USGBC-LA Wildfire Defense Education & Tours Program

Wildfire Defense Toolkit for California Homeowners

October 2021

This toolkit is a compilation of a variety of wildfire defense resources including Ready, Set, Go! - developed by the California Department of Forestry and Fire Protection - CalFire, and other resources made available by the Federal Emergency Management Agency - FEMA, National Fire Protection Association - NFPA, and others. Contact your local fire and building department for specific requirements or recommendations for your community or feel free to contact us at info@usgbc-la.org for more information or guidance.

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U.S. GREEN BUILDING COUNCIL LOS ANGELES

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INTRODUCTION

Our region now faces a 365-days-a-year fire season with devastating and potentially deadly consequences. Architects, builders, developers, urban planners, and landscapers have critical roles to play and that's why the green building community is taking action. USGBC-LA has created our Wildfire Defense Education and Tours programming to help bring together the sustainability, green building, and fire prevention communities to jointly address wildfire resilience while increasing awareness by providing know-how, reducing confusion, and infusing communities with hope and support. The program is designed to empower property owners, designers, and managers to proactively reduce wildfire hazards to minimize the loss of property and life.

The main purpose of this toolkit is to provide homeowners with proper information and guidance on how to help reduce fire risk and the potential for damages to homes and properties caused by wildfires while also complying with local regulations.

This toolkit combines valuable and comprehensive resources related to home-hardening and wildfire defense landscaping strategies into one source for homeowners. Wildfire defense strategies addressed in this toolkit include the implementation of defensible space, home hardening strategies, fire-resistant landscaping, and other helpful resources available for homeowners in SoCal.

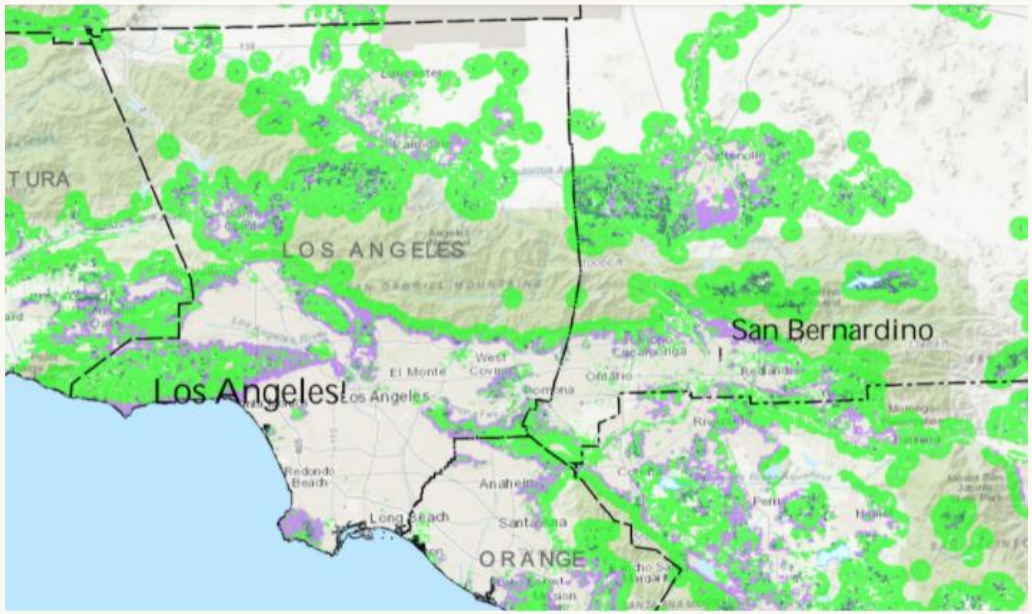
INTRODUCTION (CONT'D)

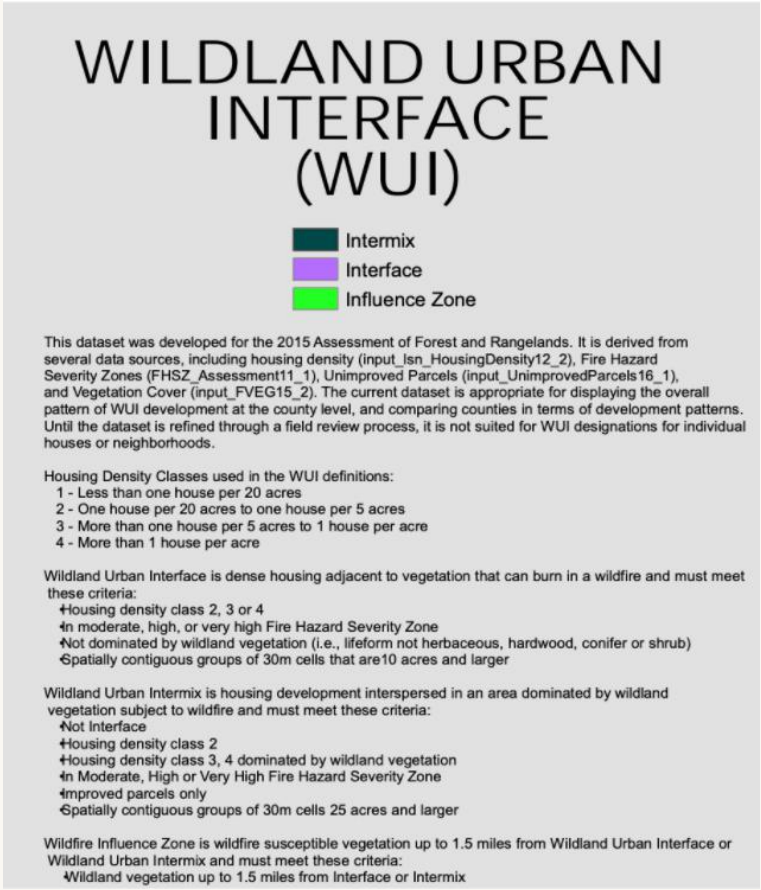
What is the WUI?

According to FEMA, the Wildland Urban Interface (WUI) is the zone of transition between unoccupied land and human development. While WUI is not a designation of potential wildfire severity, the term refers to an area where urban development meets undeveloped lands at risk of wildfires. It is the zone where structures and other human development meet undeveloped wildland or vegetative fuels.

Statistics show that more than 46 million residences in 70,000 communities in the United States are at risk for WUI fires.

