

**Sonoma County
Hazard Mitigation Plan**

WILDLAND FIRE HAZARDS

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WILDLAND FIRE HAZARDS TABLE OF CONTENTS

Hazard Description	3
Hazard History	9
Future Potential	11
Exposure and Vulnerability	17
Impact and Loss Estimates	23
Plans	23
Codes and Regulations	26
Mitigation Programs and Activities	30
Financial Resources	31
Other Stakeholders	34

LIST OF TABLES

Table WH-1:	Wildland Fire Damage and Loss Figures in CDF Areas
Table WH-2:	Sonoma County Fires in Past Forty Years
Table WH-3:	Fire Districts and Departments
Table WH-4:	Several County Buildings Located in High Wildland fire Risk Areas

LIST OF FIGURES

Figure WH-1:	Percent of Fires by Cause in Sonoma County 2008 – 2014
Figure WH-2:	County of Sonoma State Response Area
Figure WH-3:	County of Sonoma CSA40 Areas

WILDLAND FIRE HAZARDS

Hazard Description

Factors Affecting Wildland Fire Risks

A wildland fire is a fire in which the primary fuel is natural vegetation. Wildland fires can consume thousands of acres of vegetation, timber and agricultural lands. Fires ignited in wildland areas can quickly spread to areas where residential or commercial structures. Fires that start in urbanized areas can grow into wildland fires.

Wildland fires can be caused by natural events, such as lightning or high winds. Lightning causes about five percent of wild fires statewide. The vast majority of wildland fires, about 95 percent, are not natural occurrences but the result of human activity. WH-1 provides a breakdown of fire causes in California from 2008 to 2015. Campfires, careless smokers, electrical sparks, and arson cause most wildland and wildland/urban interface fires. In Sonoma County, electrical equipment, such as power lines and transformers, have caused numerous fires

The combination of highly flammable fuel, long dry summers and steep slopes creates a significant natural hazard of large wildland fires in many areas of Sonoma County. Wildland fire season in Sonoma County spans the months after the last spring rains have fallen and until the first fall or winter rains occur. The months of August, September and October have the greatest potential for wildland fires as vegetation dries out, humidity levels fall, and off shore winds blow. However, as effects of climate change are being realized, fire season has been lengthened and in drought conditions fires can occur at any time of year.

Wildland fire behavior is based on three primary factors: Fuels, Weather, and Topography.

- **Fuels:** Consists of a variety of vegetation (grass, brush or trees) available for combustion. The amount and density of fuel directly affects the intensity of the fire and the rate of fire spread. Different fuels have different burn qualities. For example, grasses release little energy, but can sustain very high rates of spread. In Sonoma County, there is a very diverse range of fuels. The southern third of the County is characterized by grasslands and/or oak woodland. Highly fire-prone nob cone pine and chaparral landscapes can be found in the east, along the Napa and Lake County lines. Redwood forest environments are found across the County, especially along the north coast and in the lower Russian River drainage. In much of the oak woodlands, fire exclusion is allowing Douglas Fir and other brushy species to colonize the grass lands, changing fuel models and fire potential. Moisture levels and continuity of fuel is an important element in determining the spread of fire. Vegetative fuels and their burning characteristics are

combined with other factors including slope and aspect, ladder fuels, crown density, and fire weather conditions to create fuel hazard ranking map.

- Weather: Sonoma County's primary wildland fire season spans the months May through October. Strong and dry north-east "Santa Ana" or "Foehn" winds, significantly increase likelihood and severity of wildland fires across California and the west, most often occur in the fall months. With the exception of areas immediately along the coast, during fire season the weather is generally warm and dry during the day, with peak summer day temperatures 80° – 100° F, and relative humidity ranging between 20% and 35%. Gradient winds are generally out of the South/Southwest at 5-10 mph, strengthening to 10-15 mph in the late afternoon and diminishing by dark. Coastal onshore flow, often accompanied by fog, frequently prevails after sunset, allowing for good nighttime relative humidity recovery in the warm inland areas. In the inland valleys, fog usually dissipates by 11:00 am. The fog layer depth is usually between 1,000 and 1,500 feet: elevations above this often do not experience fog nor do they receive the same nighttime cooling and moisture recovery as lower elevations.
- Topography, especially slope, is a critical indicator of fire behavior. As fire moves up slope, fuels ahead of the fire preheat, speeding up a fire's uphill progress. The steeper the slope, the faster fire will move uphill, whereas downhill slopes can slow down the rate of spread.
- Two steep ranges dominate the western and eastern lengths of Sonoma County, and most of the County's WUI is in the hills and valleys of these two ranges. The hills of the Coastal Range rise abruptly from the Pacific shoreline to over 2000 feet. The slopes of the Mayacamas Mountains on the County's eastern boundary rise from sea level valleys including the Santa Rosa Plain, up to 4,500 feet on the slopes of Mount St. Helena. In steep terrain, common geographic features such as drainages, gulches and canyons can funnel air to act as "chimneys", pulling hot air, gasses and embers ahead or outside of the main fire. Aspect, the cardinal direction that a slope faces, also has a major influence on fire behavior. South facing slopes receive heating and drying solar radiation from early in the morning until sunset, whereas north facing slopes will only receive solar radiation during a short period of the day when the sun is high in the sky. Sonoma County's valleys and foothills are predominantly devoted to agriculture but also contain most of the urbanized areas and population.
- Considering the above factors, California Department of Forestry and Fire Protection (CAL FIRE) has mapped fire hazard severity levels in Sonoma County are shown in Figure 8.8. Over half of Sonoma County has been rated as moderate or high fire hazard risk. Area of Very High Fire Severity Zone (VHFSZ) are designated along the mountainous eastern range of Sonoma County. Fire Hazard Severity Zones represent areas of variable size ranging from 20 acres in urbanized areas to at least 200 acres in wildland areas, with relatively homogeneous characteristics regarding expected burn probability and

potential fire behavior attributes based on climax fuel conditions over a 30-50 year time horizon. There are other trends which may be exacerbating wildland fire risk, as described below.

Fire Suppression

Since the 1950's, fire prevention and suppression became the standard approach to fire management in forests and woodland. Many experts assert that as a result, fuel loads in forests and woodlands have built up to higher levels than if the forest fires were allowed to burn. The success of these prevention campaigns is thought to increase the probability of large-scale losses to fire due to the decades long fuel accumulations.

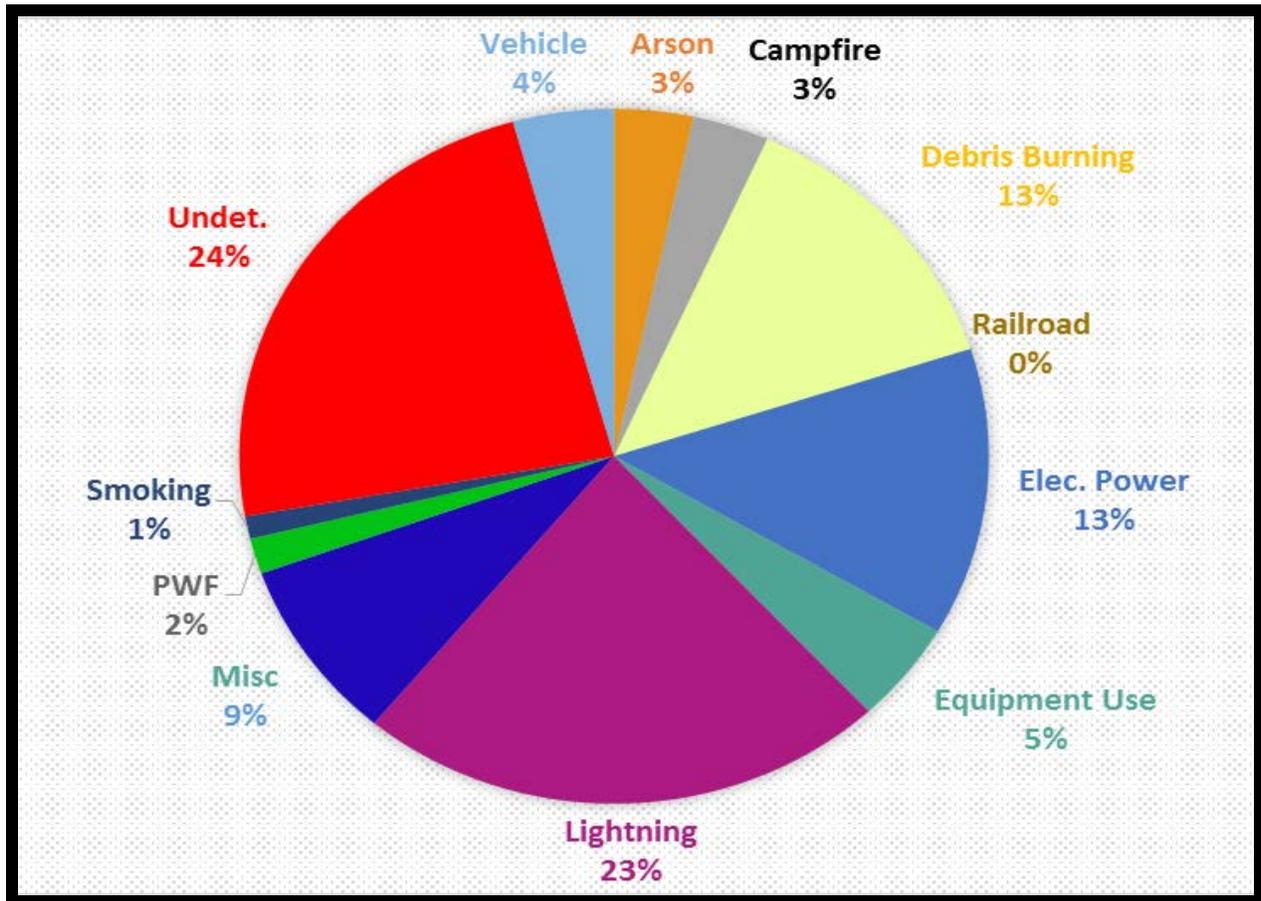
Climate Change

In the last few decades there has been a pronounced trend of larger and more frequent wildland fires across the American west. While the causes are still debated, a number of scientific studies indicate that the firefighting season has lengthened across the entire western United States because of longer, hotter, and drier summers.

