



Beverly Hills Fire Department Presents:

Understanding Wildfire Threats to Homes

Wildfire threats to homes and communities built in or near wildfire prone areas will always pose a threat. Fire, by nature, is an unpredictable and often uncontrollable force but with community wide preparation, we as individuals have the ability to take measures/actions to reduce the vulnerability from wildfires through education.

Understanding wildfire factors that put homes at risk include:

- Homes built adjacent to natural fuels
- A lack of, or insufficient, building, fire and planning codes and their regulations
- Misconception about how structures ignite
- Overgrown vegetation and/or persistent drought conditions

To reduce the risk of ignition to homes and property, residents need to develop a basic understanding of the physical factors of how wildfires spread.



There are 3 key factors that contribute to how a wildfire burns - Weather, Topography, Fuel. This is also known as the **Wildfire Behavior Triangle**.

1. How **Weather** Affects Wildfires:

- Temperature, humidity and precipitation can dry out vegetation quicker and make it easy to ignite.
- Wind increases the supply of oxygen to a fire and causes pre-heating of fuels in front of the fire which dries vegetation and speeds up the rate of spread.

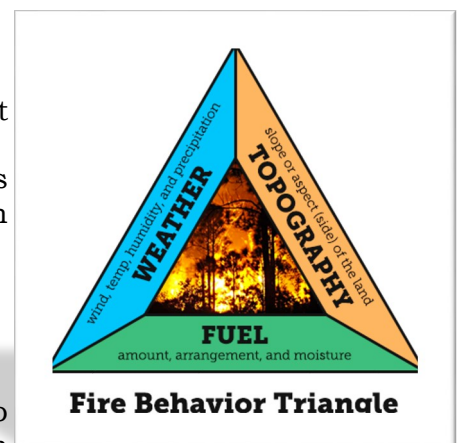
2. How **Topography** Affects Wildfires:

- Steep slopes can carry and increase rate of fire uphill
- Canyons act as chimneys for wind to spread fire
- Slopes facing south or southwest have greater exposure to afternoon sun, resulting in lower humidity and high temperatures.

3. How **Fuel** Affects Wildfires and Types of Fuels:

- Fine Fuels: (Grass, leaves, twigs and needles) These easily ignite, burn quickly and tend to carry and spread the fire.
- Ladder Fuels: (Shrubs, small trees) These can help carry a fire from the surface up to the top of trees.
- Heavy Fuels: (Trees, large limbs, downed logs, large shrubs, homes) Burn longer and produce more heat.

*Of the three fire behavior factors, **FUEL** is where residents can affect the greatest change.



Facts:

Remember that wind-driven embers, not flames from the wildfire, are the biggest threat to residential properties during a wildfire. Once these embers land on and ignite combustible materials, the potential for the wildfire to spread is much greater.



Residents can influence fire behavior by thinning trees and shrubs, pruning lower branches, removing debris, removing flammable plants that are close in proximity to the home and maintaining clearances all year round. Breaking the continuity of vegetation fuel will help reduce chances of spread and survivability to structures. Fires don't occur seasonally... it can happen anytime.

In order for combustion (fire) to occur, three essential factors are required: Heat, Oxygen, Fuel

- Fuel: Can be vegetation, structure or anything flammable
- Heat: Produced by fire, through Radiation/convection/conduction
- Oxygen: Air, wind

To better understand combustion, let's look at heat, more specifically, heat transfer (which is how wildfire actually moves and spreads).

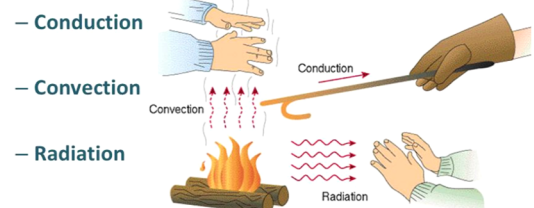
There are three heat energy mechanisms of heat transfer:

- **Radiation:** is heat energy released from a burning object. In wildfire radiation heat moves ahead of the flames to heat up and ignite fuels. The amount of heat produced and how far it travels depends on the size of the fuels that are burning. Larger fuels burn hotter than smaller.
- **Convection:** is transfer of heat by movement of rising hot air or gases. During a wildfire, burning materials on the surface create convection currents that preheat leaves, branches and other materials. The current can also lift embers into the air and land on unburnt vegetation, structures or other materials, enhancing the likelihood of new or additional ignitions outside of the main fire.
- **Conduction:** is heat transferred through direct contact. This would be direct flame impingement to other materials.

Heat transfer illustrates how wildfires spread. Fire doesn't engulf everything in its path, it only advances to locations that meet the requirements for combustion. By altering the type, size, quantity and spacing of vegetation and other fuels, residents can influence the movement of wildfire and decrease its potential to ignite homes.

