



Stanford University Wildfire Management Plan 2019

Stanford University Fire Marshal's Office

Table of Contents

1. Executive Summary
2. Wildfire Threat Assessment
 - a. Campus Description
 - b. Contributing Factors
 - c. Wildfire Ignition Sources
 - d. Situational Awareness
3. Prevention Measures
 - a. Fuel Management
 - b. Home Safety Surveys
 - c. Fire Weather Monitoring
 - d. Schedule
4. Wildfire Response
 - a. Fire Department Response
 - b. Stanford University Response
5. Communication
 - a. Communication with Community
 - b. Contacts

Appendix

- Appendix I: Fire Safety Guidelines for Mowing Dried Vegetation
- Appendix II: Biological Stewardship and Fire Management
- Appendix III: NWS/NOAA Definitions of a Fire Weather Watch and Red Flag Warning
- Appendix IV: Maps and Images
- Appendix V: Wildfire Public Resources

Glossary

References

1. Executive Summary

Stanford property includes 8,180 acres much of it undeveloped land with hilly topography and mixed vegetation types. The west side of the main campus sits at the interface with these wildland areas and the property encompasses moderate to very high fire hazard severity zones. Recent catastrophic wildfires in California have demonstrated the need for a comprehensive wildfire management plan for the Stanford University campus and surrounding lands. This plan for the 2019 California Wildfire Season recognizes the hazards to life, property, and the environment that an uncontrolled wildfire may pose to the campus and neighboring communities that overlap with Stanford property.

This plan was developed by the Stanford University Fire Marshal's Office (SUFMO) for the prevention and mitigation of wildfire hazards on the Stanford University campus, surrounding Stanford property, and the SLAC National Accelerator Laboratory (SLAC) during the wildfire season. It does not address air quality concerns related to wildfires, or contingency plans for emergency shutoff of power by utility providers during high fire hazard conditions. This is being addressed by separate groups within Stanford University Environmental Health & Safety and external agencies such as the [Bay Area Air Quality Management District](#) and [PG&E](#). SUFMO will review the plan annually and revise as necessary to address concerns related to climate and weather conditions, development and public use in wildland areas, and recommendations from local fire agencies for future fire seasons.

To aid the University in preventing and limiting the impact of potential wildfires, this document (1) summarizes potential wildfire hazards; (2) details prevention measures used by the University; (3) outlines wildfire response and the roles of University partners; and (4) provides points of contact to address concerns related to wildfire safety.

2. Wildfire Threat Assessment

a. Campus Description

Stanford University is located on the San Francisco Peninsula, 20 miles north of San Jose and 35 miles south of San Francisco. The campus includes developed and undeveloped property, covering a total of 8,180 acres (or 12.8 square miles). The property is located in six different governmental jurisdictions.

Table 1. Stanford University Lands

Acres	Jurisdiction
4,017	Unincorporated Santa Clara County
2,701	Unincorporated San Mateo County
1,161	Palo Alto, CA
114	Woodside, CA
111	Menlo Park, CA
76	Portola Valley, CA

Two important roadways are the 280 Interstate Freeway and Junipero Serra Boulevard, which run parallel to each other on the southwest side of campus and can act as firebreaks. The northeast side of campus is mostly developed with the main academic campus, faculty/staff housing, and other commercial buildings bordering the city of Palo Alto. In contrast, the southwest side of Junipero Serra Boulevard is mostly undeveloped with academic, research, and residential structures distributed sporadically throughout the property. The threat of wildfire primarily comes from this southwestern side of the campus property.

The campus gains in elevation from 75 feet at the main academic campus to over 900 feet at the hills of Portola Valley and Woodside. Continuing west from Junipero Serra Boulevard towards the Interstate 280 freeway, the property is primarily undeveloped, made up of grassland with oak trees. West of Interstate 280, the vegetation is oak savanna, chaparral, and north coast scrub. This area can be described as primarily closed-canopy oak woodland.

The Stanford University campus climate is generally considered to be a “Mediterranean type” climate; winters are cool and moist, and the summers are warm and dry. Local temperatures are seldom below 32° Fahrenheit (F) or above 86° F, where the average high temperature is 70.3° F and the average low temperature is 46.8° F. Average annual humidity is 82.95% and the average annual wind speed is 16.08 miles per hour. Rainfall in the area averages between 16 and 20 inches annually, with the majority of the rain occurring between November and May.

b. Contributing Factors

There are four factors that must be considered to effectively evaluate the hazards posed with regard to a wildfire. These factors are fuel factors, topography, weather, and fire history. Each factor increases the probability, intensity, and rate of spread of a wildfire. Often, these factors occur simultaneously which can further increase the risk and severity of a wildfire.

Fuel type, moisture content, fuel load, and the arrangement of the fuel directly influence the ignitability of the fuels, the intensity of the fire, and the rate of spread. The table below details fuel factors that can increase the likelihood of wildfire ignition:

Fuel Type	<p>Ground fuels are found below the ground. Surface fuels are found above the ground.</p> <p><i>Ground fuels include organic matter in soils. In California surface fuels are the primary concern and include needles, leaves, grasses, shrubs, dead or down branches, and trees. While there are different combinations of fuel types, the most common are grass (flash fuels), brush (moderate fuels), and timber (heavy fuels).</i></p>
Fuel Moisture	<p>The amount of water contained within the given fuel.</p> <p><i>With elevated temperatures and irregular seasonal rainfall, fuels dry out, increasing their combustibility. During the fall, even with cooler temperatures, moisture content in fuels remain low until seasonal rains return. For this reason, the most devastating wildfires occur in California during the fall months.</i></p>
Fuel Load	<p>The amount of fuel available to burn.</p> <p><i>As the amount of fuel increases, so does the duration and intensity of the fire.</i></p>
Fuel Arrangement	<p>Arrangement directly affects the size and intensity of a fire.</p> <p><i>Ladder fuels such as branches, shrubs, or trees beneath the main canopy allow a fire to spread from the ground to the tree canopy.</i></p>

The topography of the wildland areas is another factor that affects the fire behavior of a wildfire. Fires burn faster uphill than downhill. Topography also impacts wind speed and direction. Hills, peaks, and canyons can cause erratic wind conditions which can greatly increase the intensity and speed at which the fire spreads.

