



Forest Bioenergy

Opportunities for Georgia and the South

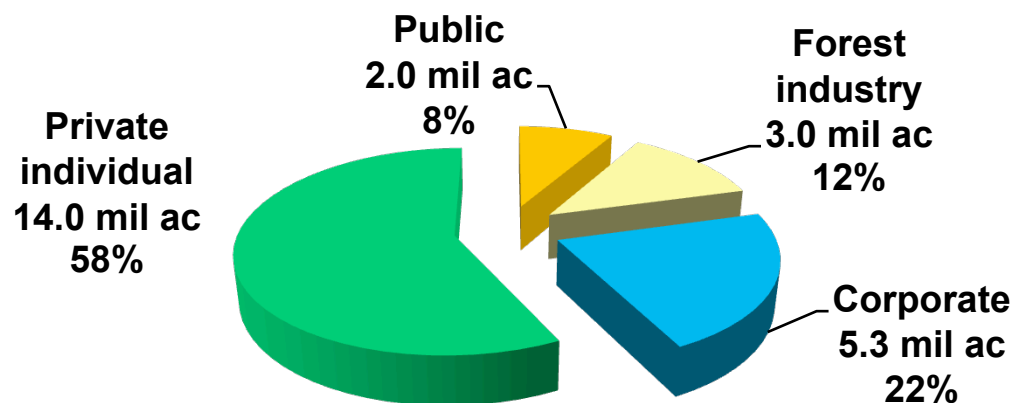
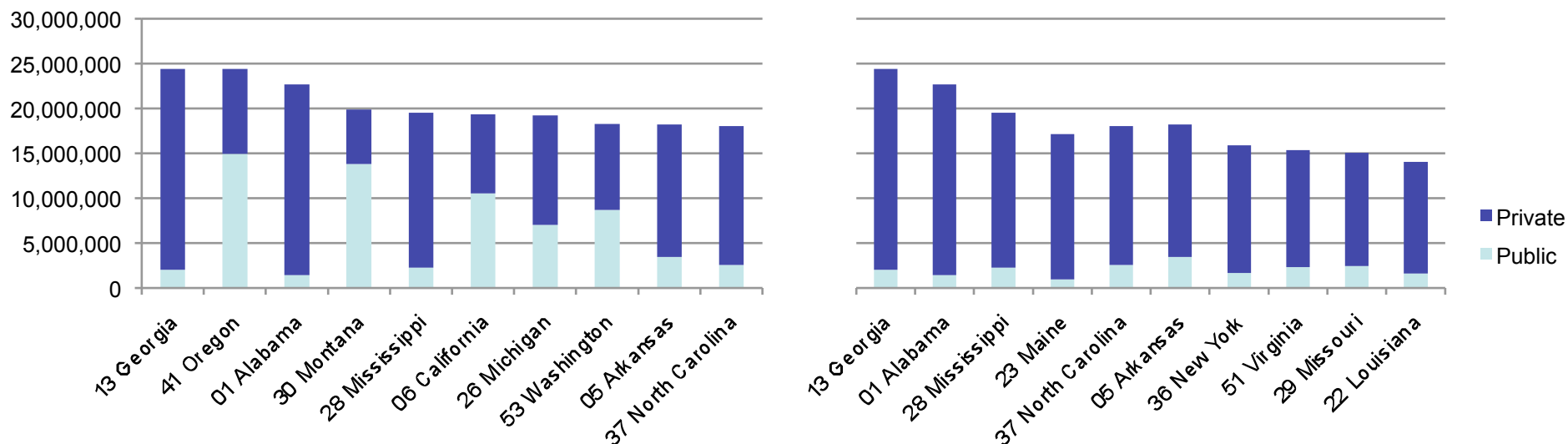
Nathan McClure
Georgia Forestry Commission

A photograph of a dense forest of tall, slender pine trees. The trees have thick, dark, textured bark and are spaced closely together. The ground is covered in lush green undergrowth, including various shrubs and grasses. The lighting is bright, suggesting a sunny day, and the overall scene is a healthy, mature forest.

