

An aerial photograph of a dense green forest. In the bottom right corner, a bright orange and yellow fire is burning, with thick black smoke rising from it. The fire appears to be a controlled burn or a wildfire that has reached a clearing.

# Design Patterns for a Fire-Resilient Landscape

A Guide for Land Owners

Designing a Fire-Safe Property



The Eugene Water & Electric Board, University of Oregon Landscape Architecture department, McKenzie Watershed Council, Oregon Department of Forestry, and the Upper Willamette Soil & Water Conservation District created this guidebook in order to better advise Oregon landowners on how to construct a fire-resistant landscape. The graphics and suggestions included here have been created and collected by researchers and students from the University of Oregon Landscape Architecture department. These students and instructors worked directly with landowners who lost their homes in the Holiday Farm Fire, working side by side to create design solutions in the aftermath of wildfire. Ultimately, these design patterns are tools to build a more sustainable landscape that can better withstand the increasing pressure of wildfires.

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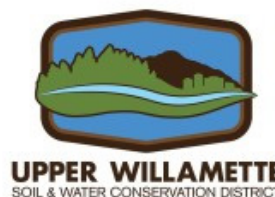
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**Please note:** all information in this guide should be considered general guidance. Each property has unique features that will influence the success of any project. Some properties have complicating factors that may require hiring a professional. EWEB, the University of Oregon, and other project partners are not responsible for any property damage or loss, or any other damages resulting from the education and guidance we provide. Please check with your local jurisdiction to determine if permits are required, or any restrictions exist for activities associated with any landscape installation.

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# Introduction

## Climate Change & Wildfires

Climate change will have a large impact on Oregon. The summer season is growing hotter and droughts more intense. The rising ocean threatens many historic coastal towns. Despite summer droughts, winter flood risk has increased.

The summers of Oregon's future looks to be ones beset by heat and drought, and doubtless an increased risk of wildfires.



Oregon Fire Season by Rae Matthews

## Wildland Urban Interface

The Wildland Urban Interface (WUI) is a transitional space between developed areas and wilderness. In recent decades the number of residences within this space has grown drastically (U.S. Fire Administration, 2021). The WUI may offer landowners privacy and a closeness with nature, but there are risks associated with it, too. Within the WUI, wilderness and human development intermingle. Unoccupied lands may contain a significant amount of fuel for wildfires, and those wildfires may spread to homes within the WUI.

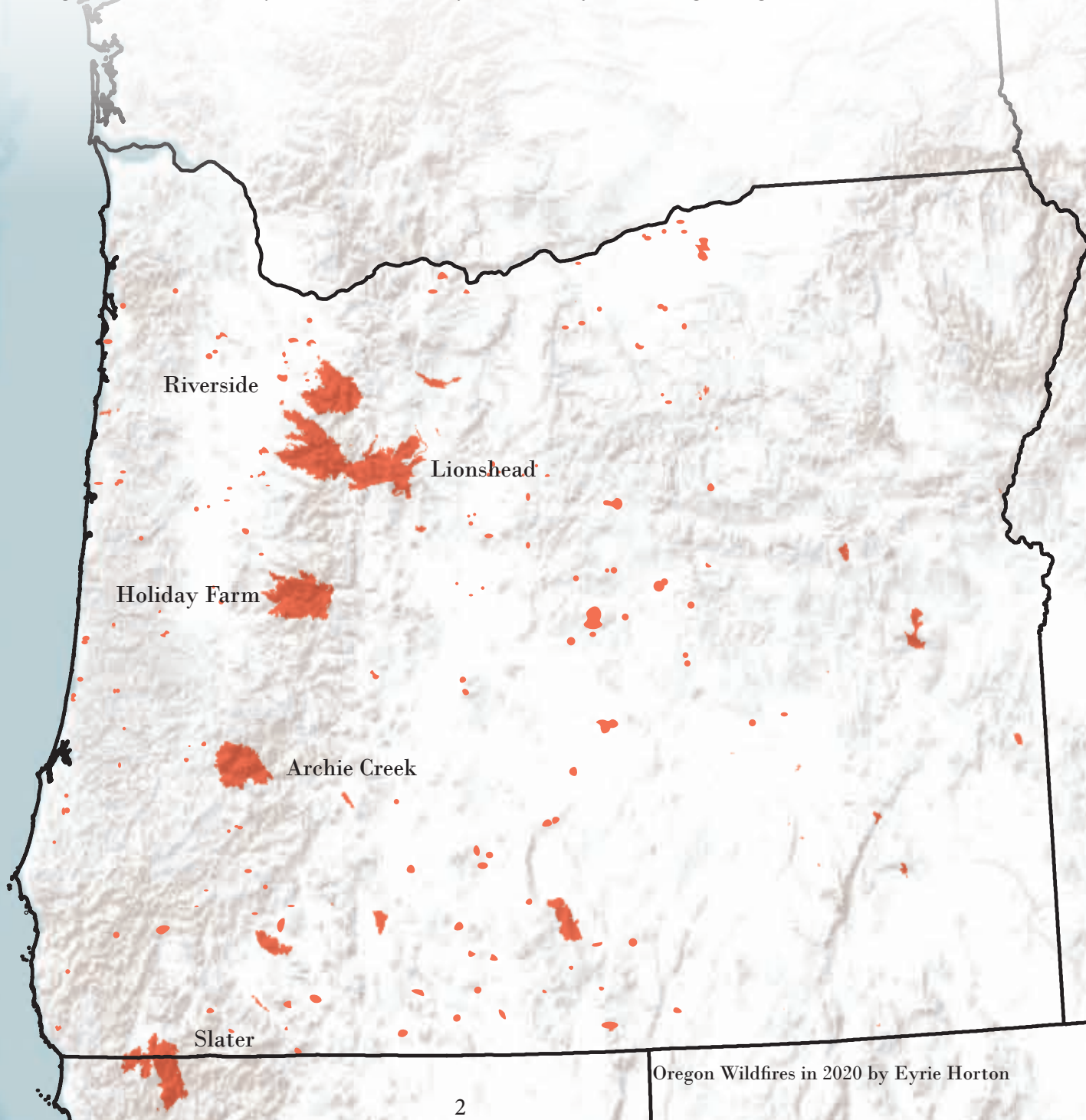
More information about WUI growth can be found here: <http://silvis.forest.wisc.edu/data/wui-change/>



## 2020 Wildfire Season in Oregon

Wildfires raged along the western half of the United States as the summer of 2020 came to a close. Oregon, a state with a reputation for being lush and green, was not spared from these catastrophic fires. During the 2020 wildfire season over one million acres burned in Oregon, and more than 4000 homes were destroyed (Urness, 2020). Thousands of residents experienced some level of evacuation notice, and smoke blanketed the western half of the state.

This record-breaking wildfire season was brought about by a combination of intense drought, high winds, an abundance of fuel available to burn, and ignition sources. As climate change progresses, Oregon's summers are likely to be hotter and dryer, circumstances that will increase the frequency and range of wildfires throughout the state (Floyd, 2019). 2020 may have been just the beginning of the new 'normal'.



# Design Patterns

## Setup

In the wake of the Holiday Farm Fire, residents of the Goodpasture Neighborhood approached University of Oregon Landscape Ecologist, Bart Johnson, with a simple request: *Help us build back better*. Professor Johnson, with the help of a class of Landscape Architecture students and assistant teacher Adam DeHeer, launched an interactive studio that aimed to develop design strategies to better prevent wildfire destruction. The students worked in teams with homeowners who had lost their homes to the Holiday Farm Fire in 2020. Over the course of the studio, the students developed a series of design strategies which were then used to construct concept designs for the landowners.

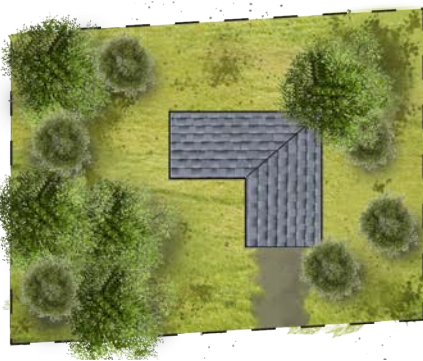
## What are design patterns?

The design strategies created by students were called ‘patterns.’ Design patterns were made to be flexible and easily reproduced in different landscapes. Each pattern was inspired by a repeated problem within the landscape. These problems included the presence of invasive species, overlapping tree canopies, dense underbrush, runoff, and many more - all of which made the properties more vulnerable to wildfire. Each of these issues contribute to the risk and severity of future wildfires. These problems were studied and design solutions were developed to improve wildfire resilience and ecological health of the landscape.

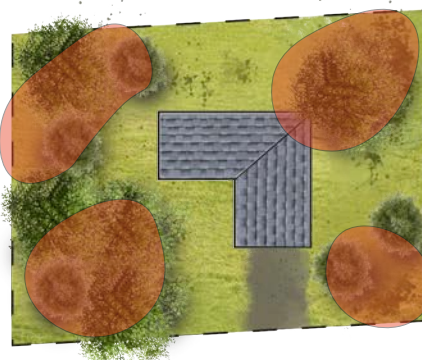
## How are patterns used?

Each pattern represents a replicable but flexible solution to a specific problem, and these patterns can be applied in various locations or contexts and combined with other patterns. Each pattern is designed to provide increased resiliency to wildfire. Essentially, something in the landscape is identified as increasing the risk of wildfire spreading – this is the problem. An appropriate pattern is applied to the problem, making the landscape more resilient to fire.

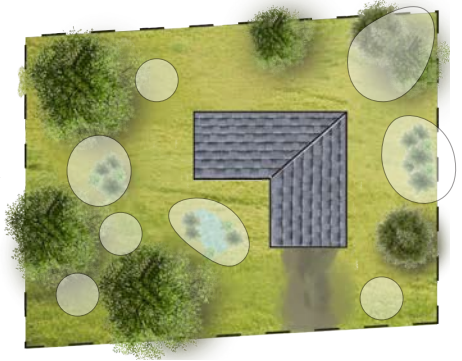
### Existing Landscape



### Identification of Problems



### Application of Design Patterns



## Risk of Fire Over Time

As the climate continues to shift and wildfires become an evermore present threat, there is no guarantee of safety in the wildland-urban interface. However, there are steps that can be taken to make a property and neighborhood more resilient. This guidebook hopes to present some of the more common problems that make a property more susceptible to fire, while also walking landowners through some potential solutions.



# Site Assessment

## Evaluating Your Property

The first step in creating a fire-resilient property is to assess your current landscape. It's important to identify any ongoing or potential issues to inform your selection of appropriate design patterns. Becoming more familiar with your landscape will have the added benefit of making you more aware of any changes in the landscape.

- 1. Defining Zones** (pg. 6) - The area surrounding your home should be divided into concentric circles of zones, with the zone nearest your home being the most fire-resistant. Each zone has its own guidelines for how to ensure fire safety.
- 2. Identify Fuel Loads** (pg. 7) - Are canopies overlapping, or are shrubs and brush growing densely on your property? Is the grass growing tall, or is it regularly mowed? Is it dry at certain times of the year?
- 3. Recognize Habitat Types** (pg. 10) - What kinds of habitat are present on your property? Is it riparian, forest, or a rare savanna site? Knowing the types of ecosystems present in your landscape will help you select plants and direct your expectations for the site. Refer to the Plant Communities pattern for further guidance.
- 4. Identify Invasive & Native Species** - Are there invasive species on your property? Identifying them is the first step in their removal. On the other hand, it's also important to identify native species. Preserve these if possible, they might be fire-resistant. Refer to pg. 21 for more information on native species and their preferred habitats.
- 5. What are Your Trees & Plants Doing for You?** - Is there a tree that provides perfect shade, or conveniently blocks a neighbor's view? Note that tree or shrub. Refer to pgs. 14, 15, and 21 to learn more about the functions of trees, privacy screens, plant pods, and vegetation's role in wildlife habitats.
- 6. Note the Presence of Habitat Snags** (pg. 31) - These may need to be removed or preserved, depending on their proximity to your home.
- 7. Does Your Property Match Your Vision?** (pg. 18) - Does your aesthetic lean more wild and forested, or do you want something open with expansive views? And does your current landscape match this goal?
- 8. Identify Small, Moderate, and Steep Slopes** (pg. 20) - Slope has a huge impact on appropriate spacing of shrubs and trees. Make sure you know where slopes exist on your property.
- 9. How Does Water Flow?** - During a rainy season, take the opportunity to track where water flows on your property. What paths does it take, does it pool anywhere in particular, is there runoff flowing directly into a body of water nearby? Design patterns on pgs. 25, 27, and 28 may be able to help you manage the water on your landscape.

**10. Is There Wildlife Present on Your Property?** - If wildlife is present (and you want it to stick around), there are clear strategies that combine fire-safe landscaping with wildlife habitat.

**11. What is Your Ongoing Maintenance Regime?** - Consider both the short-term and long-term ongoing maintenance of your property. How will a fire-safe maintenance regime be different from your ongoing process?

**12. Is Your Neighborhood Community Actively Engaging in Wildfire Prevention?** - If possible, community engagement makes for a more resilient landscape. Getting your neighborhood on board with fire-safe practices will make everyone safer from wildfires.



# Defensible Space & Zones

**Defensible Space** - A buffer area between your home and any wildland beyond your property. This buffer space is meant to slow or even stop fire from spreading to your home, while also providing firefighters with open space where they can work and defend your home.

The defensible space surrounding your home is divided into radiating zones, each of which require different firewise measures. Typically the most strict preventative measures are installed closest to the home. These zones and many of the associated guidelines relate closely to many of the patterns shown later in this guidebook.

**Zone 0:** A non-combustible space 0-5' around the home

- Utilize fire-resistant materials & design strategies for the home itself\*
- Clean roofs & gutters of dead leaves & plant debris

**Zone 1:** A clean & carefully landscaped space 5-30' around the home

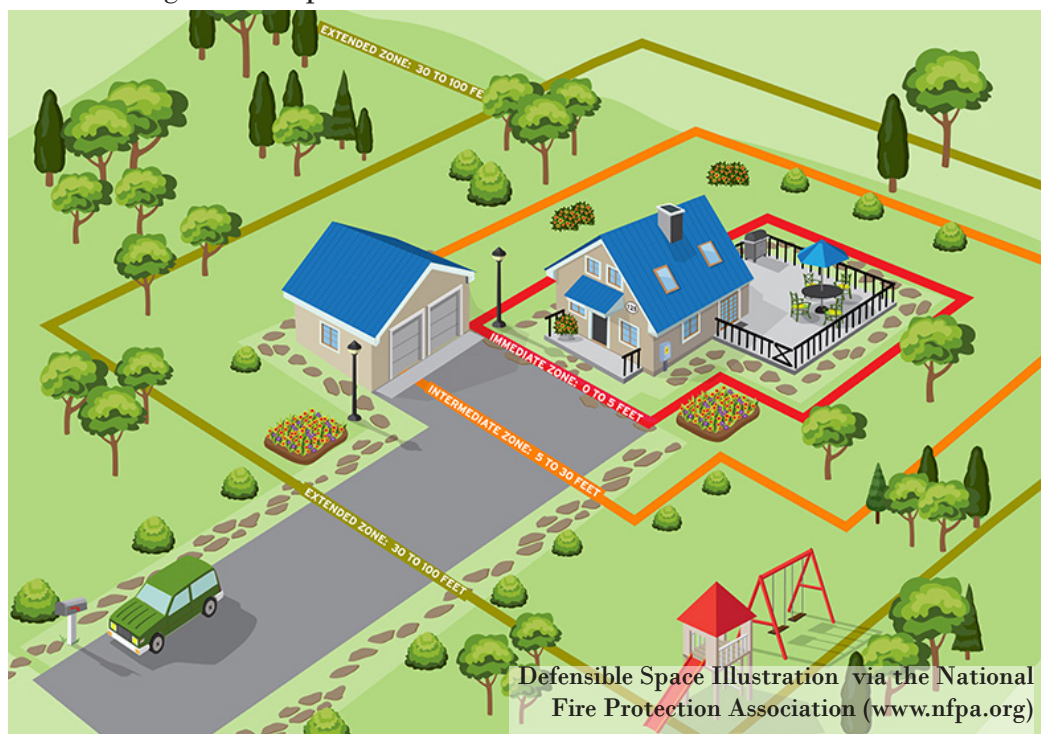
- Remove dead plants, dry leaf litter, or pine needles
- Utilize native, fire-adapted plants wherever possible
- Trim trees to eliminate canopy overlap (18' distance between trees is ideal)
- Keep lawns or groundcover mowed to a maximum height of 4"
- Remove shrubs under trees (ladder fuels) & prune tree branches 6-10' from the ground

**Zone 2:** A space to reduce fuels, 30-100' around the home

- Remove any accumulated ground litter or debris
- Remove dead plant & tree material
- Cull any small trees sprouting up between mature trees
- Trim trees to eliminate canopy overlap (12' distance is permissible in this zone)\*\*
- Keep vegetation away from outbuildings or woodpiles

**Zone 3:** Extended firewise space, 100'+ from the home

- Follow the same general rules as in Zone 2
- However, trim trees to eliminate canopy overlap (6' is permissible in this zone)



## Fuel Loads

**Fuel** - Anything that can burn. This could be trees, shrubs, grasses, perennial plants, leaf litter, or any other plant material available. The drier the vegetation, the more likely it is to burn.

**Fuel Load** - This refers to the quantity of fuel available to burn. Is there a thick layer of dead leaves and pine needles on the ground? Has a set of blackberry bushes grown out of control? Are tree canopies overlapping overhead? That is a high fuel load, and it will burn very quickly, especially if dry. Controlling the amount of fuel may lessen the ability of a fire to spread, and decrease its severity. The graphic below displays the difference between a relatively high fuel load and a lower fuel load.

