchandise was thrown from shelves and destroyed. Two people were injured when the shaking induced a crowd to flee a movie theater in a panic.

1954 San Jacinto Earthquake

The earthquake, sometimes referred to as the Arroyo Salada earthquake, caused minor damage over a wide area of southern California, cracking plaster walls as far away as San Diego, and knocking plaster from the ceiling at the Los Angeles City Hall. In Palm Springs, a water pipe was broken, and the walls of several swimming pools were cracked. Part of San Bernardino experienced a temporary blackout when power lines snapped in the shaking.

1970 Lytle Creek Earthquake

Twenty minutes after a magnitude 4.1 "foreshock" (which was actually in a slightly different location), the Lytle Creek earthquake struck the area near Cajon Pass, knocking a San Bernardino radio station off the air, and causing landslides and rock falls in the Transverse Ranges. Several roads were blocked or partially blocked. The quake caused some unusual damage in areas a fair distance from the epicenter. Power was disrupted in the Santa Monica Mountains northwest of Hollywood. A high-pressure water system in a Riverside aerospace plant was damaged, leading to a subsequent boiler explosion that injured four people. More typical minor damage also occurred, primarily in the Lytle Creek area (intensity VII on the Modified Mercalli Scale) and to a lesser degree in the nearby towns of Colton, Crestline, Cucamonga, Fontana, Glendora, Highland, Mt. Baldy, Rialto, Rubidoux, and Wrightwood.

1971 Sylmar Earthquake

This earthquake occurred on the San Fernando fault zone, a zone of thrust faulting which broke the surface in the Sylmar-San Fernando Area. The total surface rupture was roughly 19 km (12 miles) long. The maximum slip was up to 2 meters (6 feet). The earthquake caused over $500 million in property damage and 65 deaths. Most of the deaths occurred when the Veteran's Administration Hospital collapsed. Several other hospitals, including the Olive View Community Hospital in Sylmar suffered severe damage. Newly constructed freeway overpasses also

collapsed. Loss of life could have been much greater had the earthquake struck at a busier time of day. In response to this earthquake, building codes were strengthened and the Alquist Priolo Special Studies Zone Act was passed in 1972. The purpose of this act is to prohibit the location of most structures for human occupancy across the traces of active faults and to mitigate thereby the hazard of fault rupture.

1986 N. Palm Springs Earthquake

This earthquake occurred along either the Banning fault or the Garnet Hill fault. The earthquake was responsible for at least 29 injuries and the destruction or damage of 51 homes in the Palm Springs-Morongo Valley area. It also triggered several landslides in the area. Damage caused by this quake was estimated at over $4 million. Ground cracking was observed along the Banning, Mission Creek and Garnet Hill faults, but these cracks were due to shaking, not surface rupture.

1990 Upland Earthquake

The 1990 Upland earthquake was much more damaging than the quake of 1988. It triggered landslides which blocked roads in the Mount Baldy area, and it caused some damage to the San Antonio Dam, which lies across the path of the main watershed coming south from Mount Baldy. Thirty-eight people sustained minor injuries, and damage was considerable near the epicenter. The quake was felt as far away, northeast, as Las Vegas, Nevada, and as far south as Ensenada, Mexico.

1992 Joshua Tree Earthquake

The Joshua Tree earthquake raised some alarms due to its proximity to the San Andreas Fault. Damage caused by the Joshua Tree was slight to moderate in the communities of Joshua Tree, Yucca Valley, Desert Hot Springs, Palm Springs, and Twenty-nine Palms. Thirty-two people had to be treated for minor injuries. Though somewhat forgotten in the wake of the Landers earthquake, the Joshua Tree quake was a significant event on its own, and was felt as far away as San Diego, Santa Barbara, Las Vegas, Nevada, and even Phoenix, Arizona.

1992 Landers Earthquake

The quake was described at the time as the largest earthquake to have occurred in the contiguous United States in 40 years. Damage to the area immediately surrounding the epicenter was severe. Roads were buckled, buildings and chimneys collapsed. There were also large surface fissures. To the west in the Los Angeles Basin was much less severe. The majority of the damage throughout the LA area involved items knocked off shelves. Unlike the Northridge event a year and half later, no freeway bridges were knocked down because of the epicenter's remote location. Power was knocked out to thousands of residents, but generally restored within two to three hours. There was some damage to homes from water displaced from swimming pools. Loss of life in this earthquake was minimal. Three people died and more than 400 people sustained injuries.

1992 Big Bear Earthquake

This earthquake struck little more than 3 hours after the Landers earthquake on June 28, 1992 at 8:05am. This earthquake is technically considered an aftershock of the Landers earthquake (indeed, the largest aftershock), although the Big Bear earthquake occurred over 20 miles west of the Landers rupture, on a fault with a different orientation and sense of slip than those involved in

the main shock. From its aftershocks, the causative fault was determined to be a northeast trending left-lateral fault. This orientation and slip are considered "conjugate" to the faults that slipped in the Landers rupture. The Big Bear earthquake did not break the ground surface, and, in fact, no surface trace of a fault with the proper orientation has been found in the area. The Big Bear earthquake caused a substantial amount of damage in the Big Bear area, but fortunately, it claimed no lives. However, landslides triggered by the quake blocked roads in the mountainous area, aggravating the clean-up and rebuilding process.

1994 Northridge Earthquake

Because of this earthquake, sixty people were killed, more than 7,000 injured, 20,000 homeless and more than 40,000 buildings damaged in Los Angeles, Ventura, Orange and San Bernardino Counties. Severe damage occurred in the San Fernando Valley: maximum intensities of (IX) were observed in and near Northridge and in Sherman Oaks. Lesser, but still significant damage occurred at Fillmore, Glendale, Santa Clarita, Santa Monica, Simi Valley and in western and central Los Angeles. Damage was also sustained to Anaheim Stadium. Collapsed overpasses closed sections of the Santa Monica Freeway, the Antelope Valley Freeway, the Simi Valley Freeway and the Golden State Freeway. Fires caused additional damage in the San Fernando Valley and at Malibu and Venice. Preliminary estimates of damage are between 13 and 20 billion U.S. dollars. Felt throughout much of southern California and as far away as Turlock, California; Las Vegas, Nevada; Richfield, Utah and Ensenada, Mexico. The maximum recorded acceleration exceeded 1.0g at several sites in the area with the largest value of 1.8g recorded at Tarzana, about 7 km south of the epicenter. A maximum uplift of about 15 cm occurred in the Santa Susana Mountains and many rockslides occurred in mountain areas, blocking some roads. Some ground cracks were observed at Granada Hills and in Potrero Canyon. Some liquefaction occurred at Simi Valley and in some other parts of the Los Angeles Basin.

1999 Hector Mine Earthquake

The earthquake was felt throughout Southern California, as well as in Las Vegas, Nevada. Many people were awakened in Las Vegas, with many reporting dizziness or trouble walking. Reports were filed as far north as Carson City, Nevada, where one woman reported waking up, hearing chimes in her house ringing. Nearly no damage was reported in the immediate area of the earthquake due to the remote location of the epicenter in the Mojave Desert, with no settlements for 14 miles, however Amtrak's westbound Southwest Chief (train #3) was an unusual victim of the earthquake. The train was traveling very near the epicenter when the quake struck. The combined force of the quake and train caused several rails to come loose and the train derailed. Only minor injuries were reported, and the trainset suffered repairable damage.

2003 Big Bear City Earthquake

The earthquake occurred about 90 miles east of Los Angeles in the San Bernardino Mountains near Big Bear City, jarring residents awake and shaking buildings over a wide area, but not causing any serious damage or injuries. Five aftershocks in the Mw 4.0+ range occurred within the first six hours of the main shock, frightening many people and contributing to the minor damage reported.

2008 Chino Hills Earthquake

The Chino Hills earthquake caused no deaths or significant damage due to the physical location of its epicenter. Most of the infrastructure is relatively new and well suited to withstand a large

quake. However, the high volume of telephone use following the shock overloaded provider capacity and disrupted service into the afternoon. Amusement rides at Disneyland, Six Flags Magic Mountain, Universal Studios Hollywood and Knott's Berry Farm were evacuated and temporarily shut down. This earthquake was felt across much of southern California, and as far away as Las Vegas, Nevada.

2010 Borrego Springs Earthquake

A M5.4 earthquake occurred in Southern California at 4:53 pm (Pacific Time) about 30 miles south of Palm Springs, 25 miles southwest of Indio, and 13 miles north-northwest of Borrego Springs. The earthquake occurred near the Coyote Creek segment of the San Jacinto fault, which is one of the strands of the San Jacinto fault. The earthquake exhibited sideways horizontal motion to the northwest, consistent with slip on the San Jacinto fault. It was followed by more than 60 aftershocks of M1.3 and greater during the first hour. Seismologists expect continued aftershock activity. The earthquake was felt all over Southern California, with strong shaking near the epicenter.

2012 Brawley Earthquake

A M5.4 earthquake occurred at 12:57 pm (Pacific Time) about 4 km north-northwest of Brawley on August 26, 2012. The depth of the earthquake was 8.3 km. it was widely felt across southernmost California, northern Baja California, and western Arizona. Its north-south extent ranges from the northern section of the Imperial fault, starting approximately 10 km north of the United States-Mexico international border and connecting to the southern end of the San Andreas Fault, where it terminates in the Salton Sea.

2014 Brea Earthquake

A M5.1 earthquake occurred at 9:09 pm (Pacific Time) about 2 km from Brea on Friday, March 28, 2014. The quake was preceded by two smaller foreshocks, and more than 100 aftershocks followed, including a magnitude-4.1 that hit Saturday afternoon, the largest in the sequence so far. No major injuries were reported. It was centered near La Habra in Orange County — about 25 miles southeast of downtown Los Angeles — at a depth of about 5 miles. It was felt as far south as San Diego and as far north as Ventura County, according to citizen responses collected online by the USGS. One community was evacuated from their homes after firefighters discovered foundation problems. Fire crews red-tagged 20 apartment units in a building in the Orange County city of Fullerton after finding a major crack in the foundation. Structural woes including broken chimneys and leaning were uncovered in half a dozen single-family houses, which were also deemed as unsafe to occupy until building inspectors clear the structures. The damage displaced 83 residents. Another 14 residential structures around the city suffered lesser damage, including collapsed fireplaces. The estimate for damages to public property in La Habra, Fullerton and Brea totaled about $824,000. For private property, the total of reported damages was $1.75 million – about $250,000 in Brea, $1 million in Fullerton and $503,000 in La Habra.

2016 Borrego Springs Earthquake

A M5.2 earthquake at a depth of 0.6 miles occurred about 20 km from Borrego Springs on Friday, June 10, 2016 at 1:04 am (Pacific Time), followed by several aftershocks. 3,162 people were affected by the seismic movement. The earthquake triggered a minor rockslide on Montezuma Valley Road about 14 miles southeast of Borrego Springs, but there were no immediate reports

of injuries or damage in San Diego or Riverside counties. The epicenter was 13 miles north-northwest of Borrego Springs and 16 miles south-southwest of La Quinta in Riverside County. It was strong enough to be felt in San Bernardino County. The earthquake occurred along the San Jacinto Fault. There were at least eight aftershocks in the same general area within 3 hours and 10 minutes. The strongest were magnitude-3.5 shakers at 1:06 a.m., 1:33 a.m. and 4.14 a.m. -- all at a depth of slightly more than 6 miles.

Since June of 2016, no major disasters due to earthquake have occurred within the City of Fontana.

4.5.3 Location/Geographic Extent

The risk of seismic hazards to residents of City of Fontana is based on the approximate location of earthquake faults within and outside the region. This map includes Alquist-Priolo Geologic Hazards Zones Act created under the Seismic Hazards Mapping Act and the USGS Quaternary Fault and Fold Database of the United States. The USGS database contains information on faults and associated folds in the California that are believed to be sources of M>6 earthquakes during the Quaternary (the past 2.6 million years). Figure 4-9 shows fault zones in or near the City of Fontana. Per the California Department of Conservation's Earthquake Fault Zone Maps, City of Fontana is near the following active fault zones or regulatory fault zones managed by the Department of Conservation.

Historical and geological records show that Southern California has a long history of seismic events. Southern California is probably best known for the San Andreas Fault, a 400-mile long fault running from the Mexican border to a point offshore, west of San Francisco. Geologic studies show that over the past 1,400 to 1,500 years, large earthquakes have occurred at about 130-year intervals on the southern San Andreas Fault. As the last large earthquake on the southern San Andreas occurred in 1857, that section of the fault is considered a likely location for an earthquake within the next few decades.

But San Andreas is only one of dozens of known earthquake faults that crisscross Southern California. Beyond the known faults, there are a potentially large number of "blind" faults that underlie the surface of Southern California. One such blind fault was involved in the Whittier Narrows earthquake in October 1987.

Although the most famous of the faults, the San Andreas, is capable of producing an earthquake with a magnitude of 8+ on the Richter scale, some of the "lesser" faults have the potential to inflict greater damage on the urban core of the Los Angeles Basin and nearby cities.

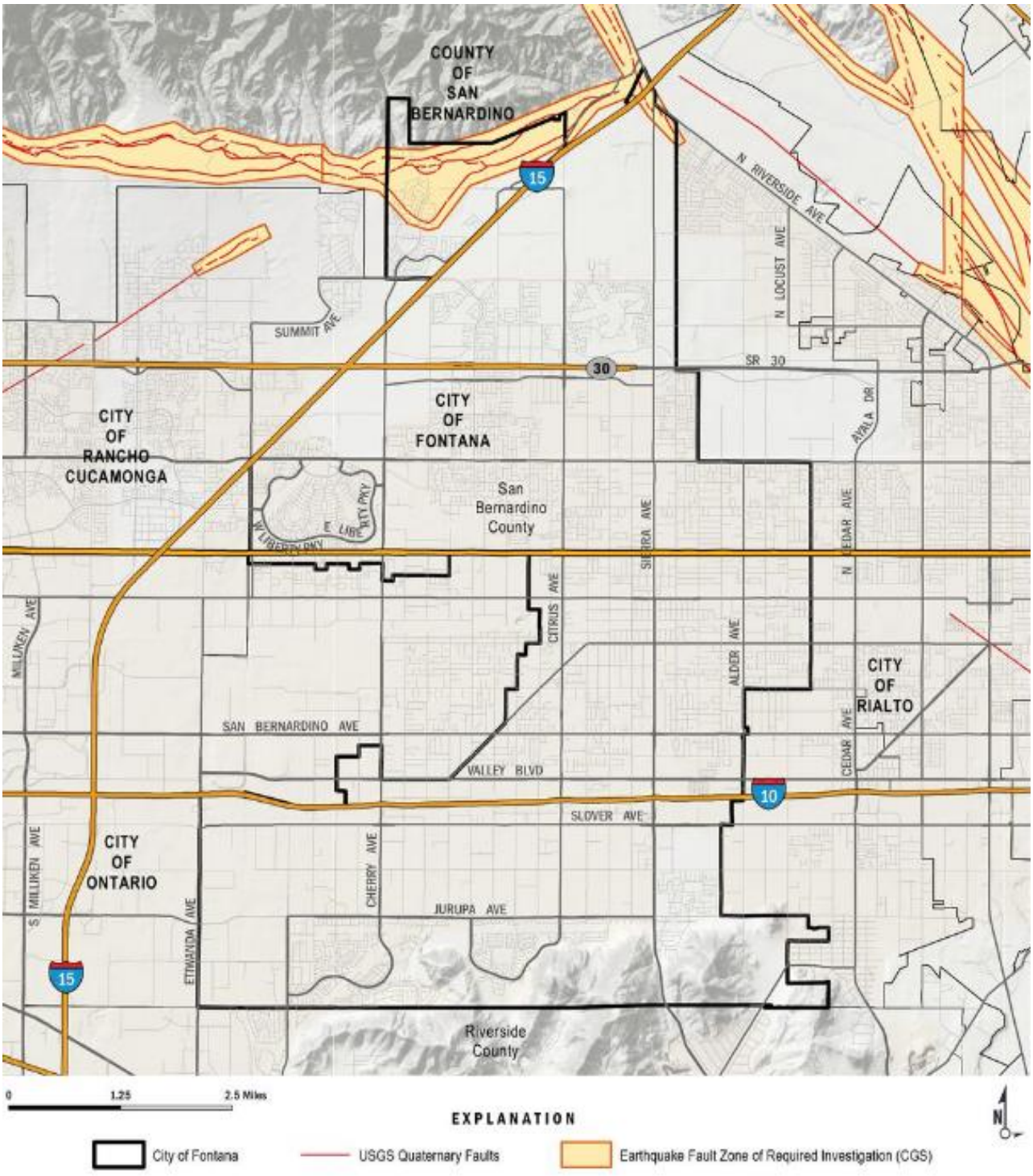


Figure 4-9: Active Fault Map

Source: Department of Conservation & USGS

4.5.4 Magnitude/Severity

The most common method for measuring earthquakes is magnitude, which measures the strengths of earthquake. Although the Richter scale is known as the measurement for magnitude, the majority of scientists currently use either the Mw Scale or Modified Mercalli Intensity (MMI) Scale. The effects of an earthquake in a particular location are measured by intensity. Earthquake intensity decreases with increasing distance from the epicenter of the earthquake.

The magnitude of an earthquake is related to the total area of the fault that ruptured, as well as the amount of offset (displacement) across the fault. As shown in Table 4-5, there are seven earthquake magnitude classes, ranging from great to micro. A magnitude class of great can cause tremendous damage to infrastructure in City of Fontana compared to a micro class, which results in minor damage to infrastructure.

Earthquake Magnitude Classes		
Magnitude Class	**Magnitude Range (M = Magnitude)**	**Description**
Great	M > 8	Tremendous damage
Major	7 <= M < 7.9	Widespread heavy damage
Strong	6 <= M < 6.9	Severe damage
Moderate	5 <= M < 5.9	Considerable damage
Light	4 <= M < 4.9	Moderate damage
Minor	3 <= M < 3.9	Rarely causes damage.
Micro	M < 3	Minor damage

Table 4-5: Moment Magnitude Scale

The MMI Scale measures earthquake intensity as shown in Table 4-6. The MMI Scale has 12 intensity levels. Each level is defined by a group of observable earthquake effects, such as ground shaking and/or damage to infrastructure. Levels I through VI describe what people see and feel during a small to moderate earthquake. Levels VII through XII describe damage to infrastructure during a moderate to catastrophic earthquake.

Earthquake Magnitude and Intensity		
Magnitude (M_w)	**Intensity (Modified Mercalli Scale)**	**Description**
1.0 – 3.0	I	I. Not felt except by very few people under especially favorable conditions.
3.0 – 3.9	II – III	II. Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
		III. Felt quite noticeably indoors. Many do not recognize it as an earthquake. Standing motorcars may rock slightly.
4.0 – 4.9	IV – V	IV. Felt by many who are indoors; felt by a few outdoors. At night, some awakened. Dishes, windows and doors rattle.

Earthquake Magnitude and Intensity		
Magnitude (M_w)	**Intensity (Modified Mercalli Scale)**	**Description**
		V. Felt by nearly everyone; many awakened. Some dishes and windows broken; some cracked plaster; unstable objects overturned.
5.0 – 5.9	VI – VII	VI. Felt by everyone; many frightened and run outdoors. Some heavy furniture moved; some fallen plaster or damaged chimneys.
		VII. Most people alarmed and run outside. Damage negligible in well-constructed buildings; considerable damage in poorly constructed buildings.
6.0 – 6.9	VII – IX	VIII. Damage slight in special designed structures; considerable in ordinary buildings; great in poorly built structures. Heavy furniture overturned. Chimneys, monuments, etc. may topple.
		IX. Damage considerable in specially designed structures. Buildings shift from foundations and collapse. Ground cracked. Underground pipes broken.
7.0 and Higher	VIII and Higher	X. Some well-built wooden structures destroyed. Most masonry structures destroyed. Ground badly cracked. Landslides on steep slopes.
		XI. Few, if any, masonry structures remain standing. Railroad rails bent; bridges destroyed. Broad fissure in ground.
		XII. Virtually total destruction. Waves seen on ground. Objects thrown into the air.

Table 4-6: Modified Mercalli Scale

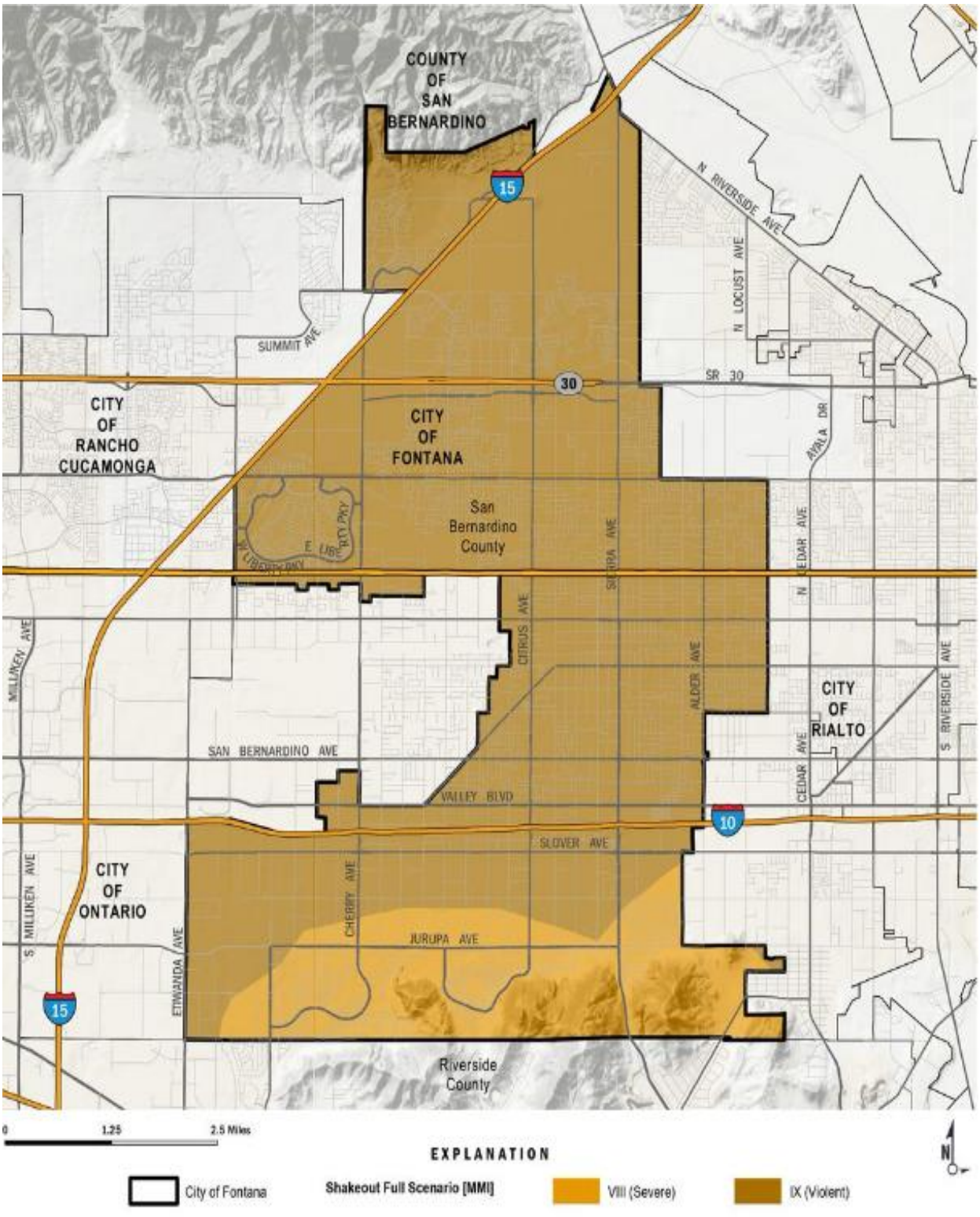


Figure 4-10: Great Shakeout Scenario MMI Classes

Source: USGS ShakeOut Full

4.5.5 Frequency / Probability of Future Occurrences

While earthquakes occur less frequently than other primary natural hazard events, they have accounted for the greatest combined losses (deaths, injuries, and damage costs) in disasters since 1950 in California and have the greatest catastrophic disaster potential (Cal EMA 2010).

The USGS estimates that the probability of an earthquake occurring over the next 30 Years in the Southern California with a magnitude of 6.7 or greater is 93 percent. Table 4-7 from the USGS lists Average time between earthquakes in the Southern California region together with the likelihood of having one or more such earthquakes in the next 30 years (starting from 2014). "Readiness" indicates the factor by which likelihoods are currently elevated, or lower, because of the length of time since the most recent large earthquakes. The values from the USGS include aftershocks. It is important to note that actual repeat times will exhibit a high degree of variability, and will almost never exactly equal the average listed in the table.

Magnitude (greater than or equal to)	Average repeat time (years)	30-year likelihood of one or more events	Readiness
5	.7	100%	1.0
6	2.3	100%	1.0
6.7	12	93%	1.0
7	25	75%	1.1
7.5	87	36%	1.2
8	522	7%	1.3

Table 4-7: Southern California Region Earthquake Probability

Source: USGS UCERF3: A New Earthquake Forecast for California's Complex Fault System FS 2015-3309

Uniform California Earthquake Forecasts (UCERF) estimated the likelihood that California will experience a magnitude 8 or larger earthquake in the next 30 years has increased from about 4.7% in 2007 (UCERF23F3F[2]) to about 7.0% for the thirty-year duration starting in 2014 (UCERF34F4F[3]). Several of the major Southern California faults have a high probability of experiencing a Magnitude 6.7 or greater earthquake within the next 30 years (Figure 4-10); 59% probability of a M6.7 or greater on the Southern San Andreas Fault, 31% probability on the San

[2] USERF2 = 2008 California Earthquake Probabilities. In April 2008, scientists and engineers released a new earthquake forecast for the State of California called the UCERF. Compiled by USGS, Southern California Earthquake Center (SCEC), and the California Geological Survey (CGS), with support from the California Earthquake Authority, it updates the earthquake forecast made for the greater San Francisco Bay Area by the 2002 Working Group for California Earthquake Probabilities.

[3] UCERF3 = 2014 California Earthquake Probabilities. UCERF3 is the first type of model, representing the latest earthquake-rupture forecast for California. It was developed and reviewed by dozens of leading scientific experts from the fields of seismology, geology, geodesy, paleoseismology, earthquake physics, and earthquake engineering. As such, it represents the best available science with respect to authoritative estimates of the magnitude, location, and likelihood of potentially damaging earthquakes throughout the state (further background on these models, especially with respect to ingredients, can be found in U.S. Geological Survey Fact Sheet 2008–3027, http://pubs.usgs.gov/fs/2008/3027/)

Jacinto Fault, and 11% probability on the Elsinore Fault. These probabilities were determined by the USGS and CGS in a 2008 study (2007 Working Group on California Earthquake Probabilities, 2008, The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2): U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203 [http://pubs.usgs.gov/of/2007/1437/]).

Figure 4-11 shows the locations of major faults in California, including the four (4) major faults in Southern California in relation to San Bernardino County region. These faults are the Southern San Andreas, the San Jacinto, the Elsinore, and the Garlock Faults. There are also many smaller faults within San Bernardino County capable of producing significant earthquakes. However, these four faults are considered by the United States Geological Survey (USGS) and the California Geological Survey (CGS) to be the most dangerous in the County. (California Geological Survey Special Publication 42, Interim Revision 2007, “Fault-Rupture Hazard Zones in California” - Alquist-Priolo Earthquake Fault Zoning Act).

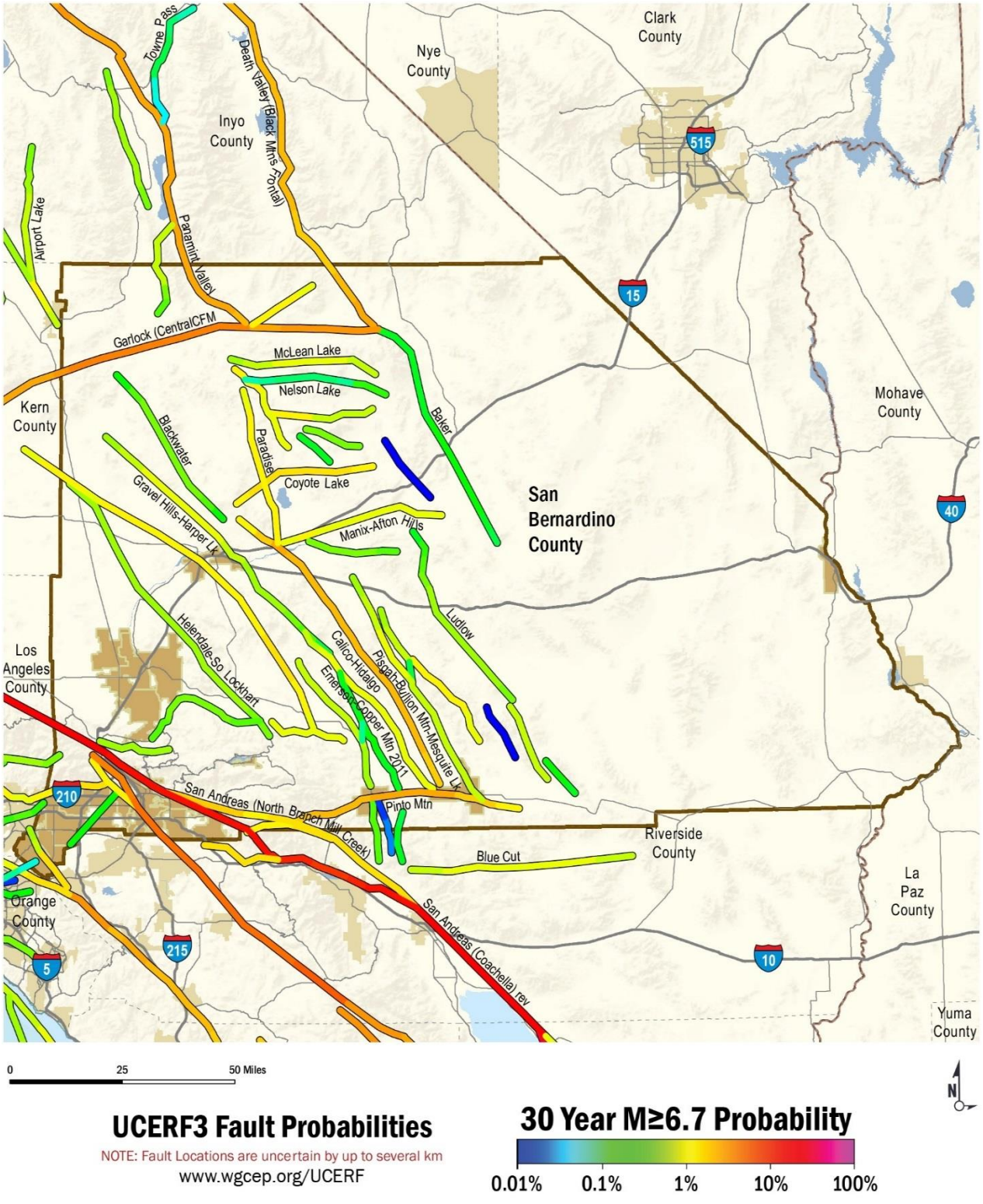


Figure 4-11: UCERF 3 Fault Probabilities

Source: USGS/ WGCEP

4.6 Landslide Hazard Profile

Landslides occur when the force pulling the material on the slope in a downward direction under gravitational influence exceeds the strength of the earth materials that compose the slope (USGS 2004). These materials may move by falling, toppling, sliding, spreading, and/or flowing. Strength of rock and soil, steepness of slope, and weight of the hillside material all play an important role in the stability of hillside areas. Weathering and absorption of water can weaken slopes, while the added weight of saturated materials or overlying construction can increase the chances of slope failure. Sudden failure can be triggered by earthquake shaking, excavation of weak slopes, and heavy rainfall.

Landslides are primarily associated with mountainous regions. Additionally, landslides can occur in areas of low relief. Landslides can occur due to geological, morphological, or human causes. These include weak and sheared materials, thawing, shrink swell, and deforestation. Landslides often accompany other natural hazard events, such as earthquakes, flooding, and wildfire.

4.6.1 Regulatory Environment

San Bernardino County has adopted the 2013 California Building Standards Code to regulate development in hillside areas in the County.

4.6.2 Past Occurrences

There have been no reported historical occurrences of landslides in the City of Fontana, nor have any landslides occurred since the update of the LHMP in 2012.

4.6.3 Location/Geographic Extent

Areas with steeper slopes, in combination with other factors described above, are more susceptible to landslides than areas on shallow slopes. Figure 4-12 illustrates the slope areas at risk to landslide in City of Fontana.

4.6.4 Magnitude/Severity

Earthquake-induced landslides are secondary earthquake hazards that occur from ground shaking. Gravity inexorably pulls hillside down, and earthquake shaking enhances this on-going process. Landslides can destroy roads, buildings, utilities, and other critical facilities necessary to respond and recover from an earthquake. Many communities in southern California with steep slopes have a high likelihood of being impacted by earthquake-induced landslides.

