living with WILDFIRE

a guide for the homeowner

Learn about what creates them, what fuels them, how to prepare for them, as well as tips on protecting your property, home and family against wildfires

Presented by

Burn Institute®
Dear Reader,

On behalf of the San Diego County Fire Chiefs’ Association, I am pleased to present Living with Wildfire: A Guide for the Homeowner, a collaborative effort of the Burn Institute and the fire service. We all agree that Southern California is a wonderful place to live, but it comes with risks. In recent years, wildfires posed a significant threat to our communities and loved ones. But knowledge is power. Becoming an informed citizen is the first step to living safer and smarter.

Did you know that having the proper 100 ft. brush clearance around your house (firefighters call it “defensible space”), will give your home a more than 90% chance of surviving a wildfire? That’s assuming that you have non-combustible roofing and ensure that there is nothing flammable stored close to your house. Have you created a fire escape plan so that if you need to evacuate, (more than 120,000 did in 2014), you know exactly what to take and what route you plan to travel? Do you have an alternative route in case one is blocked? This informative guide offers hard facts, useful tips and important guidelines to assist you in preparing for the next wildfire. You will find valuable information that will not only help to protect your home and property – but could potentially save your life.

Within these pages we’ll teach you about the local terrain, fire-resistant landscaping and how to build defensible space around your home. We’ll discuss how and why wildfires move so swiftly and what fuels them. We’ve even given you step-by-step instructions to create a family evacuation plan including a supplies checklist and how to secure your home if you are asked to leave.

Perhaps most importantly, we have included useful community resources, contact information and website addresses, many of which are listed to the right. Because fire and burn prevention technology is continually changing, this should be considered a living document; we encourage you to learn more. Contact your local Fire Department, Fire Safe Council, San Diego County Fire Chiefs’ Association (listed to the right), or visit the Burn Institute website at burninstitute.org.

Severe wildfires are a part of living in Southern California. We need to get used to that fact. And with continued drought conditions combined with unstoppable Santa Ana winds – the next big one is just around the corner. It’s not a matter of if. It’s a matter of when. The fire service is preparing for the next big one – shouldn’t you do the same?

Susan Day
Burn Institute
Executive Director

Register With AlertSanDiego - Never Be Out Of Touch During An Emergency

AlertSanDiego, San Diego County's regional reverse 9-1-1 mass notification system, sends emergency information to your registered mobile phone, Voice over IP (VoIP) phone, and email address. By registering, you are allowing emergency response personnel to notify you with information and/or actions to take, such as evacuation, during an emergency. All San Diego County residents are encouraged to register online for AlertSanDiego.

www.ReadySanDiego.org

Useful Information

www.burninstitute.org
Burn Institute
www.firesafecouncil.org
Fire Safe Council
www.sdcountyemergency.com
San Diego County Emergency Homepage
www.fire.ca.gov
California Department of Forestry & Fire Protection
https://www.wildlife.ca.gov/
California Department of Fish & Game
www.fws.gov
U.S. Fish/Wildlife Service
www.bewaterwise.com
Metropolitan Water District for “Smart Landscaping”

www.sandiego.gov/public-safety 619.533.4444
City of San Diego Public Safety
www.sandiego.gov/development-services 619.446.5200
City of San Diego Development Services Dept.
www.sandiego.gov/park-and-recreation 619.685.1350
City of San Diego Park & Recreation
www.sandiegocounty.gov/content/sdc/pds/ce5.html
San Diego County Emergency Homepage
www.fire.ca.gov
California Department of Forestry & Fire Protection
https://www.wildlife.ca.gov/
California Department of Fish & Game
www.fws.gov
U.S. Fish/Wildlife Service
www.bewaterwise.com
Metropolitan Water District for “Smart Landscaping”

Special thanks to Clifford Hunter (Fire Marshal, Retired), and Mark Dossett (Deputy Fire Marshal, San Diego Fire-Rescue Department), who worked tirelessly in a collaborative effort to identify the most current coding, the latest in brush management, and evacuation information.
Much of the southwest United States is considered a high fire hazard environment. Long before “modern civilization,” fires would periodically burn through – part of an environmental cycle that renewed and re-invigorated living things.