How is Heat Transferred?

There are THREE ways heat can move.



According to "Grassfires: Fuel, Weather and Fire Behavior" the average speed of a wildfire is 9 to 12.5 MPH.

Before & After Picture of a community destroyed by wind driven wildfires. (2017 Santa Rosa)



In 2018, over 100 people lost their lives to wildfires in California. The highest loss in decades.

Homes and its surroundings are vulnerable to three potential types of ignition fires:

- **Crown Fires:** are extreme types of wildfire that burn on the tops of trees. They spread by radiation and convection and are heavily influenced by wind. Crown fires generate embers that can travel more than a mile and create spot fires beyond the main fire.



- **Surface Fires:** can be low or high intensity fires that can burn through live or dead vegetation. These types of fires can ignite houses and attachments like fences, decks and similar exterior combustibles.

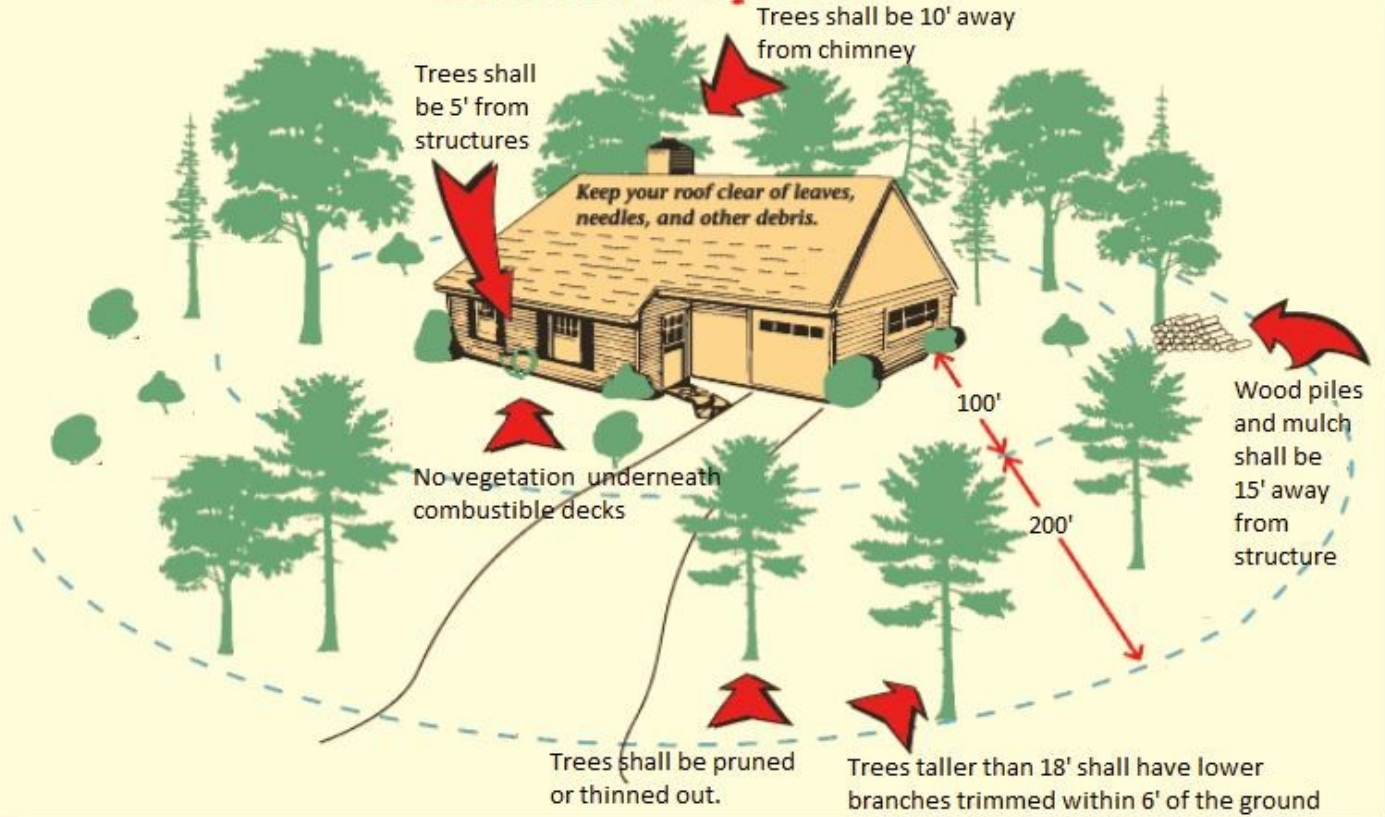
- **Embers:** Burning pieces of airborne wood and vegetation that can be carried more than a mile through the wind. They can cause spot fires, ignite exterior and interior portions of homes, debris and other combustible objects. Embers can penetrate woodpiles, patio decorative items, vents, debris filled gutters and openings in homes.



