Managing Pine Straw

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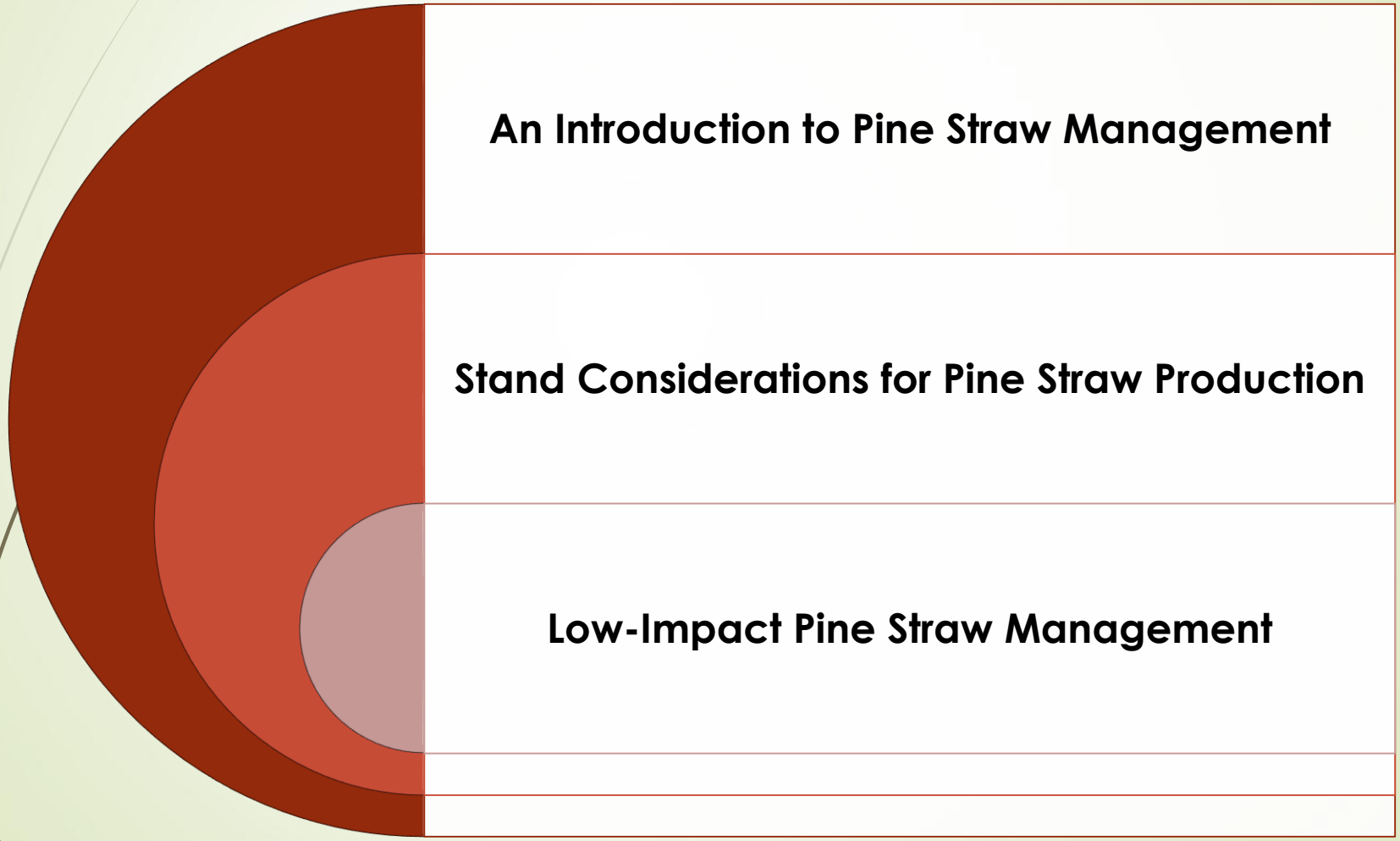
Presentation Overview



The Basics of Pine Straw Management

http://forestry.ohiodnr.gov/whitepine

In spite of being "evergreen," pine species continuously replace their needles

http://www.locallygrownlandscapes.com/mulchpine-straw/

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

http://www.yelp.com/biz/lowes-home-improvement-dedham

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

http://www.thecuttingedgenews.com/index.php?article=77700

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

http://texastreeid.tamu.edu/content/TreeDetails/?id=77

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=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

Photo Credit: http://www.army.mil/article/37653/fort-braggs-award-is-for-the-birds/ and http://www.floridapinestraw.com/Pine%20Straw.htm

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
- Usually based on an agreed upon price per bale.
- Pros
  - Often results in more bids/increased competition
- Cons
  - May require more monitoring.

