

S.A.F.E. LANDSCAPES

Southern California Guidebook

Sustainable and Fire-Safe Landscapes In The Wildland Urban Interface





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Sustainable and Fire-Safe Landscapes
In The Wildland Urban Interface

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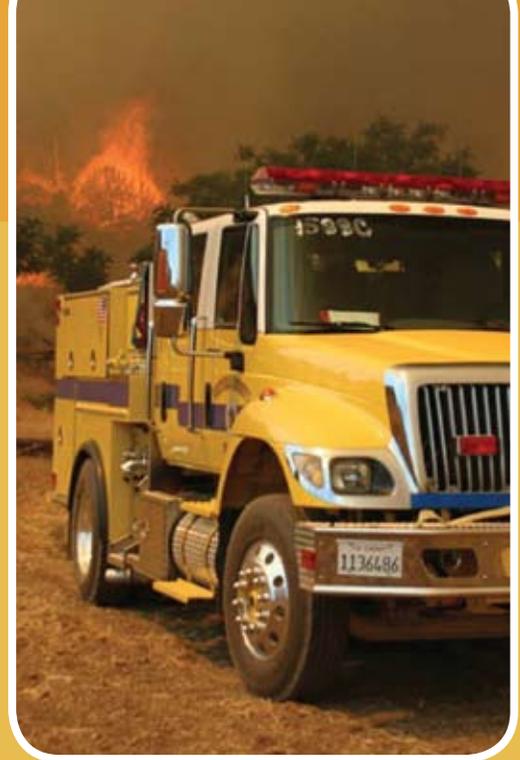
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INTRODUCTION

SAFE LANDSCAPES PROJECT

SAFE (Sustainable And Fire Safe) Landscapes provides guidelines for creating and maintaining fire-safe, environmentally friendly landscapes in the wildland-urban interface. This project is a collaboration between University of California Cooperative Extension – Los Angeles and Ventura Counties, the Los Angeles and San Gabriel Rivers Watershed Council, the Los Angeles County Fire Department, the Ventura County Fire Department, the National Park Service, and numerous governmental, non-profit, and business organizations (listed on the inside back cover). Development of this guidebook was supported by the Renewable Resources Extension Act, the National Fish and Wildlife Foundation, the California Department of Food and Agriculture, the California Community Foundation, and the California Department of Conservation.



Ventura County Fire Department

Fire safety in the wildland-urban interface starts in the home, with the use of fire-resistant building materials and architectural design features, good practices to avoid starting fires in and around the home, and a good fire response plan for your family. Beyond the home, develop a fire-resistant landscape where plants and hardscape are maintained so that they do not easily transmit fire. Establish your defensible space so that the risk of fire burning to your property and home is reduced, and fire fighters can safely protect your home. Fire is a part of the natural environment in Southern California. There is no way to completely ensure that your home will not be exposed to wildfire. If you live in the wildland-urban interface, it is not a question of IF a fire will occur, but WHEN. Preparation for wildfire requires that YOU take responsibility for your safety, property, and pets in the event of a fire. Maintain your property to reduce the risk of damage during a wildfire, and be fully prepared to evacuate. The information in this guidebook can help you reduce, but not eliminate, the risk of fire to your home and property.



WHAT IS THE WILDLAND URBAN INTERFACE?

The wildland-urban interface (WUI) is the area where urban and suburban development meets undeveloped areas containing natural vegetation. It can be a beautiful, quiet place to live, but with the benefits of being near nature come risks. One of the most pressing is wildfire, but others include risky interactions with wildlife such as bears and mountain lions, as well as physical phenomena such as floods and landslides.

Within the greater WUI, areas are classified as to their relative fire hazard severity zones. These are areas in mountains, foothills, and canyons where adjacency to vegetated areas, difficulty of access, and weather patterns pose greater risk of wildfire. CAL FIRE and the fire response agency in each local jurisdiction have determined where these areas are, and require the management of vegetative fuels near buildings. To find out if your property is in a fire hazard severity zone, contact your local fire agency.



Jane Croft

SUSTAINABILITY

The United Nations defines sustainable development as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” In the wildland-urban interface areas of Southern California, living sustainably means protecting yourself, your family, and your property from risk, while also protecting natural habitat. Native plants are essential ecosystem components and provide habitat for native birds, butterflies and other wildlife. California is known as a global hotspot for its diversity of unique plants and animals. To preserve this natural heritage, it’s important to live responsibly in the wildland-urban interface. For more on our State’s threatened biodiversity, visit <http://www.biodiversityhotspots.org/>.

Good fire preparation in your landscape can help protect wildlands from damage, but sustainable and fire-safe gardens also conserve water, limit the use of potentially harmful chemicals such as fertilizers and pesticides, and avoid invasive plant species.

Sustainable fire-safe landscaping should be easy to care for. Many native and California-friendly plants grow slowly and maintain high levels of moisture in their leaves and stems with little irrigation. By choosing these plants, you can protect the health of neighboring habitat and create a beautiful low maintenance garden. For more information about sustainable plant selections, visit www.PlantRight.org and see the list of other references in the back of this guidebook.



Scott Vickers

Flames burn close to homes during a wildfire in the wildland-urban interface.

CLIMATE, FIRE, AND HABITAT IN SOUTHERN CALIFORNIA

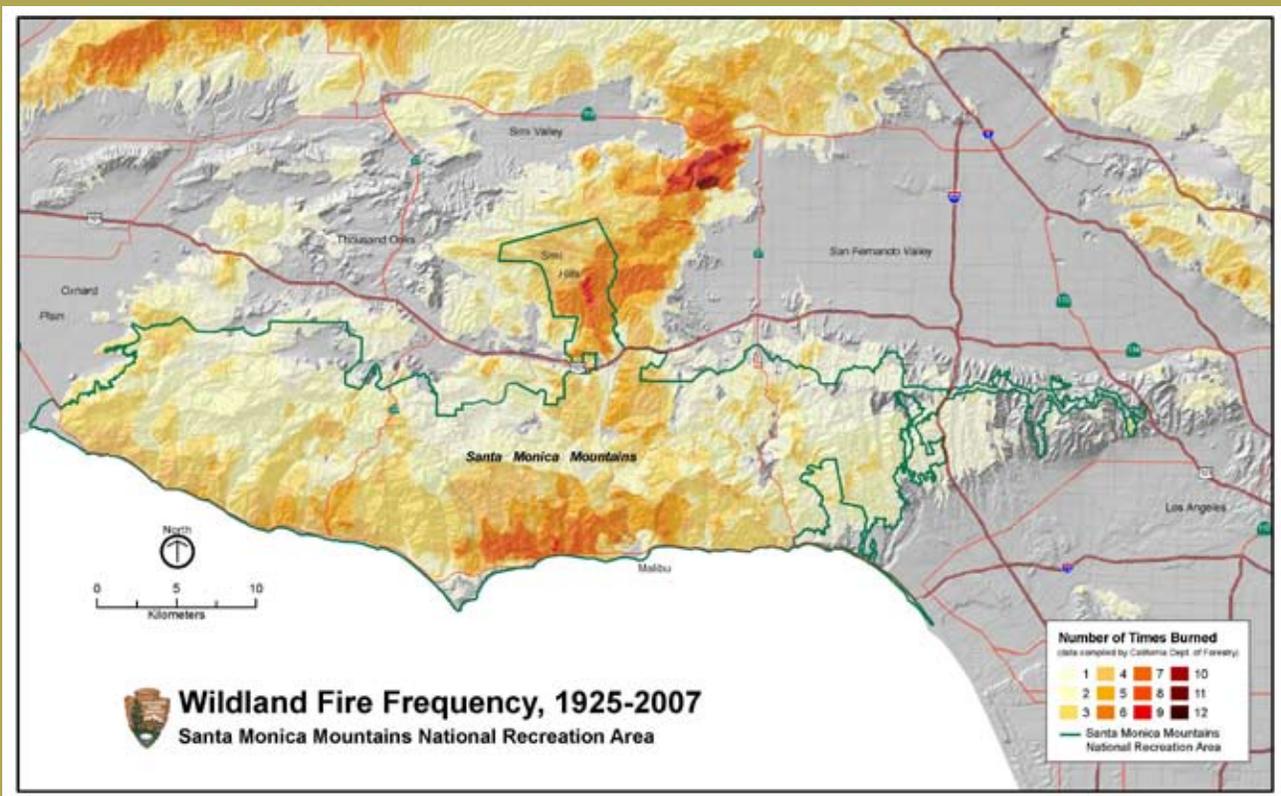
MEDITERRANEAN CLIMATES AND PLANT ADAPTATIONS

The climate type in much of California is described as Mediterranean, with winter rains and dry, hot summers. Mediterranean climates are found in only five places in the world: California (extending into southern Oregon and northern Baja California, Mexico); the Mediterranean region itself; and the subtropical south or west coasts of Chile, South Africa, and Australia. All of these areas support uniquely adapted groups of plants and animals, and most of these places are prone to large wildfires. The plant communities found in these areas are dominated by large, woody, evergreen shrublands. Individual plants have small thick waxy leaves to help retain moisture through the dry summers and have developed adaptations to their native fire regimes. Some shrubs have underground root crowns that allow them to re-sprout after a fire. Others are killed by fire, but produce seeds that can remain in the ground for many years, germinating in response to smoke, heat, and ash. Some species do both. During the first spring following a fire, it is common to see “fire followers”: annuals that germinate in response to a fire and produce beautiful flowers. They won't be seen again until the next fire.

FIRE REGIMES

Mediterranean habitat types are often described as “fire adapted”, but it is important to realize that they are adapted to specific fire regimes. Elements of a fire regime include the spatial, or place-related, relationship between plants and fire, the intensity and severity of a fire, and the temporal, or timing-related, relationships between vegetation and fire: what time of year, and how often, does fire naturally occur?

The spatial aspect of fire regime has to do with where within the vegetation fire occurs – not just from a bird's-eye view, but also in cross section. Fire can occur at three levels. Ground fires occur along and within soils that are rich in organic matter. Surface fires spread through vegetation along the ground surface; this takes place with most grass fires. Crown fires occur at the tops of trees and shrubs – regardless of whether the top is 70 feet off the ground in a forest fire, or 10-15 feet off the ground in a shrub-dominated plant community. Crown fires have relatively longer flame lengths and spread more rapidly than ground and surface fires. Any particular wildfire incident can combine each of these types of burns.



Intensity is a term that describes the amount of energy released (as heat) in a fire, and the way fuel is consumed on a per acre and per minute basis. Severity is a measure of the damage caused by a fire, and is usually described in terms of the amount of plant mortality and soil alteration.

