

# Sonoma County Community Wildfire Protection Plan

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**FIRE SAFE SONOMA**



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This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. The Sonoma County Community Wildfire Prevention Plan (the Plan) is a work in progress. Various changes are anticipated throughout the Plan over the next several years.

Readers are urged to consult with their own agencies having jurisdiction regarding the use or implementation of this Plan, as well as their own legal counsel on matters of concern.

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However, if and once grant funding is received from state or federal agencies and prior to work performed pursuant to this Sonoma County CWPP or a local CWPP, or prior to issuance of discretionary permits or other entitlements by any public agencies to which CEQA or NEPA may apply, the lead agency must consider whether the proposed activity is a project under CEQA or NEPA. If the lead agency makes a determination that the proposed activity is a project subject to CEQA or NEPA, the lead agency must perform environmental review pursuant to CEQA or NEPA.

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# **Executive Summary**

## ***Collaboration and Community Outreach***

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) wildfire 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.

This plan 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.

Eight meetings were held across the county to solicit the thoughts and concerns of County residents and encourage collaborative discussion between residents and stakeholder agencies. The meetings allowed for much productive discussion. Concerned residents were able to gain understanding about their wildfire risks and how they might address them, while agency personnel learned about issues of concern for their local areas.

## ***Sonoma County's Wildland Urban Interface***

Approximately one-third of county's 495,000 residents reside in Sonoma County's Wildland/Urban Interface or Intermix (WUI), wherein wildland fuels intermix with homes and structures. The potential for wildfire depends primarily on three elements: topography, fuels and weather. The way these three elements interact on any given day will determine fire behavior. More than 50.5% of County land area, approximately 513,388 acres, is coniferous forests and oak woodlands. 68% of these forested parcels are in private ownership. Fuels conditions vary considerably across ecosystems and microclimates, but most of Sonoma County's WUI areas are in areas identified by CAL FIRE as high or very high fuel rank/potential. The fire season comes in the typically dry summer and fall months, but can be significantly lengthened by weather events such as drought and global climate change.

## ***Fire Issues in Sonoma County's Wildland/Urban Interface (WUI)***

Many decades of successful fire suppression in combination with conversion of forest and grazing lands to residential use have had dramatic effects on virtually all of Sonoma County's ecosystems, leaving a legacy of dense vegetation with a high proportion of dry dead materials, placing nearby communities at risk of significant home loss. It is crucial that residents of Sonoma County's WUI understand the importance of making individual homes and entire communities capable of withstanding the passage of a wildfire without suffering high numbers of home ignitions. To withstand wildfire,

elements on structures that make it vulnerable to ignition need to be modified and fuels maintained in the one hundred foot defensible space zones. These activities are primarily the responsibility of individual homeowners. Educating residents about what they can do to create “wildfire adapted” homes and communities and providing assistance so they do so will reduce risks of economic and life loss in the WUI.

### ***Wildfire History***

Our County has had a number of significant fires in the past, especially in the Mayacamas Mountains and the Coast Range. In 1964, the Hanley Fire, burned 52,570 acres from Calistoga to the outskirts of Santa Rosa, and only 108 structures were lost. Today, the area contains thousands high value homes, commercial properties, vineyards and infrastructure. Though today there are more firefighting resources and equipment, the potential for a similar incident exists, with greater potential for life loss and economic impact. In addition to fuels ranking and other data from CAL FIRE’s Fire and Resource Assessment Program (FRAP), fire history remains an important indicator for future fire potential.

### ***Designation of the Wildland/Urban Interface (WUI)***

One of the things that a CWPP can do is to designate the WUI, which can help in funding efforts for wildfire risk reduction projects. Since nearly any wildfire in the State Responsibility Areas (SRA) will have the potential to destroy high priority assets, this plan designates the SRA as the WUI. Additionally, since embers can travel for miles in advance of a wildfire, LRA areas within 2 miles of SRA areas are also declared WUI. As smaller community-based CWPPs are developed, these boundaries may be increased or decreased to better reflect community needs.

### ***Risk Assessment***

This Risk Assessment combines the findings of the Sonoma County Hazard Mitigation Plan, the CAL FIRE’s Sonoma-Lake-Napa-Unit Strategic Plan, and the considerations of residents as compiled in the community meetings. Life and safety is always the first priority, followed by property such as homes, critical infrastructure and natural and cultural resources.

### ***Hazard Reduction Priorities***

There are a variety of means that wildfire risks can be reduced. Most importantly, homeowners need to ensure that homes and surrounding vegetation is treated to resist ignition. Additionally, larger-scale projects can create fuel breaks that can protect entire communities. These can be achieved through a variety of means, including mechanical treatment, prescribed fires, and grazing. The following list of reduction priorities incorporates the wishes of agencies and community members.

- 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 wildfires, thus protecting homes, communities and natural resources. In addition to reducing wildfire 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, language and disabilities.
- 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.

### ***Fire Agency Overview***

Sonoma County's WUI is primarily served by one of 35 Fire Protection Districts, Community Service Areas, and the fire companies of the County Service Area # 40. Additionally, there are six municipal fire departments which also serve WUI areas. In the State Responsibility Area, CAL FIRE has primary responsibility for wildland fires and takes command of any fire on arrival. Most of Sonoma County's WUI is served by volunteer or combination fire departments.

Sonoma County, CAL FIRE LNU's West Division, is divided into four Battalions. Each battalion is discussed in the final chapters of the CWPP, with details about community assets, and the fire agencies that serve there.

As they are developed, smaller community-based CWPPs will be placed in the Appendices. Additionally, the appendix contains educational materials and the project matrix, which will be updated yearly and used to rank wildfire risk reduction projects on a County-wide basis.

### ***Conclusion***

Residents of Sonoma County's WUI are highly concerned about wildfire, as are the firefighters who serve them. To meet the challenges of protecting homes and lives in the current era of increased risk and reduced funding, the most efficient programs will be those that help residents safely coexist with fire. Fuel management programs are critical, as is education in creating defensible space and reducing structural vulnerabilities. The challenges are great, but the work is imperative.

## Mutual Agreement Page

### The Sonoma County Community Wildfire Protection Plan:

- Was collaboratively developed, and meets the intent of the Healthy Forest Restoration Act (HFRA) in emphasizing the need for agencies to work collaboratively with communities in developing hazardous fuel reduction projects, and places priority on treatment areas identified by communities themselves in a CWPP. Interested parties and federal land management agencies in the vicinity of this CWPP have been consulted.
- Identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect areas within this CWPP.
- This plan recommends measures to reduce the ignitability of structures throughout the area addressed by the plan.
- This CWPP is intended for use as a planning and assessment tool only, utilizing a compilation of community issues/goals and projected fire mitigation strategies. The CWPP is not to be construed as indicative of project “activity” as defined under the “*Community Guide to the California Environmental Quality Act, Chapter Three, Projects Subject to CEQA.*” Per the Community Guide, Section 3.1.1, “CEQA only applies to public agency decisions to approve, or actions to carry out, a discretionary project.” Any actual project activities meeting this definition of project activity and undertaken by the CWPP participants or agencies listed shall meet with local, state and federal environmental compliance requirements.

The following entities mutually agree with the contents of this Community Wildfire Protection Plan:

Efren Carrillo, Board Chair Sonoma County Board of Supervisors <b>Attest:</b>	Date
Clerk of the Board of Supervisors	Date
Shana Jones, Unit Chief CAL FIRE Sonoma Lake Napa Unit (LNU)	Date
Bill Braga, President Sonoma County Fire Chiefs Association	Date
Al Terrell, Chief Sonoma County Fire and Emergency Services Department	Date
Roberta MacIntyre, President Fire Safe Sonoma, Inc.	Date

# **Chapter 1**

## **Introduction**

The Sonoma County Community Protection Plan (CWPP) was developed by Fire Safe Sonoma with input from CAL FIRE and local fire agency personnel, as well as Sonoma County Fire and Emergency Services Department, Bureau of Land Management (BLM), and stakeholders including community members, forest and rangeland property owners, and other interested groups. The Sonoma County CWPP is a planning tool that Fire Safe Sonoma hopes will help concerned citizens, planning professionals, Fire Safe Councils, responsible agencies, and other interested parties assess wildfire threats to homes and communities and identify measures that may be taken to reduce risk.

There are many strategies that can be undertaken to reduce risks of wildfire to life, property and the wildland environment. The most important are:

- Structural modifications that residents can do to make their homes more resistant to ignition during wildland fires.
- Vegetation management within the 100 foot “Defensible Space Zone,” proven to be critical to home survival in wildland fires.
- Landscape-scale projects such as fuel breaks and shaded fuel breaks, wherein fire fuels are strategically reduced in order to reduce risk to entire communities, ecosystems or infrastructure.
- Education and pre-fire planning.

Each of these strategies alone can provide significant risk reduction, but the greatest risk reduction will result from projects that address at least two, and ideally all four strategies.

Many decades of successful fire suppression in combination with conversion of forest and grazing lands to residential use has had dramatic effects on virtually all of Sonoma County’s ecosystems, from redwood forests to chaparral and grasslands. In absence of regularly occurring fires, grazing and logging, vegetation has become denser and fire fuel loads have greatly increased. Increasing population in WUI areas also means that more homes and lives are at risk to wildfire. At the same time, fire seasons seem to be getting longer and more severe. The severity and destructiveness of the 2015 Lake County Rocky and Valley Wildfires were a clear indication of how bad things can get when heavy fuel loads, drought, and fire weather combine.

Returning thousands of acres of wildland to healthier conditions is a daunting prospect. The costs of mechanical clearing and/or prescription burning are prohibitive for many small or large landowners. Well planned and prioritized grant funded vegetation management projects can help reduce fire fuel loads tremendously.

However, it is critical that residents and agencies never lose sight of the importance of smaller scale projects, such as homeowners creating defensible space and modifying

structural elements that make their homes vulnerable to ignition in wildfires. Actions homeowners take within 100 feet of their homes are more important than larger-scale vegetation management projects for individual home survival.

As this County-wide plan covers a large and very diverse area, the focus is broad. Likewise, the hazard reduction priorities in the plan are intentionally broad enough to provide for effective treatment strategies in Sonoma County communities from the windy Pacific shores to the hot and dry slopes of the Mayacamas Mountains. In the future smaller community-based CWPPs will be written that will specifically identify localized threats and specific solutions. As they are written, these Community based CWPPs will be included in the appendix of this document.

This document is organized in two parts, each of which can be viewed as a stand-alone document. The first part is this Sonoma County Community Wildfire Protection Plan, a general overview relevant to wildland fire risks for the County. The second part contains a variety of appendices that can be changed or modified over time.

The purpose of the CWPP is to help reduce the potential loss of human life and damage to property, natural and cultural resources within Sonoma County due to wildfire. More specifically, the objective is to protect assets at risk through focused pre-fire management prescriptions (such as fuel reduction) that can increase initial fire attack success and reduce home ignitions. A critical component of the plan is to encourage individual citizens to be involved in the coordinated effort of pre-fire planning and fire prevention and protection within his or her respective community.

The CWPP is a dynamic document and as such it should be reviewed periodically, with facilitation from the Fire Safe Sonoma, Inc., and amended as needed by the Board of Supervisors.

One of the benefits of the County-wide CWPP is that groups or agencies with wildfire risk reduction projects for which they are seeking funding can have them included in the CWPP Project Matrix, Appendix B. Projects submitted for inclusion in the matrix can be ranked by a collaborative group on a yearly basis. This project prioritization will help ensure that any grant funds spent are being prioritized on a County-wide basis, and help grantors know that projects have been considered collaboratively.

When agencies, individuals and communities work together, risks of loss of life and damage to property and the environment due to wildfire can be significantly reduced. Fire Safe Sonoma hopes that this document will help inspire communities to action and find the cooperators and aid that will make it possible.

It is recommended that this document serve as an advisory plan to guide wildfire prevention and preparation activities throughout Sonoma County, subject to compliance with all other applicable local, state and federal laws and regulations.

## 1.1 Acknowledgements

Primary funding for the Sonoma County Community Wildfire Protection Plan came from:

- A National Fire Plan grant from the Bureau of Land Management through the California Fire Safe Council.<sup>1</sup>
- A generous gift from Fireman's Fund Insurance Company.

Fire Safe Sonoma is deeply grateful for the support provided by these funders, which will help keep Sonoma County's Wildland/Urban Interface communities safer far into the future.

Fire Safe Sonoma and the CWPP's primary author, Caerleon Safford, also wish to thank all of those who have helped us through the process of creating, writing and editing this CWPP. Those who helped include but are not limited to the following individuals and agencies.

- CAL FIRE
- Sonoma County Fire and Emergency Services Department
- Fire Safe Sonoma and Staff from Fire Safe Councils across the state
- The Sonoma County Fire Chief's Association
- Mary Dedannan, Rachel Smith and Chris Helgren for editorial assistance
- Barbara McNally for layout
- Individuals and groups from across our County who stepped up for wildfire safety



*Photo 1-1: Left to Right: Steve Farmiloe, Matsen Insurance Brokers, Inc., Santa Rosa; Scott Smith, Fireman's Fund Insurance Company; Caerleon Safford and Jack Rosevear, Fire Safe Sonoma.*

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<sup>1</sup> The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the California Fire Safe Council, the U.S. government, or our funders. Mention of trade names or commercial products does not constitute their endorsement by the California Fire Safe Council, the U.S. government, or our funders.

## **Chapter 2**

### **About the Community Wildfire Protection Plan**

The Community Wildfire Protection Plan (CWPP) was defined by the Healthy Forests Restoration Act of 2003.<sup>2</sup> The intention for the CWPP is to enhance collaboration between stakeholders from federal, state and local agencies and community groups in order to identify strategic sites and methods for wildfire risk reduction across landscape and jurisdictional boundaries. Per the Healthy Forests Restoration Act, the three requirements for a CWPP are that it:

- Is collaboratively developed, emphasizing the need for agencies to work collaboratively with communities in developing hazardous fuel reduction projects, and places priority on treatment areas identified by communities.
- Identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect areas within this CWPP.
- Recommends measures to reduce the ignitability of structures throughout the area addressed by the plan.

This CWPP serves Sonoma County as a whole, and is purposefully broad to identify overall trends and priorities for fire mitigation strategies. It brings together stakeholders from the community, local groups, and local, state, and federal agencies.

The goals for the Sonoma County Community Wildfire Protection Plan are to:

- Identify, assess, and coordinate risk reduction strategies.
- Prioritize fuel reduction areas and projects.
- Promote wildfire awareness, especially information about structural ignitability and defensible space in at-risk communities across the county.
- Complete annual monitoring of projects listed in the CWPP; evaluate projects to assess progress and effectiveness, and recommend changes as appropriate.

The areas most at risk to loss of life and property in wildland fires are located in what is known as the Wildland/Urban Interface (WUI), where homes and businesses intermix with wildland vegetation. Wildfire risks in Sonoma County's WUI communities were collaboratively identified and prioritized based on public and agency input, local area knowledge, and an assessment of hazard factors identified by CAL FIRE's Fire and Resource Assessment Program (FRAP) data. CAL FIRE LNU's four West Division Battalions represent the geographical divisions in this plan, and discussion and maps are provided for each area.

Suggested projects for which funding may be sought are included in the Project Matrix (see appendix B). This CWPP neither guarantees funding nor is it regulatory. Its

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<sup>2</sup> You can see full text of the Healthy Forests Restoration Act at [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108\\_cong\\_bills&docid=f:h1904enr.txt.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_cong_bills&docid=f:h1904enr.txt.pdf)



purpose is to delineate wildfire risks in the WUI and to identify and prioritize potential solutions so that when funding is sought to address issues, there is a comprehensive over-all plan from which to start. The Sonoma County CWPP is a working document that will serve as a tool to coordinate fuels treatment in a manner that protects communities and landscapes from wildfire. Appendices to the plan should be updated yearly, and as local communities write their own CWPPs, they will be appended to the plan.

## **2.1 Challenges and Approaches**

Residents are the key to preventing loss of lives and homes in the WUI. Wildfire home loss can be greatly reduced when residents take action to both increase structures' resistance to ignition and reduce vegetation to create 100 feet or more of defensible space. This Sonoma County CWPP contains information to assist homeowners in developing strategies to achieve these goals.

Vegetation management in Sonoma County's wildland areas is a critical factor to mitigate the severe fire risks in the WUI. Because the majority of Sonoma County wildlands are small parcels in private ownership, there are challenges in fuels reduction work. The Sonoma County Forest Conservation Working Group (see Chapter 11) estimates that the county has about 17,000 forested parcels of less than 50 acres.<sup>3</sup> Many of these parcels are owned by individuals who like living in a beautiful forest landscape, but may have limited financial resources to maintain their forest property beyond the 100' defensible space zone. Additionally, forest residents often have limited understanding of what it takes to maintain a healthy forest ecosystem.

The preponderance of small and privately-owned wildland parcels poses several challenges. To address forest health on a significant scale, the whole forest must be considered as a single ecosystem, rather than many small pieces as defined by ownership boundaries. To enact change across property boundaries, all property owners need to come together, educate themselves about good forestry practices, and ultimately agree on appropriate and desirable actions. Needless to say, this can pose difficulties. On private lands the costs and labor associated with maintaining vegetation are another serious impediment for many, if not most residents. The CWPP can help communities prioritize and develop collaborative projects to more effectively leverage grant funds accomplish fuels treatment projects.

In other areas of the country, fuels mitigation grant programs are often funded by federal agencies to help protect communities that are at risk from fires originating on federal lands. Because Sonoma County has very little federal land, access to federal fuels mitigation programs is somewhat restricted. Based on a few scattered small parcels of Bureau of Land Management land, BLM has generously funded several important grant projects for Fire Safe Sonoma (National Fire Plan funds provided through the California Fire Safe Council), including the creation of this CWPP. Other important funding

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<sup>3</sup> This estimate was arrived at with GIS data, which described "forest" as 50% tree cover.

sources include CAL FIRE, The California Fire Safe Council, USDA (EQIP Program, etc.). Well designed fuels management programs that have been collaboratively developed, have great support from local agencies and residents, and are listed in the CWPP project matrix (see appendix B) have a better chance of being funded.

Great work has been accomplished by fire safe councils, watershed councils, homeowners associations, fire agencies and individual residents across the county. Increased collaboration and understanding of issues in the WUI can leverage these efforts and lead to more positive programs in the future.

## **2.2 Collaboration and the CWPP Development Team**

This Community Wildfire Protection Plan was developed by Fire Safe Sonoma staff with guidance and support from CAL FIRE and numerous local fire agencies. This CWPP also benefitted by contributions from representatives from a variety of federal, state and local agencies along with community members and groups. CAL FIRE personnel played an especially crucial role in its planning and provided crucial data and information for the community risk assessments. The Bureau of Land Management has been instrumental in the development of this plan, providing input, advice, and funding. Additionally, the Sonoma County Fire Chiefs Association and the Fire Prevention Officers Section have also been involved. Sonoma County Fire & Emergency Services Department has provided guidance and advice as well as considerable logistical support.

## **2.3 Involving Community Members: Outreach**

This CWPP provided an opportunity for a widespread education and community outreach effort. Fire Safe Sonoma, in conjunction with CAL FIRE and local fire agencies, held nine education and outreach meetings throughout Sonoma County to inform residents of the CWPP effort<sup>4</sup>. Community input for the CWPP was additionally solicited at a variety of fire safety and forest health workshops throughout Sonoma County.

These meetings achieved three major goals. First they were educational, and featured an informative half-hour presentation on wildfire behavior, defensible space, and structural ignitability. Second, CAL FIRE battalion chiefs and local fire chiefs spoke directly to residents about their concerns and suggested solutions. Third, local residents identified the community assets that they most value want to protect from harm. Additionally, community members voiced their own concerns about wildfire risk, their ideas for potential solutions, and projects they would like to see take place in their communities. Community participants were asked to complete a “Fire Risk and Asset Survey” which

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<sup>4</sup> CWPP Community Meetings were held in the following locations: The Sea Ranch; Sebastopol; Santa Rosa, ; Petaluma; Glen Ellen; Guerneville; Healdsburg; Sonoma. Meetings included a presentation about wildfire, defensible space, and structural ignitability, followed by an opportunity for local and state firefighters to share their concerns with the community, and an opportunity for local residents to ask questions, share their concerns, and suggest projects they would like to see take place in their communities. Notes from the meetings can be found in Appendix F

tabulated their responses. The results of the survey can be seen in Chapter 5 “Risk Analysis” and in the battalion sections at the end of this plan.



*Photo 2-1: CWPP Community Meeting, The Sea Ranch.*

The process of developing this CWPP has helped communities clarify and refine priorities for the protection of life, property, and critical infrastructure in the wildland-urban interface. It has provided an opportunity for community members and agency personnel to participate in valuable discussions regarding vegetative fuels loading, structural vulnerability, fuels management and mitigation options. Additionally, the CWPP process has served to acquaint community groups with various non-profit, state, and federal agencies that may be able to work with them on mutually beneficial projects in the future.

The goal of the effort was to create a collaborative document that will be viewed as a valuable contribution to public safety. This CWPP also serves as an accessible resource to assist residents in mitigating hazards around their homes and communities to further reduce the threat of wildfire.

As fire management plans are successfully institutionalized, it is expected that the general public will grow to understand the factors of living in a wildfire-prone environment. This Plan will help focus citizens and other stakeholders as they develop mitigation strategies and specific projects to implement them. Hopefully, defensible space around structures, firewise building practices, adequate water supplies, and sufficient fire equipment access in the WUI will become as commonplace as smoke alarms and fire extinguishers are today in residential and commercial occupancies.

## Chapter 3

# Sonoma County Profile

Approximately 40 miles north of San Francisco, Sonoma County's 1,588 square miles is bordered by the Pacific Ocean on the west, Marin County and San Pablo Bay to the south, Solano, Napa, and Lake Counties to the east, and Mendocino County to the north.

Assets at risk refer to values that have the potential to be burned or damaged by wildfire. Among Sonoma County's assets at risk are homes, natural resources, critical infrastructure and some of the world's most valuable agricultural lands, which are often interspersed with high value residential and commercial real estate<sup>5</sup>.



*Photo 3-1: The Cedars, arguably the most extraordinary natural feature in Sonoma County contains unique geological formations and at least eight plant species that only exist at this unique locale. The Bureau of Land Management (who owns 1,500 acres of the property) will designate the property as an "Area of Critical Environmental Concern," and the Sonoma Land Trust, in collaboration with a variety of conservation entities, is working towards the conservation of the property.*

Approximately one-third of county's 495,000 residents reside in Sonoma County's **unincorporated Wildland/Urban Interface or Intermix (WUI)**. In its simplest terms, "WUI" means an area wherein wildland fuels intermix with homes and structures. Further explication of the terms can be found on page 33 of this document.

The remaining two-thirds of Sonoma County's population reside in 78 square miles of incorporated cities and towns, mostly located along the Highway 101 corridor (Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Santa Rosa, Sebastopol, and Windsor).

Wildland fire season in Sonoma County spans the months after the last spring rains have fallen and until the first significant 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.

Natural fire causes, such as lightning, account for very few fires in the LNU. The primary cause for fires within the LNU is human related. The top four average determined fire causes in the LNU are:

- |                        |                     |
|------------------------|---------------------|
| 1. Debris burning: 16% | 3. Vehicles         |
| 2. Power lines: 16%    | 4. Other/Misc.: 11% |

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<sup>5</sup>Strategic Fire Plan, Sonoma-Lake-Napa Unit, 2015, p.15

Wildfire behavior is based on three primary factors: topography, weather, and fuel. Ultimately, fire behavior is directly related to the severity of conditions of each of these three factors on any given day. The three elements are called the “fire triangle.” If there is only one leg of the fire triangle present—say the fire starts on a steep slope where it can make a rapid uphill run, but the weather is not hot, dry and windy and fuels are moderate—firefighters should have a good chance to stop the fire. Worst case would be if all three elements of the fire triangle were bad, e.g., a fire that starts on a steep slope on a hot dry, windy day, in heavy fuel. When all three elements of the fire triangle are present, there is the potential for extreme fire behavior that will be very difficult for firefighters to contain. We will evaluate each of these three factors in the following paragraphs.

### **3.1 Topography**

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. Additionally, fires create their own up-slope winds. The steeper the slope, the faster fire will move uphill, whereas downhill slopes can slow down the rate of spread. Homes, natural resources and agricultural assets in the hilly areas of the County face the highest wildfire risks, and property owners in hilly areas should make all efforts to create and maintain appropriate defensible space, especially downhill from the structure, and insure that buildings are built or retrofitted to resist ignition during wildland fires. See appendix A for further information on how to make your home better adapted to a wildfire prone environment.

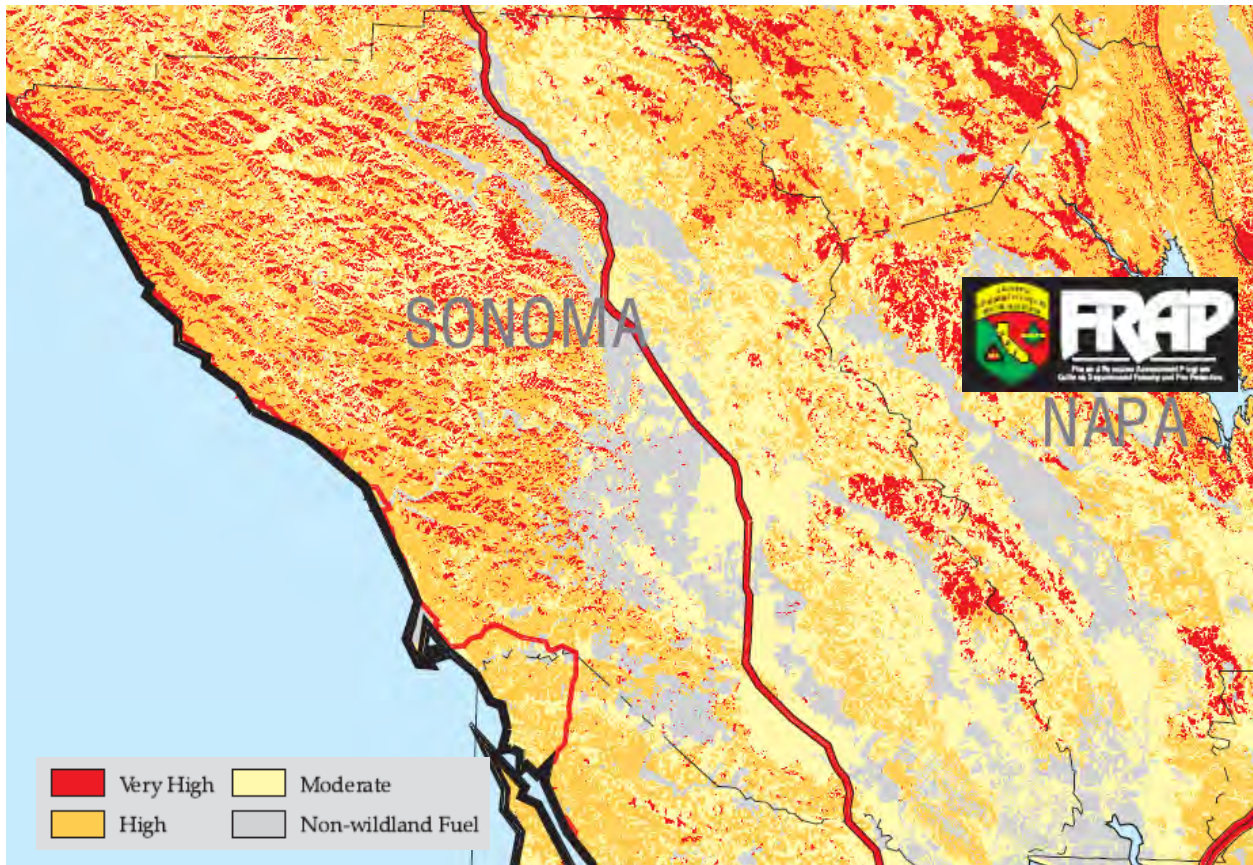
Two steep ranges dominate the western and eastern lengths of Sonoma County, and most of the County’s WUI is in the hills and valleys of these two ranges. The hills of the Coastal Range rise abruptly from the Pacific shoreline to over 2000 feet. The slopes of the Mayacamas Mountains on the County’s eastern boundary rise from sea level valleys including the Santa Rosa Plain, up to 4,500 feet on the slopes of Mount St. Helena. Sonoma County’s valleys and foothills are predominantly devoted to agriculture but also contain most of the urbanized areas and population.

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.

With the exception of vineyards and manmade features, in both the Coast Range and Mayacamas Mountain fire corridors, there are few natural barriers that can be connected by firefighters to create effective firelines to stop the forward progress of a wildland fire.

The Russian River is by far the largest river system of Sonoma County’s watersheds and drains over 1,485 square miles as it flows to the Pacific Ocean. The Russian River is the primary water supply for much of the urbanized part of the county, and also is a key attraction to many communities along its banks. Other major watersheds include the Gualala River, Salmon Creek, Tomales-Drakes Bay, and San Pablo Bay.

### 3.2 Vegetative Fire Fuels



Map 3-1: CAL FIRE FRAP Fuel Rank/Potential Fire Behavior. Map modified to fit page FRAP Maps found at [frap.cdf.ca.gov/data/frapqismaps/frapqismaps-fuel\\_rank\\_Q81\\_download](http://frap.cdf.ca.gov/data/frapqismaps/frapqismaps-fuel_rank_Q81_download)

Fuel, quite simply, is something that will burn. In a wildland fire, plants or fire-prone buildings are simply fuels that the fire uses to spread through the environment. Even so-called “fire safe” plants will burn in a wildland fire if they are not maintained to be free of dead materials and irrigated during the dry months.

There are approximately 513,388 acres of coniferous forests and oak woodlands in Sonoma County—more than 50.5% of County land area. Most of the oak woodland, and over 68% (132,000 acres) of the coniferous forestland, is in private ownerships of 50 acres and less. Much of this forest acreage is not regularly maintained, and contains “decadent” dry/dead material and overcrowded trees and brush.

The wide variation of ecosystems and microclimates in Sonoma County make for a wide variety of vegetative fuels. In cooler climates there are redwood ecosystems as well as

coastal prairie grasses. In the hills of the Mayacamas, chaparral, lodgepole pine, as well as oak grass lands dominate. See the fuel model maps on page 31 and in Chapters 14-17 for more detailed information about fuel models in your neighborhood.

Throughout the Nation, and in Sonoma County, many years of fire suppression and changing land use has greatly increased the density of trees and brush, increasing potential for lethal wildfires, especially on years that dry conditions exacerbate fuel risks. While some ecosystems are more fire prone than others, all County residents who live in an area with surrounding wildlands should ensure that there is proper defensible space surrounding buildings, and learn about structural elements that can easily ignite in wildfire and what they can do to adapt homes to safely survive a passing wildfire.

Please see Chapter 4 “The Wildfire Environment” for more information about the wildfire environment in Sonoma County.



*Photo 3-2: The images above show vegetation change over 100 years. Top left, a painting by Richard Jones of his West County ranch in about 1905. The photo on the right was taken by his granddaughter in 2005. The arrow points to the same barn. In 100 years, the hillside behind the barn has transformed from an open oak woodland into a much more fire-prone bay and Douglas fir forest.*

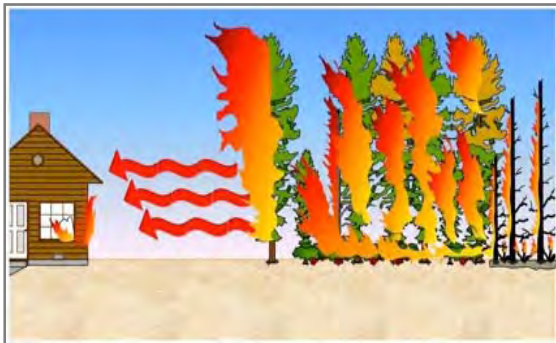
### 3.3 Structural Fire Fuels

Typically, homeowners in WUI environments think first of surrounding trees and brush when assessing their wildfire risks—the idea that ignition-prone elements on the house itself poses as much or more risk as the wildland fuels may be a new concept. It is crucial for WUI residents to understand that to keep homes from igniting, the most important action is to treat the elements on the structure that make it vulnerable to ignition. There are three primary ways that structures ignite due to wildfire. Please see appendix A for more information on how to protect your home from ignition.



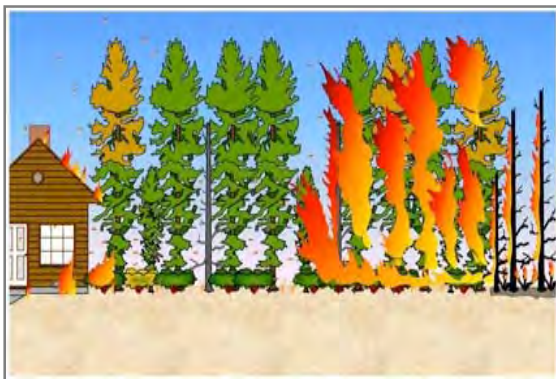
#### ***Direct Flame Contact***

Vegetation and other combustible materials are near enough to the structure for flames to ignite the structure. Direct flame contact can be minimized with 100' defensible space. The area 30' from the home should be “lean, clean and green” with all fire prone plants and debris removed.



#### ***Convective Heat***

Surrounding fuels put out enough heat to ignite nearby structures even though flames do not touch the building. In neighborhoods where homes are close to each other, convective heat can be a risk. Risk can be reduced by good vegetation management in the defensible space zone, and/or by hardening the structure so that it is less vulnerable to convective heat.



#### ***Embers***

Burning embers can be carried miles from a wildfire on wind currents to land on or near homes. Embers are responsible for more WUI home ignitions than direct flame and convective heat. Embers can land on ignition prone structural elements such as wood roofs, ignite dry vegetation or materials near the structure, and/or blow into openings on the structure, such as vents, to ignite the home from the inside. Both structural vulnerabilities and defensible space must be addressed to minimize threat from embers.



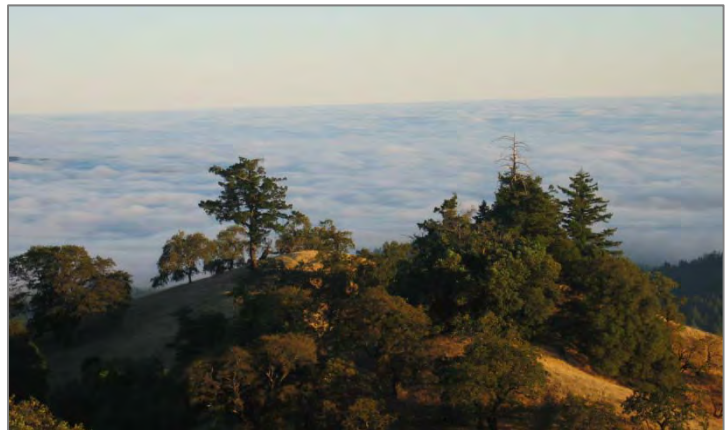
A non-fire resistant wooden roof is likely to be the first thing to ignite on a structure during a wildfire—even more likely than surrounding vegetation. It is critical that WUI residents understand that it is equally as important to address ignition-prone elements on the structure itself as it is to treat fire fuels in the 100' or more “defensible space” zone.