Southern Timberlands



Top Ten US States in Total Timberland



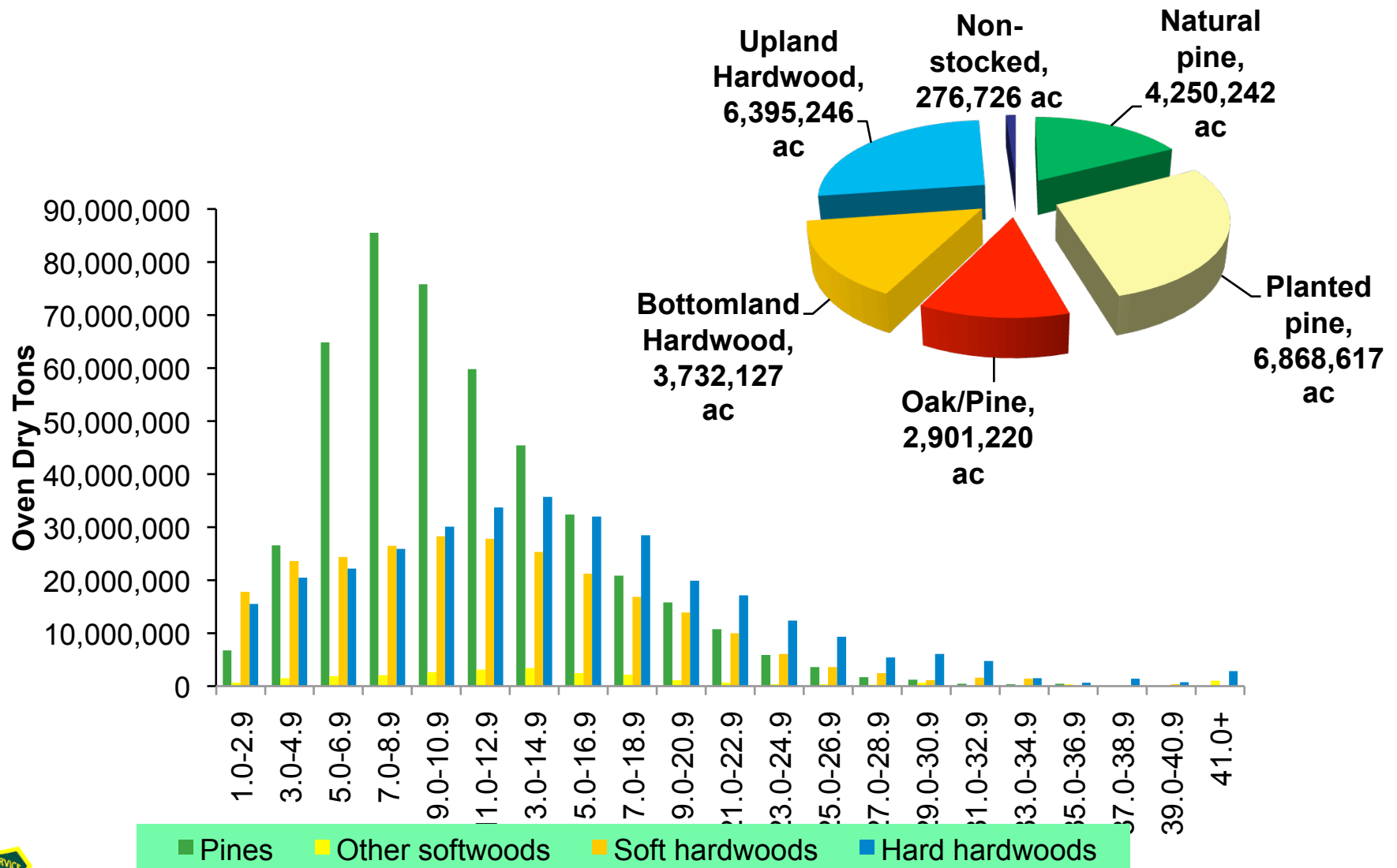
**Georgia Timberland
Ownership – 24.4 mil ac**



Source: US Forest Service FIA Program and Evaluator database, data query 2/22/2010



