

# A Homeowner's Guide to Wildfire Retrofit



Created by the staff of the

Institute for Business and Home Safety  
[www.disastersafety.org/](http://www.disastersafety.org/)

and

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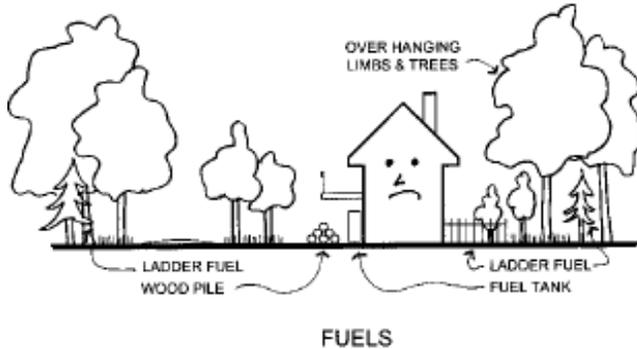
## You and Your Local Fire Department

In a wildfire, your local fire department has two priorities – to remove you and your family from harm's way and to stop the progression of the wildfire. If your home happens to be in the wildfire's path, they may or may not be able to protect it – there are simply no guarantees. You must take action before a fire starts.

## Just the Right Conditions

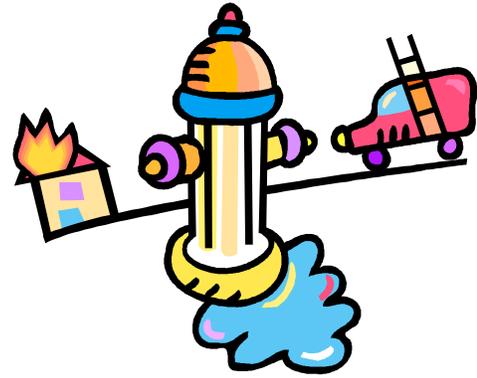
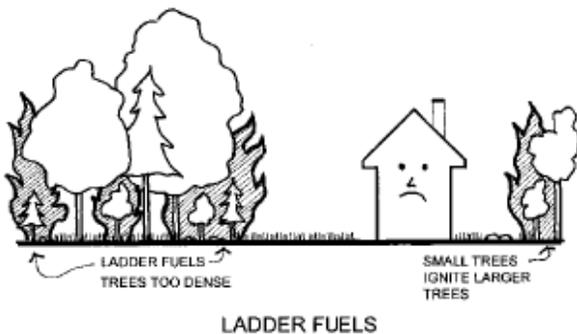
Fuels, Weather and Topography work together to determine how quickly a wildfire travels and at what intensity.

Fuels: Two basic types 1) Vegetation 2) Structures



Vegetation: Fuel in its natural form consists of Living and Dead trees, bushes and grasses. Grasses burn quicker and with less intensity than trees.

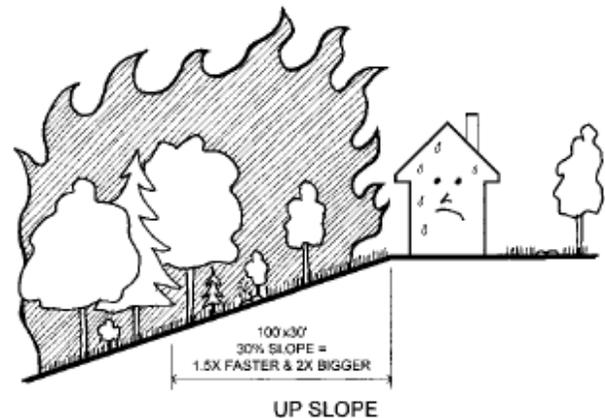
Ladder Fuels: Help convert a Ground fire into a Crown fire (tree tops) that moves much more quickly. Any branches or shrubs between 6 inches and 6 feet are considered ladder fuels.



Structural Density: The closer the homes are together, the easier it is for the flames to spread from one structure to another.

Weather: High temperature, Low humidity and Swift winds can increase the probability of ignition and increase the difficulty of fire control. Drought conditions can exacerbate existing conditions.

