The Oregon Garden in Silverton, Oregon, created its Fire Safety House to demonstrate the principles of fire-resistant landscape design, and creating a defensible buffer zone around the structure. Conifers near the house were almost all removed, but the landscape still has attractive trees, shrubs and perennials. Shown here are paperbark maple (*Acer griseum*) and blue-eyed grass (*Sisyrinchium* spp.). PHOTO BY CURT KIPP

Not burning down the house

Creating landscaping "zones" with fire-resistant plants is key to fighting wildfires

By Elizabeth Petersen

Before summer officially started on June 21 this year, hot, dry, drought conditions had already turned the western United States into a tinderbox. During June, wildfires struck in Oregon, Washington, Alaska and both southern and northern California.

Even the Queets River rainforest on the Olympic Peninsula was dry enough to sustain a major wildfire.

Although mandated and voluntary efforts to install drought-tolerant plants have gained traction, parts of the country where population centers border wilderness areas are especially at risk. In these so-called "wildland–urban interfaces," a lack of available water has combined with super-dry conditions to greatly increase the risk of wildfire. ▶

Whether sparked by lightning or human carelessness, wildfires can quickly destroy homes and other buildings.

How can property owners who live in these wildfire-prone districts reduce their risk? The first step is to understand the challenge. Second is to create defensible space by reducing potential fuel, and finally, to introduce plants with fire-resistant characteristics.

The firefighter challenge

After the Skeleton Fire in Bend, Oregon, in 1996, the website FireFree.org was launched as a resource to help homeowners defend their landscapes from fire. It was designed to "change the values and behaviors of citizens for generations to come," explained Gary Marshall, who was Bend's fire marshal during the historic blaze. "To really save homes, individuals have to take responsibility for their property before a fire."

The Oregon Garden Fire Safety House includes low perennials around the house, including lavender, sedums (*Spathifolium* 'Cape Blanco'), *Ribes sanguineum* and *Dianthus*. PHOTO BY CURT KIPP

The number-one FireFree.org tip, and the main focus of the online campaign, is to create "defensible space" — a minimum 30-foot buffer zone around a house that can be fashioned in one weekend and easily maintained.

Gary English, owner of Landsystems Nursery in Bend, Oregon, was around when the Skeleton Fire raced through the area. "Homes surrounded with green belts were saved during the fire, but homes without green belts were destroyed," English recalled. "We have been a test site for big fires, and the biggest lessons are to be careful and use good common sense."

Since then, other measures have been taken to help tackle the problem. Lists of fire-resistant plants have been compiled. Garden centers such as Landsystems have worked with subdivisions and homeowner associations to clean up and recycle organic debris in the wildland–urban interface areas and to install fire-resistant landscapes.

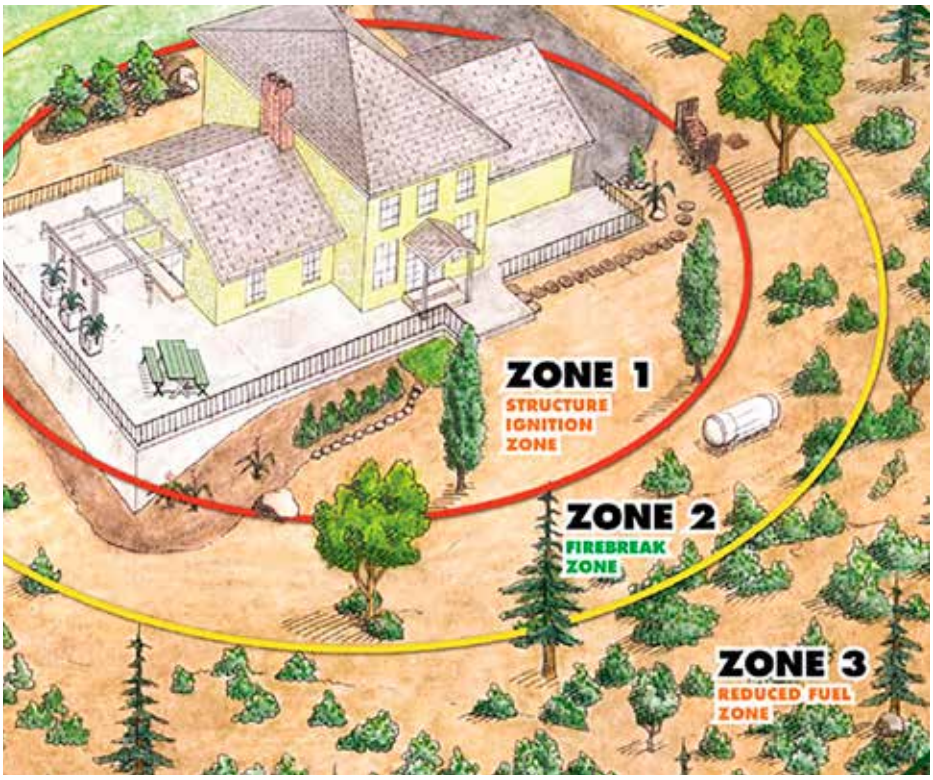
Since wildfire danger exists where structures and nature intersect, landscape decisions in these areas need to put protection ahead of aesthetic choices.

