



# Woodland Owner Notes

## Producing Longleaf Pine Straw

*Longleaf pine trees deposit a blanket of needles, often called pine straw, on the forest floor annually. Many forest owners do not realize that it is possible to sell this straw, but in fact wise management of this resource can substantially increase the owner's income from the forest land. Retail sales of North Carolina longleaf pine straw in 1996 were estimated to exceed \$25 million. This volume could easily be doubled or tripled if owners were more aware of this opportunity and if the market were expanded by promoting sales in states to our north.*

Early North Carolina settlers encountered a virgin longleaf pine forest that covered nearly all of the well drained soils of North Carolina's Coastal Plain. Conversion of the land to other uses and species, unfavorable cutting practices, and failure to provide proper conditions for regeneration have greatly reduced the acreage of this valuable Southern pine.

Longleaf pine grows well in a variety of soils, but most stands in North Carolina today are growing in soils that are sandy, have a low amount of organic matter in the surface layer, and are moderately to strongly acid. The soil drainage ranges from good to excessive. Approximately 411,000 acres of land with this type of soil may be found in 23 eastern and south central counties (Table 1). The possibility of producing pine straw for sale can be an incentive to better management of these forested acres.

### Growing Longleaf Pine

Traditionally, the planting of longleaf pine has not been recommended because a high percentage of plantings have resulted in failure.

Most of these failures have been caused by the use of poor quality nursery stock, improper care and handling of seedlings, inadequate site preparation, and poor planting techniques.

Seedlings have an excellent chance of survival if they have a root collar diameter of at least ½ inch, are not allowed to dry out, are planted promptly after lifting (< 2 weeks old), and are machine planted on well-prepared sites. Recommended planting spacing ranges from 5 by 10 feet to 7 by 10 feet, depending on the site. Direct seeding of prepared areas and natural regeneration under a shelterwood cut are also cost-effective methods of establishing longleaf stands. Container-grown longleaf seedlings are available, and though more costly, often result in higher survival rates. Refer to Woodland Owner Note 16, *Steps to Successful Pine Plantings*, for more information on survival rates for pines.

Longleaf seedlings are intolerant of competition, and their initial growth is slow. Once the trees reach sapling size, however, their growth rate in well-stocked stands compares

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favorably with that of other Southern pines and they may outgrow the other varieties on some sites.

Management from sapling size to maturity is relatively easy. Longleaf pine seldom stagnates. Rarely is it grown exclusively for pulpwood. The greatest economic returns are realized when the trees are grown on longer rotations and used for larger products such as poles, piling, sawtimber, and veneer logs. Rotation periods of 60 years will produce high-quality products on average sites. Straw production is highly compatible with an extended rotation period and can provide an economic justification for holding mature timber.

**Table 1. Counties with longleaf pine stands.<sup>1</sup>**

<u>County</u>	<u>Acres</u>
Beaufort	7,376
Bladen	45,414
Brunswick	66,974
Carteret	10,788
Columbus	25,400
Craven	5,181
Cumberland	22,657
Duplin	3,879
Harnett	13,870
Hoke	30,262
Johnston	2,758
Jones	2,164
Lenoir	355
Moore	41,620
New Hanover	8,090
Onslow	20,515
Pender	31,343
Pitt	3,097
Richmond	32,126
Robeson	3,098
Sampson	8,643
Scotland	22,525
Wayne	2,979
<b>Total</b>	<b>411,114</b>

Longleaf pine needles are flexible and fibrous, with lengths ranging from 8 to 18 inches. They are used primarily by the nursery and landscape industry for decorative cover and mulch. Garden centers are the main suppliers to homeowners. The shorter slash pine needles can be baled with either the wire-tied or conventional pickup balers.

### Raking and Baling

Longleaf pine needles are usually gathered into piles with a pitch fork or mechanical rake for baling. Some are raked

and piled entirely with pitch forks where the understory vegetation prevents the use of tractor-mounted rakes.

Baling pine straw is a labor-intensive process. One person loads the straw into the baler with a pitchfork, another ties the wire that binds the bale, and another stacks the bales. A three-person crew can produce from 250 to 300 bales per day. The tractor-powered baler is driven from pile to pile.

Higher production can be achieved if partial windrows can be formed and the straw then fed into the pickup reel, where it is mechanically tied with twine. The most efficient production is attained where the straw is raked into long, clean windrows, picked up mechanically, baled, and pushed out to the side. Production by this method can reach 1,000 bales per day.