Photo Credit: http://www.wonderbaby.org/news/accessible-currency-in-united-states

That was the view from 30,000 Feet

http://www.army-technology.com/projects/cl289/cl2896.html

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

Photo Credits: https://ericbeene.wordpress.com/tag/pine-straw/, http://www.flsteward.org/working_timber_pine_straw.html, , http://www.freestockphotos.biz/stockphoto/107 and David Schnake

Harvesting Method Influences Price

Hand Raking/lifting and Baling

Hand Raking and Mechanical Baling

Tractor Raking and Baling

More difficult and often less profitable

Easier and often more profitable

http://alfafarmers.org/stories/news-detail/pine-straw-offers-forest-owners-additional-income#.Vo8lo_krJQI, , https://www.google.com/search?q=Longleaf+Pine&espv=2&biw=1440&bih=839&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiBt6fc_5jKAhWIZCYKHR9EC3gQ_AUIBigB#tbm=isch&q=Pine+straw+baling&imgrc=9YXm3Q0WDfESvM%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

Stand Density

Basal Area	SI 60		SI 70		SI 80		SI 90	
	Pinestraw Production per Acre							
	lb	bales	lb	bales	lb	bales	lb	bales
80	2200	114	2500	130	2900	151	3200	166
100	2500	130	2900	151	3300	171	3700	192
120	2700	140	3200	166	3600	187	4100	213
140	3000	151	3400	177	3900	203	4400	229
160	3100	161	3600	187	4100	213	4600	239
180	3200	166	3700	192	4200	218	4800	249

DANGER ZONE

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

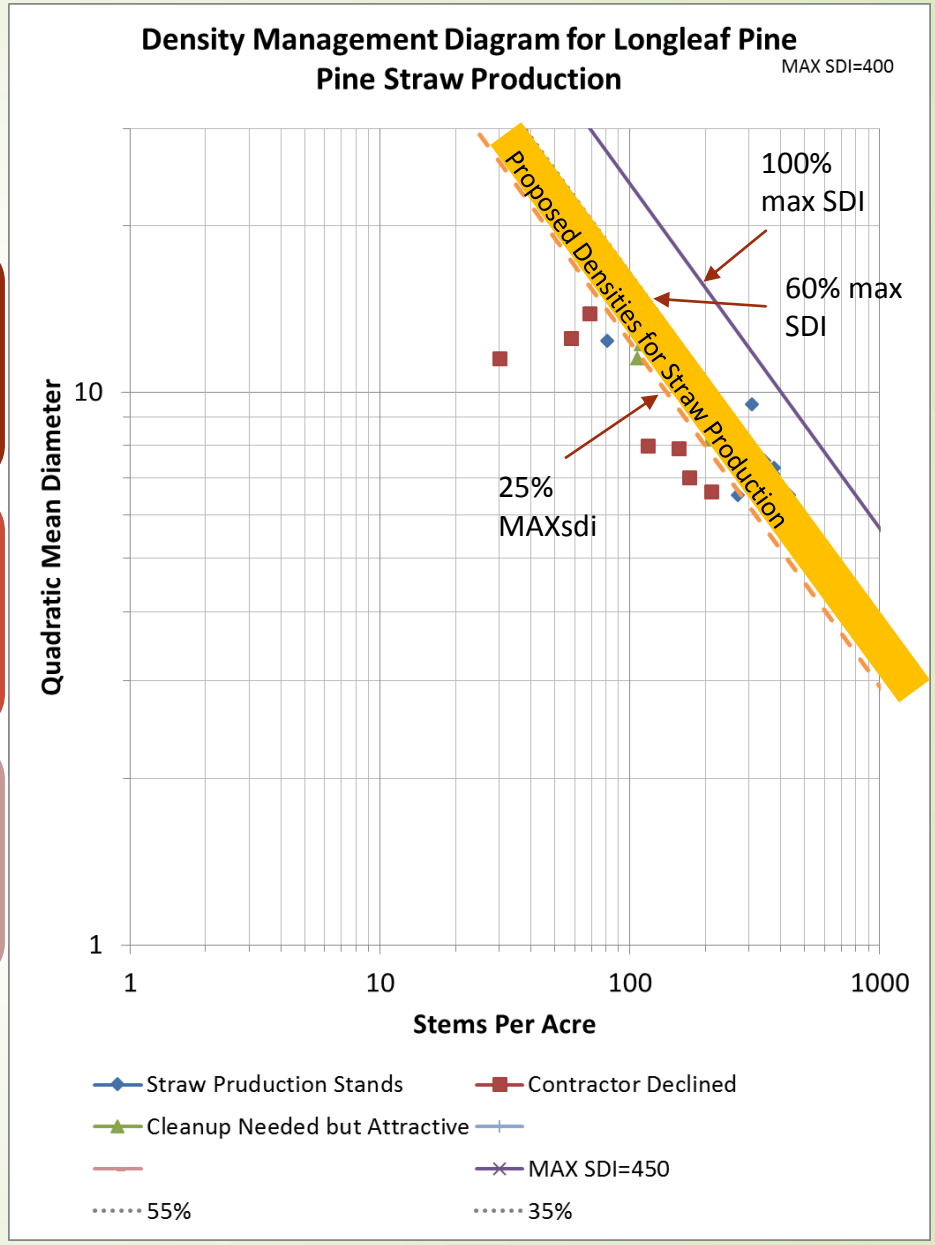
Density Management Diagram for Straw Production

