



Estimating Biomass Supply in the U.S. South

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My focus

- Forest resource modeler focused on regional outlooks for the medium run 5-20 years.
- Usually take current inventory, growth, and removals as a starting point to model supply over time
- Then look at the impact of various demand scenarios



Outline

- Difference in the questions being asked and the methods being employed

- Two themes
 - Views of "supply"
 - Quantity on the ground (no economics)
 - Quantity on the ground that might feasibly be produced
 - Quantity on the ground that is likely to be removed based on past behavior - empirical
 - Role of residuals



"Supply" Questions (1)

- How much wood is there to convert to energy?
 - Naive: all of the wood
 - Simple GIS procurement circles
 - Filtered by some definition of sustainability – "growth"
 - Southern Bioenergy Roadmap



"Supply" Questions (1 continued)

- How much wood is there to convert to energy?
 - Southern Bioenergy Roadmap
 - Table 4. Summary of energy values of biomass feedstock resources in the South
 - Gross energy value of "net annual growth" – net of mortality
 - No other wood use
 - All trees grow – only a few are harvested
 - IP monograph
 - Looks at growth net of current harvest
 - Maintains industry at current levels



"Supply" Questions (2)

- How much would it cost to provide different quantities of wood?
 - Engineering cost curves
 - Billion ton study – how much wood could be economically harvested at different prices
 - Arrays resources from least to most expensive and tabulates quantities
 - Other studies using this approach: Billion ton study, FASOM, NEMS, POLYSYS



"Supply" Questions (3)

- Based on past behavior – how much wood would be harvested at different prices?
- Because bioenergy markets don't exist (yet), we use
 - Existing wood markets and behavior, and
 - Assumptions about residuals (by products of current harvest)

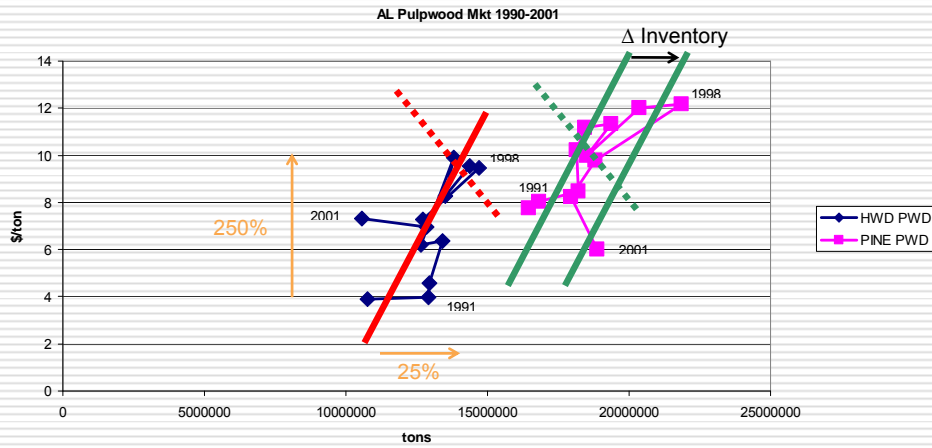


"Supply" Questions

- Some things we know about wood markets:
 - Harvesting and transportation cost are more than half of the delivered cost of pulpwood
 - Forest resources are spatially diverse (forest types, management, ownership, age classes, productivity, harvest intensity)
 - Demand and supply are price insensitive (inelastic)



What does price inelastic mean? *(price impacts bigger than harvest impacts)*

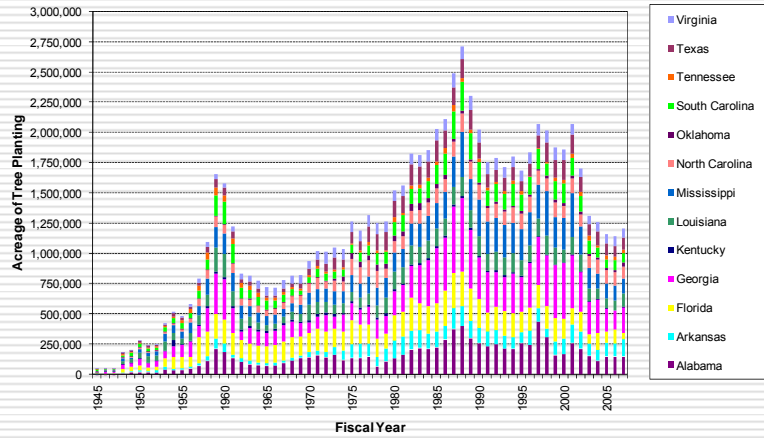


So how do you project inventory over time?

