

A GUIDE FOR THE HOMEOWNER

LIVING WITH WILDFIRE

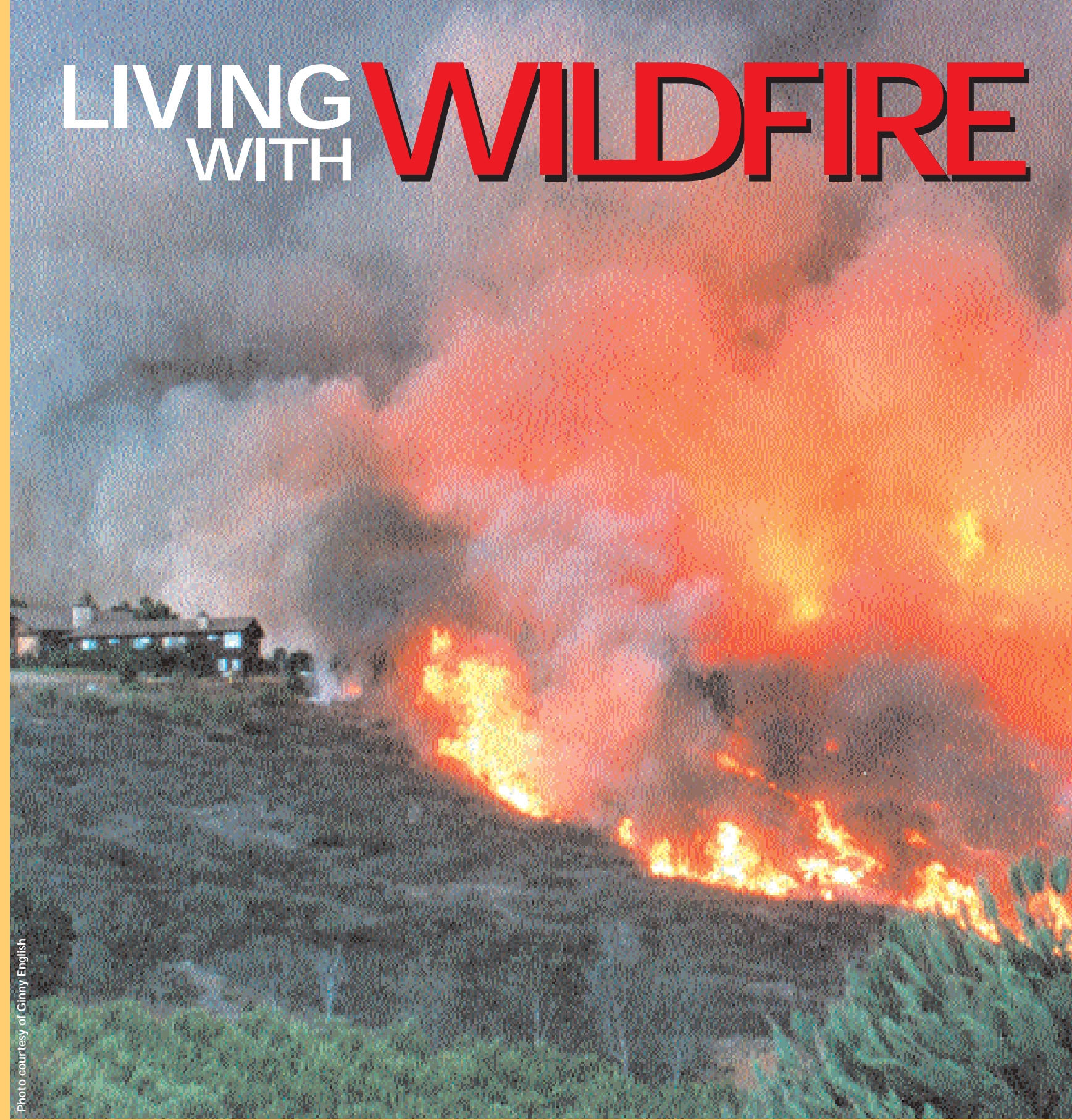


Photo courtesy of Ginny English



SAN DIEGO COUNTY
FIRE CHIEFS'
ASSOCIATION

LIVING WITH WILDFIRE

Presented by: Burn Institute • San Diego County Fire Chiefs' Association

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 un-meetable 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 it. *Pre-prepare.* "Pre" is the key. This document 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 you've chosen to live in. Through advanced planning and preparation, we can be ready for wildfire.

Read on. Learn why wildfire is a real threat, and the steps you can take to be prepared to meet that threat.

Special thanks to University of Nevada, Reno Cooperative Extension, and Dr. Ed Smith, for developing the original version of "Living with Fire." We have borrowed extensively from this excellent work.



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

Is your home prepared?

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.

With more and more people, fires are more likely to happen—with devastating results.

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
- neighborhoods devastated

The Wildfire ENVIRONMENT

The Fire 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.