The California WUI map can be downloaded from the CalFire website.



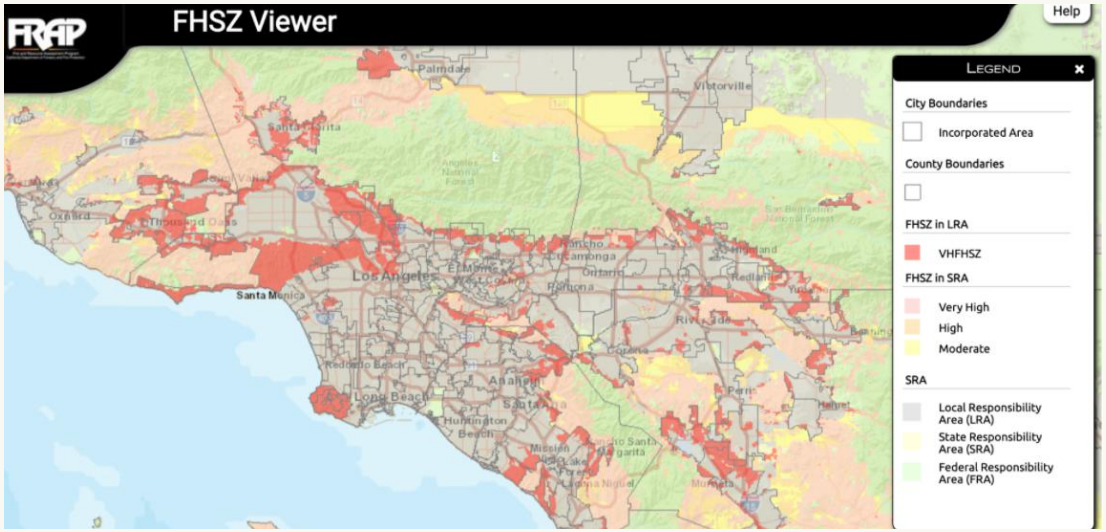


INTRODUCTION

Fire Hazard Severity Zones

The Fire Hazard Severity Zones (FHSZ) maps assign a hazard ranking based on the factors that influence fire likelihood and fire behavior, considering a few factors such as fire history, existing and potential vegetation over a 30 to 50-year time horizon, local climate, topography, and ember production and blowing.

The maps show three levels of hazard in the State Responsibility Areas: Moderate, High, and Very High, and properties can be searched by address on the Fire Hazard Severity Zones maps to learn about their fire hazard severity. The map below was developed by CalFire and shows FHSZ statewide:



Source: https://egis.fire.ca.gov/FHSZ/

These designations mandate how people construct buildings and protect property to reduce risk associated with wildland fires. The CalFire map, last updated in 2007-2010, is currently being updated to incorporate improved fire science, data and mapping techniques. It is informed on the CalFire website that an updated Fire Hazard Severity Zone map is in progress and will include lands where the state has financial responsibility for wildland fire protection, known as State Responsibility area or SRA, as well as areas of California where local governments have financial responsibility for wildland fire protection, known as Local Responsibility Area or LRA. Per law, only lands zoned as Very High Fire Hazard Severity are identified within local responsibility areas.

More detailed and localized FHSZ maps are available on the CalFire website, on a countywide basis.

INTRODUCTION

Measures homeowners and residents can take

According to CalFire, maintaining an efficient defensible space, applying home hardening strategies, and using fire-resistant landscaping is the most effective way to increase the chances of a property surviving a wildfire.

- Defensible space is the buffer that helps to keep the fire away from a home.
- Fire-resistant vegetation contributes to making defensible space-effective.
- Hardening a home means using fire-resistant construction materials that in conjunction with maintenance best practices can protect a home from a wildfire.

Source: https://survey123.arcgis.com/share/77d52e2c982e480990320eb5bd53f5fc

CREATE A DEFENSIBLE SPACE

The vegetation surrounding a building or structure is fuel for a fire. Even the building or structure itself is considered fuel. Fuel reduction through vegetation management is the key to creating good **defensible space**. According to the CalFire Department, defensible space is the buffer area 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 helps protect your home from catching fire—either from embers, direct flame contact, or radiant heat. Proper defensible space also provides firefighters a safe area to work in.

Source: https://www.flickr.com/photos/calfire/albums/72157719088190490/with/51141710519/

CREATE A DEFENSIBLE SPACE

Defensible Space Zones

In the state of California, defensible space is categorized by zones: Zones 1 (30 feet); and Zone 2 (100 feet) and is currently required by law for properties located in State Responsibility Area (SRA). A third zone - Zone 0 - passed into law in 2020 and a new ember-resistant zone within 0 to 5 feet of the home will be required by future regulations.

Below are some measures homeowners and residents can adopt within each Zone according to CalFire and FEMA:

Zone 0 - Ember Resistant	Zone 1 – Lean, Clean, and Green	Zone 2 – Reduce Fuel Zone
0-5 feet from buildings structures	Extends **30 feet** from buildings structures or to the property line, whichever is closer	**30 feet to 100 feet** from buildings structures or to the property line, whichever is closer
• Use hardscape like gravel, pavers, concrete, and other noncombustible mulch materials. • Remove all dead and dying weeds, grass, plants, shrubs, trees, branches, and vegetative debris. • Check your roofs, gutters, decks, porches, stairways, etc. • Consider relocating garbage and recycling containers outside this zone. • Consider relocating boats, RVs, vehicles, and other combustible items outside this zone.	• Remove all dead plants, grass and weeds (vegetation), dead or dry leaves, and pine needles from your yard, roof, and rain gutters. • Remove branches that hang over your roof, flammable plants near windows, and keep dead branches 10 feet away from your chimney. • Trim trees regularly to keep branches a minimum of 10 feet from other trees. • Relocate wood piles to Zone 2. • Remove vegetation and items that could catch fire from around and under decks, balconies, and stairs. • Create a separation between trees, shrubs, and items that could catch fire, such as patio furniture, wood piles, swing sets, etc.	• Mow annual grass down to a maximum height of 4 inches. • Create horizontal space between shrubs and trees. • Create vertical space between grass, shrubs, and trees. • Remove fallen leaves, needles, twigs, bark, cones, and small branches. • All exposed wood piles must have a minimum of 10 feet of clearance. • Use driveways and paved or gravel walkways or patios to create firebreaks throughout the yard. • Plant fire-resistant, low-volume vegetation that retains moisture. • Distance detached structures such as a garage, pump house, pergola from the home by at least 50 feet. Increase the distance if combustible materials are stored.

