



**FAMILY SAFETY AND  
HOME PROTECTION GUIDE**





**TRUST  
PREVENTION,  
NOT LUCK**

**WILDFIRE DEVASTATES  
THOUSANDS OF  
FAMILIES AND HOMES  
EACH YEAR, BUT YOU  
CAN STAY SAFE AND  
PROTECT YOUR HOME  
BY TAKING ACTION  
TODAY. FOLLOW  
THE STEPS IN THIS  
GUIDE TO BECOME  
WILDFIRESTRONG.**





# SAFETY FIRST

## Wildfire Safety and Evacuation Tips

Wildfires are an increasingly common threat, particularly in dry and forested areas. The fast-moving fires can cause devastating loss of life, damage to homes and neighborhoods, and economic disruption, making rebuilding and recovery complex.

Preparing for a wildfire and knowing how to respond can make all the difference in ensuring your safety and that of your loved ones. Below are essential wildfire safety and evacuation tips to help you stay prepared.



### PREPARING FOR WILDFIRES BEFORE THEY STRIKE

#### 1 Create a Defensible Space

- ▶ A defensible space contains a series of zones around your home designed to slow the spread of wildfire. The first and most critical zone is the space immediately next to your home that extends to five feet. Embers can travel up to three or more miles, land next to your home, and ignite, so keeping the space free of any ignitable material is imperative.
- ▶ Use the checklist in the "Creating a WildfireStrong Home" section on page 16 of this guide to create a defensible space around your home.



#### 2 Develop an Emergency Plan

- ▶ Create a wildfire action plan that includes evacuation routes and meeting locations.
- ▶ Identify alternate ways out of your neighborhood if primary routes are blocked.
- ▶ Assign responsibilities, such as who will bring emergency kits or assist pets.
- ▶ Keep your vehicle gas tank full or EV battery charged at all times.
- ▶ Ensure all family members are familiar with the plan.



#### 3 Assemble an Emergency Supply Kit

- Prepare a "Go Bag" with essentials such as:
- ▶ Non-perishable food and water (at least three days' worth) and pet food
  - ▶ Medications and first aid supplies
  - ▶ Essential documents (IDs, insurance papers, bank records) backed up on a portable computer drive
  - ▶ Flashlights, batteries, and a portable phone charger
  - ▶ N95 masks and bandanas to protect against smoke inhalation
  - ▶ Emergency contact numbers and a battery-powered radio

#### 4 Stay Informed

- ▶ Sign up for emergency alerts and warnings with local government and news organizations.
- ▶ Monitor fire conditions via local news, social media channels, smartphone weather apps, and official agencies like the National Weather Service. Do not rely on only one source for alerts.
- ▶ Have a backup communication plan in case cell networks fail. Remember that sending messages via text can work even when cellular phone calls do not.
- ▶ Meet with your neighbors and establish a text group or phone tree to use in a wildfire emergency. Include older adults or neighbors with special needs.

## WHAT TO DO DURING A WILDFIRE

### 1 Follow Evacuation Orders

- ▶ If authorities issue an evacuation order, leave immediately, as wildfires spread rapidly and unpredictably.
- ▶ Take your “Go Bag” with emergency supplies and important documents.
- ▶ Follow designated evacuation routes and avoid driving through thick smoke.



### 2 Protect Your Home If You Have Time

If evacuation is not yet mandatory, take steps to make your home less vulnerable:

- ▶ Shut all windows and doors to prevent embers from entering.
- ▶ Move combustible furniture and contents away from windows.
- ▶ Shut off gas, propane, and air conditioning systems.
- ▶ Leave exterior lights on to make your home more visible in smoky conditions.

### 3 Evacuate Safely

- ▶ Wear eye protection and protective clothing, such as long sleeves, pants, and sturdy shoes, to shield yourself from heat and embers.
- ▶ Keep car windows and vents closed to minimize smoke exposure.
- ▶ If trapped, seek shelter in a non-flammable structure or a low-lying area with minimal vegetation.



## ACTIONS AFTER A WILDFIRE

### 1 Wait for Official Clearance

- ▶ Do not return home until the authorities declare it safe.
- ▶ Check for hazards like smoldering embers, unstable structures, or gas leaks.

### 2 Assess Damage and Contact Insurance

- ▶ Document any damage with photos and contact your insurance company promptly.
- ▶ Be cautious when cleaning up ash and debris—wear protective gear and follow health advisories.