All the natural factors necessary to support large, intense and uncontrollable fires remain. What’s changed is an increased population with an increase of homes in these areas, often with little regard to fire’s threat. This has caused an interference with the cycle of periodic fires. Result: greater fire potential to more and more people. Result: catastrophic fires causing huge losses and unmeetable demands on fire fighting resources. Result: a direct threat to your community, your home, your family!

There are things you can do to understand the threat and prepare for wildfire. “Pre” being the key. This guide outlines steps you can take – long before a fire – to prepare your home and family to survive wildfire.

Every step you take in advance reduces risk to you, your family and your home – whether firefighters are available to help protect you or not.

Fire is, and always has been, part of the dynamics of the beautiful area in which we’ve chosen to live. Through advanced planning and preparation, we can be ready for wildfire.

Evacuate early or stay and defend?

If you live in the Wildland/Urban Interface area, then you are in danger of experiencing a wildfire. During wildfires, evacuations are put in place to protect lives. Your property can be replaced, but your life cannot. Therefore, we strongly recommend that you evacuate when told to do so by authorities.

Brush fire fatalities most commonly occur when people wait to leave their home, or are overtaken by fire. If you live in an area that’s at high risk for brush fire, it's important for you to decide now whether you're going to evacuate early or stay and defend your home.

Sheltering in place, or staying to defend your home, requires considerable planning. Fire agencies cannot make that decision for you. It's up to you to determine whether you are capable of staying and defending your home.

When to leave

Relocate early enough to avoid being caught in fire, smoke or road congestion. Don’t wait to be told by authorities to leave. In an intense wildfire, they may not have time to knock on every door. If you are advised to evacuate, don’t hesitate!

Remember

By evacuating early, you give your family the best chance of surviving a wildfire. You also help firefighters by keeping roads clear of congestion, enabling them to move more freely and do their job.

In addition, if you choose not to evacuate, and consequently need to be rescued by firefighters or law enforcement officers, you may be putting those professionals in harm’s way.

This home was saved from destruction because of advanced preparation by the homeowner long before a fire started.

Is your home prepared?
Firebrands

Firebrands and embers are burning materials produced by wildfire which are lifted high into the air and carried beyond the fire front. They are one of the major causes of homes burned due to wildfire. Typical firebrand and ember materials include pieces of burning vegetation and, if houses are involved, wood shake shingles. Depending on wind speed and size of materials, firebrands and embers can be carried more than one mile ahead of the fire front. A shower of thousands of firebrands and embers can be produced during a major wildfire event. If these firebrands and embers land in areas with easily ignited fuels – including wood roofs, wood plies, wood mulch – numerous spot fires can start. Homes located blocks away from the main fire front can be threatened.

To the right are three examples of vegetation common to our region with computer-generated estimates of how each would burn under common fire weather conditions. Predictions are based on a 20 MPH wind and a 20% uphill slope. Fuel moisture content is based on normal weather for August in our area.
The Wildfire Environment

Today, researchers are studying the fire environment in great detail. They’re gaining knowledge and understanding about the complex inter-relationships between man and nature.

Fire experts have long-recognized three basic components: weather, fuel and terrain (things that burn).

Together, these three items affect the likelihood of fire starting, how fast it moves, its power and difficulty to control.

Weather
Dry, hot and windy weather increases the likelihood of a major wildfire.

These conditions:
• Make ignition easier
• Help fuels burn more rapidly
• Increase fire intensity

High winds speeds, in particular, can transform a small, easily controlled fire into a catastrophic event.

Fuel
Fuel is required for any fire to burn. In a wildfire, fuels are usually living vegetation (trees, shrubs, brush, grass) and dead plant materials (dead trees, dried grass, fallen branches, etc.) Homes, when in the path of wildfire, can become fuel. The quantity, size, moisture content, arrangement and other fuel characteristics influence the ease of ignition, rate of fire spread, length of flames and other fire behavior.

