



## Low Cost Retrofit List



### 10 Low Cost Ways to Harden Your Home

1. When it is time to replace your roof, replace it with fire-resistant Class A roof material.
2. Block any spaces between your roof covering and sheathing (bird stops).
3. Install non-combustible corrosion resistant metal gutter covers on gutters to prevent the accumulation of leaves and debris in the gutter.
4. Cover your chimney and stovepipe outlets with noncombustible corrosion-resistant metal mesh screen (spark arrestor), with 3/8-inch to 1/2-inch openings.
5. Cover all vent openings with 1/16-inch to 1/8-inch noncombustible corrosion-resistant metal mesh screens.
6. Caulk and plug gaps greater than 1/16-inch around exposed rafters and blocking to prevent ember intrusion.
7. Inspect exterior siding for dry rot, gaps, cracks, and warping. Caulk or plug gaps greater than 1/16-inch in siding and replace any damaged boards, including those with dry rot.
8. Install weather stripping to gaps greater than 1/16-inch in garage doors to prevent ember intrusion. The stripping must be compliant with UL Standard 10C.
9. When it's time to replace your windows, replace them with multi-paned windows with at least one pane of tempered glass.
10. When it's time to replace your siding or deck, use compliant noncombustible, ignition-resistant, or other materials approved by the Office of the State Fire Marshal (OSFM).

### 5 No Cost Ways to Create Defensible Space and Enhance the Effects of a Hardened Home

1. Regularly clean your roof, gutters, decks, and the base of walls regularly to avoid the accumulation of fallen leaves, needles, and other flammable materials.
2. Ensure all combustible materials are removed from underneath, on top of, or within five feet of a deck.
3. Remove vegetation or other combustible materials that are within five feet of windows and glass doors.
4. Replace wood mulch products within five feet of all structures with noncombustible products such as dirt, stone, or gravel.
5. Remove all dead or dying grass, plants, shrubs, trees, branches, leaves, weeds, and pine needles within 30 feet of all structures or to the property line.

**For questions or additional information, contact the Newport Beach Fire Department Fire Prevention Division at (949) 644-3106 or [nbfdwildland@nbfd.net](mailto:nbfdwildland@nbfd.net)**

# IMMEDIATE (NONCOMBUSTIBLE) ZONE

Why is it important to create and maintain 5 feet of noncombustible space around the exterior of a building?

Wildfire risks are on the rise, but there are ways home and business owners can take control of their vulnerabilities. Changes made to a structure and its surroundings within 100 feet can make a big impact. Research from the Insurance Institute for Business and Home Safety (IBHS) shows that the first 0 to 5 feet around the structure, known as the immediate zone or noncombustible zone, has the greatest impact on your risk. IBHS and the National Fire Protection Association® (NFPA®) recommend keeping this zone well-maintained and clear of combustible materials.

## IBHS Research

The main objective of the 0-to-5-foot zone is to reduce the potential that embers landing near a building will ignite fuels and expose the area around a home to a direct flame (Figure 1). Removing anything that can ignite from embers is critically important. To verify how effective a 5-foot noncombustible zone is around a building, more than 180 tests were conducted in 2018 at the IBHS Research Center to evaluate fire behavior and heating of buildings (Figures 2a & 2b).

## Key Observations

- For combustible landscaping, such as wood mulch, the thickness of the mulch bed, wind speed, and location of the flame and building all impact the potential of mulch to ignite and how quickly fire can spread to the building.
- Burning mulch generates embers that can ignite nearby mulch, increasing the chances of direct flame contact spreading to the building.
- When flames are 5 feet away, a building's surface temperature is below temperatures that could cause ignition. However, corners of a building (45-degree angles) experience a higher temperature when exposed to flames, even when a 5-foot space is present. Testing showed that corners can be more vulnerable due to fire spread through fuel (such as mulch) on the ground, because at the same wind speed, wind blowing directly at a wall (90-degree angle) will result in taller flames and more radiant heat, while wind on a corner (45-degree angle) will result in longer flames that are closer to the ground.

## Recommendations

- Keep the corner areas of a building clear of combustible materials due to the higher probability of having direct flame touching the surrounding ground.
- Keep gutters free of debris and use metal gutters.
- Install hard surfaces, such as a concrete walkway, or use noncombustible mulch products, such as rock.
- Keep the lawn well irrigated and use low-growing herbaceous (non-woody) plants. Shrubs and trees are not recommended in the 5-foot zone.
- Remove dead vegetation and implement a maintenance strategy to keep the 5-foot zone clear of dead plant materials.
- Mitigating home ignition zones should not stop at 5 feet from the building. It should be combined with the footprint of an attached deck and area that extends away from the building up to 100 feet or to the property line.



