

# Overview of The Plantation Management Research Cooperative (PMRC)

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# PMRC Overview Outline

- Mission
- Big Picture
- Field Trial Program
- Key Products
- Strategic Priorities
- New Projects
- Membership Info
- Contact Information/More Info

# What is the Mission of the PMRC?

“Create value for its members by improving knowledge of southern pine plantation performance under different silvicultural regimes and by developing growth and yield systems and decision support tools that result in improved silviculture, management, and valuation of the plantation resource”

# PMRC Big Picture

- Long record of significant contributions
- Strong fundamentals
  - Committed members
  - Skilled PMRC/Warnell staff and faculty
  - Substantial UGA Warnell support
  - Excellent database and comprehensive field trial program
  - Products of value to forestland investors
- Clear future direction to create value
  - Strategic Plan completed in 2007

# Future Success

- Create value for current members
- Demonstrate value proposition for potential members
- Produce value for Warnell/UGA

# PMRC Members

## Full Members

- Foley Timber & Land
- Forest Capital Partners
- GMO Threshold Timber
- Hancock Forest Management
- MeadWestvaco
- Molpus Timberlands Management
- Plum Creek Timber
- Potlatch
- Rayonier
- Resource Management Service
- The Campbell Group
- Weyerhaeuser

## Associate Members

- BASF
- Cellfor
- Dow AgroSciences
- Smurfit-Stone Container

## Warnell School of Forestry & Natural Resources

Ownership represents about 50% of plantation acreage in US South.

*Current full membership leverages \$50 for every \$1 in dues*

# PMRC Warnell Team

- Core Faculty – Borders, Cieszewski & Kane (Director)
- Associated Faculty – Clutter, Daniels +, +...
- Research Professionals (RP) - Harrison, Rheney, Zhao
- Field Crew – Lowe (RP) and 4 technicians
- Grad. Students – 2 MS (Purvis, Mayo), 2 PhD (Volfovicz, Yatch)



# Field Trial Program

- South's most comprehensive series of field trials to quantify impacts of silvicultural treatments and complementary growth and yield plots
- Singularly strong database and field trial program in:
  - Planting density
  - Competition control
  - Intensive silviculture
  - Treatment combinations and regimes
  - Loblolly and slash pine
- Developing singularly strong database and field trial program in:
  - Planting density, culture and thinning
  - Mid-rotation regimes of thinning, release, and fertilization
  - Enhanced genetics (MCP, varietal)

# Field Trial Program

- **Field testing emphasis is on true region-wide analysis to insure widest applicability of resulting management tools**
- **PMRC crews do 95% of field work**
  - **Insures standardization and quality**
  - **Members' time requirement lessened**

