



LIVING WITH  
**FIRE**  
IN SONOMA COUNTY

**A GUIDE FOR THE HOMEOWNER**



# LIVING WITH FIRE

## LIVING IN A HIGH HAZARD FIRE ENVIRONMENT

Much of Sonoma County is considered a high hazard fire environment. Based on past experience, this area possesses all the ingredients necessary to support large, intense, and uncontrollable wildfires.

Within this hazardous environment, there are individual houses, subdivisions, and entire communities. Many homes, however, would be unable to survive an intense wildfire. Since it is not a question of "if" wildfires will occur but "when" they will occur, the likelihood of human life and property loss is great and growing.

Our ability to live more safely in this fire environment greatly depends upon our use of "pre-fire activities." Pre-fire activities are actions taken before a wildfire occurs which improve the survivability of people and homes. They include proper vegetation management around the home (known as defensible space), use of fire resistant building materials, appropriate subdivision design, and other measures. Research clearly demonstrates that pre-fire activities save lives and property.

In 1999, Fire Safe Sonoma adopted The Living With Fire program for Sonoma County. Fire Safe Sonoma is a non-profit 501(c)3 corporation comprised of fire prevention professionals, public agency representatives, business owners and concerned residents who recognize the urgent need to deal with the issue of catastrophic wildfire in Sonoma County. Our mission is to raise public awareness of wildfire related problems, such as loss of life and property, and devastation of wildlife habitat and the natural environment as well as provide education that promotes fire safety and prevention. For more information about Fire Safe Sonoma call (707) 565-1152.

## THE "LIVING WITH FIRE" PROJECT



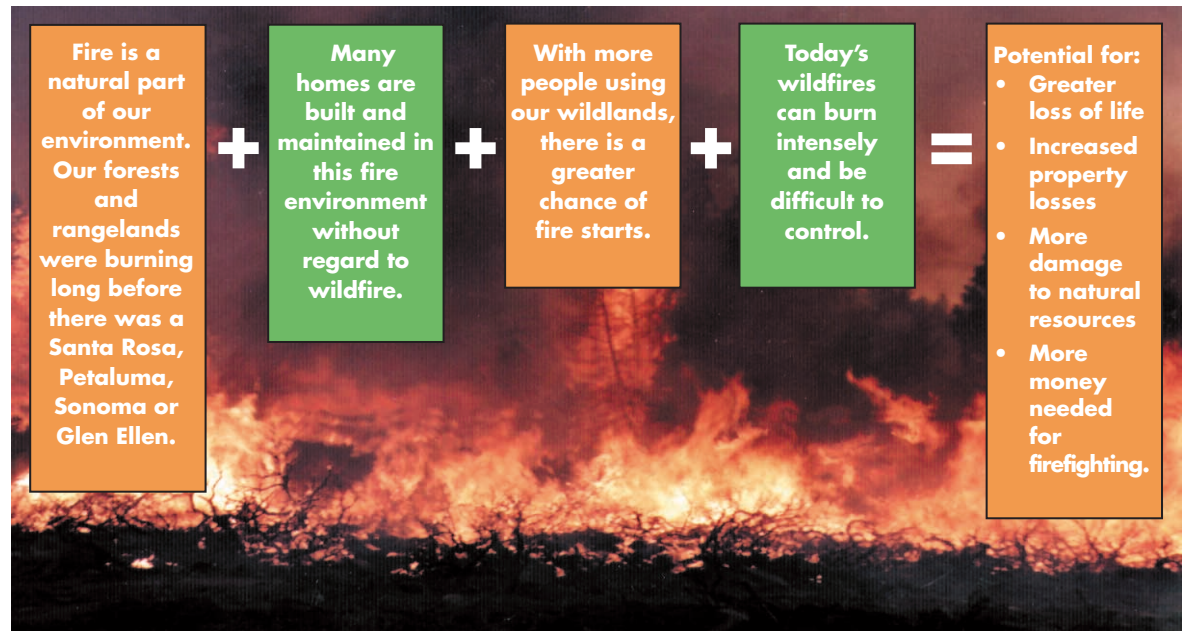
Photograph courtesy of California Department of Forestry and Fire Protection.

The pre-fire activities implemented by this homeowner included a green and well maintained landscape, reduction of wildland vegetation around the perimeter of the property, a fire resistant roof, and a good access road with a turnaround area. The charred surroundings of the home show that these pre-fire activities effectively protected it when wildfire hit.

## THE "WHY WE'RE WORRIED ABOUT WILDFIRE" EQUATION



Montana artist Monty Dolack's painting of wildfire in the urban interface reflects the threat facing homeowners who live in fire country.



# FREQUENTLY ASKED QUESTIONS ABOUT DEFENSIBLE SPACE



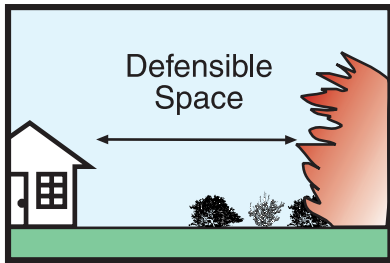
Photograph courtesy of Ben Hammack.

More and more homes are being built in high fire hazard environments.

In the 1980's, the term "defensible space" was coined to describe vegetation management practices aimed at reducing the wildfire threat to homes. This article responds to some of the commonly asked questions about defensible space.

## WHAT IS DEFENSIBLE SPACE?

Defensible space is the area between a house and an oncoming wildfire where the vegetation has been modified to reduce the wildfire threat and to provide an opportunity for firefighters to effectively defend the house. Sometimes, a defensible space is simply a homeowner's property maintained backyard.



## WHAT IS THE RELATIONSHIP BETWEEN VEGETATION AND WILDFIRE THREAT?

Many people do not view the plants growing on their property as a threat. But in terms of wildfire, the vegetation adjacent to their homes can have considerable influence upon the survivability of their houses. All vegetation, including plants native to the area as well as ornamental plants, is potential wildfire fuel. If vegetation is properly modified and maintained, a wildfire can be slowed, the length of flames shortened, and the amount of heat reduced, all of which assist firefighters in defending the home against an oncoming wildfire.

## THE FIRE DEPARTMENT IS SUPPOSED TO PROTECT MY HOUSE, SO WHY BOTHER WITH DEFENSIBLE SPACE?

Some individuals incorrectly assume that a fire engine will be parked in their driveway and firefighters will be actively defending their homes if a wildfire approaches. During a major wildfire, it is unlikely there will be enough firefighting resources available to defend every home. In these instances, firefighters will likely select homes they can most safely and effectively protect. Even with adequate resources, some wildfires may be so intense that there may be little firefighters can do to prevent a house from burning. The key is to reduce fire intensity as wildfire nears the house. This can be accomplished by reducing the amount of flammable vegetation surrounding a home. Consequently, the most important person in protecting a house from wildfire is not a firefighter, but the property owner. And it's the action taken by the owner **before** the wildfire occurs (such as proper landscaping) that is most critical.

## DOES DEFENSIBLE SPACE REQUIRE A LOT OF BARE GROUND IN MY LANDSCAPE?

No. Unfortunately, many people have this misconception. While bare ground is certainly effective in reducing the wildfire threat, it is unnecessary and unacceptable due to appearance, soil erosion, and other reasons. Many homes have attractive, well vegetated landscapes that also serve as effective defensible space.

## DOES CREATING A DEFENSIBLE SPACE REQUIRE ANY SPECIAL SKILLS OR EQUIPMENT?

No. For the most part, creating a defensible space employs routine gardening and landscape maintenance practices such as pruning, mowing, weeding, plant removal, appropriate plant selection, and irrigation. Equipment needed includes common tools like a chain saw, pruning saw, pruning shears, loppers, weed-eater, shovel, and a rake. A chipper, compost bin, or a large rented trash dumpster may be useful in disposing of unwanted plant material.

## HOW BIG IS AN EFFECTIVE DEFENSIBLE SPACE?

Defensible space size is not the same for everyone, but varies by slope and type of wildland vegetation growing near the house. See the article entitled "Creating An Effective Defensible Space" for specific information.



Photo courtesy of Dave Hill

## DOES DEFENSIBLE SPACE MAKE A DIFFERENCE?

Yes. Investigations of homes threatened by wildfire indicate that houses with an effective defensible space are much more likely to survive a wildfire. Furthermore, homes with both an effective defensible space and a nonflammable roof (composition shingles, tile, metal, etc.) are many times more likely to survive a wildfire than those without defensible space and flammable roofs (wood shakes or shingles). Appropriate roofing materials and defensive space give firefighters the opportunity to effectively and safely defend the home.

## DOES HAVING A DEFENSIBLE SPACE GUARANTEE MY HOUSE WILL SURVIVE A WILDFIRE?

No. Under extreme conditions, almost any house can burn. But having a defensible space will significantly improve the odds of your home surviving a wildfire.

## WHY DOESN'T EVERYONE LIVING IN A HIGH WILDFIRE HAZARD AREA CREATE A DEFENSIBLE SPACE?

The specific reasons for not creating a defensible space are varied. Some individuals believe "it won't happen to me". Others think the costs (time, money, effort, loss of privacy, etc.) outweigh the benefits. Some fail to implement defensible space practices simply because of misconceptions or lack of knowledge.

## HOW DO I CHANGE THE VEGETATION ON MY PROPERTY TO REDUCE THE WILDFIRE THREAT?

The objective of defensible space is to reduce the wildfire threat to a home by changing the characteristics of the adjacent vegetation. Defensible space practices include:

- Increasing the moisture content of vegetation.
- Decreasing the amount of flammable vegetation.
- Shortening plant height.
- Altering the arrangement of plants.

