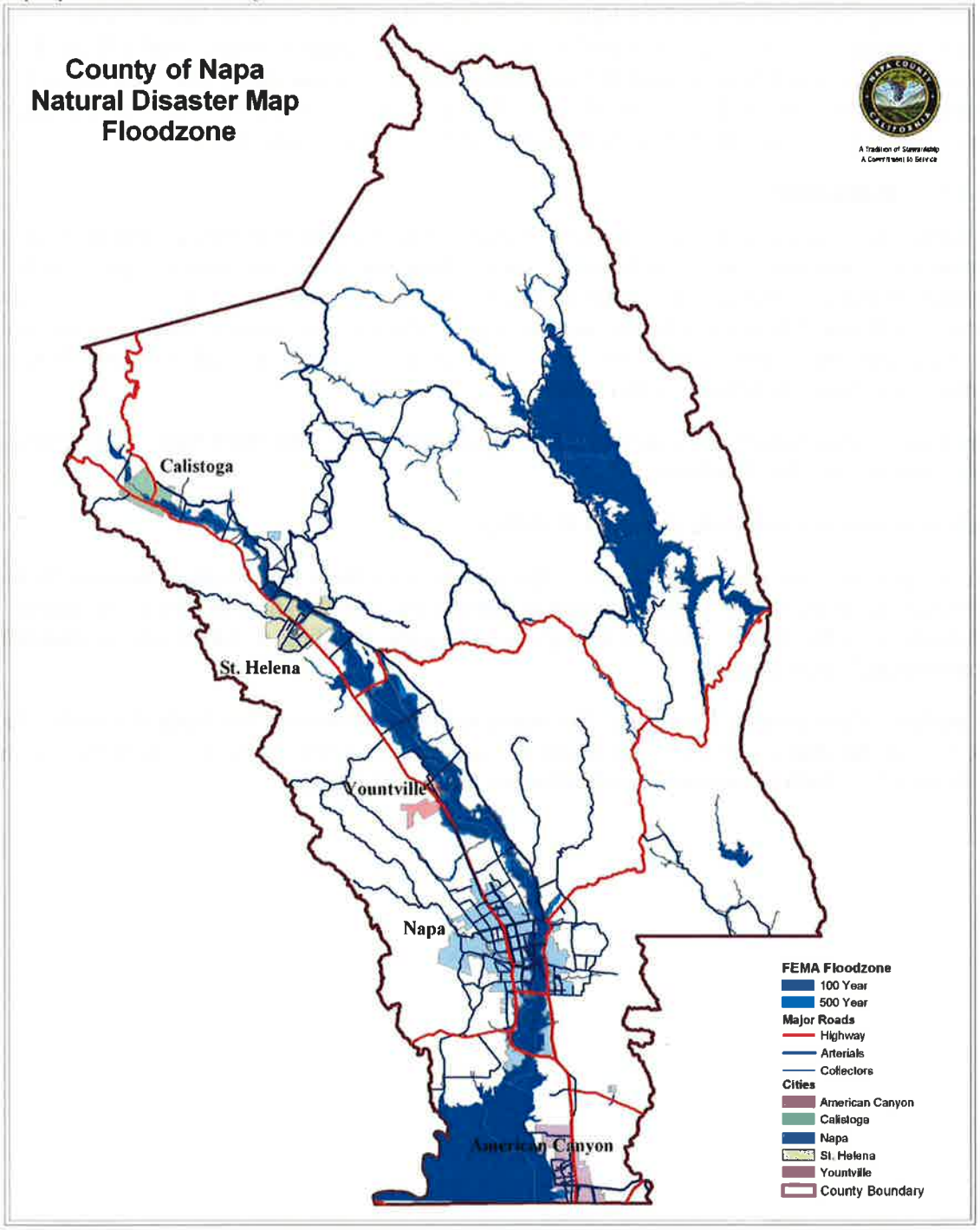

Figure 2-15: Napa County Flood Zone Map

2.4.2. Major Threat: Earthquake

Napa County faces a potential $1.5 billion earthquake risk. This is an estimate based on Hazus Loss Estimation Models due to building damages and business losses. One billion dollars damages would result from a local 6.5 magnitude earthquake caused by the West Napa Fault, running through Napa Valley. The Rodgers Creek Fault would cause estimated damages to Napa County in the one-half billion-dollar range with a 7.1 magnitude quake

2.4.2.1. *Mitigation*

To further its proactive mitigation posture, Napa County has joined FEMA's Disaster Resistant Communities initiative, which is based on establishing public-private partnerships in order to leverage resources necessary to create a disaster-resistant community. The U. S. Geological Survey, California Division of Mines and Geology, California Governor's Office of Emergency Services, and the Napa County Office of Emergency Services are all Disaster Resistant Communities program partners with FEMA.

Napa County experienced a 5.2 earthquake in September 2000 on the West Napa Fault. Damages were estimated at $30-50 million.

Implementation of Earthquake Resistant Buildings

The communities in the Napa County Operational Area have all adopted Seismic Retrofit ordinances to reinforce all historic buildings. During the last Building & Fire Code update all jurisdictions in the county adopted a single Countywide Building & Fire Code to streamline permitting and enforcement.

An analysis of our primary Emergency Services facilities construction standards shows that Napa County will be able to provide immediate & sustained response from our facilities. All new facilities will be built to current Essential Service Facility Standards.

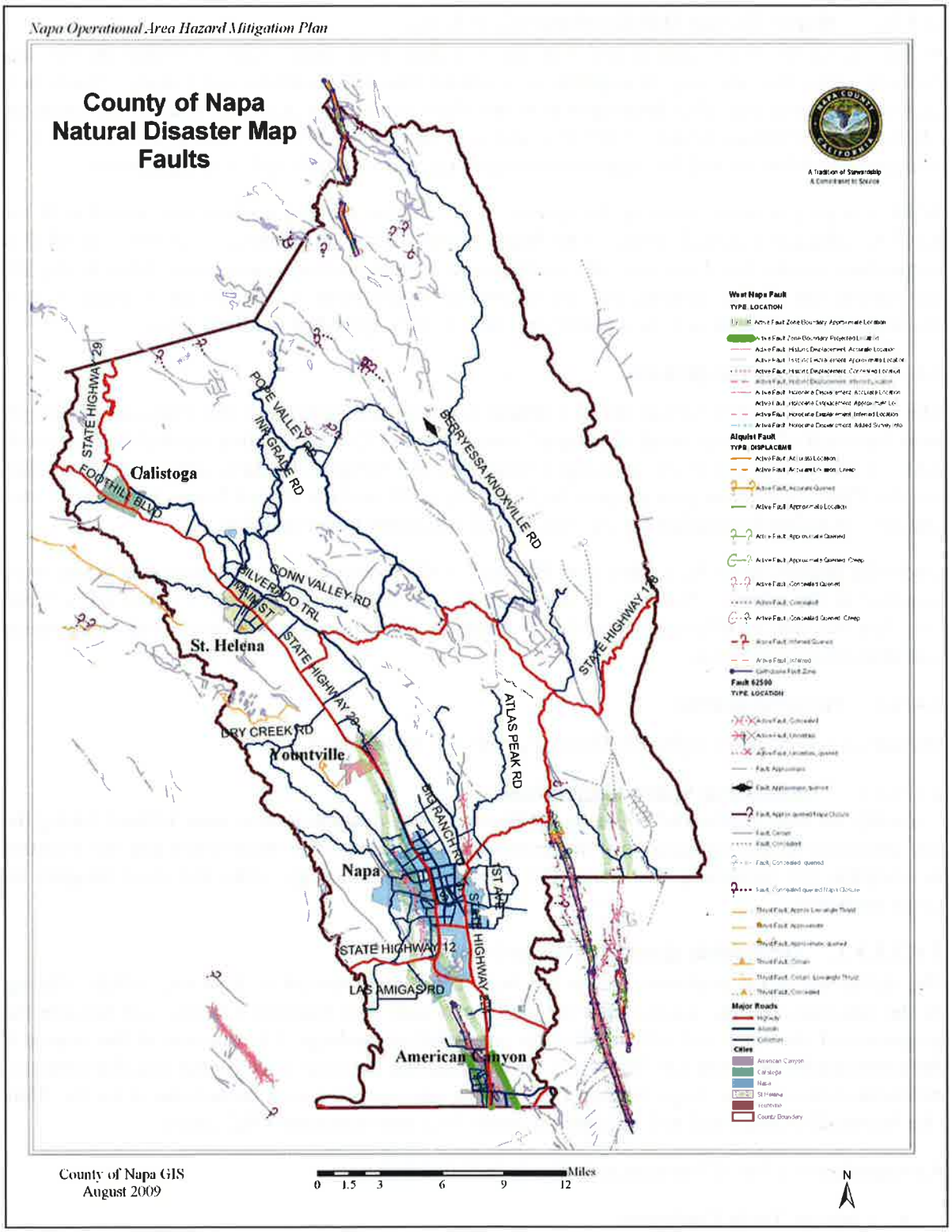

Figure 2-16: Napa County Fault Map

2.4.3. Major Threat: Wildland Interface Fires

A narrow valley floor surrounded and intermingled with steep, hilly, wooded terrain that contains areas that are very susceptible to wildland fires characterizes the County. Such fires expose residential and other development within the County to an increased risk of conflagration. The hilly/mountainous terrain on the east and west side of Napa Valley strongly influences both wildland fire behavior and the suppression capability of firefighters and their equipment.

Wind is a predominant factor in the spread of fire in that burning embers are carried with the wind to adjacent exposed areas. The Napa Valley has a characteristic southerly wind that originates from the San Francisco Bay and becomes a factor in fire suppression. Also, during the dry season the Valley experiences an occasional north wind of significant velocity that is recognized by fire fighters to be a significant factor in the spread of wildland fires.

2.4.3.1. *Firewise Conference*

The public participation for the initial wildland fire interface portions of this Plan was developed from the input of participants at the Napa County Firewise Conference that was held on June 4-6, 2003. From this initial Firewise group's strategies, the mitigation action items were developed for this Plan. This public process was facilitated by CDF and the United States Forestry Service and gave us a firm foundation for our fire hazard mitigation planning efforts.

Under the leadership of the County Fire Marshal's Office two competitive mitigation grants were awarded to the county. Working in conjunction with the Firewise group, County OES, Napa City Fire Marshal's Office an aggressive program of fire mitigation, education and organization was launched county wide.

2.4.3.2. *Firewise grants*

Mitigation actions taken using the firewise grants are listed below.

2.4.3.2.1. Defensible Space Inspections

Currently we have conducted 100 using defensible space evaluators who were trained during the last grant period, 100 using county fire crews doing preseason fire inspections and we intended to complete the remaining 800 using the following methodology visits and door hangers on target properties.

2.4.3.2.1.1. Defensible Space Evaluator's Course

The defensible space evaluator course has been completely reworked from our initial offering. At the conclusion of the second pilot the California state Fire Marshal's Office will become the proponent of the class and will finalize the presentation package. The success of the course is demonstrated by the State fire Marshal's Office selecting the course for further development and statewide delivery. The Napa County DSE course was accepted as a model course by the State Fire Marshall's Office and will become the basis for a new statewide DSE course.

A comprehensive list of Firewise activities is included below:

- Firewise Trade Conference
- Angwin/Deer Park Community Workshop
- Pope Valley community meeting

- Berryessa Highlands community meeting
- Circle Oaks community meeting
- Direct mail outreach to promote chipping program
- Countywide free chipping program
- Public Service Announcements (Radio) promoting fire prevention
- Utility bill inserts promoting defensible space
- Newspaper ads promoting free chipping program
- "Door Hangers" promotion defensible space planning
- Update of Countywide risk map
- Defensible space inspection class for qualified contractors
- Information display at Home & Garden Show and Earth Day
- Information display at Angwin town center
- Sponsorship of free defensible space home inspections
- Update and management of Napa Firewise website
- Period press releases announcing Firewise events
- Bi-weekly Firewise columns in Napa Register (fire prevention messages)
- Display banners promoting fire prevention and DS planning
- Ongoing support for Fire Safe Councils and community action organizations

2.4.3.2.2. Community Firewise development

After the success of the exercise and community education events with the Montecito Heights neighborhood within the City of Napa, the program branched out and assisted the Angwin, Mt Veeder, Circle Oaks and Gordon Valley Firewise/Firesafe Councils in developing their local programs.