### 3 Support Recovery Efforts

- ▶ Preregister and take training courses with local relief agencies so you are prepared to volunteer with recovery organizations and help neighbors with recovery.
- ▶ Use the steps in this guide to mitigate future wildfire risks.
- ▶ Wildfires can be unpredictable, but proper preparation can significantly increase your safety and chances of survival. By creating a defensible space, developing an emergency plan, and knowing when to evacuate, you can protect yourself, your loved ones, and your home from the dangers of wildfires.





# THE TALE OF TWO HOMES

## A Wildfire Survival Story

**"The entire deck and the back of the house were already in flames, and I thought it might be too late."**

—RJ, Rancho Bernardo Resident

In October 2007, the Witch Creek fires in San Diego County scorched nearly 200,000 acres and destroyed more than 1,000 homes. Pushed by strong Santa Ana winds, flames as high as 40 feet ripped through community after community, forcing thousands from their homes and leaving utter devastation for the families of Southern California.

In Rancho Bernardo, residents and next-door neighbors RJ and Helena were among those forced to evacuate. RJ shared his harrowing experience, recalling the moment he realized his home was on fire right after receiving a reverse 911 call. "The entire deck and the back of the house were already in flames, and I thought it might be too late." The intense heat was palpable as he and his family rushed to their car. "All I could do was follow the tail lights because I could not see anything else. I didn't even know what side of the street I was on," RJ recounts. When the flames finally subsided, all the homes on the cul-de-sac were reduced to ashes—except for one house that remained standing.

◀ Opposite: The aftermath of the wildfire at RJ's home.





▲ Above: Helena's home after the wildfire.

The Federal Alliance for Safe Homes (FLASH), a nonprofit disaster safety organization, sent wildfire expert Pat Durland to investigate what caused RJ's home and five others to burn and how one survived. Durland noted that the fuel break ended about 20 yards from the bottom of the slope near RJ's house. The strong winds pushed the flames up the slope, igniting the deck attached to the house. Once the deck caught fire, the house quickly followed and could not be saved.

Cuyamaka Fire District Chief Kevin Dubler explains how quickly any fire, large or small, can spread through wildland areas when they are close to homes. Dubler emphasizes how building code changes can help prevent such tragedies, particularly regarding wooden decks. "You've got some 2x6s with air gaps between

them, and if the fire gets underneath that deck, there's no way to stop it from igniting. It's like organized kindling, particularly when the decks are 8 to ten feet off the ground," Dubler says. He adds that vegetation growing under decks exacerbates the problem, acting as ladder fuel that helps the flames reach the deck and, subsequently, the house.

In stark contrast to RJ's experience, Helena's home was the only one on her cul-de-sac to survive the Witch Creek fire. Why did her home sustain little to no damage when the six others were total losses? FLASH President and CEO Leslie Chapman-Henderson explained that Helena took simple yet effective steps to make her home resistant to wildfires, "The most crucial strategy was addressing the roof's combustibility. Helena replaced her

wooden shake roof with a Class A fire-resistant asphalt shingle, leaving the fire with no ignition material. This simple change is why her home still stands today."

Pat Durland spoke with Helena about her other improvements that ultimately saved her home. "The first thing that happens is you can expect the embers to get here before the flames do. They landed on your cinderblock patio, but there was nothing for them to burn. Your house was clean—no piles of debris, no wood piles—so the fire had to go out because it couldn't find anything to burn," Durland explained.

In Chief Dubler's district, new building codes and enhanced techniques give homes a better chance of survival. These codes require fire-resistant siding materials like stucco and fiber-cement, dual-glazed or tempered glass windows, and fire-rated doors for all exterior entries. Vents must be screened to prevent embers from entering the attic, a common cause of house fires during wildfires. Wooden shingles, treated or untreated, are no longer allowed.

According to Chief Dubler, "The most important thing to understand about fire is that it follows a process of combustion, which requires oxygen, heat, and fuel, and we can manipulate the fuel to protect properties. A good starting point is vegetation management—removing flammable vegetation near the home. From there,

homeowners can tackle larger projects like replacing siding and removing wooden decks."

Chapman-Henderson states, "The tale of two houses—RJ's destroyed home and Helena's surviving one—is a story that unfolds in every disaster. The fires in California in October 2007 were no different. Some houses survive; others are destroyed. But what's most important is the story of the families inside those homes. By learning from these stories and better protecting our structures in the future, we can all benefit."

