

General Guidelines to Implement Performance Based Defensible Space Regulations under PRC 4291

State Board of Forestry and Fire Protection (BOF)
California Department of Forestry and Fire Protection

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A. Purpose of Guidelines

The purpose of these guidelines is to describe fuel reduction treatments that will result in compliance with Public Resources Code (PRC) 4291(a) and (b) and with regulation 14 CCR 1299, Defensible Space. These guidelines are necessary because of recent changes to PRC 4291 that expand the defensible space clearance requirement from 30 feet of a structure to 100 feet. Defensible space is the area within the perimeter of a parcel where basic wildfire protection practices are implemented. The area is characterized by the establishment and maintenance of emergency vehicle access, emergency water reserves, street names and building identification, and fuel modification measures. The focus of these guidelines is on the fuel modification measures, meaning where vegetation is managed and maintained so that it reduces the spread and intensity of encroaching wildfires or escaping structure fires.

From a fire standpoint, the vegetation surrounding homes is fuel for a fire. Even the home itself is considered fuel. Research and experience have shown that fuel reduction around a structure increases the probability of a structure surviving a wildfire. Good defensible space allows firefighters to protect and save homes safely without unacceptable risk to their lives. Fuel reduction through vegetation management is the key fundamental to creating defensible space.



Effective Defensible Space

Fuel reduction standards (clearing requirements) to create adequate Defensible Space will be very different throughout California because of the wide variation of terrain, climate conditions, and vegetation characteristics. Fire frequency and intensity of burning will vary greatly between the North Coast forests and the Southern California forests and chaparral because of the differing climate and vegetation characteristics. While great variation in fuel management treatments for Defensible Space are found in the State, there are some common practices:

- Properties with greater fire hazards will require more clearing. Clearing requirements will be greater for those lands with steeper terrain, larger and denser fuels, fuels that are highly volatile, and in locations subject to frequent fires.
- Creation of Defensible Space through vegetation management usually means reducing the amount of fuel around the home, providing separation between fuels, and or reshaping retained fuels by trimming. Creation of Defensible Space can typically be done by removing fuels; removing lower limbs of trees; or reducing the height of the smaller fuels. **Fuel treatment practices that will comply with State Law 4291(b) include removing dead vegetation, separating fuels from 4 feet to 40 feet (depending on conditions), and pruning lower limbs.**
- In all cases, fuel reduction does not mean cutting down all trees and shrubs, or creating a bare ring of earth across the property. It does mean arranging the tree, shrubs and other fuels sources in a way that makes it difficult for fire to transfer from one fuel source to another.
- A homeowner's clearing responsibility is limited to 100 feet away from their building or to the property line, which ever is less, and limited to their land. Adjacent property owners are not required to clear beyond 100 feet from their structure, but are encouraged to do so to create appropriate defensible space on a community-wide basis.
- Fuel reduction activities that remove trees may require permits from State or local agencies. For example, trees removed for fuel reduction that are used for commercial purposes require permits from the California Department of Forestry and Fire Protection. Also, many counties and towns require tree removal permits when cutting trees over a specified size.

The methods used to manage fuel can be important in the safe creation of Defensible space. Care should be taken with the use of equipment when creating your defensible space zone. Internal combustion engines must have spark arresters and metal cutting blades should be used with caution to prevent starting fires during periods of high fire danger. A metal blade striking a rock can create a spark and start a fire. This is a common cause of fires during summertime.

Vegetation removal can also cause soil disturbance, soil erosion, regrowth of new vegetation, and introduction of non-native invasive plants. Always keep soil disturbance to a minimum, especially on steep slopes. Erosion control techniques such as minimizing use of heavy equipment, avoiding stream or gully crossings, use of mobile equipment during dry conditions, and covering exposed disturbed soil areas will help reduce soil erosion and plant regrowth.

B. Definitions:

Fuel: Vegetative material, live or dead, which is combustible during normal summer weather. For the purposes of these guidelines, it does not include fences, decks, woodpiles, trash, etc.

Aerial fuels: All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs and cones, snags, moss, and high brush. Examples include trees and large bushes.

Surface fuels: Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branches and downed logs.

Reduced Fuel Zone: The area that extends out from 30 to 100 feet away from the building or structure (or to the property line, whichever is nearer to the structure).

Building or structure: Any structure used for support or shelter of any use or occupancy.

