FUTURE FOREST ECONOMICS RESEARCH: 
AN INDUSTRIAL PERSPECTIVE 

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I would like to thank those involved in planning this meeting for the opportunity to speak today. As a user of forest economics research results for over 30 years I am excited about reviewing my impressions of where we have been and where the field of forest economics is going—at least from an industrial perspective. During my career I have had the opportunity to work in land management, wood procurement, and in various planning roles that were involved with strategic direction of the forest resources division. In these roles, I had the challenge of trying to utilize various models, information, and forecasts produced by the forest economics research community. Therefore, my approach is not as a forest economics researcher, but that of a forest planning coordinator.

I guess one reason for being here today is that experience is expected to impart knowledge—Mike Clutter identified me as an “old wise mystic.” I can only attest to being old! I am uncomfortable with the assignment of the day—to predict where forest economics research is heading. I get the same feeling whenever I am asked to assemble price forecasts by product for planning purposes at Georgia-Pacific. With retirement looming near on the horizon, I can at least be assured that these transgressions will not be held over my head for years to come. So here we go!

Introduction
I think it is hard to state where forest economics research is headed without some understanding of past results and how those results were used. Hence, some of my talk will be focused on the past and the problems we have encountered using such research. Hopefully this approach will help identify opportunities for future work. There are five major areas of emphasis that I will comment on today:

- Forest inventory and analysis data
- Resource projections
- Price forecasting
- The RPA process
- Sustainability

Each of these topics is key to developing strategic and tactical plans for industrial forest planning. Probably 90 percent of the forest economics research that we fund is in one of these areas.

Forest Inventory and Analysis Data
Georgia-Pacific’s first involvement in using data to help in the strategic planning process involved using Forest Service Forest Inventory and Analysis (FIA) data to help understand basin-level inventory. These data were a key component in the analysis of potential mill sites and expansions. Early work was characterized by hours of poring over the 26 standard tables in the FIA publications. It was essentially impossible to try to customize these analyses to fit the given basin of interest due to

crude computing equipment. As computers became faster and more available, data from FIA surveys became the standard for analyzing resource questions from a basin level up to national resolution. Generally, these data became the primary method for forest economists to use when making assessments of inventory.

As the dataset became larger and several successive inventories were completed, many additional uses were suggested for these FIA data. Researchers often used the data for a wide array of studies that probably were not originally intended given the sampling plan. Growth and yield models were developed from the data; some used the data for assessing changes in productivity, and others used it for testing causal hypotheses concerning forest health and growth. The measurement of growth became a far more important part of the objective of FIA surveys. Similarly, field and office procedures were adjusted from survey to survey in order to better address some of these new and important questions, as well as address some standardization issues among FIA units. As of today, and going forward, we will continue to struggle with questions concerning appropriate use of FIA data. These questions need to be framed within the context of the original intent of the FIA sampling plan, thus insuring appropriate use of the data.

One area where industry has had significant impact on FIA programs is in the area of funding. Industry has long recognized the importance of FIA data in their internal strategic and tactical planning efforts. FIA data are the only "game in town" for basin, state, and regional assessments of inventory by ownership class. Consequently, industry has lobbied hard for increased funding of FIA projects—even in the face of shrinking budgets for the Forest Service. This lobbying effort has in most instances been successful. However, forest survey cycle times continue to slip in areas where more timely data are needed to drive decisions. A Blue Ribbon Panel on FIA reviewed the program and concluded that in the South a five-year survey interval was needed to precisely understand how increased pressure on the forest resource was affecting inventory. Current cycle time is closer to 10 to 12 years. We hope the Forest Service is prepared to address this issue and a more timely FIA will be the result. This is a high-priority issue for forest industry.

One area were substantial opportunity exists for FIA is in the adoption of new technology. Increased use of remotely sensed data, particularly for change detection and acreage estimation by timber type. By sampling those areas which have a higher probability of change, then sampling plans can be optimized. Similarly, acreage estimation can be better (more accurately and precisely) estimated using a variety of remote sensing tools. I hope that FIA will start to show some interest in pursuing these and other opportunities involving new technology.