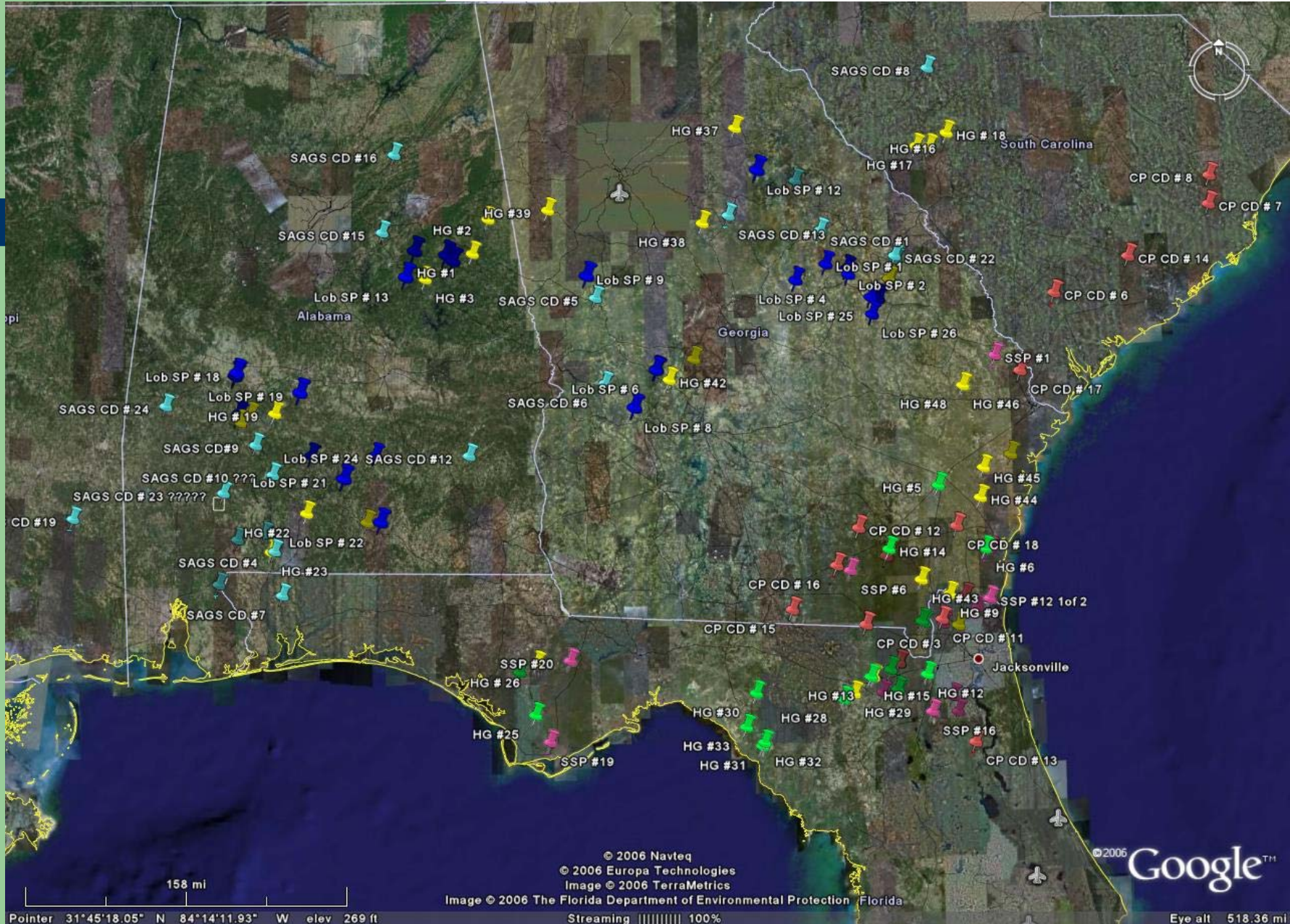
# Field Trial Program

- Field program is south-wide
  - Significant Western Gulf efforts with culture x density x thinning series and planned new mid-rotation series
- Field program and database allow PMRC to develop silviculture and growth and yield technology applicable to a wide array of management objectives – from biomass to sawtimber.