How Fast Is WILDFIRE?

Shown 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 speed of spread and flame length would increase greatly during seasonal dry winds like "Santa Anas."



Wildfire attacked this neighborhood with a vengeance. Driven by Santa Ana winds, it raced through homes at rates even faster than the fuel examples at the right—growing by more than 8 football fields per minute.

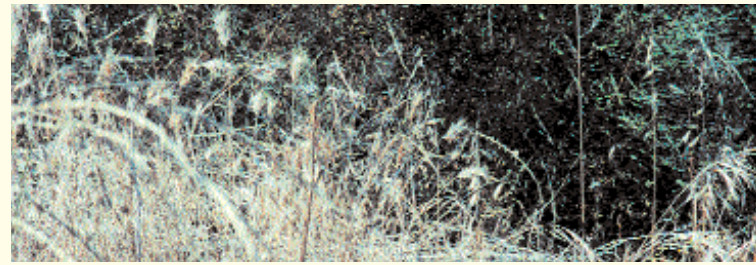
Firebrands

Firebrands are burning embers produced by wildfire which are lifted high into the air and carried beyond the fire front. Firebrands are one of the major causes of homes burned due to wildfire.

Typical firebrand materials include pieces of burning vegetation, and, if houses are involved, wood shakes and shingles. Depending on wind speed and size of materials, firebrands can be carried more than 1 mile ahead of the fire front.

A shower of thousands of firebrands can be produced during a major wildfire event. If these firebrands land in areas with easily ignited fuels—including wood roofs—numerous spot fires can start. Homes located blocks away from the main fire front can be threatened.

Grass Fire



Speed: 4 miles per hour
Area: 2.5 acres per minute =
(6 football fields per minute)
Fire size in 6 minutes: 27 acres
Flame length: 8 feet



Grass and Sagebrush Fire



Speed: 1.7 miles per hour
Area: 4/5 acre per minute =
(1.1 football fields per minute)
Fire size in 6 minutes: 5 acres
Flame length: 12 feet



