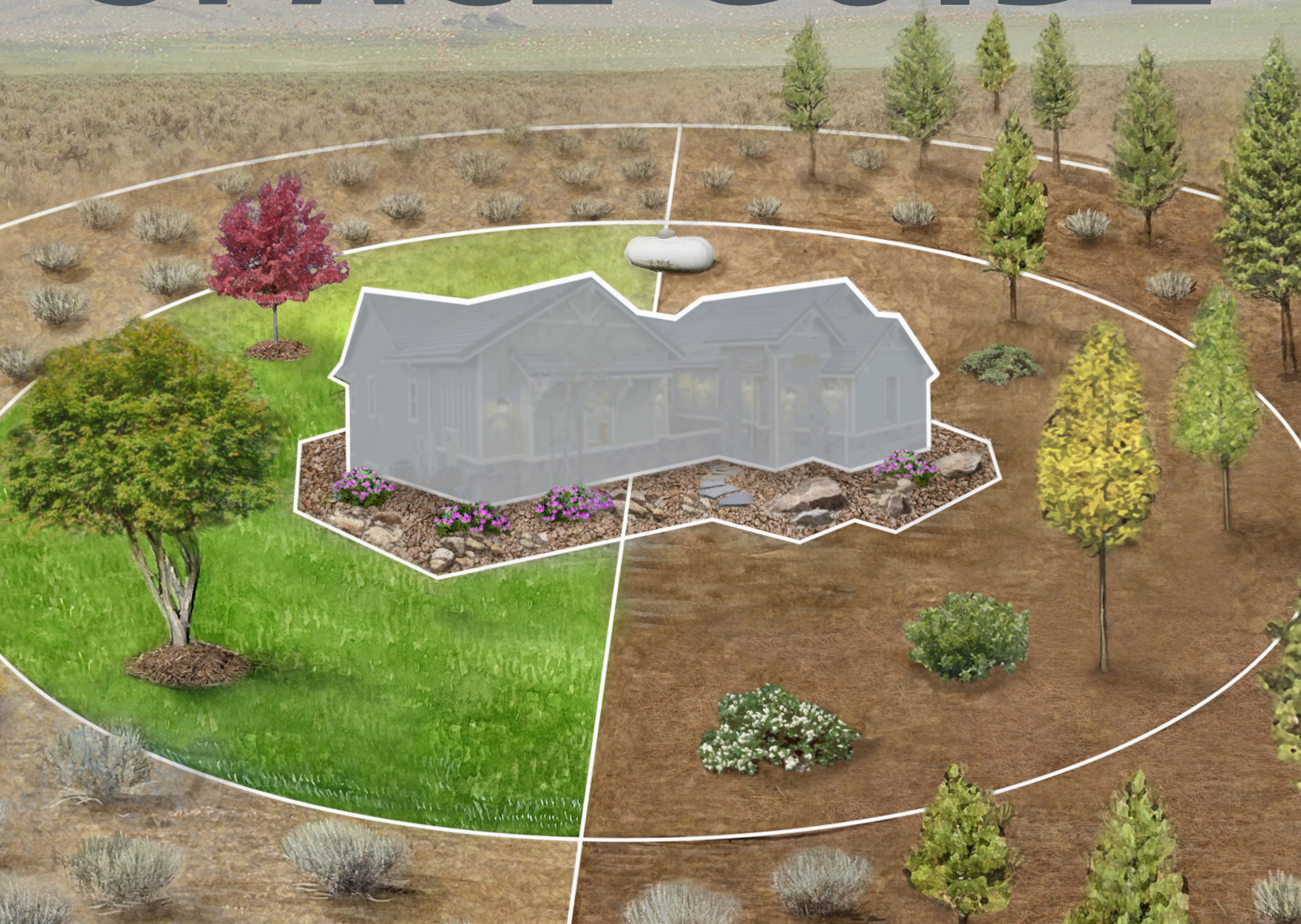


LIVING WITH FIRE DEFENSIBLE SPACE GUIDE



EXTENSION
College of Agriculture,
Biotechnology & Natural Resources



PEER
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DEFENSIBLE SPACE IS THE BUFFER AROUND A HOME where the vegetation has been managed to reduce the wildfire hazard. Creating defensible space increases the chance of home survival and provides a space for firefighters to safely defend the home during a wildfire event. Adequate defensible space does not require complete removal of the home’s surrounding vegetation. Removal of all vegetation is not good for ecosystem health and can often lead to an increase in invasive weeds and grasses (such as cheatgrass). In this guide, you can learn about how to create an aesthetically pleasing and safer landscape that can reduce the impacts of wildfire on your home. In this guide, we provide defensible space recommendations for sagebrush ecosystems and pine-dominated ecosystems.