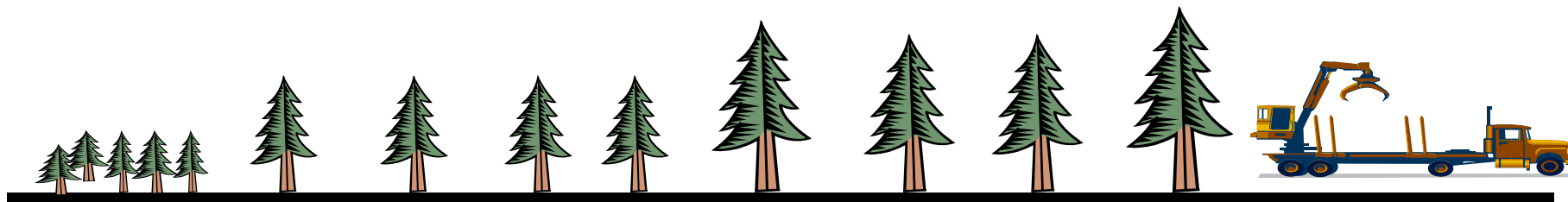
Georgia Timber Types and Biomass in Species Groups



Source: Forest Inventory and Analysis program, US Forest Service, 2008 data



Typical Pine Forest Management



Yr 0.....thin at 15 yrs.....thin at 24 yrs.....harvest at Yr 33

Loblolly pine yield (g tons/ac/yr) on average site:

<u>Product</u>	<u>Amount</u>	<u>Value/ g ton*</u>
Logging residues	.74	\$4
Pulpwood	2.0	\$8 (6)
Small sawtimber	2.1	\$18 (25)
Large sawtimber	1.7	\$29 (40)

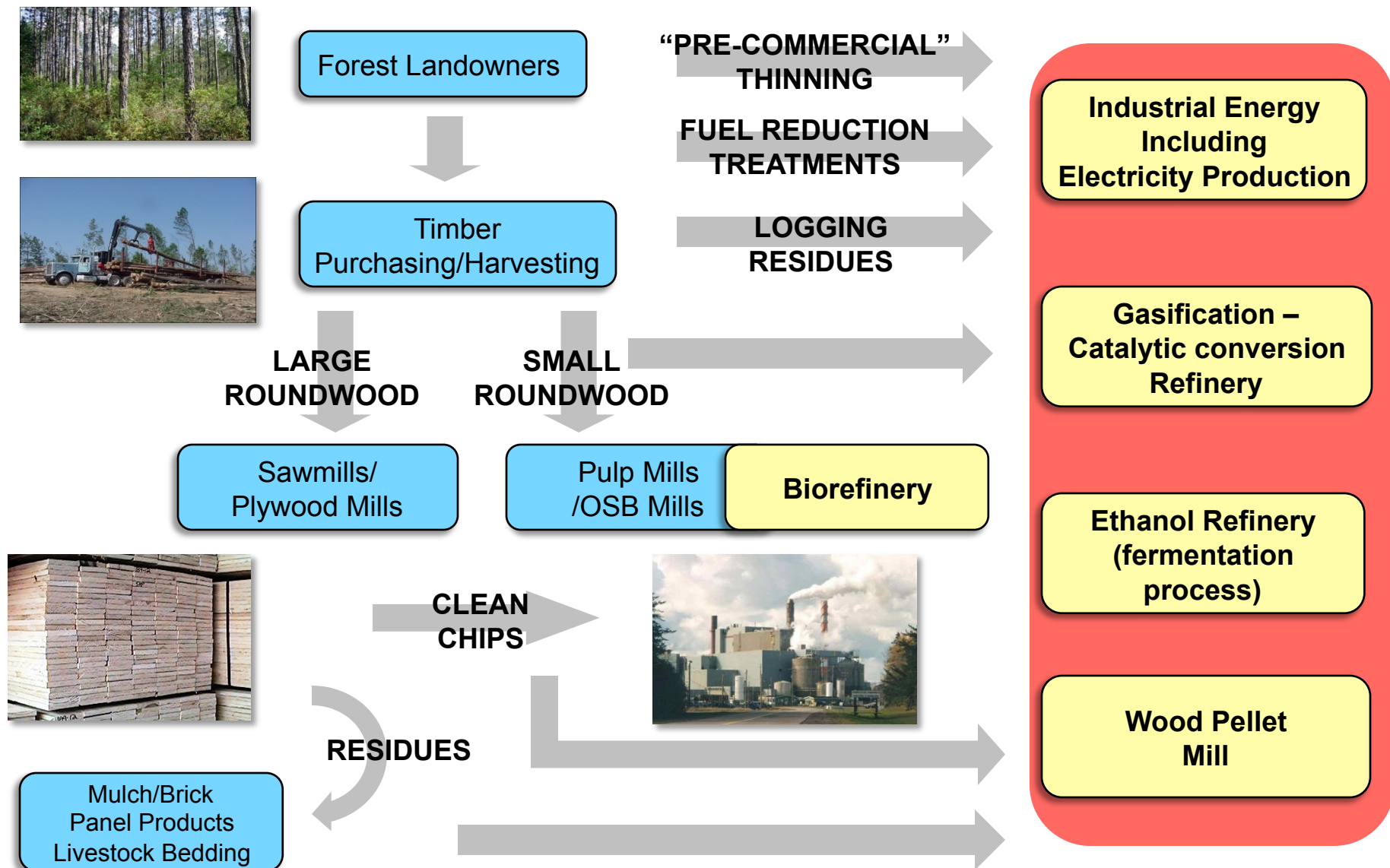
Sources: Dickens, et al; Forest Economics papers using GaPPS, Univ. of Georgia; 2004