**Figure 1** – Creating and maintaining home ignition zones (defensible space) around your property are proven ways to reduce risks of property damage during a wildfire, as tests at the IBHS Research Center have shown.



**Figure 2a** Experiments conducted at the IBHS Research Center to study the effectiveness of creating a noncombustible space around buildings.



**Figure 2b** Embers impacting a building: left side with combustible (wood) and the right with noncombustible (rock) mulch.

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## Learn More

- ▶ For online training and other resources, see [nfpa.org/firewise](https://nfpa.org/firewise).
- ▶ Access the latest research from IBHS at [ibhs.org](https://ibhs.org).





# How Homes Catch Fire



## Is Your Home Hardened to Survive a Wildfire Ember Storm?

**FIRE HARDENED** means your home is prepared for wildfire and an ember storm. It does not mean fireproof. Home hardening addresses the most vulnerable components of your house with building materials and installation techniques that increase resistance to heat, flames, and embers that accompany most wildfires.

Learning to live with wildfire includes taking steps to reduce the risk to homes. Homes built to modern (2008 or later) building codes, with an adjacent and well-maintained defensible space, have a much better chance of surviving wildfire. Maintenance and upgrades to older homes can significantly improve the chance of your home surviving a fire.

Part of learning to live with wildfire is understanding that we have some control in how we prepare for and address this hazard, and how we manage fire in our individual communities.

This brochure can help you better understand options for hardening your home and where to find more information.

### THREE WAYS YOUR HOME CAN BE EXPOSED TO FIRE



#### EMBER STORM

Embers are small pieces of burning material that can travel more than a mile ahead of a wildfire. They can create spot fires when they land on combustible materials, such as leaves in your gutter or plants under your windows.



#### RADIANT HEAT

Radiant heat generated from burning structures or plants can be hot enough to ignite a house without direct flame contact. This is particularly challenging in densely populated areas, where the heat from one burning home can ignite the next.



#### DIRECT FLAME

Depending on time and exposure, direct flame contact can ignite your home. The flaming front of a wildfire is often not hot enough to ignite a house, but plants under windows ignited by embers or direct flame can break glass, allowing fire to enter the house.

Embers are responsible for most damage during wildfires. They can accumulate on your home, deck, or porch and ignite plants, mulch, leaves, fencing, or furniture. They can also be forced into gaps in the home (e.g. attic vents or an open or broken window) and burn the home from the inside out. When this happens, there can be little damage to the surrounding vegetation, leaving people puzzled as to what caused the home to burn.

*Embers cause the majority of wildfire home ignitions.*

PHOTO CREDITS: INSURANCE INSTITUTE FOR BUSINESS & HOME SAFETY (above left); TENNESSEE DIVISION OF FORESTRY (center)

## Home and Property

**WE'VE LEARNED FROM RECENT FIRES. HARDENING YOUR HOME** and keeping the 5 feet closest to your house clear of flammable materials (including patio furniture and décor) greatly improves its chance of surviving a fire.

Maintaining defensible space is the law within 100 feet of a home in wildfire-prone areas, and highly recommended elsewhere. If a garage, shed, your neighbor's house, or the property line is closer than 100 feet, it is especially important to harden your home to reduce vulnerability to radiant heat and to work together with your neighbors to reduce risk—a great way to build community while protecting assets.

See the *California Fire Safe Council, Defensible Space* brochure for more information.



### KEY ELEMENTS OF DEFENSIBLE SPACE

- ✓ Keep your gutters and roofs clear of leaves and debris.
- ✓ Maintain a 5-foot noncombustible zone around your home and deck.
- ✓ Break up fuel by creating space between plants, and between the ground and the branches of trees.
- ✓ Mow grass to a height of 4 inches.
- ✓ Keep mulch away from the house. Bark mulch helps plants retain water but ignites and becomes flying embers during a wind-driven fire.
- ✓ During a wildfire move anything burnable—such as patio furniture or gas BBQ tanks—30 feet away from structures.

## Helpful Resources

The **CALIFORNIA FIRE SAFE COUNCIL (CFSC)** helps coordinate a strong network of partnerships with local, regional, state, and national organizations in order to help California residents acquire the education, resources, and tools they need to be better prepared for wildfire.

For more information:

[FireSafeCouncil.org](http://FireSafeCouncil.org) • [ReadyForWildfire.org](http://ReadyForWildfire.org)

Contact your local Fire Safe Council to get involved.