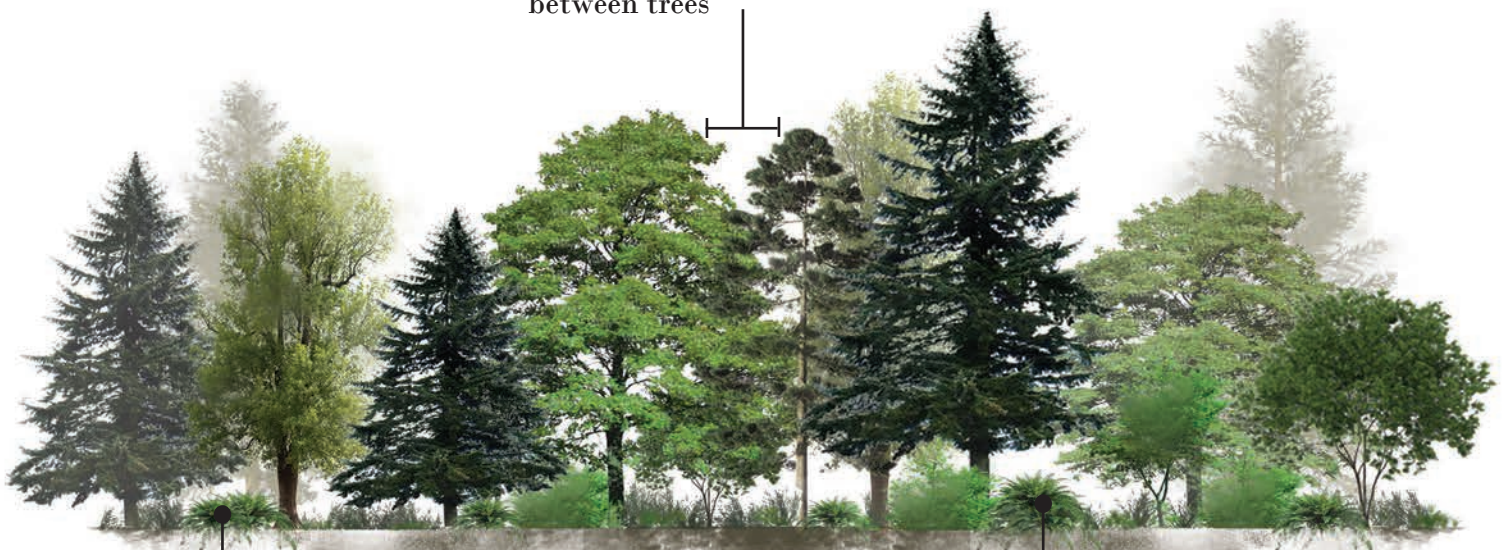
**Ladder Fuel** - This is a name for a type of fuel. Ladder fuels are dry or dead fuels that allow fire to climb from the ground or lower vegetation up into the forest canopy. Common ladder fuels include grasses, shrubs, low-hanging branches, or small trees.

**Surface Fuel** - Another type of fuel, surface fuels are anything on the ground that is liable to burn and help fire spread along the lower level of the landscape. Surface fuels are often composed of dead leaves and needles, dead branches, fallen trees, bark, pine cones, or low-lying plants and grasses.

### High Fuel Load & High Fire Risk

The graphic below displays a forest that has been not been maintained with fire-resilience in mind. Vegetation overlap, surface fuels, and ladder fuels exist in abundance, making this forest a prime candidate for hot, severe fires.

canopy overlap allows  
fires to spread easily  
between trees



dense vegetation  
along the forest floor  
contributes to significant  
amount of *surface fuel*

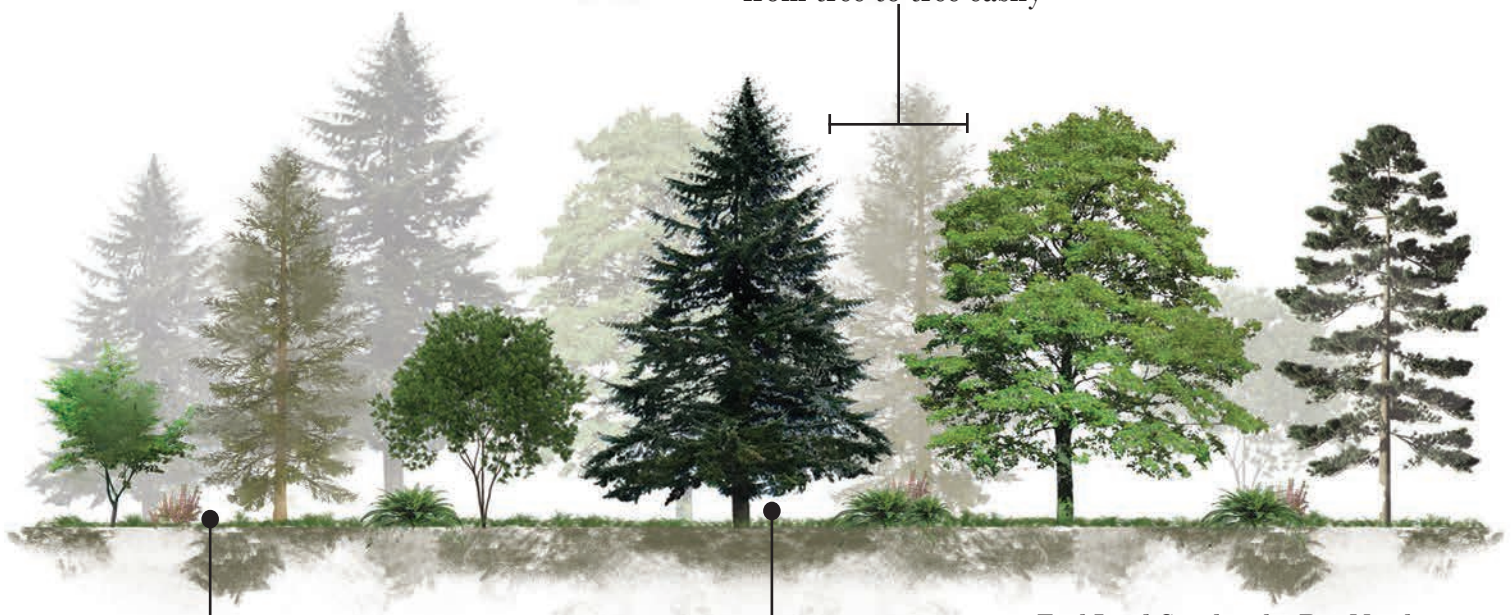
shrubs and low-hanging  
branches give fire the  
chance to climb into the  
canopy, AKA *ladder fuels*



## Low Fuel Load & Low Fire Risk

In contrast to the previous graphic, this forest has been prepared for wildfire. Surface fuels have been reduced or pruned, and ladder fuels have been removed. In this forest, wildfire will be unable to spread easily or quickly, granting professionals the opportunity to halt the fire.

distance between canopies  
prevents fire from jumping  
from tree to tree easily



Fuel Load Graphics by Rae Matthews

*surface fuel* is reduced to ensure that fire cannot spread at the ground level

low-hanging branches and shrubs below trees are removed, eliminating *ladder fuels*

# Native Plants & Healthy Plant Communities

**Native Plants** - Native plants are those that occur naturally within the region or ecosystem. Native plants are often adapted to local ecosystems processes and are better suited to the local climate than exotic species.

**Invasive Plants** - Plant species that have been introduced and thrive to the point of destroying and damaging native species are considered invasive species. These plants should be known and controlled within the landscape, because they can overgrow and easily create a high fuel load.

**Fire-Adapted Plants** - These are plant species that don't ignite easily when exposed to fire or other ignition sources. They can be damaged or killed by fire, but their foliage and stems don't significantly contribute to fuel and add little to a fire's intensity. They typically have moist and supple leaves, don't accumulate dry, dead plant material, and have water-like or minimal sap. In addition, many will resprout after fire.

## Why native plants?

Many native species in Oregon have evolved to live alongside regular wildfires. Because of this, they tend to be fire-adapted, which means they don't catch fire easily, don't contribute much in the way of fuel, and regrow well if burnt.

## Why are diverse plant communities important?

Current climate change projections predict that summers in the region are going to become hotter and drier, and wildfires will become more frequent. As Oregon heats up, some plant and tree species may not do as well under these new conditions. In order to maintain plant communities and habitats, a broad array of plant and tree species should be planted. Diverse plant communities are better able to withstand disease, wildfire, and other environmental pressures. Planting an assortment of native species that are well adapted



Plant Species Graphic by Vanessa Taylor



# Vegetation Design Patterns

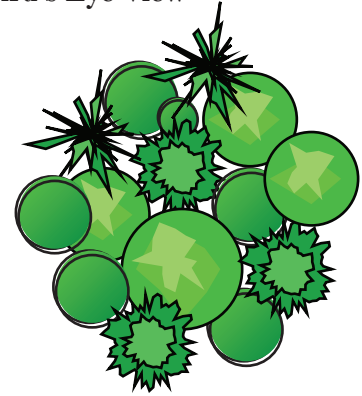
## Fire-Resilient Plant Communities

Oregon contains a huge variety of environments, from sand dunes to temperate rainforest to dry scrubland. Within the wildland-urban interace, there are a few common habitat types that present themselves. Each contains a different plant community and support various types of wildlife. The following graphics will display the basics of these community types.

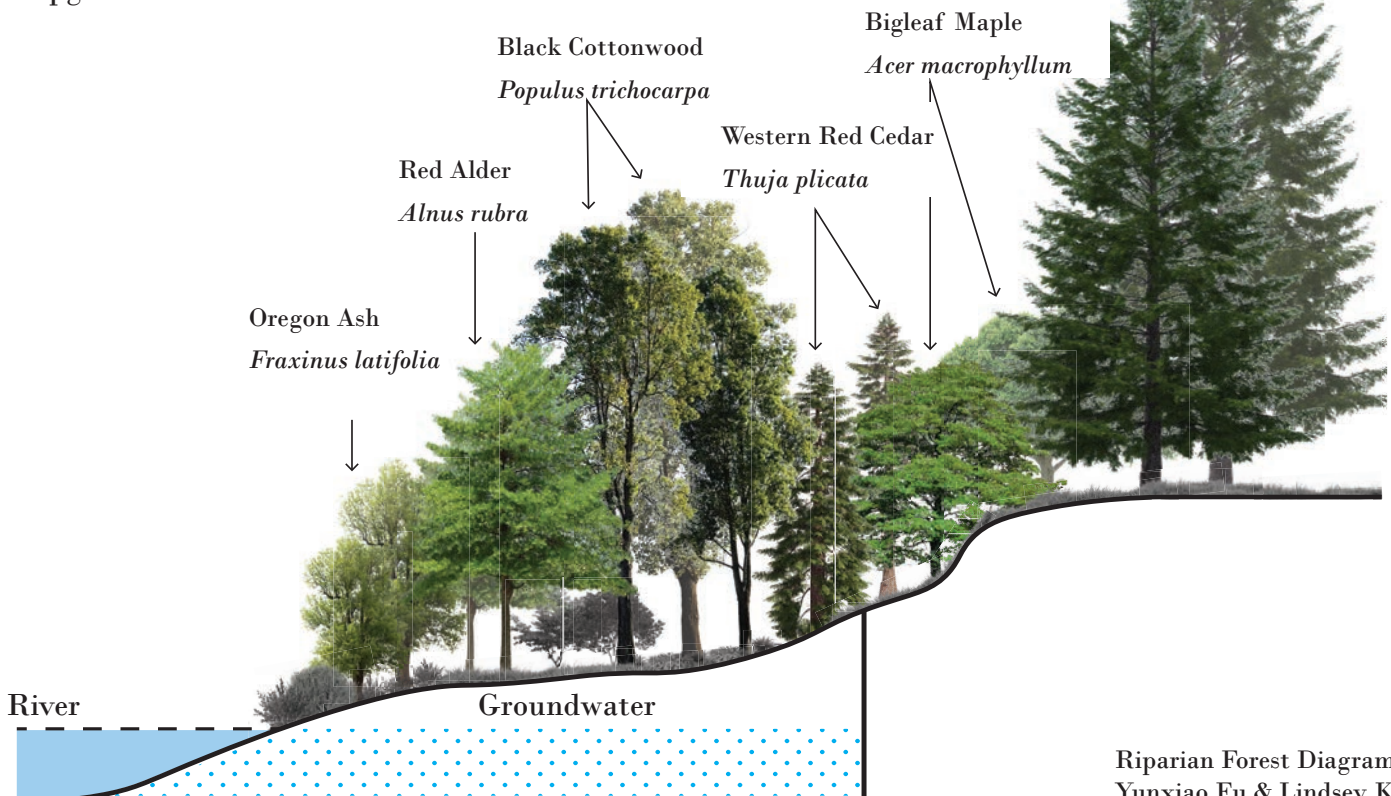
### Riparian Forest

- Often the transition zone between upland forests or other habitats and an aquatic environment.
- May be subject to frequent flooding - plants here are accustomed to this.
- Riparian forests help anchor the shoreline, reducing the damage from flooding and runoff.
- Species are often organized in 'tiers' of distance from the water - some species thrive at the water's edge, while others prefer some distance from the water.
- Canopy is typically denser here, and that's okay - it creates wildlife habitat and holds moisture. Other habitat types require more regular thinning.
- If possible, place a fuelbreak between the denser riparian vegetation and other habitats - fuels breaks are explained on pg 43.

### Bird's Eye View

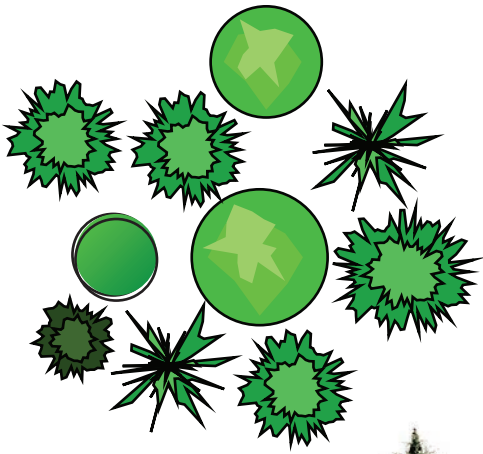


Douglas Fir  
*Pseudotsuga menziesii*



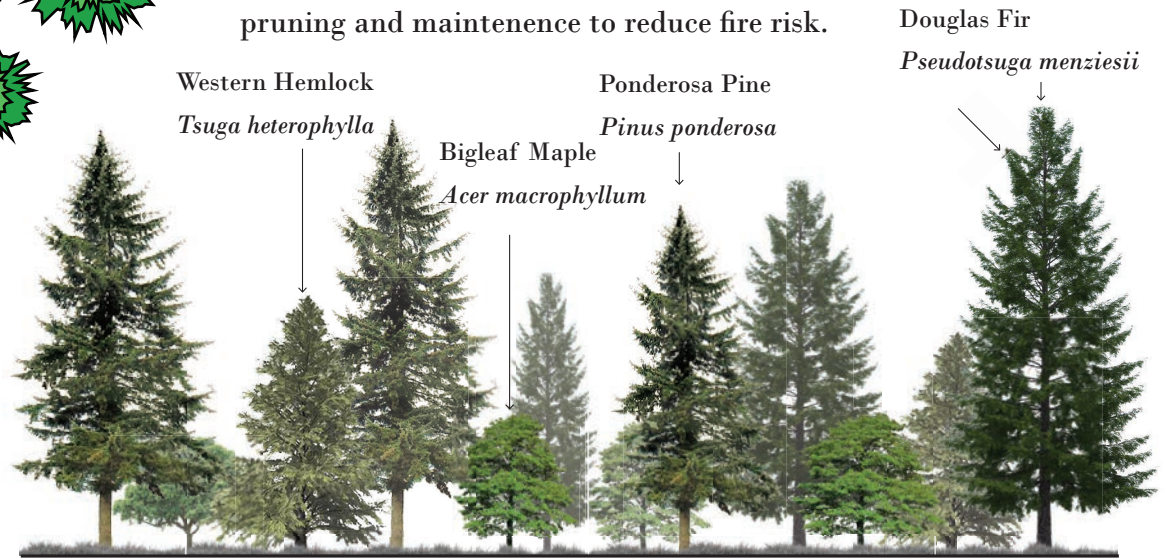
Riparian Forest Diagrams by  
Yunxiao Fu & Lindsey Kurtz

### Bird's Eye View



### Forest

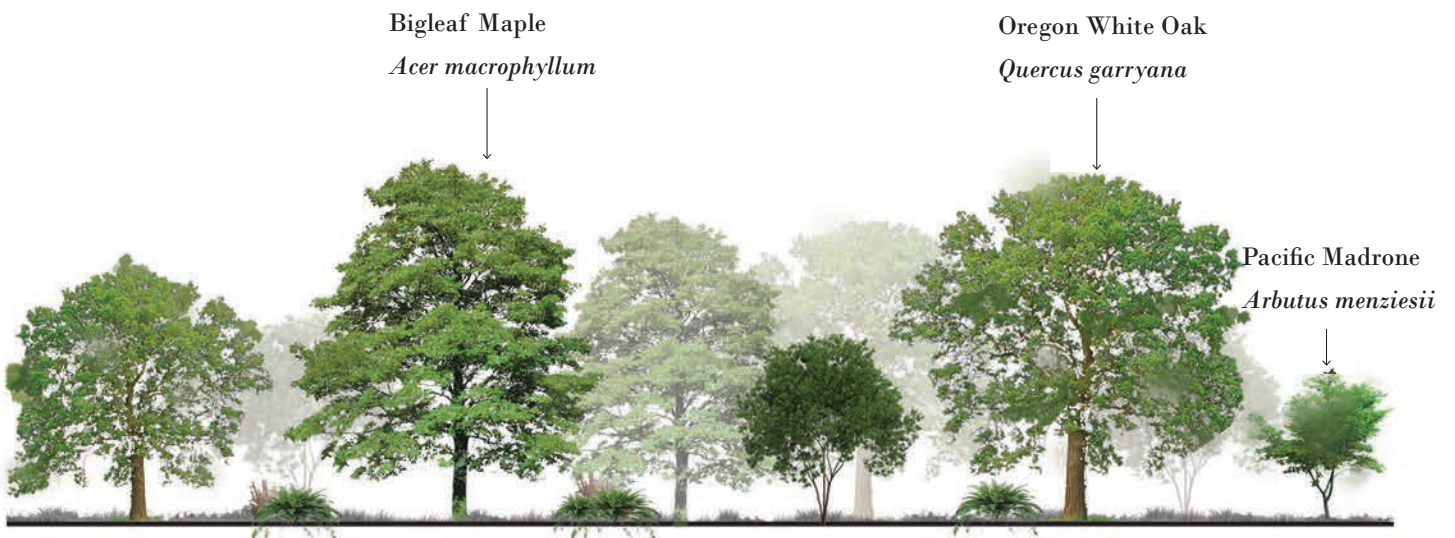
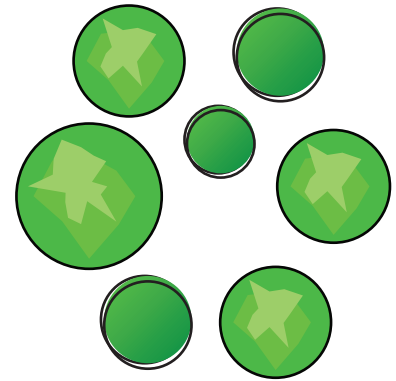
- Mixed evergreen and deciduous trees throughout.
- Under some climate projections, broadleaf evergreen trees may become the dominant evergreen species in this habitat, supplanting Douglas Firs and Ponderosa Pines.
- Canopy can be somewhat dense, and often requires thinning to prevent overlap.
- Tends to have denser understories that require pruning and maintenance to reduce fire risk.