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

Beyond 60% MAX sdi is the zone of immanent 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

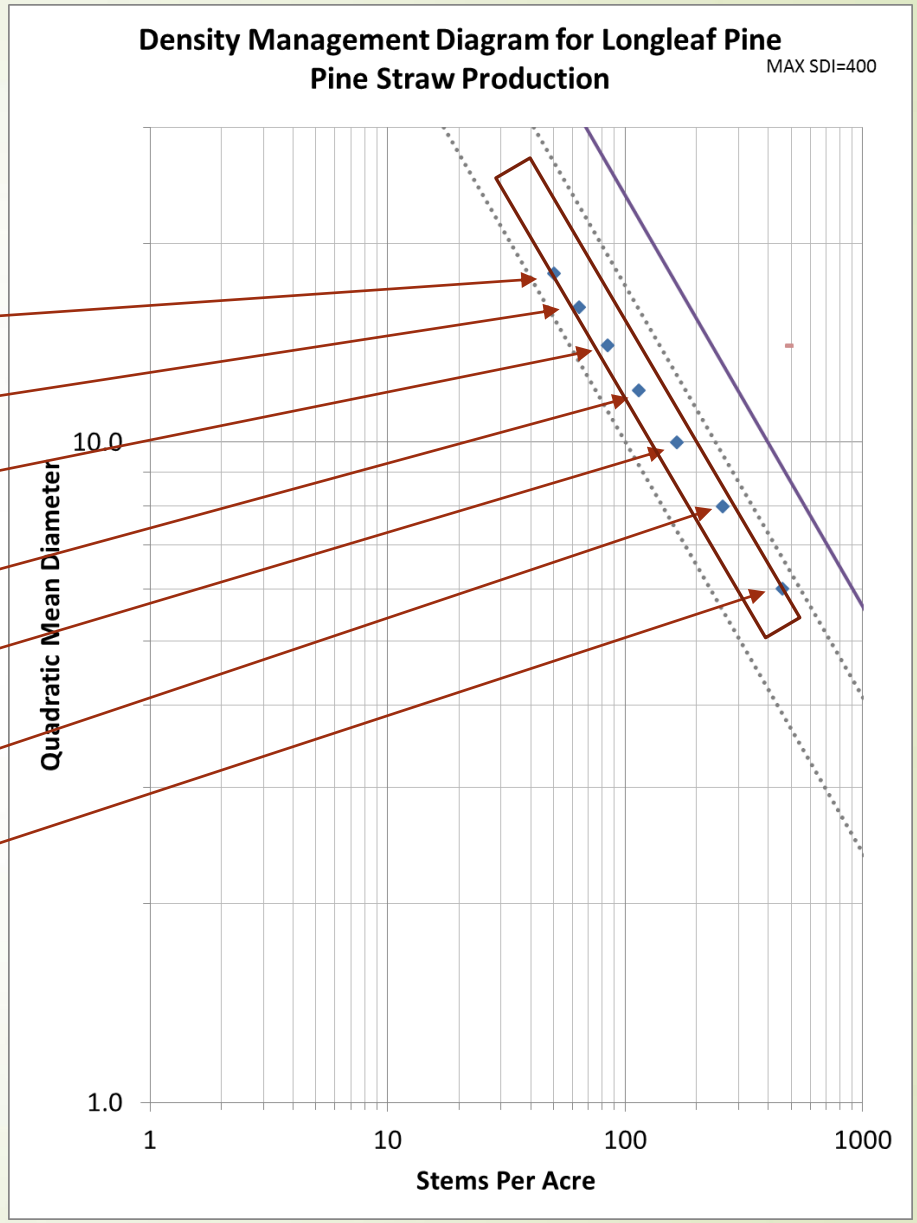