**Resource Projection**

All those working with FIA data to assess current inventory quickly recognized that a method for predicting basin, state, regions, or national inventory in the future was needed. Subsequently, we had the development of resource projection models. Almost all these models use FIA data to represent the current inventory situation and then project growth, removals, changes in land use, etc., to provide estimates of future inventory. Some models work at a basin level (GRITS), others at a regional or national level (TAMM/ATLAS), while others are more global in nature (CINTRAFOR).

Georgia-Pacific has used a number of these models to help understand inventory dynamics through time at various resolutions (basin, regional, and global). However, when models are compared using the same starting data, growth rates, etc., rarely do any two models provide consistent results over a 15-year horizon. Differences of 40 to 50 percent in standing inventory are not uncommon at the end of 15 years. Not only are such astounding differences troubling, at times even the basic trends
exhibited through time are divergent. It is frustrating to try and explain why such differences can occur when the trees which are represented in inventory for the next 15 years are already in the ground and growing. I am encouraged that the Southern Forest Resource Assessment Consortium (SOFAC) is funding development of some growth and yield models for use in such inventory projection models. This is certainly where one significant factor differs from model to model. Generally the growth and yield methodology employed in these inventory projection models is not consistent with accepted growth and yield modeling approaches. I would think we have opportunities here to involve growth and yield researchers on this topic.

The most difficult obstacle Georgia-Pacific faces using these models is to adequately reflect spatial and temporal trends among the levels of resolution using different models. For example, we wish to produce some local basin runs which are compatible with a set of global trends we think are plausible. We currently have no way of understanding how those global assumptions may affect inventory through time at any particular basin. Since ultimately we are assessing how to adapt our forests and manufacturing facilities at a local level to these global trends, we need a tool which will help us simulate how global trends affect local markets and inventories. We must attempt to better understand the “linkages” between differing levels of resolution. When trying to formulate execution-based strategies, local effects must be explored in the planning process. Ultimately, decisions on tactical direction—like which mills should be expanded, which should be closed, which should be refocused on other products—must be the result of a successful planning effort.

The resource projection models of the future will need to exhibit better spatial and temporal integration. Similarly, such models will need to be flexible as to the level of resolution provided and the level of input needed to run simulations. This is an area of research that needs to be addressed as we go forward.

**Price Forecasting**

At Georgia-Pacific our Forest Resources Division is responsible for assembling price forecasts for raw materials (pine pulpwood, pine chip-n-saw, pine sawtimber, hardwood pulpwood, etc.). These prices influence the planning efforts in the other divisions which are evaluating possible mill expansions/contractions/additions/acquisitions. We currently cannot produce credible price forecasts consistent with a macro view of where the supply/demand relationships are heading. Also, we find it is difficult using current models to produce a price forecast that will be consistent at several levels of resolution.

I believe that much of this problem is related to the estimates of price elasticity used in many of these models. Little work has been done at estimating these elasticities and incorporating them into models at a basin or subregion level—the level of resolution we are interested in for most analyses. We often use price elasticities from across large areas (regions) and wrongfully use them for more localized application for want of better data. If we hope to develop more consistent, accurate, and precise estimates of future price, then better understanding of these relationships at the basin level will be essential.

As discussed above in regard to inventory, spatial and temporal trends in price are also inconsistent in many of the currently available models. Those models which have the ability to represent several subregions of basins generally are not capable of reflecting the arbitrage which occurs as part of the market-clearing mechanism. We realize that price will probably never be predicted “well,” however we should strive to develop models which are consistent with economic theory and practice, thus insuring reasonable behavior and better accuracy.
By separating the discussions of inventory projection an price projection I do not mean to imply that these activities are unrelated or independent exercises. Both of these functions must necessarily be part of a simultaneous system in order to produce plausible trends for either element.

The RPA Process

Having had the opportunity to chair an American Forestry and Paper Association (AF&PA) subcommittee charged with reviewing the RPA document, I have been astonished by the results of this process. RPA is intended to provide the background necessary to formulate policy decisions for our nation's forest resources, and its modeling work attempts to project quantity and price of raw materials and assess the state of these resources using a variety of inputs. The process seems to be heavily influenced by current Forest Service policy which has a tendency to greatly limit the number of different scenarios evaluate, especially those proposed by industry.