Bentley, James; Harvest and Utilization Study, 2004; Southern Research Station, USFS

* General recent stumpage prices in Georgia (parenthesis indicates prior to economic downturn)



Forest and Bioenergy Industry Integration



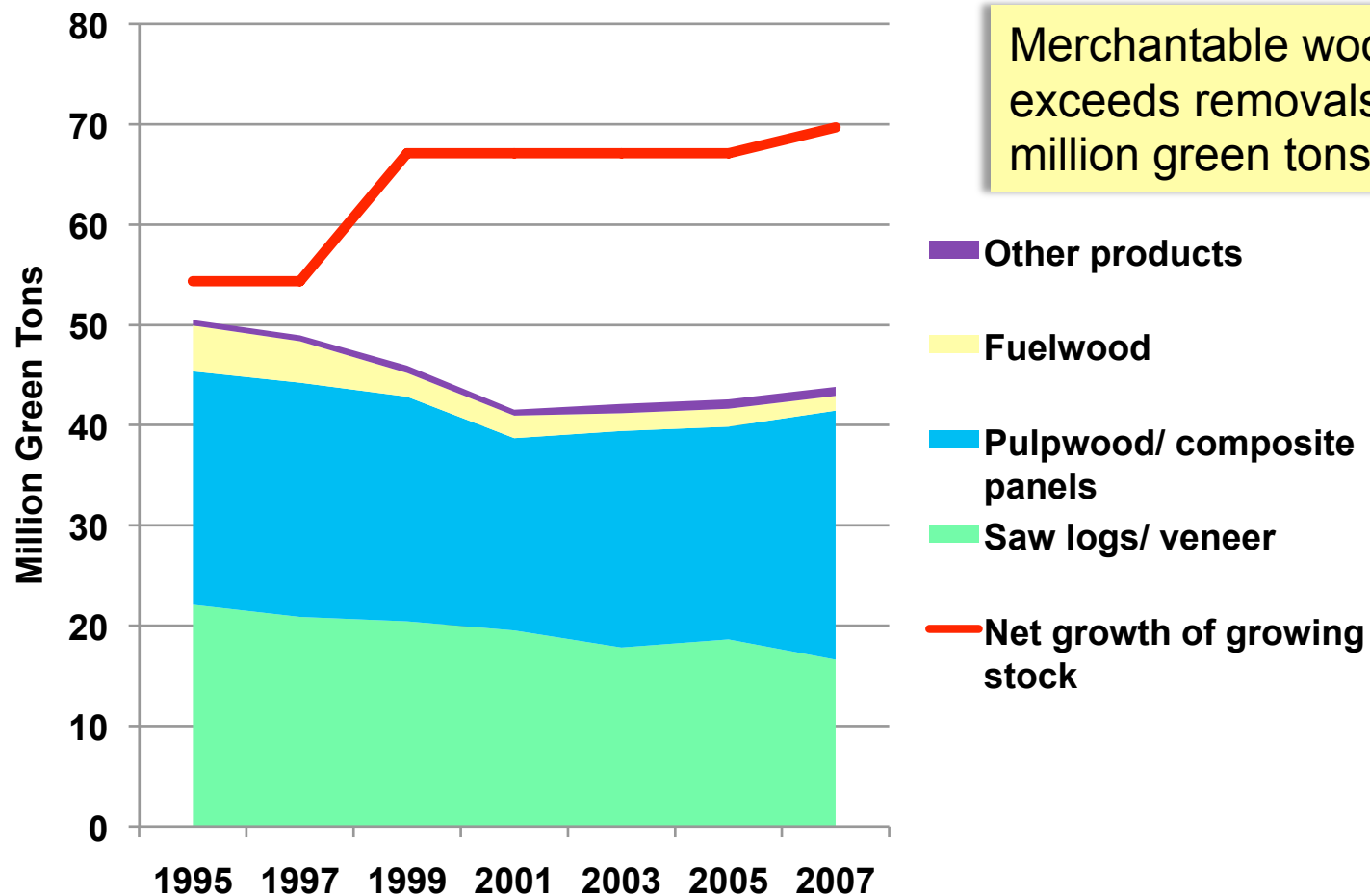
An aerial photograph of a forested hillside. The forest is composed of dense green trees, with patches of yellowish-brown grass or undergrowth visible between the trees. A small figure of a person is visible on the hillside, providing a sense of scale. The text is overlaid on the lower portion of the image.

