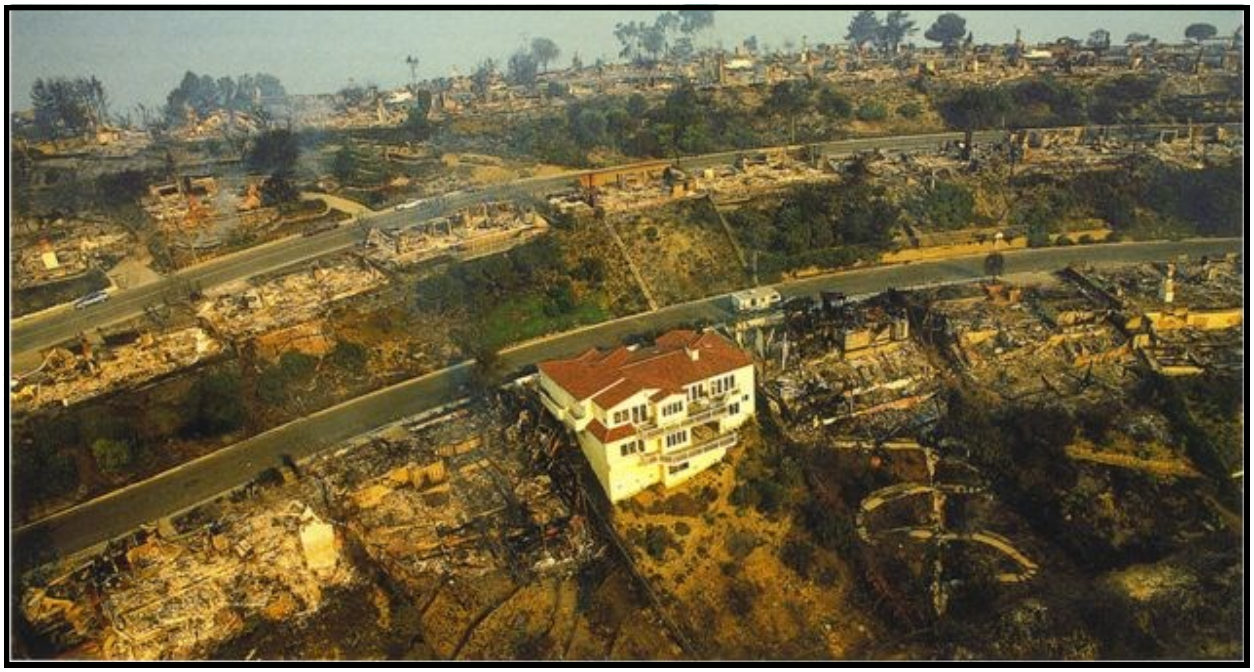
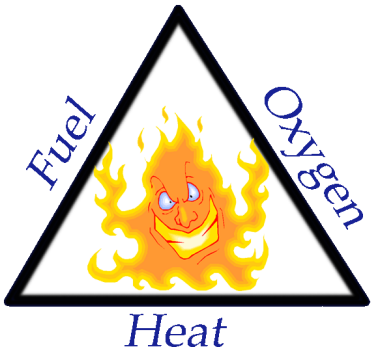
Wildfire Home Assessment

Prevention Makes the Difference





The Wildfire Threat

In its simplest terms, the wildland urban interface (WUI) is any point where fuel feeding a wildfire changes from natural (wildland) fuel to man-made (urban) fuel. The fire triangle shown above lays out the three basic needs for a fire to occur and continue, fuel, heat, and oxygen. Fires burn and ignitions occur only if a sufficient supply of each factor is present.

A wildland fire must be close enough for the flying embers or flames to contact the flammable parts of your home. These two factors, the home and fire proximity, represent the fuel and heat sides of the fire triangle. By characterizing the home as fuel and the heat from flames and firebrands, we can evaluate a home's ignitability.