84 14-inch trees/acre

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

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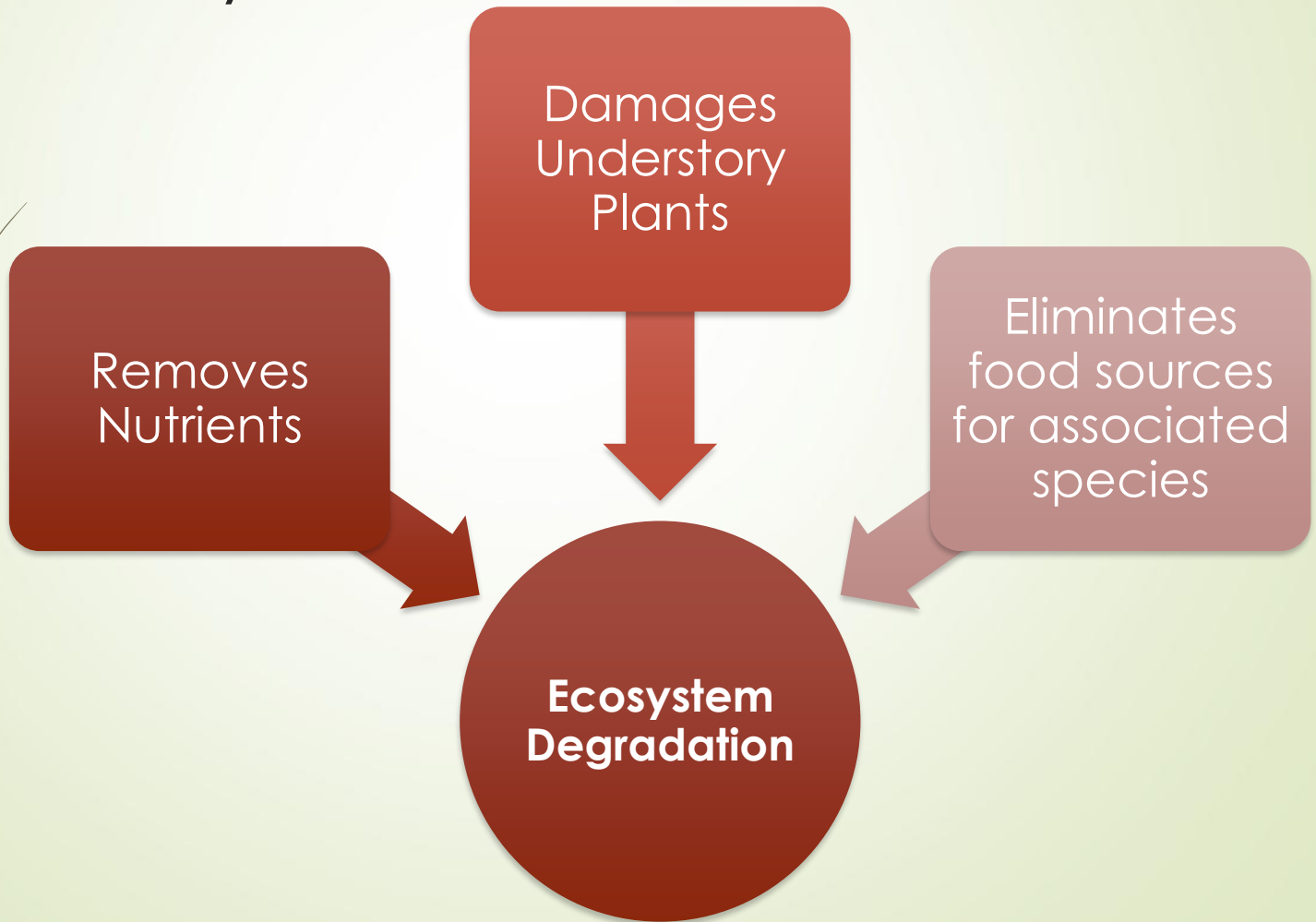
Increasing Value for Wildlife