### Woodland

- Primarily deciduous trees, ideally with significant numbers of Oregon White Oak.
- Oaks have evolved to withstand wildfire, and are especially resilient.
- Thin as needed to maintain the spaced out woodland canopy.
- Mow, graze, or use other maintenance methods to reduce ladder or ground fuels and isolate any shrub patches.
- 

### Bird's Eye View

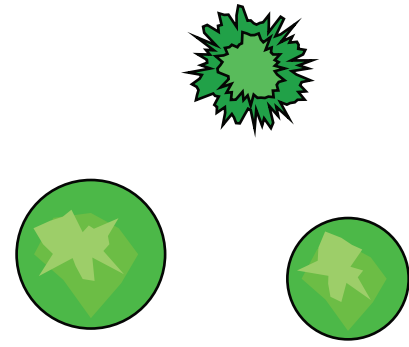




## Oak-Pine Savanna

- This particular habitat is a unique part of the Oregon ecosystem - much of historical Oregon used to be Savanna, maintained by indigenous peoples' regular application of prescribed burns.
- This plant community is endangered within Oregon, so it is less likely to be present in standard landscapes.
- However, this habitat and the species present within it would fare well in heat and drought, so it may become more common as climate change progresses.
- Mowing and grazing is required to maintain the landscape.

## Bird's Eye View



Douglas Fir  
*Pseudotsuga menziesii*



Ponderosa Pine  
*Pinus ponderosa*



Pacific Madrone  
*Arbutus menziesii*



Oregon White Oak  
*Quercus garryana*



Savanna Diagrams by Yunxiao Fu & Lindsey Kurtz



# Appropriate Planting by Zone

Each zone has its own guidelines and restrictions in order to reduce flammability. Much of the risk of fire catching or spreading is contained within the plantings in the landscape. Dry, dense thickets set too close to a low-limbed pine tree will allow fire to grow quickly, throwing embers and spreading through overlapping canopy. However, this scenario can be avoided.

There are many planting choices based on zones and defensible spaces that can make a landscape safer and less flammable. Following these guidelines will slow or halt the progress of a fire away from the home.

## General Suggestions

- Utilize fire-adapted and fire-resistant plant species throughout.
- Remove invasive species as they appear.
- Maintain distance between plants or plant pods.
- Remove dead or dry plant litter.
- Keep plants and trees trimmed to reduce fuel availability and overlap.

## Suggestions by Zone

### Zone 1

- If planting trees within this space, smaller deciduous trees are best.
- If there is lawn, keep it short and well watered.
- Alternatively, a native groundcover can be used and will hold moisture near the ground.
- Rain gardens are encouraged.
- Pollinator gardens are also okay as long as they are well isolated and distant from other plants/plant pods.

### Zone 2

- Mow groundcover or grass to a maximum of 4".
- Limb up trees to 12' or more, especially if shrubs are planted nearby.
- Consider the future growth of trees and thin or plant accordingly.

### Zone 3

- Mow groundcover or grass to a maximum of 4".
- Limb up trees to 6' or more, especially if shrubs are planted nearby.
- This is the best zone to allow habitat snags.
- Consider the future growth of trees and thin or plant accordingly.



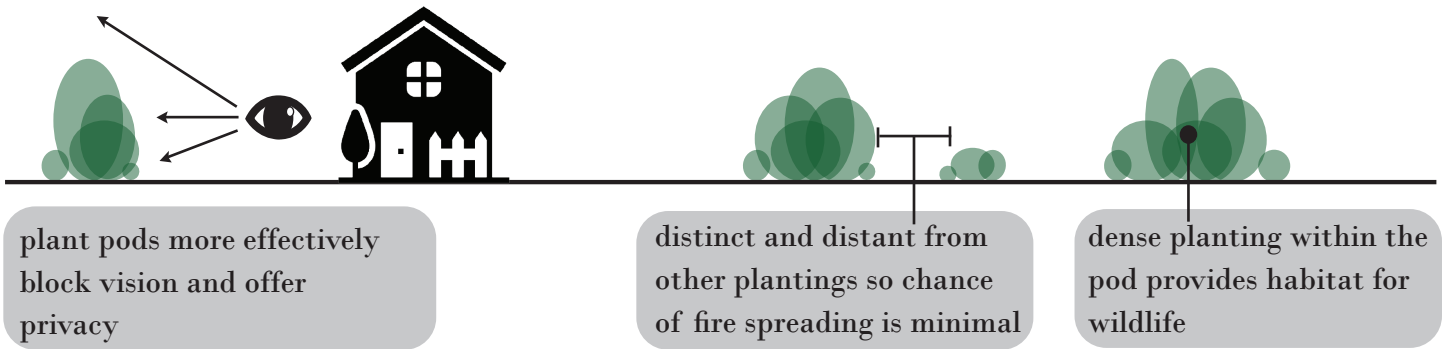
Planting by Zone Graphic & Pattern by Rae Matthews

Oregon State University offers a downloadable PDF book on fire-resistant plants for the home, available here: [https://ir.library.oregonstate.edu/concern/administrative\\_report\\_or\\_publications/pr76f369j](https://ir.library.oregonstate.edu/concern/administrative_report_or_publications/pr76f369j)

# Plant Pods

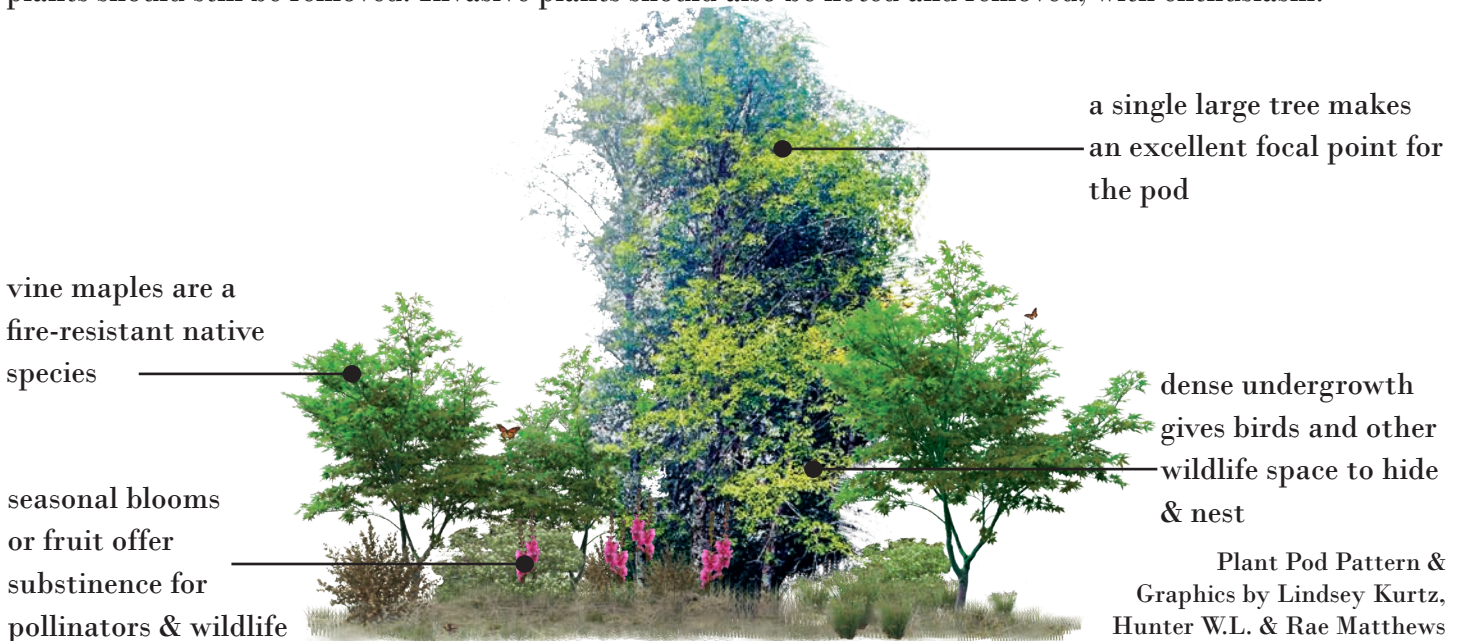
One of the simplest methods to make a landscape fire resistant is creating distance between plantings and limbing up trees. This makes it difficult for fire to travel from one plant to another, but in practice it can create a sparse feel and dissuade wildlife from the area.

Instead of planting individual plants, perennials, shrubs, and small trees can be planted in distinct, isolated clusters. This 'plant pod' method provides an aesthetically appealing grouping of vegetation while maintaining the separation that fire safety demands. This has additional benefits, as plant pods work more effectively as a visual screen than stand-alone plants, and birds and other wildlife will also appreciate the dense pockets of vegetation where they can hide and nest.



This method offers a practical compromise for landscape design. However, plant pods should be designed with care and attention to detail. It would be unwise to simply leave patches of unmanaged invasive shrubs alone and call it a plant pod. Ideally, they would be composed of native plants, which are less flammable, better for wildlife, and function within the local landscape.

When designing the composition of a plant pod, you should be familiar with each plant species. What is their mature size? What kind of care will they require? Are the plants that technically qualify as ladder fuels fire-resistant (they should be!)? Familiarize yourself with the varieties within the plant pod, and keep an eye on them as they mature. Although density is allowed within the pod, dead or dying branches or plants should still be removed. Invasive plants should also be noted and removed, with enthusiasm.

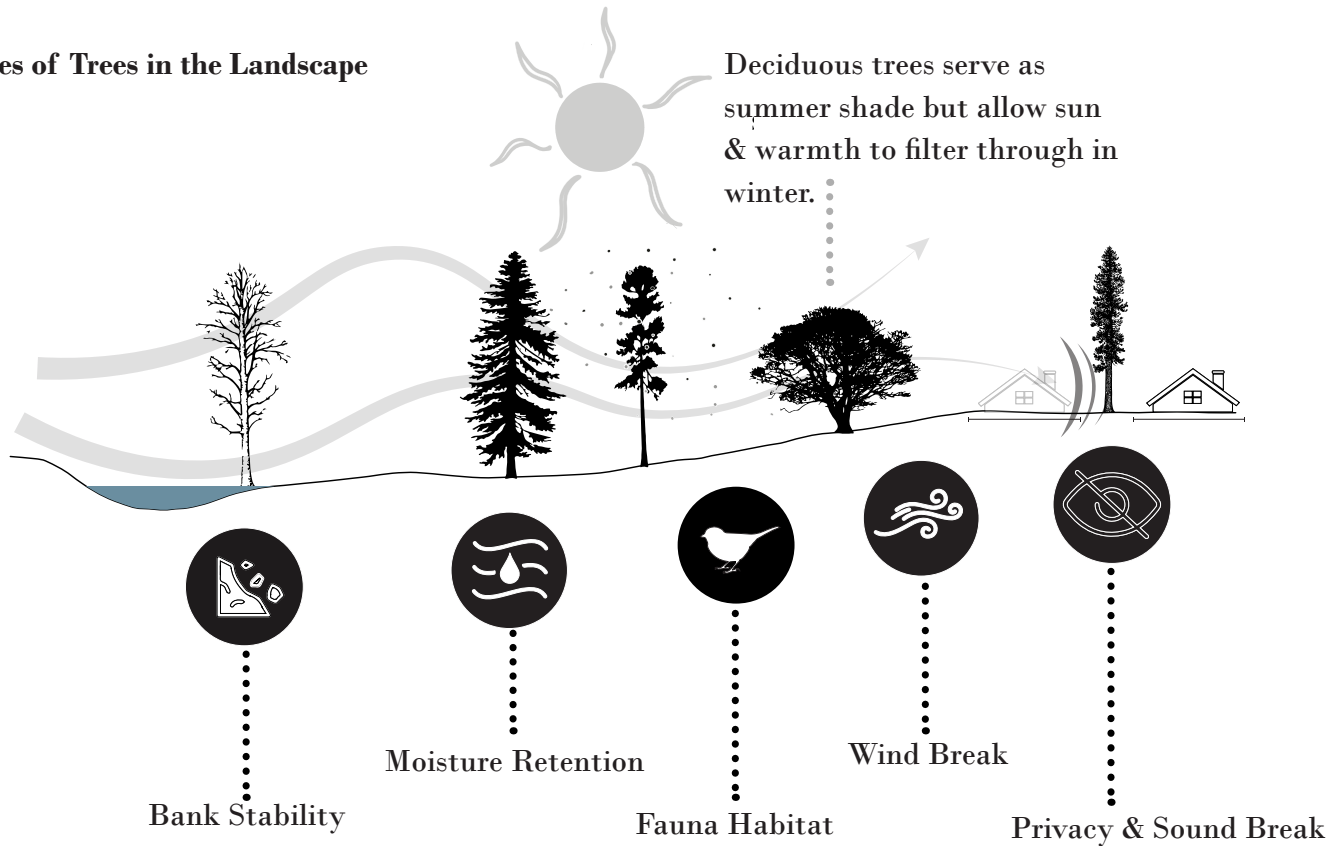


# The Functions of Trees

Native trees are often overlooked in favor of exotic species when designing the landscape. However, exotic species may not play the same helpful role as native trees do, and at worst may act as harmful or invasive species.

It's important to understand the functions and values of different native trees. Using them intentionally within the landscape allows them to serve specific functions that will enrich your life and property.

## Roles of Trees in the Landscape



## Specific Trees



### Bigleaf Maple

*Acer macrophyllum*

- grows well in many habitats
- develop large and broad canopies
- deciduous - provides summer shade and winter sun
- recovers quickly from wildfires
- should be placed with future size in mind

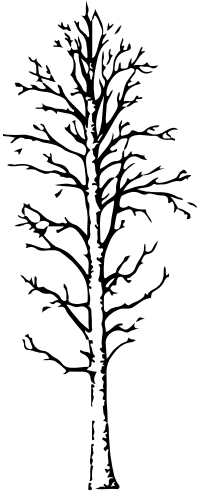


### Grand Fir

*Abies grandis*

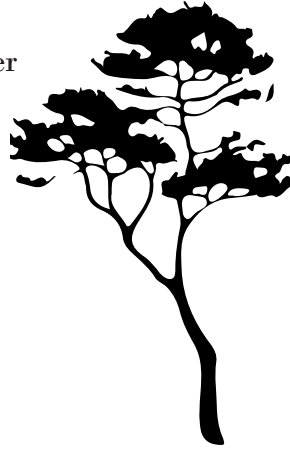
- grows well in moist, well-drained soil
- extremely tall when mature
- evergreen - provides summer shade & winter privacy
- excellent cover & food for wildlife





Red Alder  
*Alnus rubra*

- riparian species
- deciduous - provides summer shade & winter sun
- fixes nitrogen in the soil (makes the soil more habitable for other species)
- tolerates low-nutrient soil
- slow recovery from fires
- best placed in rain gardens, along rivers or ponds



Pacific Madrone  
*Arbutus menziesii*

- grows well in dry environments
- needs well-drained soil
- broadleaf evergreen - provides summer shade & winter privacy
- grows best exposed to sunlight
- very drought tolerant
- burns easily, but resprouts vigorously



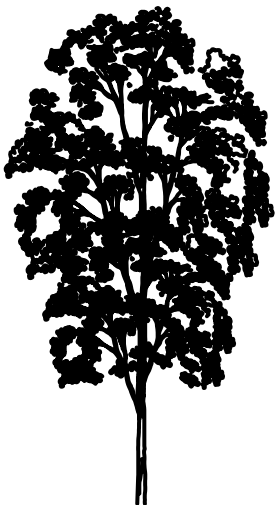
Oregon Ash  
*Fraxinus latifolia*

- typically a riparian species
- withstands poor drainage and flooding
- deciduous - provides summer shade & winter sun
- a major component of riverine habitats



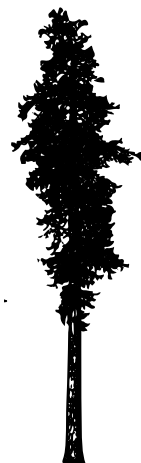
Ponderosa Pine  
*Pinus ponderosa*

- a hardy species that can grow in a variety of habitats
- drought resistant
- evergreen - provides summer shade & winter privacy
- mature trees are tall but narrow in structure
- they are especially fire resistant



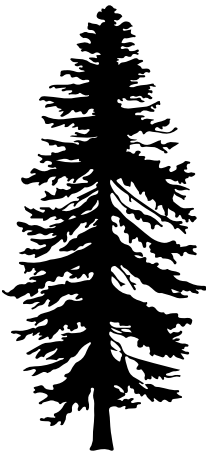
Black Cottonwood  
*Populus trichocarpa*

- grows well in riparian zones
- prefers moist soil and tolerates flooding
- deciduous - provides summer shade & winter sun
- relatively fire-resistant and recolonizes the landscape quickly after wildfires
- plant away from structures - roots are aggressive



Douglas Fir  
*Pseudotsuga menziesii*

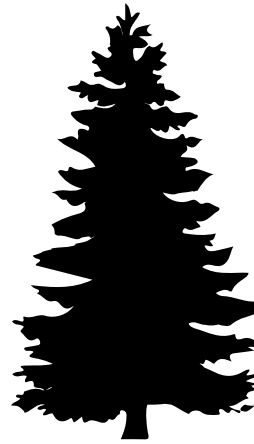
- an iconic Oregon tree
- grows well in many habitats
- evergreen - provides summer shade & winter privacy
- act as a food source for various wildlife
- large trees are very fire-resistant



### Western Red Cedar

#### *Thuja plicata*

- thrives in moist, well-drained soil, often along rivers & swamps
- evergreen - provides summer shade & winter privacy
- provides cover for wildlife and food in the winter
- recovers slowly from wildfires
- works well to block views and enhance privacy



### Western Hemlock

#### *Tsuga heterophylla*

- needs rich, moist soil in order to thrive
- tolerates shade & humidity
- evergreen - provides summer shade & winter privacy

This list of trees is by no means all-encompassing - there are many other tree varieties that might have a place in your landscape. Oregon State's downloadable PDF book on fire-resistant plants for the home also includes many tree recommendations. It is available here: [https://ir.library.oregonstate.edu/concern/administrative\\_report\\_or\\_publications/pr76f369j](https://ir.library.oregonstate.edu/concern/administrative_report_or_publications/pr76f369j)

## Difference of Vision

All landowners have a different vision for their property, and different desires in regards to privacy, maintenance, and aesthetics. While one landowner may want a classic conifer forest, another may prefer a large clearing with distant views available.

