

## SOUTHERN PINE BEETLE

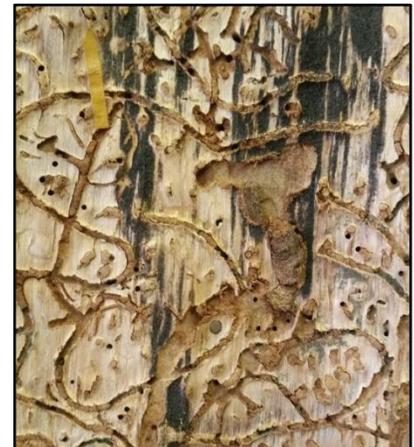
**BACKGROUND:** In Arkansas, the southern pine beetle (SPB) was once considered the most destructive forest pest. However, the beetle had no considerable activity since the late 1990s. Despite the lack of outbreak, the threat of future infestation still remains, and all landowners and foresters should be aware of its biology and management.

**IMPORTANCE:** The southern pine beetle (*Dendroctonus frontalis*) is considered the most destructive forest insect in the southeastern United States. It is capable of attacking all southern pines, and in Arkansas it attacks loblolly and shortleaf pine. Weakening of trees by flooding, windstorms, and drought commonly precedes outbreaks. Typically, older trees larger than six inches in diameter are more susceptible.

**IDENTIFICATION:** The brown to black beetle is about 1/8 inch long. Its hind end is rounded, in contrast to the scooped out posterior of *Ips* beetles. Larvae are white with a reddish-brown head and the pupae pure white. Fully-grown larvae and pupae are approximately 1/8 inch in length. Eggs are white and are visible to the eye.

**SIGNS OF ATTACK:** The first indication of attack is usually yellowing or browning of needles, though this symptom occurs long after SPB has infested the trunk. The trunk will usually reveal white, yellow or sometimes red-brown pitch tubes, about as large as a wad of gum. With extremely drought stressed trees, pitch tubes may be very small or absent, and only reddish-brown boring dust will be present. Removal of the bark will show a distinctive winding "S" shaped gallery pattern, which is quite different from the "Y" or "H" shaped gallery patterns of *Ips* beetle. In active spots, trees attacked the previous year will have dark reddish-brown foliage. On the edges of an infestation, foliage will change to light greenish or yellowish green.

**LIFE CYCLE:** Adult beetles are usually attracted to weakened trees, and they are adapted to infesting lightning struck trees. However, in epidemic situations, they can attack trees that appear healthy and vigorous. Initial attacks are in the mid-trunk and then the length of the tree below the crown. Adult beetles excavate the characteristic "S" shaped egg-galleries. Eggs are laid in niches along these galleries. Larvae do not move far from the egg galleries (about 1/4 inches) where they create widened feeding chambers. When fully grown, larvae excavate cells near the bark surface in order to pupate. After pupation, adult beetles chew through the bark and emerge to attack nearby trees. The complete life cycle takes between 25 and 50 days, depending on the temperature. Across its range, there are commonly three to five generations per year, but Arkansas can experience between five and eight generations.

