

The Southern Forest Landscape

Where its been
Where its headed
What matters
imho

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My Research Focus

- Bio-economic assessment at a spatial scale and in a time frame that is useful for strategic public and private decision-making
- Focus on economic fundamentals applied to detailed forest resource projections
- Usually take current inventory, growth, and removals as a starting point to model supply over time by sub-region
- Then look at the impact of various demand scenarios
- Energy demand scenarios and carbon consequences dominate current research



OUTLINE

- **Forest Trends**
 - **The extensive margin**
 - **Age class structure**
- **Growth/Removals vs. Sustainability**
- **Converging Cycles**
 - **Housing**
 - **Planting**
- **What Matters**



Forest Markets

- Product Definitions
- Forest types – role of plantations
- Planting trends – age class distribution
- Ag/Forest transition

Wood Products

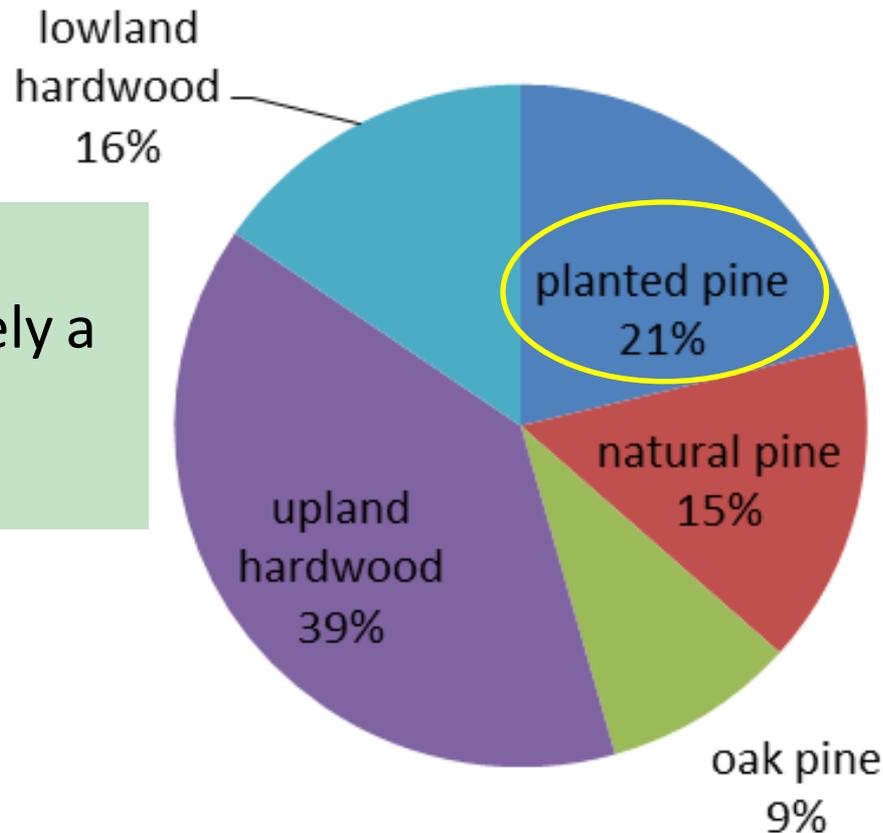
- Small Trees – “**pulpwood**”, 5”-9” diameter, 10-15 years old, \$6-\$10/ton stumpage prices
 - pulp, OSB, pellets
- Medium Trees – “**chip n saw**”, 9”-11” diameter, 15-20 years old, \$10-\$20/ ton
 - fiber and small sawn wood
- Large Trees – “**sawtimber**”, 11+” diameter, 20+ years old, \$25-\$40/ton
 - lumber, plywood
- **Logging Residues** – 20% of pine harvest, 40% of hardwood harvest