Amy Jo Detweiler, associate professor of horticulture at OSU Extension Deschutes County, provides education on fire-resistant plant material and landscaping techniques. Her advice is to manage landscaping according to its proximity to buildings.

The first task is to reduce the fuel load that could contribute to a wildfire, taking into consideration both plant and building materials. Areas closest to buildings should be irrigated and well maintained, she said. Farther away from buildings, the landscape can consist of a mix of native plants with shrubs and trees limbed up.

Four zones of defensible space

The website NapaFirewise.org defines the four zones of fire defensible space, starting with Zone 1 — the space closest to a building, or the "structure ignition zone" in fire protection par-



The main principle of fire-resistant landscaping is to place shorter plants and trees nearest the house, and keep taller trees farther away. DIAGRAM COURTESY OF NAPAFIREWISE.ORG

lance. This area, within about 10 feet of a building, should contain only low-volume, fire-resistant plants with high moisture content; these plants must be watered regularly to maximize their resistance to fire.

Although brown lawns demonstrate water conservation during a drought, well-watered turf is actually a useful protection against wildfire. Well-irrigated plants close to buildings are an important aspect of protection against wildfire.

A "firebreak zone" (Zone 2) is a radius about 10–30 feet from the structure. There, the goal is to create an environment that will not sustain a wildfire. Recommendations include using fire-resistant plants, breaking up continuous vegetation, pruning trees up 6–10 feet aboveground and limiting shrub growth beneath trees. ▶

Eliminate the "fire ladder" potential around homes, English advised. "Low plants next to taller plants next to a house allow fire to sweep up quickly," he said. "Don't plant too thickly and avoid plants with high oil content." Bitterbrush, for instance, will ignite, explode and take off quickly in a fire.

Deciduous trees can be a valuable line of defense in Zone 2, since they typically have more lush, moist foliage and less potential fuel load in the form of interior twigs and duff than conifers. Spacing is also important: 30 feet or more between clusters of two or three threes will provide a vegetation gap that fire is less likely to breach.

Perhaps most important of all is to remove flammable plants from this zone. These include popular plants that frequently surround buildings closely, including juniper, western red cedar,

Flames surround a home during the Skeleton Fire, which burned 18,000 acres near Bend, Oregon, in 1996. The use of a defensible space increases firefighters' ability to combat a blaze. PHOTO COURTESY OF OREGON DEPARTMENT OF FORESTRY, SOUTHWEST OREGON DISTRICT

holly, arborvitae and small pine trees.

Pine trees in particular are highly flammable, because they have nearly every characteristic that can increase the flammability of plants: they are resinous, they shed needles and retain twigs, their branches hang low and they are covered with dense foliage.

Only two conifers are considered fire resistant: larch, which is a deciduous conifer, and ponderosa pine. Both boast thick bark and high moisture content that keep them safer.

