

Salvage Removal: 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, efficient use of damaged or killed timber is an important part of forest IPM and will help the landowner recoup revenue from damaged timber.

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 and to salvage the value remaining in the affected 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 2). 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.

Salvage Removal

Just because a tree has been killed by southern pine beetles does not mean that it is worthless. SPBs feed in the cambium, the thin layer between the wood and the bark. They do not bore deep into the wood or affect the integrity of the wood fibers directly. A tree that was recently killed by SPBs may still be just as suitable for harvest as a freshly cut tree. The tree only loses its value when the wood has been left so long that it begins to rot, which usually occurs well after the needles have fallen off completely. Also, the development of blue-staining that often occurs when SPBs attack a tree might affect its marketability, but it does not normally affect its structural integrity. Actually, since the recent outbreaks of SPBs in the mid 1990’s and early 2000’s a new market has developed for using blue-stained pines for specialty wood products, mostly for furniture, instruments, flooring and veneer. Some mills may specialize in “salvage” or “sustainable” lumber.

Salvaging SPB infected trees is important for recuperating the value that would otherwise be lost, and it also is the preferred method for controlling the spread of SPB outbreaks. For salvage to be effective, SPB infested trees must be removed very quickly after initial attack.



Figure 1. Blue-stained wood. Photo courtesy of Southern Forest Products Association www.southernpine.com

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 easily	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

When to Conduct Salvage Removal

Trees attacked by SPBs can be salvaged at any time of the year when ground conditions permit. SPB infestations should be salvaged as soon as they are identified. When salvage of a SPB infestation is not feasible or must be delayed for long periods, active infestations can be stopped using the cut-and-leave method. (See Forestry Leaflet No. 7, Cut-and-Leave) Cutting and leaving SPB infestations will not allow the landowner to recoup any value, but at least it will stop the spread of SPBs to unaffected trees. Before starting any salvage cuts in SPB affected site, it is a good idea to check with the state forestry department (SC Forestry Commission in South Carolina) just to be sure that no regulations have changed regarding salvaging infested trees. South Carolina does not have rules that affect salvage of SPB infected pines, but other states do.

How to Salvage SPB Infested Spots

1. After a spot has been located, identify all infested trees and determine the active head(s) (Table 1). The most recently attacked trees will be in the active head(s) of the spot (Figure 2). Spots with the most infested trees should be marked for salvage first.
2. With marking paint or flagging, mark the salvage boundaries. If freshly attacked trees are present, include a horseshoe-shaped buffer strip of green, uninfested trees around the active head(s) of the spot. The buffer should be as wide as the average height of the trees in the spot (40 to 60 feet). The buffer is necessary to disrupt spot growth and to ensure that no freshly attacked trees are left.
3. Salvage should begin as soon as possible after marking the boundaries. Cut and remove buffer trees first to prevent further spot growth. Continue harvesting toward the spot origin until only those

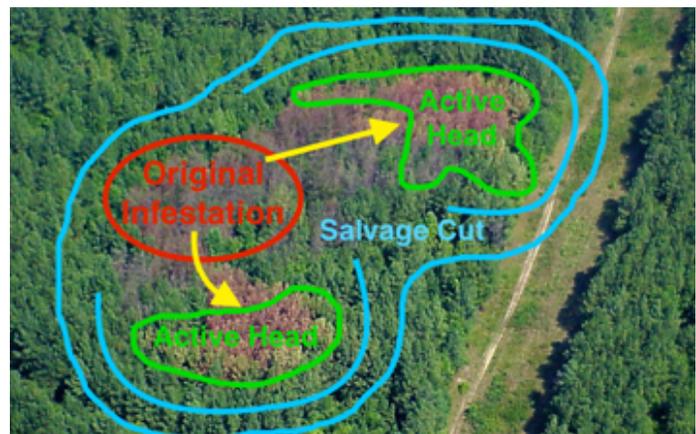


Figure 2. Salvage area of a SPB spot

- dead trees that have deteriorated beyond use remain (see Figure 2).
4. Do not deck infested logs next to green trees since emerging beetles may attack them.
 5. Avoid damaging standing green trees along skid trails since open wounds attract certain bark beetles.
 6. After two weeks check the treated spot for reinfestation (breakouts) around the edges of the spot. Treat breakouts as needed.
- The buffer strip of green trees must be included to assure effective control. If salvage operations are delayed, active spots may have to be marked again before harvesting to account for additional spot growth.

Financial Return from Salvage Removal

The financial return from the salvage of SPB-infested timber will vary according to several factors. These include the total volume and sizes of the trees, their current market value, the accessibility of the site/spot, and the type of harvesting equipment used. Because SPB spots occur most frequently in stands that are overcrowded and the logging equipment is already on-

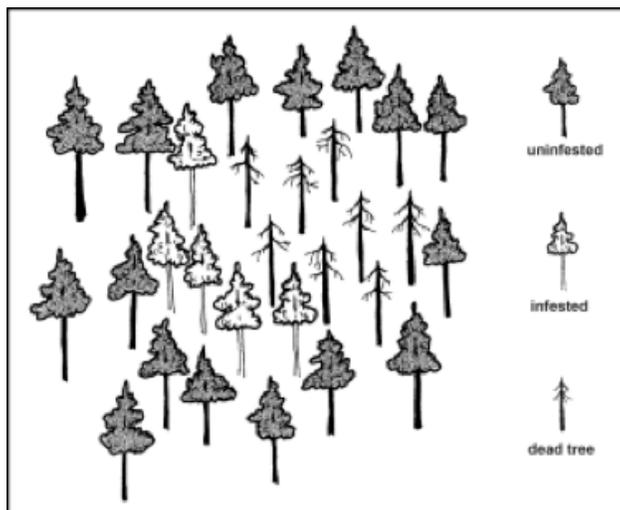


Figure 3. Active SPB Spot

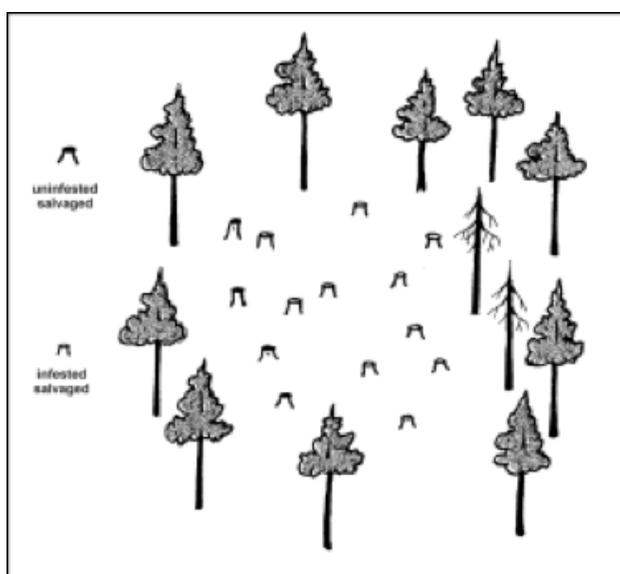


Figure 4. SPB Spot After Salvage Removal

site, it makes sense to go ahead and thin the rest of the stand after the trees within the marked boundaries of a SPB spot have been harvested. Thinning or cutting the rest of the stand may be the only way to make the salvage activity economically feasible for the logger. For small sites with small SPB infestations, hand-felling and using a portable sawmill may be the only economical means for salvaging the affected timber.

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>

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