

# The FORSight Resource

Volume 2, Issue 1

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## Upcoming Events...

 Forest Leadership Conference  
March 1-3, 2005  
Toronto, Ontario Canada  
www.forestleadership.com

 International Symposium  
Red Alder:  
A State of Knowledge  
March 23-25, 2005  
University of Washington  
Seattle, WA  
www.westernforestry.org

 Small Log Conference  
Mar 31 - Apr 1, 2005  
Coeur d'Alene, Idaho

 Global Forest & Paper  
Summit  
June 1-3, 2005  
Vancouver, BC

 V Int'l Conference on  
Forest Vegetation Management  
June 20-24, 2005  
Oregon State University  
Corvallis, OR  
http://voutreach.cof.orst.edu/

 SAF National Convention  
Oct 19-23, 2005  
Dallas Fort Worth, TX  
www.safnet.org/natcon/



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## Strata-based vs. Stand-based Forest Planning

The basic unit of forest inventory is the stand. Easy to identify, based on timber type, these are usually contiguous areas of homogeneous overstory vegetation. Foresters are intimately familiar with stands. Not quite as familiar but equally important are strata. Strata are aggregations of timber stands with similar characteristics. While the characteristics can encompass virtually any descriptive trait, strata are usually aggregated based on a combination of physical site and vegetative characteristics. Stratification is commonly used to develop efficient sampling schemes for forest inventory.

But what purpose does aggregating similar stands into strata serve? There are a

number of answers to this question.

**Strategic models are easier to build and faster to run.** Models can be constructed much faster since less independent units need to be considered, less future yield projections are required and less time is spent running the model itself. This allows analysts and managers to devote more time to understanding the model and the results.

**Close to optimal solutions are more easily achieved with strata-based planning.** Take the following example...if an optimal solution designates a certain treatment for a stand in a certain period and spatial constraints encountered

later in the process prevent this from occurring, the optimal solution is compromised. Because strata contain many stands similar in characteristics, if one stand is restricted due to spatial constraints, another stand within the same stratum may be substituted, thus keeping the optimal solution intact.

**Sampling efforts can be leveraged.** Through aggregation, a stratum will contain a greater number of plots than an individual stand. If a good job of stratification is done, the mean value of a given parameter within a particular stratum will be better represented. The goal of stratification should be to reduce the 'within strata' variation.

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## Outsourcing...a Solution for the Future?

Outsourcing is nothing new to the forest industry. From landscape maintenance to contract harvesting, outsourcing has allowed companies to focus 'human capital' on core business activities. There has been a proliferation of companies entering this industry that are making traditional non-core activities the focus of their business. Accounting, payroll services, employee

benefits and other specialized tasks are being outsourced more frequently.

Why? Outsourcing enables firms to better utilize internal resources, increase responsiveness to customer needs and reduce costs.

How much can outsourcing really save? To arrive at the true cost savings of outsourcing, consider the fol-

lowing factors:

- Hiring/Recruiting
- Physical Office Space
- Office Equip./Furniture
- Infrastructure
- Training
- Benefits/Payroll Taxes
- Learning Curves
- Guaranteed Internal Market
- Downsizing/Severance

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# Remote Sensing - Understanding the Technology and Its Applicability to Natural Resource Management

**What is remote sensing?** It is simply the process of collecting information about the earth's surface without having to be physically present. Remote sensing is becoming an increasingly valuable tool in the management of forest land and other natural resources. Typically, remote sensing utilizes different types of satellite imagery or digital aerial photos as the medium from which critical information is extracted.

As more and more imagery providers enter the market, the cost of imagery acquisition is declining rapidly. At the same time, the quality and variety of imagery available is almost overwhelming. Add to this the ability to collect data without having to invest in time and transportation to visit the field (field visits for ground truthing are sometimes necessary and advisable) and the benefits become very attractive. Timely, accurate and cost effective digital data that can be analyzed any number of ways and then integrated into existing GIS systems.