Tall Chaparral Fire

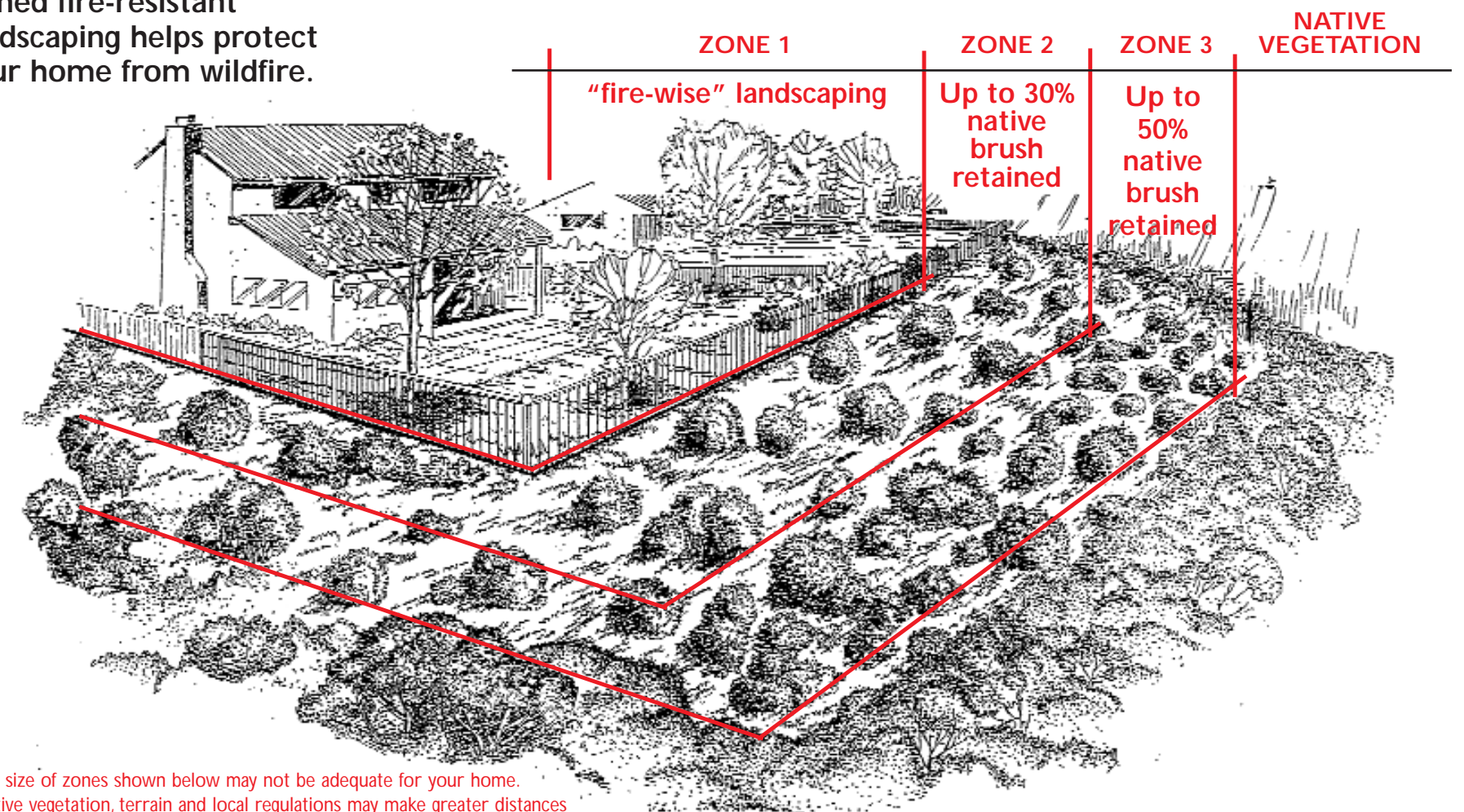


Speed: 8.3 miles per hour
Area: 6 acres per minute =
(8 football fields per minute)
Fire size in 6 minutes: 36 acres
Flame length: 47 feet



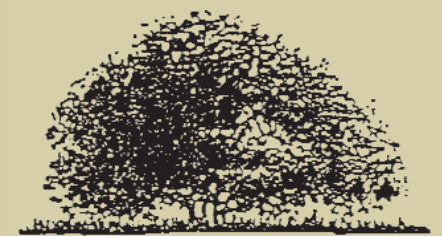
DEFENSIBLE SPACE

Zoned fire-resistant landscaping helps protect your home from wildfire.



* The size of zones shown below may not be adequate for your home. Native vegetation, terrain and local regulations may make greater distances necessary. Contact your fire department for specific requirements.

ZONE 1	(from structure out a minimum of 30-50 feet)* 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 page 7 "step 4".
ZONE 2	(a minimum of 30-100 feet from structures)* 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.
ZONE 3	(70-100 feet from structures) This is a transition area that has been planted with low fuel-volume plants and native vegetation that has been thinned to reduce fuel volume. When thinning, try to leave 20 feet of space between large shrubs and trees. Remove ladder fuels. The width of this zone depends largely on the type, size, and density of native vegetation, and the steepness of slope, and exposure.
NATIVE VEGETATION	(beyond 100 feet from structures) Check with environmental regulatory agencies before modifying native vegetation that might include endangered species and habitat. Note that 100 feet of zoned fire-resistant landscaping may not be adequate to protect your home under all circumstances, but protects well in most situations.



An unpruned shrub



A shrub pruned to remove 40% of flammable fuel

Is there anything we can do? **YES!**

The keys to surviving wildfire are:

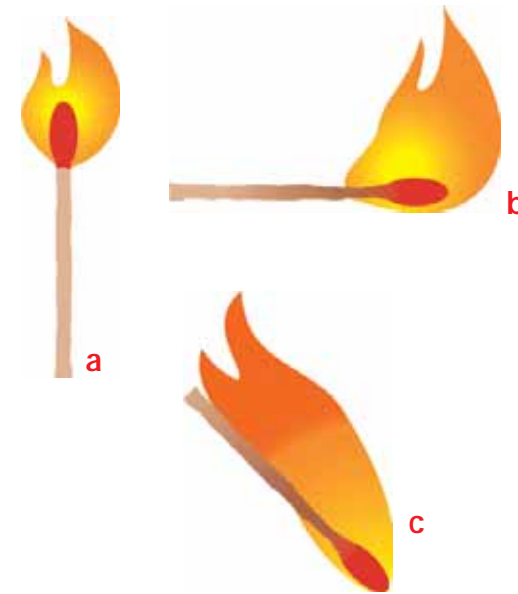
Defensible SPACE • Defensible HOMES • EVACUATION Planning

Steps to DEFENSIBLE SPACE

1 HOW SLOPES FUEL FIRES

The diagram to the right 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.