Vegetation management projects, such as community fuel breaks that take place more than 100' from residences, can give homeowners a false sense of security about wildfire risks. Fuel breaks should reduce fire intensity thus increasing likelihood that firefighters will be able to stop or reduce fire spread. However, it is critical that homeowners understand that to reduce their homes' risk of ignition in wildland fire, they must also treat the structure and 100' defensible space zone.

“Creating Wildfire Adapted Homes and Landscapes” (Appendix A) has specific recommendations and links to further information about how to make homes and forests better adapted to survive in wildfire prone environments.

### **3.4 Weather**

Weather is another of the key factors for fire behavior. Sonoma County's wildfire season spans the months after the last spring rains have fallen and until the first significant fall or winter rains occur. The months of August, September and October have the greatest potential for wildland fires as vegetation dries out and humidity levels fall. Strong and dry north-east “Santa Ana” or “Foehn” winds, which



*Photo 3-3: Fog blankets the coast and inland valleys while upper elevations remain high and dry at the Pole Mountain Lookout.*

significantly increase likelihood and severity of wildland fires across California and the west, are most likely 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.

“Red Flag” warnings are issued for weather events which may result in extreme fire behavior that will occur within 24 hours. In red flag conditions, low relative humidity, strong winds, dry fuels, the possibility of dry lightning strikes, or any combination of the above could lead to rapid or dramatic increases in wildfire activity. If these critical weather patterns align with the topography, extreme rates of spread can result, especially along exposed ridges and through constricted areas.

### **3.5 Global Warming<sup>6</sup>**

In the last few decades there has been a pronounced trend of larger and more frequent wildland fires across the 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 drier summers and that global warming has contributed to this phenomenon.

According to the Union of Concerned Scientists, by century's end, we may see up to 55 percent larger wildfires if we fail to make significant cuts in global warming emissions. If average statewide temperatures rise to the medium warming range (5.5 to 8°F), the risk of large wildfires in California is expected to increase about 20 percent by mid-century and 50 percent by the end of the century. This is almost twice the wildfire increase expected if temperatures are kept within the lower warming range. In addition to temperature, wildfires are determined by a variety of factors, including precipitation. Because of this, future wildfire risk throughout the state will not be uniform. For example, a hotter, drier climate could increase the flammability of vegetation in northern California and promote up to a 90 percent increase in large wildfires by the end of the century. A hotter, wetter climate would also lead to an increase of wildfires in northern California, but to a lesser extent—about a 40 percent increase by century's end.<sup>7</sup>

The risks have gone up because vegetation is further desiccated and more easily ignited. Firefighting costs have gone up, straining the resources of firefighting agencies. Research by scientists with the Scripps Institution of Oceanography and the University of Arizona, published in the journal "Science," point to climate change, not fire suppression policies and forest accumulation, as the primary driver of recent increases in large forest fires.<sup>8</sup> Researchers linked rising seasonal temperatures and the earlier arrival of spring conditions with the increase in wildfire activity. The EPA's Climate Change website indicates that wildfires are increasing and likely to intensify in areas with warmer temperatures, drier summers and longer growing seasons. Several other

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6 Sonoma County Hazard Mitigation Plan, 2011, p 132. [http://www.sonoma-county.org/prmd/docs/hmp\\_2011/index.htm](http://www.sonoma-county.org/prmd/docs/hmp_2011/index.htm)

7Source: California Climate Choices – a Project of the union of Concerned Scientists; [http://www.climatechoices.org/impacts\\_wildfires](http://www.climatechoices.org/impacts_wildfires)

8 Source: <http://www.uagrad.org/alumnus/gwfire.html>

studies have also indicated increased hazards and risks associated with vegetation fires due to climate change.<sup>9</sup>

### 3.6 Population Growth

According to the Sonoma County Hazard Mitigation Plan, population growth rates in Sonoma County are slowing. By 2020 it is expected that 73% of the population will reside in Sonoma County’s nine cities (up from 68% in 1990), with the remaining 27% residing in the unincorporated areas. The growth rate in the unincorporated areas is expected to be much lower than in the cities (69 percent versus 1.29 percent, respectively). Current land use policies promote city and community centered growth, and limit new development to levels consistent with adequate infrastructure and services, including public safety considerations.

Area	1980-1990	1990-2000	2000-2020
All of Sonoma County	2.62%	1.68%	.88%
All city urban service areas	3.34%	2.54%	1.29%
Unincorporated areas outside of city USA	2.11%	.67%	.69%

Table 3-1: Historic and Projected Annual Population Growth Rates<sup>10</sup>

The slower anticipated growth in the unincorporated area is due to several reasons. First, physical factors such as septic suitability, slopes, water availability, distance from services, etc., often limit development. Second, the County’s land use policies encourage city-centered growth by establishing zoning densities which favor accommodation of population growth in urbanized areas where adequate services exist. However, in rural areas it can be difficult to collect census or building data, so this data may not truly be reflective of how many people are living out in the hills.

### 3.7 Demographic Trends

2010 Census Data reveal two demographic trends that point to important considerations for educational outreach in Sonoma County.

First, Sonoma County’s population is aging, a trend which will have will have direct impacts in the WUI areas of the County. Currently, over 100,000 individuals, more than 20 percent of Sonoma County’s population, are over age 60. This trend is largely driven by aging baby boomers, many of whom bought rural properties during the back-to-the-land movement during the 1960s and 1970s. As the back-to-the-landers themselves reach their sixties, seventies and beyond, it becomes increasingly difficult for them to maintain vegetation and fire safety standards on their properties. Social science research indicates the elderly are more vulnerable to disasters than the general public. They are more likely to need emergency medical aid, which will increase pressures on the small, local volunteer fire departments that serve the rural areas. As this population

<sup>9</sup> <http://epa.gov/climatechange/effects/forests.html#fire>.

<sup>10</sup> Sonoma County Hazard Mitigation Plan, 2011, p.30

segment continues to age, special preparedness and mitigation initiatives may be required, and any projects that address fire fuels and wildfire preparedness should take this trend into consideration.

Secondly, the county is becoming more diverse with a growing portion of the population of Hispanic or Latino descent. In 2010, 25 percent of the population was of Hispanic or Latino heritage, up from 17 percent in the 2000 Census. Spanish or bilingual preparedness and mitigation outreach programs will be increasingly important to efficiently reach the Spanish speaking population.

### **3.8 Residential development in Sonoma County's WUI**

2010 census data indicates that the number of housing units increased by 21,419 units between 2000 and 2010 with 16.6 percent occurring in the unincorporated area<sup>11</sup>. Residential construction in wildland areas has increased the potential for future wildland fires to impact life safety and property and increased the burden on rural firefighting resources. Wildland fires that start in the woods and spread into abutting areas with relatively dense housing, often result in the greatest losses of property and life. Additionally, efforts to save lives and property will take precedence over losses to wildland resources, so firefighters' efforts must focus on protecting populated areas rather than fighting the fire in the most efficient way.

Homes in rural locations on large parcels far from neighbors are vulnerable to fire for several reasons. First, many rural homes are located in areas far from firefighting resources, so response times can be extended—an hour or more for homes located far out on dirt roads. A house fire that is not accessed by firefighters within 14 minutes is likely to turn into a total loss. Additionally, a structure fire in a home without sufficient defensible space can easily spread into the wildland where it could potentially burn thousands of acres. Many rural homes are older, some with untreated wood roofs, narrow roads, limited access, steep terrain, and inadequate water supplies which can all contribute to the potential for greater life and property loss.

However, the highest potential for home loss is in the Wildland/Urban **Interface**. In the Interface, areas with relatively dense building which border wildland areas, even relatively small acreage fires may result in disastrous damages. The 1991 Oakland Hills fire (Tunnel Fire) destroyed more than 2,800 buildings and claimed 25 lives, yet only burned 1,600 acres, considered a small to medium sized fire by wildland fire standards. Between October 2003 and October 2007, seven California WUI fires destroyed a total of 8,877 structures - on average over 2,200 structures per year. These seven fires resulted in 29 deaths, and over 317,000 hectares (783,000 acres) burned.

WUI fire represents 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 (86) 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

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<sup>11</sup> Ibid

showing increasing pattern of development encroaching into previously wildland areas. WUI fire zones are present near many populated areas.

### 3.9 Planning

The Sonoma County General Plan and Land Use Maps govern the types of land uses and development that may occur in different areas of the unincorporated county. Table 2 indicates the acreages under different land use and zoning districts as of June 2011

Land use category	Zoning Districts	Total Acres
Land Intensive Agriculture	LIA	70,243
Land Extensive Agriculture	LEA	180,203
Diverse Agriculture	DA	66,770
Resources and Rural Development	RRD, RRDWA, TP	490,670
Rural Residential	RR, AR	69,722
Urban Residential	R1, R2, R3, PC	7869
Commercial	C1, C2, C3, CO, LC, RC, K	3176
Industrial	MP, M1, M2, M3	2120
Public/Quasi public	PF	56,424

Table 3-2: Land use and zoning of unincorporated areas of the County.<sup>12</sup>

### 3.10 Sonoma County WUI Building Code

Permitted Building Construction in the WUI or SRA requires all structures to be built according to specific codes. The codes are referenced as Chapter 7A, in the California Building Code and Chapter 327 in the California Residential Code. Sonoma County's Fire Prevention Code requires that for all permitted new structures or remodels in the SRA be built with products approved for use in the WUI including:

- Class A Roofing materials
- Eave and Foundation Vents that prevent ember intrusion
- Fire Resistant Exterior Covering (Siding)
- Windows and Openings that can withstand high heat
- Fire resistant Decking materials

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<sup>12</sup> Sonoma County Hazard Mitigation Plan, page 28.

- Accessory Structures within 50 feet of other structures (cupolas, outbuildings bigger than 120 square feet, etc.) also need to meet WUI criteria

Approved building products for the WUI are listed by the Office of the State Fire Marshal on their website at

[http://osfm.fire.ca.gov/licensinglistings/licenselisting\\_bml\\_searchcotest.php](http://osfm.fire.ca.gov/licensinglistings/licenselisting_bml_searchcotest.php)

# **Chapter 4**

## **The Wildfire Environment**

### **4.1 Wildfire's Ecological Roles**

Wildfire is a natural part of California's ecology. Low intensity fires are a necessary component for forest health. For millennia, innumerable fires across the landscape have served beneficial purposes, including reducing fuel loads by removing small diameter trees and brush thus reducing competition for water and nutrients. Low intensity fires also make different nutrients available to the surviving trees, sanitize forest floors, and provide a check on insect and disease infestations. Before humans moved into this ecosystem around 13,000 years ago, fires were caused by natural events such as lightning.

With the arrival of humans, fire frequency increased as the first inhabitants used fire to increase food production and make harvest easier, causing more frequent low-intensity fires. Early European explorers were often rhapsodic in their praise of the open and abundant landscapes they saw, but did not realize the role of fire in creating and maintaining these landscapes. With the arrival of European settlers, disruption in Native lifeways and prohibition of Native burning greatly decreased fires in the landscape.

### **4.2 Wildland Fire Suppression**

Fire, ignited by lightning and Native Americans, has shaped the structure and composition of the majority of California's ecosystems for millennia, and is indisputably a major component of natural background conditions in the state. In California's most abundant forest types, these historical fires were frequent and of limited intensity, consuming dead material and killing small trees, but leaving most large trees alive and intact.

Dr. Scott Stephens, a fire science professor at UC Berkeley, estimates that approximately 4.5 million acres burned every year in California prior to 1800. That's less than the average annual area burned in wildfires throughout the entire U.S. during the period 1994-2004, which was considered an extreme decade for wildfire<sup>13</sup>.

Since the beginning of the 20th Century, as forest/firefighting agencies have grown, and the tools in the firefighters' arsenal increased, fire agencies have become more successful at putting out both natural and human-caused fires. The last century of fire suppression has led to significant shifts in forest composition, structure, and function, resulting in fires that are now uncharacteristically intense and lethal. Nationwide, firefighters currently suppress 98% of wildfires before they reach 25 acres.

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<sup>13</sup> Northern California Prescribed Fire Council, letter; "Comments on EER Federal Register Notice Vol. 80 No. 224 FR 72840-72897". November 20, 2015

Throughout California, as population has spread farther out into the countryside, the risk for home and life loss from wildfire has increased. Hills and forests that once burned regularly are now the sites of modern houses. There is tremendous pressure to put out fires that may destroy neighborhoods, lives and homes. This risk influences wildfire policy on the national and state levels. Responses to large damaging fires have largely enhanced fire suppression policies.

CAL FIRE aims for an “initial attack effectiveness” of 95% of fires contained at less than 10 acres in size, and in most years, they come close to meeting this goal. This is a great achievement and doubtless has saved lives and homes; however, there have been unintended consequences of this “initial attack” success.

### **4.3 Consequences of Wildfire Suppression**

Today, forests are far denser with many more trees per acre and greater buildup of dead wood on the forest floors than would have been true when frequent, low-intensity fires were common. This means that when fires do burn, they burn with greater intensity, get much larger, and can cause irreversible damage to wildland ecosystems.

The 98% of fires that are controlled at low acreage are the fires that can be put out—those that occur when less intense weather and fuel conditions give firefighters the upper hand. But suppressing most fires also means that the benefits of low intensity fires to forest ecosystems are lost. The 98% success rate has set us up for the most dangerous 2%—those fires that occur when weather and fuels conditions give the fire the upper hand. The 2% of wildland fires that escape cost more to suppress than all the rest, and are more likely to cause great damage to ecosystems and result in loss of structures and life.

### **4.4 Sonoma County Forest Landscape: Parcelization**

There are approximately 513,388 acres of coniferous forests and oak woodlands in Sonoma County—more than 50.5% of County land area. Most of the oak woodland, and over 68% (132,000 acres) of the coniferous forestland, is in private ownerships of 50 acres and less. These forests are unique, with 10 species of true oak and 19 species of conifers. Forests provide a suite of economic and non-economic benefits to the citizens of Sonoma County, including fish and wildlife habitat, clean air and water, recreational opportunities, and scenic attributes. A number of factors, including population growth, regulatory requirements, and changes in the local and global economy are creating pressure to convert forests and woodlands to other uses.<sup>14</sup> As properties convert, activities such as grazing and logging cease with subsequent increase in fuel loads.

The large proportion of forested land in relatively small parcel size makes vegetation management on a forest ecosystem-scale challenging. For a forest ecosystem, a 50 acre parcel is very small. However, for a landowner, maintaining five—let alone 50—forested

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<sup>14</sup> Euphrat, Fred, et al.: Protecting Forests Across Landscapes and Through Generations: The Sonoma County Forest Conservation Working Group. <http://sonomaforests.org/about-us/>



acres to wildfire compatible standards is an expensive challenge. Depending on the steepness of terrain and tree cover on the parcel, vegetation management can be difficult or almost impossible.

For many landowners, grant funding is a crucial component to mitigation in their overstocked forest lands. Having a Forest Management Plan written by a Registered Professional Forester is a crucial first step. CAL FIRE's California Forest Improvement Program (CFIP) provides funding to have a forester write a Forest Management Plan for the property, and also cost share funds to carry out recommended treatments. Contact CAL FIRE for further information about CFIP.

Projects that will educate forest land owners about wildfire risks and how to better adapt structures and landscape for a wildfire prone environment and help them achieve their goals are a critical both for the health of forested landscapes and the safety of Sonoma county residents. To reduce home loss, it is critical to start with structural vulnerabilities and defensible space. Whenever possible, projects should address forest health and vegetation management on an ecosystem-wide rather than parcel by parcel basis.

#### **4.5 Sonoma County's Plant Communities**

California's plant communities evolved with fire in the landscape. Many native plants either can survive fire (think of thick barked redwood) or need fire to propagate (nobcone pine needs fire to project seeds from cones). Most native plants burn readily, and some are more fire-prone than others. When fires take place in environments with fire-adapted plant species which have not burned for many years, extreme fire behavior can be the result, with far more destructive effects to the environment than would have been the case if regular low-intensity fires had taken place.

As a rule of thumb, plants that have strong odors (think of conifers or bay trees) have a high proportion of highly combustible volatile oils. Likewise, plants that grow to contain a high proportion of dead materials on the trunk or in the canopy can easily spread fire through the landscape—think of chemise brush, scrub oaks, and non-natives like eucalyptus, broom and gorse.

Most of the grasslands of California have been taken over by non-native annual grasses which grow during the wet season and dry to create the classic "golden hills of California" by late summer. A hillside grass fire on a windy day can move incredibly quickly and be deadly, even though it burns with less intensity than a fire in trees or brush.

Brushy fuel models, which include plants such as chemise, manzanita and scrub oak, host an incredibly rich and diverse number of animal, insect and plant species and are a vital ecosystem. However, brushy ecosystems, left unburned and unmaintained for many years will burn with incredible intensity. Homeowners who live in or near brushy fuels need to be aware of the risks and take appropriate mitigation strategies around homes.

Forested landscapes have wide variability in their fire potential, depending on species composition, and forest condition. Long unburned forests with low “ladder fuels” growing under taller trees and lots of dead wood littering the forest floor and canopy, will burn far more intensely than a forest that is less dense and more green.

Vegetation 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 rankings. You can see a small CAL FIRE FRAP Fuel Rank map on page. For a more detailed view, go to CAL FIRE’s FRAP data at [frap.cdf.ca.gov/data/frapgismaps/frapgismaps-fuel\\_rank\\_download](http://frap.cdf.ca.gov/data/frapgismaps/frapgismaps-fuel_rank_download)

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 along the Napa and Lake county lines. Redwood forest environments can be 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.

In recent years, a variety of pathogens such as Sudden Oak Death (SOD), caused by non-native *Phytophthora ramorum*, and insects such as pine/fir borer beetles have caused significant tree mortality. In Sonoma County, SOD has killed of hundreds of thousands of trees, especially tan oak and coast live oak<sup>15</sup>. Spread especially by warm spring rains, spread of the pathogen that causes SOD mortality slows down in drought years. Unfortunately, the when trees are stressed by drought, the voracious activity of pine and fir borers goes up. When significant numbers of dead trees are left standing to mix with live fuels in forested environments, increased fire behavior potentially can be a consequence.

Projects that help landowners improve forest conditions should always take into consideration forest health and diversity of the overall landscape while reducing the risk of catastrophic wildland fire to homes and communities.

Our overgrown wildlands need to be treated to reduce the size and destructiveness of wildfires. Low intensity fires would accomplish this goal, yet because of human populations in wildland areas, firefighters suppress even natural fires when they occur. Vegetation could be treated by cutting and thinning trees and brush in the wildland, but the sheer size of the area that needs thinning makes mechanical treatment a near impossibility. How do we manage to return overgrown forests to a healthier condition while also preventing the trauma and economic consequences of home loss?

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<sup>15</sup> University of California Cooperative Extension and Sonoma County Department of Emergency Services, *Sonoma County Sudden Oak Death Strategic Response Plan*, 2008.

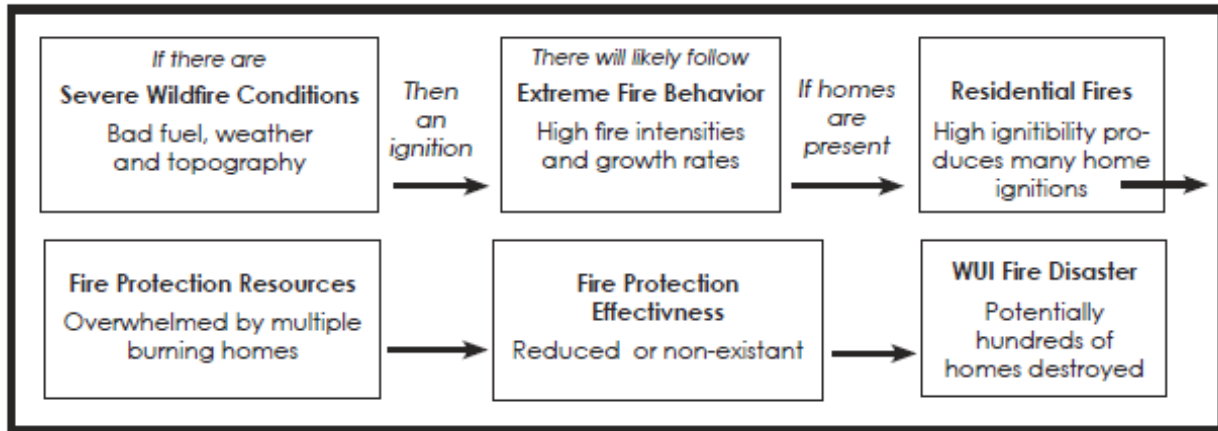
#### 4.6 Toward a Solution of the Wildland-Urban Interface Fire Problem

One of the most compelling mitigation strategies is to first make the most critical assets at risks—especially homes and communities—more capable of surviving wildland fire without homes igniting. US Forest Service researcher Dr. Cohen points out that, in order to have any lasting effect on home loss in wildland fire incidents, the national paradigm needs to shift from wildfire suppression to “wildfire compatibility.” We need to make use of research findings that demonstrate the specific causes of home ignitions during wildland fire incidents in order to make homes in the WUI resistant to wildfire. If homes in the WUI don’t ignite, we can shift the current focus from protecting structures and putting out all fires as soon as we can to a new and more realistic model: Managing fires to benefit ecosystems and reduce risk of large, destructive firestorms in the future. The key is to first adapt homes in the WUI to withstand wildfires. Ultimately this new paradigm results in both healthier wildlands and safer residents.

*“During extreme wildfires, home destruction is related to the home and its immediate site characteristics... Wildland fire is inevitable and a principal ecological process... Our society’s cultural and material incompatibility with fire as an essential ecological process leads us to take actions that jeopardize the benefits we derive from those ecosystems. To sustain our ecosystems, we must sustain our homes!” Jack Cohen*



## 4.7 Evolution of a Wildfire Disaster



The WUI fire disaster context depends on exposure of vulnerable homes to uncontrollable, extreme fire behavior. If the number of burning and vulnerable homes overwhelms the fire protection capability, fire protection effectiveness is reduced, and many homes are left without protection. If homes are ignition-resistant, then many homes do not ignite and fire protection is not overwhelmed by the ignitions that do occur. Thus, an extreme wildfire can occur without a WUI fire disaster.<sup>16</sup> Research carried out by Cohen and many others in recent years has shown that if vegetation within 100' of structures is treated to keep flames and heat away from homes, and the homes themselves are treated so that they are resistant to ignition from flame contact, radiant heat, ember and firebrand exposure, the chain of events described in the above chart can be broken.

Thus, an extreme wildfire can occur in a WUI without it becoming a fire disaster. This understanding is a key breakthrough in fire protection. It follows from these findings that the most effective policies to deal with the problem of WUI disasters are those that focus on preparation and wildfire compatibility.

Therefore, limited resources might be well used to educate residents about the steps needed to take to reduce home loss, and provide assistance to homeowners to treat nearby vegetation and replace fire-prone elements of their structures with fire resistant alternatives.

<sup>16</sup> Cohen, Jack "The Wildland Urban Interface Fire Problem: A Consequence of the Fire Exclusion Paradigm," *Forest History Today*, Fall, 2008, p. 23.

## Chapter 5 Sonoma County Wildfire History<sup>17</sup>

Wildland fires, particularly wildland/urban interface fires, have historically occurred in Sonoma County. The California Department of Fire and Forestry (CAL FIRE) has identified several “historic wildfire corridors” in Sonoma County. Those corridors include: the Guerneville/Cazadero area which experienced fires in 1923, 1951, and 1978; the Geysers which has experienced multiple fires, the most recent in 2015; the 1964 Hanley Fire northeast of Santa Rosa; and the Sonoma Valley, where the Cavedale fires of 1925 and 1996 caused significant property damage.

As development and human activity increased over the decades, the incidence of human caused fires increased. A map showing historic fires in Sonoma County from 1950 to 2006 is included as Figure 8.9. The map, prepared by CAL FIRE, shows fires which burned 300 acres or more.

Year	Name	Acres Burned	Structures Burned	CAL FIRE Battalion
1964	Hanley	52,700	108	1410
1964	Nuns Canyon	10,400	27	1412
1965	Knight’s Valley	6,000	0	1413
1965	Pocket Ranch	4,000	0	1413
1965	Austin Creek	7,000	0	1411
1972	Bradford	1,760	4	1413
1978	Creighton Ridge	11,405	64	1411
1988	Cloverdale	1,833	100	1413
1988	Geysers	9,000	7	1413
1996	Porter Creek	300	0	1413
1996	Cavedale	2,100	0	1413
1999	Geyser Road	1,300	0	1413
2000	Berryessa	5,731	15	1412
2004	Geysers	12,000	6	1413

*Table 5-1: Notable Sonoma County wildland fires 1964 to 2004*

On September 17, 1923, a fire ignited near the summer resort community of Guerneville. Within 3 hours it had burned through Guerneville to the Pacific Ocean. Several other fires erupted that same day in Sonoma County and elsewhere in the San Francisco Bay Area, due to the hot dry weather conditions and strong winds. The most significant was a fire in Wildcat Canyon to the northeast of the City of Berkeley, which burned into the urban area, consuming 130 acres and nearly six hundred structures, leaving four thousand people homeless.

The pattern of multiple fires occurring on critical fire weather days continues today throughout California.

<sup>17</sup> Fire History section taken from the Sonoma County Hazard Mitigation Plan, 2011, p.136-138

Thirty-eight years later on Labor Day Weekend, September 2, 1961, fire again struck Guerneville. As Labor Day vacationers poured into the resort area, the humidity dropped to 12% and the winds increased to 30-32 mph, raising concerns of the state foresters on duty. Their fears were realized when two small fires, believed set by arsonists about a quarter mile apart at the end of Watson Road, were fueled by the winds and raced toward Guerneville, a mile to the south. In all, the fire burned 5,769 acres and eighteen residences. It resulted in approximately \$500,000 in timber losses, and watershed and recreational losses estimated at an additional \$500,000<sup>73</sup>. The following day, a second fire started eight miles southwest of Guerneville burned 1,800 acres and 7 structures.

Perhaps the 1964 fire season presented the greatest potential for widespread disaster. Ninety-four forest fires were burning in the Redwood Empire and the mountain area of Solano County between September 18 and September 28, 1964. Winds in excess of seventy-five miles per hour, high temperatures, and tinder dry vegetation spread the fires 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 ninety-four fires. The fire started the morning of September 19 on the Hanley property off Highway 29 on the slopes of Mt. Saint Helena in Napa County. By the end of the next day, the fire was contained, until the late 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. From there, the fire raced into Knights Valley and turned southward into Franz Valley. By nightfall, the fire, driven by 70 mile per hour winds, headed down Mark West Canyon toward Santa Rosa. The Sonoma County Hospital on Chanate was threatened, with embers falling on the rooftop, and forty-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. On another front of the fire to the east, flames burned over the hills and down into the Rincon Valley area, where it was held. The fire was not brought under control until the morning of the seventh day. In total, the fire leveled 84 homes and 24 summer cabins, and consumed 105,000,000 board feet of timber valued at \$1.5 million. More than fifty-two thousand acres were blackened. Miraculously, 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.

On September 3, 2004, a Calpine electrical switch caused the Geysers Fire. The fire 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, the regional telecommunications company. Firefighters were able to save pumping stations and geothermal power plants, all 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.

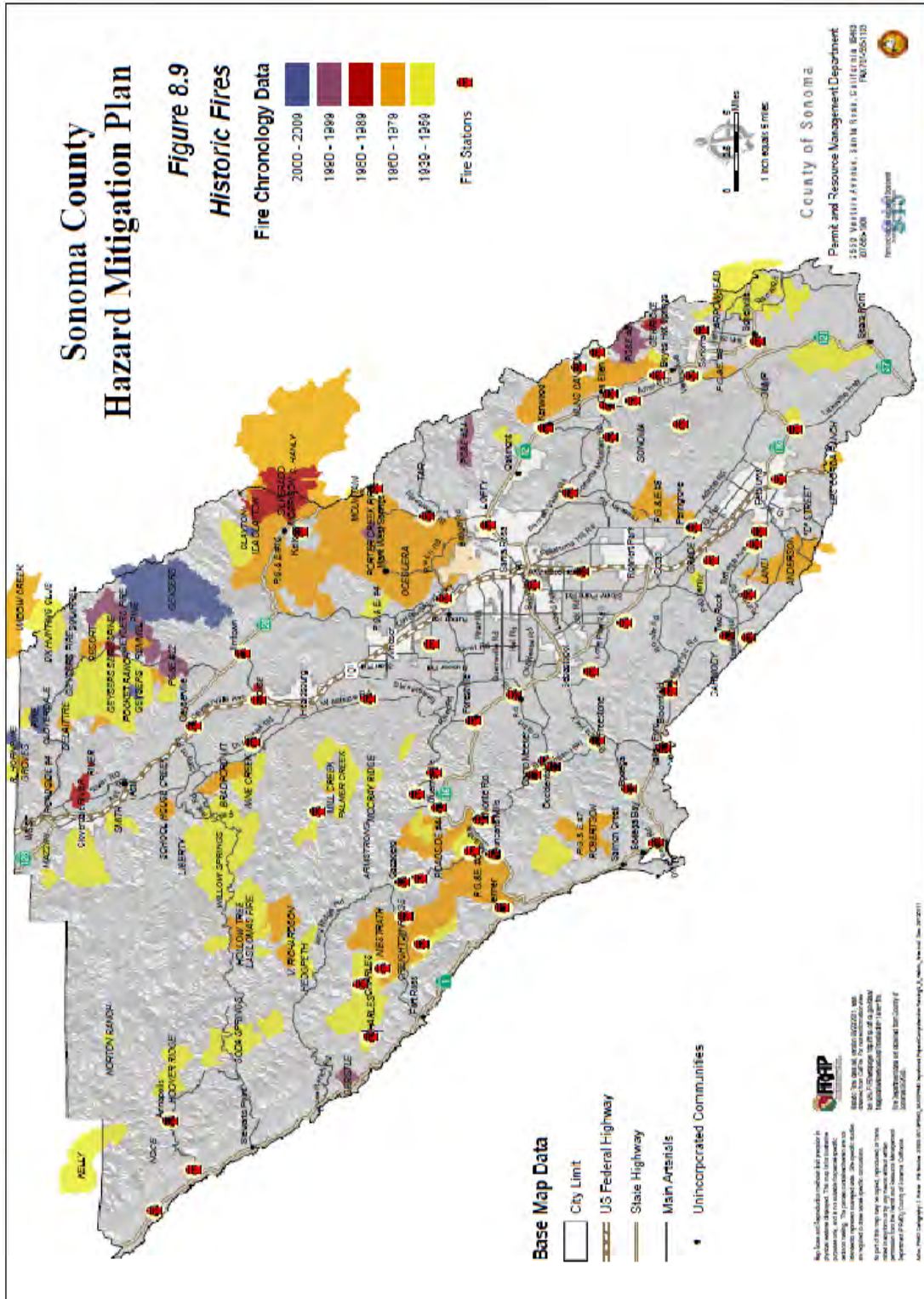
The northeastern portion of Sonoma County bordering Lake and Napa counties has spawned numerous wildland fires, as noted on the fire history map. Most recently, 5000 acres burned near the Geysers during the October 2015 Valley Fire, which devastated 76,067 acres of Wildland/Urban Interface and Intermix Communities in Lake County.

Fuel conditions are similar between Lake County and much of eastern Sonoma County. Three Lake County fires in 2015—Rocky, Jerusalem, and Valley—together burned 170,623 acres in Lake and surrounding counties. The fires killed four people and destroyed 2,051 buildings. During the Valley fire, embers spread the fire from Cobb Mountain to the town of Middletown, located in a wide valley miles away from the ignition point. Burning during extreme drought conditions, these fires were weather driven and burned with very high intensity, very erratically, and overwhelmed available resources from ignition until changes in weather conditions allowed firefighters to gain the upper hand. In August of 2016, the arson-caused Clayton fire destroyed an estimated 299 structures and nearly 4,000 acres in Lower Lake.

For many years, Sonoma County has not experienced catastrophic wildland or wildland/urban interface fires that caused significant loss of life and property such as the 1991 Oakland Hills Fire, the 1993, 2003, and 2007 Southern California fire seasons, and the Lake County fires of 2015 and 2015. However, a repeat of the 1964 Hanley Fire could cause catastrophic damage to the County and the City of Santa Rosa. Since the Hanley Fire, there has been tremendous growth within the footprint of the fire with thousands high value homes, commercial properties, vineyards and critical infrastructure. This growth is echoed in most of Sonoma County's WUI areas.

Firefighting resources available in the 21<sup>st</sup> Century are vastly superior to those in the 1960s. We have access to far more firefighters, firefighting apparatus, and air resources than were available in the past. However, the 2015 Lake County fires should serve as a reminder to the residents of Sonoma County that wildfires sometimes just can't be stopped, and may well burn into urban areas. It is imperative that Sonoma County Fire Agencies continue and improve outreach to Sonoma County WUI residents to teach them how to make homes and landscapes wildfire compatible as well as promote projects that reduce wildland fuel hazards and help residents make structures more ignition resistant.