Slope: The upward or downward incline or slant of terrain influences fire. Hot gases rise in front of the fire along the slope face pre-heating up-slope vegetation. Slope can move a grass fire up to 4x faster with 2x higher flame lengths than a fire on level ground.



## How Your Home Catches on Fire

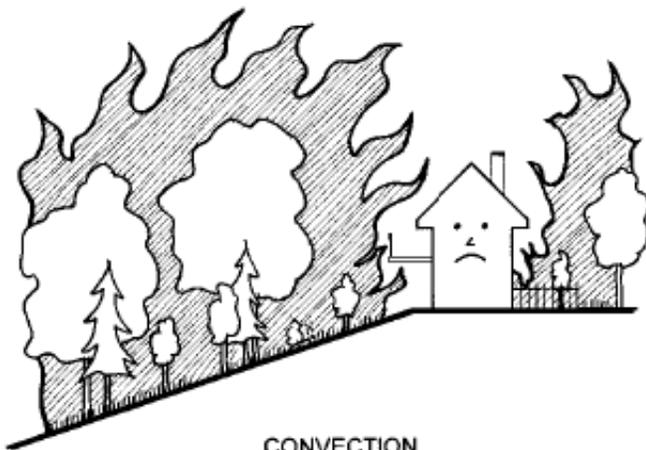
There are three ways a wildfire can transfer itself from the natural vegetation or other burning homes to Your Home: Radiation, Convection, Firebrands.

Radiation: Wildfire radiates heat the same way a radiator heats your rooms in the winter. Radiated heat is capable of igniting combustible materials from distances of 100 feet or more.



RADIATION

Convection: Contact with the flames may also cause a wildfire to ignite Your House because the heat column preheats and dries any fuels in front of it. Typically, the convective heat column rises vertically, within the heat plume. This changes if your home is on a slope because now the column is pointed at Your House (along the slope line).



CONVECTION

Firebrands: These are burning materials that detach from a fire and can be carried a long distance by the winds associated with the wildfire. These distances can be up to one mile.



FIREBRANDS

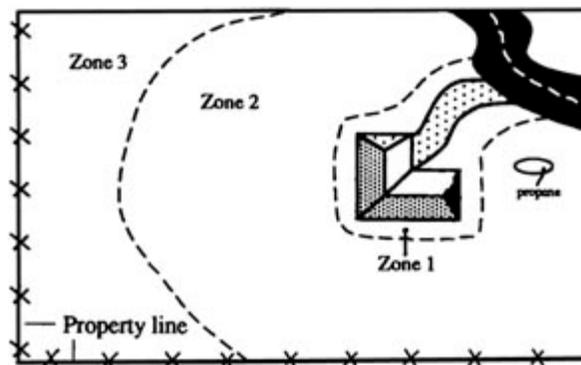
Your Home's building materials and design play a significant role in determining the level of exposure to heat and flames that can be endured before ignition.

## Assessing Your Property

### Assessing Your Property

- Have wildfires occurred in your area? If so, under what conditions? Your local fire department can help you determine this.
- Do you have seasons when wildfires are more likely to occur?
- Do you live in hilly or flat country?
- Are there areas around your home that are more susceptible to a wildfire?
- Do you border wildland (vegetated, uncultivated land)?
- Do you have a deck attached to your home? Open or closed?
- Is there a substantial amount of tall vegetation (over 2 feet) crowded around your home?
- Do tree limbs extend over your home or are they touching the exterior walls?
- Are the trees in good condition or are they dying?
- Do you have a woodpile in close proximity to your home?
- Do you have any fuel tanks nearby?
- Is a wood fence attached to your home?

What You Can Do To Reduce Your Risk: Homes and landscapes in a wildland/urban interface (WUI) area can be designed and maintained to increase the chances of surviving a wildfire without the intervention of the fire department. You need to create a Defensible Space for Your Home to help firefighters do their job and to reduce their risk.