Weather plays a critical role in the ignition, spread, and intensity of a wildland fire, as well. Periods of dry, hot weather preheat and dry out fuels making them easier to ignite. Winds can increase the spread of a fire by carrying embers ahead of the fire creating spot fires, making the fire difficult to contain. Areas experiencing periods of high temperatures, low humidity, and high winds are especially vulnerable to wildland fires.

Fuel type and load, topography, and regular weather patterns influence where fires are likely to occur on the landscape. Following a previous fire, a combination of fuel loads growing back and the regular weather patterns in the area can create conditions favorable for the development and spread of a wildfire. The Stanford Foothills and Jasper Ridge areas have not had a history of significant wildfires (all less than 100 acres), in part due to typical conditions (e.g. humid winds from the ocean and bay, trees with higher moisture content) being more favorable in these areas. However, under the right conditions, larger fires are possible.

c. Wildfire Ignition Sources

Understanding and identifying possible ignition sources is a critical step in developing strategies to help prevent wildfires. Wildfire ignition sources are grouped according to the following classifications: natural, accidental, and incendiary.

Natural	Natural ignition sources include any source that is not a result of human involvement. The most common natural ignition source is lightning.
Accidental	Campfires, open burning, smoking, electrical power transmission lines, garden tools, agricultural equipment, and fireworks are all accidental ignition sources. Accidental fires are typically having an element of human involvement.
Incendiary	Ignition sources that are the result of the intentional act of starting a fire, more simply known as arson.

Limiting ignition sources in wildland areas helps to prevent wildfires. In California and across the United States, there is a noted relationship between human's presence and wildfires (Keeley & Syphard, 2017; Balch et al, 2017). In the US, 84% of wildfires are human started (this includes both accidental and incendiary) (Balch et al, 2017). Stanford University prohibits ignition sources such as smoking and open burning on the foothill trails as part of its efforts to prevent wildfires in the wildland trail areas.

d. Situational Awareness

Overall, the threat of wildfire to the Stanford campus ranges from moderate to high; the immediate campus is at a moderate risk for wildfire and the overlapping Woodside and Portola Valley communities are at high risk. The threat from a wildfire to the main academic

campus is moderate for two primary reasons; (1) it is located downslope of the wildland area; and (2) Junipero Serra Boulevard acts as a fire break separating the campus from the wildland area. The areas west of Junipero Serra Boulevard are in what the California Department of Forestry & Fire Protection (CAL FIRE) regards as Very High Fire Hazard Severity Zones due to hilly topography with heavily wooded areas and/or large open grasslands. Maps illustrating where these areas are in the State of California, San Mateo County, and Santa Clara County can be viewed in Appendix IV. Given this land also overlaps with University campus, it is important that Stanford has a plan for preventing wildfires on the University property that have the potential to affect the previously listed neighboring communities. To mitigate the risk in these high fire zones, Stanford works with local fire departments on land maintenance and management on University land to prevent the start and spread of wildfires to the extent that is possible.

3. Prevention Measures

Recognizing the threat posed by wildfire to the campus and the surrounding community, Stanford University is taking prevention measures to reduce the likelihood of a wildfire occurring and to reduce the potential damage to life, property, and the environment. The measures include three main strategies: fuel management, home safety surveys, and fire weather monitoring, a description of these measures is outlined in this section, as well as a timeline for implementation and relevant meetings with partners and stakeholders involved in the process.

a. Fuel Management

Fuel management is an important part of wildfire prevention. The goal of fuel management is to reduce the fuel loads, create and maintain breaks, and maintain clearance around power transmission lines, to reduce the likelihood for wildfire events.

Reduction can slow the spread and reduce the intensity of wildfires. In areas that are overgrown this is achieved by thinning or removing vegetation. For lighter fuels such as grass and light brush as well as areas where mechanical fuel reduction is not possible, grazing animals such as goats or cattle are used; Stanford uses vendors for this service with goat herds of 700-750 goats or more. For heavier fuels, hand crews or masticating equipment reduce fuel loads. This maintenance strategy is the responsibility of Buildings & Grounds Maintenance and Real Estate, both groups within Lands, Buildings and Real Estate (LBRE). Appendix IV provides photographic examples of a few fuel reduction methods.

Fire breaks are created and maintained in order to help slow or stop the spread of a wildfire, protect neighboring properties, and limit the size of wildfires. Fire breaks are established by mowing, tilling, grazing, or using hand crews (Appendix IV). For the leased properties, the lessees are responsible for having any prescribed fuel management work

done. Real Estate oversees fuel management work on direct owned lands and perform general leased property inspections on agricultural lands annually. Fuel mitigation work is performed by Buildings & Grounds parcels other than those that are managed by the individual leasees or Real Estate. Mowing operations are conducted in accordance with the Fire Safety Guidelines for Mowing Dried Vegetation (Appendix I).

Power transmission lines located on or in close proximity to University property are evaluated to ensure the lines are in compliance with regulations regarding the vegetation clearances. The California Public Utility Commission (CPUC) General Order 95, Rule 35 requires a minimum clearance of 18 inches between power transmission lines and trees. The required clearances reduce the chance trees can come in contact with the power transmission lines. Lines are monitored continually to keep up with growing rate of trees and vegetation. Owners of the lines are responsible for maintaining the clearing. The Public Utility Commission has made a determination that land between Alpine and Sand Hill roads is in a High Fire Threat District. For High Fire Threat Districts, the clearance increases to 48 inches.