An understanding of what causes homes to burn will provide you with a better understanding of how to reduce the potential for fire loss. A wildland fire does not spread to homes unless the homes meet the fuel and heat requirements sufficient for ignition and continued combustion. Reducing the potential loss of your home must involve a reduction in the flammability of the home (fuel) in relation to its potential severe case exposure from flames and firebrands (heat). Effective actions must focus on the home and its immediate surroundings because the fire services do not have the resources for effectively protecting every home during severe wildfires. Homeowners have the ultimate responsibility for their homes protection.

In the end, residential loss reduction must focus on the home and its immediate surroundings.

Many homes burn down during wildland fires even though the homeowner appears to have complied with all fire safety regulations.

Unfortunately, the vulnerability of a home during a wildland fire depends on three basic variables: location, building design, and defensible space. Fire exploits the weakest link. If any one of these variables is not properly addressed, the chances a home will burn during a wildland fire increases dramatically.

Location: The placement of a home within the wildland urban interface is critical. While offering the best views, home sites located at the tops of canyons or within mountain saddles are extremely dangerous. These topographical features concentrate both heat and embers and funnel them directly at the home. Such locations have been the sites of both firefighter and homeowner fatalities. Consequently, homes within such vulnerable locations are usually considered indefensible by firefighters and they will not risk their lives to protect them. While some fire risk can be reduced on such sites by building design and fuel management, it is impossible to make them 100% fire safe.

Design: The primary cause of home ignition during a wildland fire is by embers landing in vulnerable locations or entering attic spaces through roof vents. Therefore it is vital to install attic vents designed to resist ember entry, box-in all exposed wood surfaces (eaves, undersides of decks, etc.), and eliminate flammable surfaces that possess nooks and crannies in which embers can settle, (tile/concrete roof edges, porch corners, etc.).

Defensible space: At the minimum, flammable/combustible material within the first 30 feet around a home should be removed (including stacks of wood, patio furniture, etc.) and vegetation within the next 70 feet should be properly thinned and managed to eliminate a continuous bed of fuel that can bring fire to the house. Do NOT clear vegetation down to the dirt! This will encourage the growth of weeds which, if not continually removed, can increase the fire hazard. It is critical to create a managed zone with lightly irrigated vegetation that will form a barrier to embers and heat flow. Properly managed vegetation helps to break up and cool air currents that send embers and heat toward a structure. Plants that can produce embers (palm trees, acacia, etc.) ,should not be within the 100 foot of a defensible space zone. Native plants are OK if properly thinned. Homes above slopes may need additional fuel management beyond 100 feet.

Our most important objective is to protect property by educating the owners and hardening of the home and its surroundings to establish an **Asset Protection Zone** therefore giving properties a far greater chance of surviving a wildfire.

Explanation of Your Threat Assessment Report

The Home Ignition Zone consists of five distinct areas. Each area is reviewed independently and assigned a rating which speaks to the risk of ignition in that specific area. What we are trying to do is clearly explain the vulnerabilities of your home and property in an easy to understand format using proven process' that will help you better understand what can be done to decrease the fire risk to an acceptable level.

The ratings scale is :1 (slight threat), 2 (low threat), 3 (moderate threat), 4 (high threat) and 5 (extreme threat). The home is also assigned an overall rating which reflects a weighted average of the Home Ignition Zone. The five areas considered are:

Overview of Surroundings

Roof Structure and Attachments

Home Exterior

Foundation to Immediate Area

Immediate Area to HIZ Perimeter

It is important to address all of these areas because they all play a vital role. Wildfire has the tendency to find and exploit those areas of a home that are most susceptible. Once a fire has ignited, the entire structure is at risk. Reduce the ignitibility of the Home Ignition Zone and the chance of saving your home increases greatly.

Overview of Surroundings

The overview of surroundings documents the condition of a variety of items in the surrounding environment, as they will place the structure in the most risk from ignition by a wildland fire.

This portion of the assessment documents the following issues:

The location of the structure in relation to predominant topographical features, such as flat open areas, ridges, saddles, steep slopes, natural chimneys like steep narrow draws, or small canyons that will increase the ignition potential of the structure.