The temporal aspects of the fire regime of a particular place and plant community include the season during which the fires occur, and the length of the fire season. In Southern California fires naturally occur during summer and fall, a time when dry weather has removed most of the moisture from many plants and hot dry winds occur that can rapidly spread any fires that ignite. In unaltered systems, it also includes when natural sources of ignition, such as lightning, occur. In Southern California, however, most fires are ignited by human activity. The largest fires occur in the summer during years of low rainfall and extended dry periods and in the fall during Santa Ana wind events. Fire frequency describes how often fires occur, and “return interval” is used to describe the average number of years between large fires.

Southern California shrubland habitats are resilient to specific fire frequencies. More frequent fires and unnaturally short fire return intervals can result in the replacement of native communities. This process is known as type conversion. In many areas, fires are occurring more frequently than they would naturally, often leading to type conversion from native habitat to a vegetation community dominated by invasive weeds.

SOUTHERN CALIFORNIA HABITATS

While the descriptions below discuss the major terrestrial vegetation communities in Southern California, there are additional vegetation types. These habitats may overlap in many places .

Chaparral

Chaparral is California’s most extensive native plant community. It is also one of the State’s most characteristic wilderness types, dominating foothills and mountain slopes from the Rogue River Valley in southern Oregon to the San Pedro Martir in Baja California. Properly defined, chaparral is a kind of shrub-dominated community of hard-leaved plants shaped by summer drought, mild, wet winters, and fires that naturally occur every 30 to 150 years or more – more frequent fires can lead to habitat loss and conversion to non-native grasslands. Dominant woody shrubs in chaparral include chamise, manzanita, ceanothus, scrub oak, and laurel sumac. Softer plants such as buckwheat and sage, as well as yuccas, can also be found here. Chaparral often grows in a continuous stand of dense vegetation, creating a flammable landscape when ignited. Some chaparral shrubs



Chaparral, Griffith Park, Los Angeles



Sabrina Dril

Coastal sage scrub, Paramount Ranch, Santa Monica Mountains Natural Recreation Area

have flammable characteristics, including small fine leaves, lots of litter, and peeling bark. Because of these growth characteristics, fires in chaparral can be high intensity (long flame length) and can spread rapidly through the ecosystem when wind driven. These fires will also produce copious embers which can exacerbate the rate of spread by spotting in front of the flame front.

Sage scrub

Sage scrub, sometimes called “soft chaparral”, is composed of drought deciduous, soft-leaved fragrant shrubs such as California sagebrush, buckwheat, and a variety of sage species. Sage scrub may also contain some woodier plants such as laurel sumac and lemonadeberry, yuccas (Our Lord’s Candle), and in some areas, cacti including prickly-pear and cholla. It is found in the coastal valleys, plains, and sandy interior foothills at elevations below 2500 feet. Sage scrub is generally shorter and more open than chaparral. This is the most common habitat type in the coastal areas of Southern California. Due to various human impacts from farming and ranching to urban and suburban development, the extent of this plant community has been reduced to less than 15% of the area it covered prior to European settlement. Sage scrub burns easily and frequently, although as already stated, too-frequent fires often result in the loss of sage scrub and conversion to non-native weedy annual grasses.

Sage scrub, sometimes called

Oak woodlands and savannahs

In Southern California, oak woodlands are usually dominated by the evergreen coast live oak, though deciduous valley oaks can be found in northern parts of the region, and Engelmann oaks in the south. Open savannahs with individual or clumps of trees can be found in broad valleys and rolling hills, while dense canopies can be found along stream corridors. Other species commonly found in these communities include toyon, hollyleaf cherry, hollyleaf red-berry, Mexican elderberry and softer perennials like poison oak. In a few areas, California walnut may be a dominant tree. Oaks have large spreading canopies which are mirrored underground by wide root zones. The shade of oaks can inhibit the growth of more flammable species, and can keep the area near your home cool and moist. Oaks are not highly flammable and often recover well after a fire, re-sprouting in branch forks or at the base. While maintaining a fire-safe landscape may require trimming individual branches, it rarely requires removal of an entire oak tree. Many counties and cities in the region have ordinances limiting oak pruning and removal so be sure to check with your local fire agency before trimming or removing oaks.

Montane forest

Montane forests are generally pine- and fir-dominated communities that occur at higher elevations in Southern California’s mountain areas from 3000 up to 8500 ft. At the lower parts of the range, dominant trees include big-cone Douglas fir and Coulter pine as well as canyon live oak and California bay. On higher slopes, lodgepole, limber, ponderosa, Jeffrey, and sugar pines occur along with white fir, incense cedar, western juniper, and black and canyon oaks. The low elevation species are sensitive to fire, and thus are only found on rocky areas where the geology itself is fire-resistant. In recent years, drought combined with beetle and disease infestations have increased the number of dead trees, and thereby the fire hazard in montane forests in this region. Most of the montane forest in Southern California occurs in National Forests and a few isolated high elevation communities such as Wrightwood, Big Bear, Idyllwild, and Julian. Residents in these areas should contact CAL FIRE and their local forestry and fire experts and refer to the UC Forest Landowners Curriculum found at <http://groups.ucanr.org/Forest/documents/newsletter1747.htm>.



Sabrina Drill

Riparian Forest, Arroyo Seco, Angeles National Forest

Desert montane

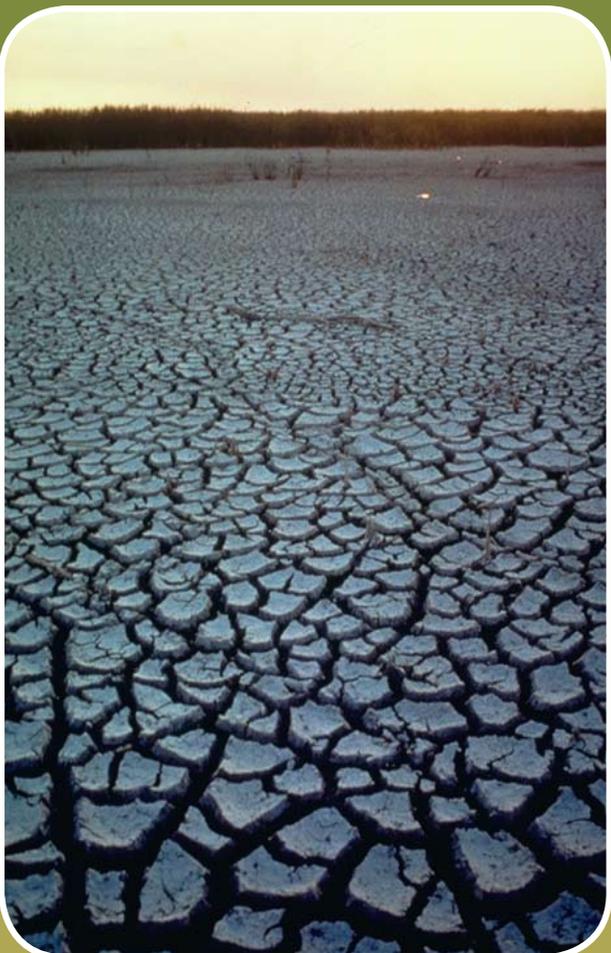
Arid slopes of the inland portions of Southern California's mountains support pinyon-juniper woodlands, dry chaparral, sagebrush, and desert scrub communities, with sparse areas of chaparral. These vegetation types occur in open canopy stands with sparse undergrowth. Because of the natural separation of the vegetation, these communities do not carry fire well, and have long fire return intervals. In recent years, however, non-native annual grasses have invaded these communities, filling the space in between native plants with grasses that germinate and grow in spring and die back in summer. This creates a continuous dry fuel load. Hence, the frequency of fire in these desert areas has drastically increased. In the year after a fire, these disturbance-adapted grasses may be the first plants to germinate, competing with the native vegetation, and slowly converting the natural habitat to more flammable grasslands.

Riparian Forest

Riparian forests are the willows, sycamores, cottonwoods, alders, coast live oaks, and other trees and plants that occur along streams in Southern California. Depending on the steepness of the topography, riparian forests can occur in narrow canyons or along broad, wooded corridors. Historically, these wet areas acted as fire breaks during wildfires. The greatest impacts occurred after a fire, when flows of sediment downstream from eroding slopes could wipe out banks, then establish new ones. In recent years, however, many of our riparian forests have been invaded by exotic species. Two of these, *Arundo* (also known as giant cane) and *Tamarisk* (also known as salt cedar), grow in dense stands. In summer when water levels recede, they may dry out and become dormant, turning into potential fuel for fires. This can change these natural riparian fire breaks into flaming corridors, rapidly fueling the spread of a fire. Giant reed and salt cedar both recover very quickly after a fire, much faster than the native trees, and expand their range along the river or creek.

FIRE AND CLIMATE CHANGE IN SOUTHERN CALIFORNIA

Global warming has occurred rapidly over the past half-century. In the arid U.S. Southwest, this will mean that future droughts will likely be more severe, and it will mean a change in the timing and type of precipitation. In California, less precipitation will occur as snow, meaning that less water can be stored in the snow-pack, and our traditionally dry summers could see even less water availability. Summertime peak temperatures will increase in many places. Fire “seasons” may become even longer.



Jack Kelly Clark

Drought conditions - deep cracks in dry soil.

INVASIVE PLANTS AND WILDLAND HEALTH

Most plants don't escape our yards and gardens, but the handful that do can cause serious problems. Animals, wind, and water move plants and seeds far from where they were planted. Once established in natural areas, invasive plants displace native vegetation and greatly reduce the amount and quality of habitat for native wildlife. These plants can also fuel wildfires, contribute to soil erosion, clog streams and rivers, and increase flooding. Poor maintenance of cleared areas can promote their spread. Because they thrive in disturbed soils, improper clearance or over-clearance often leads to a landscape dominated by invasive plants. These species can produce more fuels than native vegetation, increasing the potential for ignition.



Ailanthus and other invasive plants in stream bed.

Jason Casanova



When choosing plants for your fire-safe landscape, you can help protect the health of neighboring wildlands by avoiding invasive species. Several of the worst offenders are described in this guidebook. You can find complete lists that were developed by the California Invasive Plant Council, at www.cal-ipc.org and the Los Angeles and San Gabriel Rivers Watershed Council, at www.weedwatch.org. Remember when buying plants to make sure to check the scientific name so that you are getting the species you want!



FEATURED PROBLEM PLANTS

Every season, we feature several plants that can have a negative impact on your landscape and the habitat around you. The symbols you'll find under this section represent the following plant characteristics:



Highly Flammable



Invasive

REFERENCES

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Stephenson, John R., and Gena M. Calcarone. 1999. Southern California Mountains and Foothills Assessment: Habitat and Species Conservation Issues. General Technical Report GTR-PSW-172, Pacific Southwest Research Station, Forest Service, USDA. 402 pp.

FIRE-RESISTANT HOMES AND LANDSCAPES

The key to protecting your home and property from fire is to start from the house and work out, rather than from the wildland and move in. The Wildland Urban Interface Building Standard, also known as Chapter 7A, is a new addition to the California Building Code that affects how new homes are built in wildfire-prone areas. Those who already own a home can utilize the new code to help decide what to do when remodeling. Check with your building department to find out about any local requirements.