For building codes in California, visit Office of the State Fire Marshal:

[OSFM.Fire.ca.gov/CodeDevelopment/WildFireProtectionBuildingConstruction](http://OSFM.Fire.ca.gov/CodeDevelopment/WildFireProtectionBuildingConstruction)

Additional Hardened Home Information:

[ReadyForWildfire.org/Hardening-Your-Home](http://ReadyForWildfire.org/Hardening-Your-Home)  
[DisasterSafety.org/ibhs/ibhs-Wildfire-Publications](http://DisasterSafety.org/ibhs/ibhs-Wildfire-Publications)  
[UCANR.edu/Sites/Fire/Prepare/Building](http://UCANR.edu/Sites/Fire/Prepare/Building)

Sign up for CAL FIRE Alerts:

[ReadyForWildfire.org/Ready-for-Wildfire-App](http://ReadyForWildfire.org/Ready-for-Wildfire-App)

Look for an emergency alert system in your county.

**ALWAYS CALL 911 FOR EMERGENCIES**

This publication is made possible through a grant from the USDA Forest Service, Pacific Southwest Region Cooperative Fire Program. The California Fire Safe Council is an equal opportunity provider.





# Recommendations for Hardening Your Home to Better Survive Wildfire

EMBER-RESISTANT CONSTRUCTION RELIES ON BOTH MAINTAINING DEFENSIBLE SPACE AND HARDENING YOUR HOME. HERE ARE SOME THINGS YOU CAN DO TO HARDEN YOUR HOME TO MAKE IT MORE FIRE-RESISTANT.

**YOUR TOP 3 PRIORITIES SHOULD BE YOUR ROOF, VENTS, AND NEAR-HOME VEGETATION.**

- 1) Avoid combustible materials on the property, especially within the first five feet of the home.
- 2) Incorporate fire- and ember-resistant construction materials, installation details, and maintenance.
- 3) Be thoughtful about landscaping choices and maintenance.

**THE ROOF** has the greatest exposure to fire embers.

- ❑ Inspect and repair or replace your roof with tile, metal, asphalt, or shingles (materials with a Class-A fire rating).
- ❑ Plug gaps between your roof covering and sheathing to prevent ember entry.
- ❑ Install a metal drip edge (i.e., metal angle flashing) at the roof edge.
- ❑ Cover tile caps to prevent bird nesting.



**VENTS** can allow embers to enter a crawl space, the attic, soffit, or foundation.

- ❑ Upgrade vents with 1/8-inch metal mesh, or install vents approved to resist embers and flames (see resources).



**EAVES AND SOFFITS** with open-eave construction should be inspected.

- ❑ Wherever possible enclose open eaves.
- ❑ Caulk and plug gaps around exposed rafters and blocking.



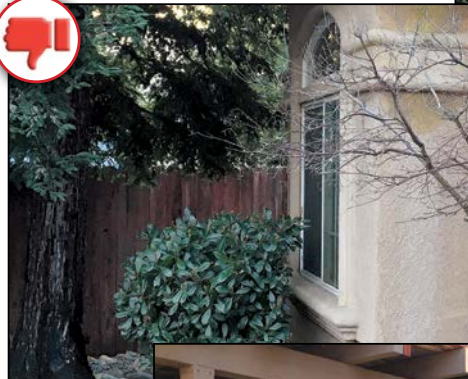
**WINDOWS** can break from the heat, even before a home ignites, allowing burning embers or flames into the home.

- ❑ Install or upgrade to multi-pane tempered glass.
- ❑ Ensure there is no vegetation or other combustible materials within 5 feet of windows and glass doors.



**SIDING** is vulnerable if exposed to flames or radiant heat for periods of time.

- ❑ Inspect all siding. Plug or caulk gaps and joints.
- ❑ Maintain 6 inches of vertical noncombustible material between the ground and the start of the siding.
- ❑ Replace shingle or shake siding with ignition-resistant materials.
- ❑ If a neighboring home or outbuilding is closer than 30 feet, be sure to use noncombustible or ignition-resistant materials.
- ❑ Use a noncombustible louvered or self-closing dryer vent cover.



**DECKS** are vulnerable to fires from embers igniting vegetation or materials near or below them.

- ❑ Ensure that all combustible items are removed from underneath, on, or next to your deck.
- ❑ Put a noncombustible layer between wood decks and siding.



## CHIMNEY

- ❑ Cover your chimney and stovepipe outlets with a noncombustible mesh screen.

**RAIN GUTTERS** should be cleared of leaves and needles that embers can easily ignite.

- ❑ Inspect and clean gutters regularly.
- ❑ Install a noncombustible gutter guard to reduce accumulated debris.