# Sonoma County Wildfire History Map



Map 5-1: Wildfire History: Sonoma County Hazard Mitigation Plan, figure 8.9



## **Chapter 6**

### **Wildfire Potential**

#### **6.1 Fire Threat and Fuel Hazard Rankings**

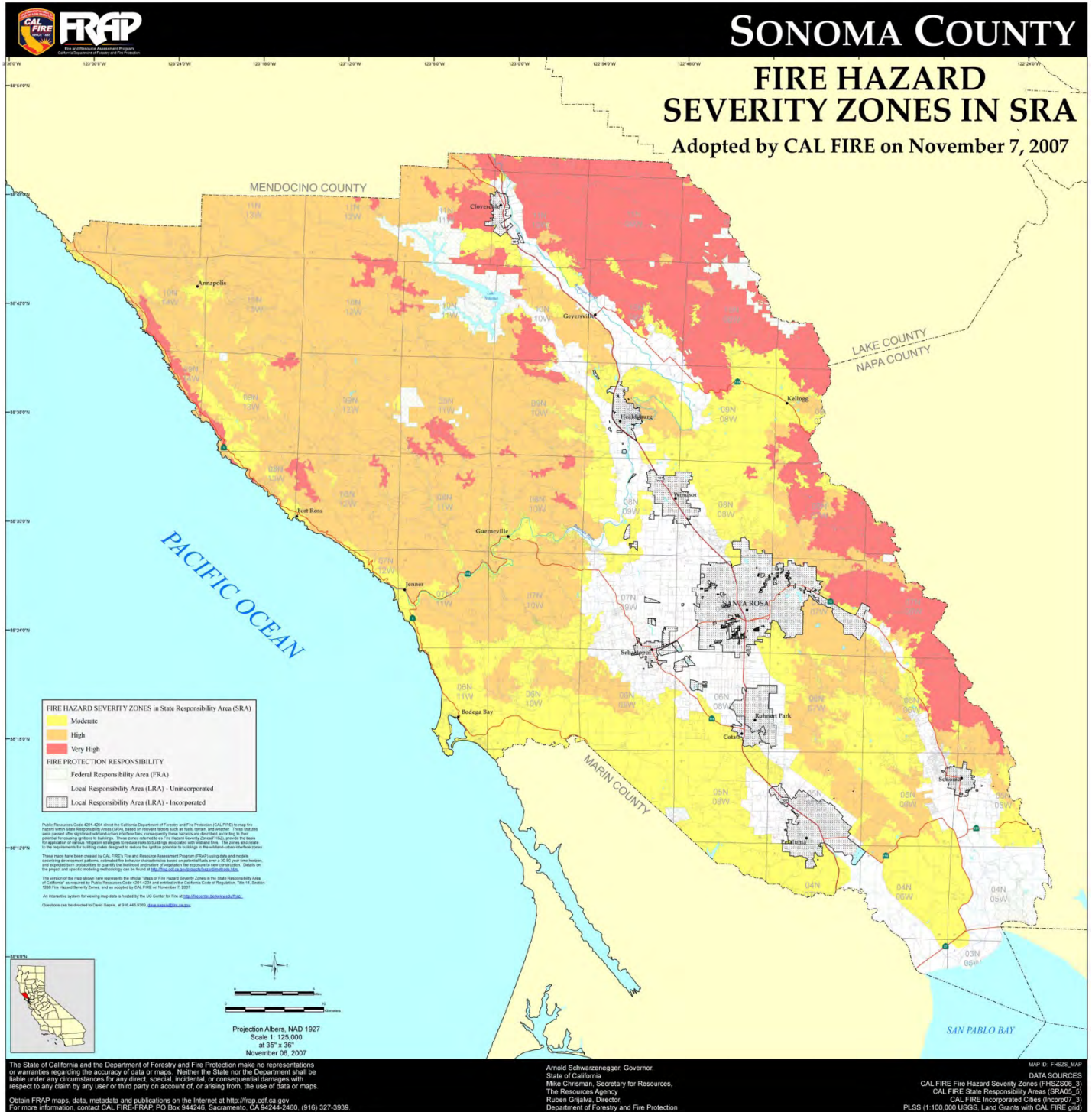
CAL FIRE produces Fire Threat Maps for California. Fire threat is derived from a combination of fire frequency, (from 50 years of fire history), and expected fire behavior under severe weather conditions. Fire behavior is derived from fuels and terrain data. The resulting fire threat can be used to estimate the potential for impacts on various assets and values susceptible to fire. This CWPP uses CAL FIRE battalions as the geographic divisions. Fire threat maps are located in each battalion section.

CAL FIRE's Sonoma-Lake-Napa Strategic Fire Plan analyzes fire hazards and assets at risk. The analyses identify high-risk and high-value areas where there is potential for costly and damaging wildfires. Three elements are evaluated to assess the fire hazard: vegetation fuel, weather and fire history.

Fuel Hazard Rankings are derived by combining wildland fuels and their characteristics with other factors such as slope and aspect, ladder fuels, crown density, and fire weather conditions (See map on page 10). Wildland fuels are made up of the variety of vegetation available for combustion in a given land area. These consist of grass, brush or trees—each has its own set of burning characteristics, depending on moisture content, biomass volume, arrangement of leaves and branches, live-to-dead vegetation ratio, vertical and horizontal continuity, and species mix. All of these factors contribute to fire spread, intensity, and threat to assets at risk. Sonoma County vegetation is made up primarily of coastal and interior conifers, with grass the primary vegetation in the southern portion of the county, and brush occurring along the northeastern county boundary with Lake County. Fuel Hazard and Fire Threat can be seen on CAL FIRE's Fire and Resource Assessment Program (FRAP) website at [http://frap.cdf.ca.gov/data/frapgismaps/frapgismaps-fuel\\_rank\\_Q81\\_download](http://frap.cdf.ca.gov/data/frapgismaps/frapgismaps-fuel_rank_Q81_download)

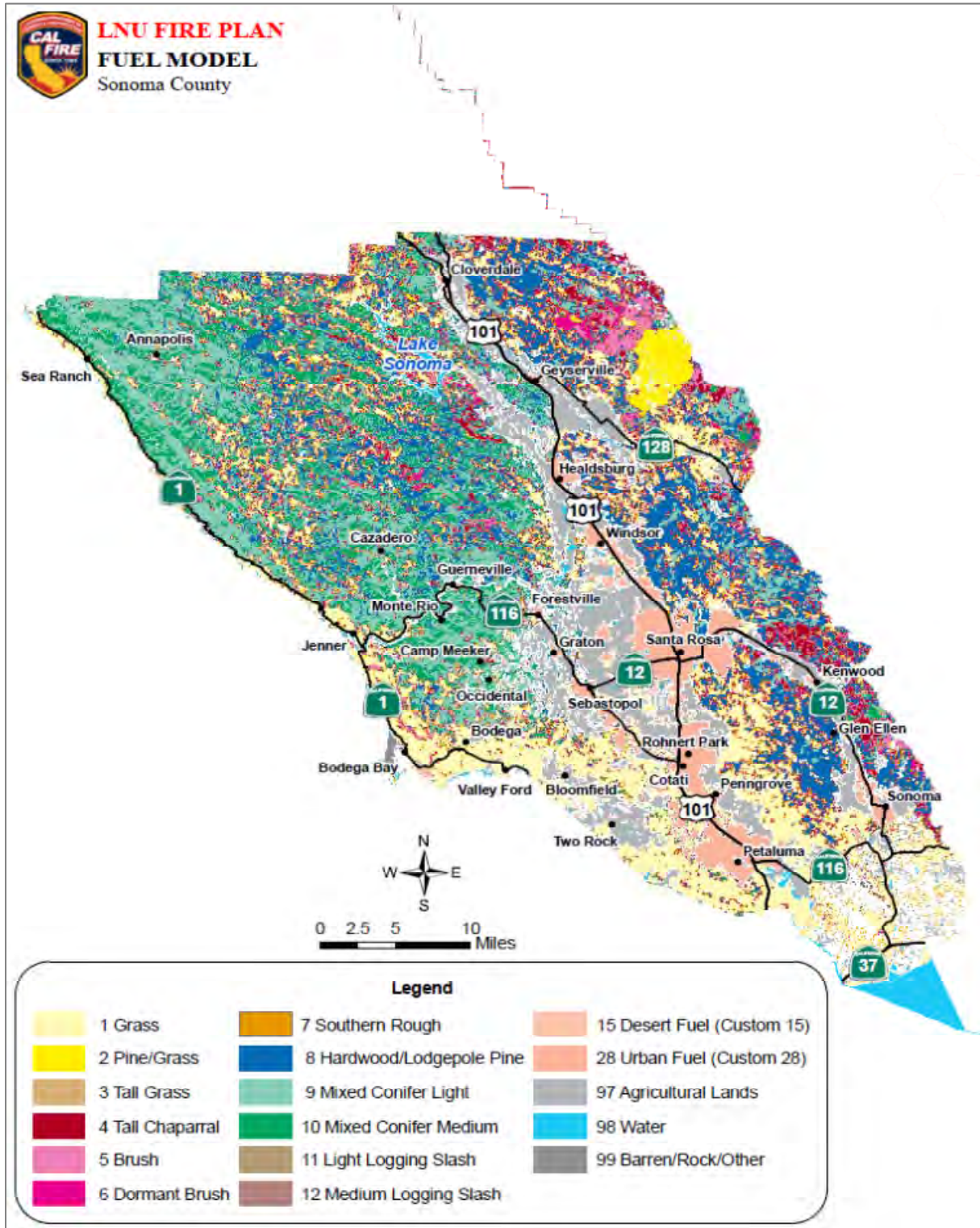
The vegetation fuel ranking is a useful tool to estimate fire behavior and to identify areas that may benefit from vegetation management mitigation measures. However, the frequency of severe fire weather and fire history are more effective indicators in assessing the fire risk in Sonoma County. The frequency 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. Unfortunately, there are gaps in weather data collected historically and at existing weather stations. For example, the weather station at Santa Rosa collects data that is applied to southern Sonoma County and the Napa Valley. On an August afternoon, it could be sixty degrees and foggy at Bodega Bay and over one hundred degrees in Calistoga. The lack of data to accurately reflect Sonoma County's microclimates results in misleading information regarding the overall Sonoma County fire hazard. Fire History is likely the best current indicator for Sonoma County to use in determining where severe fire weather is likely to occur.

# Map: Sonoma County Fire Hazard Severity Zones



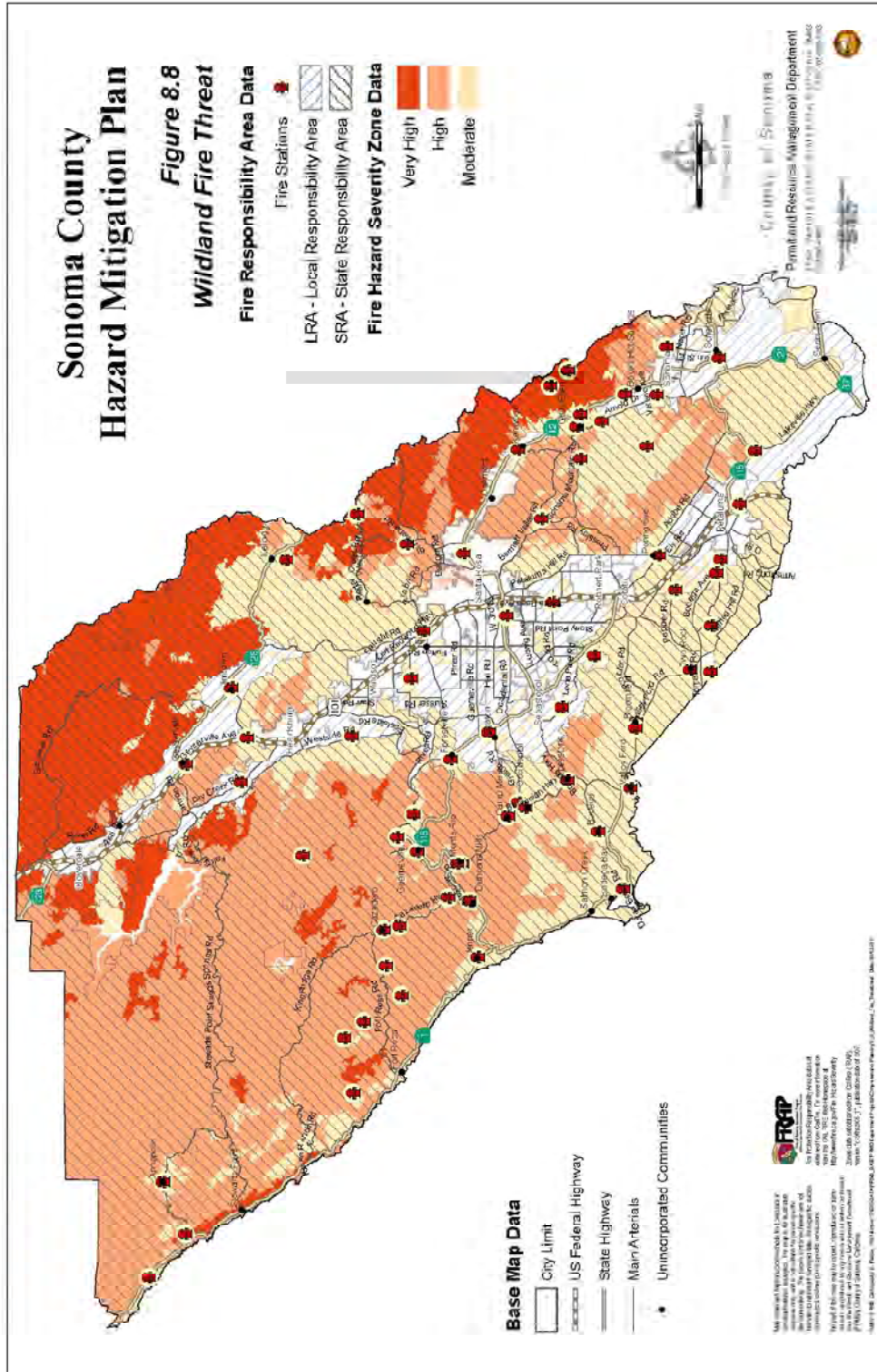
Map 6-1: Fire Hazard Severity Zones. See map at full size at CAL FIRE's FRAP website at [http://www.fire.ca.gov/fire\\_prevention/fhsz\\_maps\\_sonoma](http://www.fire.ca.gov/fire_prevention/fhsz_maps_sonoma)

# Map: Sonoma County Fuel Models



Map 6-2: Sonoma County Fuel Model. Formatting modified to fit document.

# Map: Sonoma County Wildland Fire Threat



Map 6-3: Sonoma County Wildland Fire Threat. Formatting modified to fit document.

## **Chapter 7**

# **Designation of the Wildland Urban Interface (WUI)**

This plan uses the term WUI as defined in the Federal Register (66:751, 2001) report on WUI communities at risk from fire (USDA & USDI, 2001). The term “WUI” comprises both Wildland Urban **Interface** and **Intermix**, but there is a distinction.

*“The **Interface** Community exists where structures directly abut wildland fuels. There is a clear line of demarcation between residential, business, and public structures and wildland fuels. Wildland fuels do not generally continue into the developed area. The development density for an interface community is usually 3 or more structures per acre, with shared municipal services. Fire protection is generally provided by a local government fire department with the responsibility to protect the structure from both an interior fire and an advancing wildland fire. An alternative definition of the interface community emphasizes a population density of 250 or more people per square mile.”*

*“The **Intermix** Community exists where structures are scattered throughout a wildland area. There is no clear line of demarcation; wildland fuels are continuous outside of and within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres. Fire protection districts funded by various taxing authorities normally provide life and property fire protection and may also have wildland fire protection responsibilities. An alternative definition of intermix community emphasizes a population density of between 28-250 people per square mile.”<sup>18</sup>*

In general, a WUI is that area where homeowners and communities should be aware of the risks posed by wildfire. They should understand the importance of creating and maintaining defensible space as well as how to make structures less vulnerable to ignition during a wildfire. Additionally, fuel reduction work should be performed to protect communities, infrastructure and watersheds from wildfire.

In Sonoma County, the area known as the State Responsibility Area (SRA) is WUI. Nearly every wildfire, even in the more remote areas of the County, will have the potential to destroy assets. Additionally, because embers from surrounding vegetation can travel for several miles to ignite homes, areas in Local Responsibility Areas can declare as WUI property 2 miles from the SRA boundary.

Local plans and CWPPs may declare a WUI boundary that is larger.

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<sup>18</sup> Federal Register 66:751, 2001.

## **Chapter 8 Risk Assessment**

This Risk Assessment was compiled from three sources, CAL FIRE, The County of Sonoma and County Residents who attended the CWPP Collaborative meetings.

According to the CAL FIRE's Strategic Fire Plan, the priority risks in the Sonoma-Lake – Napa Unit are as follows<sup>19</sup>:

- Life and safety
- Structures
- Water and watershed values
- Rangeland
- Agriculture
- Recreation
- Air quality
- Soil resources
- Wildlife
- Unique scenic areas
- Cultural and historical resources.

The County of Sonoma created the following Risk Assessment. It provides a great basis for risk assessment throughout the County. However, it is hoped that smaller-scale CWPPs in the future will have more detailed risk assessments that are more specific for smaller geographic areas.

### **Wildfire Hazard and Risk Assessment Sonoma County Hazard Mitigation Plan<sup>20</sup>**

#### ***Methodology***

This section reviews the exposure and vulnerability of community elements and facilities to wildfire risk. The term exposure refers to the number of facilities, their value, and the functions they support that are located in areas at risk of wildfires. The term vulnerability refers to how likely each of those facilities is to be damaged if impacted by a wildfire. Whenever possible, facilities exposed to wildfire risk are listed and their values are presented. For each of the facilities examined, all available information was collected from the County and other sources, including GIS maps and databases, other forms of databases, reports, and studies. An explanation of the data sources and analysis techniques used for analyzing each type of facility is presented in Appendix G.

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<sup>19</sup> Strategic Fire Plan, Sonoma-Lake-Napa Unit, 2015, p.15

<sup>20</sup> This section taken from Sonoma County Hazard Mitigation Plan, pp 144-162

Critical facilities incorporate essential facilities such as 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 within the County borders are operated by other government jurisdictions or private entities.

Wildfires threaten many buildings and infrastructure systems in the County, particularly those located in the County's hilly areas. In addition to threatening the built environment, wildfires can harm people and disrupt important functions.

Rapid wildland fire suppression is critical to prevent small fires from becoming large uncontrolled firestorms that become increasingly difficult to contain. Inadequate firefighting resources and communications systems can contribute to fire-spread. The greatest potential for a catastrophic wildland/urban interface fire in Sonoma County would result from multiple fire ignitions during a severe weather siege 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 but are not limited to Mark West Estates, Franz Valley, Porter Creek, Heights Subdivision, Foothills Ranch, and Rincon Valley.

Fire season in the Bay Area – late summer to fall – is followed by the winter rainy season. Areas burned by large fires lose all vegetation and the ground surface is significantly altered, leading to increased rainfall runoff. This can lead to more flooding as well as floods that peak rapidly, allowing less than usual warning time. It can also lead to increased erosion and landslides in hilly areas. These are secondary hazards that should be mitigated to the extent possible immediately after a fire.

Wildland fires are part of the natural cycle in Sonoma County, and many people advocate for limited fire suppression in natural areas. Planned burns are a tool used to manage wildfire risk, burning small brush and other flammable materials before they build up to unsafe levels. Wildfire management programs must balance respect for the region's natural cycle with protecting the way of life of County residents.

## **ASSETS AT RISK**

Firefighters are often the first responders not just for fires but also for earthquakes, floods, landslides and other emergencies. It is critical that fire stations and the personnel and equipment they hold are undamaged and operational for response to every type of disaster that could occur in the County.

The main type of government facility located in high wildfire risk areas is fire stations: thirty fire stations are located in high wildfire risk areas in the County. There are many benefits to having stations in these high risk areas because it places equipment and personnel in good position to respond to events in their area. In the event of large blazes, it is possible that fire stations could be overtaken by a fire and burned. It is

expected that the station will have adequate warning to completely evacuate all important equipment and personnel before this would happen, though many rural stations have not been assessed for their risk to natural disasters. Since fire stations

## **8.1 Hospitals**

None of the major hospitals in the County are located in high wildfire severity zones as defined by CAL FIRE. However, it is notable that all of the hospitals are located in the central part of the County and a wildfire in the coastal mountains, which face high wildfire risk, could isolate residents on the coast from emergency medical care facilities. Coastal residents do have access to an urgent care clinic in Gualala with paramedics based in Bodega Bay, Guerneville and Gualala; and helicopter ambulances.

## **8.2 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 wildfire. Twelve public schools in the County, mostly elementary schools, are located in areas of high wildfire risk. Four private schools are also located in high risk areas.

## **8.3 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 City agencies, public safety officials and emergency responders. The network is comprised of remote mountain top communication sites, consisting of towers and equipment buildings, which provide wireless communications coverage throughout Sonoma County.

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 function after a wildfire passes over their location. However, major wildfires in other areas of the state have destroyed wireless communication sites, which impeded firefighting efforts, and Sonoma's system could be damaged by similar events.

## **8.4 Roads and Highways**

Numerous county, state and federal roads and highways pass through high wildfire risk areas. Any of these roads could be temporarily closed if a fire is burning in its vicinity. Closure of these routes would cause serious transportation problems for County residents. It could also hamper access of emergency responders. Larger highways in high wildfire risk areas are the biggest concern, due to the level of traffic they carry. State and federal routes in the County pass through high wildfire 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 wildfires, however, are not stopped by roads and have been known to jump distances of up to a mile, particularly when winds are high.

## **8.5 Water Supply Systems**

The SCWA water supply and transmission system is made up of transmission pipelines (aqueducts), collector wells, booster pump stations, storage tank reservoirs, and other facilities that allow the agency to supply water for drinking and firefighting, manage flood risk, and 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 adopted a Local Hazard Mitigation Plan<sup>21</sup> in December 2012 which assessed the risk that Wildfires posed to the Agencies infrastructure and operations. Fire was not considered to pose as high a risk to SCWA facilities. The Agency's 2008 LHMP states the following:

“Fire is relevant to the Water 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 Water Agency's water supply system – that is, the emergency water supply needs of fire departments who may be relying on the Agency to supply that water. Both aspects are driven by the fire hazard in Sonoma County.

[CAL FIRE's fire threat map]...shows five threat classes that range from no threat to extreme threat. The figure shows that most of the Water Agency's water system is in an area of low fire hazard except for the facilities in the Wohler and Mirabel area. The figure also shows a high fire threat near the Los Guilicos tank. However, a more detail examination during the site reconnaissance confirmed a low fire hazard because of a clearing zone around the facilities. The Agency has an active maintenance program to address such issues. Furthermore, since the Agency is a wholesaler it does not have direct responsibility for firefighting.”<sup>22</sup>

Water supply is especially important since it is used to fight wildfires. In addition to water provided by the Sonoma County Water Agency, all areas of the County rely on water supplied by local water distribution companies or agencies, or water from local wells. All of these sources can be incapacitated if the power supply is interrupted. While underground water pipes are unlikely to be damaged by wildfires, buildings and

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<sup>21</sup> *Sonoma County Water Agency Local Hazard Mitigation Plan.*

<http://www.scwa.ca.gov/secureourwater/>

<sup>22</sup> Ibid p. 29

equipment necessary to manage the water supply can burn. 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 wildfire. Facilities of other water distributors may also be in these areas.

Any 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 water systems, this generally consists of large water tanks of a minimum of 2,500 gallons. These tanks are seen as a resource to protect individual structures from wildland fires. Most, but not all, fire agencies in the County have the proper equipment to connect to these tanks. The County inspects these tanks during construction but has no mechanism to ensure that they remain serviceable over time.

## **8.6 Other Utilities**

Utility systems can be disabled by wildfires, particularly in wildland/urban interface areas. Above-ground wiring for electricity, telephone and cable and the poles that support them can burn. Buildings housing important equipment can burn, and equipment can be damaged by the intense heat generated by fires or water used to suppress fires even if the building housing it does not burn. Utility services in many areas of Sonoma County could be disabled by wildfires. In addition the power transmission lines can cause fires; CAL FIRE's Strategic Fire Plan, Sonoma-Lake Napa Unit, 2015 lists power lines as the number two cause of wildfires in the Unit<sup>23</sup>.

A number of high voltage lines pass through high fire risk areas of the County. According to PG&E, there are 177 miles of high voltage transmission lines in the County. In addition there are many more miles of low voltage electrical distribution lines which serve most inhabited areas. The electrical system can be damaged by wildfires if high-or low-voltage lines, substations, or generating facilities burn.

Numerous PG&E 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 wildfires have occurred near it in the past century. As seen in 2004, 2012 and 2015, when wildfires come close to these types of facilities the power company must shut them down. During the 2004 Geysers Fire, four high-voltage transmission lines and 400

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<sup>23</sup> *Strategic Fire Plan, Sonoma-Lake-Napa Unit, 2015, p. 17*

megawatts of generating capacity were taken offline.<sup>24</sup> In that event, power supply to County residents was maintained due to rerouting through the electricity grid, but the entire state, and especially County residents, were urged to reduce power use.

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 wildfire risk areas. If these structures are burned, it could contribute to poor telephone functionality in various parts of the County.

### **8.7 Hazardous Materials Sites**

The County has many sites containing hazardous materials. These sites include dry cleaners, gas and service stations, agricultural sites, industrial sites, and high-tech facilities. The majority of the sites of most concern 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 wildfires. If these sites burn, impacts could include increased air pollution, environmental damage, or difficult post-fire clean-up.

### **8.8 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 wildfires is related to a number of factors, including location, surrounding vegetation, construction materials, and suppression resources. County buildings located in wildland/urban interface areas are at most risk of damage by wildfire. Buildings in these areas are at high risk, regardless of mitigation measures such as vegetation management, construction materials and suppression systems. While these measures reduce fire risk, a wildfire spurred on by heavy winds and dry weather can overwhelm fire fighting efforts and destroy buildings very quickly.

### **8.9 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. Certain types of people 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 wildfire risk area of the county: The Sonoma Developmental Center (SDC) is a residential facility serving individuals with developmental disabilities. The facility is governed by the California Department of Developmental Services.

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<sup>24</sup> PG&E news release, Sept 7, 2004 "Pacific Gas and electric Company Urges Customers in the Santa rosa Area to Conserve Electricity as Geysers Fire Continues to Burn."

Around 12,600 buildings are located in areas with high and very high risk of wildfires<sup>25</sup>. Assuming a replacement value of \$150 per square foot, the structures account for \$4.8 billion in real estate. Structures with vulnerable structural elements such as older, wooden roofs, or poor defensible space and tree branches overhanging the roof are at particular risk. The risk to residents is increasing as additional mountainous areas of the County are being developed and buildings formerly used as summer cottages are converted into permanent homes.

## **8.10 Environmental Resources**

Wildfires change the environment. The long-term impacts of fire on plants and animals can be positive and negative. The relationship between wildfires and environmental health is complex and not fully understood, but it is clear that 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 that are sensitive to fire damage.

After a significant wildfire, increased amounts of sediments will flow into rivers and streams. This can have a negative impact on 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 wildfires in County watersheds.

The 2004 Geysers Fire illustrates both negative and positive impacts fires can have on the environment. That fire burned nearly all of the Audubon Society's Mayacamas Mountain Sanctuary. According to a Madrone Audubon Society Report, many shrubs and trees planted in recent years as an effort to restore natural habitats were burned, as well as many mature trees. Sanctuary managers believe that most birds and wildlife were able to escape the blaze and view the burned landscape as an opportunity to establish native plant species now that many invasive weeds have been killed.

## **8.11 Impact and Loss Estimates: Methodology**

The science of estimating potential losses from wildfires is in its infancy. Some sophisticated computer models exist that can model wildfire spread, such as the FARSIGHT model used by research institutions. These models, however, are expensive and impractical for use by the County. This Plan, instead, estimates the impacts of a plausible wildfire scenario in the County. The next actual wildfire to occur in the County will have different characteristics and will affect different areas, but examining a scenario provides a realistic assessment of the types of damage that could occur in the County that might be mitigated. The scenario is followed by a summary of damage and economic losses in recent wildfires.

We assess the impacts of a repeat of the 1964 Hanley and Nunn's 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

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<sup>25</sup> This includes all structures with a footprint greater than 1000 square feet regardless of occupancy.

could more successfully contain these blazes. A repeat of these fires would cause significantly more damage today than occurred in 1964 due to subsequent development.

### **8.12 Repeat of 1964 Hanley and Nunn's 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 Nunn's Canyon to the edge of Route 12. Together, these fires burned 65,800 acres, over 100 homes and destroyed millions of dollars in property.

If we superimpose the areas burned by these two fires on today's built environment, we find that 3,500 buildings are currently located in these areas. 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.

The cost of damage to buildings, their contents and agriculture could easily exceed one billion dollars<sup>80</sup>. Developments 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 multiple millions.

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 burning on a severe weather day could overwhelm resources and cause significant damage.



*Photo 8-1: Two Smoke Columns from Lake County's 69,438 Acre Rocky Fire in August, 2015. In September & October, the Valley Fire burned 76,067 acres, including 5000 in Sonoma County, took four lives and consumed 1955 structures.*

## **Community Concerns**

As fire officials and local residents took the opportunity to hear each other's concerns and brainstorm for solutions, several common themes were expressed. Residents were most concerned about fuels conditions that they perceived to be a risk to life and structures. At every meeting people expressed apprehension about mortality from Sudden Oak Death (SOD), a tree disease caused by the pathogen *Phytophthora Ramorum* which fatally affects tanoak trees and some oak species. People living in the western portion of the county, where SOD is widespread, were especially concerned.

Residents were anxious about fuels conditions on large tracts of land near or abutting their homes, especially lands managed by State and County Parks, the Sonoma County Open Space District, and the Sonoma Land Trust. Additionally, large private parcels, timber lands, and parcels owned by private corporations posed concerns in some areas. The most common request at all meetings was for programs, such as free chipper service, that can help homeowners reduce fuel loads on their properties and make their neighborhoods more wildfire safe.

Residents at the meetings typically directed questions to attending fire professionals about issues such as legal mechanisms to force neighbors to contend with fuel build up; the efficacy of fire retardant gel products; the advisability of sheltering in place during wildland fires; which plants might be considered fire resistive, and methods to deal with fire safety in heavily forested areas. Another common theme was cancellation of homeowners' insurance for residents of WUI areas; there was considerable discussion about the amount of vegetation clearance that insurance companies can demand, and most meetings had at least one attendee whose insurance company had cancelled coverage.

At every meeting, community members expressed a desire for further education. The questions they asked fire officials clearly demonstrated their intention to learn more about what they can do. Attendees specifically requested more educational programs be given locally to help inform their neighbors about defensible space and wildfire issues.

The meetings showed that that Sonoma County WUI residents are extremely interested in gaining information about how they can act to make their homes and communities more wildfire safe, and keen to learn about programs that will help them to accomplish this goal. This is good news, since this CWPP identifies WUI residents as the single most essential factor in the success of wildfire loss prevention plans. Residents must be informed and empowered to take appropriate actions. Transcribed notes are available in Appendix G.

### **8.13 Community Asset Values and Risk Perception**

Fire Safe Sonoma solicited residents' concerns through the Fire Risk and Community Asset Survey. The survey was handed out at all CWPP community meetings and other public meetings, and was posted on Fire Safe Sonoma's web site. The intent of the

survey was to ascertain what values and assets were most important to the respondents. Survey questions asked residents to rate the extent that they considered wildfire a risk to their assets, and why they perceived the risks that they did. Assets could be ranked low (1) to high value (4), while risks from wildfire, vegetation, and slope could be evaluated as low risk (1) to high (3). Not surprisingly, the forms showed that peoples' gravest concerns are for their homes—all but one person ranked their home as a 3 or 4, extremely important. The following chart shows the top five asset values and total point values assigned to them on surveys received. Note that survey results are also available in chart format in each Battalion Section.



*Photo 8-2: Community Broom Removal Work Day: Fire Free Fitch. Founder Laura Teitz (pictured on the left with the orange broom wrench) gathered neighbors, CAL FIRE, and Fire Safe Sonoma members to clear and pile broom and brush for chipping.*

## Community Asset Values and Risk Perception Questionnaire: Tabulated Responses

Individuals were asked "How important to you consider these assets to be to your community?"

Individuals were asked to rate their perception of their wildfire risks, and what they thought was causing risk.

Individuals ranked items with these values	Not Important Or N/A	A Bit Important	Moderately Important	Very Important	Extremely Important	Wildfire Risk			Risk due to <u>Vegetation</u>			Risk due to <u>Slope</u>		
						Low Risk	High Risk	Extreme	Low Risk	High Risk	Extreme	Low Risk	High Risk	Extreme
Number of responses per column (53 Surveys Total)														
Homes	1	0	0	3	49	2	10	37	4	13	20	6	12	29
Commercial Structures	25	6	8	9	5	8	6	9	7	10	5	10	9	2
Historical/Unique Structures	27	4	6	7	9	7	6	3	5	11	4	8	7	3
Escape Routes	2	2	1	8	40	3	11	31	2	12	32	2	11	32
Power/Communication lines/facilities	9	0	5	9	30	0	13	25	2	12	22	5	15	18
Water storage/Delivery	3	0	2	9	39	3	11	27	5	12	22	7	12	21
Wildlife	2	2	11	17	21	1	13	28	3	13	23	3	13	21
Unique Plant or animal habitat	6	5	8	16	18	2	15	18	3	12	21	6	11	19
Viewsheds (Scenic Beauty)	9	6	7	15	16	2	7	38	2	10	22	3	10	36
Trails, etc.	20	5	13	9	6	5	10	10	4	10	10	5	7	11
Watercourses	20	3	5	13	12	2	9	14	3	10	11	5	10	7
Crops/Orchards/Vine yards	22	5	12	7	7	4	13	7	6	10	9	7	11	7
Range and Pasturelands	26	6	6	7	8	3	14	4	4	10	8	7	9	6
Timber Productivity	28	10	7	4	4	1		1		1	1		2	



## **Chapter 9**

### **Hazard Reduction Priorities**

This list is based on risk assessment priorities from CAL FIRE, the County of Sonoma, community agencies and stakeholders. Hazard reduction priorities include:

- 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 wildfires, thus protecting homes, communities and natural resources. In addition to reducing wildfire 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, language and disabilities.
- 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.

This Sonoma County CWPP's priorities are in alignment with the priorities as outlined in the ***Strategic Fire Plan, Sonoma-Lake-Napa Unit, 2015***. CAL FIRE priorities are:

1. Public Roads Escape Routes
2. Strategic Community Fuel Brakes
3. Landscape level fuel reduction and ridge top fuel breaks
4. Broadcast Prescribed Fires<sup>26</sup>

Because it can be anticipated that fuels hazards and thus treatment priorities may change over time, this list of hazard reduction priorities will also be placed in the Appendix with the Project Matrix of past, current and proposed fuels management/education and wildfire safety projects.

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<sup>26</sup> *Strategic Fire Plan, Sonoma-Lake-Napa Unit, 2015*, pp 6-8, 21

## **Chapter 10 Mitigation Strategies**

### **10.1 What Can Be Done to Reduce Structure Loss from Wildfire?**

Since the 1960s, researchers and firefighters have analyzed the causes of structure loss in wildland fires. Their work clearly has indicated that, to effectively reduce home loss, residents must treat BOTH the VEGETATION surrounding the structure and the STRUCTURE itself. Please refer to Appendix A for detailed information about how to make your home and landscape wildfire compatible.