Sustainability of Forest Bioenergy

- Sustainability: supply
- Sustainability: environmental integrity



Additional Wood Use is Sustainable

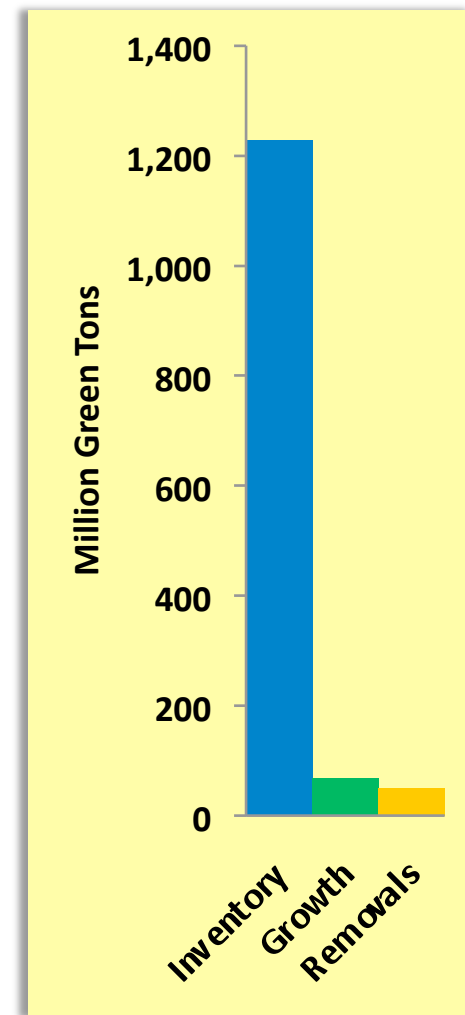
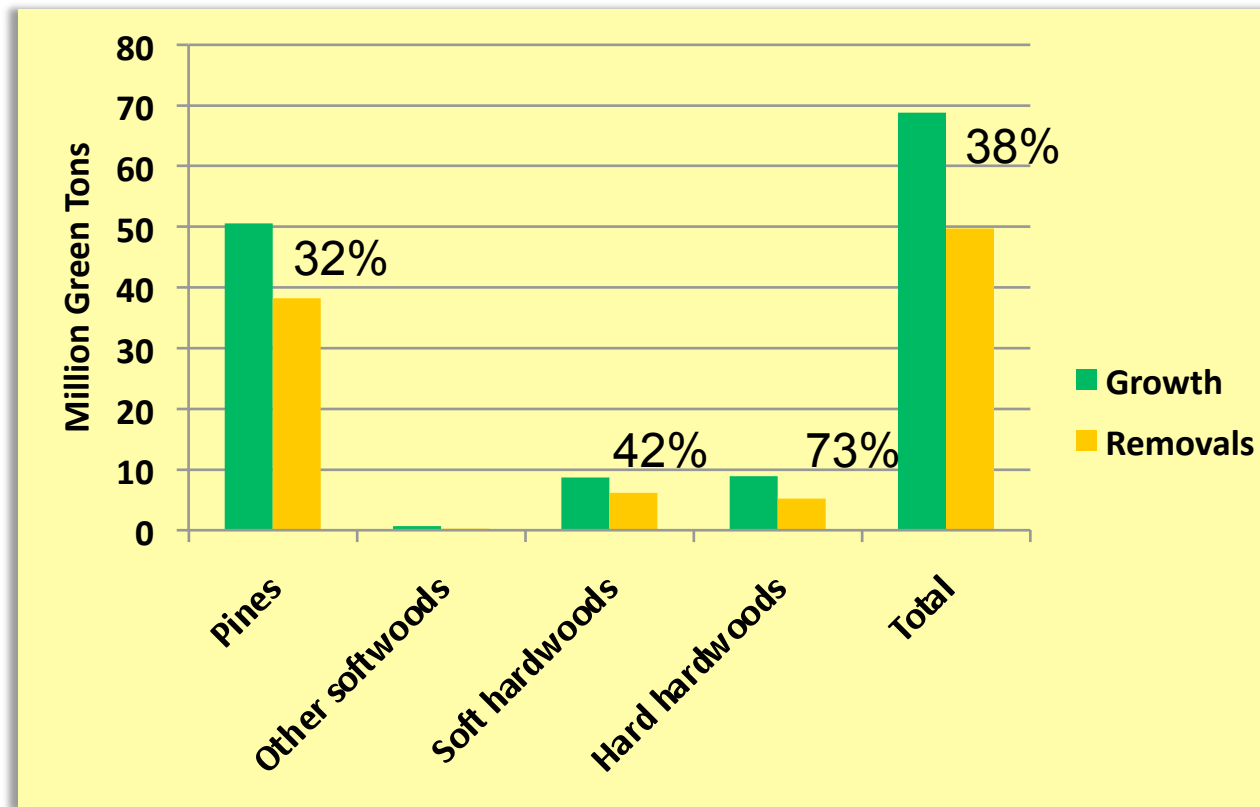