FOREST LAND

Forest type portfolio: Where we are today

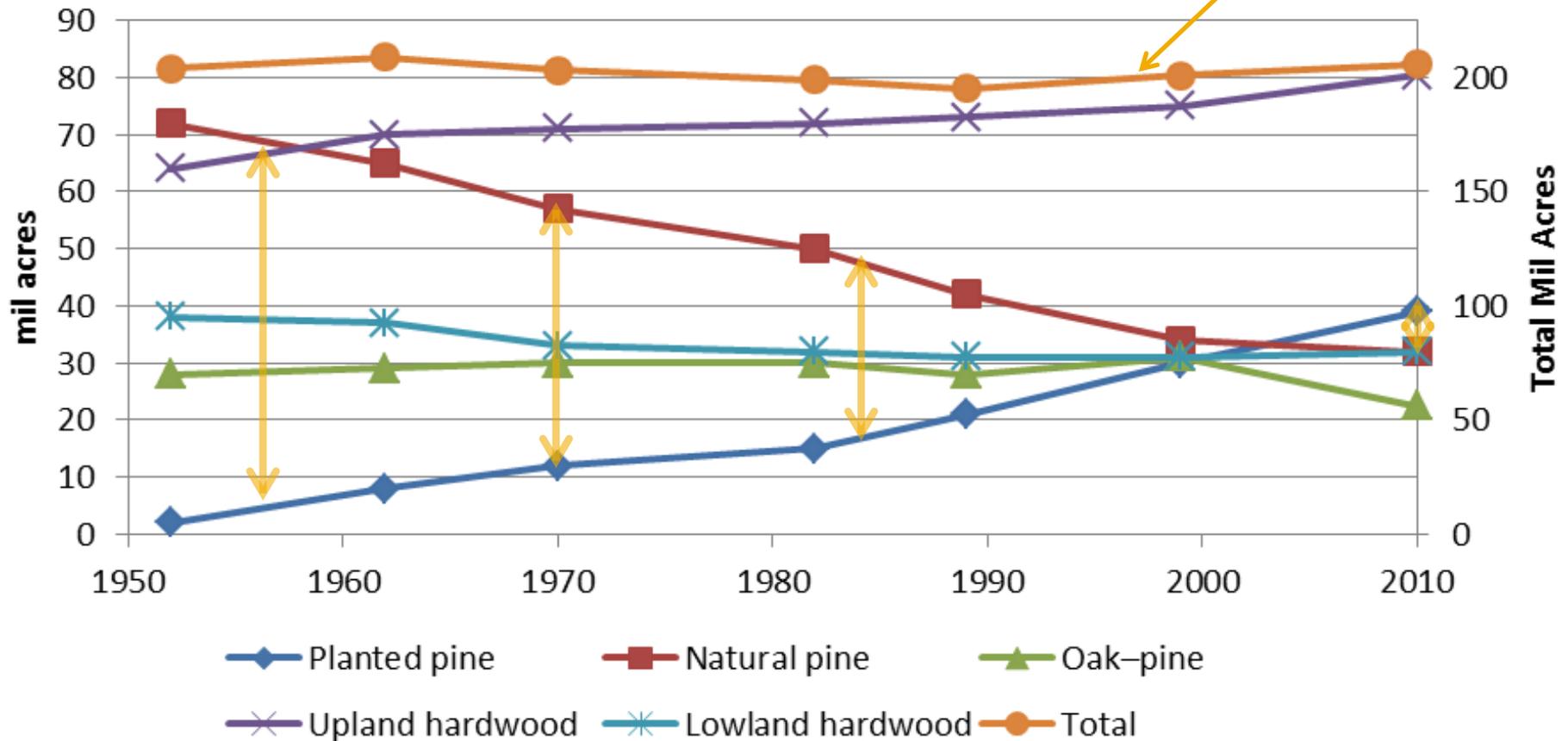
2010 U.S. South Forest Types

U.S. South is
predominately a
hardwood
landscape



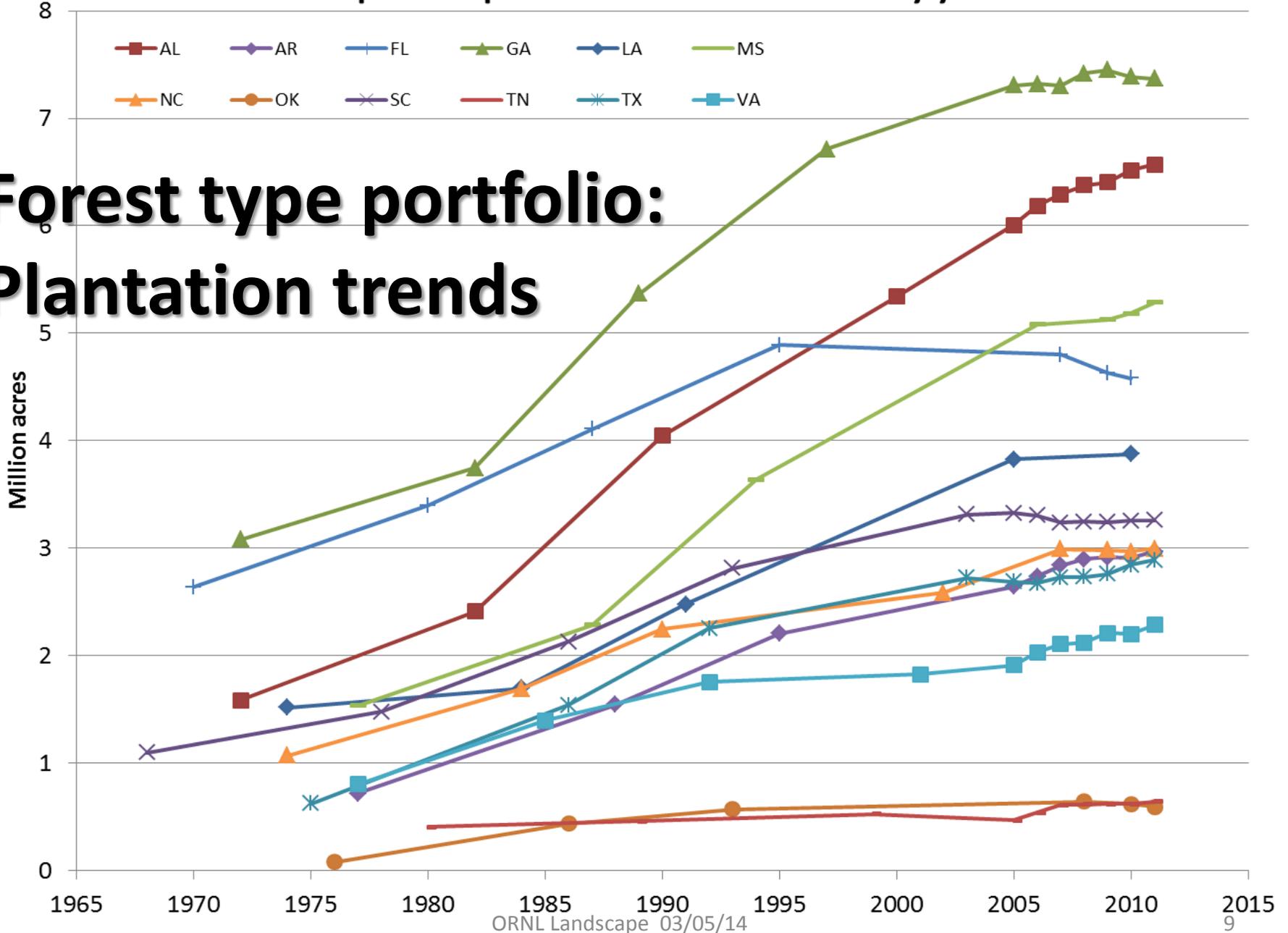
Forest type portfolio: How we got here

Forest Acres by Type

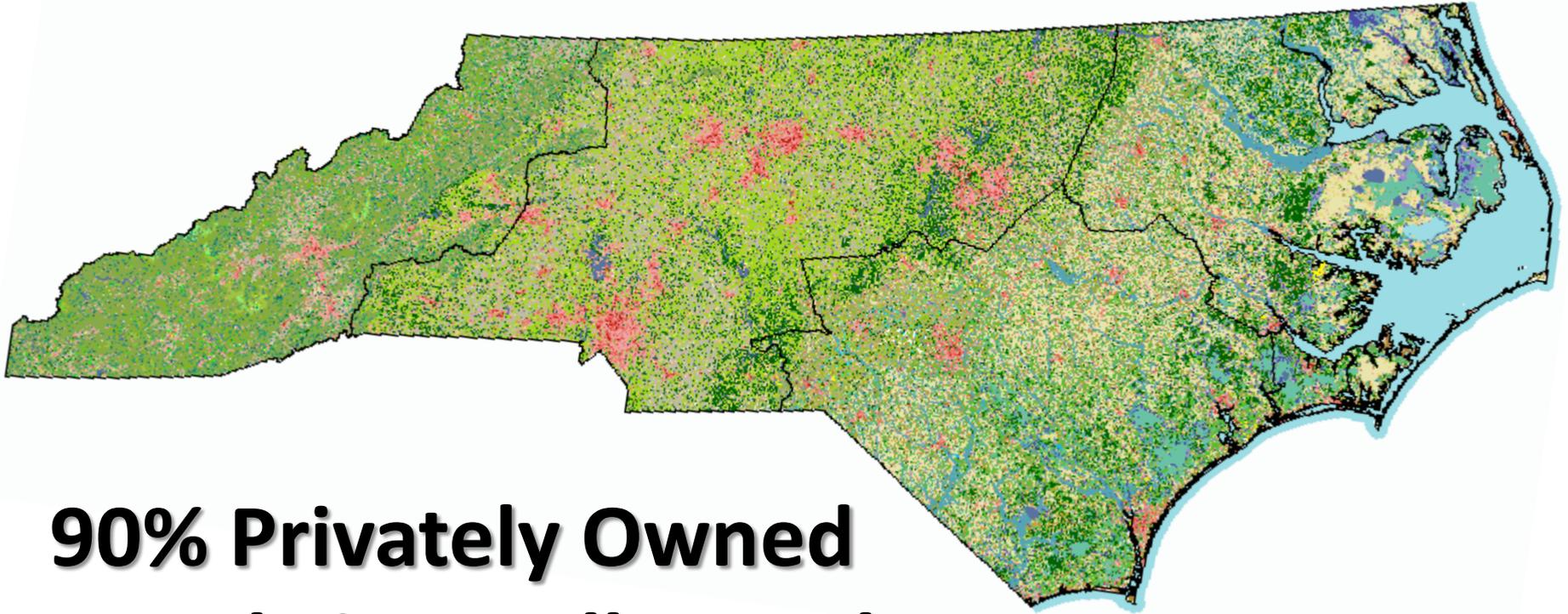


Area of planted pine in 12 Southern states by year

Forest type portfolio: Plantation trends



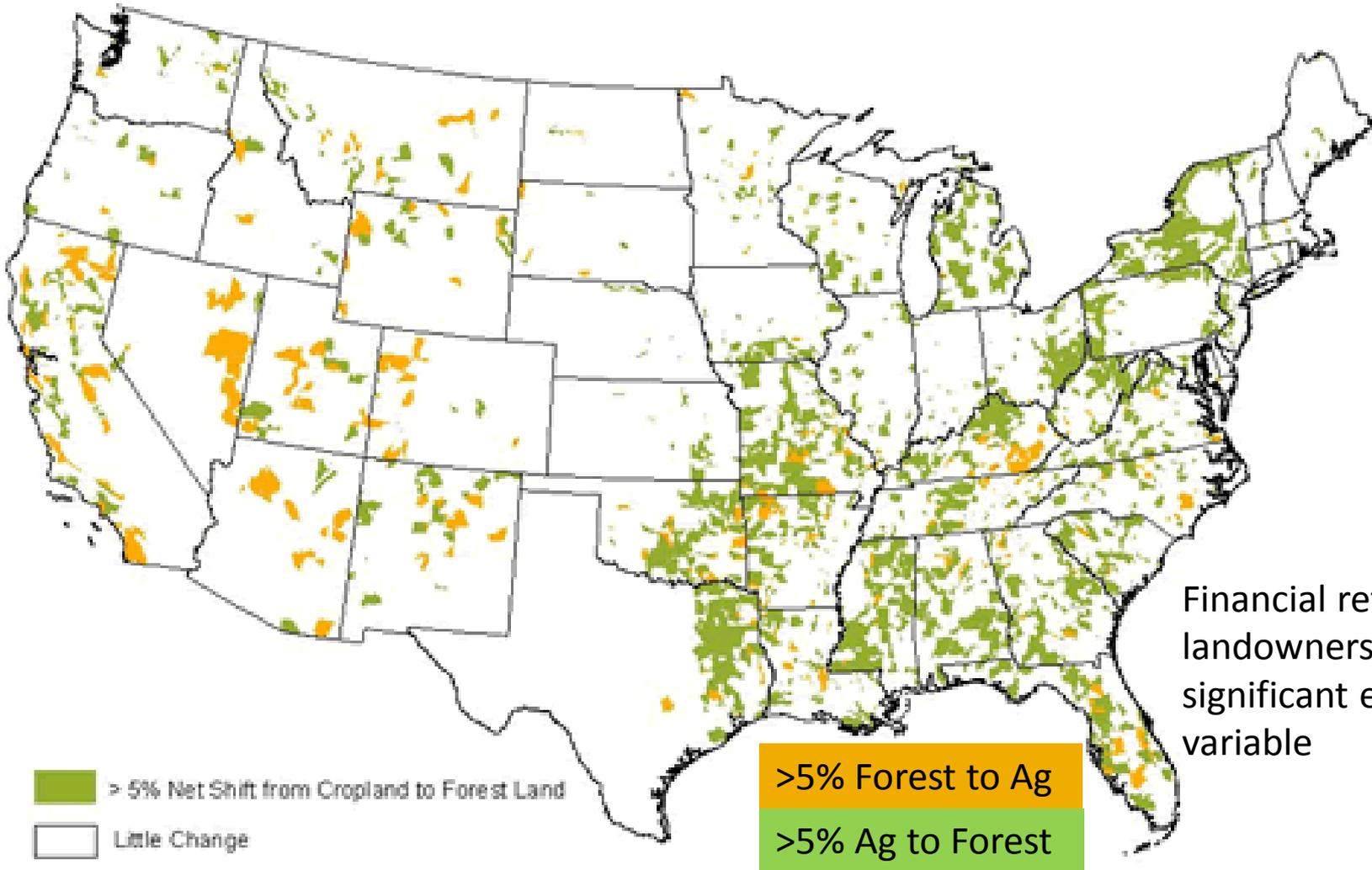
Forest type portfolio: North Carolina and the South