DEFENSIBLE SPACE IS ONLY ONE PART OF REDUCING YOUR WILDFIRE THREAT.

The most effective way to reduce the threat of wildfire is the “coupled approach” which considers the home’s construction materials and the surrounding vegetation. If you would like to learn about home hardening, or how to retrofit your home with ignition-resistant materials, view the publication, *Wildfire Home Retrofit Guide*.



SAGEBRUSH ECOSYSTEM

The natural vegetation in these ecosystems has a large amount of sagebrush combined with native shrubs, grasses and flowering plants with few trees.

PINE-DOMINATED ECOSYSTEM

A pine-dominated ecosystem is where the dominant natural vegetation is pine trees. Examples of trees in this region are ponderosa pine and jeffrey pine.

WE REFER TO DEFENSIBLE SPACE AROUND A HOME IN THREE DISTINCT ZONES. These zones are useful to remember when making a defensible space plan. We provide different recommendations in each zone regarding the types of acceptable plants and ground cover, distance between vegetation, and overall maintenance. Defensible space planning varies based on your ecological setting, the surrounding vegetation and prevailing winds. Fire moves more rapidly with strong winds, so it's important to consider which part of your property aligns with prevailing wind patterns. The illustration is divided into two ecosystems: the left shows the sagebrush ecosystem, and the right shows a pine-dominated ecosystem. This guide is a helpful tool to plan your defensible space, but it does not replace the expert advice that an in-person defensible space inspection can provide. For information about a free defensible space inspection, contact your local fire agency.

SAGEBRUSH ECOSYSTEM

SAGEBRUSH ECOSYSTEM

ZONE 0

ZONE 1

ZONE 0

Ember-Resistant Zone | 0–5 feet

Remove woodpiles; wood mulch and other combustible mulch; junipers, sage and other high-fire-hazard plants; dead leaves; pine needles; and weeds. Use hardscaping, such as gravel, decomposed granite, rock, concrete, brick or pavers. No plants are fireproof, but if you must have plants in this zone, favor plants that are low growing and nonwoody with high moisture content. Understand that wildfires can occur during the fall and winter. During those seasons, plants become dormant, contain less moisture and can burn easily.

ZONE 2

SAGEBRUSH ECOSYSTEM



ZONE 1

Lean, Clean, and Green Zone | 5–30 feet

Lean – Reduce the flammable vegetation to a small amount, if any. Ensure discontinuous islands of vegetation. Mulch can be used, but not in a continuous, widespread manner and should be surrounded by noncombustible options, such as decomposed granite or irrigated lawn.

Clean – Remove all dead or flammable debris. Avoid mass plantings of shrubs and trees.

Green – Keep plants healthy and irrigated (when possible). If located in a pine-dominated ecosystem, remove all pine needles once in this zone in the spring. Needles can accumulate during the colder fall and winter months.