### **10.2 Treating the Vegetation: Defensible Space**

Creating and maintaining a Defensible space radius of at least 100' from structures is crucial for three reasons: to save lives of both residents and firefighters, to keep fires that start in structures from escaping into the wildland, and to prevent home loss in a wildfire. Reducing vegetation helps protect structures by ensuring that intense radiant heat from forest fuels is far enough away from the sides of the building that the heat doesn't ignite the structure. Defensible space also ensures that flammable brush does not act as kindling for the structure in a direct transmission of flames. For these reasons, California Public Resource Code 4291 demands that homeowners in Wildland-Urban Interface areas create 100' feet of defensible space. For new construction in WUI areas, Sonoma County's building codes can increase this distance to 150' and beyond where slope, topography, or fuels increase risk.

### **10.3 Protecting Homes through Better Design and Materials**

Additionally, buildings must be constructed using materials that can withstand the multiple threats of wildfire without igniting. Reducing the question of structural ignition to its simplest possible terms, a house won't *burn* in a wildfire if it doesn't *ignite* in the first place. The major ignition threat is firebrands—burning embers that can be carried for miles on the wind to fall on or near the house. This threat is addressed by treating the house so that even if firebrands fall on it, it is much less likely to ignite. Homes can be constructed or modified to greatly increase their chances of surviving a wildfire with minimal damage.

### **10.4 The Healthy Forests Restoration Act (HFRA) Directive**

HFRA stipulates that Community Wildfire Protection Plans such as this one address the means of reducing structural ignitability, in a manner accessible to the public. Appendix A, "Creating Wildfire Adapted Homes and" is one effort to do so. Public education is an essential component to help Sonoma County Communities become wildfire compatible, and is repeatedly requested by residents themselves.

## 10.5 Wildland Mitigation Strategies: Fuel Breaks

The primary goal of a fuel break or shaded fuel break project is to modify wildland fuels with the goal of reducing flame length and high energy output from wildfire. Reducing fire intensity can be key to allowing fire crews to protect people and property from wildland fire.

Effective fuel breaks should act as anchor points from which firefighters can attack on wildland fires or from which they can safely use fire as an operational tool.

Fuel breaks should also provide safer ingress/egress for emergency responders and the public. With reduced fuel adjacent to a roadways and structures, flame lengths, fire activity, and heat production will be reduced, making it safer for firefighters to access the area and protect structures in the community.

Overall, fuel breaks should accomplish the following goals: abate fire risks; reduce fuel load; discourage invasive species and encourage healthy habitat for natives; suppress establishment and spread of tree diseases and damage causing insects, and create an overall improvement in forest health. Treatments could be carried out through mechanical means, with hand tools, or by prescribed burn.

A host of regulations could apply to any vegetation management project, from Timber Harvest Regulations to the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). It is critical that compliance with and completion of all Federal, State and Local regulations and processes be a part of the planning process for any project from inception. Making sure that your project complies with regulations can be expensive and can take a significant amount of project time. Make sure that this is considered in any project budget and timeline.

A **fuel break** typically refers to the removal of all or the majority of vegetation in a specific strategic area. A **shaded fuel break** refers to “thinning” of vegetation so that ladder fuels are removed while a canopy of tree cover is left in place to shade the ground.

Fuel breaks can be effective because they leave little to no fuel available to burn. Though less fuel is removed in the creation of a shaded fuel break, they can also be sufficient to reduce fire behavior. Additionally, shaded fuel breaks are less invasive to sensitive resources on the landscape, and more acceptable to neighboring residents. Typically, shaded fuel breaks are easier to maintain because the shaded landscape discourages regrowth. While fuel breaks can work well to help firefighters stop fire advance, when conditions are extreme, as in the 2015 Lake County wildfires, fuel breaks are far less effective.

The type and size of fuel reduction projects should be determined on a project by project basis. The widths of roadside shaded fuel breaks generally range from 10 feet up to 50 feet, and in certain instances may even be wider. Strategic fuel breaks can be as wide as 400 feet. The responsible fire agency as well as the community should collaboratively develop projects that meet the needs of the stakeholders.

Shaded fuel breaks can be placed around individual structures, a community or neighborhood identified to be at risk. For example, after a community has developed defensible space out to 100 feet from structures, they may wish to augment that with an extended fuel break. Depending on the topographical location of the community, an extended fuel break around the residences may be of strategic importance. There is no specific prescription for this type of project. It should be developed in collaboration with the community and responsible fire agency, and be adapted to local environmental constraints. While most projects are carried out with manual labor using chainsaws, there are a variety of methods used to manage vegetation.

**Mechanical:** Using large machines like masticators, grinders and chippers, trees are taken down and chipped on site. Chips can be disposed of by broadcasting, or removing for disposal or reuse (firewood, chips for cogeneration, finished wood products, etc.) off site. Mechanical treatment can only be used when roads allow access to the site. Costs for mechanical means of treatment per acre



vary considerably, and the cost of treatment will increase along with fuel loading, steepness and difficulty of access to terrain. Sensitive natural resources must be considered when using mechanical means.

Photo 10-1: Masticator removing trees killed by Sudden Oak Death.



**Manual Labor/Hand Tools:** Chainsaws and other tools are used to cut trees and brush, either lopping-and-scattering, chipping debris in place or burning in piles. Per acre cost for hand varies considerably, and the cost of treatment will increase along with fuel density, difficulty of access and steepness of terrain.

California Department of Corrections inmate crews,

Photo 10-2: California Conservation Corps.

who do a lot of fuels mitigation work in communities across California, cannot work in much of the western half of Sonoma County because of the amount of time it takes for them to commute from their home camps. Additionally, inmate crews do not work on private property.



*Photo 10-3: Sheep and goats hard at work.*

**Grazing:** Properly managed, grazing of domestic livestock such as sheep, goats and cattle can be an efficient and cost effective means to control grasses and brush, and can greatly benefit soil health and the ecosystem. Grazing animals can browse noxious plants such as poison oak that are difficult to manage, and greatly reduce fuels on slopes too steep for easy maintenance.

### ***Prescribed burning:***

Prescribed burning is the intentional introduction of fire into a landscape to accomplish predetermined management objectives. Prescribed burns can, at relatively low cost, protect trees from future fires, disease, and insects; prepare a seedbed for the future forest, and manage competing vegetation to improve the habitat for wildlife and native plants.

Fire can be an excellent management tool to deal with high surface fuel loads and dense understories. However, the window of opportunity for carrying out a prescribed burn is limited by weather, fuel conditions, air quality concerns, potential mortality of high value trees, and availability of CAL FIRE and local fire crews to monitor burns. Sonoma County's Mediterranean climate means very wet winters which make it difficult to burn vegetation in the spring, followed very quickly by very hot and dry conditions, which greatly increase the potential for out-of-



*Photo 10-4: Prescribed burn at Fort Ross State Historic Park, August 2010. A cooperative effort between California State Parks, CAL FIRE and local volunteer agencies, the burn was implemented to help give struggling native plant species more growing room as well as provide a training opportunity for firefighters.*

control burns.

There is tremendous concern over the potential for a prescription burn to escape. In SOD infested forest, for example, the presence of a large number of dead and dying trees may preclude prescription burning unless substantial pre-fire fuels treatment is carried out. The public sometimes objects to the production of smoke, either for visual disturbance or health conditions.

However, California's ecosystems evolved with fire, and it can be one of the most efficient and beneficial tools for reducing fire fuels and improving the health of long unburned landscapes. Educating firefighters, agencies, and the public about the potential benefits and cost efficiency of prescribed burns could help us to make more use of this valuable tool.



*Photo 10-5: Fort Ross SHP prescribed burn. Firefighters use a drip torch to ignite dense non-native grasses. Volunteer Firefighters from Timber Cove, Fort Ross, Annapolis and Cazadero participated along side with CAL FIRE Staff.*

# Chapter 11

## Partners in Wildfire Prevention

Fire as a process involves the proper combination of three elements: heat, oxygen, and fuel. A wildfire doesn't conform to jurisdictional boundaries. It burns wherever the three elements are present. Therefore, a wildfire, regardless of size, can impact a wide variety of stakeholders.

A stakeholder can be any person, agency, or organization with a particular interest in fire safety and protection of assets from wildland fire. Here is a partial list of stakeholders that might be able (in fact, eager!) to assist you as you create your defensible space and manage your wildland properties.

### ***CAL FIRE Foresters and Firefighters***

CAL FIRE foresters and firefighters at Region, Unit, Division, and Battalion levels are available to help residents in the development and planning for fire safe projects. Though during the fire season there may be limited staff availability at all levels, during the winter months CAL FIRE staff is a great resource.



### ***California Forest Improvement Program***

CAL FIRE's California Forest Improvement Program (CFIP) is a cost-share program; generally it reimburses landowners 75% of designated cap rates for project work. On a property with "substantial damage," such as wide-spread Sudden Oak Death, it can cover up to 90% of costs. CFIP can pay for activities such as fuels management/fire safety work, removal of trees infected with Sudden Oak Death, replanting with non-susceptible species, and preparation of a management plan. Average annual funding for Sonoma County over the past 10 years has been \$86,000, enough to fund ~10 projects. Landowners must have at least 20 acres of forestland, or apply as a group with enough neighbors to come up to this total. CFIP funds cannot be used within 100' of structures. [www.fire.ca.gov](http://www.fire.ca.gov)

### ***Volunteers in Prevention***

CAL FIRE Volunteers in Prevention are available to help with fire prevention and projects. Contact your local CAL FIRE Station or the West Division Headquarters in Santa Rosa to volunteer or see if you can find some help with your prevention project.

[fire.ca.gov/communications/communications\\_volunteers.php](http://fire.ca.gov/communications/communications_volunteers.php)



### ***Local Fire Agencies***

All local fire agencies are concerned about wildland fire risks in their response areas, and will be pleased to know that residents in their area are attempting to make their homes more fire safe. Local fire department will have a very clear understanding of issues in area neighborhoods, although the availability of staff to advise homeowners, as well as the level of knowledge about WUI prevention issues, will vary from agency to

agency. Give your local fire department a call and get to know them—sharing information with local agencies is mutually beneficial. Many small local fire departments depend on the generosity of the community to keep their engines equipped and on the road. Support your local fire department!

### ***Fire Safe Sonoma***

Fire Safe Sonoma’s mission is to increase awareness of wildfire issues in our county and help local residents and firefighting agencies to achieve improved wildfire safety. Formed in 1992, Fire Safe Sonoma has been instrumental in helping to educate residents about wildfire prevention and safety, especially through distribution of their publication, “Living with Fire in Sonoma County.” Fire Safe Sonoma acts as a liaison between local communities and agencies, actively seeks grant funding for wildfire-related projects, and manages grant programs. [www.firesafesonoma.org](http://www.firesafesonoma.org)



### ***Fire Safe Councils***

Local Fire Safe Councils, which act at a neighborhood or community level, can make great strides in increasing local awareness of wildfire issues and can serve to focus attention on issues in their area. The formation of more local councils across the county will be tremendously helpful in coordinating projects. The Sea Ranch Fire Safe Council has been successful in launching several planning projects and a cooperative project with Pacific Gas & Electric Company to remove hazardous fuels from roadways and around power lines. Many communities have expressed an interest in forming local Fire Safe Councils, and it is anticipated that the future will see more active local councils. Fire Free Fitch, formed in 2007 by one person concerned about wildfire issues in her neighborhood, has made great strides. They have organized emergency planning, held numerous educational workshops, and launched multiple chipper programs. If you are interested in creating a Fire Safe Council in your neighborhood, contact Fire Safe Sonoma.

### ***California Fire Safe Council***

The state-wide California Fire Safe Council (CFSC), a nonprofit organization and member of the California Fire Alliance, consists of public and private organizations. The CFSC's mission is to preserve and enhance California's humanmade and natural resources by fostering wildfire protection. The CFSC accomplishes its mission through public education programs and by funding community fire safety projects. The CFSC distributes fire prevention education, evaluates legislation pertaining to fire safety, and assists local organizations to initiate fire safety programs. The CFSC administers the Grants Clearinghouse program, which provides a onestopshop concept for fire prevention community assistance grants. Since 2008 the Grants Clearinghouse has funded projects including fuel reduction projects including, prescribed fire, mechanical, and grazing, as well as education and outreach activity, Community Wildfire Protection Plan (CWPP) development, and biomass reutilization. The CSFC has funded five projects for Fire Safe Sonoma, including this CWPP.



## ***Sonoma County Fire and Emergency Services***

Sonoma County Fire provides emergency and non-emergency services for residents and visitors to Sonoma County through five divisions; Administration, Fire Operations and Training, Fire Prevention, Hazardous Materials and Emergency Management.

[sonomacounty.ca.gov/Fire-and-Emergency-Services/](http://sonomacounty.ca.gov/Fire-and-Emergency-Services/)



- **The Fire Division** comprises 13 volunteer fire companies (VFCs) serving approximately 500 square miles of rural Sonoma County. More than 200 first responder volunteers serve their communities in the VFCs, responding to over 1000 calls per year. The VFCs are all in SRA/WUI, so are a critical link for wildfire prevention and suppression.
- **The Emergency Management Division** is the lead agency for the planning and coordination of response, recovery, and mitigation activities related to county-wide emergencies and disasters.
- **The Fire Prevention Division** provides plan check and inspection services for fire-related code compliance in coordination with the Permit and Resource Management Department, and administers contracts for fire prevention, code enforcement and plan review and actively participates with the countywide Fire Investigation Task Force.
- **Sonoma County Fire curbside chipper program** provides free chipping for individuals and groups in WUI areas who cut and pile woody debris for defensible space clearance. Free chipping is proven to be a strong incentive to help individuals and groups make properties and neighborhoods more wildfire safe.
- **Hazardous Materials Division** handles response to hazardous materials incidents throughout the County and shares responsibility for facilities that handle hazardous materials.



*Photo 11-1: A grateful West County homeowner watches the Sonoma County Chipper crew in action.*

## ***Resource Conservation Districts***

Resource Conservation Districts (RCDs) provide technical and educational assistance programs for agricultural and rural landowners to protect, conserve, and restore natural resources. Conservation projects may include: conservation education, soil erosion and sediment control, water conservation, groundwater recharge, rangeland and pasture management, and in-stream and wildlife habitat enhancement. The two RCDs serving Sonoma County — Sonoma RCD and Gold Ridge RCD — collaborate with Fire Safe Sonoma and CAL FIRE to assist forest landowners, help find funding for conservation projects, and ensure that projects consider fire safety. [www.sonomarc.org](http://www.sonomarc.org) and [www.goldridgercd.org](http://www.goldridgercd.org).

### ***Registered Professional Foresters***

There are thousands of small parcels (under 50 acres) of forested land in Sonoma County. Fire suppression and the fact that most of these parcels are not being actively managed for timber production, grazing, or agriculture are all factors that greatly increase fire fuels and cause a decline in overall forest health. Exemptions to forest practice regulations can allow landowners to do a limited timber harvest on their land, and use revenues from timber sales to help them pay for work done to improve overall forest health. A registered professional forester can help landowners navigate forest practice regulations and create a timber harvest plan. CAL FIRE's CFIP program (see above) can help you pay for a forester to create a forest management plan for your property.

### ***Watershed Councils & Community Forests***

Watershed Councils and Community Forest groups are locally organized, voluntary, non-regulatory groups established to improve the conditions of watersheds & forests in their local area. Bringing together local stakeholders from private, local, state, and federal interests in a partnership, councils plan protection and restoration strategies in a holistic way--from ridge top to ridge top, and from headwaters to mouth. Through partnerships, these groups work collaboratively to identify issues, promote cooperative solutions, focus resources, agree on goals for watershed protection and enhancement, and foster communication among all watershed interests.

### ***Citizens Groups and Homeowners Associations***

Citizens groups, such as homeowners associations and local ad-hoc committees, can be powerful agents of change. Groups such as the Fountaingrove Open Space Maintenance Association and the Fitch Mountain Homeowners Association have collaborated extensively with CAL FIRE, Sonoma County Fire, and local fire officials to implement community wildfire protection projects.

### ***The Sonoma County Forest Conservation Working Group***

The Sonoma County Forest Conservation Working Group is a team with forestry and conservation expertise working together to provide education and resources to forest



landowners with the goal of protecting and sustaining healthy forests, woodlands, and watersheds in Sonoma County. Members represent forest landowners, local and regional land trusts, watershed councils, and state and local agencies. For more information go to: <http://sonomaforests.org/>

### ***Agencies and Corporations***

Agencies and corporations throughout the county undertake vegetation management projects every year. For example, millions of dollars are expended yearly for roadway clearing by county or state road departments and companies like Pacific Gas and Electric Company. Ideally, community fuels management projects can be done in conjunction with routine vegetation management by other agencies to increase the

boundaries and effectiveness of projects. This routine work also can provide important matching funds for grant projects.

***Pacific Gas and Electric***

PG&E must inspect all the power transmission lines in the county yearly and maintain them clear of vegetation. PG&E is committed to reducing the number of outages and wildfires caused by vegetation. PG&E has provided grant funds to Fire Safe Sonoma for vegetation management and educational projects.



***CalPine***

CalPine Energy Corporation and the Northern California Power Authority, geothermal energy producers in the Geysers area of Sonoma and Lake counties, have worked with CAL FIRE Staff to implement pre-fire management projects of various types.

***Federal Land Managers***

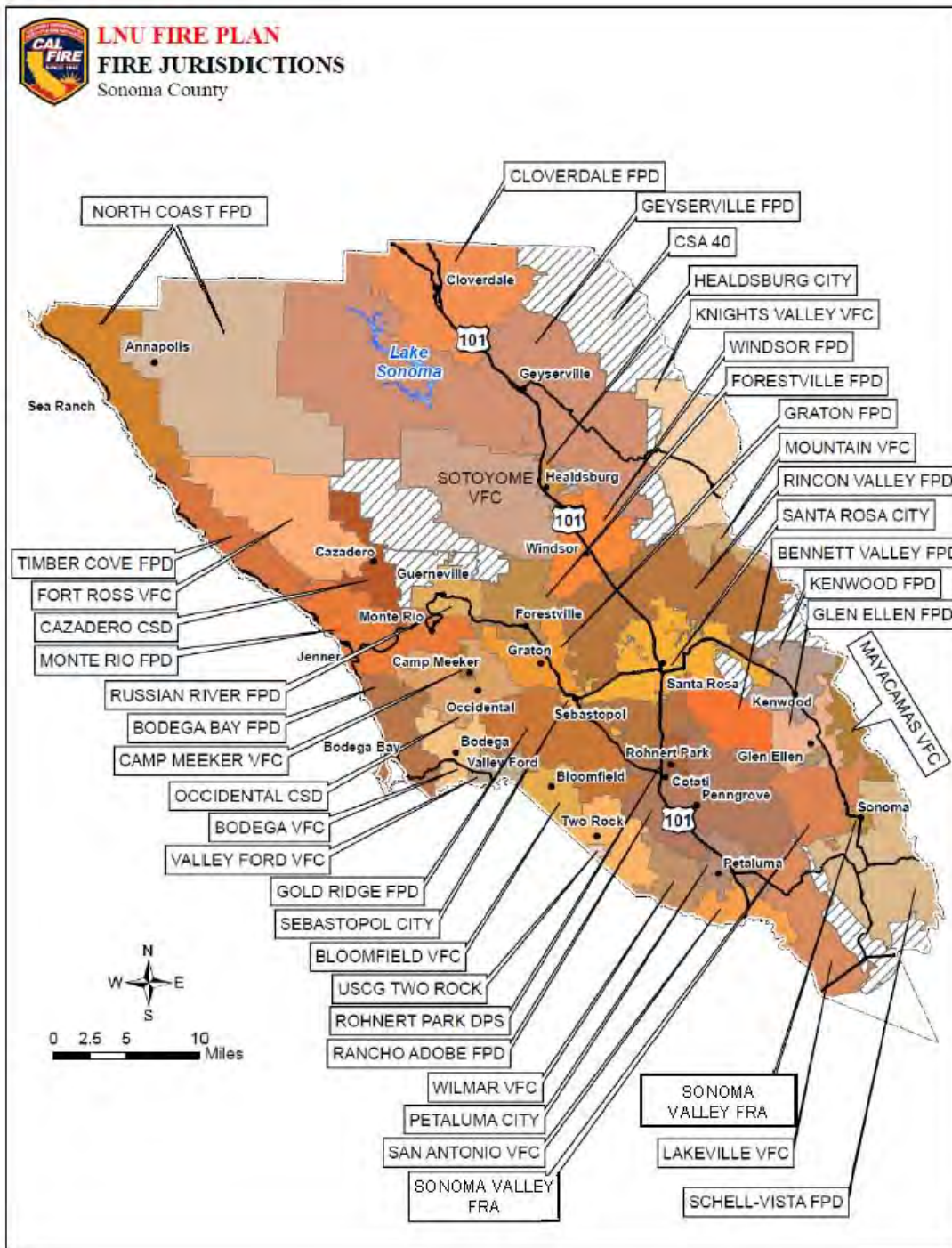
Federal government agencies also have major stakes in fire safety and protection of assets from wildland fire. At the federal level, CAL FIRE and Fire Safe Sonoma have worked closely with the USDI Bureau of Land Management's Ukiah Field Office, USDA Forest Service, and the U.S. Army Corps of Engineers on numerous pre-fire management projects over the years.

***State Agencies***

State agencies include the Department of Fish and Wildlife, State Lands Commission, and the Department of Parks and Recreation. CAL FIRE has either active or recently completed Vegetation Management Program projects on lands administered by each of these agencies.

# Chapter 12

## Sonoma County Fire Agencies



Map 12-1: Sonoma County Fire Agencies. FPD=Fire Protection District, CSD=Community Service District, VFC=Volunteer Fire Company (part of Sonoma County Service Area #40).

## **12.1 State Responsibility and Local Responsibility Areas**

Initial response to all fire, medical, and similar emergencies is the responsibility of 41 local fire departments. Sonoma County is divided up into Local Responsibility Areas (LRA), which are located primarily in municipalities, and State Responsibility Areas (SRA).<sup>27</sup> In all areas designated SRA, the state firefighting agency, CAL FIRE, has primary responsibility for wildland fires and fires that pose a threat of spreading into the wildland. CAL FIRE has primary command of SRA fires as soon as their units arrive on the scene. In LRA areas, local agencies have primary command, though they may choose to request support from CAL FIRE.

## **12.2 Local Fire Agencies**

In Sonoma County there are 41 local fire agencies including Fire Protection Districts (FPDs) or Community Services Districts (CSDs); six municipal fire departments; and the County Service Area (CSA) #40 which consists of 13 Volunteer Fire Companies (VFCs) under the direction of the Sonoma County Fire and Emergency Services Department.

CAL FIRE has a number of automatic aid agreements and mutual threat zones with fire protection agencies throughout Sonoma County, including the Santa Rosa Fire Department, Rincon Valley FPD, Occidental CSD, Graton FPD, Forestville FPD, Russian River FPD, Cazadero CSD, the Petaluma Fire Department, Wilmar VFC, Rancho Adobe FPD, Kenwood FPD, Glen Ellen FPD, Valley of the Moon FPD, Schell Vista FPD, Geyserville FPD, and the Healdsburg Fire Department. These agreements provide for varying levels of service, including responses to fires, traffic accidents, and medical aid.

CAL FIRE may provide additional coverage to Local Responsibility Areas under the Amador Plan (Public Resources Code 4144), which allows local agencies to contract with CAL FIRE for fire protection services during the “non-fire” season. CAL FIRE has a contract to provide one engine company, collocated with the CAL FIRE Sea Ranch station. CAL FIRE also has Amador contracts with Cloverdale FPD, Monte Rio FPD, and Wilmar VFC during the wintertime to staff a station and one engine.

## **12.3 Paid and Volunteer Fire Departments**

By acreage, most of the Wildland Urban Interface (WUI) in Sonoma County is in the unincorporated rural parts of the county and is served by volunteer or “combination”

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<sup>27</sup> The State Board of Forestry and Fire Protection designates as SRA land where the primary financial responsibility for preventing and suppressing fires is that of the state. These include:

A) Lands covered wholly or in part by forests, or by trees producing or capable of producing forest products.

B) Lands covered wholly or in part by timber, brush, undergrowth, or grass, whether of commercial value or not, where this growth protects the soil from excessive erosion, retards runoff of water, or accelerates water percolation, if these lands are sources of water that is available for irrigation, or domestic or industrial use.

C) Lands in areas that are principally useful for range or forage purposes, that are contiguous to the lands described in subdivisions (A) and (B). See Public Resource Code 4126. Statewide, SRA encompasses approximately 31 million acres.

fire departments, with both paid staff and volunteers. However, some of the most densely populated areas of Sonoma County's WUI are found at the outskirts of urban communities such as Santa Rosa, Windsor, Petaluma, and Healdsburg. These WUI areas are also served primarily by paid or "combination" fire departments, with both paid staff and volunteers.

Paid or volunteer, firefighters have the same responsibilities: responding to all emergency situations such as medical emergencies (which comprise the majority of fire department responses); structure and wildland fires; vehicle crashes; hazardous materials incidents; safety issues such as trees down on roadways and storm damage, as well as requests for assistance for many non-emergency issues.

#### **12.4 Volunteers Serve Most of Sonoma County's WUI**

Paid and volunteer departments alike must satisfy training requirements. Both paid personnel and volunteers are professional firefighters who serve their communities well; the essential difference is that volunteers are not paid to serve their communities. Most volunteer departments do not have staff at the fire house waiting for calls. Instead volunteers respond to calls from wherever they are when dispatched on their pagers. This system might add to response time, as volunteers must first get to the firehouse then leave in apparatus to incidents.

Some volunteer departments have experienced increasing problems attracting new members and retaining volunteers. The volunteer staffing problem is especially common in the rural areas where many local residents must commute to the urban core for work and are not available for responding to emergencies or completing fire department training requirements.

Despite these challenges, like the paid firefighters, the volunteer firefighters of Sonoma County are hardworking, professional, and dedicated to serving and protecting their communities. To a greater or lesser degree, all fire agencies rely on property taxes for operational costs. Property taxes are tied to real estate values, and so the market devaluation such as occurred in the 2010s caused significant reduction in income for most fire districts. Many paid departments have faced cutbacks and funding reductions in recent years. Fire prevention activities, such as community education and inspection programs, have often been reduced or eliminated as staff is cut. Rural volunteer fire departments likewise are experiencing a reduction in income, both from declining property taxes and smaller donations from their local communities

Running any fire department is expensive. Even when revenues decline, the costs of running a fire department keep rising. Purchasing and maintaining apparatus, first aid supplies, firefighter gear, communications equipment, tools, and gasoline gets more expensive every year. Overall, while local agencies continue to efficiently serve their communities' emergency service's needs, if fire department incomes continue to decline in the future, there could be increasing reason for concern for all Sonoma County residents.

## **12.5 Encouraging Fire Safety is Cost-Effective**

Sonoma County firefighters, like their counterparts nationwide, have excellent “initial attack success,” extinguishing 98 percent of wildfires at less than 25 acres. However, every year, fires start when weather conditions, topography, and fuels combine to make it impossible for firefighters to put out the fire during initial attack. The two percent of fires that “get away” generally overwhelm local resources very quickly and have great potential to cause multiple structure losses. In Sonoma County, we face the potential for such a catastrophic fire every year.

The new reality of reduced funding and resources makes it critical to encourage and educate local residents to become increasingly “fire safe”: that is, to do everything they can to save their homes far in advance of the fire. There are thousands more homes in Sonoma County than there are fire trucks to protect them. In the event of a catastrophic fire, the steps that county residents take to “wildfire safe” their properties—thinning and maintaining vegetation, and decreasing ignition potential from windblown embers—have a far greater potential to save homes and lives than relying solely on the efforts of firefighters during the fire. This has always been true, but never more so as we face system-wide economic difficulties in conjunction with the potential for increasing wildfire potential due to changes in the climate.



*Photo 12-1: A prescription burn in the hills east of Santa Rosa helped reduce down-slope fuels below an at-risk community.*

## Chapter 13

### CAL FIRE Unit Overview<sup>28</sup>



CAL FIRE responds to wildland fires, structure fires, automobile accidents, hazardous material spills, and a variety of other emergency incidents. CAL FIRE staffs nine stations within the County, as well as the Sonoma Air Attack Base; total fire-season staff is approximately 115, with a reduced staff of approximately 50 during the non-fire season.

The Sonoma-Lake-Napa Unit (LNU) is one of 21 California Department of Forestry and Fire Protection (CAL FIRE) administrative units. The Unit was created in 1996 with the merger of the then Sonoma Ranger Unit and the Lake-Napa Ranger Unit. It comprises six counties: Sonoma, Lake, Napa, Yolo, Colusa, and Solano (map, below). LNU has primary responsibility for more than 2.1 million acres of State Responsibility Area (SRA), and 2.3 million acres of CAL FIRE Direct Protection Area (DPA) lands, more than any other unit (table, below). It has the third largest population living within CAL FIRE DPA, and ranks third in the average number of annual fires.

The Sonoma-Lake-Napa Unit is divided into five divisions, and ten field battalions. Sonoma County defines the West Division and is divided into four battalions. The West Division office is located in Santa Rosa.



Map 13-1 CAL FIRE Sonoma-Lake-Napa Unit (LNU).

The West Division (Sonoma County) is comprised of Sonoma Air Attack Base (Air Attack 140, Air Tankers 85 and 86), and 9 State Fire Stations (Santa Rosa, Occidental, The Sea Ranch, Cazadero, Hilton, Glen Ellen, Petaluma, Healdsburg, and Cloverdale Station, that house 14 engines and 2 dozers. The Sea Ranch contracts with CAL FIRE for Schedule “A” services, both Petaluma and Hilton Stations have an “Amador” contract through Sonoma County. Additionally, Cal Fire dispatches for the City of Cloverdale.

Napa County defines the South Division, and is comprised of three field battalions. Lake County defines the North Division, and comprised of two field battalions. The remaining counties of Yolo, Solano, and Colusa define the East Division, and are comprised of a single battalion. Sonoma-Lake Napa Unit’s Headquarters, including the Emergency

<sup>28</sup> *Strategic Fire Plan, Sonoma Lake Napa Unit, 2015*



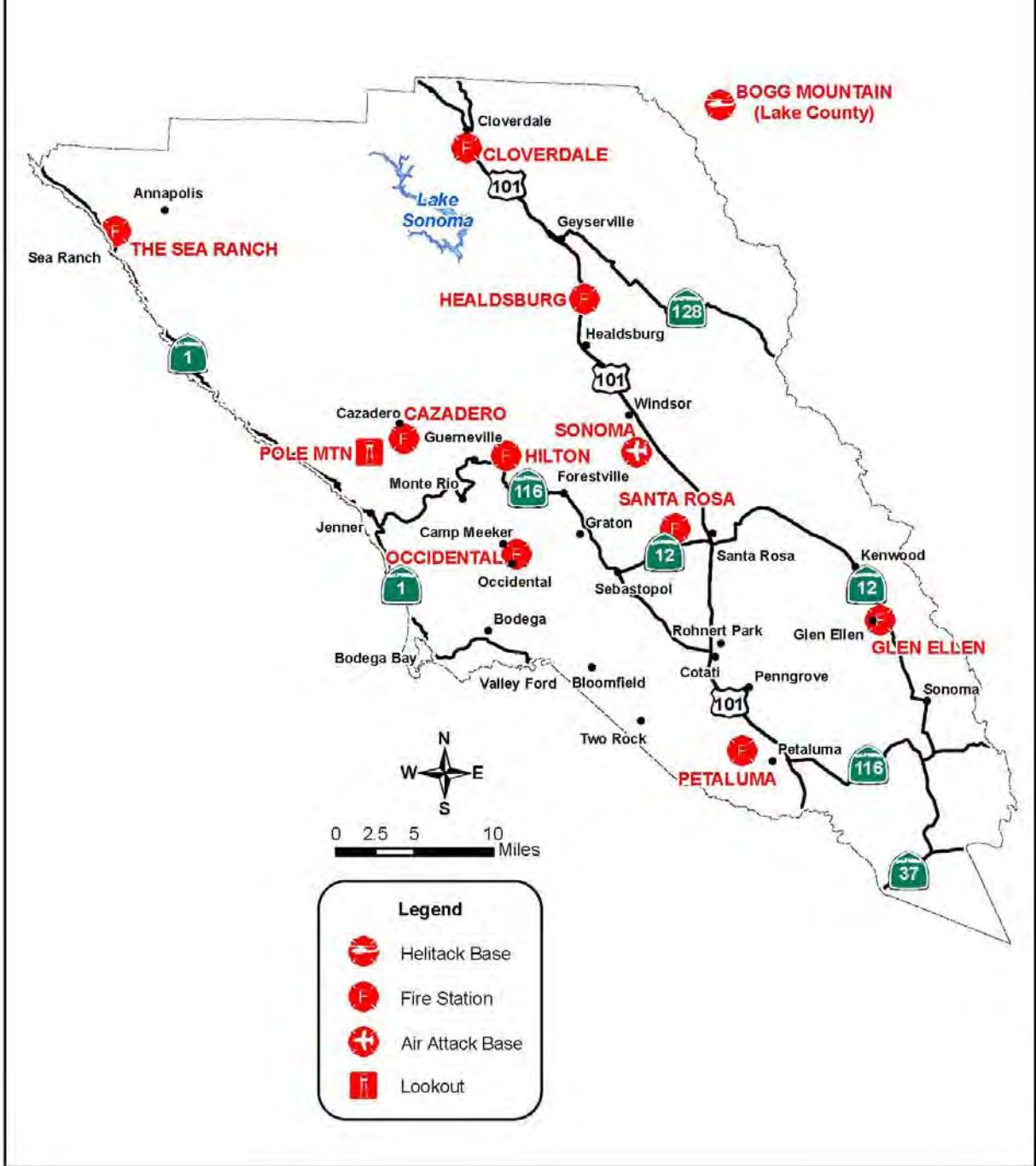
Command Center (ECC) and the South Division offices are located just north of St. Helena in Napa County (Central Division).