Stephen L. Quarles



The new code correlates the ability of your home to survive a wildfire with its location, maintenance of your near-home vegetation (your defensible space), and building materials used on the outside of your house. Here are some of the Chapter 7A highlights regarding exterior materials and construction methods for buildings:

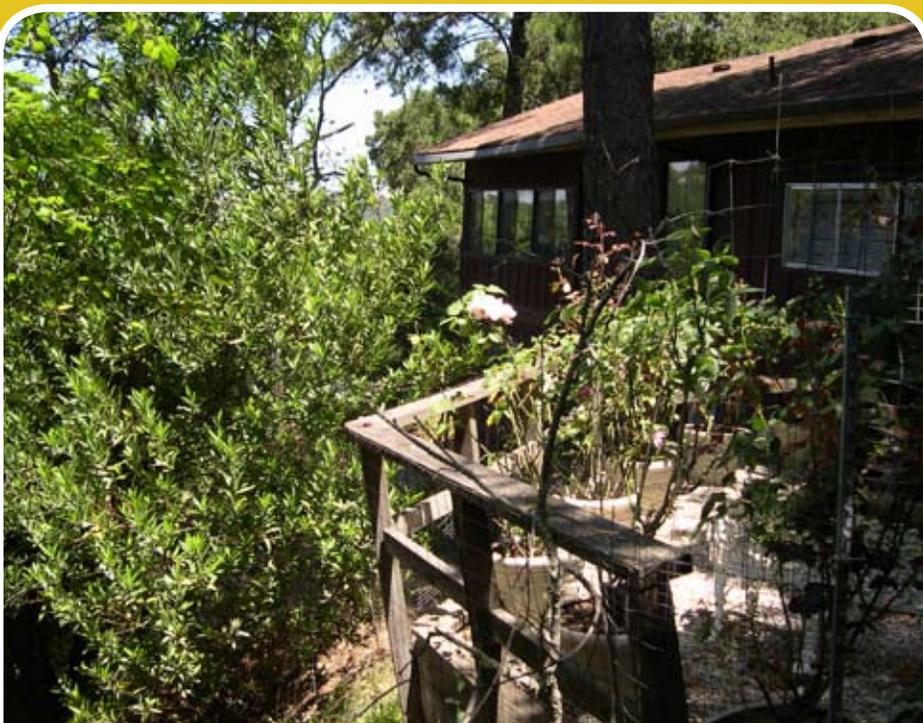
- The required fire rating of your **roof covering** (Class A, B, or C) is defined.
- Gaps between your **roof covering** and **roof deck** (such as with clay barrel tile roofs) must be plugged at the ends (“bird stopped”).
- Energy-efficient dual-pane **windows** must include at least one pane of tempered glass.
- Energy released from burning **deck** boards can’t exceed a maximum value.
- **Vents** used in eaves and soffits must resist the intrusion of embers and flames.
- **Siding** must be classified as noncombustible or ignition-resistant, or must pass a fire test approved by the Office of the State Fire Marshal.

A link to Chapter 7A of the California Building Code, and to a handbook listing products that comply with it, can be found at the end of this chapter.

Top photograph: Materials for new homes built in the wildland-urban interface must comply Chapter 7A of the California Building Code.

Left photograph: A SAFE Landscape is a package deal consisting of a home created from code-compliant building materials and a fire-safe landscape. Owners or caretakers of this property in the wildland-urban interface must follow CAL FIRE’s defensible space guidelines in order to create and maintain a fire-resistant landscape.

Stephen L. Quarles



BUILDINGS

Three main factors define a fire-safe building: location, materials and design features, and management of near-home vegetation (defensible space). Protecting your home from a wildfire is a *package deal* – survival of your home, with its existing design and materials, is directly related to how well you select and maintain your near-home vegetation.

During wildfires, most home ignitions are caused by flying embers. These embers can come from burning vegetation or other burning buildings.



Accumulated pine needles on this complex roof could allow embers to ignite roofing materials.

Stephen L. Quarles

Roof

If you haven't already, make an upgrade to a **Class A** roof your first priority. Ignition-resistant Class A roof coverings — such as concrete tile and asphalt composition shingles — have become the norm in California. Laws passed in the late 1990s required all new homes and all roof replacements in very high fire hazard severity zones to be Class A. Nevertheless, there are still many older homes that do not have Class A roofs.

“Roof edge” issues are also an important part of a fire-safe roof. A **complex** roof (one with many angles and intersections) can readily accumulate debris. This debris can be readily ignited by embers. Even if you have a Class A roof covering, the roof may still be vulnerable depending on the adjacent material. It is important to keep your roof and gutters clean of debris to avoid ember ignition during a wildfire.

Vents

Fires that ignite in the attic as a result of embers entering through vents usually result in complete loss to the home. Use 1/8-inch mesh screens to cover your vents, or attic vents that have been designed to resist the intrusion of embers and flames. Make sure your fire-safe vents allow sufficient air flow to control moisture.

Vents for crawl spaces under homes or for attics are required by building codes to minimize the build-up of moisture, which can lead to mold growth and decay in building materials.

Burning embers that impact vent screens will burn down to a size where they can move into the attic or crawl space. Finer mesh screens are better since smaller embers have a harder time igniting building materials and debris. Be sure to maintain vent screens with frequent cleaning: screens less than 1/8-inch mesh do a better job of keeping out embers, but they will also plug up with debris more easily.

Recent innovations include the development of vents designed to limit ember intrusion while still allowing sufficient air flow for ventilation, and construction designs and procedures for unvented attic and crawl spaces. Unvented designs eliminate the use of vents. Make sure you check with your local building department if you are considering an unvented option.

For added protection, you can make vent covers out of plywood or another solid material that can be quickly installed when wildfire approaches. These covers will stop embers from entering the enclosed spaces. Remove

them after the fire threat passes.

Deck

Attention to decking can also reduce fire hazards. An ignited deck endangers the portions of the building that it is adjacent to, including windows or sliding glass doors and siding. The heat and flames from a burning deck can cause the glass to break and permit the fire to enter the house, which means likely destruction.

Don't store combustible materials such as firewood and lumber next to your house or under your deck. When building a new deck, use materials that meet new fire performance requirements.

Be mindful of the gaps between the boards and between the house and the decking. Combustible debris can build up in these gaps and at interior corners. Wind-blown embers can lodge there, resulting in ignition of the debris and decking or combustible siding.

Storing combustible materials under or on top of the deck should be avoided due to the potential for developing a flaming exposure adjacent to your home.

Replacing deck boards can be expensive, but is one of the best investments you can make. For replacement, consider any material — plastic, plastic composite lumber, fire-retardant treated lumber rated for exterior use, or lumber — that passes the state test procedure approved by the California State Fire Marshal's office, and are listed at the end of this section. Many decking products have complied with these requirements. Materials that meeting the specifications for an ignition-resistant material (e.g., fire retardant treated lumber) and noncombustible material are available for decking surfaces. Decking materials that comply with Chapter 7A requirements don't necessarily meet these more restrictive requirements.



Stephen L. Quarles



Stephen L. Quarles

The decking being tested here doesn't comply to Chapter 7A provisions.

Windows

Windows are another priority. Research has shown that by far the most important factor in determining the vulnerability of windows in a wildfire is the glass, not the framing material. An open window is also very vulnerable to the entry of embers – windows should be closed as part of your preparation for wildfire.

Installation of dual-pane windows with an outer pane of tempered glass will provide more protection for the inner pane. The inner pane will heat up more slowly and uniformly, and therefore may not break even though the outer pane does.

Tempered glass is much stronger than regular glass and therefore does a better job of resisting breaking during a wildfire. Chapter 7A requires at least one-pane of a dual pane window to be tempered glass. Since the type of frame isn't

The 'bug' in the corner of this glass window pane indicates that it is tempered glass.



Stephen L. Quantiles

we are looking at vertical flame spread on a combustible siding product. Noncombustible siding is shown on the right hand side of the wall. Both wall sections had the same initial fire exposure.

as important, it can be selected based on cost, aesthetics, energy efficiency or other factors.

As is the case for vents, homeowners can fabricate window covers out of 1/2-inch plywood or another fire-resistant material. Cut them to size and mark them clearly so they can be installed quickly over windows before evacuating the home when a fire breaks out.

Siding

Siding is vulnerable for two reasons. First, if ignited, the flame can spread up the wall, potentially breaking windows, or spreading into the attic through the eave or soffit. Secondly, fire can penetrate through a lap joint, burn into the stud cavity and into the living space of the home. If you have combustible siding, near-home vegetation should be carefully selected and maintained, and storage of combustibles adjacent to the home should be avoided to reduce the chance of the siding igniting. A wide array of noncombustible siding can be installed over the sheathing, such as stucco or fiber-cement siding. Ignition resistant and noncombustible products provide more protection against vertical flame spread and lap joint penetration. Combustible siding, such as wood panel and lap or vinyl siding products would be more vulnerable to penetration at lap joints, and vertical flame spread. Combustible siding products that comply with Chapter 7A have only demonstrated a resistance to flame penetration at lap joints. If ignited, it

could still be vulnerable to vertical flame spread. [All siding should be inspected regularly for warping, and other issues that could result in penetration into the stud cavity, and maintained as necessary .] Again, please use the link below for a list of building materials that have complied with the new requirements of the building code.

Siting/Location

New homes should be built away from ridge tops, canyons, and saddles.

Beyond the House Itself

Post your address on a noncombustible sign in highly visible location. Maintain your entry roadway for adequate width to allow firefighting equipment to get to your home.

Beyond these priority areas, there are other areas where measures may be taken to keep the house safer in a fire, such as fences, garages and gutters. For detailed information from the University of California Cooperative Extension on the fire protection priority areas and many other issues, see the *Homeowners Wildfire Mitigation Guide* online at <http://groups.ucanr.org/HWMG>.

See also the UC Center for Fire Research and Outreach at <http://firecenter.berkeley.edu/>, and an interactive Web site with information about actions to take before, during and after fires at <http://www.wildfirezone.org/>.

A handbook listing many of the products that comply with the provisions of Chapter 7A has been published by the Office of the State Fire Marshal. It's available on line at <http://www.osfm.fire.ca.gov/strucfireengineer/pdf/bml/wuiproducts.pdf>. To review Chapter 7A in its entirety, please visit <http://www.osfm.fire.ca.gov/pdf/firemarshal/buildingcodechapter7a.pdf>.

DEFENSIBLE SPACE AND FIRE-SAFE LANDSCAPES



DEFENSIBLE SPACE

Providing a “defensible space” can reduce the risk of structural damage caused by wildfire. This space, at least 100 feet wide in California, is the area surrounding a structure where plants are maintained in a way that decreases the fire hazard and provides an opportunity for firefighters to safely defend your home. Vegetation that does not ignite easily should be planted in the defensible space. Landscape plants protect soils from erosion and provide aesthetic and ecological benefits. Trees and shrubs are acceptable as long as they are widely spaced and do not provide a continuous path of fuel for a fire to climb from the ground to a tree crown or roof (a fuel ladder). Proper landscape maintenance can dramatically improve the fire safety of a yard.