This is accomplished through the "Three R's of Defensible Space." The article "Creating An Effective Defensible Space" provides detailed information about changing vegetation characteristics for defensible space.

## THE THREE R'S OF DEFENSIBLE SPACE

### Removal

This technique involves the elimination of entire plants, particularly trees and shrubs, from the site. Examples of removal are cutting down a dead tree or cutting out a flammable shrub.

### Reduction

The removal of plant parts, such as branches or leaves, constitute reduction. Examples of reduction are pruning dead wood from a shrub, removing low tree branches, and mowing dried grass.

### Replacement

Replacement is substituting less flammable plants for more hazardous vegetation. Removal of a dense stand of flammable shrubs and planting an irrigated, well maintained flower bed is an example of replacement.

# CREATING AN EFFECTIVE DEFENSIBLE SPACE\* ...A Step-by-Step Guide

Are you worried about the wildfire threat to your home, but aren't sure how to get started in making your home defensible? Follow these six steps to an effective defensible space...

## STEP ONE: HOW BIG IS AN EFFECTIVE DEFENSIBLE SPACE?

The size of the defensible space area is usually expressed as a distance extending outward from the sides of the house. This distance varies by the type of wildland vegetation growing near the house and the steepness of the terrain.

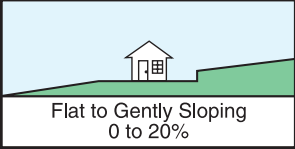
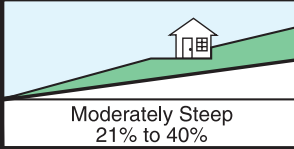
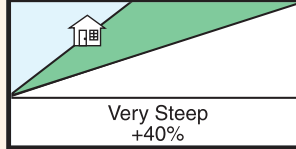
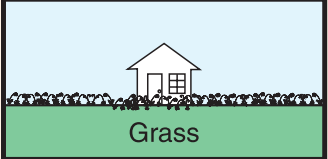
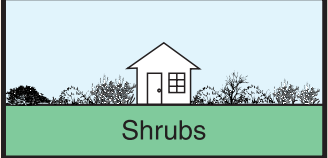

On the "Recommended Defensible Space Distance" chart presented below, find the vegeta-

tion type and percent slope which best describes the area where your house is located. Then find the recommended defensible space distance for your situation.

For example, if your property is surrounded by wildland grasses, and is located on flat land, your recommended defensible space distance would extend 30 feet from the sides of the house. If your house is on a 25% slope and the adjacent wildland vegetation is dense tall brush, your recommended defensible space distance would

be 150 feet or more.

If the recommended distance goes beyond your property boundaries, contact the adjacent property owner and work cooperatively on creating a defensible space. The effectiveness of defensible space increases when multiple property owners work together. The local assessor's office can provide assistance if the owners of adjacent properties are unknown. **Do not work on someone else's property without their permission.**

DEFENSIBLE SPACE				
RECOMMENDED DISTANCES—STEEPNESS OF SLOPE				
	 Flat to Gently Sloping 0 to 20%	 Moderately Steep 21% to 40%	 Very Steep +40%	
VEGETATION TYPE	 Grass Wildland grasses, weeds, and widely scattered shrubs with grass understory.	<b>30-50</b> feet	<b>100</b> feet	<b>100</b> feet+
	 Shrubs Includes shrub dominant areas of manzanita, chaparral, or coastal scrub.	<b>100</b> feet	<b>150</b> feet	<b>150</b> feet+
	 Trees Includes forested areas. If substantial grass or shrub understory is present, use those values shown under "shrubs."	<b>30</b> feet	<b>100</b> feet	<b>150</b> feet+

- 1) Find the percent slope which best describes your property.
- 2) Find the type of vegetation which best describes the wildland plants growing on or near your property.
- 3) Locate the number in feet corresponding to your slope and vegetation. This is your recommended defensible space distance.

\* Please note the recommendations presented in this article are suggestions made by local firefighters experienced in protecting homes from wildfire. They do not take precedence over local ordinances. **CHECK WITH YOUR LOCAL FIRE OR PLANNING DEPARTMENT FOR SPECIFIC REQUIREMENTS.**

Temporarily mark the recommended distance with flagging or strips of cloth tied to shrubs, trees, or stakes around your home. This will be your defensible space area.

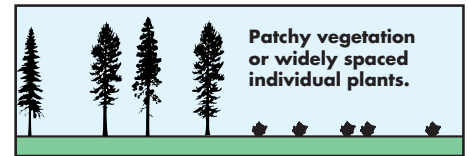
**STEP TWO: IS THERE ANY DEAD VEGETATION WITHIN THE RECOMMENDED DEFENSIBLE SPACE AREA?**

Dead vegetation includes dead trees and shrubs, dead branches lying on the ground or still attached to living plants, dried grass, flowers and weeds, dropped leaves and needles, and firewood stacks. In most instances, dead vegetation should be removed from the recommended defensible space area. A description of the types of dead vegetation you're likely to encounter and the recommended actions are presented below.

**STEP THREE: IS THERE A CONTINUOUS DENSE COVER OF SHRUBS OR TREES PRESENT WITHIN THE RECOMMENDED DEFENSIBLE SPACE AREA?**

Sometimes wildland plants can occur as an uninterrupted layer of vegetation as opposed to being patchy or widely spaced individual plants. The more continuous and dense the vegetation, the greater the wildfire threat. If this situation is present within your defensible space area, you should "break-it-up" by providing a separation between plants or small groups of plants.

Not only are steep slopes often considered high wildfire areas, they are also highly erodible. When removing shrubs and trees from steep slopes, keep soil disturbance to a minimum. Also, it may be necessary to replace flammable vegetation with other plant materials to prevent excessive soil erosion.



**TYPES OF DEAD VEGETATION AND RECOMMENDED PRACTICE**

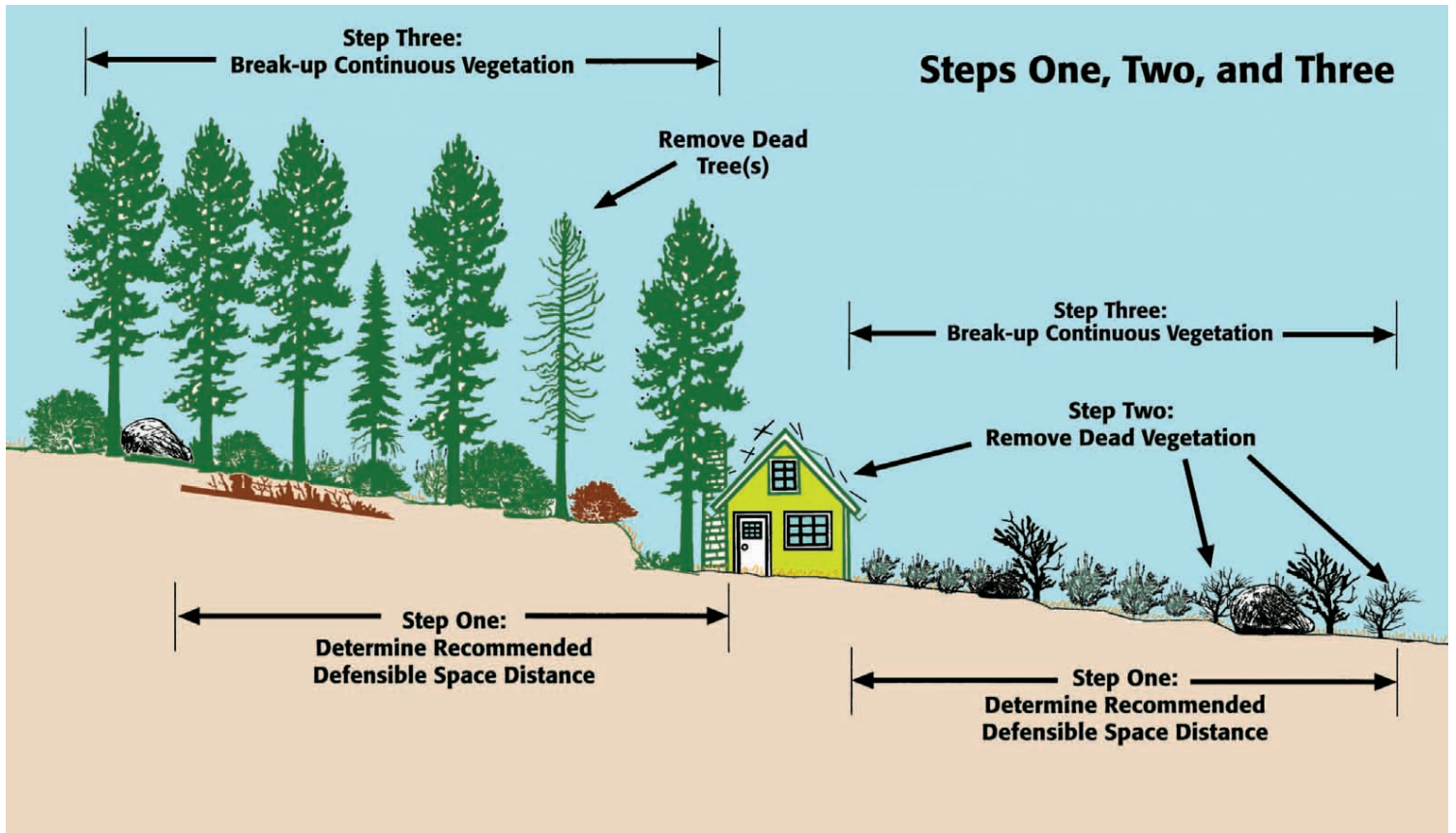
DEAD FUEL TYPE	RECOMMENDED PRACTICE
<b>STANDING DEAD TREE</b>	Remove all standing dead trees from within the defensible space area.
<b>DOWNED DEAD TREE</b>	Remove all down dead trees within the defensible space area if they have recently fallen and are not yet embedded into the ground. Downed trees that are embedded into soil and which cannot be removed without soil disturbance should be left in place. Remove all exposed branches from an embedded downed dead tree.
<b>DEAD SHRUBS</b>	Remove all dead shrubs from within the defensible space area.
<b>DRIED GRASSES AND WILDFLOWERS</b>	Once grasses and wildflowers have dried out or "cured," mow to 3 inches within the defensible space area.
<b>DEAD NEEDLES, LEAVES, BRANCHES, CONES (ON THE GROUND)</b>	Reduce thick layers of pine needles to a depth of two inches. Do not remove all needles. Take care not to disturb the "duff" layer (dark area at the ground surface where needles are decomposing) if present. Remove dead leaves, twigs, cones, and branches.
<b>DEAD NEEDLES, LEAVES, BRANCHES, AND TWIGS (OTHER THAN ON THE GROUND)</b>	Remove all dead leaves, branches, twigs, and needles still attached to living trees and shrubs to height of 15 feet above ground. Remove all debris that accumulates on the roof and in rain gutters on a routine basis (at least once annually).
<b>FIREWOOD AND OTHER COMBUSTIBLE DEBRIS</b>	Locate firewood and other combustible debris (wood scraps, grass clippings, leaf piles, etc.) at least 30 feet uphill from the house.