"The future is extraordinarily bright," says RJ. "If you can picture a phoenix, that's our new symbol here because something beautiful will come from these ashes."



Watch the video about  
RJ and Helena's story by visiting  
[www.YouTube.com/stronghomes](https://www.YouTube.com/stronghomes).

For more information on protecting your  
home from wildfires, visit [Flash.org](https://Flash.org).

**"The most important thing to understand about fire is that it follows a process of combustion, which requires oxygen, heat, and fuel."**

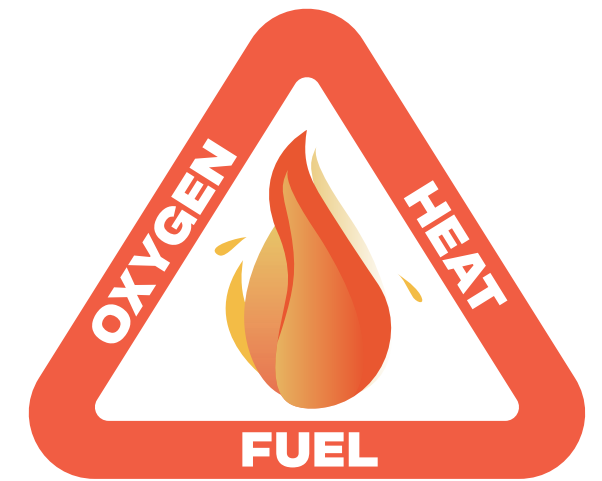
—Cuyamaka Fire District Chief Kevin Dubler





# Understanding Wildfire Behavior

## NO FUEL. NO FIRE.



The fire triangle is a simple model that explains that fire needs oxygen, heat, and fuel, or it cannot burn.

**Oxygen:** Oxygen in the air supports the chemical processes during combustion. Most fires require at least 16% oxygen to continue burning, while normal atmospheric air contains about 21% oxygen.

**Heat:** Heat is the energy source that raises materials to their ignition temperature. Sources include embers, open flames, sparks, hot surfaces, or even sunlight concentrated through glass.

**Fuel:** Fuel is any combustible solid, liquid, or gas material that can sustain a fire, such as wood, paper, gasoline, or propane. Wildfire fuel includes plants and ignitable building materials like roofs or decks during wildfires.

The fire triangle teaches us that removing any one of these three elements will extinguish a fire. However, the only element we can control is fuel, so managing and eliminating fuels is the best way to prevent fires and empower firefighting strategies. That's why we say, "No Fuel. No Fire."





# Evaluate **YOUR HOME'S WILDFIRE LOCATION RISK**

**1** Is the home subject to building codes or land use ordinances incorporating wildfire safety measures?

☐ YES ☐ NO

(Visit [www.Inspect2Protect.org](http://www.Inspect2Protect.org) to learn more)

**2** Is the home located in or near a forest, wildland, or area with dense vegetation?

☐ YES ☐ NO

**3** Has the home experienced wildfires in the past?

☐ YES ☐ NO

(Visit [Inspect2Protect.org](http://Inspect2Protect.org) to check the disaster history for your location.)

**4** Is the home on a slope or near a canyon where fire can travel faster?

☐ YES ☐ NO

**5** Are the neighboring homes fire-resistant?

☐ YES ☐ NO

**6** Does the community have the infrastructure (roads and water supplies that firefighters can use) to respond to a wildfire?

☐ YES ☐ NO

*If you answered yes to questions 1-4 or no to questions 5 and 6, ask your local code official or fire department to help you assess your home's risk or speak with a qualified, licensed engineer or inspector.*