Illustration courtesy of Cal Fire.

Defensible Space Guidelines

Below are general guidelines adapted from CAL FIRE:

1. Create and maintain a defensible space of at least 100 feet or greater from each building or structure. Check with your local fire department on the distance required in your community.
2. Preserve single specimens or groupings of well-spaced and well-pruned trees or other vegetation.
3. Eliminate ladder fuels within the defensible space zone by disrupting the vertical and/or horizontal continuity of plants.

Fire-safe landscaping in zone 2.

FIRE-SAFE LANDSCAPING

You can improve the fire safety of your property by properly designing and maintaining your landscape. Make sure there is horizontal and vertical separation between plants. If a fire occurs, this will minimize the spread of fire between your plants, and from your plants to your home. Choose fire resistant plants. It is important to understand, though, that all plants will burn given the right conditions. Ensure plants are properly irrigated. Dead leaves, branches and other flammable debris should be regularly removed. Fire-safe landscapes should also include hardscape, such as granite paths and stone walls. These can act as a fuel break and help to slow down or change the path of an approaching fire. Make sure to keep combustible items such as firewood piles and propane tanks away from your home, and remember that the house itself can be made more fire resistant. Finally, in all cases, maintain your plants and property throughout the year to reduce the amount of fuel near your home.



Jane Croft



BRUSH, FUEL AND VEGETATION — CLEARANCE, MAINTENANCE, MANAGEMENT, MITIGATION, MODIFICATION, THINNING, REDUCTION, AND TREATMENT

These terms are typically used interchangeably to mean the maintenance of vegetation (trees, shrubs, grasses, groundcovers, and vines) in a way that minimizes the transmission of fire from one plant to another, and ultimately, to your house. Proper maintenance for fire safety does not mean eradication of all plants, but rather the selective removal of highly flammable vegetation. The

goal of brush clearance is not to remove all vegetation, but to specifically remove fuels that create a fire hazard. When done well, “cleared” areas should still include enough well-spaced and judiciously pruned plants to protect against excessive erosion and provide wildlife habitat.

A SEASONAL GUIDE TO FIRE-SAFE LANDSCAPING

Heuchera x 'Wendy' and Dudleya hassei create an attractive low maintenance and fire-resistant landscape. Rancho Santa Ana Botanical Garden.





Courtesy of John Todd, L.A. County Fire Department, Forestry Div.

SPRING

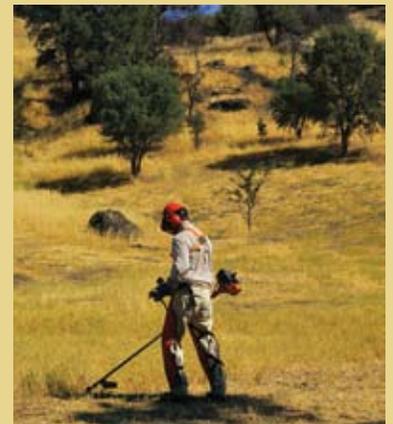
Early spring is a good time to give your irrigation system a check-up. Water plants deeply and only as needed. This encourages deep roots and drought tolerance, and discourages weeds, overgrowth, and snails. If you haven't already, start composting greenwaste as part of your spring cleaning. Also, leaving grass clippings on your lawn as mulch

provides nutrients to your soil, helps retain soil moisture, and keeps green waste out of landfills. For more information, read these publications: *Compost in a Hurry*: <http://ucanr.org/repository/fileaccess.cfm?article=54109&p=DIOEDS>, and *Mowing your Lawn and Grasscycling*: <http://ucanr.org/repository/fileaccess.cfm?article=54080&p=MMPHCR>.



FIRE PREPAREDNESS FOR YOU AND YOUR PROPERTY

- To reduce fire hazards and invasive plant seed banks, pull weeds or weed whip before the seed heads mature. This may occur any time between February and April, depending on the previous year's weather.
- Remove stacks and other accumulation of construction materials, yard waste, and other debris from your yard.
- **Be ready!** Have a plan of action in place in case a wildfire occurs in your area (see **Resources: inside back cover**).
- Pre-cut and label materials to cover your windows and vents in the event of a fire, and store them, along with a hammer and nails or drill screws, in an easily accessible place.
- Locate woodpiles and fuel tanks at least thirty feet from all buildings and maintain a 10 foot zone free of vegetation around them.
- Make sure your decks, porches, or landings are free of unnecessary clutter and that anything remaining can be quickly and easily removed.
- Be sure to keep your "water reservoirs" and portable tanks filled, and have mops and hoses stored with the rest of your emergency supplies (ladders, shovels, etc.).





Mark Hoogwerff



Before you begin your spring garden tasks, be aware that most birds nest from March to September. Make sure that fuel management activities do not disturb nests. Look first before cutting. For more information, please visit <http://www.fws.gov/birds/Permits-Fact-Sheet.pdf>.

FIRE HAZARD REDUCTION - IT'S YOUR RESPONSIBILITY!

Brush clearance, weed abatement, and fuel modification are all terms used by fire jurisdictions to describe required treatment or thinning of vegetation on your property to reduce fire hazards.

This DOESN'T mean the clearance of all vegetation, but it does mean the selective removal to decrease fire hazard. In most jurisdictions,

You are only required to treat the vegetation on your own property. Brush clearance on other property is the responsibility of the owner.



Contact your local forestry or fire personnel if such clearance is needed. Too often, vegetation is allowed to grow unmanaged until it becomes a critical fire hazard. Generally, when this occurs, extensive effort is required by the property owner to address the problem. Some jurisdictions have more specific requirements for brush clearance inspections. Please check with your local fire department for more information. Inspections are usually conducted by your local fire department. Additional requirements may be made

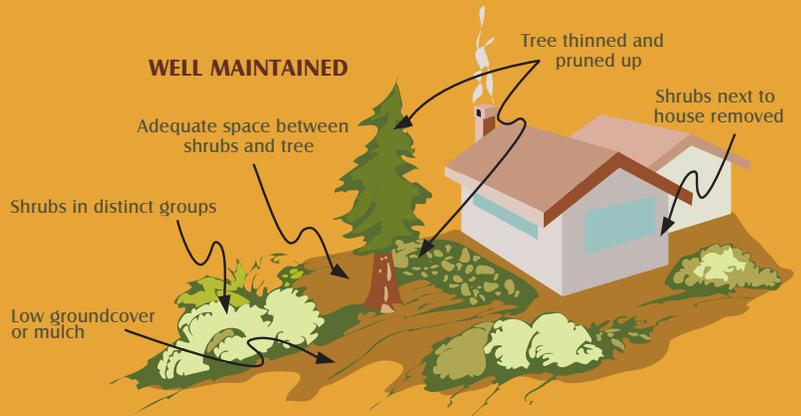
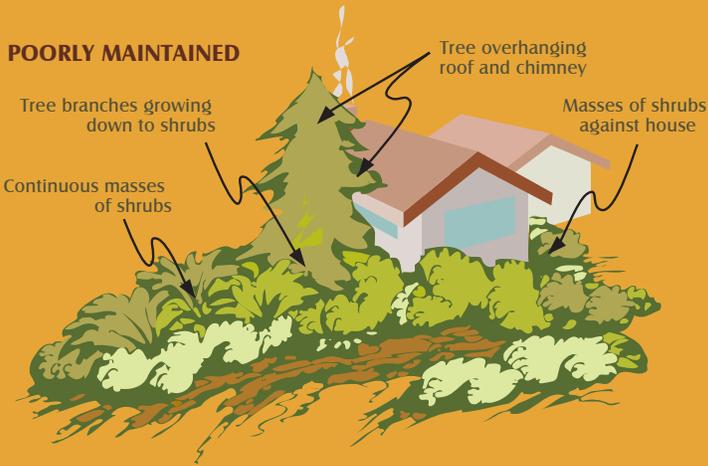
by insurers. Please contact your insurance agent or insurance company for additional information, or visit <http://www.disaster101.com>.



DISASTER PREPAREDNESS FOR PETS

Prepare two disaster kits for your pets – one for the home and a portable version if you need to evacuate. Include food, water, medication, and toys. Review your kits regularly to ensure that their contents are fresh. Keep in mind that pets are not allowed at evacuation shelters, so arrange a location in advance to house your pets away from the fire. If you have large animals or livestock, make special arrangements for their care during an evacuation. For more information, check out the ASPCA's website checklist at: <http://www.asPCA.org>, or see CDFA's disaster preparedness guides for pets at http://www.cdfa.ca.gov/ahfss/ah/disaster_prep_Brochures.htm.

Which one of these matches your landscape?



FUEL MODIFICATION

- Landscape with plants that have fire-resistant characteristics (*see p. 29*).
- Maintain your **defensible space** (*see Introduction*) by thinning vegetation at least 100 feet or more from all structures.
- Space individual or clumps of native trees and shrubs at least ten feet apart and remove the lower six feet of branches on trees taller than eighteen feet.
- Maintain plants by watering as needed, and by removing dead or dry growth, leaves and needles.
- Call your local utility company before pruning near power lines or before planting trees close to any power line to confirm the maximum tree height allowable for that location.
- Ask your local utility company to inspect yearly any utility lines adjacent to or on your property where they may contact trees.

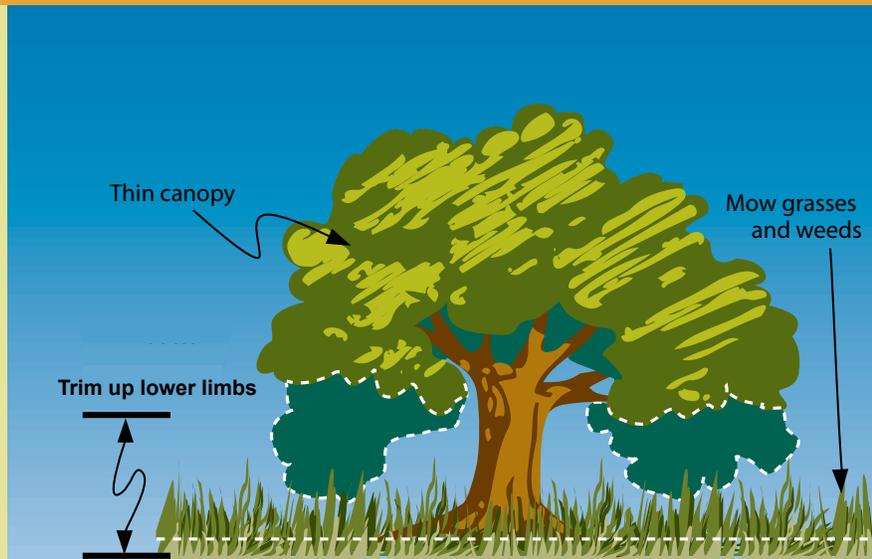


Illustration courtesy of East Bay Municipal Utility District (EBMUD)

Do NOT remove vegetation down to bare soil, and do not destabilize hillsides by using heavy equipment; soil erosion and mudslides can result. Contact your fire department, a city engineer, or local NRCS office for erosion control techniques. Make sure brush clearance contractors understand the importance of maintaining stable slopes.

