
Development of Second Generation Multiple Product Southern Timber Market Model

Southern Forest Resource
Assessment Consortium

Southern Forest Sector Dynamic Change

- Growing Timber Production
 - > more than doubled from 1960s
 - > increasing wood demand
 - > shift in market share to the South
 - > the South largest wood producing region
 - > United States
 - > the world
- Accumulation of Growing Stock Inventory
 - > increased by half from 1960s
 - > substantial investment in timber growing
- Land Use Changes

Timber Supply Modeling

- Forest Planning Input Since 1970s
- Need Further Development to Assess Rapid Change
- Five Major Areas that Need Development:
 - > multiple products
 - > timber harvesting behavior
 - > forest inventories and growth
 - > forest investment
 - > land use

Modeling Activities

- Phase I
 - > integration of current timber supply modules
 - > multiple product SRTS modeling framework
 - > development of new well documented code
- Phase II
 - > development of new modules
 - > evaluation of new modules
 - > development of new timber market model

Integration of Current Timber Supply Model Components

- Stumpage Market Equilibrium
 - > integrated equilibrium module
- Harvest by Management Type / Age Class
 - > integrated type-harvest allocation module
- Inventory and Growth
 - > inventory accounting module
- Programming
 - > new well documented code

Multiple Products

- Diverse Wood Product Manufacturing
- Increasing Competition for Timber Inputs
 - > demand for pulpwood and solidwood related
 - > competition over wide range of diameters
- Impacts on Supply and Demand
- Develop Multiple Product Demand Model
 - > price effects between wood products & stumpage
 - > allocation of timber harvest to wood products

Multiple Product Demand Model Tasks

- Collect Data and Assemble Database
 - > data types and sources
 - > trade flows
- Estimate Demand
 - > aggregated regional model
 - > multiple product profit function
- Develop Inputs for Timber Market Model
 - > identify key parameters

Timber Harvesting Behavior

- Forest Types, Ownership, and Timber Harvest
- Use Observed Behavior to Estimate Supply
- Accommodate Owner and Forest Type Information
- Identify Most Important Supply Parameters
 - > age structure, species composition, site & spatial characteristics, growth rates, multiple timber outputs, ownership, amenity values
- Use Estimated Parameters to Allocate Harvest

Timber Harvesting Behavior Tasks

- Consistently Aggregate Supply
- Collect Data
- Identify Spatial Scale
- Estimate Supply Parameters
 - > supply function of prices, inventory, socio-economic factors, biophysical characteristics
- Verify Model Parameters

Forest Inventories and Growth

- Intensified Forest Management of Southern Pines
 - > higher growth and yield
 - > shorter rotation
- Multiple Product Framework
 - > product distribution models
- Southern Annual Forest Inventory System (SAFIS)
 - > annual updates
 - > partial sampling

Forest Inventories and Growth Tasks

- Expand Existing Product Distribution Models
 - > current models
 - > dbh distribution by age class fixed
 - > proposed approach
 - > use dbh standard distribution models and Monte Carlo simulation
 - > generate dbh distributions
- Develop Methods to Incorporate SAFIS Information
 - > annual data variability
 - > update growth and yield equations with partial information

Management Intensity

- Intensive Management
 - > grow timber faster
 - > more costly
- Investment Determined by Market Forces
- Link Timber Prices and Productivity Gains with
 - > plantation establishment rates
 - > applied management treatments

Management Intensity Tasks

- Define Management Intensity Scope
 - > decision 1: plant or regenerate naturally
 - > decision 2: choose management treatments
- Link Timber Prices and Management Intensity
 - > intensity function of price, site productivity and characteristics
- Develop Investment Response Function

Land Use Change

- Extent of Forestland Governed by Market Forces
- Land Allocation Determinants
 - > population and income growth
 - > changes in agricultural markets
- Identify Land Use Change Impact
 - > timberland area
 - > timber inventory
- Link Land Use Change Determinants with Timber Market

Land Use Change Tasks

- Estimate Relationship Between Timber Prices and Land Allocation
 - > timberland function of timber price, ag. variables
land quality, demographic variables
- Obtain Exogenous Data Variables
 - > population, income, housing values
- Develop Land Allocation Response Function

Deliverables

- Current Model Version
- Progress and Final Reports
- Southern Forest Resource Assessment
 - > current timber supply projections
 - > price levels
 - > harvest levels and distribution
 - > inventory levels and distribution
- Updated Databases
- Technical Publications Before Broader Release
- Results of “On Demand” Model Runs

Research Team

- Cooperative Effort
- North Carolina State University
- USDA FS Southern Research Station
- Research Triangle Institute
- Other Institutions
- Efficiency

Benefits

- Ability to Provide Forecasts & Analyses
 - > continuously using current data and assumptions
 - > using best current theory and practice
- Forest Sector Model Provides
 - > multiple products framework
 - > yields, prices, and inventories
 - > investment responses
 - > land use change responses

Benefits

- Make Informed Business Decisions
- Develop Sound Investment Policies
- Evaluate Regulatory Policies
- Evaluate Consequences of Policies Aimed at
 - > sustainability
 - > certification
 - > rural development

How Do We Get There?

- Integrate Existing Multiple Product Timber Supply Model Components
- Develop New Modules in Five Major Areas
- Evaluate and Incorporate New Modules
- Develop Second Generation Multiple Product Timber Market Model
- Develop New Model Into Modular Software Program

Summary

- Comprehensive Southern Timber Market Model:
 - > integrated supply & demand
 - > multiple product framework
 - > refined timber harvest choice models
 - > more accurate biometrics models
 - > investment response
 - > land use change response