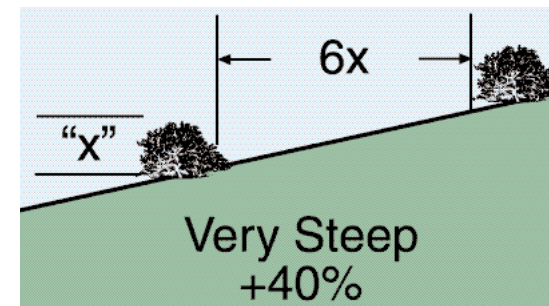
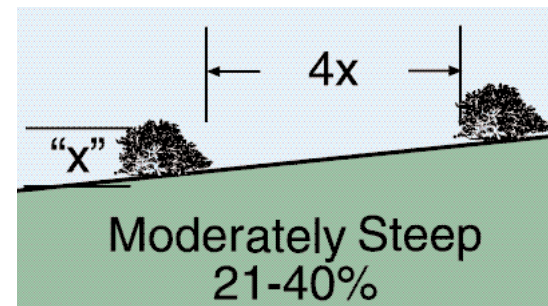
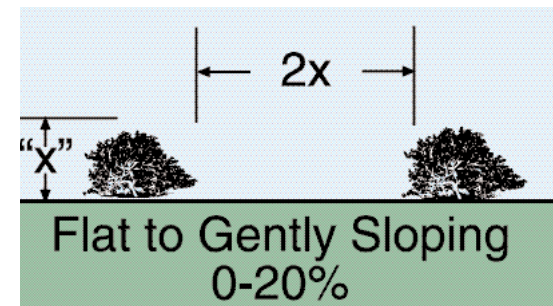


2 REDUCING THE "FUEL"

The first goal in creating a defensible space is to selectively remove plants, then prune to reduce fuel volume of the plants that remain.

Sometimes wildland plants and even landscaping can occur 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.

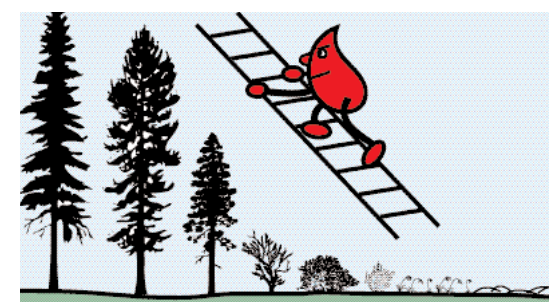
If this situation is present within your recommended defensible space area, you should "break-it-up" by providing for separation between plants or small groups of plants. Clear dry vegetation in cooler, earlier hours, not in the heat of the day. Remember, if it's too hot outside for you to be working, it's too hot to be using equipment for clearing brush.



3 LADDER 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. 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.



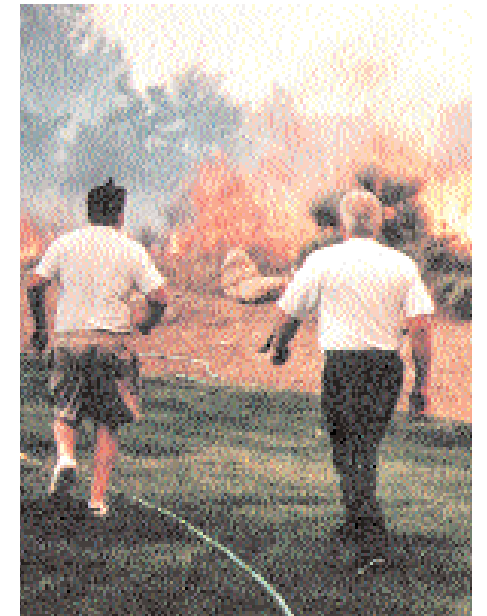
Steps to DEFENSIBLE SPACE

4 SMART LANDSCAPING

Landscaping with wildfire in mind – "firescaping" – involves plant selection based primarily on the plant's ability to reduce the wildfire threat. Minimize the use of evergreen shrubs and trees within 30–50 ft. of a structure, because junipers, other conifers and broadleaf evergreens, such as eucalyptus, contain oils, resins and waxes that make these plants burn with great intensity. Use ornamental grasses and berries sparingly because they also can be highly flammable.

Choose "fire smart" plants. These are plants with high moisture content. They are low growing. Their stems and leaves are not resinous, oily or waxy. Deciduous trees are generally more fire resistant than evergreens because they have a higher moisture content when in leaf, but a lower fuel volume when dormant.

Contact your local fire department for recommendations or for referrals to local experts for appropriate fire-resistive planting options for your particular area.



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.

5 MAINTAINING IT FIRE-SAFE

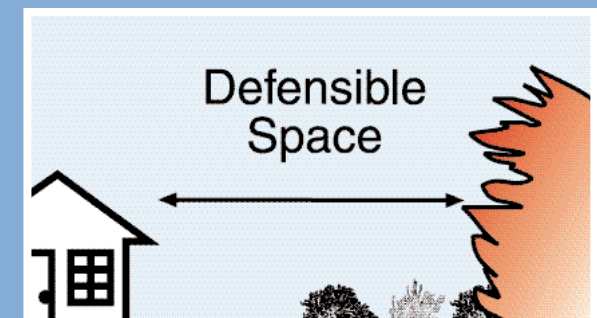
A fire-resistant plant can lose this quality altogether if not properly maintained and irrigated. Lack of long term attention can result in fire-resistant plants loading up with dead twigs, leaves and branches, to grow into monstrous, yet sometimes invisible fuel volumes.

