

# *Living With Fire*

## **Forest Thinning & Defensible Space**

**John Christopherson, Natural Resource Management Specialist  
University of Nevada Cooperative Extension**

Thinning forest trees is one of the basic tools of silviculture – the science and art of producing and tending a forest. In its most basic sense, it is the removal of trees that are growing too close together. It is actually one of several types of intermediate cuttings applies to an immature stand of trees. Intermediate cuttings are used to modify an existing stand of trees, but not to replace it with a new one. Common modifications are in species composition, age distribution, and tree density. Other intermediate cuttings are pruning, salvage, sanitation and release. The purpose of these intermediate cuttings is generally to increase the growth of the trees and the value of the final product harvested.

Thinning can also be an effective tool for wildfire hazard reduction through the creation of defensible space. Defensible space refers to an area surrounding a house or neighborhood where the vegetation has been modified to reduce wildfire threat and which provides an opportunity for firefighters to work effectively and safely. The crowns of standing live and dead trees represent one of the primary fuel sources contributing to wildfire hazard in forested communities.

The theory which thinning is based upon is found in naturally growing forests. A young stand of trees typically contains many more individuals than do older stands. As a stand of trees grows, individuals compete with one another for sunlight, space, water and nutrients. Those trees which are able to grow in height fastest eventually overtop their neighbors. These overtopped trees decline, and eventually die, leaving a stand of trees containing fewer individuals. Thinning accelerates this natural process by removing the weaker or less fortunate trees and allowing the remaining trees to grow unimpeded by competition.

Thinning can also partially mimic the historical role fire played in the forest. Reports from pioneers and early settlers paint a picture of a forest much different than that present today. The forest of the Lake Tahoe Basin, as well as most pine forests of the West, contained large, widely spaced ponderosa, Jeffrey and sugar pines growing in open stands which allowed abundant sunlight to reach the forest floor, giving rise to a diverse mixture of grasses, wildflowers and shrubs. Furs were present mainly on the moister and shadier areas and at higher elevations. The primary agent responsible for this composition was fire. Low

intensity fires burned through the forest regularly and in effect acted as a natural thinning agent, removing small pines and thin-barked firs. The dense, shaded forest present today is a result, in large part, of the absence of this fire induced thinning.

In addition to the direct benefits of increased tree growth and value, thinning provides the following indirect benefits:

- 1) Increased tolerance of environmental pressures. The tree's vigor is enhanced through reduced competition. This enables the trees to better withstand insect and disease attacks and periods of drought.
- 2) Increased plant diversity. Thinning provides openings in the forest canopy allowing sunlight to reach the understory and stimulate growth of more grasses and wildflowers. A greater abundance of native plant species more closely resembles historical forest conditions and is consistent with one of the Tahoe Regional Planning Agency's goals for vegetation in the Tahoe Basin.
- 3) Improved Wildlife Habitat. The increased number of plant species in the understory creates a richer source of food and cover for many wildlife species.
- 4) Reduced Wildfire Threat. Wider tree spacing can slow the spread of fire, help keep the fire on the ground surface rather than in the tree canopies; and reduce fire intensity by reducing the amount of available fuel.
- 5) Improved aesthetics. A more open, park-like forest is generally perceived as visually more pleasing than a dense one.

Although cutting forest trees is viewed by some as a harmful act, if done with care for the surrounding environment, it can improve the condition of the forest. The improvement of the forest's health, creation of more historical conditions and reduction of wildfire threat can be beneficial outcomes of forest thinning. These benefits are also goals of the Tahoe Regional Planning Agency, and in fact, tree harvest and vegetation manipulation are identified as methods by which these goals can be attained.

### **Thinning for Defensible Space**

Many of the guiding principles applied in conventional thinning should be used in thinning for defensible space. The selection of trees to be favored and those to be cut is based on 1) the relative position and condition of the crown; 2) the health of the tree; and 3) the condition and quality of the stem. More specifically the trees to be removed should be selected using the following criteria:

#### **1) Spacing**

Spacing for tree thinning is commonly based on leaving a certain number trees per acre of a given diameter. However, when thinning for defensible space, the spacing of tree crowns is more important.

Trees with crowns that are touching or are close together increase the probability of a fire spreading through the crowns. Enough trees should be removed so that no two tree crowns are within 10 feet of each other. On slopes steeper than 20%, the spacing between crowns should be increased (Table 1).