**Recommended Separation Distances for Shrubs**

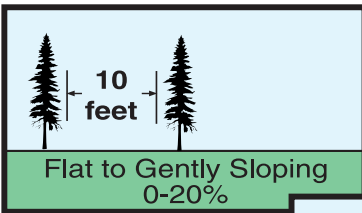
For areas with dense brush, the recommended separation distance is dependant upon shrub height and steepness of slope. Specific recommendations are presented below.

Note: Separation distances are measured between canopies (outermost branches) and not between trunks.

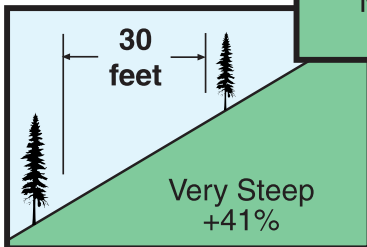
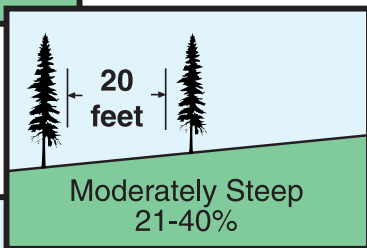
For example, if your home is located on a 10% slope and the brush is four feet tall, the separation distance would be two times the shrub height or eight feet. The recommended separation distance can be accomplished by removing plants or through pruning that reduces the diameter or height of shrubs (shorter height means less separation is needed).



### Recommended Separation Distances Between Tree Canopies



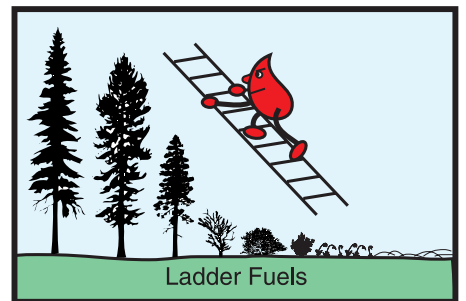
For forested areas, the recommended amount of separation between tree canopies is determined by steepness of slope. The specific recommendations are presented here. Separation distances are measured between canopies (outer most branches) and not between trunks.



Note: Separation distances are measured between canopies (outer most branches) and not between trunks. For example, if your house is situated on a 30% slope, the separation of tree canopies within your defensible space should be 20 feet. Creating separation between tree canopies can be accomplished through tree removal.

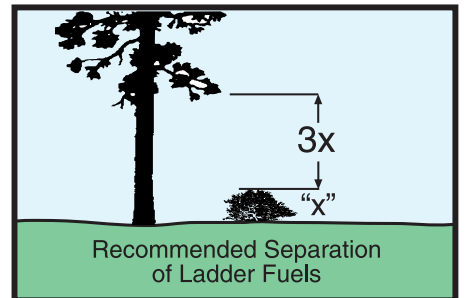
### STEP FOUR: ARE THERE LADDER FUELS PRESENT WITHIN THE RECOMMENDED DEFENSIBLE SPACE AREA?

Vegetation is often present at varying heights, similar to the rungs of a ladder. Under these conditions, flames from fuels burning at ground level, such as a thick layer of pine needles, can be carried to shrubs which can ignite still higher fuels like tree branches. Vegetation that allows a fire to move from lower growing plants to taller ones is referred to as “ladder fuel.” The ladder fuel problem can be corrected by providing a separation between the vegetation layers.



Within the defensible space area, a vertical separation of three times the height of the lower fuel layer is recommended.

For example, if a shrub growing adjacent to a large pine tree is three feet tall, the recommended separation distance would be nine feet. This could be accomplished by removing the lower tree branches, reducing the height of the shrub, or both. The shrub could also be removed.



**STEP FIVE: IS THERE AN AREA AT LEAST 30 FEET WIDE SURROUNDING YOUR HOUSE THAT IS "LEAN, CLEAN, AND GREEN"?**

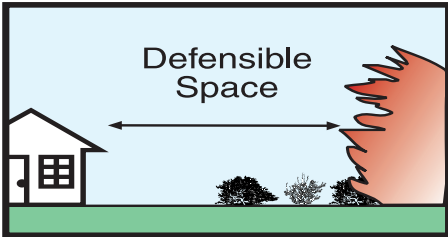
The area immediately adjacent to your house is particularly important in terms of an effective defensible space. It is also the area that is usually landscaped. Within an area extending at least 30 feet from the house, the vegetation should be kept....

- **LEAN**—small amounts of flammable vegetation,
- **CLEAN**—no accumulation of dead vegetation or other flammable debris, and
- **GREEN**—plants are healthy and green during the fire season.

The "Lean, Clean, and Green Zone Checklist" will help you evaluate the area immediately adjacent to your house.

**STEP SIX: IS THE VEGETATION WITHIN THE RECOMMENDED DEFENSIBLE SPACE AREA MAINTAINED ON A REGULAR BASIS?**

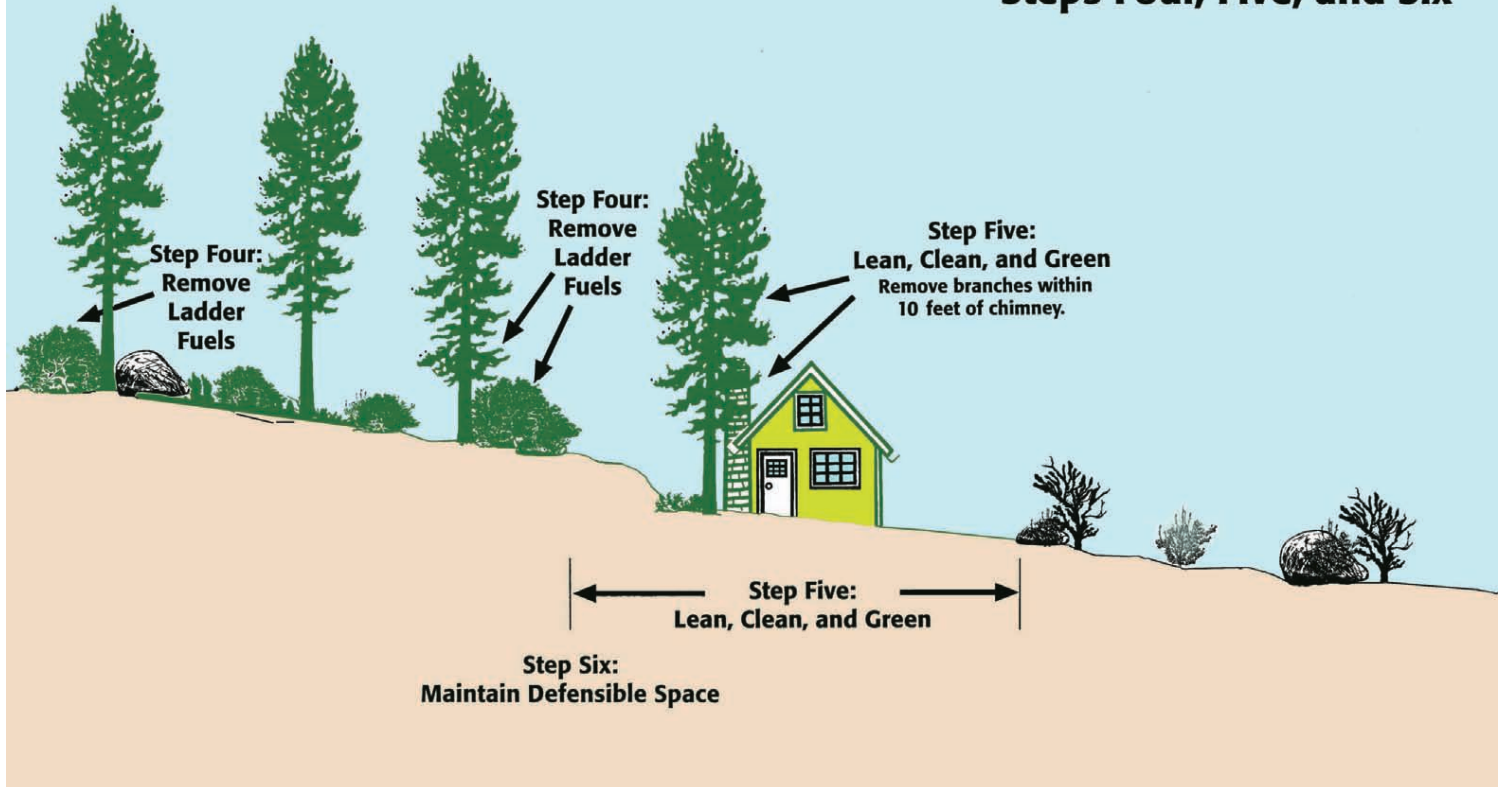
Keeping your defensible space effective is a continual process. At least annually, review these defensible space steps and take action accordingly. An effective defensible space can be quickly diminished through neglect.