90% Privately Owned
Mostly in small parcels
Forest and Marginal Ag Interspersed

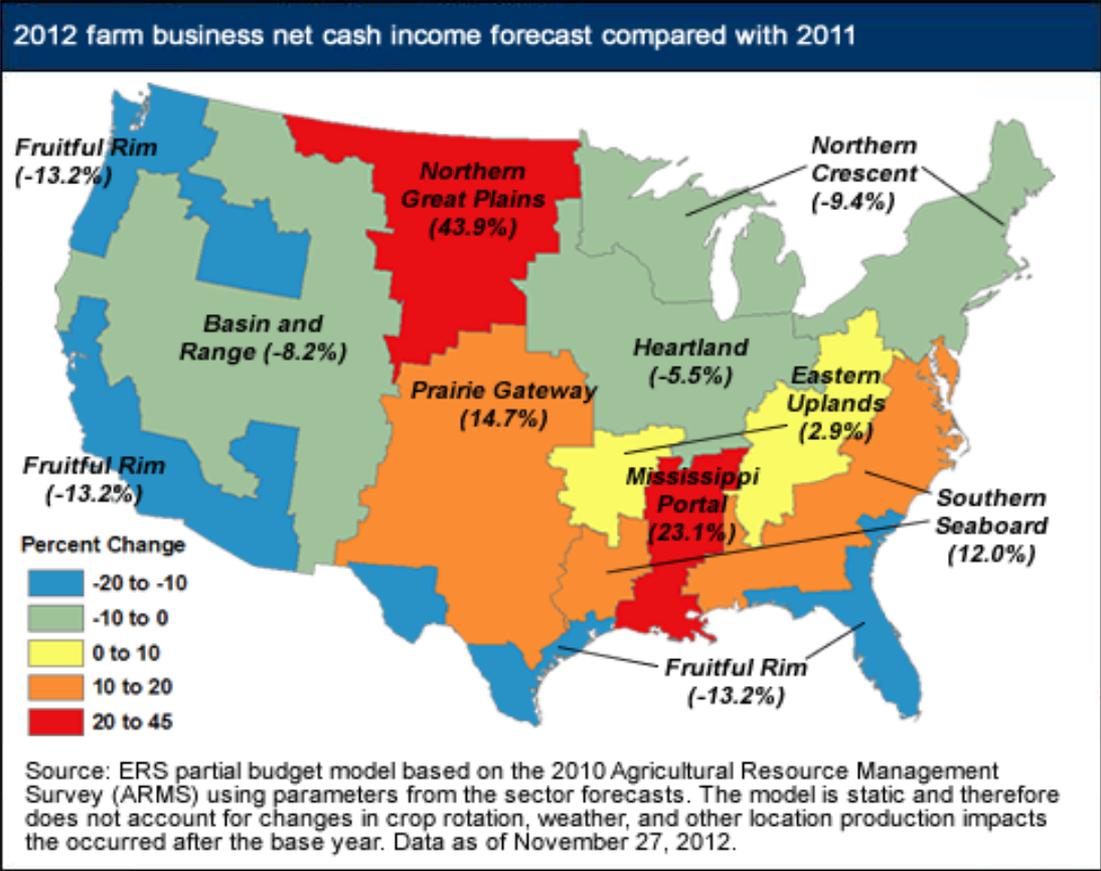
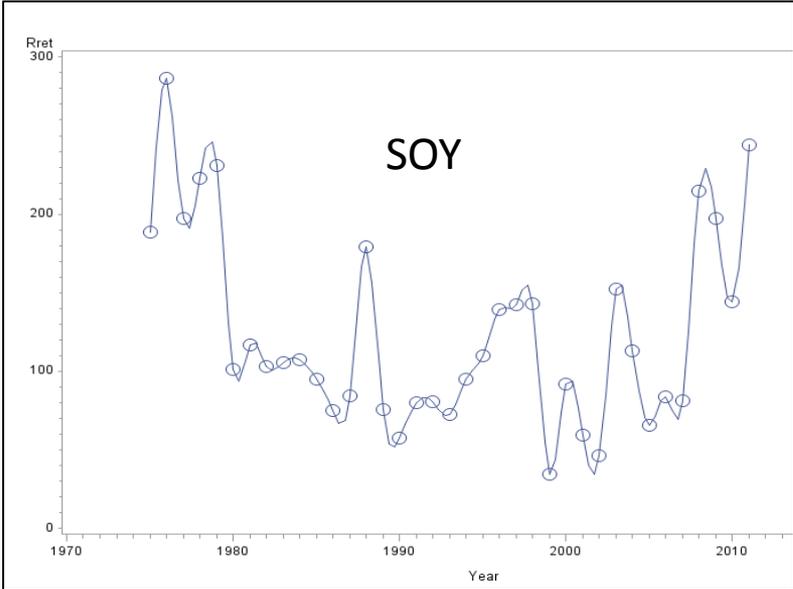
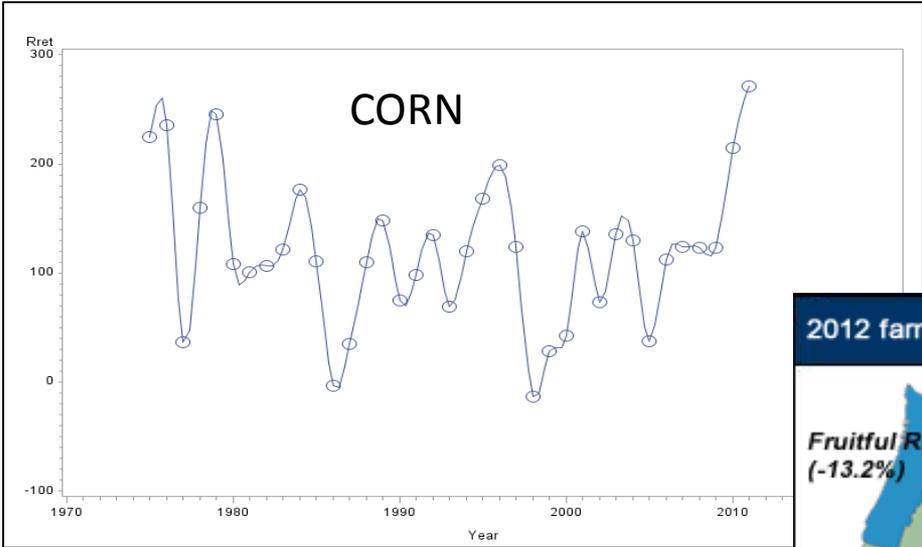
Forestland trend stable, but not static

Net shifts between cropland and forest land, 1982-97



Financial returns to landowners empirically significant explanatory variable

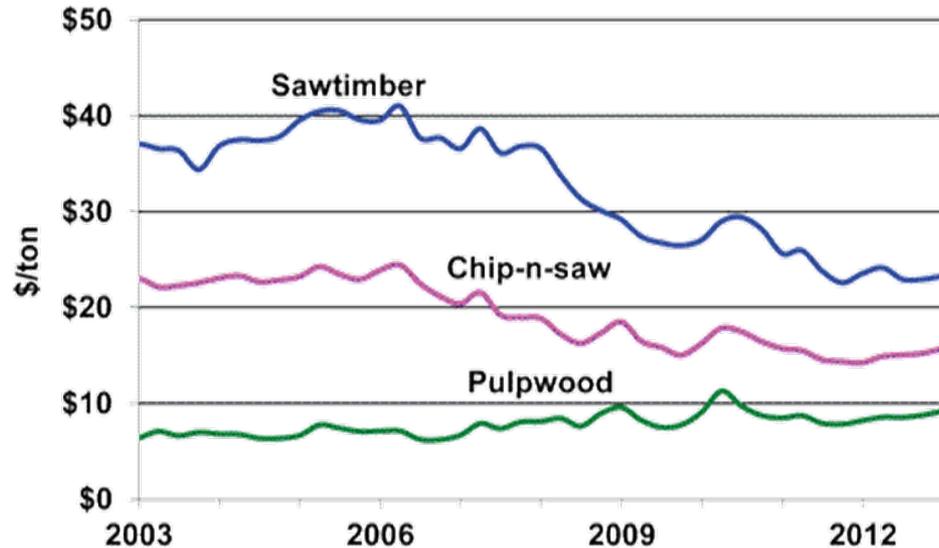
Ag rents are high and expected to increase