Terrain
Of all types of topographic features, steepness of slope is among the most influential on fire behavior. The steeper the slope, the faster a fire will spread. Other important factors are:
• Aspect – south and southwest slopes usually have more fires
• Chimneys – steep, narrow drainage

Other Factors:
Human Environment
As people move into wildfire country, the human-built environment becomes important in predicting loss of life and property. Examples of increased risk to people living with the threat of wildfire:
• Combustible construction, especially roofs
• Narrow roads, limited access
• Lack of fire-safe landscaping
• Inadequate water supply
• Poorly planned subdivisions

Environmental Warning
Landowners who have received notice from the California Department of Fish and Game or U.S. Fish and Wildfire Service of the occurrence of rare, threatened, or endangered species on their property in areas subject to fuel break clearance must notify both agencies in writing at least 10 days prior to vegetation clearing. The agencies will have up to 10 days following such notification to (1) Determine whether the proposed clearing complies with State and/or Federal endangered species requirements and, (2) To suggest voluntary, alternative abatement measures if feasible and warranted. Failure of the agencies to respond within 10 days will allow the landowner to proceed with abatement.

Cut all grass and weeds to approximately two inches in height on flat parcels or parcels with a slope gradient up to 25%; remove all cut grass and weeds. Remove all tumbleweeds, rubbish, litter and combustible debris from property. Do not conduct any grading or discing on your property since special permits may be required. To verify, call The Development Services Department at 619.446.5000.

THE WILDFIRE EQUATION
Fire is part of our environment. Our brush-covered hills, canyons and forests were burning periodically long before homes were built here.

+ People are living in this fire environment. Many homes are built and landscaped with no thought of wildfire, and they’re often on narrow roads.

Today’s wildfires can burn fast…and seasonal hot, dry winds drive fires even faster, making them impossible to control.

= DISASTER
• Deaths and serious injuries
• Natural resources & wildlife destroyed
• Homes and treasures within lost

“How fast is wildfire?” Quiz:

☐ Are you physically fit to fight spot fires in and around your home for up to 10 hours or more?
☐ Are you and your family members mentally, physically and emotionally able to cope with the intense smoke, heat, stress and noise of a wildfire while defending your home?
☐ Can you protect your home while also caring for members of your family, pets, etc?
☐ Do you have the necessary resources and equipment to effectively fight a fire?
☐ Does your home have defensible space of at least 100 ft. and is it cleared of flammable materials and vegetation?
☐ Is your home constructed of ignition resistant materials?

If you answered “No” to any of these questions, then plan to evacuate early.
The Three R's of Defensible Space

**Removal:** Eliminate entire plants, particularly trees and shrubs from the zone. Examples: cutting down a dead tree or cutting out a flammable shrub.

**Reduction:** Remove plant parts such as branches or leaves. Examples: pruning dead wood from a shrub, removing low branches and mowing dried grass.

**Replacement:** Substitute more hazardous vegetation with less flammable plants. Examples: removal of a dense stand of flammable shrubs and planting an irrigated, well-maintained flower bed.

How slopes fuel fires

The diagram below provides an idea of how fire behaves on sloping ground.

- **A** A match held in the upright position does not burn down rapidly.
- **B** A match held at a horizontal angle would increase the speed of the flame. The match shown here might represent vegetation burning on a flat to gently sloping area.
- **C** This match represents a fire moving rapidly up a steep slope. In this case, as in all slopes, canyons and chimneys, flames preheat vegetation and structures ahead of it, moving the fire along at an alarming rate.

Reducing the “fuel”

The first goal in creating a defensible space is to selectively thin plants, then prune to reduce the fuel volume of the plants that remain. Sometimes wildland plants and even landscaping can grow as an uninterrupted layer of vegetation as opposed to being patchy or widely spread individual plants. The more continuous and dense the vegetation, the greater the wildfire threat. If this situation is present within your recommended defensible space area, you should “break-it-up” by providing for separation between plants or small groups of plants. Cut or clear dry vegetation in cooler, earlier hours, not in the heat of the day. Remember, if it’s too hot outside for you to be working, it’s too hot to be using equipment for thinning brush.

Ladder and wick fuels

Vegetation is often present at varying heights, similar to rungs on a ladder. Under these conditions, flames from fuels burning at ground level can be carried to shrubs, which can ignite still higher fuels like tree branches. Example of ladder fuels: wood fences that attach to your home, wood piles or storage of combustible materials next to your house, combustible ground cover, wood mulch. The ladder fuel problem can be corrected by providing a separation between the vegetation layers. Within the defensible space area, a vertical separation of three times the height of the lower fuel layer is recommended.
Maintaining zoned fire-resistant landscaping helps protect your home from wildfire

ZONE 1
From structure out a minimum of 30-50 ft. County Areas 50 ft.
The area nearest your home should contain low-growing plants with low fuel volume. Ideally there should be no tall-growing plants this close to your home. However, since we all enjoy the shade of a tree or two, select the tree wisely – see Smart Landscaping on page 9.