- Track changes in growth, removals, land use change
- By region, owner, forest type, age, product class (e.g. pulpwood, sawtimber)
- Important because tomorrow's forest won't be like today's, and
- Possible, because tomorrow's forest is already planted (15 years or so)



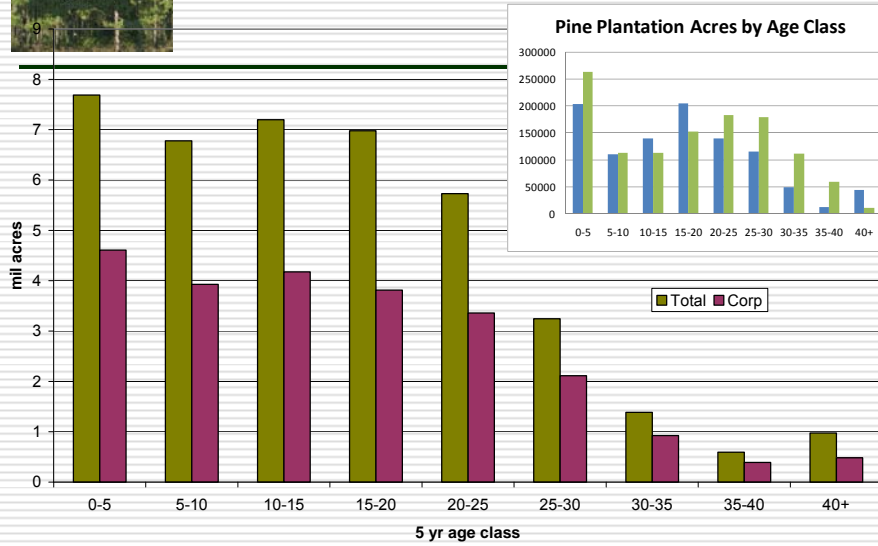
Southern Tree Planting, All States and Ownerships, 1945-2007



Source: USFS, GFC, TMS

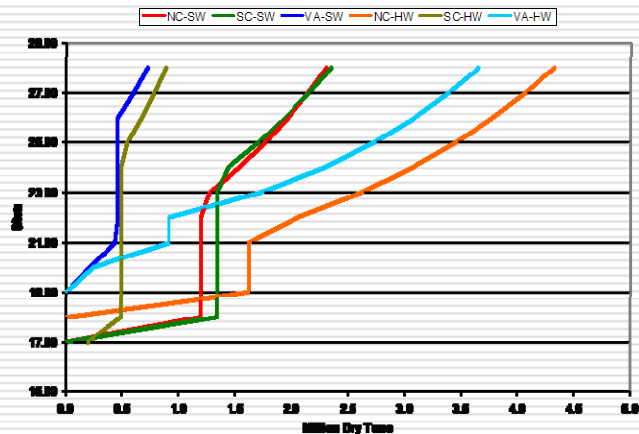


Plantation Acres





Roundwood/Residual Interaction

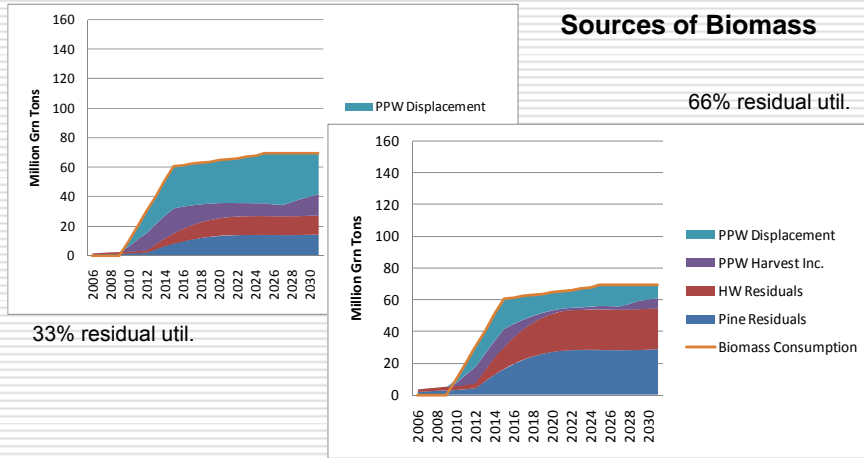


Bioenergy Approach

- The challenge of projecting emerging bio-energy markets
- A few unknowns: which technologies, using which feedstocks, at what scale, where, and when?



