

# A Landowners Guide to Forest Stand Improvement

## ***Thinning Trees***

Tree thinning redistributes the available soil moisture and nutrients to a fewer number of trees, increasing their health, vigor, and growth. Thinning produces trees with strong, straight trunks and symmetrical tops which subsequently increases the merchantable woody material produced by the stand.

Thinning should remove trees which are overstocked, suppressed, or defective. Identify limiting factors on your property *before* implementing any practices, such as high flows through a drainage or creek, presence of threatened and/or endangered species, and the nesting or migration patterns of animals.

1. **All trees over 10 inches in diameter at DBH (4.5 feet from the ground) should be avoided,** as they are considered “merchantable timber,” a designation that exceeds the scope of the private landowner without assistance of a Registered Professional Forester.
2. A tree with insect attack, a broken top, or suffering from disease should be removed. Tree trunks that have crooks, two or more tops, skinned bark, or other poor forms should be removed.
3. Snags (a dead tree, still standing) should be preserved when possible to provide beneficial habitat. Leave 7-15 for each acre of forest: 1-2 trees >18” dbh/acre, 2-5 trees >12” dbh/acre, 4-8 trees > 6” dbh/acre (DBH is the diameter of the trunk at breast height, which is 4½ feet up from the ground). Because they are not in competition for water and nutrients, removal of snags will not substantially improve the forest products and should not be considered part of the program goals.



## ***Treating brush in the forest***

Forest improvement practices done by the landowner should achieve both a healthy tree stand and a balanced forest environment. Species that may be considered *less-desirable*, such as manzanita, ceanothus, or poison oak, serve an important role in the ecological community. The goal is not to aim to eliminate any native plant species, but instead to reduce excessive populations to appropriate densities.

Shrubs should remain interspersed *between* leaf trees. Shrubs should not be maintained around the trunk of the trees. Efforts to remove shrubs adjacent to trunks should not damage the bark of the tree. Significant amounts of ground cover, such as bear clover (mountain misery), should be left intact and not a focus of the removal activities.

## **Hardwoods**

Hardwoods, on average, should comprise 20% of the tree species. Select and leave the largest and straightest oaks when possible. Multiple stemmed oaks (Interior Live Oak, Black Oak) can be thinned to 2-3 stems per cluster/clump. Other species, such as dogwood, alder, yew, and madrone, should be maintained, when appropriate, to benefit forest diversity.

## **Noxious and Invasive Weeds**

All non-native weedy plant species should be removed from the project location. Species, such as Himalayan blackberry, that may grow in drainages or along creeks or seeps should only be removed when under appropriate permit(s).

## **Methods of Removal**

1. **Mechanical** - Heavy equipment, such as the masticator pictured below, are used to mechanically remove the unwanted trees and competing vegetation.
2. **Hand** - Pruning shears or a chainsaw is used to remove unwanted trees. This method is best for steeper slopes, more intricate work, or in areas that are inaccessible to machinery.



## **Treating Slash**

The proper method of treatment depends upon the condition and silvicultural requirements of the stand, fire hazard from machinery or burning, and correlation of the time of the year with the possibility of insect activity. Generally, use of a masticator will not require slash disposal, as the material has already been reduced in size and distributed on-site.

1. **Pile and Burn**- slash should be piled and burned in openings between trees to prevent damage to standing trees. The piles should be burned in accordance with the state fire laws as administered by your local fire control agency. Check with the authorities before burning. A *permit may be required.*
2. **Chipping and Scattering** - Chips should not be more than 4" deep and kept 4 feet back from standing tree trunks.
3. **Lop & Scatter:**
  - Limbs and tops of cut trees are to be removed from the main trunk so that the material lies within 18" of the ground. Slash should be scattered to minimize concentrations and pulled away from remaining trees to maximize contact with the ground.
  - Tree trunks are to be cut into 36 inches or smaller sections to maximize ground contact.
  - Large stems and portions of the tree trunk larger than 3" in diameter may be removed from the area for firewood or poles. *Exceptions may occur when downed wood is needed to provide habitat for specific animal species.*