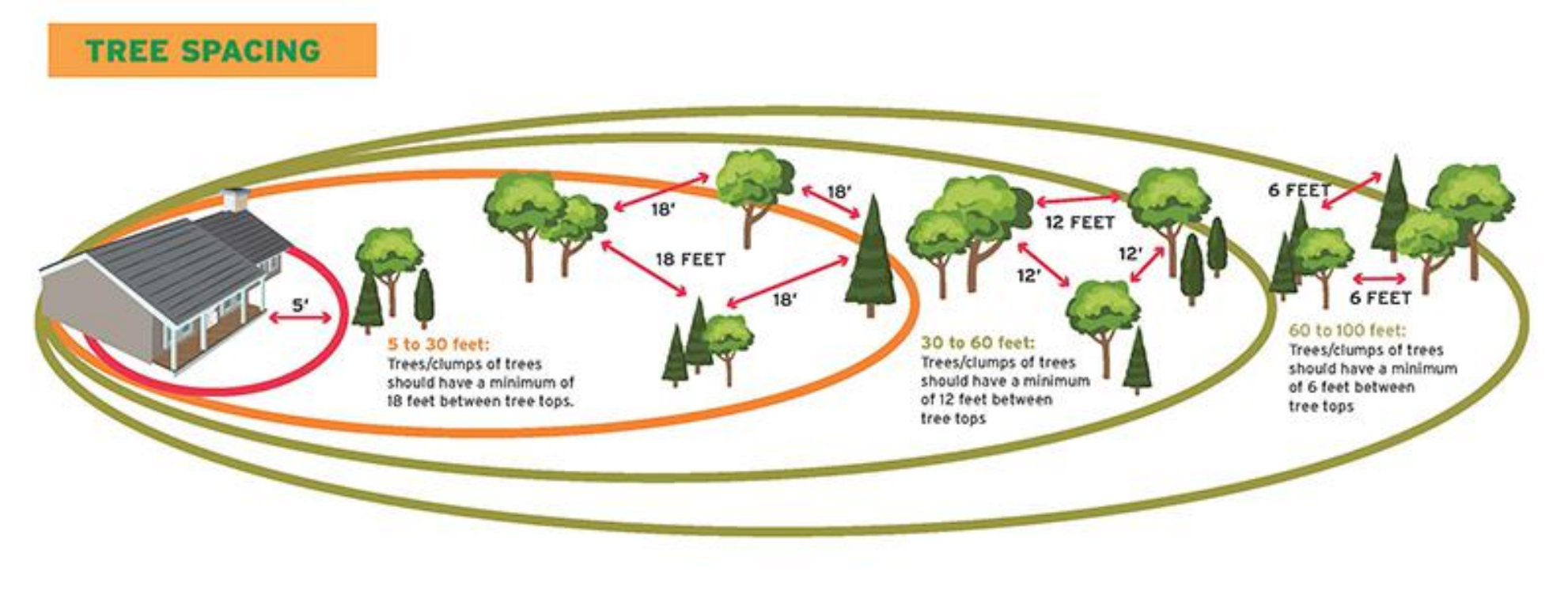
☆ An additional **Zone 3** is recommended by FEMA to reduce fuels that are farther than 100 feet from the building by thinning and pruning vegetation horizontally and vertically. The goals in Zone 3 are to improve the health of the wildlands and help slow an approaching wildfire.

CREATE A DEFENSIBLE SPACE

Plant and Tree Spacing

Plant and tree spacing, vertically and horizontally, is applicable to all Zones and determined by the type, height, and size of brush and trees, as well as the slope of the land. Removing all tree branches at least 6 feet from the ground is a general rule.

The formula to determine proper spacing can be found on the CalFire website.



Source: https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Preparing-homes-for-wildfire

CREATE A DEFENSIBLE SPACE

Additional Measures for an Effective Defensible Space

- Mow before 10 a.m., and never on a hot or windy day. String trimmers are a safer option (vs. lawnmowers) for clearing vegetation.
- Ensure that patio furniture is either made of noncombustible material such as metal or is at least 30 feet away from the building.
- Store fuel tanks away from a structure at the minimum distance that is required by code or greater and place it underground or on a non-combustible pad.
- Maintain your defensible space by pruning and removing dead branches and leaves.
- Regularly clean your roof, gutters, decks, and the base of walls.
- Ensure that all combustible materials are removed from underneath, on top of, or within 5 feet of a deck.
- Remove vegetation or other combustible materials that are within 5 feet of windows and glass doors.
- Replace wood mulch products within 5 feet of all structures with noncombustible products such as dirt, stone, or gravel.
- Remove all dead or dying grass, plants, shrubs, trees, branches, leaves, weeds, and pine needles within 30 feet of all structures.

Full recommendations on how to create a defensible space and home hardening strategies can be found on the Wildfire is Coming, Are you Ready? brochure developed by CalFire - a wildfire action plan with valuable information that helps educate people living in fire-prone areas about the importance of improving their property resistance to wildfires by creating defensible space and home hardening strategies. The plan also includes an evacuation plan for residents to leave their houses in a safe manner.

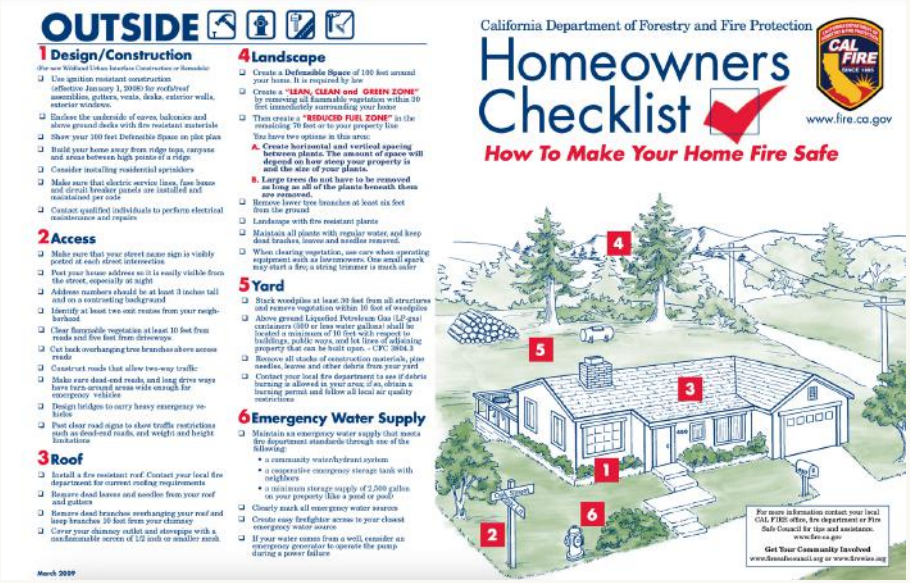
The Home Builder's Guide to Construction in Wildfire Zones developed by FEMA provides guidance on how to create a fire-resistant zone that can reduce the potential for damage to homes from wildfires.