**GARAGES** are especially vulnerable to embers and ash. Embers can enter a garage as easily as dust, potentially igniting a house from the inside.

- ❑ Install weather stripping, or gaskets, around and under the garage door to limit ember entry.
- ❑ Store all combustible and flammable liquids away from ignition sources.
- ❑ Know how to operate your garage door when there is no power.

## FENCES

- ❑ Fences or gates that connect to structures should use noncombustible materials within 5 feet of the building, to prevent the fence from burning up to the structure.



**DRIVEWAYS AND ACCESS ROADS** should be built and maintained according to state and local codes so that emergency vehicles can safely reach your home.

- ❑ Maintain access roads with a minimum of 10 feet of clearance on either side.
- ❑ Ensure that all gates can open without power to accommodate emergency equipment.
- ❑ Trim overhanging trees up to 15 feet from the ground in order to allow emergency vehicles to pass.

## ADDRESS

- ❑ Make sure your address is clearly visible from the road.

**WATER SUPPLY** can be enhanced by having multiple garden hoses long enough to reach all areas of the structures on your property.

- ❑ If you have a pool or well, consider getting a fuel-powered pump.
- ❑ Best practice is to provide a 2½-inch water line from a water tank to a standpipe fitted with 1½-inch fire hose fittings coordinated with your local fire department.



For best practices to protect your home and property, see the *California Fire Safe Council, Defensible Space* brochure.





## Creating Defensible Space to Help Survive a Wildfire Ember Storm

**DURING AN EMBER STORM**, flying embers can ignite anything combustible in their path, including your home and anything near it, such as plants or patio furniture.

Defensible homes should have nothing ignitable within the first 5 feet, and reduced fuels out to 100 feet or the property line (whichever is closer).

Creating and maintaining defensible space around a house—while hardening the home against wind- or heat-driven embers, flames, and heat—will increase the likelihood that it survives a wildfire. Defensible space also helps firefighters be safer while protecting property.

If a home is difficult to find, is surrounded by dense vegetation, or doesn't provide enough safe space for firefighters to work, it may be too dangerous to attempt to save.

This brochure is a guide to help you create your defensible space and find additional information and resources.

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Maintaining defensible space is the law within 100 feet of a home in wildfire-prone areas, and highly recommended elsewhere. If a garage, shed, your neighbor's house, or the property line is closer than 100 feet, it is especially important to "harden" the home itself to reduce vulnerability to radiant heat, and to work together with your neighbors to reduce risk—a great way to build community while protecting assets.

See the *California Fire Safe Council, Home Hardening* brochure for more information on structure protection.



#### Ladder Fuels and Fuel Continuity

Fire needs fuel to burn. A *fuel ladder* occurs when grass or other surface fuel carries flames into shrubs or small trees and then the fire climbs into larger trees—a continuous vertical line of fuel. Surface and ladder fuel is almost always necessary to sustain fire in upper tree branches. Defensible space breaks up the continuity of fuel both horizontally and vertically, to interrupt the spread of fire to your home.

EXAMPLE OF A FUEL LADDER  
Continuous vegetation reaches into upper tree branches, providing a "ladder" for the fire to climb.



## Helpful Resources

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**Defensible Space is the law in wildfire-prone areas. Contact CAL FIRE or your local fire department for specific defensible space information and local ordinances.**

[ReadyForWildfire.org/Defensible-Space](https://ReadyForWildfire.org/Defensible-Space)

**Contact your local Fire Safe Council to get involved.**

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# Recommendations for Creating Defensible Space

## HOMES SURVIVE WILDFIRE THROUGH A COMBINATION OF THE FOLLOWING FACTORS:

- 1) Awareness and management of combustible materials on the property, especially within the first 5 feet of the home.
- 2) Incorporation of fire- and ember-resistant construction materials, installation details, and maintenance.
- 3) Careful landscape selection, placement, and maintenance.

For best practices to protect your home and other structures, see the *California Fire Safe Council, Hardened Homes* brochure.

Defensible Space is the law in wildfire-prone areas. These condensed recommendations address legal requirements and best practices for preparing and protecting your property.

For more information contact CAL FIRE or your local fire department.

### ZONE 0

#### 0 feet – 5 feet from buildings, decks, and other structures

The goal is to avoid home ignition from blowing embers.

- Use noncombustible materials such as rock, stone pavers, cement, bare earth, gravel, or sand.
- Remove all plants and shrubs near windows.
- Remove leaves and needles from your roof and rain gutters.
- Clear vegetation and items that could catch fire from around and under decks.
- Remove dead branches that overhang or touch your roof. Keep branches 10 feet away from your chimney.
- Remove all leaves, needles, or other debris that fall in this zone.

