



Many grassland plants including *Asclepias speciosa* are both fire resistant and attractive to beneficial insects.

GOING NATIVE **Designing for Fire — Homeowner Guidelines and Considerations for Native Planting**

by Haven Kiers¹ and Jessica Colvin² Photos courtesy Haven Kiers

Introduction

California wildfires broke records in 2018, with the Mendocino Complex Fire staking claim as the largest fire in state history and the Camp Fire capturing the title of deadliest, most destructive, and costliest fire on record in the United States (Cal Fire 2018). In fact, the state tops both the list of *Most Wildfire Prone States*, with over 2 million Californian households at high or extreme risk from wildfires (Texas is a distant second with only 700,000 high risk homes), and the *Number of Acres Burned* list, with more than 1.8 million acres burned by wildfire in 2018 (Verisk's Wildfire Risk Analysis 2019). It is clear that California homeowners living in the wildland urban interface

(WUI) need to take precautions to protect their homes, and defensible space principles and fire-resistant landscapes provide the best option for home survivability (e.g., Bell et al. 2007, White and Zipperer 2010). However, it is less clear which types of plants and plant palettes should be installed around residential areas in the WUI, where vegetation should be placed to have the most beneficial (and least detrimental) effects, and exactly how the creation of defensible space is best accomplished to combine both functionality and aesthetics.

Given the gravity of these most recent fires, the resulting home insurance premium hikes in fire-prone areas (or the dropping of homeowners entirely from existing insurance policies), and subsequent public service campaigns focused on fire prevention, most homeowners in the WUI understand the necessity to create defensible

continued next page

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Designing for Fire *continued*

space around their homes. Barriers to widespread adoption of wildfire defenses do not arise from a lack of knowledge about correct fire-scaping practices, but instead from the perception of associated labor and costs, the difficulty in disposing of the resulting brush, and, perhaps most importantly, the lack of specific knowledge on recommended plant materials and landscape designs which provide wildfire defense (Hodgson 1994).

Daunted by the power and scale of recent wildfires and unable to tackle the scope of the problem on their own, state and federal agencies such as California Department of Forestry and Fire Protection (Cal Fire), the U.S. Forest Service (USFS), and the U.S. Bureau of Land Management (BLM) have increasingly focused on preventative measures individual homeowners living in the WUI can take to reduce the risk to their structures during a wildfire event. This article takes the defensible space recommendations developed by Cal Fire as a starting point, incorporates a firewise native plant palette, and proposes a modernized, habitat-focused, aesthetic approach to defensible space design at the neighborhood scale.

Background

The western landscape has evolved with fire, and, as a result, many of its native plants require fire to germinate, establish and/or reproduce. As a regular component of these ecosystems, wildfire historically serves to maintain the health of native fire-adapted species, while also reducing dead biomass and subsequent fuel for more devastating fires. However, because people are increasingly moving into the wildlands, a management strategy of fire suppression has been adopted, leading to the accumulation of fuel loads and the encroachment of non-native, often invasive, species (Syphard 2007).

Although the practice of fire suppression is crucial for the protection of lives and property, it has led to complex management challenges along the WUI. As development continues to expand to areas bordering wilderness, natural resource managers from local, state, and federal agencies are left with little to no choice on how to proceed with fire occurrence at these edges (Miller 2011). Warming temperatures, extreme weather events, and prolonged drought add to fears of wildfires, demanding action and attention. Managers from county planning departments, Cal Fire, and the USFS have realized that asking homeowners to take preventative measures to reduce risks to their structures can effectively help reduce the spread of wildfires.



Clusters of *Heuchera rosada* and *Iris douglasiana* thrive in shady spots.

The Rules of Defensible Space

Creating defensible space is a preventative measure that homeowners can take to minimize the risk of losing their structures to wildfire. Defensible space is defined as “the area surrounding a structure where plants and other landscape elements are maintained to decrease fire hazard and allow firefighters to make a stand; addressing embers and spot fires before they grow” (UCCE Defensible Space Website). Defensible space is typically divided into three zones. Zone 1, or the “Near-Home Noncombustible Zone,” starts at the walls of a structure and expands out to 5’. Zone 2, which is also called the “Lean and Clean Zone,” stretches from 5-30’ away from the structure, and Zone 3, the “Reduced Fuel Zone,” spans from 30-100’ (or to the property line, if less than 100’) (Franz 2018). Vegetation of any type other than regularly irrigated potted plants is discouraged within Zone 1, while low groundcovers (including mown grass, flowers, and vegetables) are allowed within Zone 2. Trees and shrubs are acceptable in Zone 3 as

continued next page



This low-growing annual meadow provides flowers in the spring and can be mown in the summer.

