LIVING WITH FIRE

IN SAN MATEO COUNTY

A guide for the homeowner

LIVING WITH FIRE IN SAN MATEO COUNTY

www.smcfiresafe.org

Mission Statement, Fire Safe San Mateo County

The Mission of Fire Safe San Mateo County is to maintain the quality of life and property for the citizens living in the wildland-urban intermix zones of San Mateo County. Working together, we can achieve effective fire protection, education and planning.

The key elements of the Mission are to reduce hazardous vegetation, the creation of defensible space around structures, and the education of citizens regarding fire hazards and fire behavior through the guidance of local agencies.

Much of San Mateo 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 of these homeowners, however, are ill prepared to survive an intense wildfire. Since it is not a question of "if" a wildfire will occur but "when," the likelihood of human life and property loss is great and growing.

There is increasing recognition that our ability to live more safely in this fire environment depends upon "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.

The pre-fire activities implemented by this homewowner 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. As seen in the photo, these pre-fire activities were effective.

THE "WHY WE'RE WORRIED ABOUT WILDFIRE" EQUATION

Fire is a natural part of our environment. Our forests, shrublands and grasslands were burning long before there was an urban interface.

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People are living in this fire environment. Many homes are built and maintained without regard to wildfire.

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There is a greater chance of fire starts. With more people using our wildlands, more fire ignitions are likely.

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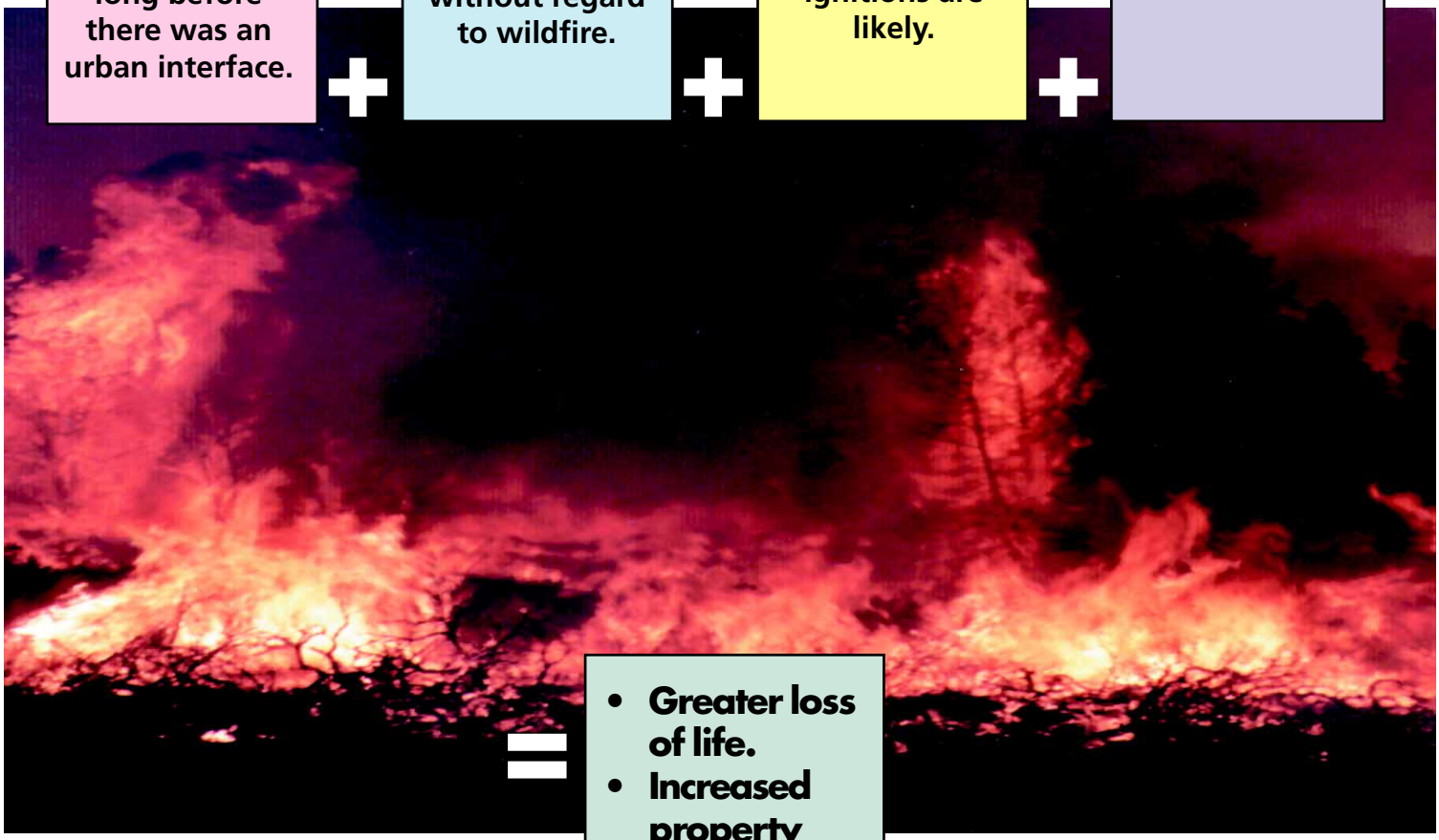
Today's wildfires can burn intensely and be difficult to control.



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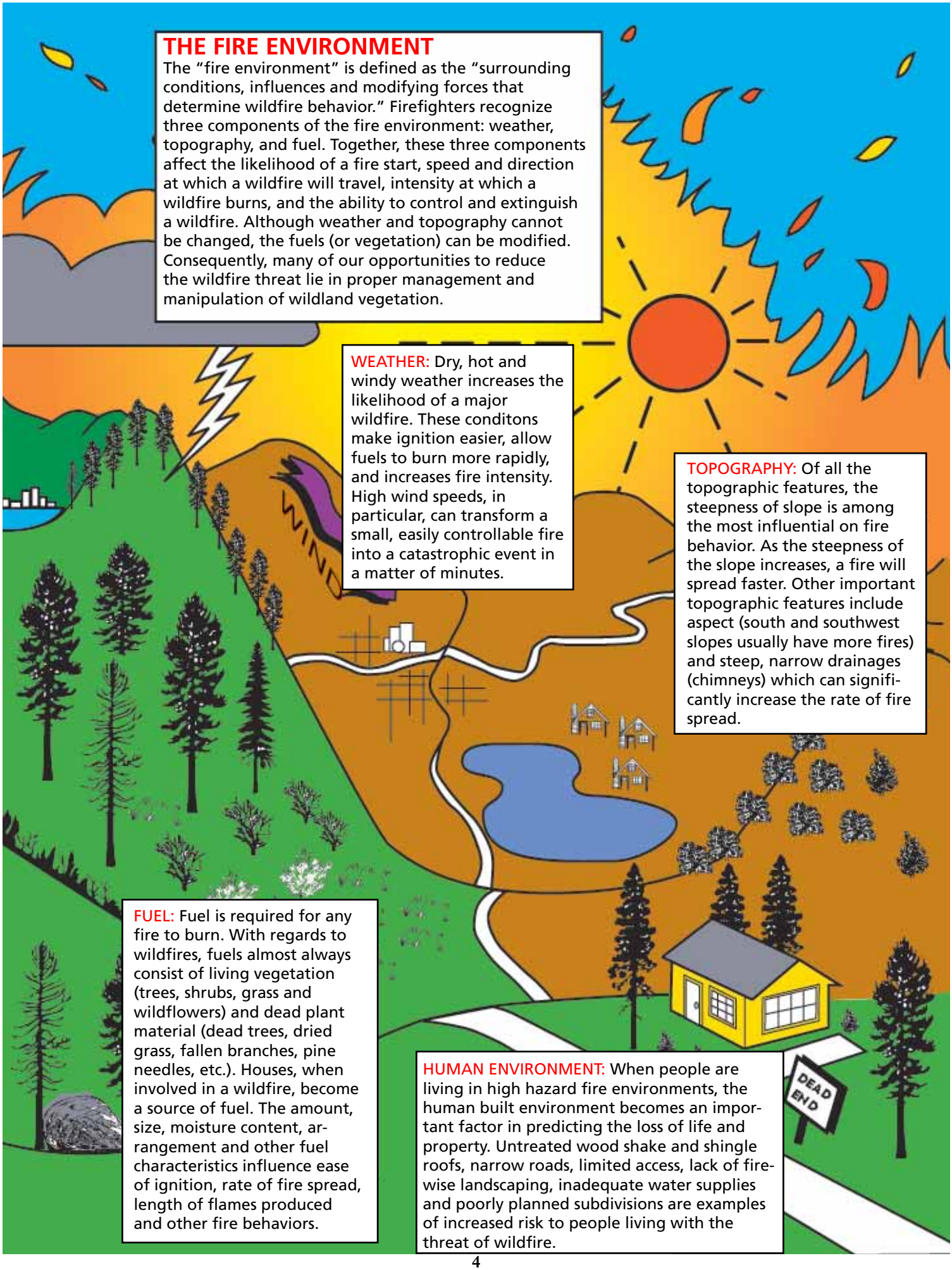
- **Greater loss of life.**
- **Increased property losses.**
- **Damage to natural resources.**
- **More money spent on firefighting.**