Drip irrigation, plus periodic pruning and cleaning can maintain the fire-resistiveness as well as the appearance of landscaping.

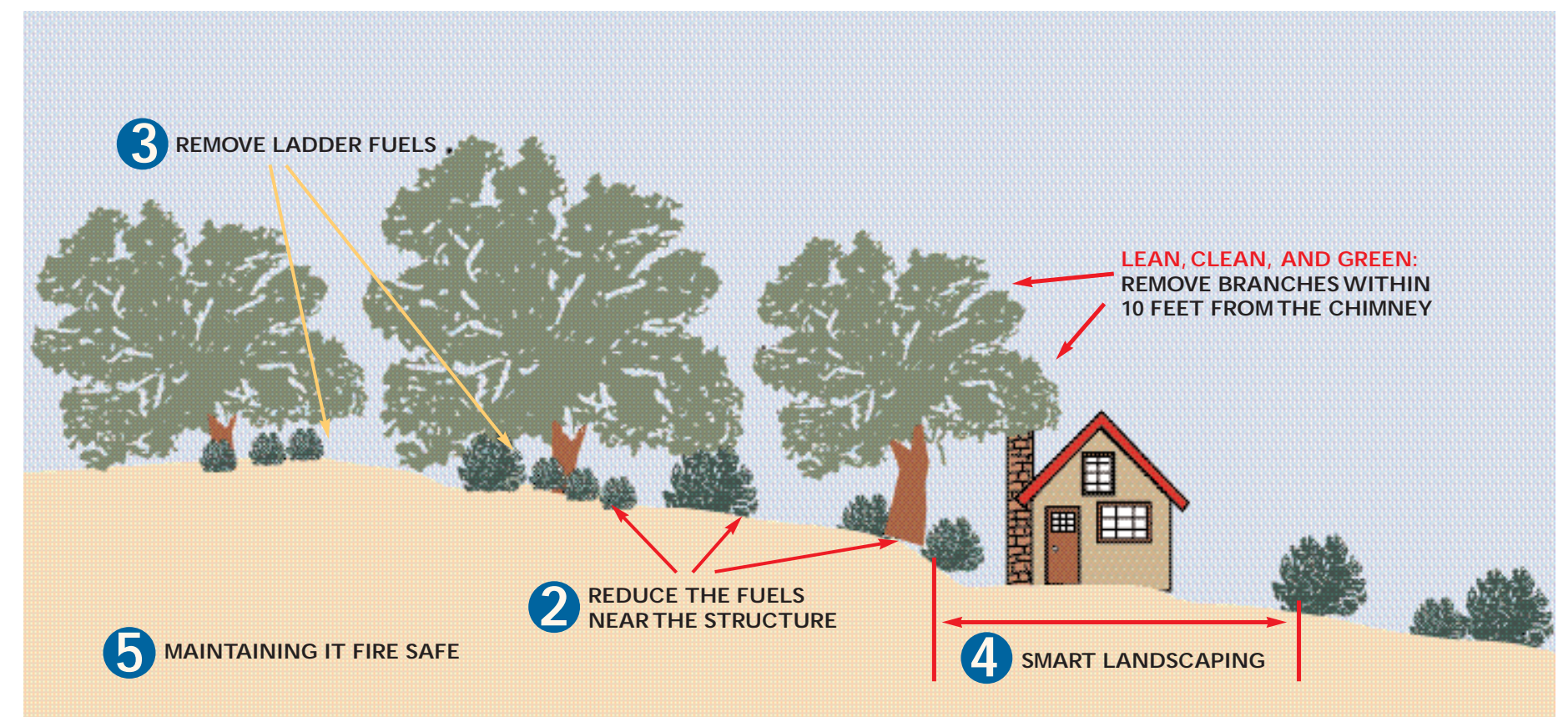
6 ENVIRONMENTAL REGULATIONS

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. clearance from existing structures. If endangered species are encountered, contact environmental agencies for guidance.

"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.



Contact your local fire department for recommendations or for referrals to local experts for appropriate fire-resistive planting options for your area.

DEFENSIBLE HOME

DEFENSIBLE HOME

Things You Can Do To Better Protect Your Family And Home From Wildfire

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. These recommendations are primarily from the California Department of Forestry and Fire Protection's "How to Make Your Home Fire Safe." When coupled with an effective Defensible SPACE, these recommendations will make your home much easier for firefighters to defend and improve its chances of survival in a wildfire.



These new homes in wildfire country have fire-resistive walls, non-combustible roofs, "fire-wise" landscaping, residential fire sprinklers, good access, water supply and a defensible space.

