

# Forest Management and Decision-Making After The Southern Pine Beetle

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Although southern pine beetle has ravaged many areas in Tennessee, we are still recommending establishing pine for most beetle-killed areas in Tennessee. Why? Although establishing pine may seem counter-productive, pine is still the best-suited forest cover (both ecologically and economically) for most of the drier and poorer sites. Pine is inexpensive to establish and grows well on a variety of sites, especially those with shallower soils that are typically dry.

Why do we have an explosion of pine beetles? There are several reasons. Pine beetles are a native insect and are present every year. Their populations tend to cycle with build-ups every 8 to 10 years. Favorable weather conditions, particularly mild winters and hot, droughty summers allow populations to build. Cold, subfreezing winter temperatures and mild summers usually deter the beetle. Trees that are stressed from lack of moisture or from competition from adjacent trees are most susceptible. Trees that become stagnated from lack of forest management or are in need of thinning are prime candidates for attack from pine beetle. Keeping pine trees prosperous and healthy is the best prevention against pine beetle attack.

If you have acreage that has been affected by pine beetle or has died, what should you do with that land? A few steps or guidelines to get that land back into forests are listed below.

1. **Re-examine your Ownership Objectives.** What is the future potential for that land and what do you want to achieve with land ownership? Do you have economic, wildlife, aesthetic or recreational objectives or a mix of objectives?
2. **Site Quality Assessment.** Will your land support your ownership objectives for your forest?

**3. Assess what trees are left including potential regeneration.**

- a. Dense pine plantations probably have few trees remaining. Check and see if through natural seed fall, new pine seedlings have started to grow. If not or if there are not a sufficient number per acre, planting is required. If left to nature, a hardwood/pine mixture will probably occur.
- b. Mixed pine-hardwood stands. If pines have succumbed to beetles, is the hardwood stocking sufficient to allow the stand to increase in value? Are the trees of desirable species and form? If not, it may be time to cut your losses and start over with a new stand of trees, preferably planted pine or sprouts and seeds of hardwoods. If a mixed stand is preferable, plant pine at a wide spacing (100 to 150 per acre) and allow natural hardwood regeneration to fill-in between planted pine.
- c. Regeneration of *desirable* species not present. In most instances, more shade-tolerant and less valuable hardwood species such as red maple and sweetgum will occur in the understory. If desirable species are not present, probably the best option is to control the unwanted vegetation and prepare the site for planting.

Your options are:

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| <ol style="list-style-type: none"><li>1. Carry the natural succession forward.</li><li>2. Manipulate the existing vegetation to encourage more “desirable” species.</li><li>3. Work toward supplemental planting of desirable species</li><li>4. Eliminate the existing brush and unwanted species and establish a pine plantation.</li></ol> |
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**4. Do You Have A Potential Stand of Trees?** Refer to separate article with the same title on the “**Publications**” sub heading on the home page.

**5. Site Preparation for Planting**

- a. Site Preparation Methods: Once the decision has been made to remove the existing vegetation on a site, the next step is to decide how to remove the material. The choices are herbicide, mechanical, burning or combinations.

The choice you make will depend on: your objectives, the species to be removed, volume of material, environmental impact and safety, time and cost.

Herbicide application is an environmentally friendly option. Most herbicides use a plant hormone to affect the plant growth and survival processes. They are benign in animal physiological systems and are effective in such low doses that very little, if any, active ingredients are introduced in the ecosystem. The use of herbicides will control unwanted vegetation and help prepare the site for planting, but will have little physical effect on standing dead pines.

The impact of mechanical vegetation removal on the soil should be a primary concern in your decision. Moving vegetation with a bulldozer, unless done with utmost care, will disturb the top layers of soil. These layers are critical to site productivity in a forest. Large percentages of essential nutrients are located in the top few inches of soil. The organic matter of the forest floor is important in protecting the soil from raindrop impact and directing water into the soil. The root systems of the plants being removed also hold the soil in place and provide avenues for water infiltration.

When plants are killed in place, their gradual decay maintains the nutrient pool, the organic matter is conserved and the root mat is gradually replaced with that of the new community. Little or no opportunity ever exists to allow soil to leave the site.

Recent news of the high profile escaped “controlled burns” in the West reinforces the need for the most careful use of fire for forestry objectives. Many pine sites that are falling to southern pine beetle are relatively dry with large volumes of dead material. Fire is often considered the cheapest method of site preparation, especially for natural regeneration or for planting. However, this is not true if the fire escapes.