A lot of people assume that when a wildfire starts, it will be quickly controlled and extinguished. This is an accurate assumption 97% of the time. For most wildfires, firefighters have the ability, equipment, and technology for effective fire suppression. But 3% of the time wildfires burn so intensely that there is little firefighters can do.



THE FIRE ENVIRONMENT

The "fire environment" is defined as the "surrounding conditions, influences and modifying forces that determine wildfire behavior." Firefighters recognize three components of the fire environment: weather, topography, and fuel. Together, these three components affect the likelihood of a fire start, speed and direction at which a wildfire will travel, intensity at which a wildfire burns, and the ability to control and extinguish a wildfire. Although weather and topography cannot be changed, the fuels (or vegetation) can be modified. Consequently, many of our opportunities to reduce the wildfire threat lie in proper management and manipulation of wildland vegetation.

WEATHER: Dry, hot and windy weather increases the likelihood of a major wildfire. These conditons make ignition easier, allow fuels to burn more rapidly, and increases fire intensity. High wind speeds, in particular, can transform a small, easily controllable fire into a catastrophic event in a matter of minutes.

TOPOGRAPHY: Of all the topographic features, the steepness of slope is among the most influential on fire behavior. As the steepness of the slope increases, a fire will spread faster. Other important topographic features include aspect (south and southwest slopes usually have more fires) and steep, narrow drainages (chimneys) which can significantly increase the rate of fire spread.

FUEL: Fuel is required for any fire to burn. With regards to wildfires, fuels almost always consist of living vegetation (trees, shrubs, grass and wildflowers) and dead plant material (dead trees, dried grass, fallen branches, pine needles, etc.). Houses, when involved in a wildfire, become a source of fuel. The amount, size, moisture content, arrangement and other fuel characteristics influence ease of ignition, rate of fire spread, length of flames produced and other fire behaviors.

HUMAN ENVIRONMENT: When people are living in high hazard fire environments, the human built environment becomes an important factor in predicting the loss of life and property. Untreated wood shake and shingle roofs, narrow roads, limited access, lack of firewise landscaping, inadequate water supplies and poorly planned subdivisions are examples of increased risk to people living with the threat of wildfire.

THE LIMITATIONS OF WILDLAND FIREFIGHTING

Presented at right are firefighter tactics as they relate to wildfire flame length

FLAME LENGTH	EFFECTIVE FIRE SUPPRESSION TACTICS
Less than 4 ft	Fireline constructed with hand tools, such as shovels and axes, can be effective at the front of the fire.
4 to 8 ft	Bulldozers and other heavy equipment will be needed to construct an effective fireline. Where bulldozers are not available, fire engines with hoses and water will be required to "knock down" the flames before the fire crews with hand tools can be effective. Or fire crews must construct a fireline at a considerable distance from the fire.
8 to 11 ft	Airtankers with fire suppressing retardant or helicopters with water are required to reduce the fire's rate of spread before fireline construction by crews or bulldozers can be effective.
More than 11 ft	Direct fire suppression efforts will be ineffective. Retreat to existing roads, streams and other barriers. Burn out fuels between the fireline and the advancing fire front.

IMPROVE THE ODDS: CREATE A... DEFENSIBLE SPACE

In most areas, a safety zone should be cleared away from your home for a distance of not less than 30 feet. As the slope of your lot increases, additional clearance as far out as 100 feet or more may be necessary. Flammable vegetation too close to your home will make it almost impossible for firefighters to save your home in the event of a brush fire.

San Mateo County Fire Safe Committee recommends the following ways to maintain a defensible space between homes and flammable vegetation and combustible growth:

- Clear away flammable vegetation and combustible growth a minimum of 30 feet away from homes. If a wooden deck is part of the back of the home, this 30-foot distance starts from the edge of the deck outward. Brush and weeds must be cut to the ground, raked up, and removed from the property. Single specimens of trees and shrubbery used as ground cover, provided that they don't form a means of rapidly transmitting fire from the native growth to any structure, can be kept in this 30-foot space.
- Trim trees horizontally to at least 10 feet away from the home and decks. If a homeowner wishes to keep a tree within this 10-foot distance they must trim any nearby trees a minimum of 10 feet away from this tree within this first 30-foot space.
- Large trees must be limbed up to a minimum of six feet above the ground and smaller trees limbed up proportionately.
- Homes that have any type of slope must have an additional defensible space created.
- This distance must be an additional minimum of 70-foot space in addition to the first 30 feet for a total of 100 feet. In this additional 70-foot space, the vegetation should be cut so that it is not more than 18" above the ground. The cut vegetation can be left in place as long as it is mulched down. Trees within this 70-foot space should also be limbed up a minimum of 6 feet above the ground for large trees and proportionately for smaller trees. Flammable vegetation and combustible growth should be cut and removed from below the canopies of the trees in this 70-foot space.
- Refer to the step-by-step process beginning on page 7 to create a defensible space.

FREQUENTLY ASKED QUESTIONS ABOUT DEFENSIBLE SPACE

As the number of people living in and adjacent to wildlands grows, the likelihood of homes being threatened by wildfire also grows. A critical factor in determining whether or not a home will survive a wildfire is the type, amount, and maintenance of vegetation surrounding the house. In the 1980's, the term "defensible space" was coined to describe vegetation management practices aimed at reducing the wildfire threat to homes.

WHAT IS DEFENSIBLE SPACE?

Defensible space refers to that 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 properly 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, what is growing adjacent to their homes can have considerable influence upon the survivability of their houses. All vegetation, including naturally occurring native plants and ornamental plants in the residential landscape, 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 to defend 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 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 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 properties 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. The necessary equipment consists of 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 usually expressed as the distance from the house in which vegetation is managed to reduce the wildfire threat. The necessary distance for an effective defensible space is not the same for everyone, but varies by slope and type of wildland vegetation growing near the house. See the section entitled "Creating An Effective Defensible Space" on page 8 for specific information.

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). These conditions 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. But some have failed to implement defensible space practices because of lack of knowledge or misconceptions.

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:

- increase the moisture content of vegetation.
- decrease the amount of flammable vegetation.
- shorten plant height.
- alter 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.

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 steepness of the terrain.

For example, if your property is surrounded by wildland grasses, and is located on flat land, your recommended defensible space distance would extend out 30 feet from the sides of the house. If your house sits on a slope and the adjacent wildland vegetation is dense tall brush, your recommended defensible space distance would be 100 feet.