**THE LEAN, CLEAN, AND GREEN CHECKLIST**

- 1  Emphasize the use of low growing herbaceous (non-woody) plants that are kept green during the fire season through irrigation if necessary. Herbaceous plants include lawn, clover, a variety of groundcovers, bedding plants, bulbs, perennial flowers, and conservation grasses.
- 2  Emphasize use of mulches, rock, and non-combustible hard surfaces (concrete sidewalks, brick patios, and asphalt driveways).
- 3  Deciduous ornamental trees and shrubs are acceptable if they are kept green and free of dead plant material, ladder fuels are removed, and individual plants or groups of plants are arranged so that adjacent wildland vegetation cannot convey a fire through them to the structure. Shorter deciduous shrubs are preferred.
- 4  Minimize the use of ornamental coniferous shrubs and trees such as juniper, monterey pine and tall exotic grasses such as pampas grass.
- 5  Where permitted, most wildland shrubs and trees should be removed from this zone and replaced with more desirable alternatives (see first box). Individual specimens or small groups of wildland shrubs and trees can be retained so long as they are kept healthy and free of dead wood, are pruned to reduce the amount of fuel and height, and ladder fuels are removed.
- 6  For some areas substantial removal of wildland vegetation may not be allowed. In these instances, wildland vegetation should conform to the recommendations presented in steps 2 through 4. Please become familiar with local requirements before removal of wildland vegetation.
- 7  Tree limbs within 10 feet of a chimney, encroaching on powerlines, or touching the house should be removed.

**Steps Four, Five, and Six**

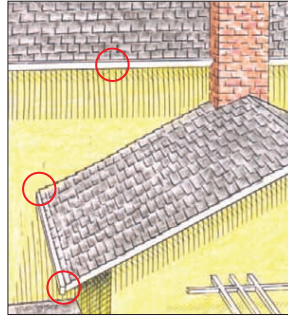


# HOME IGNITION ZONE

(The home plus 10ft distance)

It's the "little things" that will endanger your home. Just a little ember landing on a little pile of flammable material will burn it. Spend a morning searching out and getting rid of those flammable little things outside and your home will be much safer.

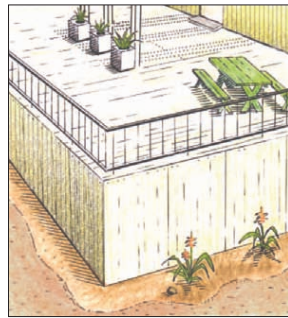
1. Keep your rain gutters and roof clean of all flammable material.



2. Get rid of dry grass, brush and other flammable materials around your home - and don't forget leaves, pine needles and bark walkways. Replace with well maintained (watered) landscape vegetation, green lawn and landscape rocks.

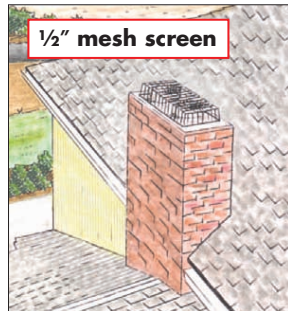
3. Clear all flammable materials from your deck. This includes brooms, stacked wood and easily ignitable patio furniture. Also enclose or board up the area under your deck to keep it from becoming a fuel bed for hot embers.

4. Move woodpiles and garbage cans away from the home 30 feet or more.



5. Use fine mesh metal screen (1/4") or less to cover eaves, roof and foundation vents to prevent embers from entering.

6. Inspect and clean your chimney every year. Trim away branches within 10 feet. Install a spark arrestor with 1/2 inch mesh screen.



7. Got a propane tank? Get rid of any flammable materials within 10 feet of it and, if possible, position it at least 30 feet from any structures.

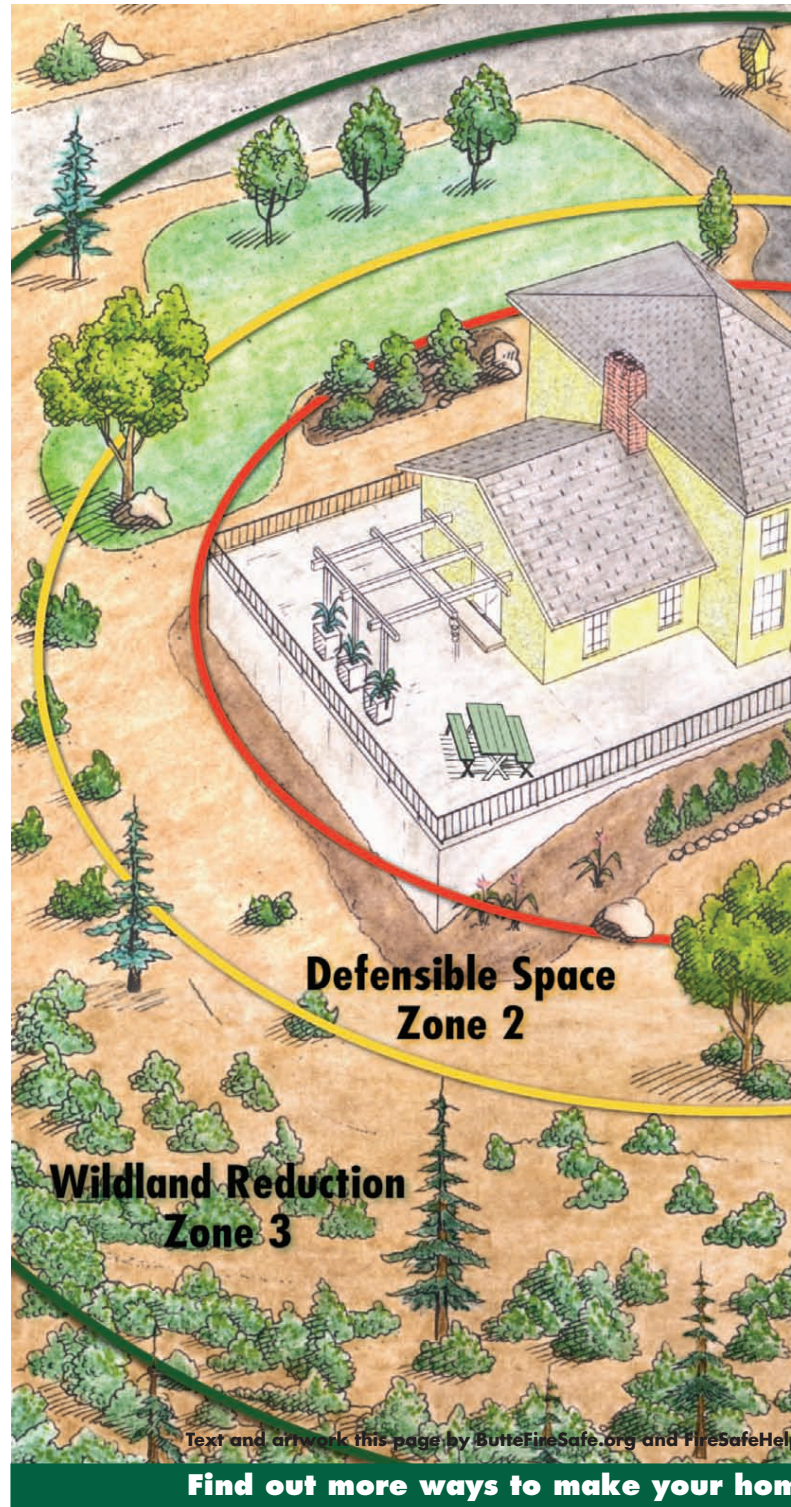
8. Window screens should be metal not plastic or other flammable material.

Burning embers landing on wood shake roofs are one of the leading factors for losing your home to a wildfire. Replace your wood shake roof with non-flammable (Class-A) roofing materials such as asphalt shingles, tile, or metal.

# DEFENSIBLE SPACE ZONE (100 feet)

Your "defensible space" is the area that is a minimum of 100 feet from your home (as required under the State Public Resources Code 4291 or other local ordinances). This is the area where you've modified the landscape to allow your house to survive on its own-greatly improving the odds for firefighters who are defending your home.