Although not a major concern for Fontana (see Appendix E – Map 12), the southern Jurupa hillside areas of the city and the San Bernardino National Forest are subject to landslide potential.

4.6.5 Frequency/Probability of Future Occurrences

Landslides are not a major concern in the City of Fontana. They are more likely to occur after a significant earthquake, but a landslide has never been reported in the city. The only areas susceptible to landslides are the southern Jurupa hillside and the northern part of the city close

to the San Bernardino National Forest, but there is a low probability of this hazard affecting these areas in the future.

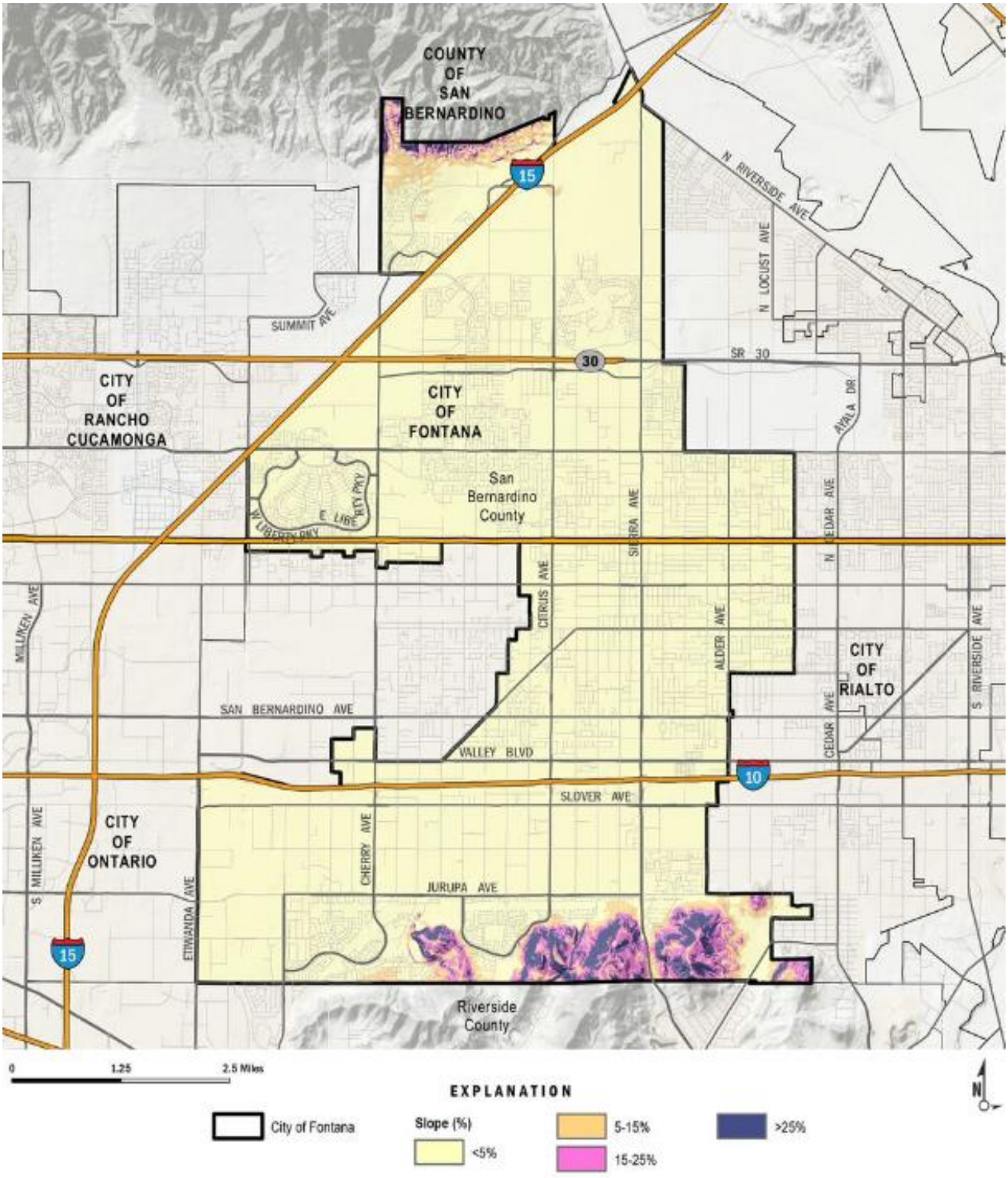


Figure 4-12: Slope of Land in San Bernardino County

Source: USGS National Elevation Dataset

Figure 4-13: Landslide Hazard Susceptibility

Source: California Geologic Survey

4.7 Climate Change

Climate change refers to any distinct change in measures of climate lasting for a long period of time, more specifically major changes in temperature, rainfall, snow, or wind patterns. Climate change may be limited to a specific region, or may occur across the whole Earth. Climate change may result from:

- Natural factors (e.g., changes in the Sun's energy or slow changes in the Earth's orbit around the Sun);
- Natural processes within the climate system (e.g., changes in ocean circulation); and
- Human activities that change the atmosphere's make-up (e.g., burning fossil fuels) and the land surface (e.g., cutting down forests, planting trees, building developments in cities and suburbs, etc.).

The effects of climate change are varied: warmer and more varied weather patterns, melting ice caps, and poor air quality, for example. As a result, climate change impacts a number of natural hazards.

The 2013 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

4.7.1 Regulatory Environment

California's response to climate change is directed by Legislation and Regulations and by other Mandates such as executive orders.

4.7.2 City of Fontana 2017 General Plan

The 2017 City of Fontana General Plan includes a Sustainable Development Element which includes the concept of Environmental Sustainability. Environmental sustainability is defined as the ability of the environment to continue to properly function indefinitely. The element establishes goals and policies in the categories of energy, waste reduction, urban design, urban nature, transportation, environmental health, water and energy efficient city buildings and facilities.

4.7.3 The Sustainable Communities and Climate Protection Act of 2008

The Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, SB 375, Chapter 728, Statutes of 2008) looks to reduce GHG emissions through coordinated

transportation and land use planning with the goal of more sustainable communities. Regional targets are established for GHG emissions reductions from passenger vehicle use by the sustainable communities strategy (SCS) established by each metropolitan planning organization (MPO). The SCS is an integral part of the regional transportation plan (RTP) and contains land use, housing, and transportation strategies to meet GHG reductions targets. In San Bernardino County, the South Coast Air Quality Management District facilitates compliance with the federal Clean Air Act and implements the state's air quality program.

The Office of Planning and Research's General Plan Guidelines and SB 375 builds upon Assembly Bill 162 (flood protection) and Senate Bill 1241 (fire protection) and supports Safeguarding California implementation.

SB 375 also supports Assembly Bill 2140 which requires that a City/County General Plan contains a safety element in addition to a Hazard Mitigation Plan. AB 2140 also requires a vulnerability assessment, adaptation goals, policies and objectives, and a set of feasible implementation measures.

4.7.3.1 2016 California Building Efficiency Standards

By adopting the 2016 California Building Code, the City has also adopted the 2016 Building Energy Efficiency Standards Title 24, Part 6. The Standards contain energy and water efficiency requirements (and indoor air quality requirements) for newly constructed buildings, additions to existing buildings, and alterations to existing buildings. Public Resources Code Sections 25402 subdivisions (a)-(b) and 25402.1 emphasize the importance of building design and construction flexibility by requiring the Energy Commission to establish performance standards, in the form of an "energy budget" in terms of the energy consumption per square foot of floor space. For this reason, the Standards include both a prescriptive option, allowing builders to comply by using methods known to be efficient, and a performance option, allowing builders complete freedom in their designs provided the building achieves the same overall efficiency as an equivalent building using the prescriptive option. Reference Appendices are adopted along with the Standards that contain data and other information that helps builders comply with the Standards. (California Energy Commission, 2016)

4.7.3.2 California Adaptation Planning Guide (APG)

The State of California has been taking action to address climate change for over 20 years, focusing on both greenhouse gas emissions reduction and adaptation. The California Adaptation Planning Guide (APG) continues the state's effort by providing guidance and support for communities addressing the unavoidable consequences of climate change.

Based on upon specific factors, 11 Climate impact regions were identified. Some of the regions were based on specific factors particularly relevant to the region. As illustrated in Figure 4-14 San Bernardino County is located in the Desert Region.

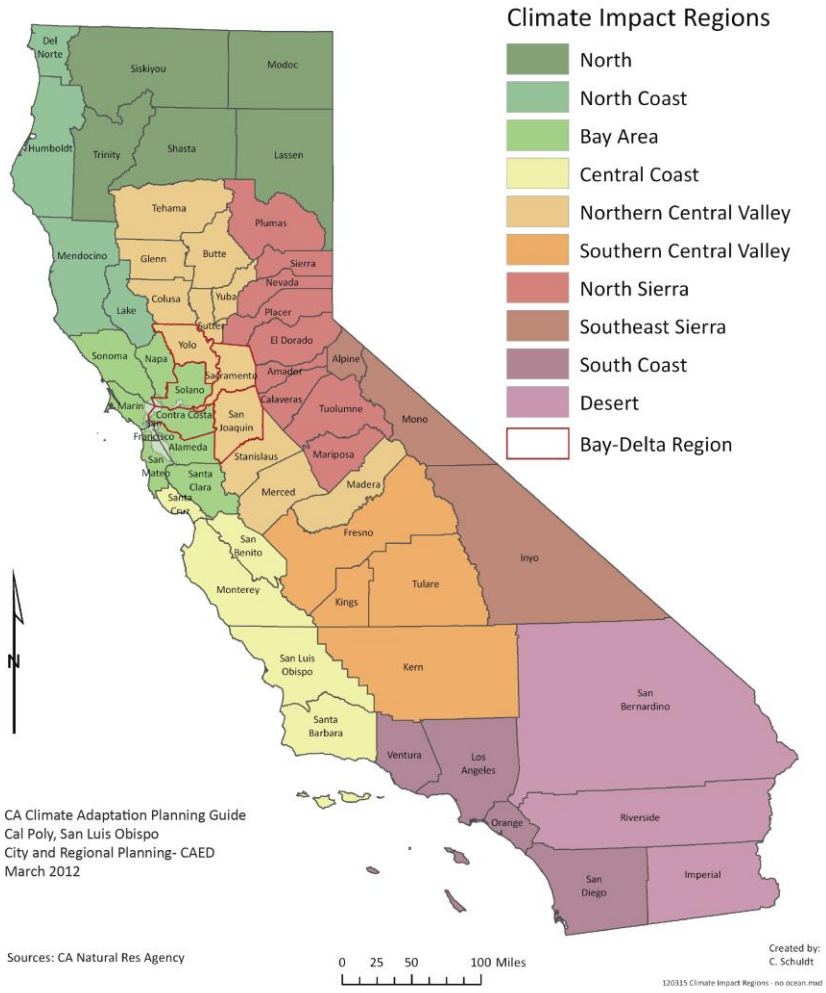


Figure 4-14: Climate Impact Regions

Source: California Natural Resources Agency

The Desert is a heavily urbanized inland region (4.3+ million people) made up of sprawling suburban development in the west near the South Coast region and vast stretches of open, largely federally owned desert land to the east. Prominent cities within the desert portion include Palm Springs (44,500+) and El Centro (42,500+). The region's character is defined largely by the San Gabriel Mountains, San Gorgonio Mountains, San Jacinto Mountains, and smaller inland mountains reaching through the desert to the Colorado River, which borders the region on the east. Communities in the Desert region should consider evaluating the following climate change impacts:

- Reduced water supply
- Increased temperature
- Reduced precipitation
- Diminished snowpack
- Wildfire risk
- Public health and social vulnerability

- Stress on special-status species

4.7.4 Past Occurrences

Climate change has never been directly responsible for any declared disasters. Past flooding, wildfire, levee failure, and drought disasters may have been exacerbated by climate change, but it is impossible to make direct connections to individual disasters. In addition, unlike earthquake and floods that occur over a finite time period, climate change is an on-going hazard, the effects of which some are already experiencing. Other effects may not be seriously experienced for decades, or may be avoided altogether by mitigation actions taken today.

According to the California State Hazard Mitigation Plan (SLHMP), the worst single heat wave event in California occurred in Southern California in 1955, when an eight-day heat wave resulted in 946 deaths. The July 2006 heat wave in California caused approximately 140 people deaths over a 13-day period.

Since the update of the LHMP in 2012, no major disasters due to climate change have occurred within the City of Fontana.

4.7.5 Location/Geographic Extent

The effects of climate change are not limited by geographical borders. San Bernardino County, the State of California, the United States, and the rest of the world are all at risk to climate change. As such, the entire County is at risk to the effects of climate change.

Figure 4-15 and Figure 4-16 provide Cal Adapt[4] modeled decadal July high temperature averages for 2010 and 2090. These figures provide current decade-long July temperature averages and possible annual high heating trends for the remaining portion of the century. The data presented in the figures represent a “projection” of potential future climate scenarios, they are not predictions. These figures illustrate how the climate may change based on a variety of different potential social and economic factors. The visualizations are comprised of average values from Coupled Climate model 2.1 (GFDL), Community Climate System Model Version 3 (CCSM3), Coupled Global Climate Model Version 3 (CNRM) and Parallel Climate Model 1 (PCM1). During the next few decades, scenarios project average temperature to rise between 1° and 2.3°F; however, the projected temperature increases begin to diverge at mid-century so that, by the end of the century, the temperature increases projected in the higher emissions scenario (A2) are approximately twice as high as those projected in the lower emissions scenario (B1). Customizable maps can be viewed at http://cal-adapt.org/temperature/decadal/

[4] Cal-Adapt has been funded to provide access to data and information that has been produced by the State's scientific and research community. The data available in this site offer a view of how climate change might affect California at the local level.

Figure 4-15: July Decadal Average High Temperature Map; 2010

Source: Cal-Adapt

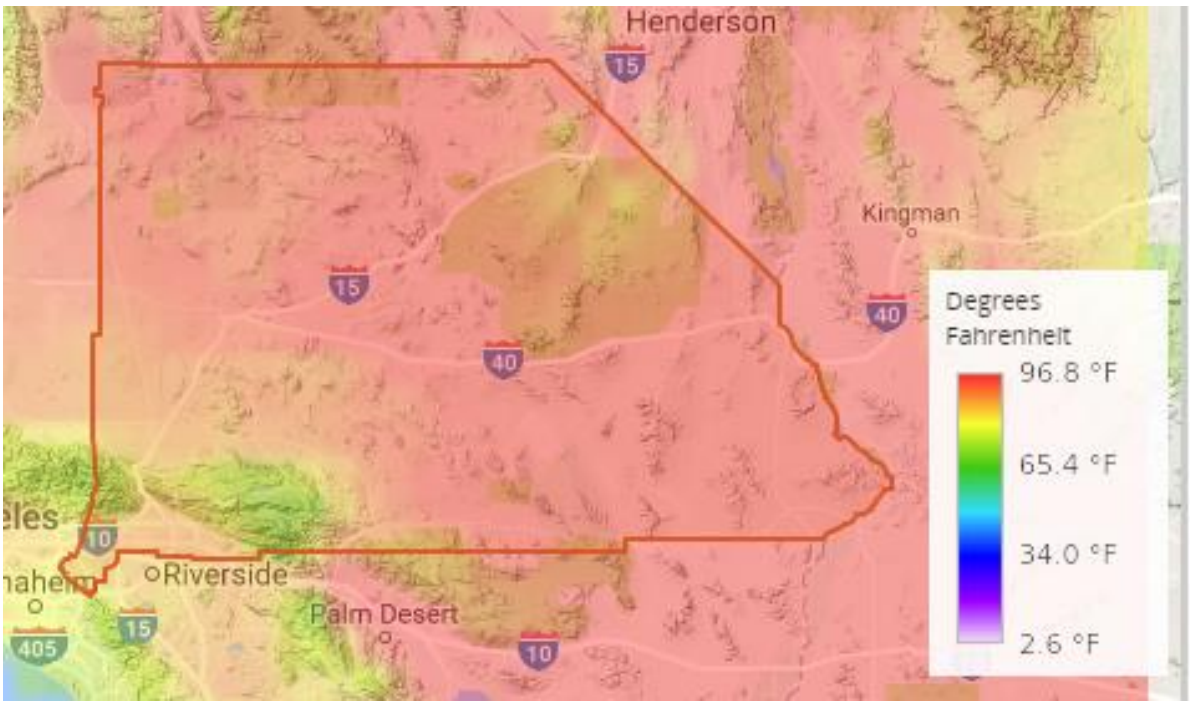


Figure 4-16: July Decadal Average High Temperature Map; 2090

Source: Cal-Adapt

4.7.6 Magnitude/Severity

The California Adaptation Planning Guide has calculated projections for changes in temperature, precipitation, heat waves, snowpack and wildfire risk in the desert area, as shown in Table 4-8. Hotter, drier conditions are expected to exist in the desert area, increasing the risk for other natural hazards.

Effect	Ranges
Temperature Change, 1990-2100	January increase in average temperatures: 2°F to 4°F by 2050 and 5°F to 8°F by 2100 July increase in average temperatures: 3°F to 5°F by 2050 and 6°F to 9°F by 2100 (Modeled high temperatures; high carbon emissions scenario)
Precipitation	Generally, annual rainfall will decrease in the most populous areas. Wetter areas like the western part of Riverside and southwestern San Bernardino counties will experience a 2 to 4 inch decline by 2050 and 3.5 to 6 inch decline by the end of the century. Big Bear is expected to lose around 8 inches per year by 2090. Southern Imperial County will have a small decline of about 0.5 inches. The eastern, desert portion of the region will see little to no change in annual rainfall. (CCSM3 climate model; high carbon emissions scenario)
Heat Wave	Heat waves are defined by five consecutive days over temperatures in the 100s over most of the region. Three to five more heat waves will be experienced by 2050, increasing to 12 to 16 in the western parts of the region to more than 18 to 20 in the eastern parts of the region.
Snowpack	March snowpack in the Big Bear area will diminish from the 2.5- inch level of 2010 to 1.4 inches in 2030 and almost zero by 2090. (CCSM3 climate model; high emissions scenario)
Wildfire Risk	Most areas are projected to have the same or slightly increased likelihood of wildfire risk. The major exceptions are the Mecca San Gorgonio and San Jacinto Mountains, where wildfire will be 1.5 and 2.0 times more likely. (GFDL model, high carbon emissions scenario)

Table 4-8: From APG: Table 41. Summary of Cal-Adapt Climate Projections for the Desert Region

[Public Interest Energy Research, 2011. Cal-Adapt. Retrieved from http://cal-adapt.org]

The California Climate Adaptation Strategy (CAS), citing a California Energy Commission study, states that "over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined." This study shows that California is getting warmer, leading to an increased frequency, magnitude, and duration of heat waves. These factors may lead to increased mortality from excessive heat, as shown in Figure 4-17.

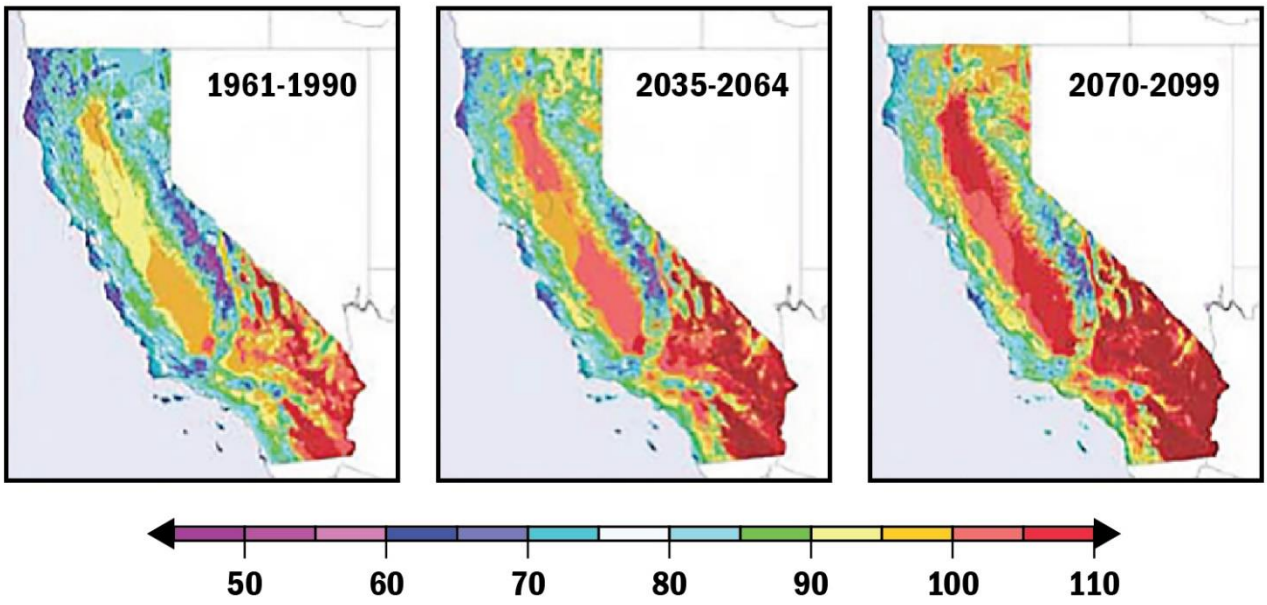


Figure 4-17: California Historical and Projected Temperature Increases - 1961 to 2099

Source: Dan Cayan; California Climate Adaptation Strategy

4.7.7 Frequency/Probability of Future Occurrences

Climate change is one of the few natural hazards where the probability of occurrence is influenced by human action. In addition, unlike earthquake and floods that occur over a finite time period, climate change is an on-going hazard.

The 2009 Climate Adaptation Strategy (CAS) delineated how climate change may impact and exacerbate natural hazards in the future, including wildfires, extreme heat, floods, drought, and levee failure:

- Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in the City of Fontana and the rest of California, which are likely to increase the risk of mortality and morbidity due to heat-related illness and exacerbation of existing chronic health conditions. Those most at risk and vulnerable to climate-related illness are the elderly, individuals with chronic conditions such as heart and lung disease, diabetes, and mental illnesses, infants, the socially or economically disadvantaged, and those who work outdoors.
- The Desert region relies on water from the Colorado River and the State Water Project. Both of these sources begin with mountain snowpack. Climate change will result in drastically reduced supply from these sources. Declining snowpack in the San Gabriel Mountains, San Gorgonio Mountains, and San Jacinto Mountains will lead to permanently diminished local water supply.

- Higher temperatures will melt the snowpack earlier and drive the snowline higher, resulting in less snowpack to supply water to California users.
- Droughts are likely to become more frequent and persistent in the 21st century.
- Intense rainfall events, periodically ones with larger than historical runoff, will continue to affect California with more frequent and/or more extensive flooding.
- Storms and snowmelt may coincide and produce higher winter runoff. Together, these changes will increase the probability of dam and levee failures in the San Bernardino County Flood Control District.
- Warmer weather, reduced snowpack, and earlier snowmelt can be expected to increase wildfire risk through fuel hazards and ignition risks. These changes can also increase plant moisture stress and insect populations, both of which affect forest health and reduce forest resilience to wildfires. An increase in wildfire intensity and extent will increase public safety risks, property damage, fire suppression and emergency response costs to government, watershed and water quality impacts, vegetation conversions and habitat fragmentation.

4.7.8 Planned Development

The City of Fontana has adopted a General Plan that provides a foundation on which all development and future programs that address climate change are built upon. Additionally, the Municipal Code provides for development that is consistent with the 2016 California Building Efficiency Standards.

4.7.9 Goals, Policies, and Objectives

The City of Fontana General Plan Safety Element and the Sustainability and Resilience Element contains goals, policies and objectives that are required to be met with any future development or regeneration of existing buildings and structures.

4.7.10 Implementation Measures

The City has established a “Sustainable Fontana” program to coordinate City government resource-efficiency efforts and promote private initiatives and opportunities. The City will continue collaboration with the San Bernardino County Transportation Authority (SBCTA), infrastructure agencies, and other regional agencies to continue compliance in reaching and exceeding current and future state goals for greenhouse gas reductions and energy efficient regulations.

4.7.11 Drought Hazard Profile

Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. Drought severity depends on numerous factors, including duration, intensity, and geographic extent, as well as regional water supply demands by humans and vegetation. The severity of drought can be aggravated by other climatic factors, such as prolonged high winds and low relative humidity.

Drought originates from a deficiency of precipitation over an extended period, usually one or more seasons. Drought can result in a water shortage for some activity, group, or environmental sector. Drought is a complex natural hazard, which is reflected in the following four definitions commonly used to describe it:

• Agricultural – drought is defined principally in terms of naturally occurring soil moisture deficiencies relative to water demands of plant life, usually arid crops.

• Hydrological – drought is related to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.

• Meteorological – drought is defined solely on the degree of dryness, expressed as a departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.

• Socioeconomic – drought associates the supply and demand of economic goods or services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall. It may also be called a water management drought.

Although climate is a primary contributor to hydrological drought, other factors such as changes in land use (e.g., deforestation), land degradation, and the construction of dams all affect the hydrological characteristics of the basin. Since regions are interconnected by hydrologic systems, the impact of meteorological drought may extend well beyond the borders of the precipitation-deficient area. Similarly, changes in land use upstream may alter hydrologic characteristics such as infiltration and runoff rates, resulting in more variable streamflow and a higher incidence of hydrologic drought downstream. Land use change is one of the ways human actions alter the frequency of water shortage even when no change in the frequency of meteorological drought has been observed.

4.7.11.1 Regulatory Environment

The City of Fontana and the County of San Bernardino have a number of regulatory requirements and documents that address planning for drought. This includes Watershed Water Quality Management Plans (WQMP) for the City of Fontana. On November 24, 2015, the City Council for the City of Fontana, adopted and approved Ordinance No. 1734 approved the revised Technical Guidance Document for Water Quality Management Plan (TGD-WQMP).

The 1972 Federal Water Pollution Control Act, also known as the Clean Water Act (CWA) provides the basis for the protection of all inland surface waters, estuaries, and coastal waters. California's Porter-Cologne Water Quality Control Act of 1970 established the Regional Water Quality Control Board as the agency responsible for implementing the CWA and Porter Cologne requirements in the Santa Ana Watershed.

In 2006, California State lawmakers adopted AB 1881, which requires cities and counties to adopt ordinances that necessitate efficiency of water use in new and existing urban irrigated landscapes in California. This provided guidelines and timelines for the revision of the State's Model Water Efficient Landscape Ordinance (MWELO) and mandated that every city, county or other agency within the State adopt MWELO or be in compliance with it through their own ordinance. On November 24, 2015, the San Bernardino County Water Efficient Landscape Ordinance was implemented.

Technical Guidance Document for Water Quality Management Plan (TGD-WQMP)

In September of 2016, the City of Fontana implemented a Water Quality Management Plan Handbook that provides guidance and direction for project proponents on the regulatory requirements applicable to a private or public development activity, including public works transportation projects, from project conception to completion.

4.7.11.2 Historical Occurrences

The 2013 California State MLHMP states that from 1950 to 2012, there has been eight-drought State Emergency Proclamations in California. Specifically for San Bernardino County, there have been six drought events since 1896. Previous occurrences of drought are described as follows:

- 1975 to 1977: California experienced the two driest years (1976 and 1977) in the State's history in 1976 and 1977. The drought was declared an Emergency (FEMA-EM-3023) on January 20, 1977. Total crop damages statewide totaled $2.67 billion dollars for both years ($888.5 million in 1976 and $1.8 billion in 1977).

- 2006 to 2009: A California State-declared three-year drought of below-average rainfall, low snowmelt runoff, and the largest court-ordered water restricting in state's history. The dry conditions damaged crops, deteriorated water quality, and caused extreme wildfire danger. Approximately $300 million in agricultural revenue loss, and a potential $3 billion in economic losses over time.
- 2012 to 2016: San Bernardino County first declared a local drought emergency in 2014. This ongoing drought is the most severe drought in over 100 years. In order to abide by the State Water Resources Control Board's mandatory water reductions, the San Bernardino Municipal Water Department Board of Water Commissioners authorized implementation of Stage IIA of the department's Water Supply Contingency Plan on June 1, 2015. The State Water Board will adjust emergency water conservation regulations through the end of January 2017, in recognition of the differing water supply conditions across the state, and develop proposed emergency water restrictions for 2017 if the drought persists.

Additional information about previous occurrences of droughts in California (in general) can be obtained from the California DWR.

Since the update of the LHMP in 2012, no major disasters due to the drought have occurred within the City of Fontana.

4.7.11.3 Location/Geographic Extent

Drought can affect the County, region, and the State of California as a whole. The County's primary source of water is imported by the San Bernardino Valley Municipal Water District through participation in the State Water Project (SWP). This supply is supplemented by groundwater basins in the County. Drought has no defined geographical boundaries and cannot be depicted in map form. As such, the entire County is subject to drought.

4.7.11.4 Magnitude/Severity

The magnitude of drought is usually measured in time and the severity of the hydrologic deficit. There are several resources available to evaluate drought status and estimate future expected

conditions. The National Integrated Drought Information System (NIDIS) Act of 2006 (Public Law 109-430) prescribes an interagency approach for drought monitoring, forecasting, and early warning. The NIDIS maintains the U.S. Drought Portal (www.drought.gov) which is a web-based access point to several 71 drought related resources. Resources include the U.S. Drought Monitor (USDM) and the U.S. Seasonal Drought Outlook (USSDO).

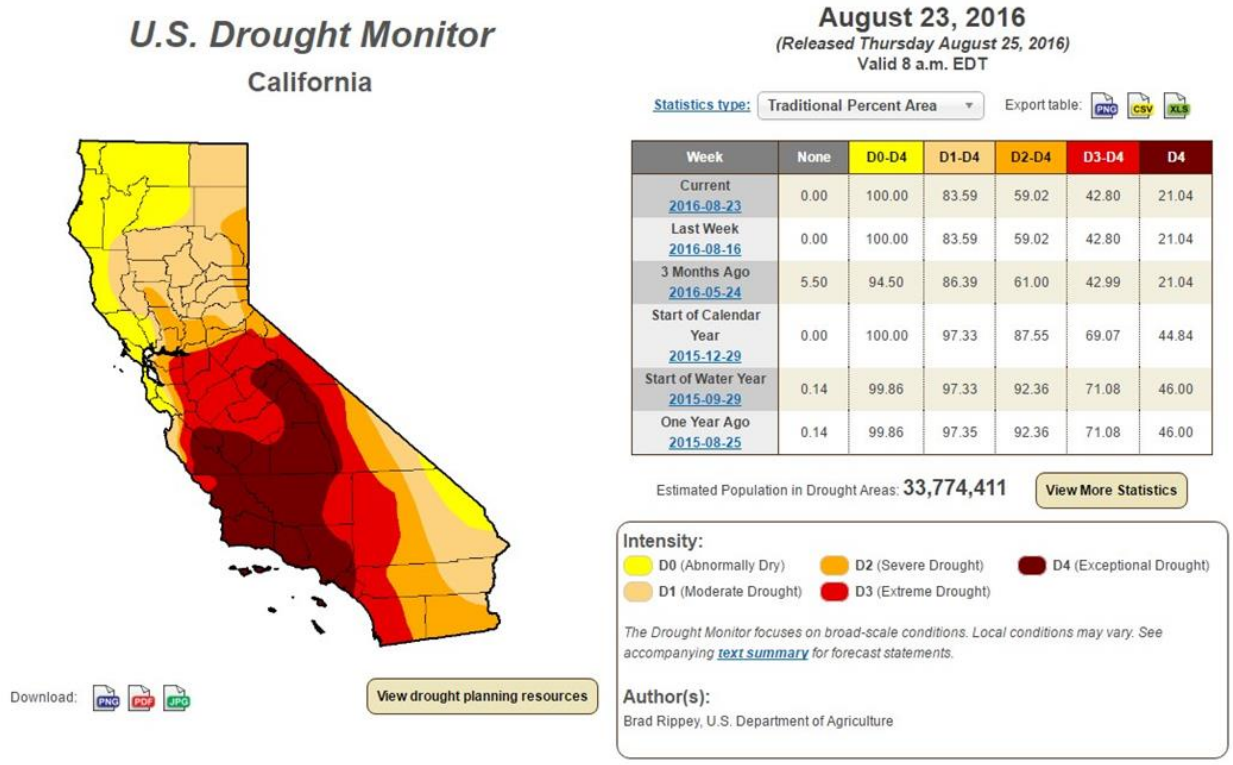


Figure 4-18: US Drought Monitor Map for the State of California on August 23, 2016

Source: U.S. Department of Agriculture

The USDM provides a summary of drought conditions across the United States and Puerto Rico and is developed and maintained by the National Drought Mitigation Center (www.drought.unl.edu). USDM includes the U.S. Drought Monitor Map. This map is updated weekly by combining a variety of drought database and indicators, and local expert input into a single composite drought indicator. The map denotes four levels of drought intensity (ranging from D1 - D4) and one level of "abnormal dryness" (D0). In addition, the map depicts areas experiencing agricultural (A) or hydrological (H) drought impacts. These impact indicators help communicate whether short- or long-term precipitation deficits are occurring. An example Drought Monitor Map for the State of California for August 23, 2016 is illustrated in Figure 4-18. The USSDO, shown in Figure 4-19 is a three-month projection of potential drought conditions developed by the National Weather Service's Climate Prediction Center.