2.4.3.2.3. Chipping and Fuel Management Programs

The program is in its fifth year of chipping and anticipates up to 150 day of chipping with this grant. As of today we have chipped over 1,225,000 cubic yards of waste from over 200 sites. This is a very cost effective mitigation effort. We have collaborated with the Bay Area Air Pollution Control District and have received a dedicated high performance chipper. The County Corrections Department, Public Works and Risk Management staffs have created an annual, seasonal program using supervised inmate labor. Mechanical fuel reduction is critical in the Bay Area as the number of burn days even for agricultural products is extremely limited. The reduction in fire danger to structures is currently the most efficacious means of creating defensible space, the keystone of a fire safe community. Additionally, we have tracked the volunteer labor involved in creating piles to be chipped and over 12,600 voluntary hours have been expended in this program.

The Firewise and beneficial environmental impact of this program is now a very recognized part of our service to the residents of the County. The partnership developed under the grant has led to a locally funded, sustainable program using donated chippers, County Correctional labor, and County Fire managed annuitant supervisors who manage the program and the inmates assigned to the project.

2.4.3.2.4. Implementation of Firewise & Fuel Reduction Program

Since 2007 both Northern and Southern California have experienced devastating large wildfires. In the same time period, Napa County has had relatively small fires in comparison. This is

directly attributed to our Firewise Program and Fuel Reduction programs. Only two structures have been lost to Wild land fire since these programs were implemented.

2.4.3.2.5. Mitigation actions

To directly reduce the threat of wildfire in Napa County, the Board of Supervisors has passed various Ordinances & Resolutions. In 2007 they passed Ordinance 1290, which abates Weeds & Rubbish for Fire Protection. Also in 2007 they passed Resolution 08-45 Defensible Space Guidelines to reduce vegetation surrounding building and structures. In 2008 under Residential Development Guidelines the County required Automatic Fire Sprinkler System in all new residential occupancies, set requirement for Water Storage, and Access Road Standards.

2.4.3.2.6. Recent Plan Update & Review

In the past 8 months the Planning Team reviewed each section of the plan focusing on recent FEMA review comments. Our focus was directed on making the plan a 'working' document that could be utilized in actual disasters. In the recent update, the Planning Team eliminated areas of the plan that did not 'detail' actual hazards & mitigations that are the major threat to our communities: flood, earthquake, & fire. They followed the FEMA Mitigation Plan 'Crosswalk'. Each section was updated as part of this process.

Section 3. RISK ASSESSMENT

3.1. Hazard Identification

The planning process used FEMA tools to evaluate all the possible threats faced. Through the threat analysis process the most probable threats, the most devastating threats and the most significant threats to Napa County were identified. The three most significant hazards faced are: floods, earthquakes, and wildland interface fires.

The initial development of the plan and the plan update addressed the fact that no jurisdiction in Napa County has unique or varied risks: all jointly share the same significant hazards and threats.

Mitigation of these significant hazards has the side benefit of appreciably enhancing the overall disaster resistance in the community from related threats. For example, the clearing of roads of intrusive vegetation eliminating a wildfire hazard will also speed the restoration of the road after an earthquake. The effect of mitigation actions carried out is recognized as a synergistic effect.

3.2. Assigning Risk Factors

The HMP Planning Committee assigned risk factors for each hazard profiled through a facilitated jurisdictional focus group meeting. During the group exercise, risk factor (RF) criteria worksheets were used to examine each identified hazard for potential risk. This methodology produces RF numerical values that allow identified hazards to be ranked against one another (the higher the RF value, the greater the hazard risk). Final RF values are obtained by assigning numerical criteria index values to five risk assessment categories. Risk assessment categories include probability, impact, spatial extent, warning time and duration.

To obtain RF's for each hazard, each jurisdictional focus group assigned a numerical range (1-4) to each risk assessment category. Based upon unique concerns for the planning area, a weighing factor was agreed upon for each RF category. The RF weighting scheme is used to establish a higher degree of importance to selected risk assessment categories. To calculate the RF value for a given hazard, the Planning Committee developed the RF weighting scheme below:

RF Value = [(Probability x .30) + (Impact x .30) +
(Spatial Extent x .20) + (Warning Time x .10) + (Duration x .10)]

The sum of all five categories shown in the equation above equals the RF final risk factor values presented in Table 3-2. Table 3-1 provides a summary of the RF criteria the Planning Committee used to assign criteria index values during the first jurisdictional focus group meeting. This RF approach uses hazard data, local knowledge, and consensus opinions to produce numerical values that allow identified hazards to be ranked against one another. The final RF developed can be used to evaluate hazards and classify perceived hazard risk for Napa County and each jurisdiction within Napa County. Risk factors for each jurisdiction are provided in Appendices B-H.

Table 3-1: Risk Factor Criteria

Risk Assessment Category	Degree of Risk	Level	Criteria Index	Weight Value
PROBABILITY **What is the likelihood of a hazard event occurring in a given year?**	**UNLIKELY**	LESS THAN 1% ANNUAL PROBABILITY	1	30%
	POSSIBLE	BETWEEN 1 & 10% ANNUAL PROBABILITY	2	
	LIKELY	BETWEEN 10 &100% ANNUAL PROBABILITY	3	
	HIGHLY LIKELY	100% ANNUAL PROBABILTY	4	
IMPACT **In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?**	**MINOR**	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.	1	30%
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE DAY.	2	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE WEEK.	3	
	CATASTROPHIC	HIGH NUMBER OF DEATHS/INJURIES POSSIBLE. MORE THAN 50% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR 30 DAYS OR MORE.	4	
SPATIAL EXTENT **How large of an area could be impacted by a hazard event? Are impacts localized or regional?**	**NEGLIGIBLE**	LESS THAN 1% OF AREA AFFECTED	1	20%
	SMALL	BETWEEN 1 & 10% OF AREA AFFECTED	2	
	MODERATE	BETWEEN 10 & 50% OF AREA AFFECTED	3	

Risk Assessment Category	Degree of Risk	Level	Criteria Index	Weight Value
	LARGE	BETWEEN 50 & 100% OF AREA AFFECTED	4	
WARNING TIME Is there usually some lead time associated with the hazard event? Have warning measures been implemented?	MORE THAN 24 HRS	SELF DEFINED	1	10%
	12 TO 24 HRS	SELF DEFINED	2	
	6 TO 12 HRS	SELF DEFINED	3	
	LESS THAN 6 HRS	SELF DEFINED	4	
DURATION How long does the hazard event usually last?	LESS THAN 6 HRS	SELF DEFINED	1	10%
	LESS THAN 24 HRS	SELF DEFINED	2	
	LESS THAN 1 WEEK	SELF DEFINED	3	
	MORE THAN 1 WEEK	SELF DEFINED	4	

Table 3-2 displays RF index criteria and weighting determinations from the HMP Planning Committee. Final RF scores determine High, Moderate, or Low risk designations based upon the conclusion index. It should be noted that although some hazards are classified as posing "Low Risk", their occurrence of varying or unprecedented magnitudes is still possible and will continue to be re-evaluated during future updates of this plan. Due to the inherent errors possible in any disaster risk assessment, the results of the risk assessment should only be used for planning purposes and in developing projects to mitigate potential losses.

3.2.1. Hazard Risk Factor

Table 3-2: Napa County Risk Factor Results Table

Rank	Natural Hazards	Probability	Wt.	Impact	Wt.	Spatial Extent	Wt.	Warning Time	Wt.	Duration	Wt.	RF Factor
1	Wildfire	4	1.2	2	0.6	3	0.6	4	0.4	3	0.3	3.1
2	Flooding	2	0.6	2	0.6	4	0.8	4	0.4	4	0.4	2.8
3	Earth-Quake	3	0.9	2	0.6	3	0.6	1	0.1	4	0.4	2.6

Risk Factor Conclusion	
HIGH RISK (3.0 – 4.0)	Wildfire
MODERATE RISK (2.0 – 2.9)	Flooding, Earthquake
LOW RISK (0.1 – 1.9)	

The RF results assist planners to classify risk for each hazard regardless of hazard type. For purposes of this plan the following classifications are used:

Low Risk—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.

Moderate Risk —Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

High Risk—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.

3.3. Flood Hazard

Wildfire Vulnerability Analysis		
Community Vulnerability Rating	2.8	Moderate Risk, Moderate potential impact.

Risk to Napa County citizens and property from flood is of moderate concern, as calculated in the flood hazard risk factor in Table 3-2. The Napa River drainage basin is located just north of San Pablo Bay between the eastern Howell Mountains and the western Mayacamas Mountains. The drainage basin is about 50 miles long on a north-south axis, ranges from five to ten miles in width and covers approximately 426 square miles.

The Napa River originates near Mount St. Helena, traverses the center of the basin, and empties into the Mare Island Strait, which flows into the tidal marshlands and sloughs of San Pablo Bay. The relatively flat lands of the basin are centered about the river and consist of farm valley areas north of the City of Napa and tidal marshlands, reclaimed tidal lands and industrial areas south of the City.

The Napa River is navigable from San Pablo Bay to Third Street in downtown Napa. Tidal waters extend through downtown Napa to Trancas Street, which is the upstream limit of the flood protection project. The river is sinuous throughout its course and has a large oxbow area within the City of Napa. Many residential, business and industrial buildings are located along the Napa River within the city limits.

Napa Creek is a tributary to the Napa River in the City of Napa. Its headwaters rise in the Mayacamas Mountains on the west side of the valley and flow southeasterly to discharge through a narrow, meandering channel into the Napa River in downtown Napa. The Napa Creek drainage area is 14.9 square miles.

A flood occurs when the existing channel of a stream, river, canyon, or other water course cannot contain excess runoff from rainfall or snowmelt, resulting in overflow on to adjacent lands. Flooding may also occur due to high tides and wind.

A 'floodplain' is the area adjacent to a watercourse or other body of water that is subject to recurring floods. Floodplains may change over time due to natural processes, changes in the characteristics of a watershed, or human activity such as construction of bridges or channels.

Nationwide, floods result in more deaths than any other hazard. Physical damage from floods includes the following:

- Inundation of structures, causing water damage to structural elements and contents.
- Erosion or scouring of stream banks, roadway embankments, foundations, footings for bridge piers, and other structures.
- Impact damage to structures. Roads, bridges, culverts, and other features from high velocity flow and from debris carried by flood waters. Such debris may also accumulate on bridge piers and in culverts, increasing loads on these features or causing overtopping or backwater effects.
- Destruction of agriculture, erosion of topsoil, and deposits of debris and sediment on crop lands.
- Release of sewage and hazardous or toxic materials as wastewater treatment plants are inundated, storage tanks are damaged, and pipelines severed.

Floods also cause economic losses through closure of businesses and government facilities; disrupt communications; disrupt the provision of utilities such as water and sewer; result in excessive expenditures for emergency response; and generally disrupt the normal function of a community.

In regions such as Napa County that do not have extended periods of below freezing temperatures or significant snowfall, floods usually occur during the season of highest precipitation or during heavy rainfalls after prolonged dry periods. Napa County is dry during the late spring, summer, and early fall and receives most of its rain during the winter months. The average annual precipitation in Napa County is 24.84 inches per year with most of this precipitation occurring in the winter months. The peak historic rainfall intensity recorded in Napa County occurred in 1983 with 51.29 inches and the driest year was 1939 with 10.37 inches. The most rainfall in one month was 16.13 inches in 1955 when major flooding occurred in the area. The most rainfall in 24 hours was 5.95 inches on November 21, 1977. Although snow is rare 1.0 inch fell in March 22, 1987.

For purposes of conducting a risk assessment at a given location, it is necessary to determine the likelihood of flooding in specific locations. Factors contributing to the frequency and severity of riverine flooding include the following:

- Rainfall intensity and duration
- Antecedent moisture conditions
- Watershed conditions, including steepness of terrain, soil types, amount and type of vegetation, and density of development
- The existence of attenuating features in the watershed, including natural features such as swamps and lakes and human built features such as dams.
- The existence of flood control features, such as levees and flood control channels.
- Velocity of flow

These factors are evaluated using a hydrologic analysis to determine the probability that a discharge of a certain size will occur; and a hydraulic analysis to determine the characteristics and depth of the flood that results from that discharge.