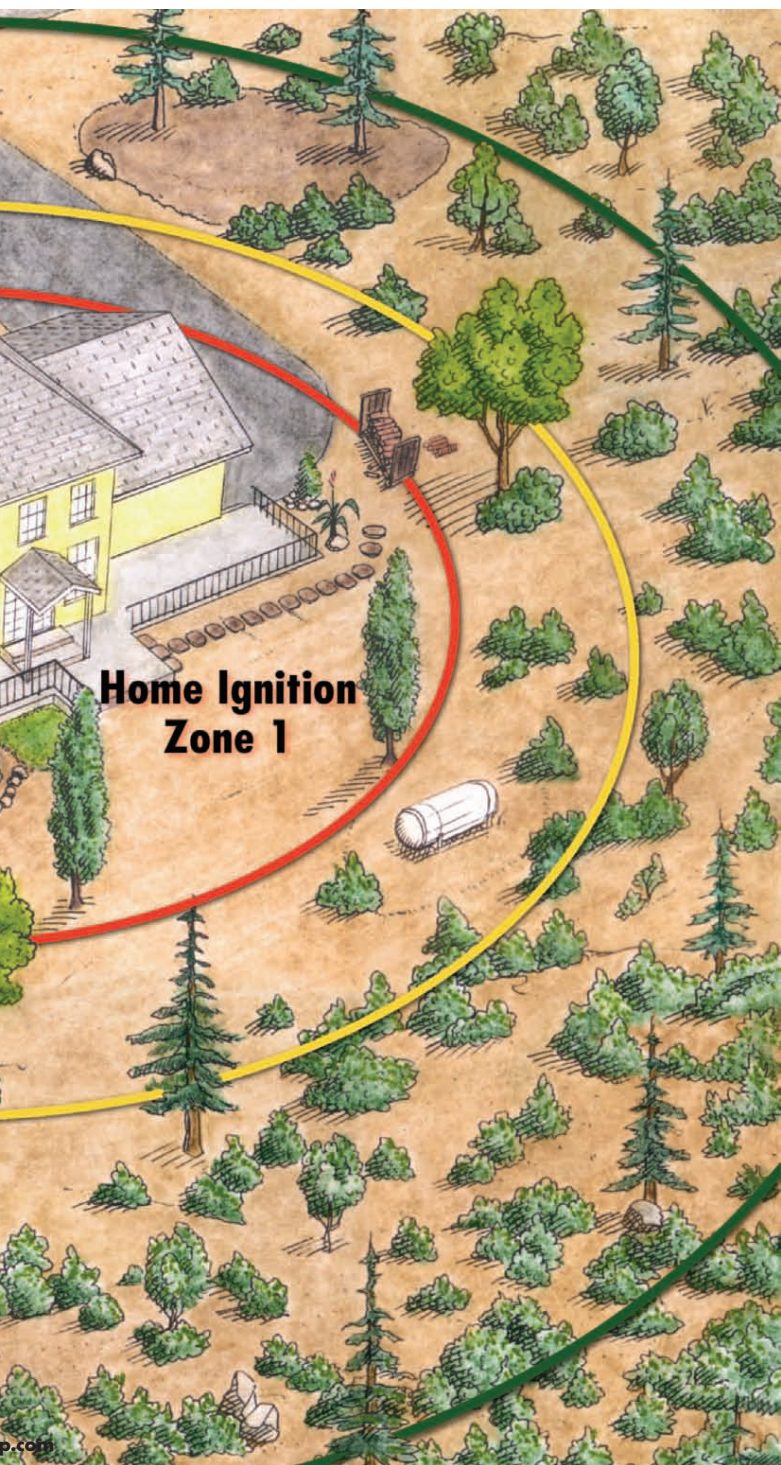
If your home is on a slope or subject to high winds, extending the distance beyond 100 feet is prudent.



**et or more distance) + Keep this area lean and green!**

Create a *Defensible Space Zone* by keeping in mind the three R's of defensible space:

<b>Removal</b>	This technique involves the elimination of entire plants, particularly trees and shrubs, from the site. Examples of removal are cutting down a dead tree or cutting out a flammable shrub.
<b>Reduction</b>	The removal of plant parts, such as branches or leaves, constitute reduction. Examples of reduction are pruning dead wood from a shrub, removing low tree branches, and mowing dried grass.
<b>Replacement</b>	Replacement is substituting less flammable plants for more hazardous vegetation. Removal of a dense stand of flammable shrubs and planting an irrigated, well maintained flower bed is an example of replacement.



Keep your home fire safe: [www.firesafesonoma.org](http://www.firesafesonoma.org)

## WILDFIRE FUEL REDUCTION ZONE

**(The outlying area beyond the required defensible space)**

Getting rid of the undergrowth and thinning out densely-crowded smaller trees in this outlying area will reduce fire intensity and slow the spread of a fire moving toward your home. Defensible space increases the odds of your home's survival.

Experts recommend a minimum of 10 feet of spacing (on level ground) between individual trees and 2X the height for shrubs measured at the crown (widest part) of the tree or shrub. You will need to increase spacing even more on slopes.

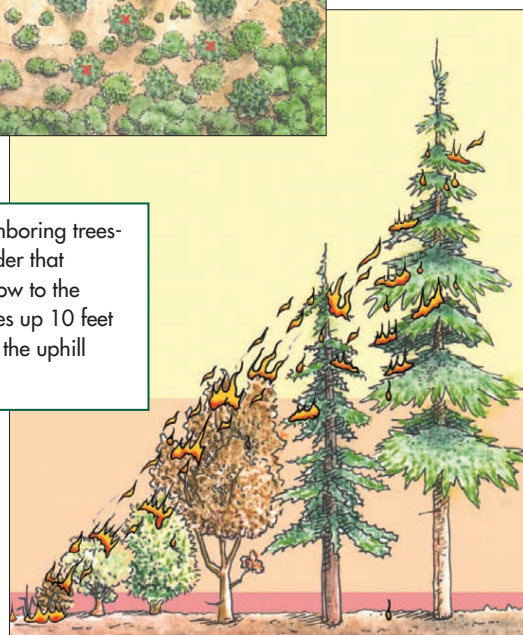
Remember to plan for trees and shrubs at their full mature size when planning minimum crown to crown separation.

It's possible, depending upon the size of your property, that you will be limited by our property boundary and unable to complete the fire safe measures identified in zones 2 and 3. If this happens, talk with your neighbors and ask their cooperation. A safer home means a safer neighborhood for everyone.



Reduce density by giving brush and shrubs more space-ideally they should be about 10 feet apart from one another on level ground.

Fire "climbs" neighboring trees- don't give it a ladder that reaches from the low to the high. Limb live trees up 10 feet as measured from the uphill side.



# FIRESCAPE - FIRE SAFE LANDSCAPE DESIGN

“When a wildfire comes through your neighborhood, could your home survive on its own?”



A dramatic question, but one we need to consider when living in an environment where wildfire is a threat. Firescaping is landscape design that reduces house and property vulnerability to wildfire. The goal is to develop a landscape with a design and choice of plants that offers the best protection and enhances the property. The ideal is to surround the house with things that are less likely to burn.



It is imperative when building homes in wildfire-prone areas that fire safety be a major factor in landscape design. Appropriate manipulation of the landscape can make a significant contribution toward wildfire survival.

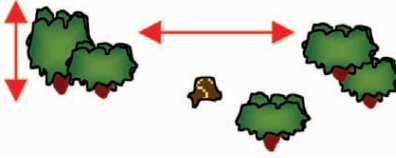
## VEGETATIVE FUEL HAZARDS

Vegetative fuels include living and dead native vegetation materials. The amount of heat energy released during a wildland fire is defined by the amount, arrangement and rate of combustion of the vegetative fuels. Vegetative fuel flame lengths can exceed 100 feet and the radiated heat can ignite combustible materials from distances of 100 feet or more. Winds can carry live fire brands for several miles.

Firescape integrates traditional landscape functions and a design that reduces the threat from wildfire. It does not need to look much different from a traditional design. In addition to meeting a homeowner’s aesthetic desires and functional needs such as entertaining, playing, storage and erosion control—firescape also includes vegetation modification techniques, planting for fire safety, defensible space principals and use of fire safety zones.

Mitigation of wildfire hazards focuses on breaking up the continuity of horizontal and vertical fuels. Additional distance between landscape plants is required on slopes.

## REMEMBER TO PROVIDE SEPARATION & SPACING



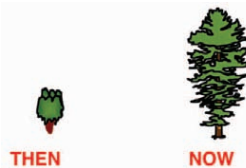
Through proper plant selection, placement and maintenance, we can diminish the possibility of ignition, lower fire intensity, and reduce how quickly a fire spreads, increasing a home’s survivability.

In firescaping, plant selection is primarily determined by the plant’s ability to reduce the wildfire threat. Other considerations may be important such as appearance, ability to hold the soil in place, and wildlife habitat value. **The traditional foundation planting of junipers is not a viable solution in firescape design.** Minimize use of evergreen shrubs within 30 feet of a structure, because junipers, other conifers and broad-leaf evergreens contain oils, resins and waxes that make these plants burn with great intensity.

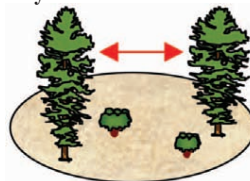


Firefighters call junipers the gasoline plant!

Use ornamental grasses and berries sparingly because they also can be highly flammable. Choose “fire smart” plants. They tend to be low growing, have a high moisture content, and have stems and leaves that are NOT resinous, oily or waxy. Deciduous trees are generally more fire resistant than evergreens because they have a higher moisture content when in leaf, but a lower fuel volume when dormant.



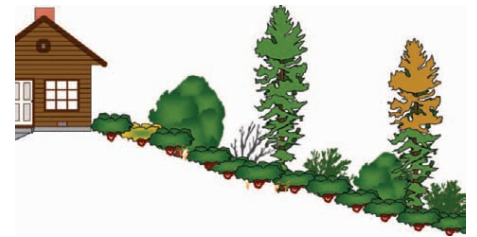
Placement and maintenance of trees and shrubs is as important as actual plant selection. When planning tree placement in the landscape, **remember their size at maturity**



Ornamental specimen trees can be used within 30 feet of structures if pruned properly, are well irrigated and separated from other trees. Keep tree limbs at least 10 feet from chimneys, power lines and structures.

Firewise design uses driveways, lawns, walkways, patios, parking areas, areas with inorganic mulches, and fences constructed of nonflammable materials such as rock, brick or cement to reduce fuel loads and create fuel breaks. Fuel breaks are vital components in every firescape design. Water features, pools, ponds or streams can also be fuel breaks. Areas where wildland vegetation has been thinned or replaced with less flammable plants are the traditional fuel break. **Remember, while bare ground is an effective fuel break, it is not recommended as a firescape element due to aesthetic, soil erosion and other concerns.**

A home located on a brushy site above a south or west facing slope will require more extensive wildfire safety landscape planning than a house situated on a flat lot with little vegetation around it.