This pattern acknowledges these preferences and highlights the basic rules of each scenario. It is possible to create a variety of settings that are firewise and well-suited to your own aesthetic preferences.



Wild and Forested



Somewhat Trim, Mostly Forest



Cleaning Up, More Maintained



Resort-Like

**Less Maintenance**  
**More Privacy**  
**Higher Fire Risk**

**More Maintenance**  
**Less Privacy**  
**Lower Fire Risk**

### Less Maintenance & More Privacy

These spaces are often beautiful and mysterious. The charming green and lush canopies are appealing to landowners and visitors alike. They tend to be less firewise than other landscapes, but proper maintenance can resolve most of the issue. If you need more privacy, these are your ideal options.

#### Wild & Forested



- Clear fuel both surface and ladder fuels throughout the property.
- Aim for little to no canopy overlap
- Focus on fire resistant plantings like those mentioned later on pg. 22 and 23.

- Plant fire resistant plants in plant pods to minimize fire spread and to break up available fuels.
- Limb trees to at least 6'.
- Clear understory by mowing, grazing, or other pruning methods and continue this maintenance regimine throughout all seasons.



**Somewhat Trim, Mostly Forest**



## More Maintenance & Less Privacy

In contrast, these spaces are well manicured and open. They are perfect for landowners who enjoy an ongoing project, as they require more time and resources. These spaces generally stand up better to fire, and the strategies listed below will optimize their fire safety.

### Cleaning Up, More Maintained



- Prune and trim trees rigorously within 30' of the house
- Maintain a green lawn or groundcover year round, water and cut when necessary
- Maintain the lawn height at <4" throughout the year.

- Ideally keep vegetation at least 5' away from the house to prevent fire jumping from the ground plane to the structure.
- Limb trees to 6-12'
- Focus on fire resistant plantings like those mentioned later on pg. 24.



### Resort- Like

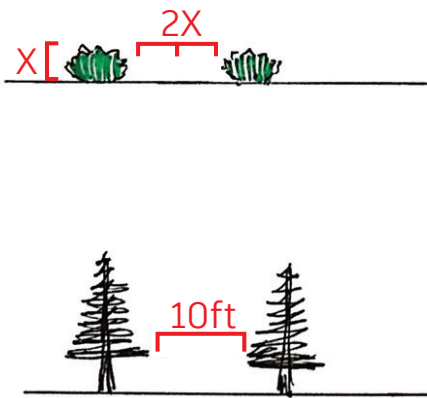
Difference in Vision Pattern  
& Graphics by Brooke Ridgeway

# The Impact of Slope

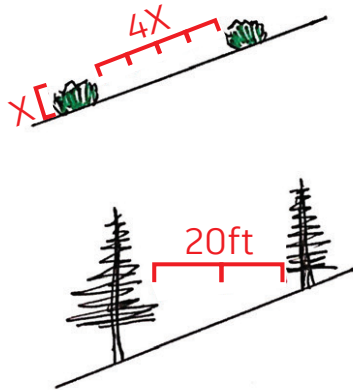
Fire travels differently depending on the topography of a landscape. One of the major determinants of this is slope - a steeper slope allows fire to rise and spread more quickly uphill. Standard planting distances that would prevent fire from spreading on a flat piece of land will not be as effective when faced with a slope.

Knowing that fires can jump farther uphill increases the necessary planting distance between trees and shrubs. As shown by the graphics below, shrubs and trees need to be planted farther apart to stop the spread of fire. Luckily, there are some simple guidelines to follow that will ensure your hilly property will remain firewise.

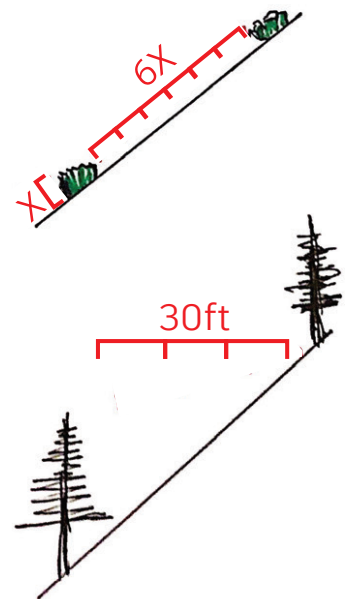
**Flat to Small Slope**  
(<20%)



**Small to Moderate Slope**  
(20-40%)

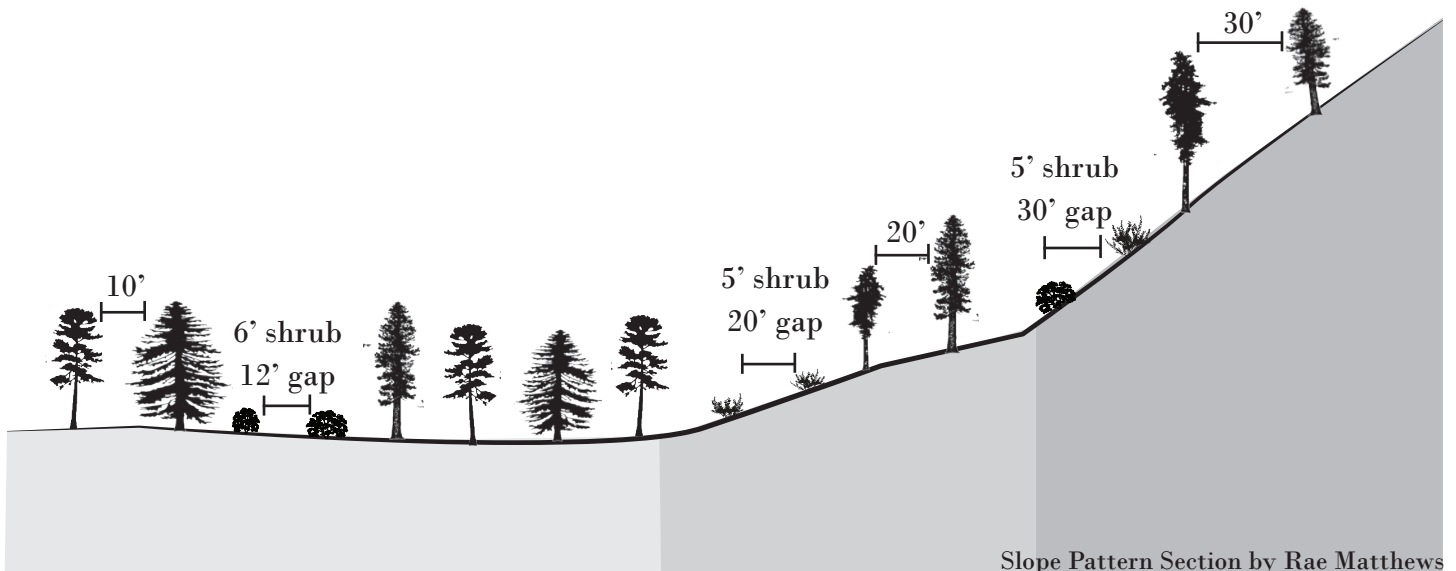


**Moderate to Steep Slope**  
(>40%)



The Impact of Slope Pattern & Graphics by Yunxiao Fu

## Application in the Landscape



Slope Pattern Section by Rae Matthews

# Fire-Adapted Plant Palettes

Fire is a part of the landscape when living in the Wildland-Urban Interface. Living in this area means living, to some extent, with wildfire. As discussed on pg. 9, native, fire-adapted plants are excellent tools for creating a more resilient landscape, as these plants have evolved alongside wildfire and tend to withstand occasional fires. They may not ignite easily, are quick to regrow, or have other traits that give them, and the landscape as a whole, a fighting chance against wildfires.

While these plants have a clear place in the fire-resistant landscape, it can be challenging to know where to place specific species. To help guide your placement, the following plant palettes have been created with some of the main players of native Oregon vegetation, divided into appropriate ecosystems where they will thrive.

## Riparian Vegetation

The riparian zone, which is the area near a waterway, has a very specific array of plants that are happiest there. These plants typically enjoy a little more moisture, and are composed of a wide variety of deciduous trees and shrubs, with the occasional presence of conifer species. Gaps in the canopy allow patchy sunlight.



Shrub



Perennial



Groundcover



Grass

\* reliably resprouts



Mock Orange



Red Osier\*



Pacific Dogwood



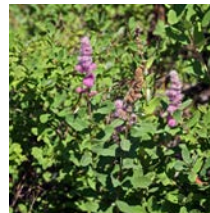
Blue Elderberry



Thimbleberry



Chokecherry



Western Spirea



Vine Maple



West. Serviceberry



Snowberry\*



Oregon Iris



Wild Strawberry



Inside-Out Flower



Forest Vegetation 

Oregon forests, meanwhile, have more abundant numbers of conifers mixed in with deciduous trees. Mature forests tend to density if left unmanaged, so thinning is recommended to maintain a fire-resilient landscape. Soil is drier here than in the riparian zone, and some plants are more drought-tolerant in this habitat. Be careful when planting to avoid contributing to ground or ladder fuels - spacing is important in this ecosystem.



Vine Maple



Pacific Dogwood



Red Osier\*



Cal. Hazelnut\*



Oregon Grape



Oceanspray



Sword Fern\*



Thimbleberry



Western Spirea



Snowberry\*



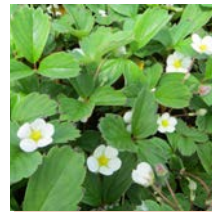
Box Huckleberry



Columbine



Oregon Iris



Beach Strawberry



Salal



Inside-Out Flower



California Brome



Shrub



Perennial



Groundcover



Grass

\* reliably resprouts

Woodland Vegetation ☀️ 🌙

Woodlands have a less dense canopy than forests, and are dominated by more deciduous trees, such as Oregon White Oak or Bigleaf Maples. This area should be thinned as needed to maintain the spaced out canopy and distance between shrubs or plant pods. Many of the understory species present here enjoy more sun than their forest counterparts.



West. Serviceberry



Oceanspray



Honeysuckle



Oregon Grape



Mock Orange



Chokecherry



Red Currant



Baldhip Rose



Nootka Rose



Thimbleberry



Blue Elderberry



Snowberry



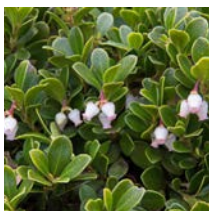
Columbine



Oregon Iris



West. Buttercup



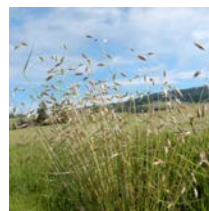
Kinnickinick



Wild Strawberry



Low Oregon Grape



Cal. Oatgrass



Shrub



Perennial



Groundcover



Grass

\* reliably resprouts



Savanna Vegetation 

Savannas were once much more widespread in the Willamette Valley, due to the frequent application of prescribed fires by indigenous peoples. Nowadays, they are much more rare. If present in the landscape, it is important to thin trees vigorously to maintain the sparse canopy. This habitat is also especially vulnerable to invasive species, so their removal should be prioritized.



Bigleaf Lupine



Yarrow



Pearly Everlasting



Columbine



Douglas Aster



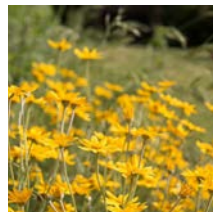
Hall's Aster



Common Camas



Great Camas



Oregon Sunshine



Oregon Iris



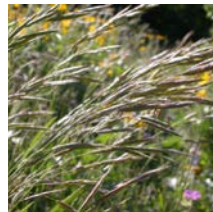
Penstemon



Goldenrod



Wild Strawberry



California Brome



Sitka Brome



Cal. Oatgrass



Tufted Hairgrass



Blue Wildrye



California Fescue




Roemer's Fescue

Plant Palettes Pattern & Graphics by Sydney Gastman



Shrub



Perennial



Groundcover



Grass

\* reliably resprouts



# Water & Erosion Design Patterns

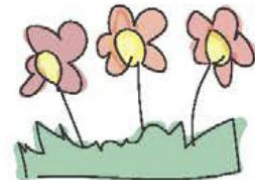
## Holding Moisture & Saving Water Around the Home

Summer drought is common in the Pacific Northwest and increases the chances of fire. Because of this, it is worthwhile to retain moisture in the landscape as much as possible.

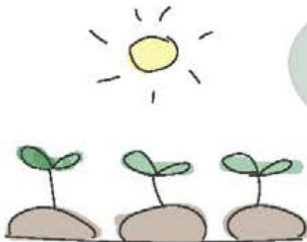
Luckily, there are a number of design approaches that help hold water within the landscape. These strategies are customizable and flexible to your landscape.



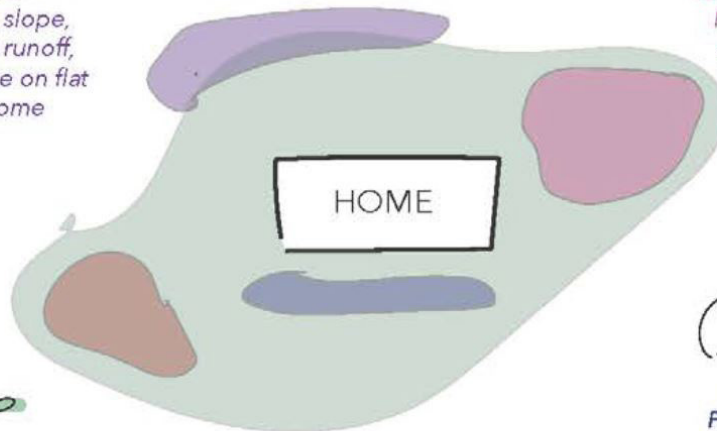
**RAIN GARDEN:**  
catch water down slope,  
filter water, reduce runoff,  
hold moisture - place on flat  
site 10'+ from home  
in full sun



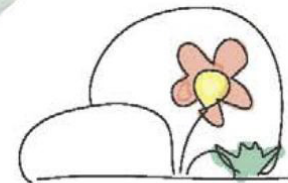
**FLOWER BEDS:**  
require regular watering,  
hold moisture - place  
anywhere on property



**VEGETABLE GARDEN:**  
requires regular watering,  
holds moisture - place  
anywhere on property in  
full sun



**NATIVE GROUNDCOVER**  
(evergreen):  
hold moisture, low to ground -  
place all over: more plant coverage  
on ground = more water retention



**ROCK GARDEN/  
PERMEABLE PAVING:**  
reduce runoff/erosion,  
water sinks through,  
not flammable - place  
closest to home to increase  
fuel free defensible space

Graphic by Sydney Gastman

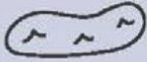


Kinnickinnick Groundcover via Van Berkum Nursery

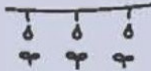


Rain Garden Photo via the Ramsey-Washington Metro Watershed District

## OTHER PRACTICES TO RETAIN MOISTURE



ADD A POND/WETLAND



DRIP IRRIGATION



HARVEST RAINWATER



CHOOSE NATIVE PLANTS



REDUCE LAWN



COMPOST AND MULCH



IRRIGATE IN SUMMER



CHOOSE DEEP ROOT PLANTS

There are many different ways to retain moisture in the landscape. Doing so is a customizable process that depends on your personal preferences as well as the nature of your landscape. Analyze your property with these strategies in mind.

Does water pool at a low point during the spring, ruining your grass and creating a mudpit? This space might be perfect for a rain garden, pond, or decorative water feature.

Do you enjoy gardening? Are there any native plants that you want to try growing? It might be worth looking into composting and rainwater harvesting - not only would your garden benefit, but both actions would hold moisture near your home.

If you're sick of mowing and maintaining your lawn, try planting a low-lying native groundcover instead, or creating a rock garden.

