Managing Pine Straw

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Presentation Overview

- An Introduction to Pine Straw Management
- Stand Considerations for Pine Straw Production
- Low-Impact Pine Straw Management
The Basics of Pine Straw Management

In spite of being “evergreen,” pine species continuously replace their needles.

Many consider pine straw to be a low cost and aesthetically-pleasing mulch or groundcover.

Contractors harvest straw for resale to home improvement centers or direct sale to landscapers.

Pine straw can therefore be a valuable source of non-timber revenue in the southeast.
Preferred Species

**Longleaf pine**
*Pinus palustris*
- Needles 8-18 inches long
- Needles tend to keep their color longer than slash pine needles
- Native to a wide variety of Carolina sites

**Slash pine**
*Pinus elliottii*
- Needles 7-10 inches long
- Needles tend to grey a little quicker
- Not native to most of the Carolinas
- Grows well on the right sites but poorly on others

http://texastreeid.tamu.edu/content/TreeDetails/?id=77
http://texastreeid.tamu.edu/content/TreeDetails/?id=73
The Harvesting Process

Site cleaned
• Hardwood removed
• Sticks and cones removed
• Herbaceous layer controlled

Straw Harvested
• Raked or lifted
• Hand or mechanically baled

Transported to market
• Local markets
• Out of state markets

The landowner is compensated sometime during this process

Sale Methods

Lump Sum
• **Payment received up front**
• **Pros:**
  • No waiting around for your profits!
  • Great if you do not want to monitor the harvester
• **Cons**
  • Many contractors cannot come up with that much money up front

Per Unit
• **Payment received as the straw is harvested**
• **Pros**
  • Usually based on an agreed upon price per bale.
• **Cons**
  • Often results in more bids/increased competition
  • May require more monitoring.

That was the view from 30,000 Feet


Now it is time to get into the weeds

https://firstclassmlmtools.com/avoid-the-confusion-that-is-in-the-weeds/
Quality Influences Price

“Clean Straw”

Higher Prices

“Dirty Straw”

Lower Prices

Harvesting Method Influences Price

Hand Raking/lifting and Baling
- More difficult and often less profitable

Hand Raking and Mechanical Baling

Tractor Raking and Baling
- Easier and often more profitable

http://alfafarmers.org/stories/news-detail/pine-straw-offers-forest-owners-additional-income#.Vo8Io_krJQI,
https://www.google.com/search?q=Longleaf+Pine&espv=2&biw=1440&bih=839&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiBt6fc_5jKAhWiZCYKH9jEC3gQ_AUIBigB#isch&q=Pine+straw+baling&imgrc=9YXm3QOWDE5vM%3A,
and http://www.floridapinestraw.com/Pine%20Straw.htm
Stand Density

High Stand Density

Higher Production

Lower Stand Density

Lower Production
# Production Potential

## Site Quality

<table>
<thead>
<tr>
<th>Basal Area</th>
<th>SI 60</th>
<th>SI 70</th>
<th>SI 80</th>
<th>SI 90</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pinestraw Production per Acre</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>lb bales</td>
<td>lb bales</td>
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<td>lb bales</td>
<td>lb bales</td>
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<tr>
<td>80</td>
<td>2200 114</td>
<td>2500 130</td>
<td>2900 151</td>
<td>3200 166</td>
</tr>
<tr>
<td>100</td>
<td>2500 130</td>
<td>2900 151</td>
<td>3300 171</td>
<td>3700 192</td>
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<tr>
<td>120</td>
<td>2700 140</td>
<td>3200 166</td>
<td>3600 187</td>
<td>4100 213</td>
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<tr>
<td>140</td>
<td>2900 151</td>
<td>3400 177</td>
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<td>4400 229</td>
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<td>160</td>
<td>3100 161</td>
<td>3600 187</td>
<td>4100 213</td>
<td>4600 249</td>
</tr>
<tr>
<td>180</td>
<td>3200 166</td>
<td>3700 192</td>
<td>4200 218</td>
<td>4800 249</td>
</tr>
</tbody>
</table>

Assumes ~19.25 lbs per 26 in x 13 in x 14 in per dry bale.

Adapted from: [http://content.ces.ncsu.edu/nutrition-management-for-longleaf-pinestraw](http://content.ces.ncsu.edu/nutrition-management-for-longleaf-pinestraw)
Density Management Diagram for Straw Production

25% MAX sdi is the transition from open-grown stand to a competing population.

Beyond 60% MAX sdi is the zone of imminent competition-induced mortality.

Staying between 25% and 60% MAX SDI should:

• Create moderate to high canopy cover
• Keep density below levels where mortality is imminent.
Currently Recommended BA Target of 90 Square Feet per Acre

This translates to:

- 50 18-inch trees/acre
- 64 16-inch trees/acre
- 84 14-inch trees/acre
- 114 12-inch trees/acre
- 165 10-inch trees/acre
- 258 8-inch trees/acre
- 458 6-inch trees/acre
Increasing Straw Production

- High stand density
- Limited to absent understory vegetation
- Hardwood species absent

Increasing Value for Wildlife

- Low or variable stand density
- Abundant and diverse understory vegetation
- Moderate hardwood component acceptable, perhaps desired

