Silviculture For Quality Forests: A Lumber And Veneer Perspective

Introduction

To the layperson (and sometimes even among professionals) there's a perception that forests are about big, old trees. A century ago certainly the forests of the Lake States con-sisted of large acreages of stands of mature trees that were both old and big. And even though there are remnant stands present today, settlement, development, and harvesting have caused numerous changes in the forest.

The lumber and veneer industry of the Great Lakes area was built to capitalize on these forests of large trees, and throughout the second half of the 19th century and well into the 20th, this was a major production area for the Nation's supply of both softwood and hardwood lumber and veneer.

A great deal has changed in the last 50 years. As the forest has changed, so has the industry. Today, there are far fewer lumber and veneer operations and most of the lumber production is from smaller trees. Just the same, there are still mills that focus on larger, higher quality sawtimber and veneer logs, and if not in quantity alone, certainly in quality, this production is a significant reason to manage for more high quality, large trees in our regional forests.

Additionally, the Lake States have seen a significant change in forest composition, which presents challenges as well. These biological challenges are significant in themselves, but the social/political issues that surround forest management today are equally as challenging. There must be both strong professional and community resolve around the belief that making the necessary commitments to and investments in forestry means that the forests then can be used to provide a full range of products and values.

The Changes

A great deal is known about the heyday of prime forests, logging, and big mills in the Great Lakes region. Heavy harvesting began in the 1830s and moved west across Michigan, Wisconsin, and Minnesota, cutting out 75 percent of the resource by 1930. It was an era that wasn't sustainable, nor was it ever intended to be. It wasn't until the late 1890s that concern about forest reserves brought about conservation efforts that have developed into our dedicated forests and public and private forestry organizations.

It is safe to say that over 1 billion board feet of sawtimber and veneer were harvested annually in each of the Lake States for many decades, and each State at one time held the record for the largest national volume harvested. Each State had a mill or two that broke national or international production records. For example, the Virginia Rainy Lake mill owned by Weyerhaeuser at Virginia, Minnesota, set a world record at 1 million board feet in 24 hours.

And, of course, the first and most sought after sawtimber was eastern white pine. Early writing indicated that the forests were thought to be eternal (endless), thus the name of the Minnesota book: “The Eternal Pines.” Ultimately, Michigan and Wisconsin were more fortunate than Minnesota because when the pines were mostly gone there, underneath or along side these monarchs were rich hardwood forests.

Today, we have only a remnant left of that huge industry. Average yearly lumber production in the three States combined is less than 1 billion board feet, and more notably, production at standard sawmills (carriage and/or head saws), where quality lumber is produced, is only 25 percent of this total. Veneer production is also a fraction of former output.

About The Author:

Jack Rajala, President, Rajala Companies, Box 578, Deer River, MN.

So, where are we today in terms of capacity and supply; what has changed?

- Mills are fewer and smaller.
- Log supply is extremely tight and severely limits growth. Reasons are both biological and political.
- Wood quality (including size) continues to deteriorate.
- The shift to greater percentage of smaller diameter wood provides nothing for the veneer mills and very little for the quality lumber mills.

Some of the factors causing these changes include:

- Lack of timber management direction and output goals at major agencies
- Political influences
- Changes in cover types with a trend to pulpwood species
- Lack of sound silviculture consistently implemented on the ground

Throughout most of the last 30 years, the biggest constraint to growth of the sawtimber and veneer industry, and the major business challenge, has not been markets, nor manufacturing complexi-ties, nor even financial capital. It has been timber supply. And this is in a region where we have over 70 million acres of timberland. Has it been a lack of sheer volume of trees available? Only partially, and certainly forest land managers often struggle to have the budget and other resources available to keep lands productive and our forests healthy.

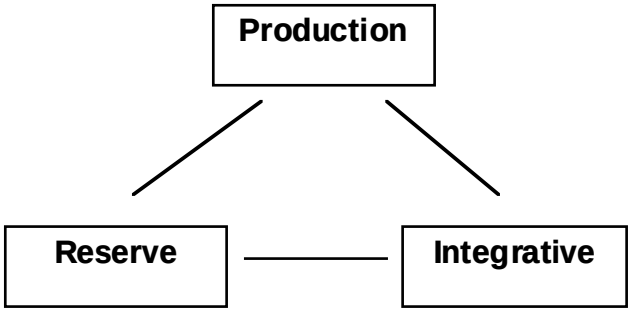

Figure 1.—Nodes of the triad model including production management (where fiber production is predominant), reserve management (where preservation of native biological diversity is the priority), and extensive or integrative management where commodity production and sustainability of biological diversity are shared priorities.