Holding and maintaining moisture in the landscape is a beneficial practice with a variety of fun options to incorporate your needs and aesthetic. What methods would work in your landscape?



Rain Garden by Rae Matthews

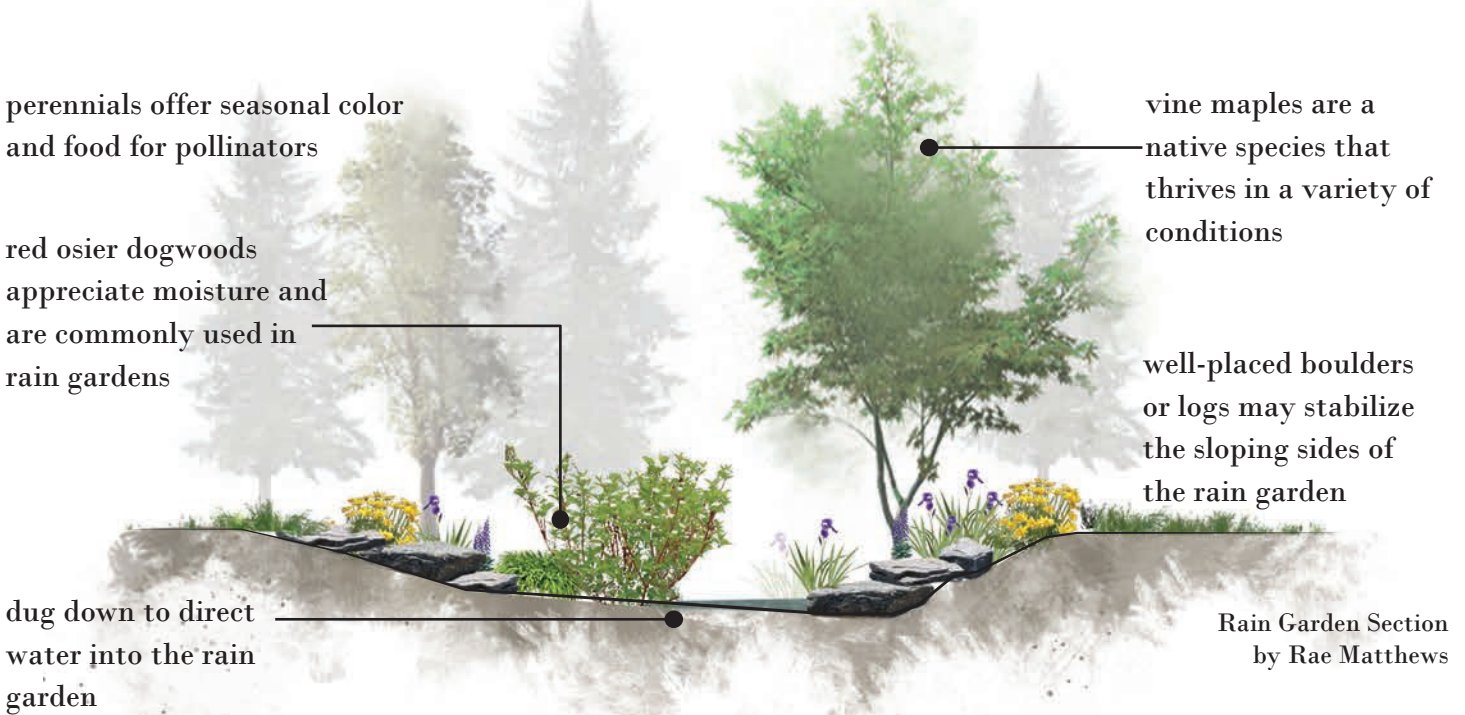


# Rain Gardens & Swales

Rain gardens and swales are two methods of holding water in the landscape that are common, functional, and can be made aesthetically appealing. If runoff is an issue on your property or you have naturally occurring low-spots in your landscape, it would be worth investigating these options.

## Rain Garden

Rain gardens are shallowly dug depressions that incorporate an assortment of carefully selected plants. The plants and soil filter and clean runoff, allowing the water to be reabsorbed into the soil. The plants incorporated within these gardens need to be able to withstand both occasional flooding and drought. As usual, native plants are the best choice for most rain gardens.



Bioswale via Aaron Volkening, Flickr

## Swales

Swales are similar to rain gardens, but typically move water or runoff from one point to another. They channel the water from point A to point B. They're a great solution to redirect runoff that may be damaging your property or causing problematic erosion. Swales can be planted with grass or incorporate a wider variety of plants, similar to a rain garden.

Constructing a rain garden or swale can be an intimidating prospect - to better understand the function and appropriate plants refer to the Naturescaping Guide and other resources available at [www.purewaterpartners.org](http://www.purewaterpartners.org).

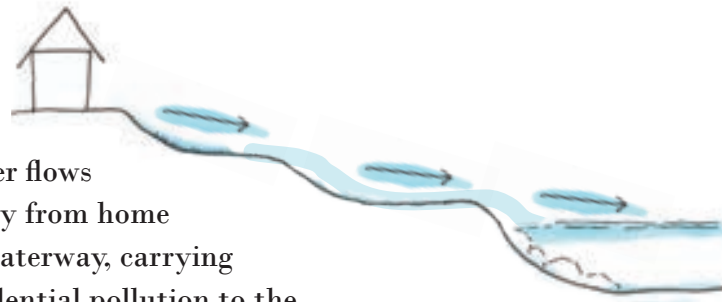


# Mitigating Runoff & Contamination

Rivers and other waterways are a vital part of the Oregon ecosystem. The presence of homes and maintained landscapes along these shorelines may contribute pollutants to hydrologic systems via runoff.

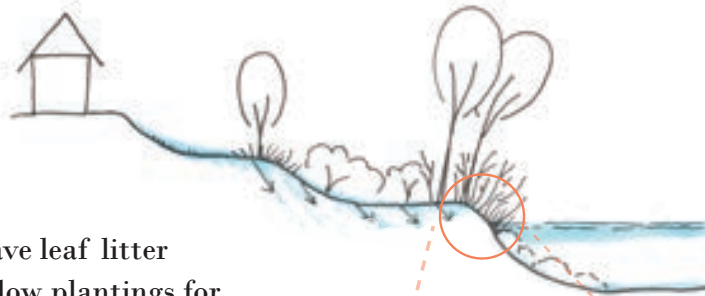
Runoff should be reduced and diverted from waterways as much as possible. Planting native vegetation and retaining leaf litter along shorelines helps to absorb and filter any contaminated runoff. This vegetation and leaf litter allows contaminants to filter through the soil before reaching the river. In addition, homeowners are advised to consider alternative landscaping methods that require fewer chemicals or pesticides - like organic gardens & native groundcovers, . Maintaining the health of these waterways ensures healthier, more resilient ecosystems overall.

Limit the amount of water flowing directly into the river, stream, or pond. Too little vegetation allows contaminated water to flow directly into the waterway.



water flows freely from home to waterway, carrying residential pollution to the waterway (and eroding the bank)

Plant native plant species along the shore to slow and filter runoff. This will allow the runoff to reach the waterway only after filtration and soil microbe fixation.



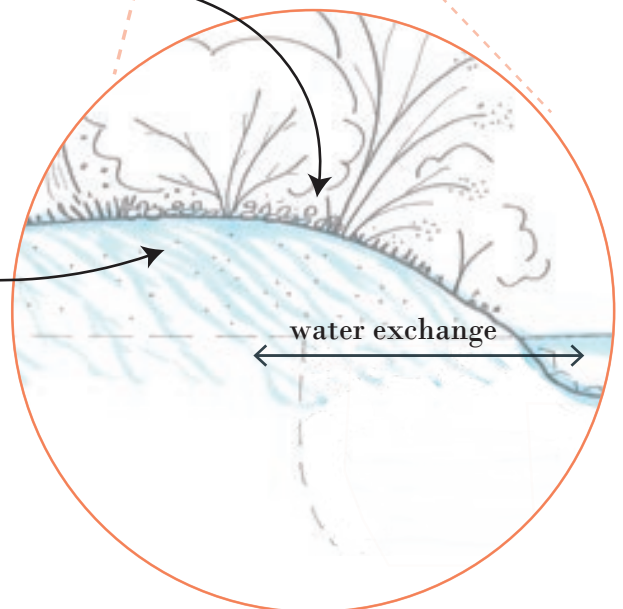
leave leaf litter below plantings for optimal infiltration - but only in the riparian zone, where fire risk is lower

It's important to maintain a riparian buffer along the waterway - riparian natives such as Cottonwoods, Douglas Spirea, Willows, Dogwoods, or Sedges are well-adapted to this type of habitat and will filter any runoff coming from residences.

To get ahead of the problem, reduce the pollution produced by your residence. Some of the most common culprits are:

- chemical herbicides and pesticides
- fertilizer
- pet waste
- failing septic systems
- vehicle contaminants

naturally occurring soil microbes help to break down contaminants



Mitigating Runoff Pattern & Graphics by Eyrie Horton

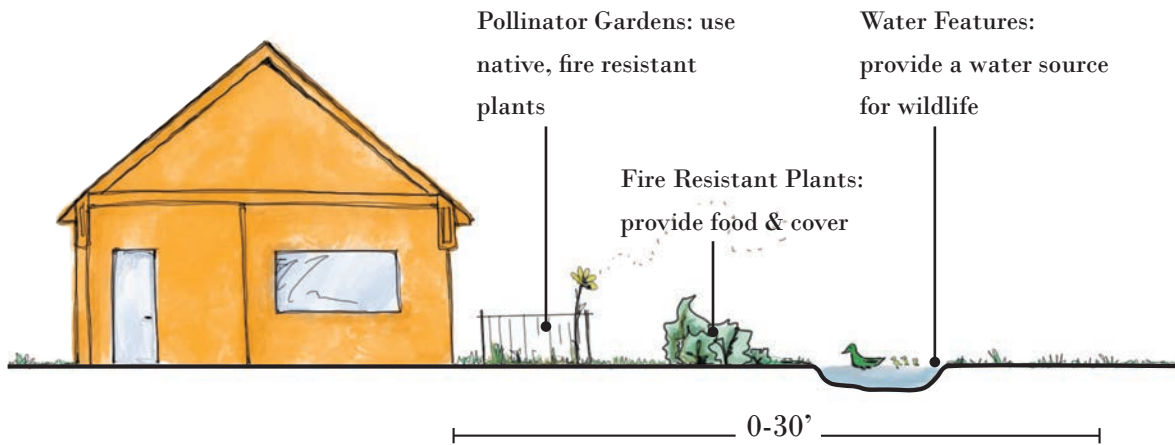
# Wildlife Design Patterns

## Creating Fire-Resistant Wildlife Habitat

Healthy ecosystems contain and support a wide variety of wildlife. However, wildlife habitat is generally associated with increased fuel hazards - many species feel safest hiding in dense thickets of shrubbery.

By acknowledging and utilizing the guidelines of defensible zones (explained on pg. 6), habitat features can be carefully placed to create functional wildlife habitat throughout the landscape while maintaining fire resilience.

### Zone 1



Zone 1 Wildlife Habitat  
Graphic by Darby Pierce



Monarch Butterfly via  
Garden Design



Birds via the Pure Water Partners  
Naturescaping Manual



Western Gray Squirrel  
via Cary Kerst

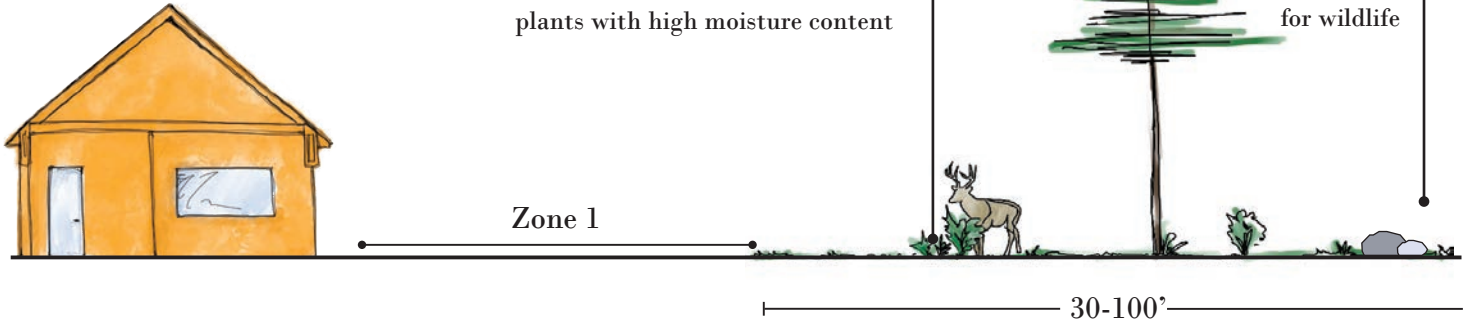
Within Zone 1, the opportunities for installing wildlife habitat are small-scale. Trees are typically smaller, space between plantings is paramount, and skittish wildlife is unlikely to approach human dwellings. However, well placed pollinator gardens, rain gardens, and native plants will draw in pollinators, birds, and small mammals.

**Zone 2**

Plant Pods: will create mini fuelbreaks between plantings, while also granting wildlife food and cover

Plant Deciduous Shrubs: focus on plants with high moisture content

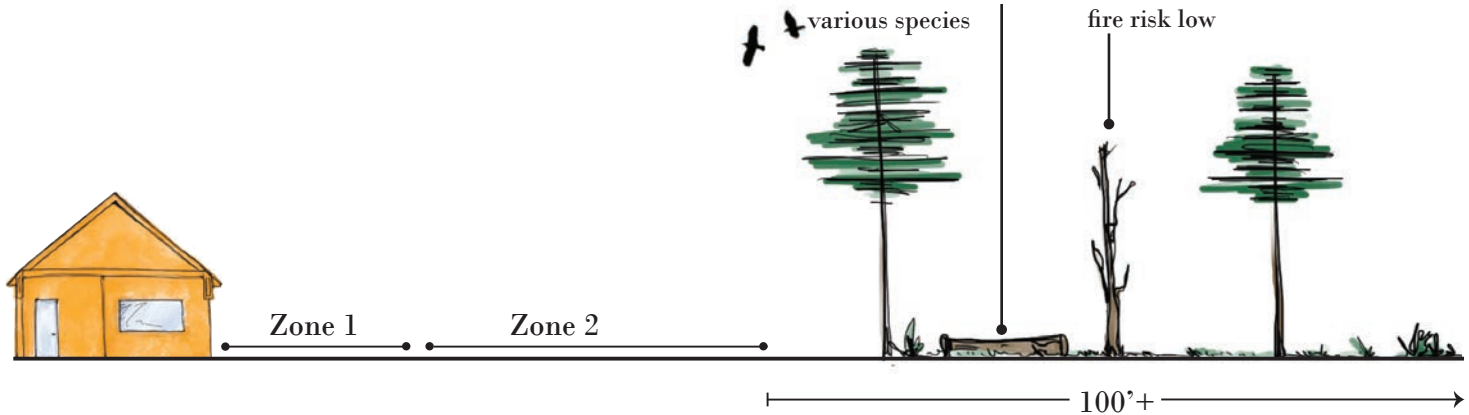
Rock Gardens: rocky outcrops will provide shelter & warm basking spots for wildlife



**Zone 3**

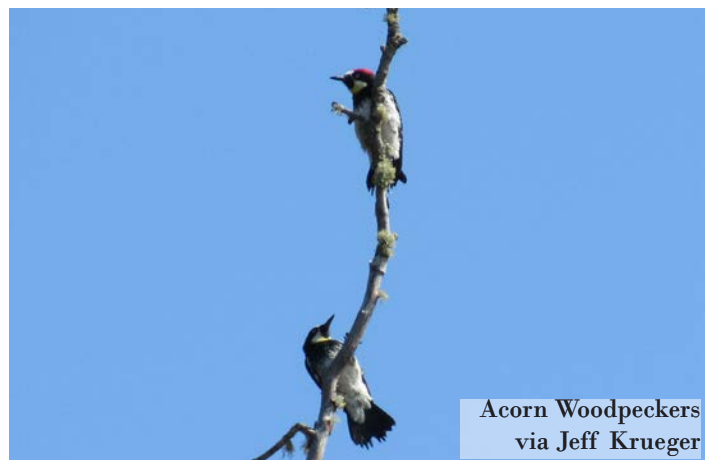
Downed Logs: ideal for nesting and cover for various species

Snags: only allow a few per acre to keep fire risk low



Zone 2 & 3 Wildlife Habitat  
Graphics by Darby Pierce

Note: Snags may be left, but be aware that if they ignite they could create a hazard by generating embers across the property. Refer to *The Life of Dead Trees* on pg. 31 for further information.