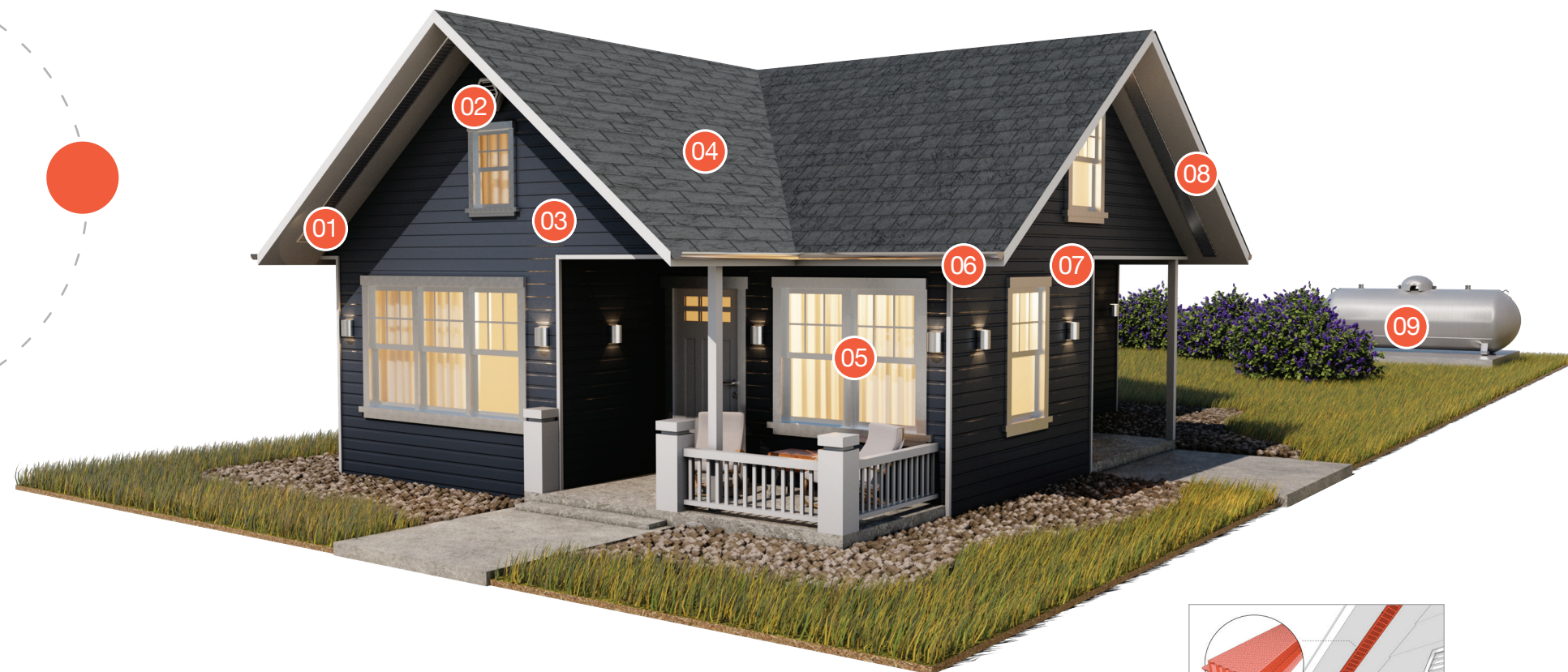
## **IDENTIFY AND UNDERSTAND WILDFIRE- RESISTANT CONSTRUCTION DESIGN AND MATERIALS**

Evaluate the construction materials and products on your home, such as roof coverings, siding, decking, and fencing, to ensure they are non-ignitable, non-combustible, or fire-resistant materials, including:

- ▶ Exterior walls made from concrete, fiber-cement panels or siding, stucco, masonry, metal, or fire-retardant-treated wood siding or panels
- ▶ Roof coverings of asphalt fiberglass composition shingles, concrete slab, and flat/barrel-shaped tiles (Class A) or cement clay, copper, metal, or slate
- ▶ Fire-resistant shutters
- ▶ Multi-pane windows with at least one pane of tempered safety glass
- ▶ Metal vs. wood or vinyl window frames
- ▶ Fire-rated exterior doors
- ▶ Non-wood garage doors
- ▶ Non-combustible or fire-rated decks, porches, and fences



# Creating a **WILDFIRE STRONG HOME**

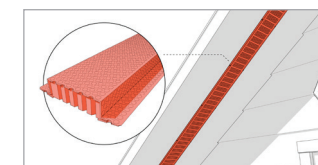


## VERIFY THAT THE FOLLOWING METHODS AND FIRE-RESISTANT PRACTICES ARE IN PLACE

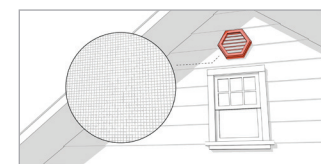
- ▶ Woven wire mesh spark arrestors in each chimney or stovepipe to prevent large embers from entering or escaping
- ▶ Eaves are either closed or made from fire-resistant materials
- ▶ Soffit vents are ember-resistant and/or protected with 1/8-inch metal wire mesh
- ▶ Minimal roof overhangs, preferably flat vs. sloped, to avoid trapping hot gases
- ▶ Underground utility and equipment connections
- ▶ Fire-resistant defensible space and non-combustible landscaping within 100 feet of the home, including 0 to 5 feet from the house with zero ignitable material
- ▶ If utility and equipment connections aren't underground, gaps and penetrations in exterior walls and roofs are sealed with fire-resistant materials
- ▶ Indoor fire sprinklers. Note: sprinklers qualify your home for insurance discounts



