Wildfires spread by a combination of a moving fire front and airborne burning embers, called firebrands. Loss of homes during wildfires results from some part of the building igniting from one or more of three types of exposures: 1) embers (firebrands), 2) radiant heat, and 3) direct flame contact.

Firebrands can be light enough to be blown long distances, more than a mile away from the main body of a wildfire. Should thy land on or near your home, they can easily ignite combustible materials such as nearby vegetation, accumulated debris, outdoor furniture, and door mats, or enter your home through openings in vents or screened doors and windows.
Firefighters are passionate about saving homes. They know the heartache that a fire can bring. But oftentimes, not every home that becomes threatened by wildfire can be saved. A huge factor in whether your home will survive a wildfire is the amount of preparation you put into making your home defendable BEFORE the fire occurs.

Firefighters sometimes use the terms “winners” and “losers” (or “defendable” and “not defendable”) to distinguish between those houses with defensible space versus those that do not have it. CAL FIRE defines DEFENSIBLE SPACE as “the buffer you create between a building on your property and the grass, trees, shrubs, or any wildland area that surround it. This space is needed to slow or stop the spread of wildfire and it protects your home from catching fire—either from direct flame contact or radiant heat. Defensible space is also important for the protection of firefighters defending your home.”

Defensible Space Around the Home

Igniting Homes

Urban fuel = Home

Close enough

Fuel

Heat

Oxygen

Make Your Home a Winner!
Make Your Home a Winner!

In larger emergency situations, where many homes are threatened and firefighting resources are stretched thin, homes without defensible space will likely be passed over in favor of those that have a greater chance of survival and offer firefighters a safe location from which to fight the fire.

Here are some things you can do to make your home more survivable and appealing to firefighters:

Make Your Driveway Accessible and Visible—Fire engines need a minimum clearance of 20 feet wide by 15 feet high and an adequate turn-around space to be able to access your home. Cutting back overhanging branches and vegetation alongside your driveway can help ensure safe passage for firefighting apparatus. Additionally, making sure that road and address signs leading to your home are clearly visible assists emergency personnel trying to locate you during an emergency. Address signs with bright letters that are at least 3-inches tall and set against a dark, contrasting background color will help make your home easier to locate quickly.

Have an Emergency Water Supply — Having water for fire protection stored and accessible to fire trucks can greatly impact your home’s survivability. Maintain an emergency water supply that meets fire department standards through one of the following: (1) a community water/hydrant system, (2) a cooperative emergency storage tank with neighbors, or (3) a minimum storage supply of 2,500 gallons. Create easy access for firefighters to tap into your water source. Putting a metal standpipe (hydrant) or fire valve at the end of the water line with a 2 ½-inch male National Hose Thread adapter makes it so that firefighters can quickly attach to your water source. Labeling your water source with large, visible lettering or a blue reflector is also a good practice.

Maintain Defensible Space — Clear all flammable vegetation other than trees, ornamental shrubs and green grass or ground cover out to 30 feet from your home or property line (whichever is closer). Remove all dead branches from trees next to, or hanging over any building. Remove all tree branches within 10 feet of a chimney or stovepipe. Keep all leaves, needles, and other dead vegetation off the roof and out of the gutters.

These practices make your home more resistant to ignition, and they provide a safer environment for firefighters to work in.
“Hardening” your home against fire does not make it fireproof, but rather it protects the most vulnerable parts of your home with proven building materials and/or techniques to resist some of the heat, flame, and ember storm that comes with wildfires.

**PREPARE (HARDEN) YOUR HOME NOW -- BEFORE FIRE STRIKES.**

**Here are some of the things you can do to harden your home:**

**Roof:** The roof is the most vulnerable part of your home. The large surface areas of roofs make them likely receptors for flying embers. Roof edges with large gaps between the roof covering and sheathing, and horizontal-to-vertical intersections on roofs are especially vulnerable because embers can become lodged in these crevasses and ignite material there, particularly if debris such as pine needles or dead leaves have collected there.

Be sure to clean out combustible materials from these and other vulnerable places on your home—such as rain gutters—regularly. Homes with wood or shingle roofs have a higher risk of igniting and causing the home to being destroyed during a wildfire. Build your roof or re-roof with materials such as composition, metal or tile. Block any spaces between roof decking and covering to prevent embers from catching.