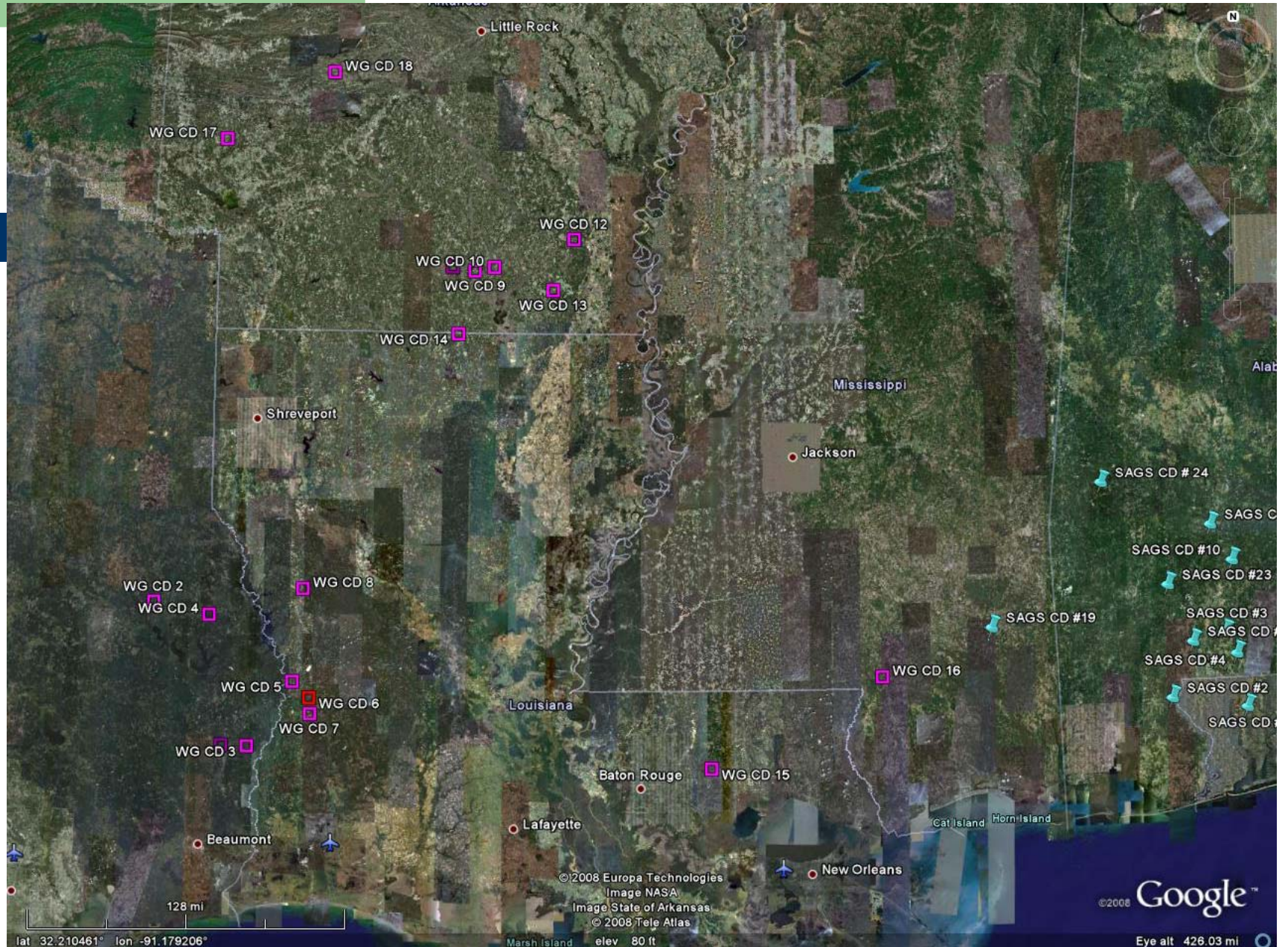
# PMRC Field Projects

<b>Initiation Period</b>	<b>Project</b>
1976-1977	Growth and yield (Active)
1976-1984	Mid-rotation competing vegetation studies (terminated)
1979-1980	Loblolly/slash species comparison (terminated)
1980-1984	HWC duration and area of control (terminated)
1980-1986	Site preparation/complete vegetation control (active)
1986-1987	Planting stock/vegetation management (active)
1986-1990	Loblolly HWC and early release (active)
1988-1994	Complete vegetation control and/or annual fertilization (active)
1990-1992	Shrub control and HWC (active)
1995-1997	Bedding, chem. SP, and HWC (active)
1995-1997	Lob/slash culture x density (active) x thinning (lob only)
2001-2003	Loblolly Western Gulf culture x density x thinning (active)

# PMRC East Region Studies



# PMRC West Region Studies



# Key PMRC Products

- Technical Reports on Designed Field Trials
  - 2007
    - 8-yr UCP/Pied Culture Density; 21-yr UCP/Pied Site Prep; 26-yr Slash Site Prep; Site Prep & HWC in LCP; Modeling Mortality
  - 2008 (planned)
    - 21-yr Improved Planting Stock – Competition Control; 12-yr CP Culture Density; 10-yr UCP/Pied Culture Density