Many of these dead pine stands are hazardous from dead and falling trees. If you were unable to salvage the dying and/or dead trees, these trees will ultimately come down. The small twigs will fall first followed by the larger branches and finally the trunk will either break in two at some height or the entire tree will fail at the groundline. This progression will occur over 2 to 5 years.

The woody debris from these falling dead trees can increase the fire hazard and decrease accessibility for planting crews, unless provisions are made to move the stems into windrows or pile and burn the material. These types of operations require a fair amount of money on the front end of the investment.

Probably a combination of treatments will be necessary to achieve the control of unwanted vegetation and debris before the stand is planted. Herbicides and fire are most effective on smaller woody vegetation and herbaceous cover. Mechanical methods may be needed with larger trees. Safety should be of utmost concern during site preparation, whether using mechanical equipment, prescribed burning or applying herbicide.

## 6. Regenerate the stand.

- a. Plant pine at a wider spacing, (at least 10' x 10' or 435 trees per acre) to allow trees to get to a larger merchantable size to make thinning more profitable. Most pine seedlings are genetically improved for increased growth characteristics, better survival and more resistance to disease, particularly fusiform rust than seedlings planted 20 years ago.
- b. Weed control may or may not be needed depending on the stocking of the stand. Denser stands may not have much underbrush. A late-summer fire should set the system back enough for natural regeneration to be successful, depending on seed fall and hardwood sprouting. Fire will facilitate planting, but may not hold long enough during the next growing season to allow seedling establishment. The primary competition in the first year is below ground. Water is a scarce resource and grasses and forbs can be tenacious competitors. Shade tolerant trees such as maple and beech that have been established in the understory for some time will need to be controlled, either manually or chemically to encourage growth of pines. Site preparation will control some of the unwanted vegetation, but generally a herbicide release of pines, controlling competing unwanted herbaceous and woody hardwood vegetation is warranted after the first or second growing season. For more specific information on application of herbicides, refer to the articles on herbicides and ground application methods that are on the webpage.
- c. Species to be planted: Loblolly, shortleaf or eastern white pine. Loblolly pine is widely available, inexpensive and easily planted. It grows on a variety of sites and is easy to sell in most places. Loblolly is susceptible to ice damage. Shortleaf pine is slower growing, but with denser wood. Survival of planted seedlings has been mixed. Plant more trees per acre to make sure of adequate stocking. Shortleaf is less susceptible to ice damage and is a desirable tree for the log home industry. Eastern white pine is more site specific and will not tolerate hot temperatures and late season droughts. Seedlings are more expensive and should be planted on well-drained sites with

sufficient year-around moisture. Do not plant on exposed areas, as survival will be reduced.

There are a variety of ways to manipulate the vegetation on your land. The only wrong ways are those that negatively impact the system. That is why Best Management Practices (BMPs) should be used, whether applying chemicals, using a dozer, or using a prescribed fire. Early planning and a discussion with a forester about your plans is the best advice.

### A Sample Prescription

June 2002	Control unwanted vegetation through a control burn or mechanical site preparation or combination
Late August or Early September 2002	Chemical control of resprouts and herbaceous vegetation
December 2002 through March 15, 2003	Plant trees
Late Summer after 1 <sup>st</sup> or 2nd Growing Season Depending on Competition	Herbicide Pine release

### Costs

We estimate a \$300 to \$400 cost per acre for removing existing dead pine trees, site preparation (whether burning or chemical or both), procuring seedlings, planting, and a chemical pine release. The cost-share is 50 percent of actual costs. The most expensive operation is the removal of the dead pine trees. These costs are variable depending on your local area (labor and equipment available).

Your costs will be substantially less if standing dead tree removal is not required. If you can use chemicals/herbicides that are applied from the ground and plant among the dead standing trees, costs are lower. Be cognizant of safety concerns of falling branches and trees, i.e., do not work on windy days and wear protective equipment. If your trees have not been dead for more than one year, breakage of trees is minimal.

## **Summary / Recommendations**

1. Re-examine your objectives for land ownership
2. Do a site quality assessment.
3. Assess what trees are left including potential regeneration.
4. Do you have a potential stand of trees or is planting necessary?
5. Consider your site preparation alternatives
6. Regenerate the stand.
7. Monitor growth and development of your trees.