Table 1	
RECOMMENDED DISTANCES BETWEEN TREE CANOPIES	
BY PERCENT SLOPE*	
PERCENT SLOPE	RECOMMENDED DISTANCES BETWEEN TREE CANOPIES
0 to 20	10 feet
21 to 40	20 feet
41 to 60	30 feet

\* Adapted from "Wildland Home Fire Risk Meter," Simmerman and Fischer I (1990)

## 2) Position in canopy

Pine trees growing under the canopy of larger trees may not receive adequate sunlight for good growth. Trees growing beneath the canopy of larger ones also provide a "ladder" for fire to move from the ground into the crowns of larger trees (Figure 1).



Figure 1 – Smaller trees form a ladder-like configuration that contributes to fire spread into the crowns of larger trees. Removal of the smaller trees is similar to reducing rungs in a ladder – it makes it harder for fires to climb the fuel ladder.

## 3) Insects and disease damage

Trees which have been attacked by insects or disease may be killed outright or are weakened to the point where they will succumb to other environmental factors. Look for signs of insect attack like trees with red tops, or accumulations of pitch or saw dust on the tree trunk or in bark crevices. These trees should be removed in a thinning.

#### 4) Poor form

From a forest management perspective, poorly formed trees are less valuable than well formed trees. In a landscape, trees with "poor" form may be desirable as character trees. However, these trees often represent hazards to nearby structures and should be considered for removal in a thinning. Some examples of poor form are:

- a. forked stem
- b. broken top
- c. sweep, lean, and crook (Figure 2)

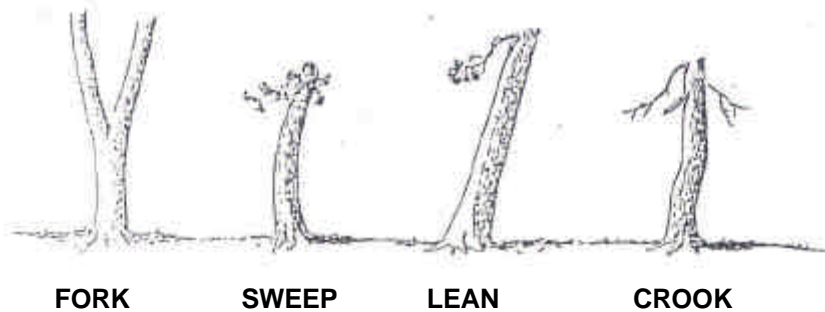


Figure 2 – Poorly formed tree stems

#### 5) Live crown ration less than 40%

The percentage of length of stem supporting living branches is called the live crown ratio. For instance, a 100 foot tall tree which has branches extending from its top down 60 feet would have a live crown ratio of 60%. Trees with a live crown ratio less than 40% generally will be less vigorous and less able to tolerate environmental pressures.

#### 6) Species

Fir trees have several characteristics which make them more of a fire hazard than pines, and therefore, are a species which should be favored for removal. They commonly grow in the shade of other trees with branches extending to the ground. This makes them a common source of ladder fuel. Removal of fir not only can reduce the wildfire threat, but also promotes a more balanced mix of tree species. Special effort should be made to retain species of limited occurrence like incense cedar and sugar pine. On sites where fir is the only species present, the previous 5 criteria should guide the thinning. Leave some small trees, if they do not pose a fire hazard, as these represent the next generation of mature trees in the forest.

#### **Other Important Considerations**

Trees are only one source of potential fuel; in many forested communities, shrubs, grass, and other dead plant material comprise a significant amount of the

available fuel. These fuel sources should also be modified for an effective defensible space. Additionally, any fuel modification should not be viewed as a one time operation, but an ongoing process, as plants will grow back.

Before cutting trees on your property, you should check local ordinances for restrictions which may apply\*. Contact your city or county government for more information. Additionally, be sure to accurately determine your property boundaries to prevent removal of trees off your property.

Small trees (i.e., less than 6 inches in diameter) can be cut safely by most individuals if done correctly. A bow saw is often all that is necessary. Cutting larger trees is a dangerous task and should be done by a qualified tree faller. Tips on selecting a qualified tree service are available in Cooperative Extension's "Selecting a Tree Service Company" fact sheet. To ensure selection of proper trees for removal, it is best to have a professional forester mark the appropriate trees. State Forestry agencies have the expertise and will normally provide this service free of charge. Check your phone book for the appropriate agency to call.

\*Live trees less than 6 inches in diameter in the Lake Tahoe Basin must be marked for cutting by the appropriate State Forestry agency or a qualified forester.

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