Local weather conditions including wind, relative humidity, temperature, and fine fuel moisture content.

Nearby structures are evaluated using the same criteria as the primary structure.

Any neighboring properties that could impact the ignition zone of the property being assessed.

The structure's location on the slope relative to the structure's potential exposure to heat from a wildland fire.

Roof Structure and Attachments

The next section of the assessment reviews, *From Chimney to Eaves* which, in basic terms, means the top of the home down to the underside of the eaves of your home. The structure assessment documents the conditions of construction that place the structure in the most risk from ignition by a wildland fire.

Type, condition and construction of roofing materials and assemblies: The roof is the most vulnerable part of the structure and is subject to the collection of combustible vegetative litter (e.g., leaves, pine needles) or other debris and buildup that can be ignited by firebrands. Gaps in the roof covering can allow small wind-blown firebrands to penetrate under the covering and ignite the material below.

Materials and construction used in eaves of roof overhangs: It is important that the material used and the way the eaves are constructed are reviewed to insure that embers cannot gain a foothold anywhere because the loss of the home could incur if the eaves are ignitable.

Skylights in roof assemblies: Plastic skylights can melt from radiant heat or flaming embers or both. Deformation can result in large openings that can allow the entry of embers and other flaming materials. Skylights constructed of multilayered glazed panels or tempered glass provide increased protection from heat and embers.

Construction materials of gutters, downspouts, and connectors: Gutters and downspouts collect leaves and pine needles. Gutters and eave troughs made from combustible materials (e.g., wood, vinyl) are as vulnerable to firebrand collection as the roof and other parts of the structure. If leaf litter is allowed to gather in gutters, firebrands or embers can ignite the leaf litter, which in turn could ignite combustible eave materials or overhangs. If gutters are attached to combustible fascia boards, the fascia board should be considered as a possible fuel that can be ignited by fine fuels burning in the gutters. Gutters that pose a fire threat from an approaching wildland fire are often pulled down by attending fire fighters.

Roof Ventilation: Ventilation of your home is very important, but you must take steps to insure that attic, crawl space, eave, and soffit vents provide appropriate protection, (e.g., metal screening, noncombustible skirting) to prevent entry of firebrands.

Home Exterior

The next portion of the assessment reviews *From Top of Exterior Wall to Foundation***.**
This portion of the report documents the conditions of the following items.

The materials and construction used in exterior walls and exterior siding: Exteriors of a structure should have a fire resistant material that meets and/or exceeds minimum building standards enforced by the local building official to help prevent fire spread.

The materials used in windows and other openings in vertical surfaces: Windows should be constructed of multi-paned or tempered glass that will resist fracture from intense heat and window screens made from a material that will not allow hot firebrands to enter the home's interior. If you cannot change your single pane windows, it is recommend that you install stainless metal window screens that help dissipate radiant heat and can protect your windows from glass breakage due to flying debris during a wildfire.

The location, size, and screening of ventilation openings: Ventilation of your home is very important but you must take steps to insure that attic, crawl space, eave, and soffit vents provide appropriate protection, (e.g., metal screening, noncombustible skirting) to prevent entry of firebrands.

All attached accessory structures are reviewed as part of the primary structure.

Areas next to or under a structure where combustible materials that present a source of flame exposure to the structure might collect—it is important to determine where materials can collect around the home and to insure embers can not gain access to any areas.

Most homes do not burn from an imagined "Wall of flame", but rather from embers that can travel miles ahead of a fire front.

Foundation to Immediate Area

The next portion of the assessment reviews *From Foundation to the Immediate Landscaped Area*. This portion of the report documents the conditions of the immediate 30 feet around your home by reviewing the following items and to observe construction and vegetation, as they place the structure in the most risk from ignition by a wildland fire.