Nation-wide it is estimated that by 2100, the average size of wildland fires will increase by 55 percent. If average statewide temperatures rise to the medium warming range (5.5 to 8°F), the risk of large wildland fires in California is expected to increase about 20 percent by 2050 and 50 percent by the end of the century. Changes in precipitation patterns could also result in an increase in future wildland fire risk throughout the state.

Wildland fire risk increases as land use further desiccates vegetation making it easy to ignite. Firefighting costs have increased thus straining the resources of firefighting agencies. Some research points to climate change, not fire suppression policies and forest accumulation, as the primary driver of recent increases in large forest fires. Rising seasonal temperatures and the earlier arrival of spring conditions are linked with the increase in wildland fires (Scripps Institution of Oceanography).

Figure WH-1: Percent of Fires by Cause in Sonoma County 2008-2014



Sudden Oak Death (SOD)

Sudden Oak Death is a forest disease caused by a fungus-like organism, called *Phytophthora Ramorum*, which is causing a die-off of thousands of oaks and tanoaks in California’s coastal regions. Currently, Sonoma County is experiencing dramatic and large scale SOD mortality. U.S. Forest Service aerial surveys conducted from 2005 through 2007 mapped the distribution of Sudden Oak Death (SOD). The surveys showed that during that time, 7.5 percent of the land in Sonoma County (75,000 acres) was affected by SOD mortality, making Sonoma County a hotspot for SOD infestations with mortality more than twice of any other county in California (USFS, 2008).

The 2008 Sonoma County Sudden Oak Death Strategic Response Plan indicates that an estimated 440,000 acres of Sonoma County are at Medium to Very High Risk for establishment of this disease. About 99 percent of the mortality is on private land and the remaining is primarily in parks and along roadways. Some researchers estimate that SOD mortality in tanoak will reach 80 to 100 percent. The increased number of dry dead trees caused by SOD increases fuel loads for wildland fires (Forest Ecology and Management 2004).

Residential Development in Wildland Areas

The area where residential development meets or intermixes in wildland areas is referred to as the Wildland/Urban Interface (WUI). Fire in these areas often results in the greatest losses of property and life. Distance from firefighting resources, construction elements that make buildings vulnerable to ignition, narrow roads, limited access, steep terrain, lack of defensible space, and inadequate water supplies, all contribute to the potential for greater life loss and property damage in a wildland/urban interface fire. Added residential construction in wildland areas creates a higher potential for wildland fires that could cause significant loss of life and property, and increased the burden on firefighting resources in the County.

Wildland/Urban Interface fire is a significant concern for the State of California for several reasons. First, California has a chronic and destructive WUI fire history. Since 1950, 56 percent of federally declared disasters in the state were the result of WUI fires. California has widespread WUI fire vulnerability, as indicated by CAL FIRE mapping of WUI zones showing increasing pattern of development encroaching into previously wildland areas. WUI fire zones are present near many densely populated areas.

Even relatively small acreage fires in WUI environments may result in high losses. The 1991 Oakland Hills Tunnel Fire destroyed more than 2,800 buildings and claimed 25 lives, yet burned only 1,600 acres, considered a small to medium-sized fire by wildland fire standards. Three fires in 2015, the Rocky, Jerusalem and Valley fires together burned 170,623 acres in Lake and surrounding counties. The fires killed four people and destroyed 2,051 buildings. In August 2016, the arson-caused Clayton fire destroyed an estimated 299 structures and nearly 4,000 acres in and near Lower Lake.

Effects of Wildland Fires

Wildland fires can cause death and injury to residents, visitors, and firefighters. While people generally have some warning before wildland fire engulfs an area, the dynamic nature of fire means that evacuation warnings may give residents little time to prepare for departure. Many civilian fatalities involve residents who do not leave evacuated areas in a timely fashion. Firefighters also face a high risk of being injured or killed by wildland fires, by fire overrunning their location, vehicle or airplane crashes, and other causes.

Major wildland fires lead to numerous environmental changes including: loss of vegetation and ground cover, alteration of soil properties, and the reduction of hillside stability. These factors alter a watershed's hydrologic response to rain events and can potentially result in post-fire flooding, debris flows, and landslides in areas downstream of recent burn areas. Wildland fires can have an adverse secondary effect on water quality by increasing sediment loads in area streams which degrade habitat.

Large, intense wildland fires burning in decadent and overgrown vegetation may result in extensive negative ecological effects and destruction of habitat. Wildland fires contribute to "bad air days" throughout the state. Wildland fire smoke produces small soot particles, which

can cause or aggravate cardiovascular and respiratory illness. Wildland fires produce a number of pollutants; particulates smaller than 10 microns (PM₁₀) are of particular concern for human health. Air pollution from wildland fires can cause health problems over a broad area, particularly for people with asthma or other respiratory problems. For example, the wildland fires that burned nearly three-quarters of a million acres in southern California in 2003 caused particulate matter to increase four to five times above normal levels throughout the southern part of the state. Five million people were exposed to poor air quality for at least two days during the fires, and nearly two million were exposed for five days in a row.

Area health providers can expect to see higher than usual numbers of patients with respiratory complaints during a wildland fire. In general, during a wildland fire, the number of people needing medical care may increase.

Local economic impacts from catastrophic wildland fires include the cost of fire suppression, disruptions to consumption and production of local goods and services. Immediate effects may include decreased recreation/tourism and timber harvest, as well as disruptions from evacuations and transportation delays. Other effects include direct property losses (in the form of buildings, timber, livestock, and other capital), damage to human health, and possible changes in the long-term structure of the local economy.

Table WH-1: Wildland Fire Damage and Loss Figures in CDF Areas

Year	Number of Fires	Acres Burned	Structures Destroyed	Damage Costs	CDF Suppression Costs
2015	6,335	307,598			
2014	4,299	191,307			\$209 million
2013					\$240 million
2012					\$310 million
2011					\$140 million
2010	2,961	23,191	94	\$3,216,706	\$90 million
2009	3,546	73,098	121	\$33,385,456	\$274 million
2008	4,923	347,810	992	\$151,085,423	\$500 million
2007	5,647	425,238	3,079	\$253,157,117	\$524 million
2006	4,805	222,896	431	\$60,270,382	\$206 million
2005	4,908	74,004	102	\$49,392,943	\$117 million
2004	5,574	168,134	1,016	\$126,790,417	\$170 million
2003	5,961	404,328	5,394	\$974,186,857	\$252 million
2002	5,759	112,809	327	\$173,976,860	\$135 million
2001	6,223	90,985	389	\$87,295,001	\$166 million
2000	5,277	72,718	130	\$29,876,853	\$114 million

Source: CDF Fire Season Summaries 2000-2015

Hazard History

Wildland fires, particularly wildland/urban interface fires, have historically occurred in Sonoma County. CAL FIRE has identified several "historic wildland fire corridors" in Sonoma County, including the Guerneville/Cazadero area which experienced fires in 1923, 1951, and 1978; the Geysers area which has experienced multiple fires, the most recently in 2013; and the 1964 Hanley fire area. Another area with a repetitive fire loss history is Sonoma Valley where the Cavedale fires of 1925 and 1996 caused significant property damage.

As development and human activity in Sonoma County increased over the decades, the incidence of human caused fires also increased. A map showing historic fires in Sonoma County from 1950 to 2015 is included as Figure 8.9. The map, prepared by the California Division of Forestry and Fire Protection (CDF), shows fires which burned 300 acres or more. Some large or costly fires in the past forty years are listed in Table WH-2.

Table WH-2: Sonoma County Fires in Past Forty Years

Year	Name	Acres Burned	Structures Burned
1964	Hanley	52,700	108
1964	Nuns Canyon	10,400	27
1965	Knight's Valley	6,000	0
1965	Pocket Ranch	4,000	0
1965	Austin Creek	7,000	0
1972	Bradford	1,760	4
1978	Creighton Ridge	11,405	64
1988	Cloverdale	1,833	100
1988	Geysers	9,000	7
1996	Porter Creek	300	0
1996	Cavedale	2,100	0
1999	Geyser Road	1,300	0
2000	Berryessa	5,731	15
2004	Geysers	12,000	6
2008	85	322	0
2008	Pine	989	0
2013	McCabe	3,505	
2015	Valley	76,067	1,955

In 1964, 94 forest fires were burning in northern California from September 18 to 28. Winds in excess of 75 mph, high temperatures, and tinder dry vegetation caused the fires to spread across timberlands, farms, and residential areas. Two of the three major fires caused serious damage in Sonoma County: the Hanley fire and the Nuns Canyon fire.

