Pine Straw – An Economically Important Forest Product in Georgia

November 2012

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Introduction

Pine straw, the uppermost forest floor layer of undecayed needles, is raked, baled, and sold as landscaping mulch in the southeastern U.S. The value of pine straw as a forest product has increased in Georgia, North Carolina, and South Carolina. Pine straw income received by forest landowners in Georgia has increased by over 5-fold from 2000 through 2010 (from $15.5 million to $80 million). Annual Georgia timber revenues have declined by 31% (from $690 million to $475 million) during this same period. Pine straw revenues have helped many landowners maintain reasonable cash flows to achieve attractive rates of return on their forestland. Rates of return can be increased from 6 to 10% without pine straw production to 9 to 18% with annual pine straw income in loblolly, longleaf, and slash pine stands.

How Pine Straw is Commonly Sold

Pine straw can be sold by the bale or by the acre. Current average per acre reported prices in the southeastern U.S. range from $50 to $150 per acre for each raking. Revenues for a single rake have been as high as $200 to $450 per acre for high quality longleaf pine stands. Pine straw can also be sold by the bale. Per bale prices range from $0.20 to $0.35 per bale for loblolly, from $0.40 to $0.65 per bale for slash, and from $0.50 to $1.00 per bale for longleaf paid to the forest landowner. When selling by the bale, make sure that bale dimensions are clearly defined in a contract, as there is not standard bale size. Common “bales” in Georgia are mostly rectangular with dimensions of 12x12x24” to 14x14x36” that weigh from 15 to 25 lbs/bale. There are also cylindrical bales that are usually larger than most rectangular bales and can weigh from 18 to 36 lbs or more. Remember that the larger the bale the lower the bale count per acre.

Pine Straw Production Factors and Rates

A number of factors affect pine straw production rates. They are:
- species
- site productivity
- stand density (basal area) and age
- hand versus mechanical baling (packing density)
- hand versus mechanical raking (mechanical raking often leaves pine straw in the rows)
- percent rakeable stand
- raking intensity (semi-annual, annual, or periodic) and frequency
- time of year of rake
- competition control and the use of fertilizers

All the above factors affect pine straw production rates with the most intensively managed stands and best sites producing the most straw and the poor sites (deep sands of the Sand Hills or shallow soils of the Piedmont with low fertility) and low or no inputs producing the least straw. Competition control (the use of forest herbicides and mowing) and fertilization are two commonly used forest management tools to improve (1) stand conditions
for raking, (2) increase the acreage of a stand that can be raked, and (3) increase pine straw production (on low fertility sites). Table 1 lists pine straw bale/acre production rates by species.

Table 1. Common annual pine straw production rates based on fourteen studies and operational raking in the Southeastern U.S.

<table>
<thead>
<tr>
<th>Species</th>
<th>Low *bales/acre</th>
<th>High *bales/acre</th>
<th>10-yr average *bales/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loblolly</td>
<td>100 to 120</td>
<td>275 to 450</td>
<td>175 to 275</td>
</tr>
<tr>
<td>Longleaf</td>
<td>60 to 80</td>
<td>150 to 350</td>
<td>100 to 250</td>
</tr>
<tr>
<td>Slash</td>
<td>80 to 100</td>
<td>250 to 400</td>
<td>125 to 250</td>
</tr>
</tbody>
</table>

*Assumes a common rectangular bale of 13x13x32” or approximately 16 to 19 lbs per bale dry weight. There is currently no standard bale size in Georgia.

Species Preference, Raking Periods, and Stand Conditions in Southern Pine Stands

In the southeastern U.S. loblolly, longleaf, and slash pine stands are commonly raked. The order of preference is longleaf, slash, and then loblolly straw. Pine species differences in longer needle length, better color retention, and slower rate of deterioration are factors for this order of reference.

Southern pine stands that are (1) clean of understory vegetation and debris (dead stems, branches, and cones), (2) good road access (all weather roads, graveled roads, wide roads, good turn-around areas), and (3) proximity to local markets are important factors in making pine straw harvesting attractive to pine straw buyers or contractors. Longleaf, slash and loblolly pine stands (that are suitable to rake) are commonly raked starting at canopy closure (age 6- to 10-years-old depending on stocking, species, and growth rate) until the first thinning. If the stand is attractive to a contractor, the contractor may negotiate a 3- to 7-year (5-years is common) written agreement with the landowner to rake the stand.

Site factors that may preclude intensive annual raking include: slopes greater than 4 to 8% (excessive erosion) and marginal soils. Excessively well drained deep sands may be best to be raked on a three year cycle to conserve soil moisture, organic matter, nutrients, and to minimize soil erosion. In general, thinned stands are less attractive due to new understory growth and reduced needle production. Thinned stands are often raked in South Carolina and North Carolina once crowns rebuild and understory vegetation is controlled.

Pros and Cons of Pine Straw Raking in Southern Pine Stands

The pros of pine straw raking include:
(1) an annual income for a period of 5 to 10 or more years,
(2) an initial income 5 to 10 or more years prior to the first income from a thinning (the traditional first income from pine stands),
(3) an earlier return on one’s investment in site preparation and planting,
(4) a higher net revenue ($300 to $1200 per acre or more) and rate of return (from one to eight percentage points), and
(5) the pine stand is easier to walk through and may be more aesthetically pleasing to some.

The cons of pine straw raking include:
(1) reduced soil moisture due to increased evaporation rates,
(2) increased soil erosion under intensive raking regimes,
(3) nutrient removals with annual pine straw raking may reduce site productivity if performed for a prolonged period of time,
(4) reduced near-term diameter growth due to intensive raking in some cases without ameliorative treatments, and
(5) minimal cover and food for wildlife species.
Marketing Pine Straw

Demand for pine straw raking will vary by location. Get a list of pine straw vendors from your local County Extension office, State Forestry Commission, or ask neighbors who have pine straw raked for their contractor name and contact information. If a landowner’s pine stand is producing a lot of straw, has a clean understory for easy raking, a good road system, and is in an area of contractor demand, his/her pine acreage should be easy to sell. Make sure the contract clearly states type of payment (by the bale or by the acre), frequency/time of payment (100% at completion of each rake, 50% every ½ year, etc), contract length with start and end time, who is responsible for herbicide and fertilizer application (where needed), mowing, and that road, fence, and other property items are found in the same condition after the last rake as prior to the first rake. If a landowner is selling by the bale, make sure the “bale” dimensions are clearly defined in the contract.