The magnitude of flood used as the standard for floodplain management in the United States is a flood having the probability of occurrence of one percent in any given year. This flood is also known as the 100 year flood or base flood. The most readily available source of information regarding the 100 year flood is the system of Flood Insurance Rate Maps (FIRMs) prepared by FEMA. These maps are used to support unincorporated areas of Napa County and for each incorporated city and town in the county. The FIRMs show 100 year flood plain boundaries for most flooding sources in the county. The FIRMs also show floodplain boundaries for the 500 year flood, which is the flood having a 0.2 percent chance of occurrence in any given year. Rivers and streams where FEMA has prepared detailed engineering studies may also have designated floodways. A designated floodway is the channel of a watercourse and portion of the adjacent floodplain that is needed to convey the base or 100 year flood event without increasing flood levels by more than one foot and without increasing velocities of flood water.

Figure 2-15 shows the 100 year and the 500 year floodplains for flooding sources throughout Napa County. Additional flood maps are located in Appendix A and are based on flood hazard data obtained from the FIRMs, awareness maps, and 100 year flood data prepared by the Napa County Flood Control District.

The extent of floodplains in Napa County is greatly affected by structures built to control flooding. These structures have been built throughout the populated west side of the county and are operated and maintained by a number of agencies. A major flood control project on the Napa River and its tributaries is described in this section on pages 27-29. A number of levees have been built along the Napa River to protect agricultural lands and populated parts of the county and to withstand a 100 year flood event.

Napa County and all the incorporated cities within the county have all adopted Floodplain Management ordinances consistent with the National Flood Insurance Program (NFIP) and remain current in amending and updating their local codes to remain compliant with the NFIP. These ordinances are intended to protect the NFIP from costly claims. This minimizes the risk and danger to the safety and welfare of the public due to flooding events.

3.3.1. Flood History

Almost all of the land adjacent to the Napa River is subject to flooding. Numerous damaging floods have been recorded since 1862 on the Napa River. Seven major floods occurred between 1862 and 1900. The 15 most recent serious floods occurred in 1942, 1943, 1955, 1962, 1963, 1965, 1967, 1973, 1978, 1982, 1983, 1986, 1995, 1997, 1998 and 2005.

The February 1986 flood was estimated to have been a 35-year event. The flood resulted in three people dead, 27 injured, 5,000 evacuations, 250 homes destroyed, and another 2,500 residences damaged countywide, totaling $100 million in damages. The most recent flooding occurred in December 2005.

The flood threat to each of our communities is illustrated by the following series of maps. Since flooding routinely develops from north to south, the maps are presented in that order.

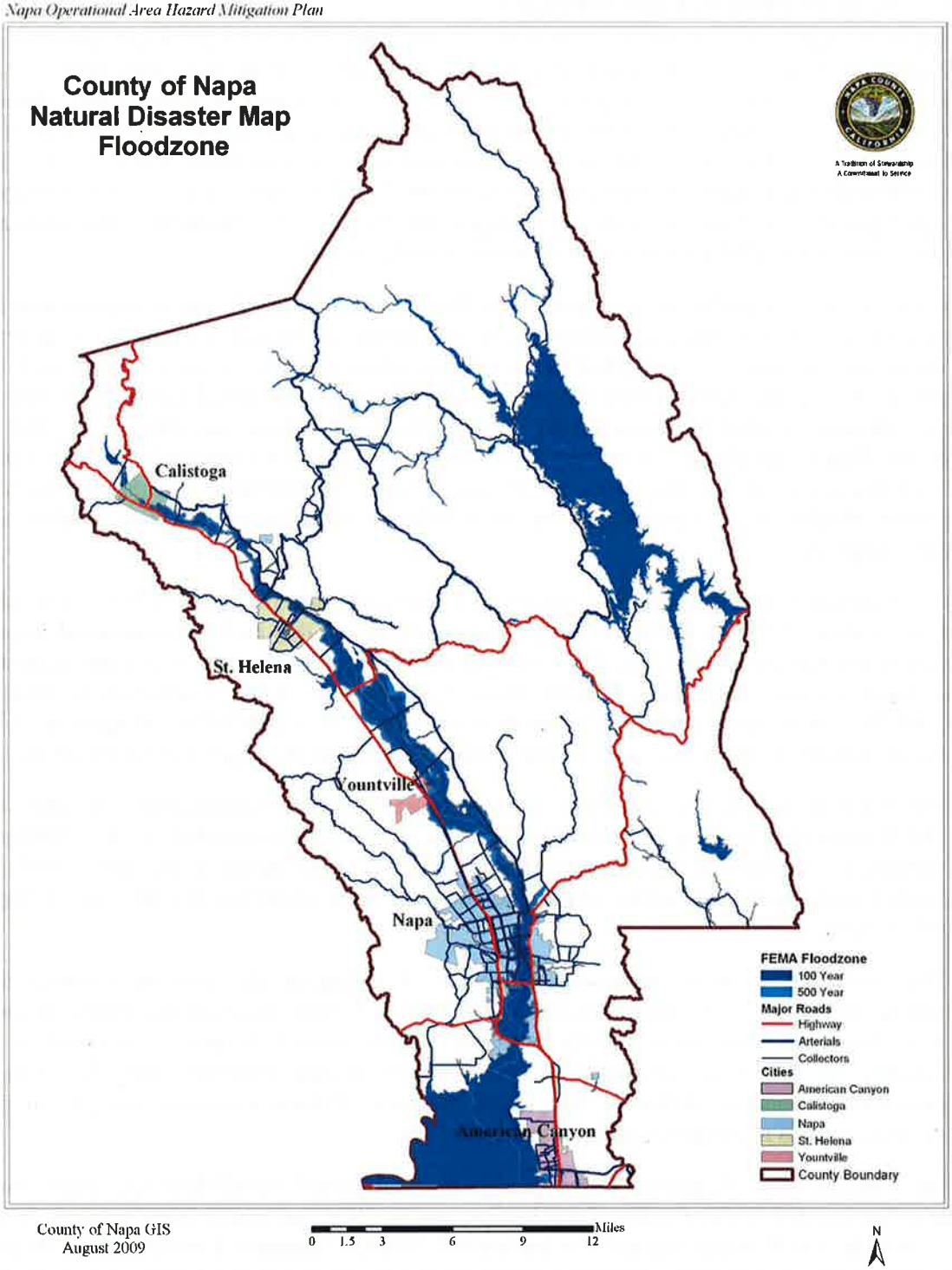

Figure 3-1: Napa County Flood Zone Map

3.3.2. Napa River Flood Control Project

The Federal Government first became involved with the Napa River in 1938 when "preliminary examinations and surveys" were authorized by the Secretary of War. Six years later, House Document 626 of the 78th Congress was released. The report recommended channel improvements for reaches of the Napa River and Conn Creek, and construction of a dam to create a 37,000 acre-foot flood damage reduction and water conservation reservoir on Conn Creek. Although these features were authorized by the Flood Control Act of 1944, Congress never appropriated construction funds. So, during 1948, the City of Napa built a dam on Conn Creek to establish a 31,000 acre-foot water conservation reservoir.

The flood of 1955 compelled the Committee on Public Works of the House of Representatives to request the Board of Rivers and Harbors "to review reports on Napa River and its tributaries" and "determine the need for modification of the recommendations in such reports and the advisability of adopting further improvements for flood control and allied purposes in view of the heavy damages caused by recent floods." The committee's request was fulfilled in 1963 by the "Review Report for Flood Control and Allied Purposes" which recommends that previously authorized flood control improvements above Soscol Street be rescinded and that the Federal Government should "adopt a project in the basin below Trancas Street for flood control and recreation purposes."

Three years passed before funding for "Advanced Engineering and Design (1967) was provided and in September of 1975 a General Design Memorandum (GDM) and Environmental Impact Statement (EIS) was completed. The 1975 Plan included recreation features that were requested by the local sponsor, the Napa County Flood Control and Water Conservation District (NCFCWCD). Voters opposed the 1975 Plan by referendum election in 1976 and again in 1977. After its second defeat, the project was placed in inactive status at the request of NCFCWCD.

The 1986 flood revived public interest in flood damage reduction. Subsequently, in 1987, the NCFCWCD requested the project be reactivated. The project was reactivated in Oct. 1988 and Preconstruction, Engineering and Design (PED) activities were initiated. In April 1995 the Sacramento District submitted a plan to provide 100-year flood protection for the City of Napa, California for public review.

This Plan followed a more traditional approach of enlarging the existing channel and constraining the river to its main channel. The proposed Plan received numerous adverse comments. Major concerns were salinity intrusion due to channel deepening, degradation of water quality in the river, disposal of contaminated dredge material, and the general environmentally insensitive nature of the project. Because of these concerns, many local and environmental groups requested modifications to the Plan.

The San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), which must provide a Section 401 Water Quality Certification, stated, "Without major improvements in the project and the Draft Supplemental Environmental Impact Statement/Environmental Impact Report (SEIS/EIR) as currently submitted, approval of this project will be difficult." With this reaction, the local sponsor did not believe they could get sufficient community support to provide the local financing. It appeared as if the Napa River Project could not be implemented.

To foster community consensus and support for a flood protection plan, NCFCWCD initiated a community-wide coalition process. Its purpose was to consider various ways to modify the plan initially proposed so it would be more acceptable to the community and resource agencies. The Community Coalition, with the assistance of outside consultants, resource agency personnel, and the Corps of Engineers Napa Project Delivery Team (PDT) held numerous meetings from January 1996 to May 1997 to develop modifications to the Plan that would bring broader acceptance.

During this collaborative process, many meetings were held and much information was prepared and presented for consideration by community stakeholders. These meetings addressed the engineering, environmental and economic aspects of the Napa River Project. The process started with distrust of the Corps of Engineers; however, through open and honest communication with all stakeholders this distrust was alleviated. The PDT was open to all suggestions and the mission became to better understand what the stakeholders wanted in this project. A "living river" concept was developed. This would be a river system with structure, function, and diversity. It would have physical, chemical, and biological components that function together to produce complex, diverse communities of plants, and animals.

To support such a concept, some environmental restoration would need to be integrated into the project. However the Corps was working with an old authorization (1964) that did not include environmental restoration as a purpose. It became a requirement to design a project that stayed within the original authorization yet could still meet this additional requirement. Working with other professionals both within and outside the Corps, the PDT successfully developed such a design. River conveyance was increased by excavating in the overbank and leaving the existing river intact. This channel modification design was guided by an understanding of the geomorphic fluvial and estuarine processes forming the channel in this tidal reach. This approach also provided a structure for the restoration of tidal wetlands, previously destroyed in this estuary system. All stakeholders were in support of this design.

The result of this collaborative process was a modified Plan that provided the desired flood protection, eliminated the environmental concerns associated with the previously developed Plan, and also provided significant associated environmental quality outputs. The revised Plan underwent public and policy review in 1998. The Plan has received much media attention and has been touted as the new approach to flood protection. NCFCWCD held a local election in 1998 to increase the County sales tax to provide their portion of the financing. The PDT assisted in providing informational material about the project and meeting with interested groups during the election campaign. The ballot measure was named 'Measure 'A'. This 'Measure 'A' vote was successful in March 1998 and another major hurdle was overcome. The Project Cooperation Agreement (PCA) for the Napa River/Napa Creek Flood Protection Project was signed in February 2000 with the Federal Government and the first construction contract was awarded in July 2000.

As of 2010, construction of the Project is approximately 50% complete. Funding for construction is through annual federal appropriations to the Corps and 'Measure 'A' funds. The schedule for completion, which is currently projected to be 2016 relies on sufficient federal appropriations each year.

The Flood District has spent a total of $192 million on the project through the end of last fiscal year. The Army Corps has allocated approximately $180 million including the ARRA funding.

Two major construction efforts are underway on the Flood Project--specifically the Napa Creek Project and the Rail Bridge Relocation. The Project has lowered dikes creating over 900 acres of wetland in the South Wetlands Opportunity Area. Almost four miles of overbank excavation has been completed in the southern reach creating tidal marsh plains and floodplain terraces to increase the channel's flood carrying capacity.