Cool winter and spring days are the best time to do fire hazard reduction in hazardous areas. Make sure mechanical tools have approved spark arrestors, and avoid using them on hot dry days when sparks can ignite vegetation. Please visit http://www.fire.ca.gov/communications/downloads/fact_sheets/EquipmentUse.pdf for more information on equipment use safety.



PROBLEM PLANTS

Castor Bean, Artichoke Thistle



- Left:** Castor Bean
(*Ricinus communis*)
Right: Artichoke Thistle
(*Cynara cardunculus*)



Michael Nickel



Clarence A. Rechenthin

Artichoke Thistle (*Cynara cardunculus*) is a spiny perennial herb with bright purple thistle flowerheads and an aggressive root system. The plant is known to spread along game trails in coastal sage scrub in Southern California. Castor Bean (*Ricinus communis*) is a perennial shrub with maple-like leaves and is found in riparian areas, chaparral, sage brush, and along roadsides. Castor Bean seeds are highly toxic to humans as well as many animals. Both plants can become dense monocultures that exclude shrubs, herbaceous plants, and annual grasses. They colonize disturbed areas and grow rapidly, shading out native seedlings and groundcovers. The best method of seedling control is by hand pulling with gloves when small or in wet soil. Mature plants may best be controlled with herbicide.

Large Periwinkle, Ivy



- Left:** Large Periwinkle
(*Vinca major*)
Right: English Ivy
(*Hedera helix*)



Drew Ready



Drew Ready

Large Periwinkle (*Vinca major*), English Ivy, (*Hedera helix*), Algerian Ivy (*Hedera canariensis*), and Cape or German Ivy (*Delairia odorata*) are all vines, and they are all invasive in Southern California. Thick mats can be difficult to maintain, and can hide underlying dead, dry material, which can be a fire hazard. Small infestations of all of these can be effectively removed by hand-pulling. For non-invasive vine alternatives, try California Desert Grape (*Vitis girdiana*) or Beach Strawberry (*Fragaria chiloensis*) for an additional benefit: homegrown fruit. Star Jasmine (*Trachelospermum jasminoides*) is another good alternative. If you do opt for vines in wetter parts of your garden, make sure to keep them well watered, and trim back any dead material.

Hottentot Fig, Crystalline Ice Plant



- Left:** Hottentot Fig, Highway Iceplant
(*Carpobrotus edulis*)
Right: Crystalline Iceplant
(*Mesembryanthemum crystallinum*)



Júlio Reis



Gary A. Monroe

Hottentot Fig or Highway Iceplant (*Carpobrotus edulis*) and Crystalline Iceplant (*Mesembryanthemum crystallinum*), are groundcovers that invade coastal areas of Southern California. Both can spread to form nearly impenetrable, shallow-rooted mats that dominate native plant communities and do not prevent erosion. The woody thatch underlying these mats can also become a fire hazard if not maintained properly. Both plants are easily removed by repeated hand pulling. Large infestations may be best controlled with herbicide. A good alternative to consider is a mix of non-invasive succulents like Kleinia (*Senecio mandraliscae*) or Catalina Island Live-Forever (*Dudleya hassei*). For hillsides try deep-rooted San Diego Marsh Elder (*Iva hayesiana*).



SUMMER

In early summer, give your leaf blower a vacation; use a rake instead. Leaf blowers blow away mulch and topsoil, and they contribute to air and noise pollution. They are also a fire hazard due to engine heat and the sparks they can generate.



REVIEW SUMMER VEGETATION MAINTENANCE

- Water appropriately to maintain healthy leaf moisture without encouraging excess growth.
- Hand-prune the inside branches of shrubs to reduce flush of growth. Remember, edging and shearing alone results in weak, fast growth and more fuel.
- Stay ahead of weeds by maintaining a regular schedule of hand pulling or weed whipping, before the seed heads mature, to reduce fire hazard and invasive seed banks.
- Utilize mulch to suppress weeds.
- Dry leaves and other debris that collect in your rain gutters can be dangerous and ignite very easily from wind-blown embers during wildfires. Cleaning your rain gutters regularly can prevent this from being a threat.
- For general landscape maintenance and irrigation information, check out the *Sunset Western Garden Book* or *Care and Maintenance of Southern California Native Plant Gardens*.



Accumulated fuel in rain gutter.



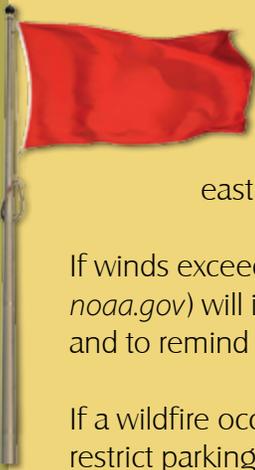
KEEP YOUR PROPERTY FIRE-SAFE WHEN ON VACATION. You can take a vacation this summer with few worries if you take some preventive measures before leaving to ensure your house is fire-safe.

- Check your smoke detectors on a regular basis to make sure they are functioning properly. Batteries could run down or other components could fail while you're away.
- Close windows and, if you have them, shutters.
- Check to make sure that all stoves have been turned off or disconnected.
- Turn off all unnecessary appliances and make sure everything that draws current is unplugged - lightning storms or sudden electrical surges could cause a fire in this equipment while you're away.
- Put your irrigation system on a timer, or better yet, enlist someone to water your property when needed to help maintain plant health and fire resistance.
- Make sure all flammable materials are stored completely away from the exterior of your home.
- Leave your house and car keys as well as your contact information with a neighbor or relative in case of emergency.

In July, don't forget that all fireworks, even the so-called "safe and sane" type, are illegal in most of Southern California, including all federal lands. Always dangerous, fireworks are especially hazardous during windy conditions.



Timothy Goodwin



SANTA ANA WINDS. The true onslaught of the east winds – Santa Anas - often begins in July and sometimes lasts into November or December. Santa Ana winds are strong, hot, very dry winds that sweep into Southern California from the east or northeast. When temperatures are warm and vegetation moisture is very low, these east winds create critically dangerous fire conditions.

If winds exceed 25 mph and humidity is below 15%, the National Weather Service (<http://www.nws.noaa.gov>) will issue a **Red Flag warning**. These are issued to make everyone aware of the hazard and to remind them to make preparations should they be asked to evacuate.

If a wildfire occurs during a Santa Ana wind event, the fire can spread very rapidly. Some jurisdictions restrict parking on narrow streets on Red Flag days. This helps residents evacuate and fire companies gain access during a wildfire. If residents trying to evacuate become trapped in their vehicles, this can lead to a catastrophic situation. Be aware of Red Flag days and respect parking restrictions in posted locations. Residents in the WUI should be prepared to evacuate if asked to do so by emergency personnel. Evacuations are ordered to save lives. Property can be replaced; lives can't. If you choose to ignore an evacuation order to stay and defend your property, the fire department may not be able to assist you. Please contact your local fire department for more information about fire and wind conditions, and directions for how to respond.



Fall plant sale at Rancho Santa Ana Botanic Garden. Image courtesy of Barbara Eisenstein.

Late summer is a good time to begin planning for the fall planting season. Local botanical gardens or community colleges host design classes that will help you make the most of your garden. Visit www.plantright.org to find recommended alternatives to invasive plants.

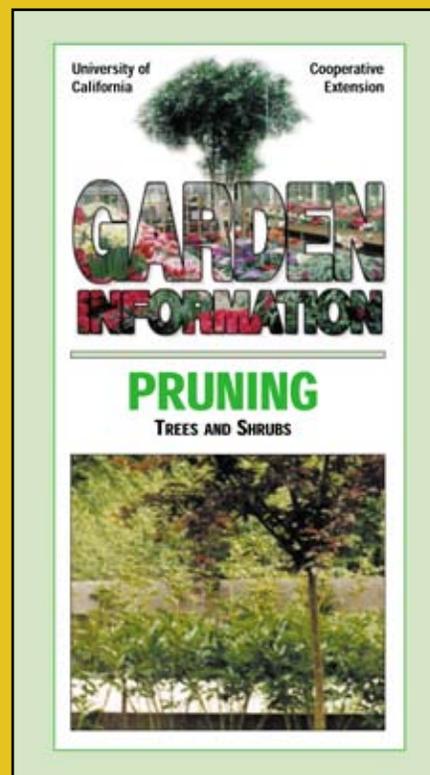


PRUNING FOR HEALTHY PLANTS. Most plants will benefit from occasional corrective pruning, and all will benefit from the removal of dead wood. Time the pruning of individual plants over several years to allow them to recover. Try pruning about 1/3 of your plants in a given year, so that all are pruned at the end of three years.

Regularly remove dead material and branches from your trees and shrubs. For deciduous trees and shrubs, prune before they lose their leaves, when it is easier to see the dead branches.

Hand-prune inside branches to reduce flush of growth. Hedging and shearing alone results in weak, fast growth and more fuel.

For more information on proper pruning techniques, read the University of California Cooperative Extension's *Garden Information* series on *Pruning Trees and Shrubs*, written by Donald R. Hodel, Environmental Horticulture advisor for UCCE. It is also available online at <http://ucce.ucdavis.edu/files/filelibrary/1359/36622.pdf>.



On steep slopes, be sure to keep shrubs and trees (for example, Coast Live Oak) with deep root systems to help prevent erosion!

FIRE-RESISTANT PLANT CHARACTERISTICS. When choosing plants or identifying which plants to keep when performing fuel modification, look for fire-resistant plants.

Fire-resistant plants

- Store water in leaves or stems
- Produce very little dead or fine material
- Possess extensive, deep root systems for controlling erosion
- Maintain high moisture content with limited watering
- Grow slowly and need little maintenance
- Are low-growing in form
- Contain low levels of volatile oils or resins
- Have an open, loose branching habit with a low volume of total vegetation



Heuchera x 'Wendy' and Dudleya hassei, Rancho Santa Ana Botanical Garden. Drew Ready, Los Angeles & San Gabriel Rivers Watershed Council

The moisture content of plants is an important consideration because high levels of plant moisture can lower fire risk and act as a heat sink, reducing the intensity and spread of fire.

CHARACTERISTICS OF FLAMMABLE PLANTS. Avoid purchasing or consider removing highly flammable plants.

Highly flammable plants

- retain large amounts of dead material within the plant
- produce a large volume of litter
- contain volatile substances such as: oils, resins, wax, or pitch



Pampasgrass is highly flammable as well as extremely invasive.