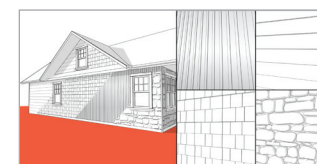
## MAKE STRUCTURAL UPGRADES TO INCREASE WILDFIRE RESISTANCE



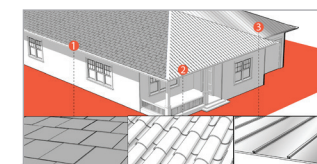
- 01 Replace non-metal vent materials



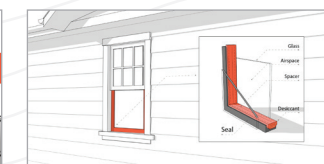
- 02 Cover vents with wire mesh



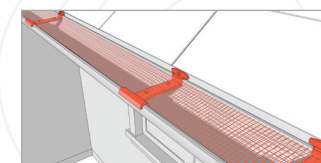
- 03 Upgrade to non-combustible siding



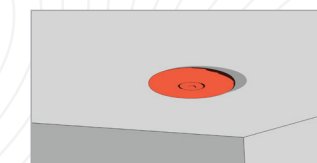
- 04 Install a fire-resistant roof cover



- 05 Upgrade to heat and flame resistant windows



- 06 Install non-combustible (metal) leaf guards over gutters



- 07 Install residential house sprinklers



- 08 Protect eaves, overhangs, and soffits



- 09 Place fuel tank 30 feet away



# Prioritize defensible space and keep your home wildfire-ready



## Immediate Zone (0-5 feet from the home)

- ▶ Clean roofs and gutters of dead leaves, debris, and pine needles.
- ▶ Replace or repair any loose or missing shingles or roof tiles.
- ▶ Install 1/8" metal mesh screening to reduce embers from passing through eaves and soffit vents.
- ▶ Clean debris from exterior attic vents and install 1/8" metal mesh screening to block ember entry.
- ▶ Cover deck undersides and crawl spaces with non-combustible materials or metal mesh to

prevent the accumulation of combustible debris and slow the entry of embers, especially if your home is above-grade

- ▶ Repair or replace damaged or loose window screens and any broken windows.
- ▶ Move flammable material away from wall exteriors, e.g., mulch, plants, leaves, pine needles, firewood piles, etc.
- ▶ Remove anything stored underneath decks or porches.
- ▶ Do not store propane grills, propane cylinders, or other flammable liquids next to your home.



## Extended Zone (30-100 feet from the home)

- ▶ Dispose of heavy accumulations of ground litter or debris.
- ▶ Remove dead plants and tree material.
- ▶ Remove small conifers growing between mature trees.
- ▶ Remove vegetation next to storage sheds or other outbuildings within this area.
- ▶ Trees 30 to 60 feet from the home should have at least 12 feet between canopy tops; trees 60 to 100 feet should have at least 6 feet between the canopy tops.