Value Creation  
Planting Density x Culture  
Create Very Different Stands

900 I

1800 I

600 I

1800 O

1200 I

600 O

300 I

1500 I

300 O

1500 O

1200 O

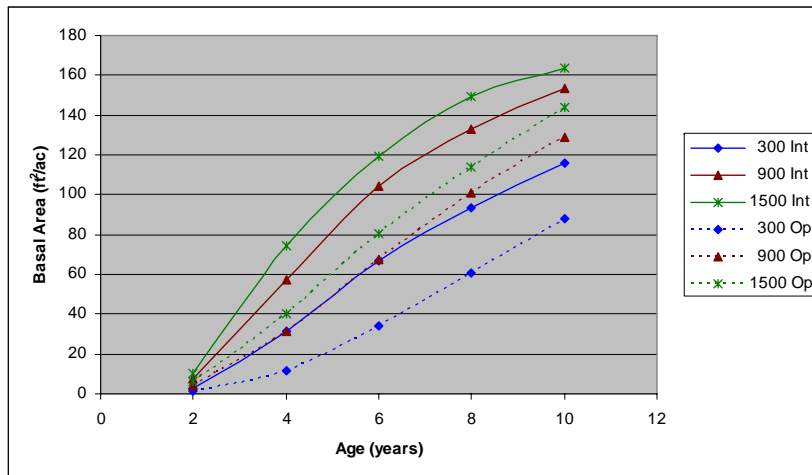
900 O

SAGS Culture/Density Installation #20

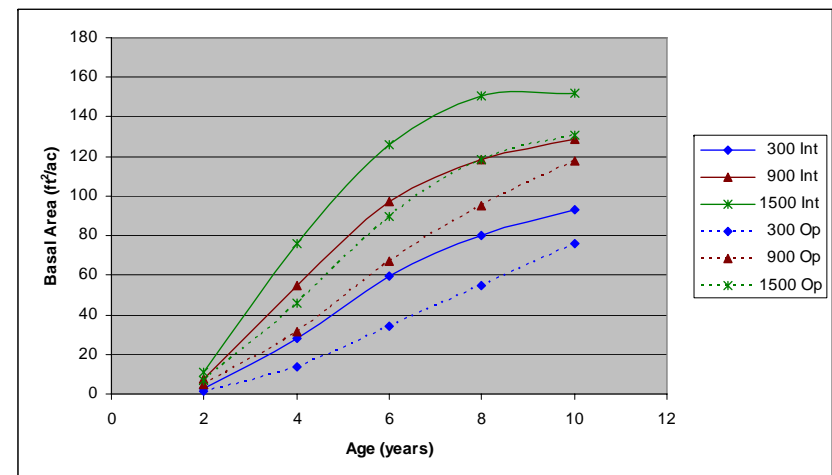


# Planting Density x Culture x Thinning- Eastern Lower Coastal Plain Results

- Ability to evaluate stocking management and cultural intensity for objectives ranging from biomass to sawtimber
- Singularly valuable field studies



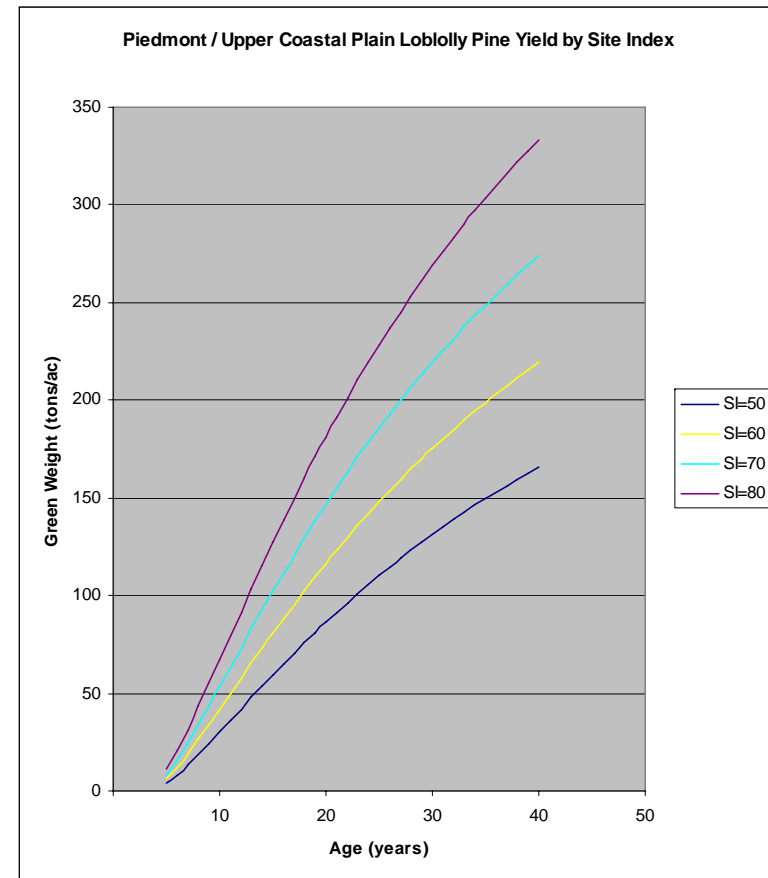
**Loblolly Pine**



**Slash Pine**

# Key PMRC Products

- Growth and Yield System Updates
  - Loblolly Pine(2004);  
Slash Pine (2005)