ROOF

- Install a non-combustible roof that meets the classification requirements of your community. Check with your fire marshal.
- Cover your chimney and stovepipe with an approved spark arrestor.
- Remove dead trees and vine branches overhanging your roof.
- Remove any tree branches within 10 feet 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 feet 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 fire-resistive 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 or tempered 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 feet away from all structures, and clear away combustible vegetation within 10 feet of woodpiles.
- Locate LPG tanks at least 30 feet from any structure, and surround them with at least 10 feet clearance.
- Remove all stacks of construction materials, pine needles, leaves and other debris from your yard.
- Contact your local fire department to see if open-burning is allowed in your area.

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 storage supply of 2500 gallons on your property.
- 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.

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 to show 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 contrasting with the background, and large enough to be clearly seen from the street. If needed, provide a second set of numbers.
- Clear combustible vegetation at least 10 feet from roads and driveways.
- Cut back overhanging tree branches above roads. Fire trucks need a minimum 14 feet 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 next page 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.

The Wood Shake and Shingle Roof Hazard

Your home can be threatened by wildfire in three ways:

- direct exposure to flames,
- radiated heat, and
- airborne firebrands.

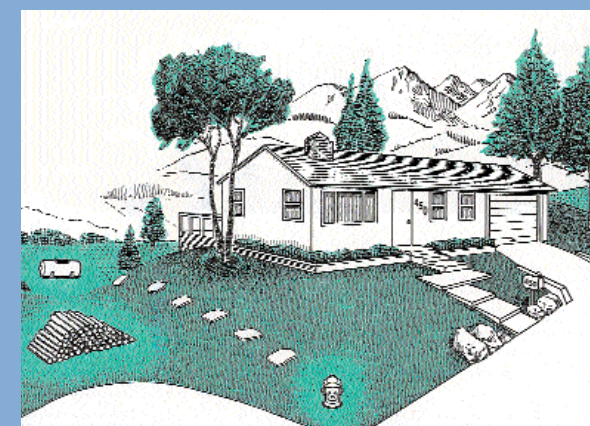
Of these, firebrands account for the majority of homes burned by wildfire. The most vulnerable part of a house to firebrands is the roof.

Because of its angle, the roof can catch and trap firebrands. If the roof is constructed of combustible materials, the house is in jeopardy of igniting and burning.

Not only are combustible roofing materials a hazard to the structure they cover, but also to other houses in the vicinity. Burning wood shakes, for example, can become firebrands, be lifted from the burning roof by a thermal column of rising smoke and flames, and be carried blocks away, igniting other combustible roofs.

Unfortunately for owners of existing combustible roofs, there are no long-term reliable measures to reduce roof vulnerability to wildfire—other than re-roofing with non-combustible materials.

The Right Stuff



"...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

This home was designed and is maintained with wildfire in mind.

- Native vegetation is thinned as it approaches the home.
- Most landscaping is "fire-wise," but pine trees should be trimmed back or replaced.
- Access roads have native vegetation cleared back.
- A pool can supply emergency water for firefighters.
- The roof is non-combustible as are exterior walls.
- Eaves are boxed-in to prevent burning embers from igniting the structure.
- Windows are dual pane to reduce heat transmission.
- Residential fire sprinklers would stop fires ignited by radiant heat.

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 prepare your own list.

IMPORTANT STUFF



- prescriptions, medications
- eyeglasses
- important documents (birth certificates, passports, insurance papers & inventory, personal phone & address books, tax records, personal finance floppy disks, children's school records, inoculation & vaccination records, photos, art)
- jewelry
- pet, pet food, leash, carrier
- child's favorite toy
- other...

- 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 embers)
- work gloves
- more ??? use your imagination

- 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.



SET

When evacuation seems likely, put your plan into action.

Take a deep breath, and remember that you have planned well. Remember, too, that lives always take priority over property.

- Use your list of "Important Stuff." Collect those items in boxes you can easily carry.
- Face your car out, so you have the best visibility when you do have to leave.
- Load your "Important Stuff" and Emergency Supply Kit into the car. Load pets at the last minute when the family leaves.

And if there's time...