CREATE A DEFENSIBLE SPACE

Useful Resources Available

A defensible space self-assessment is available on the CalFire website to help homeowners and residents to determine how prepared their homes are for a wildfire and what measures they can adopt in order to reduce the chances of the fire reaching their homes.

- This homeowners checklist created by CalFire compiles the best strategies to make a home fire safe, covering defensible space, landscaping, home hardening, and more.
- The County of Los Angeles Fire Department provides a list of fire reduction service providers on their Fire Hazard Reduction Program website, which includes: brush clearance (defensible space) and goat vendors.



Did you know?

Starting in July 2021 homeowners selling a property located in a high or very high fire hazard severity zone, are enforced by law - Assembly Bill 38 - to document a Defensible Space Inspection. An inspection can be required online by filling out this form on the CalFire website.

The CalFire - Fire and Resource Assessment Program (FRAP) determines the fire hazard severity zones in the state of California and a map can be found online at https://egis.fire.ca.gov/FHSZ/.

HOME HARDENING STRATEGIES

Communities located in wildfire-prone areas need to take safety measures to reduce the risk of potential damage caused by wildfires while increasing their chances of survival. In addition to creating and maintaining defensible space, homeowners and residents can adopt home hardening strategies to prepare their homes and communities for wildfire. It takes the combination of both defensible space and the hardening of your home to really give your house the best chance of surviving a wildfire.

According to CalFire, there are three ways your home can be exposed to wildfire:

1. Direct flames from a wildfire or burning neighboring home;
2. Radiant heat from nearby burning plants or structures; and
3. Flying embers. Flying embers from a wildfire can destroy homes up to a mile away and are responsible for the destruction of most homes during a wildfire.

Building a Fire Resistant Structure

Roof and Rain Gutters

The roof can be the most vulnerable part of your home. Homes with wood or shingle roofs are at high risk of being destroyed during a wildfire. Roof covering fire ratings are Class A, B, C, or unrated; with Class A providing the best protection: asphalt fiberglass composition shingles, concrete and flat/barrel-shaped tiles, metal, clay, or tile.

Maintenance best practices include:

- Block any spaces between the roof decking and covering to prevent embers from catching.
- Remove accumulated vegetative debris from the roof and from the rain gutters.
- Inspect shingles or roof tiles and replace or repair those that are loose or missing.
- Install a noncombustible gutter cover on gutters to prevent the accumulation of leaves and debris.
- Screen roof and attic vents to prevent ember entry.
- Install a corrosion-resistant and non-combustible metal drip edge for additional protection on your roof's edge.

The NFPA Fact-sheet: Roofing Materials contains detailed information on fire-resistant roofing materials and best practices to reduce the ignition risk during wildfires.

HOME HARDENING STRATEGIES

Vents

Vents on homes create openings for flying embers. Although building codes require vent openings to be covered by corrosion-resistant metal screens, it's important to assure that a proper metal mesh is installed. Vents that meet the flame-and ember-resistant standard are listed on the California Office of the State Fire Marshal Building Materials Listing Program website.

Source: https://disastersafety.org/wildfire/wildfire-ready/

Safety measures to consider:

- Cover all vent openings with 1/16-inch to 1/8-inch metal mesh.
- Do not use fiberglass or plastic mesh because they can melt and burn.
- Use ember and flame resistant vents (WUI vents).
- Do not store combustible items (e.g., cardboard boxes, newspapers) near the attic or vents.
- Inspect vents to make sure they are in good condition.
- If you have enough preparation time before a wildfire, use metal tape to temporarily seal up vents from the inside of the house.

The NFPA Fact-sheet: Attic and Crawl Spaces Vents contains detailed information on how to prevent embers from entering the attic through vents and maintenance best practices.

HOME HARDENING STRATEGIES

WILDFIRE RESEARCH FACT SHEET

Under-Eave Construction

The under-eave area of a house is often overlooked when addressing vulnerabilities that can cause damage or loss during a wildfire. Neglecting this structural component increases susceptibility to heat from flames, which can become trapped, allowing fire to spread through attic vents and into the attic. Embers lodged in gaps between blocking and joists can also result in ignition and fire entry into the attic.

TYPES OF UNDER-EAVE CONSTRUCTION

Open-Eave Construction: Roof rafters visibly extend out beyond the exterior wall. This option is typically less expensive and is commonly found in many parts of the U.S.

Soffited-Eave Construction: Material connecting and enclosing the space between the edge of the roof and the exterior wall.

SOFFITED-EAVE CONSTRUCTION IS BEST FOR HOMES WITH A WILDFIRE RISK

Wildfire research conducted by IBHS supports the use of soffited-eave construction. Additional research and guidance (e.g., FEMA P-737, Home Builder's Guide to Construction in Wildfire Zones, Fact Sheet No.6 https://www.fema.gov/media-library-data/20130726-1652-20490-2869/fema_p_737_fs_6.pdf) also suggests a soffited design as the best option. Vents located in the under-eave area can be entry points for embers and flames when limited effort has occurred to reduce risks in the home ignition zones (particularly in the near-home zone). Embers entering an attic can ignite stored combustible materials. Research has shown that open-eaves are more vulnerable to both ember entry and direct flame contact exposures, relative to soffited-eaves.

With open eaves, use a sealant (such as caulking) to cover gaps, or enclose the underside of the roof overhang. In open-eave construction, embers can and do accumulate between blocking and joists and can ignite these members if sufficient accumulation occurs.