We find that the models used in the RPA process suffer from many, if not most, of the shortcomings discussed earlier. Growth calculations are performed in a manner inconsistent with standard modeling techniques, price trends rarely behave in a "reasonable" manner, and many of the input assumptions appear to be politically convenient.

One of the major justifications for the FIA data collection effort is to provide timely data to the RPA process. However, these efforts do not appear to consistently communicate data needs. Far better planning between FIA and the RPA process needs to occur so as to insure that data collected are useful for the RPA process. Consistency across FIA groups is a key element in this communication process.

One substantial concern we have is the lack of southern focus and expertise in the RPA modeling process. In the last couple of RPA updates the South is expected to pick up a substantial amount of production from the Pacific Northwest. Many of us involved with such projections in the South seriously doubt these numbers. A more regional focus needs to be adopted in the future. In fact, we recommend that a team of individuals assembled from universities, the Forest Service, industry, and other interested parties should guide future RPA work. This team should have balance with regard to region, work background and employers, and be responsible for building consensus around the RPA updates.

We recently reviewed congressional testimony about the RPA process. It was apparent that no group had encouraging comments about the last update. If this is to be useful, a credible process which provides meaningful information to the legislative bodies and the public is in order.

Sustainability

Sustainability! A fantastic sounding word. A word on everyone's lips—both operational and environmental! A now-common catch word! Yet it has very different meanings to the various communities. Before sustainability, federal foresters spoke of sustained yield—the even and continuous flow of products from managed forests. And before sustainability, industrial foresters spoke of renewability. Renewability meant that trees had a natural capacity to renew or replace themselves and where this was not the case we, as foresters, replaced them. We depended on the renewability of trees to provide the balance for the continuation of forests and their productivity.
So, when everyone began using the word "sustainability" we signed on since it appeared very consistent with our practice of forestry—and it still does. However, with many definitions floating around we still have much work to do toward one agreed-upon definition.

As foresters, we must link sustainability of forests to sustainable development of our industry and the nation’s economy. If we do not, then trees become less valuable and only valued as part of the esthetic landscape for oxygen production, as reservoirs for birds, animals or other wild creatures, and for recreation. The American Forestry and Paper Association’s recently-announced Sustainable Forestry Initiative (SFI) is certainly a big step in the right direction.

Sustainability of the forests is not possible without adequate planning, proper management, and credible information and forecasts to allow us to make mid-course corrections as they may be needed. Endorsement of and adherence to the AF&PA principles will require new technology in managing our forests. Concepts like adjacency constraints, landscape-level spatial analysis, and incorporation of habitat limitations are new to our traditional planning processes. Generally, we have not considered spatial data in these analyses. The incorporation of such concepts into quantitative planning models will be a challenging and important research topic as we go forward.

Sustainability, SFI principles, and Best Management Practices are costly and place additional burdens on our American industry—burdens that our overseas and Canadian competitors, in many instances, do not have. Hopefully, increased market share because of sustainability as a nation may make up at least some of these costs.

Sustainability also pushes us into the realm of looking at the biological potential for the resource. Georgia-Pacific, as well as others in the industry, is participating in research focused on the intensive production of timber and its associated economics. We see this as a very positive trend to meet the needs of the country as well as keeping our unit costs competitive.

The sustainability commitment pushes us in industry to even greater requirements for accurate, timely inventories and credible forecasts. So the pressure is on us. Hopefully together we can come up with better answers.

In closing, while I’m not sure that I clearly defined the future state of forest economics, I do hope that I have presented some opportunities for future research and thoughts that may guide that research. The forest and paper industry that currently exists in the southern U.S. is still preeminent in the world—one of the few traditional manufacturing industries in the United States that can still make such a claim. The industry challenge to you is to provide the tools, models, and knowledge necessary to keep this industry healthy and productive while meeting the environmental challenges of the future.