SLAC has electrical transmission lines on the university property they are responsible for maintaining. The lines are part of a 7-mile-long and 100-foot-wide easement that runs west to the crest of the Santa Cruz Mountains and transverses several fire management areas. The easement contains dedicated 230kV power transmission lines that supply the SLAC master substation. These lines are managed by SLAC but are owned by Pacific Gas & Energy, the Department of Energy, and Stanford University. SLAC land includes portions of both Local Response Areas (Woodside Fire) and State Responsibility Areas (CAL FIRE).

b. Home Safety Surveys

In an effort to better prepare Faculty/Staff homes located on campus property and within the wildland urban interface (homes within ½ mile of undeveloped wildland area), home safety surveys will be conducted by SUFMO from May through July. The initial surveys will be conducted from the public right of way. The surveys will primarily be noting: (1) visible address sign posted; (2) combustible debris on the roof and/or in rain gutters; (3) dead or dried vegetation on property; (4) dried branches adjacent to or overhanging structures; (5) branches or vegetation closer than 10 feet to any chimney; and (6) chimneys not equipped with spark arrestor. Survey findings will be provided to the residents so they can take necessary actions to protect their homes. SUFMO is also able to conduct complete home surveys at the request of residents.

c. Fire Weather Monitoring

Weather forecasts monitored by the [National Weather Service \(NWS\)](#) are monitored on a continual basis by SUFMO, and the Stanford University Department of Public Safety (SUDPS) is notified by Santa Clara County via CAL FIRE when Red Flag warnings are issued for the Stanford area. NWS monitors and forecasts weather conditions that increase the probability of a wildland fire. During periods of low humidity, high winds, and/or high

temperatures, NWS may declare a Fire Weather Watch or a Red Flag Warning which are sent to all affected Counties by CAL FIRE. When a fire weather warning is issued, measures are taken to limit possible ignition sources such as prohibiting outdoor fires. If the fire weather warning is elevated to a Red Flag Warning, then SUDPS will close the Stanford Foothills to the public and all Foothill gates will be staffed to prevent entry. Any maintenance work that could potentially cause a fire or threat to public safety will be suspended. SUDPS alerts the campus community by AlertSU. Definitions of these warning levels can be found in Appendix III.

d. Timeline

Below is a general timeline for planning, assessment, and management work to be completed in preparation for the upcoming wildfire season.

Month	Activity	Description
Late March	Pre-Fire Season Planning Meeting	SUFMO meets with local fire departments and University partners to discuss the outlook for the upcoming fire season, hazard areas of concern, and fuel hazard mitigation plans. SUFMO will present the year's Wildfire Management Plan for the upcoming fire season.
April	Parcel Field Assessments	Field assessments are conducted by LBRE and SLAC to evaluate fuel loading, conservation areas, and methods of fuel reduction. Assessment will confirm adequacy of the proposed fuel management work or if adjustments need to be made due to increased hazard.
May through July	Home Safety Surveys	SUFMO conducts home safety surveys for designated Faculty/Staff Housing areas that are located in the wildland urban interface area. Follow up surveys will be conducted as necessary.
May through July	Fuel Management Work	When the rains have ended, mowing and tilling operations begin with the goal of completing the work by early July; any time after, the weather will make work unsafe due to weather-related fire factors.

		Other types of fuel work may be conducted as necessary after July 1st. This includes grazing, hand crew work or mowing, and tilling (if mowing and tilling can be done in accordance with safety guidelines). Tree growth around power and transmission lines are to be monitored continually throughout the year.
November	Debriefing Meeting	A meeting will be held with SUFMO, Building and Grounds Maintenance, Land Use and Environmental Planning and Real Estate to discuss issues related to wildfire hazard mitigation work conducted for the current wildfire season and plans for the upcoming season.
December	Fire Season Final Report	SUFMO will compile a Fire Season Final Report which will summarize fuel mitigation efforts including type of work, acreage and costs of work, list of fire incidents on Stanford property, home surveys, and the number of red flag days. The Fire Season Final Report will be included in the following year's Wildfire Management Plan.

4. Wildfire Response

Wildfire response is a coordinated effort between local fire departments and Stanford University. Location, intensity, and speed of fire spread will determine the emergency response.

a. Fire Department Response

Santa Clara County

The standard fire response for the foothills area varies upon the size of the fire, fire conditions, and the threat to structures. Initially, the Palo Alto Fire Department response will include two Type III (Wildland Type) engines, one Type I (Structure Type) engine, two Type IV patrol units, one Paramedic ambulance, and one Battalion Chief (Appendix IV). With the exception of the ambulance, three personnel are assigned to each response unit vehicle. The ambulance requires two personnel. A Santa Clara County Fire Department brush unit from the Santa Clara County El Monte Fire Station (located at Foothill Community College in Los Altos Hills) with three to four personnel will also be dispatched.

For large fires, the Santa Clara County can respond an additional four Type I engines and three Type IV brush units, each unit with three personnel. The emergency response system has the depth to provide additional resources from other mutual aid entities in the same area (e.g. CAL FIRE Ranger Unit resources located in Cupertino and San Martin). These include additional Type III units, air assets, hand crew resources, bulldozers, and command staff to complete an overhead requirement in the event of a major fire. Other fire apparatus resources are available through the [Santa Clara County Mutual Aid System](#).

San Mateo County

Based on the San Mateo County Fire Service's Wildland Alarm Plan, the level of fire department response to wildland fires is contingent on the wildfire threat due to weather conditions. The response levels are based on Low/Medium, High, and Extreme/Very High Level Response fire danger:

Low/Medium Level Response	Three Engines and a Battalion Chief (Notification to the CAL FIRE Battalion Chief)
High Level Response	In addition to the resources for a Low/Medium Level Response, three more engines, a CAL FIRE Type 3 engine, a water tender, an additional Battalion Chief and a CAL FIRE Battalion Chief
Extreme/Very High Level	In addition to the resources for a Low/Medium Level and High Level Responses, three more engines and two more Battalion Chiefs

In addition to the resources listed for response, other wildfire equipment and resources are available from CAL FIRE including additional Type 3 engines, air attack resources (air command, helicopters and air tankers), bulldozers, and fire crews.

b. Stanford University Response

Should a wildfire occur within Stanford property or on properties adjacent to Stanford with the possibility of spreading to Stanford lands, Stanford will respond in accordance with the strategies outlined in the [Stanford University Emergency Plan](#).

Concurrent with fire department response, initial assessment of the fire and the potential to impact the educational or research missions of the institution or damage Stanford property will be conducted by the Stanford Situation Triage & Assessment Team (STAT). They will determine whether additional resources are necessary to address the situation and will activate teams as needed. STAT may direct the activation of one or more

Department Operations Centers (DOCs) and will determine the need for establishing an Emergency Operations Center (EOC) and its location. STAT will coordinate with outside agencies on specific fire response strategies based on the prevailing conditions at the time of the event.