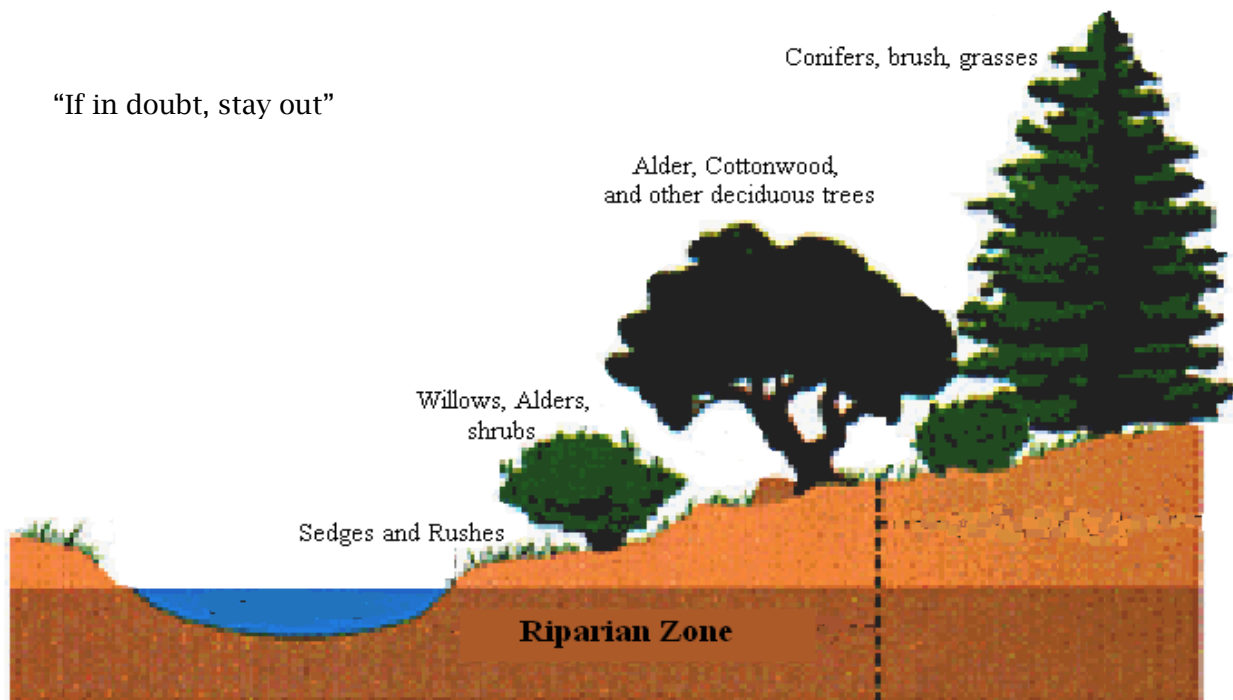
## **Riparian Areas and Wetlands**

Riparian areas and wetlands should **not** be treated under the same guidelines as the main stand of trees. Many legal restrictions from federal, state, county, and local agencies set thresholds for plant removal, soil movement, stream crossing, presence of slash, and other types of disturbance. It is the landowner's responsibility to uphold these laws and to acquire any necessary permits before the implementation of a project. Consult with an environmental professional (when necessary), to determine appropriate treatments for each specific ecological site.

A minimum distance of **25ft** must be maintained by all machinery around either side of a watercourse, including **seasonal drainages**. Creeks/streams which provide **year-round** habitat for fish require a minimum **50ft** set-back for machinery. Handwork can be done in riparian areas, but a limited amount of material can be removed, and may require a permit from the California Department of Fish and Wildlife. Additional information relevant to a project may be found through one or more of the following agencies:

- US Fish and Wildlife
- Army Corp of Engineers
- The California Department of Forestry and Fire Protection (CALFIRE)
- California Department of Fish and Wildlife

"If in doubt, stay out"



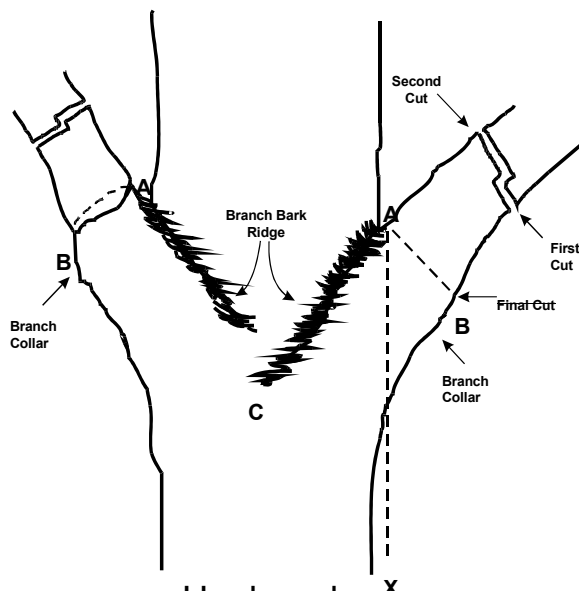
## **Threatened and Endangered Species**

Prior to beginning any work in an area, potentially present threatened or endangered plant and animal species should be identified. Due to the biological and behavioral characteristics of some migratory bird species, destruction of their nests presents an elevated risk of violation of certain environmental regulations. Project work should not continue in an area where there has been a nest sighting without further environmental assessment. Project work must be carried out in a manner that will not adversely affect any listed species, including designated habitat.