Source: Forest Inventory and Analysis program and Timber Product Output Reports, Southern Research Station, US Forest Service, 1995-2008; Volume -to-weight conversion using 70 lbs/cubic foot





Growth and Removals of Merchantable Trees



Source: Forest Inventory and Analysis program, US Forest Service, 2008 data



Georgia Statewide Forest Biomass Availability Estimates - 2009

Forest Biomass Source	Annual Recovery Estimate (US Green Tons)
Logging Residues and Understory Trees (65% recovery rate)	11,718,900
"Pre-commercial" thinning receiving treatment	927,773
Land Use Change (recovery rate)	2,751,938
Urban Wood Waste	2,873,646
Total	18,272,257

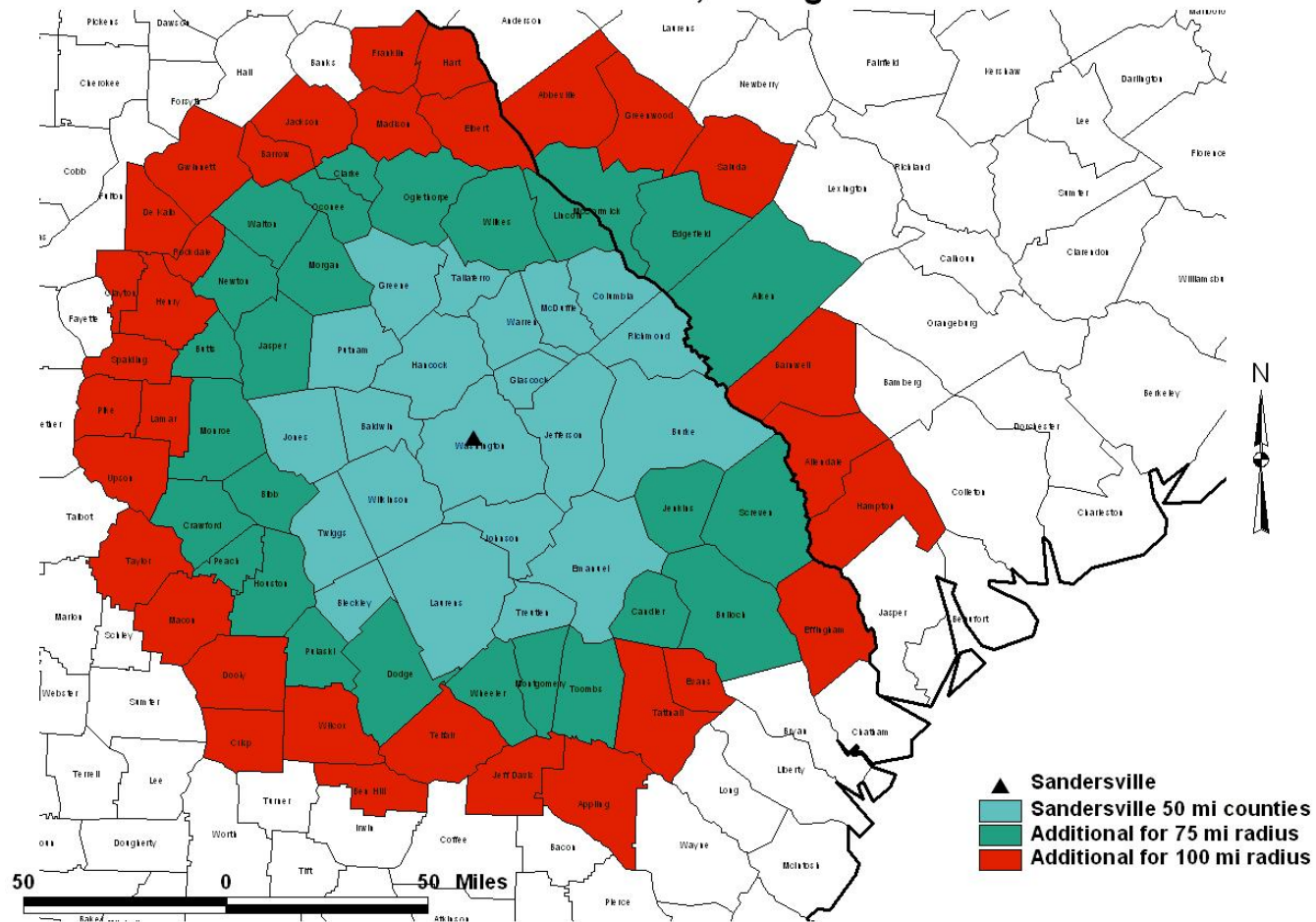
**Expected need:
10 – 12 million green
tons in 5 years**