The Hanley fire was the largest of the 94 fires. The fire started the morning of September 19 on the Hanley property off Highway 29 on the slopes of Mt. St. Helena in Napa County. By the end of the next day, firefighters had contained the fire, but late in the night, winds drove the flames down the slopes to encircle Calistoga on two sides. Several homes on the perimeter of town were burned. At mid-day of the third day, an ember ignited a spot fire on the ridge west of Highway 128 between Calistoga and Kellogg, in Sonoma County. The fire then raced into Knights Valley and turned southward into Franz Valley. By nightfall, the fire, driven by 70 mph winds, headed down Mark West Canyon toward Santa Rosa. The Sonoma County Hospital on Chanate Road was threatened, with embers falling on the rooftop, and 40-foot high flames in nearby trees. The fire was held only yards away from the front door of the hospital and to the north along Highway 101. To the east of the fire burned over the hills and down into the Rincon Valley area, where it was again stopped. The fire was not brought under control until the morning of the 26th of September. In total, the fire consumed 105 million board feet of timber valued at \$1.5 million, and destroyed 84 homes and 24 summer cabins. More than fifty-two thousand acres were blackened. No human lives were lost.

The Nuns Canyon fire in the Sonoma Valley started on the same day as the Hanley fire and burned for six days. By the third and fourth days the fire had burned 9,500 acres and reached Highway 12 and Boyes Hot Springs. By the sixth day, when the fire was brought under control, it had destroyed twenty-seven homes and more than 10,000 acres.

Although Sonoma County has not experienced catastrophic WUI fires like those that caused significant loss of life in the 1991 Oakland Hills Fire and the 1993 and 2003 Southern California fires, a repeat of the 1964 Hanley Fire could cause catastrophic damage to the County and the City of Santa Rosa. One example, the Porter Creek fire in October 1996, ignited nine miles northeast of Santa Rosa, spreading into the Franz Valley Road area. Swift action by firefighters and homeowners to maintain defensible space held the fire at 300 acres, with no structures lost.

The northeastern portion of Sonoma County bordering Lake and Napa counties has spawned numerous wildland fires, as noted on the fire history map. A number of fires have ignited in the area known as the "Geysers". A fire on Labor Day weekend 2004 burned 12,500 acres in the Mayacamas Mountains in Sonoma and Lake counties over a five-day period, and cost over \$14 million to suppress and caused over \$10 million in property damage. The fire consumed six cabins and destroyed equipment and vehicles belonging to several companies operating in the area, including Calpine Corp., PG&E and ATT. Firefighters were able to save pumping stations and geothermal power plants worth hundreds of millions of dollars. The 2004 Sonoma Lake Napa Fire Management Plan indicated that vegetation management was one of the primary reasons the geothermal facilities were not destroyed in the 2004 Geysers Fire.

The largest fire that has occurred recently is the Valley Fire. Although it was located mainly in southern Lake County, it moved into Sonoma County. Starting on September 12, 2015, the fire burned 76,067 acres and destroyed 1958 structures including 1280 homes, 27 multi-family

structures, 66 commercial properties, and 585 minor structures such as outbuildings and sheds. In addition, 93 structures were damaged including 41 homes, 7 commercial properties and 45 other minor structures. Four firefighters were injured and there were 4 civilian fatalities. The fire burned 5,000 acres near the Geysers and destroyed four steam cooling towers. Rehabilitation to restore the natural landscape that may have been altered during initial firefighting efforts is underway.

Future Potential

CAL FIRE produces Fire Threat Maps for California. Fire threat is derived from a combination of fire frequency, derived from 50 years of fire history, and expected fire behavior under severe weather conditions, based on fuels and terrain data. The Fire Threat Map for Sonoma County is shown in Figure 8.8. This fire threat map can be used to estimate the potential for impacts on various assets.

CAL FIRE Sonoma-Lake-Napa Fire Management Plan analyzes fire hazards and high-risk and high-value areas where there is potential for costly and damaging wildland fires. The vegetation fuel ranking is a useful tool to estimate fire behavior and to identify areas that may benefit from vegetation management mitigation measures. Frequency of severe fire weather and fire history are more effective indicators in assessing the fire risk in Sonoma County.

The frequency of severe fire weather is defined as the percentage of time during the fire season that weather stations record high temperatures, low humidity, and strong winds.

Fire Protection Services

The ultimate size of the wildland fire, the amount of property damage, and number of injuries are largely defined by the speed of the initial emergency fire suppression response. Rapid wildland fire suppression is critical to prevent small fires from becoming large uncontrolled firestorms that become increasingly difficult to contain. Communities that have well-organized fire suppression teams can significantly reduce their wildland fire hazard by preventing small blazes from growing into difficult to control wildland fires.

In the Sonoma County areas most prone to wildland fires, fire suppression services are highly dependent on part time and volunteer fire-fighting personnel. Unfortunately, the number of volunteer fire fighters has decreased in recent years.

Fire protection responsibilities in the unincorporated areas of the county is shared by nearly 40 State, County, and local agencies. A listing of the fire districts and departments is included in Table WH-3. The area served by each of these agencies is shown in Figure 8.10. Those agencies are important partners working together to reduce the risks from wildland fires through mitigation efforts. Cooperative working partnerships allow entities to share resources and knowledge for more effective and coordinated outcomes.

Although the County is not responsible for funding each fire protections agency in the unincorporated areas of Sonoma County, adequate funding is necessary to ensure effective service over time.

Many of the fire districts are staffed by paid firefighters and supplemented by volunteers. Fire districts throughout the County report that the cost of operations is increasing more rapidly than tax revenue to support capital equipment and operation. Adequate funding is necessary to ensure effective service over time. The County is not responsible for funding each fire protections agency in the unincorporated areas of Sonoma County.

Firefighting suppression responses alone cannot fully eliminate or reduce the risks from wildland fires. Taking proactive steps to reduce the incidence of, and potential risk from, wildland fires before they occur is essential for hazard reduction.

Table WH-3: Fire Districts and Departments

Community	Designation
Bennett Valley	Fire Protection District
Bloomfield	Volunteer Fire Company
Bodega	Volunteer Fire Company
Bodega Bay	Fire Protection District
Camp Meeker	Volunteer Fire Company
California Department of Forestry/CAL FIRE	State Agency
Cazadero	Community Service District
Cloverdale	City Fire Department/Fire Protection District
Dry Creek Rancheria	Pomo Indian Tribe Fire Department
Forestville	Fire Protection District
Fort Ross	Volunteer Fire Company
Geyserville	Fire Protection District
Glen Ellen	Fire Protection District
Gold Ridge	Fire Protection District
Graton	Fire Protection District
Healdsburg	City Fire Department
Kenwood	Fire Protection District
Knights Valley	Volunteer Fire Company
Lakeville	Volunteer Fire Company
Mayacamas	Volunteer Fire Company
Monte Rio	Fire Protection District
Mountain	Volunteer Fire Company
North Sonoma Coast	Fire Protection District
Occidental	Community Service District
Petaluma	City Fire Department
Rancho Adobe	City Fire Department/Fire Protection District
Rincon Valley	Fire Protection District
Rohnert Park	Department of Public Safety
Russian River	Fire Protection District

San Antonio	Volunteer Fire Company
Santa Rosa/Roseland	City Fire Department/Fire Protection District
Schell-Vista	Fire Protection District
Sebastopol	City Fire Department
Sonoma County	County Service Area #40
Sonoma Developmental Center/Eldridge	State Agency
Sonoma Valley	Fire Protection District
Sotoyome	Volunteer Fire Company
Timber Cove	Fire Protection District
Two Rock	Volunteer Fire Company
Two Rock Coast Guard	Federal Agency
Valley Ford	Volunteer Fire Company
Wilmar	Volunteer Fire Company
Windsor	City Fire Department/Fire Protection District