ZONE 2

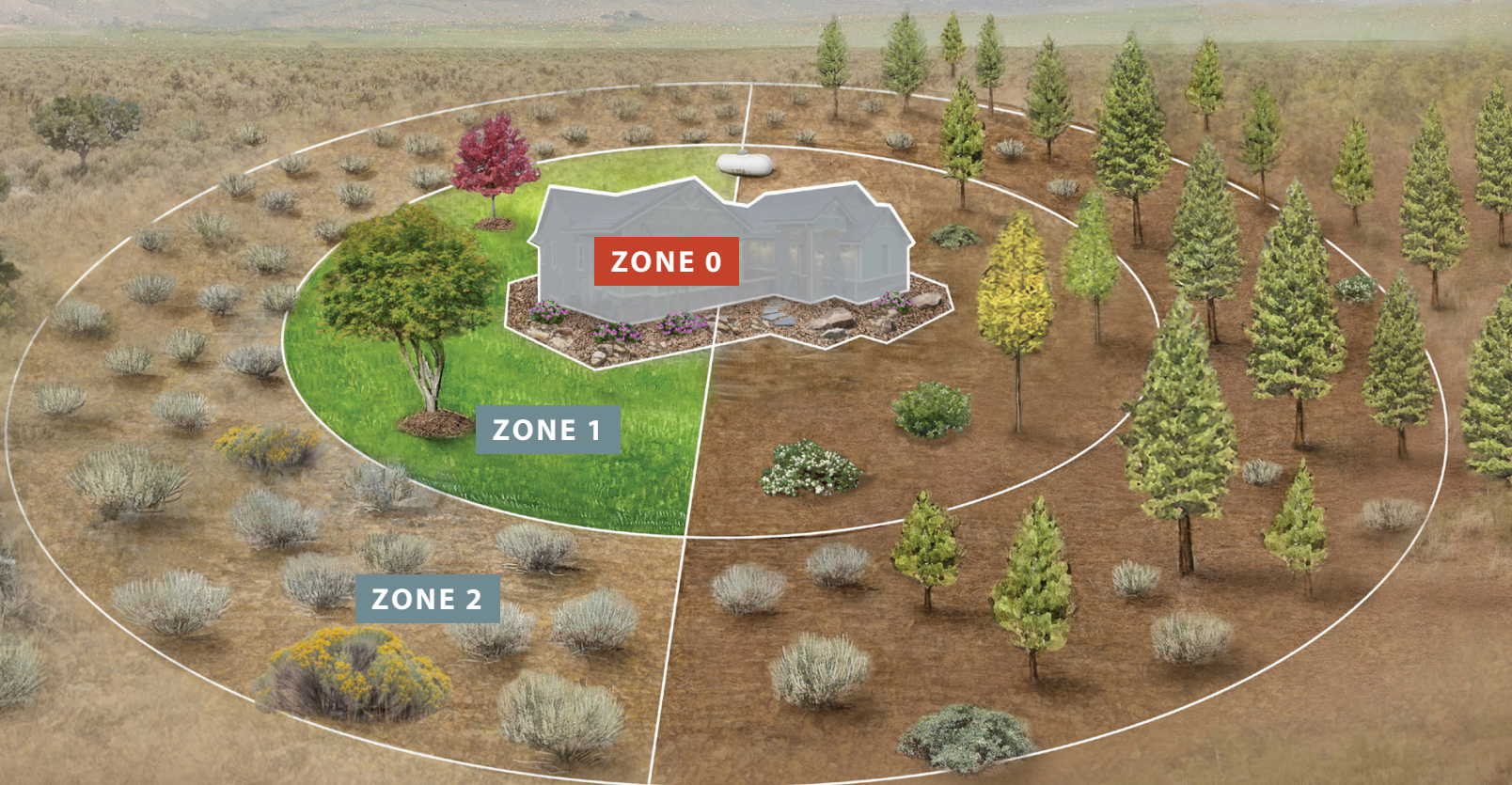
Reduced Fuel Zone | 30–100+ feet

Eliminate all dead or dried vegetation. If living in a pine-dominated ecosystem, don't allow pine needles on the ground to exceed 3 inches in depth. Create separation between shrubs or small groups of shrubs and trees. Remove ladder fuels, or low-growing vegetation that promotes fire from the ground to the tops of trees.

ZONE 0

The Ember-Resistant Zone | 0–5 feet

The goal in this zone is to reduce the vulnerability of the home to embers by creating a zone of ember-resistant materials around the home. In wildfire events, 60–90% of the homes ignite from embers. Therefore, a noncombustible zone is critical. Gravel, a concrete or brick walkway, or another hardscape feature is commonly used to construct this zone. This ember-resistant zone should include the area under and around any attached deck. Ensure this zone is free of any woodpiles, wood mulch or flammable vegetation.



Checklist for the Ember-Resistant Zone in All Ecosystem Types

- Eliminate all vegetation in the ember-resistant zone. However, if that is not possible, plant low-growing (less than 18 inches), irrigated, high-moisture-content, nonresinous vegetation, such as succulents, some ground covers and flowers. Provide spacing between these plants and clear dead vegetation from beneath the plants. Understand the wildfire risk is higher when plants are present within this zone.
- Use gravel, decomposed granite, rock, concrete, brick, pavers or other hardscape features to create an ember-resistant zone.
- Do not plant shrubs, bushes, trees or any woody vegetation under first-story windows or soffit vents, in front of foundation vents, or in corners.
- Remove woodpiles, wood mulch or flammable vegetation. Flammable vegetation includes juniper, mugo pine, Austrian black pine, arborvitae, cedar, large exotic grasses and Scotch broom.
- Remove the dead and dying vegetation, such as trees, shrubs, branches, leaves, twigs, grass, weeds, pine needles and flowers.