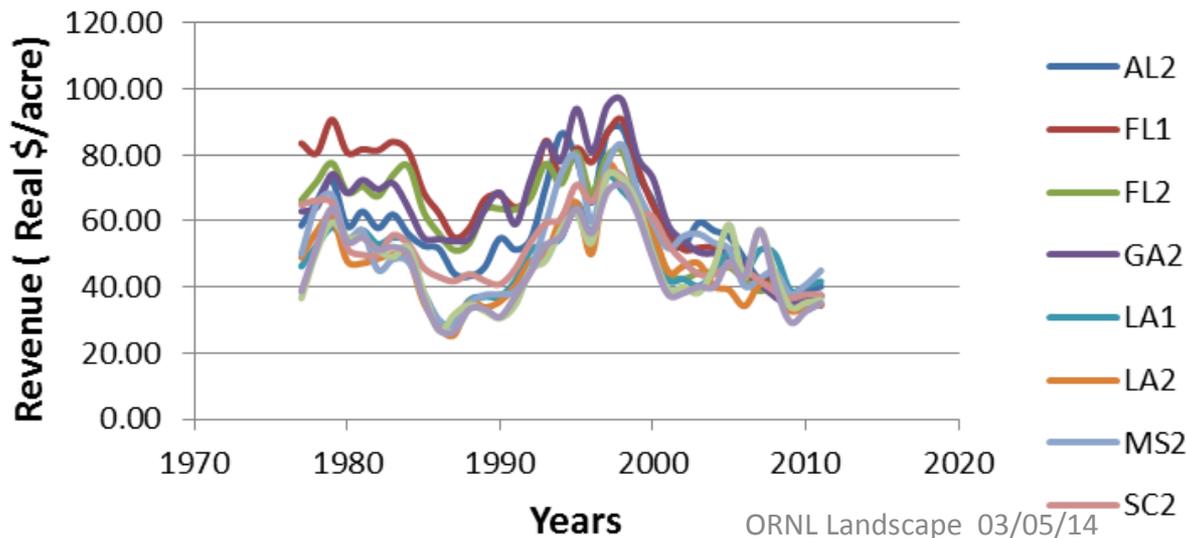
Forest management rents are low

- Pine pulpwood has increased through the recession
- Main income source is pine sawtimber; has not recovered

South-wide Pine Stumpage Prices 2003 to present

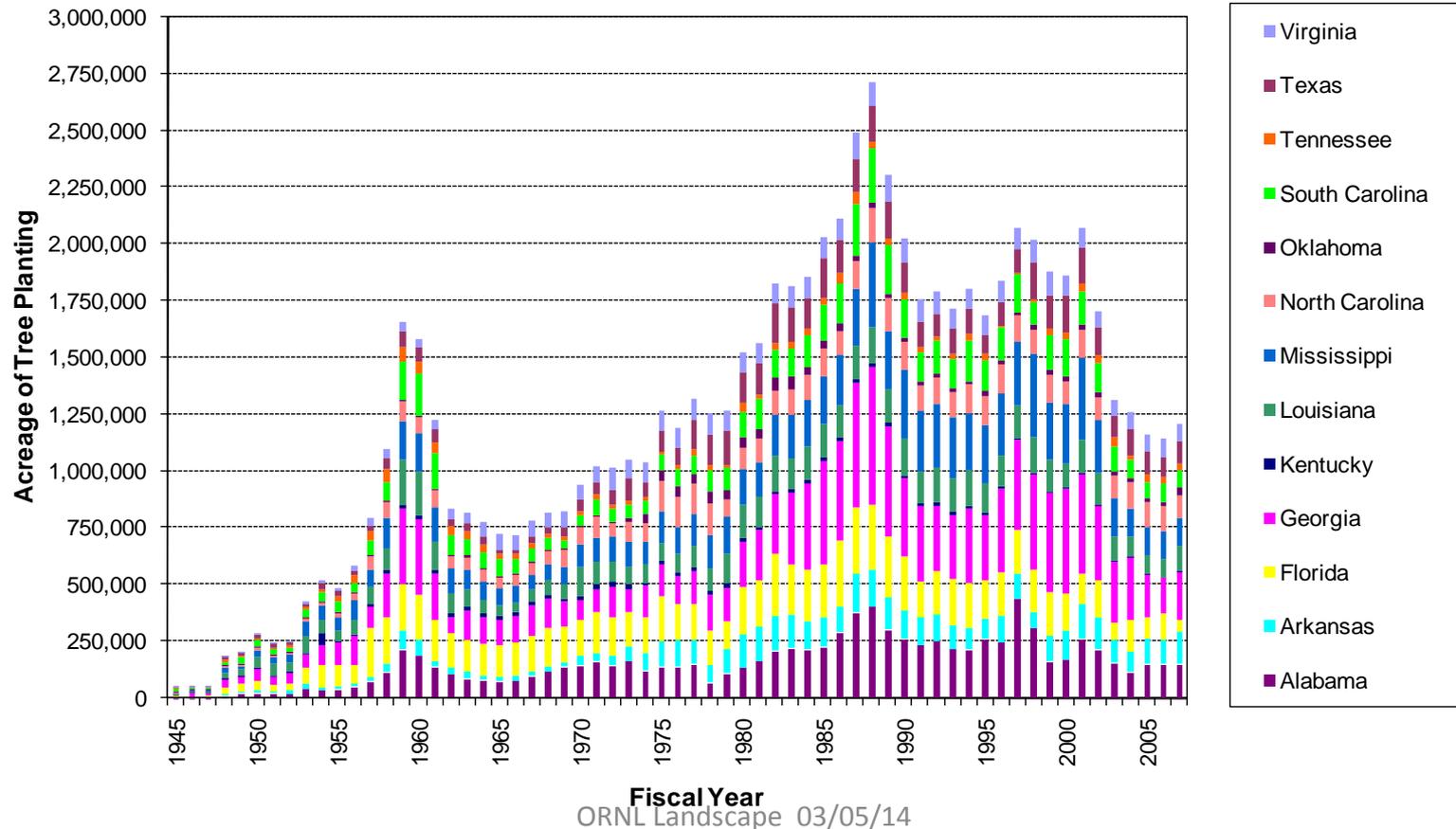


Revenue estimates for planted pine management, regime by Timber Mart South zones (1977-2011).