## The Life of Dead Trees

**Habitat Snag** - A dead or dying tree, upright or fallen, which is left to decompose naturally.

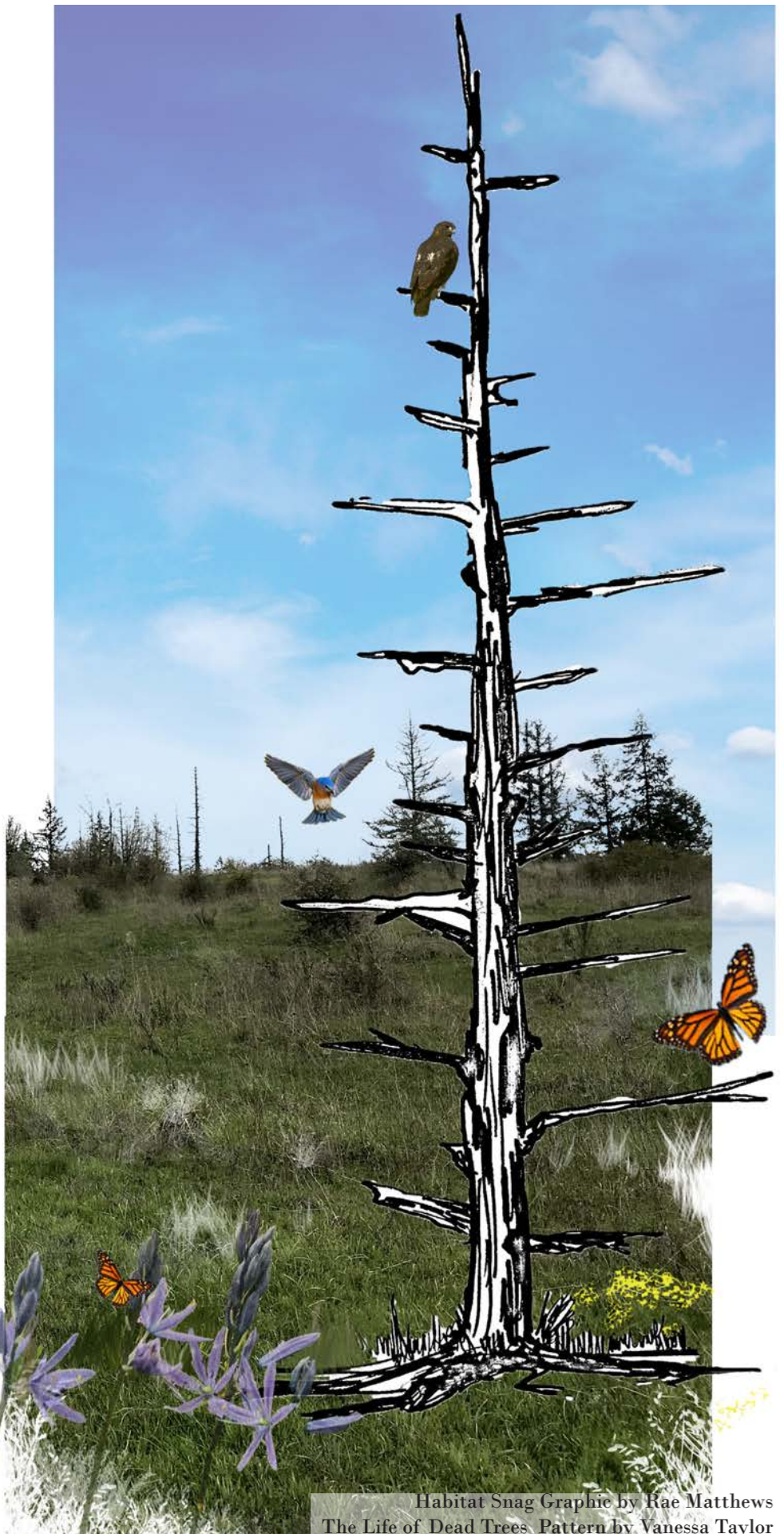
Removing dead and dying vegetation is a big part of creating a fire resistant landscape. However, there are many kinds of wildlife that utilize dead trees, also known as habitat snags, for shelter or food. These dead trees are often regarded as something to be discarded, but they are a key part of many species' life cycles.

Habitat snags can be maintained, even in a firewise landscape. By taking some simple precautions, they can benefit your local wildlife with minimal fire risk.

Maintain space between habitat snags and other vegetation - just as if it was a live tree. Upright snags require the same distance as a similarly sized tree, while fallen snags or stumps should have the same spacing treatment as shrubs of the same size.

Keep an eye on the state of the habitat snag and maintain clear space around it. Prune, trim, or remove any excess vegetation or leaf litter nearby.

Placement is key - keep snags out of Zone 1 and away from spaces where firefighters would set up.



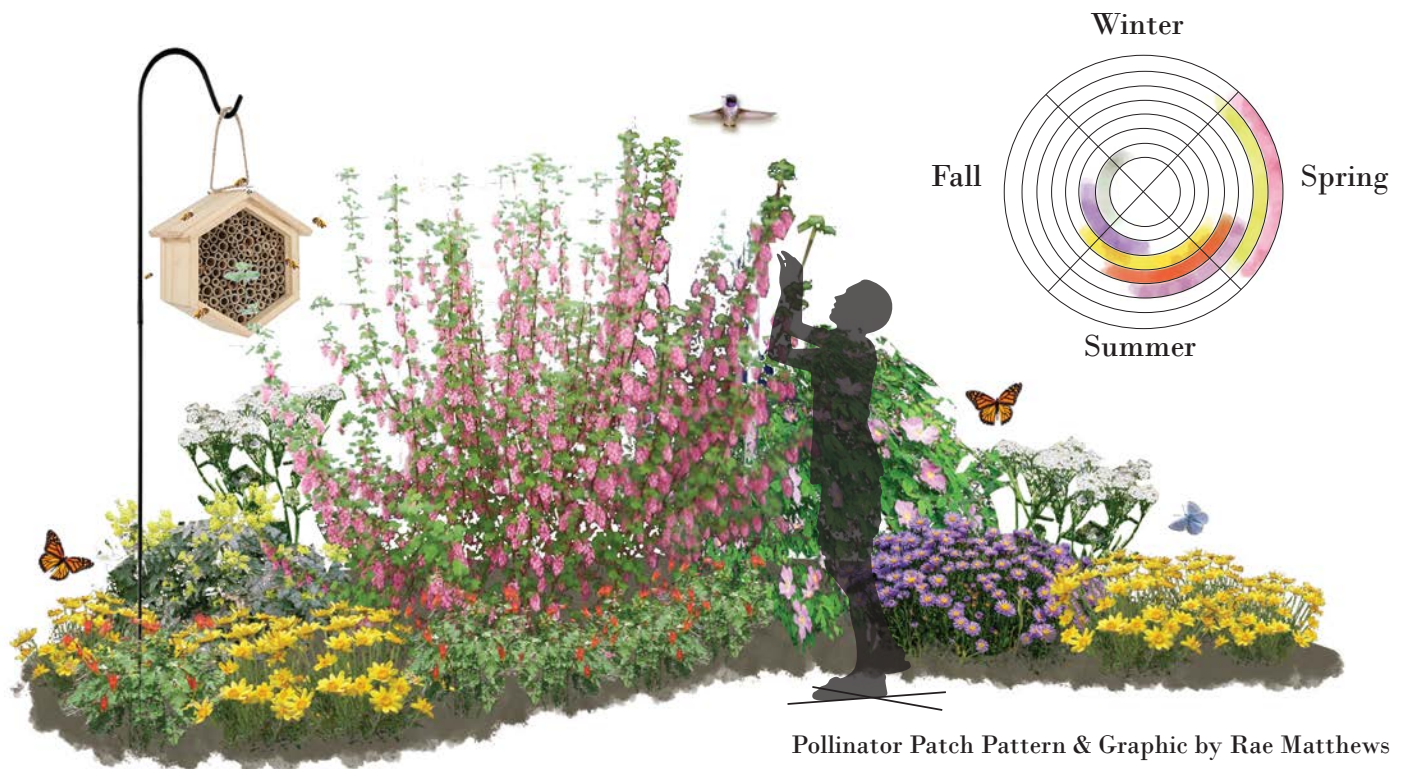
Habitat Snag Graphic by Rae Matthews  
The Life of Dead Trees Pattern by Vanessa Taylor

## Pollinator Patches

Another component of healthy ecosystems are pollinators. Pollinator patches are a specific kind of plant pod (pg. 14) designed to feed and sustain various species of insects, birds, and other wildlife that pollinate plants. These specialized gardens provide for these species while also helping plants to produce fruit and flowers and enhancing local biological diversity.

Like all other plant pods, pollinator patches require careful spacing to reduce fire risk. It is also best to utilize native plant species (which will appeal to native wildlife) that will bloom throughout the warmer months. As with any gardens or plantings on your property, be sure to remove dead and dry plant material.

Designing and selecting plants for an effective pollinator garden can be challenging - check out Oregon State's article at <https://extension.oregonstate.edu/news/12-plants-entice-pollinators-your-garden> to inspire your plant list.



Individual pollinator patches are good, but multiple pollinator patches are better. Install a few on your property, or coordinate with neighbors. A network of patches not only provides sustenance for pollinators, but also encourages them to move and interact with more of the native plants.

The Oregon Wildlife Foundation offers workshops on how to work with pollinators and other information on their website. For a deeper dive on pollinators and their importance, refer to their webpage: <https://www.myowf.org/native-pollinators>



# Maintenance Design Patterns

One of the most important parts of a fire-resilient landscape is regular maintenance. Installing a fire-safe landscape is a good start, but the landscape has to be consistently monitored and adjustments made over time. Invasive species can spread quickly, leaf litter can accumulate, small saplings can become dangerous ladder fuels, and a formerly fire-safe property can become high risk. For this reason, it is important to incorporate fire-resistant maintenance regimes into your standard schedule.

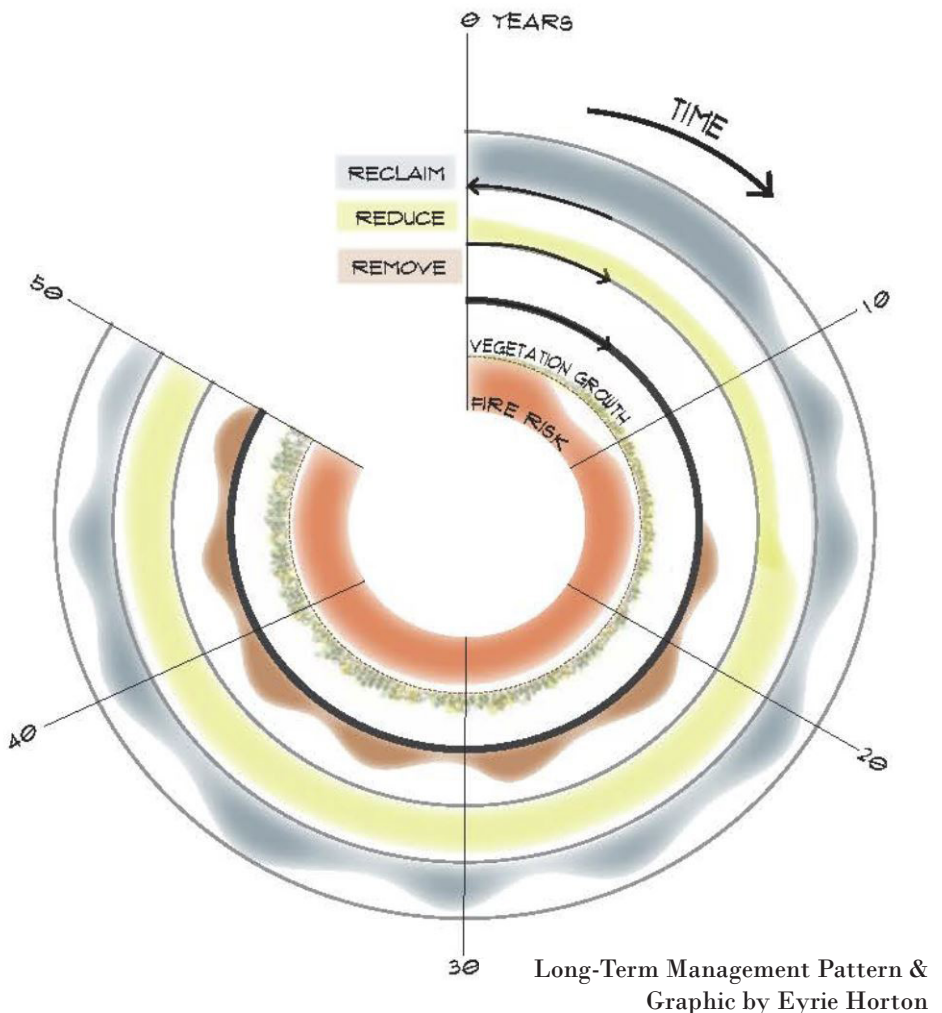
## Long-Term Management: 50 Years

The landscape is constantly evolving through the months, years, decades, and beyond. As the landscape changes, so does the maintenance required. This cyclical timeline outlines the general themes of action that should be taken during different years in a fire-resilient landscape. Year 0 is assumed to be immediately post-wildfire. The landscape at this point is a blank slate, with minimal vegetation and lots of potential. However, this landscape is also at risk - bare, unanchored soil and contaminants can be washed away by any amount of runoff and invasive species are poised to grow explosively in the sun-soaked soil.

This first stage is time to **reclaim** the landscape by identifying and removing invasive species. As natives become more established, invasive activity should decrease, but you will need to evaluate the state of invasive species regularly to ensure they don't take over.

Continuous fuels, horizontal and vertical, create unnecessary risk near your home. This stage of **reduction** requires you to trim, prune, and thin areas in your property as vegetation starts to grow. In the early years, this will consist of finer fuels, like grasses and smaller shrubs. At around the 15 year mark larger fuels will start to require maintenance. Evaluate growing fuels annually.

After 15 years, you will be required to occasionally **remove** vegetation. Maintain your defensible space by removing vegetation that doesn't follow your spacing guidelines. Don't allow fuels to encroach at the ground level, and keep an eye on trees to make sure canopies are not overlapping. Evaluate this encroachment once every 2-5 years.



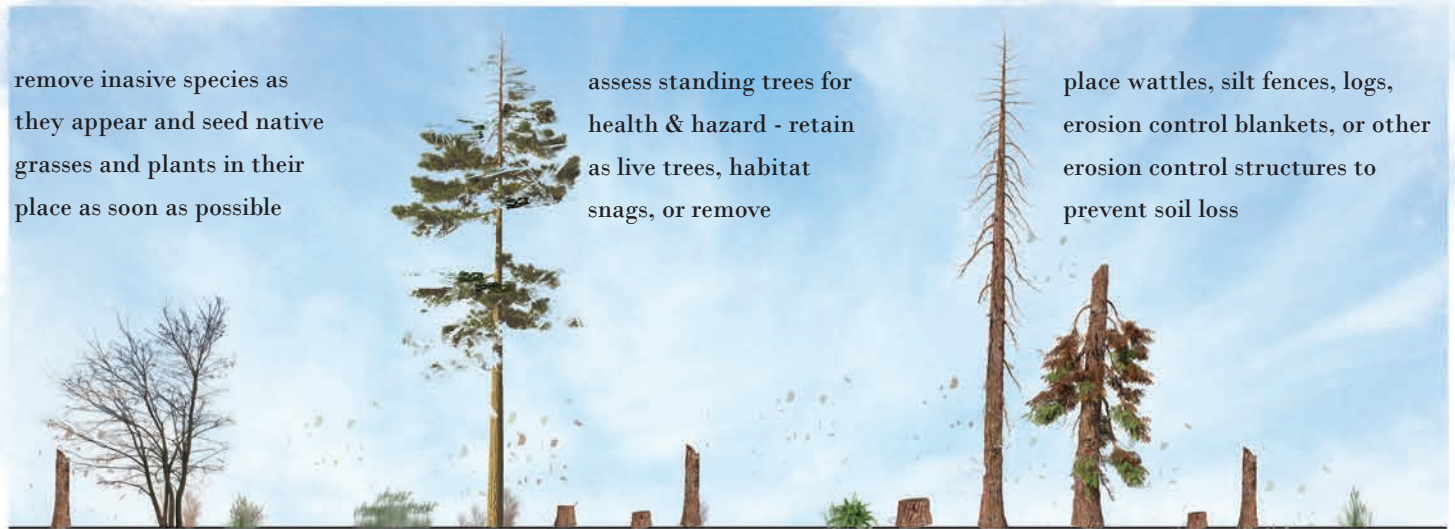


# Planting for the Future

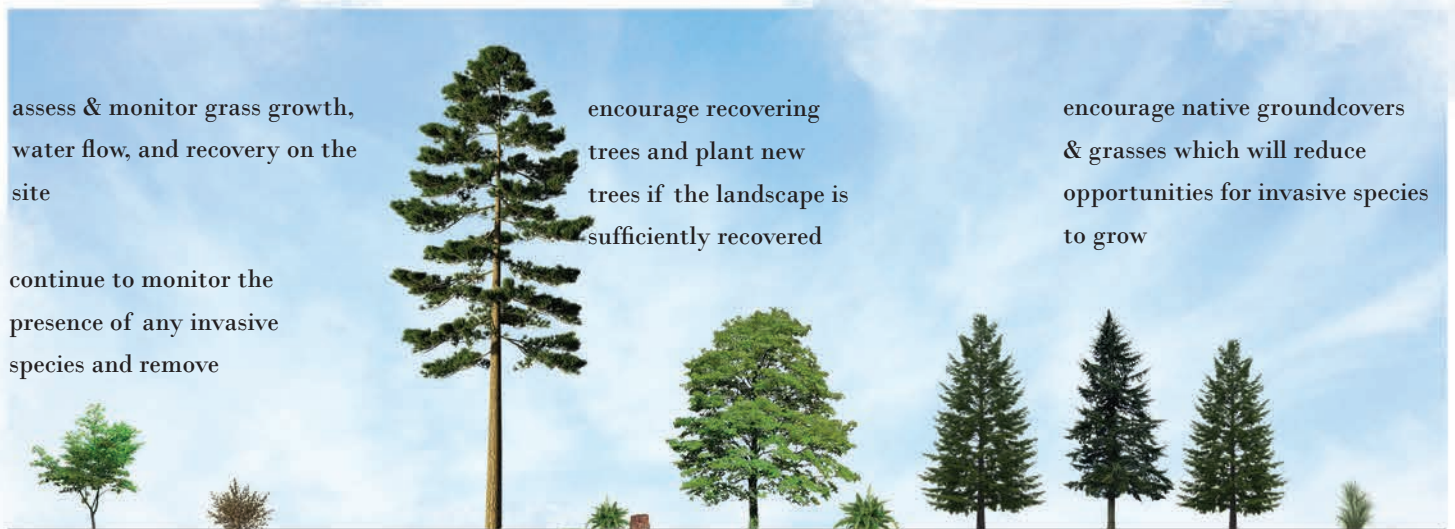
Severe wildfires leave landscapes burnt and barren. At this point, the landscape is vulnerable to soil loss, invasive species, contaminated runoff, and is generally sparse and unfit for human habitation. However, much of this can be addressed by planting smartly and maintaining vegetation in a firewise way.