! **ORNAMENTAL JUNIPERS** are popular landscaping shrubs because they require little maintenance, are drought tolerant and evergreen. However, they are highly flammable and burn intensely. It is recommended to remove all ornamental junipers within 30 feet of the home.

PLANTS FOR DEFENSIBLE SPACE IN SAGEBRUSH ECOSYSTEM

For a list of defensible space plants in the sagebrush ecosystem, view *“Choosing the Right Plants in Northern Nevada’s High Fire Hazard Area.”*



← Low-growing (less than 18 inches), high-moisture content, non-resinous vegetation

PLANTS FOR DEFENSIBLE SPACE IN PINE-DOMINATED ECOSYSTEM

For a list of defensible space plants in the pine-dominated ecosystem, view *“Choosing the Right Plants in Nevada’s High Fire Hazard Areas Lake Tahoe Basin.”*





Specific Recommendations for Each Ecosystem

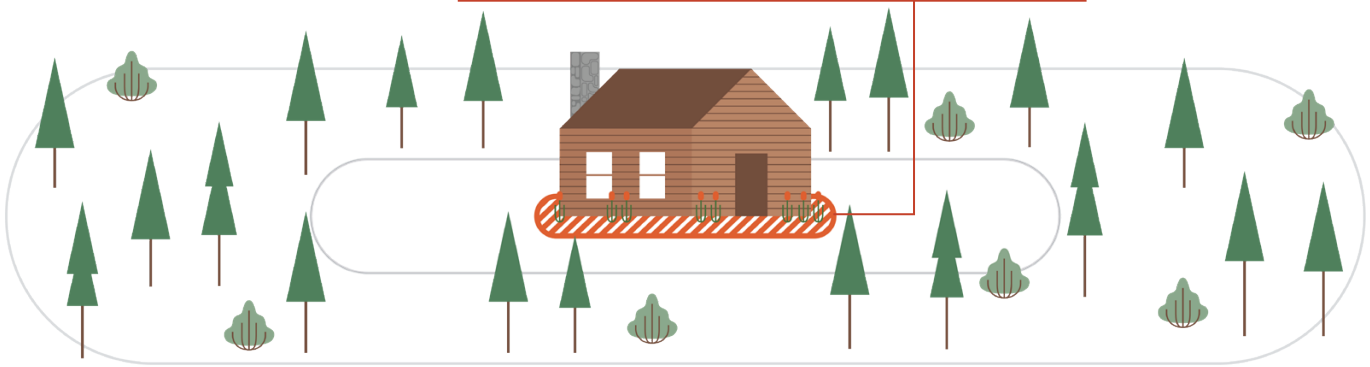
PINE-DOMINATED ECOSYSTEM

- Remove flammable trees and shrubs, such as big sagebrush, bitterbrush, juniper, greenleaf manzanita, snowbrush, rabbitbrush, huckleberry oak, pine and fir.
- If you live in the Lake Tahoe Basin, check with the Tahoe Regional Planning Agency (TRPA) before installing hardscape to see if a permit is required. View the TRPA's website on the QR code:

TO VIEW THE TRPA'S WEBSITE:



Routinely remove pine needles in Zone 0.