Defensible Space: The area of reduced fuels *between* Your Home and the untouched wildland. This is to provide enough distance between the home and a wildfire to ensure that the home can survive without extensive effort when a wildfire is on its way. There are three zones within the Defensible Space.

## **Defensible Space**

**Zone 1:** Establish a well-irrigated area around Your Home. Plantings should be limited to carefully spaced species. The size of the area depends on the hazard level.

A Low Hazard Area:

- Flat terrain, Limited wildland, Native vegetation, Is not closely surrounded by trees, Fuels are at least 50 feet from the home depending on slope, and Fire trucks have easy access

A Moderate Hazard Area:

- History of wildfires, Hilly terrain (slope between 10-20%), Bordering wildland, Trees are located close to the home, Fuels are within 50 feet of the home depending on slope, and Fire trucks have access

A High Hazard Area:

- History of nearby wildfires, Steep terrain (slope average over 20%), Forested wildland within 100 feet of the home, Trees are crowded within 30 feet, Fuels are within 30 feet, and Fire trucks have limited access

In a low hazard area the well-irrigated area should extend a minimum of 30 feet from Your Home on all sides.

As the hazard risk increases, a clearance of between 50 and 100 feet or more may be necessary, especially on any downhill sides of the lot.

**Zone 2:** Maintain a reduced amount of vegetation. Place low-growing plants and carefully spaced trees in this area. Your irrigation system should also extend into this area.

Trees should be at least 10 feet apart at the drip line, and all dead or dying limbs should be trimmed off. For trees taller than 18 feet, prune lower branches within 6 feet of the ground. This may look odd if you have pinyon pines or juniper trees. For trees shorter than 18 feet, prune the lower branches to a height of 6 feet or half of the trees total height, whichever is less. This is to

reduce the potential of a ground fire moving into the tree crowns. No tree limbs should come within 10 feet of Your Home.

**Zone 3:** This furthest zone from Your Home is a slightly modified natural area. Thin selected trees and remove highly flammable vegetation such as dead or dying trees and shrubs.

How Far Should Zones 2 and 3 Extend?

*Low Hazard Areas:* These two zones should extend another 20 feet beyond the 30 feet in Zone 1. This creates a modified landscape of over 50 feet total.

*Moderate Hazard Areas:* These two zones should extend at least another 50 feet beyond the 50 feet in Zone 1. This would create a modified landscape of over 100 feet.

*High Hazard Areas:* These two zones should extend at least another 100 feet beyond the 100 feet in Zone 1. This would create a modified landscape of over 200 feet total.

**The Importance of Maintenance:** Once you have created Your Home's defensible space, you must maintain it or risk losing the benefit of its protection.

## The Ideal Fire Resistant Home

A Wildfire sees Your Home as a Fuel Source. The Defensible Space around Your Home will keep all but the worst wildfires at bay. However, if the wildfire does break through your first line of defense, ignition might occur on Your Home's exterior.

Use this checklist to determine how fire resistant Your Home is:

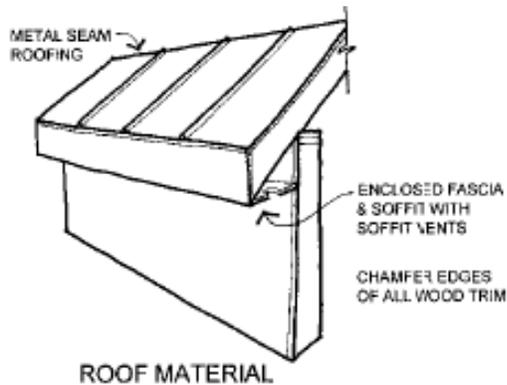
Taking Inventory	
<i>Examine your home's construction and materials. Use the following as a checklist.</i>	
<ul style="list-style-type: none"><li>• What type of roof covering do you have? Asphalt, wood, concrete, tile or metal? Concrete, tile or metal are the best choices.</li><li>• How are your eaves, fascias and soffits constructed? Are they made from vinyl, wood or metal? Metal is the best option.</li><li>• What are Your Home's exterior walls covered with? Are they wood, aluminum or vinyl siding, stucco, brick or concrete masonry? Wood and vinyl siding is the poorest choice.</li></ul>	<ul style="list-style-type: none"><li>• Do you have large windows or sliding glass doors that border or face the wildland? Are they single pane, double pane or tempered glass?</li><li>• How are Your Home's attic and sub-floor vents protected? Are their covers metal or vinyl?</li><li>• Are spark arresters installed on all your home's chimneys?</li><li>• Does Your Home have a deck or balcony that overhangs a slope?</li><li>• Is there a porch, garage or wood fence that attaches directly to your home?</li></ul>