Designing for Fire *continued*

long as they are widely spaced and pruned up to avoid a fire ladder effect.

Although it is tempting to focus primarily on plant selection when designing a fire-resistant landscape, the reality is that there are no “fire-proof” plants, and most of the fire-resistant/firewise plant lists available are based on anecdotal, rather than scientific, information. Standardized methods for determining plant flammability or WUI landscape suitability do not currently exist (Bethke 2015). While plant selection does play a significant role in designing a fire-resistant landscape, plant maintenance is even more important. Preventative maintenance is key — a poorly maintained landscape can easily

become a fire hazard, even if the majority of its plants are labeled as fire-resistant. Thus, the principles of defensible space require that all vegetation within 100’ from the structure is regularly irrigated and routinely checked for dead/dry material. Dead trees or branches, lawn clippings, and any dried-out vegetation must be cut, cleared away, and immediately removed from the property (Readyforwildfire.org 2018).

Cal Fire’s publication, “Defensible Space and Hardening Your Home,” outlines another key component of firewise landscapes — plant and tree spacing. Plants need to be separated from each other both horizontally and vertically. Trees and shrubs must be pruned up to at

continued next page

Designing for Fire *continued*

least 15' above ground level (10' above roof level) and spaced out to prevent canopies from touching. Islands of taller vegetation should be separated from each other with paths, hardscape, or low-growing groundcovers (Cal Fire 2017).

Rethinking the Rules

While it is challenging to align garden design principles of aesthetics, habitat creation, and human comfort with the defensible space principles of cut, clear, and remove, homeowners *can* create fire-resistant landscapes that are both beautiful and attractive to pollinators and wildlife. As developed land increases and population continues to grow, re-establishing habitats in urbanized areas has become crucial for a changing climate. Local pollinators are best adapted to local climate conditions and offer the best chance of enhancing native biodiversity and promoting the success of locally native plant species.

Although most California native species have moderate maintenance requirements (pruning or cutting back, regular weeding until the native species have become established, removing dried material/deadheading), those needs align with what is already required by defensible space principles. A simple way to approach the creation of defensible space is by incorporating the “Three R’s” developed by the Sierra Club as a model for fire prevention in the East Bay Hills (Sierra Club 2018):

REMOVE fire-dangerous exotic and native vegetation in areas most at risk for fire;

RESTORE those areas with California native tree and plant species that are less fire- dangerous; and

RE-ESTABLISH greater local biodiversity of flora and fauna.

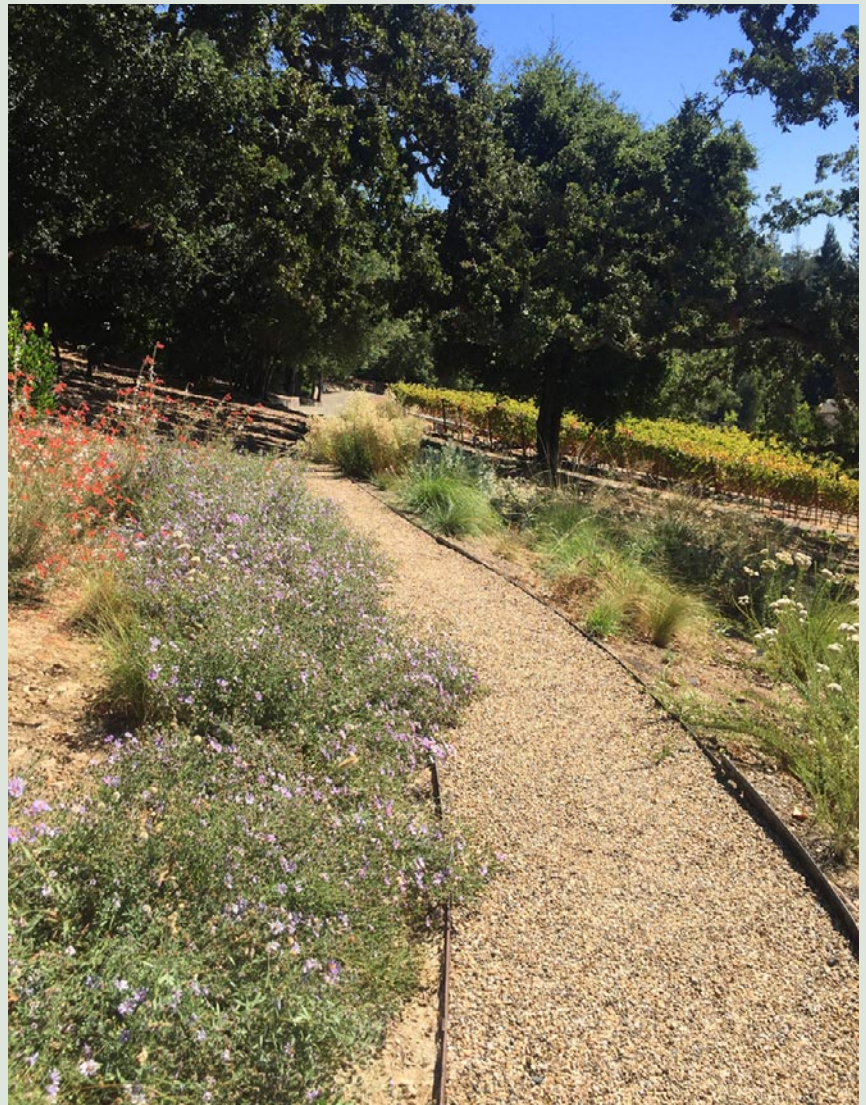
By removing flammable non-native trees and shrubs and favoring plant palettes dominated by a fire-resistant mix of annual and perennial native species (ideally ones that have been sourced from nurseries that provide plants with genetics local to the residential site), homeowners can reduce the threat of wildfire while simultaneously improving wildlife habitat and creating a beautiful landscape.