Merchantable Tree Growth above Removals	19,113,044
Mill Residues	14,610,000



Local Sustainability is the Key

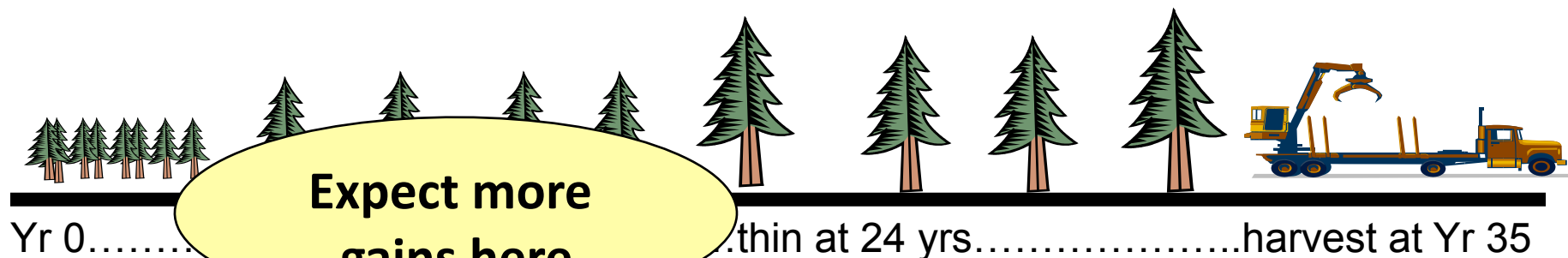
Forestry Biomass Procurement Area Sandersville, Georgia