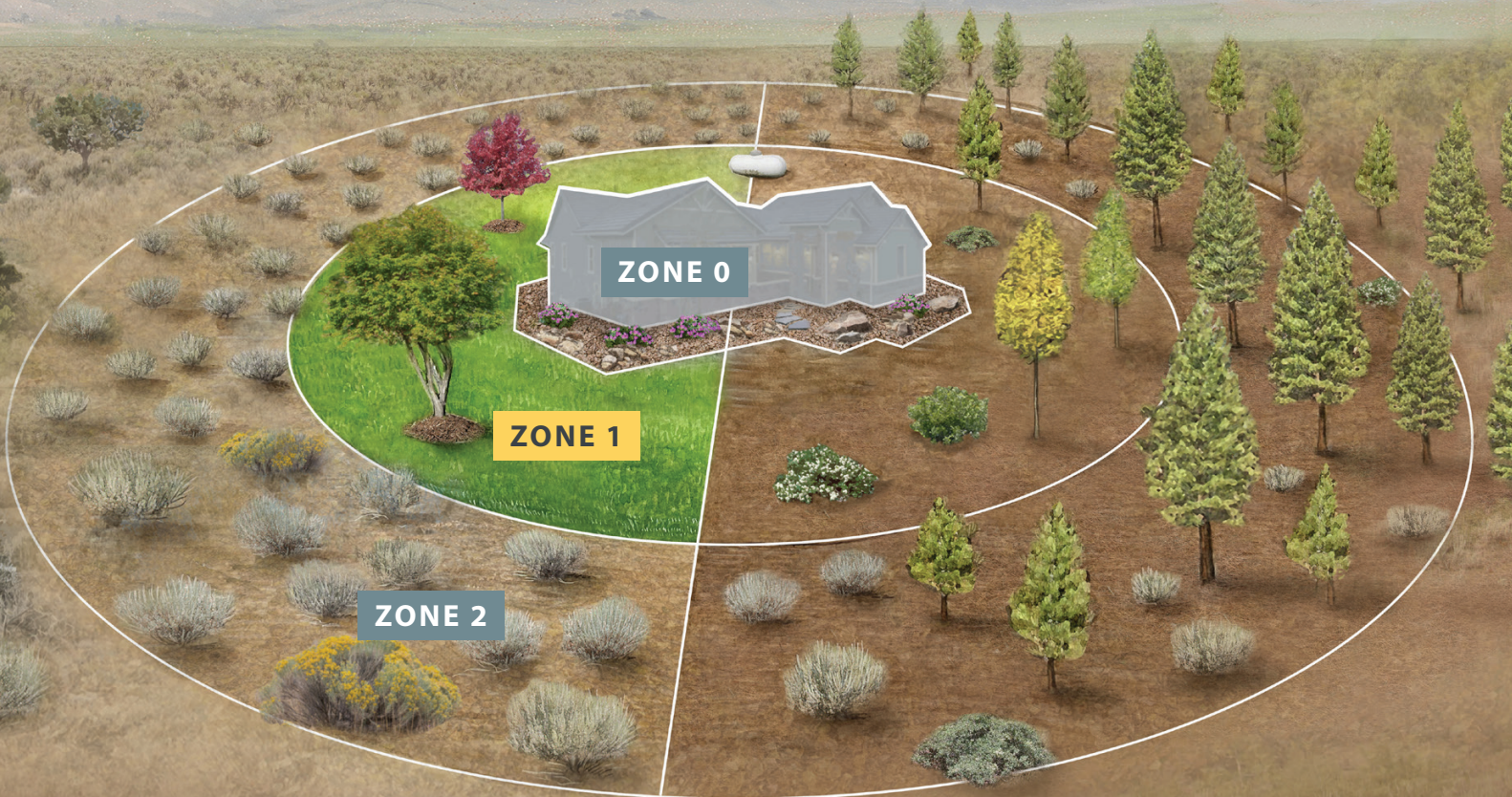
SAGEBRUSH ECOSYSTEM

- Remove flammable trees and shrubs, such as big sagebrush, bitterbrush, rabbitbrush, cheatgrass, pinyon, juniper and manzanita.

ZONE 1

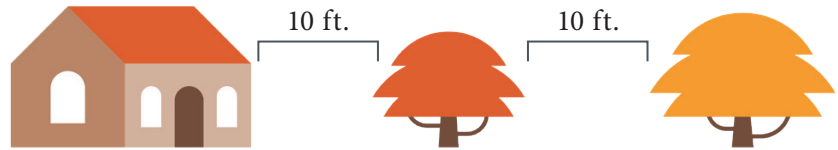
The Lean, Clean, and Green Zone | 5–30 feet

The objective of this zone is to reduce the risk of fire spreading from surrounding vegetation to the home. “Lean” indicates that there is only a small amount of vegetation present. Vegetation should be grouped in discontinuous islands. “Clean” indicates that vegetative debris and dead materials are routinely removed. “Green” indicates that vegetation within this zone is kept green and well irrigated (if applicable) during dry months.



Checklist for the Lean, Clean, and Green Zone in All Ecosystem Types

- Trim tree branches within 10 feet of the home, chimney, deck or roof and within 10 feet of other trees.



- Mulch is beneficial to tree and plant health. Limit the use of wood mulch to 1 inch in depth and create distinct “islands” of mulch by surrounding the mulch with green, irrigated vegetation or hardscape/ignition-resistant materials to prevent the flammable mulch from extending to the home.