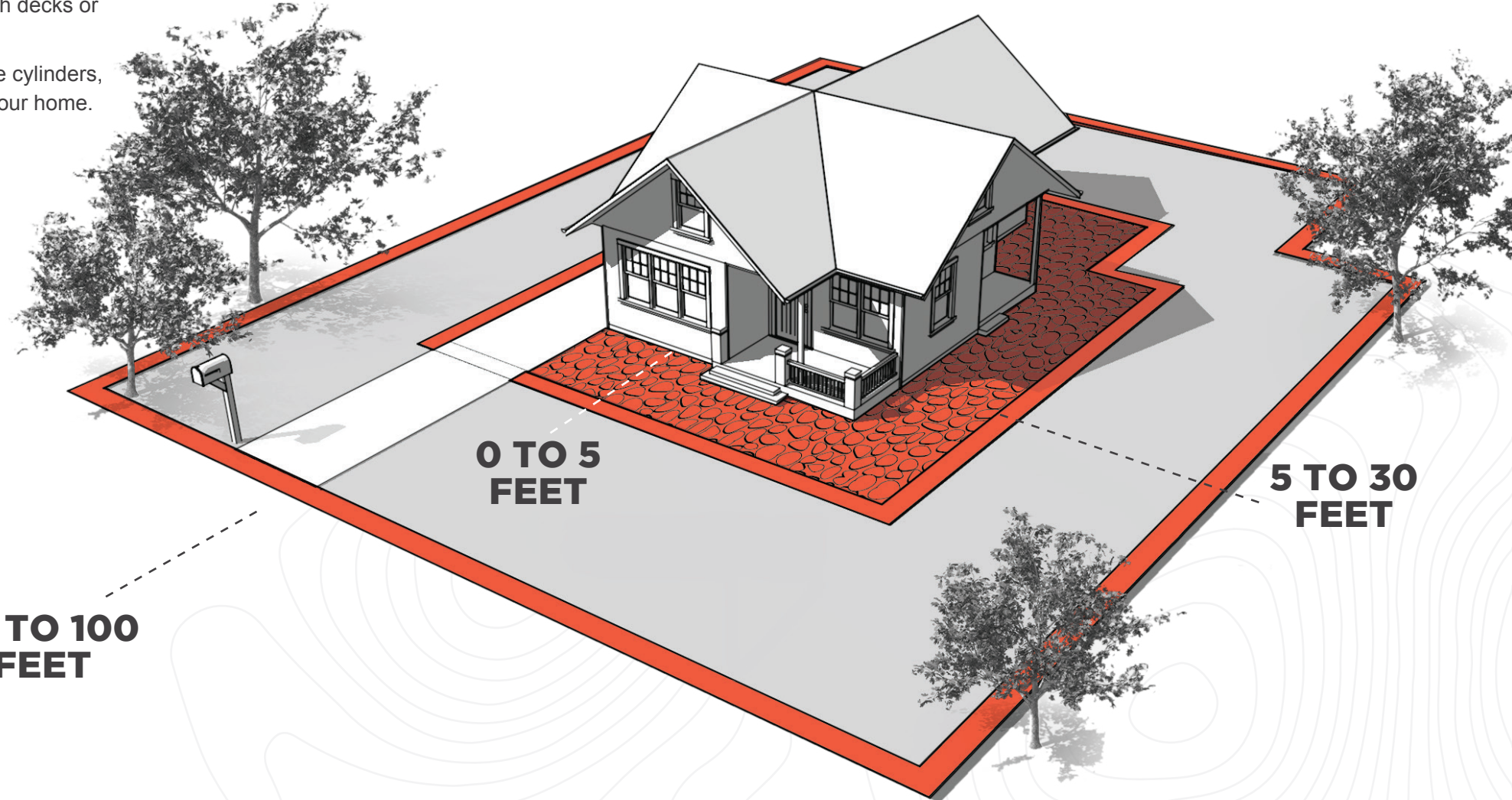
**Note:** The distances listed for crown spacing are suggested based on NFPA 1144. However, the crown spacing needed to reduce crown fire potential could be significantly greater due to slope, tree species, and other site-specific conditions. Check with your local forestry professional for advice on what is appropriate for your property.



## Intermediate Zone (5-30 feet from the home)

- ▶ Clear vegetation from under large stationary propane tanks.
- ▶ Create fuel breaks with driveways, walkways/paths, patios, and decks.
- ▶ Keep lawns and native grasses mowed to a height of four inches.
- ▶ Remove ladder fuels (vegetation under trees) so a surface fire cannot reach the crowns.
- ▶ Prune trees up to 6-10 feet from the ground.
- ▶ For shorter trees, don't exceed 1/3 of the overall tree height.

- ▶ Space trees with a minimum of 18 feet between crowns, increasing the distance with the percentage of slope.
- ▶ Plan tree placement to ensure the mature canopy is no closer than 10 feet from the edge of the home.
- ▶ Limit trees and shrubs to small clusters of a few each to break up the continuity of the vegetation across the landscape.







FOR NEIGHBORS

# COMING TOGETHER

## How Neighbors Can Mitigate Wildfire Risk in Their Communities

Wildfires are a growing threat in many regions, with increasing temperatures, prolonged droughts, and expanding development in fire-prone areas. While individual homeowners can take steps to protect their properties, a community-wide approach to wildfire mitigation is far more effective.