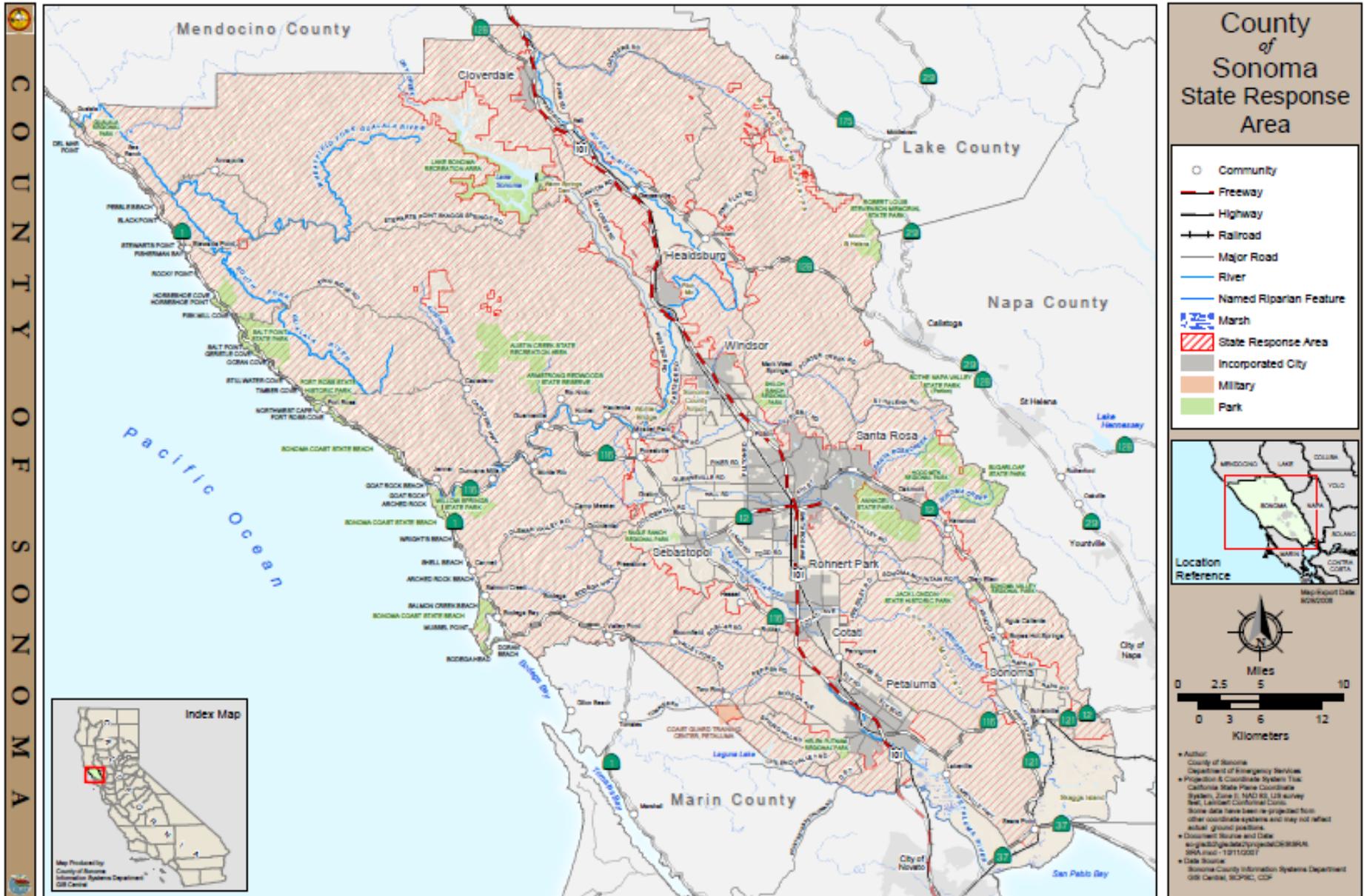
Note: Bloomfield Volunteer Fire Company is not currently active in fire suppression response.

California Department of Forestry and Fire Protection (CAL FIRE)

CAL FIRE has lead responsibility for fighting wildland fires on over 31 million acres of California's privately-owned wild lands in 21 different "State Responsibility Areas" (SRA). CAL FIRE oversees a number of programs to promote fire prevention and loss mitigation. These include vegetation management programs, technical studies of fire risk, and training and education programs. CAL FIRE has a permanent staff of approximately 4,700 employees, a seasonal staff of 2,200 employees and operates 228 fire stations located throughout the state. CAL FIRE is the only fire-fighting agency to use air operations to fight fire.

The County is in the Lake-Napa Unit (LNU) State Responsibility Area (SRA), where CAL FIRE is the lead agency responsible for fighting wildland fires. The LNU has primary responsibility for more than 2.1 million acres of SRAs located in Sonoma, Lake, Napa, Yolo, Colusa, and Solano counties. The LNU is divided into three divisions and 10 field battalions. The boundaries of Sonoma County define the West Division, which contains four battalions and covers approximately 793,793 acres. The general response time for ground vehicles to areas within the SRA is one to two hours, and air support response is usually within 15 minutes. The State Responsibility Areas of Sonoma County are shown in Figure 8.8.

Figure WH-2: County of Sonoma State Response Area



Sonoma County Fire and Emergency Services Department

The Fire and Emergency Services Department (FES) provides fire protection, rescue, emergency medical, fire prevention, code enforcement, Certified Unified Program Agency (CUPA), hazardous material response, and arson investigation services for the unincorporated areas of the county that are not included in an independent fire protection district or a city fire department. FES has a work force of fifteen paid and 300 volunteer firefighters who administer and manage the twelve active volunteer fire companies serving the County. Fourteen Volunteer Fire Companies are supported by non-profit organizations. In many cases these private entities own the fire station and fire apparatus used and a contractual relationship has been established between FES and each Volunteer Fire Company. This contract outlines the responsibilities and roles of the Volunteer Fire Companies and FES in supporting the fire suppression response in County Fire Services Area #40 (CSA #40).

County Fire Services Area # 40 (CSA #40) provides a base funding for fire protection services provided by FES and the Volunteer Fire Companies. Three communities served by FES have passed a special tax increment to enhance services within that specific fire service area. The special County Fire tax fire service areas are Wilmar, Maacamas, and Sotoyome.

CSA #40 incorporates significant areas that are rural and sparsely populated. Continuing to provide fire protection to these areas as volunteer staffs dwindle and the costs of providing services exceed tax revenues present challenges. Currently, FES and volunteer fire companies face staffing difficulties caused by changing demographics and mandated training standards. There are also significant financial challenges in maintaining and/or replacing obsolete and outdated vehicles and equipment.

Fire and Emergency Services is responsible for the emergency management planning, response and recover coordination and implementing mitigation activities. FES is also the primary coordination point for emergency management's communication flow between the Federal, State, and local levels; developing emergency operation plans for the county, cities, and districts; conducting training and educational outreach programs related to emergency preparedness; and sponsoring emergency management training.

FES implements hazardous material regulatory programs for the unincorporated area and cities of Rohnert Park, Cotati, Cloverdale, Sonoma, and the Town of Windsor. This service implements state laws that require safe generation, use, and storage of hazardous materials. FES's hazardous materials team provides response and mitigation to hazardous materials incidents.

FES is responsible for Fire Prevention enforcement of the California Fire Code and other fire-related codes and ordinances. FES enforces vegetation management by private property owners in all new development in State Responsibility Areas.; reviews building construction plans; and performs inspections of new construction for fire code compliance. Staff also provides counter service at the Permit and Resource Management Department (PRMD).

Figure WH-3: County of Sonoma CSA40 Areas



Independent Special Fire Protection Districts

There are 17 independent Fire Protection Districts in the county which are funded through taxes in special assessment districts for each district. Each district has its own elected board and operates independently from the County. Vegetation management regulations are enforced by each fire district based on individual district priorities. Factors influencing level of enforcement include accessibility, budget and staffing constraints.

In August 2005, a Municipal Services Review (MSR) was conducted of the Sonoma County Fire Protection Service Providers for the Sonoma County Local Agency Formation Commission (LAFCO). The review was prepared in accordance with the Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000. The purpose of the review was to identify measures that can be taken to improve emergency response and coordination. Each review must identify and assess nine factors related to various aspects of financing, management, infrastructure, and future growth projections. The ninth factor specifically reviews government structure options, including the advantages and disadvantages of consolidation or reorganization of service providers. The MSR for Sonoma County Fire Protection Service Providers concluded that "the existing number and configuration of fire protection agencies may be less than optimal." (County of Sonoma Fire Protection Service Providers 2005.)

The County Board of Supervisors has approved a project to seek a more effective, efficient, and sustainable fire service system in the county, particularly the unincorporated areas. While it is their belief that the many volunteers and professionals provide excellent services today, there are concerns about financial stresses that many of the agencies face. The goal of the Fire Services Project is to develop recommendations for the Board of Supervisors with the assistance of community stakeholders to ensure that the fire services system in the county is sustainable into the future. In 2014, the Ad-Hoc Committee was established for purposes of reviewing existing fire services in Sonoma County and to make recommendations to support a more effective and efficient fire system. In order to help in this project the Fire Services Advisory Committee was established and includes representatives from all stakeholder groups. The Advisory Committee works to ensure that the Fire Services Project considers key questions and information in all of the phases of the project but particularly in Phase 2 to develop recommendations.

Exposure and Vulnerability

Methodology

This section reviews the exposure and vulnerability of communities and facilities to wildland fire risk. Whenever possible, facilities exposed to wildland fire risk are listed and their values are presented. For each of the facilities examined, information was collected from the County and other sources, including GIS maps, databases, reports, and studies. An explanation of the data sources and analysis techniques used for each type of facility is presented in Appendix G.

Critical facilities incorporate essential facilities (emergency operations centers, police and fire stations, hospitals and shelters); transportation systems; lifeline utility systems; high potential loss facilities, such as dams; and facilities housing hazardous materials. Some of these facilities are owned and operated by the County, while others are operated by other jurisdictions or private entities. All critical facilities are discussed in general here, but those that are the direct responsibility of the County are examined in detail.

The greatest potential for a catastrophic wildland/urban interface fire in Sonoma County would result from multiple fire ignitions during a severe weather event where wildland fires were burning out of control in several locations around the state and mutual aid resources were stretched beyond capacity. Local communities at high risk of a wildland/urban interface fire, include Mark West Estates, Franz Valley, Porter Creek, Heights Subdivision, Foothills Ranch, and Rincon Valley.