**What can remote sensing be used for?** From verification of merchantable inventories for potential acquisi-

tions to assessing damage from natural disasters, remote sensing technology is emerging as a cost effective tool. Other uses that have become commonplace are:

- Area Measurements
- Identification of Forest Types
- Stand boundary delineation
- Forest fragmentation assessment
- Wetlands identification
- Soil erosion assessment
- Determine object locations & dimensions
- Damage Assessments

**Is this emerging technology?** Remote sensing can be dated back to 1861. During the Civil War, aerial photography (a form of remote sensing) was used to gather military intelligence. With the advent of satellites, powerful computer processors and digital processing software, remote sensing has taken huge strides forward in both applicability and reliability. Imagery that used to take weeks or months to secure can now be obtained in days. Remote sensing is a mature technology taking advantage innovations and refinements.

**What does a project generally entail?**

FORSight handles these types of projects in the following manner: Our process is direct and simple and consists of the following steps:

- User needs assessment – determine client objectives
- Acquire appropriate imagery (cost vs. benefit)
- Prepare imagery for processing - 'mosaic images together', and orthorectify
- Process imagery based on client needs
  - Correct for distortions
  - Enhance images
  - Classify images
  - Change detection processing
- Data extraction
- Date summarization
- Perform analyses on 'remotely sensed' data
- Format outputs that meet client needs (digital, hardcopy, tabular, etc)
- Integrate data into existing GIS systems

**What is FORSight's background in Remote Sensing?**

FORSight Resources has the experi-

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## Outsourcing:

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With outsourcing, the sum total of these costs is zero. All costs associated with outsourcing are included in a contractual agreement. These arrangements can be very temporary in nature or span much longer terms. The key point is that outsourcing offers a great deal of flexibility to a company as opposed to the much more time consuming and costly path of securing capacity internally.

What happens when a key employee leaves? It is common for people to pursue other opportunities that may better themselves both personally and professionally. In cases where a key em-

ployee works at an isolated location, finding a replacement can be a formidable task. If a relationship with a best-in-class supplier has been established, the transition need not be painful. Through work on previous projects, suppliers gain knowledge of key business processes and can pick up slack in times of transition until a suitable replacement can be hired.

The impact of outsourcing can extend beyond cost reduction to include shortened cycle times, enhanced quality and service based on partnerships with best-in-class suppliers. Outsourcing should be a relationship building exercise and interactive in nature. Relationships

with best-in-class suppliers need to be forged to create a level of trust before the full value of outsourcing can be realized.

All companies have limited resources and consequently need to allocate them to in a way that maximizes their returns. By shifting more resources into the company's core activities, the business will be able to leverage resources and enhance its competitive position.

By outsourcing, a company is also able to take advantage of the capital investment, technology innovation and specialized expertise of the supplier. This

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# Growth Model Review - FASTLOB

	PARTICULARS
<b>Author</b>	Loblolly Growth & Yield Research Cooperative
<b>Species</b>	Loblolly Pine Plantations
<b>Region</b>	Coastal Plain & Piedmont of the U.S. South
<b>Silviculture</b>	Commercial Thinning & Fertilization
<b>Model Type</b>	Whole stand
<b>Add'l Info</b>	<a href="http://www.fw.vt.edu/g&amp;y_coop/loblolly.htm">www.fw.vt.edu/g&amp;y_coop/loblolly.htm</a>

**FASTLOB** was developed to project growth and yields for thinned and fertilized loblolly pine plantations. The model was developed using data from cutover, site-prepared areas throughout the Piedmont & Coastal Plain regions in the Southeastern U.S.

**Required inputs** to the model are:

- Age
- Site index (or dominant height)
- Trees per acre
- Log rule

**Optional inputs** to the model include:

- Thinning & Fertilization Information
- Stand Basal Area
- Drainage Type (Standard, Poor)
- Percent Basal Area in Hardwoods

**Outputs** include:

- Total Stand Basal Area
- Trees per Acre
- Dominant Height
- Total & Merch Volume
  - Standing Inventory
  - Harvest Removals

Simulations can include one or two thinnings at any time after age four. The initial thinning may be a low (to target BA or TPA), row, or row-low thinning. The second thinning must be a low thinning. As many as four mid-rotation fertilization treatments of Nitrogen and/or Phosphorus can be scheduled during the rotation after age four.