The type and content of communication necessary to send out to the campus community based on the risk posed by the wildfire will be determined by STAT in consultation with University Communications. Communications may include all-campus emails, notices posted on the Stanford emergency website (<https://emergency.stanford.edu>), or activation of the University mass notification system, AlertSU (which can include mass text message and email notifications to the Stanford community). STAT will remain active until the Incident Commander of the event determines that the threat has been reduced sufficiently so that the fire no longer poses a threat to the Stanford campus.

c. Santa Clara and San Mateo County Emergency Alert Systems

Santa Clara County and San Mateo County both maintain their own emergency alert systems through their Offices of Emergency Services (OES). The messages sent out are not necessarily coordinated with AlertSU.

Santa Clara County Emergency Alert System (AlertSCC)

AlertSCC is a free and easy way to get emergency alerts sent directly to your cell phone or mobile device, landline, or email. Alerts can include:

- Fire
- Earthquake
- Severe weather
- Crime incident that affects your neighborhood
- Instructions during a disaster

To sign up for emergency alerts within Santa Clara County visit the AlertSCC website at <https://www.sccgov.org/sites/oes/alertscc/Pages/home.aspx>.

San Mateo County Alert System (SMC Alert)

SMC ALERT is a free alert notification system used to immediately contact you during urgent or emergency situations in San Mateo County. You can set alerts to send emergency and non-emergency text and voice messages to you:

- Email Accounts;
- Cell Phones, Smartphones, Tablets;
- Voice Messages to Landline Phones (home & work).

To sign up for emergency alerts within San Mateo County visit the AlertSCC website at <https://hsd.smcsheriff.com/smcalert>.

5. Roles and Responsibilities

The effectiveness of the strategies prescribed in this plan can only be accomplished through the cooperation of our team of Stanford University partners. The campus partners that have a role in this plan include:

Department or Group	Responsibilities
Environmental Health and Safety (EH&S) <i>Stanford University Fire Marshal's Office (SUFMO)</i>	Provides comprehensive services to the Stanford community encompassing all aspects of Fire Safety. As it pertains to wildfires, these responsibilities include meeting with the various stakeholders to review and confirm fuel reduction plans, meet with local agencies to review any of their concerns, and complete Faculty Staff Housing surveys.
Lands, Buildings and Real Estate (LBRE)	Responsible for all construction and maintenance of the Stanford campus, including fuels management work.
<i>Buildings and Ground Maintenance (BGM)</i>	Responsible for managing and performing fuel management including mowing and tilling fire breaks on Stanford land that is not under lease agreement through Real Estate (see <i>Real Estate</i> below).
<i>Zone Management (Zone A)</i>	Manages major maintenance and repair projects for the University including facilities located in the foothills (Zone A), an area susceptible to wildfires. A Zone Map can be found here .
<i>Real Estate</i>	Responsible for fuel reduction on open lands with no leaseholders. Works with leasees to ensure required fuel management work is conducted in accordance with this plan and the direction of local fire departments.
<i>Land Use and Environmental Planning (LUEP)</i>	Directly oversees Stanford's stewardship activities for biological and cultural resources located on Stanford lands. Appendix IV contains their Biological Stewardship and Fire Management plan.

Stanford University Department of Public Safety (DPS)	The Department of Public Safety provides response and security review of all Foothill properties adjacent to the main campus and Jasper Ridge (as requested). They provide direct support to all fire response agencies in a Wildfire event. DPS is responsible for closing access to the Stanford Foothills when Red Flag Warnings are issued by NWS.
SLAC National Accelerator Laboratory	SLAC areas are on land leased to the Department of Energy. SLAC has a Wildfire plan that is overseen and coordinated by the SLAC Fire Marshal's Office.

Outside agencies also have roles related to mitigating wildfire hazards as well as providing emergency response related to wildfires on Stanford campus. The outside agencies that have roles related to wildfires include:

Agencies	Role
United States Department of Energy (DOE)	Owns and operates a set of 230 kV power lines that extend from SLAC for five miles to Skyline Boulevard. DOE funds the ongoing power transmission easement vegetation fuel reduction program along with Stanford. SLAC is responsible for the maintenance of these lines.
Pacific Gas and Electric (PG&E)	Required to review and mitigate overhead power line exposures to adjacent tree limbs, etc. in accordance with their Wildfire Safety Plan approved by the State of California. Responsible for maintenance of all PG&E lines and some SLAC lines.
Santa Clara County (SCC) Roads and Airports Department <i>Roads and Signal Operations Division</i>	Provides fuel reduction services along Junipero Serra Boulevard within 10' easements present on both sides of the road.
Palo Alto Fire Department (PAFD)	Provides direct response services to Stanford lands. This includes the Faculty/Staff Housing areas and open lands within the main campus area and Palo Alto.

Santa Clara County Fire Department (SCCFD)	Provides fire services for Santa Clara County. SCCFD has jurisdiction with regard to the enforcement of fire and life safety regulations for the main campus.
California Department of Forestry and Fire Protection (CAL FIRE)	Provides varied emergency services in Santa Clara and San Mateo County. CAL FIRE notifies affected Counties when Red Flag Warnings are declared by NWS.
Woodside Fire Protection District (WFPD)	Provides emergency services to the communities of Woodside, Portola Valley, Emerald Hills, Ladera, Los Trancos, Skyline, and Vista Verde.
Menlo Park Fire District (MPFD)	Provides emergency services to the communities of Atherton, Menlo Park, East Palo Alto, and some of the unincorporated areas of San Mateo County.

6. Communication

a. Communication with Community

Each spring, SUFMO provides information for the residents of the Faculty/Staff Housing areas on how they can protect their homes from a wildfire. This correspondence also contains information on the home safety surveys to be conducted from May through July. This information is sent to residents via email.

b. Contacts

Below are contacts for campus and community groups related to wildfire management and response. For more information please contact the relevant group.