If the recommended defensible space 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.

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

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 would be the cutting down of a dead tree or the cutting out of 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 the substitution of less flammable plants for more hazardous vegetation. For example, removal of a dense stand of flammable shrubs and planting an irrigated, well maintained flower bed would be a type of replacement.

CREATING A 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? Then follow these steps to an effective defensible space...

SCREEN

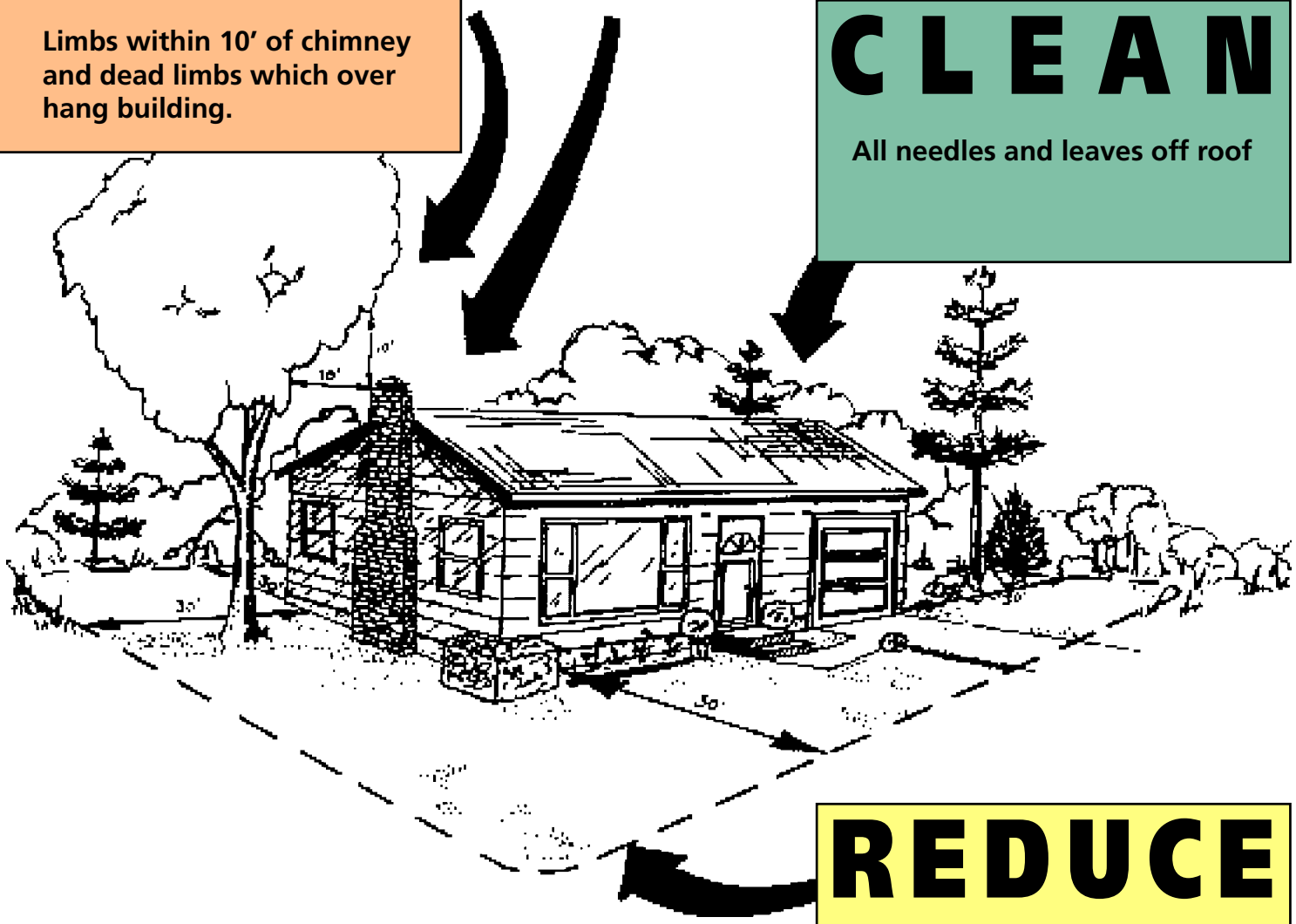
1/2" mesh screen on chimney outlet. A professional can advise you on how to install it correctly.

REMOVE

Limbs within 10' of chimney and dead limbs which over hang building.

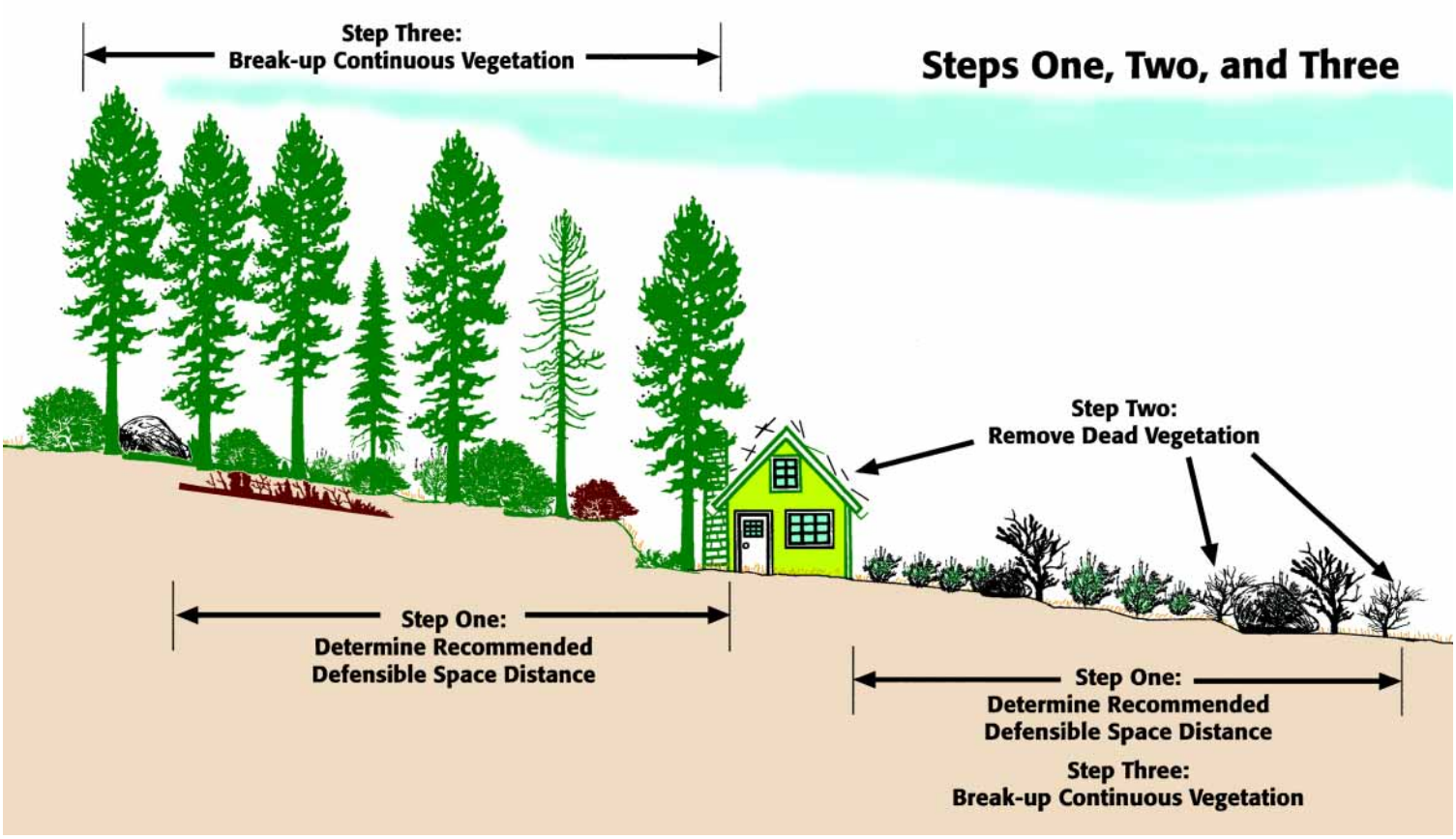
CLEAN

All needles and leaves off roof



REDUCE

Amount of flammable vegetation within 30' of buildings, and such additional clearance, up to 100 feet, as may be directed.