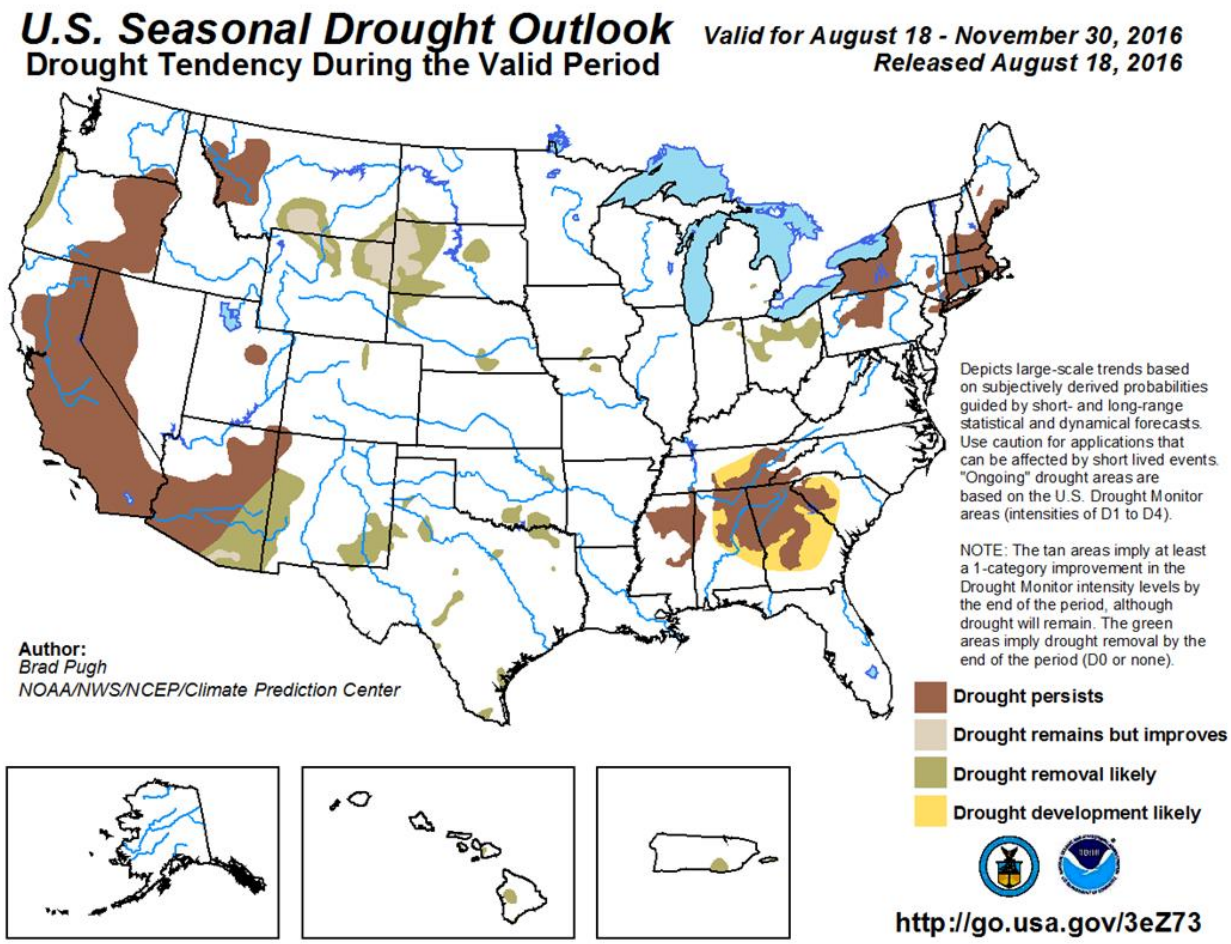


Figure 4-19: USSDO Drought Tendency Map (Valid August 18- November 30, 2016)

Source: go.USA.gov

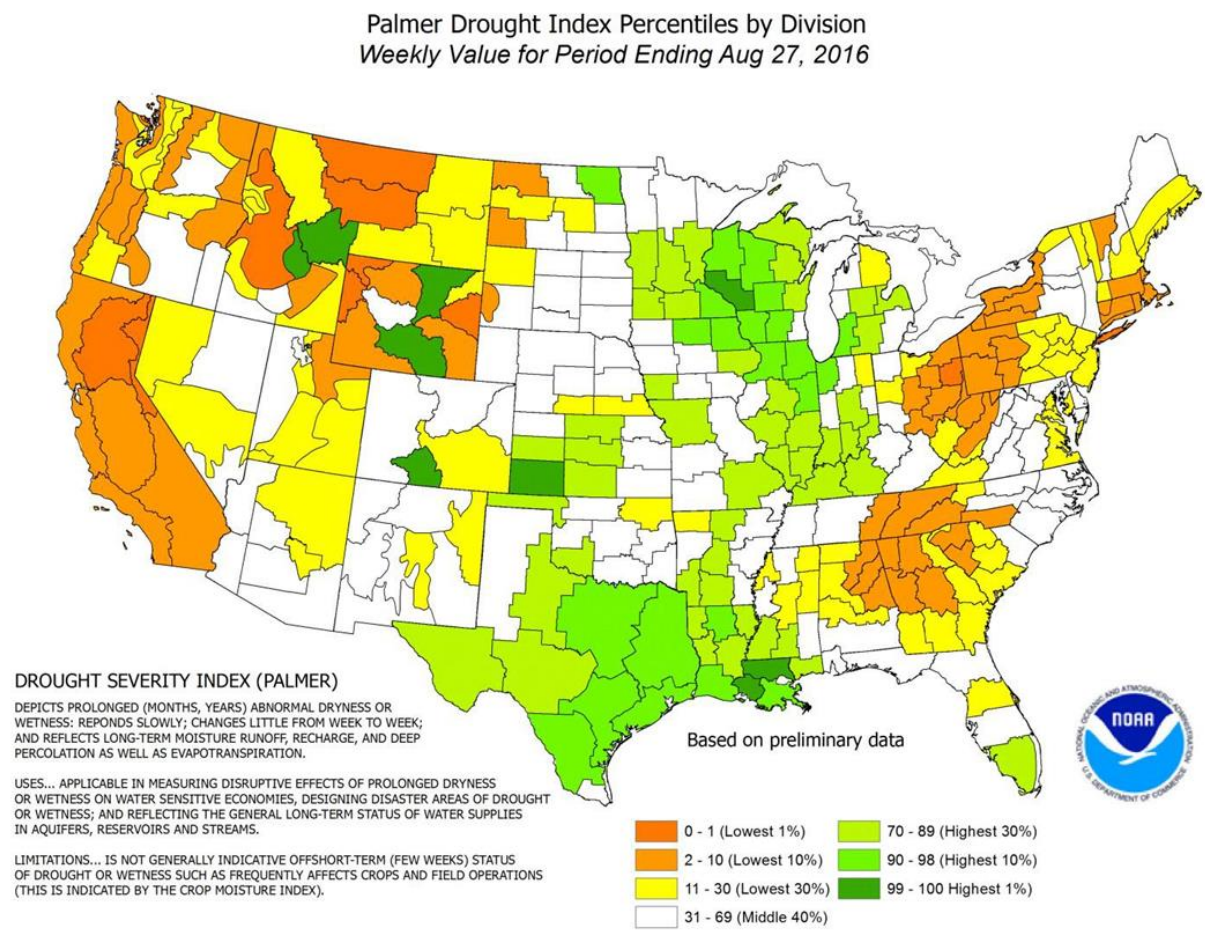


Figure 4-20: Month SPI through the end of August 2016 for San Bernardino County

Source: cpc.ncep.noaa.gov

The Vegetation Drought Response Index, or VegDRI, is a bi-weekly depiction of vegetation stress across the contiguous United States. VegDRI is a fine resolution (1-km2) index based on remote sensing data, and incorporates climate and biophysical data to determine the cause of vegetation stress. Development of the VegDRI map and associated products is a joint effort by the National Drought Mitigation Center (NDMC), the U.S. Geological Survey's (USGS) National Center for Earth Resources Observation and Science (EROS), and the High Plains Regional Climate Center (HPRCC). Figure 4-21 illustrates the VegDRI results for Southern California for August 21, 2016.

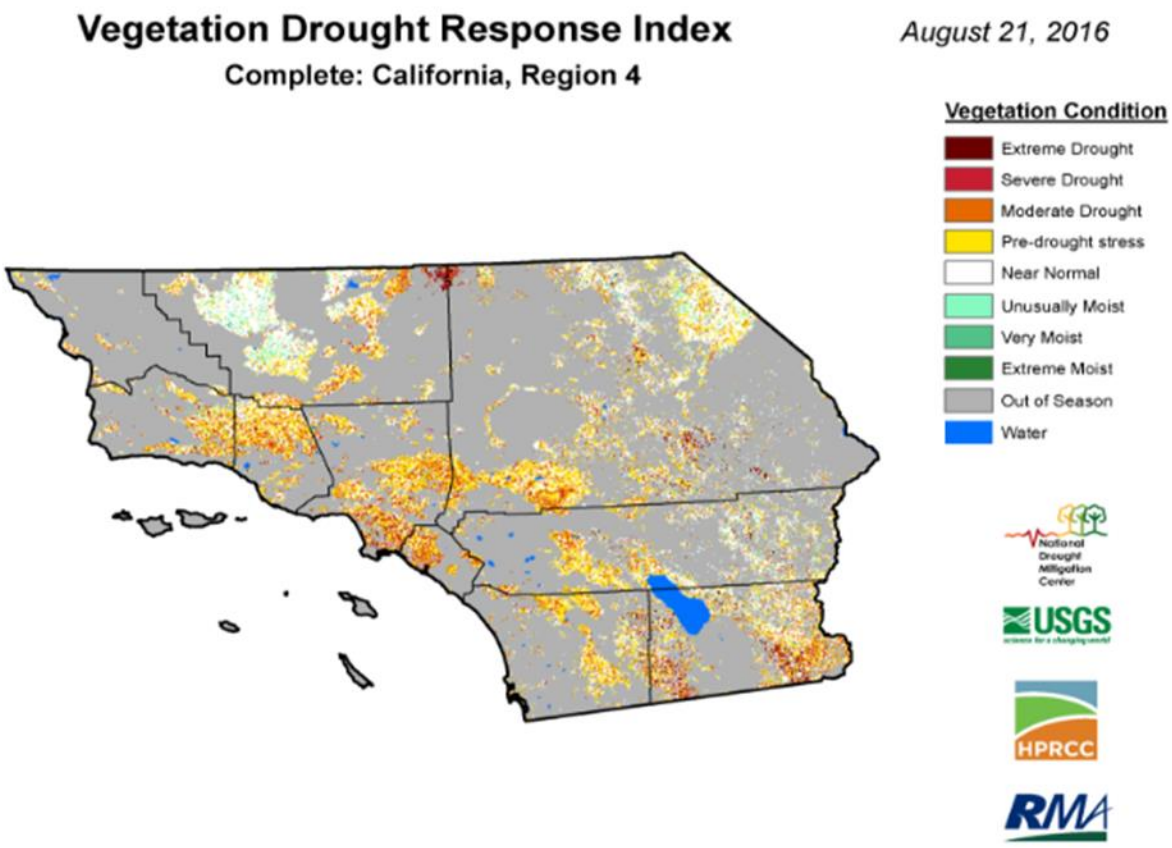


Figure 4-21: Vegetation Drought Response index - California Region 4 for August 21, 2016

Source: http://vegdri.unl.edu/

4.7.11.5 Frequency/ Probability of Future Occurrences

Currently there is no data on the probability of drought that would be comparable to the USGS effort on earthquakes in the region, or how 100-year flood maps are created. However, according to the 2012 Solano County EOP, drought cycles occur every 7 to 11 years in Vacaville and Solano County as a whole.

4.7.11.6 Vulnerability

Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply.

Due to lack of defined geographical boundaries, the vulnerability assessment for drought differs from other natural hazards. The impacts of drought can be categorized as economic, environmental, or social. Many economic impacts occur in agriculture and related sectors, including forestry and fisheries, because of the reliance of these sectors on surface and subsurface water supplies. In addition to obvious losses in yields in crop and livestock production, drought is associated with increases in insect infestations, plant disease, and wind erosion. Droughts also bring increased problems with insects and diseases to forests and reduce growth.

The incidence of forest and range fires increases substantially during extended droughts, which in turn places human and wildlife populations, buildings, infrastructure and critical facilities, at higher levels of risk.

Income loss is another indicator used in assessing the impacts of drought because so many sectors are affected. Reduced income for farmers has a ripple effect. Retailers and others who provide goods and services to farmers face reduced business. This leads to unemployment, increased credit risk for financial institutions, capital shortfalls, and loss of tax revenue for local, state, and federal government. Less discretionary income affects the recreation and tourism industries. Prices for food, energy, and other products increase as supplies are reduced. In some cases, local shortages of certain goods result in the need to import these goods from outside the stricken region.

4.7.11.7 Loss Estimation Results

No standardized methodology exists for estimating losses due to drought. Drought does not generally have a direct impact on critical and non-critical facilities and building stock. Instead, drought vulnerability is primarily measured by its potential impact to sectors of the County's economy and natural resources. In San Bernardino County some of the potential impacts to the economy include the following:

- Reduced agricultural and livestock production
- Loss of timber from increased wildfires
- Decreased municipal and industrial water supply
- Loss of recreation/tourism
- Decreased wildlife and wildlife habitat

4.7.11.8 Statewide Mandatory Water Reductions

Recognizing persistent, yet less severe, drought conditions throughout California, on May 18, 2016 the State Water Resources Control Board adopted an emergency water conservation regulation requiring locally developed conservation standards based upon each water supplier's specific circumstances. It replaces the prior percentage reduction-based water conservation standard. In San Bernardino County, each water wholesaler (San Gabriel Water Agency) was required to calculate the supply of water for the next three years, considering drought conditions persist. Each water supply retailer subsequently self-certified the expected demand on water resources, determining whether or not there is sufficient supply to meet demand. Our Department certified that there is sufficient water supply to meet the demand over the next three years; however, due to ongoing drought conditions in the region, water conservation efforts should continue.

4.7.11.8.12015 San Bernardino Valley Regional Urban Water Management Plan

This Urban Water Management Plan provides a summary of anticipated supplies and demands for the years 2015-2040 for the agencies participating in the plan, including San Gabriel Valley Water District (Fontana Water Company), Cucamonga Valley Water District, West Valley Water District, Marygold Mutual Water Company, and Crawford Canyon Mutual Water Company, who all service the City of Fontana. The Urban Water Management Plan Act requires evaluation of the following:

- Whether supplies will be sufficient to meet demands during the following hydrologic year types:
    - Normal/average year
    - Single dry year
    - Multiple dry year sequence;
- Existing baseline water use in terms of gallons per capita per day (GPCD) (applies only to retail water suppliers);
- Targets for future water use consistent with the Water Conservation Act of 2009 (SB X7-7) which seeks a 20 percent reduction in per capita water use by 2020;
- Demand Management Measures (DMMs) implemented or planned for implementation as well as the methods proposed for achieving future water use targets;
- Water shortage contingency planning; and
- Notification and coordination with other water agencies, land use entities, and the community.

4.7.11.8.2Water Shortage Contingency Plan

In 1987, Fontana Water Company (FWC) started and maintained various funds whereby it can respond to emergencies without waiting for funds from outside sources. FWC has approved a living document known as the “Emergency Preparedness and Response Procedure” in March, 1994 and most recently revised the document in April 2010 and adopted a “Water Shortage Contingency Plan” in July of 2014. It should be noted that the Fontana Water Company is a division of the San Gabriel Valley Water Department.

4.8 Terrorism Profile

There is no single, universally accepted definition of terrorism, however, FEMA defines "terrorism" as intentional, criminal, malicious acts. FEMA document 386-7 refers to terrorism specifically as the use of Weapons of Mass Destruction (WMD), including biological, chemical, nuclear, and radiological weapons; arson, incendiary, explosive, and armed attacks; industrial sabotage and intentional hazardous materials releases; and "cyberterrorism."

FEMA developed the Integrated Emergency Management System (IEMS) using an all-hazards approach. While the IEMS was established as an "all-hazard" approach, responding to the threat of terrorism (referred to as counterterrorism) came to be viewed as the responsibility of law enforcement, defense, and intelligence agencies. Furthermore, defensive efforts to protect people and facilities from terrorism (referred to as **antiterrorism**) were generally limited to the government sector, the military, and some industrial interests.

While the term "mitigation" refers generally to activities that reduce loss of life and property by eliminating or reducing the effects of disasters, in the terrorism context it is often interpreted to include a wide variety of preparedness and response actions. For the purposes of this document, the traditional meaning will be assumed; that mitigation refers to specific actions that can be taken to reduce loss of life and property from manmade hazards by **"modifying the built environment"** or antiterrorism to reduce the risk and potential consequences of these hazards.

4.8.1 Antiterrorism Regulatory Environment

Adopted on February 9th, 2012 and updated on October 1st, 2013, United Facilities Criteria (UFC) 4-010-01 defines the United States Department of Defense's (DoD) minimum antiterrorism standards for both new and existing buildings. The document applies to DoD buildings, National Guard buildings, visitor centers and museums, visitor control facilities and expeditionary structures. Historic preservation compliance for implementation of anti-terrorism standards, philosophy, design strategies and assumptions are all taken into account. Site planning, structural design, architectural design, and electrical and mechanical design are discussed in detail in Appendix B. The document is available to the public and be found online.

4.8.2 Counterterrorism Regulatory Environment

After the Waterman Terrorism Incident on December 2nd, 2015 two full time positions with a regional FBI-led terrorist task force (FBI's Joint Terrorism Task Force) were created. These task force officers have the clearance to conduct terrorism investigations in the County. The Task Force includes partners from Homeland Security Investigations (HSI), the San Bernardino Police Department, the San Bernardino County Sheriff's Department, the Riverside County Sheriff's Department, the Ontario Police Department, the Riverside Police Department, the Corona Police Department and the Chino Police Department. For more information regarding the positions, contact the San Bernardino Police Department at (909) 384-5742.

According to the State of California Department of Justice's Anti-terrorism program website, the Anti-terrorism program works with federal, state and local law enforcement agencies to detect, investigate, prosecute, dismantle, prevent and respond to domestic and international terrorist activities.

The State of California Bureau of Security and Investigative Services' Power to Arrest Course includes a Weapons of Mass Destruction (WMD) & Terrorism Awareness section. More information regarding the course can be found in the Bureau of Security and Investigative Services California Code of Regulations. Past Occurrences

There have been two terrorist attacks recorded in San Bernardino County. Table 4-9 describes both attacks.

Date	Perpetrator Group	Fatalities	Injured	Target Type
3/16/1970	White Extremists	0	1	Government (General)
12/2/2015	Unaffiliated Individuals	16	17	Government (General)

Table 4-9: Terrorist Attacks in San Bernardino County

Source: ***Global Terrorism Database***

The state of California has experienced 574 terrorist attacks from 1970-2011 (Integrated United States Security Database (IUSSD): Data on the Terrorist Attacks in the United States Homeland, 1970-2011 2012). Figure 4-22 shows the types of terrorist attacks in the state of California from 1970 to the present.

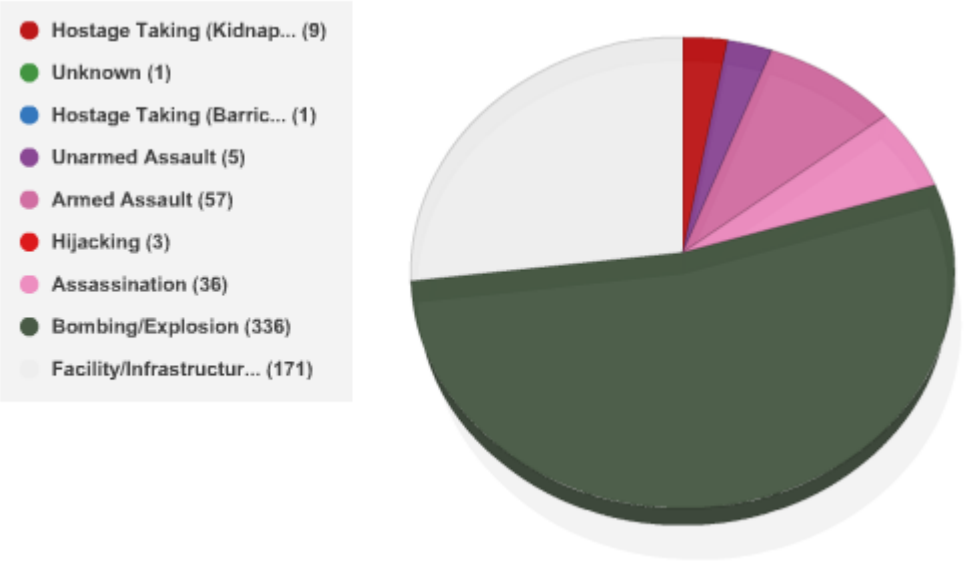
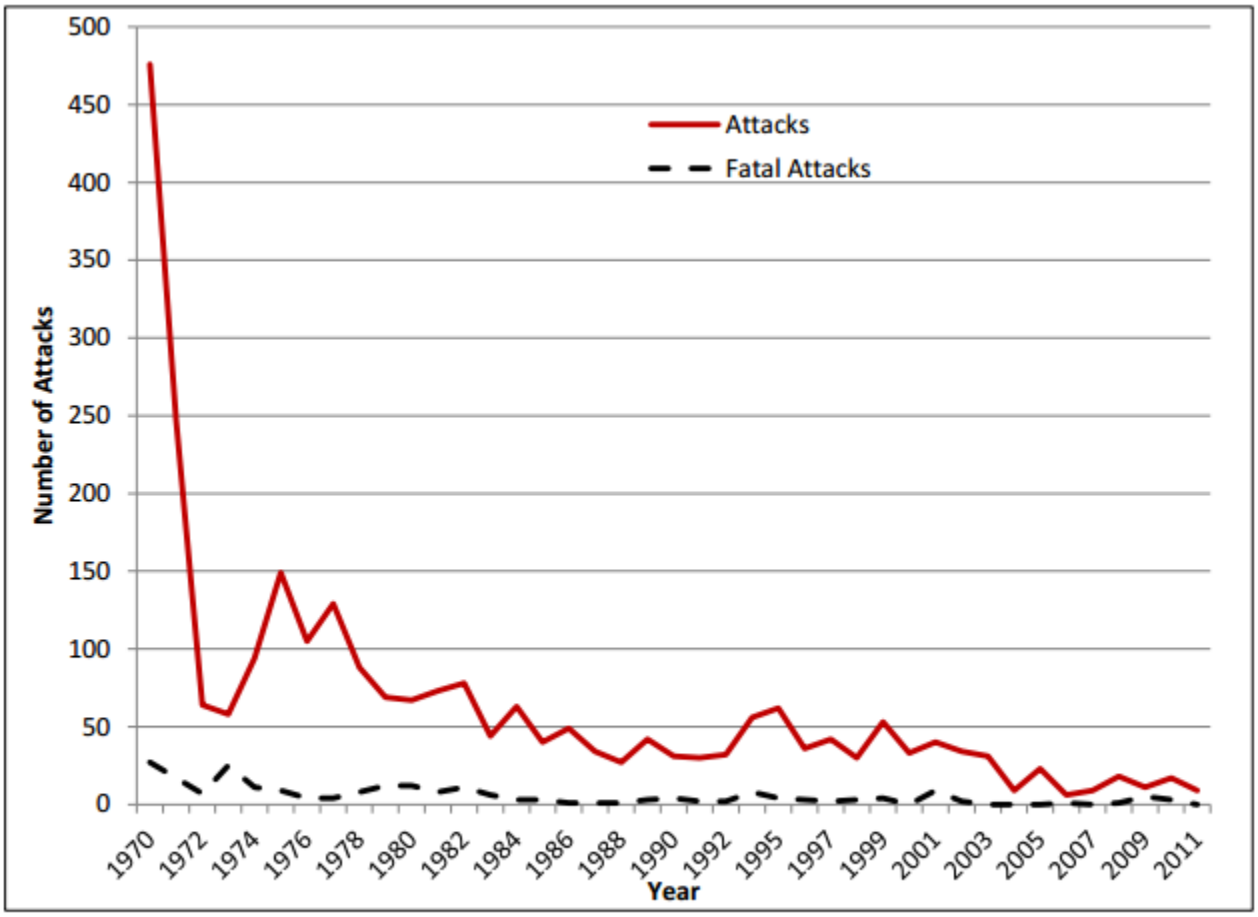


Figure 4-22: Types of Terrorist Attacks in California from 1970- Present

Source: ***Global Terrorism Database***

As seen in Figure 4-23, since 1970, the number of terrorist attacks in the United States has steadily decreased. According to the heritage.org website, most terrorist attacks on America happen outside our nation's borders. The number of international terrorist attacks against the United States from 1970-2011 is shown in Figure 4-24.



Note: There were 2,608 total attacks and 226 fatal attacks between 1970 and 2011.

Source: Nine facts about terrorism in the United States since 9/11, The Washington Post 9/11/2013

Figure 4-23: Total and Fatal Terrorist Attacks in the United States by Year

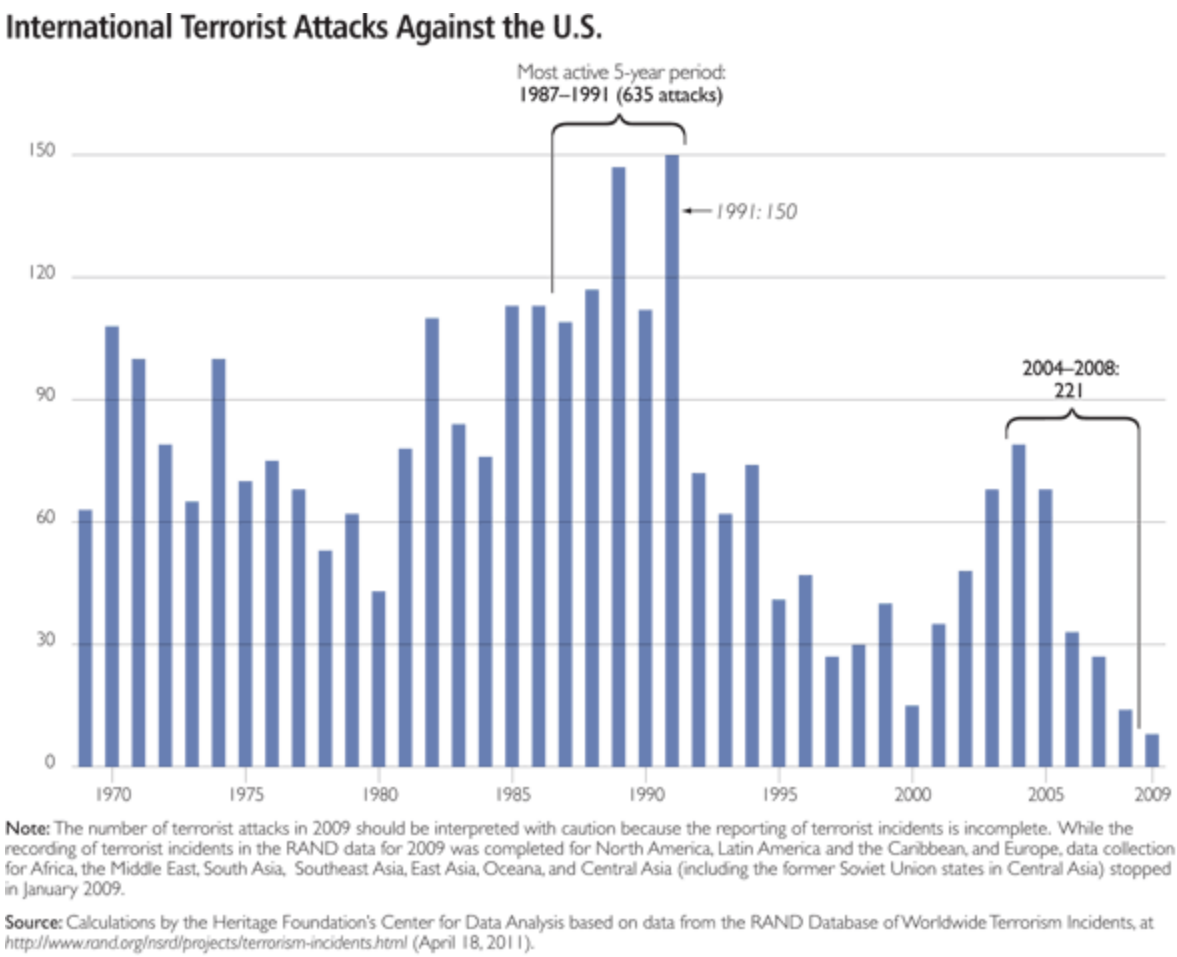


Figure 4-24: International Terrorist Attacks Against the United States

Source: Terror Trends: 40 Years' Data on international and Domestic Terrorism, Heritage.org 5/20/2011

4.8.3 Location/ Geographic Extent

Unlike natural hazards, which often follow patterns and can be forecasted, manmade hazards such as acts of terrorism are much more unpredictable. Terrorists have the ability to choose targets and tactics and can often adjust conditions to achieve their objective. Terrorist attacks are often in a more specific location rather than a widespread, more predictable area such as a flood plain. As demonstrated in the Waterman Terrorism Incident, "homegrown terrorists" (self-radicalizing and pulls off their attacks without any help or communication with people in other countries) are even harder to detect and predict.

Translating most manmade hazard profiles into meaningful geospatial information is difficult at best. Instead, the planning team will use an asset-specific approach, identifying potentially at-risk critical facilities and systems in the community. Once a comprehensive list of assets has been developed, it will be prioritized so that the community's efforts can be directed to protect the most important assets first. Then, beginning with the highest priority assets, the vulnerabilities of each facility or system to each type of hazard will be assessed (FEMA 2003).

4.8.4 Magnitude/ Severity

As previously discussed, predicting terrorist attacks cannot be done with the same level of accuracy as predicting a natural hazard and its potential impacts on the community. However, we can learn from past terrorist incidents. Table 4-10 profiles 10 different types of terrorist attacks and technological hazards.

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
Conventional Bomb/ Improvised Explosive Device	Detonation of explosive device on or near target; delivery via person, vehicle, or projectile.	Instantaneous; additional "secondary devices" may be used, lengthening the time duration of the hazard until the attack site is determined to be clear	Extent of damage is determined by type and quantity of explosive. Effects generally static other than cascading consequences, incremental structural failure, etc.	Overpressure at a given standoff is inversely proportional to the cube of the distance from the blast; thus, each additional increment of standoff provides progressively more protection. Terrain, forestation, structures, etc. can provide shielding by absorbing and/or deflecting energy and debris. Exacerbating conditions include ease of access to target; lack of barriers/shielding; poor construction; and ease of concealment of device
Chemical Agent *	Liquid/aerosol contaminants can be dispersed using sprayers or other aerosol generators; liquids vaporizing from puddles/ containers; or munitions.	Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists.	Contamination can be carried out of the initial target area by persons, vehicles, water and wind. Chemicals may be corrosive or otherwise damaging over time if not remediated.	Air temperature can affect evaporation of aerosols. Ground temperature affects evaporation of liquids. Humidity can enlarge aerosol particles, reducing inhalation hazard. Precipitation can dilute and disperse agents but can spread contamination. Wind can disperse vapors but also cause target area to be dynamic. The micro-meteorological effects of buildings and terrain can alter travel and duration of agents. Shielding in the form of sheltering in place can protect people

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
				and property from harmful effects.
Arson/ Incendiary Attack	Initiation of fire or explosion on or near target via direct contact or remotely via projectile.	Generally minutes to hours.	Extent of damage is determined by type and quantity of device/ accelerant and materials present at or near target. Effects generally static other than cascading consequences, incremental structural failure, etc.	Mitigation factors include built-in fire detection and protection systems and fire-resistive construction techniques. Inadequate security can allow easy access to target, easy concealment of an incendiary device and undetected initiation of a fire. Non-compliance with fire and building codes as well as failure to maintain existing fire protection systems can substantially increase the effectiveness of a fire weapon.
Armed Attack	Tactical assault or sniping from remote location.	Generally minutes to days.	Varies based upon the perpetrators' intent and capabilities	Inadequate security can allow easy access to target, easy concealment of weapons and undetected initiation of an attack.
Biological Agent *	Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point or line sources such as munitions, covert deposits and moving sprayers.	Biological agents may pose viable threats for hours to years depending on the agent and the conditions in which it exists	Depending on the agent used and the effectiveness with which it is deployed, contamination can be spread via wind and water. Infection can be spread via human or animal vectors.	Altitude of release above ground can affect dispersion; sunlight is destructive to many bacteria and viruses; light to moderate wind will disperse agents but higher winds can break up aerosol clouds; the micro- meteorological effects of building and terrain can influence aerosolization and travel of agents.
Cyberterrorism	Electronic attack using one computer system against another.	Minutes to days	Generally no direct effects on built environment.	Inadequate security can facilitate access to critical computer systems, allowing them to be used to conduct attacks.