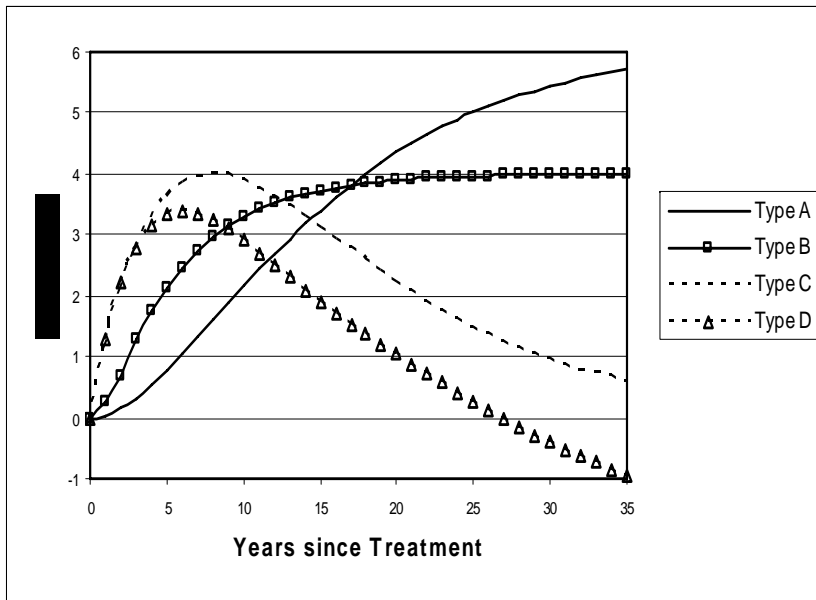


# Key Products

## Growth and Yield Systems

- Distinguishing Attributes
  - Driven by wealth of PMRC data with complement of non-PMRC data
  - Whole stand approach
  - Compatible system of equations
  - Comprehensive
    - Whole stand attributes, diameter and product distributions
    - Allows flexibility in stand conditions and silvicultural regimes
  - Base models with adjustments in dominant height and BA/ac made for silvicultural treatments
  - Hardwood basal area is an independent variable in base model for Upper Coastal Plain and Piedmont G&Y system

# Growth & Yield System: Treatment Response Modeling



- Comprehensive system of response models for dominant height and basal area often provide more realistic response estimates than using only site index adjustments
- Model forms relate to biological response patterns
- Ongoing research to make models as data driven and biologically correct as possible

# PMRC Strategic Priorities for 2008-2010 Period

<b>Rank</b>	<b>Topic</b>
1	Mid-Rotation Modeling
2	Trt Response Models
3	G&Y Models
4	Collaboration w/Coops
5	Expanding Membership/Geographic Scope
5	Decision Support/Workshops
7	Inventory Quality
8	Enhanced Genetics
9	Data Mgt Systems

# Mid-Rotation Technology

## Planting Density x Culture x Thinning

Age 12 Loblolly, Intensive Culture, Palatka, FL

- Thinning treatments are imposed on stands established at different planting densities with operational and intensive culture.
- This creates a wide variety of stocking and crown conditions and an excellent dataset for modeling thinning response