<b>County</b>	<b>SRA Acres</b>	<b>SRA Persons</b>	<b>SRA Houses</b>	<b>DPA Acres</b>	<b>DPA Persons</b>	<b>DPA Houses</b>
Colusa	270,899	708	392	297,360	610	356
Lake	390,084	20,409	11,276	481,598	20,286	11,205
Napa	370,084	17,498	6,741	433,510	17,500	6,742
Solano	93,820	10,751	3,884	96,643	10,751	3,884
<b>Sonoma</b>	<b>793,793</b>	<b>59,030</b>	<b>28,162</b>	<b>817,929</b>	<b>59,041</b>	<b>28,165</b>
Yolo	183,127	1,564	661	209,406	1,564	661
<b>TOTAL:</b>	<b>2,101,807</b>	<b>109,960</b>	<b>51,116</b>	<b>2,336,446</b>	<b>109,752</b>	<b>51,013</b>

Table 13-1 SRA (State Responsibility Area) and DPA (Direct Protection Area) acreage and population. (DPA includes federal lands which can be more effectively protected by CAL FIRE)

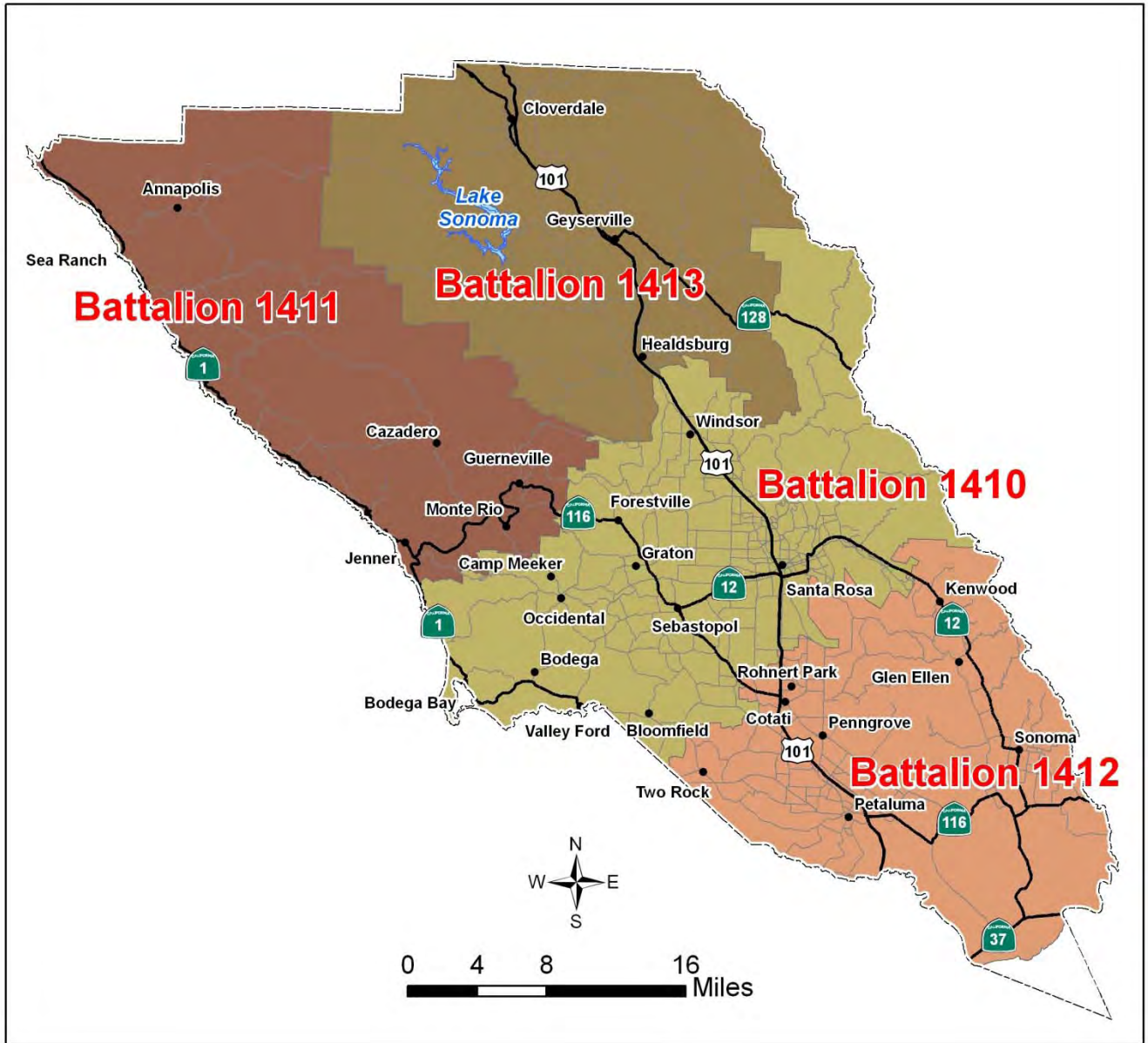


**LNU FIRE PLAN**  
**FACILITIES**  
 Sonoma County



Map 13-2 CAL FIRE West Division (Sonoma County) Facilities

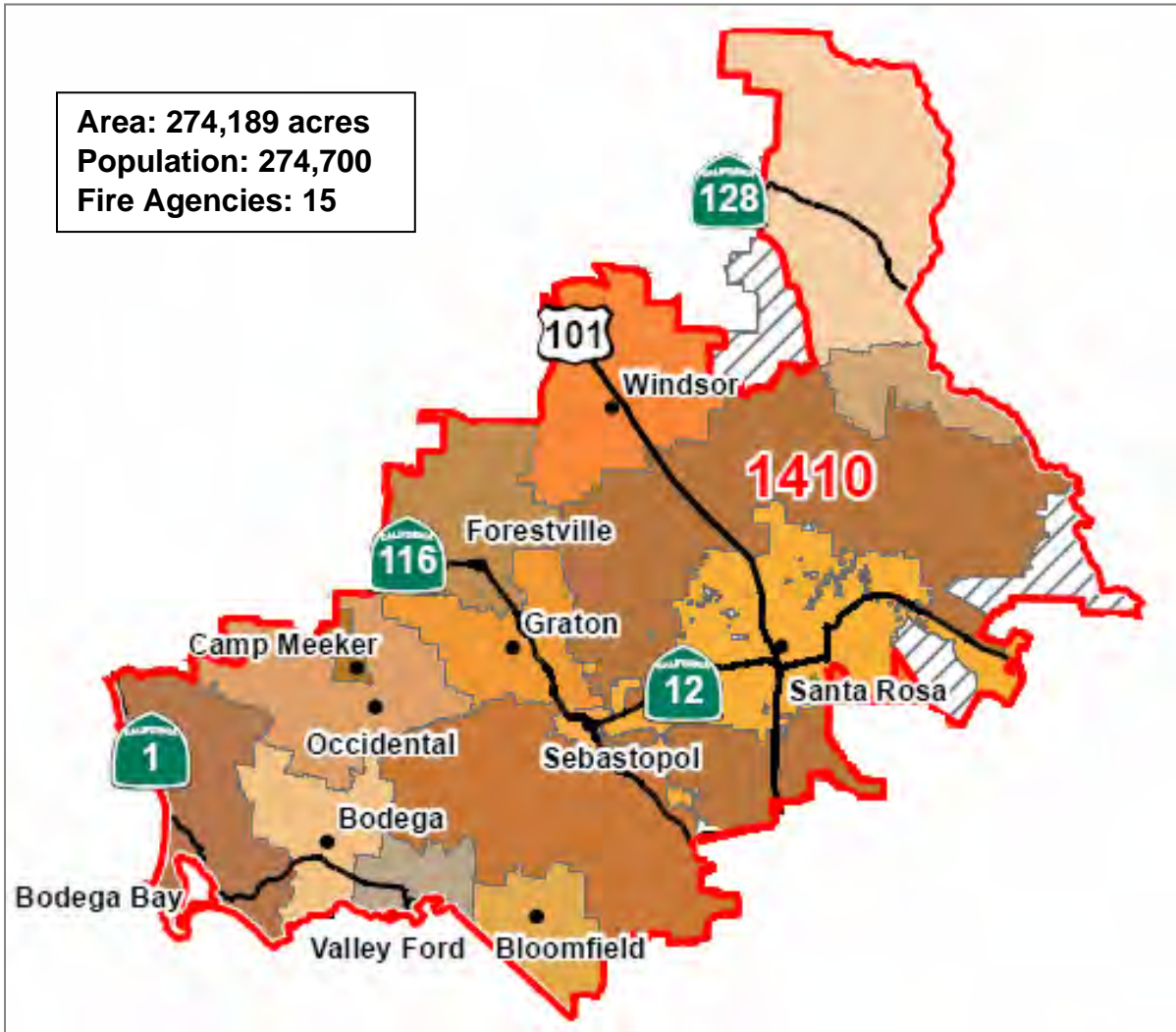
# CAL FIRE West Division, Sonoma County Battalions 1410, 1411, 1412, 1413



Map 13-3 Sonoma County, CAL FIRE West Division Battalions

# Chapter 14

## Battalion 1410



Map 14-1: Battalion 1410 Agencies & Communities

### 14.1 Discussion

Battalion 1410 spans Sonoma County: its western boundary is the Pacific Ocean and its north-eastern the Lake County line. There is an elevation difference of over 4,300 feet—from sea level in the west to the slopes of Mt. St. Helena in the east. The landscape and settlement patterns are vastly different across the battalion—from the cool coastal region to forested areas with densely packed wood-frame homes and cabins, to dairy farms, to homes and vineyards in the dry rolling hills of the Mayacamas Mountains, to the populous areas surrounding Santa Rosa—the largest city in the CAL FIRE Unit.

All of the local agencies within the battalion are aware of and concerned about fire potential in their WUI areas and many have been proactive in planning for wildfire incidents through education and, when budgets allow, on-site inspections of properties.

Notably, the Santa Rosa Hazard Fuels Risk Assessment (Appendix E) is a great example of proactive planning. The objective of this project was to identify, classify, and prioritize areas within and surrounding the city of Santa Rosa that represent the highest risk related to wildland fire in the urban interface. Additionally, in the Santa Rosa area, the Fountain Grove II Open Space Maintenance Association has prepared a CWPP for their community (Appendix C). This community, located in the footprint of the 1964 Hanley Fire just north of the developed urban core of Santa Rosa, has considerable fuels issues with great potential for economic and life loss in the event of wildfire. Their proactive stance to wildfire loss prevention and community education has succeeded in greatly reducing their risks.

With the exception of the urban centers (LRA) located within battalion 1410, virtually all the region is WUI, and nearly every incident becomes a multi-agency response. Areas of dense housing in or near WUI areas mean that multiple structures are often threatened in wildfire incidents. Sudden Oak Death, a tree disease caused by pathogen *Phytophthora Ramorum* which fatally affects tanoak trees as well as some other oak species, has devastated the forested areas in the west of the division, and continues to increase mortality in the eastern half. As is true for most of the county, changing land use and fire suppression has caused increasing fuels build up, putting much high-value real estate at risk.

The footprint of the 1964 Hanley Fire, which burned from Calistoga west to Santa Rosa and consumed 52,700 acres, is almost entirely within battalion 1410. Though the Hanley Fire destroyed only 108 structures, today the area has thousands of buildings, including high-value homes, commercial structures and critical infrastructure. There is uniform concern both from fire officials and of local residents about the potential for high losses were a similar event to reoccur.

**Battalion 1410 Communities at Risk**

- Bloomfield
- Bodega
- Bodega Bay
- Camp Meeker
- Forestville
- Graton
- Larkfield-Wikiup
- Occidental
- Roseland
- Santa Rosa
- South Santa Rosa

*List maintained by the Office of the State Fire Marshal.*  
[http://osfm.fire.ca.gov/fireplan/fireplanning\\_communities\\_at\\_risk](http://osfm.fire.ca.gov/fireplan/fireplanning_communities_at_risk)

## 14.2 Local Fire Agencies within Battalion 1410

Battalion 1410's has great geographic diversity—from the cool coast to the hot dry slopes of Mount St. Helena, as well as extremely variable population density. Much of the County's Local Responsibility Areas (LRA) and the County's largest city, Santa Rosa, are in the middle of the battalion. All of the municipalities within the battalions have significant WUI.

Agency	Size (Sq. Miles)	Population	ISO-PPC	Paid Staff	Volunteer Staff	Engines	Water Tenders	Other Apparatus	Station Location
<b>Bloomfield VFC (CSA#40)</b>	18	583	8	0	7	1	1	2	1 Station in Bloomfield
<b>Bodega Bay FPD</b>	37	20,000	5	10	15				1 station in Bodega Bay
<b>Bodega VFC (CSA#40)</b>	18	1500	8	0	17	2	1	2	1 Station in Bodega
<b>Camp Meeker VFC (CSA#40)</b>	2	1000	4	0	11	5	0	1	1 Station in Camp Meeker
<b>Forestville FPD</b>	24	8,000	4	7	21	3	1	7	1 station in Forestville
<b>Gold Ridge FPD</b>	75	25,000	6	12	55				3 stations in Sebastopol
<b>Graton FPD</b>	26	14,000		0	30				1 station in Graton
<b>Mountain VFC (CSA#40)</b>	22			0	12	4	1	2	1 station in Mountain
<b>Occidental CSD</b>	25	5,000	5	1	25				1 station in Occidental
<b>Rincon Valley FPD</b>	125	30,000	4	22	30				4 stations in Santa Rosa
<b>Roseland FPD</b>	3	5,000	3	0.5	0				1 station in Roseland (contract w/ SRFD)
<b>Santa Rosa City</b>	45	170,000	3	148	0	12	1	2	10 stations in Santa Rosa
<b>Sebastopol City</b>	4	8,000	3	1	32	3	0	5	1 station in Sebastopol
<b>Valley Ford VFC (CSA#40)</b>	13		8	0	19	2	0	1	1 station in Valley Ford
<b>Windsor FPD</b>	30	30,000	3	6	33				2 stations in Windsor

Table 14-1: Fire Agencies within Battalion 1410

### 14.3 Fire Chiefs & Local Residents WUI Concerns,

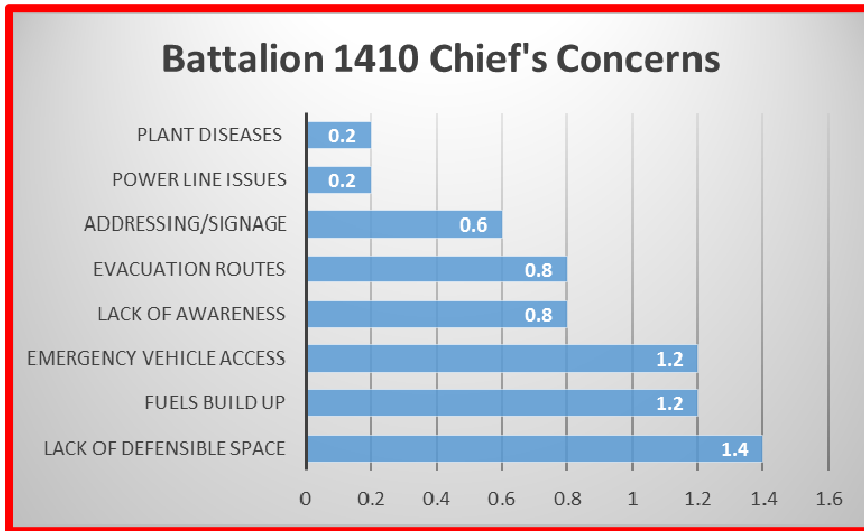


Table 14-2 Fire Chiefs' Concerns, Battalion 1410

In Battalion 1410, fire officials' the top two WUI Area concerns are: 1 – Defensible Space, and 2- Fuels Buildup.

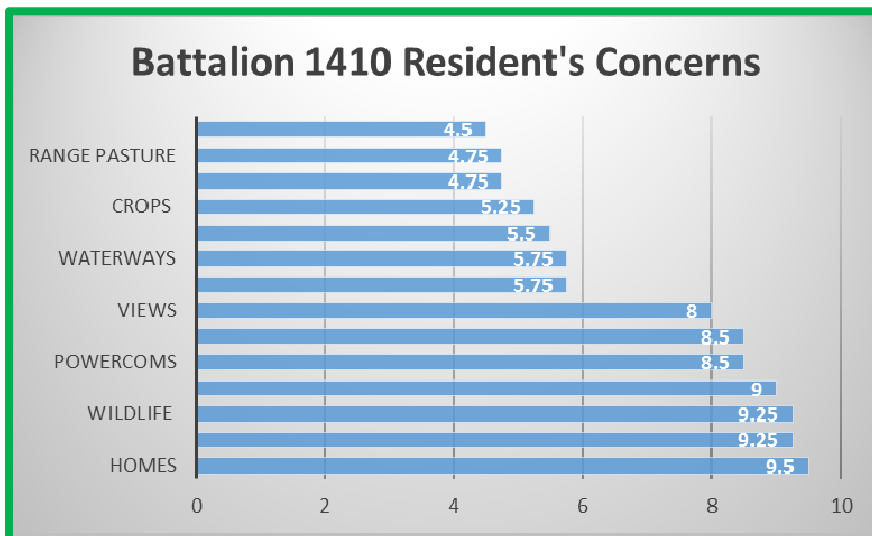


Table 14-3: Residents' Concerns, Battalion 1410

Because Battalion 1410 represents such large and diverse geography, residents' concerns varied considerably across the battalion. In the Western portion, the effects of Sudden Oak Death were a frequent concern, as was general fuels build up. In the east, many residents expressed concerns about neighboring lands that don't maintain vegetation that residents perceive as posing a risk to their homes.

**CAL FIRE Battalion Chief 1410 Wildfire Concern Survey  
May, 2016**

CAL FIRE Battalion Chiefs were asked to rank their level of concern (Low, Moderate, High, Very High) about the following wildfire issues.

<b>Wildfire Issue</b>	<b>Ranking</b>	<b>Comment</b>
1. Fuels build up in areas around your community	High to Very High	Fuels build up is a significant concern in several communities in the battalion, including Mark West, Camp Meeker and Occidental.
2. Fuels build up and lack of defensible space around homes.	High	While some communities have enacted local ordinances and made progress, others need to make significant progress .
3. Increasing tree mortality due to disease or drought.	High	Bug kill is increasing due to drought conditions.
4. Local residents lack understanding about wildfire risks & mitigation strategies.	High to Mod	The 2015 Lake County fires have helped raise awareness, but there are still areas of concern.
5. Availability and safety of evacuation routes.	Moderate to High	In areas dense building and narrow roadways, there is significant concern.
6. Emergency Vehicle Access/clearances/turnouts	Moderate to high	
7. Addressing/Signage	Moderate to High	
8. Power line issues	Moderate	
9. Specific Concern #1: Add a specific concern not already noted.		
10. Specific Concern #2: Add a specific concern not already noted.		

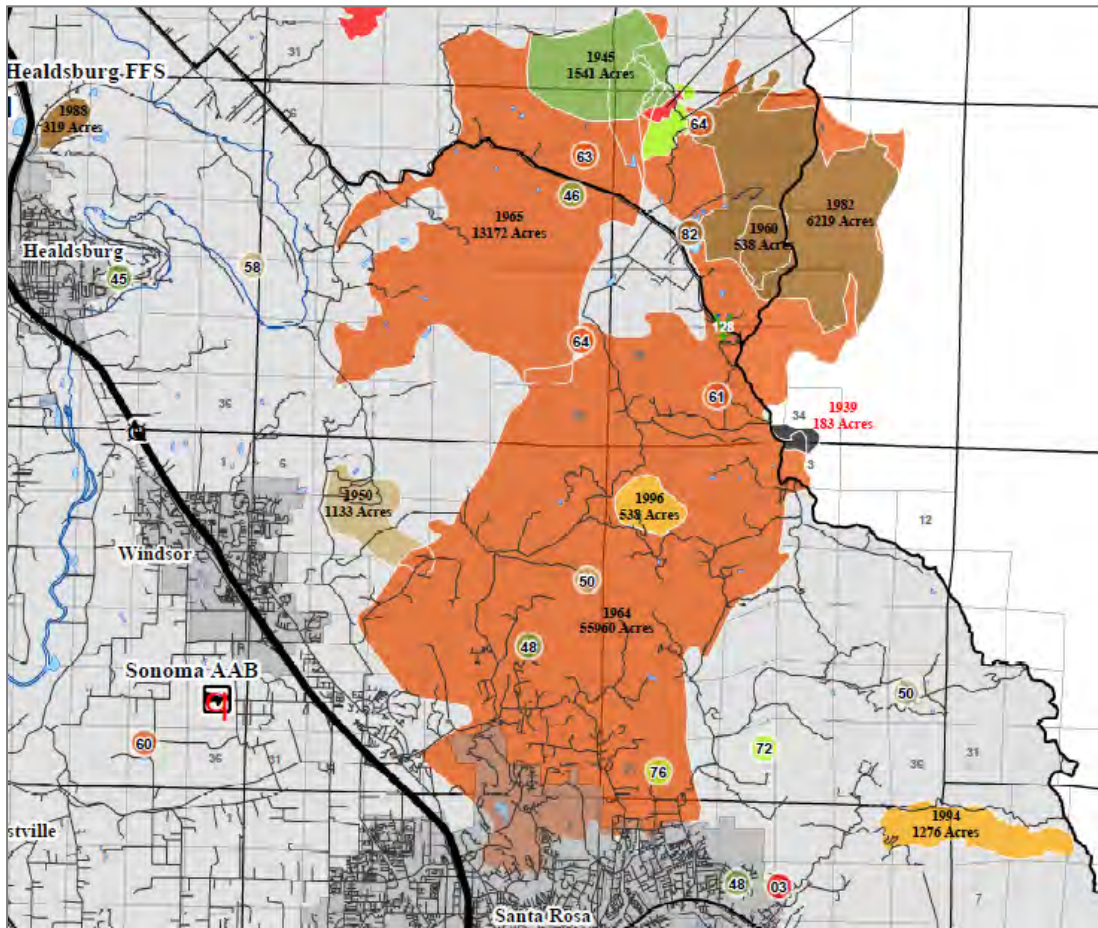
<b>Community Wildfire Planning</b>	<b>Response</b>
11. Does your community (or communities) have a disaster plan in place?	There are several communities working on creating CWPPs or other plans, but more are needed.
11. Is there critical infrastructure in your community that is at particular risk to wildfire?	Communications facilities and transmission lines.
12. Are there areas outside your community (e.g., Open Space, Parks, etc.) that you see as posing a fire risk to your response area?	Because they are heavily used and have areas of difficult access, area parks have potential for fires to start and burn for some time before fire is reported. Foothill Regional Park, Shiloh Ranch Regional Park, and Riverfront Regional Park, have potential to burn into heavily populated areas
13. Are there significant fire-prone invasive species present in your response area?	Eucalyptus, medusa head, star thistle.



## Other Projects:

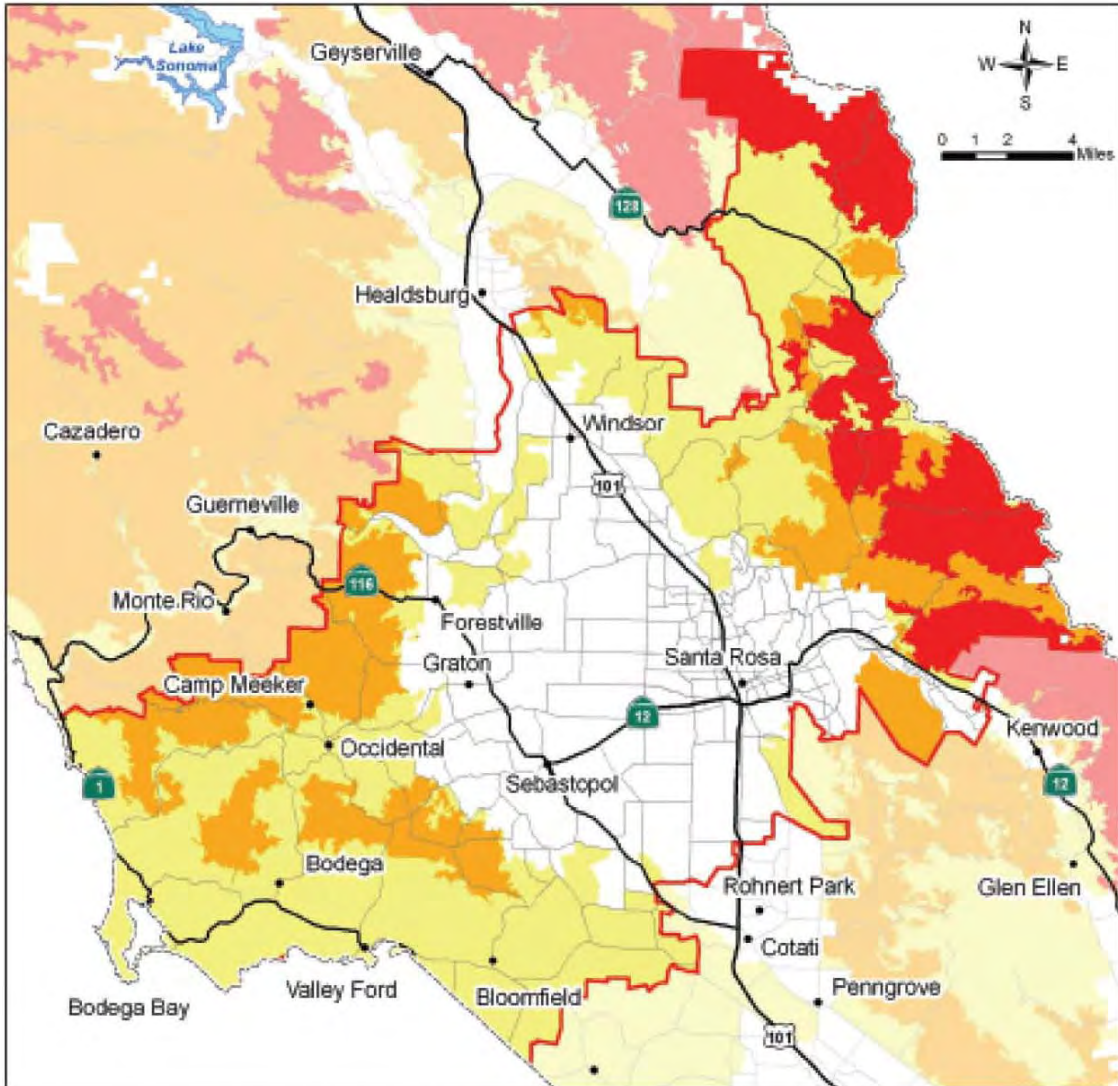
Three of Fire Safe Sonoma's Grant funded projects have benefitted residents of Battalion 1410:

- Battalion 1410 was by far the biggest user of Fire Safe Sonoma's County-wide Chippers Ahoy! Curbside chipping program. Ten communities in 1410 used chipper services, with a total of 278 residents requesting service during the program (2008-2010).
- Fire Safe Sonoma's Sudden Oak Death Mitigation Project helped homeowners with high incidence of Sudden Oak Death on their properties treat defensible space zones.
- The Sonoma County Roadside Hazard Fuels Survey and Removal Project (2012) surveyed roads and subsequently removed hazardous trees from two roadways with high numbers of dead trees (Green Valley Rd. and Harrison Grade Road).







Map 14-2: There is a significant fire history in the areas north of Santa Rosa, notably the 1964 Hanley fire, which burned 52,700 acres from Calistoga all the way to the Chanate Road Hospital in Santa Rosa..

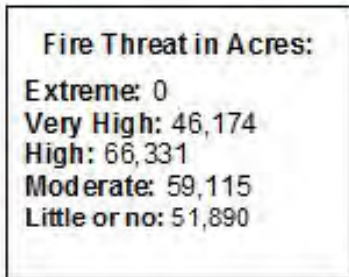
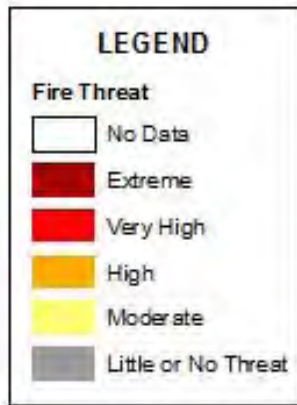
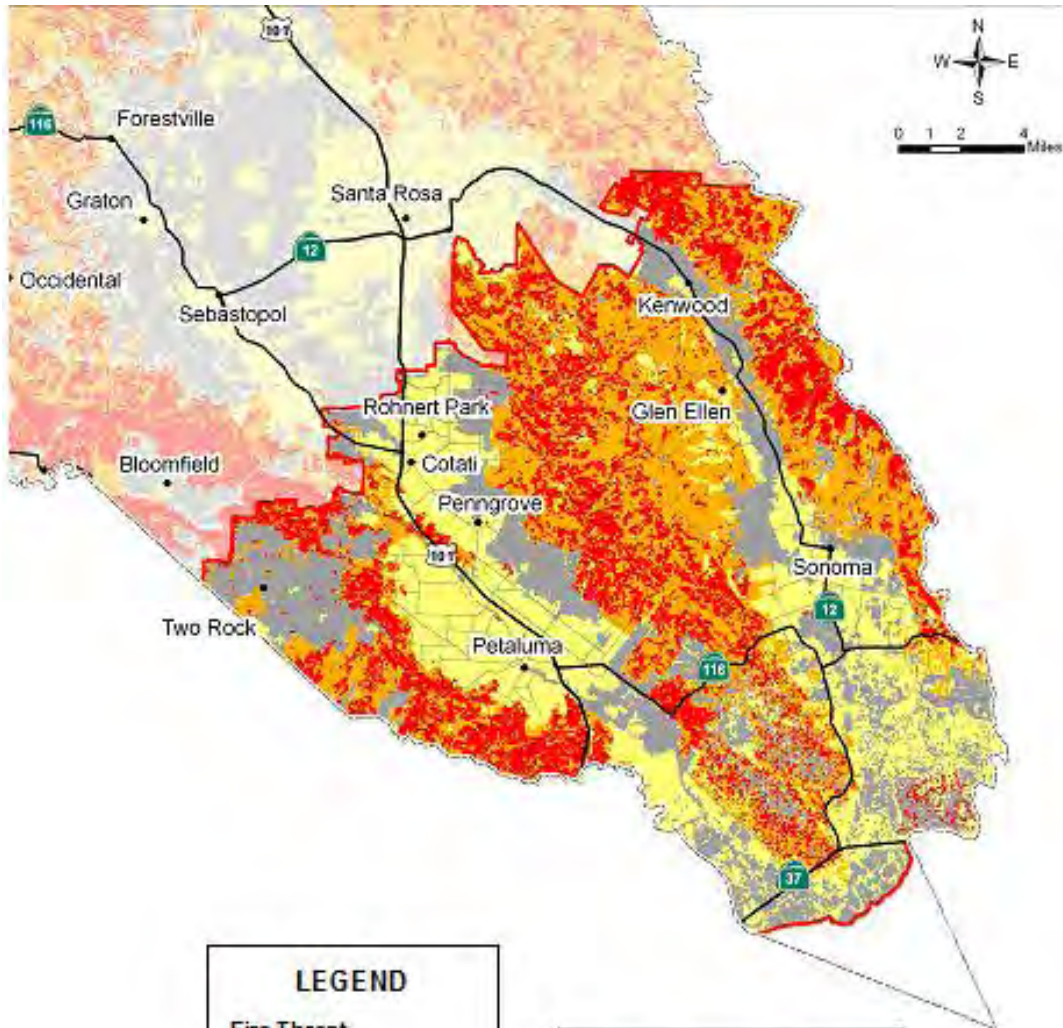
## Map: Battalion 1410 Fire Hazard Severity Zones



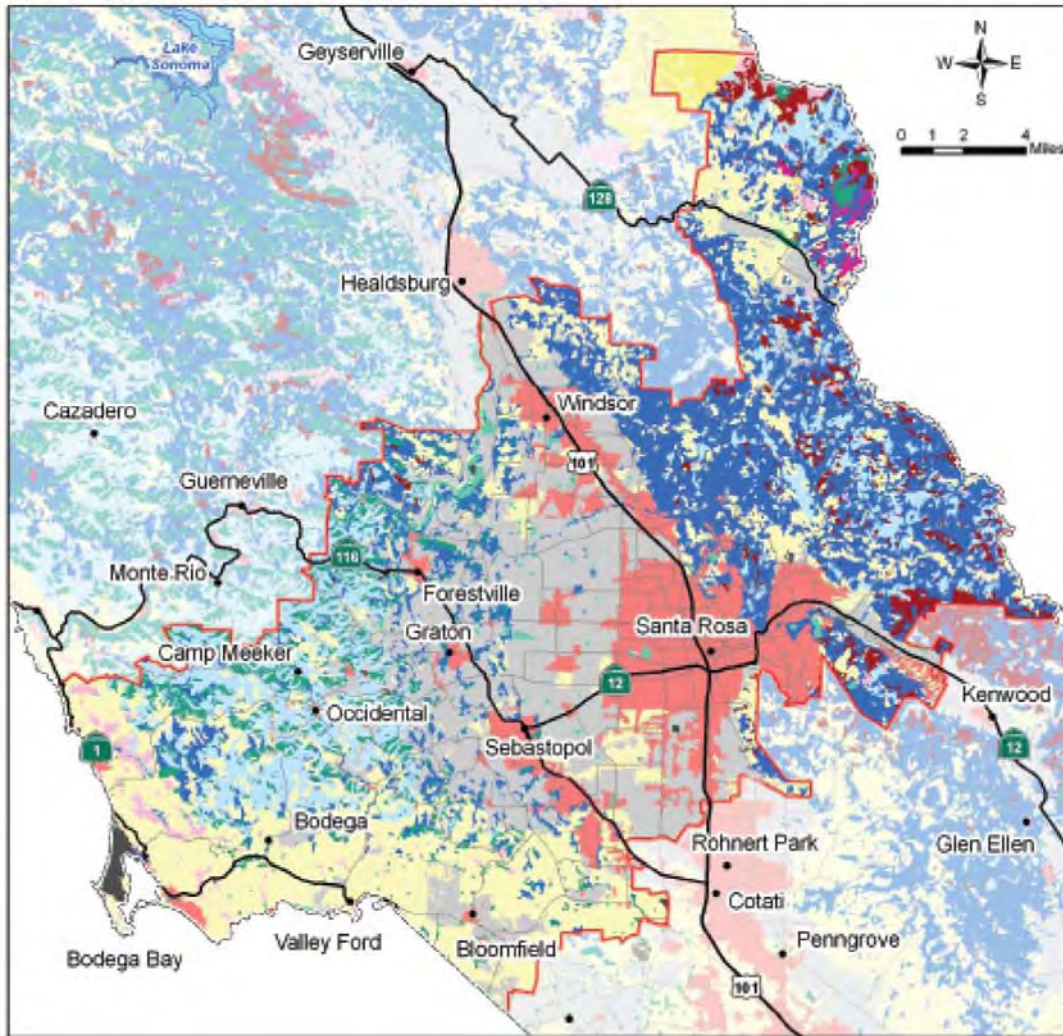
**Legend: Fire Hazard Severity Zones and Acreage**

	<b>Very High—32,757</b>
	<b>High—48,310</b>
	<b>Moderate—100,369</b>
	<b>Not rated (LRA)—92,752</b>