If not trimmed away, dried palm fronds form persistent "skirts" or petticoats around the trunks of fan palms. Such leafbase skirts can present a high fire hazard!

FAMILY FIRE DRILL. Now is the time to create a fire escape plan for your family. Establish at least two exit paths out of each room, as well as a place away from the house where your family can meet once everyone is out of danger. In a multi-story house, consider roll-out evacuation ladders for upper-floor rooms. Remember that a plan won't help unless everyone in your family knows and understands it. Be sure to practice several times with a fire drill. Check with your local fire department for up-to-date fire drill procedures. Everyone who is capable needs to learn how to use the fire extinguisher. Be sure to practice several times. In an emergency situation, you need to act without hesitation, so if you have to stop and think about how to operate the extinguisher, you might not be able to control a fire in time. For information on different types of fire extinguishers, please visit www.fire-extinguisher101.com. Show every family member how to "stop, drop and roll." This technique has been proven to be a life-saver.



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DO YOU HAVE AN **EMERGENCY SUPPLY KIT** READY?

- bottled water
- water purification kit
- 3-day supply of food
- goggles
- respiratory masks
- work gloves
- flashlights
- batteries
- prescription medications and spare eye glasses
- protective clothing: sturdy shoes, cotton jeans, cotton long-sleeved shirts, scarves, bandanas
- FRS radio
- a first aid kit and first aid book
- hand sanitizer
- wool blankets
- a local map
- paper and markers
- pictures of family members

For Further information, please visit www.redcross.org.



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PROBLEM PLANTS

Brooms (Scotch, Spanish)



Spanish Broom (*Spartium junceum*)

Left: plant close-up

Right: plant form



Jon M. Randall



Michael Nickel

Scotch Broom (*Cytisus scoparius*) is a small to medium sized shrub with sharply angled branches and golden yellow flowers. Spanish Broom (*Spartium junceum*), is a perennial shrub with rush-like branches and light yellow flowers. They can be found throughout the southern coastal counties of California. Brooms tend to form dense stands and take over native plant communities, and infestations are fire hazards during the dry season. Pulling mature plants with weed wrenches is effective for removal combined with several years of follow-up seedling control. Western Redbud (*Cercis occidentalis*), with its deep pink flowers in spring, is an attractive alternative, but as always, take care to space shrubs properly and cut back dead branches and twigs in fuel management zones.

Myoporum, Tree of Heaven



Left: Myoporum (*Myoporum laetum*)

Right: Tree of Heaven (*Ailanthus altissima*)



Carolyn Martus



Bill Neill

Myoporum (*Myoporum laetum*) is a small evergreen tree or shrub with a broadly spreading crown. Tree of Heaven (*Ailanthus altissima*) is a deciduous tree or shrub that can reach heights of 30-65 feet. It can create dense thickets and produce copious seeds, contributing to its ability to spread and crowd out native vegetation. Both Myoporum and Tree of Heaven grow and spread rapidly and have invaded significant areas along the coast of Southern California and along streams in riparian areas. Seedlings can be pulled by hand, but pulling must be done when the soil is moist and the plant is small, due to long, strong taproots. One alternative as a screen or tree is the Fern Pine (*Podocarpus gracilior*).

Mexican Fan Palm



Mexican Fan Palm (*Washingtonia robusta*)

Left: plant form

Right: plant close-up



Bill Neill



Forest & Kim Starr

The Mexican Fan Palm (*Washingtonia robusta*) grows to 100 feet tall; the trunk is slightly curved or bent with compact bright green fan-shaped palm fronds. Mexican Fan Palms can form dense mature stands in river, stream and wetland areas. If not properly pruned, these palms hold on to their large collars of dried and highly flammable fronds. Many fire officials blame the rapid spread of the Old Fire in San Bernardino on Mexican Fan Palms. Removal of these palms is best when they are young, as they are costly to remove once they mature. Consider using the Guadalupe Palm (*Brahea edulis*) or the Mexican Blue Palm (*Brahea armata*) as a substitute for Mexican Fan Palms. They grow more slowly, stay smaller, and are not invasive.



Fall is a good time in Southern California to begin new plantings. The weather is beginning to cool down, yet temperatures are still warm enough to encourage germination.

Ensure that your landscape is still fire-safe. Clear your roof of accumulated debris to prevent ignition from flying embers in the event of a wildfire. Maintaining your property is a year-round task.

DROUGHT-TOLERANT LANDSCAPING. Create eye-catching gardens and landscapes that save water, prevent pollution, and protect the environment with drought-tolerant landscaping that uses designs and plants suited to local conditions.

How to create a drought-tolerant landscape:

- Use **California Friendly** and **low-water-use** plants
- Group plants according to their irrigation needs
- Limit turf areas to those needed for practical uses
- Use efficient irrigation systems and schedule irrigation wisely
- Mulch to help maintain soil moisture
- Provide regular maintenance, especially to ensure fire resistance



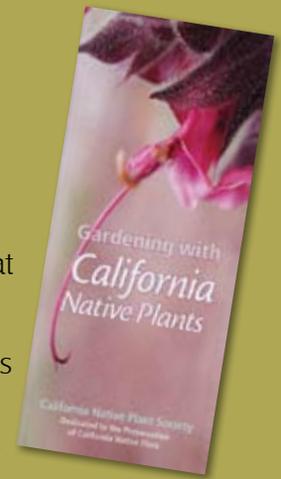
Drought tolerant plants must be able to withstand low water and high-heat conditions while still maintaining their aesthetic and functional qualities.

Plants that thrive in naturally dry conditions sometimes have external characteristics like small, divided, spiny, waxy, or hairy leaves that help plants hold in moisture, reducing water loss through transpiration. Sometimes the plants lack leaves entirely. Some drought tolerant plants survive periods of reduced summer water by going dormant and then resuming growth during the winter and spring.

Many low-water-use plants actually avoid drought by producing wide-spreading or long roots to reach stored groundwater. These extensive root systems can also be beneficial for hillside stabilization. A variety of species on a slope – trees, shrubs, and perennials - will provide a range of root depths to help bind soil and rocks together.

Many drought-tolerant plants can be useful in areas of high fire danger. Some dry land plants are low-growing with a creeping or spreading habit; this low foliage along with open branching, limited leaf litter, and low quantities of flammable oils or resins contribute to fire-resistance. Be sure to water these plants as needed to maintain moisture.

A wide assortment of native Southern California plants is perfectly suited to our climate's low precipitation. Native species have evolved and adapted to the local weather over thousands of years. In their native habitat, they are tolerant of seasonal extremes, having adapted to survive winter cold and summer heat, periodic drought, wildfires, coastal conditions and high winds. Once established, many native species require little or no additional irrigation beyond normal rainfall. For more information about native plants, visit California Native Plant Society's website at <http://cnps.org>.



Another group of California-friendly plants are from Mediterranean-climate regions. This includes species from the Mediterranean Basin, South Africa, southwest Australia, and Central Chile. These plants use water-conserving techniques that allow them to withstand long, hot summers. When using any non-native plants, care must be taken to choose species that will not escape into the wild and displace native species. This is especially important with non-native drought tolerant species, as their adaptations make them able to survive and flourish under our local conditions - however, only a few of these non-native species are known to cause problems. Many invasive plants have aggressively invaded California's wildlands, out-competing native species for water and other resources. For more about invasive plants, see the previous section on invasive plants and wildland health.

Water conservation and fire-safe landscaping are not contradictory terms: because drought tolerant gardens can be planted according to fire-safe principles, you can save water and be fire-safe at the same time.

During drought, both fire safety and water conservation become even more important. Dry vegetation in wildland areas increases the chance of devastating wildfires – but the best defense against this is to be vigilant about avoiding ignition. During a drought, fire personnel are faced with decreased water supply to fight fires, so it is especially important to conserve water.

Creating a drought tolerant landscape entails using plants with low-water needs and grouping plants together with similar water requirements. Mulches and efficient irrigation systems help to conserve water as well. Another feature of low-water use landscapes is the incorporation of non-planted areas, such as dry "stream beds" that are attractive and need no water at all. From a fire safety perspective, these features can act as fuel breaks.

Maintenance is vital for both fire safety and drought tolerance. Don't rely on simply choosing the right species of plant – any plant will burn under the right conditions. Healthy plants need less water and produce less dead fuel, and many plants, such as grasses (see <http://www.ipm.ucdavis.edu/TOOLS/TURF/MAINTAIN/irrhov.html>) and woody plants, can be trained to require less water if you promote root growth with deep, infrequent watering. Deeply rooted plants are more drought-tolerant because they can access water held further down in the soil. Efficient irrigation makes it easy to maintain a landscape that is both drought tolerant and fire-resistant.

Proper landscaping techniques not only create beautiful landscapes, but also benefit the environment and save water. In addition, attractive, water-efficient, low-maintenance landscapes can increase home values.

Drought-tolerant landscaping can offer many economic and environmental benefits, including:

- Lower water bills from reduced water use
- Reduced landscaping labor and maintenance costs
- Conservation of natural resources and preservation of habitat for plants and wildlife
- Reduced runoff of stormwater and irrigation water that carries top soils, fertilizers, and pesticides into lakes, rivers, and streams
- Fewer yard trimmings to be managed or landfilled
- Extended life for water resources infrastructure (e.g., reservoirs, treatment plants, groundwater aquifers), thus reduced taxpayer costs



Courtesy of NASA/MODIS

Southern California wildfires, October 2003.

FIRE SEASON

In Southern California, the fire season's hot dry temperatures and recurring windy conditions begin in late summer and last until the first rains. Homes and landscapes have the best chance of withstanding a wildfire during this season if a fire-safe landscape has been established in spring and summer. If late season vegetation management is needed, take care to work only when temperatures are cooler and humidity is higher. Also, ensure any mechanical equipment you use will not cause a spark. Several large wildfires have been ignited by last minute fuel management.

During fire season, take steps to remain healthy and safe:

- Observe restrictions on fires, campfires, and barbeques at home and in parklands.
- Repair any problems with cars or other machinery that could cause sparks. Never throw burning cigarettes or matches out of a window!
- Maintain chimneys and spark arresters.
- Be aware of any parking restrictions on days with high fire risk – emergency vehicles may need access at any time.
- Become familiar with likely evacuation routes and centers in advance. Have a family plan and place to meet during a fire.
- During a fire, check news sources regularly for any specific instructions from fire and public health agencies – take heed of any evacuation orders from local fire agencies. Have a portable radio and spare batteries on hand.
- Reduce outdoor activities on smoky days.
- Pack any necessary materials (documents, medicines, extra food and clothing) and park vehicles oriented for a quick and easy exit. See the emergency supply kit recommendations on p. 30
- If evacuation is necessary, close all doors and windows to prevent ember entry into buildings. Lock doors and windows for security. The fire department will find a way in if they need to.