When neighbors work together, they can significantly reduce wildfire risks and create safer, more resilient communities. Here's how neighbors can unite to mitigate wildfire risks in their neighborhoods.

### 1 Create a Fire-Adapted Community

A fire-adapted community acknowledges wildfire risks and takes proactive measures to minimize them. Residents can organize meetings to educate each other about fire risks and develop community-wide strategies to protect homes and infrastructure. The National Fire Protection Association's (NFPA®) Firewise USA® program provides excellent resources and guidance for communities looking to become WildfireStrong. (visit [www.firewise.org](http://www.firewise.org))

### 2 Clear Defensible Space in Common Areas

Defensible space is the buffer around homes and structures that slows wildfire spread. Neighbors can work together to establish and maintain defensible space in common areas and assist

neighbors who need help establishing the space around their homes. Some tips include:

- ▶ Remove dry leaves, dead branches, and other flammable debris from yards and common areas.
- ▶ Prune tree branches to at least 10 feet above the ground.
- ▶ Keep the grass and vegetation well-maintained and watered.
- ▶ Use fire-resistant landscaping, such as stone pathways and native, drought-resistant plants.
- ▶ By coordinating efforts, communities can create more expansive defensible spaces that protect entire neighborhoods rather than just individual properties.





### 3 Organize Community Clean-Up Days

One of the most effective ways to reduce wildfire risk is through regular community clean-up events. These events can focus on clearing debris, disposing of flammable materials, and maintaining firebreaks. By working together, residents can efficiently remove large amounts of hazardous vegetation and waste, making the area much safer in the event of a fire. Follow the model used for the annual NFPA Wildfire Community Preparedness Day to help protect your neighbors and neighborhood. (visit [www.wildfireprepdays.org](http://www.wildfireprepdays.org))

### 4 Develop an Emergency Preparedness Plan

A well-prepared community is better equipped to respond to a wildfire emergency. Neighbors should work together to:

- ▶ Establish an emergency communication network.
- ▶ Identify evacuation routes and emergency meeting points.
- ▶ Share resources, such as emergency kits and fire extinguishers.
- ▶ Keep an updated list of community members who may need assistance

during evacuations, such as the elderly or disabled.

- ▶ Practice an emergency drill to ensure everyone knows what to do when a wildfire threatens the area.

### 5 Improve Home Fire Resistance

Homes built with fire-resistant materials and proper maintenance are less likely to ignite. Neighbors can support each other by:

- ▶ Replacing wooden roofs and siding with fire-resistant materials.
- ▶ Installing mesh screens over vents to prevent embers from entering homes.
- ▶ Sealing gaps in eaves, decks, and other openings where embers can enter.
- ▶ Encouraging local authorities to enforce fire-safe building codes.
- ▶ Bulk purchasing fire-resistant materials as a community can make these improvements more affordable.

### 6 Advocate for Fire Safety Policies

- ▶ Communities can work with local governments and fire departments to advocate for policies that enhance fire safety, such as:

- ▶ Adopting and administering the latest versions of modern, model wildfire building codes, including the International Wildland-Urban Interface Code and the Standard for Wildland Fire Protection (NFPA 1140) as well as state codes such as the California Chapter 7A Building Code.
- ▶ Maintaining firebreaks along roads and properties.
- ▶ Restricting activities that could ignite wildfires, such as outdoor burning during dry seasons.

Remember, local officials need your support to take action for fire mitigation efforts.

### 7 Engage with Local Fire Departments and Organizations

Fire departments, forestry services, and environmental organizations often offer training programs, workshops, and resources to help communities prepare for wildfires. Neighbors can invite experts to guide mitigation efforts and emergency response strategies.

### 8 Leverage Fire Prevention Technology Tools

Technology can play a crucial role in wildfire mitigation. Communities can use:

- ▶ Fire risk assessment apps and mapping tools to identify high-risk areas.
- ▶ Emergency alert systems to receive real-time wildfire updates.
- ▶ Remote sensing and camera systems to detect fires early.

Neighbors can respond quickly to wildfire threats and minimize damage by staying informed.

### Conclusion

Mitigating wildfire risks requires a collective effort. When neighbors come together, they can create fire-adapted communities, clear defensible spaces, organize clean-ups, prepare for emergencies, and advocate for fire safety policies. By working collaboratively, communities can significantly reduce wildfire risks and protect their homes, families, and environment from devastating wildfires.