Now, take some Actions to fix any issues you found than make Your Home less fire resistant!

## Take Action Now

Now you can Take Action by deciding on the best modifications for Your Home, based on your risks.

**Roof:** This is the most vulnerable part of your home. Firebrands can fall on your roof, landing in nooks and crannies where fires can easily start.



The best way to avoid firebrands igniting your roof is to have a fire resistant roof. There are three levels of classifications based on testing, Classes A, B and C. Class A roofing is the most fire resistant and recommended roofing material.

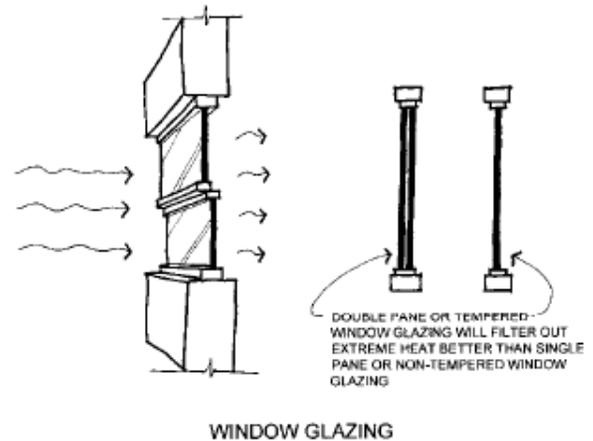
Some treated wood shake shingles products have ratings of Class C or better. Over time, however, the effectiveness of the chemicals is broken down by weathering and the roof becomes unprotected.

**Exterior Walls:** Radiant and Convective heat from wildfires can ignite the exterior wall of Your Home. Once a fire starts on an exterior wall it can easily 'bridge' to more vulnerable areas such as eaves, soffits (underside of an overhang), vents and windows.

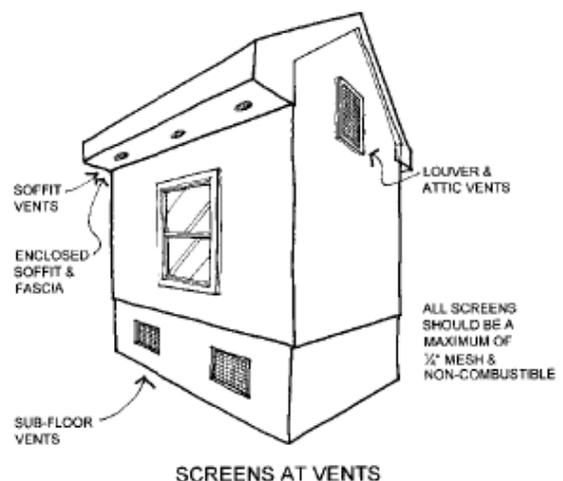
Wall materials that resist heat and flames include cement, plaster, stucco and concrete masonry such as stone, brick, or block. Other materials may not burn, like vinyl, but they can lose their integrity when exposed to high heat and can create a direct path for fire to enter Your Home.

**Exterior Windows, Glass Doors and Skylights:** High heat exposure can cause glass, both single and double pane, to fracture and collapse leaving an opening for flames and firebrands to enter.

Tempered glass typically fractures at higher heat exposures, well above the radiant heat exposures capable of igniting the surrounding wood.



**Eaves, Fascias, Soffits:** These are vulnerable to both Firebrands and Convective exposures. Eaves, Fascias and Soffits should be 'boxed' or enclosed with noncombustible materials to reduce vent size. The materials used should not melt or burn at relatively low temperatures (PVC, Vinyl). Non-combustible screening should be used on vents.