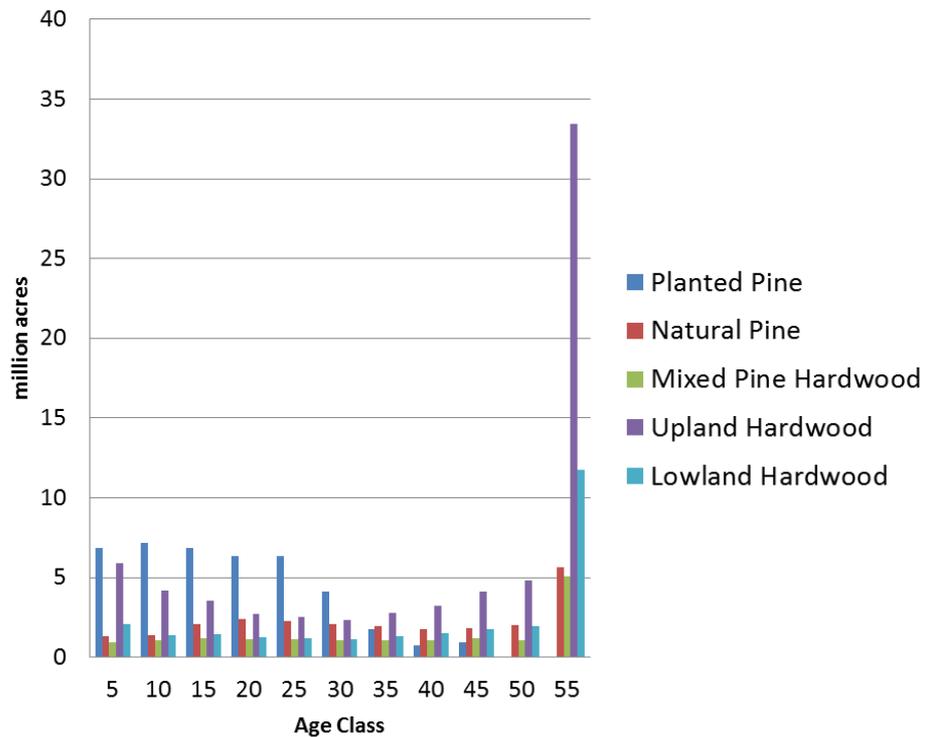
Tree Planting in the South

Southern Tree Planting, All States and Ownerships, 1945-2007

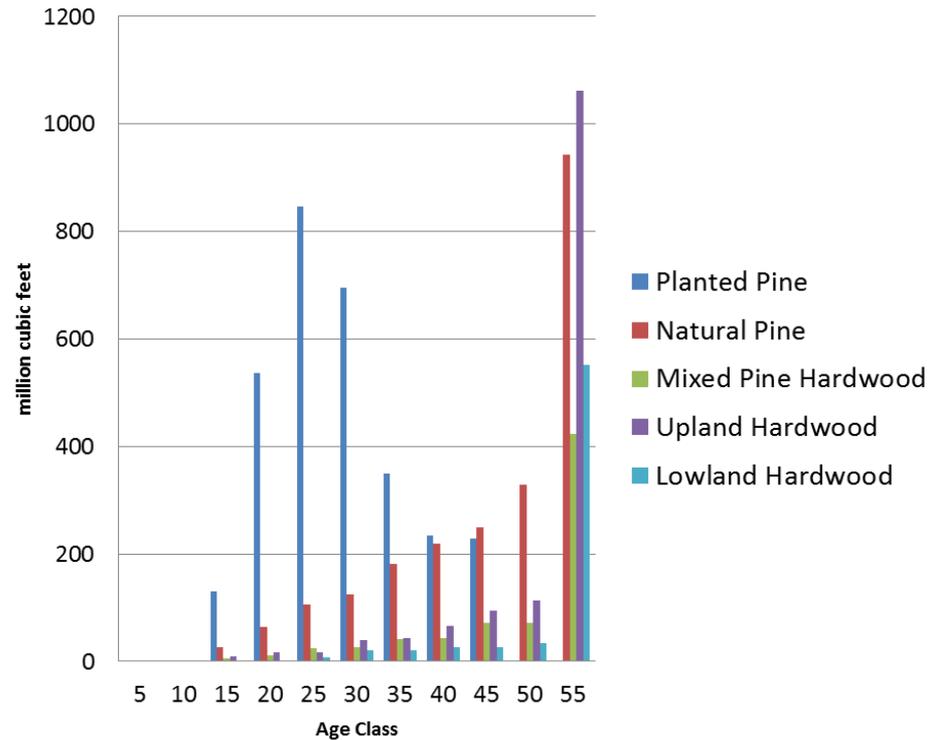


AGE CLASS STRUCTURE

U.S. South Acres
by Forest Type by Age Class



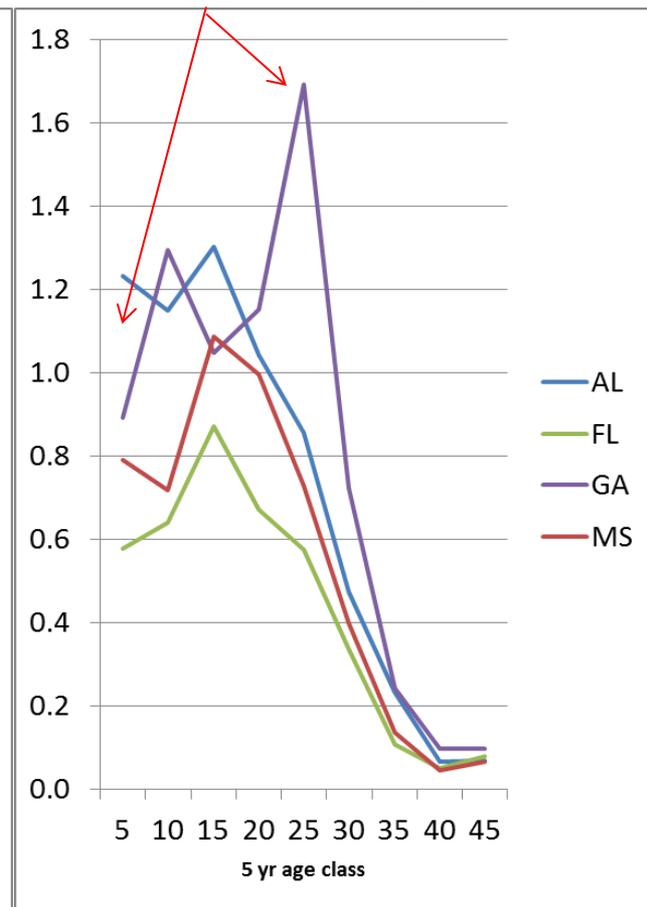
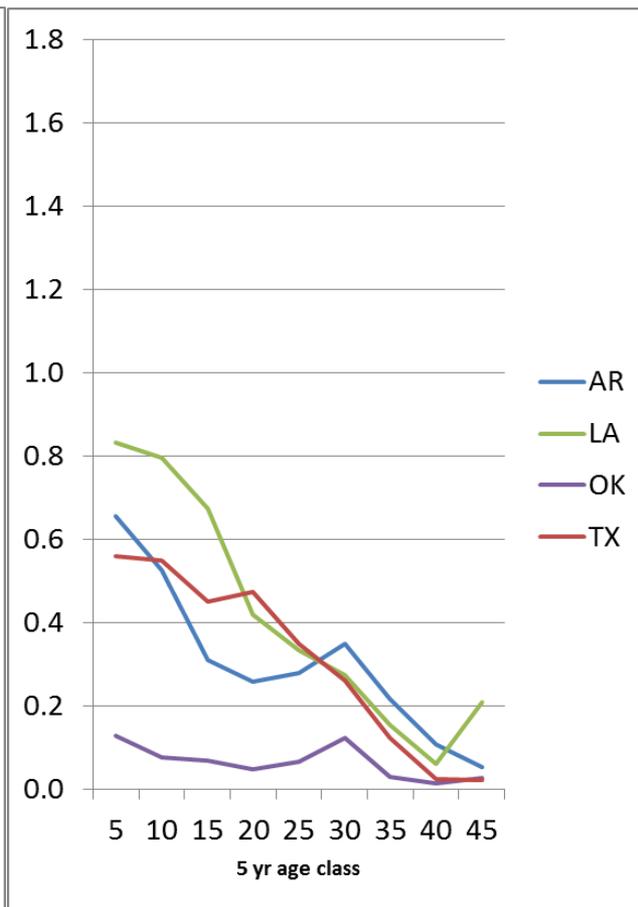
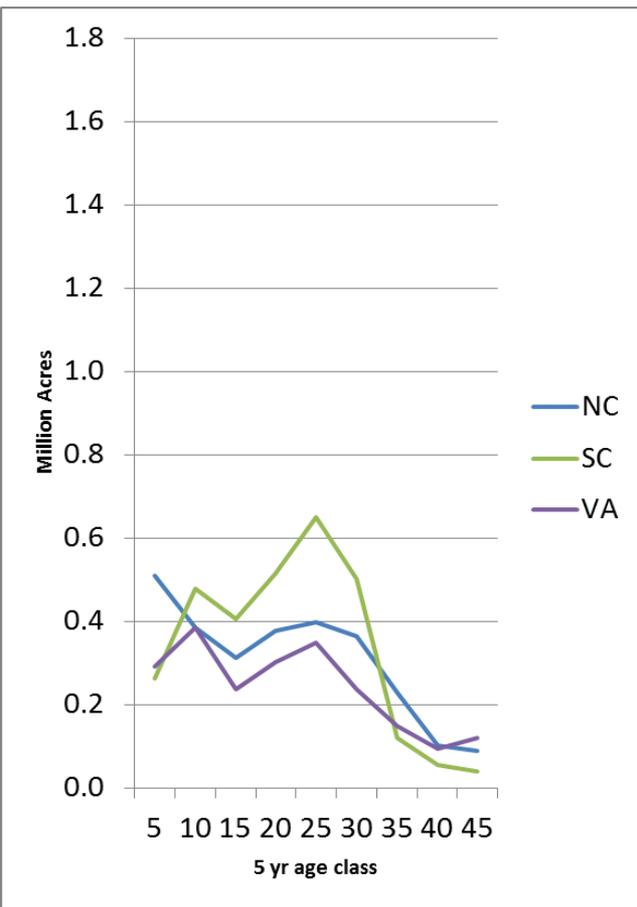
U.S. South Removals
by Forest Type by Age Class