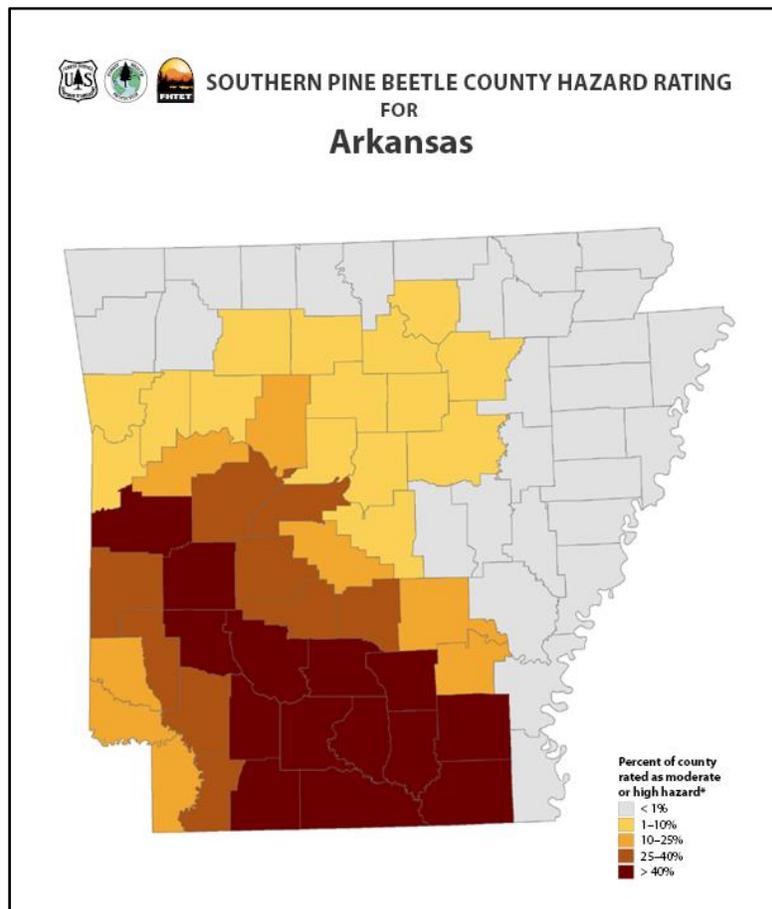


**HAZARD RATING AND PREVENTION:** Research has led to a better understanding of the beetle and its relationship to the tree and stand. With this information, we can prevent beetle attack or more effectively manage an outbreak. **The first line of defense against SPB outbreaks is prevention, and this involves proper management of our pine forests.**

The goal of any SPB prevention program is to identify pine stands growing under conditions preferred by the beetle. Several methods have been developed to determine if a stand has high or low SPB hazard. High hazard stands should be thinned to favor vigorous tree growth and promote natural resistance to beetles.

Landowners with high density pine stands may want to reduce their risk of SPB infestation. Consult a registered forester for management advice. Depending on the stand, the forester may recommend one or more of the following actions:

- Thin to basal areas of 70-100 sq. ft./acre to promote rapid tree growth and resistance to beetles
- On sandy soils, use borax on tree stumps to prevent annosus root rot
- Harvest and regenerate over-mature stands
- Conduct a prescribed burn to reduce plant competition
- Treat hardwoods with herbicide to reduce growing competition
- When practical, remove high hazard trees preferred by beetles, e.g., those damaged by lightning, ice, logging, or other pests



**CONTROL METHODOLOGY:** Southern pine beetle control requires integration of three recommended techniques: salvage, cut and leave, and pile and burn. Control should be a year-round project; but winter control is especially important because brood densities tend to be higher and concentrated in fewer trees.

**SALVAGE:** When infestations occur in easily accessible merchantable trees, remove infested trees IMMEDIATELY. Promptly process infested material at nearby mills to minimize spread of SPB infestations. Chipping or burning should destroy infested material and bark. Encourage harvesting of infested trees first before salvaging trees where SPB has already evacuated.

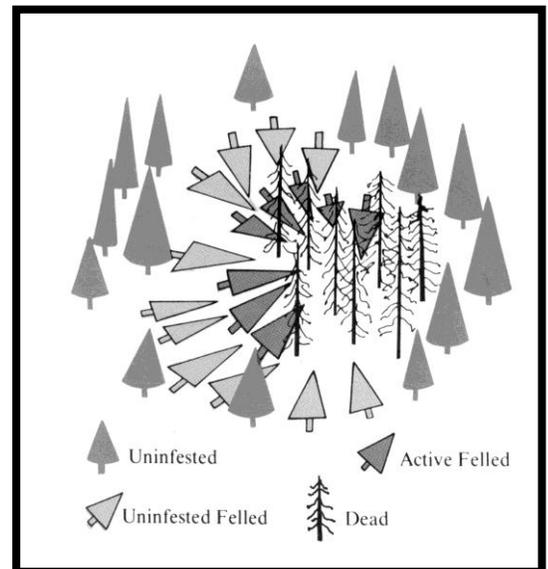
Success in salvage control depends on removing all pines with fresh attacks and those with developing beetle broods. The best insurance is cutting a buffer strip of uninfested green pines around the active head of a spreading spot to interrupt the beetles' attractant source and stop their advance. The buffer strip also provides a margin for error, in case infested pines were initially overlooked.