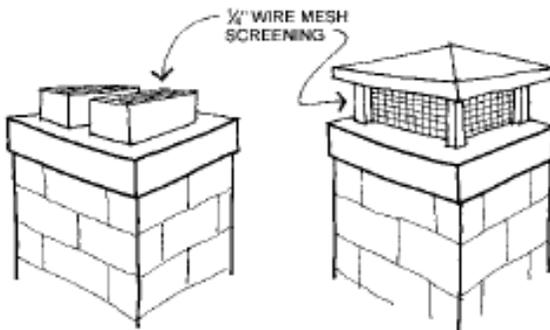
## Take Action Now

Attic, Subfloor or Foundation Vents: Wind and/or direct contact with Convective heat can push Firebrands through the vents into Your Home's basement or crawl space.

Vent openings should be screened to prevent Firebrands or objects larger than ¼ inch from entering your home. Use materials to cover vents that will not burn or melt when exposed to Radiant or Convective heat or Firebrands.

Fireplace Chimneys: Windblown embers can access Your Home through the fireplace chimney flue. The Firebrands can collect on flammable objects increasing the chance of combustion inside the house.

Avoid this situation by installing a Spark Arrestor on your chimney. Use materials made from welded wire or woven wire mesh with openings less than ¼ inch wide.



CHIMNEY SCREENS

Overhangs and Other Attachments: This includes additional structures attached to Your Home such as room push outs, bay windows, decks, porches, carports and fences. These features are vulnerable to Convective heat exposures.

When assessing Your Home, if the feature in question is attached to Your Home, it should be considered part of Your Home.

To reduce the vulnerability of the feature, you must remove all fuels around these areas. Also, box in the undersides of the overhangs, decks and balconies with non-combustible or fire-resistance materials to reduce the possibility of ignition. For fences, make sure they do not directly attach to Your Home.



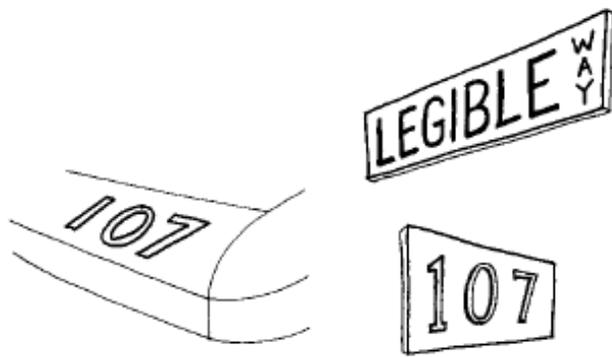
WOOD PILES, DECKS, FENCES, ETC.

## Helping Your Local Fire Department

After creating a Defensible Space and modifying Your Home's vulnerable areas, there is no guarantee a wildfire will not threaten Your Home. It is important that your Local Fire Department be able to find and defend Your Home.

Here are some property modifications to accommodate your Local Fire Department.

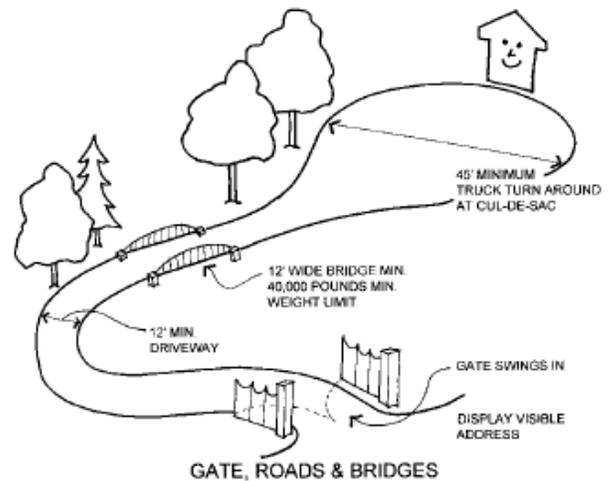
Street Signs and Numbers: It is critical that street signs and house numbers be non-combustible and visible from the road.