Current Plantation Age Class Structure

State Totals Mask Big Local (Timbershed) Differences

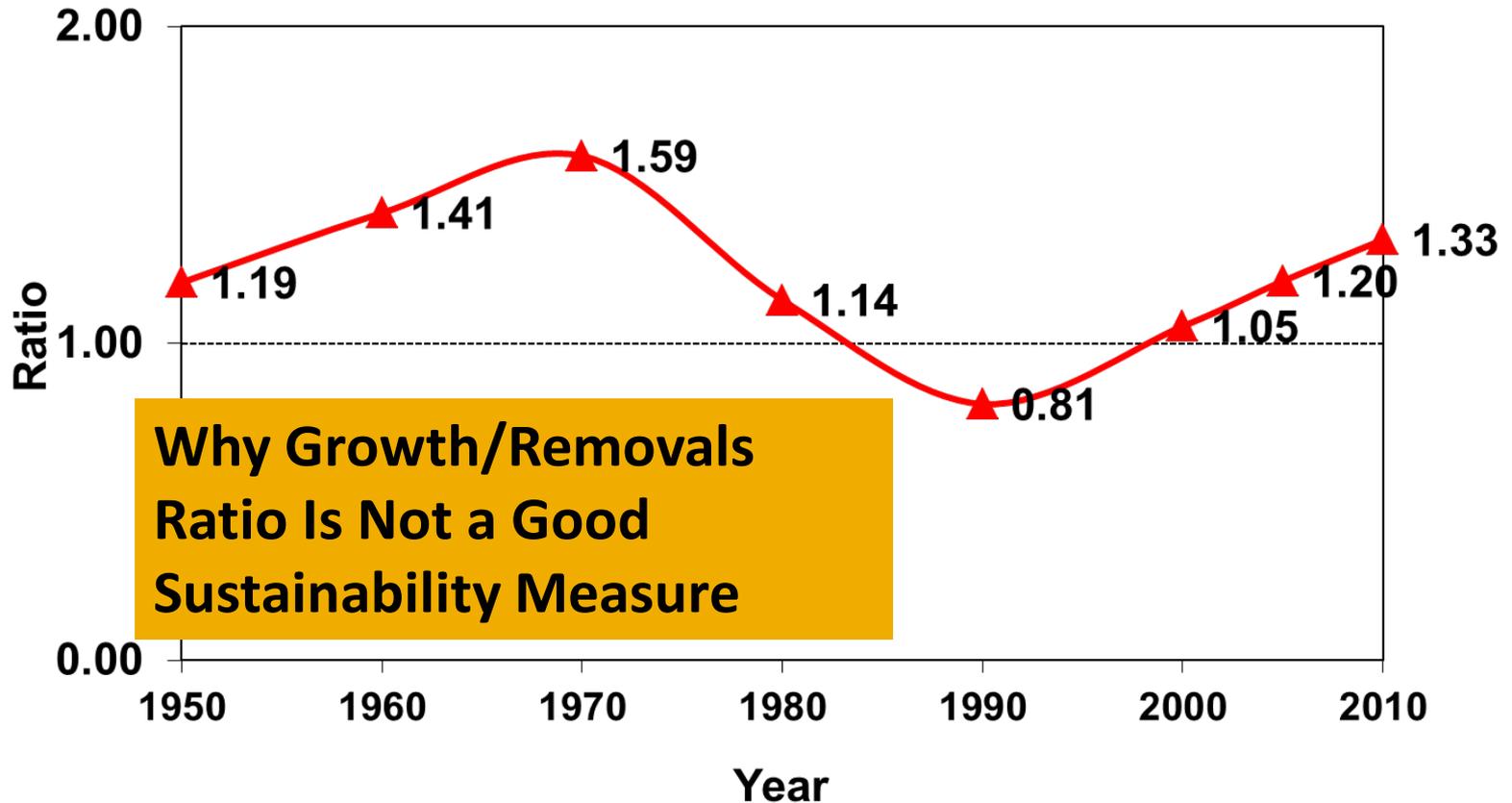
Growth/Removal Implications



GROWTH VS REMOVALS AND SUSTAINABILITY

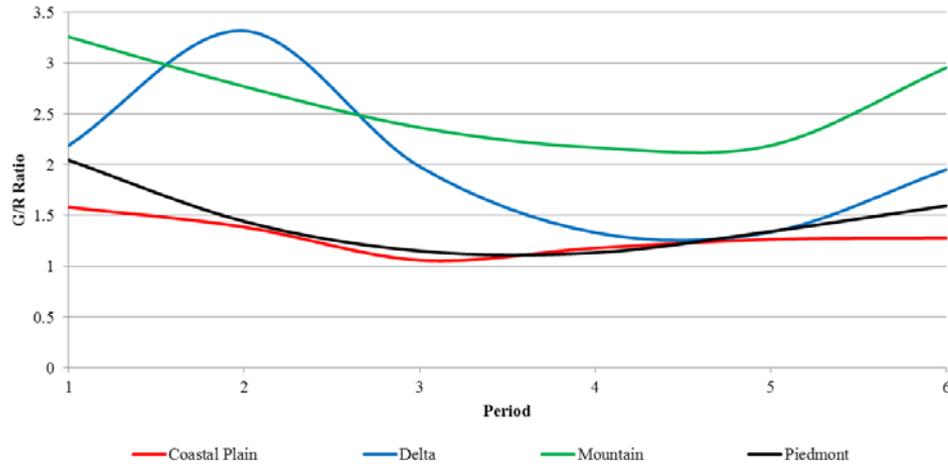
Update to 1990

Areas where $G/R < 1$ in 1990 (21 survey units)

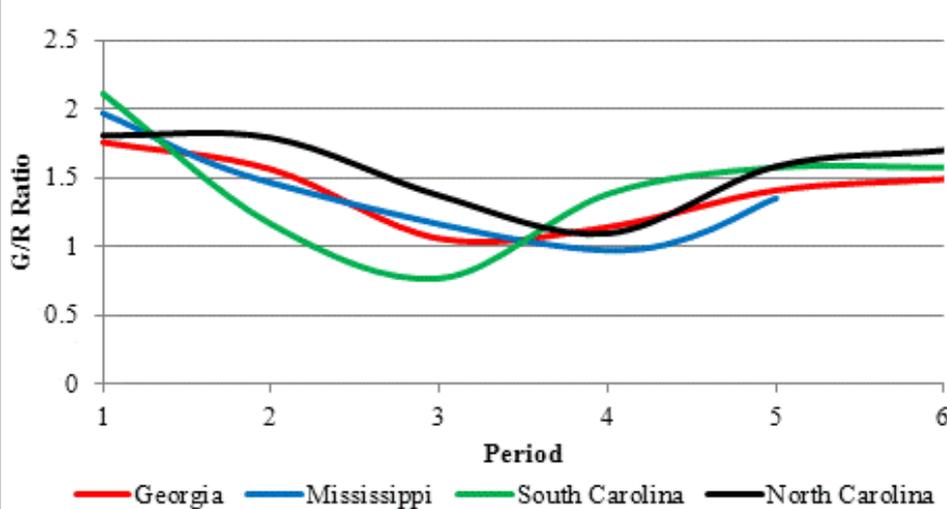


In the long run harvest shifts to lower price regions (*vice versa*) so that growth drain moves through cycles. SRTS captures this effect since inventory decreases lead to higher prices and less harvest over time (*vice versa*). Ray Sheffield

Physiographic Regions Growth to Removals Ratio



Growth to Removals Ratio for Selected States



Growth vs. Removals Today

- Means little in terms of long term sustainability.
- In an active market – decreasing inventory means less supply which means higher prices.
- Higher prices means production moves elsewhere.
- Land management intensifies.
- Takes about 20 years.

Natasha James

Growth/Removals vs. Sustainability

- Using G/R as a measure of sustainability assumes that the current inventory trend (*going up vs going down*), tells you the future outcome (*sustainable or un-sustainable*) – *only true for about 10 years*
- Southern forestland and plantation area are price responsive (*extensive margin*)
- Plantation management intensity is price responsive (*intensive margin*)
- Current age class distribution is skewed (*so current growth has little connection to future growth*)
- Removals are dynamic spatially and temporally (*high harvest and declining inventory implies higher prices, which shifts procurement in the short-run [SR] and influences capacity changes in the longrun [LR]*)
- Product definitions are technology and price dependent (*short run - CNS is pulpwood, long run – induced innovation e.g. OSB , curved sawing*)
- **Southern G/R is dynamic and appears to go through \approx 20 year cycles**