All vegetative fuels and other combustible materials adjacent to and within 30 feet of the structure are known for their potential to contribute to the intensity and spread of wildland fire: Dense and flammable vegetation needs to be removed from the area immediately around a home in order to reduce the risk of structural ignition during a wildfire. The question is how to properly do so without causing additional problems.

> The immediate landscaped area is the closest to the house and includes the area encircling the structure for at least 30 ft on all sides. The landscaped vegetation within 30 ft of structures should be irrigated as needed, cleared of dead vegetation, and/or planted with succulents and other plants (where appropriate) that are low in flammability potential. Pines, Palms, and Eucalyptus trees do not belong anywhere near a house. Plantings should be limited to carefully spaced, low-growing, low-flammability species, grasses, and lawns. Shrubs planted next to the structure should be of low flammability, no more than 18 in. in height, and not planted against the home. The planting bed should be noncombustible (e.g., stone, gravel, bare ground) or irrigated if combustible materials (e.g., bark mulch) are used.
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> All highly combustible plants, such as Junipers and Ornamental Conifers, should be removed or trimmed and maintained to be ignition-resistant. Vegetation deposits (dry leaf and pine litter) that can support surface fire and flames should be removed regularly. Areas of vegetation (natural areas, undeveloped areas, landscaped areas, fields, etc.) that exist near the structure should be evaluated for the possibility of causing ignition of the structure.

The presence and location of all heat and flame sources within 30 feet of the primary structure: Areas on, next to, or under a structure, should be kept free of combustible fuel such as debris, vegetation, wooden furniture, brooms, welcome mats, furniture cushions, gasoline cans, firewood stacks, or piled construction materials. Look for combustible walkways, fencing, or decking attached to the structure, highly combustible fuels adjacent to the structure, combustible materials stored under decks or adjacent to the structure, animal nests among combustible structural fuels, and landscaping materials like mulch or ground cover plants near the structure and surrounding plants that might support flaming combustion or that could easily be ignited by firebrands.

Flammable vegetation close enough to windows to provide intense radiant heat or flame contact should be pruned, moved, or substituted with smaller, lower flammability plants.

Areas that encourage the collection of combustibles include window wells, inside corners of exterior walls and other nooks and crannies where dry leaves, pine needles, and other combustible litter can gather and whose ignition would present a source of flame exposure to the structure.

Detached structures within 30 feet of the primary structure that might be ignited by flames, radiant heat, or firebrands from wildland fires are inspected using the same criteria as the main structure.

Vehicle parking areas within 30 feet of any surface of the structure: Parking areas within the immediate landscaped zone shall be maintained free of dry grasses and fine fuels that could be ignited by hot exhaust systems or firebrands.

Unfortunately, the term "clearance" is used when referring to this 100-foot zone, leading people to think all vegetation must be removed down to bare soil. This is why some Fire Departments have replaced the word "clearance" with "thinning" when referring to vegetation management around homes. Officials are continually trying to help citizens understand that clearance does not mean the removal of all native plants. Bare soil clearance not only unnecessarily compromises large amounts of native wildlands and increases erosion, but also will lead to the growth of weeds in the now disturbed soil. These weeds are considered "flashy fuels" which actually increase fire risk because they ignite so easily.

Immediate Area to Home Ignition Zone (HIZ) Perimeter

The next portion of the assessment reviews *From the Immediate Landscaped Area to the Extent of the Home Ignition Zone.* This portion of the report documents the conditions of the area from 30 feet around your home to the distance of 100 feet or the property line by reviewing the following items and to observe construction and vegetation, as they place the structure in the most risk from ignition by a wildland fire.

Vegetation within the area between the outer edge of the immediate landscaped area and the extent of the structure ignition zone as potential fuel that can convey the fire to the structure: Now for structures near wildland open space, an additional 70 feet should be modified in such a way as to remove dead wood from shrubbery, thin and trim trees and shrubs (lower limbs removed), and prevent the growth of weedy grasses. Maintaining a modified canopy of vegetation to shade the ground is important to reduce weed growth.