The following are suggested methods for achieving the goal of defensible space, while improving biodiversity and adding natural beauty to a landscape. These methods incorporate the defensible space zones defined in Cal Fire’s “Defensible Space and Hardening Your Home:”

Zone One: 0' – 5'

Ideally, the 5' zone should be free of vegetation, and should also exclude combustible materials of any kind, such as wood mulch, brooms, fences, or other materials with the potential to burn. Hardscape design in Zone One can include permeable, non-combustible materials like pavers, gravel, or decomposed granite to increase stormwater infiltration and reduce erosion around the property. Zone One also offers an opportunity — particularly within southern-facing pockets around the main structure that go underutilized and undisturbed — for leaving modest amounts of bare earth. Many native bee species do not nest in hives but rather in individual nests buried in the ground. These bees are far less aggressive than honey bees and still provide the benefits of pollination.

continued next page



A gravel path separates groups of flowering perennials and doubles as a fire break.

Designing for Fire *continued*

Incorporating intentional bare earth pockets are welcome and encouraged in Zones Two and Three as well.

Zone Two: 5' – 30'

Traditional defensible space design calls for the 30' zone around the house to be planted with irrigated turf, a low-growing ground cover, or grouped perennials with open space in between (Pacific Northwest Extension 2006). An alternative to this approach is planting a lawn of *Festuca rubra* (a cool-season native grassland species that thrives in partial shade). It requires less irrigation than a typical turfgrass lawn and can be left unmown for a lush prairie look in the cool months, and either kept irrigated or mowed to 2" during summer's fire season. Another native low-growing groundcover with high marks in several firewise planting lists is lippia (*Phyla nodiflora*), which requires no mowing, needs little irrigation, and produces lavender-pink flowers that attract small butterflies and bees.

Alternatively, homeowners could use Zone Two to seed an annual wildflower meadow of spring-blooming native forbs, such as lupine (*Lupinus succulentus*), California poppy (*Eschscholzia californica*), goldfields (*Lasthenia californica*), baby blue eyes (*Nemophila menziesii*), phacelia (*Phacelia* spp.) and tidy tips (*Layia platyglossa*). Mixed with a perennial bunchgrass like onion grass (*Melica californica*) or purple needlegrass (*Nassella pulchra*), such a wildflower meadow would bloom profusely during the spring and could then be mowed and raked when things start to dry out in the summer months. For a shady area, wild strawberry (*Fragaria chiloensis* or *F. vesca*) could be used as a groundcover; it spreads easily and stays green year-round.

Groundcovers that remain low to the ground, require little maintenance and minimal water, and remain green and healthy during the dry season make ideal candidates for Zone Two. Instead of planting groundcovers of periwinkle (*Vinca major*) and English ivy (*Hedera helix*) in the 30' zone — both of which appear on many of the firewise planting lists, but can be extremely invasive — homeowners could consider planting low-growing white yarrow (*Achillea millefolium*), California lilac (*Ceanothus thyrsiflorus*), or prostrate varieties of manzanita (*Arctostaphylos hookeri* or *A. uva-ursa*) (Bethke 2015). These spreading groundcovers burn slowly when pruned and irrigated properly and can delay the spread of a wildfire, especially if they're located in beds surrounded by walkways and paths. When allowed to form a dense mat of foliage and roots, native groundcovers can also help reduce soil erosion and minimize invasive weeds, which only contribute to fire hazard.