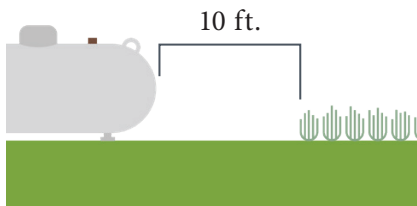
- Remove dead vegetation, including shrubs, trees, dried grass, flowers, weeds, twigs and branches.

- Favor deciduous shrubs and trees or vegetation that sheds its leaves instead of evergreens. Evergreen examples include junipers, mugo pine and arborvitae.

- Keep firewood at least 30 feet from any structure.

- Clear weeds and flammable plants within 10 feet of a propane tank.

- Keep plants well irrigated during the dry months.



↑ 10 feet from weeds or flammable plants

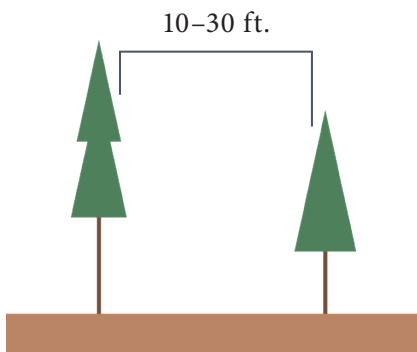
Specific Recommendations for Each Ecosystem

PINE-DOMINATED ECOSYSTEM

- Separate individual trees or small groups of trees by 10–30 feet. If located in the Tahoe Basin, removing trees with a diameter greater than 14 inches requires a permit from your local fire agency. Contact your local fire agency or the TRPA to evaluate tree removal. Visit TahoeLivingWithFire.com for your local fire agency’s information.

- Remove a majority of native shrubs. Some can remain in this zone if they are healthy and the height is reduced. Low-growing shrubs, such as pinemat manzanita and mahala mat, can remain.

- Use low-growing (less than 18 inches) irrigated, herbaceous plants that are recommended for the Lake Tahoe Basin. Examples include turf, clover, flowers, ground covers and succulents. Be sure to remove dead foliage and dead plants.

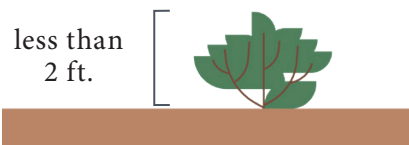


Routinely remove pine needles once every spring and as needed to keep Zone 1 clean and lean.



SAGEBRUSH ECOSYSTEM

- Use green, herbaceous, low-growing plants (less than 2 feet) in this zone.
- Ensure native vegetation is well-spaced and free of dead vegetation. Make sure to prune lower branches and space appropriately into discontinuous islands.
- Clear all cheatgrass within 30 feet of the home. Be aware that cheatgrass thrives in disturbed areas. If a large amount of the native shrubs are removed, cheatgrass will likely take over. The use of herbicide in this zone will reduce the prevalence of cheatgrass.