Fire Stations

As firefighters are the first on-scene for fires, earthquakes, floods, landslides and other emergencies, it is critical that fire stations, personnel, and equipment remain operation in the event of an emergency. There are 35 stations located in high wildland fire risk areas in the County. Stations in these high risk areas place equipment and personnel in good positions to respond to events in their area. However, in the event of large fires, it is possible that fire stations could be overtaken by the fires and burned.

Hospitals

None of the major hospitals in the County are located in high wildland fire severity zones as defined by CAL FIRE. All hospitals in the County are located in the most populous, central part of the County. A wildland fire in the high risk coastal mountains could isolate these residents from emergency medical care facilities. Coastal residents would access to an urgent care clinic in Gualala; paramedics based in Bodega Bay, Guerneville and Gualala; and helicopter ambulances.

Other Emergency Response Buildings

Most of the emergency response facilities are located in urban areas outside of the wildland fire prone areas. However a number of radio communication towers and fire stations are in high or very high fire severity zones. Other important infrastructure located in wildland fire risk areas are discussed below.

Schools

Public schools in California are designed to high fire-resistant standards, but these construction methods are intended to protect against small structure fires, not a major wildland fire. Twelve public schools in the County, mostly elementary schools, are located in areas of high wildland fire risk. Four private schools are also located in high risk areas.

Emergency Communications System

The County has a wireless communications network used for public safety and emergency response. The communications network is used by the County and cities, public safety officials and emergency responders. The network is comprised of remote mountain top communication sites, consisting of towers, equipment, and buildings, which provide wireless communications coverage throughout Sonoma County. The Sheriff's Office maintains, repairs and modernizes the network.

The County uses eleven tower sites for communications antennas. Six towers are located in areas at high risk of wildland fire. The County regularly clears vegetation around tower sites to reduce fire risk. Most tower sites contain very little flammable material; fuel for backup generators is carefully stored to reduce risk. The communications system is designed to be functional even after the loss of one or more antennas, and individual sites may remain functional after a wildland fire passes over their location. However, in the past, wildland fires in other areas of the state have destroyed wireless communication sites, which impeded firefighting efforts.

Roads and Highways

Numerous County, state and federal roads and highways pass through high wildland fire risk areas. Any of these roads could be temporarily closed if a fire is burning in its vicinity. Closure of these routes may cause serious transportation problems for County residents. Wildland fires also hampers access by emergency responders and evacuation efforts of the local population.

Larger highways in high wildland fire risk areas are the biggest concern, due to the level of traffic they carry. Several state and federal highways in the County pass through high wildland fire risk areas: Highway 1, Highway 12 near Glen Ellen, Highway 101 north of Healdsburg, Highway 116, and Highway 128. Wider roads can act as fuel breaks for fires, stopping or temporarily slowing their spread. Large wildland fires, however, are not stopped by roads and have been known to jump distances of up to a mile, particularly when winds are high.

Water Supply Systems

The Sonoma County Water Agency (SCWA) water supply and transmission system is made up of aqueducts, collector wells, booster pump stations, storage tank reservoirs, and other facilities to supply water for drinking and firefighting, to manage flood risk, and to maintain health of key watersheds. The Agency also manages two major reservoirs impounded by dams which are owned by the Army Corps of Engineers, and one inflatable dam.

SCWA has completed a multi-year, multi-hazard reliability assessment of its water supply and transmission system and last adopted an update to their Local Hazard Mitigation Plan, December 12, 2012, which assessed the risk that Wildland fires posed to their infrastructure and operations. Fire is not considered to pose as high a risk to SCWA facilities. The Agency's 2012 LHMP states the following:

“Fire is relevant to the Agency’s system from two perspectives: (a) potential damage that fires may directly cause to the Agency’s facilities, and (b) firefighting demands on the Agency’s system – that is, the emergency water supply needs of fire departments who may be relying on the Agency to supply that water.

Most of the Agency’s water system is in an area of low fire hazard except for the facilities in the Wohler and Mirabel area.”

Water supply is especially important since it is used to fight wildland fires. All areas of the County rely on water supplied by local water distribution companies or agencies, or water from local wells and dams. Some of these sources can be incapacitated if the power supply is interrupted. While underground water pipes are unlikely to be damaged by wildland fires, buildings and equipment necessary to manage the water supply can be damaged. Facilities for at least two local water companies (Holland Heights Water Company and the Sea Ranch Water Company) are located in areas at high risk of wildland fire.

Shortages of water due to supply problems can be exacerbated by open water connections in the burning areas. Especially in urban interface areas, homeowners may use hoses to wet their roofs and may leave those running after abandoning their property. Firefighters may have to abandon open hydrants. These open connections can add to the excessive demand on water systems.

Water for fire-fighting is also available from residential sources. The County requires all residential development to have adequate water supply or storage to fight fires. In outlying areas that are not served by urban water systems, rural residential properties typically install large water tanks of a minimum of 2,500 gallons. These tanks provide a water supply to protect individual structures from wildland fires. Fire companies in the County have the proper equipment to connect to these tanks. The County inspects water tanks during construction but has no mechanism to ensure that they remain serviceable over time.

Other Utilities

Utility systems can be disabled by wildland fires, particularly in wildland/urban interface areas. Above-ground poles and wiring for electricity, telephone and cable can be damaged by fire. Buildings housing important equipment can burn, and equipment can be damaged by the intense heat or by water used to suppress fires. Utility services in many areas of Sonoma County could be disabled by wildland fires.

A number of high voltage lines pass through high fire risk areas of the County. Low voltage lines serve all areas that are inhabited. According to PG&E, there are 177 miles of high voltage transmission lines in the County. There are many more miles of electrical distribution lines. The electrical system can be affected by wildland fires if high- or low-voltage lines, substations, or generating facilities burn.

Numerous electrical substations are located in high fire risk zones, including those at Dunbar, Fort Ross, Monte Rio, Annapolis, Eagle Rock, and The Geysers. The Geysers geothermal plant is located in one of the County's highest fire risk areas, and several wildland fires have occurred near it in the past century. Most recently in the Valley Fire, four cooling towers at the power plants were destroyed by fire, necessitating long term repairs prior to getting them back online. About two percent of past wildland fires have been caused by powerlines according to Figure WH-1 above.

Communication systems are also at risk from fire. Several AT&T facilities are located in high risk areas, and aboveground telephone lines serving the population living in high risk areas are vulnerable. Several cellular telephone antennae, owned by various companies, are located in high wildland fire risk areas. Damage to these structures could contribute to poor telephone functionality in various parts of the County.

Hazardous Materials Sites

The County has many sites containing hazardous materials. These sites include drycleaners, gas and service stations, agricultural sites, industrial sites, and high-tech facilities. The majority of the sites are clustered along Highway 101 or associated with the Geysers geothermal field. Approximately 50 sites with hazardous materials are located in areas at high risk of wildland fires. If these sites burn, impacts could include increased air pollution, environmental damage, or challenging and costly, post-fire clean-up.

County Buildings

The County owns over 580 buildings, ranging from high occupancy structures like office buildings and the county jail to low occupancy structures such as storage sheds. The total insured value of county-owned buildings and contents exceeds \$500 million, including structures, finishes, and contents.

The risk of property damage caused by wildland fires is related to a number of factors, including location, surrounding vegetation, construction materials, and fire suppression resources. County buildings located in wildland/urban interface areas of the County are at high risk, despite mitigation measures such as vegetation management, construction materials and suppression systems. These mitigation measures may reduce fire risk, but a wildland fire spurred by heavy winds and dry weather can overwhelm firefighting efforts and destroy buildings very quickly. County buildings that are located in these zones include those listed below in Table WH-4.

Table WH-4: County Buildings Located in High Wildland Fire Risk Areas

Building	Address	Building Value	Contents Value
Valley of the Moon Children’s Home and Annex	Pythian Way	\$1,400,000	\$800,000
Hood Mansion		Unknown	Unknown
JJC		Unknown	Unknown
Sheriff Coastal Housing	22006 Davis Way	\$200,000	Unknown
Youth Camp	6201 Eastside Road	\$1,800,000	5,100,000
Occidental Community Center Building	3920 Bohemian Highway	\$700,000	\$100,000

Note: Building Value and Contents Value represent combined value of all structures at this site. This table lists insured value, which may not accurately reflect current value or replacement value.

People and Private Buildings

An estimated 33,900 people in unincorporated Sonoma County live in areas potentially at risk of wildland fires, representing seven percent of the total population. Some populations are more at risk of being harmed by disasters than others, including the very young, the very old, the disabled and the chronically ill. One important government facility serving the disabled is located in the high wildland fire risk area of the county: The Sonoma Developmental Center (SDC) is a state operated residential facility serving individuals with developmental disabilities. Around 12,600 buildings are located in areas with high and very high risk of wildland fires. (This includes all structures with a footprint greater than 1000 square feet regardless of occupancy.) Assuming a replacement value of \$150 per square foot, the structures account for \$4.8 billion in real estate. Structures with older, wooden roofs or without adequate vegetation management are at particular risk. Risk increases as additional mountainous areas of the County are developed and buildings formerly used as summer cottages are converted into permanent homes.