Wildfire safety is a shared responsibility—start the conversation with your neighbors today and take proactive steps to safeguard your community.





FOR LEADERS

# Protecting Communities from Wildfires: **A LEADERSHIP** **GUIDE**

Wildfires are becoming more frequent and intense due to prolonged droughts and increased development in fire-prone areas. Leaders at all levels—whether in government, emergency services, or community organizations—play a crucial role in protecting communities from these devastating disasters. Here are key actions leaders can take to safeguard lives, properties, and the environment from wildfires.

## 1 Implement Proactive Fire Prevention Policies

Leaders can reduce wildfire risks by enacting and enforcing fire prevention policies. These measures may include:

- ▶ Enforcing fire-resistant building codes in wildfire-prone areas.
- ▶ Prohibiting building materials that exacerbate wildfire risk.

- ▶ Restricting outdoor burning and fireworks during dry seasons.
- ▶ Encouraging the creation of defensible space around homes and businesses.
- ▶ Supporting controlled burns to reduce hazardous vegetation.

By establishing clear guidelines and regulations, leaders can help prevent fires before they start.

## 2 Invest in Early Detection and Rapid Response Systems

Wildfires can spread quickly, so early detection and a fast response are essential. Leaders should prioritize:

- ▶ Installing remote sensing and fire detection cameras in high-risk areas.
- ▶ Utilizing satellite data and AI-powered fire prediction models.



- ▶ Strengthening emergency response infrastructure, including firefighting resources and personnel.
- ▶ Developing an effective wildfire alert system that notifies residents in real-time.

Investing in technology and response strategies can save lives and minimize damage.

## 3 Strengthen Emergency Preparedness and Evacuation Planning

A well-prepared community is less vulnerable to wildfires. Leaders can enhance emergency preparedness by:

- ▶ Creating a communications text group, phone tree, or other method to ensure wildfire alerts can be shared swiftly across the affected area.
- ▶ Conducting regular wildfire drills for residents and first responders.
- ▶ Creating and publicizing evacuation routes

and safety zones.

- ▶ Providing emergency supply kits and preparedness resources to households.
- ▶ Establishing community emergency response teams to assist during crises.

Preparedness efforts ensure that residents know what to do when a wildfire threatens their area.

## 4 Enhance Community Engagement and Education

Raising awareness about wildfire risks and safety measures empowers communities to take action. Leaders can:

- ▶ Organize town hall meetings and workshops on wildfire mitigation.
- ▶ Distribute educational materials on fire-resistant landscaping and home hardening.
- ▶ Engage with schools, businesses, and local organizations to spread wildfire safety messages.



- ▶ Promote volunteer programs for community clean-ups and firebreak maintenance.

Educated communities are more resilient and proactive in reducing fire hazards.

## 5 Secure Funding for Wildfire Mitigation Efforts

Mitigation efforts require financial resources. Leaders should:

- ▶ Advocate for federal and state funding to support wildfire prevention initiatives.
- ▶ Partner with businesses, nonprofits, and academic institutions for research and resource-sharing.
- ▶ Provide grants and incentives for homeowners to implement fire-resistant upgrades.
- ▶ Invest in local firefighting resources, including equipment and training programs.

A well-funded mitigation strategy can significantly reduce wildfire threats and improve emergency response capabilities.

## 6 Encourage Sustainable Land and Forest Management

Poor land management can exacerbate wildfire risks. Leaders can promote sustainable practices by:

- ▶ Supporting reforestation and forest thinning projects to maintain healthy ecosystems.
- ▶ Implementing zoning laws that prevent development in high-risk wildfire zones.
- ▶ Encouraging responsible agricultural and grazing practices to reduce fire fuel.
- ▶ Working with environmental organizations to balance conservation and fire prevention.



Sustainable land management reduces the likelihood and intensity of wildfires.

## 7 Coordinate with Regional and National Agencies

Wildfires often extend beyond local jurisdictions, requiring coordinated responses. Leaders should:

- ▶ Collaborate with state and federal agencies such as the U.S. Forest Service and FEMA.
- ▶ Participate in multi-agency wildfire response exercises.
- ▶ Share resources and intelligence with neighboring communities and regions.
- ▶ Establish mutual aid agreements to strengthen response capabilities.

A coordinated approach enhances efficiency and effectiveness in wildfire prevention and response.