Progressing outward from the structure, 30 – 100 feet, the types and densities of vegetation should change to reduce the continuity of vegetation fuels. For example, plantings can be done in islands. Trees can be introduced into this zone with careful consideration of their flammability and continued maintenance to separate crowns and avoid ladder fuels (combustible items that can transfer flames up to other fuels). Tree placement should be planned so that the edge of the canopy of the tree when fully mature is no closer than 10 feet to the edge of the structure.

This area should not be stripped to bare ground as some have suggested. Selectively thin the native vegetation, remove the dead wood, and maintain a loose canopy, without disturbing the soil.

Once native vegetation is cleared and the soil is disturbed the homeowner is permanently shackled with a number of negative consequences:

1. Continual maintenance costs
2. The introduction and growth of invasive weeds
3. Increased soil erosion and the formation of gullies
4. Surrounding aesthetics seriously damaged
5. Natural habitat destroyed
6. Reduction of native animal life
7. Potential legal costs if “clearance” is done improperly or on public/private land without proper authorization
8. Failure to account for future changes in vegetation management laws
9. Failure to account for changes in personal tastes. Do you think you’ll always want your home surrounded by dirt and weeds?
10. False sense of security that “clearance” will prevent your home from burning

Separation of tree crowns: A tree crown spacing of 18 feet for trees within 30 feet of a structure will reduce radiant heat to, or below the level where ignition of wood occurs, with closer spacing of trees allowed in the zones further from the structure. These tree spacing recommendations apply equally to thinning of mature trees or planting of new trees in high risk and extreme risk areas. Tree spacing is measured between the outer edges of the crowns of mature trees, so new trees must be planted with spacing equivalent to the estimated diameter of the mature crown.

Zone	Distance from Structure	Recommended Tree Crown Spacing
1	0–30 ft	18 ft
2	30–60 ft	12 ft
3	60–100 ft	6 ft
4	Beyond 100 ft	No restrictions

Additional items that are reviewed in this area are:

- Detached structures within the area between the outer edge of the immediate landscaped area and the extent of the structure ignition zone that might be ignited by flames, radiant heat, or firebrands from wildland fires.

- Vehicle parking areas within the area between the outer edges of the immediate landscaped area and the extent of the structure ignition zone.

- All projections attached to the primary structure that extend beyond the immediate landscaped area.

Beyond the 100’ HIZ perimeter

Progressing even farther from the structure, more medium-sized plants and well-spaced trees can be planted in well-spaced groupings to reduce exposure to wildland fire and help maintain privacy. The volume of vegetation (i.e., fuel) should be kept as low as possible or practical.

The most distant area 100–200 ft from the structure determines the extent of the structure ignition zone. Plants in this furthermost area should be carefully pruned and thinned, and highly flammable vegetation removed. Particular attention should be paid to the types and densities of the vegetation in this area. For example, some vegetation and trees generate more firebrands than others and require additional thinning, removal, or replacement.

A Defensible Space of 100 feet around your home is required by law. But the widely held belief that clearing a space of 100 feet alone means your property is safe tends to be a widely held misconception because a proper defensible space around a property might need to be expanded depending on several factors: Size and shape of buildings, materials used in their construction, the slope of the ground on which the structures are built, surrounding topography, orientation of trees and sizes and types of vegetation on your property along with a host of other factors. Terrain, climate conditions and vegetation interact to affect fire behavior and fuel reduction standards, so all of these issues must be taken into account. We suggest that each specific property have an on site inspection which should be performed and overseen by a properly trained and qualified professional that has experience in the fire service field that can help define what your properties weaknesses are and help to correct these issues to better protect your family and property.

Home Ignition Zone

Studies of structural ignition from radiant heat indicate that ignitions are unlikely to occur from burning vegetation beyond 130 feet from a structure. Therefore, clearing of vegetation and thinning of trees to a distance of 130 feet from a dwelling, as in a zoned Firewise landscape, will prevent ignition of a structure from the radiant heat of a flame front in a high-risk ecosystem.