Also, at the southern end, dikes and levees have been constructed, 236,000 tons of contaminated soil was removed, and over two miles of recreation trails were created. In 2008, the award-winning Hatt to First floodwall project in the downtown area was completed. The Flood Project has also constructed four roadway bridges and two pedestrian bridges and accomplished many utility relocations. The final phases of the Project will include the Oxbow/Bypass excavation and the construction of floodwalls and pump stations.

3.3.3. Napa County Small Stream Flood Threat

Although the Napa River is the main drainage for the surrounding watershed, and the Napa River/Napa Creek Flood Protection Project when completed will prevent catastrophic flooding along the river's banks, there remains a significant threat of flooding along the many feeder streams in the Napa River watershed.

Garnett Creek is the uncontrolled headwaters of the Napa River in the northwest end of the valley, numerous low-lying properties and two bridges are subject to damage along its length. On the west side of the watershed, Sulphur Creek, Dry Creek, Hopper Creek, Redwood Creek, Napa Creek and Browns Valley Creek all contribute substantial runoff to the Napa River drainage during the wet season. All these creeks bisect developed area and are crossed by late 19th and early 20th century bridges with low approaches and low stream clearance.

On the east side Conn Creek, which is fed by the spillway at Conn Dam when Lake Hennessey is at full capacity, Rector Creek, and Milliken Creek all have the same characteristics. The desirability of creek side real estate as a residential location has moved residents into the high water zones of all these creeks. Historic land use polices of development in Napa County did little to preclude development in these areas and even today control of the riparian corridors by government is still very controversial, as witnessed by the recent extreme public opposition exhibited against our proposed Stream Setback Ordinance.

Mitigation can lessen the threat to these residents and local infrastructure. The areas of greatest efficacy would be in improving bridge approaches, elevating homes in the floodplain, vegetation and streambed management and land use practices.

3.3.4. Probability of Future Flooding

Napa County will experience local flooding in future years. During the months of November through April winter storms saturate soils. Napa County experiences 'Atmospheric River Storms' that can deliver over 1" rain per hour over extended time frames. That event produces local tributary streams and the Napa River flooding. The '100 Year Flood' is calculated to be the level of flood water expected to be equaled or exceeded every 100 years on. The term is used to describe an event that has a 1-in-100 chance of happening in any given year. When you do the

math, there is a 65% chance that there will be a "100-year flood" in 100 years. Likewise, a "50-year flood" has a 2% chance of happening in any given year, and there's a 4% chance of a "25-year flood" every year. Keep in mind that calculations are based on less than a hundred years of flood records. The Napa River Flood Project is being constructed to protect the community from this 100-year event, which would be a larger flood than the 19686, 1195, or the 2005 flood events.

3.3.5. Vulnerability Assessment of Structures, Infrastructure, & Critical Facilities

The threat of damage to structures from flooding has been in reduced due to completion and near completion of flood projects in St. Helena, Yountville, and Napa. There is no threat of structure damage due to flooding in Calistoga & American Canyon.

The Yountville flood wall was completed in 2006 and has eliminated the flood threat to 250 homes. The St. Helena Flood Project is complete and offers flood protection to 200 mobile homes, and the Napa Flood project has the Oxbow channel near completion.

No critical facilities are located in designated flood areas. All infrastructures (roads, utilities) are installed to minimize flood damage. Any new structures & infrastructure built in the flood plain must meet Napa County Building Standards & Flood Mitigation measures and are built to the 2010 Uniform Building Code.

3.3.6. Repetitive Flood Loss

Napa County is required to assemble a plan that addresses areas of repetitive loss (RL) claims as prescribed by the FEMA's National Flood Insurance Program (NFIP) and Hazard Mitigation Program. A RL property is a FEMA designation defined as an insured property that has made two or more claims of more than $1,000 in any rolling 10-year period since 1978. The term "rolling 10-year period" means that a claim of $1,000 can be made in 1991 and another claim for $2,500 in 2000; or one claim in 2001 and another in 2007, as long as both qualifying claims happen within 10 years of each other. Claims must be at least 10 days apart but within 10 years of each other. RL properties may be classified as a Severe Repetitive Loss property under certain conditions. A Severe Repetitive Loss property (SRL) has had four or more claims of at least $5,000, or at least two claims that cumulatively exceed the buildings reported value. A property that sustains repetitive flooding may or may not be on Napa County's RL property list 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 Napa County;
- 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;
- The owner of a flooded property that does carry flood insurance may choose not to file a claim;
- Even insured properties that are flooded regularly with filed claims may not meet the $1,000 minimum threshold to be recognized as an RL property; or

- The owner adopted mitigation measures that reduce the impact of flooding on the structure, removing it from the RL threat and the RL list (in accordance with FEMA's mitigation reporting requirements).

Many jurisdictions are required to address only the individual properties on the updated FEMA RL list. A property appears on FEMA's RL inventory because the structure had flood insurance and received two or more claims. These properties are merely representative of the community's overall repetitive flooding problem.

Extensive FEMA NFIP databases are used to track claims for every participating community. Currently, Napa County contains a total of 122 RL properties under their jurisdictional umbrella. The total dollar amount of claims paid to date by the NFIP is $8,799,352 of structural and $2,632,231 content claims. Together, the total claims paid by the NFIP are in excess of $11,431,583 for Napa County since 1977. This includes claims within Napa County jurisdictions (City of Napa, City of St. Helena and Town of Yountville), as well as claims within the unincorporated area of the County. Although the City of Calistoga has had several NFIP claims in the past, none of the claims have been reported to be on the same property and therefore are not recorded in the RL property database.

In order to make the NFIP a viable program it works to reduce the flood risk in the community and develop mitigation measures to reduce insurance payouts. 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 Napa County'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.

This section will provide an overview of the jurisdictions in Napa County that have experienced repetitive loss due to flooding.

3.3.6.1. *Unincorporated Napa County*

FEMA has reported 43 RL properties in the unincorporated area of Napa County, of which there have been 137 loss payments issued since 1977. The RL properties account for a total of $3,792,876 in damages, of which $3,109,001 are related to building damage and $683,875 are related to content damage.

Total RL Properties	Total Number of Property Loss Payments	Building Loss Payments	Contents Loss Payments	Total Paid	Average Payment Per Incident
43	137	$3,109,001	$683,875	$3,792,876	$27,685

3.3.6.2. *City of Napa*

FEMA has reported 72 RL properties in the City of Napa, of which 214 loss payments have been issued since 1977. The RL properties account for a total of $7,128,624 in damages, of which $5,339,562 are related to building damage and $1,789,062 are related to content damage.

Total RL Properties	Total Number of Property Loss Payments	Building Loss Payments	Contents Loss Payments	Total Paid	Average Payment Per Incident
72	214	$5,339,562	$1,789,062	$7,128,624	$33,311

3.3.6.3. *City of St. Helena*

FEMA has reported four RL properties in the City of St. Helena, of which 11 loss payments have been issued since 1977. The RL properties account for a total of $472,416 in damages, of which $313,122 are related to building damage and $159,294 are related to content damage.

Total RL Properties	Total Number of Property Loss Payments	Building Loss Payments	Contents Loss Payments	Total Paid	Average Payment Per Incident
4	11	$313,122	$159,294	$472,416	$42,946

3.3.6.4. *Town of Yountville*

FEMA has reported three RL properties in the Town of Yountville, of which six loss payments have been issued since 1977. The RL properties account for a total of $37,666 in damages, of which all $37,666 have been related to building damage.

Total RL Properties	Total Number of Property Loss Payments	Building Loss Payments	Contents Loss Payments	Total Paid	Average Payment Per Incident
3	6	$37,666	$0	$37,666	$6,277

3.4. Earthquake Hazard

Wildfire Vulnerability Analysis		
Community Vulnerability Rating	2.6	Moderate Risk, Moderate potential impact.

Earthquakes are considered to be one of the most potentially destructive threats to life and property in Napa County. A moderate to severe seismic incident on any of several fault zones in relative close proximity to the County is expected to cause:

- Extensive property damage, particularly to pre-1930's unreinforced masonry structures
- Significant numbers of fatalities and injuries
- Damage to water and sewage systems
- Disruption of communications systems
- Broken gas mains and petroleum pipelines, resulting in numerous fires
- Disruption of transportation arteries
- Competing requests for scarce mutual aid response resources

Major faults that directly affect Napa County include the Northern San Andreas, the Rodgers Creek, the Northern Hayward, the Concord Green Valley and the West Napa Fault. Additionally most of Napa County's resources and population are on the Napa Valley floor. The valley floor consists of alluvial soils that enhance and amplify the shaking from earthquakes.

3.4.1. Earthquake Loss Estimation Modeling

As part of its efforts to mitigate hazards and protect lives and property from the devastating effects of natural disasters, FEMA provides individuals, businesses, and communities with information and tools to work proactively to mitigate hazards and prevent losses resulting from disasters. One of these tools is HAZUS or Hazards U.S., a natural hazard loss estimation methodology developed by FEMA under contract with the National Institute of Building Sciences.

Using Geographic Information Systems (GIS) technology, HAZUS allows users to compute estimates of damage and losses that could result from an earthquake. To support FEMA's mitigation and emergency preparedness efforts, HAZUS is being expanded into HAZUS-MH , a multi-hazard methodology with new modules for estimating potential losses from wind and flood (riverine and coastal) hazards.