### ZONE 1

#### 5 feet – 30 feet from buildings, decks, and other structures

The goal is to reduce heat and movement of flame.

- Remove all dead plants, grass, and weeds.
- Actively prune live shrubs.
- Relocate woodpiles outside of this zone.
- Avoid extensive use of mulch, which can convey fire to the house.
- Limit fallen leaves, needles, twigs, bark, cones, and small branches to a depth of 2 inches.
- Move all gas and propane tanks outside of this zone.

### ENTIRE PROPERTY

#### 5 feet – 100 feet from buildings, decks, and other structures, or to the property line

- Create islands of vegetation with horizontal spacing between shrubs and trees.
- Create vertical spacing between grass, shrubs, and trees.
- Choose low-growing, irrigated, non-woody plants such as vegetables, succulents, erosion-control grasses, flowers, or lawn to create landscaping in this zone.
- Mow or remove dead or dried vegetation.
- Trim trees regularly to maintain a minimum of 10 feet of clearance between branches of adjoining trees or shrubs.
- Mow any grass to a maximum height of 4 inches.
- To protect water quality, maintain vegetation near waterways; do not clear to bare soil. Vegetation removal can cause soil erosion that damages streams, especially on steep slopes. Remove dead trees and shrubs, leaving the roots in place, if practical.
- Break up dense shrub cover on slopes by creating small islands of pruned shrubs staggered horizontally.
- Prior to evacuation, pull patio furniture, play sets, and gas BBQ tanks as far as possible from any structure, and bring cushions inside.



## LANDSCAPING TIPS

### Proper Placement Makes A Difference

Remember, any plant can burn under the right conditions. For all plants, maintenance is key.

When choosing species to plant in your 5- to 30-foot defensible space zone, look for plants with these characteristics:

- Able to store water in leaves and stems.
- Produce limited dead and fine material.
- Maintain high moisture content with limited watering.
- Low-growing or open form.
- Open loose branches with a low volume of total vegetation.
- Low levels of volatile oils or resins.
- Slow growing with little maintenance needed.
- Not considered invasive.

# Safer from Wildfires in



**Safer from Wildfires is an interagency partnership between Insurance Commissioner Ricardo Lara and the emergency response and readiness agencies in Governor Gavin Newsom's administration to protect lives, homes, and businesses by reducing wildfire risk.**



With California experiencing devastating, climate change-intensified wildfires, homes and businesses need insurance they can rely on. Commissioner Lara is using every tool available to improve insurance for our communities. Drawing on the direct experience of first responders and the latest research on wildfires, the partnership created a consistent approach to reducing risk with a list of achievable and effective actions to help make existing homes and businesses safer from wildfires. The ultimate goal is protecting consumers by reducing wildfire risk in their communities, making insurance available and affordable for all Californians.



CALIFORNIA  
**Public Utilities Commission**

This "ground up" approach for wildfire resilience has three layers of protection — for the structure, the immediate surroundings, and the community — to prevent wildfires from catching and spreading to other homes and businesses in the neighborhood.

Commissioner Lara is working to increase available incentives for wildfire safety. To view the list of insurance companies currently offering discounts visit [insurance.ca.gov](https://insurance.ca.gov).

## 1 Protecting the structure



- Class-A Fire rated roof
- Maintain a 5 foot ember-resistant zone around a home (including fencing within 5 feet)
- Noncombustible 6 inches at the bottom of exterior walls
- Ember and fire-resistant vents (See [Low-Cost Retrofit List](#), and Chapter 7A)
- Upgraded windows (Double paned or added shutters)
- Enclosed eaves

## 2 Protecting the immediate surroundings



- Cleared vegetation and debris from under decks
- Removal of combustible sheds and other outbuildings from the immediate surroundings of the home, to at least a distance of 30 feet
- Defensible space compliance (including trimming trees, removal of brush and debris from yard, and compliance with state law and local ordinances)

## 3 Working together as a community



- A community should have clearly defined boundary and a local risk assessment in consultation with the local fire district or state fire agency; an identified evacuation route, cleared of vegetative overgrowth, and evacuation plan contingencies; clear funding sources to implement community mitigation activities and meet clear risk reduction goals; and integrated and up-to-date local planning documents pertinent to community wildfire risk.
- Current examples include the Fire Risk Reduction Community designation under development by the Board of Forestry, Firewise USA communities in good standing, and Shelter-in-Place designations.