ZONE 2
A minimum of 30-100 ft. from structures County Areas 50-100 ft.
Low-growing ground covers that are resistant to fire and low in fuel volume are recommended in this zone. When properly maintained, a fire may be stopped before it reaches your home.

NATIVE VEGETATION
Beyond 100 ft. from structures
Check with environmental regulatory agencies before modifying native vegetation that might include endangered species and habitat. Note that 100 ft. of zoned fire-resistant landscaping may not be adequate to protect your home under all circumstances, but protects well in most situations.

To learn more about Fire-Resistive Plants
California-friendly plants require less water and are featured in the “Be Water Wise” program. Search by color of leaves or flowers, height, sun/shade requirements, soil type needed and blooming habits, at:

www.bewaterwise.com

Additionally, you can contact your local fire department, nursery, university extension office, or landscape architect for other recommendations on fire-resistant planting options for your particular area.

*Measured on a horizontal plane.
These hillside homes have visible defensible space, that protected them from a rapidly moving wildfire.
Wood decks and fences

Embers can land on many wood surfaces near or adjacent to structures, then ignite and burn hot enough to ignite eaves, wood siding, and other combustible parts of houses. Wood fences catch on fire, and can ignite the house if they are attached.

☐ Consider replacing the surfaces and covers of wood decks, porches, and patios with fire-rated deck materials, concrete, or stone.
☐ Keep combustible materials 30 ft. from the house, including woodpiles, trash, wooden trellises, gas-powered equipment.
☐ Replace the wood fence or gate attached to the house, with wrought iron, stucco, or plastic fence or gate.

Smart landscaping

Landscaping with wildfire in mind – or “firescaping” – involves plant selection based primarily on the plant’s ability to reduce the wildfire threat. “Fire smart” plants grow slowly and stay small, so they require little pruning. They produce fewer leaves, dead, and dry material, and they keep their moisture content even in dry Santa Ana winds. Avoid plants that contain oils, resins and waxes that make these plants burn with greater intensity, such as eucalyptus, pines, and junipers. Don’t plant Mexican Fan Palms, as they produce dry fronds that are very flammable and fly through the air when ignited. Don’t plant ornamental grasses, such as Pampas grass, as they are highly flammable and spread into adjacent natural areas. Within 1-5 ft. of the foundation, replace mulch and ground litter with rocks or mineral soil. Contact your local fire department, nursery, university extension office, or landscape architect for recommendations on fire-resistive planting options for your particular area.

Maintaining fire-resistance

A fire-resistant plant can lose this quality altogether if not properly maintained and irrigated. Lack of long-term attention can result in fire-resistant plants loading up with dead twigs, leaves and branches, to grow into monstrous, yet sometimes invisible fuel volumes. Walk the perimeter of your house and prune plants that are under windows or eaves. Remove weeds, and consider putting two inches of mulch under plants, in areas that are at least 1-5 ft. from the foundation. Maintain the correct irrigation schedule year-round for the good health of your plants to prevent untimely death or excessive weak growth. Consider drip irrigation to reduce overall water use, and get more information on www.bewaterwise.com. Remove dead foliage and twigs from trees and shrubs, then determine the cause of the dead foliage and treat diseases or pests to restore the plant to good health. If it dies, remove the plant immediately. A dead plant is fuel.

Environmental regulations

Federal and State environmental regulations might, at first, appear to conflict with fire protection planning concepts. Environmental law should not be ignored in preparing for wildfire. Cooperation between environmental regulators, fire agencies and property owners has resulted in an agreement to allow a 100 ft. thinning from existing structures. If endangered species are encountered, contact your local Planning Department.

Create a Fire-Resistive Environment

Firefighters can control about 97% of all wildfires that start. 3% overwhelm even the best-equipped, well-staffed agencies.

That’s when your advanced preparation REALLY counts.
In a wildfire, firefighting forces are stretched to the limit. You can design or modify your home to resist wildfire—or it can be totally unprepared and indefensible. A defensible home has a far better chance of survival—whether or not firefighters can get to it in time! The manner in which a house is designed, location where it is built, materials used in its construction, and fire department access, all influence survivability during a wildfire.