# Map: Battalion 1410, Fire Threat



## Map: Battalion 1410 Fuel Models

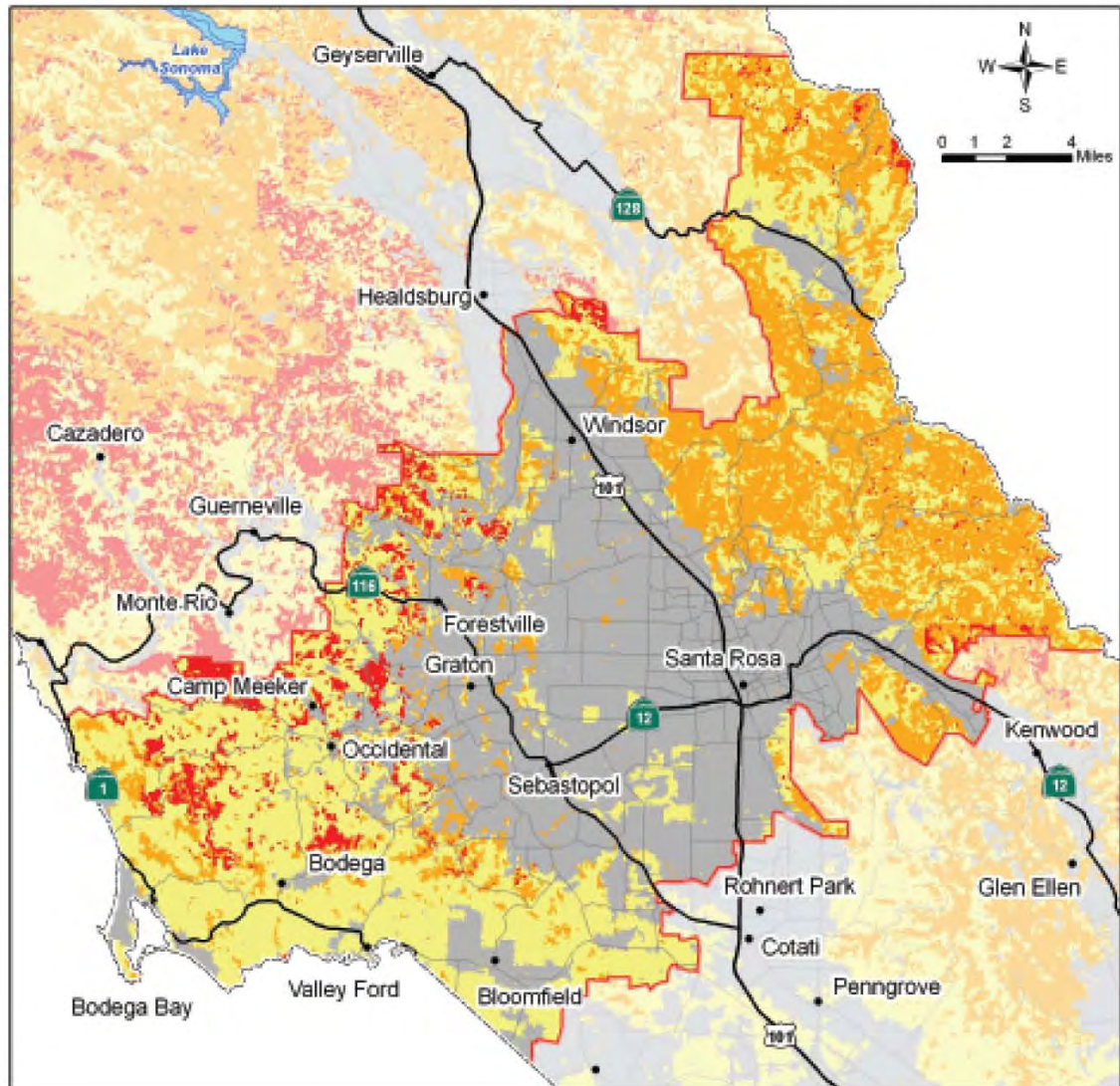


**Legend: Fuel Models and total acreage**

	1—Grass: 70,319		9—Mixed conifer, light: 31,032
	2—Grass and Pine: 1,669		10—Mixed conifer, medium: 11,431
	4—Tall Chaparral: 7,061		28—Urban fuel: 32,667
	5—Brush: 3,619		97—Agricultural land: 56,575
	8—Dormant Brush: 1,200		98—Water: 2,711
	9—Hardwood/Lodgepole: 54,311		99—Barren/Rock/Other: 1,479
			Not mapped: 219

# Map: Battalion 1410 Condition Class

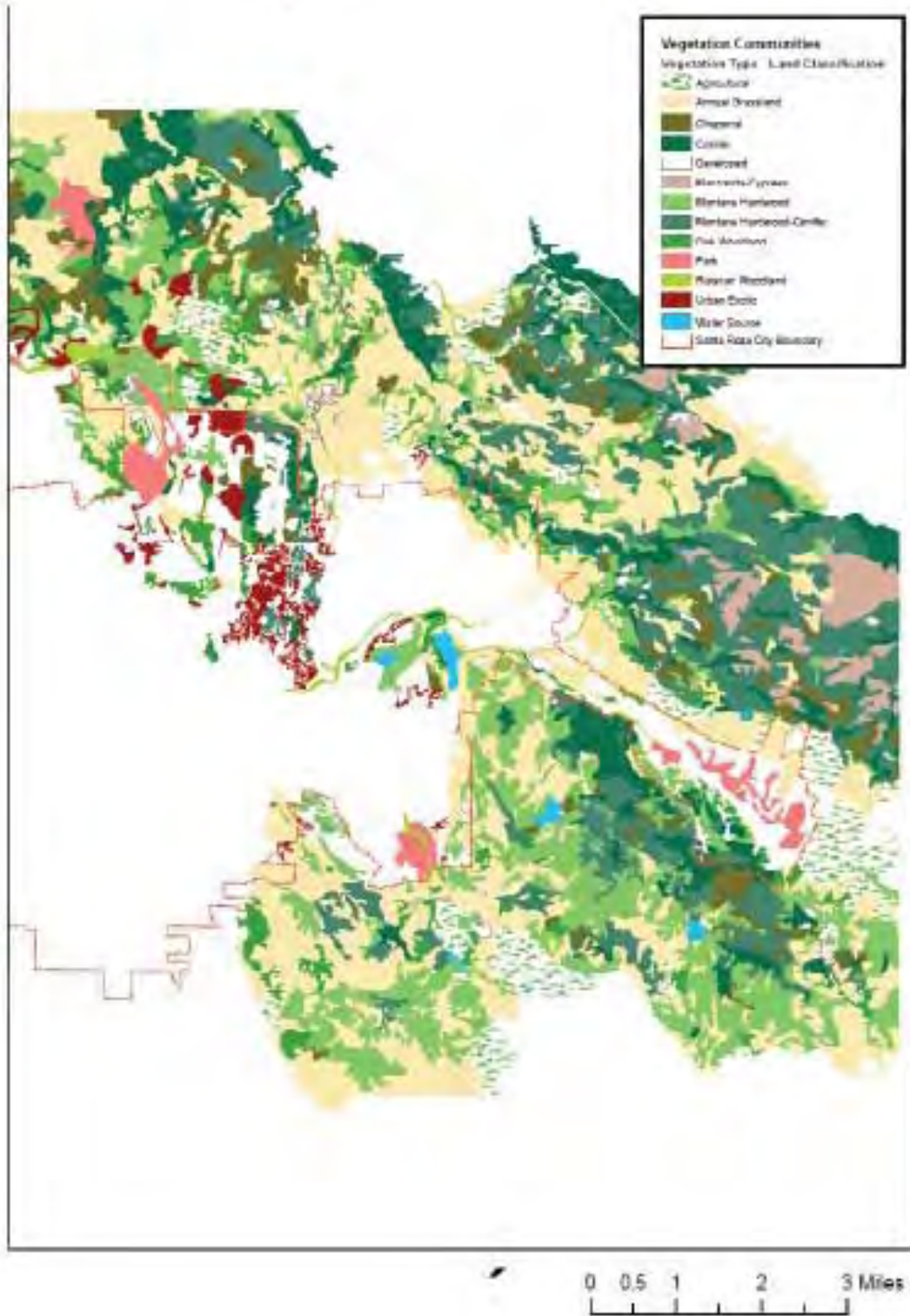
## Departure from Natural (Historical) Fire Regime



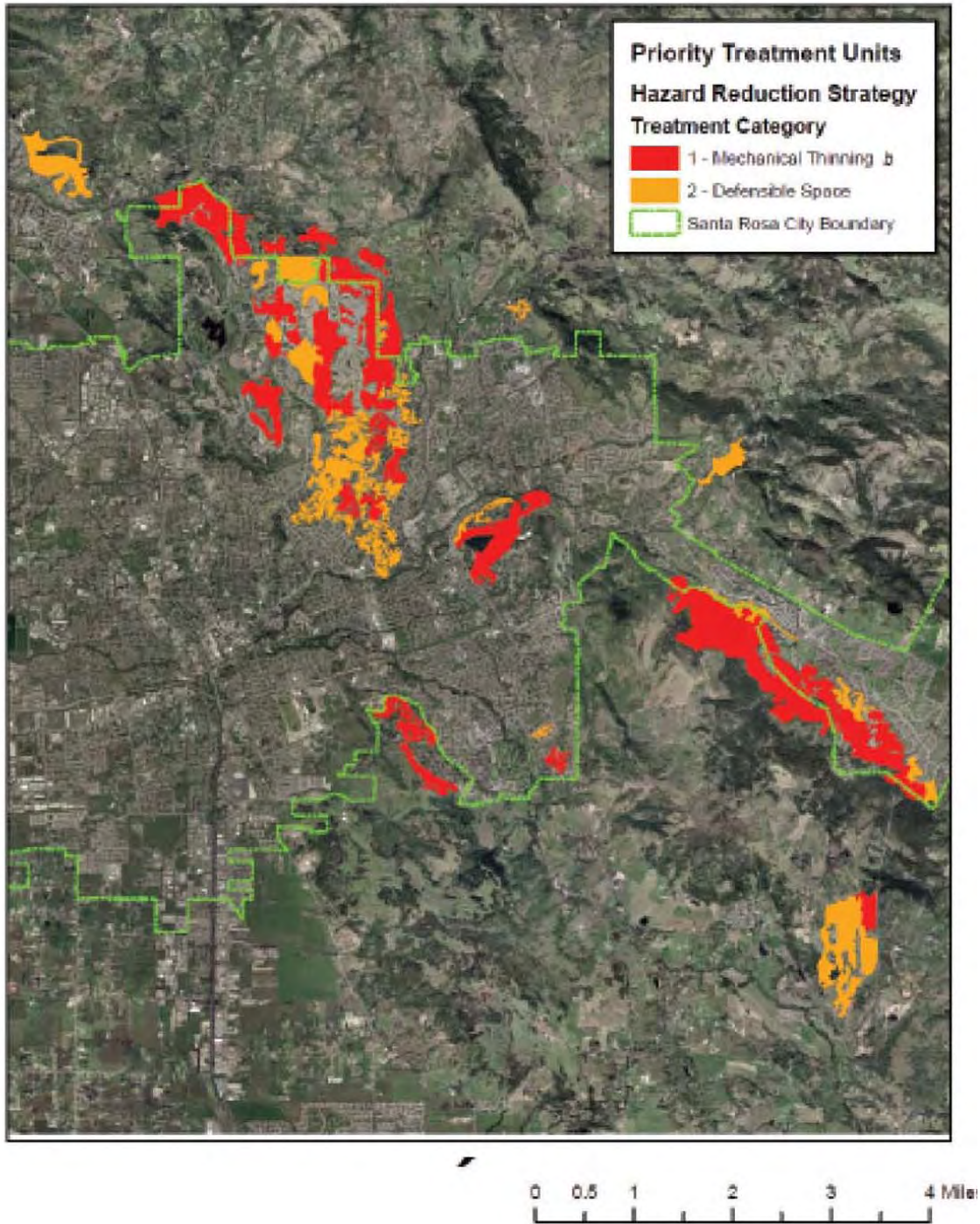
### Legend: Condition class and total acreage

- 1—Within natural range: 95,563
- 2—Moderate departure: 63,550
- 3—High departure: 11,824
- Not Rated: 102,545

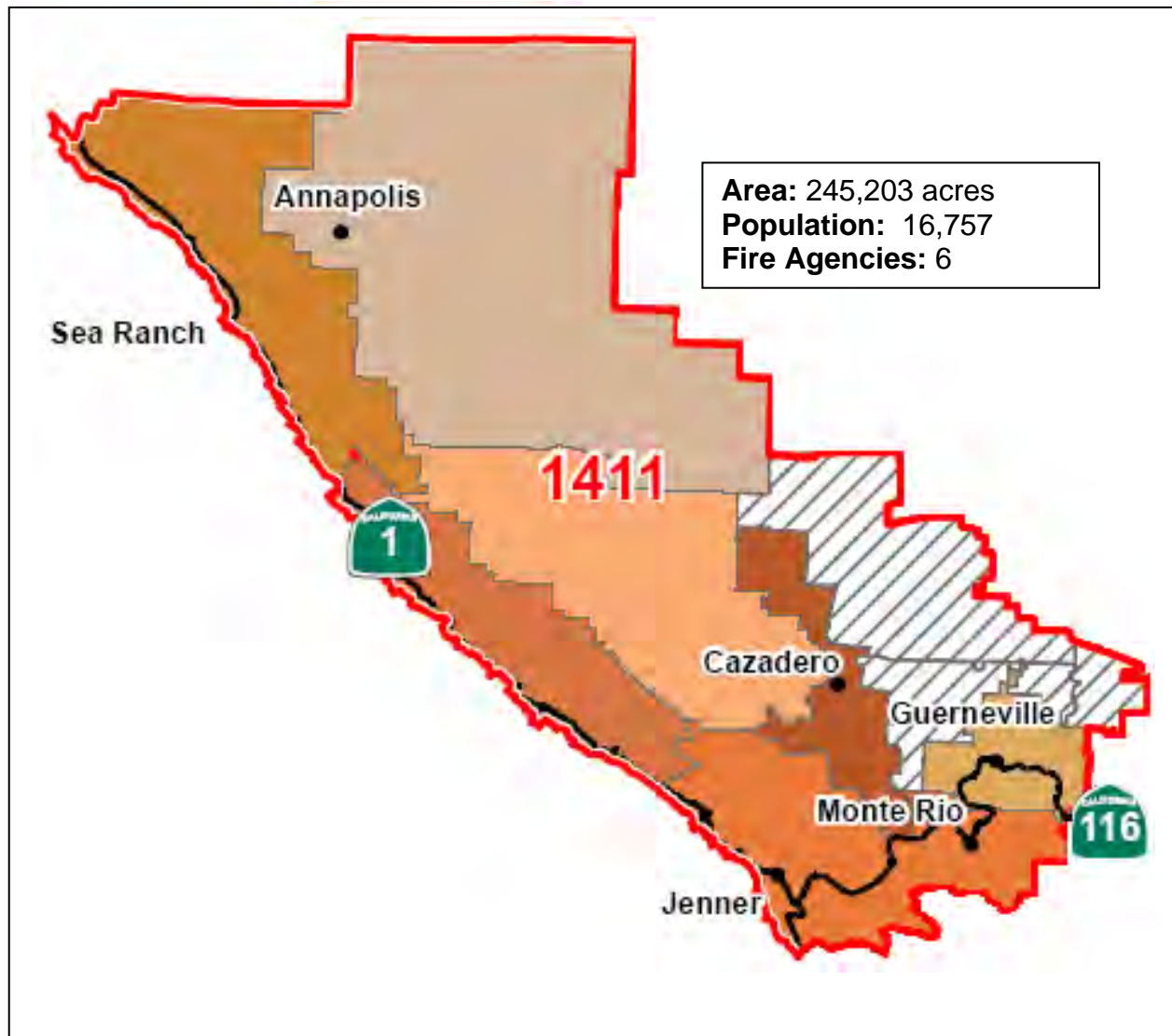
# Map: Santa Rosa Vegetation Communities



# Map: Santa Rosa Hazard Fuel Reduction Priorities



## Chapter 15 Battalion 1411



Map 15-1: Battalion 1411 Agencies & Communities

### 15.1 Discussion:

Battalion 1411 encompasses the northwestern edge of the Unit, and some of the most rural areas of Sonoma County. All of the battalion's 236,638 acres is SRA, with the exception of a few parcels of Federal Responsibility Area (FRA) in the Bureau of Land Management Area's Austin Creek/Cazadero holdings, and the Kashia Indian Reservation.

The Russian River Fire Protection District is the only paid local government fire department, except for a CAL FIRE Schedule A program at The Sea Ranch and an Amador Contract in Monte Rio. There are four CAL FIRE engines in the battalion, one



at The Sea Ranch, another near Cazadero, and two just east of Rio Nido along Highway 116 at Hilton.

Despite its coastal location, Battalion 1411 has areas of very high fire risk, as attested by the high number of historical fires, thirty-two, that have occurred within its boundaries.

In parts of the Lower Russian River communities of Rio Nido, Guerneville, and Monte Rio, narrow, steep, vegetation-covered streets with inadequate pull-outs and turn-arounds provide access to homes built in the early 20th century as vacation homes, most wood-sided. Though in general the redwood ecosystem that dominates the lower Russian River area is not particularly fire-prone, increasing understory and the effects of Sudden Oak Death, which has killed thousands of oaks and tanoaks in the area, are adding to the potential for wildfire. In the event of a large WUI fire, these areas would present difficulties for safe evacuation and access for firefighters.

Steep topography too poses challenges throughout the battalion. The scenic Sonoma Coast is characterized by the coastal ridges, which rise to 2200 feet immediately inland from the Pacific. Despite the proximity to coastal fogs along the coastline, the elevation of the coastal ridges precludes the cooling influences of the ocean; at elevations over 1000 feet, hot temperatures with low relative humidity and dense vegetation prevail through the summer and fall. Historically, there have been a series of large wildland fires in the coastal hills, including the 1978 Creighton Ridge Fire, which consumed 11,405 acres and 64 structures. Population has been slowly increasing at higher elevations and the area has significant Sudden Oak Death mortality.

Along the coast, despite cooler temperatures than the rest of the county, several factors present significant fire risk. The coastal prairies are characterized by heavy grasses, shrubs, and both native and introduced conifers. The coast brings a significant number of tourists into the year during the summer, and this influx of people, in addition to permanent local residents, pose significant risk of human-caused ignition. Wind is common along the coast, and has caused many fires when trees drop on power lines. Flashy fuels along the coast paired with windy conditions can significantly increase fire behavior when conditions are dry.



*Photo 15-1: Steep terrain. dry grasses, oaks and conifer forests characterize Battalion 1411*

Two large coastal subdivisions, The Sea Ranch and Timber Cove, are very aware of their fire risks. The Sea Ranch, a planned community of 3,500 acres subdivided into 2,290 parcels, has an excellent fuels management plan, a completed CWPP (Appendix D), has achieved Firewise Communities designation, and has an active Fire Safe Council. The Timber Cove subdivision likewise is aware of its fuels issues, especially decadent pine plantation. There is an active Safety Task Force which is making great strides towards improving awareness of wildfire and safety issues and planning for disasters.



*Photo 15-2: A sheep and goat grazing program is an important component of vegetation management at The Sea Ranch.*

The battalion is fortunate to have the Pole Mountain Lookout, the last functioning lookout station in the North Bay area. The Pole Mountain Lookout is privately funded through donations from local communities. Pole Mountain is staffed daily throughout the fire season. Lookouts can see into four counties (Sonoma, Lake, Napa, Mendocino, Marin, and even parts of the Bay Area) and are instrumental in the detection of fires in the rugged hills of both western and eastern Sonoma County. The lookouts also provide information to CAL FIRE dispatchers about smoke reports as well as providing three daily weather observations.

The battalion has been heavily hit by the Sudden Oak Death Syndrome, and there are significant numbers of dead tan oaks and other oaks throughout. Residents are increasingly concerned about the risks that dead trees pose to their fire risk.

**Battalion 1411 Communities at Risk**

- Annapolis
- Cazadero
- Duncan's Mills
- Jenner
- Monte Rio
- Stewarts Point Rancheria
- The Sea Ranch
- Timber Cove

*List maintained by the Office of the State Fire Marshal.*

[http://osfm.fire.ca.gov/fireplan/fireplanning\\_communities\\_at\\_risk](http://osfm.fire.ca.gov/fireplan/fireplanning_communities_at_risk)

## 15.2 Local Fire Agencies within Battalion 1411

All of Battalion 1411 is in the State Responsibility Area (SRA), and is WUI. With the exception of Russian River FPD, all fire departments in Battalion 1411 are entirely staffed by volunteers. Battalion 1411's fire departments are to greater or lesser degree impacted by issues facing volunteer fire departments across the county—difficulties finding and keeping volunteers and raising adequate funds for operations. Though the Volunteer fire agencies in the battalion have unusually active volunteer participation and community support, increasing emergency responses are taking a toll on local volunteers and straining financial resources.

Agency	Size (Sq. Miles)	Population	ISO-PPC	Paid Staff	Volunteer Staff	Engines	Water Tenders	Other Apparatus	Station Location
<b>Annapolis</b>	150	481		0	7	1	1	1	1 Station in Anaapolis
<b>Cazadero CSD</b>	18	1,500		2	20				2 stations in Cazadero
<b>Fort Ross VFC (CSA#40)</b>	54	546		0	18	4	1	2	4 Stations in Fort Ross
<b>Monte Rio FPD</b>	45	3,000	4	0.5	14				3 stations in Monte Rio, Jenner, Duncan Mills
<b>North Sonoma Coast FPD</b>	261	1692	5	0	29	4	1	2	2 stations The Sea Ranch & Annapolis
<b>Russian River FPD</b>	18	10,000	4	12	6	3	0	5	2 stations in Guerneville, Rio Nido
<b>Timber Cove FPD</b>	48	500		0	24	3	1	3	1 station in Cazadero

Table 15-1: Fire Agencies within Battalion 1411

### 15.3 Fire Chiefs & Local Residents WUI Concerns,

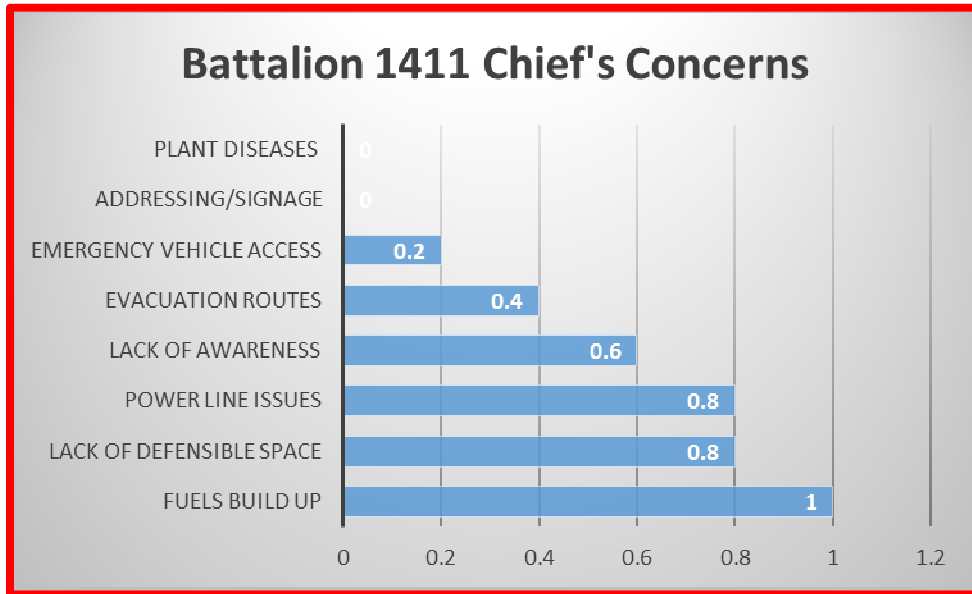


Table 15-2: Local Fire Chiefs' Concerns, Battalion 1411

The overall top two concerns are: 1 – Defensible Space, and 2- Fuels Buildup.

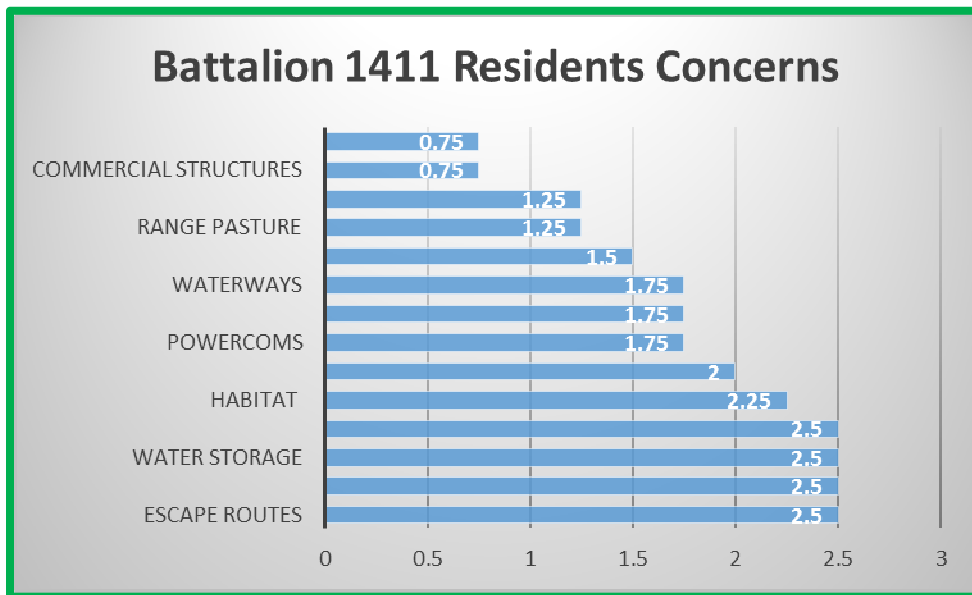


Table 15-3: Local Resident's Concerns, Battalion1411

The overwhelming concern expressed by residents was the effect of Sudden Oak Death on wildfire behavior. Residents asked how to deal with dead trees on their properties and in their neighborhoods to increase wildfire safety. Additionally, many residents in this battalion have limited escape routes or one-way-in-one-way-out access, making planning for emergency evacuation an issue.

**CAL FIRE Battalion Chief 1411 Wildfire Concerns:  
May, 2016**

CAL FIRE Battalion Chiefs were asked to rank their level of concern (Low, Moderate, High, Very High) about the following wildfire issues.

<b>Wildfire Issue</b>	<b>Ranking</b>	<b>Comment</b>
1. Fuels build up in areas around your community	High	
2. Fuels build up and lack of defensible space around homes.	Very High	Some areas have a combination of high density residences amongst forested areas hindering the establishment of defensible space.
3. Increasing tree mortality due to disease or drought.	Very High	Sudden Oak Death. Climate change, drought, longer summers, aging tree stock all contributing to increasing tree mortality across Battalion 1411.
4. Local residents lack understanding about wildfire risks & mitigation strategies.	Moderate	Most people seem to understand the problem. It is difficult for them to take action.
5. Availability and safety of evacuation routes.	High / Very High	In some areas of the battalion, there are significant issues stemming from roads that are very narrow, with heavy vegetation on roadsides, and one way in one way out roads.
6. Emergency Vehicle Access/clearances/turnouts	High	Public and private roads are becoming overgrown in several areas along with fire apparatus becoming larger. Some private roads do not have proper bridges to support fire apparatus and limited areas to facilitates turning around.
7. Addressing/Signage	High / Very High	More rural areas tend to have poor signage and addressing.
8. Power line issues	Moderate	
9. Specific Concern #1: Add a specific concern not already noted.	Very High	Because of long transport time from conservation camp, much of Battalion 1411 cannot use inmate crews to help accomplish vegetation management projects and prescription burns.
10. Specific Concern #2: Add a specific concern not already noted.	High	Parcelization (forested areas in small parcel ownership) makes it very difficult to plan and enact vegetation management programs that can have wide-spread benefits.

<b>Community Wildfire Planning</b>	<b>Response</b>
11. Does your community (or communities) have a disaster plan in place?	Most areas need community-based plans.

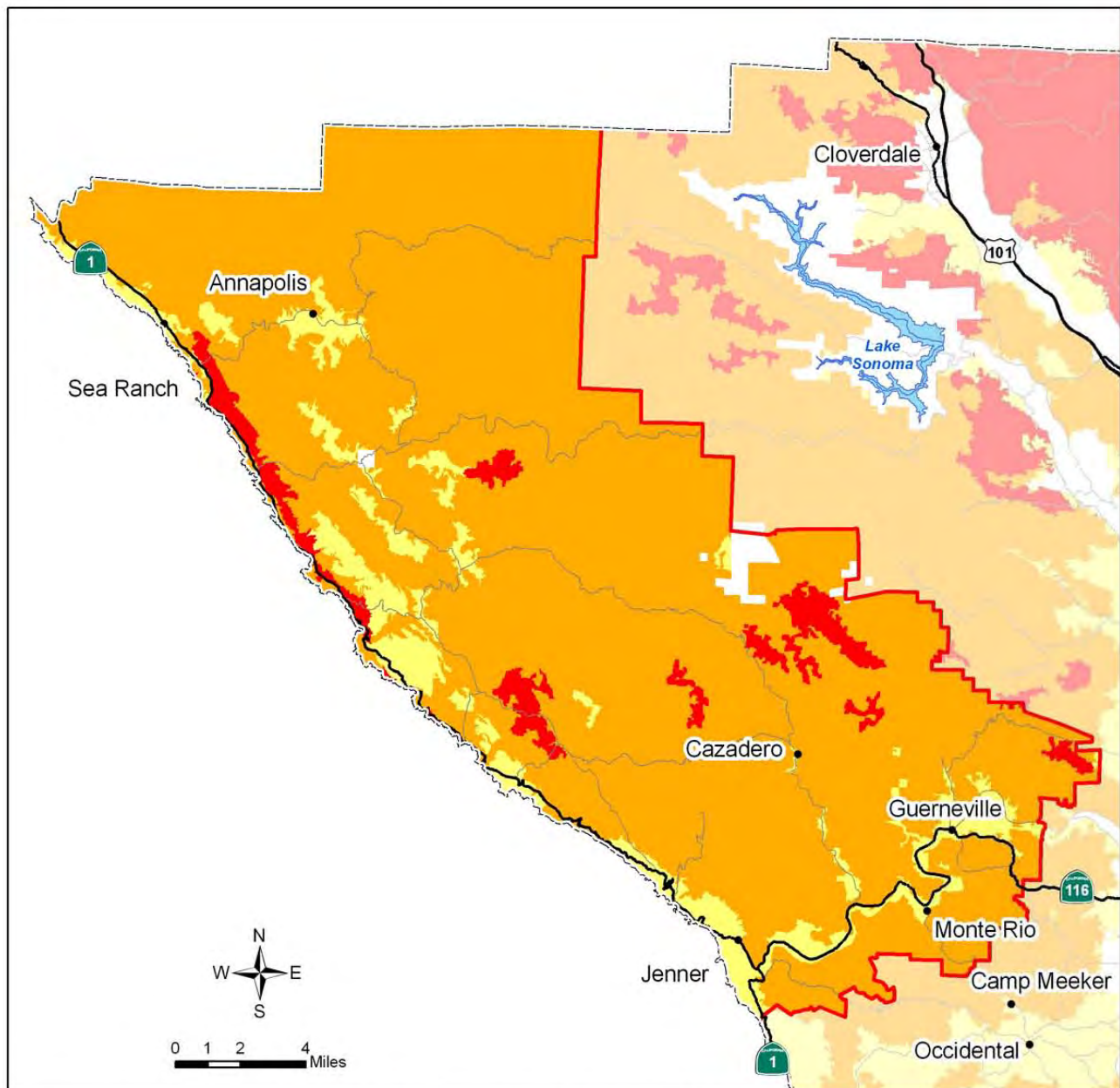
<p>11. Is there critical infrastructure in your community that is at particular risk to wildfire?</p>	<p>Wooden power poles throughout the battalion, fire stations in some areas. Highway 1 is a major evacuation route—potential for failure of wooden retaining walls and road wash outs. There are several communications towers and radio repeaters that are at risk due to heavy surrounding vegetation including, Oak Ridge and Mount Jackson. There are also concerns about aging and unreliable landline phone services in some areas that may be unavailable for citizens to report emergencies.</p>
<p>12. Are there areas outside your community (e.g., Open Space, Parks, etc.) that you see as posing a fire risk to your response area?</p>	<p>Most large acreage holdings, public and private, are overgrown. Last major fire was in 1978 and there has been little maintenance in forested areas.</p>
<p>13. Are there significant fire-prone invasive species present in your response area?</p>	<p>Brooms, planted pines, pampas grass, some eucalyptus.</p>

## **Other Projects:**



Three of Fire Safe Sonoma's Grant funded projects have benefitted residents of Battalion 1411:

- Fire Safe Sonoma's County-wide Chippers Ahoy! Curbside chipping program. Seven communities in the battalion used chipper services, with a total of 148 households residents receiving service during the program (2008-2010).
- Fire Safe Sonoma's Sudden Oak Death Mitigation Project helped homeowners with high incidence of Sudden Oak Death on their properties treat defensible space zones.
- The Sonoma County Roadside Hazard Fuels Survey and Removal Project (2012) surveyed roads and subsequently removed hazardous trees from two roadways with high numbers of dead trees. The arborist's survey found that Battalion 1411 had the highest density of dead hazard trees along roadsides. Project funds removed trees from Fort Ross Road, King Ridge Road, Hauser Bridge Road and Skaggs-Springs Road.