Environmental Resources

Wildland fires can have long-term impacts on all plant and animal species in an environment. The relationship between wildland fires and environmental health is complex. Some fragile ecosystems can be adversely affected by large fires. Ecosystems that are most at risk of long-term negative consequences are areas with endangered or threatened species, local stream habitats, and older forests.

After a significant wildland fire, increased amounts of sediments will flow into rivers and streams. Erosion and sedimentation can have a negative impact on water quality and fisheries. It is unclear how the threatened fish species in the County – Coho, Steelhead and Chinook salmon – could be affected by this potential secondary impact of wildland fires.

Impact and Loss Estimates

Methodology

This Plan estimates the impacts of a plausible wildland fire scenario in the County and provides a realistic assessment of the types of damage that could occur in the County. The scenario is described below and is followed by a summary of damage and economic losses in recent wildland fires.

We assess the impacts of a repeat of the 1964 Hanley and Nuns Canyon Fires, which burned simultaneously in September of 1964. This scenario assumes that the same areas would burn again, and does not examine whether current firefighting techniques could more successfully contain these blazes. A repeat of these fires would cause significantly more damage today than occurred in 1964 due to increased development.

Case Study: 1964 Hanley and Nuns Canyon Fires

In September of 1964, the Hanley Fire, fueled by dry weather and 70 mile per hour winds, swept across the Napa-Sonoma County border. It burned out of control through Knights Valley, Franz Valley, and Mark West Canyon and was finally stopped when it reached the northern parts of Santa Rosa. Simultaneously, a fire burned through Nuns Canyon to the edge of Route 12. Together, these fires burned 65,800 acres, destroyed more than 100 homes and damaged millions of dollars in property.

Today, about 3,500 buildings are located in the area that was burned in these historic fires. These buildings include many private homes, one public middle school, ten sites with hazardous materials, a PG&E substation, and high-tech commercial space. An estimated 9,600 people live in this area.

Assuming a value of \$150 per square foot for reconstruction, the cost of damage to buildings, their contents and agriculture could exceed one billion dollars. Residential communities including Franz Valley, Mark West Estates, Foothills Ranch, Porter Creek, and Heights Subdivision would be devastated by a repeat of these fires. Firefighting costs could reach millions of dollars.

Stringent fire safety standards in Sonoma County coupled with improved mutual aid systems may prevent a repeat of the 1964 fires; however, it is not inconceivable that a large uncontrolled wildland fire could overwhelm resources and cause significant damage.

Plans

Community Wildland fire Protection Plans (CWPP)

The Community Wildfire Protection Plan (CWPP) was defined by the Healthy Forests Restoration Act of 2003 with the intention of enhancing collaboration between stakeholders from federal,

state and local agencies and community groups as they search for solutions to Wildland/Urban Interface (WUI) Wildland fire issues. There are three requirements for a CWPP: it is collaboratively developed with input from agencies and community members; it identifies and prioritizes treatment areas, mitigation strategies and treatments; and it recommends measures to reduce the ignitability of structures.

The Sonoma County CWPP was developed with input from many organizations, including state and local fire departments, federal agencies, community groups, and land management agencies. Every attempt was made to include divergent points of view in developing the CWPP. Fire Safe Sonoma (FSS) has worked with CAL FIRE and the County of Sonoma to integrate this plan into other existing plans such as the Sonoma County Hazard Mitigation Plan and CAL FIRE's Strategic Fire Plan, Sonoma-Lake-Napa Unit.

The following list of reduction priorities is outlined in the CWPP:

- Projects that help Wildland-Urban Interface residents reduce fire fuels in the defensible space zone of homes, and along important egress and access routes.
- Projects that help residents reduce structural ignitability.
- Projects that serve to educate residents about fire, fire risks, vegetation management, ecosystem and forest health, structural vulnerability, and how to most efficiently reduce risks.
- Projects that increase community safety through planning.
- Strategic fuel breaks that can help firefighters stop the advance of wildland fires, thus protecting homes, communities and natural resources. In addition to reducing wildland fire threats, fuel breaks should also serve to improve ecosystem health.
- Projects that help highly motivated and organized community groups achieve their fire safety goals.
- Projects that consider demographic trends of residents, such as age and language.
- Projects that allow large land holding managers and nearby residents to achieve mutually acceptable strategies for fuels management.
- Projects that improve conditions and health in a variety of fire-prone ecosystems, especially in areas impacted by tree diseases, pathogens or insects, or in areas where native species are at risk because of changing conditions.
- Projects that address fire-prone invasive plant species including but not limited to gorse, broom, and eucalyptus.
- Projects that make use of woody biomass and other emerging technologies.
- Projects that support and aid fire agencies in achieving their missions.

National Fire Plan

This plan was prepared by the U.S. Department of Agriculture and Department of Interior. The purpose was to address wildland fire hazards and to develop a strategy to minimize the short and long term impacts from wildland fires. The Plan outlined a comprehensive strategy with a commitment to fund a continued level of "Hazardous Fuel Reduction" and additional funding for

a "Community Assistance/Community Protection Initiative." The intent of the Community Assistance initiative is to provide communities adjacent to federal lands with technical assistance and funding to reduce the threat of wildland fires. The Plan directed federal agencies to "work directly with communities to ensure adequate protection from wildland fires, and to develop a collaborative effort to attain the desired future condition of the land." The key wildland fire management agencies in California have chosen to accomplish this effort through the California Fire Alliance.

The California Fire Plan

The California Fire Plan (Fire Plan) is the state's road map for reducing the risk of wildland fire. The Fire Plan emphasizes the reduction of firefighting costs and property losses, increase firefighter safety, and improve ecosystem health after fires by protecting at-risk assets through pre-fire management and initial attack success.

Sonoma Lake Napa Unit Fire Management Plan

The Sonoma Lake Napa Unit Fire Management Plan (LNU) Fire Management Plan, last updated in 2010, reflects the wildland fire situation in the CAL FIRE Unit by identifying high-risk and high-value areas where costly and damaging wildland fires may occur. The four basic components of the LNU Fire Plan assessment are: assets at risk; vegetation fuel hazards; fire history and frequency of severe fire weather; ignition workload assessment, and management prioritization. The Plan also includes strategies for reducing the fire risk in priority areas.

Sonoma County General Plan 2020

California State law requires each County to prepare a General Plan to set forth community policies and to guide development of the county and the distribution of future land uses while protecting and maintain the public health, safety and welfare. Sonoma County updated the General Plan in September of 2008. The Plan is intended guide land use and development decisions, land use or zoning changes, development proposals, use permits, subdivisions, capital improvement plans, must be found consistent with the general plan before approval. The General Plan includes a Public Safety Element that includes goals and policies to reduce damage from wildland fires and establishes the following goal:

- GOAL PS-3: Prevent unnecessary exposure of people and property to risks of damage or injury from wildland and structural fires

The Public Safety Element includes mapping of the "High" and "Very High" Wildland Fire hazard zones as identified in the County's 2011 Hazard Mitigation Plan and consistent with the areas designated by CAL FIRE mapping. The Public Safety Element uses the hazard mitigation plan and existing data on wildland and urban fire hazards to guide new development and to help reduce damage from fire hazards.

The General Plan Public Safety Element recommended a number of implementation programs including Program 2 to prepare amendments to Chapter 25 of the County Code, addressing fire

safety requirements for subdivisions, and Program 4 to prepare and adopt an ordinance requiring automatic sprinkler or other on-site fire detection and suppression systems in new residential and commercial structures. In total, the Public Safety Element sets forth 13 policies to reduce risks from fires (See Appendix B).

Other elements of the General Plan include goals to minimize potential injury and property losses from natural hazards. For instance, the Land Use Element includes Objective LU-7.1 to:

- “Restrict development in areas that are constrained by the natural limitations of the land, including but not limited to fire hazards”.

The General Plan notes that in order to reduce the risk of fire damage in rural areas, the types and intensities of land uses should be limited. Wildland fire hazards may be reduced by mitigation measures such as the removal of vegetation and installation of dependable water systems, but the hazards cannot be eliminated entirely. Rural development should be most restricted where natural fire hazards are high, fire protection is limited, and inadequate road access prevents timely response by firefighting personnel and rapid evacuation by residents. As a result, the General Plan land use densities restrict land uses and density in hazardous areas, thereby limiting the number of people and buildings exposed to hazards.

Vision 2020 County Fire Strategic Plan

The Vision 2020 County Fire Strategic Plan was developed to guide implementation of a number of recommendations for improving and maintaining delivery of community based fire suppression, rescue, and emergency medical services in County Fire Service Area #40 over a ten-year period. The recommended actions were previously identified in the June 2009 Analytical Review of CSA #40 and accepted and directed by the Board of Supervisors in August of 2009. A Fire Steering Committee was formed to prepare the Plan and guide implementation. Standards of Coverage (SOC) was developed in September 2012 to establish response time goals, service levels, fire station locations, and staffing configurations. The Plan also addresses governance and administration, operational management, capital investment planning, funding, and insurance for volunteer fire companies. Implementation of the Plan will help County Fire meet basic standards of coverage and deliver high quality fire and emergency services for “rural” service areas in CSA #40.

