FUELS AND SHADED FUELBREAKS

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We all know that fuels feed fires. But did you know that there are different types of fuels that feed fires in different ways? And that we can manage those fuels to help people fight fires?

There are three kinds of fuels - ground, ladder, and crown. Ground fuels are those on the ground, like herbaceous vegetation, downed logs, and leaf litter. Crown fuels include the tops of trees, or the canopy. And ladder fuels include anything that helps a fire climb from the ground to the crown fuels. Common ladder fuels include tall grasses, shrubs, and tree branches, both live and dead.

Reducing ground fuels breaks up the horizontal continuity, reducing how quickly the fire can spread and limiting the amount of material available to burn. Similarly, reducing ladder fuels breaks up the vertical continuity, limiting how quickly a fire can climb upwards. In both cases, the end result is a fire that is less intense and less likely to climb into the tree canopy.

While researchers tell us that it is most important to reduce surface and ladder fuels, it's also helpful to reduce crown fuels. Spacing trees out so that there is room between the individual tree crowns does two things. First, it makes it more difficult for the fire to spread from treetop to treetop. Second, creating spaces allows for the heat from a ground fire to escape upwards, rather than being trapped by tree branches.

One way to reduce fuels is to build what's called a "fuelbreak" which, as its name implies, breaks up the continuity of fuels. It might be a strip of land in which vegetation is entirely or partially removed. The idea is to significantly reduce the available fuels so that when a wildfire comes through, the amount of available fuel for the fire is significantly reduced, which reduces the intensity of the fire.

Fuelbreaks are strategically placed where firefighters will have good access and where natural and human-made features will help them fight the fire. Fuelbreaks are often put on top of ridges. And because roads themselves serve as fuelbreaks, often vegetation is reduced in strips 30 feet or more wide alongside the roads in order to increase the size and effectiveness of the fuelbreak.

Many people think of these fuelbreaks as strips of land cut down to the ground, with nothing growing in them. But these days many communities are establishing "shaded fuelbreaks" where brush (like manzanita and ceanothus) is controlled and trees are thinned. A rule of thumb for thinning trees in fuelbreaks is dbh+4+1/3 ("dbh" is (diameter at breast height, or 4.5'). Take the diameter of the tree in inches, add 4, then multiply by 1.33 to get the spacing of leave trees in feet. So between 11-inch diameter trees, you would want a spacing of 20 feet. This breaks up the crown fuels. Sometimes the lower limbs on remaining trees are removed to

reduce ladder fuels. What is left is a widely spaced stand of overstory trees over an understory that has been largely cleared of brush.

Vegetation management, by reducing and breaking up horizontal and vertical continuity of fuels, can result in fires spreading at a slower rate and having a more difficult time reaching the canopy. In some cases, fires in the tree canopy have even dropped to the ground in areas that have been properly treated for fuels reduction. The key is to be proactive and to do the vegetation management before the fire comes.

Think Like A Flame - As you look at these photos, think like a flame. How will you travel from tree to tree? How will you climb from the forest floor upwards? How big will you be? How easy will it be for you to grow? If people want to stop you, would they be able to do so?

In this area, no thinning was done, and there is an abundance of fuels.

- Ladder fuels: You can see many branches, both live and dead, that provide an easy way for fire to climb up the bushes and trees into the crown layer.
- Crown and ground fuels: The forest stand was so dense that the photo had to be taken from the road, and it wasn't possible to get a picture where you could see the crown or ground fuels clearly.
  Look closely to see the close spacing of the trees (look for the straight tree trunks). Trunks that are closely spaced mean that the crowns are closely spaced, too.

In this adjacent area, fuels treatment was done. All brush was removed, and trees under 11" dbh were thinned. The photo was taken from within the stand.
Ladder fuels: Notice how there are relatively few areas where a fire could climb up branches of brush to get Into the crowns of trees.

- Crown fuels: Look for the sunlight on the forest floor. That tells you the crowns of the trees are well spaced.
- Ground fuels: There is a layer of

duff, but there aren't large amounts of fuel on the forest floor.

These photos were taken in 2001 in Yuba County. About 30 landowners participated in a project to reduce fuels along Moonshine Road. Photos by Clare Nunamaker.