Then there's the huge challenge to keep forest land accessible. There are repeated and increasing attacks from detractors, alarmists, and anti-management groups who have tried all methods to stop the growing, the harvest, and use of trees for products. They have politicized the process of managing forests to an alarming extent.

But just as critical as these other challenges is the shaping of professional attitudes and cultures within the policymaking, scientific, and practitioner ranks. It's understandable that there will always be debate at the policy level about what, how much, where, when, and for whom. But this need not be paralyzing. And it's also understandable that science doesn't always give us a single, definitive answer, yet its validity must be honored. And it's understood that there is a broad menu of practices to choose from, once one has developed the policy, done the science, and is prepared to go out and practice forestry. At this point, all should be good to go. All systems clear. And yet, it often appears that the results have been far short of the mark, as reflected by the following:

- Stocking and productivity in many cover types are dismal in comparison to the quality and potential of sites.
- Forests are not healthy and trending downward.
- Tree and stand quality are far below par, resulting in fewer quality logs.
- Forests today increasingly cannot satisfy the resource needs of a modern sawmill/ veneer and wood products economy.

A Need for More Change

So what, more precisely, is the answer? The answer largely revolves around our silviculture and how we use it and allocate it on the landscape.

A number of models are used to generalize the management of forests from a landscape perspective. One is the triad model (Hunter and Calhoun 1996) that differentiates manage-ment options in a triad of three categories, consisting of production management and reserve management embedded in a matrix of ecological or integrative management (fig. 1).

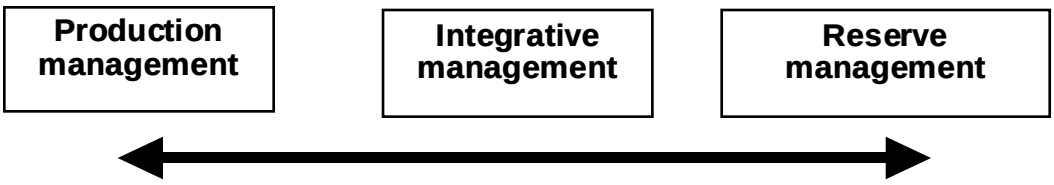

Figure 2.—A spectrum or gradient of stand management options ranging from production management to management of ecological reserves.

The triad model can be reorganized into a model that arrays stand management options along a gradient, or spectrum, of possibilities (figure 2, Palik *et al*., this volume). This model also depicts three levels of management (or nonmanagement), but it suggests that there is a wide array of options for integrative management.

Many times, forest landowners and professionals/managers are caught between the two vocal and competing extreme ends of the spectrum. Meanwhile the middle ground has become narrower and smaller. We've heard the point again and again. If we very intensively manage part of the forest (likely short-rotation, single-cohort, single-species stands), that will take care of all the product needs and then much more of the forest can be preserved in an undisturbed state where natural forces will sustain biological diversity. And the vice-versa rationale is also often heard. The result of all this one-end-or-the-other posturing has greatly diminished the middle ground the very ground that should be most fertile for the silviculturist. This is the area of greatest management challenge and opportunity. Whereas it's relatively easy to do intensive, short-rotation forestry, and it takes no great management skill to just leave forests alone, managing forests that are diverse in composition and complex in structure calls on the best of the science and art of silviculture. Further, it is this integrative middle ground of forest management that provides the stands that give us the sawtimber and veneer logs that are in such short supply. The simple fact is that the sawtimber/veneer industry cannot survive if it must go head to head with global producers of commodities from intensive managed forests, if it tries to live on small diameter trees, and if it is locked out from a wood supply because the forest is simply put into ecological reserves.

A New Emphasis

The hope for the producers of wood products (quality lumber and veneer) is to call upon silviculturists to use their fine science and art for growing and tending forests to produce quality trees and at the same time sustaining forests in terms of their compositional and structural diversity, wildlife habitat, scenic beauty, recreation, and just plain great nature.