Southwide with Optimistic View of Other Renewables



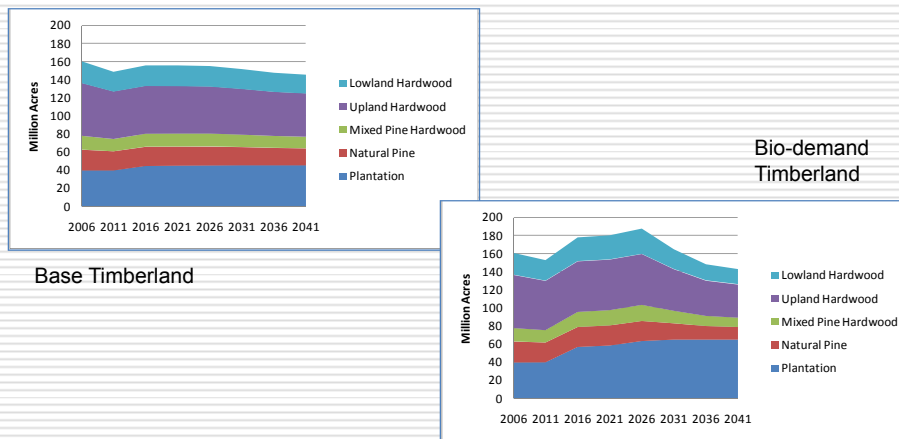
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Southwide with Optimistic View of Other Renewables



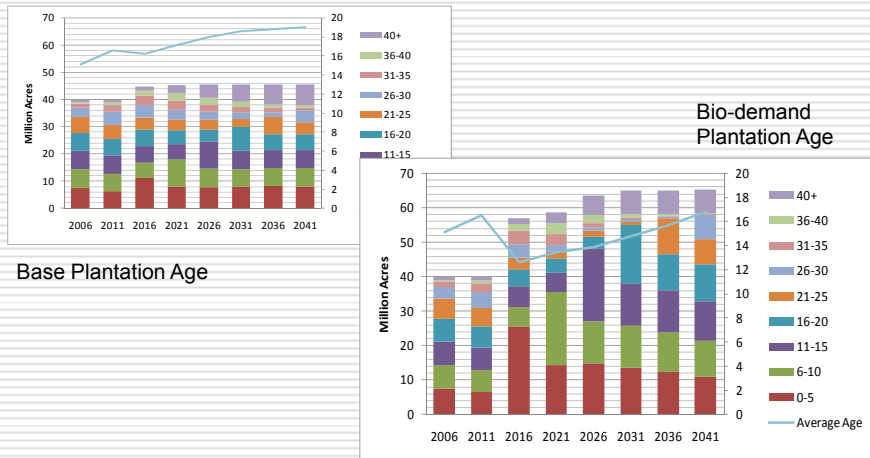
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Southwide with Optimistic View of Other Renewables



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Market-Sustainability

- ❑ Residuals could be important but expected demand will quickly exceed residual availability
- ❑ Inelastic timber supply implies more displacement than increased harvest
- ❑ Observation: energy and biofuel firms are looking at roundwood first
- ❑ Resulting higher wood prices helps landowners and may make other renewable energy sources look better and reduce "realized" biomass demand
- ❑ Timing - recession for traditional forest product industries – boom for bio-energy – plus plantation age gap

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Policy

- Expansive policies focused on demand and technology
- Restrictive policies focused on supply (e.g. certification, natural stands, residuals)
- This combination will likely lead to unanticipated policy "leakage"
- Incentives and outcomes will result from interaction of energy, forest, agriculture, environmental, and carbon policy