**Vents:** Vents are important features on homes that allow air flow and let out moisture. However, vents create openings for flying embers, which can reach attics and other concealed spaces and ignite combustible materials. Un-screened vents are extremely hazardous and should be retrofitted immediately.

Cover all vent openings with noncombustible, 1/8-inch to 1/4-inch metal mesh screening. Do not use fiberglass or plastic mesh because they can melt and burn. Protecting vents in eaves or cornices with baffles can help to block embers. Metal mesh is not guaranteed to keep out embers; however, keeping the areas underneath vents free of vegetation and debris can help prevent ember entry.

**Eaves and Soffits:** Embers can gather under open eaves and soffits and ignite exposed wood and other combustible material. Eaves and soffits should be protected with ignition-resistant* or non-combustible materials.
Hardening Your Home

**Windows:** Radiant heat from a wildfire can cause windows to break even before a home ignites. This allows burning embers to enter and ignite the home from within. Single-paned and large windows are particularly vulnerable. Install dual-paned windows with one pane of tempered glass to reduce the chance of breakage in a fire. Also consider limiting the size and number of windows that face large areas of vegetation.

**Walls and Doors:** Wood products, such as boards, panels or shingles, are common siding materials. However, they are combustible and not good choices for fire-prone areas. Consider building or remodeling your walls with ignition resistant building materials, such as stucco, fiber cement, wall siding, fire retardant, treated wood, or other approved materials. Embers can enter homes through gaps in doors, including garage doors, so have be sure to have solid-closing doors and extend siding materials from the foundation to the roof. If you have a pet door, make sure there is a way to completely close it to prevent ember entry during a wildfire.

**Balconies and Decks:** Embers can land on or underneath decks and balconies and ignite materials there. It is easy for debris and dead vegetation to collect here, so homeowners should be extra vigilant. Ensure that all combustible items are removed from underneath your deck and enclose the space under decks so firebrands do not fly under and collect. Surfaces within 10 feet of the building should be built with ignition-resistant*, non-combustible, or other approved materials. Wooden, wicker, and other combustible patio furniture should also be avoided.

**Patio Cover:** Use the same ignition resistance materials for patio coverings as a roof.

**Rain Gutters:** Remove plant matter and other debris from rain gutters regularly—especially during fire season! Rain gutters are likely locations for embers to land and any combustible materials here increases your homes chance of ignition. You can also screen or enclose rain gutters to prevent accumulation of plant debris.

**Chimney:** Protecting your home from wildfire ignitions is a top priority; however, it is equally important to protect the wildland from ignitions from your home’s fireplace. Cover your chimney and stovepipe outlets with a non-combustible screen and use metal screen material with openings no smaller than 3/8 inch and no larger than 1/2 inch to prevent embers from escaping and igniting a fire.

**Garage:** Garages often contain many flammable items as well, and hardening garages against ember entry will help protect you home. Have a fire extinguisher and tools that can be useful in a fire—such as a shovel, rake, bucket, and hoe—available for fire emergencies. Install weather stripping around and under the garage door to prevent embers from blowing in. Store all combustible and flammable liquids away from ignition sources.

**Fences:** Fences often come into direct contact with homes and, if ignited, can bring direct flame contact to the house. Consider using ignition resistant or non-combustible fence materials to protect your home during a wildfire.

*Ignition-resistant building materials are those that resist ignition or sustained burning when exposed to embers and small flames from wildfires. Examples of ignition resistant materials include “noncombustible materials” that don’t burn, exterior grade fire-retardant-treaded wood lumber, fire-retardant-treated wood shakes and shingles listed by the State Fire Marshal (SFM) and any material that has been tested in accordance with SFM Standard 12-7A-5.
Defensible space is the required space between a structure and the wildland area that, under normal conditions, creates a sufficient buffer to slow or halt the spread of wildfire to a structure. It protects the home from igniting due to direct flame or radiant heat. Defensible space is essential for structure survivability and for the protection of firefighters defending your home.

Two zones make up the required 100 feet of defensible space.