C. Fuel Treatment General Guidelines Compliant with 14 CCR 1299 and PRC 4291:

The following fuel treatment guidelines comply with the requirements of 14 CCR 1299 and PRC 4291. **All persons choosing the use of these guidelines to obtain compliance with CCR 1299 and PRC 4291 shall implement General Guidelines 1., 2., 3. and either 4a or 4b. as described below.**

General Guidelines:

1. Maintain a firebreak by removing and clearing away all flammable vegetation and other combustible growth within 30 feet of each building or structure, with certain exceptions pursuant to PRC §4291(a).
2. Dead and dying woody surface fuels and aerial fuels within Reduced Fuel Zone shall be removed. Loose surface litter, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches, shall be permitted to a depth of 3 inches in height. This guideline is primarily intended to eliminate trees, bushes, shrubs and surface debris that are completely dead or with substantial amounts of dead branches or leaves/needles that would readily burn.
3. Down logs or stumps, when embedded in the soil, may be retained when isolated from other vegetation.
4. Within the Reduced Fuel Zone, one of the following fuel treatments (4a. or 4b.) shall be implemented. Properties with greater fire hazards will require greater clearing treatments. Combinations of the methods may be acceptable under §1299(c) as long as the intent of these guidelines is met.

4a. Reduced Fuel Zone: Separation Between Fuels

When using this guideline to obtain compliance with CCR 1299 and PRC 4291, within the Reduced Fuel Zone surrounding each structure, minimum clearance between fuels will range from 4 feet to 40 feet in all directions. Clearance should be in both the horizontal and vertical directions.

The clearance distance between vegetation will depend on the slope, vegetation size, vegetation type (brush, grass, trees), and other fuel characteristics (fuel compaction, chemical content etc. Properties with greater fire hazards will require greater clearing between fuels.

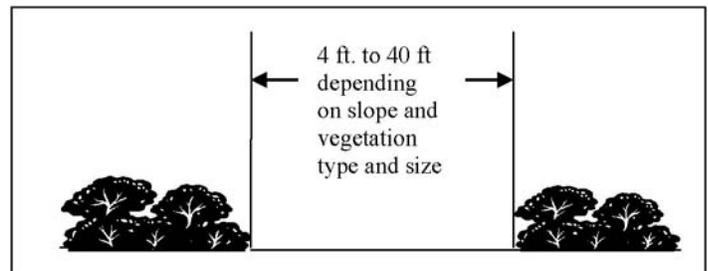
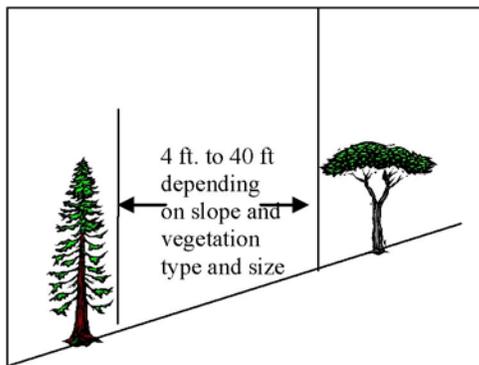
For example, if your property is on steeper slopes or has larger sized vegetation, this justifies greater spacing between individual trees and bushes (see Plant Spacing Guidelines and Case Examples below).

Grass generally should not exceed 4 inches in height. However, grass and other forbs, may be maintained less than 18 inches in height above the ground when isolated from other fuels or where necessary to stabilize the soil and prevent erosion.



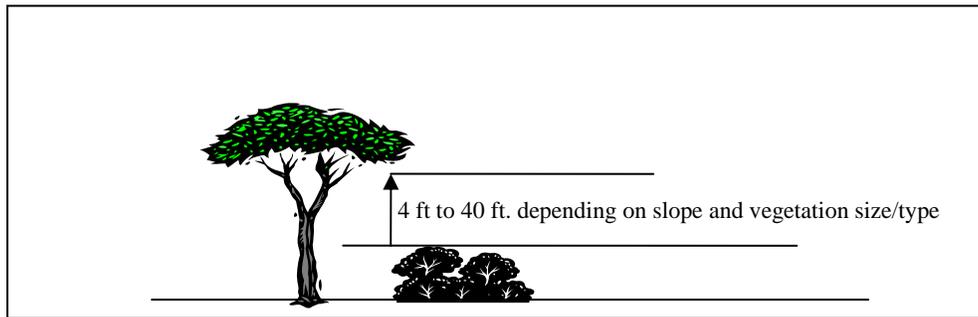
Clearance requirements include:

- Horizontal clearance between aerial fuels, such as the outside edge of the tree crowns or high brush. Horizontal clearance helps stop the spread of fire from one fuel to the next.



Horizontal clearance between aerial fuels

- Vertical clearance between lower limbs of aerial fuels, and the nearest surface fuels and grass/weeds. Vertical clearance removes “ladder fuels” and helps prevent a fire from moving from the smaller fuels to the taller fuels.



Vertical clearance between aerial fuels



Effective Vertical Separation between Fuels

Plant Spacing Guidelines

Guidelines are designed to break the continuity of fuels and be used as a “rule of thumb” for achieving compliance with Regulation 14 CCR 1299.