Boulders and rocks become fire retardant elements in a design. Whether a site can be irrigated will greatly influence location of hardscape (concrete, asphalt, wood decks, etc.), plant selection and placement.



Prevailing winds, seasonal weather, local fire history, and characteristics of native vegetation surrounding the site are additional important considerations.

The 30 feet closest to a structure will be the highest water use area in the fire safe landscape. This is an area where highly flammable fuels are kept to a minimum and plants are kept green throughout the fire season.



# Fire-Wise Plant Material for Sonoma County

Although there are no fireproof plant materials, the following is a list of some firewise plants that can be used in landscaping for fire prevention. Landscape maintenance is far more important to fire prevention than the selection of plant materials. When planning your landscape, use the characteristics of firewise-plants along with site characteristics such as slope, aspect, hardness zone and amount of precipitation to choose plant material for your site.

## TREES

### Valued natives

Acer macrophyllum	Big Leaf Maple
Alnus rhombifolia	White Alder
Cornus nuttalli	Pacific Dogwood
Platanus racemosa	Oaks
Quercus spp.	Oak
Sequoia sempervirens	Coast Redwood

### Ornamental Garden Trees:

Acer spp.	Maple
Arbutus unedo	Strawberry Bush
Cercis occidentalis	Western Redbud
Cercocarpus betuloides	Mountain Ironwood
Citrus spp.	Citrus
Fagus spp.	Beech
Feijoa sellowiana	Pineapple Guava
Fraxinus spp.	Ash
Gleditsia tricanthos	Honey Locust
Macadamia hybrids	Macadamia Nut
Metrosideros excelsus	New Zealand Xmas
Myoporum spp.	Myoporum
Pistacia chinensis	Chinese Pistache
Pittosporum spp.	Mock Orange
Rhus lancea	African Sumac
Robinia pseudoacacia	Locust, Black
Schinus molle	California Pepper
Schinus terebinthifolius	Brazilian Pepper

## SHRUBS

### Native Wildland Plants

Carpenteria californica	Bush Anemone
Ceanothus (some) spp.	Wild Lilac
Dendromecon rigida	Bush Poppy
Garrya app.	Silk Tassel
Heteromeles arbutifolia	Toyon, Christmas Berry
Lavatera aassurgentiflora	Malva Rose
Mahonia repens	Creeping Mahonia
Punus lyonii	Catalina Cherry
Rhamnus spp.	Buckthorn/Coffeeberry
Rhus integrifolia	Lemonade Berry
Ribes sanguineum	Red Flower Currant
Solanum umbellifemum	Nightshade, Blue Watch

### Domestic Garden Shrubs

Brugmansia spp.	Angel's Trumpet
Buddlein spp.	Butterfly Bush
Convolv cneorum	Bush Morning Glory
Cotoneaster congestus	Likiano
Cotoneaster horizontalis	Rock Cotoneaster
Cotoneaster microphyllus	Rockspray Cotoneaster
Cotoneaster dammeri	Bearberry Cotoneaster
Echium spp.	Echium or Priedrot
Escallonia spp.	Escallonia
Ligustrum japonicum	Japanese Privet
Ligustrum lucidum	Glossy Privet
Ligustrum texanum	Texas Privet
Nerium oleander	Oleander

## SHRUBS

### Domestic Garden Shrubs

Osteospermum fruiticosum	Trailing African Daisy
Nolina spp.	Nolina (related to Yucca)
Pittosporum crassifolium	Dwarf Karo
Pittosporum tobira	Mock Orange
Punica granatum	Pomegranate
Pyracantha "Santa Cruz"	Firethorn
Raphiolepis spp.	India Hawthorn
Rhamnus alaterus	Italian Buckthorn
Rhododendron (Azalea spp.)	Rhododendrons & Azaleas
Simmondsia chinensis	Jojoba
Thymus praecox arcticus	Creeping Thyme
Trachelospermum jasminoides	Star Jasmine
Vinca spp.*	Periwinkle
Yucca spp.	*Not recommended for riparian areas Yucca

## PERENNIALS

Achillea spp.	Yarrow
Agapanthus spp.	Lily of the Nile
Bergenia spp.	Bergenia
Centaurea cineraria	Dusty Miller
Centranthus rubber	Red Valerian
Coreopsis spp.	Coreopsis
Diets bicolor	African Iris
Diets vegeta	Fortnight Lily
Erigeron karvinskianus	Mexican Daisy
Geranium spp.	Geranium
Hemerocallis hybrids	Daylily
Hesperaloe	Red Yucca
Heuchera parviflora	Island Alum Root
Iris spp.	Iris
Kniphofia	Red Hot Poker
Lantana montevidensis	Lantana
Lavandula perzil	Sea Lavender
Mimulus spp.	Monkey Flower
Sisyrinchium spp.	Blue-Eyed Grasses
Stachys byzantina	Lamb's Ear
Strelitzia reginae	Bird of Paradise
Tulbaghia violacea	Society Garlic
Zantedeschia aethiopicca	Common Calla
Zauschneria californica	California Fuchsia

## GROUND COVERS

### Succulents

Delosperma "Alba"	White Trailing Iceplant
Echeveria spp.	Hens & Chicks
Sedum confusum	Stonecrop

### Non-Succulents

Achillea tomentosa	Woolly Yarrow
Ajuga reptans	Carpet Bugle
Armeria maritima	Common Thrift
Coprosma kirkii	Creeping Coprosma
Duchesnea indica	Mock Strawberry
Festuca rubra	Creeping Red fescue
Liriope gigantean	Giant Turf Lily
Myoporum parvifolium	Myoporum

Excerpted in part from "Pyrophytic Vs. Fire Resistant Plants" by Ray Moritz & Pavel Svhra

Use well-irrigated perennials here. Another choice is low growing or non-woody deciduous plants. Lawn is soothing visually, and is also practical as a wildfire safety feature. But extensive areas of turf grass may not be right for everyone. Some good alternatives include clover, groundcovers and conservation grasses that are kept green during the fire season through irrigation. Rock mulches are good choices. Patios, masonry or rock planters are excellent fuel breaks and increase wildfire safety. Be creative with boulders, riprap, dry streambeds and sculptural inorganic elements.



When designing a landscape for fire safety remember less is better. Simplify visual lines and groupings. A firesafe landscape lets plants and garden elements reveal their innate beauty by leaving space between plants and groups of plants. In firescaping, the open spaces are more important than the plants.

## INVASIVE PLANTS AND WEEDS

An invasive weed is any species that is, or is liable to become detrimental, or destructive to native ecosystems, and for purposes of this publication - represent an increased FIRE Hazard! They are aggressive, competitive, and difficult to control or eradicate. They compete with native plants and often force them out. Invasive plants threaten the ecological integrity of our precious wildlands. Many invasive weeds and trees are extremely fire prone and can increase the fire threat to your home and property if not removed.

You may be familiar with some of the more common invasive plants such as French and Scotch Broom; Yellow, Italian and Purple Distaff; Star Thistle; Barbed Goat Grass; Cape Ivy; Medusa Head; Pampas Grass; and Acacia to name a few.

Surprisingly, our native Douglas Fir is becoming a problem as it is vigorously reproducing and is rapidly becoming one of the most fire prone conifers in Sonoma County.

Invasive plants and weeds are opportunistic and often establish themselves in disturbed soils along newly graded drives, roads and construction sites.

# Firewise Construction Checklist

## Wildfire and your home ignition Zone – Is your home ignition prone?

How a house is designed, where it is built, materials used in its construction, landscaping, and access all influence survivability during a wildfire. Presented below are recommendations and illustrations that will make a home much easier to defend and will improve its chances of surviving a wildfire with or without direct firefighting intervention.

### Choose a firewise location if you are constructing a new home.

**Survivable Space** is similar to Defensible Space, except it emphasizes the house surviving without significant firefighter or homeowner action. It combines Defensible Space with ignition resistant construction methods and materials, many of which can be retrofitted to existing homes.

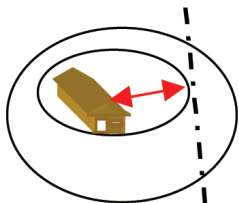
### Ignition Resistant Construction + Defensible Space = Survivable Space!

**Slope of Terrain:** Be sure to build on the most level portion of the land, since fire spreads more rapidly on even minor slopes. Avoid building on mid-slopes and away from ridge tops, canyons and areas between high points on a ridge.

**Locating a Home on your lot or acreage:** Set your single-story structure at least 30 feet back from any ridge or slope; increase distance if your home will be higher than one story. Try not to build on mid-slope sites.

AVOID	BETTER

**Set back from the Property Line** Build your home at least 30 feet from the property line so adequate defensible space can be established. If building on acreage, consider a minimum setback of 100 feet or more.



### Consider or add ignition resistant construction elements for your new or existing home.

**Design,** build or maintain a firewise structure utilizing passive ignition resistant measures. Use or replace construction materials that are ignition-resistant whenever possible. Use construction methods that resist ignition and fire infiltration.



**Roof:** For new and replacement roof construction, use only materials such as Class-A asphalt shingles, slate, clay tile, metal or concrete products. Constructing a fire-resistant sub-roof can add additional protection. Avoid use of valleys and gutters where flammable debris can collect.