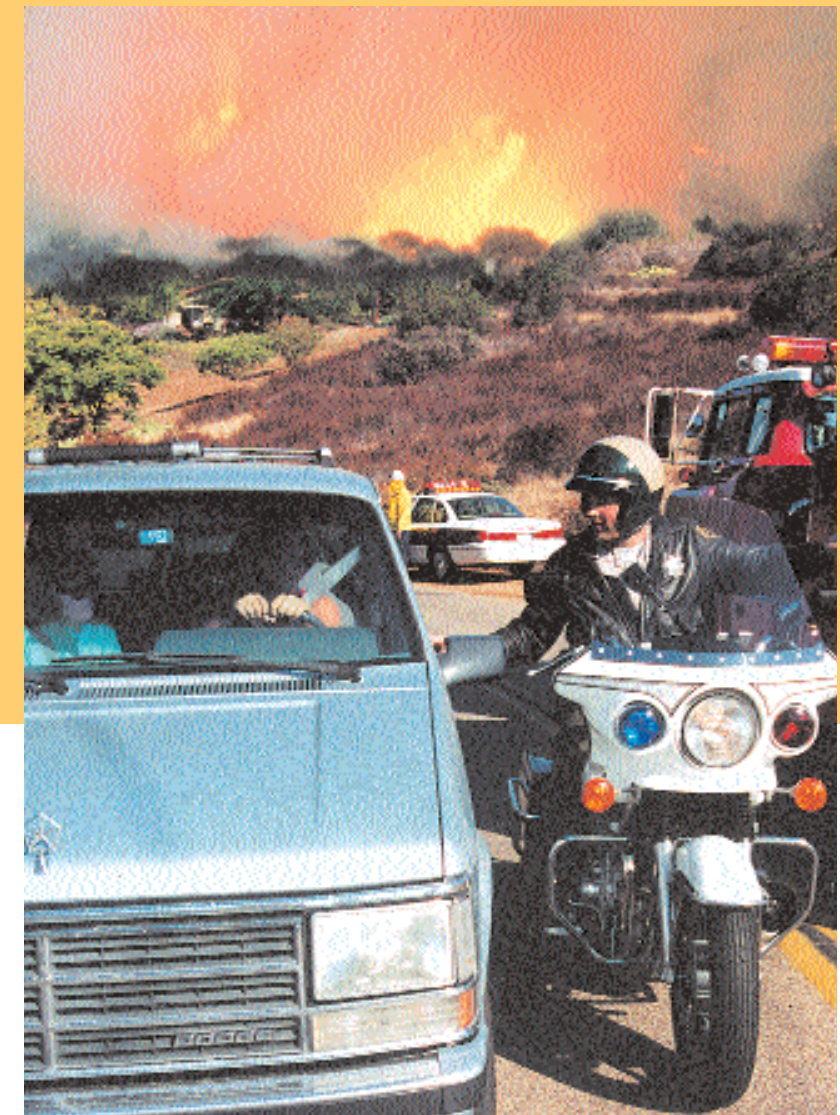
- Be sure all windows and doors are closed.
- Close metal window blinds.
- Remove light curtains and other thin combustibles from windows.
- Cluster lawn furniture and other things that might snag firefighter hoses.
- Leave exterior lights on. It helps firefighters find the house in the smoke.
- Don't leave garden sprinklers on — they can waste critical water pressure.
- Lock up the house.



GO

Get a move on!

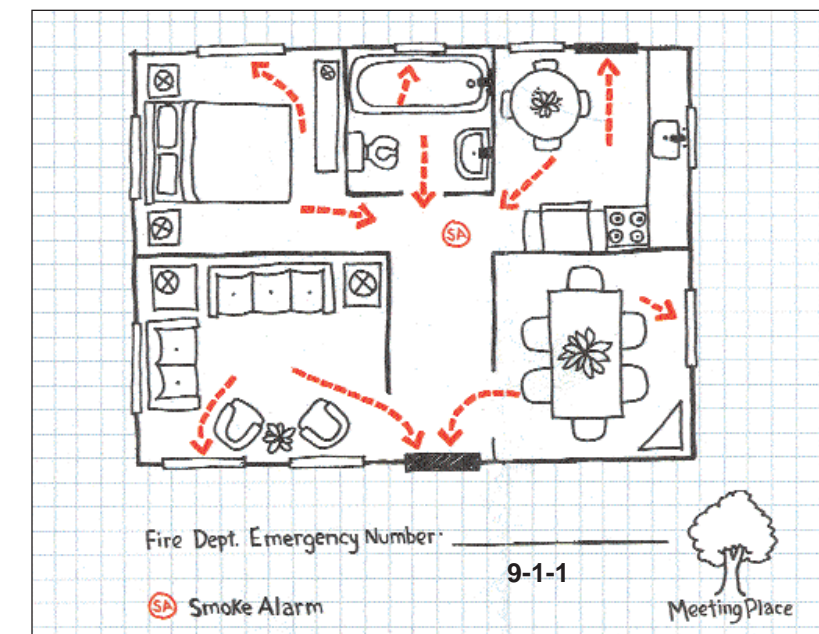
- Don't wait to be told to evacuate. Authorities may not have time to order an evacuation. If you feel threatened, leave on your own initiative.
- Obey orders of law enforcement and fire officers. They understand the risk and are acting on current fire information.
- Drive with your headlights on for visibility.
- Drive calmly and with special attention to fire trucks. They are not as maneuverable as your car.
- Do not block the access roadway for fire trucks.
- If fire overtakes you, you are far safer in the car than out.
- Check with your child's school on their Student Release policy. They should have plans to protect children in place or to bus them to safer locations. To avoid mass congestion during evacuation, pick-up should be arranged after the crisis passes.
- DO NOT call 9-1-1 for non-emergencies.
- Do not attempt to re-enter the area until officials allow it.
- Check-in at an Evacuation Center established by the Red Cross. Law enforcement officials can direct you. Whether you stay there or not, your checking in will help others know you're safe.