Group	Contact	Email
LBRE: Real Estate	Ramsey Shuayto, Director, Asset Management	rshuayto@stanford.edu
	Mimi Dunkle, Real Estate Asset Specialist	mimi.dunkle@stanford.edu
	Selina Whitlock, Real Estate Administrator	selina.whitlock@stanford.edu
LBRE: Buildings & Grounds Maintenance	Ted Tucholski, Director, Grounds Services	lucky1@stanford.edu

LBRE: Land Use & Environmental Planning	Alan Launer, Associate Director, Conservation Planning	aelauner@stanford.edu
LBRE: Zone Management (Zone A)	Edmund Chiu, LBRE Associate Director, Zone A M. Jovan Solis, LBRE Zone Management	edchiu8@stanford.edu jsolis@stanford.edu
Office of Public Affairs: Government and Community Relations	Lucy W. Wicks, Director Community Relations	lucy.wicks@stanford.edu
Department of Public Safety	Bill Larson, Public Information Officer Chris Cohendet, Captain	william.larson@stanford.edu chris.cohendet@stanford.edu
SLAC National Accelerator Laboratory	Ralph Kerwin, Fire Marshal	rkerwin@stanford.edu

Appendix

Appendix I: Fire Safety Guidelines for Mowing Dried Vegetation

The following are equipment and operations guidelines for mowing dried vegetation to help prevent wildfires. The guidelines are required to be followed by LBRE and contractors working for LBRE Buildings & Grounds Maintenance and Real Estate when working on Stanford Lands (as described in Table 1 on page 2).

Equipment:

- All equipment used for mowing shall be in good mechanical working condition.
- Mowing blades shall be adequately sharp to cut the materials being mowed.
- All motorized equipment shall be equipped with a multi-purpose (ABC) extinguisher with a minimum rating of 2A:10B:C.
- A 2A (2 ½ gallon) water extinguisher shall be available for all equipment performing mowing operations.
- In areas designated as “rocky” and pose a higher hazard for mowing operations producing sparks, a water truck with a minimum 250-gallon tank equipped with adequate hose to extinguish any fire that may be ignited.
- In areas designated as “rocky” and pose a higher hazard for mowing operations producing sparks, a person dedicated to act as a fire lookout who is capable of reacting to a fire by calling 9-1-1 in the event the mowing operations ignites a fire.

Mowing Operations:

- No mowing operations shall be conducted on any day when a red flag warning has been designated.
- No mowing operations shall be conducted during windy conditions.
- All mowing operations shall cease when the temperature reaches 80° F. The contractor shall have a means of monitoring the temperature in the area of mowing operations.
- Mowing operations shall cease at 12 PM each day when the temperature exceeds 75°.

Appendix II: Biological Stewardship and Fire Management

The following is a description of the University’s dedication to biological stewardship while managing fire risk from Land Use & Environmental Planning (LUEP):

General Principles and Priorities for Fire Management Based Upon Biological Criteria

Esther Cole Adelsheim, PhD, Conservation Program Manager, LUEP

Alan Launer, PhD, Associate Director of Conservation Planning, LUEP

Maintenance of the biological resources on Stanford lands is a priority for the University because those resources support academic activities (field research and teaching),

recreation, and ecosystem services (clean water, carbon storage, etc.). Also, the university is required to protect and preserve federally and state listed species and their habitats under state and federal law. In California ecosystems, including Stanford's lands, fire is a natural form of disturbance that often benefits native species. Unless fire return intervals and severity far exceed the levels likely to be palatable from a public safety standpoint, fire suppression is unlikely to be desirable from a biological stewardship standpoint. Clearly, biological stewardship is one of many priorities (e.g. public safety, cultural resource protection, etc.) that must be weighed and balanced when developing a fire management plan on Stanford lands. The following is a list of general guidelines and principles that can be incorporated to help support biological stewardship.

- Mowing or grazing is better than disking for firebreaks.
- Firebreaks should not be located in wetlands or riparian corridors.
- Fuel treatments and firebreaks should be spatially targeted to address sites that pose a high risk of ignition and damage to people or property.
- Fuel treatments should be scaled to fuel loads (i.e. if the year is really wet more fuel treatments may be necessary, if it is a drought year no fuel treatments may be needed).
- During dry years, grazing is likely to increase erosion, soil compaction, and spread of weeds)
- Timing of fuel treatments is critical, if timed carefully, fuel treatments can help reduce weed abundance.
- Individuals working with fire breaks, fuel management, or firefighting and prevention in areas designated as Zone 1 and 2 under the Stanford Habitat Conservation Plan (Stanford's permit in compliance with federal and state endangered species acts) are required to receive worker education from Stanford Conservation Program Staff.

Supporting documents:

- Conservation Lands (Special Conservation Areas, Conservation Easements, CTS Reserve, CTS Ponds, Jurisdictional Wetlands).
- HCP Management Zones.
- Additional Information (summary and articles).

Appendix III: NWS/NOAA Definitions of a Fire Weather Watch and Red Flag Warning

A Fire Weather Watch (FWW) or Red Flag Warning (RFW) is issued when the combination of dry fuels and weather conditions support extreme fire danger. FWW is issued up to 72 hours before the above conditions are expected to occur. RFW is issued when the conditions in the table below are expected to occur or are occurring within the next 24 hours. These advisories are written for fire managers to highlight the increased fire danger.

Each National Weather Service (NWS) office creates local criteria for fire weather watches and red flag warnings. The criteria for the Santa Cruz Mountains include:

- Daytime 10-hour fuel moisture $\leq 6\%$ (measured at 1300'), or less, for one day
- Annual grasses are cured
- No wetting rain (greater than 0.10 inch) has fallen in the last 24 hours
- Sustained winds of 20 miles per hour (MPH)
- Low Relative Humidity (RH)

Sustained Wind Speed (MPH)	Day Time Relative Humidity (RH)	Nighttime Relative Humidity (RH)
6 – 11	Less than 9%	Less than 31%
12 – 20	Less than 19%	Less than 45%
21 – 29	Less than 29%	Less than 60%
Greater than 30	Less than 43%	Less than 80%

Appendix IV: Maps and Images

1. Examples of fuel reduction strategies that include grazing animals or masticating equipment

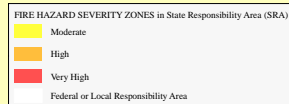


Source: [Stanford Jasper Ridge Biological Preserve](#)