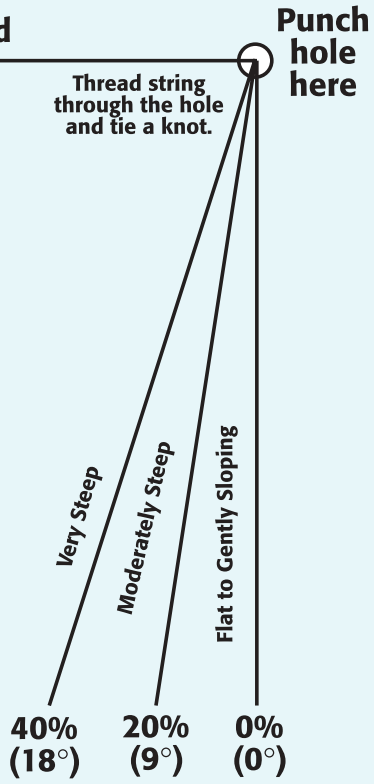
STEP ONE: **FIND THE PERCENT SLOPE WHICH BEST DESCRIBES YOUR PROPERTY.**

Homeowner's Guide to Calculating Percent Slope

Hold this line parallel to the ground

INSTRUCTIONS:

1. Enlarge this diagram using a photocopying machine.
2. Mount photocopy on a piece of cardboard.
3. Punch a hole through photocopy and cardboard at the designated spot.
4. Thread a 12" piece of string through the hole and tie a knot in the end of the string on the backside of the cardboard.
5. Tie a 1" or larger washer to weight the other end of the string.
6. Hold the designated line parallel to the ground, sighting up slope along the edge of the cardboard.
7. The weighted string will indicate the percent of slope steepness. For convenience, steepness of slope in degrees is presented in parenthesis.



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

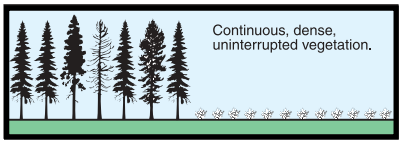
Dead vegetation includes dead trees and shrubs, dead branches lying on the ground or still attached to living plants, dried grass, flowers and weeds, dropped leaves and needles, and firewood stacks. In most instances, dead vegetation should be removed from the recommended defensible space area. A description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

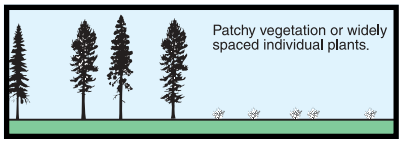
TYPES OF DEAD VEGETATION AND RECOMMENDED PRACTICE

DEAD FUEL TYPE	RECOMMENDED PRACTICE
STANDING DEAD TREE	Remove all standing dead trees from within the defensible space area.
DOWN DEAD TREE	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.
DEAD SHRUBS	Remove all dead shrubs from within the defensible space area.
DRIED GRASSES AND WILDFLOWERS	Once grasses and wildflowers have dried out or "cured," mow and remove from the defensible space area.
DEAD NEEDLES, LEAVES, BRANCHES, CONES (ON THE GROUND)	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.
DEAD NEEDLES, LEAVES, BRANCHES, AND TWIGS (OTHER THAN ON THE GROUND)	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 which accumulates on the roof and in rain gutters on a routine basis (at least once annually).
FIREWOOD AND OTHER COMBUSTIBLE DEBRIS	Locate firewood and other combustible debris (wood scraps, grass clippings, leaf piles, etc.) at least 30 feet uphill from the house.

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

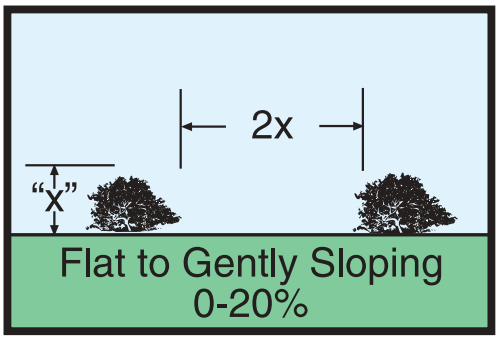
Sometimes wildland plants can occur as an uninterrupted layer of vegetation as opposed to being patchy or widely spaced individual plants. The more continuous and dense the vegetation, the greater the wildfire threat. If this situation is present within your recommended defensible space area, you should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

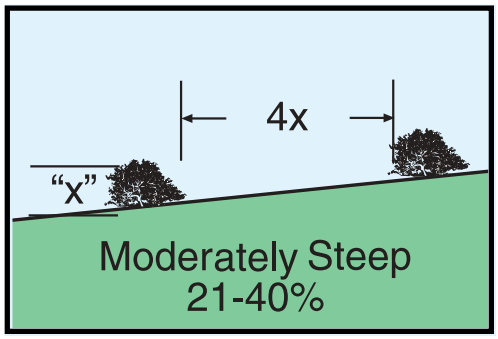


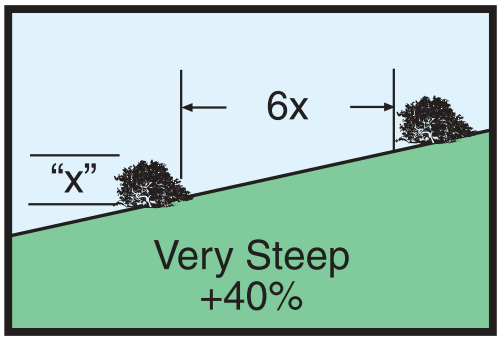


Recommended Separation Distances for Shrubs

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





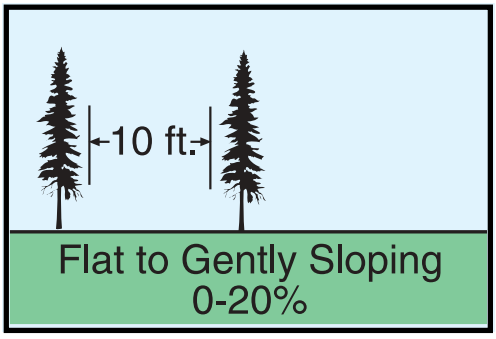


Note: Separation distances are measured between canopies (outermost branches) and not between trunks.

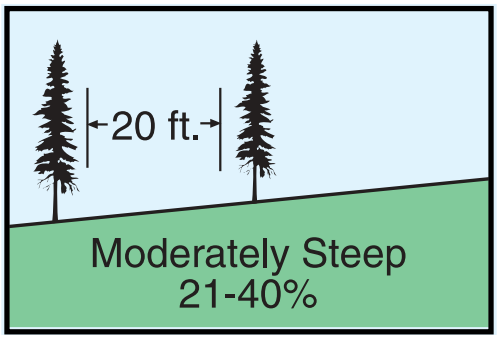
For example, if your home is located on a 10% slope and the brush is four feet tall, the separation distance would be two times the shrub height or eight feet (2 x 4 ft shrub height equals 8 ft of separation between shrubs). The recommended separation distance can be accomplished by removing plants or through pruning that reduces the diameter or height (shorter height means less separation) of shrubs.

