

FORESTRY Leaflets

North Carolina Division of Forest Resources

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PINE STRAW PRODUCTION IN NORTH CAROLINA

The importance of pine straw as a forest product was launched by the popularity of straw as a mulch in the landscaping and horticultural industry. An anonymous source states that in 1987 harvest of pine straw in North Carolina was estimated to be a \$50 million per year industry. Because it is attractive, stays in place well, and does not readily float away during rainstorms, pine straw is a favorite mulch.

Though longleaf pine straw is regarded as the "Cadillac" of all pine straw, loblolly and slash pine also contribute to this market. To date, there is no substantial price differential for straw from these three pine species. However, this could change as the availability of straw changes. Therefore, it should be remembered that longleaf straw bales easier and lasts longer than other pine needles.

Marketing: Pine straw is bought and sold on either a per bale, a per acre, or even a per cubic foot basis. Producers who rake and bale straw typically sell their product on a per bale basis while woodland owners may wish to sell straw on a per acre basis generally to other producers. Lump sum sales by either method, however, require an accurate assessment of the yield of straw. Some producers set up buying stations and purchase loose straw. Payment is made based on number of bales produced.

Yields: To compound the problem of estimating yields, the size and weight of bales vary. Bales may be 28 to 36 inches long and weigh from 30 to 60 pounds on a dry basis. An average weight would be 40 - 45 pounds for a well packed bale. Much like bale size and weight, the yield of straw varies from stand to stand, but is generally related to tree density and site quality. ¹Blevins et. al. 1994 at N. C. State University states that these two stand parameters account for 77% of the variability of pine straw yields. For example, a dry site having a low site quality will yield less straw than a moist site having a high site quality so that a low annual yield of 50 bales per acre to an above average yield of 100 bales per acre is observable. An average would be about 70 bales. Most straw is harvested from stands that are at least 15 years old and have reached crown closure.

Management: To maximize the harvestable area of a stand, to increase the efficiency of the baling operation, and to achieve the best market price for straw, production areas should be accessible and free of competing vegetation, particularly hardwood brush. Bales of straw that are contaminated with limbs, pine cones, and oak leaves are less desirable than clean bales. Because brushy stands are difficult or impossible to work, the use of herbicides in conjunction with cutting of brush may be necessary to "clean up" production areas. Prescribed fire may also be used to control understory vegetation to facilitate the baling operation. Maintaining a basal area of about 90 square ft. per acre is important in controlling understory vegetation as well as in maximizing straw yields. This basal area is equivalent to 165 ten-inch trees/acre with an average spacing of 16' x 16' (more small trees growing closer together or fewer large trees growing further apart). Thinning out corridors that are wide enough for accessibility of tractors and equipment and transport vehicles will generally be necessary. Areas outside these corridors may be selectively thinned.

Once an area has been thinned and cleaned up for production, raking and baling can begin. Removal of straw from stands is preferably done every 2 years since annual raking does not allow enough needles to accumulate to maximize production in terms of baling time. Furthermore, annual raking may increase soil compaction on some soil textures and may completely

¹Blevins, D., H.L. Allen, Steve Colbert, and W.E. Gardner. 1994. Longleaf Pine Straw Raking Nutrition Management Recommendations. Draft Forestry Extension Note. N.C. State University. 13 pp.

eliminate the litter layer. Such action creates opportunity for erosion and lowers the productivity of the site for production of both wood and straw.

Raking straw will remove nutrients from forest stands, but the quantity of nutrients that are removed is dependent upon the amount of straw removed and the frequency with which it is removed. Some soils and sites will support more raking than others before a decline in productivity of wood and straw are experienced. In general, however, fertilization to replace nutrients and, in fact, increase straw production is desirable from an investment standpoint. Dry sites of low site index are an exception to this rule since moisture availability is the primary factor limiting productivity.

To ensure that fertilization is warranted, sampling of foliage from terminal branches from the upper 1/3 of the crown should be done every five to six years. A minimum of 5 trees for every 10 acres should be sampled. (Blevins et.al. 1994) Analysis should be done by a plant tissue lab such as the NCDA, Agronomic Division, Raleigh, NC (919) 733-2656 and the results evaluated by competent agronomists.

Even though nutrients can be replaced in straw stands, raking and the use of herbicides can be destructive to the diversity of plant species that exist in many longleaf pine communities (Schafale and Weekly 1990). Because many natural areas may be disrupted by intensive management activities, it is often desirable to identify these unique areas and eliminate them from straw production. These areas typically need periodic burning to perpetuate the varied herbaceous plants and grasses that occur naturally. Burning is actually precluded by intensive straw raking.

While straw production may pose problems in preservation of natural areas, it is a good incentive for restoration of longleaf stands on agricultural sites. Old fields offer opportunity for establishment of plantations for straw as well as timber production. Through time, even these man made stands may be managed in a fashion that will allow some restoration of unique plant communities on former agricultural fields.

Profitability: Since profitability of straw production is dependent upon the efficiency of manpower, management, and equipment operating under some prevailing market, one can only generalize. At Bladen Lakes State Forest, straw stumpage prices (value of unraked straw) range from 50 cents per bale to \$1.00 per bale depending upon the presence of debris and brush. If one assumes an average of 70 cents then a low yield of 50 bales/acre/year would provide a woodland owner with \$35 per acre annually. Baled straw wholesales for \$3.00 to \$3.55 per bale. Hence, the same 50 bales per acre would gross \$150 to \$177.50. Thus, a contract baler might recover \$125(\$150 - \$35) to \$142.50(\$177.50-\$35) per acre for labor, expenses, and profit margin associated with baling. Ordinarily, labor and expenses to bale straw run from \$1.00 to \$2.00 per bale depending upon the accessibility and cleanness of the straw stand. The landowner will also realize some additional value per acre through the growth of wood and a general increase in the value of wood products through time.

Producers Association: The N. C. Pine Needle Producer's Association, a non-profit organization dedicated to conservation and research for the production of quality pine needles may provide additional information to interested parties. This organization may be contacted at P.O. Box 2326, Southern Pines, N. C. 28387.



²Schafale, M.P. and Alan S. Weekly. 1990. Ecological Concerns About Pine Straw Raking in Southeastern Longleaf Pine Ecosystem. N.C. Natural Heritage Program. N.C. Division of Parks & Recreation.