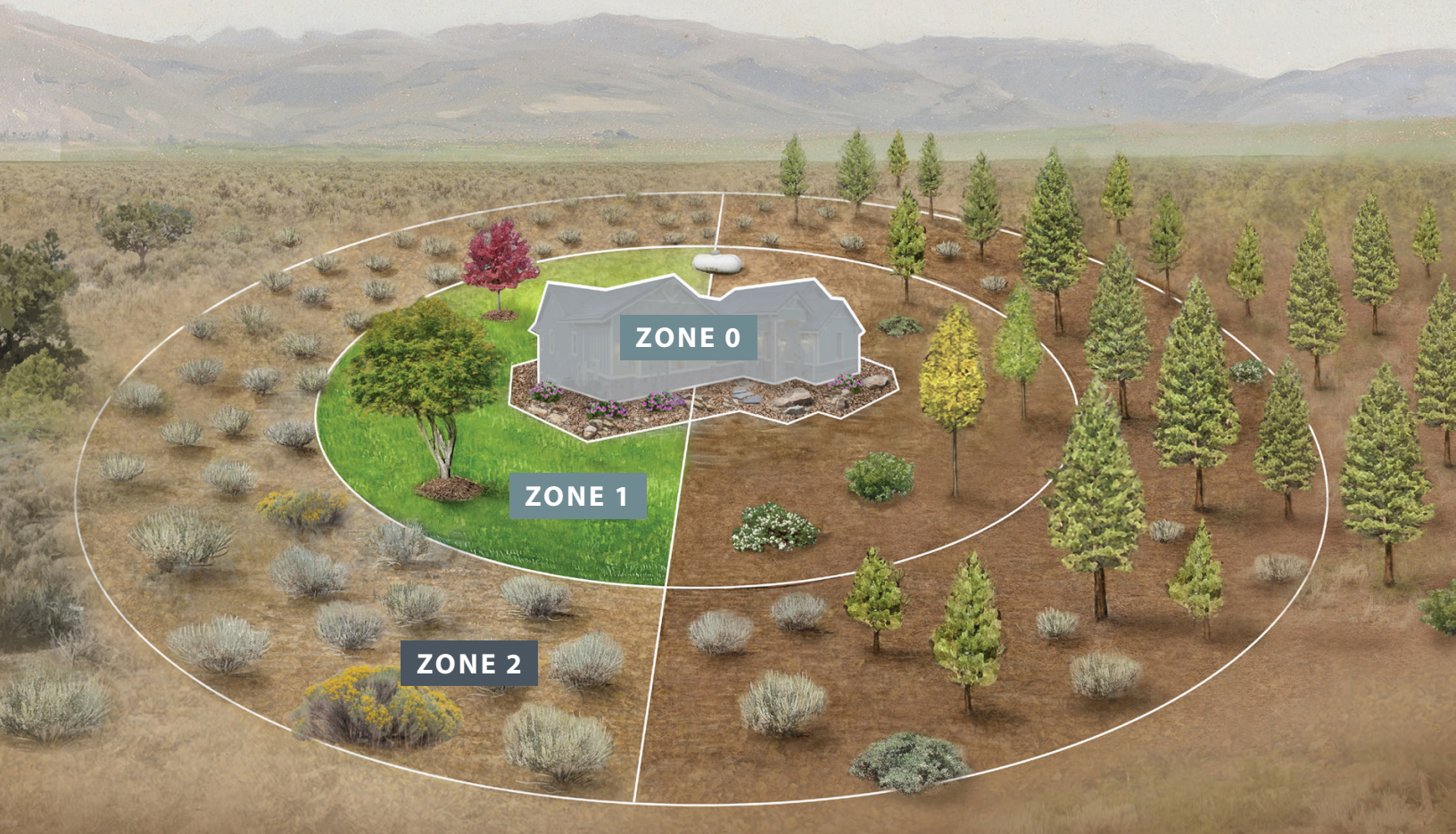
TO LEARN MORE ABOUT CHEATGRASS:



ZONE 2

The Reduced Fuel Zone | 30–100+ feet

The objective of this zone is to reduce fire spread and restrict fire movement into the crowns of trees or shrubs. Remove dead plant material, lower tree branches and other ladder fuels (such as shrubs, lower branches, smaller trees). Locate outbuildings, sheds, etc. at least 30 feet away from the home and create an ember-resistant zone around all outbuildings and propane tanks.



TO BEGIN PLANNING for this zone, consider the vegetation surrounding your home and the slope of your property. Fire spreads faster on steeper slopes, therefore a larger Zone 2 is recommended if your home is located on top of a steeper slope. This table will help you decide how far Zone 2 must extend from your home. This concept does not necessarily apply if your home is located at the bottom of a slope. Removing too much vegetation from the bottom of the slope does little to reduce the wildfire threat, and it can cause erosion or infestation of invasive plants. Exceptions to this concept exist if your home is located at the bottom of a slope and your region experiences prevailing winds that flow from the top

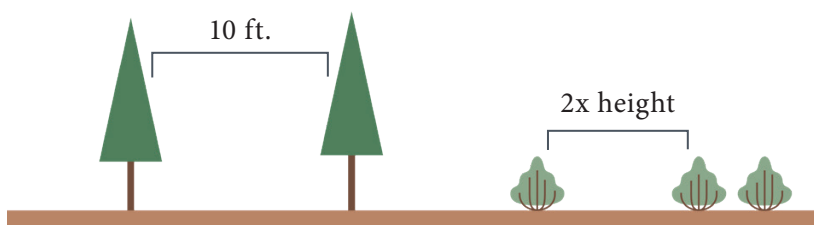
RECOMMENDED DEFENSIBLE SPACE DISTANCE

	Flat to Gently Sloping 0–20%	Moderately Steep 21–40%	Very Steep more than 40%
Grass, Dry Grass (<i>cheatgrass and weeds</i>)	100 feet	100 feet	100 feet
Shrubs and Woodland (<i>sagebrush, pinyon and juniper</i>)	100 feet	200 feet	200 feet
Trees (<i>ornamental or forest trees</i>) <i>If there's substantial shrub understory, use those values stated above.</i>	100 feet	100 feet	200 feet