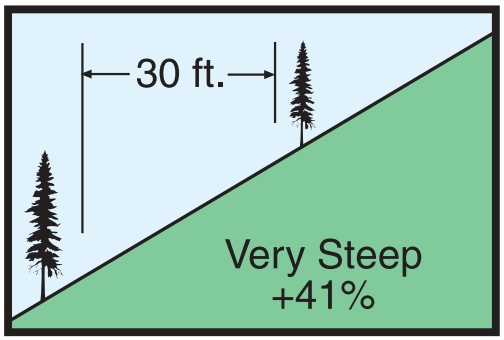
STEP THREE, continued

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 above.

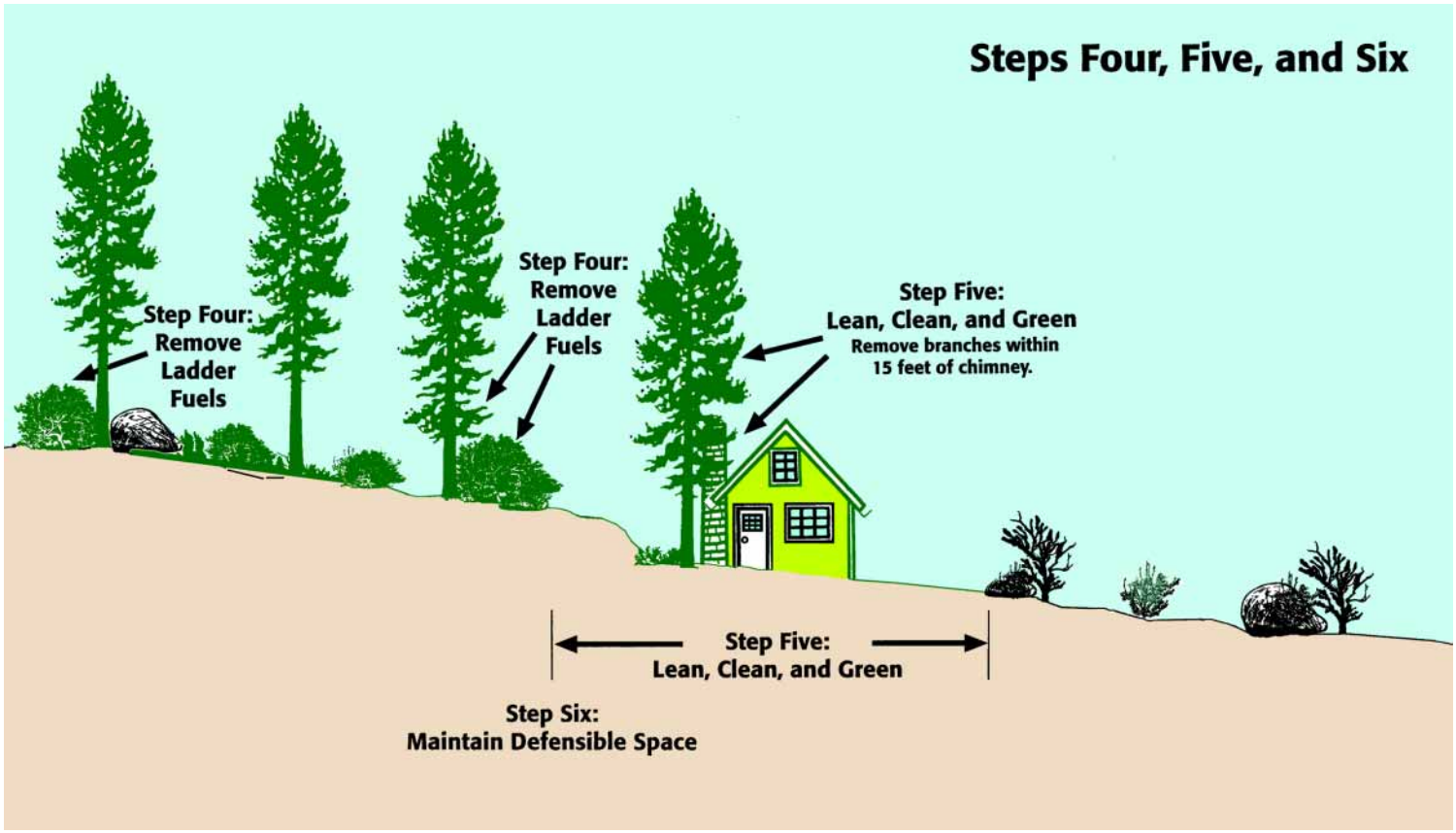




Note: Separation distances are measured between canopies (outer most branches) and not between trunks.

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.

Not only are steep slopes often considered high wildfire areas, they are also highly erodable. 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.



STEP FOUR:

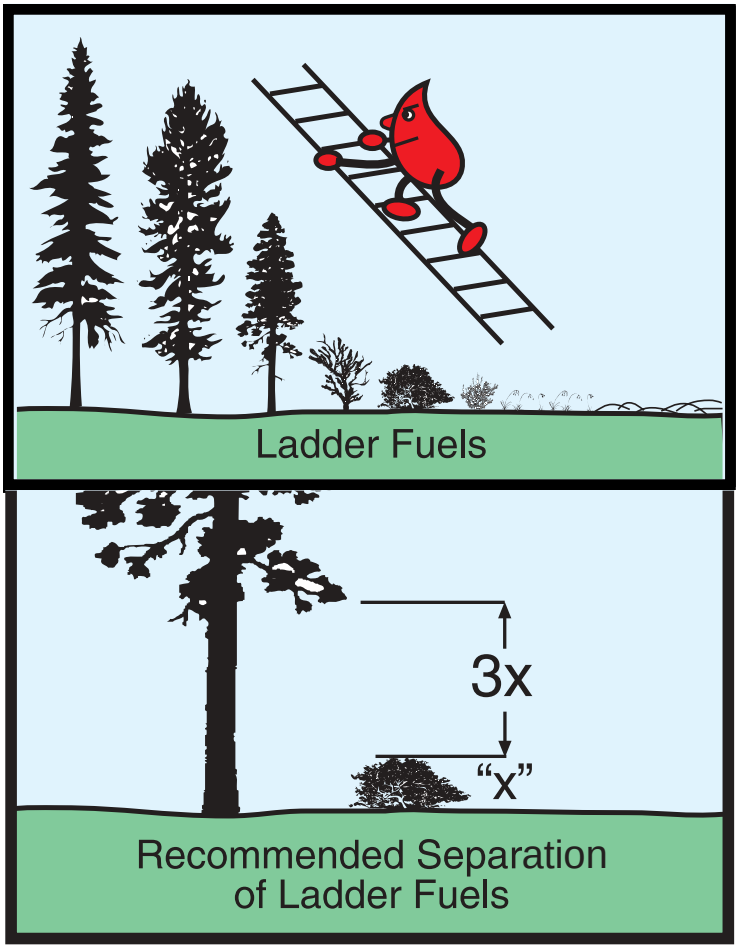
ARE THERE LADDER FUELS PRESENT WITHIN THE RECOMMENDED DEFENSIBLE SPACE AREA?

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 tree is three feet tall, the recommended separation distance would be 9 feet (3 ft shrub height x 3 = 9 feet). This could be accomplished by removing the lower tree branches, reducing the height of the shrub, or both.

A maximum height of 18" for all shrubs within 30' is recommended.



DEFENSIBLE SPACE

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.