Codes and Regulations

Government Code Section 65302.5

Under Government Code Section 65302.5, any county that has state responsibility areas (SRAs) within its boundaries must adhere to Public Resources Code Section 4128.5, which requires that counties with SRAs submit a copy of the proposed safety element of a general plan to any agency with responsibility for fire protection in the county prior to adoption or amendment. The fire protection agencies may then provide comments on or recommendations for the proposed safety element. The Board of Supervisors reviewing the general plan must consider these

comments and recommendations. If any or all of the recommendations are not accepted, the Board must provide written communication to the agency stating why it is not including the recommendations. The Board must also state how its own actions regarding land and policies within state responsibility areas will reduce the risk of fire for people, property, and natural resources. The County has complied with this regulation.

Public Resources Code Section 4290

California Public Resources Code Section 4290 provides authority to CAL FIRE to develop and implement fire safety standards for defensible safety on State Responsibility Area (SRA) lands. All residential, commercial, and industrial construction on SRA lands approved after January 1, 1991, must follow the regulations established by this board. At a minimum, the regulations will include road standards for fire equipment access; standards for street, road, and building identification signage; minimum levels for private water supply reserves that could be used for emergency fire use; and fuel breaks and greenbelts. Sonoma County Fire Safe standards and other regulations are consistent with these provisions.

Public Resources Code Section 4291

Public Resources Code Section 4291 states that a person who owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining a mountainous area, forest-covered lands, brush covered lands, grass-covered lands, or land that is covered with flammable material shall at all times maintain defensible space of 100 feet from each side and from the front and rear of the structure, but not beyond the property line. Proper clearance to 100 feet dramatically increases the chance of a house surviving a wildland fire much more than the previous 30 foot clearance requirement. The code also specified standards for tree and roof maintenance.

Public Resources Code Section 4291 also establishes requirements for building permits. Before construction on any building or rebuilding, a certification must be obtained from the local building official that the structure design adheres to the current code. After the building construction has been completed, a final inspection must be performed by the building official to verify that the building was built to state and local codes. Sonoma County Fire Safe Standards conform with these regulations.

Bates Bill

The "Bates" Bill, Government Code Section 51175, was prompted by the devastating Oakland Hills Fire of 1991. This legislation calls for the CAL FIRE Director to evaluate fire hazard severity in local responsibility area and to make a recommendation to the local jurisdiction where Very High Fire Hazard Severity Zones (VHFHSZ) exist. The Government Code then provides direction for the local jurisdiction to take appropriate action.

State Responsibility Areas (SRA's) Under the California Fire Plan must consult with CAL FIRE on development proposals within these areas to assure safe development conditions.

Fire Hazard Severity Zone (FHSZ) Mapping

Fire Hazard Severity Zone mapping requires CAL FIRE to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors (Public Resources Code (PRC) 4201-4204 and Government Code 51175-89). These zones, referred to as Fire Hazard Severity Zones (FHSZs), define the application of various mitigation strategies to reduce risk of wildland fires. CAL FIRE completed FHSZ mapping in Sonoma County in 2010.

CAL FIRE has remapped both state and local fire responsibility areas to provide updated, more accurate map zones, such that mitigation strategies can be implemented in areas where hazards warrant.

Building Codes

On September 20, 2007 the California Building Standards Commission (CBSC) approved the Office of the State Fire Marshal's emergency regulations amending the California Code of Regulations (CCR), Title 24, Part 2, known as the 2007 California Building Code (CBC). In January 2010, the CBSC approved the 2010 California Building Code (CBC) and the new 2010 California Residential Code (CRC). Provisions for wildland fire exposure for residential occupancies can be found in Chapter 3, Section 327 of the CRC. Nonresidential provisions can be found in Chapter 7A of the CBC. These codes were adopted by ordinance and became effective on January 1, 2011.

New buildings located in any Fire Hazard Severity Zone within State Responsibility Areas, any Local Agency Very-High Fire Hazard Severity Zone, or any Wildland-Urban Interface Fire Area designated by the enforcing agency for which an application for a building permit is submitted on or after January 1, 2011, shall comply with all sections of 2010 CRC Chapter 3, Section 327, for residential structures and CBC Chapter 7A for non-residential structures. New buildings located in any Fire Hazard Severity Zone shall comply with one of the following:

- State Responsibility Areas (SRA): New buildings located in any Fire Hazard Severity Zone within SRA, for which a building permit application is submitted after January 1, 2011, shall comply with 2010 CRC Chapter 3, Section 327, for residential structures and CBC Chapter 7A for non-residential structures.
- Local Agency Very-High Fire Hazard Severity Zone (LRA VH FHSZ): New buildings located in any Local Agency Very-High Fire Hazard Severity Zone for which an application for a building permit is submitted after January 1, 2011 shall comply with 2010 CRC Chapter 3, Section 327, for residential structures and CBC Chapter 7A for non-residential structures. CAL FIRE prepared maps designating the Local Responsibility Agency, "Very-High Fire Hazard Severity Zone. The Local Agency Very-High Fire Hazard Severity Zone maps are used to identify areas where ignition resistant building standards will be required for new construction; where sellers must disclose natural hazards at the time of property sale; and where a 100 foot clearance requirement for defensible space applies.

- Wildland-Urban Interface Fire Area: New buildings located in any Wildland-Urban Interface Fire Area designated by the enforcing agency shall comply with the Wildland-Urban Interface Fire Area Building Standards which establish minimum standards for materials and provide a reasonable level of exterior wildland fire exposure protection. The standards require the use of ignition resistant materials and design to resist the intrusion of flame or burning embers from a vegetation fire into buildings. The standards apply to all "R-3" occupancies. Prior to construction, the building official must review plans and verify, through "certification" that the building as proposed complies with all applicable state and local building standards, including those for materials and construction methods for wildland fire exposure as described in 2010 CRC Chapter 3, Section 327, for residential structures and CBC Chapter 7A for nonresidential structures.

Sonoma County Code of Ordinances (Chapter 13: Sonoma County Fire Safety)

Often referred to as the "Fire Safe Standards," this regulatory code constitutes the local adoption of the California Fire Code and establishes minimum fire safe standards for development within the unincorporated area of the county. The conditions and requirements will ensure that all new development within the unincorporated county afford a basic level of fire protection. County code is based on national standards, including the Uniform Fire Code Standards and the National Fire Code.

County Fire Safety Standards include emergency access requirements; road naming and addressing requirements; minimum emergency water supply and sprinkler requirements to ensure a supply of water to attack a fire or defend property from a fire; fuel modification and defensible space requirements to reduce the possibility and intensity of a wildland fire; and other fire protection measures. Due to the severe fire risk in many areas of the County, the Fire Safe Standards are more stringent than those required by the California Fire Code. Since 2003, an automatic fire extinguishing system is required in most new buildings, regardless of size, in the unincorporated areas of the County.

Sonoma County Code of Ordinances Chapter 13A: Abatement of Hazardous Vegetation and Combustible Material

In March of 2016, the Board of Supervisors adopted Chapter 13A to the County Code requiring the abatement of hazardous vegetation and combustible material. The purpose of this chapter is to provide for the removal of hazardous vegetation and combustible material from around the exterior of improvements situated in the unincorporated areas of the county so as to reduce the potential for fire and to promote the public health, safety and welfare of the community. As a result Fire and Emergency Services staff plan to implement the Fuel Reduction/Vegetation management Program as a Pilot program for the most hazardous unincorporated areas in the County by enforcing the ordinance in only the Fitch Mountain and Camp Meeker areas for the first two years after the effective date of the ordinance.

Zoning Codes

The County's zoning code does not have provisions specifically addressing wildland fire hazards. However, the zoning code provides the discretionary authority to condition project approvals, consistent with the General Plan Public Safety Element goals. The discretionary approval process also provides opportunities for fire protection agencies to have input into permit approvals or denials.

Subdivision Codes

The County subdivision ordinance, Chapter 25 of the Sonoma County Code, establishes standards to regulate the division of land, defines minimum lot sizes, densities and development standards. Subdivisions standards require provision of water storage facility for fire protection, and a fire management plan. The Code also has a number of road standards to assure adequate access for emergency vehicles.

California Environmental Quality Act (CEQA)

Prior to any action on a discretionary project subject to CEQA, the lead agency must conduct environmental review of the proposed project, including determining if the project would expose people or structures to a significant risk of loss, injury or death involving wildland fires. CEQA specifically requires evaluation of risk where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Mitigation Programs and Activities

Sonoma County Fuel Reduction and Vegetation Management Program

The first two years of the implementation of the Abatement of Hazardous Vegetation and combustible Material Ordinance and Vegetation Management program will be initiated in the unincorporated areas of Fitch Mountain and in Camp Meeker. Unincorporated areas at Fitch Mountain and Camp Meeker have been identified as pilot areas for a two (2) year period. Fitch Mountain include 709 parcels and Camp Meeker include 660 parcels to be inspected. The inspection of improved and unimproved properties provides a proactive inspection program to identify areas within Sonoma County which are high fire severity zones. The pilot vegetation management inspection program is designed to minimize and eliminate the threat of an uncontrolled fire. While the ordinance is a countywide ordinance the legislation stipulates that designated areas may be identified for the inspections and enforcement program.

