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# Cut and Leave: A Method for Controlling Southern Pine Beetle Infestations

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In 1995 and 1996, the Southern Pine Beetle (SPB) caused an estimated loss of $125 million worth of pine timber in South Carolina (SCFC 2004). Considering that SPB outbreaks are cyclical, it is likely that similar losses will occur in the future. An integrated pest management (IPM) approach on your forest lands could significantly minimize your potential losses. If an SPB outbreak does occur, only direct control methods such as Cut-and-Leave or Salvage effectively disrupt the spread of the infestation.

## The Southern Pine Beetle

The Southern Pine Beetle (SPB) is the most destructive pine bark beetle in the South. SPB infestations commonly originate in medium –aged to mature pine stands that are too dense or are choked by competing vegetation. The reduced growth rate of trees that are competing for water, nutrients and sunlight makes pines more susceptible to SPB infestation. Once underway, outbreaks can spread rapidly, killing trees over hundreds of acres and moving into managed stands that are otherwise healthy.

Once a pine tree has been attacked by southern pine beetles it is most likely going to die; therefore, it is critical to identify SPB outbreaks early in the infestation to prevent further damage to surrounding trees. For more information on identifying SPB outbreaks, see Forestry Leaflet No. 5, Identifying the Southern Pine Beetle.

The initial infestation is followed by the development of a "spot" of dead or dying trees. As the infestation grows the spot usually spreads to new trees in one or more general directions, known as the "active head(s)" (Figure 1). Table 1 describes the symptoms of a growing SPB infestation and the characteristics used to identify the active head and the direction that the spot is spreading.

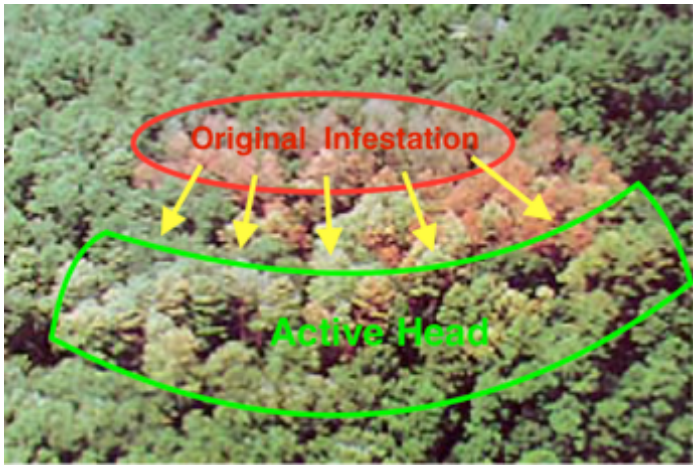


*Figure 1. Expansion of SPB Infestation*

## Cut-and-Leave

The cut-and-leave method is an effective method for controlling small and remote SPB infestations (10 to 50 infested trees) where affected trees cannot be salvaged. The method involves felling infested trees and leaving them on the forest floor. Because SPBs reproduce only in living trees, felling infested trees interrupts the reproductive cycle and reduces the expansion of the beetle population. Cutting and leaving infested trees also exposes the beetles to environmental stresses and natural predators and parasitoids that otherwise would have little effect on the beetles. The primary ways that cut-and-leave stops the spread is by 1) eliminating the recently attacked trees that are emitting secondary attractants which concentrate beetles in a small area and 2) increasing the distance from infected trees to uninfected trees which interrupts the expansion of the active head. Spots should be cut and left only if they contain freshly attacked trees, and cutting a 60ft buffer of uninfected trees beyond the active head is essential to interrupting the expansion of the spot.

## When to Apply Cut-and-Leave

Cut-and-leave should be used during the period when SPB spots are actively expanding (approximately May to October). Cutting and leaving infected trees in the winter is not as effective as during the growing season because the beetles are not actively reproducing. This

**Table 1. Progression of SPB Symptoms**

| Tree Stage | Symptom | | | | |
|---|---|---|---|---|---|
| | **Foliage** | **Pitch Tubes** | **Bark** | **Exit Holes** | **Ambrosia Beetle Dust** |
| **Freshly Infested** | Green | Soft, white, light pink | Tight, hard to remove | None | None |
| **Infested With Developing Brood** | Green trees, with larvae; fade to yellow before brood emerges | White hardened | Loose, peels easliy | Few, associated with attacking adult reemergence | White, localized areas around base of trees |
| **Vacated, Dead Tree** | Red, needles falling | Hard, yellow, crumbles easily | Very loose, easily removed | Numerous | Abundant at base of trees |

method is most effective on spots of 10 to 50 active trees. Spots with fewer than 10 infested trees usually do not need to be treated. On the other hand, spots with more than 50 infested trees should be salvaged if possible. In every case, prompt treatment after detection is recommended.