Photo credit: [http://cnre.vt.edu/magazine/articles/201108/20-million-dollar-grant-to-improve-southern-pine-forests.html](http://cnre.vt.edu/magazine/articles/201108/20-million-dollar-grant-to-improve-southern-pine-forests.html) and David Schnake
Harvesting Pine Straw Can Have Negative Impacts to the Ecosystem

- Removes Nutrients
- Damages Understory Plants
- Eliminates food sources for associated species

Ecosystem Degradation
Staggering Harvests Can Also Help Maintain Nutrient Levels

- **Rake, Rest, Rake**
  - Rake year one, rest year two, rake year three

- **Rake, Rest, Burn, Rake**
  - Rake year 1, rest year two, burn year three, rake year four

- **Rake, Rest, Rest Rake**
  - Rake year one, rest years two and three, rake year four

- **Other combinations**
  - Work with your forester to find a system that works for you
“Lifting” or custom raking can protect understory plants

Traditional Raking
- Raking can remove everything
- Understory plants
- Decaying organic material
- Fuel necessary to carry a fire

Lifting or custom raking
- Lifting tends to target just the fresh straw
- Less impact on understory plants
- Leaves enough fuel on site to carry a burn

Contractors are getting creative to meet changing landowner objectives

Custom Tools

Ground Impact
Let fire control your hardwoods and do not be afraid to retain a few!

In spite of management norms, scrub oaks are in fact a necessary component of many healthy longleaf pine forest types.

- **Fox squirrels**

- **Deer**
  - Photo Credit: https://en.wikipedia.org/wiki/Deer

- **Wild Turkeys**
  - Photo Credit: http://www.nhptv.org/natureworks/wildturkey.htm

- **Shelter for young longleaf**
  - Photo Credit: http://www.longleafalliance.org/longleaf-pine/life-stages/the-grass-stage/grass_stage2.jpg/view
Density Management Diagram for Straw Production and Wildlife—Prototype Version

Example of “wildlife friendly straw harvesting”

Manage for straw production while still maintaining enough growing space to keep understory vegetation present.

The first thinning sets the stand on a trajectory towards RCW habitat.

Once RCW habitat achieved, dial back the raking.

The Middle ground between Production of Straw and Ecosystem Services

- Manage density between the two extremes
- Use fire to “clean” your stand and allow some hardwoods to persist
- Lift instead of rake
- Harvest less frequently “Rest, Rest, Rake”
Things to keep in mind when selling pine straw

- Seek help from a consulting forester – Their “cut” is usually worth it.
- Competitive bidding is your friend.
- Make sure the contract places you in control.
- You, and not the contractor, should determine your goals and objectives.
- Multiple-use management is possible – pine straw production and ecosystem improvement are not mutually exclusive.
- Remind critics of straw harvesting that anything that encourages you to keep your forest a forest is preferable over turning your forest into a Walmart.
Questions?

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Literature on Fertilization

Applicable Literature

Managing Nutrition During Straw Production

While much of the nitrogen, phosphorus, and potassium in foliage tends to translocate back into the tree before needle drop, Potassium and Calcium can be lost through raking.

• Repeated yet minor losses of nitrogen and phosphorus can reduce productivity.

Nutrient deficiency can reduce tree vigor and leave them susceptible to other damaging agents – beetles, drought, drought and beetles, etc.

Adding nutrition can replace lost nutrients.

• A foliar analysis should be conducted prior to application!
• Applying too much fertilizer can kill trees!
• Example applications:
  • 200 lbs of diammonium phosphate (18-46-0)
  • 100 lbs of nitrogen (ammonium nitratate or urea), 50 lbs of phosphorus (triple superphosphate or groundrock phosphate), and 50 lbs of potassium (potassium sulfate).

Common Five-Year Fertilizer Recommendations

**Sandhills & Piedmont**
- ~75 lbs. Nitrogen (N)
- ~25 lbs. Elemental phosphorus (P)
- 50-80 lbs. Elemental Potassium (K³)
- Mg, Mn, B, Ca, Cu, B as needed

**Coastal Plain**
- ~75 lbs. Nitrogen (N)
- 40-50 lbs. Elemental phosphorus (P)
- 50-80 lbs. Elemental Potassium (K³)
- Mg, Mn, B, Ca, Cu, B as needed

All Rates Per/Acre
**Common Per-Acre Fertilizer Recommendations by Form**

<table>
<thead>
<tr>
<th>Species</th>
<th>N + elemental-P</th>
<th>N as Urea + P as DAP (lbs/acre)</th>
<th>N as Ammonium nitrate (AN) + P as DAP (lbs/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longleaf under 6 inches DBH</td>
<td>75 N + 25 P or 75 N + 50 P</td>
<td>114 urea + 125 DAP Or 64 urea + 250 DAP</td>
<td>158 AN + 125 DAP Or 90 AN + 250 DAP</td>
</tr>
<tr>
<td>Longleaf over 6 inches DBH</td>
<td>125 N + 25 P Or 125 N + 50 P</td>
<td>223 urea + 125 DAP Or 174 urea + 250 DAP</td>
<td>308 AN + 125 DAP Or 240 AN + 250 DAP</td>
</tr>
</tbody>
</table>
Common Packaging Methods for Pinestraw

Square Bales
Typically 26 in. x 13 in x 14 in.
Very common in North Carolina

Circular Bales
~20 inch diameter, 28 inch length
More common in Alabama, Mississippi, and Georgia.