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
Agriterrorism	Direct, generally covert contamination of food supplies or introduction of pests and/or disease agents to crops and livestock.	Days to months	Varies by type of incident. Food contamination events may be limited to discrete distribution sites, whereas pests and diseases may spread widely. Generally no effects on built environment.	Inadequate security can facilitate adulteration of food and introduction of pests and disease agents to crops and livestock.
Radiological Agent **	Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point or line sources such as munitions, covert deposits and moving sprayers.	Contaminants may remain hazardous for seconds to years depending on material used.	Initial effects will be localized to site of attack; depending on meteorological conditions, subsequent behavior of radioactive contaminants may be dynamic.	Duration of exposure, distance from source of radiation, and the amount of shielding between source and target determine exposure to radiation.
Nuclear Bomb **	Detonation of nuclear device underground, at the surface, in the air or at high altitude.	Light/heat flash and blast/shock wave last for seconds; nuclear radiation and fallout hazards can persist for years. Electromagnetic pulse from a high altitude detonation lasts for seconds and affects only unprotected electronic systems.	Initial light, heat and blast effects of a subsurface, ground or air burst are static and are determined by the device's characteristics and employment; fallout of radioactive contaminants may be dynamic, depending on	Harmful effects of radiation can be reduced by minimizing the time of exposure. Light, heat and blast energy decrease logarithmically as a function of distance from seat of blast. Terrain, forestation, structures, etc. can provide shielding by absorbing and/or deflecting radiation and radioactive contaminants.

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
			meteorological conditions.	
Hazardous Material Release (fixed facility or transportation)	Solid, liquid and/or gaseous contaminants may be released from fixed or mobile containers.	Hours to days	Chemicals may be corrosive or otherwise damaging over time. Explosion and/or fire may be subsequent. Contamination may be carried out of the incident area by persons, vehicles, water and wind.	As with chemical weapons, weather conditions will directly affect how the hazard develops. The micro-meteorological effects of building and terrain can alter travel and duration of agents. Shielding in the form of sheltering in place can protect people and property from harmful effects. Non-compliance with fire and building codes as well as failure to maintain existing fire protection and containment features can substantially increase the damage from a hazardous materials release.

Table 4-10: Event Profiles for Terrorism and Technological Hazards

** Source: Jane's Chem-Bio Handbook*
*** Source: FEMA, Radiological Emergency Management Independent Study Course*

Source: FEMA State and Local Mitigation Planning- how-to guide: Integrating Manmade Hazards

4.8.5 Frequency/ Probability of Future Occurrences

We can usually forecast the type, frequency and location of a natural hazard thanks to the laws of physics and nature. However, when dealing with manmade hazards such as terrorism, we are often dealing with functions of the human mind- malevolence, incompetence, carelessness and other behaviors. These actions cannot be predicted with any accuracy, therefore, there is the potential for an act of terrorism to occur anywhere, at any time.

4.9 Wind Surge Hazard Profile

Severe wind surges pose a significant risk to life and property in the region by creating conditions that disrupt essential systems such as public utilities, telecommunications, and transportation routes. High winds can and do occasionally cause tornado-like damage to local homes and businesses. Severe wind surges can present a very destabilizing effect on the dry brush that

covers local hillsides and urban wildland interface areas. High winds can have destructive impacts, especially to trees, power lines, utility services, and can accelerate a fire. The entire City of Fontana is at risk for these high winds.

Santa Ana Winds

Based on local history, most incidents of high wind in the City of Fontana are the result of the Santa Ana wind conditions. While high impact wind incidents are not frequent in the area, significant Santa Ana wind events and sporadic microburst activity have been known to negatively impact the local community. When conditions are right, the winds come down through the mountain passes and can reach hurricane force and be sustained for days at a time.

Santa Ana winds are generally defined as warm, dry winds that blow from the east or northeast (offshore). These winds occur below the passes and canyons of the coastal ranges of Southern California and in the Los Angeles basin. Santa Ana winds often blow with exceptional speed in the Santa Ana Canyon. Forecasters at the National Weather Service offices in Oxnard and San Diego usually place speed minimums on these winds and reserve the use of "Santa Ana" for winds greater than 25 knots. These winds accelerate to speeds of 35 knots as they move through canyons and passes, with gusts to 50 or even 60 knots.

The complex topography of Southern California combined with various atmospheric conditions creates numerous scenarios that may cause widespread or isolated Santa Ana events.

Commonly, Santa Ana winds develop when a region of high pressure builds over the Great Basin (the high plateau east of the Sierra Mountains and west of the Rocky Mountains including most of Nevada and Utah). Clockwise circulation around the center of this high pressure area forces air down slope from the high plateau. The air warms as it descends toward the California coast at the rate of 5 degrees F per 1000 feet due to compressional heating. Thus, compressional heating provides the primary source of warming. The air is dry since it originated in the desert, and it dries out even more as it is heated.

These regional winds typically occur from October to March, but with climate change those months can vary each year. According to most accounts, the winds are named either for the Santa Ana River Valley where they originate or for the Santa Ana Canyon, southeast of Los Angeles, where they pick up speed.

Microburst / Macroburst Winds

Microbursts are strong, damaging winds which strike the ground and often give the impression a tornado has struck. They frequently occur during intense thunderstorms. The origin of a microburst is downward moving air from a thunderstorm's core. But unlike a tornado, they affect only a rather small area. Macrobursts are downbursts with winds up to 117 mph which spread across a path greater than 2.5 miles wide at the surface and which last from 5 to 30 minutes. The microburst on the other hand is confined to an even smaller area, less the 2.5 miles in diameter from the initial point of downdraft impact. An intense microburst can result in damaging winds near 270km/hr. (170 mph) and often last for less than five minutes.

Downbursts of all sizes descend from the upper regions of severe thunderstorms when the air accelerates downward through either exceptionally strong evaporative cooling or by very heavy

rain which drags dry air down with it. When the rapidly descending air strikes the ground, it spreads outward in all directions, like a fast-running faucet stream hitting the sink bottom.

When the microburst wind hits an object on the ground such as a house, garage or tree, it can flatten the buildings and strip limbs and branches from the tree. After striking the ground the powerful outward running gust can wreak further havoc along its path. Damage associated with a microburst is often mistaken for the work of a tornado, particularly directly under the microburst. However, damage patterns away from the impact area characteristic of straight-line winds rather than a twisted pattern of tornado damage.

4.9.1 Historical Occurrences

Each year there is a high probability that City of Fontana will be affected by high winds coming down the local canyons and the Cajon Pass. While the effects of the Santa Ana winds are often overlooked, it should be noted that in 2003, two deaths in Southern California were directly related to the fierce condition. A falling tree struck one woman in San Diego. The second death occurred when a passenger in a vehicle was hit by a flying pickup truck cover launched by the Santa Ana winds. In 2011, City of Pasadena had over 15 million dollars in damage from a single wind event lasting only a few hours. Furthermore, this section summarizes the significant historic wind surge events that occurred in and around Fontana. These are listed in Table 4-11 below.

Date	Weather	Adverse Impacts
5/23/1932	Strong winds and low humidity.	12 serious brush fires resulted, blackening nearly 2000 acres in San Diego County.
9/24-25/1939	Tropical storm lost hurricane status shortly before moving onshore at San Pedro. Sustained winds of 50 mph.	48 dead from sinking boats.
4/13/1956	Strong storm winds hit Chula Vista. Possible tornado.	Roof damage done to 60 homes & extensively to a school. Two injured by flying glass. Trees uprooted, TV antennas toppled and windows shattered.
11/19-29/1956	A strong and prolonged Santa Ana wind event started on 11.19 and ended on 11.29. On 11.20 a 100 mph gust was recorded at a forest lookout near Saugus.	A fire north of Descanso started on 11.19, killed 11 and burned 44,000 acres. Two wooden bridges and a power plant were destroyed.
11/21-22/1957	Extremely destructive Santa Ana winds.	Winds produced a 28,000 acre brush fire on a 40-mile front west of Crystal Lake. People were ordered off streets in some areas due to flying debris. 12 of 33 passengers on an airplane over Ontario were hurt by a downdraft in extreme turbulence. Paint was completely stripped off of windward sides of 4 cars stalled in a Fontana sandstorm.

11/5-6/ 1961	Strong Santa Ana winds fanned fires in Bel Air and Brentwood.	Fire in Topanga Canyon. 103 injured firemen, $100 million economic losses including 484 buildings (mostly residential) and 6,090 acres destroyed.

9/26 – 29/ 1970	Gusts to 60 mph at Cuyamaca Rancho State Park.	The Laguna Fire. 8 killed, 400 homes destroyed, 185,000 acres burned.
12/20/1977	Very strong Santa Ana winds gusted to 90 mph in the mountains of San Diego County.	A truck driver was killed on I-8. A girl in La Mesa was injured when a tree fell on her. Some brush fires were fanned. Widespread crop damage was suffered in northern San Diego County to avocados, strawberries, etc. Numerous trees and power poles were knocked down.
11/24/1980	Annual Santa Ana winds rushing over the mountains over 70 mph.	Panorama fire destroyed 280 homes, 49 homes damaged, 64 other structures destroyed. 4 civilian deaths, 77 injuries.
1/20/1987	Wind gusts to 80 mph below Cajon Pass, 70 mph in San Bernardino, 60 mph at Mt. Laguna and 40 mph in El Toro.	Thick dust clouds. Trucks blown over. Trees down. A hundred power poles were down in the Inland Empire. Numerous power outages. Schools closed in Fontana as a result of power outages. A mobile classroom was knocked over. Brush fires were started.
12/12 – 13/ 1987	Strong Santa Ana winds in San Bernardino, with gusts to 60 mph. Gusts up to 80 mph around San Bernardino. Strong damaging winds in San Diego County.	80 power poles were blown down within a ½ mile stretch in Fontana and Rancho Cucamonga. One was injured when a tree fell on a truck. Downed tree limbs damaged cars, homes and gardens. Power poles and freeway signs were damaged. A parked helicopter was blown down a hillside in Altadena.
2/16 – 19/ 1988	Very strong Santa Ana winds: Gusts of 90 mph at Newport Beach, 70+ mph in the San Gabriel Mountain foothills. Gusts to 76 mph at Monument Peak - Mt. Laguna. Gusts to 63 mph at Ontario & gusts to 50 mph at Rancho Cucamonga.	Numerous trees and power lines downed and power outages all near the foothills of the San Gabriel and San Bernardino Mountains. Fontana schools were closed due to wind damage at schools. Three were killed when a big rig truck overturned and burned, one was killed having stepped on a downed power line). Power outages hit 200,000 customers in LA and Orange counties. Grass fires resulted. Planes flipped in local airports. Boats were torn from moorings in Newport Harbor.

10/26 – 27/ 1993	Santa Ana winds: gust to 62 mph at Ontario.	Twenty fires ravaged Southern California including in Laguna Hills. 4 dead, 162 injured, $1 billion economic losses in property alone and 194,000 acres were destroyed.
10/25 – 27/ 2003	Santa Ana Winds again hit Southern California	Unprecedented wildfires consumed hundreds of thousands of acres, killed over 20 people, & caused over one billion dollars in damage.
1/22 – 24/ 2006	Santa Ana wind event. Fremont Canyon at 71 mph. During these days, wind gusts exceeded 60 mph on 19 hourly observations.	7 big rigs overturned in Fontana. Downed power lines and trees caused power outages and property damage. Roof of a car port torn off in Hemet. Dust storm closed Ramona Expressway.
10/26/2006	Offshore winds blew to 50 mph in the Banning Pass.	The Esperanza Fire was started by an arsonist. It burned 40,200 acres from Cabazon to San Jacinto. It destroyed 34 homes and killed 5 firefighters.
10/21 – 23/ 2007	Very strong Santa Ana winds. A gust of 85 mph was recorded at Fremont Canyon, 79 mph at San Bernardino, 75 mph at Descanso and Mira Loma, 74 mph at Fallbrook and Rancho Cucamonga. Some locations experienced tropical storm force winds (or greater) for more than 36 consecutive hours.	Winds caused at least $60 million in damage and destruction to buildings, fences, vehicles, etc. The devastating wildfires of 2007 were fanned by these winds. These fires caused the largest mass evacuation in California history.
11/15 -19/ 2008	Santa Ana winds gusted over 70 mph in the Santa Ana mountains and over 60 mph in the northern Inland Empire.	Freeway Complex Fire from Corona through Chino Hills and Yorba Linda burned more than 30,000 acres.

3/20/2011	A strong low pressure system dug through southern California, bringing very strong winds, heavy rain and heavy snow, with blizzard conditions in the mountains. The strongest winds occurred over the high desert where winds exceeded 110 mph at times, causing considerable damage in the Apple Valley area.	A spotter measured a gust of 115 MPH on an anemometer. The gust damaged the anemometer shortly after. Several power poles and trees were knocked down, causing a blackout that lasted nearly 24 hours. Numerous houses sustained roof damage and at least one house had its roof destroyed. Another spotter reported a measured wind gust of 59 MPH with sustained winds of 30 MPH, resulting in downed power lines, tiles blown off roof and power outages. Yet another spotter measured sustained winds of 40 MPH with a gust of 65 MPH between 1300 and 1400 PST.

12/1-3/ 2011	These events were the result of a large upper-level closed low over northern Baja, Mexico and featured four Santa Ana events, the strongest of which occurred in Orange County and southwest San Bernardino County with wind gusts 45 to 65+ mph and reported damage on December 1. Much drier air moved into San Diego County on Saturday December 3, when the Santa Ana mountains and foothills had another surge of Santa Ana/offshore winds with gusts to near 60 mph and very low relative humidity. The final period of winds developed behind another system passing to our east on Monday, bringing wind gusts to 50 to 65 mph Monday night and Tuesday morning in the San Diego County mountains, and very low humidity. The Palm Avenue Elementary weather station in the city of San Bernardino recorded sustained northeast winds of 49 mph around 0700 PST on the 1st. A max gust of 70 mph was also recorded at that station at 0551 PST. The Cal State San Bernardino mesonet station reported high winds between 0350 and 0550 PST. During this time, sustained winds of 40 mph were recorded along with gusts of 47 and 53 mph.	Numerous occurrences of wind damage near these stations were reported. An overturned box truck was blocking the slow lane of I-15 near Glen Helen Parkway. Power lines and trees were downed near the city of San Bernardino. Power poles and lines were also down across 3rd Avenue near the Crafton Reservoir in Mentone. These winds were strong enough to overturn several trucks, down power lines, reduce visibilities in dust and topple hundreds of large trees in Rancho Cucamonga (near Fontana, San Bernardino and Ontario), near the Cajon Pass along I-15. Rancho Cucamonga was declared a state of emergency by the State of California for the nearly 500 trees damaged. This area also suffered damage to the electrical infrastructure leaving many without power.
3/6/2012	A very strong cold front brought high winds to much of the Mojave Desert and southern Great Basin. Isolated heavy snow also fell in the mountains.	Several utility poles were knocked over, and a few transformers caught fire.

4/15-16/ 2013	A strong low pressure system and cold front brought high winds and dust storm conditions to portions of the Mojave Desert.	The peak gust occurred at Bicycle Lake (KBYS) at 0315 PST. A tree and 12 foot tall ham radio tower were blown down in Barstow, and several trees were knocked down and housing areas were damaged on Fort Irwin. Multiple roads were closed, including Interstate 40, as dust storm conditions led to several accidents.
5/10/2014	A strong cold front brought high winds to much of the Mojave Desert and southern Great Basin.	Widespread damage occurred on Fort Irwin. At least 147 fences were blown down, along with many trees and power lines, and some roofs were damaged. Several power lines were blown down in and around Barstow, and three telephone poles were blown down in Trona. Dust storm conditions contributed to a pileup on I-40 near Newberry Springs involving six big rigs, which caused three injuries (indirect) and closed the interstate for several hours.
1/24/2015	A strong surface high pressure area over the Great Basin resulted in gusty east to northeast winds near the mountain crests, in the coastal foothills, and western inland valleys, including the Inland Empire. Gusty winds began on the 21st, reaching peak strength on the 23rd through 24th. Several stations recorded gusts above 65 mph. Damage included several trees and power lines down in the Inland Empire and foothills of San Diego County. There were also reports of two semi-trucks overturned, one in Rancho Cucamonga, and the other just west of Pine Valley.	High winds occurred at the Highland Springs RAWS between 0516-0716 PST on the 24th. During this time, winds were sustained out of the ENE at 40-50 mph with gusts in the 60s. A peak gust of 69 mph was recorded between 0616-0716 PST. The Ontario Airport ASOS recorded a peak gust of 64 mph around 0405 PST on the 24th. ABC7 news reported several trees down due to wind in Rancho Cucamonga and Alta Loma, as well as power lines down and customers without electricity in Fontana. One large tree fell on a car, completely crushing it, in Rancho Cucamonga. CHP also reported a big rig flipped over into a ditch along Highway 210 near the Interstate 15 junction, likely wind-related.

12/2-3/ 2016	A surface high setup over the Pacific Northwest and northern Nevada, resulting in favorable conditions for strong northerly Santa Ana winds through the Cajon Pass and over portions of Orange County. Winds began on December 2nd and lingered into the 3rd, with local gusts of 60-90 mph. Numerous trees were downed causing power outages, and flights were grounded for a period at Ontario International Airport.	Northerly winds gusting to 70 mph downed numerous trees below the Cajon Pass. The fallen trees blocked roadways and caused at least 11,000 power outages. Planes were grounded at Ontario International Airport, where a peak wind gust of 68 mph broke terminal windows and fanned a small brush fire.

Table 4-11: Wind Surge Historical Occurrences

Since December of the LHMP in 2016, no major disasters due to high winds have occurred within the City of Fontana.

4.10 Vulnerability Assessment

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be inventoried and their values tabulated. Other information can be collected in regard to the hazard area, such as the location of critical community facilities, historic structures, and valued natural resources. Together, this information conveys the vulnerability of that area to a hazard.

The information in this section provides an explicit representation of what a community stands to lose in a disaster. This is useful for City Staff and other decision makers who will need to balance the costs of mitigation against the potential harm to residents and damage to property. It provides comparable measurements of community natural hazard exposure and assists in determining which hazards and/or what parts of the City to focus on making resilient to disaster first. Based upon possible assets at risk, hazard mitigation resources can be directed where need be, in-part, by a vulnerability assessment and information presented in this section.

The vulnerability assessment is developed by providing the hazard mitigation analysts with quantitative and qualitative information for each hazard identified in the LHMP. Through an exposure analysis, quantitative data is developed for each hazard. An exposure analysis provides quantities of people and assets at risk to particular hazards. Qualitative data has been developed and presented in this section for hazards without measurable data. Qualitative data provides information beyond quantities of people and assets at risk, but rather a description of how the hazard could affect the region around Fontana.

Note: The hazard exposure analysis has been developed with best available data and follows methodology described in the FEMA publication "Understanding Your Risks—Identifying Hazards and Estimating Losses".

Note: There are other intangible losses that could result from a natural hazard event, such as losses of historic or cultural integrity or damage to the environment that are difficult to quantify. Other costs, including response and recovery costs, are often unrecoverable and are not addressed in this document.

4.10.1 Methodology

A vulnerability assessment was conducted for each of the identified priority hazards. Geospatial data is essential in determining population and assets exposed to particular hazards. Geospatial analysis can be conducted if a natural hazard has a particular spatial footprint that can be overlaid against the locations of people and assets. In City of Fontana, wildfire, flood, dam failure, earthquake, landslides, and wind surges have known geographic extents and corresponding spatial information about each hazard.

Several sources of data are necessary to conduct a vulnerability analysis. Figure 4-25 provides an exhibit of the data inputs and outputs used to create the vulnerability analysis results presented in this section. U.S. Census data is the primary source in determining natural hazard exposure to residents. Census data has been used to determine the population at risk, which is generally

referred to as population exposure. Population exposure is provided for wildfire, flooding, dam failure, severe weather, earthquakes and landslides as potential hazards later in this section.

Together with the U.S. Census data, asset data was used to provide a snapshot of how City assets are affected by natural hazards. For purposes of this vulnerability analysis, asset data includes parcels and critical infrastructure within the City of Fontana boundaries. Critical infrastructure is described as assets that are essential for people and a community to function. Critical infrastructure includes such as utilities, City of Fontana/San Bernardino County owned facilities, bridges, schools, and other community facilities that provide essential services to residents.

Critical facilities data was developed from a variety of sources including City of Fontana/San Bernardino County owned and maintained data, state and federal government datasets, and private industry datasets. A critical infrastructure spatial database was developed to translate critical facilities information into georeferenced[5] points. Critical facility points are intersected with the spatial hazard layers to develop a list of "at risk" critical facilities. The City of Fontana/San Bernardino County critical facilities that intersect with natural hazards are referred to as facilities with hazard "exposure". Exposure results are presented later in this section.

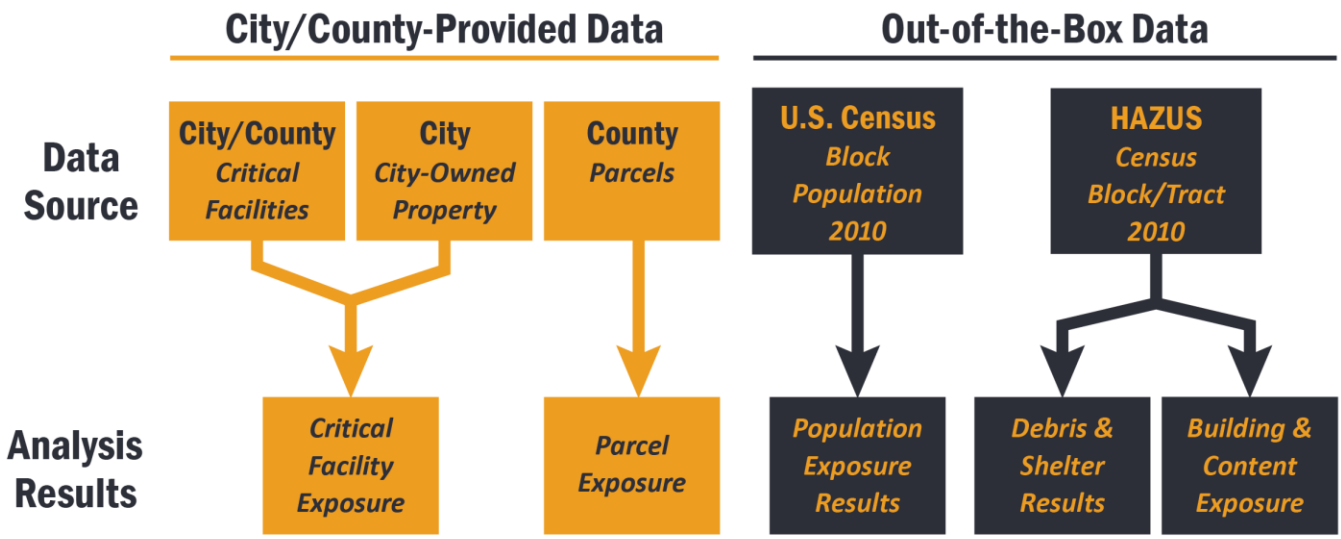


Figure 4-25: Data Source and Methodology

Lastly, FEMA's Hazus-MH MR5 (Hazus) software was implemented to conduct detailed loss estimation for flood and earthquake. Hazus is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. HAZUS uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters. For purposes of this planning effort, Hazus was used to

[5] To georeference something means to define its existence in physical space. That is, establishing its location in terms of map projections or coordinate systems. The term is used both when establishing the relation between raster or vector images and coordinates, and when determining the spatial location of other geographical features.

graphically illustrate the limits of identified high-risk locations due to possible earthquakes and floods.

The vulnerability and potential impacts from priority hazards that do not have specific mapped areas nor the data to support additional vulnerability analyses are discussed in more general terms

4.10.2 Population and Assets

To describe vulnerability for each hazard, it is important to understand the "total" population and "total" assets at risk. The exposure for each hazard described in this section will refer to the percent of total population or percent of total assets. This provides the possible significance or vulnerability to people and assets for the natural hazard event and the estimated damage and losses expected during a "worst case scenario" event for each hazard. Sections below provide a description of the total population, critical facilities, and parcel exposure inputs.

4.10.2.1 Population

To develop hazard-specific vulnerability assessments, population near natural hazard risks should be determined to understand the total "at risk" population. We can understand how geographically defined hazards may affect the City of Fontana by analyzing the extent of the hazard in relation to the location of population. For purposes of the vulnerability assessment approximately 196,433 (95.8%) of the City of Fontana's population is exposed to one or more hazards within or near the City of Fontana boundaries. Each natural hazard scenario affects the City of Fontana residents differently depending on the location of the hazard and the population density of where the hazard could occur. Vulnerability assessment sections presented later in this section summarize the population exposure for each natural hazard.

The population statistics for the City of Fontana are based on the U.S. Bureau of the Census 2010 and the ESRI forecasts for 2016 for zip codes 92335, 92336, 92337. Most of the Fontana residents have a Hispanic origin with 70.1% of the population.

- Total Population: 204,961
- Average Household: 4.04
- Population Growth (2000-2010): 18.78%
- Number of Households: 50,557
- Median Household Income: $64,520

The impacts of natural and human-made hazards in terms of ability to recover vary greatly among the population. As the events associated with the hurricane Katrina in the Gulf Coast have shown, vulnerable populations, including seniors, disabled citizens, women, and children, as well as those people living below the poverty level, are often disproportionately impacted by natural and human-made hazards. With the current Inland Empire high unemployment rate along with the general lack of training and workforce development programs, this creates a population that generally has fewer resources to prepare their homes for a disaster or to take care of themselves without assistance after an event.

4.10.2.2 Vulnerable Populations

The severity of a disaster depends on both the physical nature of the extreme event and the socioeconomic nature of the populations affected by the event. Important socioeconomic factors tend to influence disaster severity. A core concept in a vulnerability analysis is that different people, even within the same region, have a different vulnerability to natural hazards.

4.10.2.2.1 Income and Housing Condition

Income or wealth is one of the most important factors in natural hazard vulnerability. This economic factor affects vulnerability of low income populations in several ways. Lower income populations are less able to afford housing and other infrastructure that can withstand extreme events. Low income populations are less able to purchase resources needed for disaster response and are less likely to have insurance policies that can contribute to recovery efforts. Lower income elderly populations are less likely to have access to medical care due to financial hardship. Because of these and other factors, when disaster strikes, low income residences are far more likely to be injured or left without food and shelter during and after natural disasters.

Figure 4-26 shows the median household income distribution for the City of Fontana in 2012. The "median" is the value that divides the distribution of household income into two equal parts (e.g., the middle). The average median household income in the City of Fontana between 2010 and 2014 was $64,520, in the United States during the same period the median house household income was $56,516. The map in Figure 4-26 shows 2012 household income estimates using Census 2010 geographies.

4.10.2.2.2 Age

Children and the elderly tend to be more vulnerable during an extreme natural disaster. They have less physical strength to survive disasters and are often more susceptible to certain diseases. The elderly often also have declining vision and hearing and often miss reports of upcoming natural hazard events. Children, especially young children, have the inability to provide for themselves. In many cases, both children and the elderly depend on others to care for them during day to day life.

Finally, both children and the elderly have fewer financial resources and are frequently dependent on others for survival. In order for these populations to remain resilient before and after a natural hazard event, it may be necessary to augment city residents with resources provided by the City, state and federal emergency management agencies and organizations. Figure 4-26 shows the median household income distribution maps, and Figure 4-27 and Figure 4-28 show the location of vulnerable population by age within the City of Fontana.