## How to Apply Cut-and-Leave

1. Select spots with 10 to 50 infested trees. Some must have fresh attacks. Spots with a high proportion of freshly attacked trees should be treated first.
2. Mark and fell all actively infested trees toward the center of the spot (see Figure 2).
3. Mark and fell a horseshoe-shaped buffer strip of green uninfested trees around the active head of the spot. Fell them toward the center of the spot and leave them on the ground. In small spots the buffer may encircle the entire spot. However, the buffer should be no wider than the average height of the trees in the spot. The buffer is necessary to ensure that no freshly attacked trees are left standing.
4. Dead trees with no bark beetles remaining should be left standing. Beetle parasites and predators complete their development in these trees and emerge to help control beetle populations. The trees also serve as den sites for certain woodpecker species.
5. After two weeks, check the treated spot for reinfestations (breakouts) around the edges of the spot. Treat breakouts as needed.

## Advantages and Disadvantages

Cut-and-leave is practical, relatively inexpensive, and requires a minimum of manpower and equipment. The treatment can be applied soon after spots are detected, even when salvage crews are not available or in areas not readily accessible to salvage equipment.

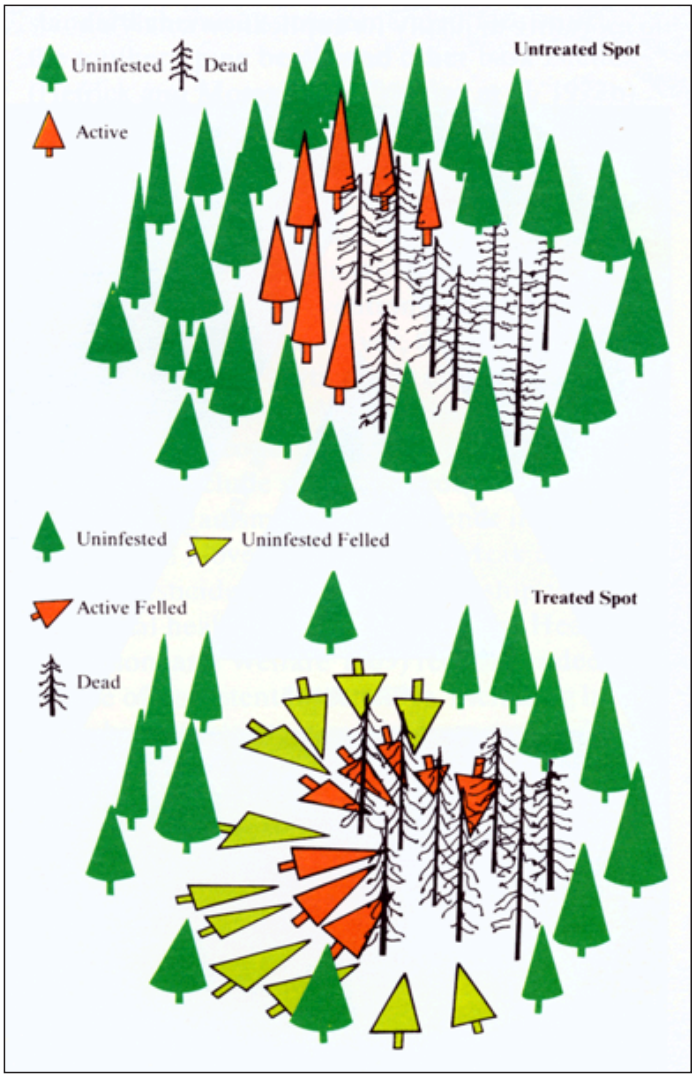


*Figure 2. Diagram of Cut-and-Leave control.*
*Ronald F. Billings, The Southern Pine Beetle*

The main disadvantage is that a buffer strip of green, uninfested trees must be felled and left around each spot to assure that all newly attacked trees are included in the treatment. However, if salvage becomes feasible at a later date, all felled trees can be removed and utilized.

## Glossary of Terms

- ACTIVE HEAD(S) OF SPOT - Area(s) of the spot containing beetles in the process of attacking green pines.
- INFESTED TREE - A pine containing southern pine beetle broods (eggs, larvae, or pupae) or attacking adults.
- BUFFER STRIP - A group of green, uninfested pines that are cut adjacent to the most recently infested trees in the spot.
- SPOT - A group of dead or dying pine trees infested by the southern pine beetle.
- SPOT BREAKOUT - An infestation of green pines on the outer edge of a spot following a control treatment.
- SPOT GROWTH - The natural expansion of untreated spots as additional green pines become infested in the active head of a spot.
- SOUTHERN PINE BEETLE - A small, dark brown beetle that can be identified by the S-shaped galleries or tunnels that it makes under the bark of attacked trees.

## Additional Information

Keeping your pine timber stands healthy and vigorous and having a good knowledge of the southern pine beetle habits and symptoms is essential to deal with this destructive pest. Professional advice and assistance is available through the South Carolina Forestry Commission, Clemson University Cooperative Extension Service, U.S.D.A. Forest Service, forest industry personnel, and private consulting foresters.

SC Forestry Commission Forest Health
http://www.state.sc.us/forest/id.htm

Southern Pine Beetle Internet Control Center
http://web2.ento.vt.edu/servlet/sf/spbicc/topic.html?topic=home

Southern Pine Beetle Literature Review and Research
http://www.barkbeetles.org/spb/spbbook/Index.html