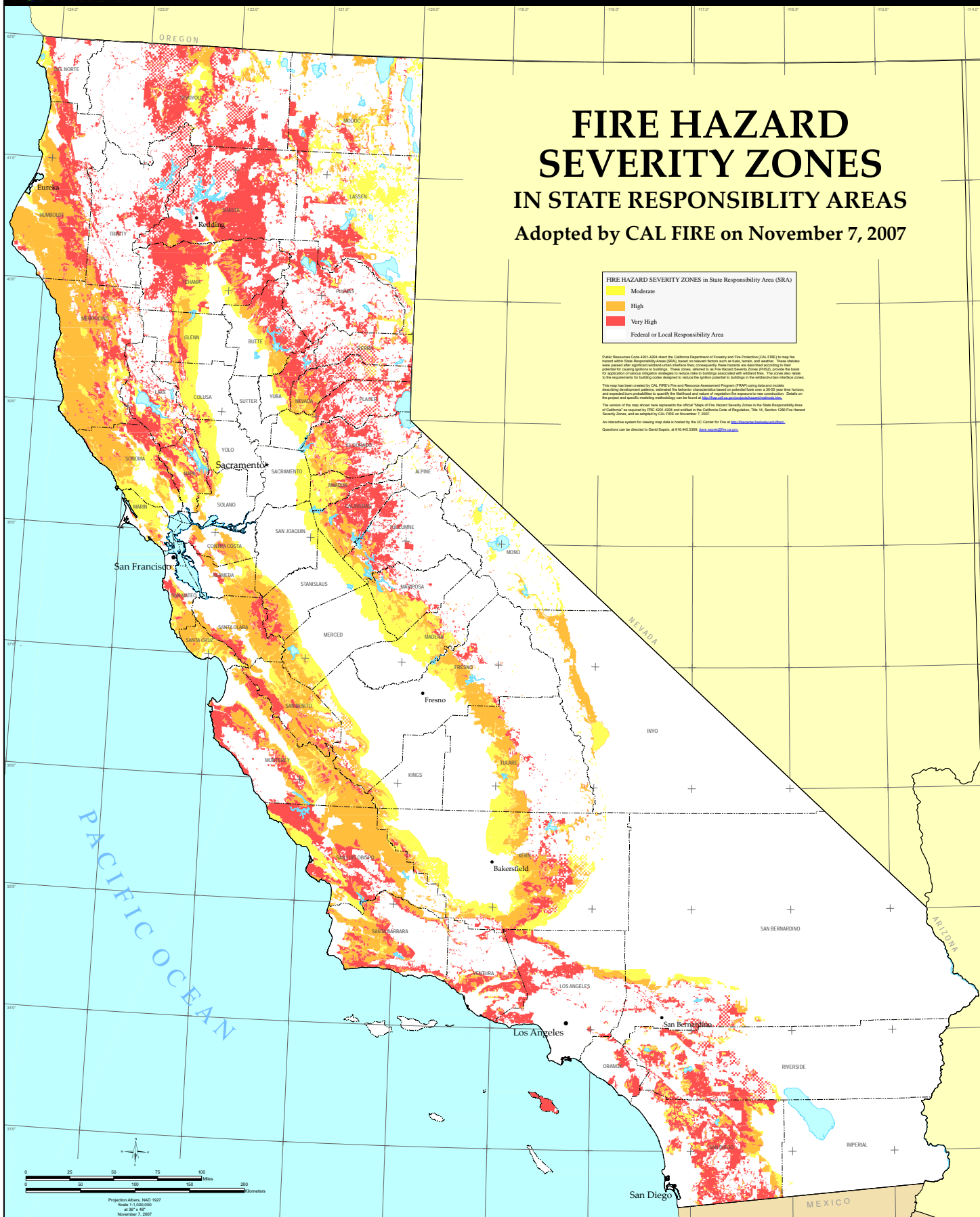
2. Fire Hazard Severity Zones Maps for State of California, Santa Clara and San Mateo Counties

FIRE HAZARD SEVERITY ZONES IN STATE RESPONSIBILITY AREAS

Adopted by CAL FIRE on November 7, 2007



Public Resources Code 4201-4204 direct the California Department of Forestry and Fire Protection (CAL FIRE) to map the hazard areas for State Responsibility Areas (SRAs) based on fire hazard severity. These areas were created after significant wildfire and/or vegetation loss, comprising those areas as identified according to their potential for causing ignition to buildings. These areas, referred to as Fire Hazard Severity Zones (FHSZs), provide the basis for application of various mitigation strategies to reduce risks to buildings associated with wildfire fires. The zones also relate to the requirements for building codes designed to reduce the ignition potential to buildings in the wildfire-prone hazard zones. This map has been created by CAL FIRE's Fire and Resource Assessment Program (FRAP) using data and models describing development patterns, estimated the historical characteristics based on historical data from a 2000 year time horizon, and expected future conditions to quantify the historical and future of vegetation for approval for new construction. Details on the project and specific modeling methodology can be found at <http://www.firehazard.ca.gov>. The version of the map shown here represents the official State of Fire Hazard Severity Zones in the State Responsibility Area of California as approved by 1997, 2002, 2004 and updated to the California Code of Regulations, Title 14, Section 1080 Fire Hazard Severity Zones, and is adopted by CAL FIRE on November 7, 2007. An interactive system for viewing map data is hosted by the U.S. Center for Fire at <http://www.firehazard.ca.gov>. Questions can be directed to David Rogers, at 916.465.5389, david.rogers@cdf.ca.gov.



The State of California and the Department of Forestry and Fire Protection make no representations or warranties regarding the accuracy of data or maps. Neither the State nor the Department shall be liable under any circumstances for any direct, special, incidental, or consequential damages with respect to any claim by any user or third party on account of, or arising from, the use of data or maps. Obtain FRAP maps, data, metadata and publications on the Internet at <http://frap.cdf.ca.gov>. For more information, contact CDF-FRAP, PO Box 944246, Sacramento, CA 94244-2460, (916) 327-3939.

