

Forest Management Notes



Athens-Clarke County Community Tree Program

Thinning Pine Stands for Forest Health

Pine trees are an integral part of the ecosystem of the Piedmont region of Georgia. Many pine species are some of the first trees to establish on a site following large scale disturbances such as wildfire, tornadoes, hurricanes, or insect outbreaks. Pines are known for their ability to tolerate tough environmental conditions.

Most southern pine forests naturally transition to hardwood forests as the ecosystem matures and reaches a climax state. It is normal for hardwoods to establish beneath a mature pine forest while they wait for any opportunity to gain space in the forestry canopy. Once hardwoods achieve a dominate canopy position, they outcompete and kill many of the original pines. Early southern pine stands were typically maintained by frequent catastrophic events like wildfire.



Many of our early pine stands were maintained by fire. Frequent wildfires decreased competition and prevented hardwood species from outcompeting established pines.

In 2004, pines made up 45% of the 24.8 million acres of forest land in Georgia. Rapid suburban expansion over the past two decades has resulted in millions of acres of land that are classified as wildland-urban interface and traditional forest management practices—like prescribed burning—have become difficult or impossible to implement. This expansion of interface forest land has eliminated the ability for frequent catastrophic events to safely maintain pine stands.

Reasons to Thin

Competition-related problems can occur as the size of trees in pine stands increases. Normally competition self-regulates in a stand as mortality increases and tree densities decrease. When pine stands become overcrowded they are at high risk for wildfire, pest, and disease outbreaks. These damaging events impact forest health and decrease investment values while increasing the risk of damage to people and property.

Wildfire: Dense and declining pine stands generate lots of woody debris that make excellent fuels for forest fires. As trees die, they create multiple layers of fuel that can turn a simple ground-level fire in to a raging canopy fire. Once a canopy fire is initiated, it becomes very difficult to control. Thinning can reduce density-related decline and remove many of the midlevel fuels that result in crown fires. Additionally, a thinned stand is easier to navigate through and a fire can more readily be suppressed as manpower and equipment arrive on scene.



If a wildfire needed to be suppressed, it would be very difficult to move machinery into this stand.

Pest and Disease Management: Overly dense pine stands are much less healthy than thinned pine stands. Trees in dense stands are constantly competing with each other for space and resources. This competition stresses the trees and makes them more prone to Southern Pine Beetle (*Dendroctonus frontalis*) outbreaks. A proper thinning will remove weak and suppressed trees and will allow forest health to improve as competition is reduced.



Density in this stand has stressed the trees and resulted in a Southern Pine Beetle outbreak.

Improving an Investment: Many landowners plant and maintain pines as a financial investment. Newly established stands are typically planted at higher densities because the young trees are not large enough to compete with each other and the high density suppresses unwanted vegetation while improving tree structure. Eventually trees grow and competition becomes a problem. At that point, trees are thinned from these stands so the remaining trees have more available resources to reach their maximum growth potential. It is normal for managed pine stands to be thinned two times before the final harvest. Each thinning is designed to remove

suppressed and declining trees so growth can concentrate on fewer, faster growing trees and the maximum amount of money can be generated at the final harvest.

When to Thin

Normally, pine stands are thinned when tree size and density starts to impact tree size, quality, health or distribution. Sometimes visual clues can be enough to determine that it is time to thin. If trees are dying from pests or diseases, debris is building up in the stand, or if more than 70% of the total height of the tree is limbless trunk then it might be time to thin your pines.

Foresters typically use a basic measurement called basal area to evaluate stand density. Basal area is the amount of cross-sectional wood (square feet) present at 4.5 feet high in the stand. Basal area tends to level out over a forest's life; i.e. as trees become larger, the weak ones die and there is the same amount of trunk area present as growth and mortality balances out. Pine stands typically max out between 120 and 160 square feet of basal area. As a stand's basal area approaches these limits, it may need to be cut back to by 30-50% to 60 to 100 square feet of basal area. Your local Georgia Forestry Commission Forester can help you establish your land's basal area if you need help deciding when it is time to thin.

How to Thin

Trees are usually marked by a forester or landowner and removed by a contractor who pays for the harvested materials. Stems are removed and limbs are either spread back through the stand, or piled somewhere on the property. In order to leave the best trees on site, the small, diseased, crooked, forked, or defective trees are selected first. Entire rows of trees may be removed when large areas of low-value trees need to be thinned. The later it is in a stand's life, the more important it is to pay attention to the types of trees that are removed in a thinning.

Occasionally, trees need to be thinned from stands that are too young or too small to generate enough revenue to interest a logger. These "precommercial thinnings" require the landowner to pay someone to remove the trees and are usually avoided. Landowners that lack enough mature trees to generate interest from loggers may want to partner with their neighbors to complete multiple small jobs at once. This aggregation can increase the value of a thinning and turn it from an expense to a source of revenue.

A properly thinned pine stand will improve forest health, decrease the risk of damage to adjacent property, and may increase the value of the trees left on site. Thinning is a safe and ethical practice that all forest landowners need to consider and part of their stewardship of the land.



A properly thinned stand will improve health and aesthetics.

For more information, contact the Athens-Clarke County Community Forestry Coordinator at (762) 400-7519 voice, (706)613-3566 fax, or by e-mail at Mateo.Fennell@accgov.com