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**“Nobody gets to run the mill by doing run-of-the-mill work.”**

**Thomas J. Frye**

## Stand vs. Strata:

*(Continued from page 1)*

Stands are temporary classifications when considering long term planning horizons encompassing multiple rotations. The life of a stand generally ends once it has been harvested. Strata however are not defined spatially and can exist in perpetuity. This is particularly useful with respect to silvicultural regime definitions. A regime can be applied to a stratum and the results should be similar regardless of where the acres representing that stratum are located.

**Stratification simplifies the planning problem greatly.** Many planners are leery of aggregating stands into strata. They have invested much to acquire stand specific data and do not want to lose that information in the planning process.

In a hierarchical approach, an optimal,

non-spatial solution is obtained. This solution expresses the potential of the property to produce returns if there were no spatial constraints to consider. Why is this solution important if it can never be achieved? Because the second phase of this process is to determine the impact of the spatial constraints in detail. Without knowing the potential, one can only guess at the impacts of individual constraints on the optimal solution. It is important to note that the stand specific data is not lost. It is utilized at the tactical or spatial planning phase.

Long-term planning is a bit of an abstraction. Trying to determine what the right thing to do a century from now on a forest landscape is difficult, yet that is exactly what we are asked to do. To simplify this abstraction, stratification is employed as a means of visualizing the future in terms we can understand today. ■

## Remote Sensing:

*(Continued from page 2)*

ence to assist clients through all phases of a remote sensing project. We are not affiliated with a particular imagery provider and we do not sell imagery. This allows us to make an unbiased determination of which imagery product will meet our client's needs. Our focus is on the extraction of critical information quickly and accurately.

FORSight Resources is also not tied to any one remote sensing technology. We use both traditional pixel classifiers (Erdas Imagine™) as well as the newer object based classifiers (eCognition™). In addition, when needed our forestry experts can do on screen digitizing and manual classification of images.

By utilizing state-of-the-art software to first, stitch images together into mosa-

ics, orthorectify, and then correct, enhance and classify the images according to client objectives, FORSight can provide clients with critical information in greatly condensed time frames. Once classified, the extraction of useful information can be completed quickly and summarized efficiently giving the client timely, accurate and cost effective answers to the questions at hand. ■

## FASTLOB:

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Single stand simulations can be made or multiple stand projections can be accomplished through batch processing. Merchantability limits are fixed to a 4 inch top diameter for the 5-8 inch class and to a 6 inch to for the 8+ inch classes. A size class distribution can be obtained for any age in a simulation. The stand is broken down into 1 inch diameter classes and the following parameters are displayed for each class:

- ◆ One inch (1") Diameter Class
- ◆ Number of Trees
- ◆ Basal Area
- ◆ Cubic Foot Volume (outside bark)
- ◆ Cords
- ◆ Green Tons
- ◆ Merchantable Cords
- ◆ Board Feet

Words of Caution - the data used to develop FASTLOB did not include genetically improved stock. The user must determine how best to handle predictions as to the effects of genetics on future yields. In addition, care must be taken when simulating multiple silvicultural treatments a stand. Treatment effects are assumed to be additive, and interactions between treatments were not taken into account during model

development due to data limitations. Related to this, sensitivity testing by the model developers suggested that FASTLOB provides reasonable estimates for one and possibly two fertilizations, but that using FASTLOB to simulate more than two fertilizations may not be appropriate, particularly at older ages. Finally, the data used to develop FASTLOB reflected site preparation techniques commonly used in southern plantation forestry in the late 1950's to early 1970's.

FASTLOB was implemented as a dynamically linked library (DLL) for the GYST growth and yield model interface and is compatible with Windows 95, 98, NT, 2000 and more recent Windows operating systems. A free demonstration version can be downloaded from the Virginia Tech Loblolly Pine Growth & Yield Research Cooperative website. ■

"You don't get harmony when everybody sings the same note"  
Doug Floyd

## Outsourcing:

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expertise could manifest itself in many ways; 1) knowledge of regulatory environments in which a company is contemplating investment, 2) a variety of problem solving methodologies developed through working with a broad client base, and 3) unique perspectives not shaped by internal cultures.

