

# When to Apply Verbenone

Pouches should be applied before beetle flight—generally between June 15 and July 1 for most pine species. In whitebark pine and other high elevation sites, MPB life cycles vary with some adults flying as early as late-May. Pouches in these high elevation forests should be placed in May if possible, or as soon as stands are safely accessible.

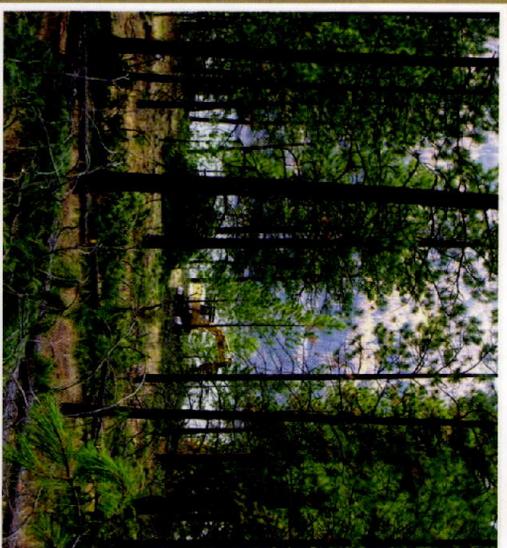
Verbenone pouches are only effective for one season and must be replaced annually.<sup>2</sup>

# Additional Considerations

Verbenone is not recommended for widespread, general forest use unless forest management, such as thinning or other stand improvement activities, is planned in the near future.

Verbenone efficacy may decrease as beetle populations increase in an area, especially if beetle-infested trees are not removed from the treatment area.

<sup>2</sup> During years of atypically long warm weather, two applications of verbenone may be required. The second application would generally occur during mid-August. Consult your local state or federal forest entomologist for recommendations.



A vegetation management plan is recommended for recreation and administrative sites to address short and long-term vegetation management objectives. The use of short-term strategies to protect high value trees and sites would include verbenone as a treatment option.

Verbenone is currently registered as a bio-pesticide for forestry applications by the Environmental Protection Agency (EPA). Unlike conventional pesticides that kill insects, verbenone is a biological pesticide that only affects beetle behavior. However, gloves should be worn when handling verbenone pouches and always follow label directions. Completion of a pesticide use proposal (PUP) is required for applications of verbenone on National Forests.

Pesticides used improperly can be injurious to humans, animals, and plants. Follow label directions and read all precautions on the label. Consult your local county agriculture agent or State extension agent regarding restrictions and registered use of pesticides.

For additional information, contact any USDA Forest Service or State Forestry Office in your area.

USDA Forest Service  
Forest Health Protection:

Missoula Field Office  
406-329-3637

Coeur d'Alene Field Office  
208-765-7342

Ogden Field Office  
801-476-9720

Boise Field Office  
208-373-4227

Montana Department of  
Natural Resources  
406-542-4283

Idaho Department of Lands  
208-769-1525

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United States Department of Agriculture  
Forest Service  
Northern and Intermountain Regions

# Using Verbenone to Protect Trees from Mountain Pine Beetle



# Introduction

Verbenone can be used as a short-term treatment to protect individual pine trees or stands from mountain pine beetle (MPB) attack. MPB naturally produces verbenone as an anti-aggregation pheromone to disperse adult beetles away from a fully colonized tree. Verbenone has been artificially synthesized and packaged into slow-release pouches. Land managers may deploy these pouches as an area or individual tree treatment to protect non-infested pine trees.

Verbenone is an alternative to insecticide treatments for protecting trees from MPB attack. Although not as effective as insecticides, the use of verbenone is sometimes selected because of environmental constraints or personal preferences. However, it is important to understand that verbenone often does not protect all treated trees or areas, particularly when MPB populations are high.

Verbenone is only one component of an Integrated Pest Management (IPM) program. To maximize the effectiveness of verbenone treatments, additional IPM activities should be implemented. These could include removing infested trees, insecticide treatments, thinning stands to reduce overcrowding, and monitoring beetle activity until beetle pressure subsides. Treatment effectiveness varies depending on a variety of factors. To enhance treatment effectiveness, follow the recommendations listed below.

# Where to Apply Verbenone

Verbenone can protect all pine species from MPB attack.



Verbenone is only a short-term treatment that should be used until long-term forest management strategies are implemented or until beetle populations subside.

Verbenone is more effective in areas where less than 15-20% of the stand is currently infested<sup>1</sup>. Removing beetle-infested trees in and adjacent to the verbenone treated area prior to application will enhance treatment effectiveness.

If beetle populations are high, a more effective method of protecting individual trees is a preventive bole spray using a registered insecticide such as carbaryl or a synthetic pyrethroid.



<sup>1</sup>A currently infested tree has mostly green needles, boring dust around more than half of the tree base or on the trunk, and may have multiple small (<1 inch) pitch masses on the trunk.

# How to Apply Verbenone

## Individual Tree Treatment



To protect individual high-value trees, apply 2 verbenone pouches per tree. Pouches should be stapled to the north side of trees through the thin plastic strip that extends beyond the pouch, not through the thick part of the pouch. Pouches should be placed at least 5-6 feet above the ground.

In campgrounds, pouches should be placed higher on the bole to prevent vandalism. Placing them on the northwest and northeast tree faces, or one above the other on the north side, prevents sunlight from warming the packets and depleting verbenone prematurely.

For trees larger than 24 inches diameter-at-breast-height (d.b.h.), applying additional pouches may be considered, up to a maximum of 4 per tree. Avoid placing pouches in direct sunlight.

Trees in areas of less than 1/2-acre, or in narrow strips, (<100 feet wide) should be treated as individual trees with 2 pouches per tree.

Treat clusters of whitebark pine stems by applying 2 verbenone pouches to each stem greater than 8 inches d.b.h in the cluster.

## Area Treatment

To protect stands of susceptible trees from MPB attack, verbenone should be applied at a rate of 30 pouches per acre, stapled on the north side of trees, 5-6 feet above the ground. Pouches should be evenly distributed throughout the treatment area, at 35-40 foot intervals in a grid. If a pine tree is not available at the proper spacing, verbenone can be placed on any vertical object including snags or other tree species, on the north side or out of direct sunlight. For additional protection, apply verbenone at the same spacing in a 75 foot buffer zone surrounding the area treatment.

If trees are widely scattered throughout an area, or if only a few trees are to be protected, apply verbenone as an individual-tree treatment.

