Fire-resilient Landscapes

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California, like much of the West, has evolved ecosystems with characteristics that are reliant on fire for ecosystem health but create serious fire hazards for people who live in in the urban wildland interface between areas of higher density and more natural areas. Sparks from a downed power lines, mowers, catalytic converters, a carelessly tossed cigarette or match, a firecracker, stray ammunition, or an untended campfire is all it takes to ignite a fire that can erupt into a conflagration that cannot be easily slowed or stopped.

Depending on rainfall, by late spring to mid-summer, soil moisture is depleted, the growing season essentially over. Native plants respond by entering a state of summer dormancy, often dropping most or all their foliage in early- to mid-summer. As the moisture level in plant tissue is depleted with increasing summer heat and lack of rain, vegetation becomes tinder dry. In autumn, conditions of relative humidity as low as ten percent combined with hot, dry winds further desiccate the landscape and create exceptionally dangerous conditions.

The adaptations of native and introduced plant species to summer drought contribute to their flammability. Many plants, such as conifers, chamise, manzanita, coyote brush, sage, and some ceanothus, contain volatile terpenes, resins, and volatile oils that make them more likely to burn than broader leafed plants, especially when moisture content is low.

A century of fire suppression and cyclical droughts throughout the West has resulted in a massive build-up of dense, tinder dry fuels. The spread of flammable, invasive exotic trees and shrubs such as broom, pampas grass, acacia, eucalyptus, etc., create a fire-ladder effect that can allows a fire to rise into the tree canopy.

Fuel Reduction

Fuel is anything flammable that will contribute to the spread of a fire, especially dead or dry vegetation, highly flammable plants, plant litter, firewood, miscellaneous scrap wood or stored lumber, and wooden structures such as fences, decks, and arbors. For the purposes of this discussion, structures are excluded, although their design and placement are key factors in fire safety.

Fuel should be reduced within a zone ranging from thirty to fifty feet (one hundred feet or more on steep slopes and in dense vegetation) from a home or other structure. Within this zone, reduce fuel by:

- cut dry, annual grasses to a maximum height of four inches after rains have ceased, usually by the end of May
- removing dead and dry brush
- maintaining other brush under two feet in height that is in close proximity to other vegetation
- removing excessive accumulations of dry leaf litter and duff
- thinning out trees so that there is 10 to 20 feet between the canopies of single trees or groups of trees
- thinning existing, or planting new, shrubs in widely separated islands
- removing highly flammable trees such as pines, other conifers, and Eucalyptus within 30 of structures or in close proximity to other trees
- raising the limbs of trees to at least eight feet above ground, and ten feet over roofs, to reduce the fire ladder effect
- replacing wood fences with metal fencing, especially those that attach to structures
- removing invasive exotic plants that are highly flammable, such as broom (Cytisus), pampas grass (*Cortederia*), Cotoneaster, cypresses and junipers.

Creating Defensible Space

Beginning July 1, 2021 California Assembly Bill 38 (AB-38) required all homes in High or Very High Fire Hazard Severity Zones (FHSZ) to be compliant with Defensible Space standards. A number of design strategies and maintenance practices can be used to break up the potential path of a fire and create defensible space around a home or other structures. Properly planned, planted and maintained, defensible space provides occupants a safe space for evacuation and for firefighters to work.

Landscape Zones:

For properties in High or Very High Fire Hazard Severity Zones (FHSZ), breaking up a property into three landscape zones serve as a framework for protecting a home and garden from a potential fire. The **Immediate or Ember Resistant Zone (Zone 0)** is the first 5 feet immediately adjacent to all structures, including any attached amenities, such as decks, attached patio covers and trellises. New State Defensible Space standards that will go into effect in 2023 require that there be no combustible materials in this zone, including organic mulches to reduce the likelihood of burning plant material igniting the adjacent structure.

The **Intermediate Zone (Zone 1), aka the Lean, Clean and Green Zone** is that area between Immediate Zone to 30 feet beyond structures or to the property line, whichever is closer. This zone is where the use of plants that can tolerate low to moderate watering are best; this zone is the appropriate location for patios and pools.

The **Extended Zone or Reduced Fuel Zone (Zone 2)** extends from 30 feet to at least 100 feet from structures. In this zone, manage natural vegetation to keep it patchy and open (about 50% coverage. Focus on native trees, reducing ladder fuels below the trees and removing all flammable invasive exotics, such as broom.

Beyond the Extended Zone, manage vegetation to reduce density to enhance fire resiliency.

Create Firebreaks:

Many homeowners mistakenly believe that defensible space requires extensive clearing of trees and shrubs, essentially creating a moonscape. The results are unattractive, bare landscapes that invite invasive, fire prone plants. Others may feel overwhelmed to the point of inactivity. Creating bare soil firebreaks, while commonly done on ranches and grassy open space areas to slow the progress of a grass fire, may not be possible, feasible nor desired on smaller residential sites, especially on slopes where erosion may a problem. Creating large, bare open areas can become a bowling alley for embers.