### Bale Size

No standard size has been established for longleaf pine straw. Bale lengths generally range from 28 to 36 inches, and the dry weight may vary from 30 to 60 pounds. An average bale is 32 inches long and weighs from 40 to 45 pounds.

### Annual Yields

Several variables control pine straw yields, including raking efficiency, the vigor and age of the trees, their basal area, the season, the time interval between rakings, and the bale size. A 15-year-old stand being raked for the first time can yield as many as 200 bales per acre. Vigorous, young to middle-aged stands will yield more straw than older, low-vigor stands. A low annual yield is 50 bales per acre, a good average is 70 bales, and 100 bales is above average.

A stand with several years' accumulation of needles will not necessarily provide a greater yield than one with a two- to three-year needle fall. On the forest floor, the needles beneath the third-year layer start to disintegrate and become too brittle to bale. To collect the red and yellow needles most desired by customers, raking should be scheduled at least every second year. A two-year interval is also more efficient than raking annually.

Needles fall throughout the year, but the heaviest shedding occurs in September and October under normal weather conditions. December, January, and February are good months for raking, provided that the bales can be carried directly to the dealer or stored under shelter.

### Managing for Straw Production

Bales free of cones, hardwood leaves, and limbs are the most desired. To produce them, the stands should be free of undergrowth and debris. Turkey oak, a species that prefers deep, sandy soils and is often associated with longleaf pine,

<sup>1</sup>Johnson, T. G. (July 1991). *Forest statistics for North Carolina, 1990*. USDA-FS Resource Bulletin SE-120. Asheville, NC: Southeastern Forest Experiment Station.

can be a serious problem. Herbicide treatment followed by a prescribed burn a year later will do much to eliminate this species. It may be feasible to cut the oak and treat the stump. Other competing vegetation can also be treated with herbicides. Current herbicide recommendations can be obtained from your County Extension Agent. If the landowner establishes a long-term contract with a pine straw producer to harvest the straw, the producer may clean up the understory as part of the contract agreement.

For maximum needle production the basal area of the longleaf stand should be maintained in the range from 90 to 100 square feet per acre. Overcrowding should be avoided, and a 25 to 30 percent crown-to-stem ratio should be maintained.

### Fertilization and Longleaf Pine

Fertilization shows promise on many sites to not only replace nutrients lost by raking, but to increase production of needles and wood as well. Since foliage typically remains on pine trees for two growing seasons (approximately 1.5 years), most needles which fall the second year following fertilizer application are produced during the first growing season after fertilization. Longleaf pine straw dry weight has increased on research plots by as much as 50 percent (over unfertilized production) by the second growing season following application. Increases of 25 to 40 percent are common. Assuming that longleaf fertilizer responses over time are similar to those in loblolly pine, they would be expected to gradually decline over the next 4- to 5-year period.

Fertilization of longleaf pine has also resulted in significant response in diameter growth of trees in stands as old as 55 years. On research plots at the North Carolina Sandhills

Gamelands, trees have responded to fertilization with a 19 percent increase in diameter growth (compared with unfertilized trees) during the first growing season, and a 49 percent increase (over unfertilized trees) during the second growing season. Refer to Woodland Owner Note 30, *Nutrition Management for Longleaf Pine Straw*, for a comprehensive discussion of fertilization.

### Selling Pine Straw

Private landowners often sell their longleaf pine straw to producers, who do the raking and baling. The producer pays by the bale. Some landowners rake and bale their own straw and sell it directly to the retailer or user. Most who do so have storage sheds.

Federal and state agencies offer their straw for sale on a sealed bid, boundary basis—that is, they accept bids (in dollars per acre) on the right to harvest pine straw within a given area over a specified period of time, generally six months. Private landowners could benefit by adopting this sale method. Its advantages are that payment is made before harvesting, competitive bidding brings the highest price, and the owner need not be concerned with keeping track of every bale harvested.

Greater participation in marketing longleaf pine straw can be expected where balers set up buying stations and purchase loose straw hauled to the baling site. Sellers are paid by the bale.

As with pulpwood and timber sales, it pays to market pine straw in a businesslike manner using a written contract that specifies both parties' condition of sale. For a list of pine straw producers in your area, contact your County Cooperative Extension Agent or County Forest Ranger.

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