Trees	Minimum horizontal Space from edge of one tree canopy to the edge of the next	
	Slope	Spacing
	0% to 20 %	10 feet
	20% to 40%	20 feet
	Greater than 40%	30 feet
Shrubs	Minimum horizontal space between edges of shrub	
	Slope	Spacing
	0% to 20 %	2 times the height of the shrub
	20% to 40%	4 times the height of the shrub
	Greater than 40%	6 times the height of the shrub
Vertical Space	Minimum vertical space between top of shrub and bottom of lower tree branches: 3 times the height of the shrub	

Adapted from: Gilmer, M. 1994. California Wildfire Landscaping

Case Example of Separation Between Fuels: Sierra Nevada conifer forests

Sierra Nevada mixed conifer forests are intermixed with rural housing and present a hazardous fire situation. The combination of dense vegetation, elevations with long fire seasons, and ample ignition sources related to human access and lighting, results in homes with high risk of wildfire damage. This example includes gentle slopes (less than 20%), large mature tree overstory and intermixed small to medium size brush (three to four feet in height).



Application of the guideline under 4a. would likely result in horizontal spacing between large trees of 10 feet; removal of many of the smaller trees to create vertical space between large trees and smaller trees and horizontal spacing between brush of six to eight feet (calculated by using 2 times the height of brush).

Case Example of Separation Between Fuels: South Coast chaparral

Mature, dense and continuous chaparral brush fields on steep slopes found in many counties in southern California represent one of the most hazardous fuel situations in the United States. Chaparral tends to grow in an unbroken sea of dense vegetation that creates a fuel-rich path through which the fire can rapidly spread. Chaparral shrubs burn very hot and produce tall flames. From the flames come burning embers which can ignite homes and plants. (Gilmer, 1994). All these factors result in settings where aggressive defensible space clearing requirements are necessary.

Given a setting of steep slopes (greater than 40%) and tall, old brush (greater than 7 feet tall), significant modification is necessary to create adequate defensible space. Application of the guideline would result in the maximum spacing suggested by this guideline of 42 feet horizontal spacing (calculated as 6 times the height of the brush) between retained groups of chaparral.

Case Example of Separation Between Fuels: Oak Woodlands

Oak woodlands, the combination of oak trees and other hardwood tree species with a continuous grass ground cover, are found on over 10 million acres in California. Wildfire in these settings is very common, with fire behavior dominated by rapid spread through burning grass.



Given a setting of moderate slopes (between 20% and 40%), wide spacing between trees, and continuous dense grass, treatment of the grass is the primary fuel reduction concern. Application of the guideline would result in cutting grass to a maximum 4 inches in height and removing the clippings, with consideration of creating 20 feet spacing between trees.

4b. Reduced Fuel Zone: Defensible Space with Continuous Tree Canopy

A vegetation removal option is available for those wanting to retain a continuous stand of larger trees with no space between tree canopies while creating defensible space. For this guideline, within the Reduced Fuel Zone, spacing between aerial fuels is not required, such as in a stand of larger trees. In this situation

- remove all surface fuels greater than 4 inches in height;
- remove lower limbs of trees (“prune”) to at least 6 feet up to 15 feet (or the lower 1/3 branches for small trees). Properties with greater fire hazards, such as steeper slopes or more severe fire danger, will require pruning heights in the upper end of this range.

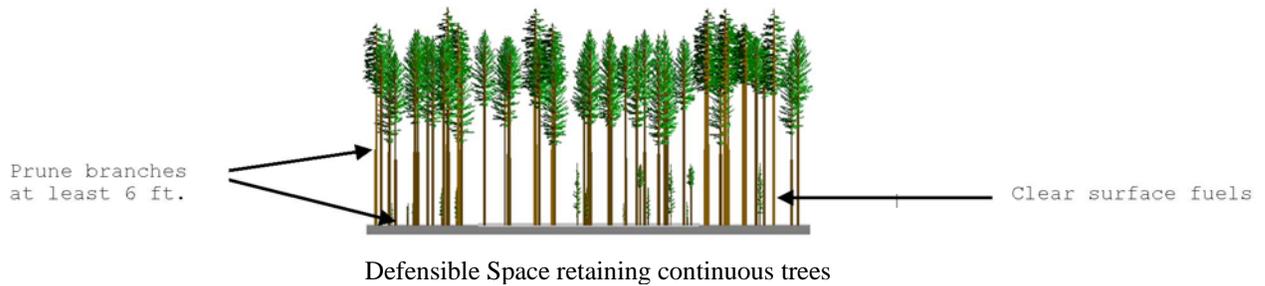


Photo Courtesy Plumas Fire Safe Council.

Defensible Space with continuous tree canopy by clearing understory and pruning

Authority cited: Section 4102, 4291, 4125-4128.5, Public Resource Code. Reference: 4291, Public Resource Code; 14 CCR 1299 (d).