Broad paved or graveled paths not only provide access through a yard, but function as a firebreak as well, reducing the likelihood of fire creep by breaking up the landscape into islands. A continuous ribbon of 4-foot-wide walkways around a home provide a safe place for firefighters to defend your home from a threating wildfire. For sloped sites, utilize non-flammable materials such as masonry, concrete, boulders, or rammed earth to create terraces helping to keep garden beds manageable while making the overall garden more accessible and aesthetically pleasing. With the good plant selections and proper maintenance, these islands function to help capture embers before the reach structures.

Planting for Fire Resistance:

Defensible Space zones do not preclude planting or maintaining trees and shrubs, but there is no such thing as fire-proof plants! Any plant will burn if hot enough. What makes some plants more fire-resistant than others is determined by several factors. Plant structure, size, foliage type, and density are key characteristics to consider. Age and health are also important. Overgrown and plants in poor health are going to be less resilient. Bottom line, we all need to give more consideration to the principle of “right plant, right place.”

Plant tissue moisture and soil moisture levels influence a plants flammability potential. Even the most fire-resistant plants, such as succulents, may burn if moisture is depleted by an extremely hot fire. Even though we frequently face serious drought conditions, it is critical to occasionally irrigate any landscaping within 30 feet of

structures to maintain adequate moisture levels in the plants in that area. A good watering of drought-tolerant and native plants every three to four weeks during the summer has been shown to make a significant difference in the flammability of plants. Using this approach, water conservation and fire resistance can be compatible goals.

In terms of the density of plant material, aim for no more than approximately 50-52% total coverage for a mature landscape. This number has been proven to be an optimal density to slow down fires but also support wildlife.

Zone 0. New Defensible Space regulations require that there be no vegetation in a five-foot band around structures). This is to reduce the chance that a home will be ignited by burning brush. Burning plants at windows can cause the windows to break, allowing fire to then spread to the interior. This poses a new challenge to think creatively about how landscapes relate to dwellings.

Zone 1 (5-30' from structures). Living in a hot-summer climate, shade is a desired commodity in the landscape. The selection and management of trees must be done with fire-resiliency in mind: selecting fire-resistant trees, pruning to avoid a fire-ladder effect and to clear rooftops, and spacing trees so canopies do not touch. For shrubs, focus primarily on lower-growing, non-woody plants. Paying attention to the size a plant may get at maturity will help to space plants appropriately so that they don't overgrow pathways and become too dense. Avoid planting shrubs directly under trees to avoid the ladder fuel problem.

While irrigated turfgrass effectively disrupts the spread of a ground fire, a large expanse of traditional turf uses significantly more water and can give a false sense of security if other fire safety precautions are not employed. A desirable alternative to lawn is a groundcover of unmown native fescues (Festuca idahoensis, F. rubra), thingrass (Agrostis pallens) or low-growing sedges (Carex tumulicola or C. praegracillus).

Zone 2 (30-100'). In this area, it is best to continue focusing on thinning out plant material. Eliminate highly flammable plants from under trees and reduce the height of less flammable plants that are growing under trees. Disconnect the canopies of trees in this area from those beyond this zone to achieve at least a fifteen-foot gap between the canopies of trees closer to the home and between trees in the outlying areas. Most native shrubs in our area can tolerate being trimmed back to reduce size every few years. Remove the trimmings and dispose of properly so that they do not become fuel for fires.

Conclusions

As we well know, fire cannot be ignored as a force of nature in the Sierra Nevada. This force must be taken into consideration by all who plan, design, build and live in this environment to reduce the risk to the community at large. Doing nothing is not an option as the consequences of not doing so are made painfully clear each year. Even then, there is no guarantee that all of these measures will be completely effective when faced with an intense, wind-driven wildfire. But keep in mind this statement by Jack Cohen, retired research fire scientist - "If your home doesn't ignite, it doesn't burn."

Master Gardener classes are offered monthly throughout the county. You can find our class schedule at: http://mgeldorado.ucanr.edu/Public_Education_Classes/?calendar=yes&g=56698, and recorded classes on many gardening topics here: http://mgeldorado.ucanr.edu/Public_Education/Classes/ and specific class recording on fire resiliency here: https://mgeldorado.ucanr.edu/Public_Education/Classes/Landscaping_Class_Presentations/

The Sherwood Demonstration Garden is open weekly on Friday and Saturday from 9 a.m. -noon until March through October. We do close in case of rain, please check our website for details https://ucanr.edu/sites/EDC_Master_Gardeners/Demonstration_Garden/

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