PROJECTING AGE CLASS STRUCTURE

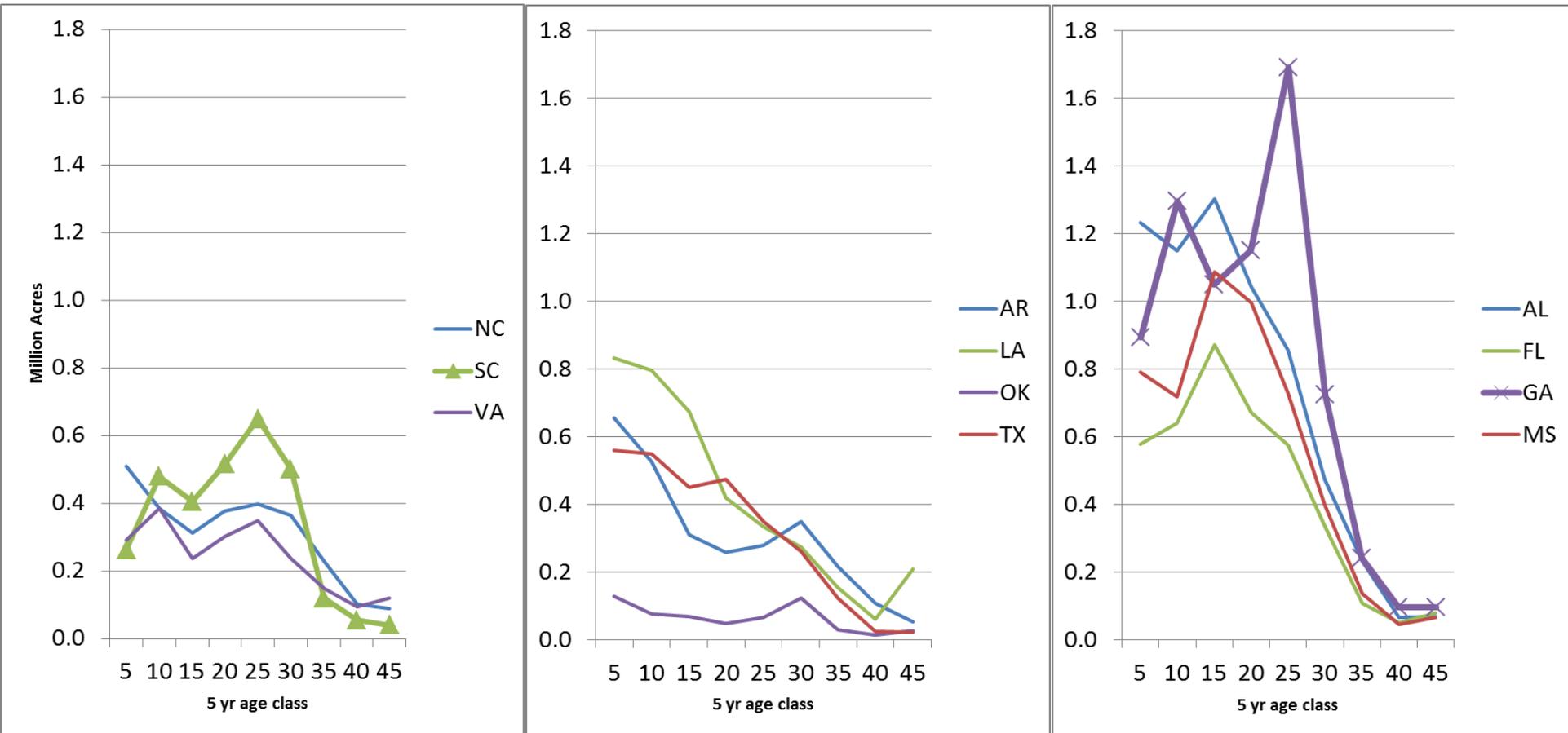
When Cycles Collide: Timber Famine Meets Wall of Wood

By: Bob Abt, Karen Abt,
Ray Sheffield, and Mac Lupold.

The Plot: *First, plant a lot of trees, then stop planting trees. Next, have a big housing recession when all those trees we planted reach sawtimber size, then start using biomass when the trees we didn't plant reach pulpwood size.*



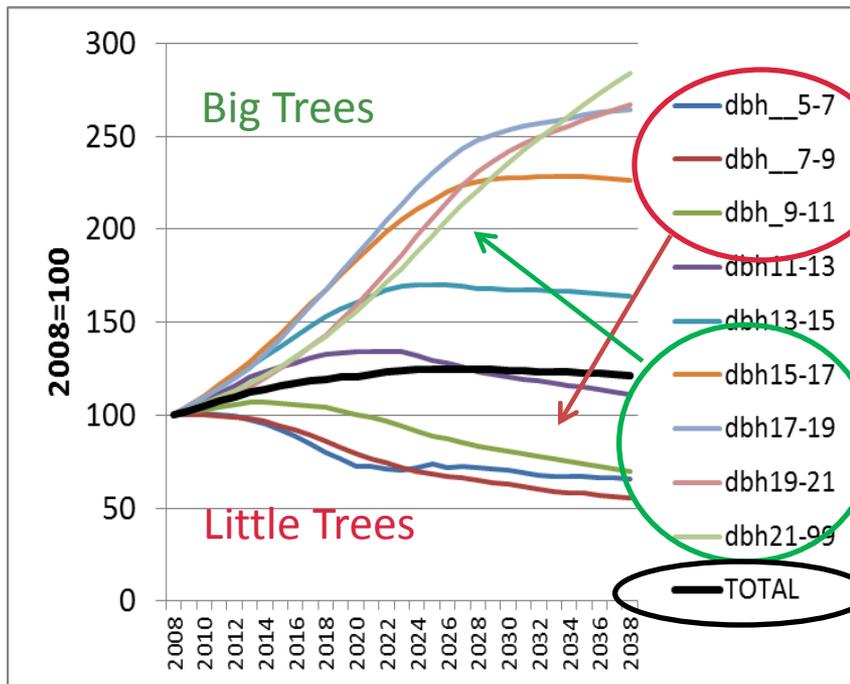
Current Plantation Age Class Structure



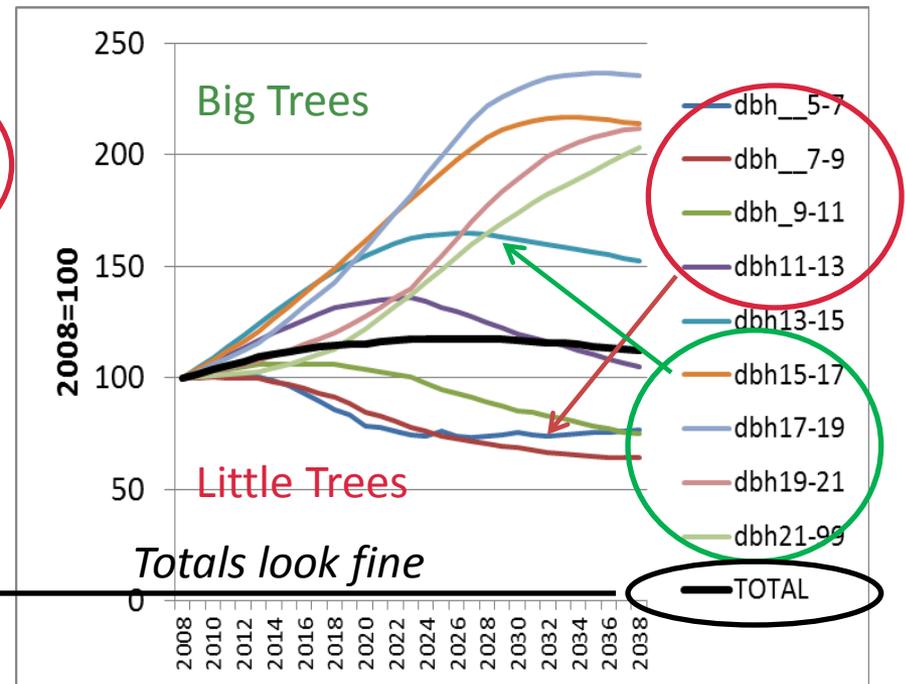
Projecting Inventory Volume by Size

Take 2008 based FIA inventory and removals by dbh class and project it out.
Age Class Distribution (in-growth and out-growth) dominates biological growth rates

South Carolina (index 2008=100)



Georgia (index 2008=100)



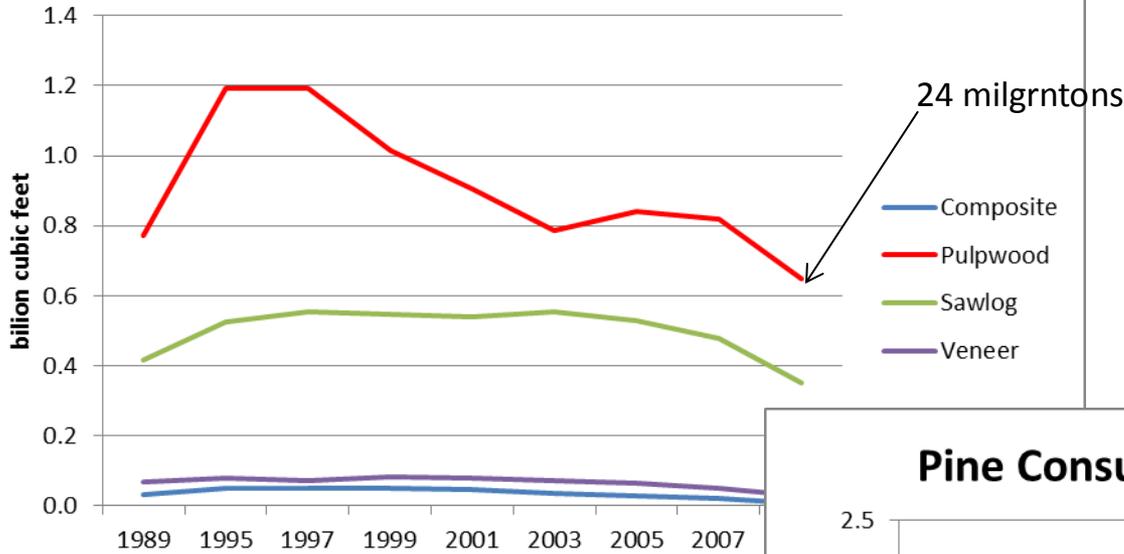
Product equilibrium requires small roundwood to expand from 9" to 13" dbh

Colliding Cycles

- Planting Cycle Positives
 - Lots of big high value trees
 - Less low value small trees
- Unfortunately value depends on supply and demand
- Demand Cycle
 - Housing crash – pine sawtimber prices down 40%
 - Harvest delayed – inventory piles up
 - Continued increase in pine pulpwood consumption with higher prices
 - New bioenergy demand for small trees