LEAN, CLEAN, & GREEN CHECKLIST

- ❑ 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 native, perennial grasses.
- ❑ Emphasize use of mulches, rock, and non-combustible hard surfaces (concrete sidewalks, brick patios, and asphalt driveways).
- ❑ Deciduous ornamental trees and shrubs are acceptable if they are kept green, free of dead plant material, ladder fuels are removed, and individual plants or groups of plants are arranged in a manner in which adjacent wildland vegetation cannot convey a fire through them to the structure. Shorter deciduous shrubs are preferred.
- ❑ Minimize the use of ornamental coniferous shrubs and trees and tall exotic grasses (such as pampas grass).
- ❑ Where permitted, most wildland shrubs and trees should be removed from this zone and replaced with more desirable alternatives. Individual specimens or small groups of wildland shrubs and trees can be retained so long as they are kept healthy, free of dead wood, and pruned to reduce the amount of fuel and height, and ladder fuels are removed.
- ❑ For some areas substantial removal of wildland vegetation may not be allowed. In these instances, wildland vegetation should conform to the recommended separation distances, be kept free of dead plant material, pruned to remove ladder fuels and reduce fuel load, and arranged so it cannot readily convey a fire from the wildlands to the house. Please become familiar with local requirements before removal of wildland vegetation.
- ❑ Tree limbs within 10 feet of a chimney, encroaching on powerlines, or touching the house should be removed.

California Department of Forestry and Fire Protection
Public Resources code 4291

STEP 1) Find the percent slope which best describes your property.

STEP 2) Find the type of vegetation which best describes the wildland plants growing on or near your property.

STEP 3) Break up continuous vegetation.

STEP 4) Determine whether or not there are ladder fuels present.

STEP 5) Create a 30-foot wide "lean, clean and green" area.

STEP 6) Maintain the vegetation within the defensible space.

FIRESCAPE

FIRE SAFE LANDSCAPE DESIGN

"When a wildfire comes through your neighborhood, could your house survive on its own?" A dramatic question, but one we need to consider when living in an environment where wildfire is a common occurrence. Firescaping is landscape design that reduces house and property vulnerability to wildfire. The goal is to develop a landscape whose design and choice of plants offers the best fire protection and enhances the property. The ideal is to surround the house with plants that are less likely to burn. It is imperative that 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 towards wildfire survival.

The ideal is to surround the house with plants that are less likely to burn.

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

There are three things which determine wildfire intensity: topography, weather and vegetation. We can only affect vegetation. Through proper plant selection, placement and maintenance, we can diminish the possibility of ignition, lower fire intensity, and reduce how quickly a fire spreads to increase a home's survivability.

In firescaping, plant selection is primarily determined by a 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 a firescape design. Minimize use of evergreen shrubs and trees within 30 feet of a structure, because junipers, other conifers and broadleaf evergreens contain oils, resins and waxes that make these plants burn with great intensity. Use ornamental grasses and berries sparingly because they also can be highly flammable. Choose "fire smart" plants— plants with a high moisture content. They are low growing. Their stems and leaves 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.

When planning tree placement in the landscape, remember their size at maturity.

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. Keep tree limbs at least 10 feet from chimneys, power lines and structures. Specimen trees can be used near a structure if pruned properly and well irrigated.

Firescape 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 a vital component 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 fuelbreak. Remember, while bare ground is effective from the wildfire viewpoint, it is not promoted 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 or not 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 area closest to a structure out to 30 ft. will be the highest water use area in the fire safe landscape. Highly flammable fuels should be kept to a minimum and plants kept green throughout the fire season. 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. 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 fire-safe landscape 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, open spaces are more important than the plants.

In firescaping, open spaces are more important than the plants.

Lawn can be an effective firescape feature. But extensive areas of turfgrass may not be right for everyone. Some good alternatives include clover, groundcovers, and native, perennial grasses that are kept green during the fire season through irrigation.

PLANTING TREES NEAR POWER LINES

When you landscape, you take a lot of things into consideration before settling on what plant goes where. You must consider the slope of the land, the type of sun exposure, lines of sight, site usage and aesthetics. Everyone knows to call Underground Service Alert (800-227-2600) before digging, but all too often one of the most visible obstacles on a site is overlooked—overhead power lines.

You may overlook powerlines as a concern because certain trees take many years to grow to the height of a power line. For example, it could take more than a decade for a sycamore tree to grow to its mature height. But once that tree grows into the power lines, it becomes a problem for you and your electric company.

Fig 1. Example of top direct trimming done to trees with a decurrent growth habit.

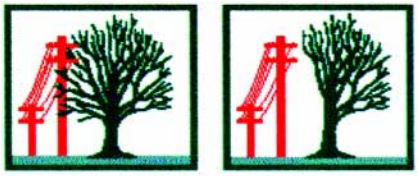


Fig 2. Example of side trimming.

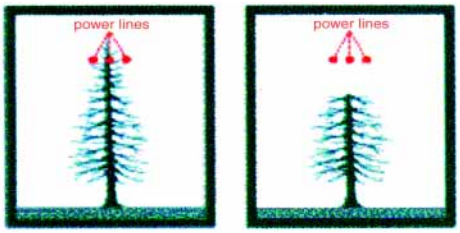


Fig 3. Example of top pruning done to redwoods and other trees with an excurrent growth habit.

Too often, homeowners who had envisioned a stately redwood on their property are left with a redwood with no top (fig. 3). Or, hoping for a majestic oak tree, they instead are left with a V-cut (fig. 2).

One way to avoid such a problem is to plant tall-growing trees at least 15 feet or more to the side of overhead power lines.

Another option is to plant trees under power lines that, at maturity, will not reach overhead wires. The International Society of Arboriculture (ISA) recommends planting trees with a mature height of 20 feet or less within 15 feet of power lines (fig. 4).

Some examples of trees that work well under power lines are: Western Redbud (Cercis occidentalis), Pacific Wax Myrlte (Myrica californica), Holyleaf Cherry (Prunus ilicifolia), California Buckeye (Aesculus californica), Japanese Maple (Acer palmatum), and Citrus spp. Your local nursery can suggest many other wonderful plants that, at mature height will only grow to around 25 feet tall.

Save the taller trees for other locations. The ISA recommends medium size trees that grow up to 40 feet (12M) tall as you get farther away from the lines. However, be aware of trees that have overhanging branches or shedding bark that could fall onto power lines or homes.

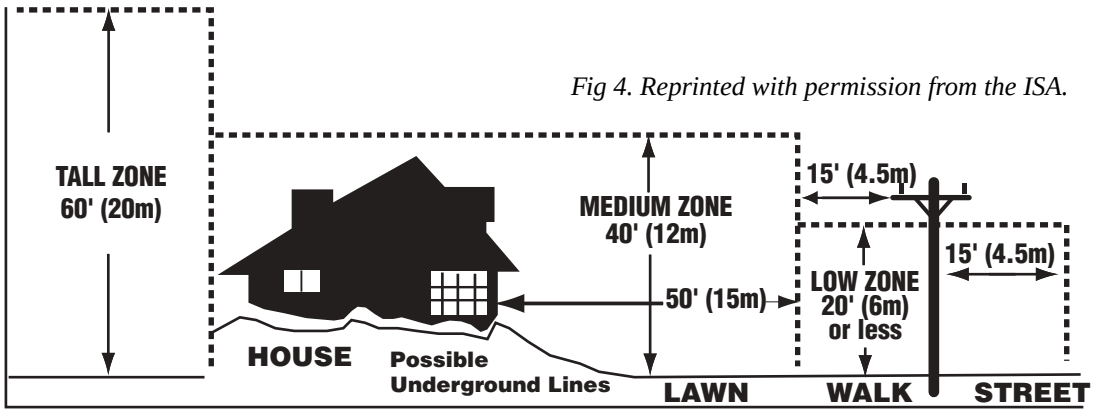


Fig 4. Reprinted with permission from the ISA.

There are thousands of species of trees in the world and countless varieties, so there is no reason to use the same trees repeatedly. A good source for suggestions and inspiration is the SelecTree site found on the Internet at http://selectree.cagr.calpoly.edu. For more information about planting trees under power lines, contact your local electric company or check out the International Society of Arboriculture's web page at www.ag.uiuc.edu/~isa, or Pacific Gas & Electric Company's web page at www.pge.com.