Does your home have a deck or an exterior staircase?
A combustible fence or gate attached to a structure is a threat if it catches on fire, and can act as a wick, bringing fire to the house.

For more information regarding combustible decks, fences, and man-made fuels, please refer to:
https://ucanr.edu/sites/fire/

Roof
☐ Install a non-combustible roof that meets the classification requirements of your community. Check with your building department or fire marshal.
☐ Review roof venting and replace old style vents (screening only) with vents that resist intrusion of firebrands and embers.
☐ Cover your chimney and stovepipe with an approved spark arrester.
☐ Remove any tree branches within 10 ft. of your chimney.
☐ Clean all dead leaves, needles and other combustible waste from your roof and rain gutters.

Construction
☐ If you can, build your home away from ridge tops, canyons and areas between high points on a ridge.
☐ Build your home at least 30 ft. from your property line.
☐ Use non-combustible materials for the exterior surfaces of your home.
☐ Enclose the underside of eaves, balconies, above-ground decks and other projections with ignition-resistant material.
☐ Relocate your attic vents from under the eaves to gables or roof areas. Prefabricated attic vents for gable and roof applications are available.
☐ Install only dual-pane, with one pane being tempered glass and the other annealed glass windows and skylights.
☐ Consider a residential fire sprinkler system for your home. Besides protecting your family when home, it may protect your home while you are away, and even prevent a house fire from spreading to the wildland.

Landscaping
☐ Contact your local fire department, nursery or university extension for suggestions.

Yard
☐ Stack woodpiles at least 30 ft. away from all structures, and clear away combustible vegetation within 10 ft. of woodpiles.
☐ Locate LPG or propane tanks at least 10 ft. from any structure, and surround them with at least 10 ft. clearance from vegetation.
☐ Remove all stacks of construction materials, pine needles, leaves and other debris from your yard.
☐ Contact your local fire department to find out if open-burning is allowed in your area.
☐ Keep all combustible mulch at 1-5 ft. from the foundation.

Emergency water supply
Maintain an emergency water supply that meets fire department standards through one of the following:
☐ Common water/hydrant system.
☐ Cooperative emergency storage tank with neighbors.
☐ A minimum water storage supply of 5,000 gallons to protect a building less than 1,500 sq. ft. on your property. Additional storage is required when exceeding 1,500 sq. ft.
☐ Clearly mark all emergency water sources and notify your local fire department of their existence.
☐ Create easy firefighter access to your closest emergency water source.
☐ If your water comes from a well, consider an emergency generator to operate the pump during a power failure.
These newer homes in wildfire country are utilizing ignition-resistant materials, non-combustible roofs, “fire-safe” landscaping, residential fire sprinklers, good access, water supply and a defensible space.
This home followed smart landscaping rules; however, a wheelbarrow left too close to the home caught on fire, which then scorched the exterior of the home. When preparing for wildfire, make sure all flammable materials are stored at a safe distance from the home.
### Access
- Identify at least two roads out from your neighborhood.
- Construct roads that allow two-way traffic.
- Design road width, grade, curves and vertical clearance, to allow large emergency vehicles. Check with your local fire marshal.
- Construct driveways to allow large emergency equipment to reach your home.
- Design bridges to carry heavy emergency vehicles, including bulldozers carried on large trucks.
- Post road signs and addresses made of non-combustible material to show house number, traffic restrictions such as “dead-end,” and weight and height limitations.
- Make sure dead-end roads and long driveways have turnaround areas wide enough for emergency vehicles. Construct turnouts along one-way roads.
- Make sure the address numbers on your home are reflective or contrast with the background, and are large enough to be clearly seen from the street. If needed, provide a second set of numbers.
- Clear combustible vegetation at least 10-30 ft. from roads and driveways.
- Cut back overhanging tree branches above roads. Fire trucks need a minimum 14 ft. vertical clearance.
- Construct “natural” fire barriers such as greenbelts, parks, golf courses, irrigated groves and athletic fields.

### Outside
- Designate one emergency meeting place outside the home, and one outside your neighborhood. See Design a Plan on page 14 for more information.
- Practice emergency exit drills regularly.
- Make sure electric service lines, fuse and breaker panels are installed and maintained as prescribed by the electrical code.
- Contact qualified service personnel to perform electrical maintenance and repairs.