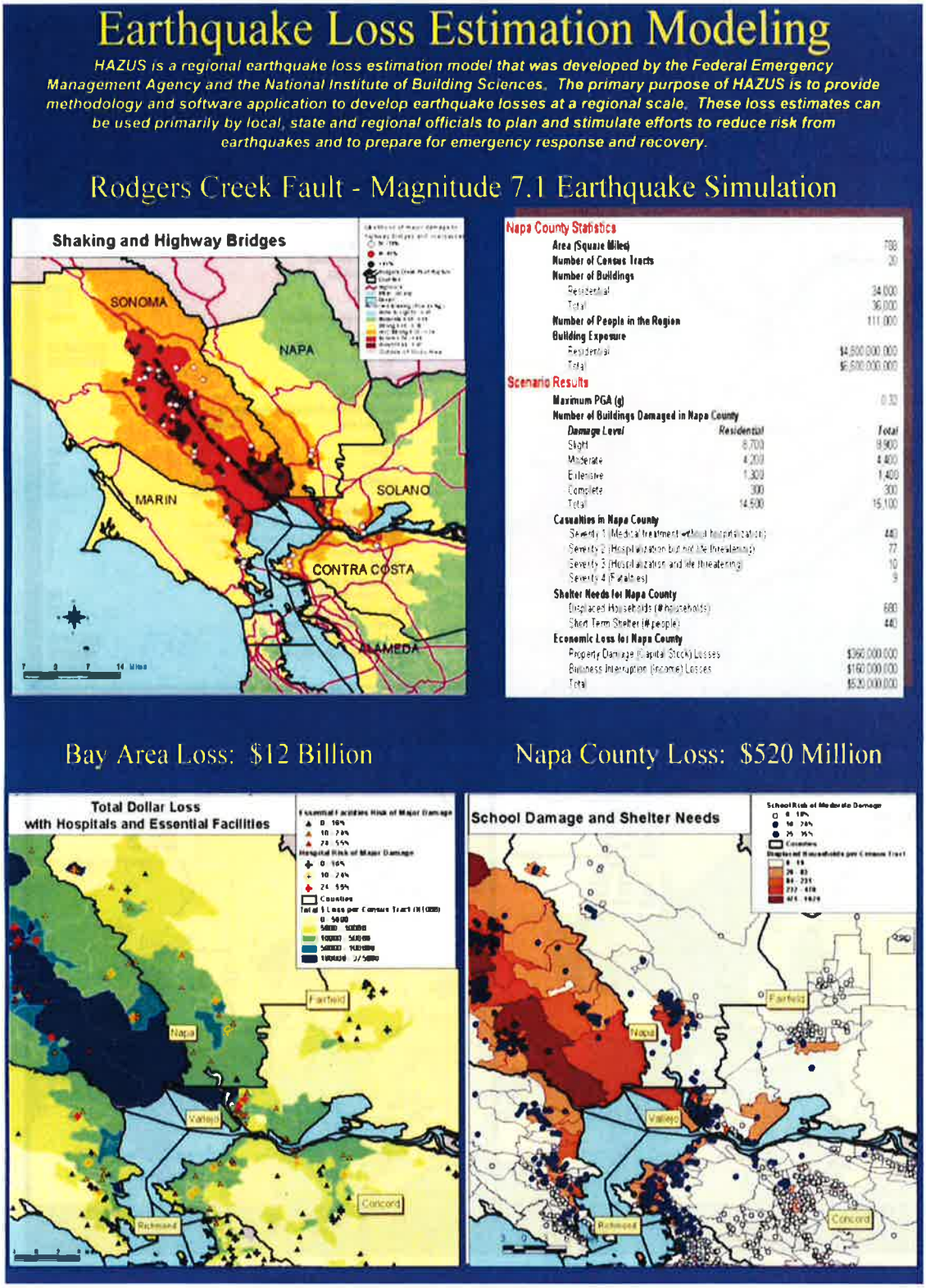

Figure 3-2: HAZUS Modeling Rodgers Creek Fault

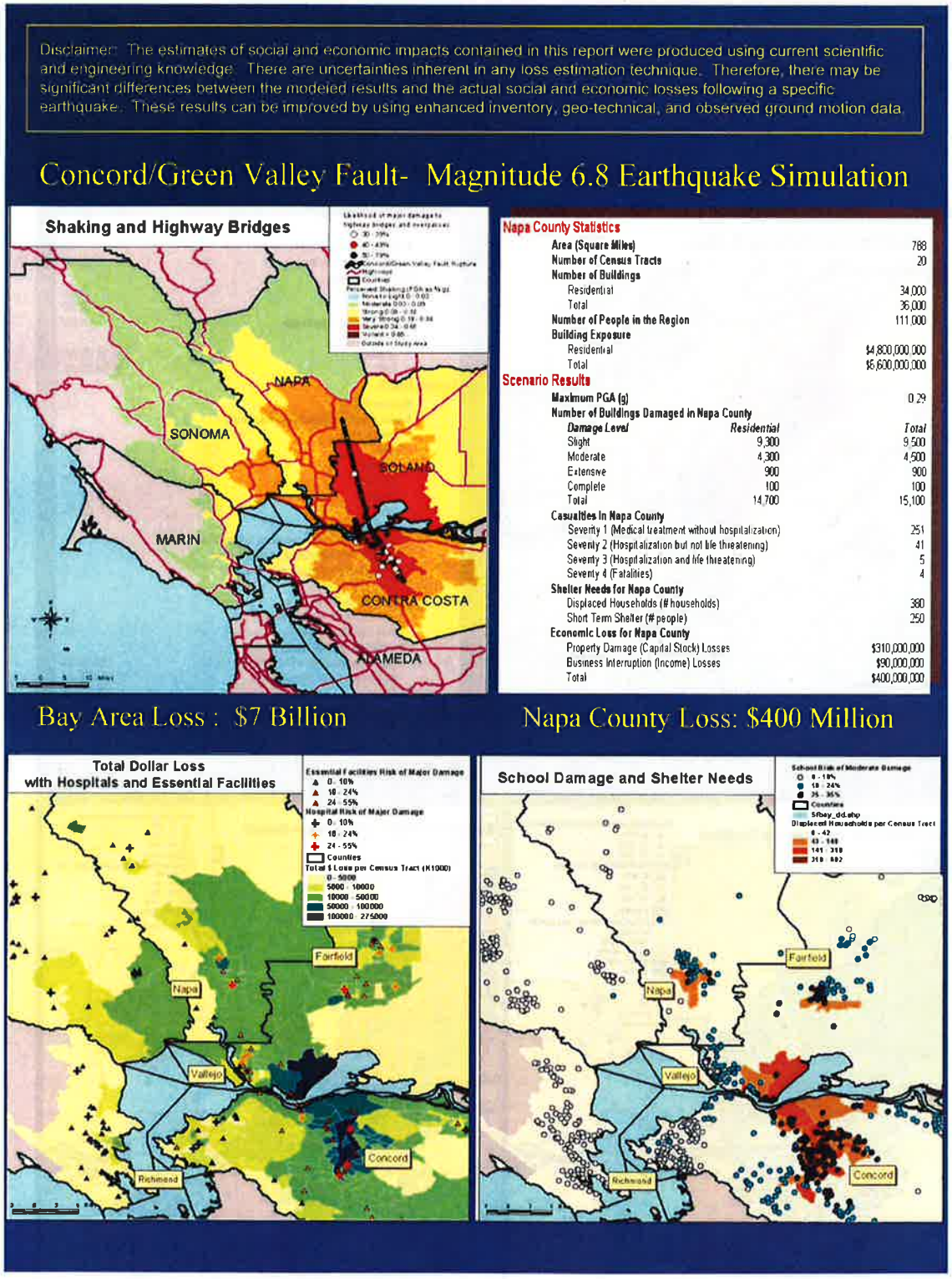

Figure 3-3: HAZUS Modeling Concord/Green Valley Fault

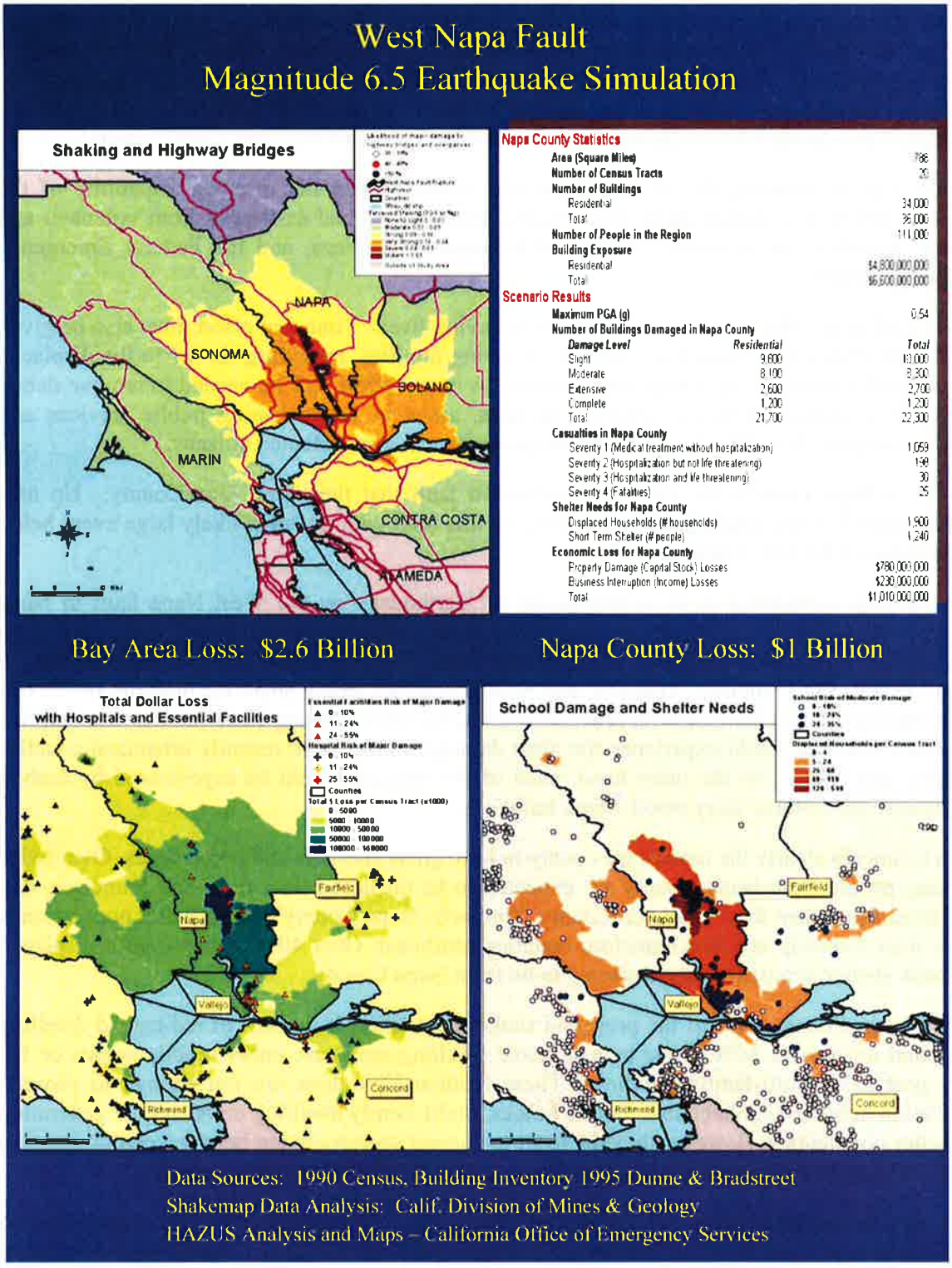

Figure 3-4 HAZUS Modeling West Napa Fault

As the preceding studies demonstrate even a "moderate" earthquake occurring in or near this area could result in deaths, casualties, property and environmental damage, and disruption of normal government and community services and activities. The effects could be aggravated by collateral emergencies such as fires, flooding, hazardous material spills, utility disruptions, landslides, transportation emergencies and the possible failure of the Napa County dams.

In this type of disaster, the community needs would exceed the response capability of the County's emergency management organization, requiring mutual assistance from volunteer and private agencies, the Governor's Office of Emergency Services, and the Federal Emergency Support Functions.

In any earthquake, the primary consideration is saving lives. Time and effort must also be given to providing for people's mental health by reuniting families, providing shelter to the displaced persons and restoring basic needs and services. A major effort will be needed to remove debris and clear roadways, demolish unsafe structures, assist in reestablishing public services and utilities and provide continuing care and temporary housing for affected citizens.

The West Napa Fault is the most serious known fault that threatens Napa County. Up to a Richter scale 7.0 magnitude quake is possible on this fault with the most likely large event being in the range of Richter magnitude 6.7.

This scenario earthquake is for a magnitude 6.7 earthquake on the West Napa fault in Napa County. An event along the West Napa fault would cause the most severe damage in Napa County. Out of the total Bay Area uninhabitable units of 9,652, almost half (43%) would be in Napa County. San Francisco, Alameda, and Solano counties would share the majority of the rest of the damage. As is the case with previous events, the older housing stock in Alameda and San Francisco counties would experience the most damage. In the more recently urbanized counties of Napa and Solano, on the other hand, most of the damage would be experienced by mobile homes and one-to-three story wood-frame buildings.

Napa County is clearly the hardest hit county in both gross numbers and percentages. Over twice as many people from Napa County are expected to be displaced than from San Francisco, and over three times than from Alameda County. Similarly, Napa County's peak shelter population is larger than Alameda and San Francisco counties combined. Over 40% of this event's displaced and peak shelter populations are expected to be from Napa County.

Within Napa County, 79% of the projected shelter population is a result of red-tagged dwelling units, and most (over 80% of the uninhabitable dwelling units) are either mobile homes or 1-3 story post-1939 multi-family buildings. These relationships alone are not enough to prove a correlation between uninhabitable mobile homes, multi-family dwelling units and the generation of shelter populations. However they do seem to suggest an association between certain housing types and the probability of going to a shelter in the event of a major earthquake."

After any earthquake there will be a loss of income. Individuals can lose wages due to businesses inability to function because of damaged goods or facilities. Due to business losses, the County of Napa and the cities in the Napa Operational Area will lose revenue. Economic recovery from even a minor earthquake is critical to these communities.

The Rodgers Creek fault is believed to be a northern continuation of the Hayward Fault. It begins under San Pablo Bay directly south of Napa County, travels toward Sears Point, under the hills to Sonoma Mountain then North to the vicinity of Windsor. The West Napa Fault begins under San Pablo Bay and travels north up the West Side of the Napa Valley to the vicinity of Yountville. The Green Valley Fault is a northern extension of the Concord fault and cuts through the southeast side of Napa County. We are in near proximity of several other major faults including the San Andreas, Hayward, Mayacamas and Mt Diablo Fault. The combined probability of a major quake on one of these major faults exceeds 70% over the next thirty years.