It seems quite clear; just the same, in a recent technical report (Shifley and Sullivan 2002) on the state of the region's forests, we see an interesting quandary. The report says that in the North Central Region we have 17 percent of the Nation's population and 14 percent of its timberland. The region consumes 17 percent of the Nation's wood, grows only 10 percent, and harvests only 7 percent. The same report goes on to say "There are many ways to alter the current balance among growth, harvest, and consumption." Interestingly, the suggested menu of things that resource managers can do includes:

- Increase forest growth per acre through improved management of natural forests.
- Increase growth per acre through intensive plantation culture.
- Increase the number of forested acres in production through tree planting and agro-forestry.
- Change the amount of wood sold.

Note that all of these suggestions are quantitative prescriptions and miss the mark of promoting better trees for higher yield, quality, and value. Once again, we sense the lack of perception that it's not just a matter of more; it's also a matter of more what and to be sure, it's a matter of how. That's where good silviculture really counts.

A New Goal

The silviculture model needs to be reshaped to expand (not compress) the complex and sensitively managed forest section firmly in the middle, and it's time to provide the silvicultural concepts, strategies, practices, and tools to make our management far more holistic.

At either end of the spectrum model (figure 2, Palik *et al.*, this volume), a whole lot of the wood industry will falter and disappear. It's in the middle area, the managed forest area that we will find the quality resource that is the solid foun-dation of the wood products industry. It's here in the center of the spectrum that we have the greatest silvicultural challenges and opportuni-ties.

Some examples of the more notable silviculture opportunities that could help expand and improve the management of our forests:

1. Develop a modern silvicultural program to return management of red pine on appropriate sites in long-rotation, multi-cohort, multi-species stands. This can be done by developing stands composed of released or residual red pine, grown to full maturity, while a new cohort com-posed of a variety of species develops underneath. An alternative red pine strategy could save managers from relying solely on an 80-year rotation, single-species, even-aged regime, which can be undesirable ecologically and economically.
2. Find viable ways to restore white pine to the landscape. Interest in white pine as both an economically and ecologically important species has grown, but white pine, for numerous reasons, has suffered serious population decline and now occupies only a fraction of its former presence. These reasons for the decline are fairly well understood, but a comprehensive silvicultural approach to successfully manage this species on a widespread basis has not yet been developed.
3. Demystify and simplify hardwood management systems so they are readily understood and easily implemented. Within the Lake States, managing hardwoods can be one of the most challenging tasks modern forestry confronts and the results for the most part show it. There is a steady decline in both acres and quality in hardwood cover types. From a product stand point, quality means both tree size and clear wood, or in biological terms, longer growth and/or faster growth. Further, it means healthy, well-formed trees. A large amount of silvicultural literature is available today that addresses the issue, but unfortunately, it is either not easily disseminated or user friendly. It is far too little used, especially in Minnesota. Many professional land managers, both private and public, do not have a plan for managing northern hardwoods; rarely do they have a plan for white birch or even for red oak.
4. Develop an alternative management system for aspen that allows it to be grown in multi-species, multi-cohort, longer rotation regimes. Aspen management is generally thought of as single-species, short-rotation management. It has worked well in the Lake States. In many areas the site and historical composition could favor other cover types, but because aspen is so competitive and easily, cheaply regenerated the site stays in aspen. The result has been a tremendous increase in the aspen cover type in the region at the expense of other types. The silvicultural challenge is to manage aspen as part of mixed-species, multi-cohort stands, in an attempt to grow trees bigger and make them more valuable for lumber and veneer.

In summary, silviculture can help grow big trees of high value and utility, and it needs to do it in an ecologically sound and sustainable way. Oh yes, and also in an economically efficient way.

Literature Cited

Palik, B.; Levy, L.; Crow, T.R. 2004. *The Great Lakes silviculture summit: an introduction.* In: Palik, Brian; Levy, Louise, eds. Proceedings of the Great Lakes silviculture summit. Gen. Tech. Rep. NC-254. U.S. Department of Agriculture, Forest Service, North Central Research Station: 1-4.

Shifley, Stephen R.; Sullivan, Neal H. 2002. *The status of timber resources in the North Central United States*. Gen. Tech. Rep. NC-228. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 47 p.