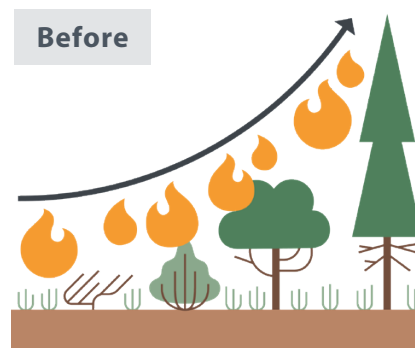
of the slope towards your home. For these special circumstances, contact your local fire agency for more information. If your recommended defensible space extends farther than your property line, ask the neighboring landowner permission to work together on defensible space.

Checklist for the Reduced Fuel Zone in All Ecosystem Types

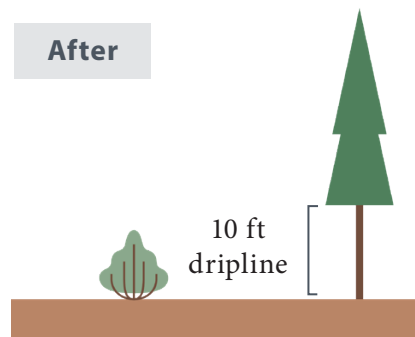
- Create a separation of twice the height between individual shrubs or small clumps of shrubs. For example, if a sagebrush is 2 feet tall, multiply that by the number two and ensure there is a 4 foot separation between shrubs. If shrubs are located on a steep slope, stagger the shrubs horizontally. Small clumps of shrubs can also be utilized to create less impacts to the ecosystem or wildlife. For example, a 5 feet by 5 feet clump of shrubs can be spaced 10 feet from another 5 feet by 5 feet clump of shrubs. If using this “clump concept” on a slope, the oblong clumps should be used horizontally perpendicular to the slope to reduce erosion.



- Maintain an average canopy spacing of 10 feet between the canopies of all trees, such as jeffrey pine and white fir.
- Remove weakened, damaged or dead trees first, before removing healthy trees.
- Clear dead vegetation, (such as dead shrubs, fallen branches, dried grass and weeds).
- Eliminate ladder fuels, such as shrubs, lower branches and smaller trees under the drip line. Do not remove more than one-third of the tree's branches, as it will impact tree health.



Ladder fuels are low-growing vegetation that promote the movement of fire from the ground to the crowns or tops of trees.



After managing the vegetation, ladder fuels are gone.

Specific Recommendations for Each Ecosystem

FOR MORE ABOUT BARK BEETLES:



PINE-DOMINATED ECOSYSTEM

- When pruning trees, consider preventing the spread of invasive bark beetles that are known to kill conifers, or evergreens. If bark beetles are of concern, thinning should occur during the late fall and winter.
- Maintain the pine needle depth at less than 3 inches.
- Leave plant roots in the soil to reduce soil erosion on steep slopes when removing shrubs or trees.
- If located in the Tahoe Basin:
 - o Obtain a permit from a local fire agency or the TRPA to remove live trees more than 14 inches in diameter. Visit TahoeLivingWithFire.com for your local fire agency's information.
 - o Contact the TRPA if defensible space extends into sensitive areas, such as lakeshores, beaches, stream environment zones, scenic resource areas and conservation/recreation areas.
 - o Consider implementing Best Management Practices (BMPs) on your property. BMP measures help to slow water runoff and control soil erosion. Contact the Tahoe Resource Conservation District or the Nevada Tahoe Conservation District.

Maintain pine needle depth at less than 3 inches in Zone 2.*



**Note: Pine needles play an important part in recycling nutrients back into the soil. Removing all pine needles can impact soil health, increase soil erosion and allow for infestation of invasive plants.*

SAGEBRUSH ECOSYSTEM

- Provide separation between native trees and shrubs. Native trees, such as Jeffrey pine, pinyon pine, Utah juniper and sagebrush, should not occur densely.
- Thin pinyon and juniper by providing a separation of 1.5 to 2 times the average tree height.



Acknowledgments

Concepts were taken from Fire Adapted Communities The Next Step in Wildfire Preparedness and were based upon the 2021 International Wildland-Urban Interface Code from the International Code Council, and a group of local, state and federal fire agencies that participated in a review of the Living With Fire recommendations.

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