- 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 and David Schnake

Harvesting Pine Straw Can Have Negative Impacts to the Ecosystem



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

Photo Credit: http://www.sptimes.com/News/070701/Homeandgarden/This_rake_has_teeth.shtml, http://www.todayshomeowner.com/how-to-keep-mulch-from-floating-out-of-flower-beds/

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

Photo Credit: Tes Randle Joy , http://www.outdooralabama.com/fox-squirrel

Deer

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

Wild Turkeys

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.

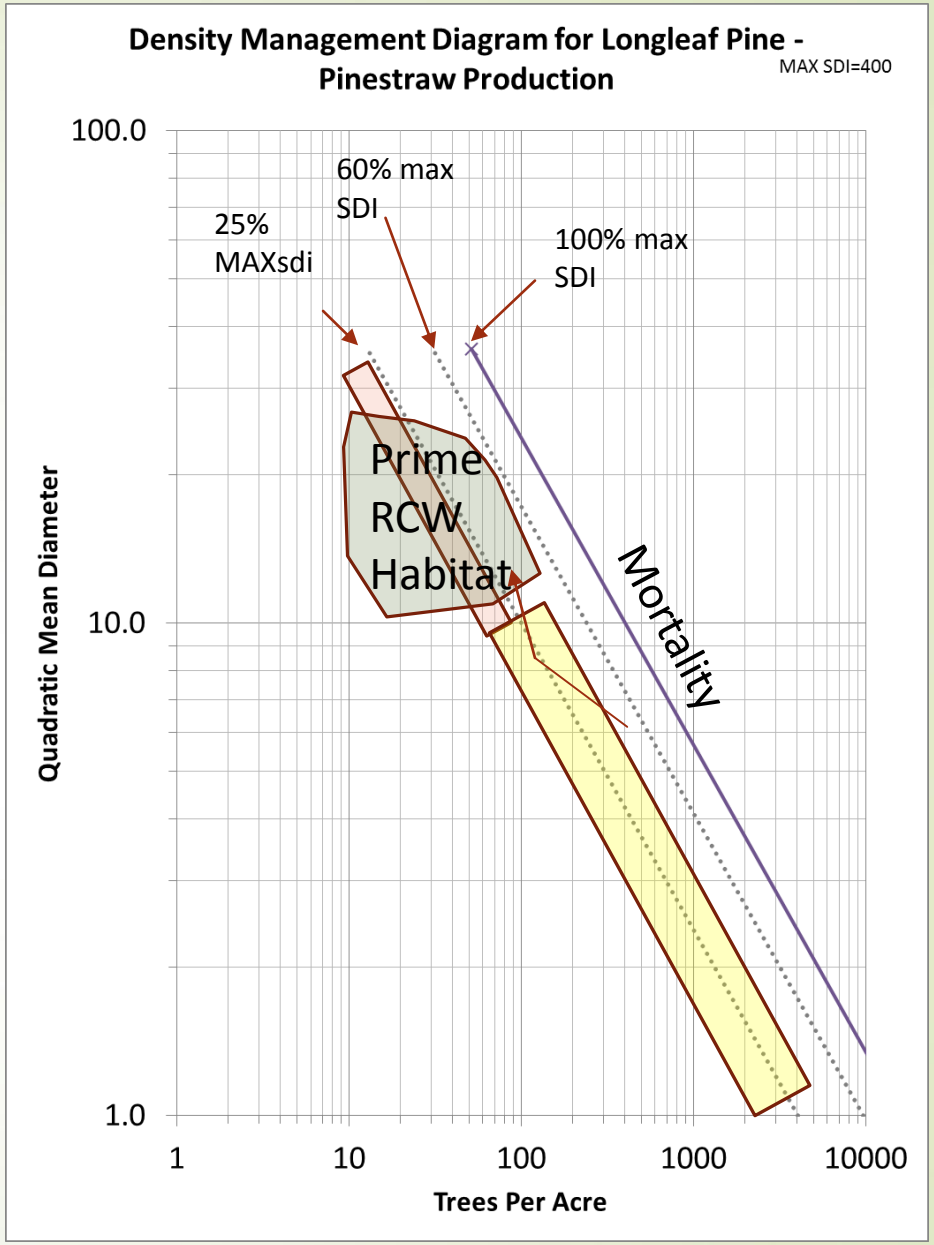
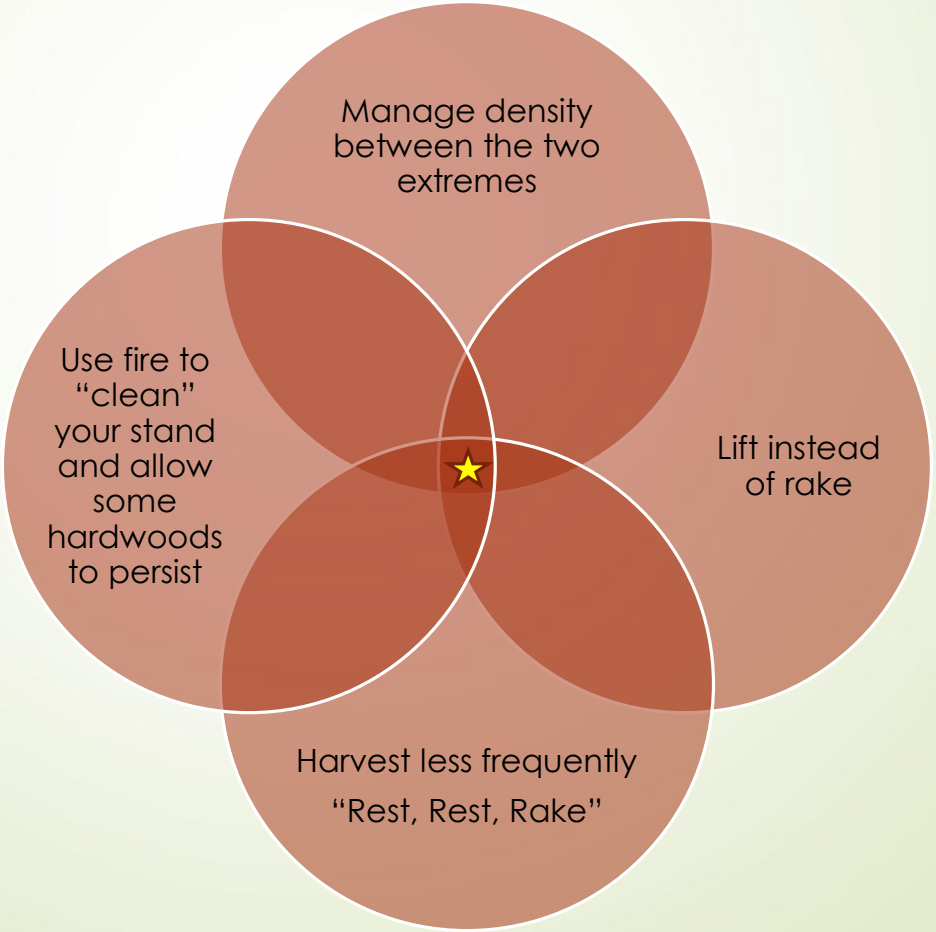