Zone 1
Zone 1 extends 30 feet out from buildings, structures, decks, etc.
- Remove all dead plants, grass and weeds (vegetation).
- Remove dead or dry leaves and pine needles from your yard, roof and rain gutters.
- Trim trees regularly to keep branches a minimum of 10 feet from other trees.
- Remove branches that hang over your roof and keep dead branches 10 feet away from your chimney.
- Relocate firewood piles into Zone 2
- Remove or prune flammable plants and shrubs near windows.
- Remove vegetation and items that could catch fire from around and under decks.
- Create a separation between trees, shrubs and items that could catch fire, such as patio furniture, wood piles, swing sets, etc.

Zone 2
Zone 2 extends from 30-100 feet out from buildings, structures, decks, etc.
- Cut or mow annual grass down to a maximum height of 4 inches.
- Create horizontal spacing between shrubs and trees. (See diagram on next page)
- Create vertical spacing between grass, shrubs and trees. (See diagram on next page). Remove fallen leaves, needles, twigs, bark, cones, and small branches. However, they may be permitted to a depth of 3 inches if erosion control is an issue.

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**THE THREE R’s OF DEFFENSIBLE SPACE**

<table>
<thead>
<tr>
<th><strong>Removal</strong></th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reduction</strong></td>
<td>The removal of plant parts, such as branches or leaves, constitutes reduction. Examples of reduction are pruning dead wood from a shrub, removing low tree branches, and moving dried grass.</td>
</tr>
<tr>
<td><strong>Replacement</strong></td>
<td>Replacement is substituting less flammable plants for more hazardous vegetation. Removal of a dense stand of flammable shrubs and planting an irrigated, well-maintained lower bed is an example of replacement.</td>
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</tbody>
</table>
Firewise Landscaping

Incorporating fire-safe concepts into the landscape is one of the most important ways you can help your home survive a wildfire. The primary goal for fire-safe or “Firewise” landscaping is fuel reduction – that is, limiting the level of flammable vegetation and materials surrounding the home and increasing the moisture content of remaining vegetation. This means that all plants existing within 100 feet the home should be low-growing, well-irrigated, and less flammable (i.e. fire resistant).

The landscape condition should not support the spread of fire to other vegetation or to a building or structure. Making sure there is horizontal and vertical spacing between plants will help minimize the spread of fire between your plants and to your home. See page X for details on plant spacing.

It is also a good idea to create a ‘fire-free’ area within five feet of the home, using non-flammable landscaping materials and/or high-moisture content annuals and perennials. Consider fire-resistant material for patio furniture, swing sets, etc.

Proper vegetation clearance does not mean eradication of all plants, but rather the selective removal of highly flammable vegetation.

It is important to understand that all plants will burn, given the right conditions. Plants that are green and lush give better protection. If properly irrigated and maintained so that dead leaves, branches, and other flammable debris are regularly removed, these plants will provide better protection and be far less likely to carry fire to your home.

### Maintaining the Firewise Landscape:

- Mow the lawn regularly and dispose of cutting and debris promptly.
- Maintain the irrigation system regularly.
- Install drought friendly landscaping, incorporating rocks, or other types of non-combustible material.
- Keep the branches of taller trees pruned six to ten feet from the ground.
- Keep your gutters and roof clean of leaf clutter and pine needles, and remove dead and overhanging branches.
- Move all flammable materials, such as firewood and propane tanks at least 30 feet way from home and other structures.
- Familiarize yourself with local regulations regarding vegetative clearance, debris disposal, and fire safety requirements for equipment.
Plant and Tree Spacing

The spacing between grass, shrubs, and trees is crucial to reduce the spread of wildfires. The spacing needed is determined by the type and size of brush and trees, as well as the slope of the land. For example, a property on a steep slope with larger vegetation requires greater spacing between trees and shrubs than a level property that has small, sparse vegetation.

Vertical Spacing

- Remove all tree branches at least 6 to 10 feet from the ground.
- Allow extra vertical space between shrubs and trees. Lack of vertical space can allow a fire to move from the ground to the brush to the tree tops like a ladder.
- To determine the proper vertical spacing between shrubs and the lowest branches of trees, use the formula shown in the picture at right.

Example: A five foot shrub is growing near a tree. $3 \times 5 = 15$ feet of clearance needed between the top of the shrub and the lowest tree branch.

Horizontal Spacing

Horizontal spacing depends on the slope of the land and the height of the shrubs or trees. Check the chart at right to determine spacing distance.

“Ladder Fuels”