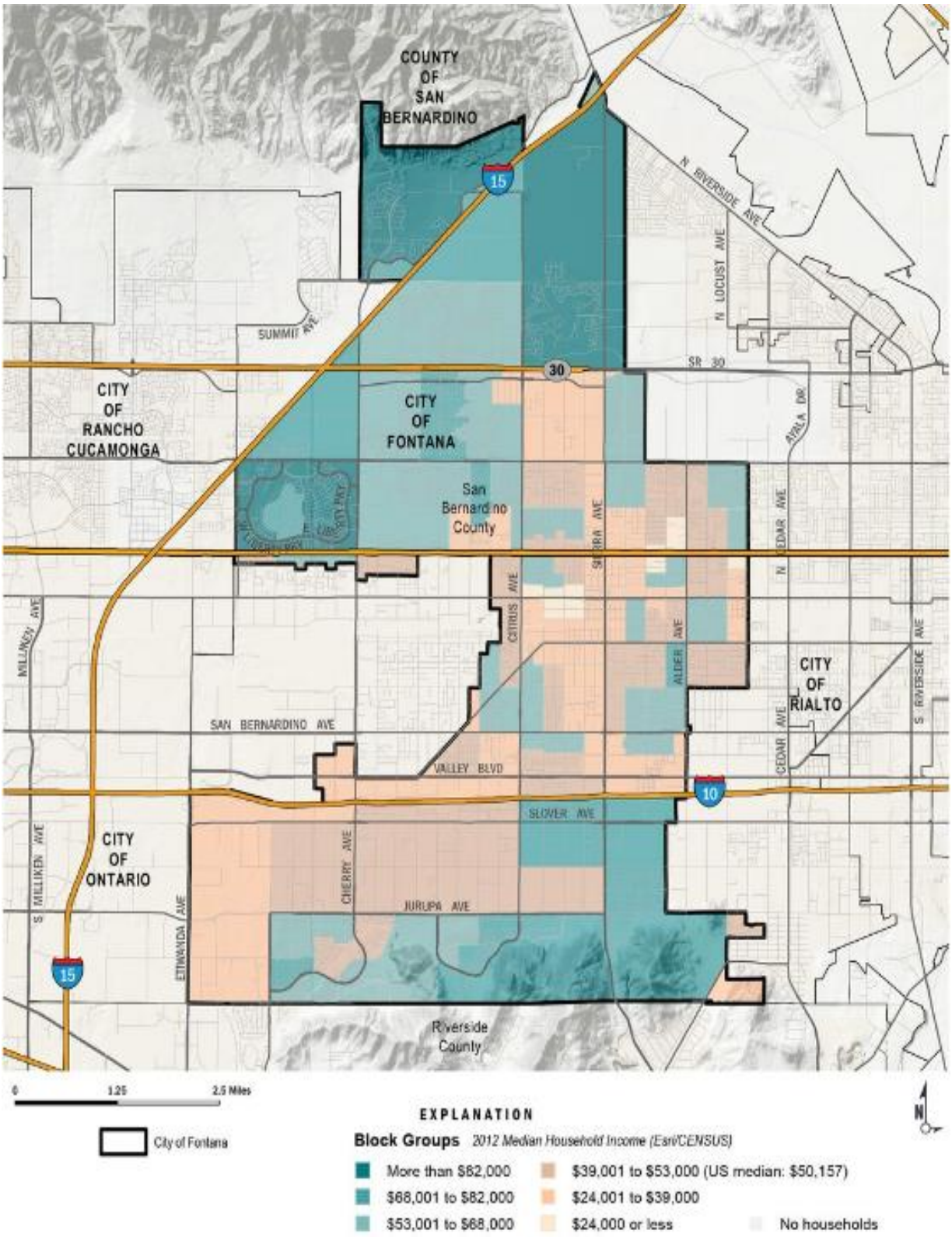


Figure 4-26: Median Household Income Distribution Map

Source: Esri/US Census Bureau

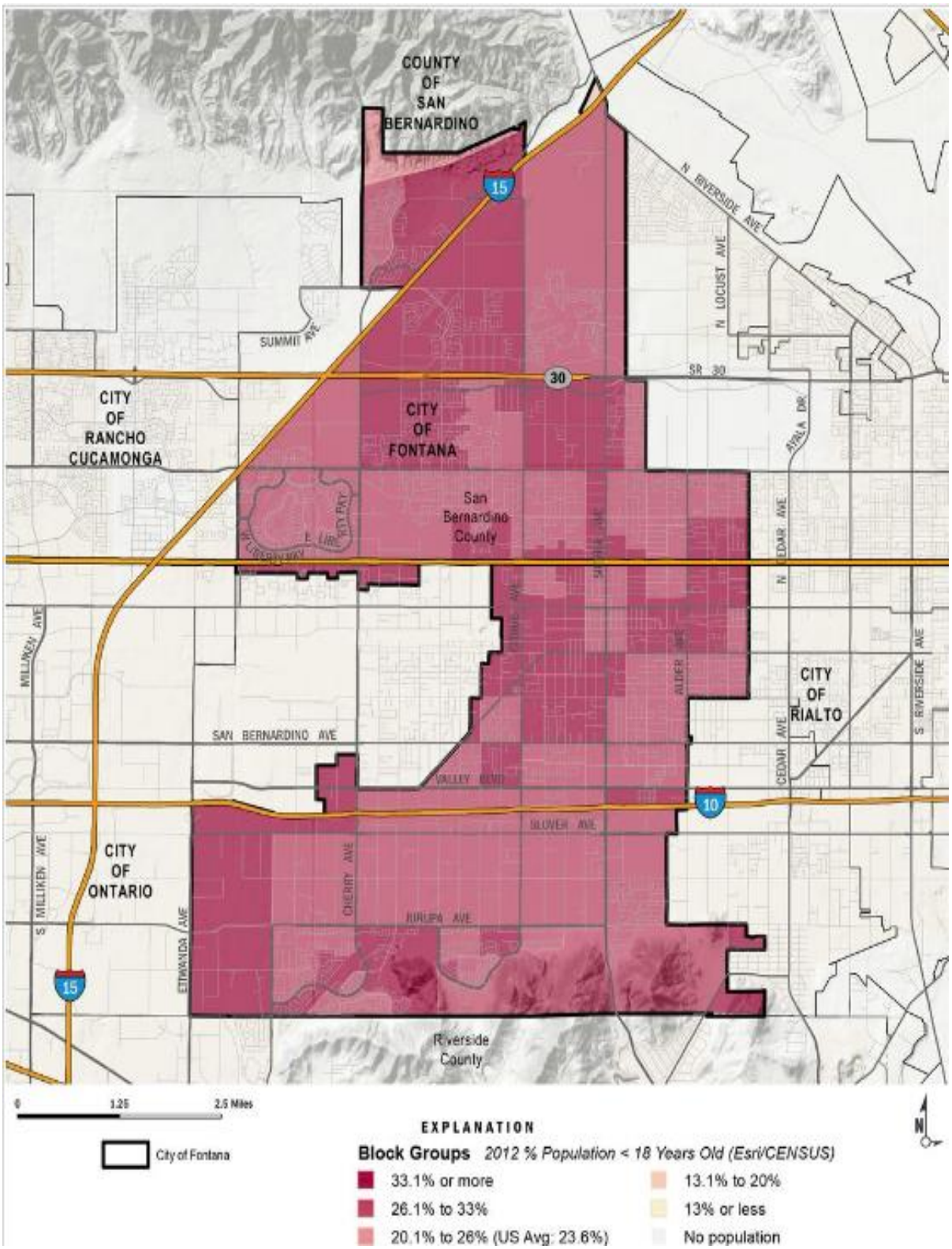


Figure 4-27: Population under 18

Source: Esri/ US Census Bureau

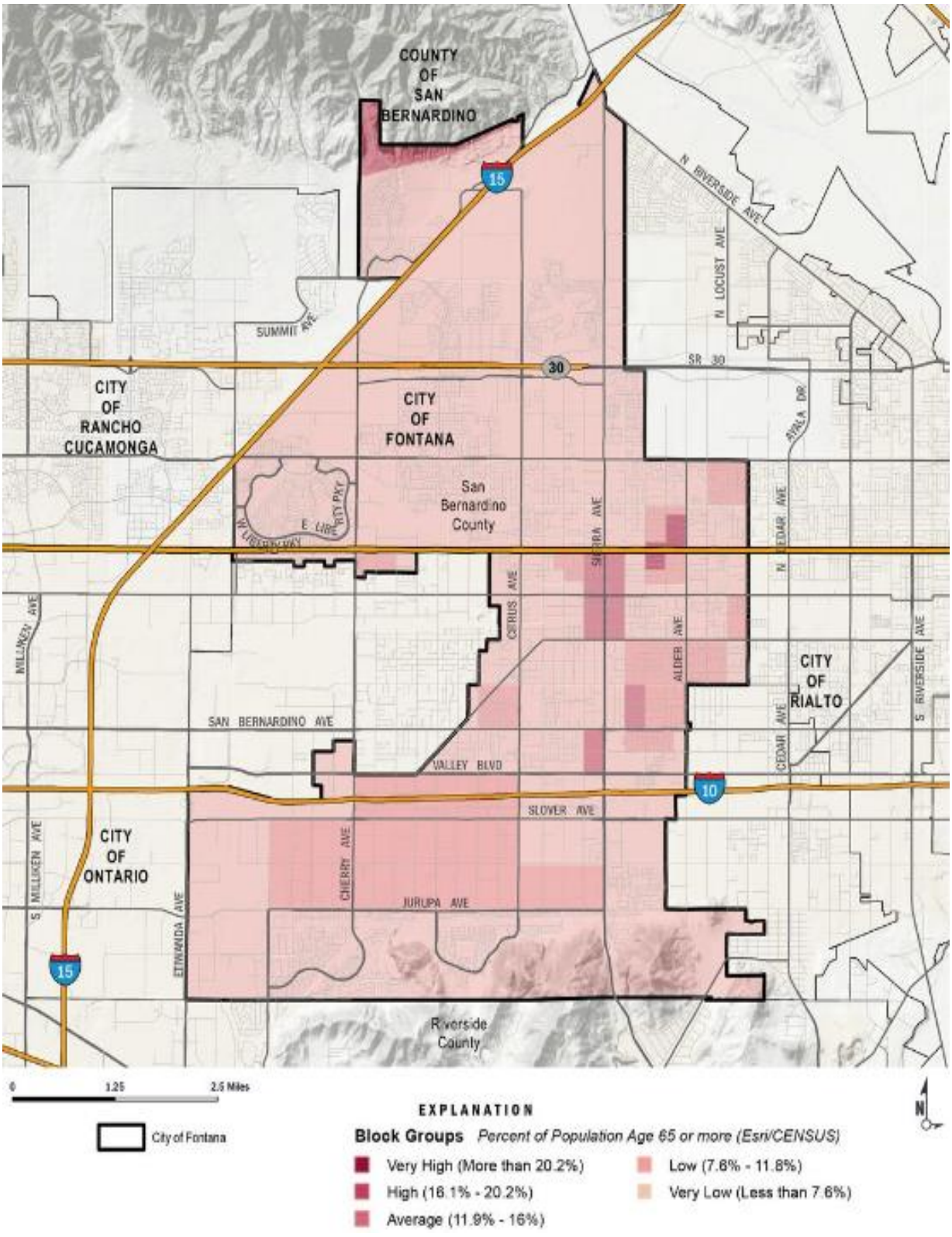


Figure 4-28: Population Over 65

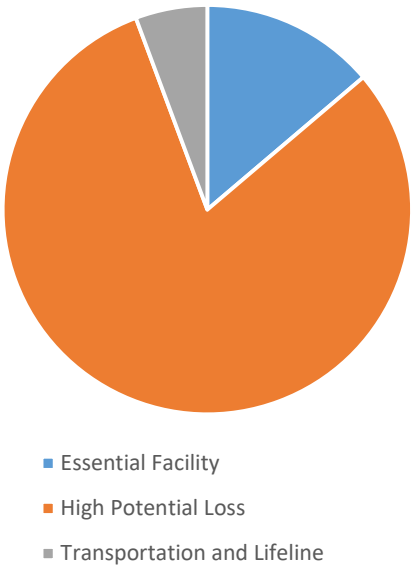
Source: Esri/Us Census Bureau

4.10.2.3 Critical Facilities

Critical facilities are of particular concern when conducting hazard mitigation planning. Critical facilities are defined as essential services, and if damaged, would result in severe consequences to the health, safety, and welfare of the public.

An inventory of critical facilities based on data from the County and other publicly sourced information were used to develop a comprehensive inventory of facility points and lifelines. Critical facility points include fire stations, buildings containing hazardous materials (HAZMAT), schools, transportation, utilities, and government buildings. Lifelines include transportation routes only. A current representation of the critical facilities and lifelines are provided in Table 4-12 and Table 4-13. Some critical facility information has been omitted from documentation due to national security purposes. The City of Fontana manages and maintains a complete list of critical facilities.

Infrastructure Type	Total Feature Count
Essential Facility	85
EOC	1
Fire Station	6
Government Facility	-
Hospital	12
Police Station	2
School	64
High Potential Loss	496
Dam	1
Economic Element-Major Employer	-
Hazmat	377
Historic/Cultural Resource-Historic	-
Utility-Communication Facility	13
Utility-Electric Power Facility	-
Utility-Natural Gas Facility	-
Utility-Potable Water Facility	-
Utility-Waste Water Facility	-
Vulnerable Population-Adult Residential Care	35



Vulnerable Population-Child Care	44
Vulnerable Population-Flood Zone	-
Vulnerable Population-Foster/Home Care	4
Vulnerable Population-Mobile Home Park	-
Vulnerable Population-RV Park	-
Vulnerable Population-Senior Care	22
Transportation and Lifeline	35
Highway Bridge	34
Railway Bridge	1
Bus Facility	-
Rail Facility	-
Airport Facility	-
Grand Total	**616**

Table 4-12: Critical Facility Points

Infrastructure Type	Total Linear Mileage
Transportation and Lifeline	**610**
Railway	**20**
Roads	**590**
Interstate Highway	28
State / County Highway	106
Primary Highway	9
Local Road, Major	194
Local Road	220
Other Minor Road	13
Vehicular Trail	1
Cul-de-Sac / Traffic Circle	0
Ramp	19
Service Road	-
Grand Total	**610**

Table 4-13: Linear Utilities

4.10.3 Hazus-MH Inputs

FEMA's loss estimation software, Hazus MH, was used to analyze the City of Fontana's building risk to flood and earthquake hazards. Hazus contains a database of economic, demographic, building stock, transportation facilities, local geology, and other information that can be used for several steps in the risk assessment process. Hazus software operates on structure square footage, structure replacement, and content replacement costs aggregated to the census block and tract levels depending on type of hazard analysis. Figure 4-29 and Figure 4-30 provide value data for building categories at the census block and census tract levels. Census block and census tracts are used to provide input information for the Hazus analysis presented in this report.

The project team used the SBEFRA project incorporated these newly updated DFIRM data into HAZUS to assess potential losses in the mapped 100-year (with and without levee protection) and 500-year flood zones. The City of Fontana results are provided in Table 4-14.

Note: The Hazus software utilizes different census level information inputs to develop loss estimates depending on the hazard module. The flood module uses census block information while the earthquake module uses census tract information. It is important to understand the total values of each as estimated damage to the community is presented on a percent of total value basis.

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (%)	Content Replacement Cost ($000)	Content Replacement Cost (%)	Total Value ($000)	Total Value (%)
Agricultural	$3,320	50.0%	$3,320	50.0%	$6,640	0%
Commercial	$617,209	49.0%	$643,262	51.0%	$1,260,471	10%
Education	$56,180	49.6%	$57,026	50.4%	$113,206	1%
Governmental	$ 62,289	49.1%	$64,547	50.9%	$126,836	1%
Industrial	$85,246	43.1%	$112,429	56.9%	$197,675	2%
Religion	$55,526	50.0%	$55,526	50.0%	$111,052	1%
Residential	$7,416,905	66.7%	$3,708,681	33.3%	$11,125,586	86%
Total	**$8,296,675**	**64%**	**$ 4,644,791**	**36%**	**$12,941,466**	

Table 4-14: Hazus Flood Census Block Input Values

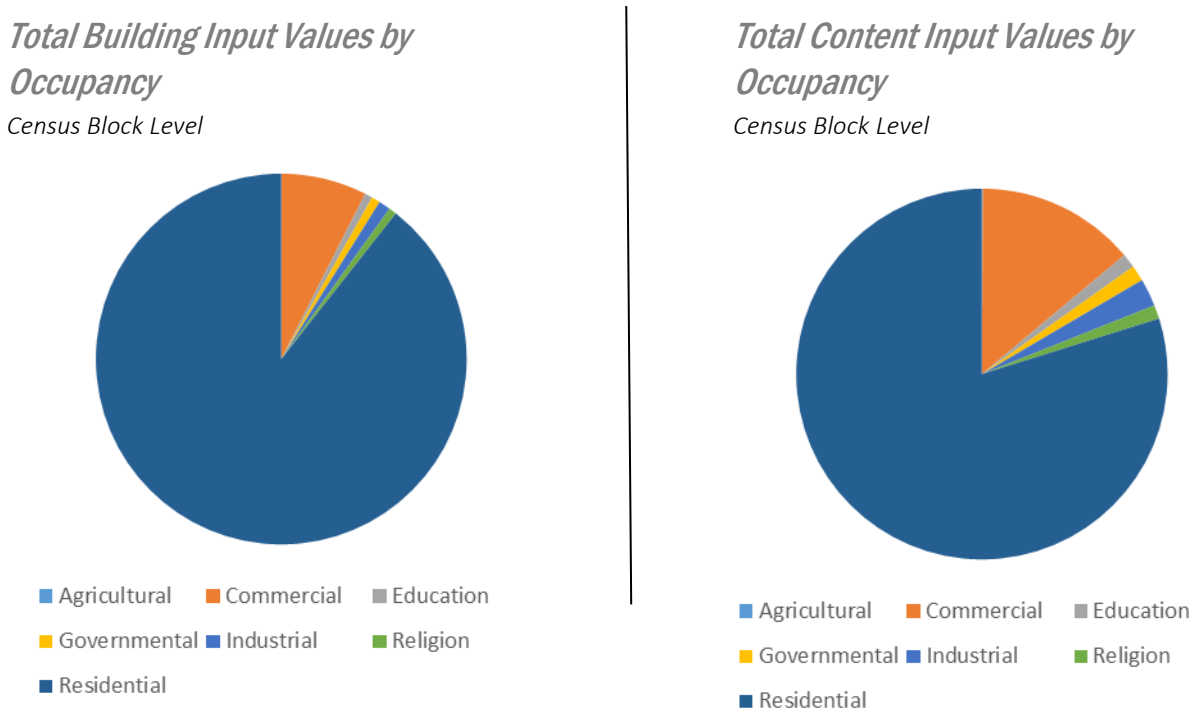


Figure 4-29: Census Block Building and Content Exposure Values

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (%)	Content Replacement Cost ($000)	Content Replacement Cost (%)	Total Value ($000)	Total Value (%)
Agricultural	$31,550	50.0%	$31,550	50.0%	$63,100	0%
Commercial	$3,072,241	49.4%	$3,144,225	50.6%	$6,216,466	16%
Education	$161,736	49.9%	$162,582	50.1%	$324,318	1%
Governmental	$ 72,808	48.7%	$76,777	51.3%	$149,585	0%
Industrial	$1,342,700	40.9%	$1,940,958	59.1%	$3,283,658	9%
Religion	$165,314	50.0%	$165,314	50.0%	$330,628	1%
Residential	$18,649,703	66.7%	$9,325,544	33.3%	$27,975,247	73%
Total	**$23,496,052**	**61%**	**$14,846,950**	**39%**	**$38,343,002**	

Table 4-15: Hazus Earthquake Census Tract Input Values

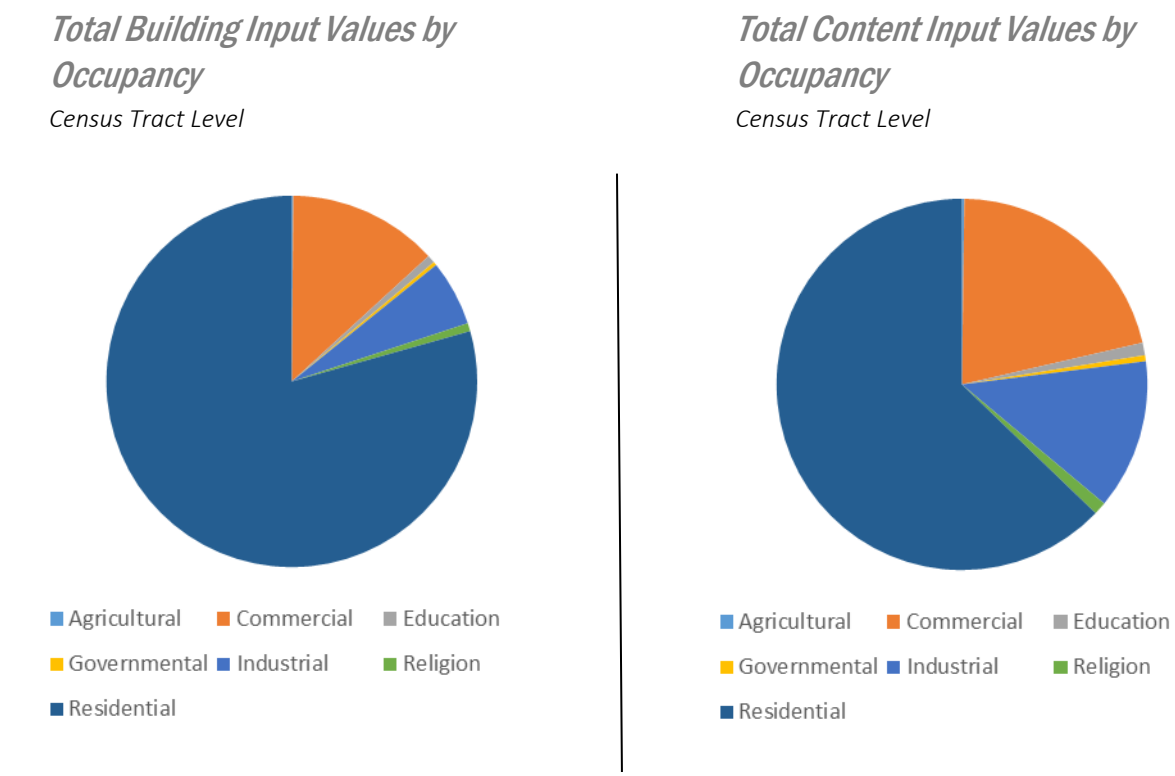


Figure 4-30: Census Tract Building and Content Exposure Values

4.10.4 Hazard Specific Vulnerability

The Disaster Mitigation Act regulations require that the City of Fontana evaluate the risks associated with each of the hazards identified in the planning process. This section summarizes the possible impacts and quantifies, where data permits, the City's vulnerability to each of the priority hazards identified in the hazard profiles. The hazards evaluated as part of this vulnerability assessment include:

An estimate of the vulnerability of the City to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, geographic extent, and damage and casualty potential.

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be inventoried and their values tabulated. Other information can be collected in regard to the hazard area, such as the location of critical community facilities, historic structures, and valued natural resources. Together, this information conveys the vulnerability of that area to a hazard.

Section 4 Vulnerability Assessment:

4.10.5 Flooding

Flooding is a significant problem in City of Fontana as described in the flood hazard profile. Historically, the operational area has been subject to flooding during periods of heavy rainfall, falling primarily between the months of October through April, which causes streams and drainage canals to become overwhelmed and overflow their banks and/or inundate storm drainage systems. Occasionally, overbank flows in City of Fontana have resulted in flooding of residential properties, road blockages, and traffic disruptions. In urbanizing areas, the increase in paved areas associated with new development decrease the amount of open land available to absorb rainfall and runoff, thus increasing the volume of water that must be carried away from by waterways. Flooding has damaged or destroyed commercial and residential structures; flooded bridges and streets and caused stream channels and flood control works to erode.

4.10.5.1 Population living with Flood Risk

Of greatest concern in the event of a flood is the potential for loss of life. Using 2012 population data aggregated by census blocks, an estimate was made of the population exposed to the 100- and 500-year floodplain. To account for census blocks that were partially within the floodplain, a weighted average was employed to calculate the proportion of the population within the floodplain. The results of the population overlay are shown in Figure 4-31. More than 4,900 residents live near or within the 100-year floodplain and approximately 14,000 residents live within the 500-year floodplain. Approximately 8,000 city residents live within areas protected by levees.

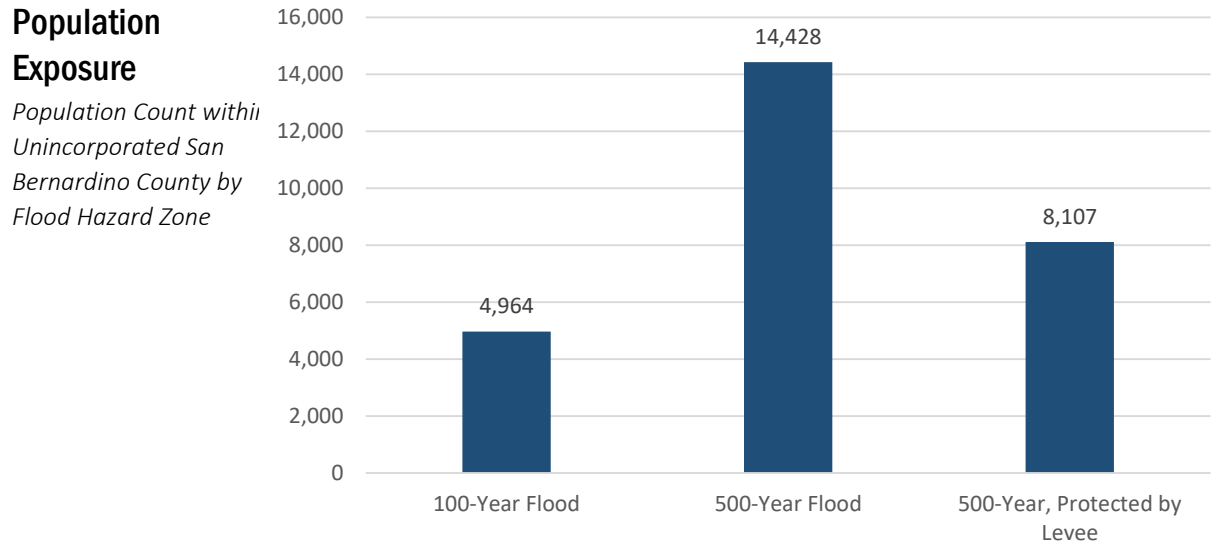


Figure 4-31: Population Exposed to NFIP Flood Zones

4.10.5.2 Residential Parcel Value with Flood Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels within the FEMA NFIP flood zones. In some cases, a parcel will be within in multiple flood zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the floodplain layer to determine the flood risk for each structure. The flood zone in which the centroid was located was assigned to the entire parcel. This methodology assumed that every parcel with a square footage value greater than zero was developed in some way. Only improved parcels greater than $20,000 were analyzed. Table 4-16 shows the count of at-risk parcels and their improvement and land exposure values.

Flood Hazard Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
100-Year Flood	573	$94,219	$34,680	$128,899
500-Year Flood	3,750	$891,947	$343,736	$1,235,684
500-Year, Protected by Levee	2,393	$536,770	$212,098	$748,868
Grand Total	**$6,716**	**$1,522,936**	**$590,514**	**$2,113,451**

Table 4-16: Parcels Exposed to NFIP Flood Zones

Notes:
1-The table above does not display loss estimation results; the table exhibits total value at risk based upon the hazard overlay and San Bernardino County Assessor data.
2- Parcel information is for all county parcels with greater than $20,000 in assessed parcel improvement value only. The San Bernardino County Assessor's roles only provide spatial information on assessed improvement and land values.

While there are several limitations to this methodology, it does allow for potential loss estimation. It should be noted that the analysis may include structures in the floodplain that are elevated at or above the level of the base flood elevation, which likely will decrease potential flood damage to these structures. Also, it is important to remember that the County Assessor's values are well below actual market values; thus, the actual value of assets at risk may be significantly higher than those included herein.

4.10.5.3 Critical Facilities Exposure

Critical facilities data were overlain with flood hazard data to determine the type and number of facilities within the 100- and 500-year floodplain. Flooding poses numerous risks to critical facilities and infrastructure:

- Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs.
- Bridges washed out or blocked by floods or debris from floods also can cause isolation.
- Creek or river floodwaters can back up drainage systems causing localized flooding.
- Floodwaters can get into drinking water supplies causing contamination.
- Sewer systems can be backed up causing waste to spill into homes, neighborhoods, rivers, and streams.

- Underground utilities can also be damaged.

Table 4-17 and Table 4-18 provide an inventory of critical facilities in the floodplain for City of Fontana and provides the locations of lifelines relative to the floodplain in the areas of the City of Fontana. With a total of 85 essential facilities, high potential losses, and transportation and lifeline structures located in either the 100- or 500-year flood zone, the impact to the community could be devastating if these critical facilities were damaged or destroyed during a flood event.

Infrastructure Type	100 Year Flood Zone	500 Year Flood Zone	500 Year Flood Zone, Protected by Levee	Total Feature Count
Essential Facility	1	11	3	15
EOC	0	0	0	0
Fire Station	0	0	1	1
Government Facility	0	0	0	0
Hospital	0	0	0	0
Police Station	0	0	0	0
School	1	11	2	14
High Potential Loss	7	46	7	60
Dam	0	0	0	0
Economic Element-Major Employer	0	0	0	0
Hazmat	6	36	4	46
Historic/Cultural Resource-Historic	0	0	0	0
Utility-Communication Facility	0	0	0	0
Utility-Electric Power Facility	0	0	0	0
Utility-Natural Gas Facility	0	0	0	0
Utility-Potable Water Facility	0	0	0	0
Utility-Waste Water Facility	0	0	0	0
Vulnerable Population-Adult Residential Care	0	1	1	2
Vulnerable Population-Child Care	1	6	2	9
Vulnerable Population-Flood Zone	0	0	0	0

Vulnerable Population-Foster/Home Care	0	1	0	1
Vulnerable Population-Mobile Home Park	0	0	0	0
Vulnerable Population-RV Park	0	0	0	0
Vulnerable Population-Senior Care	0	2	0	2
Transportation and Lifeline	2	8	0	10
Highway Bridge	2	8	0	10
Railway Bridge	0	0	0	0
Bus Facility	0	0	0	0
Rail Facility	0	0	0	0
Airport Facility	0	0	0	0
Grand Total	**10**	**65**	**10**	**85**

Table 4-17: Critical Facility Exposed to NFIP Flood Zones

Facility Type	100 Year	500 Year Flood Zone	500 Year Flood Zone, Protected by Levee	Total Mileage
Transportation and Lifeline	10	51	34	95
Railway	1	2	1	4
Roads	9	49	33	90
Interstate Highway	0	2	2	4
State / County Highway	3	8	7	17
Primary Highway	0	1	0	1
Local Road, Major	4	23	17	44
Local Road	2	14	3	18
Other Minor Road	0	1	1	2
Vehicular Trail	0	0	0	0
Cul-de-Sac / Traffic Circle	0	0	0	0

Ramp	0	0	3	4
Service Road	0	0	0	0
Total	**10**	**51**	**34**	**95**

Table 4-18: Lifelines Exposure to NFIP Flood Zones

4.10.5.4 Loss Estimation Results

The Hazus analysis was used to assess the risk from and vulnerability to flooding within City of Fontana**.** Hazus buildings data is aggregated to the census block level, known as the general building stock (GBS), which has a level of accuracy acceptable for hazard mitigation planning purposes. The following sections describe risk to and vulnerability of the GBS within the City of Fontana's mapped regulatory floodplain. The total value of exposed buildings and content within the City of Fontana's planning area was generated using Hazus.

Hazus calculates losses to structures from flooding by considering the depth of flooding and type of structure. Using historical flood insurance claim data, the software estimates the percentage of damage to structures and their contents by applying established depth-damage curves. Damage estimates are then translated to estimated dollar losses. The results are summarized in Table 4-19. An estimated $46 of damage could occur in the City of Fontana's regulatory floodplain if all flooding sources experienced a 100-year flood event. An all-encompassing event (all tributaries flooding to the NFIP 100-year floodzone) is estimated to cause losses of .00 percent of the total GBS within the City boundaries. An estimated $78,860 of damage could occur if all flooding sources experienced a 500-year flood event, representing .61 percent of the total GBS within the City boundaries.

While there are several limitations to the FEMA Hazus model, it does allow for potential loss estimation. It should be noted that the analysis may include structures in the floodplain that are elevated at or above the level of the base flood elevation, which will likely mitigate flood damage. Also, it is important to remember that the replacement costs are well below actual market values, thus, the actual value of assets at risk may be significantly higher than those included herein.

Flood Hazard Zone	Building Loss ($000)	Building Loss (% of Total Value)	Content Loss ($000)	Content Loss (% of Total Value)	Total Estimated Loss ($000)	Total Estimated Loss (% of Total Value)
100-Year	$ 11.00	0.0%	$ 31.00	0.0%	$ 46.00	0.0%
500-Year	$ 39,912.00	0.3%	$ 36,892.00	0.3%	$ 78,860.00	0.6%

Table 4-19: Flood Loss Estimation (Based on Depth) in NFIP Flood Zones

Note: *from section 4.10.3 'Hazus Flood Census Block Input Values' totals
1- Hazus Census Block Building Stock Value ($000):
2- Building Replacement Costs = $8,296,675
3- Content Replacement Cost = $4,644,791
4- Total Value = $12,941,466

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)	Total Value ($000)
Agricultural	-	0.00%	-	0.00%	-	0.00%	$6,640.00
Commercial	-	0.00%	$1	0.00%	$1	0.00%	$1,260,471.00
Educational	-	0.00%	-	0.00%	-	0.00%	$113,206.00
Government	-	0.00%	-	0.00%	-	0.00%	$126,836.00
Industrial	$7	0.00%	$28	0.01%	39	0.02%	$197,675.00
Religious	-	0.00%	-	0.00%	-	0.00%	$111,052.00
Residential	$4	0.00%	$2	0.00%	$6	0.00%	$11,125,586.00
Grand Total	**$11**	**0.00%**	**$31**	**0.00%**	**$46**	**0.00%**	**$12,941,466**

Table 4-20: 100-Year Flood Loss Estimation (Based on Depth) in NFIP Flood Zones by Occupancy Type

Note: *from section 4.10.3 'Hazus Flood Census Block Input Values' totals
1- Hazus Census Block Building Stock Value ($000):
2- Building Replacement Costs = $8,296,675
3- Content Replacement Cost = $4,644,791
4- Total Value = $12,941,466

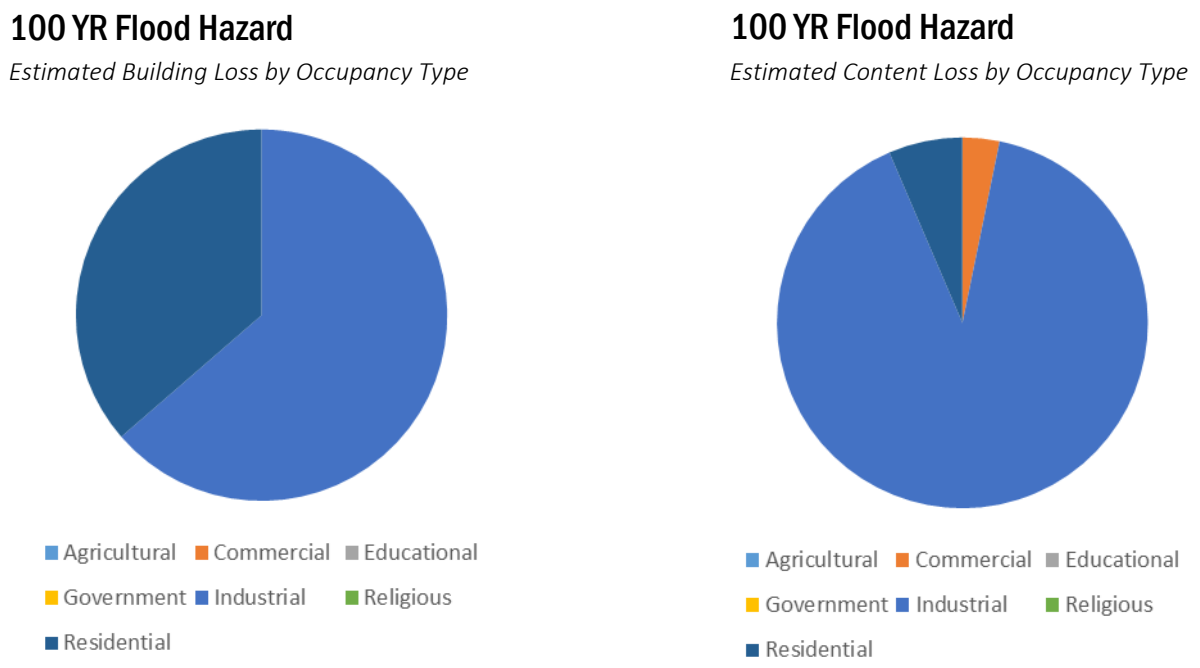
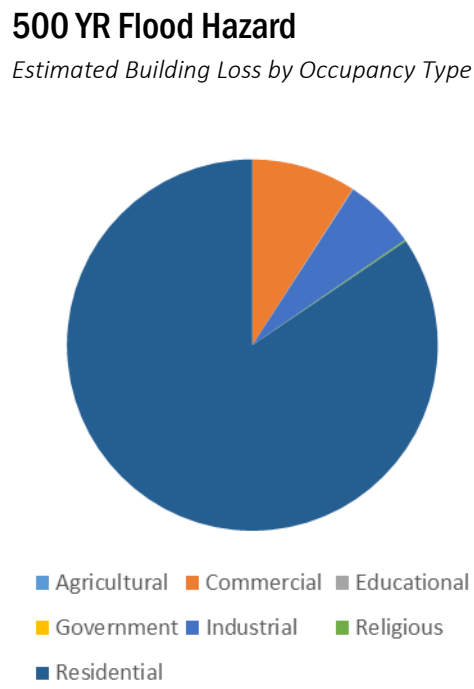


Figure 4-32: Total Building and Content Loss by Occupancy Type

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)	Total Value ($000)
Agricultural	$ 7.00	0.11%	$35.00	0.53%	$45.00	0.68%	$6,640.00
Commercial	$3,625.00	0.29%	$11,373.00	0.90%	$15,722.00	1.25%	$1,260,471.00
Educational	$23.00	0.02%	$135.00	0.12%	$178.00	0.16%	$113,206.00
Government	$ -	0.00%	$ -	0.00%	$ -	0.00%	$126,836.00
Industrial	$2,496.00	1.26%	$6,433.00	3.25%	$10,015.00	5.07%	$197,675.00
Religious	$52.00	0.05%	$491.00	0.44%	$550.00	0.50%	$111,052.00
Residential	$33,709.00	0.30%	$18,425.00	0.17%	$52,350.00	0.47%	$11,125,586.00
Grand Total	**$39,912**	**0.31%**	**$ 36,892**	**0.29%**	**$78,860**	**0.61%**	**$12,941,466**

Table 4-21: 500-Year Flood Loss Estimation (Based on Depth) in NFIP Flood Zones by Occupancy Type

Note: *from section 4.10.3 'Hazus Flood Census Block Input Values' totals
1- Hazus Census Block Building Stock Value ($000):
2- Building Replacement Costs = $8,296,675
3- Content Replacement Cost = $4,644,791
4- Total Value = $12,941,466



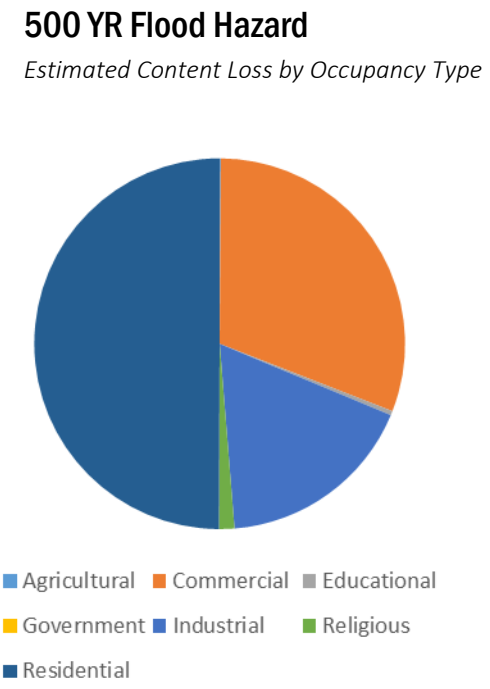


Figure 4-33: Total Building and Content Loss by Occupancy Type

4.10.6 Wildfire

Risk to the City of Fontana from wildfire is of significant concern. High fuel loads in the hills, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. During the May to October fire season the dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become large and out-of-control.

Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Short and long-term economic losses could also result due to loss of business and other economic drivers associated with City of Fontana's summer season activities. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

Generally, there are three major factors that sustain wildfires and predict a given area's potential vulnerability to burn. These factors are fuel, topography, and weather.

(a) Fuel – Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and volume. Fuel sources are diverse and include everything from dead tree leaves, twigs, and branches, to dead standing trees, live trees, brush, and cured grasses. Manmade structures are also considered a fuel source, such as homes and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Fuel is the only factor that is under human control. The City of Fontana has identified areas within that City that are considered "high fire severity" zones, and currently possess the highest vulnerability to wildfire.

(b) Topography – An area's terrain and slope affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.

(c) Weather – Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out fuels that feed wildfires, creating a situation where fuel will ignite more readily and burn more intensely. Thus, during periods of drought the threat of wildfire increases. Wind is the most treacherous weather factor. The greater the wind, the faster a fire can spread and the more intense it can be. Wind shifts, in addition to wind speed, can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. As part of a weather system, lightning also ignites wildfires, often in difficult to reach terrain for firefighters.

Factors contributing to the high, widespread wildfire risk in City of Fontana include:

- Narrow and often one-lane and/or dead-end roads complicating evacuation and emergency response.
- Nature and frequency of ignitions; and increasing population density leading to more ignitions.
- Slope of the foothills;
- Residential development along the foothills;

4.10.6.1 Population at Risk

Wildfire risk is of greatest concern to populations residing in the high wildfire hazard zones. City of Fontana census block data was used to estimate populations within the hazard zones. There are a significant number of people living within the WUI described in the wildfire profiles. More than 26,000 residents in the city live within areas considered very high fire hazard and more than 12,000 residents live within a very high hazard area[6].

Population Exposure

Population Count by Wildfire Hazard Zone

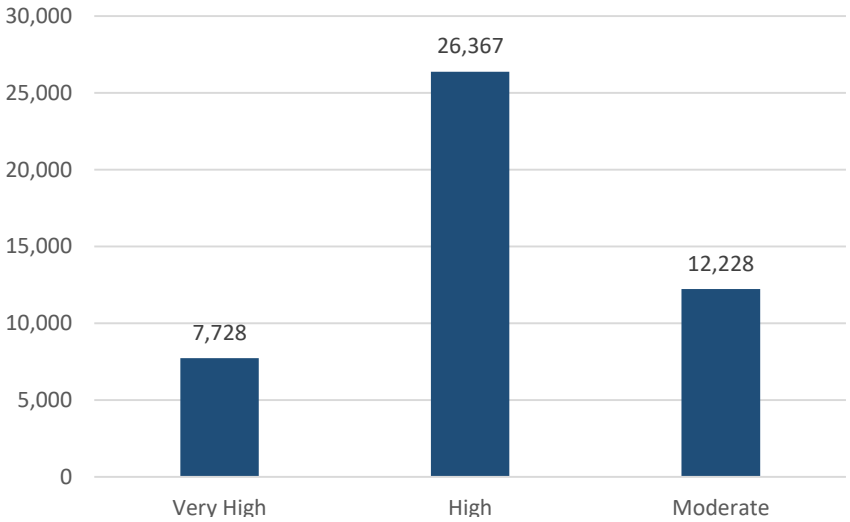


Figure 4-34: Population at risk from Wildfire Hazards

4.10.6.2 Residential Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. In some cases, a parcel will be within in multiple fire threat zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the fire threat layer to determine the risk for each structure. The fire threat zone in which the centroid was located was assigned to the entire parcel. This methodology assumed that every parcel with a square footage value greater than zero was developed in some way. Only improved parcels were analyzed. Table 4-22 exhibits portions of City of Fontana that have significant assets at risk

[6] High and very high Fire Hazard Severity Zones as defined by the California Department of Forestry and Fire Protection (CAL FIRE).

to wildfire in the Moderate, High, Very High, Non-Wildland/Non-Urban, and Urban/Unzoned fire severity zones.

Fire Hazard Severity Hazard Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
Very High	2,163	$468,877	$181,708	$650,585
High	7,389	2,136,717	$737,354	$2,874,071
Moderate	3,343	$1,182,804	$393,933	$1,576,737
Non-Wildland/Non-Urban	429	$456,995	$142,990	$599,985
Urban Unzoned	30,920	$8,714,591	$3,281,583	$11,996,174
Total	**44,244**	**$12,959,984**	**$4,737,568**	**$17,697,552**

Table 4-22: Residential Buildings and Content at Risk from Wildfire

Note:
1-The table above does not display loss estimation results; the table exhibits total value at risk based upon the hazard overlay and San Bernardino County Assessor data.
2- Parcel information is for all county parcels with greater than $20,000 in assessed parcel improvement value only. The San Bernardino County Assessor's roles only provide spatial information on assessed improvement and land values.

4.10.6.3 Critical Facilities at Risk

Critical facilities data were overlain with fire hazard severity zone data to determine the type and number of facilities within each risk classification. Table 4-23 and Table 4-24 list the critical facilities in the High and Very High wildfire hazard zones for City of Fontana.

Infrastructure Type	High	Very High	Total Feature Count
Essential Facility	5	2	7
EOC	0	0	0
Fire Station	1	1	2
Government Facility	0	0	0
Hospital	0	0	0
Police Station	0	0	0
School	4	1	5
High Potential Loss	31	6	37
Dam	0	0	0
Economic Element-Major Employer	0	0	0
Hazmat	19	2	21

Historic/Cultural Resource-Historic	0	0	0
Utility-Communication Facility	4	1	5
Utility-Electric Power Facility	0	0	0
Utility-Natural Gas Facility	0	0	0
Utility-Potable Water Facility	0	0	0
Utility-Waste Water Facility	0	0	0
Vulnerable Population-Adult Residential Care	1	1	2
Vulnerable Population-Child Care	2	2	4
Vulnerable Population-Flood Zone	0	0	0
Vulnerable Population-Foster/Home Care	0	0	0
Vulnerable Population-Mobile Home Park	0	0	0
Vulnerable Population-RV Park	0	0	0
Vulnerable Population-Senior Care	5	0	5
Transportation and Lifeline	7	8	15
Highway Bridge	7	8	15
Railway Bridge	0	0	0
Bus Facility	0	0	0
Rail Facility	0	0	0
Airport Facility	0	0	0
Grand Total	**43**	**16**	**59**

Table 4-23: Critical Facility Exposure to Wildfire

Facility Type	High	Very High	Total Mileage
Transportation and Lifeline	99	31	130
Railway	2	-	2
Roads	97	**31**	128
Interstate Highway	9	5	13
State / County Highway	16	5	21
Primary Highway	0	-	0
Local Road, Major	14	4	18
Local Road	52	13	65
Other Minor Road	2	2	3
Vehicular Trail	-	1	1
Cul-de-Sac / Traffic Circle	-	-	-
Ramp	4	2	6
Service Road	-	-	-
Grand Total	**99**	**31**	**130**

Table 4-24: Lifelines with Wildfire Risk

4.10.7 Earthquake

Major Impacts from earthquakes are primarily the probable number of casualties and damage to infrastructure occurring from ground movement along a particular fault (USGS 2016). The degree of infrastructure damage depends on the magnitude, focal depth, distance from fault, duration of shaking, type of surface deposits, presence of high groundwater, topography, and the design, type, and quality of infrastructure construction.

To analyze the risk to City of Fontana residents, the Great Shakeout scenario was chosen modeled by the California Integrated Seismic Network (CISN). The 2008 Great Southern California Shake Out was based on a potential magnitude 7.8 earthquake on the southern San Andreas Fault— approximately 5,000 times larger than the magnitude 5.4 earthquake that shook southern California on July 29, 2008. Such an earthquake will cause unprecedented damage to Southern California—greatly dwarfing the massive damage that occurred in Northridge's 6.7-magnitude earthquake in 1994. The hazard foot print for this scenario was used to develop exposure results for population, critical facilities, and single family residential parcel values. FEMA Hazus analyses was used to conducted loss estimation for both scenarios and include building and content loss estimation results based on peak ground acceleration, peak ground velocity, and peak spectral acceleration modeled for the 7.8 earthquake on the San Andreas Fault.

Important to note: Building codes provide one of the best methods of addressing natural hazards. When properly designed, and constructed per code, the average building can withstand many of the impacts of natural hazards. Hazard protection standards for all new and improved or repaired buildings can be incorporated into the local building code to reduce future flood losses.

4.10.7.1 Population at Risk

According to the 2010 US Census, the population of City of Fontana is 196,069*.* Though rural residential construction is not particularly vulnerable to earthquakes, the chosen earthquake scenarios will directly or indirectly expose the entire population of City of Fontana to ground shaking. Depending on the time of day (the population differs based on employment opportunities) and exact location of the modeled epicenter, the earthquake scenarios could be experienced differently. Figure 4-35 exhibit the population totals in each modeled earthquake severity zone. Population location is based upon information taken during the 2010 U.S. Census.

Population Exposure

Population Count for Great Shakeout Scenario

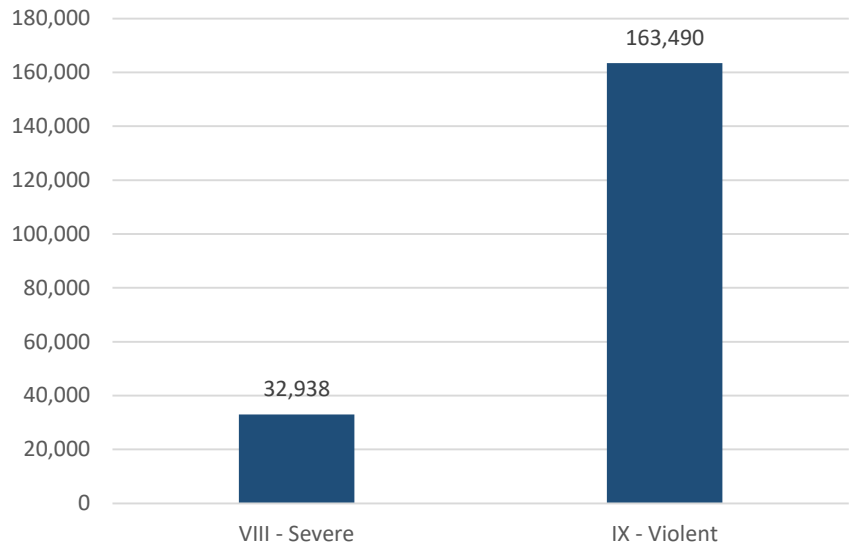


Figure 4-35: Population Exposure to the Great Shakeout EQ Shake Severity Zone

4.10.7.2 Residential Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the shake severity zones to determine the at-risk structures. Only improved parcels greater than $20,000 were analyzed. The analysis indicates residential parcels the chosen scenario will experience similar, but different shaking patterns. The type and year of construction will greatly influence damage for structures subject to similar shaking. Table 4-25 shows the count of at-risk structures and their associated improvement and land exposure values.

Shake Severity Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
IV - Light	-	-	-	-
V - Moderate	-	-	-	-
VI - Strong	-	-	-	-
VII - Very Strong	-	-	-	-
VIII - Severe	8,169	$1,705,756	$636,228	$2,341,983
IX - Violent	36,073	$11,254,228	$4,101,340	$15,355,568

Total	**44,242**	**$12,959,984**	**$4,737,568**	**$17,697,552**

Table 4-25: Residential Parcel Value Exposure from Southern California Great Shakeout

Notes:
1-The table above does not display loss estimation results; the table exhibits total value at risk based upon the hazard overlay and San Bernardino County Assessor data.
2- Parcel information is for all county parcels with greater than $20,000 in assessed parcel improvement value only. The San Bernardino County Assessor's roles only provide spatial information on assessed improvement and land values.

4.10.7.3 Critical Facilities with Damage Potential

Earthquakes pose numerous risks to critical facilities and infrastructure. Seismic risks, or losses, that are likely to result from exposure to seismic hazards include:

- Casualties (fatalities and injuries).
- Utility outages.
- Economic losses for repair and replacement of critical facilities, roads, buildings, etc.
- Indirect economic losses such as income lost during downtime resulting from damage to private property or public infrastructure.

Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs.

Linear utilities and transportation routes are vulnerable to rupture and damage during and after a significant earthquake event. The cascading impact of a single failure can have affects across multiple systems and utility sectors. Degrading infrastructure systems and future large earthquakes with epicenters near critical regional infrastructure could result in system outages that last weeks for the most reliable systems, and multiple months for others.

Table 4-26 provides an inventory of critical facility locations (points only) with earthquake exposure to the Great Shakeout Scenario. The building codes have been amended to include provisions for seismic safety at various bench marks years. Depending on "year built", each critical facility presented in the tables may have varying damage potential.

Infrastructure Type	Violent Shake Zone (IX)	Severe Shake Zone (VIII)	Very Strong (VII)	Strong Shake Zone (VI)	Total Feature Count
Essential Facility	-	-	11	74	85
EOC	-	-	-	1	1
Fire Station	-	-	1	5	6
Government Facility	-	-	-	-	-
Hospital	-	-	-	12	12
Police Station	-	-	-	2	2

School	-	-	10	54	64
High Potential Loss	-	-	48	448	496
Dam	-	-	-	1	1
Economic Element-Major Employer	-	-	-	-	-
Hazmat	-	-	29	348	377
Historic/Cultural Resource-Historic	-	-	-	-	-
Utility-Communication Facility	-	-	1	12	13
Utility-Electric Power Facility	-	-	-	-	-
Utility-Natural Gas Facility	-	-	-	-	-
Utility-Potable Water Facility	-	-	-	-	-
Utility-Waste Water Facility	-	-	-	-	-
Vulnerable Population-Adult Residential Care	-	-	6	29	35
Vulnerable Population-Child Care	-	-	7	37	44
Vulnerable Population-Flood Zone	-	-	-	-	-
Vulnerable Population-Foster/Home Care	-	-	1	3	4
Vulnerable Population-Mobile Home Park	-	-	-	-	-
Vulnerable Population-RV Park	-	-	-	-	-
Vulnerable Population-Senior Care	-	-	4	18	22
Transportation and Lifeline	-	-	6	29	35
Highway Bridge	-	-	6	28	34
Railway Bridge	-	-	-	1	1
Bus Facility	-	-	-	-	-
Rail Facility	-	-	-	-	-
Airport Facility	-	-	-	-	-
Grand Total	**-**	**-**	**65**	**551**	**616**

Table 4-26: Critical Facilities with EQ Risk Southern California Great Shakeout

HazMat Fixed Facilities

Although earthquakes are low probability events, they produce hazardous materials (HazMat) threats at very high levels when they do occur. Depending on the year built and construction of each facility containing HazMat, earthquake initiated hazardous material releases (EIHR) potential will vary. HazMat contained within masonry or concrete structures built before certain benchmark years reflecting code improvements may be of particular vulnerability.

Transportation

Earthquake events can significantly impact bridges which often provide the only access to some neighborhoods. Since soft soil regions generally follow floodplain boundaries, bridges that cross water courses are considered vulnerable. Since most of the City bridges provide access across water courses, most are at least somewhat vulnerable to earthquakes. Key factors in the degree of vulnerability are the bridge's age and type of construction which indicate the standards to which the bridge was built. Special attention will be paid to the multiple bridges that cross interstates. Interstates would serve as major emergency response and evacuation routes.

Utilities

Linear utilities and transportation infrastructure would likely suffer considerable damage in the event of an earthquake. Due to the amount of infrastructure and sensitivity of utility data, linear utilities are difficult to analyze without further investigation of individual system components. Table 4-27 provides best available linear data and it should be assumed that these systems are exposed to breakage and failure.

Facility Type	Strong (VI)	Very Strong (VII)	Severe (VIII)	Violent (IX)	Total Mileage
Transportation and Lifeline	0	0	89	521	610
Railway	0	0	0	20	20
Roads	0	0	89	501	590
Interstate Highway	0	0	0	28	28
State / County Highway	0	0	21	85	106
Primary Highway	0	0	0	9	9
Local Road, Major	0	0	2	191	194
Local Road	0	0	65	155	220
Other Minor Road	0	0	0	13	13
Vehicular Trail	0	0	0	1	1
Cul-de-Sac / Traffic Circle	0	0	0	0	0
Ramp	0	0	1	18	19
Service Road	0	0	0	0	0

Total	**0**	**0**	**89**	**521**	**610**

Table 4-27: Lifelines with EQ Risk; Southern California Great Shakeout Scenario

4.10.7.4 Loss Estimation Results

The Hazus Level 2 analysis was used to assess the risk from and vulnerability to earthquake shaking within City of Fontana. Hazus buildings data is aggregated to the census tract level for earthquake models, known as the general building stock (GBS), which has a level of accuracy acceptable for planning purposes. Where possible the GBS was enhanced using GIS data from the county as described previously. The following sections describe risk to and vulnerability of the GBS within the City of Fontana. Hazus calculates losses to structures from earthquake shaking by considering the amount of ground displacement and type of structure. The software estimates the percentage of damage to structures and their contents by applying established building fragility curves. Damage estimates are then translated to estimated dollar losses.

For each Great Shake Out Scenario ground shaking data (shakemaps) were acquired from CISN and imported into Hazus. The shakemap data consist of peak ground velocity, peak ground acceleration, peak spectral acceleration at 0.3 seconds, and peak spectral acceleration at 1.0 seconds. The earthquake module operates on census tracts that often include population and structures in the incorporated cities and the unincorporated area within a single tract. Due to this fact the results include census tracts that have a substantial portion of land within the incorporated area (loss estimates for some tracts will include structures in incorporated cities).

The results are summarized in Table 4-28 for the Great Shake Out Scenario. It is important to understand that the Hazus earthquake module uses the census tract as its enumeration unit rather than the more detailed census block. The loss estimation values for earthquakes are much higher than those of the flooding and dam failure due to this fact. The portions of incorporated areas included within boundary census tracts elevate the values due to the inclusion of additional GBS. Though the difference between census tracts and census blocks are extremely disparate, the most important summary information is the percent of loss estimation against the total value. Reading from the Table 4-28, residential building and content loss estimation from the Great Shake Out Scenario is $5.88 million dollars and 15 percent of the total value of the residential buildings. In Great Shake Out Scenario, residential damage will be the greatest. While there are several limitations to the FEMA Hazus model, it does allow for potential loss estimation. It is important to remember that the replacement costs are well below actual market values, thus, the actual value of assets at risk may be significantly higher than those included herein.

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)	Total Value ($000)
Agricultural	$9,292	14.7%	$3,018	4.8%	$12,310	19.5%	$63,100.00
Commercial	$1,297,347	20.9%	$406,913	6.5%	$1,704,260	27.4%	$6,216,466.00
Educational	$53,971	16.6%	$16,107	5.0%	$70,078	21.6%	$324,318.00

Government	$34,005	22.7%	$10,939	7.3%	$44,944	30.0%	$149,585.00
Industrial	$559,895	17.1%	$283,596	8.6%	$843,491	25.7%	$3,283,658.00
Religious	$70,717	21.4%	$22,916	6.9%	$93,633	28.3%	$330,628.00
Residential	$2,638,875	9.4%	$473,268	1.7%	$3,112,143	11.1%	$27,975,247.00
Grand Total	**$4,664,102**	**12.2%**	**$1,216,758**	**3.2%**	**$5,880,860**	**15.3%**	**$38,343,002**

Table 4-28: Estimated Building and Content Loss Great Shake Out Scenario EQ

Note: *from section 4.10.3 'Hazus Earthquake Census Block Input Values' totals
1- Hazus Census Block Building Stock Value ($000):
2- Building Replacement Costs = $23,496,052
3- Content Replacement Cost = $14,846,950
4- Total Value = $38,343,002

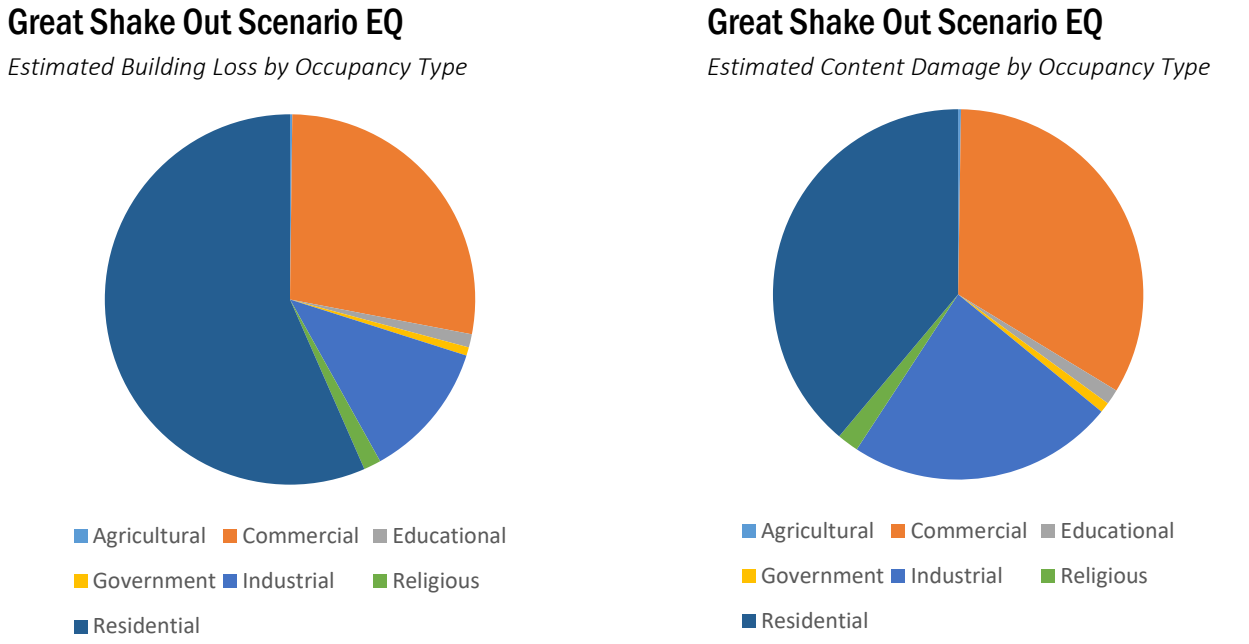


Figure 4-36: Estimated Building and Content by Occupancy Type

4.10.8 Landslide

Human activities that contribute to landslide events include altering the natural slope gradient, increasing soil water content, and removing vegetation cover. The best available predictor of where landside may occur is the location of previous occurrences. In addition, landslides are most likely to occur during severe weather events. The ground must be saturated prior to the onset of a severe weather event for a significant landslide to occur.

4.10.8.1 Population at Risk

Landslide risk is of greatest concern to populations residing in the high probability zones. There are about 700 residents susceptible to landslides as shown in Figure 4-37 below.

Population Exposure

Population Count for High Landslide Susceptibility

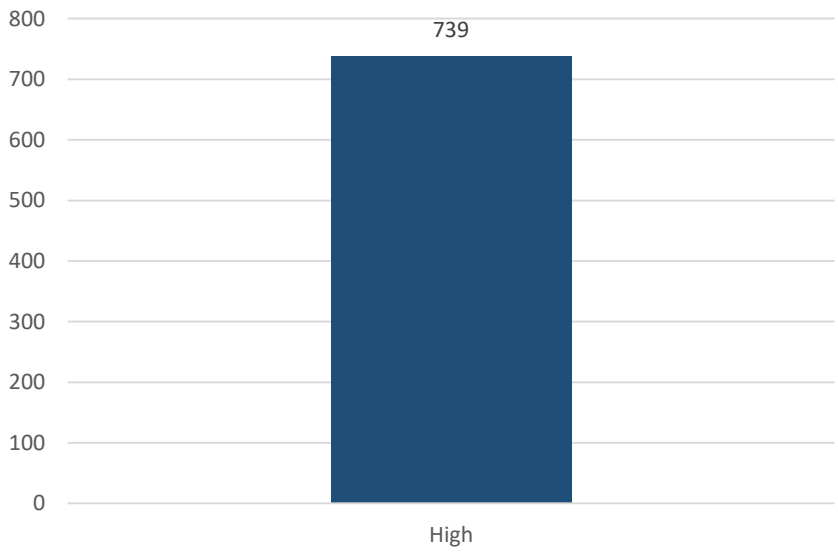


Figure 4-37: Population Exposure to Landslides

4.10.8.2 Residential Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. In some cases, a parcel will be within in multiple fire threat zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the landslide threat layer to determine the risk for each structure. The landslide threat zone in which the centroid was located was assigned to the entire parcel. This methodology assumed that every parcel with a square footage value greater than zero was developed in some way. Only improved

parcels were analyzed. Table 4-29 below shows the improvement value exposure and the land value exposure.

Landslide Risk	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
High	107	$ 21,048	$ 7,388	$ 28,436

Table 4-29: Improved Residential Parcel Exposure

Notes:
1-The table above does not display loss estimation results; the table exhibits total value at risk based upon the hazard overlay and San Bernardino County Assessor data.
2- Parcel information is for all county parcels with greater than $20,000 in assessed parcel improvement value only. The San Bernardino County Assessor's roles only provide spatial information on assessed improvement and land values.

4.10.8.3 Critical Facilities at Risk

Critical facilities data were overlain with landslide hazard severity zone data to determine the type and number of facilities within each risk classification. Table 4-30 and Table 4-31 list the critical facilities in the landslide hazard zones for City of Fontana.

Infrastructure Type	Total Feature Count
Essential Facility	0
EOC	0
Fire Station	0
Government Facility	0
Hospital	0
Police Station	0
School	0
High Potential Loss	0
Dam	0
Economic Element-Major Employer	0
Hazmat	0
Historic/Cultural Resource-Historic	0
Utility-Communication Facility	0
Utility-Electric Power Facility	0
Utility-Natural Gas Facility	0

Utility-Potable Water Facility	0
Utility-Waste Water Facility	0
Vulnerable Population-Adult Residential Care	0
Vulnerable Population-Child Care	0
Vulnerable Population-Flood Zone	0
Vulnerable Population-Foster/Home Care	0
Vulnerable Population-Mobile Home Park	0
Vulnerable Population-RV Park	0
Vulnerable Population-Senior Care	0
Transportation and Lifeline	3
Highway Bridge	3
Railway Bridge	0
Bus Facility	0
Rail Facility	0
Airport Facility	0
Grand Total	**3**

Table 4-30: Critical Facilities at Risk of Landslide

Facility Type	Total Mileage
Transportation and Lifeline	2
Railway	0
Roads	2
Interstate Highway	0
State / County Highway	0
Primary Highway	-
Local Road, Major	0
Local Road	1
Other Minor Road	0

Vehicular Trail	-
Cul-de-Sac / Traffic Circle	-
Ramp	0
Service Road	-
Grand Total	**2**

Table 4-31: Transportation and Lifelines at Risk of Landslide

4.10.9 Climate Change/Drought

Vulnerable populations should receive special attention when assessing the community's vulnerability to climate change. For example, care and sheltering during extreme heat conditions must be provided for vulnerable populations such as the elderly. According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. According to the National Weather Service (NWS), among natural hazards, only the cold of winter—not lightning, hurricanes, tornados, floods, or earthquakes—takes a greater toll. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died.

Since climate change can exacerbate other hazards, consideration should also be given to populations living in high hazard wildfire and flood zones. Drought caused by climate change will also affect the entire population. Agricultural yields will suffer and drier vegetation creates more fuel for wildfires.

4.10.9.1 Critical Facilities

The location of infrastructure, its current condition and its susceptibility to climate impacts are important factors to consider when accessing the vulnerability of critical facilities to climate change.

Infrastructure provides the resources and services critical to community function. Roads, rail, water (pipes, canals, and dams), waste (sewer, storm, and solid waste), electricity, gas, and communication systems are all needed for community function. Climate change increases the likelihood of both delays and failures of infrastructure. Delays and failures can result from climate-exacerbated hazards such as flooding, fire, or landslide, as well as increased demand, load, or stress on infrastructure systems that can result from climate change (e.g., heat impacts on roadway durability). Temporary delays or outages can result in inconvenience and economic loss, while larger failures can lead to disastrous economic and social effects. (California Adaptation Planning Guide)

Three to five more heat waves will be experienced by 2050, increasing to 12 to 16 in the western parts of the region to more than 18 to 20 in the eastern parts of the region. The age and construction method of essential facilities, transportation systems, lifeline utility systems, high potential loss facilities and hazardous material facilities will determine how they stand up to the effects of climate change such as extreme heat days.

The City of Fontana offers access to five city facility locations throughout the community for the public to provide emergency shelter during times of extreme weather or hardship. In the event of a heat wave or extreme heat day, the air conditioning and cooling capability of the building will play a critical role in the facility's ability to act as a cooling center for the community.

4.10.9.2 Loss Estimation Results

Climate Change can potentially affect critical infrastructure in a variety of ways.

- Temperature and heat waves: Heat can stress infrastructure, altering maintenance needs, particularly for roadways.
- Precipitation, intense rainstorms, and landslide: Increased frequency of landslides could be seen throughout the City, especially in areas already identified as high risk such as Jurupa Hills and Coyote Canyon.
- Wildfire: Dry vegetation as a result of high heat can increase the risk of wildfire on Jurupa Hills and Coyote Canyon.

4.10.10 Terrorism

Translating most manmade hazard profiles into meaningful geospatial information is difficult at best. Instead, the planning team will use an asset-specific approach. Population, facilities, systems and assets will be prioritized and assessed in this vulnerability assessment.

Special consideration should be given to areas with high density and those containing vulnerable populations (young, old, and those whose primary language is not English).

Facilities at high risk may include gathering places, critical facilities/ transportation and lifelines and utilities.

4.10.10.1 Population at Risk

Since terrorism can happen anytime, anywhere, 100% of the population is vulnerable to terrorism. In particular, people with access and functional needs, the elderly and the very young are especially vulnerable because they often rely heavily on others in their daily lives. Persons with English as a second language are also vulnerable as they may not receive warnings or notifications related to an incident in their primary language.

4.10.10.2 Critical Facilities Exposure

Critical facilities may include essential facilities (such as hospitals, police and fire stations, evacuation centers, etc.), transportation systems, lifeline utility systems, high potential loss facilities (such as nuclear power plants, dams and military installations, etc.), and hazardous material facilities.

Gathering facilities should also receive special attention. Places of mass gathering not only present terrorists with potential opportunities for mass casualties, symbolism and high impact media coverage, they pose a broad range of security challenges for their owners and operators. (Committe n.d.) The National Counter Terrorism Committee has noted that places of mass gathering have been specifically identified by religious and political extremists as attractive targets.