## Tree / Shrub Pruning

Remove live branches during the period of the year between November and March to a height of 10 feet off the ground. Dead branches can be removed at any time of the year. If trees are under 30 feet in height, prune lower limbs to a height that is from the ground about 1/3 the height of the tree. Disposal of material will be done by lop and scatter, chipping or mastication. Material 3" in diameter or smaller can be disposed of by lop and scatter and should be no longer than 36" or more than 18" off the ground. Some material can be piled and left in piles for wildlife. To make wildlife piles, use openings between trees, create a five feet wide buffer of bare ground around piles and limit pile size to 4 feet high by 4 feet in diameter to prevent scorching of bark and needles of standing trees and fire escape if pile burns. A fire extinguisher and shovel should be carried on equipment on sight including wood chippers. To avoid impact to nesting birds, chicks, and eggs, no pruning should occur between April 15<sup>th</sup> and July 15<sup>th</sup>.

Trees and other woody plants respond in specific and predictable ways to pruning and other maintenance practices. Careful study of these responses by Dr. Alex Shigo has led to pruning practices which preserve and enhance the beauty, structural integrity, and functional value of trees. His research discovered that the collar is an area of tissue, which contains a chemically protective zone for the rest of the tree. Naturally, as a dead branch decays, the decay moves downward. It then meets an internal protected zone, with an area of very strong wood meeting an area of very weak wood. The branch then falls away at this point leaving a small area of decayed wood within the branch collar. This decay is walled off from the remainder of the tree by the collar. If the collar is removed, the protective zone is also removed. Wood-decay fungi can easily infect the trunk. If the branch is living, removing the collar also still causes injury and can allow entry by fungi.



### Exhibit A — Hardwood Pruning

#### Pruning Techniques:

When cutting branches over 1-½ inches in diameter use the three-part cut technique:

Step 1: Locate the branch bark ridge and collar. Find the outside edge of the bark ridge (A). Then locate the swelling where the branch meets the branch collar (B). Move up the branch 6 to 12 inches from this point. If no collar is visible, the angle of the cut should approximate the angle formed by the branch bark ridge and the trunk. (Figure angle X-A-B)

Step 2: Saw an undercut from the bottom of the branch about one third of the way through the limb. Make a second cut on the top about 1 to 3 inches further from the undercut until the branch falls away.

Step 3: Remove the stub by carefully cutting along angle XAB. Pruning cuts should be clean and smooth with the bark at the edge of the cut firmly attached to the wood.

When removing a dead branch, the final cut should be made outside the collar of live callus tissue. If the collar has grown out along the branch stub, only the dead stub should be removed, the live collar should remain intact, and uninjured.

Large or heavy branches that cannot be thrown clear should be lowered on ropes to prevent injury to the tree or other property.

Wound dressings and tree paints have not been shown to be effective in preventing or reducing decay. Therefore, they are not recommended for use when pruning.

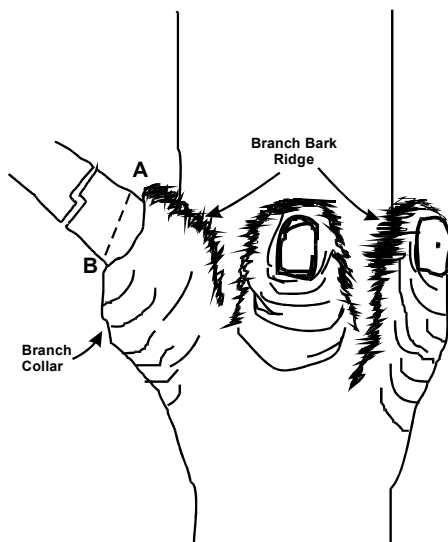
### **Exhibit B — Conifer Pruning**

#### **Pruning Techniques:**

When cutting branches over 1½ inches in diameter use the three-part cut technique:

Step 1: Locate the branch bark ridge and collar. Find the outside edge of the bark ridge (A). Then locate the swelling where the branch meets the branch collar (B). Move up the branch 6 to 12 inches from this point. If no collar is visible, the angle of the cut should approximate the angle formed by the branch bark ridge and the trunk. (*Figure angle X-A-B*)

Step 2: Saw an undercut from the bottom of the branch about one third of the way through the limb. Make a second cut on the top about 1 to 3 inches further from the undercut until the branch falls away.



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