Sustainability Using Growth Potential

For Pine Lands Only



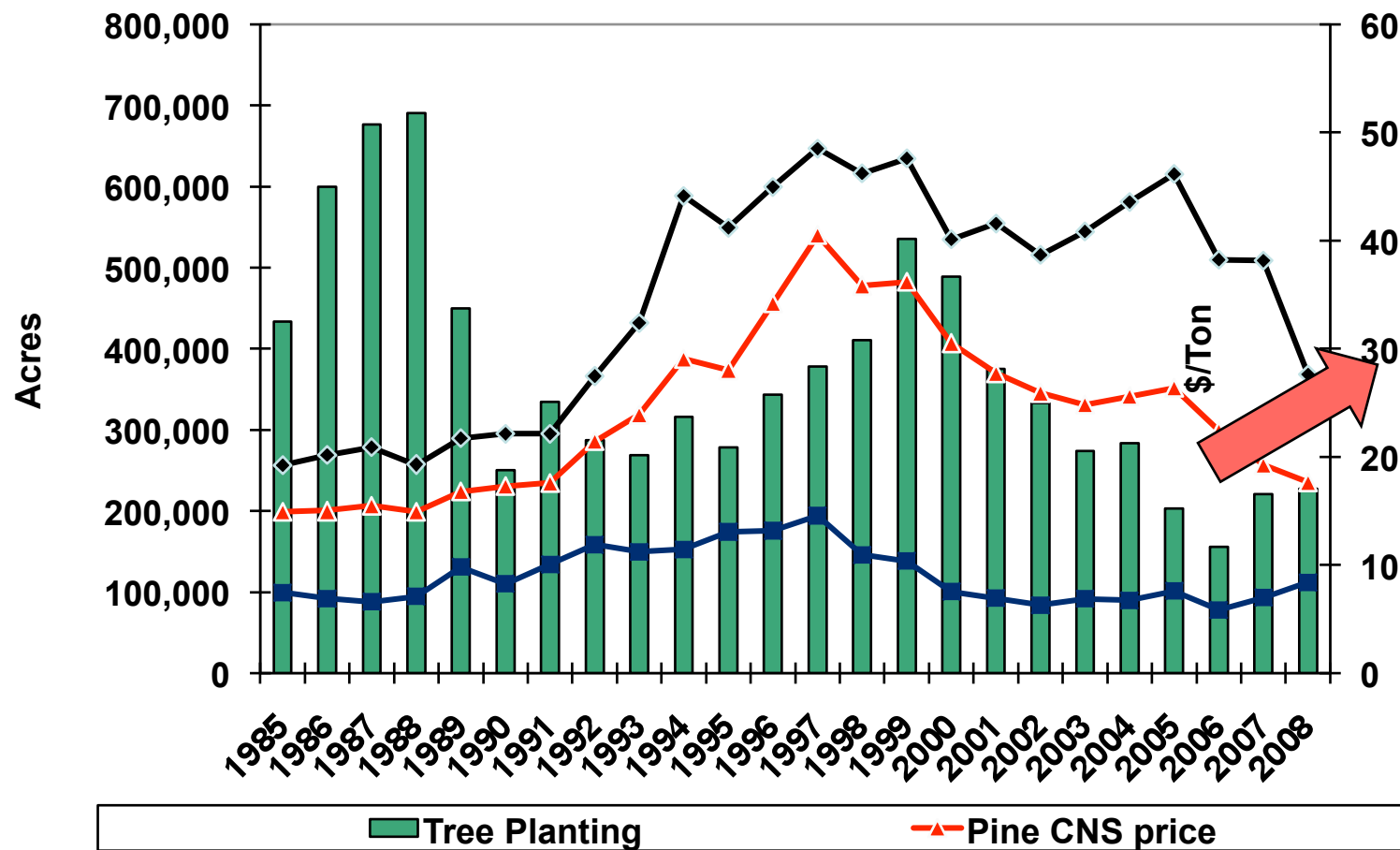
Forest Type	Acres	Production Rate per Acre*	Potential Production
Pine Plantation	7.7 million	6.9 green tons +++	53.1 mil green tons
Natural Pine	4.2 million	3.5 green tons	14.7 mil green tons
Total	11.9 million		68.6 mil green tons

Annual Timber Removals = 50 mil green tons on all lands

Sources: Sims Growth and Yield Model, USFS Timber Product Output database, general observations of natural pine growth by presenter



Markets Impact Forest Retention





Sustainability – Environmental Integrity

- “Conversion”
 - Tree planting?
 - Management intensity?
 - Exotic species?
- Georgia BMP’s for Forestry
- Biomass Harvesting Principles in draft form
 - Water quality
 - Soil productivity
 - Forest health
 - Wildlife and biodiversity
- Beneficial management tool



Summary

- Southern timberlands have the potential to produce energy from forest residues and small diameter trees
- Bioenergy is part of the forest industry when pursued in the forest landscape
- Higher values of sawtimber and small landowner objectives will continue to support longer forest rotations
- Forest resource markets result in more forests
- Forestry BMP's can be applied to biomass harvesting
- “Conversion”, “biodiversity”, rights of private landowners – sticking points