Projecting Private Forest Investment and Forest Carbon with the Forest and Agricultural Sector Optimization Model – Green House Gas

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Timberland and Carbon Sequestration

- Five factors that drive economics of storing carbon in forests for extended periods (Stavins and Richards 2005)
  - Management practices for various forest types and regions
  - Opportunity cost of land and agricultural commodity prices
  - Disposition of forest products
  - Policy scenarios
  - Parameters such as interest rate
Timberland in the United States, 2002
Yield and Private Timberland

NIPF - South Central

Cubic Feet (000) vs Age

Age

Cubic Feet (000)

Afforested Pine
Planted Pine
Natural Pine
Economics and Private Timberland

• Positive returns from intensive management (Alig et al. 1999)
• NIPF owners respond to investment incentives (Alig et al. 1990)
• FI and NIPF maximize profits (Newman and Wear 1993)
Forest and Agricultural Sector Optimization Model - GHG

- FASOMGHG is a dynamic, nonlinear programming model of the forest and agricultural sectors in the United States
- Model private timberland owner behavior
- Forest carbon sequestration accounting
FASOMGHG Timberland Regions
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Expanded Timberland Data

• Detailed species type
  – South: planted pine, natural pine, oak-pine upland and bottomland hardwood
  – PNWW: Douglas-fir, other softwoods, hardwood

• Detailed management intensity
  – Planted pine
  – Uneven-age management
Afforestation in FASOMGHG

• Detailed planted afforestation
  – South
    • Planted pine – four management intensities
    • Bottomland hardwood
  – Corn Belt
    • Hardwood and softwood
Management Costs in FASOMGHG

• Detailed management costs
  – Land conversion costs
  – Establishment costs
  – Intermediate treatment costs
    • Herbicide
    • Fertilization
    • Precommercial thinning
Preliminary Model Results

- Linear (Natural Regen. in U.S.)
- Linear (Planted in U.S.)
Preliminary Model Results

Graph showing linear trends in acres for different planting types over decades from 2000 to 2090.
Potential Policy Modeling Scenarios

• Private timberland investment
  – Encourage investment
    • Incentives for investment in regeneration and afforestation practices
  – Restricted investment
    • Uncertainty in future markets
    • Limits to investment or restrictions in borrowing
Preliminary Model Results

![Graph showing model results with linear trends and cost implications.](image)
Potential Policy Modeling Scenarios

• Afforestation
  – Carbon credits
  – Farm bill

• Joint production
  – Habitat improvement
  – Recreation
  – Changing landowner objectives
Future Steps

- Management Intensity
- Forest Type
- Public Lands
  - National Forest
  - Other Public
- Additional Policy Scenarios