Sonoma County Roadside Chipper Program

Sonoma County Fire is providing a free curbside chipper service to residents who are engaged in making their property more Wildland fire safe and reduce vegetation along access routes at no charge to residents. In the event of a Wildland fire, having 100 feet or more of defensible space has been clearly demonstrated to help save homes. Likewise, thinning vegetation on access roads can make it safer for residents and firefighters. The program runs throughout fire season from June to October, or as long as funds are available. This service is available within specific geographical areas.

CAL FIRE Fuels Reduction Program

The goal of the Fuels Reduction Program within CAL FIRE is to reduce wildland fuel loadings that pose a threat to watershed resources and water quality. CAL FIRE is implementing the Fuels Reduction Program through the Vegetation Management Program, California Forest Improvement Program, and California Forest Stewardship Program described below.

Financial Resources

Assistance to Firefighter Grant Program

The purpose of these grants is to assist national, state, regional or local organizations in addressing fire prevention and safety. Funds can be used to purchase equipment or fund planning, vegetation management and other preparedness activities. These grants are administered by the Office for Domestic Preparedness and the U.S. Fire Administration, both part of the Department of Homeland Security. Communities must match the federal grant with a 30 percent contribution.

Vegetation Management Plan

The Vegetation Management Program (VMP) is a cost sharing program that focuses on the use of prescribed burning, and mechanical means, for addressing wildland fire fuel reduction in SRA lands. The use of prescribed fire mimics natural processes, restores fire to its historic role in wildland ecosystems, and provides significant fire hazard reduction benefits that enhance public and firefighter safety. VMP allows private land owners to enter into a contract with CAL FIRE to use prescribed fire to accomplish a combination of fire protection and resource management goals.

California Forest Improvement Plan

Funding is available for fuels reduction projects conducted under the California Forest Improvement Program (CFIP). Eligible forest land owners can be reimbursed up to 90 percent of their expenses for fuels reduction projects conducted under CFIP.

Fire Management Assistance Grant (FMAG) Program

Fire Management Assistance is available to States, local and tribal governments, for the mitigation, management, and control of fires on publicly or privately owned forests or grasslands, which could, in a fire, constitute a major disaster.

The Fire Management Assistance declaration process is initiated when a State submits a request for assistance to the FEMA Regional Director at the time a "threat of major disaster" exists. The Fire Management Assistance Grant Program (FMAGP) provides a 75 percent Federal cost share and the State pays the remaining 25 percent for actual costs.

Before a grant can be awarded, a State must demonstrate that total eligible costs for the declared fire meets or exceeds either the individual fire cost threshold - which applies to single

fires, or the cumulative fire cost threshold, which recognizes numerous smaller fires occurring at the same time throughout a State. Eligible firefighting costs may include expenses for field camps; equipment use, repair and replacement; tools, materials and supplies; and mobilization and demobilization activities.

National Fire Plan Funding for Community Protection in California

In California, agencies have pooled their National Fire Plan funding into a one-stop shop to help simplify the process of finding and applying for grants to improve California's community wildland fire preparedness. This web-based tool is hosted by the California Fire Safe Council (FSC).

State Fire Assistance (SFA)

The State Fire Assistance program assists state forestry agencies in wildland fire response coordination and delivery, compliance with the national safety and training standards, hazard assessments, fuels treatment projects, and public education efforts.

California Forest Stewardship Program

This program combines funds from state and federal sources to assist communities with multiple-ownership watershed and community issues related to pre-fire fuels treatment, forest health, erosion control, and fisheries issues.

USDA Programs

The U.S. Department of Agriculture (USDA) offers the following grants to both fire departments and the communities they serve in an effort to improve firefighting through training and better equipment. The U.S. Forest Service is within the USDA's organization.

Volunteer Fire Assistance (VFA)

The Volunteer Fire Assistance Program, formerly known as the Rural Community Fire Protection Program, is administered by the State Forestry Service through 50/50 cost-sharing grants to local fire departments in rural communities. The Forest Service distributes funds to the states, which in turn gives out the funds to individual fire departments. The program's main goal is to provide federal financial, technical, assistance in the organization, training, and equipping of fire departments in rural areas with a population of 10,000 or less.

Special Vehicle and Equipment Initiative

The USDA's Rural Development's Community Facilities Program offers grants to rural areas with fewer than 20,000 people that are looking to purchase vehicles and equipment. These grants may be used to purchase needed community vehicles, including those used for utilities, snow removal, road maintenance and fire and rescue. These funds may also be used to purchase first-responder equipment for police, fire department and other emergency vehicles. Local governmental bodies are eligible to apply and the amount awarded will depend on the median household income of the area. Eligible applicants can apply at their local USDA office; grants are awarded on a first-come, first-served basis.

Community Facilities Grants

The Community Facilities Grant program is directly administered by the USDA, and the goal is to help communities develop needed facilities, including fire departments, hospitals and safety facilities. The grants are given to rural communities with 20,000 people or fewer; very small, lower-income communities receive a higher percentage of funding for projects. The grants are awarded to local governmental agencies, districts, nonprofit organizations and Native American tribal governments. These grants may be used for the construction or renovation of community facilities, and can also be used to purchase needed equipment.

Community Fire Protection Programs

The Community Fire Protection Program, enacted as part of the 2002 Farm Bill, an amendment to the Cooperative Forestry Assistance Act of 1978, provides assistance to communities for fire protection, especially in the wildland-urban interface.

Community Assistance and Protection Program

This BLM program focuses on mitigation and prevention; education; and outreach to address reduction of wildland fire threats and losses to communities and natural resources. National Fire Prevention and Education teams are sent to high risk fire areas across the country. The teams work with local residents to help reduce the number of human-caused fires and implement wildland fire prevention programs. The BLM also facilitates FIREWISE and other workshops to help people live safely in the wildland-urban interface. Other specialists assist communities by completing comprehensive wildland-urban interface community risk assessments and plans.

State Responsibility Area (SRA) Fire Prevention Fee

The State Responsibility Area (SRA) Fire Prevention Fee was enacted following the signing of Assembly Bill X1 29 in July 2011. The law approved the new annual Fire Prevention Fee to pay for fire prevention services within the SRA. The fee is applied to all habitable structures within the SRA.

Effective July 1, 2014, the fee is levied at the rate of \$152.33 per habitable structure, which is defined as a building that can be occupied for residential use. Owners of habitable structures who are also within the boundaries of a local fire protection agency will receive a reduction of \$35 per habitable structure.

This fee funds a variety of important fire prevention services in the SRA. Such activities include fuel reduction activities that lessen risk of Wildland fire to communities and evacuation routes. Other activities include defensible space inspections, fire prevention engineering, emergency evacuation planning, fire prevention education, fire hazard severity mapping, implementation of the State and local Fire Plans and fire-related law enforcement activities such as arson investigation.

Other Potential Funding Services

Additional potential multi-hazard funding sources are identified in Chapter 1 (Introduction) of this Plan.

Other Stakeholders

In addition to those Local, State and Federal agencies and nongovernmental entities identified in Section 7.9 the following entities play a key role with respect to wildland fire hazard mitigation.

US Forest Service (USFS)

The USFS is an agency of the USDA. The USFS manages public lands in national forests and grasslands. The Fire and Aviation Management part of the USFS works to advance technologies in fire management and suppression; maintain and improve mobilization and resource tracking systems used in emergency response; and support fire safety standards and community education programs at the federal, state and local level.

Bay Area Air Quality Management District (BAAQMD)

BAAQMD is a Special District regulatory agency that monitors and protects air quality. The southern portion of Sonoma County lies within the district boundaries. BAAQMD enforces regulations and issues permits for agricultural and vegetation management burns.

Fire Safe Sonoma

The Fire Safe Sonoma organization is a nonprofit organization of fire protection professionals, representatives of community action groups, homeowners and other concerned individuals. Its primary purposes are to educate, exchange information, foster fire prevention and fire safety practices, promote vegetation management, obtain grants, support local fire agency efforts and engage rural communities. Fire Safe Sonoma works with community groups on issues including sudden oak death and vegetation management. Important stakeholders such as PG&E, insurance companies, and others work together through this group.

California Fires Safe Council

The California Fire Safe Council (CFSC) is a state-level nonprofit organization and member of the California Fire Alliance, consisting of public and private organizations. The CFSC's mission is to preserve and enhance California's resources by fostering the wildland fire protection efforts. The CFSC accomplishes its mission through public education programs and by funding community fire safety projects. The CFSC distributes fire prevention education, evaluates fire safety legislation, and assists local organizations to initiate fire safety programs. The CFSC administers the Grants Clearinghouse program, which provides assistance for fire prevention community assistance grants. In ten years of grant making, CFSC has funded over 850 wildland fire mitigation projects valued at over \$81 million. Projects including fuel reduction projects, prescribe fires, mechanical treatments, and grazing methods, education and outreach activity, Community Wildland fire Protection Plan (CWPP) development, and biomass reutilization.

California Fire Alliance

The following wildland fire management agencies fulfill the national fire plan's directive to "work directly with communities to ensure adequate protection from wildland fires, and to develop a collaborative effort to attain the desired future condition of the land." California Fire Alliance is made up of the following agencies: CAL FIRE, USDA Forest Service, California Fire Safe Council, Bureau of Indian Affairs, BLM, Cal EMA, Los Angeles County Fire Department, National Park Service, and USFWS.