The County's Office of Emergency Services has identified the potential hazard areas within Napa County if a major earthquake should occur. These potential hazard areas are identified on the Napa County Major Hazards Maps. For the modeled future earthquake hazards, HAZUS results show potential losses from damage to building stock and business interruption alone range from approximately $400 million dollars for the Concord-Green Valley Fault, magnitude 6.8 running just east of Napa County and $500 million for the Rodgers Creek magnitude 7.1 earthquake, running 10 miles west of Napa County. The West Napa Fault earthquake, magnitude 6.5, running along the floor of the Napa Valley, would cause the most damaging earthquake. The West Napa Fault has never moved in historic times but does show evidence of active movement sometime during the last 11,000 years.

It is important to note that these same earthquakes will have an economic impact well beyond the boundaries of Napa County. For example, the Rodgers Creek earthquake HAZUS simulation estimated a total damage picture of $12 billion. The Concord-Green Valley earthquake totals $7 billion, while the West Napa earthquake totals $2.6 billion

3.4.2. GIS Maps and HAZUS

In addition to using HAZUS for the descriptive earthquake scenarios in this Plan, the Napa County GIS Department has developed a series of data maps demonstrating hazards and the location critical facilities in relationship to these hazards. This graphically illustrates the concentration of assets versus the various included threats. Since useable flat and buildable land in Napa County is primarily on the valley floor, the threat of flooding and loss from ground shaking is exasperated.

3.4.3. Summary of Expected Damage

There are four hospitals located within Napa County: Queen of the Valley is located the City of Napa; St Helena Hospital is located in the unincorporated town of Angwin; Napa State Hospital (including a facility for the criminally insane) is located within the city of Napa; and the State Veterans Home's Holderman Hospital is located in town of Yountville. Approximately half of the beds could be lost during a major earthquake due to the age and construction type of each of the hospitals. Smaller private medical facilities such as the Kaiser Clinic serve the public and augment the ability of our hospitals to care for their client populations.

Telephone systems will be affected by system failure, overloads, loss of electrical power and possible failure of some alternate power systems. Immediately following an event, numerous failures will occur, compounded by system use overloads. This will likely disable up to 80% of the telephone system for one day. County UHF/VHF and microwave radio systems are expected

to operate at 40% effectiveness the first 12 hours following an earthquake increase to 50% for the second 12 hours then begin to slowly decline to approximately 40% within 36 hours. Microwaves systems will likely be 30% or less effective following a major earthquake.

Damage to natural gas facilities serving the Napa communities will consist primarily of isolated breaks in major transmission lines. Breaks in mains and individual service connections within the distribution system will be significant, particularly near the fault zones, especially in the cities of American Canyon and Napa. These many leaks pose a fire threat in these susceptible areas of intense ground shaking and/or poor ground near the shoreline. Breaks in the system will affect large portions of the County and restoration of natural gas service could be significantly delayed.

Water availability and distribution for supporting life, and treating the sick and the injured are of major concern to the County of Napa. It is expected that the primary water source, Lake Hennessey, may be inaccessible due to damage to the pipelines that distribute potable water. However, Napa is also connected to the State Water project at Jameson Canyon and has a tertiary source in Milliken Dam Water treatment facility. Any one of these three facilities remaining in operation is able to supply the emergency potable water needs to the City of Napa and its immediately contiguous County areas, if the distribution system can be repaired.

There are three water reservoirs within the City of Napa that have all been recently retrograded and covered, and one reservoir in the City of St Helena. If the reservoirs and water tanks remain intact, they will likely provide ample potable water to meet demands during the time the water treatment stations are being repaired.

The three reservoirs in Napa are on solid ground and are expected to be usable after a major earthquake. However, the other cities' water tank survivability is low. Therefore, potable water will most likely have to be supplied in these area communities.

Significant damage is expected on the road system. State Highway 12 is expected to be impassable from Cordelia to the Highway 29 Intersection. Interstate 80 could suffer severe surface distortion in the Fairfield and Vacaville areas, as well as damage to its numerous bridges and viaducts in the greater Bay Area. Highway 128 is subject to landslides both up valley toward Geyserville and in the hills around Lake Berryessa. Highway 29 leaving the County to the north is subject to landslides and debris flows to the south it crosses over old bay mud and fills areas and is subject to liquefaction and surface distortion. Any combination of failures of these main highways could isolate the County for up to 72 hours with complete road restoration taking perhaps several weeks. Vehicular traffic will be limited on the foothill roads due to potential and actual landslides.

Soil liquefaction problems could cause the closure of several roads in American Canyon and areas of other cities built on unconsolidated river soils.

3.4.4. Vulnerability Assessment of Structures, Infrastructure, & Critical Facilities

The threat of damage to structures from earthquakes has been greatly reduced due to each Napa County jurisdictions adoption of Seismic Retrofit Ordinance and 2010 California Uniform Building & Fire Codes. Critical facilities that have been constructed in the past 15 years are seismically safe. An evaluation of critical facilities built prior to 1989 was completed and those

facilities have been eliminated from the critical facility inventory. All infrastructures (roads, utilities) are installed to minimize earthquake damage.

3.4.5. Probability of Future Earthquakes

The USGS, the California Office of Emergency Services, the California Geological Survey, and the Association of Bay Area Governments jointly conducted a loss estimation study focused on the ten most likely damaging earthquakes forecast for the Bay Region by the Working Group. These earthquakes occur on six of the seven major fault systems in the Bay Area. The report rates the Rogers Creek Fault a high of 15.2% for a M7.0 rupture over 30-year probability.

3.5. Fire Hazard - Wildland Urban Interface

Wildfire Vulnerability Analysis		
Community Vulnerability Rating	3.1	High Risk, Widespread potential impact.

The County's vulnerability rating for wildfires in the wildland/urban interface presents the highest and most widespread potential impact to the County. The term "wildland/urban interface" was coined in 1976 by California Department of Forestry and Fire Protection (CDF) to identify the condition where highly flammable native vegetation meets high value structures, primarily residences. In most cases, there is not a clearly defined boundary or interface between the structures and vegetation that present the hazard. Historically, residences in these ill-defined wildland/urban intermix boundary areas were particularly vulnerable to wildfires because they were constructed with a reliance on fire department response for protection rather than fire resistance, survivability and self-protection. However, in the recent past, there has developed a greater appreciation for the need to regulate development in these hazardous areas as a result of a number of serious statewide wildland fire conflagrations.

When a wildfire ignites in a high-risk wildland interface area, the priority is life and property protection. Historically, CDF forces began their attack from the most advantageous topographical or physical location, and surrounded the fire perimeter. Now, with hundreds or even thousands of structures inside the fire perimeter, the CDF's initial and extended resources are forced to divert to individual structure protection. This causes wildfire control to become secondary to protecting lives and property, thus allowing wildfires to spread unchecked, threatening and destroying more houses and natural resources.

The major wildland fire hazard risks for residential development are in the County's hilly areas characterized by steep slopes, poor fire suppression delivery access, inadequate water supply and highly flammable vegetation.

The severity of the wildland fire hazard is determined by the relationship between three factors: fuel classification, topographic slope, and critical fire weather frequency. The box at right lists fuel classifications; Napa's Fire Hazard Areas generally fall into the Medium Fuel category. Critical fire weather conditions occur in periods of relative low humidity, high heat and high winds. The Napa area typically has critical fire weather from two to seven days annually. Fuel, slope, and weather conditions combine to give Napa urban wildland interface areas and overall "High" hazard rating based on the Federal Emergency Management Agency's Urban Wildland Interface Code: 2000.

3.5.1. Fire Hazard Severity

Fuel Classification	Critical Fire Weather Frequency								
	< 1 Day/Year			2 to 7 Days/Year			> 8 Days/Year		
	Slope (%)			Slope (%)			Slope (%)		
	< 40	41 – 60	> 61	< 40	41 – 60	> 61	< 40	41 – 60	> 61
Light Fuel	M	M	M	M	M	M	M	M	H
Medium Fuel	M	M	H	H	H	H	E	E	E
Heavy Fuel	H	H	H	H	E	E	E	E	E

3.5.2. Wildland Interface Fire History

Napa County has a rich wildfire history; in the last thirty years the combination of firefighting technology and tactics, environmental restraints and developmental trends has led to increasing fuel loads, greater occupancy of high threat areas and greater potential for catastrophic wildfire. In the last thirty years Napa County wildfires have burnt 232,000 acres of land in Napa County a county of approximately 482,000 acres! There are four major factors that contribute to this history:

1. Extreme vegetation diversity
2. Diverse fire weather and fire behavior
3. Dynamic fire history
4. Complex land use patterns

A.1 Fuel Classifications

Heavy fuel – vegetation consisting of round wood 3 to 8 inches in diameter

Medium fuel – vegetation consisting of round wood 1/3 to 3 inches in diameter

Light Fuel – vegetation consisting or herbaceous plants and round wood less than ¼ inch in diameter.

To a greater or lesser degree all the proposed mitigation actions in this Plan in the wildfire portion attempt to address strategies for dealing with these interrelated factors. Figure 3-5 identifies the fire severity zones within Napa County. Additional wildfire maps in Appendix A summarize our historical fire experience.

3.5.3. Vulnerability Assessment of Structures, Infrastructure, & Critical Facilities

The threat of wildfire damage to structures has been in reduced due to adoption of the 2010 Uniform Fire Code, the Firewise program, and the Fuel Reduction (Chipping Program). There have only been two homes lost by fire in the last 10 years in Napa County. Wildfire threat to power lines is being mitigated by an aggressive line clearing program by PG&E. All critical facilities are located on the valley floor and not threatened by a wildland urban interface fire.

3.5.4. Probability of Wildland Fire

Napa County faces a wildland fire threat each and every year. In 2010 Ernie Loveless, Chief, CAL FIRE Napa-Lake-Sonoma Unit stated: "We must be honest with ourselves. Wildland fires are part of our history and will certainly be part of our future. Being prepared is critical." The wildland fire risk in Napa County can be attributed to two factors. The first is ignition sources and the second fuel loading. Mitigation measures must address reducing the fuel ignition sources, such as juveniles playing with matches, lighters or fireworks in the open vegetation areas, educating the public on better abatement procedures when using mechanical equipment, and proper disposal of cigarettes.

The second is reducing the immediate fuel load surrounding residences in the Urban Interface and Rural areas of Napa County. The Firewise Chipping Program is available free of charge to county residents. This program has had a major impact in fuel reduction each year.