The open-eave blocking likely included vents, so remember to add an adequate amount of soffit vents as part of the project. Make sure the vent area ratio (vent into the enclosed soffit and enclosed soffit into the attic) follows the requirements of local building codes.

Time-to-ignition is faster with under-eave construction and lateral flame spread is quicker, exposing other areas along the length of the home. (Using the recommended 0 to 5-foot noncombustible near-home zone minimizes the likelihood of an ignition at the base of the exterior wall.)

Using noncombustible or ignition-resistant materials to enclose the eave is recommended. The enclosure should extend from the roof edge horizontally back to the exterior wall. The horizontal soffit member is attached to a ledger board that is itself attached to the exterior wall.

Open-eave construction with vents in blocking (A), and gaps between bracking and other wood members in the under-eave area (B).

Flame impingement exposure to the undersids of the eave, and time-to-ignition of the joists, blocking and fascia was quicker; and lateral flame spread faster, when an open-eave design was used in research experiments.

Lateral flame spread was reduced when a combustible soffit material ignited in this test of a soffited-eave with a combustible soffit material.

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Eaves and Soffits

The eave overhang protects your home from rain and sun. These structural components, if neglected, can increase susceptibility to heat from flames and allow the fire to spread through attic vents. Eaves should be boxed in (soffited-eave design) and protected with ignition-resistant or non-combustible materials.

* Soffited-Eave Construction: Material connecting and enclosing the space between the edge of the roof and the exterior wall.

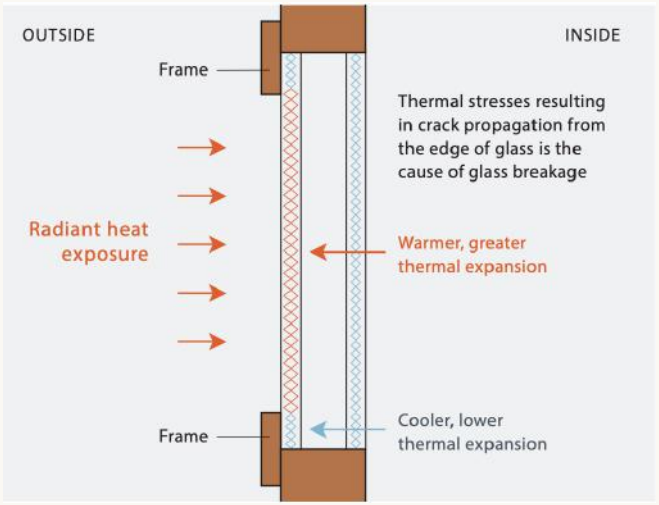
The NFPA Fact-Sheet: Under-Eave Construction explains the difference between types of under-eave construction and illustrates a few examples of best practices vs. non-recommended practices.

Windows

Windows can be a vulnerable component of a home if the framing material ignites or deforms, or if the glass breaks and falls out, both allowing embers or flames to enter the home. Single-paned and large windows are particularly vulnerable.

Important to consider:

- Install multi-paned windows with one pane of tempered glass.
- Consider limiting the size and number of windows that face large areas of vegetation.
- Install metal and plastic-clad fiberglass window screens in all windows to increase ember resistance and decrease radiant heat exposure.



Source: http://www.readyforwildfire.org/wp-content/uploads/Wildfire_Home_Retrfit_Guide-1.26.21.pdf

This illustration available on the Wildfire Home Retrofit Guide shows how a dual-pane window will resist fire exposure.

HOME HARDENING STRATEGIES

Skylights

Skylights are a great energy-saving solution for homes, but special attention should be given to this component in wildfire-prone areas as they are another entry point for embers and/or flames. The shape of the skylight, the building materials, and a maintenance routine are key factors that will influence the level of protection of your home for this component. Skylights on low-slope (flatter) roofs are more prone to the accumulation of vegetative debris (especially flat-style skylights).

SKYLIGHTS

WILDFIRE RESEARCH FACT SHEET

Skylights can compromise a home's ability to survive a wildfire when precautions are not implemented to prevent them from being an entry point for embers and/or flames.

Construction Materials/Placement

During a wildfire, a skylight can be vulnerable if subjected to an extended radiant heat exposure, or to flames when embers have ignited vegetative debris on top of the skylight. Most guidance recommends using a flat glass skylight rather than a plastic dome style because the plastic is combustible. However, there are situations, based on the slope of the roof, where a flat glass could be more vulnerable.

Vegetative debris can more easily land and stay on a low-slope roof, leading to increased risks. As seen in **Photos 1 and 2** of a low-slope roof, debris is more likely to accumulate on top of a flat glass skylight, and less likely to accumulate on a plastic dome skylight. Typical flame temperatures resulting from a wind-blown ember ignition of the debris would be high enough to break even tempered glass, the type of glass commonly used as the outer pane in a flat glass skylight.

Steep-Slope Roofs

Flat skylights are less vulnerable on a steep-slope roof because vegetative debris is less likely to accumulate. A steep-slope roof will act more like an exterior wall in terms of its response to a radiant heat exposure. Because of this increased resistance of glass over plastic to a radiant heat exposure, a glass skylight is a better choice on steep-slope roofs. The vulnerability of a domed skylight will depend on the potential for an extended radiant heat exposure, which in turn depends on the amount of vegetation and other combustibles near it **(Photo 3)**.

Dual-Pane Glass Benefits

Newer skylights feature dual-pane systems, like multi-pane windows in an exterior wall. The outer pane uses tempered glass and the inner pane uses laminated safety glass. This type of skylight is less likely to fail.

Maintenance

Both domed and flat skylights have similar framing systems (bases). Each uses a metal flashing to protect the wood framing members from both moisture- and ember-related damage **(Photo 4)**. This flashing helps the skylight survive when threatened, but should be maintained to avoid risks.

Prior to an Evacuation

Similar to windows, skylights that can open should be closed when a wildfire threatens. They also should incorporate a screen to resist the intrusion of embers in case the skylight happens to be left open **(Photo 5)**.

Photo 1. Accumulation of vegetative debris on top of a glass-type skylight on a low-slope roof.

Photo 2. Minimal accumulation of vegetative debris accumulated on these dome-type skylights on this low-slope roof.

Photo 3. The vulnerability of skylights on a steep-slope roof will depend on the potential for an extended radiant heat exposure to the roof and skylight unit.