300 TPA No Thin



600 TPA to 300 TPA



1200 TPA to 300 TPA



900 TPA to 300 TPA

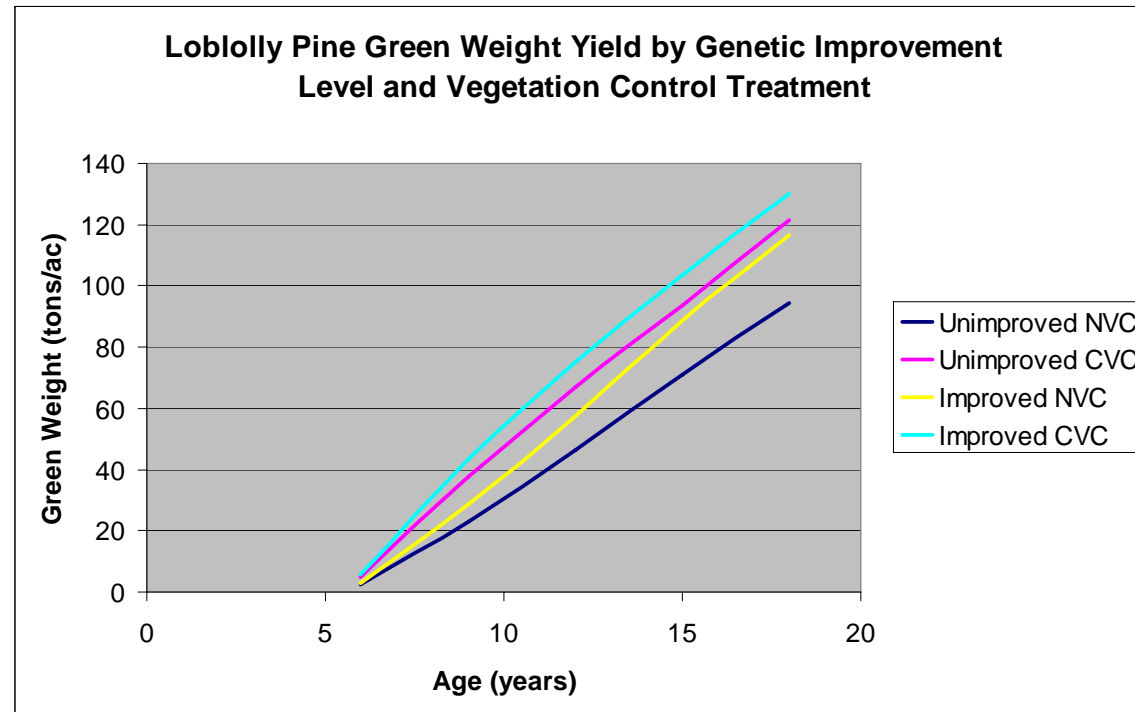
# New PMRC Projects

Initiation Period	Project
2006-2010	<b>Loblolly enhanced genetics growth and yield</b> <ul style="list-style-type: none"><li>•Current network of varietal block plantings</li><li>•Expert growth and yield system to be developed</li><li>•Possible new field studies to examine stand dynamics</li></ul>
2008-2010	<b>Thinning, release, and fertilization</b> <ul style="list-style-type: none"><li>•Study plan developed, phased implementation</li><li>•Major effort of field program during next 3+ years</li><li>•South-wide trial with modeling emphasis<ul style="list-style-type: none"><li>-First or second thinning for a range of site indices</li><li>-Range of pre-thin and post-thin basal area</li><li>-Release and/or fertilization</li><li>-Initial emphasis on second thinning of loblolly in UCP</li></ul></li></ul>

# Genetics and Silviculture Effects – Past PMRC Efforts

## PMRC regional trials with loblolly:

- Productivity gains from genetic improvement in block plantings were similar to that estimated from row plot progeny tests
- Effects of genetic improvement and vegetation control are additive



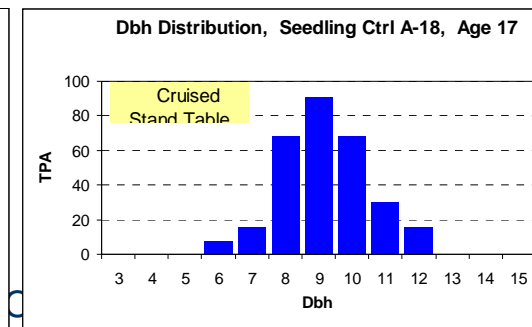
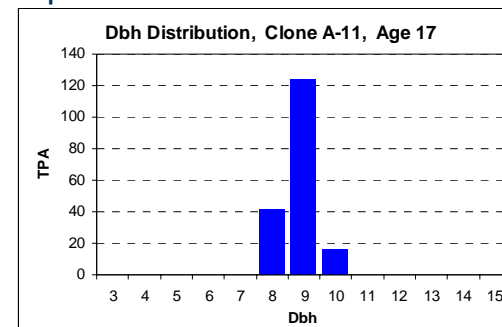
# Enhanced Genetics - Stand Dynamics and Value