# Map: Battalion 1411 Fire Hazard Severity Zones

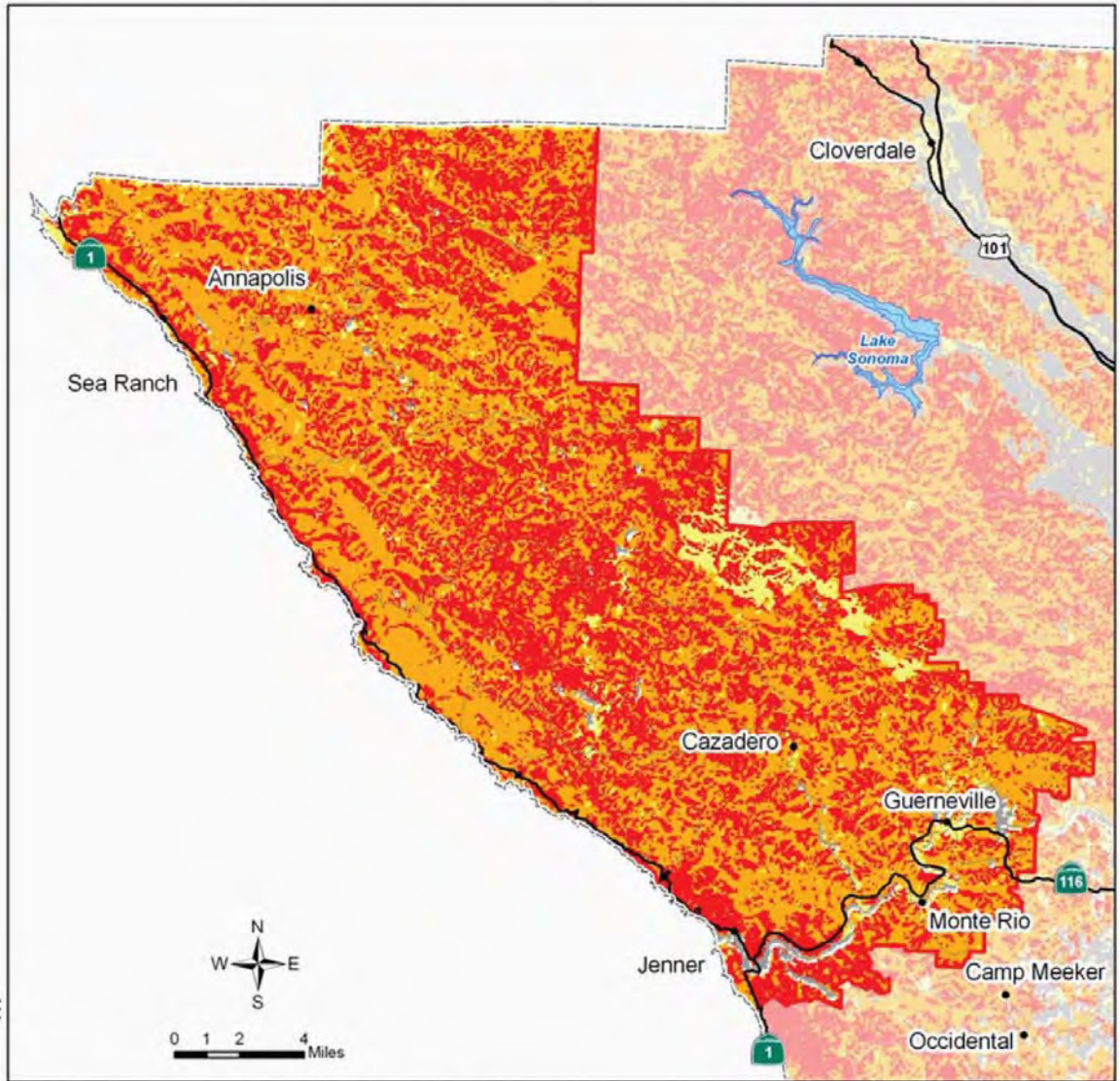


Legend: Fire Hazard Severity Zones and Acreage

	Very High—9,611
	High—211,959
	Moderate—21,699
	Not rated (LRA)



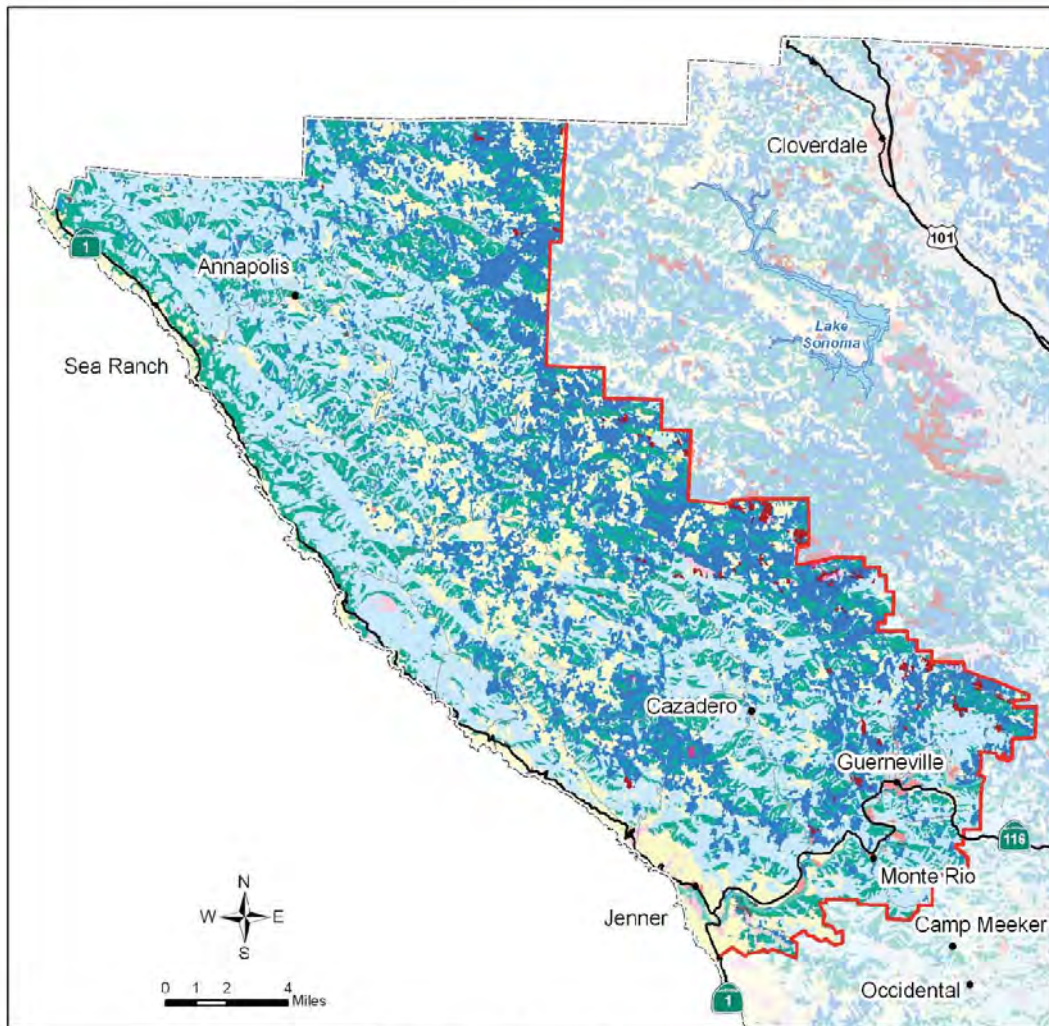
# Map: Battalion 1411 Fire Threat















LEGEND	
Fire Threat	
	No Data
	Extreme
	Very High
	High
	Moderate
	Little or No Threat

Fire Threat in Acres:
<b>Very High:</b> 3,022
<b>High:</b> 11,847
<b>Moderate:</b> 129,941
<b>Little or no:</b> 100,004

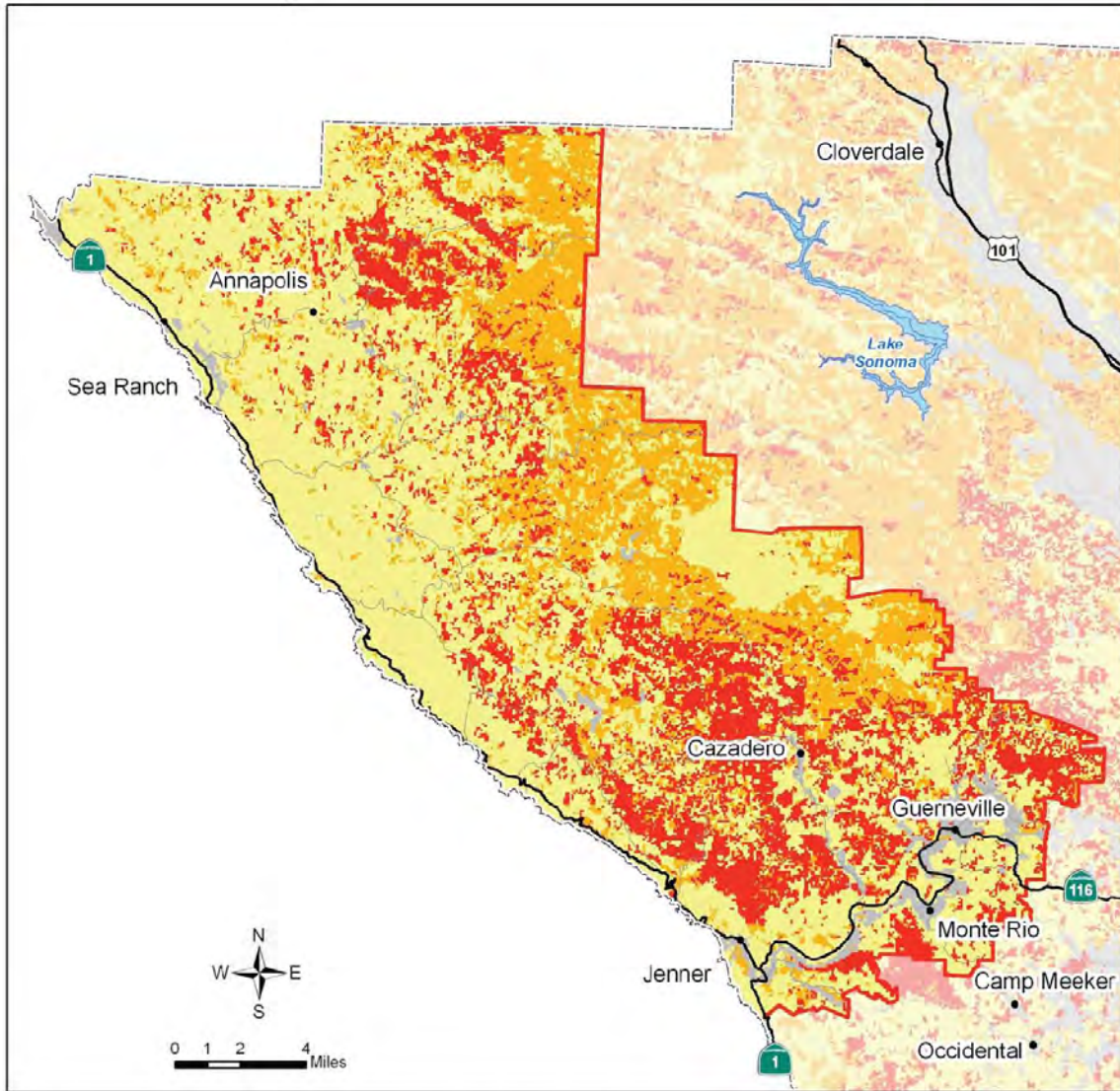
## Map: Battalion 1411 Fuel Models







Legend: Fuel Models and total acreage

 1—Grass: 39,872	 9—Mixed conifer, light: 91,580
 2—Grass and Pine: 235	 10—Mixed conifer, medium: 53,520
 4—Tall Chaparral: 1,562	 28—Urban fuel: 878
 5—Brush: 1,369	 97—Agricultural land: 1,058
 8—Dormant Brush: 144	 98—Water: 1,507
 9—Hardwood/Lodgepole: 52,712	 99—Barren/Rock/Other: 568
	Not mapped: 219

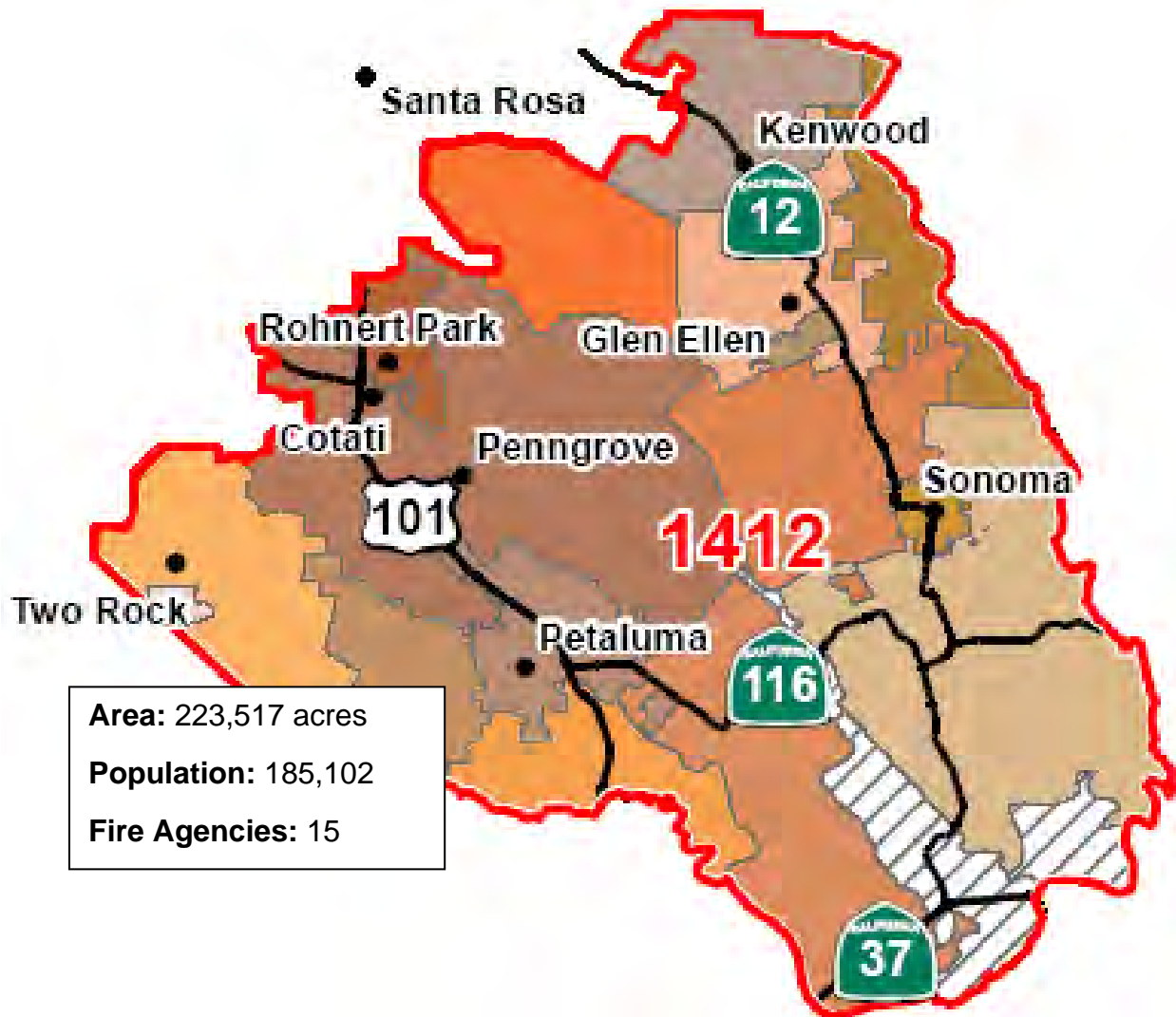
# Map: Battalion 1411 Condition Class



Legend: Condition class and total acreage

	1—Within natural range: 133,048
	2—Moderate departure: 54,452
	3—High departure: 49,767
	Not Rated: 7,234

## Chapter 16 Battalion 1412



### 16.1 Discussion

Battalion 1412 encompasses southern Sonoma County: the Sonoma Valley and the Petaluma area, and Sonoma Mountain. Within the battalion are several full-time local government fire departments as well as volunteer-based fire departments. There are two CDF fire stations, one just west of Petaluma staffed with one fire engine, and the other along Highway 12 south of Kenwood that houses two fire engines and a bulldozer.

Like Battalion 1410, Battalion 1412 encompasses many of the more urbanized areas of the county, where local responsibility areas are served by well-staffed fire agencies such

as Petaluma, Rancho Adobe, and Rohnert Park. Most of the areas outside of the municipalities are Wildland/Urban Interface (WUI). Wildfire issues and local concerns vary along with the divergent ecosystems that make up the battalion.

The western half of the battalion is largely agricultural with large dairy farms interspersed with homes. Fuels in that area are, by and large, grasslands with widely spaced oaks. Daily westerly winds have the potential to cause grass fires to grow quickly and impact structures in the fire's path.

Roadways throughout Battalion 1412 pose significant risks. State Routes 37 and 116, which run through the southern portion of the area, are major truck routes and vehicle accidents frequently result in vehicle fires that spread into the grasslands. Additionally, the Sonoma Raceway is located within Battalion 1412. The raceway hosts prestigious racing series like NASCAR, The Indy Racing League and NHRA, and draws over 750,000 spectators annually, representing the largest day crowds for any Northern California sporting event. Sonoma Raceway operates an average of 340 days per year.

Vegetation increases in the eastern portion of the district, with heavy fuel loading and many homes and vineyards in the hills on both sides of the Sonoma Valley. Tree mortality caused by bark beetles and borers and Sudden Oak Death is increasing, adding to concerns of residents and firefighters. There have been several significant wildfires in the Mayacamas Mountains, most recently the 1996 Cavedale (2063 acres). There is potential for significant losses of homes, vineyards, and businesses in the event of a large wildland fire.

Local residents and agencies have participated in a number of fuels reduction projects over the years, and in projects to create fuels breaks and roadside fuels reduction across the area in high risk areas such as communities near Annadel State Park, Trinity Road, and Cavedale Road. In the past projects have been funded through the BLM's Community Based Wildfire Prevention Grants Program and the Forest Stewardship Project. The Bennett Ridge Community Association in the hills south east of Santa Rosa has written a CWPP for their community.

#### **Battalion 1412 Communities at Risk**

- Agua Caliente
- Bennett Valley
- Boyes Hot Springs
- Cotati
- El Verano
- Eldridge
- Glen Ellen
- Kenwood
- Oakmont
- Petaluma
- Rohnert Park
- Sonoma
- Temelec

*List maintained by the Office of the State Fire Marshal.*

[http://osfm.fire.ca.gov/fireplan/fireplanning\\_communities\\_at\\_risk](http://osfm.fire.ca.gov/fireplan/fireplanning_communities_at_risk)

## 16.2 Local Fire Agencies within Battalion 1412

Battalion 1412 is characterized by some densely populated urban areas along the 101 corridor and along the Highway 12 corridor in the Sonoma Valley. Nearly all of the local agencies have significant WUI, some with very significant WUI risks. There are 21 local fire agencies. Four departments are urban-area departments with paid staff, ten departments have both volunteer and paid staff, and 7 are all-volunteer departments serving rural areas.

Agency	Size (Sq. Miles)	Population	ISO-PPC	Paid Staff	Volunteer Staff	Engines	Water Tenders	Other Apparatus	Station Location
Bennett Valley FPD	25	2,300	6	8	22				1 station in Santa Rosa
Glen Ellen FPD	27	7,500	4	2	27				2 stations in Glen Ellen
Kenwood FPD	25	3,000	6	2	17				1 station in Kenwood
Lakeville	39	370	9	0	22	3	1	2	1 Station in Lakeville
Mayacamas	42	750		0	9	3	1	2	2 Stations in Mayacamas
Petaluma City	160	70,000	3	57					4 stations in Petaluma
Rancho Adobe FPD	80	26,000	4	17	40				3 stations in Cotati, Penngrove, Petaluma
Rohnert Park City	7	42,000	4	0	12	4	1	2	4 stations in Rohnert Park
San Antonio	21	1000		0	23	2	1	3	1 station in San Antonino
Schell Vista FPD	75	5,000	5	9	34	7	2	4	2 stations in Sonoma
Sonoma Develop. Ctr.									State Facility
Sonoma Valley	2	9,284	4	36	37	7	1	16	1 station in Sonoma
Two Rock	33	900		0	14	2	0	2	1 station in Two Rock
Two Rock Coast Guard									Federal Facility
Valley of the Moon FPD	29	20,000	3	15	26				3 stations in Sonoma
Wilmar	12	4500		0	26	2	1	3	1 station in Wilmar

Table 16-1: Local Agencies within Battalion 1412

### 16.3 Fire Chiefs & Local Residents WUI Concerns

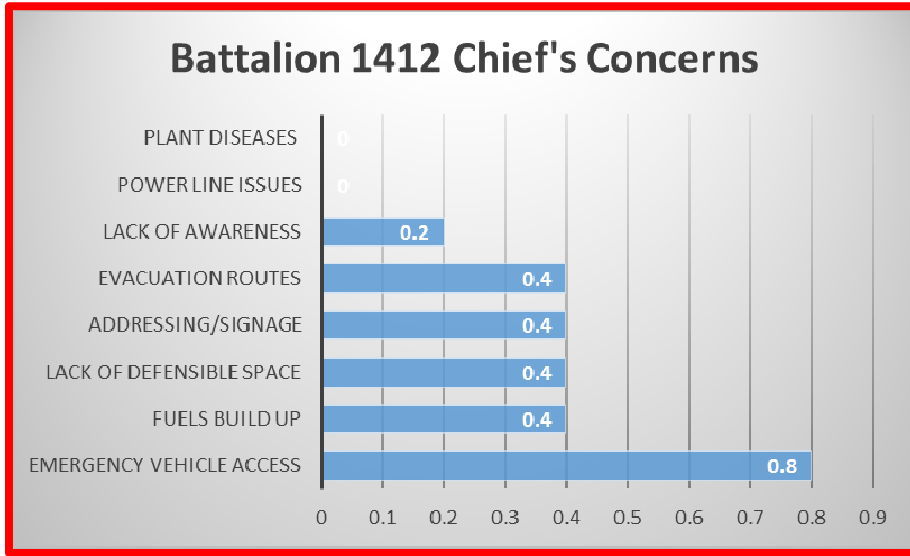


Table 16-3: Fire Chiefs' Concerns, Battalion 1412

In Battalion 1412, the Chiefs' overall top two concerns are first Defensible Space, then Fuels Buildup.

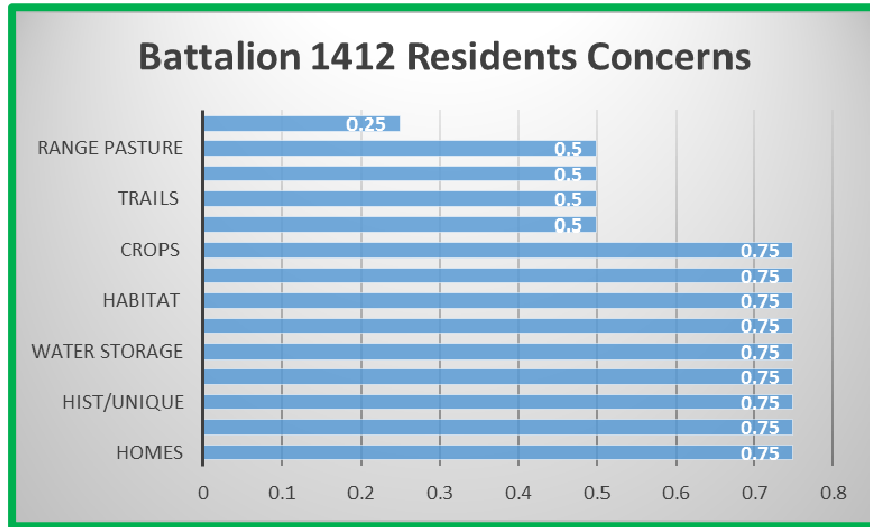


Table 16-2: Residents' Concerns, battalion 1412

Residents in or near the Mayacamas expressed concerns about fuels build up, and the potential for severe fire behavior, and about neighboring homes without adequate defensible space. Chipper programs and educational programs were requested.

In the south western half of the battalion, where grass fires are the highest risk, residents expressed concerns about how fire-start potential might be reduced, especially in agricultural contexts.

**CAL FIRE Battalion Chief 1412 Wildfire Concern Survey  
May, 2016**

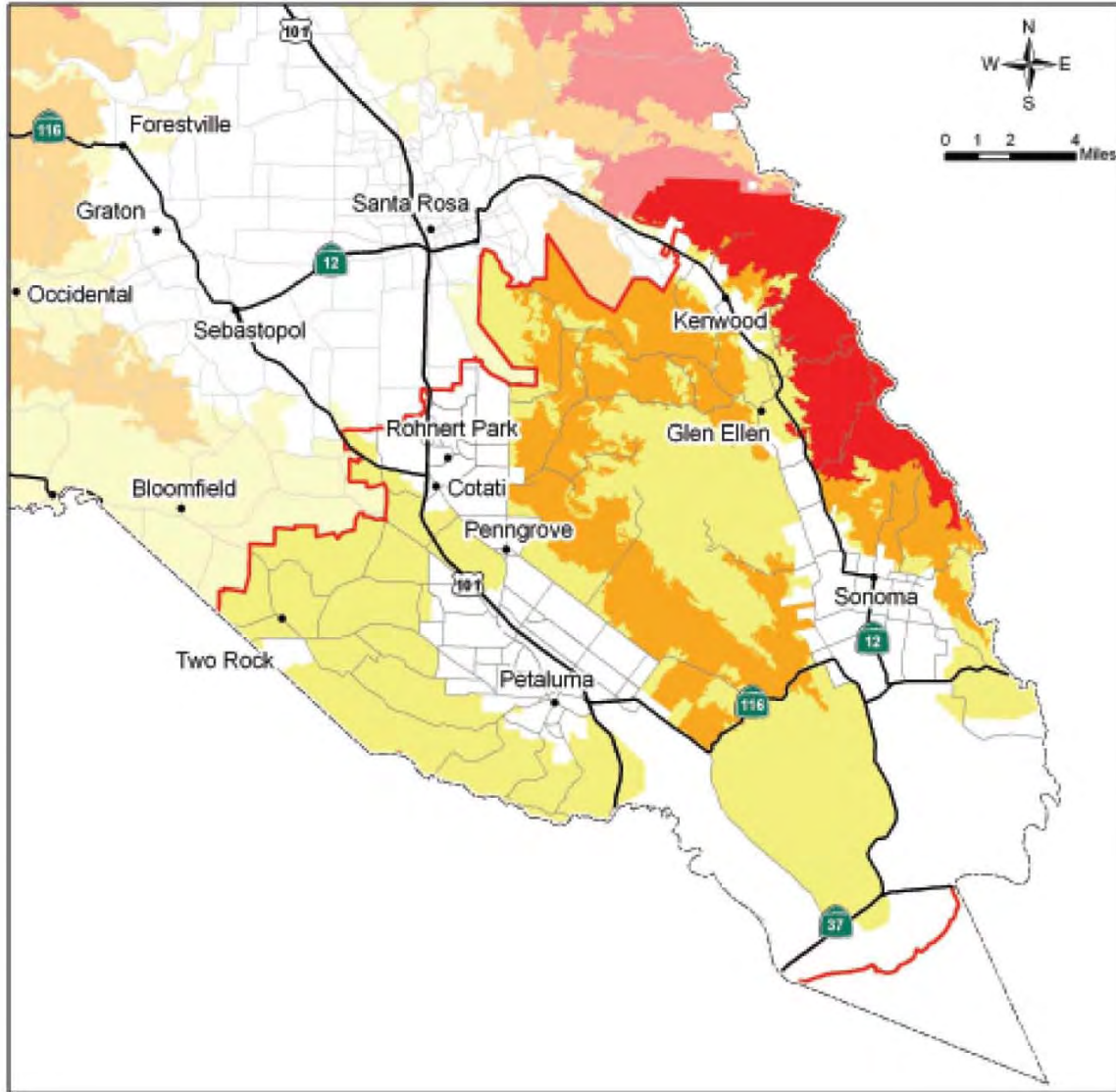
CAL FIRE Battalion Chiefs were asked to rank their level of concern (Low, Moderate, High, Very High) about the following wildfire issues.

<b>Wildfire Issue</b>	<b>Ranking</b>	<b>Comment</b>
1. Fuels build up in areas around your community	Moderate / high	Fuels vary considerably from the western area to east. Petaluma's fuels moderate, Sonoma Valley area high
2. Fuels build up and lack of defensible space around homes.	High / Very High	
3. Increasing tree mortality due to disease or drought.	Moderate / High	SOD and pine beetles
4. Local residents lack understanding about wildfire risks & mitigation strategies.	High	
5. Availability and safety of evacuation routes.	Very High	Pre attack maps help, but difficult to make sure information is getting to the public.
6. Emergency Vehicle Access/clearances/turnouts	High / Very High	Public roads high. Private driveways very high.
7. Addressing/Signage	High	
8. Power line issues	Moderate	
9. Specific Concern #1: Add a specific concern not already noted.	Very High	We need to be able to find peoples properties, be able to safely get there, and have the defensible space to be able to do something.
10. Specific Concern #2: Add a specific concern not already noted.		

<b>Community Wildfire Planning</b>	<b>Response</b>
11. Does your community (or communities) have a disaster plan in place?	Most of the communities need locally based plans.
11. Is there critical infrastructure in your community that is at particular risk to wildfire?	Towers, high tension lines, municipal water supplies
12. Are there areas outside your community (e.g., Open Space, Parks, etc.) that you see as posing a fire risk to your response area?	No.
13. Are there significant fire-prone invasive species present in your response area?	Eucalyptus, non-native grasses.



# Map: Battalion 1412 Fire Hazard Severity Zones



**LEGEND**

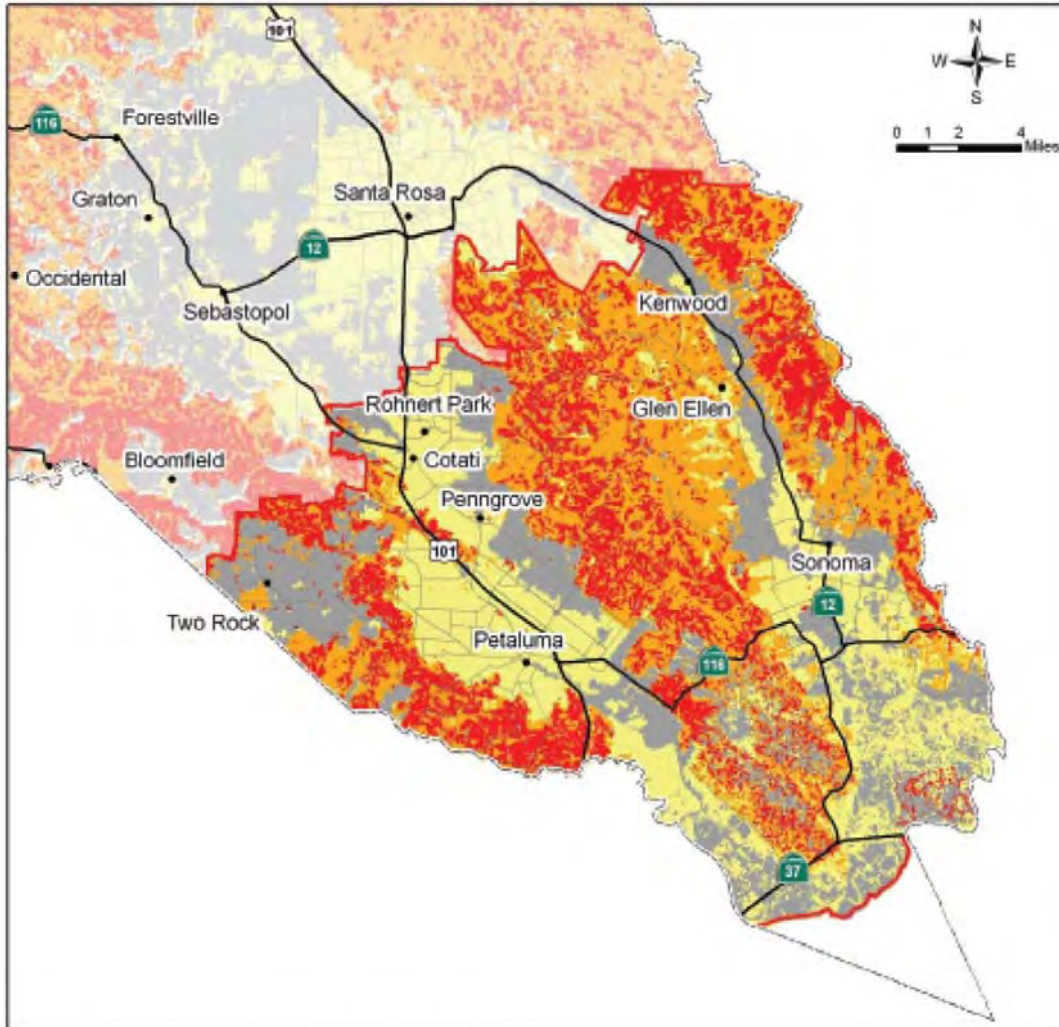
Fire Hazard Severity Zone

<span style="color: red;">■</span>	Very High
<span style="color: orange;">■</span>	High
<span style="color: yellow;">■</span>	Moderate

**FHSZ in Acres:**

<b>Very High:</b>	18,170
<b>High:</b>	39,604
<b>Moderate:</b>	90,226
<b>Not rated (LRA):</b>	75,516