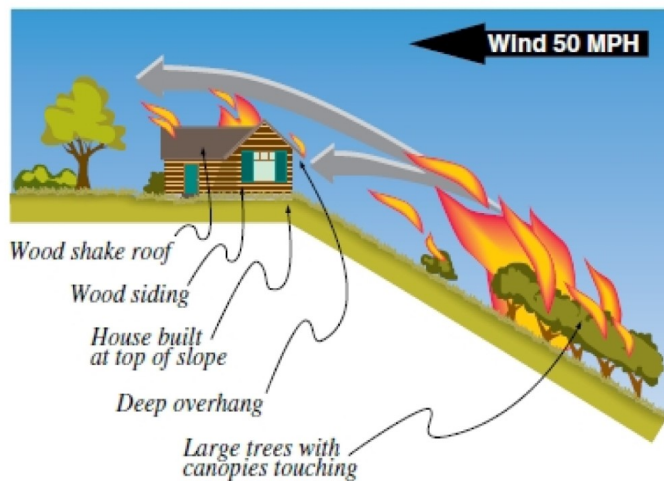
By limiting the amount of flammable vegetation, choosing fire resistive building materials and construction techniques, along with regular exterior maintenance, residents can prepare their home to withstand embers and minimize the likelihood of flames or surface fires touching the home or any attachments.



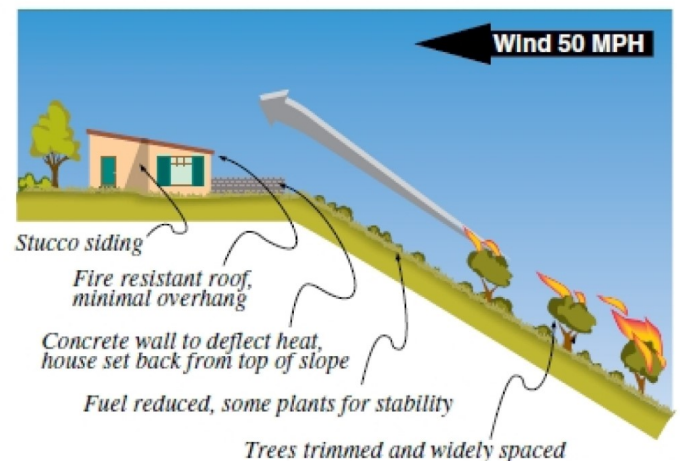
Are You Prepared?



Dangerous materials and conditions for sloped sites



Landscaping and structures designed for fire safety



Defensible Dozen

1. Clear

- *Vegetation on Hillside / Slopes:* Maintain double the recommended distance from trees and shrubs on hillsides and slopes to avoid igniting other surrounding vegetation. Fire travels faster on hillsides and slopes, reducing fuels will help slow the spread and growth of fire.
- *Reduce Fuel Ladders:* Properly separate and space your plants both horizontally and vertically. This prevents fire from climbing up from the landscape floor into the top of trees. Removing limbs and branches from the ground to 6 feet or 1/3 the total height of tree. Trim shrubs and bushes up to 2 feet from the ground will help eliminate the spread and growth of fire. Keep separation between shrubs, brush and trees.
- *Grass:* Keep grass no higher than 3 inches from the ground and well irrigated. Grass is a natural green belt that can provide a safe zone between your structure and the fire.
- *General:* First 5 feet shall be tree free, 100-200 feet shall reduce native brush, thin out trees and prune 1/3 height of vegetation. Breaking continuity of all vegetation fuel within these parameters of the property is all-round the best practice.

2. Store Away

- *Exterior Furnishings / decorative items:* Wooden or plastic patio furniture left outside during a wildfire can pose a threat to your home if embers land or ignite cushions or wood. Try to limit the amount of combustible furniture to the exterior and bring in any furniture that could fuel a fire before evacuating. (time permitted)
- *Propane:* Small cylinders used for BBQ, heating appliance, etc. shall be stored in a proper manner (away from structures and combustible storage / vegetation) and kept clear of debris.
- *Fire Wood:* Piles of wood shall be located 15 feet from structures or provided with a fire resistive tarp/cover or a non-combustible bin. Fire Wood is usually very dry and can be easily ignitable with an ember.

3. Trim / Cutback

- *Trees:* Cutback trees a minimum of 10 feet from all chimneys. Trees pose a major concern close to structures because of the leaves and debris it drops near or on the structure's roof and rain gutters. The heat the tree radiates when it catches fire can also easily spread onto the structure. The more space you can provide between a tree and structure, the less likelihood of a fire igniting the structure. Maintain a greater separation from openings such as windows, vents, etc. from trees.
- *Power Lines:* Prune Branches from power lines. Contact Edison to trim back tree from lines.