- **WIDTH OF STRIP** - Make width equal to height of infested trees, e.g., when infested trees are 65 feet tall, cut the buffer a width of 65 feet.
- **MARKING THE BUFFER** - Start marking buffer strip from freshly attacked green pines and continue into the green, healthy pines.
- **CUTTING** - Start with outermost green pines and cut back towards old, dead, vacant pines (very loose bark removed easily). There is no need to cut dead trees. Cut only green, freshly attacked pines and pines with developing broods. In summer, these are green, fading, and red-topped trees.

**CUT AND LEAVE:** As in salvage control, the cut and leave control method removes all pines with fresh attacks and those with developing beetle broods using a properly designed buffer strip. The same guidelines for the width of the buffer strip and beginning of the buffer strip apply. In the cut and leave method, infested trees and the buffer trees are felled into the center of the spot.

**PILING AND BURNING:** Cutting infested trees, piling stems and thoroughly burning the bark may suppress unmerchantable or inaccessible SPB infestations. The entire bark surface of infested trees is thoroughly burned to insure effective control. Follow the procedures below to pile and burn. Identify and mark SPB-infested trees.

- Fell and pile all trees in center of infested area
- Burn until all infested bark is thoroughly charred
- Do not burn if it is unsafe or will promote significant soil erosion
- Check carefully to ensure no green infested trees are overlooked
- Check for breakouts and treat them as needed



**EPIDEMICS:** The Arkansas Forestry Commission recommends the following during SPB epidemics:

- **CONTROL PRIORITIES** – Control the largest active infestations first using any control measures available at your disposal—salvage, cut and leave, or pile and burn. All control measures should include a buffer of green uninfested pines. Closely examine pines and determine which are infested; start the buffer strip at that point. Generally, buffers equal to the height of the pines are sufficient BUT with drought conditions and high populations, buffers of double the height should be used.
- **THINNING** – DO NOT thin pine stands during major epidemics. At least three things happen if pines are thinned during an epidemic: 1) Damage to standing pines causes pines to “bleed” sap attracting beetles and causing additional infestations, 2) Logging crews that should be controlling active infestations will be tied up on thinning and 3) The seller will receive only salvage value, which can be 50% to 75% of normal stumpage.
- **ROAD BUILDING** - Limit or delay road building in pines stands during an epidemic. If the road must be built immediately, spray damaged pines and pines adjacent to the road with a pesticide.
- **UTILITY RIGHTS-OF-WAY TRIMMING** - Cease all trimming of rights-of-way pines in epidemic counties until the epidemic is over.

**SOUTHERN PINE BEETLE PREVENTION AND RESTORATION PROGRAM:**

The Arkansas Forestry Commission (AFC) offers a cost-share program to offset pine management costs for private-landowners. This program is designed to lessen the risk of southern pine beetle outbreak within Arkansas by thinning overstocked pine stands (basal area greater than 120 square feet) and establishing stands with proper spacing. The cost-share offered by AFC is up to 50% of the treatment costs. AFC also offers an incentive to landowners who wish to manage stands less than 20 acres. Additionally, an incentive for loggers is supplied on small parcel thinnings. For more information, visit the incentives section on AFC’s forest health webpage:

<http://forestry.arkansas.gov/Services/ManageYourForests/Pages/forestManagementIncentives.aspx>

Revised: 12/22/2014

Photo credits: Erich G. Vallery, USDA Forest Service - SRS-4552, forestryimages.org

Hazard map credit: Forest Health Technology Enterprise Team, [http://www.fs.fed.us/foresthealth/technology/nidrm\\_spb.shtml](http://www.fs.fed.us/foresthealth/technology/nidrm_spb.shtml)

Illustration Credit: Direct Control Methods for the Southern Pine Beetle, Handbook No. 575, Ronald F. Billings, Texas Forest Service, forestryimages.org

The Arkansas Forestry Commission offers its programs to all eligible persons regardless of race, color, national origin, sex, age, or disability; and is an Equal Opportunity Employer