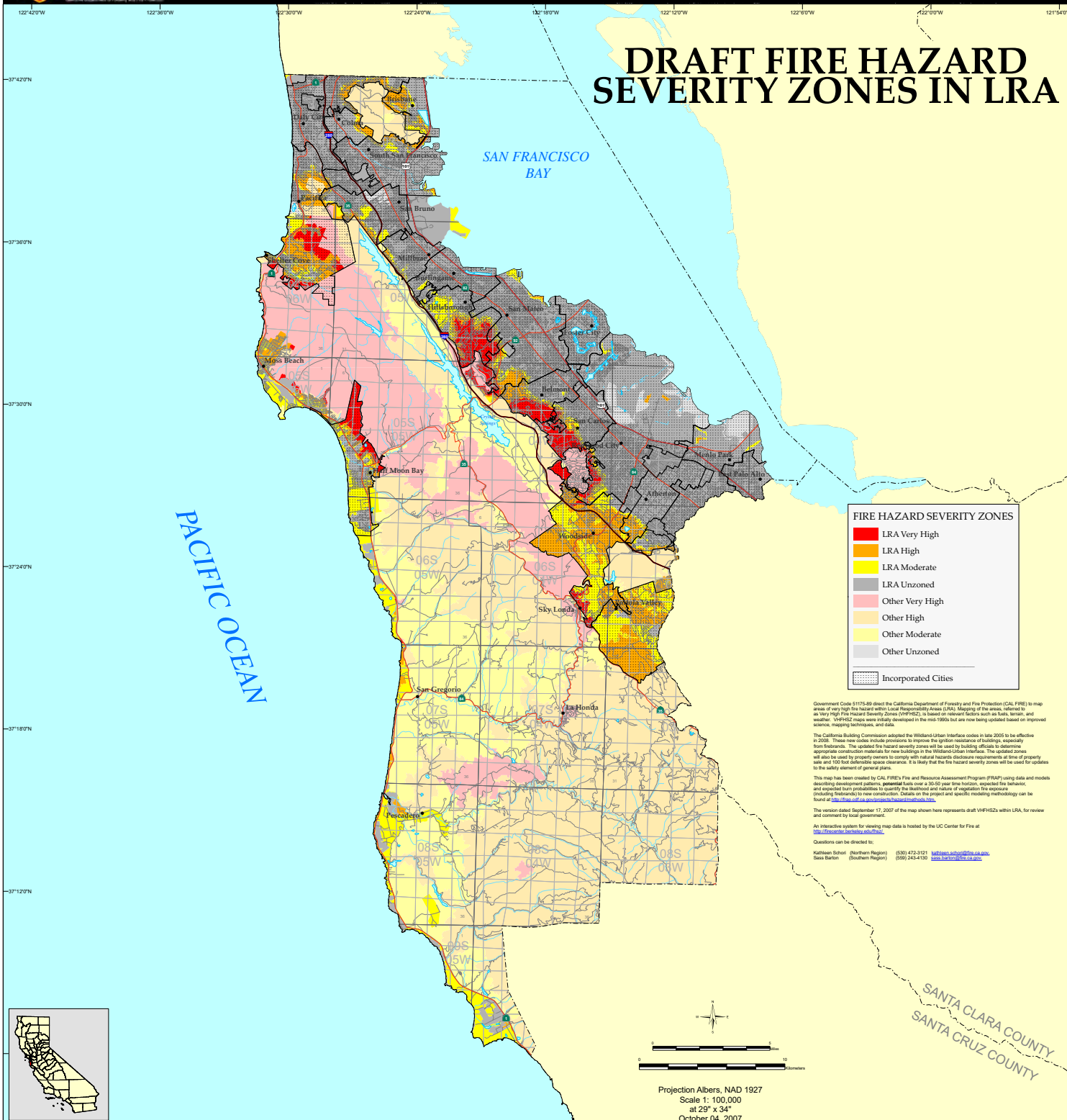
Arnold Schwarzenegger, Governor,
State of California
Mike Chrisman, Secretary for Resources,
The Resources Agency
Ruben Grijalva, Director,
Department of Forestry and Fire Protection

MAPID: FHSZS_MAP
DATA SOURCES
USGS 1:100,000 DLGs
CAL FIRE State Responsibility Areas (SRAs 05)
CAL FIRE Fire Hazard Severity Zones (FHSZS08_3)



SAN MATEO COUNTY

DRAFT FIRE HAZARD SEVERITY ZONES IN LRA



Government Code 5175.50 direct the California Department of Forestry and Fire Protection (CAL FIRE) to map areas of very high fire hazard within Local Responsibility Areas (LRAs). Mapping of the areas, referred to as Very High Fire Hazard Severity Zones (VHFHSZs), is based on relevant factors such as fuels, terrain, and weather. VHFHSZ maps were initially developed in the mid-1980s but are now being updated based on improved science, mapping techniques, and data.

The California Building Commission adopted the Wildland-Urban Interface codes in late 2005 to be effective in 2008. These new codes include provisions to improve the ignition resistance of buildings, especially from firebrands. The updated fire hazard severity zones will be used by building officials to determine appropriate construction materials for new buildings in the Wildland-Urban Interface. The updated zones will also be used by property owners to comply with natural hazards disclosure requirements at time of property sale per 153 for flood delineation areas. It is noted that the fire hazard severity zones will be used for updates to the safety element of general plans.

This map has been created by CAL FIRE's Fire and Resource Assessment Program (FRAP) using data and models describing development patterns, potential fuels over a 30-50 year time horizon, expected fire behavior, and expected burn probabilities to quantify the likelihood and nature of vegetation fire exposure (including firebrands) to new construction. Details on the project and specific modeling methodology can be found at <http://frap.cdf.ca.gov/projects/frap-network.htm>.

The version dated September 17, 2007 of the map shown here represents draft VHFHSZs within LRA, for review and comment by local government.

An interactive system for viewing map data is hosted by the UC Center for Fire at <http://frapfire.ucdavis.edu/Map/>.

Questions can be directed to:
Kathleen Schell (Northern Region) (530) 473-3121 kathleen.schell@cdf.ca.gov
Bass Barton (Southern Region) (530) 243-4130 bass.barton@cdf.ca.gov

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Arnold Schwarzenegger, Governor,
State of California
Mike Chrisman, Secretary for Resources,
The Resources Agency
Ruben Grijalva, Director,
Department of Forestry and Fire Protection

MAP ID: FHSZL06_1 MAP
DATA SOURCES
CAL FIRE Fire Hazard Severity Zones (FHSZL06_1)
CAL FIRE State Responsibility Areas (SRA05_4)
CAL FIRE Incorporated Cities (Incorp07_2)
PLSS (1:100,000 USGS, Land Grants with CAL FIRE grid)

3. Examples of fire break creation using machinery



Source: [University of Minnesota Extension](#)



Source: [John Deere](#)

4. Images of Fire Department response vehicles



Type III Engine (Source: Pierce Manufacturing Inc., [Firehouse](#))



Type I Engine (Source: Pierce Manufacturing Inc., [Fire Apparatus Magazine](#))



Type IV Patrol Unit (Source: [Bruce Dembecki](#))

Appendix V: Wildfire Public Resources

Santa Clara County FireSafe Council

The Santa Clara County FireSafe Council (SCFSC) is a non-profit organization protecting many communities at risk from wildfire in Santa Clara County. Our programs and projects are funded by multiple public and private sources, and members include fire agencies, open space managers, city governments and private citizens.