- Mass controlled pollinated and varietal stock promises significant improvements in productivity, quality, and uniformity
- PMRC focus is to quantify enhanced genetics impacts on stand dynamics, value, and uniformity
- Working closely with FNC, FBRC, and VPILPG&T to coordinate efforts
- Three legs to PMRC enhanced genetics stool:
  - **Current network of block plantings with enhanced genetics, access to designed field trial data**
  - **Expert growth and yield system to be developed**
  - **Stand dynamics examined in targeted new field trials**



Ideotype implications?

Impact of uniformity of stand development, performance and value



# Needs: Thinning and Mid-Rotation Treatments

- Thinning
  - Current thinning models (PMRC and others) were developed with data from 1960s (slash) and 1970s (loblolly) vintage plantations.
  - Limited validation indicates reasonable basal area projections for “normal” first thin conditions
  - Significant questions regarding second thinnings, ranges of initial stocking and thinning intensities, responses given new genetics/silviculture and combinations of release and fertilization

# New Regional Trial: Thinning and Mid-Rotation Treatments

- Phase 1 of new study series study to be installed during 2008-2010 period.
- Examine loblolly plantation performance across a matrix of site index, initial pre-thin basal area and residual basal area with and without release, fertilization and their combination.
- Phase 1 consists of establishing 12 installation throughout the UCP
- Each installation will contain one plot for each of the following treatments:
  - No second thin, no treatment
  - Second thin to target BA/Ac, no treatment
  - Second thin to target BA/Ac + release
  - Second thin to target BA/Ac + fertilization
  - Second thin to target BA/Ac + release + fertilization

# Decision Tools and Technology Transfer

- Past approach
  - PMRC G&Y systems and results from field series reported at annual meetings/field meetings and documented in PMRC Technical Reports
  - Cooperators developed applications (software) in-house or with technology providers

# Decision Tools and Technology Transfer

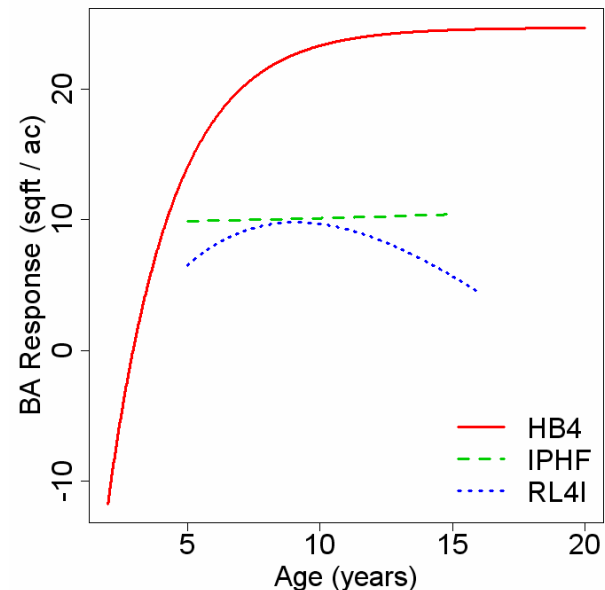
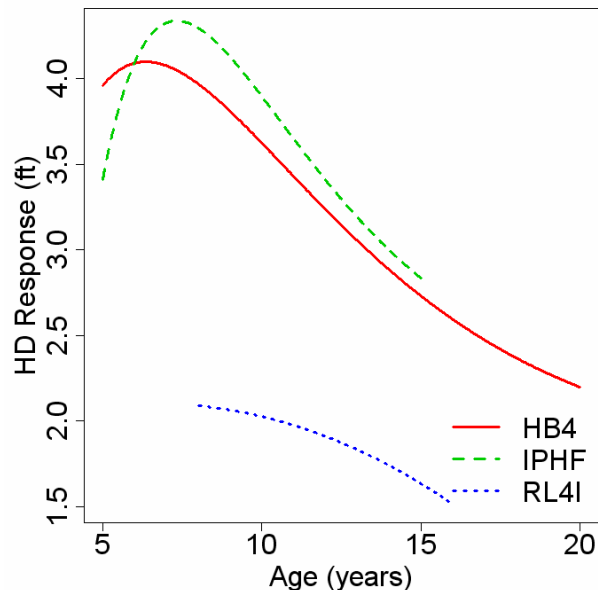
- New emphasis on PMRC decision tools/workshops
  - Identified as strategic priority; working on details
  - Decision tools - Vegetation management first priority
  - Workshops - Vegetation management, planting density and thinning, and growth & yield system first priorities
  - Tailored workshops and visits per cooperators' requests