Zone 3, the "reduced fuel zone," starts about 30 feet out from the structure and extends 100 feet or more. In this zone, bigger trees and more drought-tolerant plants can grow more safely. If done correctly, fire "offense" can be most effective here.

Zone 4 is an "access zone" about 10 feet on either side of roads and ▶

Blue-eyed grass (*Sisyrinchium* spp.) is not a true grass, but rather a leafy plant closely related to irises that usually grows as a perennial.
PHOTO BY CURT KIPP

driveways. To allow for emergency access, the routes to and from a structure should not be flammable and there should be 14-foot clearance over the road.

Landscaping a fire-safe house

Fire-resistant landscape design, with low plants near the house and taller ones farther away, is the opposite of a typical landscape, in which tall trees and shrubs are used to accent the architecture of the house, said Ty Boland, regional horticultural manager and botanical curator at the Oregon Garden in Silverton, Oregon.

Developing landscape around the Oregon Garden Fire Safety House — the first full-scale fire prevention and safety house in the nation — required removal of lots of conifers, Boland said. The goal was to keep plants

This white *Cistus* is planted near the Fire Safety House in Silverton, Oregon, and offers strong visual interest while minimizing fuel that could contribute to a fire. PHOTO BY CURT KIPP

low and at a safe distance from the structure. That meant cleaning up duff, debris and twigs from the interior of existing plants, and significantly limbing up remaining trees.

One large pine remains near the demonstration house, even though taking it down would have demonstrated better fire safety. Since it is part of a separate, adjacent section of the Oregon Garden, though, it was allowed to stay and was limbed up to 12 feet as a protective measure.

Now, the ground outside the house in Zone 1 is covered primarily with succulent groundcovers, including *Sedum spathulifolium* 'Cape Blanco', low perennials, like dianthus, daylilies and lavender, and deciduous shrubs including *Ribes sanguineum*, deciduous *Viburnum* selections and bulbs.

Instead of bark, the beds are mulched with scree, river rock or compost, and a patch of lawn near the house is kept watered.

In designing the fire-safety landscape, the crew at the Oregon Garden used the plant list provided in an OSU Extension Service manual to guide its plant choices. Created by Amy Jo Detweiler and professor Stephen Fitzgerald, *Fire-Resistant Plants for Home Landscapes PNW 590* was published in 2006 and is scheduled for an update soon. The revised edition will expand the list of plants that may reduce the risk from wildfire, and it will include the Pacific Northwest as a whole and the western states in general, Detweiler said.

Plants chosen for inclusion in the manual are backed by research-based literature that confirms them as resisting fire. Plant characteristics that reduce fuel load include having less fragrance, higher water content, supple leaves and a lack of twig accumulation.

Plants with strong fragrance, like junipers, typically have higher pitch content, more volatile sap and terpenes, which burn readily. Conversely, plants with watery pitch resist flames. Plants with higher water content have less ▶

resin, so their leaves feel moist and hold together when crushed.

Plants that collect dry materials, such as needles, leaves and twigs, in their interiors are full of fuel.

Zones within zones

Not all plants are suitable for all hardiness zones or situations, so local input is also important to making appropriate plant selections.

For Central Oregon, English recommends turf-type tall fescue, a drought-tolerant grass that needs low inputs of water and fertilizer, for the green belt around homes. Available as seed or sod, this type of fescue uses about a third less water than typical turf grass and needs even less once established, he said.

Paul Bonine, owner of Xera Plants, a wholesale grower with a retail operation in Portland, Oregon, recommends Cistus as his top choice for a fire-resistant plant. In Central Oregon, however, which gets very cold in winter, Cistus and other temperate, Mediterranean plants will not survive.

The Fire Safety House in Silverton was designed using a plant list created by Oregon State University Extension. A revised edition of the list is on its way. PHOTO BY CURT KIPP

The website KeepOregonGreen.org is an excellent resource for information about resisting wildfire. Its mission is to promote the dissemination of information to and education of the public in the prevention of human-caused wildfires in the state of Oregon. A number of helpful downloads are available at the site, including the fire-resistant plants manual.

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