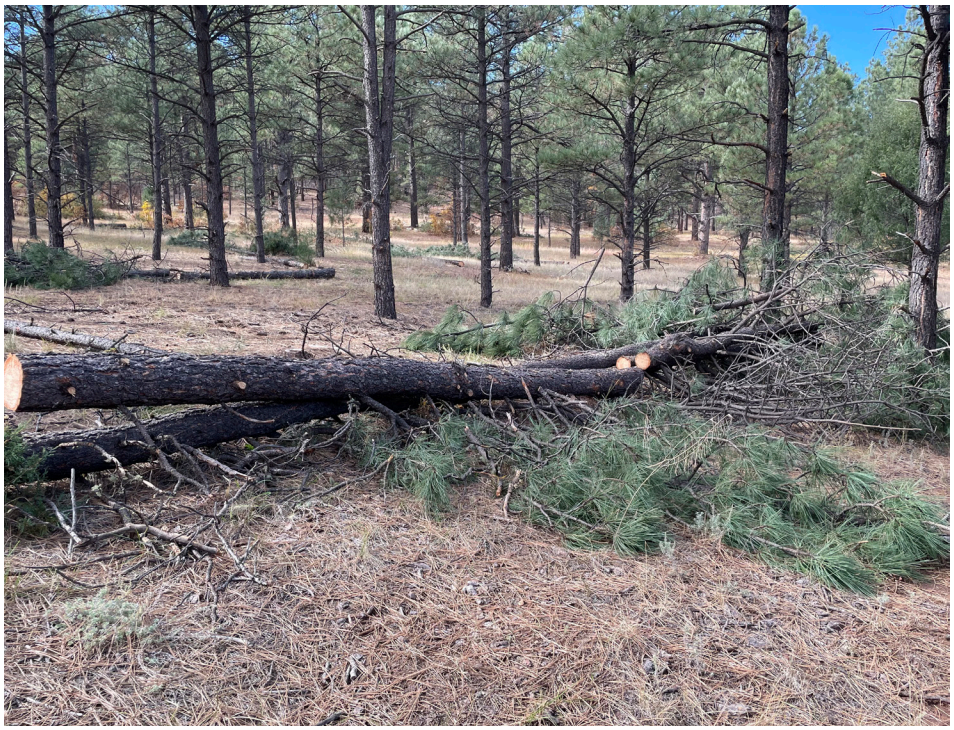
Bark Beetle Management Strategies

New Mexico Forest and Watershed Restoration Institute
New Mexico Highlands University

1. THINNING

Thinning forested areas decreases competition between trees for sunlight, moisture, space, and nutrients. Thinning improves forest health as trees become more resilient and less likely to be attacked by bark beetles. Foresters can assist landowners to determine stand densities that should be managed for a healthy, resilient forest.

Above: An overstocked ponderosa pine stand. Below: A thinning project in progress to reduce stand density.



SLASH MANAGEMENT FOR POST-THINNING

Slash includes large and small tree limbs, twigs, bark, treetops, small trees, and main stems that remain on the landscape after thinning activities. Bark beetles can colonize and reproduce in slash material and potentially pose a threat to residual standing trees. Slash should be managed to prevent or minimize the occurrence of bark beetles utilizing slash as refugia within 30 days from thinning activities. Some slash management practices include:

- Lop & Scatter
- Chipping
- Mechanical Mastication
- Pile & Burn
- Removal
- Solarization

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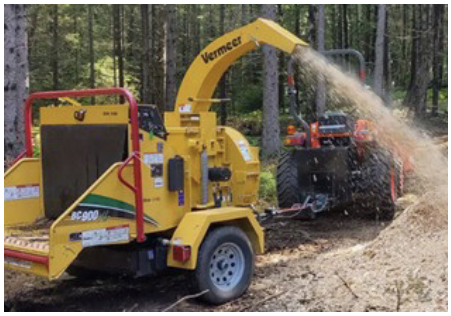
LOP & SCATTER

Lopping (cutting) and scattering (spreading) treetops, branches, and small diameter trees preferably on sunny sites where slash can dry quickly. Keep slash piles below 18" in depth to ensure slash closest to the ground dries. Cut slash into the smallest lengths as possible to hasten drying.

Right: Slash material shows material that is spread too deep resulting in refuge for bark beetles (far right).
Below: A mechanical chipper.