PROBLEM PLANTS

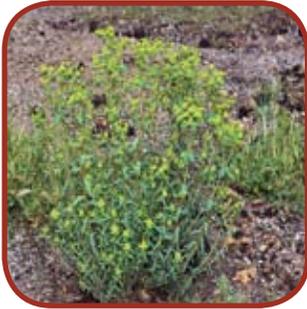
Geraldton Carnation Spurge



Geraldton Carnation Spurge
(*Euphorbia terracina*)

Left: Plant Form

Right: Plant Close-up



Joseph DiTomaso



Joseph DiTomaso

Geraldton Carnation Spurge (*Euphorbia terracina*), native to the Mediterranean, is a yellowish-green, bushy, upright perennial herb which grows up to 3 feet tall. It consists of several green to reddish, slender leafy stems which branch at the top to produce 1 to 5 flower stems. The plants spread by seed when the ripe fruits burst open. Geraldton Carnation Spurge has become established in coastal regions where it forms dense thickets that out-compete native species for space, light and nutrients. Brush cutting of mature stands (woody, several years old) seems to work if done after seed sets. Replace this plant with these alternatives: Bush Poppy (*Dendromecon rigida*) or Bush Marigold (*Tagetes lemmonii*).

Mustard, Brome and Oat Grasses



Left: Mustard
(*Brassica sp.*)

Right: Brome and Oat Grass
(*Bromus sp. and Avena sp.*)



Joseph DiTomaso



Joseph DiTomaso

Invasive plants like Black Mustard, Common/Field Mustard, and Saharan Mustard (*Brassica nigra*, *B. rapa*, and *B. tournefortii*) are often misconstrued as harmless naturalized exotics. The same is true for the invasive grasses like Slender Oat, Wild Oat (*Avena barbata*, *A. fatua*) Cheatgrass, Red Brome/Foxtail Brome and Ripgut Brome (*Bromus tectorum*, *B. medritensis*, and *B. diandrus*). Despite being here for over a century, these plants continue to have severe environmental impacts. Dense stands of these invaders suppress wildflowers and other low growing native plants. After fires, they monopolize available soil moisture before many natives have a chance to germinate and reestablish. They die out in the spring/early summer and have increased the ignition potential and fire frequency of our wildlands due to their fast burning fine fuels.

Eucalyptus Blue Gum



Eucalyptus (*Eucalyptus globulus*)

Left: plant close-up

Right: close-up of trunk



Jon M. Randall



Jon M. Randall

Blue Gum (*Eucalyptus globulus*), native to Australia, is a tall (100-180 foot), aromatic (flammable resins, gums), straight-growing tree, with bark that sheds in long strips, leaving contrasting smooth surface areas. Blue gum is distinguished by tall growth habit, smooth bark, long leaves, and large, solitary, waxy buds and fruits. Within groves, biological diversity is lost due to displacement of native plant communities and corresponding habitat. Eucalyptus is a highly flammable tree and should not be planted near wildlands. Seedlings can be hand pulled but mature tree removals should be left to a professional. See the National Park Service Eucalyptus Newsletter (http://www.nps.gov/goga/parkmgmt/fire_edu_newsletter_eucalyptus.htm).



WINTER



WINTER in Southern California is defined by the arrival of winter storms bringing rain at lower elevations, and often snow over 5000 ft. Winter is a good time to care for your soil - in burned areas, erosion can be a problem. In fuel management zones, the retention of deep-rooted vegetation during spring fire hazard reduction projects should stabilize slopes.



HOLIDAY TREE SAFETY IN THE HOME

Preventing Christmas Tree Fires

Take special fire safety precautions when keeping a cut tree in the house. A burning tree can rapidly fill a room with fire and deadly gases.

Selecting a Tree

Needles on fresh trees should be green and hard to pull from the branches, and the needle should not snap if the tree has been freshly cut. The trunk should be sticky to the touch. Old trees can be identified by bouncing the tree trunk on the ground. If many needles fall off, the tree has dried out and is a fire hazard.

Caring for Your Tree

Do not place your tree close to a heat source, including a fireplace or heat vent which can dry it out. The heat will dry out the tree, causing it to be more easily ignited by heat, flame or sparks. Be careful not to drop or flick cigarette ashes near a tree. Do not put your live tree up too early or leave it up longer than two weeks. Keep the tree stand filled with water at all times.

Disposing of Your Tree

Never put tree branches or needles in a fireplace or woodburning stove. When the tree dries out, discard it promptly. The best way to dispose of your tree is by taking it to a recycling center or having it hauled away by a community pick-up service.

Please unplug your Christmas tree lights before you leave the house!

Outdoor Lights

Inspect outdoor decorative lights and make sure electrical elements are clear of any leaf litter or dead plant material.



Please unplug your Christmas tree lights before you leave the house!



Frost-killed Laurel Sumac in Coastal Sage Scrub, Santa Monica Mountains.

CARING FOR PLANTS DURING WINTER

Frost

Many plants such as citrus, avocado and even some natives are susceptible to frost in the winter. Plants killed by frost can become a fire hazard in the wildland-urban interface. Help your plants survive the cold by preparing for frost in early winter (December). Move tender container plants to a protected area. For plants in the ground that are susceptible to frost, wrap trunks and branches with insulating material. For more information on this topic, please see the publication by U.C. Cooperative Extension advisor Pamela Geisel at <http://ucanr.org/repository/fileaccess.cfm?article=54166&p=OZRSNT>, or Cooperative Extension specialist Richard Snyder's webpage - <http://biomet.ucdavis.edu/frostprotection/Principles%20of%20Frost%20Protection/FP005.html>.

Mulching

Winter is a good time to apply organic mulches (max 3" - 6" deep) around your plants to help retain water and feed the soil. Applying mulch now will also 1) smother last year's insect eggs, spores, and weed seeds; 2) allow rain to soak in; 3) allow large pieces to break down before peak fire season. Keep organic mulches at least 30 feet away from structures. Mulches can help keep weeds under control, but this is also a good season to begin other weed control efforts. Consider removing invasive plants from your yard. For information on how to identify and control particular weeds, visit the UCCE Weed Research and Information Center at <http://wric.ucdavis.edu>, or the California Invasive Plant Council at <http://www.cal-ipc.org>.

Applying a layer of mulch in your garden will help your plants overwinter.





Steve Mitic

EROSION AND POST-FIRE RECOVERY

In Southern California, fire season ends when rains begin – and winter rains can produce copious run-off from burned or cleared areas. Maintaining native vegetation in a fire-safe landscape can help stabilize hillsides after a burn – the roots of scorched vegetation can still hold the soil. In areas where erosion risks are increased due to fire or over-clearing, additional steps may need to be taken to protect your property from mudslides and erosion. Each situation is different, however, and slope stabilization may require analysis from a soil engineer or geologist.

Contact your local public works agency for local guides, site-specific recommendations, and if needed, recommendations for engineering consultants.

In general:

- In the short term, make sure that water and debris are channeled away from your home and property or on to lower-value portions of your property, but not onto your neighbor's property! Evaluate your topography, and if possible, take advantage of the natural flow patterns. Do not try to dam water and prevent flow entirely. Ditches can be dug to accommodate larger than usual flows, and sandbags can be used to build small levees to guide flows. Contact your local fire or public works agency for more information.
- Seeding hillsides after a fire is usually not effective in Southern California. Often, seeds won't germinate and develop roots to hold soil until rains have already arrived, and in many circumstances that may be too late. Straw bales and organic mulches may be more effective. Choose weed-free straw to avoid problems down the road!
- In the long term, fire-adapted native plants will often recover within the first few months to few years after a fire, even if they look scorched. If trees on your property were scorched, try to wait as long as possible to see if they will recover – only remove burnt trees that pose an immediate hazard. Even if they do not recover, dead snags can provide important habitat for animals that have lost their homes to fire.
- Burned areas are prone to invasion by non-native weeds. Often, control of invasive plants is the most important action that can be taken to promote recovery of wildlands. Revegetation, such as tree planting, is often unnecessary and expensive. If replanting is needed, choose plant species, and even seeds, from local areas to protect the genetic diversity of sites. Planting trees can be harmful to the recovery of shrubland ecosystems. In some places, patience is the most effective recovery tool.

For other useful resources about what to do after a fire, visit <http://www.wildfirezone.org/> or your local fire and public works agencies. Remember, each situation is different, so necessary measures will vary with your location, topography, vegetation community, and the severity of the fire.

PROBLEM PLANTS

Pines, Juniper, Cypress



- Left:** Castor Bean
(*Ricinus communis*)
Right: Artichoke Thistle
(*Cynara cardunculus*)



Drew Ready



J. E. (Jed) and Bonnie McClellan

Pines (*Pinus spp.*), Junipers (*Juniperus spp.*) and Cypress (*Cupressus spp.*) species have characteristics that may make them highly flammable, such as the production of leaf litter or peeling bark, or the presence of volatile oils and resins. Though it may be possible to reduce their fire risk with frequent watering, intensive pruning, and wide spacing, it is recommended that these native species not be planted near homes in very high fire severity zones and care should be taken to remove them from the fuel management zone. Note that beyond the fuel management zone, the native species of these plants are important and attractive components of wildland ecosystems and provide habitat for native birds and wildlife. In Southern California these include: White Fir (*Abies concolor*), Torrey Pine (*Pinus torreyana*), Yellow Pine (*Pinus ponderosa*), Coulter Pine (*Pinus coulteri*), Grey Pine (*Pinus sabiniana dougl.*), Tecate Cypress (*Cupressus forbesii*), and California Juniper (*Juniperus californica*).

Pampas Grass, Jubata Grass, Crimson Fountain Grass



- Left:** Fountaingrass
(*Pennisetum setaceum*)
Right: Pampasgrass
(*Cortaderia selloana*)



Pampasgrass (*Cortaderia selloana*), Jubatagrass (*C. jubata*) and Fountaingrass (*Pennisetum setaceum*), are non-native perennial grasses with a clumped, upright growth pattern and feathery flower heads. These grasses create a fire hazard with excessive build-up of dry leaves and flowering stalks. Heavy infestations compete with native vegetation. Fountaingrass increases fire risk and endangers native plant communities. It is well adapted to fire and soil disturbance and infestation areas can greatly increase following a burn. Small infestations of Pampasgrass and Fountaingrass seedlings can be removed by hand-pulling. Mature plants may be best controlled with appropriate herbicides.

An attractive native alternative is Deergrass (*Muhlenbergia rigens*), but make sure to follow proper spacing and trim back dead material in your defensible space areas.