As time goes on, your landscape will have different planting needs. If you're starting with a totally blank slate, immediately post-wildfire, you should begin the process by minimizing risks such as water contamination and erosion. As the landscape matures, the focus shifts to encouraging native plants, removing invasive species, and then thinning and pruning to reduce the risk of fire spreading. What stage is your landscape in, and what does it need?

## Year 1 - Evaluation, Pruning, & Replanting

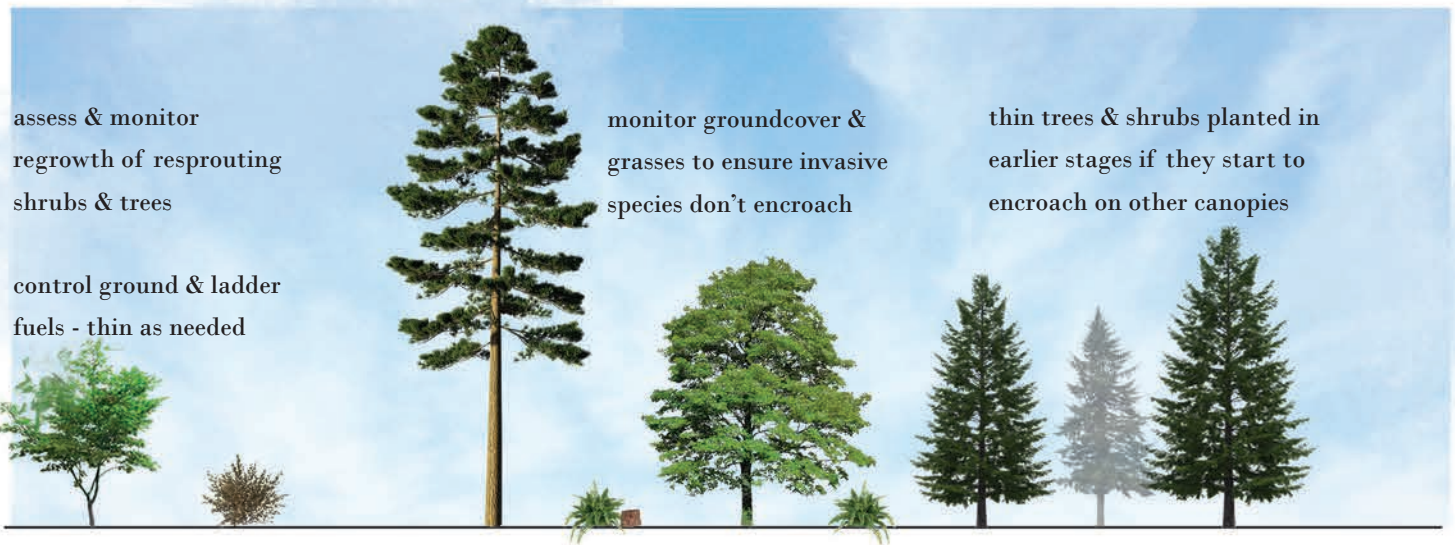


## Years 2-5 - Continue Pruning & Supervise New Growth



Post-Fire Planting for the Future Pattern by Lindsey Kurtz, Graphics by Rae Matthews

## Years 6-10 - Growth & Thinning



## Years 11-20 - Maintaining a Fire-Resilient Landscape



Post-Fire Planting for the Future Pattern by Lindsey Kurtz, Graphics by Rae Matthews

If your property is post-wildfire, the Pure Water Partners program offers assistance evaluating landscapes after a fire. They provide recommendations, help controlling invasives, and more. Go to [www.purewaterpartners.org](http://www.purewaterpartners.org) to learn more about their property assessments and options for you.



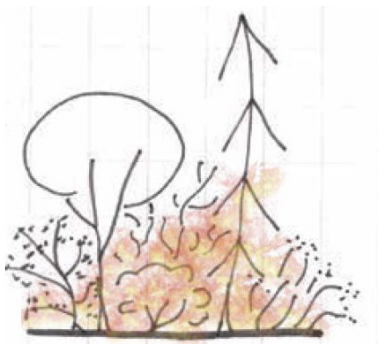
# Managing Invasive Species

Invasive species increase fire risk on your property and compromise native habitat. They are likely to thrive after a wildfire. They can easily grow to become continuous, overlapping fuels that will allow wildfire to move across the landscape and into the canopy with ease.

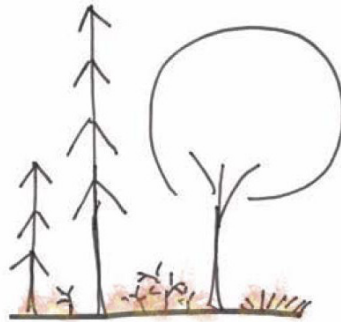
Keep an eye out for invasive species during fire recovery and afterwards. If complete removal isn't possible, cut back and remove vegetation to create space and limit connections that fire could travel across.

## Ivy & Blackberry

In Oregon, English Ivy and Himalayan Blackberry are persistent invasive species. Not only do they smother native species, but they also act as ground and ladder fuels, allowing wildfires to spread easily. Cut back these invasives to prevent wildfires from spreading quickly.

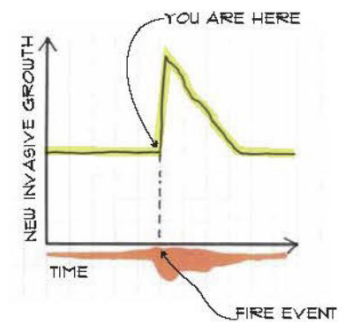


invasive species present



invasive species removed

## Growth Potential



The opportunity for invasive plants to establish themselves is greatest immediately after wildfires - if an area near you has burned, be aware. In this case, early detection and rapid response is crucial.

## Removal Methods



Contact local experts to learn more about safe and effective application of herbicides - although effective in certain situations, their use should be limited.



With some invasive species, removal is facilitated by digging up roots or rhizomes manually. This may need to be repeated on occasion.



Trim back invasives you are unable to totally remove. This will also limit their ability to grow and thrive.

Managing Invasive Species Pattern & Graphics by Eyrie Horton



English Ivy via Oregon Department of Agriculture



Himalayan Blackberry via Oregon Department of Agriculture



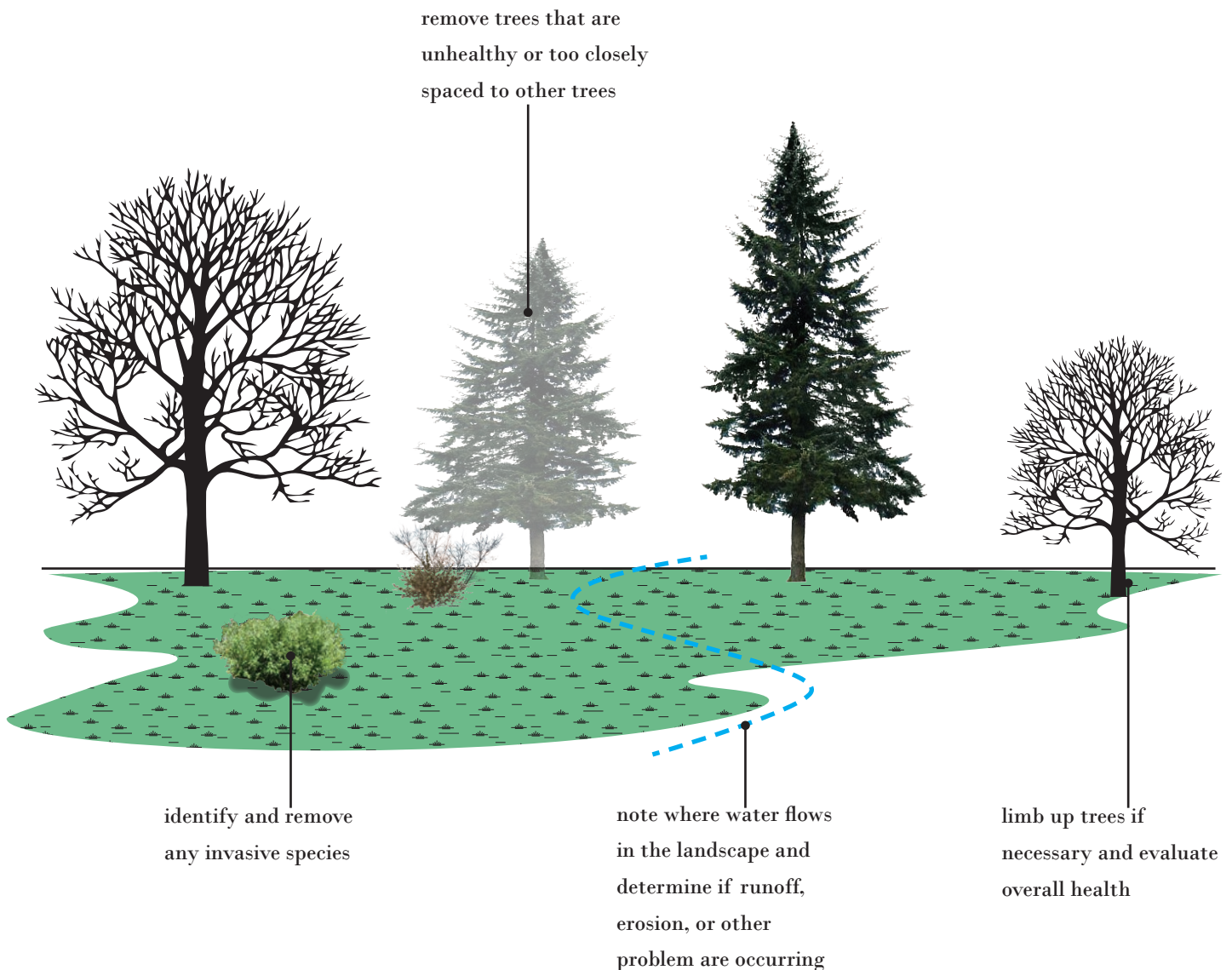
# Maintenance by Season

Unmanaged landscapes lead to greater fire risk. Adding fire-resilient maintenance to standard lawn care tasks can seem like a lot of work.

However, it's possible to divide tasks between seasons. Scheduling seasonal maintenance throughout the year can make your to-do list seem more approachable, and some tasks are more effective at certain times of year. Although regular maintenance requires some amount of time and effort, it is crucial to keeping a landscape resilient to wildfire.

## Winter Season

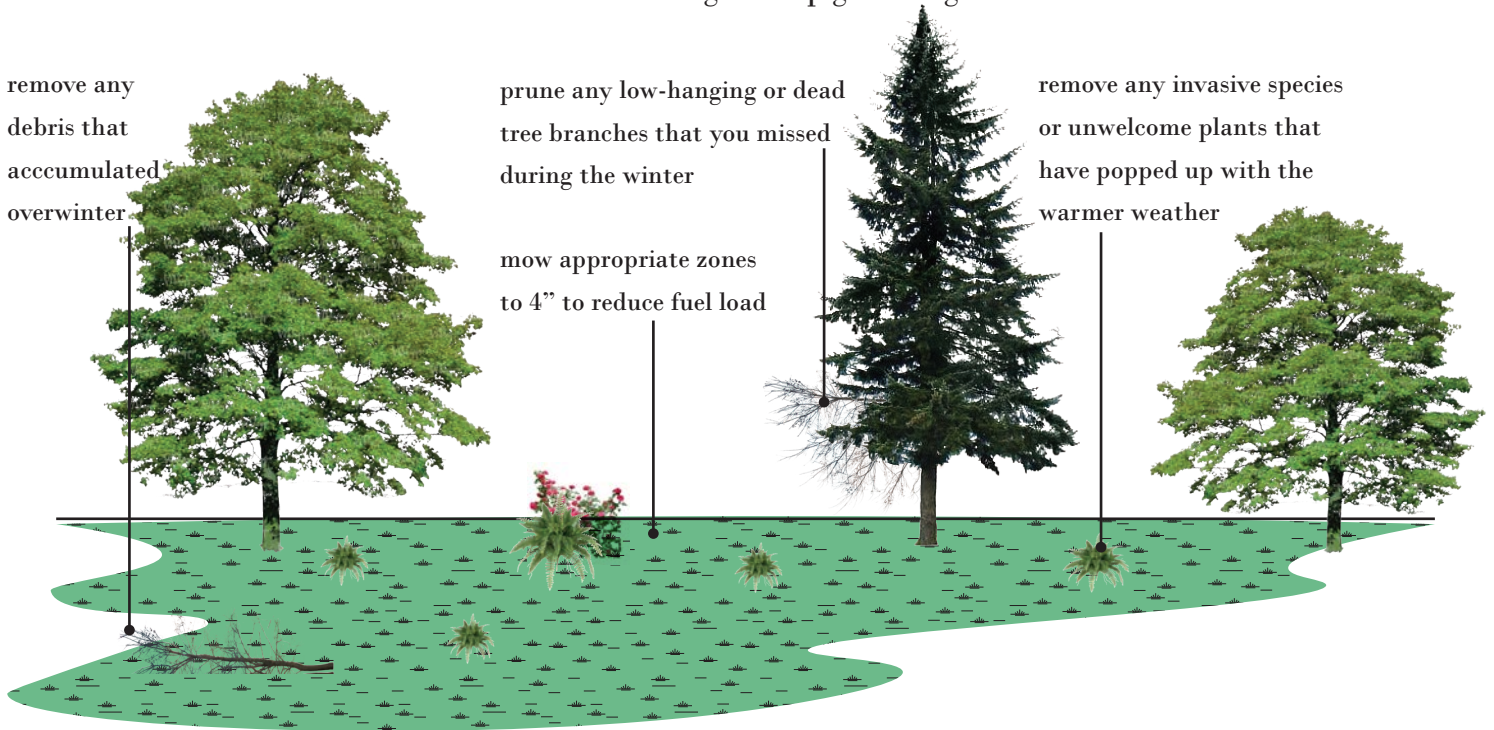
Winter is the best time to manage bulk removal of large plant growth and trees. Many plants are dormant during this season and the thin foliage allows for a clear view of the realities of your landscape. With consistent rain, this is also a great time of year to identify any issues with stormwater or runoff and brainstorm solutions.



Seasonal Maintenance Patterns by  
Hunter W.L. & Daniel Ramirez  
Graphics by Rae Matthews

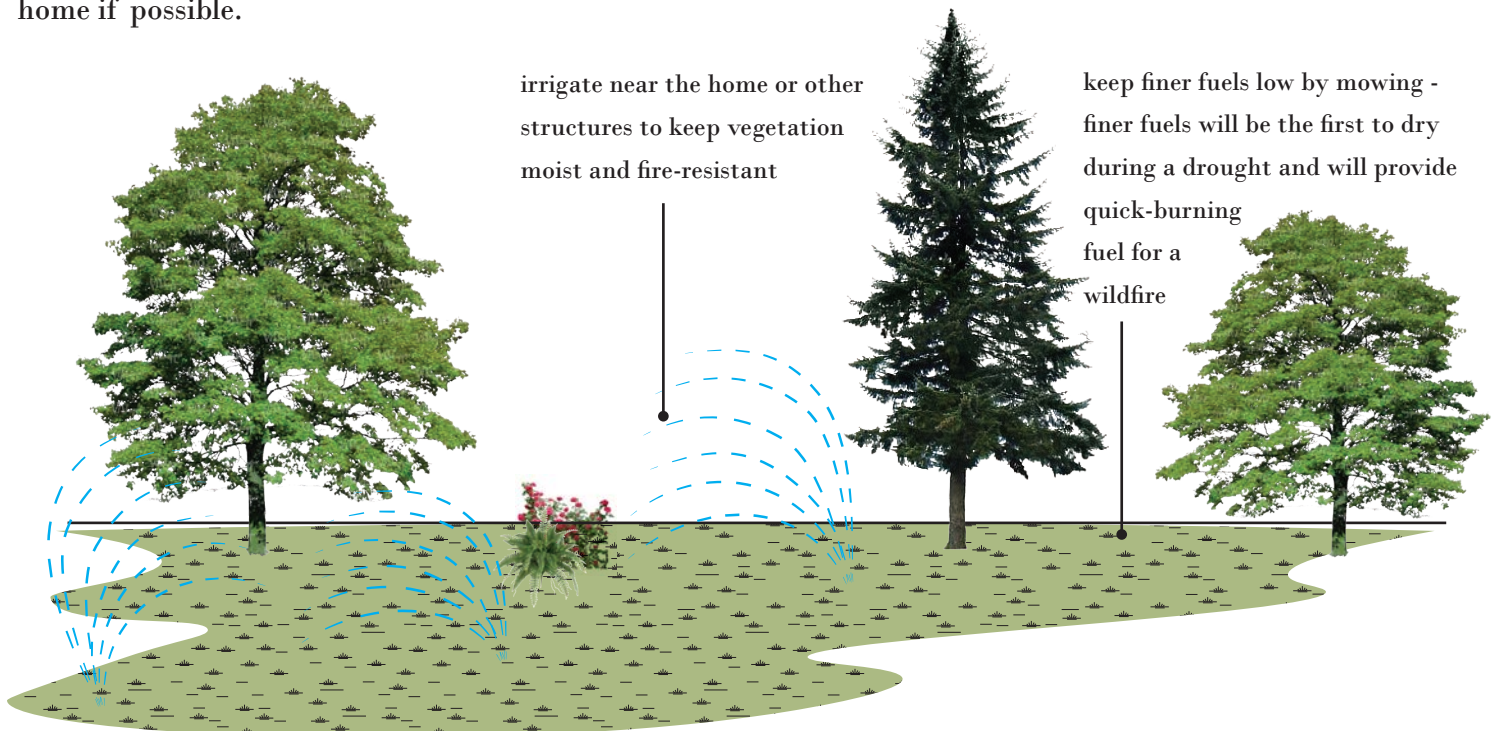
## Spring Season

Spring is the time to set the stage for summer routines by managing young plants and pruning in anticipation of growth. Like in winter, be sure to target and remove any invasive species. It's important to get ahead of their growth, because they will continue to grow vigorously throughout the warmer months if left unchecked. This is also the time to start mowing to keep grass or groundcover at 4".