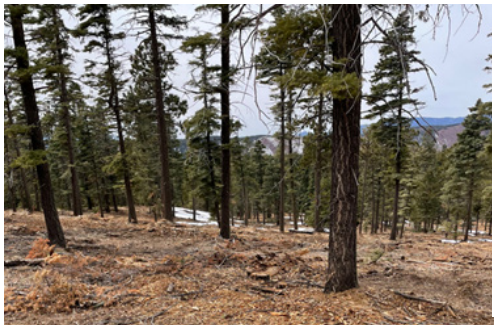


CHIPPING

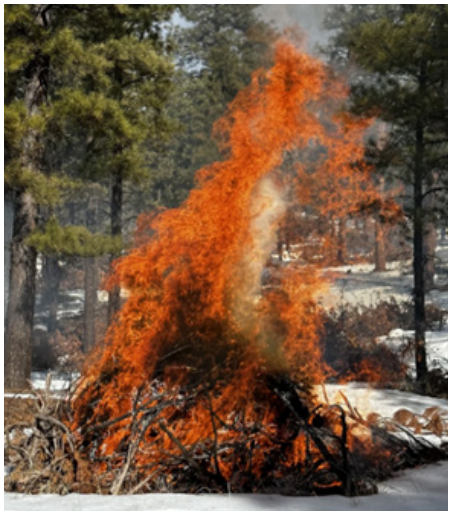
Slash material is run through a mechanical chipper to produce chipped material. This material should be removed off site or spread no greater than 2" in depth if left on site. Bark beetles may be attracted to volatiles from chipped material therefore chipping is recommended during late fall or early winter when bark beetle activity is low.

MECHANICAL MASTICATION

Standing trees, slash, and other downed material is reduced in size by the shredding or grinding action of a masticator attachment on a tractor or similar.



Above right: A mastication project in progress. Above left: Note shredded material on forest floor. Below left: A pile burn.



PILE BURNING

Slash and debris from thinning activities are piled and subsequently burned under ideal conditions.

REMOVAL

Removing slash from the site entirely. Do not move slash to sites with the same species of trees as this may attract bark beetles to a new site especially if the slash is green.

Above: Solarization. Photo by Tom DeGomez, University of Arizona

SOLARIZATION

6 mil clear plastic is used to cover small slash piles on sunny sites. Temperatures in this environment must reach 113°F to kill bark beetles. Ensure the edges of the plastic are anchored with piled soil to ensure the plastic remains in place.

2. REPELLENTS

Bark beetles communicate with each other using pheromones, chemicals that are released by an insect that impact the behavior of other insects of the same species. Anti-aggregation pheromones act as repellents for certain species of bark beetles from attacking trees.

Anti aggregation pheromones like MCH and Verbenone do not have insecticidal properties and do not kill bark beetles or other insects, and are non-toxic to birds, pets, and humans. Anti-aggregation pheromones work by preventing bark beetle attacks. Once a tree has been successfully attacked, there is no means of controlling the bark beetles. Read and follow the manufacturers label instruction when using MCH or Verbenone products to repel bark beetles.

Above: MCH bubble cap stapled to a Douglas-fir tree (photo USDA/USFS). Right: Verbenone pouch stapled to the north side of a pine tree (Synergy Semiochemicals Corp.).

MCH: is a commercially available anti-aggregation pheromone that is specific for repelling Douglas-fir beetle (DFB) from attacking Douglas-fir trees. MCH is packaged in "bubble caps" that can be stapled 6-8' high on the north side of trees. When applied to Douglas-fir trees, MCH confuses DFB by "communicating" to the beetles that the tree is not suitable for attack. MCH must be applied to Douglas-fir trees before DFB begin flying in spring or when the air temperature consistently reaches 60° F.

Verbenone: Verbenone is a commercially available anti-aggregation pheromone used to repel bark beetles from pine trees. Verbenone pouches or bubble caps must be applied to pine trees in the spring 2 weeks before bark beetles become active. Verbenone can be placed on individual trees or in a grid pattern when larger areas of pine trees need to be protected. Consider the prevailing winds as the plume of pheromone will be carried in the downwind direction of the trees that are targeted for protection against bark beetle attack.

3. CHEMICAL CONTROL

Applying insecticides that are registered for controlling bark beetles on **un-infested** trees in late winter or early spring (before April) is an effective strategy for preventing bark beetles from attacking high value trees.

A high-pressure sprayer is used to apply a solution of liquid insecticide to the tree's main trunk and branches 4" or larger in diameter before bark beetles become active. Once trees have been attacked, insecticide applications are not effective in controlling bark beetles. Always read and follow the label instructions when using any pesticide.

4. NATURAL ENEMIES

Bark beetles do have natural enemies including predators and parasitoids that are associated with maintaining endemic bark beetle populations but may not impact high densities of bark beetles on individual trees or entire stands of trees.

Above: Clerid beetles (Thanasimus dubius) prey on bark beetles. Photo by Xerces Society.

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