Photo 4. Metal flashing protects the framing members of a skylight from moisture, a direct ember ignition, or flames from ember ignited vegetation debris.

Photo 5. Operable skylights should be closed when a wildfire threatens. Similar to windows, they should incorporate a screen to resist the intrusion of embers (also good for insects!).

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NFPA

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Residents reducing wildfire risks

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What to do to reduce the vulnerability of skylights:

- Remove vegetative debris from the roof and skylights on a regular basis.
- On sloped roofs, opt for glass skylights due to the increased likelihood of exposure to radiant heat (plastic skylights may melt and burn when exposed to heat from a wildfire).
- If the skylight can open, consider adding a 1/16-inch noncombustible corrosion-resistant-metal mesh screening to reduce ember intrusion into the home in case the skylight cannot be closed before evacuation.

The NFPA fact-sheet: Skylights has comprehensive guidance and examples of what to do and what to avoid.

HOME HARDENING STRATEGIES

Walls and Other Siding Materials

Combustible siding products are widely used, including solid wood, wood composite materials, and plastic/vinyl products. However, they are flammable and not good choices for fire-prone areas. If the siding ignites, a fire can penetrate through the stud cavity into the home and spread up, enter windows, vents, spread into the attic at a gable-end vent or an under-eave area. Combustible siding can be ignited from direct-flame contact, radiant heat exposure, or in contact with embers, especially if embers ignite combustible materials close to the home.

Safety Measures include:

- Build or remodel your walls with non-combustible materials, such as stucco, fiber cement wall siding, brick, or stone veneer. Extend materials from the foundation to the roof.
- If you cannot replace all the siding, replace the lowest one foot of siding, ensuring the material extends below ground level with brick or stone veneer.
- An exposed concrete foundation in the lowest foot provides similar risk reduction.
- The use of a one-hour wall design (an additional fire-resistant layer is used in the wall assembly) provides additional protection when a more vulnerable siding material is used.
- Replace wood mulch products within five feet of all structures with noncombustible products such as dirt, stone, or gravel.
- It is not recommended to use fire-retardant coatings, such as fire-retardant paint, to provide fire protection for combustible siding.

Decks and Porches

A burning deck can ignite siding or break the glass in doors or windows, allowing fire to gain entry into the house. By adopting strategies to make decks less vulnerable to wildfires, homeowners also make their houses less vulnerable. These strategies include approaching building materials and design features, as well as maintaining a noncombustible zone around and under the deck.

HOME HARDENING STRATEGIES

Some other measures include:

- Never store flammable materials underneath decks or porches. Remove dead vegetation and debris from under decks and porches and between deck board joints.
- If a deck overhangs a slope, create and maintain an effective defensible space downslope of the deck.
- When building a new deck, use metal joists and a fire-resistant walking surface like fire-rated composite deck materials, aluminum, or lightweight concrete.
- On existing decks, apply metal flashing or foil-faced bitumen tape on top of and a few inches down the side of the support joists. This is an effective strategy to minimize fire growth when a deck is ignited by embers or flames.

The NFPA Fact-Sheet - Decks provides guidance to homeowners on best strategies to reduce the vulnerability of decks to wildfire. Another NFPA Fact-Sheet - Fire Spread on Ember-Ignited Decks covers strategies to minimize risk from wind-blown embers to decks. A list of approved deck building materials in California can be found on the CalFire website.

HOME HARDENING STRATEGIES

Garage

Garages are commonly used also as storage for most people including combustible materials. Whether attached to the home or not, garages can be another spot vulnerable to wildfires in a house and embers can easily enter poorly sealed garage doors. Have a fire extinguisher and tools such as a shovel, rake, bucket, and hose available for fire emergencies is highly recommended, along with other measures:

- Add a battery backup to the garage door motor so that the garage can be operated if power is out.
- 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.
- Treat windows and vents in the garage the same way as if it was a part of the house.

Fences

Combustible fencing, if connected to a home, can serve as a direct fire path if surrounding vegetation or embers ignite it. The best practice is to separate the fence from the house or upgrade the last 5-feet of the fence to a non-combustible material to reduce the chance of the fence from bringing fire to the home.

Privacy fences are the most vulnerable in terms of ignition because embers can accumulate in the horizontal to the vertical intersection and ignite the fence.

Good neighbor (planks alternating) are more porous and difficult to ignite via ember exposure.

Vinyl fences are not as vulnerable to embers, but can ignite through direct flame exposure if vegetative debris has accumulated at its base.

All fences are more vulnerable when vegetative debris has accumulated at their base.

HOME HARDENING STRATEGIES

Other best practices include:

- Clean up the base of the fence on a regular basis removing vegetative debris that can accumulate at the base.
- Do not use fences as a trellis for plants as they can create and trap ignitable vegetative debris.
- Replace the combustible portion of the fence within a minimum of 5-feet from the home with a noncombustible section.

The NFPA Fact-Sheet: Fencing provides guidance on material, installation, and maintenance costs choices.

Chimneys

Chimneys and stovepipes are another entry point for fire embers in homes if not installed correctly and properly cleaned and maintained.

A few measures need to be taken in order to reduce the vulnerability of chimneys:

- Cover your chimney and stovepipe outlets with a non-flammable screen with openings no smaller than 3/8-inch and no larger than 1/2-inch to prevent embers from escaping and igniting a fire.
- The use of metal step flashing at the roof-to-siding intersection (flashing extending up the wall) can reduce the vulnerability to embers.
- Close the fireplace flue during fire season when the chimney is not in use.

HOME HARDENING STRATEGIES

Driveways and Access Roads

- Consider maintaining access roads with a minimum of 10 feet of clearance on either side, allowing for two-way traffic.
- Ensure that all gates open inward and are wide enough to accommodate emergency equipment.
- Trim trees and shrubs overhanging the road to allow emergency vehicles to pass.
- Make sure your address is clearly visible from the road.

Water Supply

Consider having multiple garden hoses that are long enough to reach all areas of your home and other structures on your property. If you have a pool or well, consider getting a pump.

Additional Resources on Home-hardening Strategies

Incentive Program for Homeowners

The CPUC's Self-Generation Incentive Program (SGIP) offers rebates for installing energy storage technology at both residential and non-residential facilities in communities located in high fire-threat areas. These storage technologies include battery storage systems that can function during a power outage. Visit CPUC website for more information on the application process.