<https://sccfiresafe.org/santa-clara-county-firesafe-council/about-santa-clara-county-firesafe-council>

Fire Safe San Mateo County

The Mission of FIRE SAFE San Mateo County is to maintain the quality of life and protect property and the environment for citizens living in the wildland urban interface zones of San Mateo County through public and private partnerships for education and fuel reduction.

<https://firesafesanmarateo.org/>

California Department of Forestry & Fire Protection (CAL FIRE)

To help educate property owners and residents in areas most at risk, CAL FIRE has developed a communications program called “Ready, Set, Go!” that breaks down the actions needed to be ready for wildfire.

<https://www.readyforwildfire.org/prepare-for-wildfire/ready-set-go-campaign/>

National Fire Protection Association - FIREWISE USA

NFPA's Firewise USA® program teaches people how to adapt to living with wildfire and encourages neighbors to work together and take action now to prevent losses.

<https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA>

United States Fire Administration

The U.S. Fire Administration (USFA) develops and delivers fire prevention and safety education programs in partnership with other federal agencies, the fire and emergency response community, the media, and safety interest groups. We also work with the public and private groups to promote and improve fire prevention and life safety through research, testing and evaluation.

<https://www.usfa.fema.gov/prevention/outreach/wildfire.html>

Glossary

Defensible Space: The selection, location, grouping, and maintenance of vegetation on the property in such a manner that the opportunity for fire to burn directly to a structure is minimized.

Fire Weather: Weather conditions that create favorable conditions for the start and spread of wildfires. Fire weather conditions may include low relative humidity, high temperatures, high winds, and dry thunderstorms. Fire weather warnings typically precede the issuance of a Red Flag Warning.

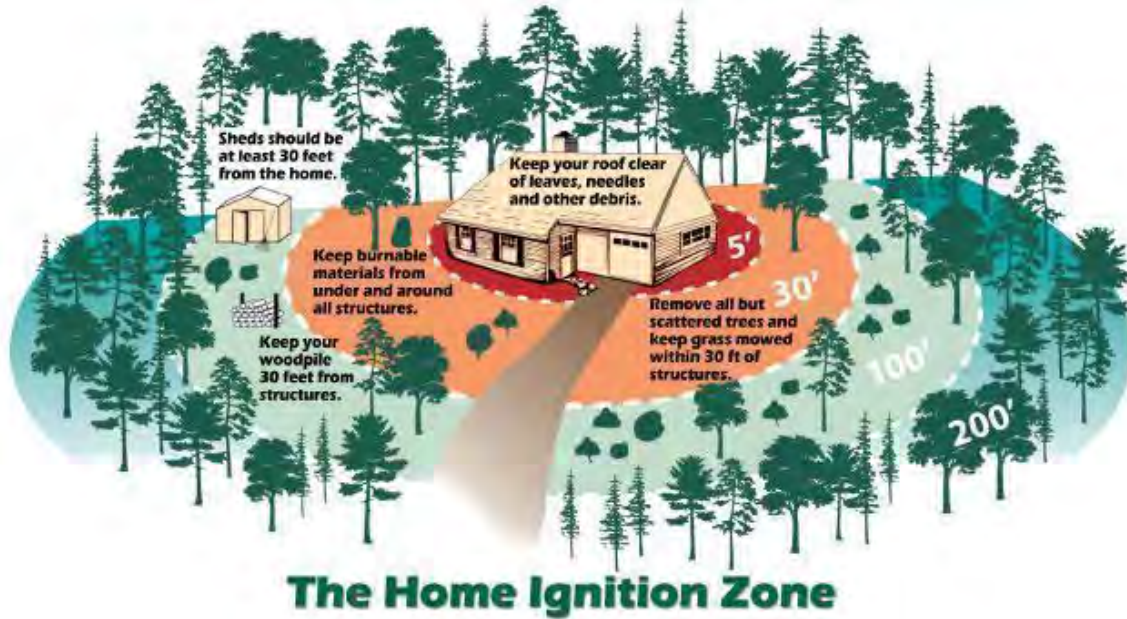
Fire Break: A barrier of cleared, mowed, plowed, or tilled land intended to halt the spread of a forest or grass fire.

Fuels: All combustible materials within the wildland urban interface or intermix, including but not limited to vegetation and structures.

Fuel Modification: Any manipulation or removal of fuels to reduce the likelihood of ignition or the resistance to fire control.

Home Ignition Zone: The area around a home extending 200 feet from the home where fuels are modified, reduced, or removed in order to improve the survivability of the home during a wildland or urban fire. The home ignition includes surrounding areas extending from the home:

- **0-5 feet Immediate Surroundings:** This area should contain only noncombustible materials.
- **5-30 feet Intermediate Surroundings:** This area should contain only a limited amount of combustible materials: nothing that will burn with a high intensity, for long duration, or produce flames that could contact the home.
- **30 to 100 feet Extended Surroundings:** This is an area where vegetative fuels are managed to prevent surface fires that would allow torching of shrubs and trees. Depending on the downward slope of the property, the distance to the home may be extended to 200 feet.



Source: [Wisconsin Department of Natural Resources](#)

Ladder fuels: Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease.

NFPA-1144 Standard for Protection of Life and Property from Wildfire: The National Fire Protection Association provides a methodology for assessing wildland fire ignition hazards around existing structures, residential developments, and subdivisions and improved property or planned property improvement that will be located in a wildland/urban interface area, and provides minimum requirements for new construction to reduce the potential of structure ignition from wildland fires.

Red Flag Warning: A forecast warning issued by the United States National Weather Service to inform area firefighting, land management agencies, and the public that conditions are ideal for wildland fire combustion and rapid spread.

Wildland Urban Interface (WUI): A zone of transition between wildland (unoccupied land) and human development. Communities in the WUI are at risk of catastrophic wildfire. The wildland urban interface includes homes located up to ½ mile from wildland area.

References: (Citations)

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