

**Converting Planted Loblolly Pine
(or Slash Pine)
to Longleaf Pine: An Opportunity**

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Many private forest landowners in the South are interested in restoring native longleaf pine forests because of the higher wildlife, recreational and aesthetic values associated with longleaf compared to other southern pine species. The appeal of the open, park-like longleaf woodlands typical of lands managed for bobwhite quail is strong for many landowners. In addition, longleaf has: greater insect, disease and fire resistance; and longleaf yields higher forest product values compared to other pines.

Yet many landowners feel they will lose wildlife habitat and income opportunities for 20 years or more if they clearcut existing loblolly or slash stands and replant with longleaf.

That does not have to be the case! There is a simple strategy where landowners can, over time, transition their even-aged loblolly (or slash) pine stands to uneven-aged longleaf while maintaining habitat values and periodic income through the sale of timber. This management system assumes that the landowner is interested in multiple resource management and not maximizing one resource over the other. Recent surveys of Southern forest family owners show that enjoyment, recreation and land appreciation tend to be of greater importance than maximizing timber income. Transitioning timber stands to longleaf can meet the needs of landowners with multiple objectives and conservation interests, while providing solid cash flow from timber management. Modifications of this approach are also described for those with more conservation-oriented interests.

A Basic Example

The site is a 15-year-old, 50-acre loblolly pine plantation on a typical Coastal Plain site. The stand was planted with 726 trees per acre after an herbicide application and a site preparation burn. Prescribed fires to reduce fuels and control hardwood sprouts were applied to the plantation at ages 12 and 14 respectively.

The transition begins with the first thinning which in this case is when the loblolly plantation is 15 years old. Existing openings and patch cuts on 20% of the 50 acres (ten acres) create openings ranging from $\frac{1}{4}$ acre up to $\frac{2}{3}$ acre in size, with the average size being $\frac{1}{2}$ acre. Existing openings are enlarged as needed to create the desired patch size.

In the remainder of the loblolly stand, 40% of the volume is selectively thinned and removed. The stocking should be varied to create a “thick and thin” pattern, leaving a varying stocking in the residual stand. Another way of achieving this is to set a target residual basal area of 60 square feet per acre with a range of 50 to 75 square feet of basal area per acre across the stand.

In the open patches, after chemical site preparation and as early in the planting season as practical, plant containerized longleaf seedlings at 622 trees per acre (7'x10' spacing). Use prescribed burning on a two-year rotation in the entire plantation to control competing vegetation. Some consideration may be needed when the young longleaf trees are two to four feet tall and susceptible to fire damage.

Repeat the thinning process with the same prescription every ten years until all the loblolly is removed and replaced with longleaf. This will carry the last of the loblolly to age 55. At this time the longleaf stand will have trees from one to forty years old.

As the longleaf becomes merchantable, selectively harvest two-thirds of the previous ten-years growth.

Conservation Alternatives

While this plan describes one approach to conversion, as the importance of conservation objectives of landowners increases, several variations might be considered that should increase the conservation (aesthetic) values with some modest increase in costs or reduced economic benefits. Increasing the frequency of burning, so that the stand is burned on an annual (sometimes two-year) rotation, can help reduce the size and sometimes the numbers of hardwoods in the midstory. Although that would result in an increase in the costs of burning, it would also increase the opportunity for rich groundcover to develop and reduce costs associated with hardwood control in the latter years of conversion.

In addition to burning frequency, the timing of the start of longleaf regeneration, and the rate and manner of regeneration can be varied. Most loblolly or slash pine plantations have gone through a significant period of fire suppression while they became established (typically 10-15 years if they were ever burned). That often allows hardwoods to become established in the understory that will respond to overstory release. South Georgia forester Leon Neel would often quote Herbert Stoddard, the father of modern day quail management, as saying that to restore land to a frequently burned condition takes the amount of time that the land was removed from frequent fire. Therefore, burning a 15 year-old plantation for 10-15 years before starting the conversion process is not out of the question. This allows time to be factored into the conversion process. A second alternative that would increase the value of time would be to convert at a much slower pace, about 10% at a time, taking advantage of any open patches that result from beetles, wind, or other natural sources of mortality. When a 15-year-old stand is periodically thinned until age 35-45, and then 10% is regenerated to longleaf pine every 10 years, the oldest trees being retained will be 135 years old). Some might argue that loblolly or slash are likely not to endure that length of time. However, with thinning practices that continue to increase the vigor of the stand by removing disease infected trees, forked trees, or those of low crown vigor will increase the health of the stand through time and extending the life of the residuals. In addition, thinning and burning the stand regularly to maintain open stand savanna grassland structure reduces the likelihood of beetle infestation.

Size and shape of regeneration areas can be varied considerably. While regeneration gaps $\frac{1}{4}$ to $\frac{2}{3}$ acre in size are sufficient, openings of any size caused by wind, insects, disease, fire or other causes should be taken advantage of in regeneration. Natural gaps often have scattered mature trees that remain. The needle drop from these trees will provide fuels that will help carry fire across the stand. Clean gaps are not required if slower growth of regeneration can be tolerated. In addition, openings in the canopy that allow longleaf to be established and to survive repeated burning can be considerably smaller than those that allow for establishment and growth. Thinking of regeneration as a process, planting could occur five or more years



Longleaf pine seedlings underplanted in a slash pine stand.

in advance of a release operation. This allows seedlings to become firmly established on the site and to respond quickly to release.

On some sites it is possible to shorten the time frame for the conversion process. Using the basic plantation as an example, the same prescription would be applied every five years. At the completion of the conversion, the oldest residual trees would be 35 years old and the oldest longleaf would be 20 years old. While this would shorten the time frame for the conversion it would create a brief interruption in timber income until the trees became older.

Hardwood Control

Regardless of the practice selected hardwoods must be controlled. Hardwood control should be accomplished primarily through repeated, frequent burning. Limiting opening sizes will ensure pine needle fuels are present to sustain frequent fires, and hardwoods are not released from competition with the overstory. However, sometimes burning alone does not achieve the desired results. Mowing above the height of the longleaf seedlings in combination with frequent burning increases fine fuels like grasses. Herbicides can effectively control hardwoods, but the application may have unintended consequences on understory plants. Herbicides are most useful on sites on where hardwood dominance is difficult to control with fire alone and in places where the understory community has been reduced in diversity due to past land use such as intensive agricultural practices. By using herbicides in these cases, frequent fire can be established and the restorative influences of fire can act over time. The

selection of herbicides and timing of application are critical to minimize their impact on existing understory communities.

This slow conversion approach is likely to result in considerable natural regeneration opportunities in the latter stages of pine conversion. During years of superior cone production, even scattered, mature longleaf pine can naturally regenerate gaps and/or stands, if the seed-bed is properly prepared. To the extent possible these opportunities should be incorporated into the conversion process. Artificial regeneration through direct seeding longleaf has often been a challenge due to the high levels of seed predation, but at least one project in the sand hills of Florida is experimenting with that approach, and landowners may wish to look into that alternative.

This strategy for converting existing loblolly or slash plantations to longleaf is not for everyone. However, if you are a landowner interested in restoring longleaf to the landscape on your property, this approach should be considered. It will maintain wildlife habitat values, increase recreational value and provide for periodic timber income during the conversion process.

For additional information on the subject, contact:

Clemson University Extension Forestry & Natural Resources:
www.clemson.edu/forestres/

Joseph W. Jones Ecological Research Center:
www.jonesctr.org

The Longleaf Alliance:
www.longleafalliance.org



Longleaf pine in South Carolina.

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