Guides and resources:

- https://disastersafety.org/wp-content/uploads/2019/03/Wildfire-Retrofit-Guide-California_IBHS.pdf
- https://defensiblespace.org/house/house-new/
- https://headwaterseconomics.org/wp-content/uploads/building-costs-codes-report.pdf
- https://ucanr.edu/sites/fire/Prepare/Building/

FIRE RESISTANT LANDSCAPE

A fire-resistant landscape uses fire-resistant plants that are strategically planted and maintained to resist the spread of fire to the home. Fire-resistant plants are those that do not readily ignite from a flame or other ignition sources. These plants are not fire-proof and can be damaged or even killed by fire, however, they do not significantly contribute to the fuel intensity. Plant moisture content, age, total volume, dead material, and chemical content are factors that influence the fire characteristics of plants.

Plants Selection

CalFire recommends homeowners get professional advice on fire-resistant plants that are suited for their area and adopt the fire defense strategies:

- Create fire-resistant zones with stone walls, patios, decks, and roadways.
- Use rock mulch, flower beds, and gardens as ground cover for bare spaces.
- Keep the garden free from dry and dead wood, dry grasses, and leaf litter, especially near any structures.
- Prune plants to provide horizontal and vertical space throughout your garden and surrounding structures.
- Eliminate fire ladders. A grass fire can move up into shrubs and then into trees.
- Hydrate plants with a water-wise irrigation system. Use non-combustible mulches near the house.
- Select fire-resistant shrubs such as hedging roses, bush honeysuckles, currant, cotoneaster, sumac, and shrub apples.
- Plant hardwood, maple, poplar, and cherry trees that are less flammable than pine, fir, and other conifers.
- Select high-moisture plants that grow close to the ground and have a low sap or resin content.
- Choose fire-retardant plant species that resist ignition such as rockrose, ice plant, and aloe.

CalFire lists a few fire-resistant plants on their website, including:

Source: https://www.readyforwildfire.org/prepare-for-wildfire/get-ready/fire-resistant-landscaping/

FIRE RESISTANT LANDSCAPE

A comprehensive list of California native fire-resistant plants can be found on the Sustainable Defensible Space website, but before selecting the plants, homeowners and gardeners should consider a few factors:

- Local area fire history
- Site location and overall terrain
- Prevailing winds and seasonal weather
- Property contours and boundaries
- Native vegetation

Watering

- Choose the right irrigation system. Your plant selection and water availability will determine the right system for you.
- Consider drip irrigation for watering most of your landscape. It's effective and conserves water because it targets where the water goes and how much gets there.
- Use sprinklers for lawns or turf landscaping. Sprinklers on timers ensure your lawn is getting the right amount of water to keep it healthy and fire-resistant.

Tall Shrubs & Trees

Trees should have their limbs trimmed so all branches, leaves, or needles are above 15 feet or your house's roofline, whichever is tallest.

- Consider using only 1 tall shrub or tree within 30 feet of your home. If you plant more than 1, make sure there is a minimum of 10 feet of space between them.
- Do NOT plant within the Home Ignition Zone (5 feet) or any area where the tree may eventually overhang your roof at its largest size. This could lead to a buildup of flammable debris on your roof.

FIRE RESISTANT LANDSCAPE

Additional Comprehensive Resources

- http://www.firefree.org/wp-content/uploads/2016/02/Fire-Resistant-Plants.pdf
- https://disastersafety.org/wildfire/fire-resistant-landscaping-for-your-home/
- https://defensiblespace.org/plants/
- https://theodorepayne.org/landscaping-for-wildfire-resilience/
- https://dpw.lacounty.gov/epd/sg/tech_sheets/fwg_info.pdf

EMERGENCY PREPAREDNESS AND EVACUATION

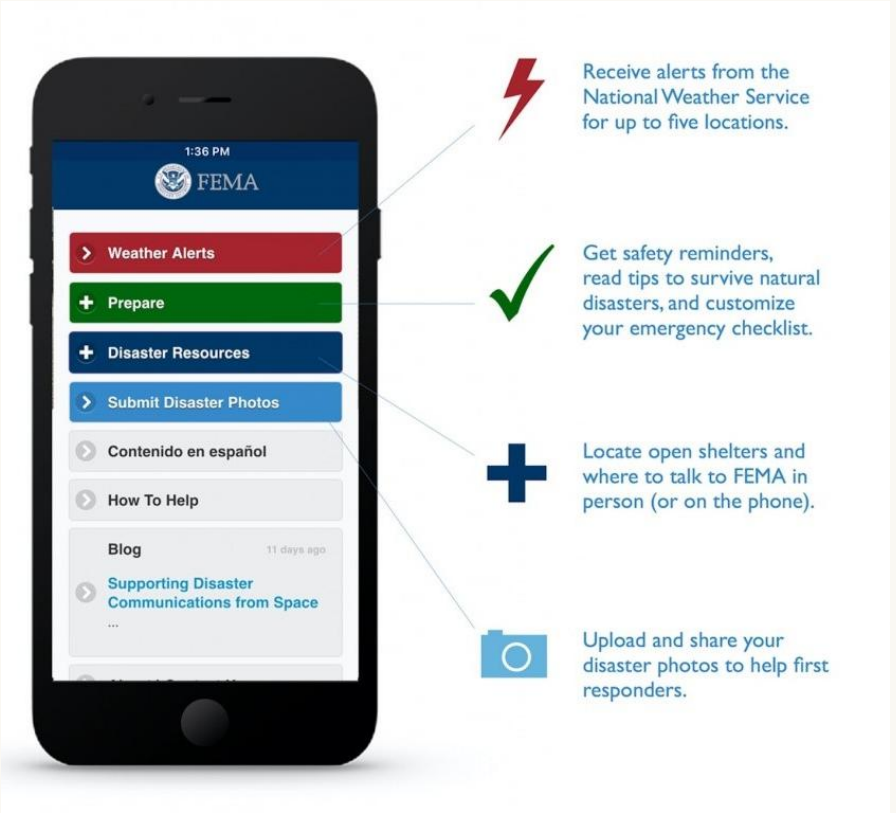
In order to prepare for a wildfire emergency, CalFire recommends that homeowners and households put together a Wildfire Action Plan, an Emergency Supply Kit, and an Evacuation Plan.

Wildfire Action Plan

A Wildfire Action Plan must be prepared in advance of a wildfire, and familiar to all household members and includes an evacuation plan with clear instructions.