# PMRC and Grant Funding

- PMRC associated faculty at Warnell seek grant funding to expand the scope of research related to southern commercial plantations.
- We currently have two projects funded through grants from the State of Georgia
  - Refining silvicultural treatment response models
  - Improving inventory quality

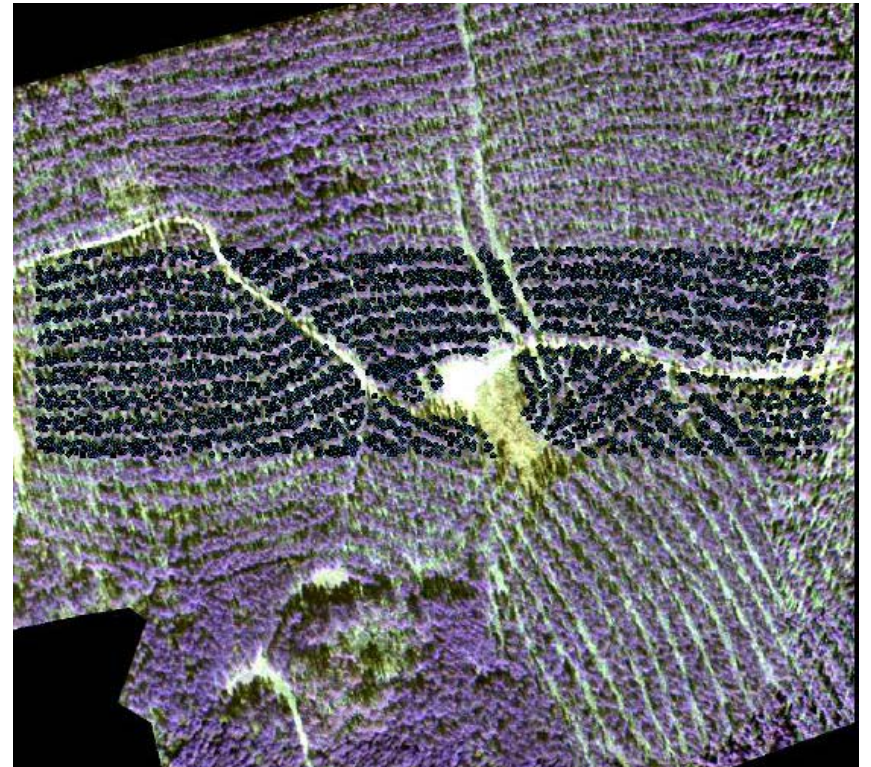
# Refine Silvicultural Treatment Response Models – Georgia Funded Project

- Chemical site prep, HWC, release, tillage, and establishment fertilization responses being valuated; Funded through June, 09
- Example below is for responses to operational HWC



# Inventory Quality – Georgia Funded Project

- Improving stand level timber estimates using new on the ground sampling methods in conjunction with aerial imagery



# Membership Classes

<b>Membership Class*</b>	<b>Attribute</b>	<b>2009 Dues</b>
Full	Owens or manages more than 200,000 acres	\$17,500
Supporting	Owens or manages 50,000 to 200,000 acres	\$11,700
Contributing	Owens or manages less than 50,000 acres	\$ 5,000
Associate	Does not own or manage forest land.	\$ 8,750

\*Consultant organizations join as one of the defined Membership categories. Membership will be negotiated on a case-by-case basis including the array of benefits to be received by the consultant.

# Want More Information on PMRC?

- **Contacts**

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- **Public Website**

<http://warnell.forestry.uga.edu/pmrcpub/>