Parallel Concepts

TWO WAYS OUT

Just as your home escape plan should include two ways out of every room – in case the usual way out is blocked by fire...

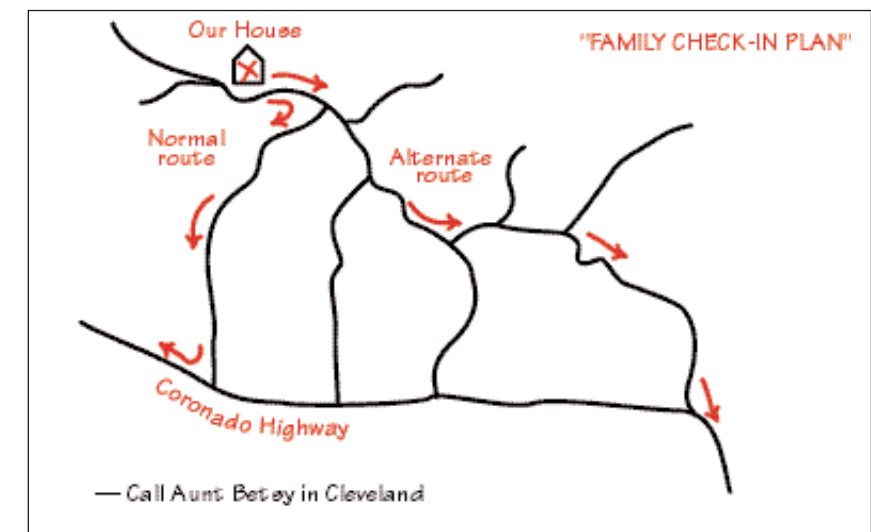


Note: To create a Family Fire Escape Plan, visit www.burninstitute.org

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 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 her too, 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 Disaster 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.

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

...IF YOU PREPARE.



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!

Prepare now!

FOR MORE INFORMATION

Contact your local fire department for expert advice on local regulations and recommendations for your neighborhood

Burn Institute

www.burninstitute.org

FireSafe Council of San Diego

Location of demonstrations gardens
Educational materials
www.firesafecouncil.org

US Fish and Wildlife Service

Advice on endangered species and habitat
Federal clearing restrictions

California Department of Fish and Game

Information on state environmental regulations, including clearing of stream beds

County of San Diego

Department of Planning & Land Use
Landscaping Brochures

Web Sites

- 1) www.burninstitute.org
- 2) www.sdcfa.org
- 3) www.co.sandiego.ca.us/cnty/cntydepts/landuse/planning/functions
- 4) www.co.san-diego.ca.us/cnty/cntydepts/landuse/fire/resistant
- 5) www.co.sandiego.ca.us/cnty/cntydepts/safety/disaster/pages/functions
- 6) www.co.san-diego.ca.us/cnty/cntydepts/landuse/agris/fire

BURN INSTITUTE PROGRAMS & SERVICES

FIRE AND BURN PREVENTION EDUCATION

- Burni the Dragon's Preschool Curriculum Guide
- Fire and Burn Prevention, Fire, Burns & You Curriculum Guide
- Let's Stay Safe From Fires & Burns Puppet Show
- It's Your Choice: Stop Fires and Burns
- Burns are Serious Business
- Child Care Burn Prevention
- Juvenile Firesetter Program
- Senior Fire Safety & Smoke Alarm Program
- First Responder Smoke Alarm Program
- Wildfire Program
- Fire Safety Training Program (Nominal Fee)

BURN SURVIVOR SUPPORT

- Camp Beyond The Scars for Burn-Injured Children
- Retreat For Adult Burn Survivors
- School Re-Entry Program
- Emergency Needs Fund
- Special Assistance Fund
- Scholarship Program
- Adult Support Group
- Holiday Party
- Special Outings

BURN RESEARCH

- Funding Vital Burn Research and Treatment

COMMUNITY SERVICE

- Spirit of Courage Awards Banquet
- Public Service Announcements
- Fire and Burn Prevention Literature
- Speakers Bureau

VOLUNTEER OPPORTUNITIES

Make a difference in the lives of others and become a Burn Institute volunteer today! For more information on how you can donate your time, visit us at www.burninstitute.org or call 858.541.2277.

The Burn Institute is a nonprofit health agency dedicated to reducing the number of burn injuries and deaths in San Diego and Imperial counties. Founded in 1972, one of the Institute's first accomplishments was to help establish the UCSD Regional Burn Center. Today, the Burn Institute continues to: reach thousands of children and adults each year with lifesaving fire and burn prevention education, fund vital burn research and treatment, and conduct burn survivor support programs that help children and adults cope with the devastating psychological and physical effects of their injuries.

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