As part of the Wildfire Action Plan, homeowners should prepare for a possible wildfire by taking the following actions:

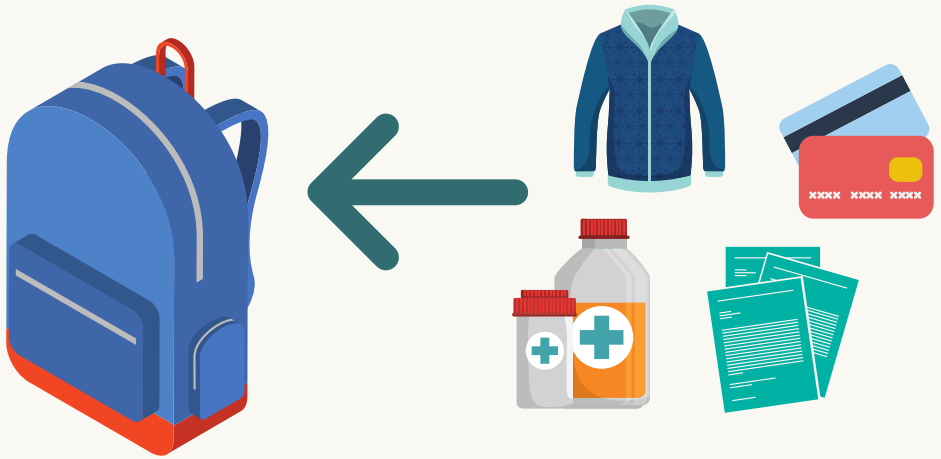
- Have fire extinguishers and learn how to use them.
- Locate the home's gas, electric, and water shut-off controls and understand how to shut them off in the event of an emergency.
- Assemble an emergency supply kit for each household member and keep an additional kit in the car.
- Buy a portable radio or scanner to stay updated on the fire.
- Have a list of emergency contact numbers near the phone.
- Sign up for alerts using the FEMA app.



EMERGENCY PREPAREDNESS AND EVACUATION

Emergency Supply Kit

As mentioned above, homeowners should assemble an Emergency Supply Kit for each member of the household. The emergency kit should be easily accessible in the event of an emergency and light enough to carry.



As recommended by CalFire, an emergency kit will include:

- Face masks
- 3-day supply of non-perishable food
- 3 gallons of water per person
- Map with evacuation routes
- Prescriptions or medication
- Change of clothing
- Extra eyeglasses or contact lenses
- A set of car keys, credit cards, cash or traveler's checks
- First aid kit
- Flashlight
- Battery-powered radio and extra batteries
- Sanitation supplies
- Copies of important documents, including birth certificates and passports
- Cell phone charging device
- Pet food and water (as needed)

EMERGENCY PREPAREDNESS AND EVACUATION

Evacuation

Households should also develop an Evacuation Plan to prepare for the event of a wildfire.

An effective evacuation plan will include:

- A designated meeting location outside the fire hazard area
- Multiple escape routes from the house and surrounding area
- Evacuation plan for pets and livestock
- An out-of-state point of contact that household members can call if they are separated

In the event that a wildfire does occur in the area, households should be ready to evacuate. It's important to understand the local community's emergency response plan and know where to go when it is time to evacuate and which routes to take.

Wildfires can be monitored on the Cal Fire Incidents website.

EMERGENCY PREPAREDNESS AND EVACUATION

If there is time, homeowners can prepare their homes for evacuation by following the Home Pre-Evacuation Checklist:

Inside the House

- Have your Emergency Supply Kit ready in your vehicle
- Shut all windows and doors but leave unlocked
- Remove flammable window curtains and close metal shutters
- Move flammable furniture to the center of the room, away from windows
- Shut off gas at the meter and turn off pilot lights
- Shut off the air conditioning

Outside the House

- Gather flammable items and bring them inside or place them in the pool if there is one - These include patio furniture, children's toys, doormats, trash cans, etc.
- Turn off propane tanks
- Move propane BBQ appliances away from structures
- Connect garden hoses to outside water valves or spigots for firefighters to use
- Fill water buckets and place them around the house
- Turn off sprinklers or any running water
- Back your car into the driveway with the vehicle loaded and all doors and windows closed. Carry your car keys with you.
- Have a ladder available and place it at the corner of the house for firefighters to access the roof
- Seal attic and ground vents with pre-cut plywood or commercial seals.
- Patrol your property and monitor the fire situation. Don't wait for an evacuation order if you feel threatened.
- Check on neighbors and make sure they are preparing to leave.
- Keep your pets nearby and prepare to transport farm animals

It is important to stay informed and alert so you know when to evacuate. Officials will determine the areas to be evacuated and plan escape routes while law enforcement officials will typically enforce the evacuation order. Evacuation orders can be announced on TV or radio and mobile alerts. When evacuating, it is recommended to cover up for protection against heat and embers by wearing long-sleeved shirts, long pants, a hat, goggles/glasses, and a bandana to cover the face.

EMERGENCY PREPAREDNESS AND EVACUATION

Returning Home

Homeowners should return home only when they are authorized by officials to do so. Stay safe when returning home by:

- Looking for downed power lines and other hazards
- Checking for hidden embers or smoldering fires
- Turn on gas only after checking propane tanks, regulators, and gas lines. If you smell gas, immediately leave the house.
- Check floor and roof for structural damage

Homeowners can also financially prepare for a wildfire by maintaining homeowner insurance, which can provide money to rebuild after a wildfire, replace lost belongings and pay for temporary housing if needed. Homeowners should discuss policy limits and coverage with their insurance company annually to ensure the policy reflects the correct house square footage and assets and to ensure they understand exactly what the policy covers. If home improvements were made, you should update your policy to include these. If you are renting, you can purchase renters insurance, which can often be bundled with auto insurance. To make replacing items easier, homeowners and renters should create a home inventory by taking photos and videos of each room. You should note expensive or important items and save receipts for big purchases.

Additional Resources on Emergency Preparedness

- Complete evacuation guide can be found at https://www.ready.gov/wildfires
- A personalized preparedness plan can be created using the CalFire app: https://plan.readyforwildfire.org/

USGBC LA

U.S. GREEN BUILDING COUNCIL LOS ANGELES

USGBC-LA Wildfire Defense Education & Tours Program

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