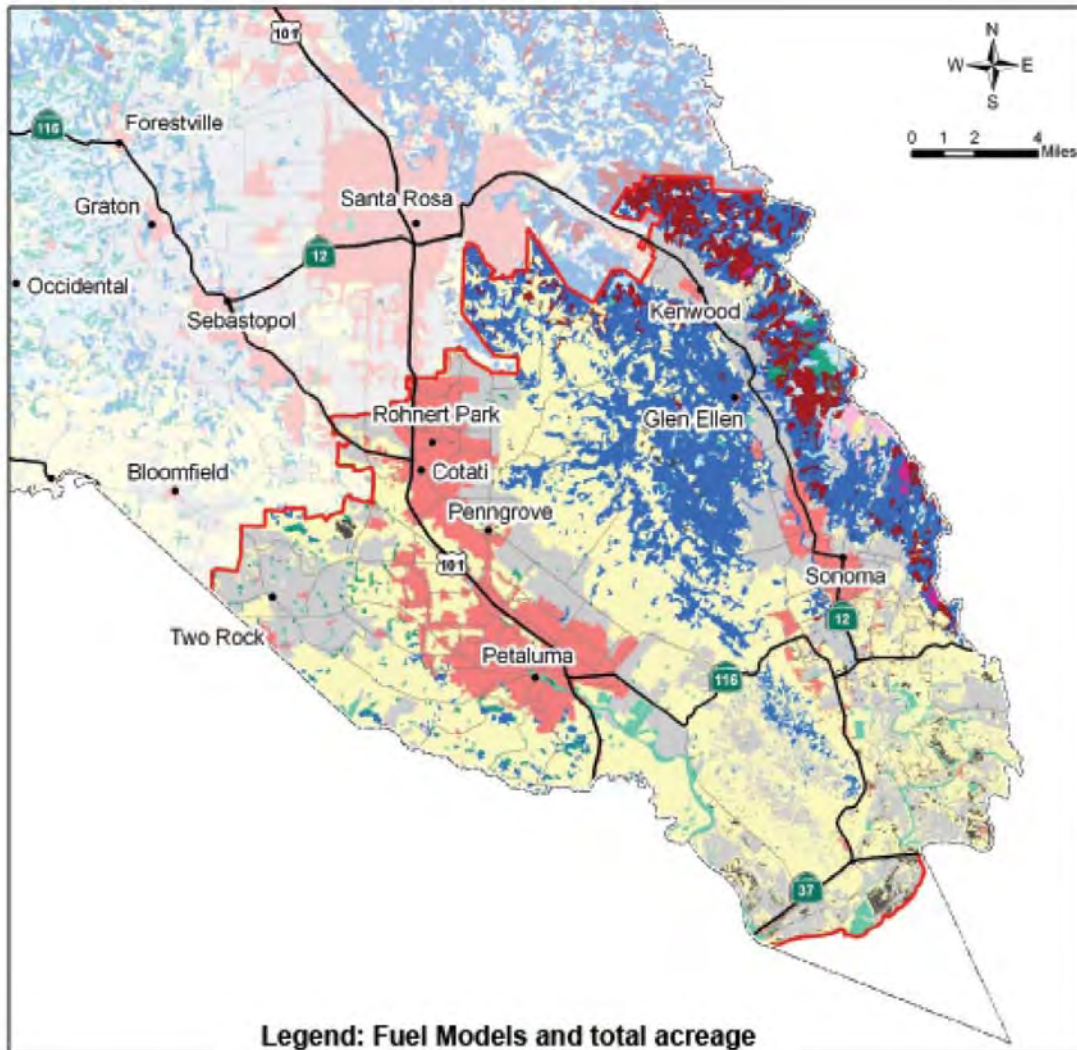
# Map: Battalion 1412 Fire Threat



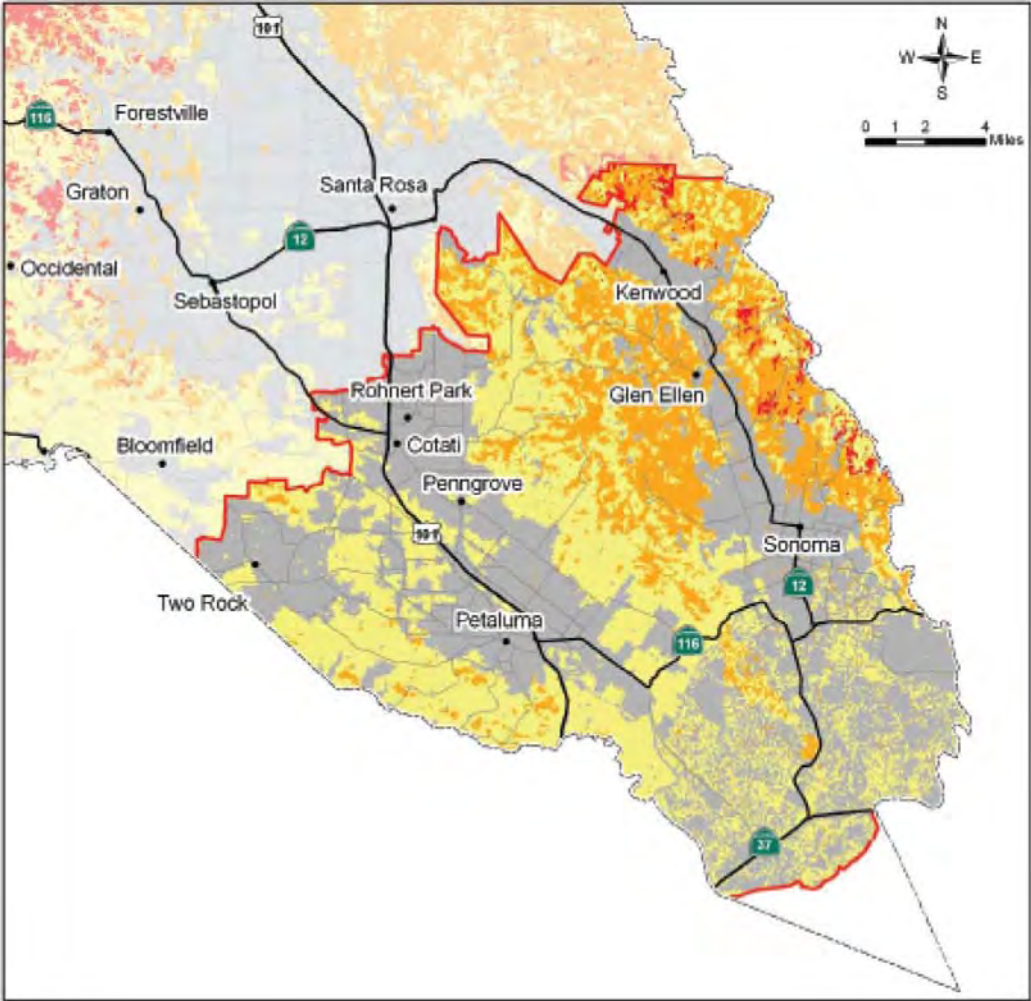
**Fire Threat in Acres:**

Extreme:	0
Very High:	46,174
High:	66,331
Moderate:	59,115
Little or no:	51,890

## Map: Battalion 1412 Fuel Models



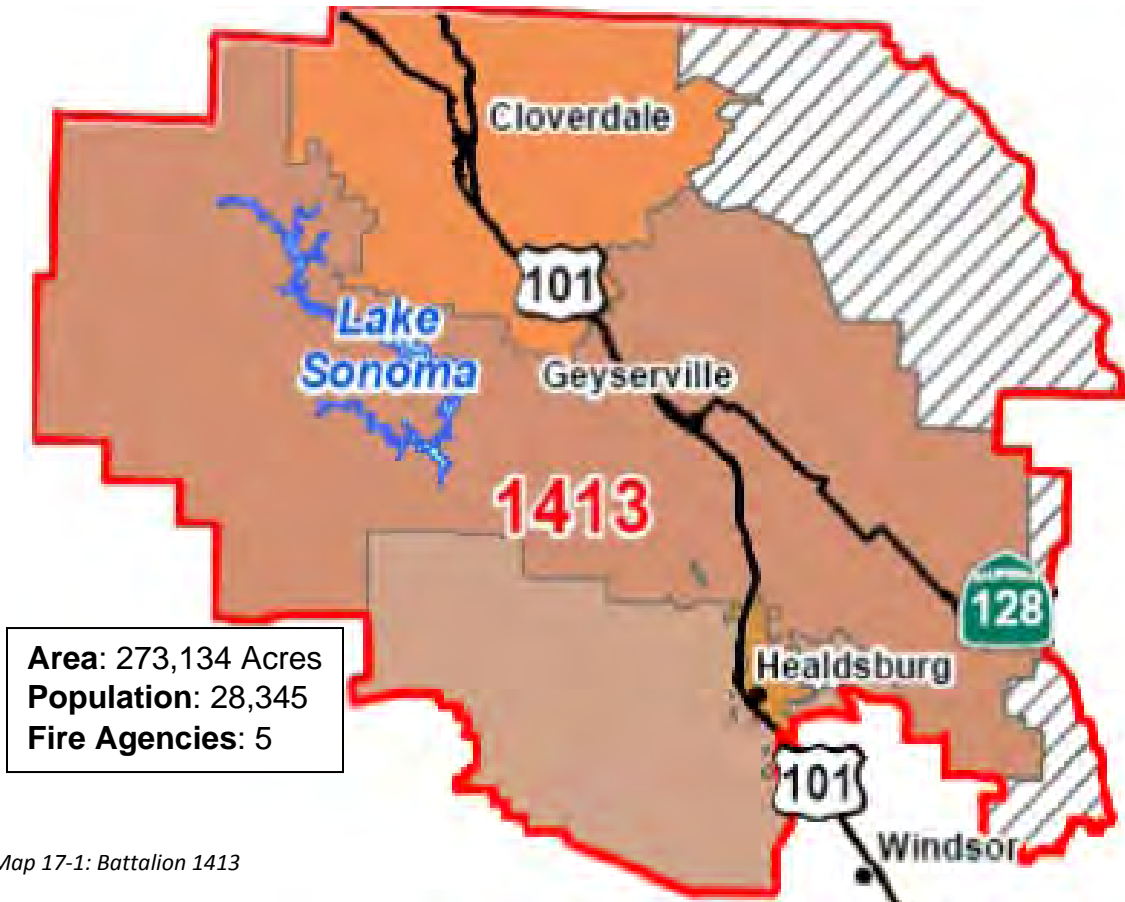
# Map: Battalion 1412 Condition Class/Departure from Historical (natural) Range



**Legend: Condition class and total acreage**

- 1—Within natural range: 86,891
- 2—Moderate departure: 38,722
- 3—High departure: 2,114
- Not Rated: 95,782

## Chapter 17 Battalion 1413



### 17.1 Discussion

Battalion 1413 encompasses Northeastern Sonoma County. Most of the battalion is very rural, with only two incorporated cities, Cloverdale and Healdsburg. Two CAL FIRE stations are located in the battalion, Healdsburg, which has two engines and a bulldozer and Cloverdale which is staffed with two engines.

County residents seeking a burn permit must get it from Battalion 1413 headquarters on Lytton Springs Road, generating over two hundred public contacts each year. Issuance of permits offers Battalion 1413 personnel great opportunities to educate residents and agricultural workers about wildfire. Because of high visitation to the station and good visibility from Highway 101, a Fire Safe Demonstration Garden was established on the grounds. A joint venture between CAL FIRE, Fire Safe Sonoma, The Sonoma County Fire Prevention Officers, and the Sonoma County Master Gardeners, the garden is a great help for residents in Sonoma County's rural and suburban environments who wish to learn about fire safe planting.

Hot, dry conditions and steep slopes prevail on much of the battalion, and the area has experienced the highest number of historical wildfires in Sonoma County, including the significant fires in 2004, 2012 and 2015. Proportionally, it contains the highest amount of Very High Fire Severity Zone in the county. Though largely rural, there are a large number of homes scattered throughout the battalion. Some of the State Responsibility Areas within the battalion, such as the Fitch Mountain area near Healdsburg, are both densely vegetated and densely populated.

Fuels and weather conditions place much of the battalion at high or very high fire risk, and there are also a number of unique and valuable assets at risk. The Geysers, comprising 30 square miles along the Sonoma and Lake County border, is the largest complex of geothermal power plants in the world. Twenty-two separate power plants make up The Geysers; 19 of them are owned by Calpine. The Geysers' geothermal field provides nearly 60% of the



*Photo 17-1, Cal Pine Generating Station at the Geysers*

average power demand from the Golden Gate Bridge to the Oregon state line. Capital improvements at The Geysers are valued in excess of four billion dollars and are vulnerable to some of the heaviest wildland fuel loadings in the county. Not only are these facilities at risk to wildfire, they also pose the risk of ignition to themselves, particularly due to numerous high-voltage transmission lines associated with the power plants.



*Photo 17-2: U.S. Army Corps Lake Sonoma*

Warm Springs Dam, which forms Lake Sonoma (2,700 surface acres), was built in 1983 by the U.S. Army Corps of Engineers. The compacted, earth-fill dam serves as a deterrent to floods and stores water for irrigation and municipalities. A popular recreation area, the lake receives well over a million visitors annually and contains 40 miles of trails and the Don Clausen Fish Hatchery. High visitation during the summer months generates a substantial number of fire and emergency responses for local agencies.

The River Rock Casino, operated by the Dry Creek Band of Pomo Indians, is located in the Anderson Valley near Geyserville. Though currently in operation in temporary structures, the tribe plans for a Tuscan-style resort with 260 guest rooms that will employ up to 2,000 workers. Though call volume in the area has increased due to high visitation at the casino, the tribe has been a generous supporter of local emergency services.

<b>Battalion 1412 Communities at Risk</b>	
• Asti	• Healdsburg
• Cloverdale	
<i>List maintained by the Office of the State Fire Marshal.</i> <a href="http://osfm.fire.ca.gov/fireplan/fireplanning_communities_at_risk">http://osfm.fire.ca.gov/fireplan/fireplanning_communities_at_risk</a>	

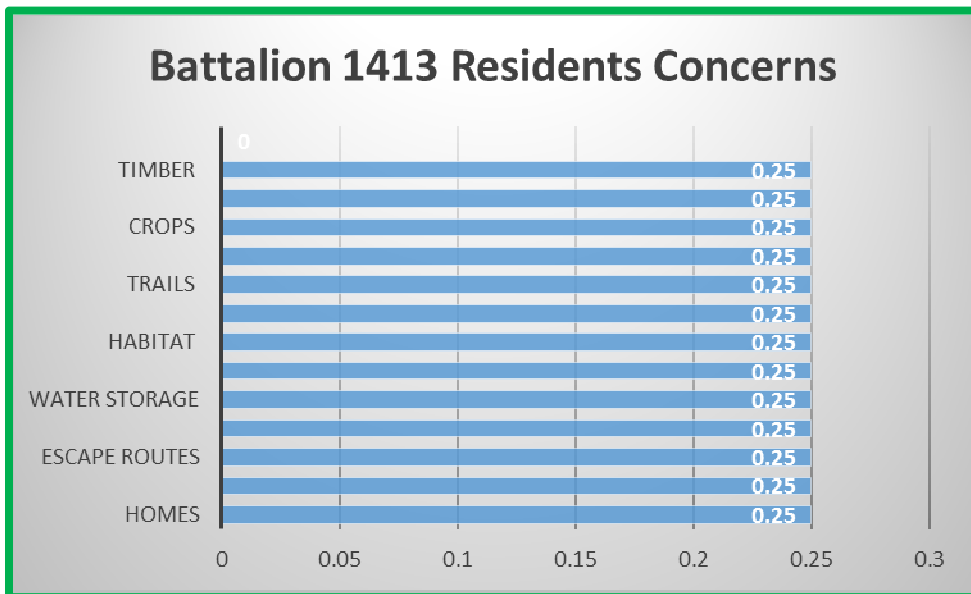
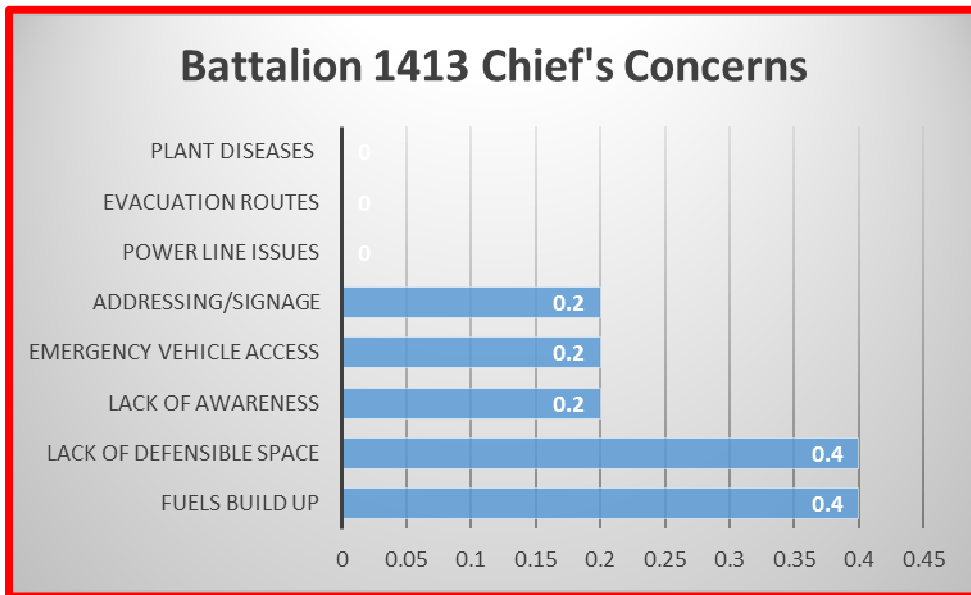
### 17.2 Local Fire Agencies within Battalion 1413

The vast majority of the district is served by all-volunteer or combination departments. During the fire season, CAL FIRE provides most of the area’s paid firefighters. The Sotoyome Volunteer Fire Department (part of the County Service Area #40) has merged its staff with Healdsburg Fire. Knights Valley Volunteer Fire has a small but dedicated volunteer staff.

Agency	Size (Sq. Miles)	Population	ISO-PPC	Paid Staff	Volunteer Staff	Engines	Water Tenders	Other Apparatus	Station Location
Cloverdale FPD	76	11,500	4	6	25	4	1	5	1 station in Cloverdale
Geyserville FPD	216	5,000	6	3.5	35	5	1	5	2 stations in Geyserville, 1 in Healdsburg
Healdsburg City	4	11,522	4	7.5	35				1 station in Healdsburg
Knight's Valley VFC (CSA#40)	82	323		0	8	2	1	1	1 station in Knights Valley
Sotoyome	64			0	0	0	1	0	Contract with Healdsburg

Table 17-1: Fire Agencies within Battalion 1413

### 17.3 Fire Chiefs and Local Residents WUI concerns, Battalion 1413



Summers are hot and dry in Battalion 1413. Residents in densely populated high-risk areas such as Fitch Mountain are concerned about a host of issues, including defensible space, overgrown vegetation on vacant lots and egress issues.



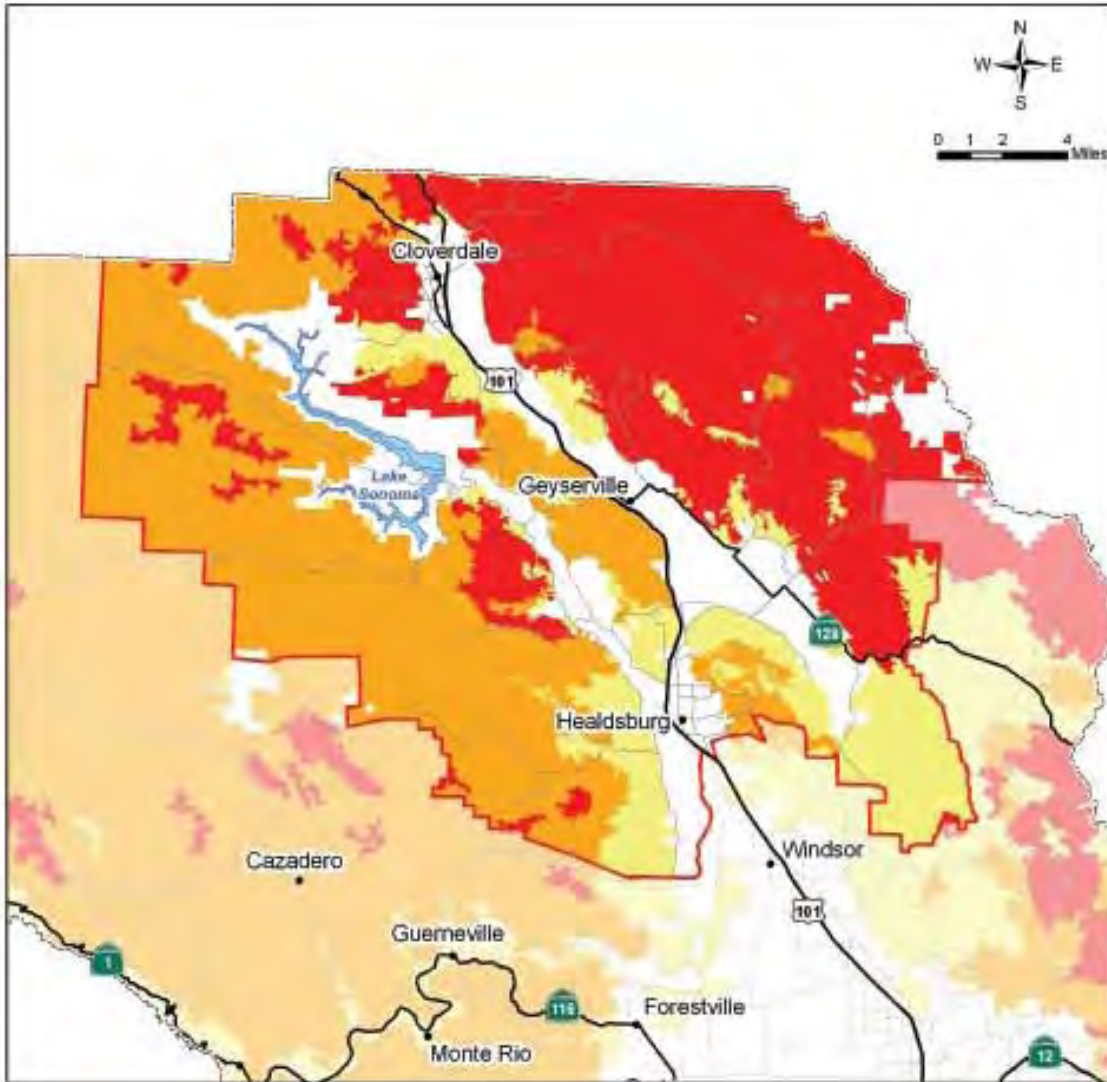
**CAL FIRE Battalion Chief 1413 Wildfire Concerns:  
May, 2016**

CAL FIRE Battalion Chiefs were asked to rank their level of concern (Low, Moderate, High, Very High) about the following wildfire issues.

<b>Wildfire Issue</b>	<b>Ranking</b>	<b>Comment</b>
1. Fuels build up in areas around your community	Very High	
2. Fuels build up and lack of defensible space around homes.	High	
3. Increasing tree mortality due to disease or drought.	Moderate	
4. Local residents lack understanding about wildfire risks & mitigation strategies.	High	
5. Availability and safety of evacuation routes.	High	
6. Emergency Vehicle Access/clearances/turnouts	Moderate to high	
7. Addressing/Signage	High	
8. Power line issues	Moderate	
9. Specific Concern #1: Add a specific concern not already noted.		
10. Specific Concern #2: Add a specific concern not already noted.		

<b>Community Wildfire Planning</b>	<b>Response</b>
11. Does your community (or communities) have a disaster plan in place?	No
11. Is there critical infrastructure in your community that is at particular risk to wildfire?	Yes, the Geysers
12. Are there areas outside your community (e.g., Open Space, Parks, etc.) that you see as posing a fire risk to your response area?	Yes, all overgrown areas.
13. Are there significant fire-prone invasive species present in your response area?	Scottish & French broom

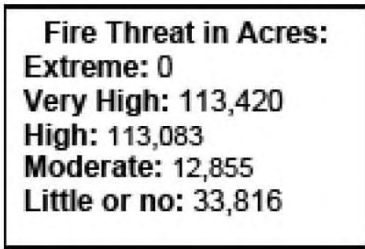
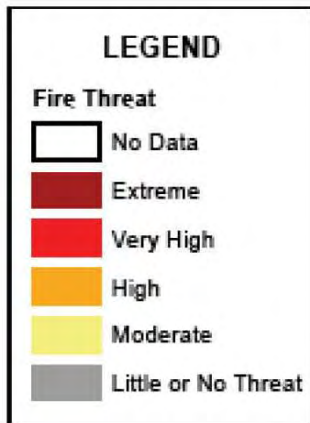
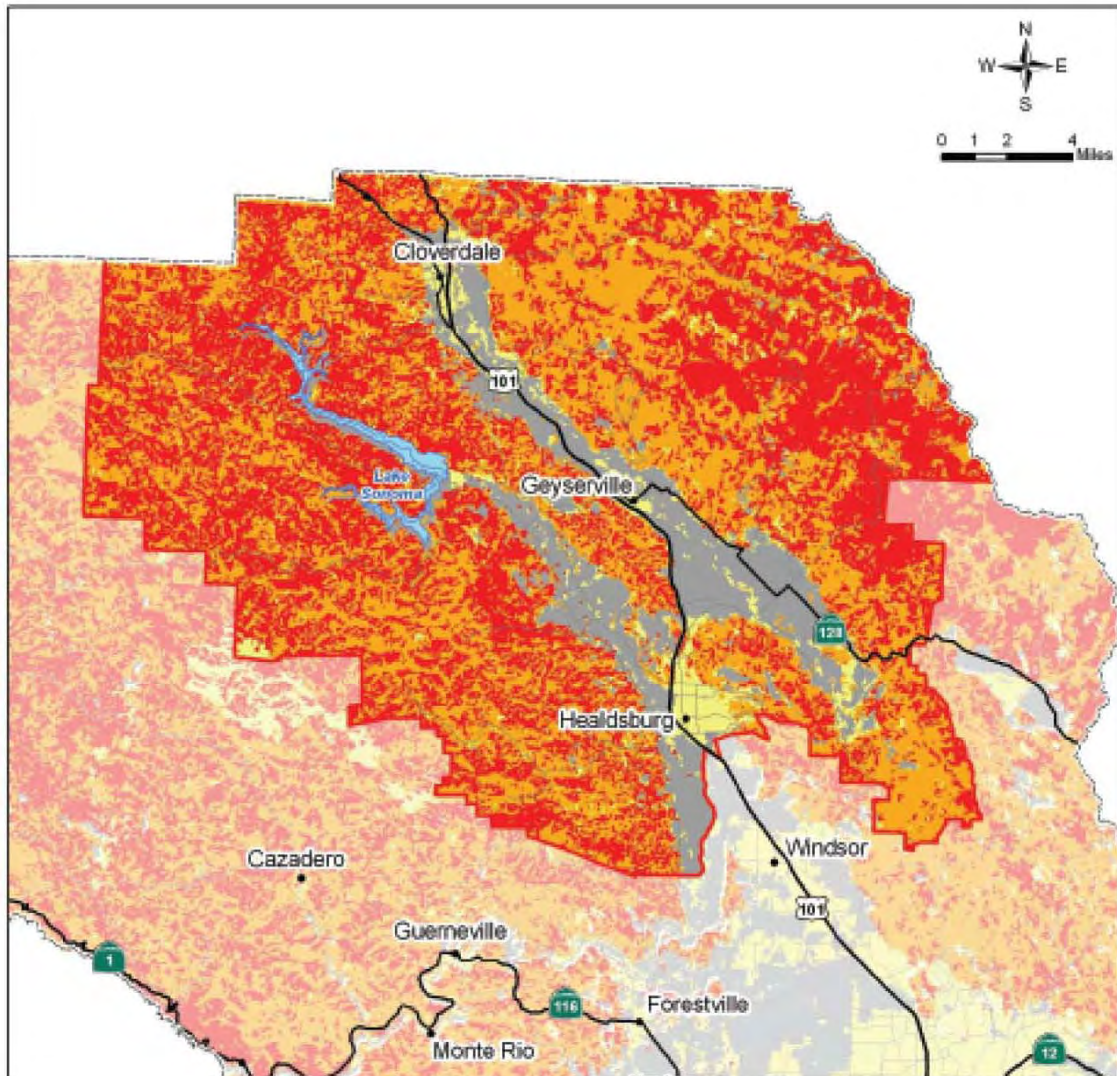
# Map: Battalion 1413 Fire Hazard Severity Zones



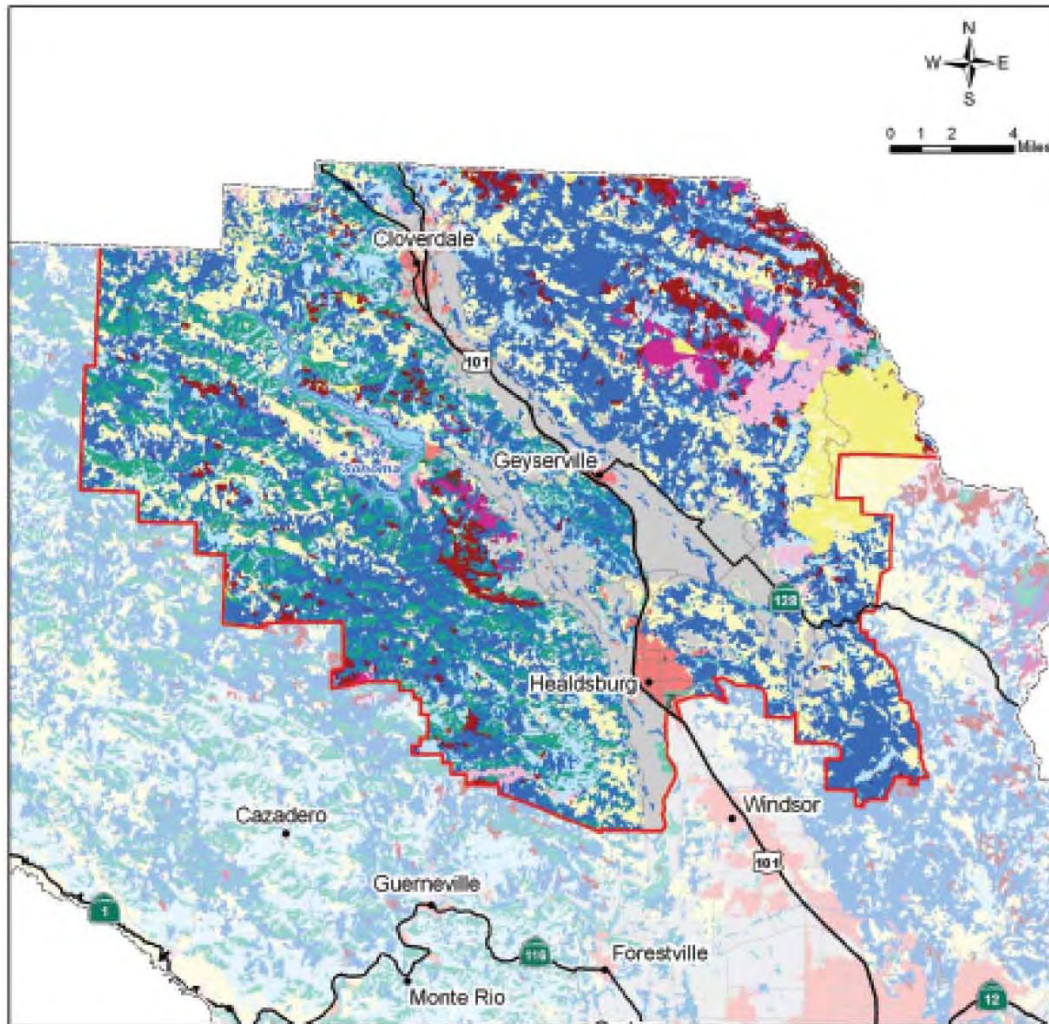
LEGEND	
Fire Hazard Severity Zone	
	Very High
	High
	Moderate

FHSZ in Acres:
<b>Very High:</b> 93,221
<b>High:</b> 93,133
<b>Moderate:</b> 35,318
<b>Not rated (LRA):</b> 51,468













# Map: Battalion 1413 Fire Threat



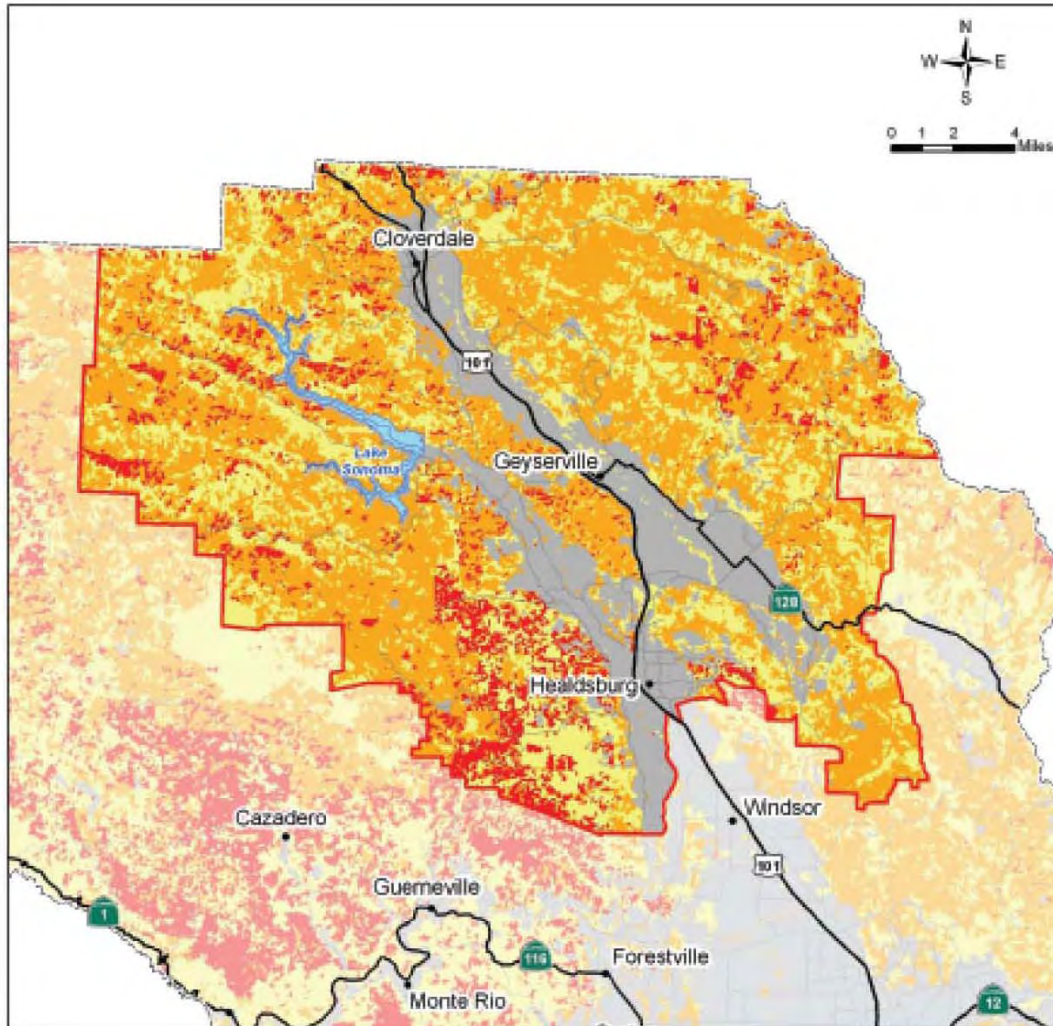
## Map: Battalion 1413 Fuel Models







**Legend: Fuel Models and total acreage**

	1—Grass: 52,659		9—Mixed conifer, light: 25,614
	2—Grass and Pine: 8,811		10—Mixed conifer, medium: 29,969
	4—Tall Chaparral: 11,605		28—Urban fuel: 4,125
	5—Brush: 10,135		97—Agricultural land: 28,944
	8—Dormant Brush: 3,536		98—Water: 3,975
	9—Hardwood/Lodgepole: 92,650		99—Barren/Rock/Other: 1,141
			Not mapped: 10

## Map: Battalion 1413 Condition Class



### Legend: Condition class and total acreage

	1—Within natural range: 75,945
	2—Moderate departure: 130,613
	3—High departure: 21,411
	Not Rated: 45,205