Islands or clusters of plants are often recommended for the 30' landscape zone near the house because they create a discontinuous path of vegetation and make it more difficult for the fire to find a direct path to the building. Flowering grassland perennials that look good planted in clusters and are included on many California firewise planting lists include yarrow (*Achillea millefolium*), buttercups (*Ranunculus californicus*), goldenrod (*Solidago californica*), coyote mint (*Monardella villosa*), blue-eyed grass (*Sisyrinchium bellum*), or yellow-eyed grass (*Sisyrinchium californicum*), and mimulus (*Mimulus* spp.) (Bethke 2015). Mixed with native ornamental grasses like deergrass (*Muhlenbergia rigens*), California fescue (*Festuca californica*),

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The mission of the California Native Grasslands Association is to promote, preserve, and restore the diversity of California's native grasses and grassland ecosystems through education, advocacy, research, and stewardship.

Designing for Fire *continued*

or blue wildrye (*Elymus glaucus*), the flowers would pop against a meadow matrix, all the while providing native insects and pollinators with food and habitat. In the shade, a combination of coral bells (*Heuchera* spp.) and douglas iris (*Iris douglasiana*) would stay green all year and provide beautiful spring color.

Bulbiferous plants are not often discussed in the defensible space literature, but a surprisingly large number of California native grassland bulbs are included in firewise plant lists such as one-leaf onion (*Allium unifolium*), bluedicks (*Dichelostemma capitatum*), Mariposa lily (*Calochortus* sp.), soap plant (*Chloragalum pomeridianum*), and chocolate lily (*Fritillaria biflora*). Several of these species attract butterflies and create optimal habitat when planted in islands or clusters.

Zone Three: 30' – 100'

Well-spaced shrubs and small trees are allowed in the 30-100' zone. Remembering that arrangement, spacing, density, and dryness of the vegetation is more important than the actual plant species planted, homeowners should be focused on selecting shrubs and trees that meet the dual standards of habitat enrichment and fuel ladder prevention. The darling of all fire-resistant plant lists is the toyon (*Heteromeles arbutifolia*), with Los Angeles, San Diego, Orange, and Inland Empire counties giving it high marks for its wildlife value (flowers and berries), drought tolerance, and low flammability (Bethke 2015). Other noted evergreen shrubs and small trees include low varieties of manzanita (*Arctostaphylos* spp.), lemonade berry (*Rhus integrifolia*), coffeeberry (*Frangula californica*), and California lilac (*Ceanothus* spp.). California buckeye (*Aesculus californica*), redbud (*Cercis occidentalis*), golden currant (*Ribes aureum*), and spice bush (*Calycanthus occidentalis*) top the lists for deciduous species (Bethke 2015). All shrubs and trees within Zone 3 should be pruned up high and thinned. For more ideas on California native plants to use in the landscape, homeowners can go to Calflora's "What Grows Here" webpage (<https://www.calflora.org/entry/wgh.html>) and Calscape's webpage (<https://calscape.org/>).

Interstitial Spaces

While the recommended plant species above can increase native biodiversity and ideally improve fire-resiliency at the site scale, the interstitial spaces *between* homes or along property edges are often overlooked or under-managed. After California-imposed water restrictions during recent droughts, homeowners' associations statewide were confronted with difficult decisions concerning shared landscapes. This left many communities with few options for shared spaces, forcing them to install artificial turf or remove vegetation altogether. While many changes were effective, they were often made in haste and without considerations for local wildlife habitat or the long-term functionality of these modified spaces. For example,



If irrigated, this mixture of native perennial flowers and grasses will bloom through summer and function as a groundcover in the 30' zone around a residence.

artificial turf still requires significant maintenance (regular rinsing to remove dirt and pet waste, irrigation to keep it from becoming too hot for human use) and is often not preferable to natural turf for sport or recreation. In contrast, while natural turf might slightly increase water demands on a community, evidence shows that, as a well-irrigated landscape, grass turf might actually serve as a fire break within developed areas. By applying the rules and methods gleaned from residential defensible space to these shared spaces, WUI communities can integrate locally native species into interstitial spaces to accomplish aesthetic goals, create habitat for wildlife, and still abide by fire resistance guidelines.

Conclusion

Homeowners have the ability to incorporate beauty and create habitat space — without sacrificing fire safety — through the thoughtful consideration of plant selection, spacing, and maintenance in their landscapes. Of equal importance is consideration for the spaces and environments adjacent to and between private homes in the WUI. Collaboration at the street- and neighborhood-levels can enhance aesthetic and property value while further increasing survivability of surrounding landscapes. WUI neighborhoods can take advantage of

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Designing for Fire *continued*

creating fuel breaks between neighbors to protect wildlands and reduce the threat of fire. As neighborhoods become more involved in fire resiliency planning, native biodiversity in both developed and undeveloped lands will be given the potential to thrive.



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