Arundo, Tamarisk



- Left:** Arundo
(*Arundo donax*)
Right: Tamarisk
(*Tamarix ramosissima*)



Bill Neill



Carolyn Martus

Arundo (*Arundo donax*) and Saltcedar or Tamarisk (*Tamarix spp.*) are two of the most devastating plants invading rivers, streams and wetlands in Southern California. Arundo can reach heights of 30 feet, forming dense stands that crowd out native plants and degrade wildlife habitat. It produces a massive amount of dormant dry vegetation in streams. This poses a serious fire risk. In large storm events clumps dislodge, accumulate downstream, and increase the risk of flooding. Small pieces that break off often re-sprout, spreading the infestation. Tamarisk is a large, many-branched shrub or tree with very small, scale-like leaves and is found in streamside and wash areas of California. It has a high capacity for water use, and can cause a reduction in groundwater supplies. It often spreads rapidly after a major disturbance, such as a fire. Removal of both Arundo and Tamarisk is difficult, as all root material must be killed or removed to avoid resprouting.

CHRONOLOGY OF SOUTHERN CALIFORNIA WILDFIRES

START DATE	NAME	COUNTY	STRUCTURES LOST	ACRES BURNED
JANUARY				
1/3/2001	Viejas	San Diego	16	10,353
1/5/1963	Red Mountain	Ventura	0	1,389
1/6/2003	Pacific	Los Angeles	0	900
1/8/2007	Malibu	Los Angeles	5	20
1/15/1961	Donlon/Fletcher	Ventura	0	2,426
FEBRUARY				
2/5/2009	Fort Fire	San Bernardino	0	1,500
2/10/2002	Gavilan	San Diego	82	5,500
MARCH				
3/7/1964	Polo	Ventura	0	684
3/12/2007	Windy Ridge	Orange	3	2,000
3/16/1964	Weldon	Los Angeles	24	UNK
APRIL				
4/12/2007	Franklin	Los Angeles	1	15
4/28/1996	Grand	Ventura	0	10,949
MAY				
5/5/2009	Jesusita	Santa Barbara	160	8,733
5/7/1984	Grimes	Ventura	Citrus/Avocado 3,000	11,164
5/8/2007	Griffith Park	Los Angeles	0	817
5/10/2007	Island	Los Angeles	7	4,750
5/12/2002	Bouquet	Los Angeles	2	4,977
JUNE				
6/1/1917	Thatcher	Ventura	60	44,003
6/1/2002	Wolf	Ventura	UNK	21,645
6/6/2002	Copper	Los Angeles	26	23,407
6/22/1976	Los Robles	Ventura	1	2,245
6/27/1990	Painted Cave	Santa Barbara	641	4,900
6/30/1985	Normal Heights	San Diego	76	UNK
JULY				
7/1/1985	Wheeler	Ventura	0	122,724
7/1/1988	Piru	Ventura	0	12,068
7/3/1985	Black Mountain	Ventura	0	1,324
7/4/2007	Zaca	Santa Barbara	1	240,207
7/12/2004	Pine	Los Angeles	15	17,418
7/17/2004	Foothill	Los Angeles	0	6,000
7/20/2004	Crown	Los Angeles	7	11,966
7/27/1977	Sycamore	Santa Barbara	234	805
7/29/2002	Pines	San Diego	37	61,690
AUGUST				
8/8/2009	La Brea	Santa Barbara	2	89,489
8/20/1963	Creek Road	Ventura	0	4,533
8/25/2009	Morris	Los Angeles	0	2,168
8/26/1996	Marple	Los Angeles	UNK	19,861
8/26/2009	Station	Los Angeles	53	160,557
8/26/2009	Ridge Complex	San Diego	0	1,372
8/27/2009	Cottonwood	Riverside	0	2,409
8/28/1967	Warring Canyon	Ventura	1	4,003
8/30/2009	Oak Glen 3	San Bernardino	1	1,159
8/31/2009	Pendleton	San Bernardino	1	860
SEPTEMBER				
9/1/2003	Curve	Los Angeles	50	20,857
9/2/2007	North	Los Angeles	0	2,200
9/4/2006	Day	Ventura	11	162,702
9/6/1955	Refugio	Santa Barbara	20	84,770
9/7/1932	Matilija	Ventura	0	220,000

cont. - CHRONOLOGY OF SOUTHERN CALIFORNIA WILDFIRES

DATE	NAME	COUNTY	STRUCTURES LOST	ACRES BURNED
9/12/1948	Wheeler Springs	Ventura	17	22,503
9/12/2007	Pine	San Diego	UNK	2,170
9/12/2008	Marek	Los Angeles	41	4,824
9/13/2008	Sesnon	Los Angeles	15	14,703
9/14/2007	Butler II	San Bernardino	UNK	14,039
9/22/2003	Williams	Los Angeles	62	38,984
9/25/1970	Wright	Los Angeles	103	27,925
9/25/1970	Foothill	Ventura	12	4,731
9/25/1970	Clampitt	Los Angeles	80	107,103
9/26/1970	Laguna	San Diego	382	175,425
9/26/1970	Camarillo Hts	Ventura	3	183
9/26/1973	Potrero	Ventura	3	12,297
9/28/2005	Topanga	Ventura/Los Angeles	6	24,175
OCTOBER				
10/14/1985	Ferndale	Ventura	20	46,809
10/15/1967	Devonshire/Parker	Ventura/Los Angeles	48	23,088
10/15/1967	Sence Ranch	Ventura	76	18,354
10/16/1967	Timber Canyon	Ventura	8	10,841
10/16/1967	Ditch Road	Ventura	13	1,245
10/20/2007	Ranch	Los Angeles	1	58,401
10/21/2007	Canyon Fire	Los Angeles	14	4,521
10/21/1958	Calumet	Ventura	5	17,212
10/21/2003	Grand Prix	San Bernardino	196	59,448
10/22/2007	Rice	San Diego	208	9,472
10/22/2007	Grass Valley	San Bernardino	178	1,247
10/22/2007	Slide	San Bernardino	272	12,759
10/23/1978	Kanan	Los Angeles	224	25,385
10/23/1978	Mandeville Cyn.	Los Angeles	20	5,500
10/23/2003	Piru	Ventura	8	63,991
10/23/2007	Poomacha	San Diego	138	49,410
10/23/2007	Ammo	San Diego	0	21,084
10/25/2003	Old	San Bernardino	1,003	91,281
10/25/2003	Simi	Ventura	300	108,204
10/25/2003	Cedar	San Diego	4,847	273,246
10/26/1993	Green meadows	Ventura	45	38,477
10/26/2003	Paradise	San Diego	223	56,700
10/26/2006	Esperanza	San Bernardino	54	40,200
10/27/1993	Kinneloa	Los Angeles	196	5,485
10/27/1993	Laguna	Orange	448	14,437
NOVEMBER				
11/2/1993	Old Topanga	Los Angeles	323	18,000
11/6/1961	Bel Air	Los Angeles	484	6,090
11/7/1955	Ventu Park	Ventura	8	13,956
11/11/1986	Bradley	Ventura	0	9,229
11/13/2008	Tea	Santa Barbara	210	1,940
11/14/2008	Sayre	Los Angeles	600	11,244
11/15/1977	Carlisle	Ventura	0	1,368
11/15/2008	Freeway	Orange County	400	30,305
11/24/1980	Panorama	San Bernardino	325	23,600
11/24/2007	Corral Fire	Los Angeles	87	4,901
DECEMBER				
12/3/2006	Shekell	Ventura	7	13,600
12/4/1962	Culbert Lease	Ventura	4	5,314
12/4/1993	Towsley	Los Angeles	0	1,800
12/11/1958	Malibu/Zuma	Los Angeles	103	18,000
12/21/1999	Ranch	Ventura	1	4,371
12/28/1956	Lake Sherwood	Ventura/Los Angeles	20	35,164

REFERENCE WEBSITES



American Soc. of Landscape Architects, So. Cal. Chapter	http://www.asla-socal.org
Angeles National Forest	http://www.fs.fed.us/r5/angeles/
Builders Wildfire Mitigation Guide	http://firecenter.berkeley.edu/bwmg/
California Chaparral Institute	http://www.californiachaparral.com
CAL FIRE	http://www.fire.ca.gov
The California Fire-Safe Council	http://www.firesafecouncil.org
California Invasive Plant Council	http://www.cal-ipc.org
California Native Plant Society	http://www.cnps.org
California Office of the State Fire Marshal	http://osfm.fire.ca.gov/
Cleveland National Forest	http://www.fs.fed.us/r5/cleveland/
Conejo Valley Open Space Conservancy	http://www.conejo-openspace.org
Disaster101.com	http://www.disaster101.com
Firewise Communities	http://www.firewise.org/
Inciweb	http://www.inciweb.org
Los Padres National Forest	http://www.fs.fed.us/r5/lospadres
Mountains Recreation and Conservation Authority	http://www.mrca.ca.gov
National Park Service – Santa Monica Mountains NRA	http://www.nps.gov/samo/home.htm
Natural Resources Conservation Service - NRCS	http://www.nrcs.usda.gov/feature/wildfire.html
Ojai Valley Land Conservancy	http://www.ovlc.org
Orange County Fire Authority	http://www.ocfa.org/
PlantRight	http://www.plantright.org
The Red Cross	http://www.redcross.org
Resource Conservation District of Ventura County	http://www.vcrd.org
Riverside County Fire Department	http://www.rvcfire.org/opencms/index.html
San Bernardino National Forest	http://www.fs.fed.us/r5/sanbernardino/
San Bernardino County Fire Department	http://www.sbcfire.org/
Santa Barbara County Fire Department	http://www.sbcfire.com/
UC Berkeley Center for Fire Research and Outreach	http://firecenter.berkeley.edu
University of California Cooperative Extension – Ventura	http://ceventura.ucdavis.edu
UCCE SAFE Landscapes	http://ucanr.org/safelandscapes
U.S. Geological Survey	http://www.usgs.gov/hazards/wildfires
Ventura County Fire Department	http://www.fire.countyofventura.org
Ventura County Weed Management Area	http://www.vcwma.org
WeedWatch Program	http://www.weedwatch.org
Wildfirezone.org	http://www.wildfirezone.org

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Fill in your personal information, make a copy to keep with your disaster kit, and have one posted in the kitchen to leave in the house for your reference and for firefighters.

Name

Home Address

Home Phone

Cell Phone

E-mail

Additional Family Members Living at Same Address (incl. alternate phone #s)

Location and Phone Number of Children's School

Contact Person in Another Area (name, address, phone, alternate phone)

Location of Any Hazardous/Flammable Substances (propane tanks, etc.)

Location and Phone Number of Nearest Fire Station

Location and Phone Number of Nearest Police Station

Location and Phone Number of Nearest Emergency Room

Location of Nearest Red Cross Shelter

Family Reunion information, fill out and make a copy for each family member.

Where Will You Meet in the Event of Emergency? (name of place, address, phone number)

Out of State Contact (name, address, phone, alternate phone, email)

Health Care Provider/Doctor (address, phone, member number)

List all Medication, Dosage, Prescription Number, Prescribing Doctor

Pets (names, type, special needs)

Veterinarian (name, address, phone number)