Diagram Created by: D. Schnake & James M. McCarter, NCSU. Target RCW areas from Shaw and Long, 2007. http://www.treesearch.fs.fed.us/pubs/26787

The Middle ground between Production of Straw and Ecosystem Services



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

- Blevins, D., H.L. Allen, S. Colbert, and W. Gardner. 1996. Woodland owner notes: nutrition management for longleaf pinestraw. NCSU Coop. Ext. Service WON-30. Raleigh, NC. 8 p.
- Dickens, E.D. 1999. Effect of inorganic and organic fertilization on longleaf pine tree growth and pine straw production. In: Proceedings of the 10th Biennial So. Silvi. Res. Conf., Shreveport, LA. Feb. 16-18, 1999. pp. 464-468.
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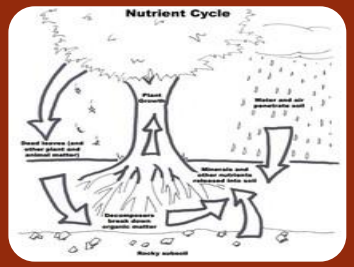
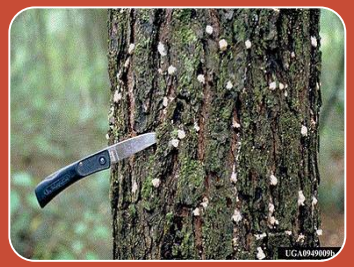
- McLeod, K.W., C. Sherrod, Jr., and T.E. Porch. 1979. Response of longleaf pine plantations to litter removal. Forest Ecology and Mgmt. 2:1-12.
- Ross, S.M., W.H. McKee, Jr., and M. Mims. 1995. Loblolly and longleaf pine responses to litter raking, prescribe burning, and nitrogen fertilization. In: Proceedings of the 8th Biennial So. Silvi. Res. Conf., Auburn, AL, Nov. 1-3, 1994. pp. 220-224.
- Lopez-Zamora, I., M.L. Duryea, C. McCormack-Wild, N.B. Comerford, and D.G. Neary. 2001. Effect of pine needle removal and fertilization on tree growth and soil P availability in a Pinus elliottii Engelm. var. elliottii stand. Forest Ecology and Mgmt. 148: 125-134.

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).

Photo Credit: http://www.yourarticlelibrary.com/environment/ecosystem/cycles-of-forest-ecosystem-energy-water-and-nutrient-cycle-ecosystem/28237/, J.R. Meeker, Florida Division of Forestry http://www.sfrc.ufl.edu/extension/4h/foresthealth/insects/soutpine.html and David Dickens, UGA, http://www.forestryimages.org/browse/detail.cfm?imgnum=1217083

Common Five-Year Fertilizer Recommendations

Sandhills & Piedmont	Coastal Plain
• ~75 lbs. Nitrogen (N) • ~25 lbs. Elemental phosphorus (P) • 50-80 lbs. Elemental Potassium (K^3) • Mg, Mn, B, Ca, Cu, B as needed	• ~75 lbs. Nitrogen (N) • 40-50 lbs. Elemental phosphorus (P) • 50-80 lbs. Elemental Potassium (K^3) • Mg, Mn, B, Ca, Cu, B as needed

All Rates Per/Acre

Common Per-Acre Fertilizer Recommendations by Form

Species	N + elemental-P	N as Urea + P as DAP (lbs/acre)	N as Ammonium nitrate (AN) + P as DAP (lbs/acre)
Longleaf under 6 inches DBH	75 N + 25 P or 75 N + 50 P	114 urea + 125 DAP Or 64 urea + 250 DAP	158 AN + 125 DAP Or 90 AN + 250 DAP
Longleaf over 6 inches DBH	125 N + 25 P Or 125 N + 50 P	223 urea + 125 DAP Or 174 urea + 250 DAP	308 AN + 125 DAP Or 240 AN + 250 DAP

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.

Photo Credits: http://cnre.vt.edu/magazine/articles/201108/20-million-dollar-grant-to-improve-southern-pine-forests.html , https://www.etsy.com/search?q=mulching