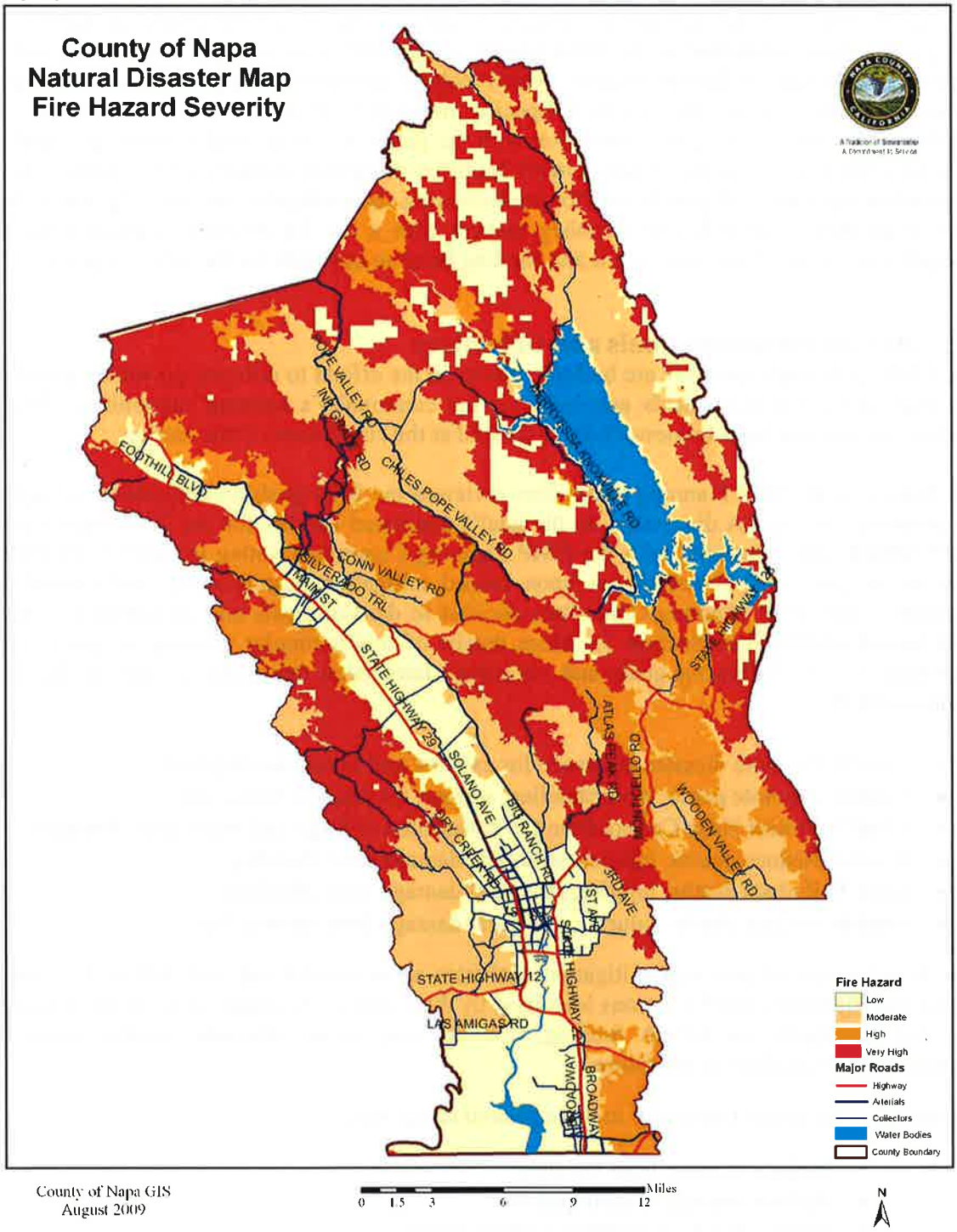

Figure 3-5: Napa County Fire Severity Zones

Section 4. MITIGATION STRATEGY

The development of the mitigation strategy includes a review of the goals, objectives and mitigation actions identified in the 2004 Napa County HMP, a capabilities assessment, and the creation of a Mitigation Action Strategy, which includes a prioritization process for selecting the mitigation actions to be implemented. Specific mitigation objectives and action items were developed for Napa County in conjunction with the public meetings held in the three locations, as cited in Section 1. The list of action items identifies mitigation projects, cost, funding sources, responsible agencies, and time frames for implementing each mitigation action. The action items were developed to provide public policy makers with a list for potential implementation as mitigation resources, time, equipment and funding become available for the selected projects.

4.1. Hazard Mitigation Goals and Objectives

The HMP goals and objectives are building blocks in the efforts to mitigate potential natural and potential human-caused hazards and build on the community's existing capabilities. Project implementation and legal framework are discussed at the conclusion of this section.

The Napa County HMP Planning Committee reviewed the 2004 goals and objectives throughout the planning process. A discussion on the goal's continued validity for the 2013 Napa County HMP ensued, and concluded with the HMP Planning Committee voting to develop an entirely new set of goals and objects based upon hazard mitigation best practices and current day priorities. The HMP Planning Committee decided to develop goals and objectives to address each hazard identified in Section 3. More details of this particular meeting are provided in Appendix I. The following goals and objectives have been developed as part of the 2013 planning effort:

- **Goal 1:** Promote disaster resistance for existing and future development
- **Goal 2:** Promote public understanding, support for disaster mitigation
- **Goal 3:** Protect Napa County from the devastation of large and small scale disasters
- **Goal 4:** Reduce deaths, injuries, structural damage from flooding
- **Goal 5:** Reduce deaths, injuries, structural damage from wildfires
- **Goal 6:** Reduce deaths, injuries, structural damage from earthquakes

The broad range of potential mitigation activities were considered, and below is a list of mitigation objectives and the actions identified by the County. Although some of these projects may not be eligible for FEMA funding, Counties may secure alternate funding sources to implement these projects in the future.

In General, these project areas fall in three general categories:

- Reduce impacts from flooding
- Reduce impacts of earthquakes
- Minimize risk of wildfire at urban interface

4.2. Capabilities Assessment

In preparing the mitigation actions, the Napa County HMP Planning Committee members were asked to consider their overall capability to mitigate identified hazards. The mitigation strategy includes an assessment of Napa County's planning and regulatory, administrative/technical, fiscal, and political capabilities to complete the identified mitigation actions. In addition to a capabilities assessment for Napa County, each jurisdictional focus group completed their own assessment to evaluate the specific capabilities of their jurisdiction.

4.2.1. Planning and Regulatory Mitigation Capabilities

Napa County has several plans and programs in place that guide the County's mitigation of development in hazard-prone areas. The following table lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities. Table 4-1 provides a sample list of possible planning and regulatory capabilities.

Table 4-1: Napa County's Regulatory Mitigation Capabilities

Hazard	Plan/Program/ Regulation	Responsible Agency	Comments
Multi-Hazard	Hazard Mitigation Plan	Napa County Office of Emergency Services (NCOES)	Implementation and updates over a 5 Year Period.
Multi-Hazard	Emergency Operations Plan (EOP)	NC OES	To address disasters, whether they are natural, technological or manmade. The Hazard Mitigation Plan addresses natural hazards only.
Multi-Hazard	Evacuation Plan	NC OES	NC might have an evacuation plan with the following elements: ▪ Transportation ▪ Housing / Shelters ▪ Large and Small animal Evacuation
Multi-Hazard	California Building Codes	Planning, Building & Environmental Services (PBES)	Napa County has adopted new building codes and regulations that protect new development and buildings from flooding, wildfire and EQ.
Multi-Hazard	Zoning Regulations	PBES	See Napa County Building Regulations under Wildfire, Flood and Earthquake.
Multi-Hazard	Subdivision Regulations	PBES	See Napa County Building Regulations under Wildfire, Flood and Earthquake.
Multi-Hazard	Comprehensive Land Use Plan (or General, Master or Growth Mgmt. Plan)	PBES	
Multi-Hazard	Capital Improvement Plan	CEO	

Multi-Hazard	Community Facility Development and Infrastructure Assistance	Planning, Building & Environmental Services	
Multi-Hazard	Statewide Historic Preservation Plan: Local Government Assistance	Office of Historic Preservation Napa County Historical Society	OHP's Local Government Unit (LGU) offers guidance and assistance to city and county governments in the following areas: ▪ Drafting or updating historic preservation plans and ordinances ▪ Developing historic context statements ▪ Planning for and conducting architectural, historical, and archeological surveys ▪ Developing criteria for local designation programs, historic districts, historic preservation overlay zones (HPOZs), and conservation districts ▪ Developing and implementing design guidelines using the Secretary of the Interior's Standards - Developing economic incentives for historic preservation - Training local historic preservation commissions and review boards Meeting CEQA responsibilities with regard to historical resources
Wildfire	Community Wildfire Protection Plan (CWPP)	Fire Safe Council	- Update edits occurring, expect approval 2013.
Wildfire	Local Community Codes	Local Communities	
Wildfire / Flood	USDA	NRCS	Flood and Fire Recovery on Private Lands
Flood	Prop 50/84 Integrated Regional Water Management (IRWM)	DWR	DWR has a number of IRWM grant program funding opportunities. Current IRWM grant programs include: planning, implementation, and stormwater flood management. http://www.water.ca.gov/iwrm/grants/index.cfm
Flood	USDA	NRCS	Improve floodplain function and reduce effects of flooding on private lands
Flood	Central Valley Flood Protection Plan	DWR	State legislative requirements provide Napa County local planning responsibilities for floodplain management (e.g., general plans, zoning ordinances, development agreements, tentative maps, and other actions).

Flood	NFIP	Napa County Flood Control / Buildings Dept.	NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. As a participating member of the NFIP, Napa County Officials are dedicated to protecting homes of more than 160 policies currently in force. ▪ 163 policies in force ▪ $37,987,500 insurance in force ▪ 34 paid losses ▪ $680,554 total paid losses 6 substantial damage claims since 1978
Flood	DWR Prop 84	DWR	▪ Grant funding just came out from the Flood Operations Center.
Flood	***USDA***	Natural Resources Conservation Service (NRCS)	Emergency Watershed Protection Program Environmental Quality Incentive Program
Flood	***Farmland Preservation***	Statewide Drought Mitigation Plan	
Flood		Flood Control, DWR, Army Corps	
Earthquake		Response = EOC State OES	

4.2.2. Administrative/Technical Capabilities

Napa County has several departments and agencies that have both the administrative authority and technical capabilities related to hazard mitigation and loss prevention, as identified below:

Table 4-2: Napa County Administrative and Technical Mitigation Capabilities

Staff/Personnel Resources	***Yes***	***No***	***Department / Agency***	***Comments***
Planners (with land use / land development knowledge)	x		PBES	
Planners or engineers (with natural and/or human caused hazards knowledge) Public Works has capability.	x		PBES	

Engineers or professionals trained in building and/or infrastructure construction practices (includes building inspectors)	x		PBES	
Emergency Manager	x		OES	
Floodplain Manager (Planning Director / Public Works Director)	x		Flood Control	
Land surveyors	x		PBES	
Scientists or staff familiar with the hazards of the community	x		PBES, NOAA	
Personnel skilled in Geographic Information Systems (GIS) and/or FEMA's HAZUS program	x		NC GIS	
Grant writers or fiscal staff to handle large/complex grants (David Keller)	x		UASI	Limited to Public Health
Construction Equipment	X		PBES	
Public Works: ▪ Technical Assistance ▪ Personnel Assistance	X		PBES	
Utilities / Dam Safety Experts ▪ Dam Safety Personnel ▪ PG&E Arborist	x		PBES	

State Emergency Management Personnel ▪ State OES Access ▪ CCIC Access ▪ Mobile Emergency Personnel ▪ Medical Air Evacuation (Based in Auburn & Redding)	x		OES	
Regional Medical Assistance Personnel	x		EMS	
National Weather Service Weather Watchers	X		OES, PBES	

4.2.3. Fiscal Capabilities

This section identifies the financial tools or resources that the County could potentially use to help fund mitigation activities. These include County-specific capabilities, as well as state and federal resources. It is also important to note that funding can also be sourced from participating agencies/organizations that collaborate with the County in the implementation of mitigation actions.

Table 4-3: Napa County Fiscal Capabilities

Financial Resources	*Yes*	*No*	*Department / Agency*	*Comments*
Capital improvement programming	x		CEO	
Community Development Block Grants (CDBG)	x		PBES	
Special purpose taxes	x		CEO BOS	
Gas / electric utility fees		x		
Water / sewer fees	x		Special Districts	
Stormwater Utility fees	x		PBES	
Development impact fees	x		PBES	
General obligation, revenue, and/or special tax bonds	x		CEO BOS	
Partnering arrangements or intergovernmental agreements	x		Public Safety	
DWR Position 84 Bond Funding		x		
Weatherization Services		x		

4.2.4. Community Political Capability

Political capability in this instance is being measured by the degree to which local political leadership (including appointed boards) is willing to enact policies and programs that reduce hazard vulnerabilities in your community, even if met with some opposition. Examples may include guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum State or Federal requirements (e.g., building codes, floodplain management, etc.). The Napa County HMP Planning Committee Focus Group rated the political capability to enact policies and programs that reduce hazard vulnerabilities.

The diagram below provides a simple 0 to 5 scale for which the Napa County hazard mitigation planners used to assess the County's political capability. The Napa County focus group agreed that that political boards are "Moderately Willing" to change policy or programs. Generally, a higher score corresponds to a higher degree of community political capability.

Very Willing | *Moderately Willing* | *Unwilling to Adopt Policies / Programs*

Score: 2.5

4.2.5. Self-Assessment of Capability

The Napa County HMP Planning Committee conducted a short Capabilities Assessment Self-Survey in order to understand the degree of capability for categories reviewed previously in this section. Using Table 4-4 as an outline, the Planning Committee agreed "as a group" upon the degree of capability; limited, moderate, or high for each capability area. The survey conclusion results are based upon information provided previously in this Section and working knowledge of County operations.