OTHER CONSIDERATIONS IN MAKING YOUR HOME DEFENSIBLE

The manner in which a house is designed, location on which it is built, materials used in its construction, and access all influence survivability during wildfire. Presented below are recommendations and an illustration modified from California Department of Forestry and Fire Protection's publication "How to Make Your Home Fire Safe." When coupled with an effective defensible space, these recommendations will make a home much easier to defend and improve its chances of surviving a wildfire.

1. ROOF

- Remove dead branches overhanging 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 the fire resistance classification of "Class A." Check with your local fire agency.
- Cover your chimney outlet and stovepipe with a nonflammable screen of 1/2 inch or smaller mesh.

2. CONSTRUCTION

- Build your home away from ridge tops, canyons and areas between high points on a ridge.
- Build your home at least 30 feet from your property line .
- Use fire resistant building materials.
- Enclose the underside of balconies and above-ground decks with fire resistant materials.
- Limit the size and number of windows in your home that face large areas of vegetation.
- Install only dual-paned or triple-paned windows.
- Consider sprinkler systems within the house. They may protect your home while you're away or prevent a house fire from spreading into the wildlands.

3. LANDSCAPE

- See "Creating An Effective Defensible Space" (page 8) and "Firescape-Fire Safe Landscape Design" (page 14).

4. YARD

- Stack woodpiles at least 30 feet from all structures and clear away flammable vegetation within 10 feet of woodpiles.
- Locate LPG tanks (butane and propane) at least 30 feet from any structure and surround them with 10 feet of clearance.
- Remove all stacks of construction materials, pine needles, leaves and other debris from your yard.
- Contact your local fire department to see if open burning is allowed in your area; if so, obtain a permit before burning debris.
- Where burn barrels are allowed, clear flammable materials at least 10 feet around the barrel; cover the open top with a non-flammable screen with mesh no larger than 1/4 inch.

5. EMERGENCY WATER SUPPLY

- Maintain an emergency water supply that meets local fire department standards.
- 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.
- If your water comes from a well, consider an emergency generator to operate the pump during a power failure.

6. ACCESS

- Identify at least two exit routes from your neighborhood.
- Construct roads that allow two way traffic.
- Design road width, grade and curves to allow access for large emergency vehicles.
- Construct driveways to allow large emergency equipment to reach your house.
- 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. Construct turnouts along one-way roads.
- Clear flammable vegetation at least 10 feet from roads and five feet from driveways.
- Cut back overhanging tree branches above roads.
- Construct fire barriers, such as greenbelts, parks, golf courses and athletic fields.
- Make sure that your street is named or numbered, and a sign is visibly posted at each street intersection.

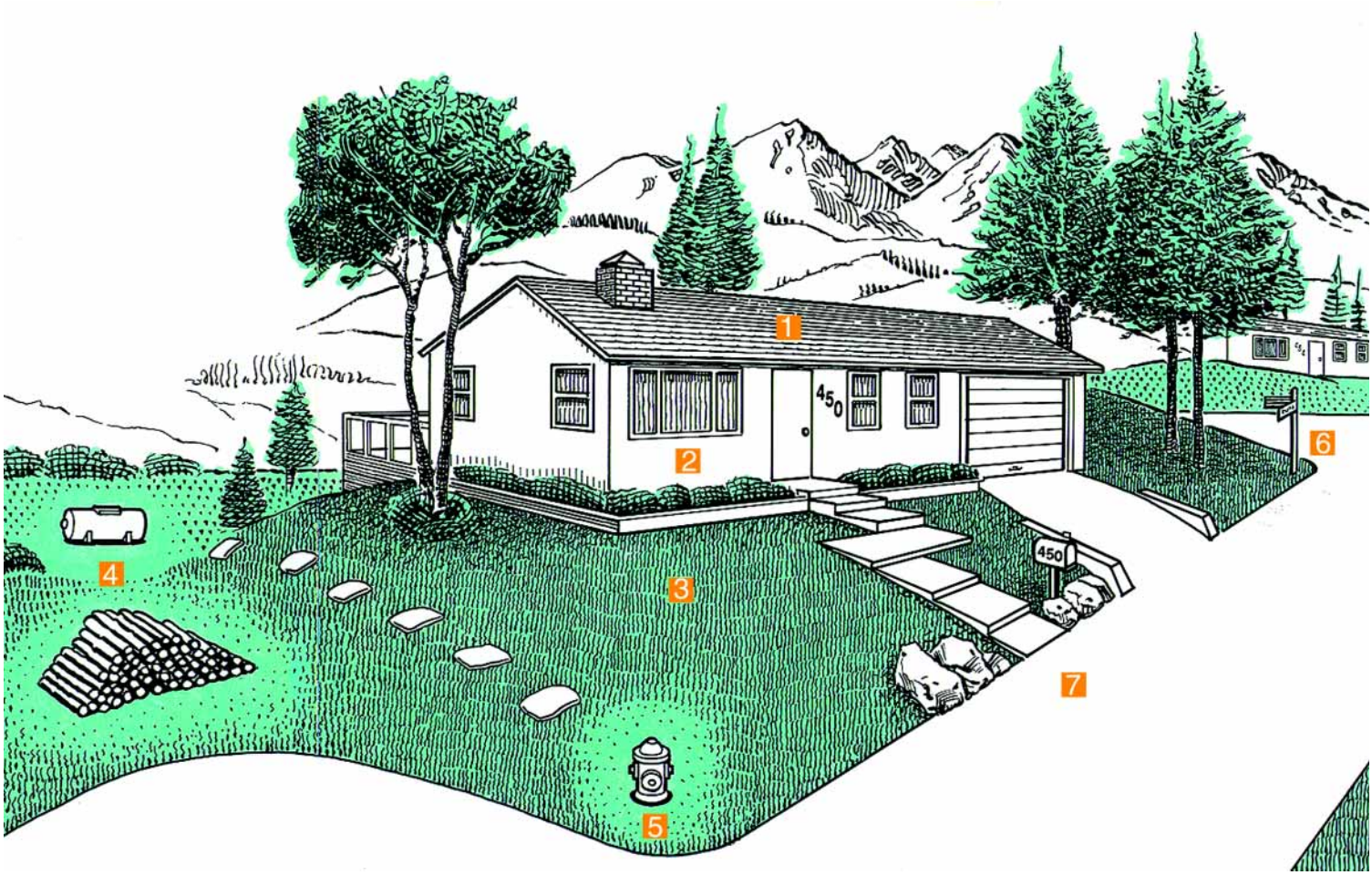
Defensible Space Factor Study: Findings from the California Paint Fire

Characteristics of Structure and Site	Probability that Structure Survived
Wood Roof, <30' of defensible space, no defensive action taken	4%
Wood roof, <30' defensible space	15%
Wood roof	19%
Non-wood roof	70%
Non-wood roof, >30' defensible space	90%
Non-wood roof, >30' defensible space, defensive action taken	99%

- Make sure that your street name and house number are not duplicated elsewhere in the county.
- Post your house address at the beginning of your driveway, or on your house if it is easily visible from the road.

7. OUTSIDE

- Designate an emergency meeting place outside your home.
- Practice emergency exit drills regularly.
- Make sure that electric service lines, fuse boxes and circuit breaker panels are installed and maintained as prescribed by code.
- Contact qualified individuals to perform electrical maintenance and repairs.
- Shut down LPG tanks and natural gas.



THE WOOD SHAKE AND SHINGLE ROOF HAZARD

A house can be threatened by a wildfire in three ways: direct exposure from flames, radiated heat, and airborne firebrands. Of these, firebrands account for the majority of homes burned by wildfire. The most vulnerable part of a house to firebrands is the roof.