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**THE REALITY OF WILDFIRE**

“...We must all keep in mind that wildfire is a dangerous and unpredictable problem, and there is no sure way to protect a home under every situation. What we can do is take full advantage of every opportunity available in the hope that it will be enough to save a home.”

- Maureen Gilmer, author, *California Wildfire Landscaping*
Best of all is the peace-of-mind that comes from planning for wildfire, preparing your home and surroundings, and practicing fire-safe activities.

**READY**

Long before fire threatens, plan your evacuation.

Make a list of items you want to take with you during an evacuation.

Here’s an example, but you should also prepare your own list.

**Important Stuff**

- Prescriptions, medications
- Eyeglasses
- Important documents (birth certificates, passports, insurance papers & inventory, personal phone & address books, tax, school & vaccination records, photos)
- Jewelry
- Pet, pet food, leash, carrier
- Child’s favorite toy
- External drive or computer backup
- Cash (in the event that ATMs are out of service)
- Cell phone and charger
- Laptop and charger

- Keep your “Important Stuff” list handy.
- Keep sturdy boxes ready for collecting things on your list.
- Prepare an Emergency Supply Kit.

**Emergency Supply Kit**

When fire threatens, you won’t have time to shop or search for supplies. Assemble an Emergency Supply Kit that includes items you’ll need if you have to evacuate.

Store them in easy-to-carry containers such as back-packs, plastic crates...

- A three-day water supply (1 gallon per person, per day)
- A three-day food supply that won’t spoil, and a way to open it
- One change of clothing & shoes per person
- One blanket or sleeping bag per person
- A first aid kit that includes family prescriptions
- Spare eyeglasses
- Emergency tools
- Battery powered radio
- Flashlight
- Plenty of extra batteries
- Extra set of car keys
- Toilet supplies
- Special items for infants, elderly, disabled
- Pet transport carrier and leash
- Pet food for three days
- Sunglasses
- Goggles (for high wind or blowing firebrands or embers)
- Work gloves

- If possible, involve your children in the planning – let them feel part of the process.
- Review and update your “Important Stuff” list & Emergency Supply Kit periodically.
- Learn alternate ways out of your neighborhood, in case the usual way becomes blocked.
- Plan how you’ll transport your pet – get a transport cage if necessary.
- If you have large animals, learn how to prepare. Call your local Department of Animal Control or Humane Society.
- Designate a relative or friend as an out-of-area contact through whom family members can relay information. Long distance phone systems often work while local communications are overloaded.
- You may not be home when wildfire threatens. Authorities must close roads for safety and you may not be able to enter. Make arrangements in advance for persons or pets who will be home when you’re not.
Parallel Concepts

Two Ways Out

Your home escape plan should include two ways out of every room – in case the usual way out is blocked by fire. To create a Family Fire Escape Plan online, visit burninstitute.org.

A pre-arranged meeting place…

And just as you should have a place to meet outside your home, to be sure everyone’s out, your evacuation plan should consider alternate routes out of your neighborhood, in case the usual route becomes blocked.

When local phones are disrupted in a disaster, long distance lines are often still functioning. It’s wise to pre-arrange with a distant relative or friend to call them in the event of a local disaster, to let family members know you’re OK.

If you let that distant contact know that your family has evacuated and is safe, other distant family members (who know of the plan in advance) can check in with them, and learn where you are and that you’re OK. This long-distance communications “family check-in plan” also works in an earthquake. And that Emergency Supply Kit you’ve assembled for wildfire evacuation will also serve well in an earthquake or other disaster.

Best of all is the peace-of-mind that comes from planning for wildfire, preparing your home and surroundings, and practicing fire-safe activities.
Fires have always burned through our area as part of the ecological life cycle. Only in the last 100 years have we built homes in wildland areas. By controlling the spread of wildfire, we have actually interfered with the natural fire cycle. Therefore, today’s wildfire is often far more intense, unpredictable and life-threatening.

As fire and environmental experts work together to find acceptable ways of returning to the natural fuel-thinning fire cycle, there ARE things you can do today to prepare for the next WILDFIRE.

If you put it off until there’s smoke in the air, it’s too late!

Your home’s survival in a wildfire—and your survival, too—are not a matter of chance...