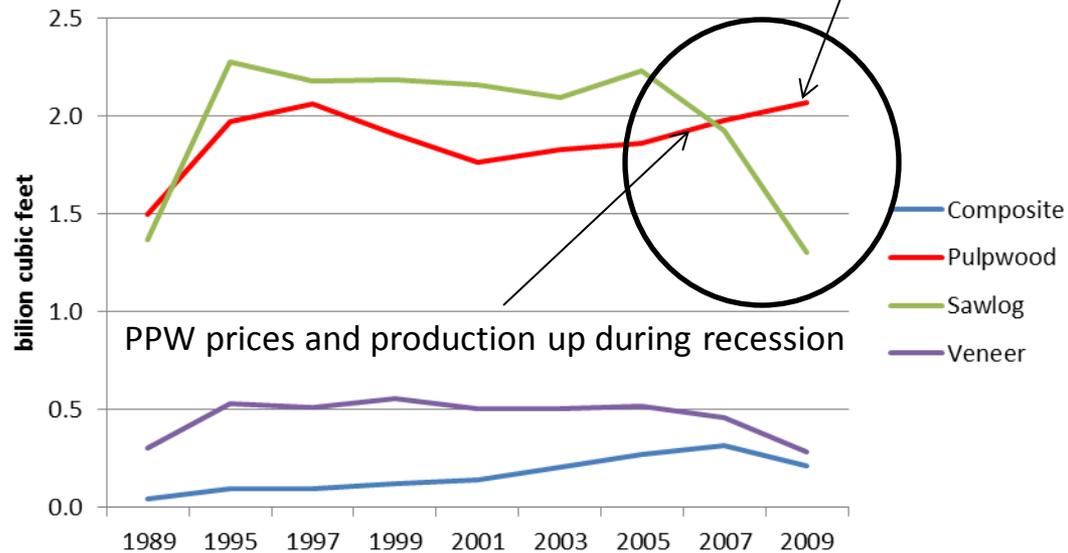
Demand Trends

Hardwood Consumption SE Coastal States



Announced Pellet Capacity = 20% of 2009 total pulpwood consumption

Pine Consumption SE Coastal States



Source: USFS FIA TPO

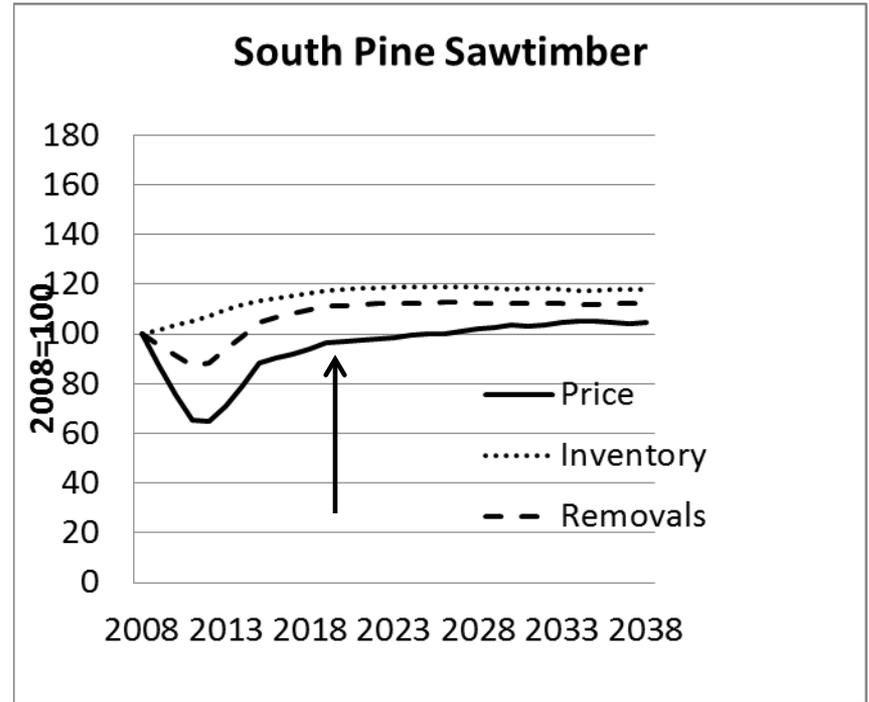
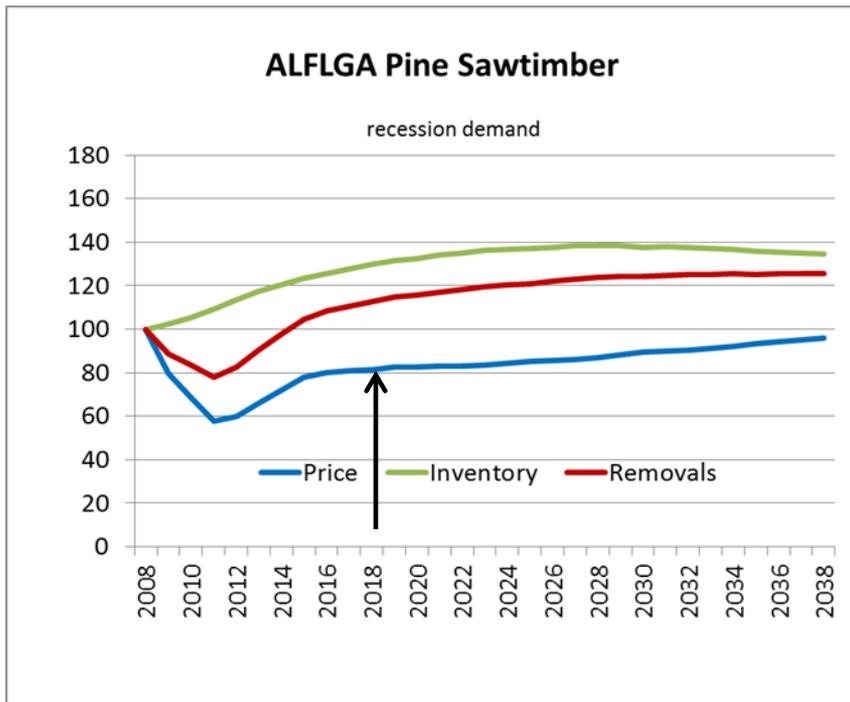
PPW prices and production up during recession

What does this mean for the future?

When housing comes back prices will be dampened by the increase in supply

ALFLGA pine sawtimber

Southwide pine sawtimber



What we can say about pine sawtimber (big trees)?

- In many areas of the South growth exceeds removals because:
 - 1990's planting boom is now sawtimber
 - Recession in housing means prices down 40%, production/harvest down 30%
 - Pine sawtimber inventories are expanding quickly
 - projected 20% higher southwide

What we can say about pine sawtimber (big trees)?

- Why is this important:
 - Landowners are postponing sawtimber harvest until prices recover
 - Build-up in inventories will dampen prices when demand recovers
 - Low pine sawtimber prices are the best predictor of how forest and agriculture compete for land in the South.
 - Low pine prices/high agriculture prices mean less timberland.
 - Postponed harvest means drop-off in planting will continue through recession

What we can say about pine pulpwood (small trees)?

- Why is this important:
 - Logging residue potential is overstated
 - Biomass will compete directly for pulpwood
 - Pulpwood supply is price inelastic (prices will react more than harvest)
 - Even high pulpwood prices can't justify timberland ownership, especially with high ag rents.
 - Biomass demand may not be price sensitive
 - Pellets for example: short payback period and subsidized

What matters?

Housing recovery

- Timing and scale of housing recovery will drive the next 20 years of plantation supply.
 - **Could extend or shorten decreased planting due to delayed harvest**
 - **Sawtimber prices best empirical predictor of re-planting decision**
 - **Robust recovery will immediately help address shortage of small pine roundwood due to sawmill residue feedback $\approx 30\%$**
 - **Competition with ag land driven traditionally driven by pine sawtimber**

Questions

My Thoughts on Pellet Feedstock Demand

- Will it use mainly logging residues?
 - Residue label can be self-fulfilling
- Will it use surplus supply due to low recession demand?
 - Surplus is in pine sawtimber not pine small roundwood (in the South)
 - Could be true around closed hardwood pulp mills (Franklin-Courtland)
 - Not recession driven – long term decline in writing/publishing papers
 - Not true in pine pulpwood market
- Will it use sawmill residue?
 - Already fully utilized
- Will not compete with pulpmills or OSB plants?
 - Varies by region, but they will compete at some level
- On the other hand, higher prices increase timber rents which keeps land in timber and encourages timber management/supply response

My Thoughts on Logging Residues

- Logging Residue advantages
 - Clear and easy to understand carbon advantage
 - Reduces competition with traditional industry
 - “Potential” cost advantage
 - Value-added to harvesting operation
- Logging Residue disadvantages
 - Concentrates demand (near high cost roundwood)
 - Significantly expands procurement circle
 - Supply Uncertainty (tail wagging the dog)
 - Limits supply response (can’t manage for residues)
 - Apparently not feedstock of choice
 - Limits renewable potential
 - Subject to business cycle fluctuations
 - Environmental impact