## Summer Season

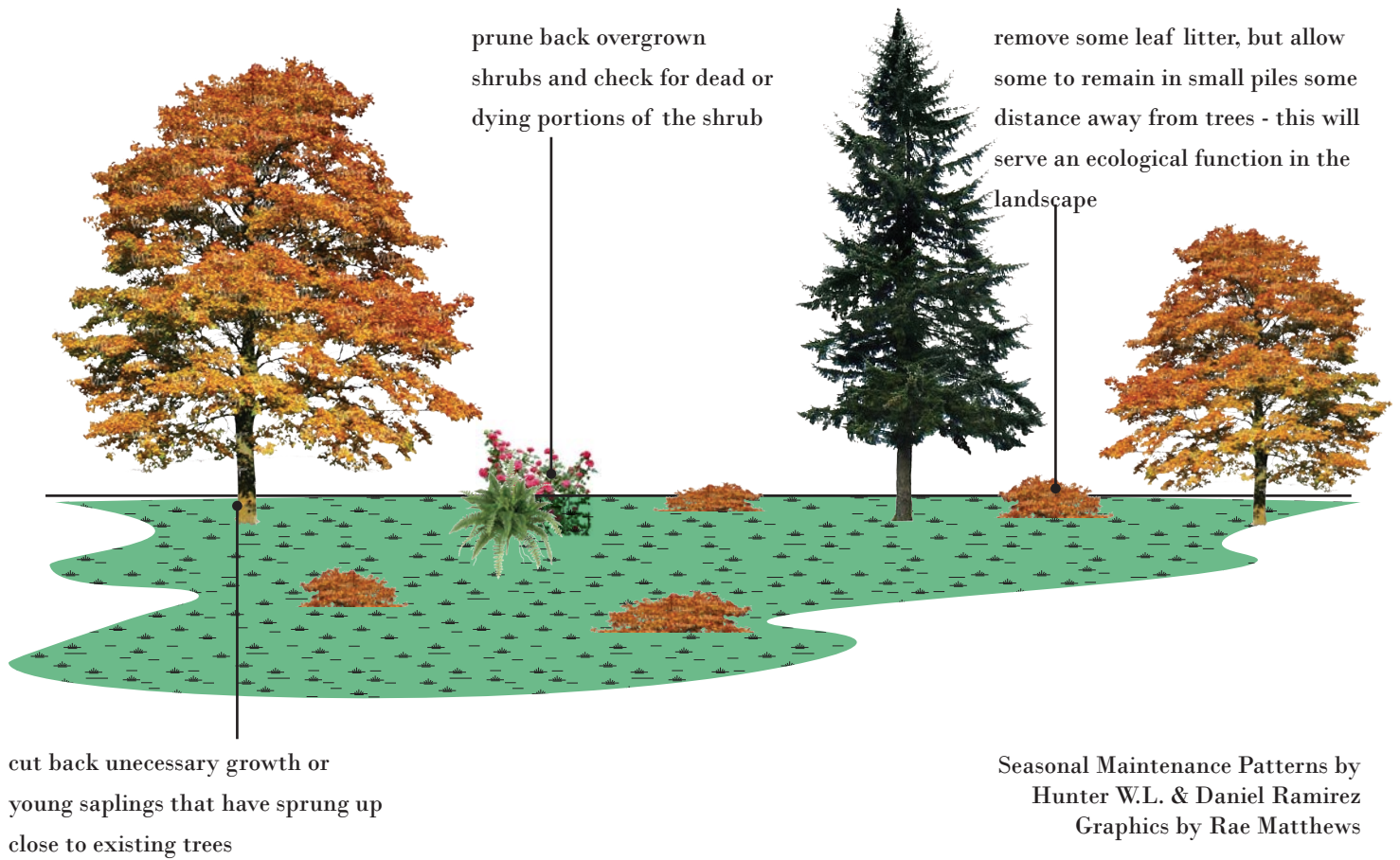
Summer is typically the driest season in Oregon. Continue to mow, but pay attention to any ongoing mowing restrictions. Keep your Zone 1 area clean and well-maintained, and irrigate vegetation near the home if possible.



Seasonal Maintenance Patterns by  
Hunter W.L. & Daniel Ramirez  
Graphics by Rae Matthews

## Fall Season

With the fall season, it is time to cut back summer growth, remove debris, and distribute leaf litter. Growth is starting to slow at this time of year, so you can take this chance to prune any shrubs that have grown too much during the summer months. Distribute leaf litter into spaced out, small piles - this will provide shelter and food for wildlife, while minimizing the risk of fire. Continue mowing to 4" until the grass stops growing.



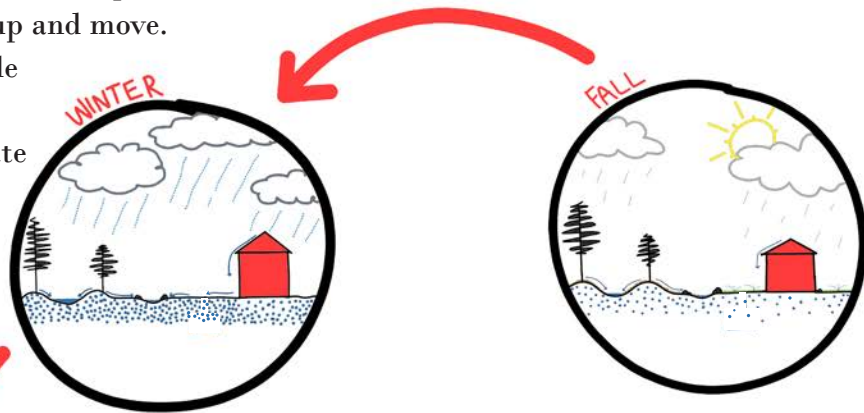


# Managing Stormwater Throughout the Year

Oregon's seasons yield very different amounts of rainfall; while the rain may seem neverending in the winter, our summers are hot and dry. Because of this, landowners may find themselves at the mercy of runoff and flooding in the winter, and then spending too much money on irrigation in the summer.

To combat the many moods of Oregon, landowners should become familiar with the flow of water on their property and consider implementing various water conservation techniques. Various strategies are more appropriate at certain times of year, and the seasonal graphic below illustrates when to consider and incorporate specific techniques.

- Note the flow of water through the landscape - where does it pool or run? Consider these spots for future rain garden or swale construction.
- Keep the ground free of pollutants that the water will pick up and move.
- Install permeable pavers to allow water to permeate the ground as much as possible.



- New growth will respond to the warmth and rain - it will help filter stormwater and hold moisture.

- Utilize irrigation if summer drought persists - fall can be dry depending on the year.

- Summer is typically dry - evaluate the water usage of your garden or other plants - are some plants needier than others? Are there native, water-wise alternatives that could be used?

- Irrigate Zone 1 to keep your home surrounded by moist lawn or groundcover.

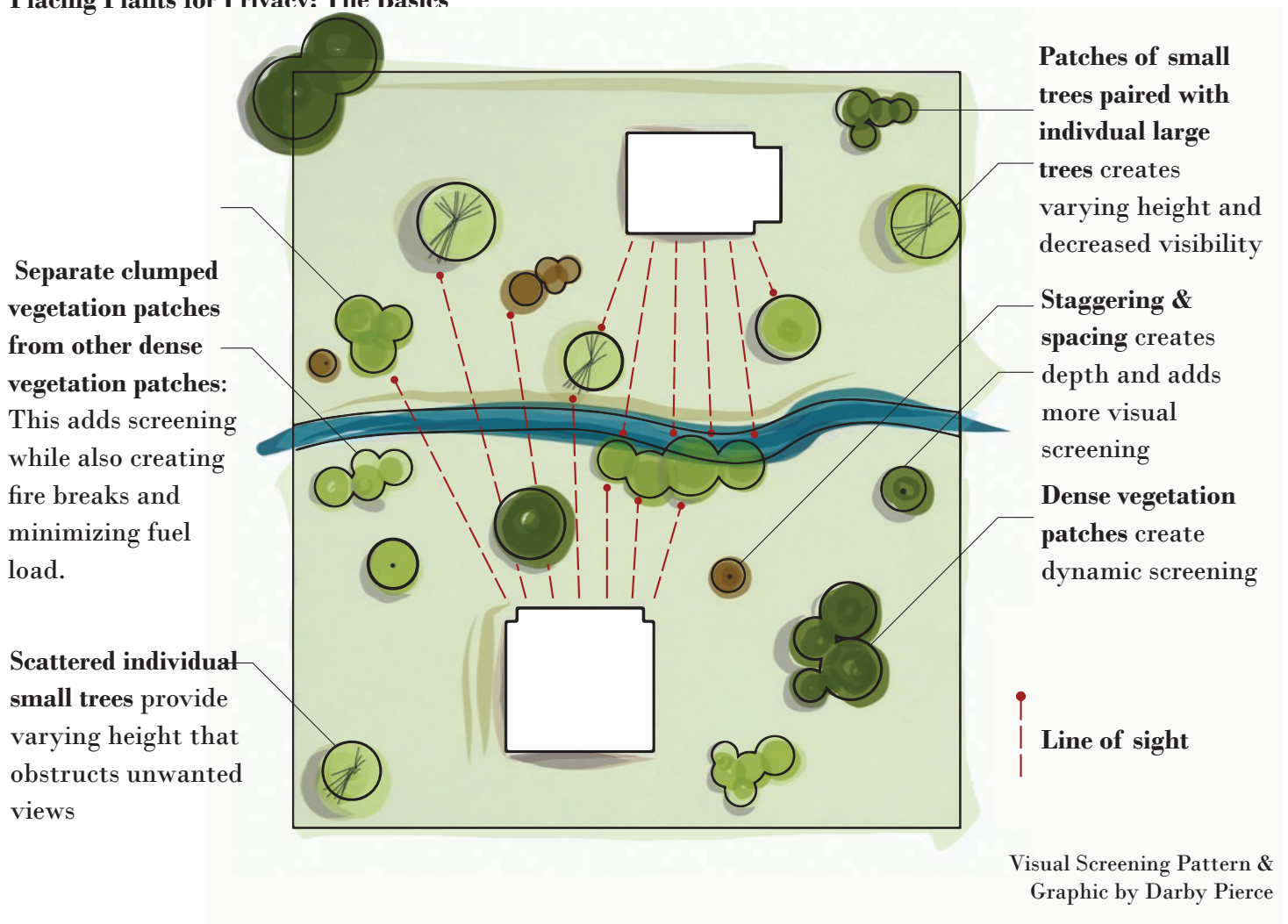
# Community Design Patterns

## Fire-Safe Noise Barriers & Visual Screens

Fuel reduction, while necessary to reduce fire risk, may have the unintended consequence of revealing direct, unwanted lines of sight between neighbors. Thinner vegetation may also allow more noise to make its way across properties. What is the best way to maintain a fire-resistant landscape while also maintaining privacy?

One way to solve this problem is careful consideration of the existing landscape and developing a plan with smart placement of a variety of shrubs, trees, or other barriers. Careful placement of these components will achieve both privacy and keep your property's fire risk low.

### Placing Plants for Privacy: The Basics



## Types of Barrier for Community Privacy

While much of fire-safe landscaping is focused on vegetation removal and spacing, there is a need for some level of privacy. In areas without wildfires, this may take the form of a privacy hedge or wooden fence - while those options are feasible in this region, extra precautions must be taken to ensure both privacy and fire resilience. As always, make sure trees, especially those near homes, are limbed up and properly spaced in order to ensure a fire-resistant landscape.



### Coniferous Trees

Coniferous trees have the advantage of foliage year round. However, a limbed up evergreen tree will only block vision from 6' upward.



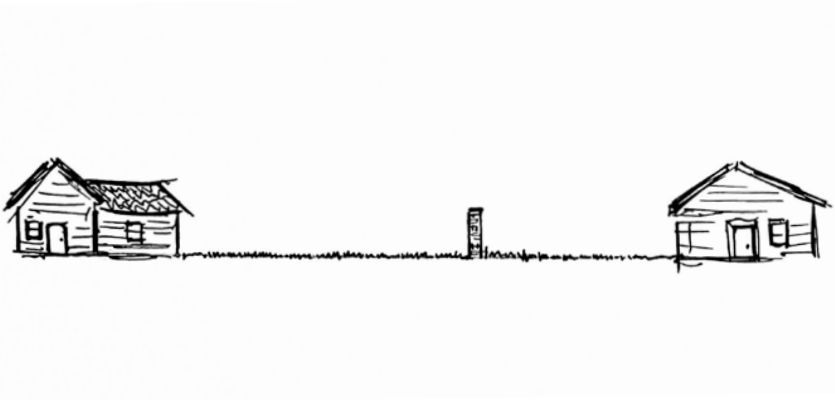
### Deciduous Trees

If summer time privacy is your priority, a deciduous tree will work, and provide fall color. The downsides are that only branches are left in winter, and most trees will leave the lower ground view visible.



### Shrubs or Plant Pods

If lower views are what you want to block, a few carefully placed shrubs or a plant pod (pg. 14) would be a great choice for blocking views.



### Walls

Walls or fences are a straightforward approach to the privacy issue. Use non-flammable or fire-resistant materials for the safest results. Do not place vegetation near any structure - walls and fences require spacing like any other structure to ensure a fire-resilient landscape.



## Fuel Breaks

**Firebreaks** - A firebreak is an area where flammable vegetation has been removed, leaving only soil. This essentially disrupts the spread of a wildfire by removing any potential fuels from its path.

**Fuel Breaks** - Fuel breaks are areas similar to firebreaks, however they do have some vegetation. However, this vegetation is slow to burn or non-flammable - like a mowed strip of grass that breaks up the continuity of fuels provided by a surrounding forest.

**Shaded Fuel Break** - Shaded fuel breaks are a kind of fuel break that allows trees. Below the trees, the ground or vegetation is strictly mowed and maintained to reduce fuels.

When wildfires occur they often travel across the landscape via canopy and undergrowth. The thick forests common throughout parts of Oregon provide a relatively uninterrupted swath of dense woodland that, if dry, allows wildfire to spread with ease.

In order to prevent or slow the spread of an active wildfire, communities could install occasional fire or fuelbreaks throughout the neighborhood. This would require a measure of community cooperation for both installation and maintenance, but would effectively disrupt the movement of a wildfire while also providing space for emergency fire fighting efforts, recreation, and unique habitat creation.



**Dense undergrowth & overlapping canopies** create an easy path for the fire to spread. With this amount of fuel and room to grow, wildfires will burn hot and move easily.



**Firebreaks** interrupt a wildfire's path. The fire will drop to a maintained ground level (which contains gravel, dirt, or native grass species) where it will have less fuel and be easier to combat. This will slow a fire's spread and give fire fighters a space to fight the fire.



Firebreaks/Fuelbreaks Pattern & Graphics by Rae Matthews

**Shaded fuel breaks** act similarly to firebreaks, but allow for trees to exist within the space. This fuelbreak type requires removal of the undergrowth and thinning of the trees and canopy to inhibit the spread of a wildfire. The shade offered by trees may trap some humidity and decrease general flammability.

**Where to Place a Fire or Fuel Break** - Roadways, recreational paths, powerline easements, and community spaces all provide space to base a fire or fuelbreak around. If the a fuel break can be built and maintained around the corridor structure of these spaces, it can slow a wildfire and give firefighters space to work. It is also worth considering the paths of former wildfires.

For more information on fire and fuel breaks: <https://catalog.extension.oregonstate.edu/pnw618>

# Glossary

**Defensible Space** - A buffer area between your home and any wildland beyond your property. This buffer space is meant to slow or even stop fire from spreading to your home, while also providing firefighters with open space where they can work and defend your home.

**Fire-Adapted Plants** - These are plant species that don't ignite easily when exposed to fire or other ignition sources. They can be damaged or killed by fire, but their foliage and stems don't significantly contribute to fuel and add little to a fire's intensity. They typically have moist and supple leaves, don't accumulate dry, dead plant material, and have water-like or minimal sap. In addition, many will resprout after fire.

**Firebreaks** - A firebreak is an area where flammable vegetation has been removed, leaving only soil. This essentially disrupts the spread of a wildfire by removing any potential fuels from its path.

**Fuels** - Anything that can burn. This could be trees, shrubs, grasses, perennial plants, leaf litter, or any other plant material available. The drier the vegetation, the more likely it is to burn.

**Fuel Breaks** - Fuel breaks are areas similar to firebreaks, however they do have some vegetation. However, this vegetation is slow to burn or non-flammable - like a mowed strip of grass that breaks up the continuity of fuels provided by a surrounding forest.

**Fuel Load** - This refers to the quantity of fuel available to burn. Is there a thick layer of dead leaves and pine needles on the ground? Has a set of blackberry bushes grown out of control? Are tree canopies overlapping overhead? That is a high fuel load, and it will burn very quickly, especially if dry. Controlling the amount of fuel may lessen the ability of a fire to spread, and decrease its severity. The graphic below displays the difference between a relatively high fuel load and a lower fuel load.

**Habitat Snag** - A dead or dying tree, which is left to decompose naturally.

**Invasive Plants** - Plant species that have been introduced and thrive to the point of destroying and damaging native species are considered invasive species. These plants should be known and controlled within the landscape, because they can overgrow and easily create a high fuel load.

**Native Plants** - Native plants are those that occur naturally within the region or ecosystem. Native plants are often adapted to local ecosystems processes and are better suited to the local climate than exotic species.

**Shaded Fuel Break** - Shaded fuel breaks are a kind of fuel break that allow trees. Below the trees, the

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