4. Remove

- *Mulch & Wood Chips:* Avoid mulch and wood chips within 15 feet of structures and 5 feet from a combustible fence. Embers can cause wood chips and mulch to smolder or ignite. These finely broken down combustibles can easily be spread through a wind driven fire causing many spot and attic fires. A great alternative is crushed gravel or stone.

5. Avoid

- *Rooftop gardens and landscape Roofs:* Rooftop gardens are prohibited in Very High Fire Hazard Severity Zone (VHFHSZ) area. This is no different than maintaining a clearance around your home... Why have it on your home? All vegetation will burn eventually, so why take a chance.
- *High Hazard Plants:* Avoid planting High Hazard plants or trees that dry easily and produce / shed debris. High Hazard plants or trees can create additional fuel for wildfires.
- *Erosion:* Do not disturb soil on hillsides when removing trees or cutting grass as this can cause future problems with hillside erosion when rain conditions appear.
- *Equipment Use:* Never use lawn mowers in dry vegetation. Watch out for rocks that could spark when using equipment. Avoid using equipment in the heat of the day or when wind is blowing. Do not place hot equipment in dry vegetation. Keep a cell phone nearby in case of a fire.

6. Screen & Seal

- *Vents and Openings:* Wind-borne embers can get into homes easily through vents and other openings and burn the home from the inside out. Screen exterior attic and soffit vents with 1/8" wire mesh to help prevent embers from entering your home.
- *Rain Gutters:* Debris collects easily in rain gutters and can easily ignite from embers. Screening gutters will prevent accumulation debris thus reducing ignitability and spread of fire.
- *Seal Gaps:* Seal any gaps on wood decking that could trap an ember and ignite material underneath.



7. Close & Secure

- *Doors and Windows:* Try to make sure all windows, doors, pet doors and garages are closed tightly before and after you leave your home. Take all measures to prevent embers from making their way into your home.

8. Replace / Repair

- *Roof Tiles:* Class A roofing material shall be installed per BHMC 1501.1—1505.1.1. Class A Roof provides the best fire resistance and therefore is the best protection for your home. Repair/replace cracked or missing roof tiles as this provides openings and spaces for embers to ignite exposed combustible construction. Seal edges of barrel tile located at edge of roof with approved material.
- *Walls / Cracks:* Cracks, holes or any type of opening to the structure are vulnerabilities to fire and embers. Repair openings to limit combustible construction exposure.

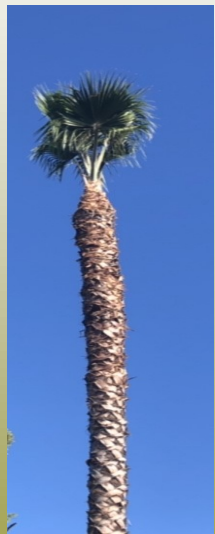
9. Plants

- *Landscaping:* Any plant will burn under the right conditions. Simply choosing the “Right Plant, Right Location” method will help maintain a fire zone. Use hardy slow growing plants that don’t produce a lot of thatch or litter. Planting native trees with thick bark and drought tolerate native plants that maintain a high internal water content are highly recommended. Mix hardscape and landscape measures to help provide a natural fire ignitable zone.

Effective Clearance



Before and After



10. Maintain

- *Housekeeping:* Frequently check and remove leaves, pines needles, debris and other flammable materials from the roof, gutter and under your deck. Embers can blow miles ahead of the fire and ignite debris.
- *Vines or Climbing Ornamental Plants:* Existing vines or climbing plants attached to structures must be well maintained in a well-watered condition, free from dead material or accumulation of debris and trimmed to minimize fire propagation.

11. Limit Combustibles (adjacent to homes)

- *Fencing, Patio Covers, Decks:* Consider using noncombustible deck boards or fire resistive materials for patios and or decks. Place non-combustible fencing (metal or masonry) to first 5 feet when attached to siding of a house. Wood fences on fire can carry flames directly to the house.

12. Be Prepared, Be Ready

- *Emergency Routes:* Make sure you are familiar with escape routes. It is a great practice to know multiple ways out in case of traffic or road closures. Try and stay updated on fire conditions so you are not rushing out at the last second.
- *Emergency Kits:* Have a emergency kit available with all the necessities. When putting an emergency kit together, make sure to have enough supplies for several days.
- *Keep Evacuation items ready:* should include important papers, documents and phone numbers, prescription medications and glasses, irreplaceable pictures, computers / hard drives, credit cards and cash.