Table 4-4: Capabilities Assessment Self-Survey Conclusion

	Degree of Capability		
Capability Area	**Limited**	**Moderate**	**High**
Planning and Regulatory Capability		X	
Administrative and Technical Capability		X	
Fiscal Capability	X		
Community Political Capability		X	

4.3. Mitigation Action Items

With the results of the hazard risk assessment finalized, mitigation goal established, and capabilities assessed, mitigation actions are set to reduce the impacts of the identified natural hazards. Brief descriptions of the mitigation action categories are provided below, followed by a discussion of the process undertaken to identify and prioritize mitigation actions. Supporting documentation for this section is provided in Appendix A.

4.3.1. Mitigation Action Categories

Mitigation actions are based on the hazard risk assessment results and FEMA's six hazard mitigation actions categories. Mitigation action categories include prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. FEMA's six hazard mitigation categories are described below:

- Prevention (PRV): Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses.
- Property Protection (PP): Actions that involve modifying or removing existing buildings or infrastructure to protect them from a hazard.
- Public Education and Awareness (PE&A): Actions to inform and educate citizens, elected officials, and property owners about potential risks from hazards and potential ways to mitigate them.
- Natural Resource Protection (NRP): Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems.
- Emergency Services (ES): Actions that typically are not considered mitigation techniques but reduce the impacts of a hazard event on people and property.
- Structural Projects (SP): Mitigation projects intended to lessen the impact of a hazard by using structures to modify the environment.

4.3.2. Identification of Mitigation Actions

To begin the process of identifying mitigation actions for the 2013 HMP update, the Napa County HMP Planning Committee reviewed mitigation actions from the 2004 HMP in June of 2013. During this process, the HMP Planning Committee reevaluated the mitigation measures from the 2004 plan and streamlined, edited and developed new mitigation actions where appropriate. All mitigation actions, including those that were completed, removed or are still in progress can be found in Appendix A along with the status of the action, cost, responsible agency and funding source.

As part of the mitigation action identification process, the HMP Planning Committee and Jurisdictional Focus Groups identified issues and/or weaknesses in the County's existing/current hazard mitigation activities and developed a new set of goals, objectives and actions identified in this section. The mitigation actions were prioritized based upon the below goals and actions. For details on mitigation actions See Appendix A.

Goal 1: Promote a Flood Safer Community

Objectives 1.1: Develop and improve the countywide flood surveillance and early warning system.

Actions 1.1.1: Maintain City County Storm Watch Program

Objective 1.2: Support the completion of the Measure 'A' Flood Control Project

Action 1.2.1: Completion of the Measure 'A' Flood Control Project as budgeted

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Objective 1.3: Housing elevation project

Action 1.3.1: Elevate 100 most flood prone houses along areas not receiving direct protection from the Measure 'A' Flood Project.

Objective 1.4: Napa River Restoration Efforts

Action 1.4.1: Secure grant funding to develop and implement river restoration program that would reduce flood damages and increase environmental quality on the river, maintain fish habitat, decrease impediment to drainage by preventing silt build up and loss of stream bed capacity.

Objective 1.5: Reduce the possibility of Localized Flooding

Action 1.5.1: Routinely inspect storm water channels for vegetation build up or encroachment, trash and debris, silt and gravel build up, and erosion or bank failure and maintain said channels were permitted by California Department of Fish and Game.

Action 1.5.2: Routinely inspect and maintain storm water inlets and outfalls for debris and obstructions, sand & gravel build-up, and structural damage or vandalism.

Goal 2: Promote an Earthquake Safer Community

Objective 2.1: Train Communities to be earthquake ready

Action 2.1.1: Continue CERT Training Program

Action 2.1.2: Earthquake month public education program

Action 2.1.3: Participate in 'The Great Shake Out' Statewide Drill

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Objective 2.2: Ensure the ability of emergency response units to communicate in the post quake environment.

Action 2.2.1: Hardening and building redundant capability into Public Safety Alerting Points

Action 2.2.2: Type standardizes and purchase mobile command/EOC vehicles

Action 2.2.3: Retrofit Critical Public Safety Infrastructure

Action 2.2.4: Build and Equip a County Emergency Operations Center

Goal 3: Promote a Fire Safer Community

Objective 3.1: Develop a defensible space program to minimize impact of wildland-Urban interface fires.

Action 3.1.1: Develop & conduct a Defensible Space community education program

Action 3.1.2: Draft and Promulgate Defensible Space Ordinance

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Objective 3.2: Create a sustainable public private partnership on building a safer community in the interface zone

Action 3.2.1: Foster and form neighborhood based Firewise Councils

Action 3.2.2: Revise General Plan with lessons learned from Firewise programs and analysis

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Objective 3.3: Develop a program to reduce shared threat in the Interface zone

Action 3.3.1: Maintain and further develop the Fuel Reduction Program

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Objective 3.4: Maintain Emergency Operations Center for coordination on information and resources

Action 3.4.1: Ensure training is provided for Command & General Staff positions in EOC's. Ensure EOC exercises are performed at least annually.

Objective 3.5: Reduce the probability of Fire Ignitions

Action 3.5.1: Focus on human causes of ignition and address the problem through education and enforcement actions, to include vigorous investigation and prosecution of arson.

4.3.3. Project Implementation

This section discusses plan adoption and implementation, as well as the processes for monitoring, evaluating, and updating the HMP, to ensure that the HMP remains relevant and continues to address the changing environment in the County. In addition, this section describes the incorporation of the HMP into existing Napa County planning mechanisms, as well as how the County will continue to engage the public.

Some projects are currently budgeted or completed by the local governments without recourse to the grant process. Project requiring grant funds will be conducted as time, staff, priority and funding allow. The Napa operational area has sought mitigation funding from numerous sources with the Pre-Disaster Hazard Mitigation Grant program being recognized as only one of several potential sources.

The plan allows for an umbrella of integrated approaches to mitigation to the threats all the signatory jurisdictions face. The cohesiveness of the area, its small size and the proximity of all jurisdiction to the Napa River, The Wild-land Urban interface, the Northern California fault complexes and the their shared major transportation routes make the projects and work done on the projects potentially beneficial to all.

The Napa Operational Area Council will be the coordination body for the day to day tracking of projects in the county. The Napa Valley association of governments will represent the opportunity to address the political issues of project prioritization and implementation in a forum that represents all the governmental stakeholders.

The Napa County Office of Emergency Services will be the central coordination point for maintaining this plan and will serve as the lead staff for grant project applications on the countywide projects selected for application under the PDM grant program.

4.3.4. Legal Framework

The legal protections for the selection, administration and financing these projects is provided by the local government governing board or council. For the county the Board of Supervisors (and for the Cities/Town their Councils) provide guaranteed public access and scrutiny through the open public meetings and agenda, budget authority, accountability, and inclusion of any granted funds into the federal annual single audit. All grant efforts are approved by these bodies prior to application and accepted formally by these bodies upon their award. As elected public officials, they are the stewards of the public trust.

Local ordinance in all signatory agencies all reflect the state model ordinance. The County CEO and/or City/Town manager are by ordinance the directors' of emergency services, as such they will have day to day oversight of any of these mitigation programs. Since all involved staff is within their chain of supervision, this provides an additional legal safeguard for the management and implementation of these projects.

Section 5. PLAN MAINTENANCE PROCEDURES

Napa County Operational Area Hazard Mitigation Plan will be used to focus project prioritization. Mitigation projects will be considered for funding through federal and state grant programs, and when other funds are made available through the County. The Napa County Operational Area Disaster Committee will be the coordinating agency for project implementation. Individual jurisdictions have the capacity to organize resources, prepare grant applications, and oversee project implementation, monitoring, and evaluation. Coordinating organizations may include local, county, or regional agencies that are capable of, or responsible for, implementing activities and programs. The Napa County OES Operational Area Coordinator (County OES Manager) will be responsible for mitigation project administration.

A number of state and local regulations and policies form the legal framework to implement Napa County's hazard mitigation goals and projects. A list of these regulations and plans is presented in the references list at the end of this section.

5.1. Plan Adoption

To comply with DMA 2000, the Napa County BOS will officially adopt the 2013 Napa County HMP within one year of FEMA approval. The adoption of the updated HMP recognizes the County's commitment to reducing the impacts of natural hazards on the County. A copy of the 2013 HMP resolution is included in Section 1.

5.2. Plan Maintenance

The Plan maintenance section of this document details the formal process that will ensure that the Napa County Operational Area Hazard Mitigation Plan remains an active and relevant document. The Plan maintenance process includes a schedule for monitoring and evaluating the Plan and producing a Plan revision every five years. This section describes how the County will integrate public participation throughout the Plan maintenance process. Also included in this section is an explanation of how Napa County government intends to incorporate the mitigation strategies outlined in this Plan into existing planning mechanisms.

5.3. Future Participation

The Napa County Planning Committee, established for this update, will become a permanent advisory body to administer and coordinate the implementation and maintenance of the HMP. The Napa County Office of Emergency Services Manager will lead the HMP Planning Committee in all associated HMP maintenance requirements. On a bi-annual basis, the Planning Committee will convene at their already established Napa County Operational Area Meetings to discuss and report progress on mitigation actions. Other duties such as reviewing and promoting mitigation opportunities, informing and soliciting input from the public, and hearing and addressing stakeholder concerns about hazard mitigation will occur on an as needed basis.

5.4. Monitoring, Evaluating and Updating the Plan

The Napa County Operational Area Hazard Mitigation Plan is a living document, and will be updated as needed with knowledge of new hazards, vulnerabilities, or other pertinent information. Bi-annual review and status updates on mitigation actions will identify new mitigation projects and evaluate the effectiveness of mitigation priorities and existing programs.

The County OES Operational Area Coordinator will be responsible for scheduling a meeting of the Napa County Operational Area Planning Committee to review and update the Plan every five years. The meeting will be open to the public and advertised in the local newspaper to solicit public input. The public will have the opportunity to review the goals and mitigation projects in light of changing situations in the county and changes in state or federal policy to ensure that this Plan is addressing current and expected needs. Consistent with current technology the approved existing plan will be available both in hard copy at each office of emergency services throughout the county and posted on the official jurisdiction website. This will ensure public access to the plan. The plan will also be made available as an adobe acrobat file on CD for a nominal fee.

The County OES Operational Area Coordinator with this public input will also review the risk assessment portion of the plan to determine if this information should be updated or modified, given any newly available data and completion of major mitigation programs such as the Napa County Flood Control. County OES Operational Area Coordinators will review HMP sections on a regular basis through Operational Area committee meetings to update language and data as need be. The list of critical facilities in the Appendices will also be reviewed and enhanced with additional details.

The County OES Operational Area Coordinator will give a status report detailing the success of various mitigation projects, difficulties encountered, and success of coordination efforts and which strategies should be revised. The status report will be published on the Napa County web sites and an executive summary will be published in the local newspaper to update the citizens of Napa County at the conclusion of each plan review.

The County OES Operational Area Coordinator will be responsible for the five-year update of the Plan, and will have six months to make appropriate changes to the Plan before submitting it to the Board, Councils and public for review and approval. At the end of the five-year period, the updated Plan will be submitted to the State Hazard Mitigation Officer and the FEMA for acceptance. The OES Coordinator will notify all holders of the County Plan when changes have been made.

5.5. Implementation through Existing Programs

Within six months of formal adoption of the Napa County Operational Area Hazard Mitigation Plan, mitigation goals will be incorporated into future development of the Napa County General Plan. In addition to Planning Committee meetings, meetings of the Board of Supervisors and public hearings will provide an opportunity for local officials to report back on the progress made on the integration of mitigation planning elements into county planning documents and procedures.

5.6. Continued Public Involvement

Napa County is dedicated to involving the public directly in review and updates of the Napa County Operational Area Hazard Mitigation Plan. Copies of the Plan will be catalogued and kept at all appropriate agencies in the County as well as at the Main Public Library, posted on official websites and be available on read only files on CD ROM.

Public meetings will be held as part of the required five-year update of the Plan. The meetings will provide a forum for public input to the Plan.

Appendix A. **Napa County Operational Area**