In this competitive industry, outsourcing could be the key to improved financial performance, increased customer service and enhanced competitive advantage. ■



*Close up of a retardant drop during the 2004 fire season in California. Courtesy of strangemilitary.com*

## Conservation Easements...What They Are and What They Do

A conservation easement is a legally binding agreement that permanently restricts the development and future use of a parcel of land to achieve a conservation objective.

Conservation easements are created for a variety of purposes that include:

- ◆ Income producing potential
- ◆ Wildlife protection
- ◆ Maintaining or enhancing:
  - public benefit
  - air quality
  - water quality
- ◆ Preserving historical, archeological or cultural aspects of real property
- ◆ Estate Planning

Elements of conservation easements should include; 1) it's purpose, 2) how conservation objectives are going to be achieved, and 3) identify all restrictions and obligations placed on land uses. Landowners should also consider which rights they wish to retain in the property after the easement is granted. A conservation easement should be individually tailored to the desires of each property owner.

Forest landowners may consider selling or donating a conservation easement as a way of creating a long-term income stream and reducing their potential estate tax burden at the same time. Of course there are qualifications that must

be met before certain tax advantages apply. To receive favorable tax treatment, there must be a qualified real property interest, a qualified organization to receive the easement and a qualified conservation purpose that results in significant public benefit.

Timberland owners are looking towards conservation easements as a means of monetizing their investment in lands that are not available for commercial harvest due to environment regulations and/or other restrictions. A conservation easements can be a valuable tool for conserving ecological values of the property without placing undue financial burden on the landowner. ■

## People in the News...

FORSight Resources Biometrician **Dr. Mark Hanus** has been extended an adjunct faculty appointment in Biometrics from the Department of Forest Resources at Oregon State University.

In addition to supporting OSU academics, he is engaged in developing a dynamic link library version of the ORGANON forest simulator and extending the model for younger stands of western hemlock and Douglas-fir. Future projects include extending the ORGANON simulator to predict the growth of genetically improved Douglas-fir, improve its ability to predict the growth of a wider range of forest tree species, and develop user interfaces between ORGANON and the Microsoft Office suite.

**“Our mission is doing business for profit. First yours. Then ours.”**

Preston V. McMurray Jr.

**FORSight Resources** is a leading provider of decision support services for natural resource management. The company's offerings include forest planning, inventory, growth and yield modeling, GIS analysis and custom programming, acquisition due diligence, wood supply analysis, forest finance, forest economics, and a host of other decision support services geared specifically towards natural resource management.

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**World-class decision support for natural  
resource management...**

## The FORSight Library...

### An Empirical Evaluation of Spatial Restrictions in Industrial Harvest Scheduling: The SFI Planning Problem

Walters, K.R., and E.S. Cox. 2001. An Empirical Evaluation of Spatial Restrictions in Industrial Harvest Scheduling: The SFI Planning Problem. *Southern Journal of Applied Forestry*. 25 (2):60-68

#### Abstract:

Member companies of the American Forest and Paper Association have adopted common operating principles called the Sustainable Forestry InitiativeSM (SFI) that call for marked reductions in the size of clearcut harvest areas, green up intervals and proximity restrictions on the harvest of adjacent areas. A commercially available hierarchical planning software suite is used to analyze the impact of the adjacency and harvest size objectives within SFI on a representative forest of the U.S. Southeast. Ten alternative, spatially feasible tactical schedules were developed for a 15 yr planning horizon and achieved 73.4 to 75.6% of the harvest

volume predicted by the nonspatial strategic harvest schedule. Spatially feasible harvest levels were negatively affected by increasingly restrictive spatial parameters: the cost of increasing the green up interval by 1 yr was at least 5% of the strategic harvest volume, and reducing the maximum allowable block size from 180 ac to 60 ac yielded a 10% reduction in harvest. The planning software has been implemented at Champion International Corporation, providing planners with a valuable tool for strategic and tactical forest planning. *South. J. Appl. For.* 25 (2):60-68.

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