**Siding / Exterior Wall Facing:** Use fire resistive exterior wall systems and materials that are at least “one hour rated,” materials that will hold back fire for a minimum of one hour. Stucco or masonry, or ignition resistant siding panels or boards are good choices. They are much better than wood, wood shingles, aluminum or vinyl, all of which are readily ignitable and/or fail quickly. Underlayment of gypsum board combined with ignition resistant siding adds even greater protection.

**Doors** Provide at least two ground level doors for easy and safe exit and at least two means of escape (i.e., doors or windows) in each room so that everyone has two ways out. Exterior doors should be “one hour rated,” doors that will hold back fire for a minimum of one hour.

Be sure to provide metal thresholds and install doors to be flush so burning embers cannot blow under them.

**Garage Doors** can also be vulnerable to failure by fire. Choose a steel clad model.

**Window Materials** and size are important. Smaller panes hold up better in their frames than larger ones. Double or triple pane especially with tempered glass and Low-E reflectivity are even more effective heat barriers than single pane glass. Avoid use of plastic window framing and use metal, not plastic screening.



**Soffits, Eaves, Decks, Balconies and Overhangs.** Soffit SOFF it. n. “The exposed underside of any overhead structural component of a building, such as eaves, balconies, decks, beams, arches, cornices and lintels.”

**Open Eaves, Decks and Overhangs** can all act as heat traps and make the building more vulnerable to flying embers and brands and intense heat from nearby fire



**Eaves Enclosed** - box in soffits and under eave areas with “one-hour” rated material.



**Decks** can act as heat traps and can be ignited by wind driven flying embers and fire brands. Use skirting to enclose or box underside of deck with “one hour” rated covering.



Enclose the underside of balconies and above-ground decks with fire resistant materials.

**Composite Lumber:** Many different companies manufacture composite lumber, each with its own proprietary formula and structural design. It is primarily used in outdoor decks and railings. It may be in the form of solid boards or may contain hollow areas. Composite lumber is a mix of plastic, wood binder and other ingredients that may provide ignition resistance inferior to wood products. When burning, composite materials tend to drip flaming liquefied plastic that “pools” on the surface below and continues to burn intensely. The State Fire Marshal’s Office has flammability test results available. As with wood decking, it is crucial to protect the underside of any deck and keep cracks and crevices free of any debris.

**Interior Residential Fire Sprinklers** are important because they have proven to extinguish undetected fire when the structure is occupied or unoccupied.



Interior residential fire sprinkles may extinguish fire originating from an exterior source, i.e. a wildland fire where radiant, convective heat or direct flame contact has caused structural failure that allows fire intrusion into the building. They may also prevent a house fire from spreading to the wildlands.

**Shutters:** Install non-flammable shutters on windows. This is a particularly good measure for weekend homes that are not continuously occupied but is also appropriate for homes that are.

**Vents:** To prevent sparks from entering your home through vents, cover exterior soffit, attic, roof and under floor vents with wire mesh no larger than 1/4 inch mesh or less. Attic vents are not recommended.



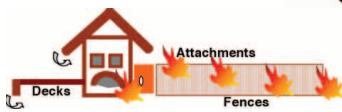
**Use of Plastic** exterior building components such as siding, decks, vents, skylights, gutters and downspouts and certain window frames can melt and/or ignite and should not be used. Use metal components where possible.

**Gutters** are best if eliminated completely. Utilize gravel filled French Drain under dripline instead. If gutters are necessary, maintain gutters and roofs (particularly valleys) clear of leaves and other debris. No Plastic!

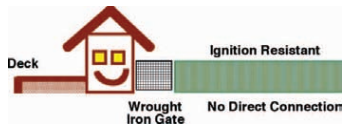
**Attachments** include any structures connected directly to your home such as decks, porches, balconies, fences, gates, breezeways or accessory buildings.

**Attachments can act as fuel bridges, or fire fuses!**

If an attachment to a home is not ignition resistant, then the home may be at risk.



If you choose to attach a fence to your home, use masonry or metal, or distance as a protective barrier between it and the house. A wrought iron style gate separating a combustible fence may provide some protection.



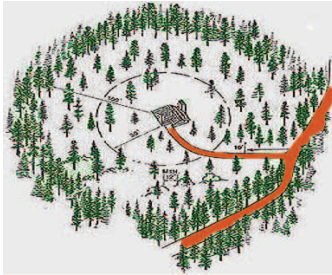
Build an ignition resistant fence and gate. Use metal when constructing a trellis and cover it with high-moisture, low flammability vegetation.

**Exterior Vertical Structural Members such as Combustible Posts or Columns:** Vertical members that support decks, balconies and overhangs that are not protected by ground to deck skirting should be clad with galvanized or copper sheathing to at

least 1 - 3-feet above ground OR built on concrete footings at least 1-foot above grade.

**ACCESS**

Identify at least two exit routes from your neighborhood. Design roads and drives for large emergency vehicles.



Construct roads or provide turnouts that allow two-way traffic.

Design bridges to carry heavy emergency vehicles, including bulldozers carried on large trucks.

Post clear road signs to show traffic restrictions such as dead-end roads and weight and height limitations.

Make sure dead-end roads and long driveways have turnaround areas wide enough for emergency vehicles. Clear turnouts along one-way roads.

Construct driveways to allow large emergency equipment to reach your house.

Clear dry grass and flammable brush up to ten feet from roads and five feet from driveways. Retention of mature trees along roadside OK.

Make sure that your street is named or numbered and a sign is visibly posted at each street intersection.

Make sure that your street name and number is not duplicated elsewhere in the county.



Post your home address in **CONTRASTING BOLD 4-inch letters** at the beginning of your driveway or on your house if it is easily visible.

**EMERGENCY WATER SUPPLY**

Maintain an emergency water supply that meets fire department standards through one of the following:

- A community water/hydrant system
- A cooperative emergency water storage tank with neighbors
- A minimum dedicated (for fire) storage supply of 2,500 gallons on your property. More may be required or prudent.
- Clearly mark all emergency water sources and notify your local fire department of their existence.
- Create easy firefighter access to your closest emergency water source.

**INSPECTION & MAINTENANCE**

Make periodic inspections of your home, looking for deterioration such as breaks and spaces between roof tiles, warping wood, or cracks and crevices, rodent entry points in the structure. Prevent combustible materials and debris including dry grass from accumulating beneath patio decks or elevated porches. Screen or enclose areas below decks with wire mesh screen no larger than 1/4 inch mesh OR less, even better construct skirting from the deck to the ground of ignition resistant materials.

**All the defensible space in the world is useless if you don't conduct regular maintenance!**

Stack woodpiles at least 30 feet from all structures and clear flammable vegetation within 10 feet of woodpiles.



**One cord of firewood contains 20 million BTUs of heat energy, or the equivalent of 160 gallons of gasoline. Do you want that near your home?**

Locate propane tanks at least 30 feet from any structure and surround them with 10 feet of clearance. Be sure that your tank has seismic tie downs.

Remove all stacks of construction materials, pine needles, leaves and other debris from your yard.

Remove dead branches hanging over your roof.

Remove any branches within 10 feet of your chimney.

Clean all dead leaves and needles from your roof and gutters.

Install a roof that meets Class "A" rating requirements.

Cover your chimney outlet and stovepipe with a non-flammable screen of one-half inch mesh.



This Checklist is not intended to replace official building code requirements, but hopes to offer suggestions when considering firesafe ignition resistant construction methods. Remember that your home may be part of the problem.

In designing or upgrading your firewise ignition resistant home, remember that the goal is to complement it with adequate defensible space.

For additional information and links to other useful websites go to the Fire Safe Sonoma home page: [www.firesafesonoma.org](http://www.firesafesonoma.org)

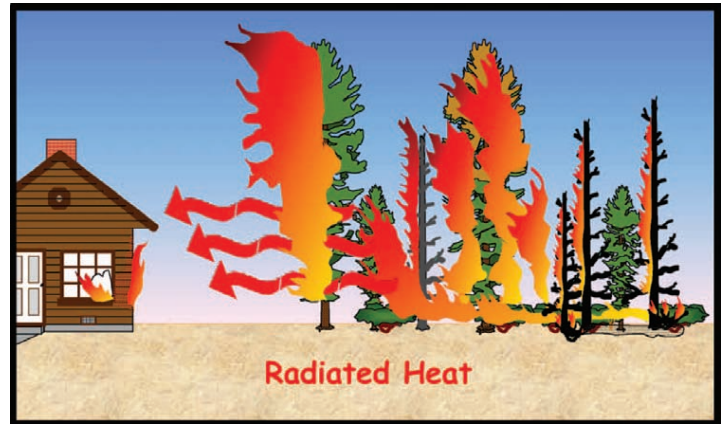


# CAUSES OF HOME IGNITION FROM WILDFIRES

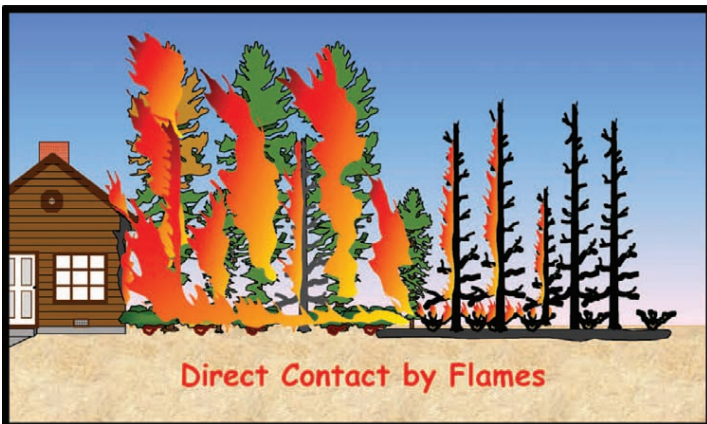
During a wildland fire, three conditions stand out as ignition threats to homes and outbuildings



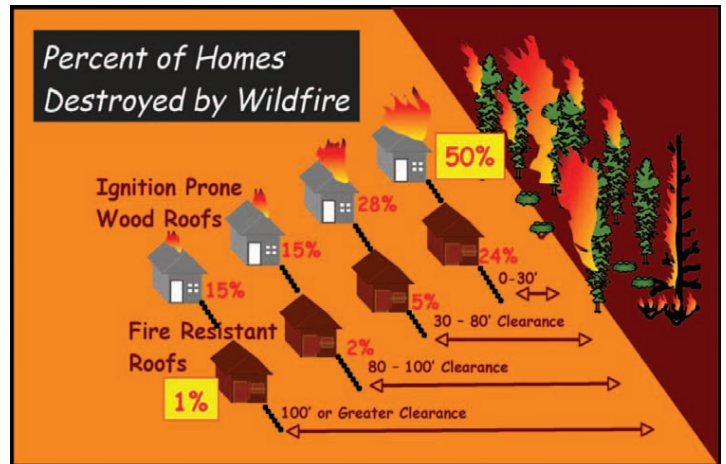
**WIND DRIVEN EMBERS** and firebrands blown ahead of the fire that land in areas that catch or trap them. Heat traps include roof valleys & gutters, open eaves, soffits, overhangs, or under decks and balconies.