Because of its angle, the roof can catch and trap firebrands. If the roof is constructed of combustible materials such as untreated wood shakes and shingles, the house is in jeopardy of igniting and burning.

Not only are combustible roofing materials a hazard to the structure on which they are installed, but also to other houses in the vicinity. Burning wood shakes, for example, can become firebrands, be lifted from the burning roof, carried blocks away, and land in receptive fuel beds such as other combustible roofs.

Unfortunately for homeowners with existing combustible roofs, there are no long-term reliable measures available to reduce roof vulnerability to wildfire other than re-roofing with fire resistant materials.

FIREBRANDS

Firebrands are burning embers produced by wildfire which are lifted high into the air and carried beyond the fire front. Firebrands are one of the major causes of homes burned due to wildfire.

Typical firebrand materials include pine cones, bark, and if houses are involved, wood shakes and shingles. Depending on wind speed and size of materials, firebrands can be carried more than 1/2 mile ahead of the fire front.

A shower of thousands of firebrands can be produced during a major wildfire event. If these firebrands land in areas with easily ignited fuels, numerous spot fires can start. Homes located blocks away from the main fire front can be threatened.

When wildfire flame lengths exceed 11 feet, direct firefighting efforts are ineffective. Under these conditions firefighters use roads, streams, and other barriers to control the wildfire.

FIRE RETARDANT PLANTS FOR THE GREATER BAY AREA

A fire retardant plant is a species that does not catch fire easily or burn as rapidly as chaparral type shrubs that are recognized for their high flammability. Keep in mind that there is no such thing as a non-flammable tree or shrub. For fire safety and peace of mind, keep trees and shrubs away from structures and well spaced. Most of the species listed below are drought resistant but they do need summer watering. Water well for newly established plants. On established vegetation, removed dead branches and prune high.

The following is a short list of what is available to you. For further information, contact your local nursery or a reputable landscaper.

Toyon *(Heteromeles arbutifolia)*
Blueblossom *(Ceanothus thyrsiflorus)*
Poppy *(Eschscholzia spp.)*
Yarrow *(Achillea spp.)*
Lily of the Nile *(Agapanthus spp.)*
Sea Pink *(Armeria spp.)*
Sage *(salvia spp.)*
Star Jasime *(Trachelospermum jasminoides)*
Cape Honeysuckle *(Teacomaria capensis)*
Day Lily *(Hemerocallis assorted)*
Coast Live Oak *(Quercus agrifolia)*
Western Redbud *(Cercis occidentalis)*
Wood Rose *(Rosa gymnocarpa)*
California Fuschia *(Zauschneria spp.)*
Western Columbine *(Aquilegia formosa)*
Sticky Monkeyflower *(Mimulus aurantiacus)*
Deerweed *(Lotus scoparius)*
Wood Rose *(Rosa gymnocarpa)*
Douglas's Iris *(Iris douglasiana)*
Creeping Strawberry *(Symphoricarpos mollis)*
California Fescue *(Festuca californica)*
California Canary *(Phalaris californica)*
Ocean-Bluff Bluegrass *(Poa unilateralis)*
(Penstemon spp.)
Hen and Chicks *(Escheveria spp.)*

WHEN WILDFIRE APPROACHES

Should a house be threatened by wildfire, the occupants may be advised to evacuate by a fire or law enforcement official. The purpose of evacuation is to protect people from life-threatening situations. Homeowners, however, do have the right to stay on the property if they so desire and so long as their activities do not hinder fire fighting efforts. If the occupants are not contacted in time to evacuate or if the owners decide to stay with their homes, the suggestions provided in the following checklist will assist in protecting their property and the lives of their family.

- ❑ Evacuate, if possible, all family members not essential to protecting the house, as well as pets.
- ❑ Contact a friend or relative and relay your plans.
- ❑ Make sure family members are aware of the prearranged meeting place.
- ❑ Tune to a local radio station and listen for instructions.
- ❑ Place vehicles in the garage, have them pointing out, and roll up windows.
- ❑ Place valuable papers and momentos in the car.
- ❑ Close the garage door, but leave it unlocked. If applicable, disconnect the electric garage door opener so that the door can be opened manually.
- ❑ Place combustible patio furniture in the house or garage.
- ❑ Shut off propane at the tank or natural gas at the meter.
- ❑ Wear only cotton or wool clothes. Proper attire includes long pants, long sleeved shirt or jacket, and boots. Carry gloves, a handkerchief to cover face, water to drink, and goggles.
- ❑ Close all exterior vents.
- ❑ Prop a ladder against the house so firefighters have easy access to the roof.
- ❑ Make sure that all garden hoses are connected to faucets and attach a nozzle set on “spray.”
- ❑ Soak rags, towels, or small rugs with water to use in beating out embers or small fires.
- ❑ Inside, fill bathtubs, sinks, and other containers with water. Outside, do the same with garbage cans and buckets. Remember that the water heater and toilet tank are available sources of water.
- ❑ Close all exterior doors and windows.
- ❑ Close all interior doors.
- ❑ Open the fire place damper, but place the screen over the hearth to prevent sparks and embers from entering the house.
- ❑ Leave a light on in each room.
- ❑ Remove lightweight and/or non-fire resistant curtains and other combustible materials from around windows.
- ❑ If available, close fire resistant drapes, shutters, or venetian blinds. Attach pre-cut plywood panels to the exterior side of windows and glass doors.
- ❑ Turn off all pilot lights.
- ❑ Move overstuffed furniture (e.g. couches, easy chairs, etc.) to the center of the room.
- ❑ Keep wood shake or shingle roofs moist by spraying water. Do not waste water. Consider placing a lawn sprinkler on the roof if water pressure is adequate. Do not turn on until burning embers begin to fall on the roof.
- ❑ Continually check the roof and attic for embers, smoke, or fire.

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

If a fire should occur within the house, contact the fire department immediately. Continue to inspect your house and property for embers and smoke.

Most importantly, STAY CALM!

FIRE SAFE CREWS

Establishing a need for a resource to work on fuel reduction projects within San Mateo County, the San Mateo Sheriff's Department and Fire Safe San Mateo developed a partnership that would provide two crews with deputies as supervisors to work on fuel management projects within the county.

In the fall of 1991, two crews began work on Old Stage Road adjacent to the Crystal Springs Watershed to provide fire department access below Bunker Hill (the Highland Subdivision).

Since then, the Fire Safe crews have worked on a multitude of varying projects throughout the county. In 2001, crews have cleared 155 tons of brush and dead material protecting $55 million of high value assets.

As part of their tool inventory, crews are trained in the use of small and large chippers, chainsaws, mowers and weed eaters.

Additionally, the Fire Safe Crews are trained for fire fighting assignments. In the last two years, the crews have responded and worked on 5 wildland fires within San Mateo County.

San Mateo County Fire Safe Committee Members

San Mateo County Fire Department
San Mateo County Sheriff's Office
San Mateo County OES
San Mateo County Parks
Half Moon Bay Fire Protection District
San Mateo City Fire Department
Woodside Fire Protection District
San Bruno Fire Department and Building Department
Stanford University-Jasper Ridge Biological Preserve
South San Francisco Fire Department
California Department of Forestry and Fire Protection
Bay Area Air Quality Management District (BAAQMD)
Mid Peninsula Regional Open Space District
San Francisco Water Department
South County Fire Authority
Millbrae Fire Department
Hillsborough Fire Department
Fireman's Fund Insurance
Pacific Gas and Electric Company
Daly City Fire Department
Burlingame Fire Department
Los Altos Hill Citizen at Large, Bill Smith
Peninsula Open Space Trust
San Mateo Co. Farm Bureau
Coastside Fire Safe Council

VISIT OUR WEBSITE AT www.smcfiresafe.org