Places of mass gathering incorporate a diverse range of facilities including, but not limited to, sporting venues, shopping and business precincts, tourism/entertainment venues/attractions, hotels and convention centers, major events and public transport hubs. This also includes significant one off events. (Committe n.d.)

		Criteria
Very High	*10*	Very High – One or more major weaknesses have been identified that make the asset extremely susceptible to an aggressor or hazard. The building lacks redundancies/ physical protection and the entire building would be only functional again after a very long period of time after the attack.
High	*8-9*	High – One or more major weaknesses have been identified that make the asset highly susceptible to an aggressor or hazard. The building has poor redundancies/ physical protection and most parts of the building would be only functional again after a long period of time after the attack.
Medium High	*7*	Medium High – An important weakness has been identified that makes the asset very susceptible to an aggressor or hazard. The building has inadequate redundancies/ physical protection and most critical functions would be only operational again after a long period of time after the attack.
Medium	*5-6*	Medium – A weakness has been identified that makes the asset fairly susceptible to an aggressor or hazard. The building has insufficient redundancies/physical protection and most part of the building would be only functional again after a considerable period of time after the attack.
Medium Low	*4*	Medium Low – A weakness has been identified that makes the asset somewhat susceptible to an aggressor or hazard. The building has incorporated a fair level of redundancies/physical protection and most critical functions would be only operational again after a considerable period of time after the attack
Low	*2-3*	Low – A minor weakness has been identified that slightly increases the susceptibility of the asset to an aggressor or hazard. The building has incorporated a good level of redundancies/physical protection and the building would be operational within a short period of time after an attack.
Very Low	*1*	Very Low – No weaknesses exist. The building has incorporated excellent redundancies/physical protection and the building would be operational immediately after an attack.

Table 4-32: FEMA Vulnerability Rating

Section 5. Community Capability Assessment

The City of Fontana strives to protect and maintain the health, safety and welfare of the community on a day-to-day basis, and takes extra measures to reduce the impacts of natural or man-made hazards. The City can use a variety of different tools, assets, and authorities to effectively prepare for, mitigate against, respond to, and recover from emergencies and disasters. These include voluntary and mandatory measures; individual and community efforts; private and public actions; and preventive as well as responsive approaches. Example mitigation activities include educating citizens, enforcing building and development codes, constructing capital improvement projects, adopting plans, establishing incentive programs, and improving emergency preparedness and response.

The capabilities available to the City of Fontana fall into the following broad categories: Agencies and People; Existing Plans; Regulations, Codes, Policies, and Ordinances; Mitigation Programs; and Financial Resources. Identifying and documenting these capabilities provides the basis for developing future mitigation opportunities and how they can be implemented within existing City programs.

5.1 Active Mitigation Programs

Below is a list of on-going Mitigation programs for the City of Fontana:

Building Code Updates

The City's building codes are updated by amending and adopting the latest California Building Standards Code (CBSC). The CBSC is based on nationally recognized model codes, and is updated and published triennially. The Department of Building & Safety is responsible for updating the City's building codes.

City Website

The Police Department – Emergency Services section of the City's Website contains information on emergency preparedness, response, and recovery. The site also provides information on volunteer programs and provides links to other organizations with additional information. In addition, the City Website has information regarding safety tips and guides, as well as a public forum that provides outreach to the community

Community Emergency Response Team (CERT)

The CERT Program is designed to train residents to assist safety personnel and city staff in the event of a major disaster. Volunteers from the community are trained in first aid, light search and rescue, minor fire suppression, and other skills that are critical in the first few hours of a disaster. The Fontana Police Department – Emergency Services Unit is responsible for the CERT program.

California Fire Code Updates

The Fontana Fire Protection District is responsible for updating, amending and adopting the latest California Code of Regulations (CCR) Title 24 to provide consistency in the application and

enforcement of building and housing standards, as well as bring the District into compliance with State law.

Continuous Improvement of Fire Services

There are many aspects to the planning and improvement process that is in place within the Fire Department to ensure an adequate and progressive level of management, fire suppression, training, support, and fire prevention services within the City. In addition, the Fire Department interfaces with different departments within the City to ensure the safety and efficiency of emergency response services. Some of the main elements that pertain to the continuous improvement of fire services are listed below.

- DEVELOPMENT IMPACT FEES – These have been established by the City with assistance from the San Bernardino County Fire Department, and they use a fee per square foot or fee per dwelling unit schedule, based on the use, and are collected for all new construction projects. The fees that are collected are used to provide funding for additional Fire Department facilities and equipment.
- FIRE PREVENTION – The Office of the Fire Marshal within the Fire Department is involved throughout the planning and construction process of all new development, reviewing and approving the design of fire protection systems, educating the community about fire safe practices, and conducting investigations of all fires, including wildland fires. Fire Prevention places conditions of approval on projects when necessary to incorporate fire safety mitigation measures for projects with special hazards, such as those in wildfire prone areas.
- STREET IMPROVEMENTS - City streets and roads are engineered in a safe, reliable manner in order to allow emergency vehicles to respond quickly. Numerous alternative routes, secondary points of access, cul-de-sac turnarounds, and other features that improve traffic circulation are planned into new development and redevelopment during the City's internal review process, which includes the Fire Department. Things that could obstruct or impair emergency access are mitigated as well, such as with the installation of security gate override systems, and the Installation of traffic signal pre-emption devices at critical signalized intersections.
- WATER IMPROVEMENTS - The City is served by five municipal water Districts, namely the San Gabriel Valley Water District (Fontana Water Company), the Cucamonga Valley Water District, Marygold Mutual Water Company, and the West Valley Water District. As development or redevelopment occurs, improvements are made to the City's water system that serve to provide the water necessary for firefighting operation. The Fire Department communicates sets requirements for water flow and pressure, locations and types of fire hydrants, and performs inspections to ensure that they are built according to what has been approved.

The San Bernardino County Fire Department, through the Fontana Fire Protection District, is responsible for continuous improvement of fire services in coordination with other City and County departments.

Disaster Preparedness Training

The Police Department – Emergency Services Unit provides city staff with the appropriate National Incident Management System (NIMS) and Standardized Emergency Management System

(SEMS) training in order to improve the ability of city personnel to respond effectively during a major emergency and/or disaster. The Police Department also trains Non- Police Department Employees on Emergency Procedures Protocol, with emphasis on the concepts of "Evacuate, Lock-Down, Lock-Out, Fire, and Active Shooter" scenarios. Along with training, the unit conducts: Earthquake Duck, Cover and Hold On and building evacuation drills.

The Emergency Services Unit also provides disaster preparedness and awareness training to the community.

Elimination of URM Buildings

The City does not have a proactive program to either demolish or seismically retrofit the city's remaining URM Buildings. Currently, 68 URM buildings remain within the City's jurisdiction. If a URM Building's occupancy changes to an intensified use (e.g. a retail store changes to a assembly use (movie theater, church, etc.) the URM Building would need to be seismically retrofitted. The Department of Building & Safety is responsible for this program.

Emergency Communications Services (ECS)

A group of volunteer amateur radio operators that provide continuous supplemental and emergency backup communications in order to free up the public safety radio system and to assist with the local response to emergencies. The Fontana Police Department – Emergency Services Unit is responsible for the ECS program.

Fontana Leadership Intervention Program (FLIP)

The Fontana Leadership Intervention Program (FLIP) is founded upon a partnership between the City of Fontana Police Department, Fontana School Police and Fontana Unified School District. The program offers "at-risk" teenagers an opportunity to experience a unique educational environment which will discourage them from engaging in future criminal activity. The Police Department is responsible for this program.

National Flood Insurance Program (NFIP)

A federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods. Participation in the NFIP is based on an agreement between local communities and the Federal Government that states if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas, the Federal Government will make flood insurance available within the community as a financial protection against flood losses. The Building and Safety and Engineering Departments assist with this program.

Neighborhood Watch

The Neighborhood Watch Program is a crime and vandalism prevention program. Through education, it teaches citizens how to help themselves by identifying and reporting suspicious activity in their neighborhoods. In addition, it provides citizens with the opportunity to make their

neighborhoods safer and improve the quality of life. The Police Department is responsible for this program.

Tree Maintenance Program

The City's tree maintenance program provides for the care of all trees located on City property or within the City's public right-of-way. The Public Works Department has developed and maintains a current tree inventory of all City owned trees including detailed site characteristics and work histories for each tree. These tree records are updated on a routine basis. All trees contained in the City inventory are pruned on a 5 year cycle. At that time the trees are assessed for hazards. Dead, diseased and broken branches are removed. Corrective pruning is also done at this time such as thinning of the tree's branch structure to allow winds to pass through the tree. This corrective pruning is also done to promote an overall healthy shape and tree canopy, and healthy growth. All work is performed in accordance with the Best Management Practices developed by the International Society of Arborists (ISA), ANSI A300 Standards and ANSI Z133.1 Safety Standards.

URM Buildings Tracking System

State law mandated local jurisdictions develop an inventory of URM Buildings located within their jurisdiction; provide said inventory to the State in January 1990; and notify the owners of these buildings that their building was on the inventory that was sent to the State. The City complied with this mandate. The Department of Building & Safety is responsible for tracking the status of the URM Buildings.

Weed Abatement/Rubbish Removal

Each year during two separate periods weed abatement and rubbish removal is carried out within the City. Initial inspections are performed at the beginning of each season, after which re-inspections are performed and properties that have not abated weeds and other hazards are put on a list. Work orders are then sent to an abatement contractor, who then does the work and bills the City. The City in turn recuperates the costs via the property tax roll through the County Assessor's office.

City standards also mandate the removal of all rubbish from parkways, sidewalks and private property, including items such as accumulations of household trash, windblown debris, discarded and abandoned objects, and other items that can present a hazard such as wood, cardboard, appliances, pallets, plastic items, vehicles, recyclables, and tires. Household hazardous materials or wastes, such as paint, chemicals, oil, anti-freeze, pesticides, cleaners, etc., are also required to be disposed of at the City's Household Hazardous Waste facility in accordance with State and local regulations. The Code Enforcement Division of the Fontana Police Department is responsible for Weed and Rubbish abatement in coordination with other City and County departments.

5.2 Local Planning and Regulatory Capabilities

The City of Fontana has numerous plans that concentrate on disaster management. These plans are significant since they support the adopted City policies and ordinances during the time of a natural disaster. Some of the plans are directly related to hazard mitigation, such as the Noise and Safety Element of the General Plan, and the Sustainability and Resilience chapter of the General Plan as well. . Other plans focus on different aspects of disaster management such as emergency response. Still others do not focus directly on disaster issues but have implications that are relevant to hazard mitigation, such as plans related to spending on public facilities and storage of hazardous materials. This section reviews City plans and highlights the elements that are relevant to disaster mitigation and can support future implementation of mitigation actions identified in these plans. The following are the plans that concentrate on disaster management:

- The General Plan
- The Noise and Safety Element
- The Circulation Element
- The Zoning and Development Code-Fire Hazard Overlay District
- The Master Storm Drainage Plan
- The Capital Improvement Plan
- The Municipal Storm Water Quality Management Plan
- Emergency Operations Plan (EOP)
- Emergency Standard Operating Procedures (SOPs)

In addition to the general plan, the information in Table 5- is used to construct mitigation actions aligned with existing planning and regulatory capabilities of the City of Fontana. Planning and regulatory tools typically used by local jurisdictions to implement hazard mitigation activities are building codes, zoning regulations, floodplain management policies, and other City programs or planning documents.

Hazard	Plan/Program/ Regulation	Responsible Agency	Comments
Multi-Hazard	Fontana/California Building Code 2016 Edition	Building Dept.	The City has adopted the California Building Code 2016 Edition, Volumes 1 and 2. The California Building codes protect buildings to the extent possible from natural occurring hazards.
Multi-Hazard	City of Fontana Municipal Code	All City Depts. as well as contractual City representatives	The City of Fontana Municipal Code.

Hazard	Plan/Program/ Regulation	Responsible Agency	Comments
Drought /Climate Change	Model Water Efficient Landscape Ordinance (MWELO)	Engineering Dept., Building Dept., Planning Dept., Public Works Dept.	The MWELO promotes the conservation and efficient use of water.
Drought	California Drought Contingency Plan	California Dept. of Water Resources	Section VI provides an overview of drought preparedness strategies from the California Water Plan Update (see separate entry). Section VII provides a brief description of local, utility, and State agency drought response roles. Situation and assessment reports will be distributed to appropriate agencies and will be posted on the DWR Drought website (www.water.ca.gov/drought).
Flood	Flood Resistant Construction	Building and Safety Dept.	The 2016 California Building Codes stipulates existing Flood Resistant Construction standards.
Flood	National Flood Insurance Program (NFIP) Administration	The Building Official is the Floodplain Administrator	NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. As a participating member of the NFIP, the City is dedicated to protecting homes of more than 60 policies currently in force.
Climate Change	2015 San Gabriel Valley Water Management Plan		The Water Management Plan is a tool that provides a summary of anticipated supplies and demands for the years 2015 to 2040
Multi-Hazard	2014 Water Shortage Contingency Plan	San Gabriel Valley Water Company	San Gabriel Valley Water Company has a "Water Shortage Plan," in place, programs whereby actions will go into effect if a catastrophic interruption, mandatory prohibition or other causes occur.
Climate Change	The Sustainable Communities and Climate Protection Act of 2008		Looks to reduce GHG emissions through coordinated transportation and land use planning with the goal of more sustainable communities. Regional targets are established for GHG emissions reductions from passenger vehicle use by the sustainable communities strategy (SCS) established by each metropolitan planning organization (MPO).

Table 5-2: Planning and Regulatory Capabilities

5.3 Administrative and Technical Mitigation Capabilities

The City has adopted codes and regulations to govern development, construction, and land use activities. They include construction standards, use limitations, study requirements and mitigation requirements which help directly or indirectly minimize the exposure of people and property loss

or injury resulting from disasters. As such, the regulations, codes, policies, and ordinances are effective tools which to use to reduce the amount of damage or harm arising from disasters. This plan provides an opportunity to review existing regulations to determine if they are effective or whether they need to be revised in certain areas to more adequately prevent loss or injury from disasters. The following are the regulations, codes, policies, and ordinances that are related to the hazardous mitigation plan.

- Zoning and Development Regulations
- Subdivisions Regulations
- California Building Code (Consisting of the California Building Code, Electrical, Mechanical Code, Plumbing Code, Fire Code, Existing Building, and other.)
- Fontana Fire Protection District Fire Code
- Fontana Municipal Code Chapter No. 12 Article No. 2 – Flood Control
- Fontana Municipal Code Chapter No. 12 Article No. 3 – Flood Control
- Fontana Municipal Code Chapter No. 26 Article No. 5 – Master Storm Drainage Plan
- Fontana Municipal Code Chapter No. 16 Article No. 19 – Social host of minors accountability and unruly gathering accountability

The State of California Department of Forestry and Fire Protection (CalFIRE) has created, and continues and revise, a map of all Fire Hazard Severity Zones (FHSZ) within the State, including those in the City, as discussed in Section 4. The Very High FHSZ can then be used to enforce enhanced regulations from the State Fire Marshal published within the California Building Code, pertaining to ignition and ember resistive building construction, within the City. Also for reference are other ordinances and codes that are in place in nearby jurisdictions, such as the County of San Bernardino, that contain requirements in hazardous fire overlay areas for fire resistive construction, fuel modification areas, development property line setbacks, vegetation clearances from roadways and buildings.

Table 5-2 provides a summary of administrative and technical capabilities organized by staff type and department. It is important to understand current administrative and technical capabilities before developing mitigation activities.

Administrative and Technical Capabilities Table:

Staff/Personnel Resources	Dept. / Agency	Comments
Development Services Staff-Planning, Building and Safety, Engineering (with land use / land development knowledge)	Community Development Department	Includes Land Use Planning, Planning Commission, Building & Safety, Code Enforcement, and Enforcement Programs relating to Land Use and Development.

Staff/Personnel Resources	Dept. / Agency	Comments
Planners, Engineers and Public Works staff (with natural and/or human caused hazards knowledge)	Community Development Department, Public Works Department and other Development Services staff	Fire Prevention can assist as well.
Engineers, Building and Safety staff and other professionals trained in building and/or infrastructure construction practices (includes building inspectors)	Community Development and Development Services as well as local utility agencies.	
Floodplain Management	Building and Safety Official	The Building and Safety Official is the Floodplain Administrator as per FEMA Region lX and NFIP data and requirements
Personnel skilled in Geographic Information Systems (GIS) and/or FEMA's HAZUS program	Information Technology Department	
Grant writers or fiscal staff to handle large/complex grants	City Grant Writing Team	Numerous types of federal, state, local, and private grants have been administered for mitigation at the local level in California, to include Capital Improvement Projects to assist in the mitigation of natural and man-made disasters.
Construction Equipment (Heavy-Duty)	Public Works Dept.	The Public Works Department maintains large pieces of equipment available for construction and moving and removal of earthen material
Emergency Management Personnel	Police and Fire Department	*State Office of Emergency Services Access* *Mobile Emergency Personnel*
Care and Sheltering	*Regional Red Cross Personal (local office in 10600 Trademark Parkway, Suite 406 Rancho Cucamonga, CA 91730* City of Fontana Community Services Department	Care and sheltering during extreme heat conditions, will provide sheltering and support services for fire victims. Cooling Center Coordination also provided by the City of Fontana.

Table 5-3: Administrative and Technical Capabilities

5.4 Local Fiscal Capabilities

City of Fontana:

Department	Role in Disaster Mitigation and Management
Mayor and City Council	• Adopts polices, codes & standards, & approves plans • Disaster Council Members • Communicate with other Elected Officials • Consult with and assist in making important decisions with the Director of Emergency Services that might affect overall policy direction • Proclaim the existence of a local emergency
City Manager	• Director of Emergency Services • Disaster Council Member
Building & Safety	• Regulates construction & occupancy of all residential, commercial & industrial buildings in order to ensure life, fire & health safety • Conducts post-disaster safety assessments • Coordinates mitigation programs • Assist with damage assessment for shelter sites, residents, & businesses throughout the City
City Clerk	• Maintains city public records • Assist with the Local Emergency Proclamation and Resolution process
Community Development	• Processes land use applications • Processes new developments or modifications/upgrades to existing structures • Responsible for Business Licenses • Inspect and post as necessary all damaged buildings, and determine if they should be evaluated • Estimate the extent of damage/cost of repair of structures • Assist in the Preliminary Damage Assessment with local, state, and federal organizations to determine losses and recovery needs • Coordinate the city Damage Assessment Response Team assignments for the city facilities, possible shelter sites, and structures throughout the community • Assist with the review and permit process of the repair or replacement of damaged structures

Community Services	• Provides programs, services & events offered include: special events, cultural arts programs, education & recreation classes, health & wellness activities, marketing & public communication efforts, youth & afterschool programs, sports, aquatics, facility management & environmental & conservation programs & fund development. • Assist with the set-up & operation of a shelter
Engineering	• Responsible for designing & managing the City's public infrastructure • Also responsible for implementation of the City's Capital Improvement Program, management of the City's signal operation & maintenance program, land development activities, & transportation & interchange development • Conduct a damage assessment of City signal system • Assist in determining safe evacuation routes • Assist with inspections/liaison within utility companies • Assist with damage surveys within the City

Fire Protection District	• The Fire Protection District is responsible for the full complement of fire protection services including emergency medical response, fire suppression, hazardous materials response, heavy rescue, & many other types of emergency services. In addition, the Fire District provides emergency medical coordination, training, fire prevention services including permits & inspections, fire investigation, public information & education, vehicle maintenance, all together with administrative support.
Human Resources	• Responsible for employee recruitment and safety • Maintenance of employee benefits • Assist with the sheltering and feeding of disaster workers and their families • Coordinate with American Red Cross and Community Services personnel to arrange for and conduct feeding and sheltering for DSW's and their families • Handle questions and problem solve in the areas of health benefits
Information Technology	• Provides technology support to all departments • Repair computer and phone equipment and services, as necessary, throughout city facilities • Assist with computer and phone set-up in the EOC and provide additional information technology support as needed
Management Services	• Provides the internal financial functions in accordance with City Council's policies • Financial support, response, and recovery for the emergency/disaster • Support the response effort and the acquisition, transportation, and mobilization of resources

Police Department	• Provides for the prevention of crime, preservation of peace & a safe environment • Coordinates all Emergency Services functions and activities • Responsible for the City Watch – Telephone Emergency Notification System • Maintains the mobile command center unit • Coordinates CERT & ECS volunteer programs
Public Works	• Responsible for maintaining Fontana's infrastructure & completing construction projects related to the City's Capital Reinvestment Program • Maintains the City's sewer, storm drains, recycling, waste water reclamation, environmental programs, streets, trees, parks, streetscapes, graffiti abatement, public buildings, fleet maintenance & vehicle replacement • Organized into three Divisions: Parks & Landscape, Support Services, & Utilities & Streets • Coordinate emergency response with all the departments and agencies involved with the event

Table 5-4: Local Fiscal Capabilities

5.5 San Bernardino County Capabilities

This section contains a summary of San Bernardino County programs and capabilities organized by hazard type. It is important to understand current County capabilities before developing mitigation activities and implementation documentation. Understanding these listed County capabilities may reduce duplication of efforts at the local level. In addition, it is also noteworthy to have this information for mutual-aid preparedness.

5.5.1 Multi-Hazard Capabilities

5.5.2 County Wildfire Mitigation Programs

San Bernardino County has one of the most comprehensive set of programs to mitigate the potential for catastrophic wildfires in the Nation. There is no other jurisdiction that has the comprehensive, multi-agency cooperation and coordination as is found in San Bernardino County.

5.5.3 County Flood Mitigation Programs

The flood mitigation programs that were established by San Bernardino County Flood Control District to protect life and property. These programs are typically designed to mitigate flood hazards to life and property, and critical infrastructure. Also, these programs can be used as a public education and information capability for local jurisdictions.

Hazard	Program	Responsible Agency	Comments
Flood	Flood Area Safety Taskforce (FAST)	Flood Control District	The FAST Organization stresses liaison with the communities, provides for community education and information, and places emphases on Community and city partnerships. For more information see County OES website or hazard mitigation plan.
Flood	Alluvial Fan Task Force	Alluvial Fan Task Force	The Task Force reviews the state of knowledge regarding alluvial fan floodplains, determine future research needs, and, if appropriate, develop recommendations relating to alluvial fan floodplain management, with an emphasis on alluvial fan floodplains that are being considered for development. For more information see County OES website or hazard mitigation plan.
Flood	StormReady	Flood Control District	San Bernardino County is a StormReady County. For more information see County OES website or hazard mitigation plan.

Table 5-5: County Flood Mitigation Programs

5.5.4 San Bernardino County Public Education and Alert Programs

San Bernardino County Fire District hosts a number of different public education and alert programs.

Hazard	Program	Responsible Agency	Comments
Multi-Hazard	MAST	Multiple	Mountain Area Safety Taskforce (MAST) has a substantial public education component. All agencies participate with the goal to have no one on the mountain uneducated about creating a thinner forest which is a more fire safe forest. For more information on MAST see County OES website or hazard mitigation plan.
Multi-Hazard	CERT	SB County Fire District	The Community Emergency Response Team (CERT) Program educates people about disaster preparedness and trains them in basic response skills. For more information on the CERT program see County OES website or hazard mitigation plan.
MULTI-HAZARD	Listos	SB County Fire District	Listos, which means “ready” in Spanish, is a twelve-hour disaster preparedness course created specifically for the Spanish-speaking community and is delivered entirely in Spanish. The program is intended to be adaptable, flexible and culturally relevant. This means participants are encouraged to involve the entire family and accommodations are made for young children. San Bernardino County Fire, Office of Emergency Services currently partners with the Cities of Fontana and Rialto to bring Listos to their communities. For more information see County OES website or hazard mitigation plan.
MULTI-HAZARD	California Disaster Corps	SB County Fire District	The Disaster Corps is a first-in-the-nation effort to professionalize, standardize and coordinate highly trained disaster volunteers statewide. This program initiative was built collaboratively in partnership with California Volunteers from the ground up through public-private partnerships and with a wide range of subject matter experts. For more information see County OES website or hazard mitigation plan.
MULTI-HAZARD	TENS	SB County Fire District	Telephone Emergency Notification Systems (TENS) During an emergency, public safety can be a direct function of the speed and accuracy of the dissemination of information. This is particularly important during emergencies that require evacuations. To that end the Board of Supervisors dedicated General Fund money in 2003 to the implementation of an automated phone dialing system that calls telephones in specific geographic areas of concern. All areas of San Bernardino County have all been preprogrammed so that during an emergency, the specific target group can be notified as quickly as possible. For more information see County OES website or hazard mitigation plan.

Hazard	Program	Responsible Agency	Comments
MULTI-HAZARD	ECS	SB County Fire District	The Emergency Communications Service (ECS) is a volunteer group providing front-line communications, technical and logistical support to the San Bernardino County Fire Department and Office of Emergency Services. Their primary mission is to support County Fire, County Government and other local agencies in time of disaster. In addition, ECS has provided telecommunications and event support to other County departments including Public Health, Behavioral Health, Public Works, Pre-School Services, Sheriff's Search and Rescue and other County Departments. For more information see County OES website or hazard mitigation plan.
Multi-Hazard	AM Radio	SB County Fire District	Community Based AM Radio Transmitters The Fire Safe Councils discovered the existence of very inexpensive but very effective community based AM radio transmitters. The transmitters are very effective for providing information and updates to a community that is either preparing for a community emergency or just had one. As a delivery modality they are extremely reliable because in most all emergencies the AM radio in your car is likely to be operational particularly when the electricity is out in your house.
Multi-Hazard	IPAWS	SB County Fire District	During an emergency, alert and warning officials need to provide the public with life-saving information quickly. The Integrated Public Alert and Warning System (IPAWS) is a modernization and integration of the nation's alert and warning infrastructure and will save time when time matters most, protecting life and property. Federal, State, Territorial, Tribal, and local alerting authorities can use IPAWS and integrate local systems that use Common Alerting Protocol (CAP) standards with the IPAWS infrastructure. IPAWS provides public safety officials with an effective way to alert and warn the public about serious emergencies using the Emergency Alert System (EAS), Wireless Emergency Alerts (WEA), the National Oceanic and Atmospheric Administration (NOAA) Weather Radio, and other public alerting systems from a single interface.

Table 5-5.4: Public Education and Alert Programs

5.6 Local, State and Federal Fiscal Resources

This section identifies the financial tools or resources that the City could potentially use to help fund mitigation activities. Fiscal capabilities include City-specific as well as state and federal resources. In addition, to augment local resources which are also potential funding programs

and resources that are provided by state and federal agencies and programs which can be used for local hazard mitigation activities.

General Fund Sources: The City of Fontana relies on several major revenue sources in the General Fund budget, including: Sales Taxes, Property Taxes, Interest and Rentals, Franchise Fees and Business Related Revenue.

Sales Taxes: The City of Fontana receives a 1% share of all taxable sales generated within its borders. In addition to this 1% share, the City receives a portion of an additional State-wide voter-approved ½% sales tax amount which is dedicated for public safety purposes.

Property Taxes: The County of San Bernardino levies a tax of 1% on the assessed valuation of property within the County. The City of Fontana receives approximately 3.24% of this 1% levy for property located within the City limits. Additionally, Property Tax in Lieu of VLF is the result o f a permanent backfill from the State's General Fund in 2004 to make up for the reduction in the Vehicle License Fee (VLF) rate from 2% to 0.65%. After FY 2004/05, this revenue increases/decreases annually in proportion to the change in assessed valuation in that jurisdiction.

Franchise Fees: The City imposes franchise fees on a variety of utilities for the use of city streets and rights-of-way.

Business Related: Businesses in the City are subject to a municipal business tax which is generally based on gross receipts and varies by business category. This category also includes Transient Occupancy Tax (TOT) which is levied on room rentals at motels and hotels at 8%.

Permits & Fees for City Services: The City of Fontana currently issues permits and collects fees for services. Fees and permits under this section are not taxes, and the amount collected cannot exceed the costs of these services.

Capital Improvement Plan: The City of Fontana's Seven-Year Capital Improvement Plan is adopted with the Operating Budget in June of each year. It matches funding sources with capital expenditures over a seven- year schedule, and serves as a planning tool to coordinate financing and scheduling of major projects undertaken by the City. The document is dynamic and consequently must be revised annual to address changing needs, priorities and financial conditions.

Federal Funding Sources: The City of Fontana understands that many of the Hazard Mitigation Measures outline in this plan are beyond the capabilities of the local government to implement instantaneously. The Federal Government offers a wide range of funding and technical assistance programs to help make communities more sustainable and livable. Many of these are listed below. Programs with potential effectiveness in the construction or reconstruction of housing and businesses, public infrastructure (transportation, utilities, water and sewer) and supporting overall hazard mitigation and community planning objectives are emphasized here. Some programs are disaster-specific, activated by a presidential declaration of a major disaster or emergency under the provisions of the Stafford Act.

Hazard Mitigation Grant Program (HMGP): This FEMA administered program provides grants to states and local governments following a presidential disaster declaration. The funds can be used to implement long-term hazard mitigation measures. According to the Disaster Mitigation Act

of 2000, communities must have a Local Hazard Mitigation Plan (LHMP) approved to receive HMGP funds. Funds will be granted only to projects that conform to local and state mitigation plans. Federal grant funds can provide 75% of a project's total cost; other sources must provide 25% matching funds. After any federally declared disaster, up to 20% of the amount spent by FEMA on disaster response and relief costs is made available in the form of HMGP grants to communities in the affected state.

Pre-Disaster Mitigation Program (PDM): FEMA developed the PDM program to coincide with the requirements of the Disaster Mitigation Act of 2000 that requires communities to prepare local hazard mitigation plans, such as this plan. Funds are authorized by Congress on an annual basis for PDM competitive grants, technical assistance and program support. FEMA grants can fund 75 % of a project; other non-federal sources must provide 25 % matching funds. Funds are only granted to communities with an approved LHMP, and supported projects must b e identified in those plans.

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Section 6. Mitigation Strategy

6.1 Mitigation Overview

The intent of the mitigation strategy is to provide City of Fontana with a guidebook to future hazard mitigation administration. The mitigation strategy is intended to reduce vulnerabilities outlined in the previous section with a prescription of policies and physical projects. This will help City of Fontana staff to achieve compatibility with existing planning mechanisms, and ensures that mitigation activities provide specific roles and resources for implementation success.

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

Mitigation measures are categorized generally for all hazards and specifically for the four high risk hazards facing the City that were extensively examined in the risk assessment section: earthquakes, terrorism, wildfire, and wind surge.

6.2 Mitigation 5 Year Progress Report

The table below contains the status of the Mitigation Projects and Programs for the city selected by the planning team during the creation of the 2012 Hazard Mitigation Plan:

Mitigation Action	Completed	On-Going	Deleted	Deferred	Comments
Storm Drain Installation Project	Completed				
Wildland Fire Access Project			Deleted		No funding available, project will be revisited another time.
San Sevaine Drainage Project	Completed				
Fire Resistive Construction Project		On-Going			
Alternate EOC Project		On-Going			
Elimination of URM Buildings Program		On-Going			
Disaster Preparedness Training Program		On-Going			

City Facilities Fire Detection Systems Upgrade Project	Completed				
Update Building Codes for Earthquakes Program		On-Going			
Weed Abatement/Rubbish Removal Program		On-Going			
URM Buildings Tracking System Program		On-Going			
Minimize Flood Hazards Program		On-Going			
Decreasing Hydrologic Impact		On-Going			
Minimize Seismic Hazards Program		On-Going			
Minimize Fire Hazards Program		On-Going			Redefined in 2010 as "Continuous Improvement of Fire Services."
EOC Upgrade Project		On-Going			

Table 6-1: Mitigation Five year Progress Report

6.3 Mitigation Goals, Objectives, and Projects

The City of Fontana Local Advisory Task Force reviewed the hazard profiles and risk assessment results as a basis for developing the mitigation goals, objectives, and projects. Mitigation goals are defined as general guidelines that explain what a community wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing community-wide visions. Objectives are statements that detail how a community's goals will be achieved. Typically, objectives define strategies or implementation steps to attain identified goals. Using Fontana's General Plan as a guideline, the Task Force developed goals with associated objectives to reduce or avoid long-term vulnerabilities to the identified four hazards. Lastly, based on the goals and objectives, the Task Force developed a list of potential mitigation projects.

Earthquake, Terrorism, Climate and Wind Surge projects are part of the "All Hazards" portion of this section. The projects the Task Force developed for the above mentioned hazards were not specific to any one hazard.

All Hazards

All Hazards – Project 1

Goal: Promote hazard mitigation as an integrated public policy

Objective: Continually build operational linkages among hazard mitigation, disaster preparedness and recovery programs within the public and private sectors

Title: **Promote Hazard Mitigation**

Description: Foster public and private partnerships to improve hazard mitigation program coordination and collaboration in the City of Fontana

Action(s): Identify and engage organizations within Fontana that have programs or interest in natural hazard mitigation. Involve private businesses throughout the City in mitigation planning efforts.