**RADIANT HEAT** generally from flammable vegetation or *adjacent burning homes* that are too close to your home.



**DIRECT FLAME CONTACT** from flammable native or urban landscaping, attached wood fences and accumulation or storage of flammable materials against the house or under decks.



Note that 50% of the houses with wood roofs and less than 30 feet of vegetation clearance were destroyed by wildfire. But less than 1% of the homes with fire resistant roofs and 100 feet of clearance were destroyed.

THE LIMITATIONS OF WILDLAND FIREFIGHTING	FUEL TYPE	EFFECTIVE SUPPRESSION TACTICS
<p>A lot of people assume that when a wildfire starts, it will be quickly controlled and extinguished. This is accurate 97% of the time. <i>The vast majority of these fires are small fires in small fuels.</i> Firefighters have the ability, equipment, and technology to effectively suppress most wildfires. But 3% of the time wildfires burn so intensely that there is little firefighters can do.</p> <p>Presented at right are firefighter tactics as they relate to common wildland fuels.</p>	<p><b>Grassland</b></p>	<p>Where accessible, suppression by fire engines using hose lines is the method of choice. Fireline constructed with hand tools can also be effective.</p>
	<p><b>Coastal Scrub Brush</b> (less than 4' tall)</p>	<p>Fire engines with water and hose lines will be needed to knock down the fire. Air tankers, helicopters and bulldozers may be required.</p>
	<p><b>Heavy Chaparral</b> (a mix of brush types 4'-15' tall containing a large amount of dead material)</p>	<p>Air tankers with fire suppressing retardant &amp; helicopters are required to reduce the fire's rate of spread before engines, fire crews or bulldozers can be effective. Burning out vegetation between the fireline and the advancing fire may be necessary.</p>
	<p><b>Dense Conifer Forest</b></p>	<p>Direct fire suppression ineffective! Fire will need to be fought using roads, streams and natural barriers. Burning out may be necessary.</p>

# IF WILDFIRE APPROACHES

If your home or neighborhood is threatened by wildfire, occupants may be advised to evacuate. Your **Family Emergency Plan** should be in place and *practiced regularly by all family members before an emergency occurs!* Include the following recommendations at a minimum. When in doubt - **EVACUATE!**

## Pre-Fire & Emergency Preparations:

- Develop a family emergency plan
- Meet with your family and discuss the types of disasters that could occur
- Have a broad-based plan that will work for most disasters including wildfire
- Discuss where to go and what to bring if advised to evacuate
- Determine and discuss two evacuation routes
- Show responsible family members how, where and when to shut off water, gas and electricity at main controls.
- Practice what you have discussed
- Plan how your family will stay in contact if separated by disaster
- Pick two meeting places: (1) a place a safe distance from home in case of a home fire; (2) a place outside your neighborhood in case you can't return home.
- Choose an out-of-area friend as a "check-in contact" for everyone to call & make sure they have the phone numbers.
- Relay your plans to the contact person

## WHEN WILDFIRE APPROACHES

### What should I have with me?

- Wear only cotton or wool clothes
- Safe attire includes long pants, long sleeved shirt or jacket and boots
- Warm clothing for cold nights
- Carry gloves, goggles, a handkerchief to cover your face and water to drink
- Keep a flashlight and portable radio with you at all times
- Tune in to a local radio station and listen for instructions

### What about family members and pets?

- Stay together
- Evacuate all family members and pets
- Capture your pets early as there will be confusion. Restrain them by leash, locked in a bedroom or kennel cage.

### How should I prepare my car?

- Place the vehicle in the garage, pointing out with keys in ignition - don't lock keys in car
- Place essential items in the car
- Roll up all windows when departing from the garage
- Always keep the tank at least half full
- Disconnect the electric garage door opener so that the door can be opened manually
- Close garage door upon leaving

### What should I take?

- Important documents (bank, IRS, trust, investment, insurance policies, birth certificates, passports and medical records)
- Credit and ATM cards
- Medications
- Prescription glasses & spares
- Driver's license
- Passport
- Computer backup files
- Inventory of home contents (consider video taping)
- Photographs of the exterior of the house and landscape
- Address book
- Cell phone and charger
- Personal toiletries
- Change of clothing for each family member
- Family photo albums and videos
- Family Heirlooms

### How should I leave my home?

- Close all interior doors
- Leave a light on in each room
- Remove lightweight, non-fire-resistant curtains and other combustible materials around windows
- Close fire resistant drapes
- Move over stuffed furniture such as couches and easy chairs to the center of the room
- Shut off main gas supply to house
- Know two or more ways out



Photo courtesy of Jim Linardos

### What about the outside of my home?

- Shut off propane at the tank or natural gas at the meter
- Show responsible family members how and when to shut off water, gas and electricity at main controls
- Close all exterior vents if possible
- Prop a ladder against the house to provide firefighters with access to the roof
- Make sure all garden hoses are connected and have spray nozzles attached
- Close all exterior doors and windows
- Leave exterior doors unlocked
- Turn on outside lights
- If available and there is time, cover windows, attic openings and vents with plywood that is at least one-half inch thick

If you have an emergency water source (pool, pond, etc.) and/or portable pump, clearly mark its availability so it can be seen from the street, Do this now, not when the fire comes.

**WHEN EVACUATION IS NECESSARY TIME IS OF THE ESSENCE. REMEMBER, MATERIAL THINGS CAN BE REPLACED - FAMILY MEMBERS CANNOT!**

**If a fire should occur within the house or the wildland around it, contact the fire department immediately. Continue to inspect your house and property for flame or embers.**

**Most importantly, STAY CALM!**

This publication was compiled by Fire Safe Sonoma. Fire Safe Sonoma is dedicated to reducing the Wildland Fire Threat and improving Fire Safety awareness throughout Sonoma County. Visit us at [www.firesafesonoma.org](http://www.firesafesonoma.org).

## THANK YOU!

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707-565-1152



Sonoma County Department of Emergency Services  
[www.sonoma-county.org/des](http://www.sonoma-county.org/des)



California Department of Forestry and Fire Protection  
[www.fire.ca.gov/php](http://www.fire.ca.gov/php)



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Sonoma County  
*Fire Chiefs Association*

Sonoma County  
*Fire Chiefs Association*  
Fire Prevention Officer's Section



Santa Rosa Firefighter's Association  
International Association of Firefighters  
Local 1401



Rincon Valley FPD



Gold Ridge FPD

### Text & Artwork:



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[www.livingwithfire.info/](http://www.livingwithfire.info/)



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Cover art - Monty Dolack Gallery,  
Missoula, Montana  
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## Fire Agencies of Sonoma County

Community Service Area #40  
Volunteer Fire Departments:  
c/o Sonoma County Department of  
Emergency Services - 565-1152

Annapolis  
Bloomfield  
Bodega  
Camp Meeker  
Fort Ross  
Knights Valley  
Lakeville  
Mayacamas  
Mountain  
San Antonio  
The Sea Ranch  
Sotoyome  
Two Rock  
Valley Ford  
Wilmar

### Fire Protection Districts City Fire Departments:

Bennett Valley FPD - 578-7761  
Bodega Bay FPD - 875-3700  
California Department of Forestry  
and Fire Protection - 576-2285  
Cazadero CSD - 632-5482  
Cloverdale FPD - 894-3545  
Fire Safe Sonoma - 565-1152  
Forestville FPD - 887-2212  
Geyserville FPD - 857-3535  
Glen Ellen FPD - 996-9266  
Gold Ridge FPD - 823-1084  
Graton FPD - 823-5515  
Healdsburg FD - 431-3360  
Kenwood FPD - 833-2042  
Monte Rio FPD - 865-2067  
Occidental CSD - 874-3800  
Petaluma FD - 778-4390  
Rancho Adobe FPD - 795-6011  
Rincon Valley FPD - 539-1801  
Rohnert Park DPS - 584-2650  
Roseland FPD (Santa Rosa) - 543-3500  
Russian River FPD - 869-9089  
Santa Rosa FD - 543-3500  
Schell-Vista FPD - 938-2633  
Sebastopol FD - 823-8061  
Sonoma County Department  
of Emergency Services - 565-1152  
Sonoma Development Center - 938-6333  
Sonoma Valley FD - 996-2102  
Timber Cove FPD - 847-3368  
Two Rock Coast Guard FD - 765-7355  
Windsor FPD - 838-1170

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