SIGNAGE

Driveways: Fire trucks and equipment are large and often get into trouble in tight spots. Your Home's driveway must be large enough to accommodate the typical sized trucks. Fire experts recommend a driveway at least 12 feet wide and 13 feet of vertical clearance.

Gates: If Your Home is gated, it is important that the gate opens inward and is wide enough for the fire fighting equipment. Experts also recommend that the gate be at least 30 feet off the main road so the equipment can pull to the roadside while opening the gate. If the gate is locked, the lock should not be so strong that firefighters cannot break it in an emergency.



# Wildfire Protection Checklist

## Before and During a Wildfire: Be Completely Prepared

You will give yourself, your family and Your Home a better chance of escaping harm during a wildfire by taking as many of these precautions as possible.

✓	<b>Before a Wildfire Strikes</b>
	Know where your gas, electric and water main shut-off controls are and how to turn them off if there is a leak or electrical short. Also, know how to use a fire extinguisher. Make sure all adult and teenage members of your family know how to shut off each utility and how to use the extinguisher.
	Become familiar with your community's disaster-preparedness plans and create a family plan. Know where the closest police, fire and emergency medical facilities are located.
	Plan several different escape routes from your home and neighborhood and designate an emergency meeting place for the family to reunite. Establish a contact point to communicate with concerned relatives.
	Put together an emergency kit that includes at least a three-day supply of drinking water and food that needs no refrigeration and, generally, no cooking; emergency cooking equipment, if required; a portable NOAA weather radio; first aid supplies and medications; basic tools, such as a wrench, a flashlight and gloves; portable lanterns and batteries; credit cards and cash; and important documents, including insurance policies.
	Talk to your neighbors about wildfire safety. Plan how the neighborhood could work together before, during and after a wildfire. Make a list of your neighbors' skills such as medical or technical. Consider how you would help neighbors who have special needs such as elderly or disabled persons. Make plans to take care of children who may be on their own if parents cannot get home.
	Periodically review your homeowner's insurance policy with your insurance agent or company to make sure that, if you are the victim of a disaster, you have enough coverage to rebuild your home and life.

# Wildfire Protection Checklist

✓	<b>During a Wildfire</b>
	If you are warned that a wildfire is threatening your area, listen to your radio for reports and evacuation information. Follow the instructions of local officials.
	Back your car into the garage or park it in an open space facing the direction of escape. Shut car doors and roll up windows. Leave the key in the ignition or in another easily accessible location.
	Close garage windows and doors, but leave them unlocked. Disconnect automatic garage door openers.
	Confine pets to one room. Make plans to care for your pets in case you must evacuate.
	Arrange temporary housing outside the threatened area.
	When advised to evacuate, do so immediately.
	Wear protective clothing – sturdy shoes, cotton or woolen clothing, long pants, a long-sleeved shirt, gloves and a handkerchief to protect your face.
	Take your emergency kit.
	Lock your home.
	Notify your relatives and the local officials that you have left and where you can be reached.
	Follow the evacuation route that your local officials have identified. If no official route exists, choose a route away from fire hazards. Watch for changes in the speed and direction of the fire and smoke.

If you are SURE you have the time, take additional steps to protect Your Home:

✓	<b>During a Wildfire, If You Have Time</b>
	Close windows, vents, doors, Venetian blinds and heavy drapes. Remove lightweight curtains.
	Shut off gas at the meter. Turn off pilot lights.
	Move flammable furniture into the center of the home away from windows and sliding glass doors.
	Turn on a light in each room to increase the visibility of your home in heavy smoke.
	Seal attic and ground vents.
	Turn off propane tanks.
	Place combustible patio furniture inside.
	Connect the garden hose to outside taps.
	Place lawn sprinklers on the roof and near above-ground fuel tanks. Wet the roof.
	Wet or remove shrubs within 15 feet of the home.
	Gather fire tools, including a rake, axe, hand/chainsaw, bucket and shovel.