All Hazards – Project 2

Goal: Increase the emergency management capability of the City of Fontana

Objective: Build a new stand-alone Emergency Operations Center (EOC)

Title: **New Emergency Operations Center (EOC)**

Description: The City's current EOC location is the Police Department meeting room. The technology and communication resources within the EOC are out dated. For an activation,

training, or exercise, the room has to be set up and equipment brought in and the room does not provide enough space for EOC operations.

Action(s): Explore the options for funding and a location of a new stand-alone EOC. One funding possibility is the FEMA Emergency Operations Center (EOC) Grant Program.

All Hazards – Project 3

Goal: *Increase the emergency management capability of the City of Fontana*

Objective: *Locate/build an alternate Emergency Operations Center (EOC)*

Title: **Alternate Emergency Operations Center (EOC)**

Description: Reduce severity of disasters in the event of the primary EOC becoming disabled by building structure failure of the Police Department. Currently, the alternate EOC is not equipped by the City and is located in an old Fire Department building that is not built to current earthquake building standards.

Action(s): Locate/build and equip an adequate backup EOC at an earthquake safe location that is convenient for city personnel to staff.

Al Hazards – Project 4

Goal: *Increase the emergency management capability of the City of Fontana*

Objective: *Pursue available grant funding to implement mitigation measures*

Title: **Pre-disaster Mitigation Grant Project**

Description: Identify and pursue funding opportunities to develop and implement local and city wide mitigation activities. Review FEMA grant application and establish internal procedure to streamline the application process.

Action(s): Review FEMA grant application and establish internal procedure to streamline the application process. Apply for grant to fund mitigation projects identified in the Local Hazard Mitigation Plan (LHMP).

All Hazards – Project 5

Goal: *Increase public awareness of risks from all natural and human-made hazards*

Objective: *Educate the public to increase their awareness of hazards, emergency response, and recovery*

Title: **Public Outreach**

Description: Through various public events/activities, educate the public on local hazards and emergency preparedness.

Action(s): (a) Support the efforts and education of people with disabilities to prepare for disasters (b) Train citizens to deal with emergencies at times when professional responders will be overwhelmed.

All Hazards – Project 6

Goal: *Improve coordination and communication with relevant community organizations*

Objective: *Establish a partnership among all levels of government and the business community*

Title: **Community emergency Preparedness Coordination**

Description: Coordinate preparedness efforts with other agencies.

Action(s): Through community committee meetings, begin emergency preparedness coordination with relevant community organizations. Identify opportunities to partner with citizens, private contractors, and other jurisdictions to increase availability of equipment and manpower and increase the efficiency and efficacy of emergency response efforts.

All Hazards – Project 7

Goal: *Significantly reduce life loss and injuries; Minimize damage to structures and property as well as disruption of essential services and human activities*

Objective: *To expand Fire Station No. 71 and improve the operational effectiveness of emergency services within the center core of the community*

Title: **Construction of Fire Station 71**

Description: Fire Station No. 71 was the original fire station built to serve the City in the 1920's. Fire Station No. 71 has been remodeled several times to accommodate increased personnel and equipment. Currently, Fire Station No. 71 is the busiest station in San Bernardino County and its ability to service the communities' needs are inadequate due to its restricted size and outdated technologies. Also, additional paramedic staffing is needed to meet the increased calls for service for medical aid. Fire Station No. 71 must be expanded in order to allow for additional emergency personnel and vehicles.

Action(s): Fire Station No. 71 will be a new and modern fire facility which will serve the core area of the City and allow for growth to meet the increasing service demands. The station will allow for needed growth in staffing and additional equipment.

Wildfire

Wildfire Mitigation – Project 1

Goal: Increase the emergency management capability of the City of Fontana

Objective: Continually evaluate and improve emergency response services

Title: **Develop Fire Strategic Master Plan**

Description: The Fire Master Plan will ensure adequate resources to respond quickly to wildfires in their initial stages for quick control and mitigation of wildfires. In addition, Fire Prevention resources will be funded in order to develop wildfire awareness public education programs.

Action(s): The Fontana Fire Protection District will develop a strategic master plan which will allocate funds for future facilities, equipment, and staffing; and will strategically plan for the utilization of these resources in the most efficient and cost effective manner.

Wildfire Mitigation – Project 2

Goal: Significantly reduce life loss and injuries; Minimize damage to structures and property as well as disruption of essential services and human activities

Objective: Ensure that enforcement of relevant state regulations and local ordinances significant reduce life loss and injuries; Encourage new development to occur in locations avoiding or minimizing exposure to hazards and enhance design requirement to improve resiliency in future disasters; Research, develop, and promote adoption of cost effective buildings and development laws, regulations and ordinances exceeding the minimum levels need for life safety

Title: **Locally adopt California Fire Code and California Building Code**

Description: Every three years the California Fire Code (CFC,) with fire safety requirements for buildings of all types and uses; and the California Building Code (CBC,) with fire resistive construction requirements and exiting and life safety requirements; together with a body of other building standards and administrative codes are updated and adopted by the State of California. These codes can be adopted and amended locally to address specific fire hazards within a local community.

Action(s): The Fontana Fire District and the City Building and Safety Department work together to amend and update the California Fire and Safety Code and the California Building Code concurrently every three years, and present the ordinances to the City Council and Fire District Board for adoption.

Wildfire Mitigation – Project 3

Goal: Significantly reduce life loss and injuries; Minimize damage to structures and property as well as disruption of essential services and human activities

Objective: Ensure that enforcement of relevant state regulations and local ordinance significant reduce life loss and injuries; Identify and mitigate imminent threats to life safety; encourage life and property protection measures for all communities and structures located in hazard areas.

Title: **Annual Fire Inspection Program**

Description: The Annual Fire Inspection Program will fund the resources to perform inspections on privately or publicly owned land where fuel modification or fuel reduction zones exist, to ensure a safe buffer zone from fuels in Fire Hazard Severity Zones and any other wildfire prone areas.

Action(s): The Fontana Fire District will develop a fee funded annual fire inspection program for the businesses within the community, including critical facilities and particularly those in the wildfire hazard areas.

Wildfire Mitigation – Project 4

Goal: Increase public awareness of risks from all natural and human-made hazards

Objective: Educate the public to increase their awareness of hazards, emergency response, and recovery

Title: **Continued implementation of a wildfire safety and preparedness public education program**

Description: A public fire safety education program can reach residents and other high risk groups with important information about home fire safety, wildfire preparedness, exit drills and evacuation, and other important safety topics

Action(s): The Fontana Fire Protection District will develop public education programs that encompass wildfire safety awareness and preparedness, at schools or community centers in fire hazard areas, in order to educate residents and business owners. Elements of some programs already in existence, such as “Ready, Set, Go!" can be used for this.

Wildfire Mitigation – Project 5

Goal: Significantly reduce life loss and injuries; Minimize damage to structures and property as well as disruption of essential services and human activities

Objective: Ensure that mitigation measures are incorporated into repairs, major alterations, new development and redevelopment practices, especially in areas subject to substantial hazard risk; Encourage new development to occur in locations avoiding or minimizing exposure to hazards and enhance design requirement to improve resiliency in future disasters

Title: **Improve fire access within fire hazard areas**

Description: Fire access roads provide necessary vehicular access for firefighting, structure protection, mop-up, and other tactical operations. These roads are built around the perimeter of new housing developments, adjacent to open naturally vegetated land within wildfire risk areas.

Action(s): The Fontana Fire Protection District will develop local standards for specifications and maintenance of fire access roads serving the perimeter of new developments, and survey existing fire access roads to evaluate the condition of these roads and whether these need improvements or repairs.

Flooding

Flooding Mitigation – Project 1

Goal: To capture peak stormwater flows to provide enhanced flood protection from 100 year-flood events for approximately 300 acres and provide secondary water quality beneficial uses.

Objective: Build the West Fontana Channel from Banana Basin to Cherry Avenue and Beech Avenue Crossings.

Title: **West Fontana Channel**

Description: The West Fontana Channel Stormwater Flood Reduction Project will expand and line the existing West Fontana Channel from Juniper Avenue to Banana Basin. Construction will include: channel deepening and concrete lining, box culverts, stub outs, low flow bio swale, and associate improvements.

Action(s): City will pay $9,550,000, as their fair Share of the West Fontana Channel project, to the San Bernardino County Flood Control District to construct the West Fontana Channel Stormwater Flood Reduction Project.

Flooding Mitigation – Project 2

Goal: To intercept upstream drainage flows and route them through a new storm drain system.

Objective: Install storm drain and sewer improvements on Banana Avenue from Santa Ana Avenue to Jurupa Avenue.

Title: **Banana Storm Drain**

Description: Storm water flows along Slover Avenue west of Banana Avenue to a natural low point half way between Banana Avenue and Calabash Avenue causing flooding to some properties. Install storm drain and sewer improvements on Banana Avenue from Santa Ana Avenue to Jurupa Avenue. These improvements are consistent with the City's Master Storm Drainage Plan.

Action(s): This is a joint cooperative project with the County of San Bernardino. The City is the lead for design and construction. The project design phase has been completed. Construction began in May 2017 with an estimated completion date of November 2017.

Flooding Mitigation – Project 3

Goal: This project will intercept surface drainage flows and route them through a new storm drain system.

Objective: Storm Drain construction on Cypress Avenue from Foothill Boulevard to Orange Way

Title: **Cypress Storm Drain**

Description: Construct Storm Drain facility on Cypress Avenue from Foothill Boulevard to Orange Way. The improvements are also consistent with the City's Master Storm Drainage Plan**.**

Action(s): The design will begin in October 2017. Construction is estimated to begin March 2019 with an estimated completion date of October 2019.

Flooding Mitigation – Project 4

Goal: Improve infrastructure to drain Ventana and Arboretum.

Objective: Design and construction of master storm drain line crossing the I-15 Interchange and connecting to Hawker-Crawford Channel.

Title: **Duncan Canyon RCB/PH I-Line A**

Description: Storm drain-basin work in the Duncan Canyon area. Design and construction of master storm drain line crossing the I-15 Interchange and connecting to Hawker-Crawford Channel. This section of the storm drain will remain dry until future development comes into the area.

Action(s): The project construction is being administered by Caltrans. Construction will begin approximately October 2016 with an estimated completion date of March 2017.

Flooding Mitigation – Project 5

Goal: Construction of stormwater improvement projects limit the number of flooding incidents and helps to protect private property, public facilities and lives which contributes to quality of life.

Objective: Install storm drain pipe outlet from the Lime Basin.

Title: **Lime Avenue Basin**

Description: Install a storm drain pipe outlet from the Lime Basin to north of Monica Court in order to mitigate flooding incidents to improve the quality of life in the area.

Action(s): Project design began June 2017. Construction is estimated to begin March 2018 with an estimated completion date of July 2018.

Flooding Mitigation – Project 6

Goal: Construction of stormwater improvement projects limit the number of flooding incidents and helps to protect private property, public facilities and lives which contributes to quality of life.

Objective: Install storm drain pipe to close missing gap between existing storm drain basin and constructed storm drain systems.

Title: **Sultana at Miller Basin**

Description: Install storm drain pipe to close missing gap between existing storm drain basin and constructed storm drain systems within Sultana Avenue and Miller Avenue. Tie existing basin into the storm drain system.

Action(s): Project design is expected to start June 2017. Construction is estimated to begin March 2018 with an estimated completion date of July 2018.

6.3.1 Considering Mitigation Alternatives

The Local Task Force committee for the LHMP participated in the development and review of mitigation actions with a wide range of alternatives. To narrow mitigation alternatives for inclusion, FEMA's six broad categories of mitigation alternatives were used. Each FEMA category is described below. The LHMP Advisory Task Force developed several mitigation alternatives for implementation under each mitigation category.

PREVENTION (PRV):

Preventative activities are intended to keep hazard problems from getting worse, and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are built. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. Examples of preventative activities include:

- Planning and zoning ordinances;
- Building codes;
- Open space preservation;
- Floodplain regulations;
- Stormwater management regulations;
- Drainage system maintenance;
- Capital improvements programming; and
- Riverine / fault zone setbacks.

PRV ALTERNATIVES:

1) Evaluate the City's regulations that manage flood risk / stormwater conveyance and consider additional standards to help prevent flood problems from increasing. These include:
    - Practicing Water Sensitive Urban Design such as the incorporation of curb cuts into bioswales to control runoff.
    - Enhanced stormwater regulations to reduce stormwater runoff, especially for new development
2) Consider additional policies and regulations to enhance the preservation of Open Space in flood prone and wild land fire high risk areas.
3) Training for City Staff:
    - Provide Certified Floodplain Manager training and certification to staff
4) Vegetation management in fire prone areas.

PROPERTY PROTECTION (PPRO):

Property protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard, or removal of the structures from hazardous locations. Examples include:

- Critical facilities protection;

- Retrofitting (e.g., seismic design techniques, etc.);
- Insurance.

PPRO ALTERNATIVES:

1) Consider promoting and supporting voluntary property protection measures through several activities, ranging from financial incentives to full funding. Examples include Earthquake Brace + Bolt, The California Residential Mitigation Program and California Air Resources Board Air Pollution Incentives, Grants and Credit Programs.
2) Promote earthquake insurance for properties with a focus on older structures built before 1980.
3) Evaluate public owned facilities and critical facilities for property protection measures.
4) Perform seismic review (both structural and non-structural) on city buildings and city owned critical facilities.
5) Provide automatic shutoff valves for utility infrastructure.
6) Review city owned buildings for seismic risk.
7) Identify and mitigate privately owned unreinforced masonry buildings within the City.

PUBLIC EDUCATION AND AWARENESS (PE&A):

Public education and awareness activities are used to advise residents, elected officials, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Examples of measures to educate and inform the public include:

- Outreach projects including neighborhood and community outreach;
- Speaker series / demonstration events;
- Hazard mapping;
- Real estate disclosures;
- Materials Library;
- School children educational programs; and
- Hazard expositions.

PE&A ALTERNATIVES:

1) Enhancing the City's Public Information Program to include both the public and private sectors.

2) Education and outreach measures to ensure the community understands **their** role in protecting **themselves** in a disaster event.

    - Mitigation measures for residents at the home (i.e. stabilizing through vegetation)
    - Safety precautions for all types of hazards, but especially earthquakes, wildfires, and drought.
    - Knowing where emergency evacuation routes and shelters are located.
    - Family and emergency preparedness measures.

3) Enhance public outreach program to include all hazards. Appropriate ways to spread information are:
    - Websites and social media
    - Mailings to everyone, in utility bills or otherwise

- News releases or newspaper articles
- Newsletters
- Displays, particularly at special events
- Handouts, flyers and other materials, which can be distributed at special events and presentations

NATURAL RESOURCE PROTECTION (NRP):

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their protective functions. Such areas include floodplains, wetlands, steep slopes, and sand dunes. Parks, recreation, or conservation agencies and organizations often implement these protective measures. Examples include:

- Floodplain protection
- Watershed management;
- Vegetation management (e.g., fire resistant landscaping, fuel breaks, etc.);
- Erosion and sediment control;
- Wetland and habitat preservation and restoration;

NRP ALTERNATIVES:

1) Inform City Council about the hazard mitigation benefits of restoring natural drainage features, wetlands and other natural areas.
2) Develop restoration and protection techniques using water sensitive urban design, landslide areas and high risk wild land fire areas.
3) Enhance public education and outreach efforts to inform the public about the need to protect hillsides from erosion. (i.e. stabilizing through vegetation) (City needs to make sure the resources are needed to do this after a fire) Enhance public education and outreach efforts to inform the public about capturing stormwater and using it for landscape features.
4) Work with property owners to replant native vegetation after a fire.
5) Land use and/or other regulatory control of undeveloped properties in flood zones.

EMERGENCY SERVICES (ES):

Although not typically considered a “mitigation” technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:

- Warning systems;
- Construction of evacuation routes;
- Sandbag staging for flood protection; and
- Installing temporary shutters on buildings for wind protection.

ES ALTERNATIVES:

1) Consider StormReady certification.
2) Provide alert and notification to residents for flood risk
3) Training for City Staff

STRUCTURAL PROJECTS (SP):

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event through construction. They are usually designed by engineers and managed or maintained by public works staff. Examples include:

- Stormwater diversions / detention / retention infrastructure;
- Utility Upgrades
- Seismic Retrofits

SP ALTERNATIVES:

1) The City has previously constructed flood control and drainage facilities that move storm and flood waters more efficiently and reduced potential for overbank flooding. The City should identify and prioritize additional projects in the City.
2) Protecting utilities from EQ damage. Not the City's responsibility but private utility industry.
3) Constructing backup utility infrastructure in the event of a natural disaster.
4) Check the condition of the City's utility infrastructure.
5) Upgrade or seismically retrofit transportation infrastructure including overpasses, underpasses, and other transportation infrastructure vulnerable to seismic events.
6) Identify or construct alternative routes for emergency access to the City. Provide shoring and bank stabilization near roadways to prevent further erosion.
7) Work with private property owners to reduce runoff.
8) Provide City infrastructure to slow the movement of water.

6.4 Mitigation Priorities

6.4.1 Prioritization Process

Based upon Task Force priorities, risk assessment results, and mitigation alternatives, mitigation actions were developed. Most importantly, the newly developed mitigation actions acknowledge updated risk assessment information. Some mitigation actions support ongoing City activities, while other actions are intended to be completed when funding is available. Regardless, mitigation actions will be part of an annual review.

The Local Advisory Task Force utilized the STAPLEE system (identified in Section 3) to help assess mitigation priorities and determined that the highest priority rankings would be assigned to those mitigation measures that met three primary criteria:

1. Greatest potential for protecting life and property;
2. Greatest potential for maintaining critical City functions and operability following a disaster; and
3. Achievability in terms of community support and cost effectiveness.

All rankings were determined by the consensus of the Local Advisory Task Force.

EARTHQUAKE –						
Action No.	**Specific Mitigation Action**	**Mitigation Type**	**Priority Rating**	**Short/Long Term Designation**	**Leading Department**	**Potential Funding Source**
EQ 1.1	Evaluate all proposed developments for impacts associated with geologic and seismic hazards.	PRV	4	Long Term and On-going as new development and/or redevelopment occurs.	Building and Safety and Engineering Department	The cost incurred for this service is recovered through Development Impact Fees (DIF's) submitted by applicant.
EQ 1.2	Perform a seismic review (both structural and non-structural) on city buildings and city owned critical facilities i.e. City Hall, Public Works building and Fire Station.	PRV, PPRO	2	Long Term and On-going	City Manager's Office; Public Works Department	Staff implemented and funded through the General Fund.
EQ 1.3	Mitigate unreinforced masonry buildings in the City, starting with gathering facilities.	PPRO	5	Long Term and as funding is procured	Public Works Department	Federal Grant Funding Subsidized by the General Fund

EQ 1.4	Work with local insurance brokers to encourage earthquake insurance for homeowners	PE & APPRO	2	Long Term and On-going	Housing Department	Staff Funded through the General Fund
EQ 1.5	Provide automatic shutoff valves for gas meters in the Fontana service area.	PPRO	3	Long Term and On-going as funding is procured	Public Works Department	Pursue Grant Funding

LANDSLIDE						
Action No.	**Specific Mitigation Action**	**Mitigation Type**	**Priority Rating**	**Short/Long Term Designation**	**Leading Department**	**Potential Funding Source**
LS 1.1	Encourage homeowners in high landslide hazard areas to plan native trees and shrubbery	PE&A PRV	5	Long Term and On-going	Public Works	General Fund and Grant Funding
LS 1.2	Develop Public Education and Awareness material regarding vegetation and erosion control and provide resources for erosion control and slope failure on private properties.	PE&A PRV	3	Long Term and On-going	Public Works Development Services Department	General Fund and Grant Funding

WILDFIRE						
Action No.	**Specific Mitigation Action**	**Mitigation Type**	**Priority Rating**	**Short/Long Term Designation**	**Leading Department**	**Potential Funding Source**
WF 1.1	Improve public education programs for residents to reduce wildfire risk	PE&A, PRV	4	Long Term and On-going	Fire Department Personnel	General Fund and Grant Funding
WF 1.2	Maintain and improve access to fire prone areas such as	PRV, NRP	1	Long Term and On-going	Public Works	Staff implemented and funded through the General Fund

	Coyote Canyon and Jurupa Hills					
WF 1.3	Continue weed abatement program and fuel management and reduction in open spaces creeks, around critical facilities, and urban/wildland interface areas	NRP, PRV	1	Long Term and On-going	Code Enforcement Department	Staff implemented and funded through the General Fund
WF 1.4	Repair/replant vegetation on slopes after a fire to minimize the risk of landslides, mudslides or slope failure	NRP, PRV	3	Short Term as necessary	Public Works Department	General Fund and Development Impact fees

FLOOD						
Action No.	**Specific Mitigation Action**	**Mitigation Type**	**Priority Rating**	**Short/Long Term Designation**	**Leading Department**	**Potential Funding Source**
FL 1.1	Perform a feasibility study for retention and detention of storm water to include water sensitive urban design.	PRV	2	Long Term and On-going	Building and Safety and Engineering Department	The cost incurred for this service is recovered through Development Impact Fees (DIF's) submitted by applicant.

FL 1.2	Evaluate public infrastructure (bridges, traffic signals, street lights, etc.) and its ability to withstand localized flood events.	PRV, PPRO	2	Long Term and On-going	Public Works and Engineering Department	Staff implemented and funded through the General Fund.
FL 1.3	Ensure undeveloped properties adhere to General Plan Land Use designations and flood plain preservation and risk reduction methodologies.	PRV	2	Long Term and On-going	Planning and Development Services Department	Staff implemented and funded through the General Fund.
FL 1.4	Continue to impose BMPs on all users of the storm drain system, including users from existing residential or commercial development. All users of the storm drain system—including, but not limited to, users from existing residential or commercial development—must comply with all BMP's imposed on the user by the environmental manager.	PE&A PRV	4	Long Term and On-going as development and redevelopment occur in the City	Planning and Engineering Department	Staff implemented and funded through the General Fund

FL 1.5	Most residential streets within the City of Fontana are swept every other week and typically follow trash service day. Industrial sweeping and commercial sweeping occur weekly.	NRP PRV	2	Long Term and On-going	Public Works Department	Staff implemented and funded through the General Fund.

CLIMATE CHANGE						
Action No.	**Specific Mitigation Action**	**Mitigation Type**	**Priority Rating**	**Short/Long Term Designation**	**Leading Department**	**Potential Funding Source**
CC 1.1	Continue to construct parks and open space for every 1,000 residents, reducing the impacts of high heat on urbanized areas.	PRV	3	Long Term and On-going	Building and Safety and Engineering Department	The cost incurred for this service is recovered through Development Impact Fees (DIF's) submitted by applicant.
CC 1.2	Plant street trees to provide shade on high heat days and reduce the urban heat island effect.	PRV	1	Long Term and On-going as future development and redevelopment occurs	City Manager's Office; Public Works Department	Staff implemented and funded through the General Fund.

CC 1.3	Continue working with Southern California Edison to promote energy conservation at residences and businesses.	PE&A, PRV, NRP	2	Long Term and On-going	Development Services Department	Staff implemented and funded through the General Fund and Grant Funding
CC 1.4	Continue working with local Water Department agencies to offer continual educational and informative water wise values.	PE&A PRV, NRP	2	Long Term and On-going	Development Services Department	Staff implemented and funded through the General Fund and Grant Funding. Continue to provide cooling shelters for residents.

6.5 Mitigation Strategy

An implementation strategy is the key to any successful planning effort. The implementation strategy identifies who has lead responsibility for the project, potential funding sources(s) to support implementation, the estimated timeframe for completion, and the priority ranking defined as follows:

- Responsible Agency: City Department and/or other agency assigned lead responsibility
- Funding source(s): Potential internal and external funding source(s)
- Timeframe: Short-term (less than 2 years); long-term (more than 2 years)
- Priority Ranking: High, Medium or Low (as defined in Section 6.4)

Section 7. Plan Maintenance

7.1 Monitoring, Evaluating and Updating the LHMP

As a living document it is important that this plan becomes a tool in the City of Fontana's resources to ensure reductions in possible damage from a natural hazard event. This section discusses plan adoption, implementation, monitoring, evaluating, and updating the LHMP. Plan implementation and maintenance procedures will ensure that the LHMP remains relevant and continues to address the changing environment in the City of Fontana. This section describes the incorporation of the LHMP into existing City of Fontana planning mechanisms, and how the City of Fontana staff will continue to engage the public.

The inclusion of the Hazard Mitigation Plan into other existing City plans will continue to be a collaborative process that involves multiple stakeholders from associated agencies and departments. Because the Hazard Mitigation Plan is a living document that reflects ongoing hazard mitigation activities, the process of monitoring, evaluating, and updating will be critical to the effectiveness of hazard mitigation within the City. To facilitate the hazard mitigation planning process, the Hazard Mitigation Plan will be reviewed annually and revisions will be provided to FEMA in a five-year cycle, as required.

The City of Fontana will review the plan at least annually and update project status and other plan elements as necessary. Departments with projects will track the status of their projects through the entire life cycle from concept to completion. Each year proposed projects are reviewed during budget development and selected projects are submitted for funding to the appropriate funding source.

7.1.1 Plan Adoption

To comply with DMA 2000, the City Council has officially adopted the 2017 City of Fontana LHMP. The adoption of the 2017 LHMP recognizes the City of Fontana's commitment to reducing the impacts of natural hazards within the City of Fontana limits. A copy of the 2017 LHMP adoption resolution is included in Section XX

7.1.2 Implementation

Over time, Implementation Strategies will become more detailed and the City of Fontana's mitigation planners will work to provide more detail for priority mitigation actions. In conjunction with the progress report processes outlined in the implementation strategy worksheets and will be extremely useful as a plan of record tool for updates. Each implementation strategy worksheet provides individual steps and resources needed to complete each mitigation action. The following provides several options to consider when developing implementation strategies in the future:

- **Use processes that already exist;** initial strategy is to take advantage of tools and procedures identified in the capability assessment in Section 5. By using planning mechanisms already in use and familiar to City of Fontana departments and organizations, it will give the planning implementation phase a strong initial boost, especially if a mitigation strategy calls for expanding existing programs, or creating new programs or processes at a later date.

- **Updated work plans, policies, or procedures**; hazard mitigation concepts and activities can help integrate the 2017 LHMP into daily operations. These changes can include how major development projects and subdivision reviews are addressed in hazard prone areas or ensure that hazard mitigation concerns are considered in the approval of major capital improvement projects.
- Job descriptions; working with department or agency heads to revise job descriptions of government staff to include mitigation-related duties could further institutionalize hazard mitigation. This change would not necessarily result in great financial expenditures or programmatic changes.

The 2017 Hazard Mitigation Plan update process was followed by inclusion of mitigation measures in the Safety Element of the City of Fontana General Plan. The City of Fontana addresses statewide planning goals and legislative requirements through its General Plan, Capital Improvement Projects, and City Building and Safety Codes. The Hazard Mitigation Plan will implement a series of recommendations, many of which are closely related to the goals and objectives of existing planning programs. The City of Fontana will have the opportunity to implement recommended mitigation action items through existing programs and procedures.

The Hazard Mitigation Plan goals and actions will be incorporated into various general operations of government. For example, the Local Hazard Mitigation Plan was recently adopted into the Safety Element of the General Plan and much of the information from the Hazard Mitigation Plan will be included in the City of Fontana Emergency Operations Plan (EOP). As any future City plans are developed, the Hazard Mitigation Plan will be a great asset in any plan development efforts. As noted earlier, much of the information contained in this Hazard Mitigation Plan is from the City's General Plan and is already part of the planning process

7.1.3 Future Participation

The City of Fontana LHMP Task Force, established for this update, will become a permanent advisory body to administer and coordinate the implementation and maintenance of the 2017 LHMP. The Department will lead the 2017 LHMP plan development and updates and all associated LHMP maintenance requirements. On an annual basis, the LHMP Task Force will report to the City Council and the public on the status of plan implementation and mitigation opportunities in the City of Fontana. Other duties include reviewing and promoting mitigation opportunities, informing and soliciting input from the public and developing grant applications for hazard mitigation assistance.

7.1.4 Schedule

Monitoring the progress of the mitigation actions will be on-going throughout the five-year period between the adoption of the 2017 LHMP and the next update effort. The LHMP Local Advisory Task Force will meet on an annual basis to monitor the status of the implementation of mitigation actions and develop updates as necessary.

The LHMP Local Advisory Task Force should prepare a yearly status report to the City Council during the five years between updates.

The LHMP will be updated every five years, as required by DMA 2000. The update process will begin at least one year prior to the expiration of the 2017 LHMP. However, should a significant disaster occur within

the City, the LHMP Local Advisory Task Force will reconvene within 30 days of the disaster to review and update the LHMP as appropriate, and the City Council will adopt written updates to the LHMP as a DMA 2000 requirement.

7.1.5 Process

The LHMP Local Advisory Task Force will coordinate with responsible agencies/organizations identified for each mitigation action. These responsible agencies/organizations will monitor and evaluate the progress made on the implementation of mitigation actions and report to the LHMP Task Force on an annual basis. Working with the LHMP Task Force, these responsible agencies/organizations will be asked to assess the effectiveness of the mitigation actions and modify the mitigation actions as appropriate. A LHMP Mitigation Action Progress Report worksheet was developed as part of this LHMP to assist mitigation project managers in reporting on the status and assessing the effectiveness of the mitigation actions.

Information culled from the mitigation leads or “champions” will be used to monitor mitigation actions and annual evaluation of the LHMP. The following questions will be considered as criteria for evaluating the effectiveness of the LHMP:

- Has the nature or magnitude of hazards affecting the City changed?
- Are there new hazards that have the potential to impact the City?
- Do the identified goals and actions address current and expected conditions?
- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the LHMP?
- Should additional local resources be committed to address identified hazards?

An Annual LHMP Review Questionnaire worksheet has been developed as part of this LHMP to provide guidance to the LHMP Task Force on what should be included in the evaluation. Future updates to the LHMP will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. Issues that arise during monitoring and evaluating the LHMP, which require changes to the risk assessment, mitigation strategy and other components of the LHMP, will be incorporated into the next update of the 2017 LHMP in 2022. The questions identified above would remain valid during the preparation of the 2022 update.

7.2 Incorporation into Existing Planning Mechanisms

An important implementation mechanism is to incorporate the recommendations and underlying principles of the LHMP into community planning and development such as capital improvement budgeting, building and zoning codes, general plans and regional plans. Mitigation is most successful when it is incorporated within the day-to-day functions and priorities of the jurisdiction attempting to implement risk reducing actions. The integration of a variety of City departments on the LHMP Local Advisory Task Force provides an opportunity for constant and pervasive efforts to network, identify, and highlight mitigation activities and

opportunities at all levels of government. This collaborative effort is also important to monitor funding opportunities which can be leveraged to implement the mitigation actions. Information from this 2017 LHMP can be incorporated into:

- **City of Fontana General Plan:** The 2017 LHMP will provide information that can be incorporated into the Land Use, Public Health and Safety, and Sustainable Development Elements during the next general plan update. Specific risk and vulnerability information from the City of Fontana's LHMP will assist to identify areas where development may be at risk to potential hazards.
- **City Building / Development Codes and Zoning Ordinances:** The 2017 LHMP will provide information to enable the City to make decisions on appropriate building/development codes and ordinances. Appropriate building codes and ordinances can increase the City's resilience against natural disasters.
- **San Bernardino Valley Regional Urban Water Management Plan (UWMP):** The 2017 LHMP highlights areas of concern regarding climate change and the added pressure it will place on the City's water supply. Suitable mitigation actions from the LHMP can be included in the UWMP.

7.3 Continued Public Involvement

A critical part of maintaining an effective and relevant Hazard Mitigation Plan is ongoing public review and comment. Consequently, the City is dedicated to the direct involvement of its citizens in providing feedback and comments on the plan on a continued basis.

The public will continue to be apprised of Local Hazard Mitigation Plan actions through the City's website and through the local media. All proposed changes to the plan will be subject to citizen review prior to City Council action. The City will follow its standard public input process, consistent with the process used in the initial plan development, which is described in Section 3 of this Plan.

During the five-year update cycle (2017-2022), City staff will involve the public using public workshops and meetings. Information on upcoming public events related to the LHMP or solicitation for comments will be announced via newspapers, mailings, and on the City website (http://www.fontana.org/local-hazard-mitigation-plan.html). An electronic copy of the current LHMP document will be accessible through the City website, with hard copies available for review at the City of Fontana Community Development Department. The LHMP Local Task Force Advisory Committee will, as much as practicable, incorporate the following concepts into its public outreach strategy to ensure continued public involvement in the LHMP planning process:

- Collaborate with San Bernardino County on hazard mitigation efforts;
- Work with public service clubs;
- Collaborate with faith based organizations;
- Distribute emails and postcards/mailers to City residents about hazard mitigation updates;

- Post meeting announcements at coffee houses, grocery stores, libraries, etc;
- Participate in other existing local community meetings;
- Distribute information through K-12 schools
- Continue to use the City website as a distribution point of hazard mitigation information