Pricing By Grade: Motivation for Managing Natural Stands of Yellow-Poplar

Gary D. Kronrad, William E. Gardner, and Douglas R. Phillips

Abstract.—Results of a survey of yellow-poplar veneer mills in North Carolina indicate that there are not enough of the highest quality logs grown in the state to meet the demand. Prices and local market demands justify forest management of yellow-poplar in this region.

Additional Keywords: veneer mills, log grades, log prices, Liriodendron tulipifera.

INTRODUCTION

Yellow-poplar has long been one of the most important eastern hardwoods. It is widespread geographically and constitutes a large and increasing percentage of the growing-stock on many of the region's best sites. The wood is in demand for furniture and mill work, is being recommended for construction lumber, and increasingly is being substituted for southern pine in plywood applications.

Yellow-poplar is a relatively easy species to manage (Beck and Della-Bianca 1981). It regenerates readily from seeds and sprouts, it has an excellent growth rate, it responds well to intermediate stand treatments, and it has rotation ages that are among the shortest of the native hardwoods. In spite of this, yellow-poplar stands are currently not receiving management treatments that could improve yields.

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Over the past few years, stumpage prices for yellow-poplar sawtimber have not been high enough to justify forest management. However, yellow-poplar is increasingly being used to produce higher value products. As a result, higher prices are being paid for the better quality logs. These prices may justify the management of forestland for producing the higher quality logs.

In this study, the product and price structure for yellow-poplar in the Piedmont area of North Carolina was examined to determine opportunities to better describe utilization options and their values. We wanted to determine whether prices and local market demands justified forest management of yellow-poplar in this region, and we wanted to better define the utilization opportunities for the species.

PROCEDURES

During February 1984, a questionnaire survey was administered by telephone to 15 of the 17 veneer mills and six sawmills who use yellow-poplar. Some of the more relevant information that was gathered included data on: (1) the number of grades used, (2) definition and cost of each grade, (3) products manufactured, (4) log hauling distance, (5) payment methods to landowners, (6) the desirability of a uniform, industry-wide grading system, and (7) the amount of interest in establishing a landowner assistance program.

RESULTS OF THE SURVEY

Results of this survey show that the typical veneer mill has been buying yellow-poplar logs by grade for an average of over 32 years, ranging from 2 to 82 years. One-third of these mills are planning to expand their production capacity in the near future and purchase more yellow-poplar.

Eight firms produce plywood for the furniture industry, 4 mills produce veneer for furniture and pianos, two firms produce furniture stock, while 2 firms produce only veneer for plywood. In addition one firm manufactures doors.

Only one firm buys a single grade of logs. Eleven firms, or 73 percent of the total, buy two grades of logs. One firm buys three grades, one firm buys four grades, and one firm buys five grades of yellow-poplar veneer logs.

All of the yellow-poplar using veneer mills buy a "Number 1" grade log. Over 72 percent of the volume of veneer logs bought was in Number 1 logs. The average price paid for this quality of yellow-poplar was $250 per thousand board feet F.O.B. the mill (Doyle rule). Although the definition of a Number 1 log varies from mill to mill, basically it must be free of defects, knots,
sweep and crook with minimum small end diameter inside bark ranging from 11 to 14 inches.

Fourteen of the 15 veneer mills (93%) buy a "Number 2" log. Over 23 percent of the volume of yellow-poplar logs purchased are in this category. The average price paid in February 1984 for this quality log was $150 per thousand board feet F.O.B. the mill. As with Number 1 logs, the definition used to describe a Number 2 log is different from mill to mill. But, basically it must be free of defects such as splits, hollows, or stains and have fewer than four small knots. The minimum small end diameter ranges from 9 to 14 inches.

Three veneer mills (20%) buy a "Number 3" log. Only 2.8 percent of the volume of all logs purchased are in this category. The average price paid for a thousand board feet F.O.B. the mill was $133. Logs must be 10 to 11 inches in diameter at the small end and have at least two clear faces.

Two (13%) mills purchase "Number 4" grade logs. Only 1.3 percent of the volume of all yellow-poplar veneer logs purchased were Number 4's and the average price paid for them was $117.50 per MBF F.O.B. the mill. A log must be at least 10 inches in diameter at the small end and have one clear face to qualify for this grade.

"Number 5" grade logs are utilized by only one firm. Very little of the total volume (.3%) of the veneer quality logs purchased are of this quality but the price is $115 per MBF F.O.B. the mill. A Number 5 log must be at least 10 inches in diameter at the small end and can have some knots greater than 3 inches in diameter.

Each of the 15 firms contacted in this study were asked if they have difficulty getting any particular grade of yellow-poplar logs. Forty-seven percent said they do have difficulty getting as much as they want of a particular grade.

Each of the yellow-poplar veneer mills contacted purchased logs on a regular basis from an average of 31 loggers; the range was from 5 to 100 loggers. Eight firms, or two-thirds of those who had information, expressed the belief that loggers who buy their own stumpage usually pay the landowners by grade. Three firms occasionally buy stumpage directly from forest landowners. Of these, grade is taken into consideration when pricing the timber but all bids are "lump sum" and are based on an average price; none of the firms itemize quantities and values of stumpage.
The maximum truck hauling distance for these mills averages 184 miles. Three firms buy their Number 1 logs grown 400 miles away while 10 firms buy logs grown over 100 miles from the mill. Only 2 of the firms receive logs by rail. Eighty percent of all the mills are willing to compensate a hauler or logger for the transportation cost. But, in practice, mills are only willing to compensate those loggers who sell them high quality logs on a regular basis.

Each of the firms contacted in this study was asked if they would like to see a uniform, industry-wide grading system implemented. Two-thirds of the firms believe that this would be a good idea. Of those who want a uniform grading system all believed that it would make buying logs easier and put everyone on the same basis in the buying and selling of yellow-poplar logs. Most of those who do not want a uniform grading system felt that they wanted to use their own definitions for grade rather than one that is imposed upon them.

Firms were asked if they were interested in establishing a program to help landowners manage their forests to produce more of the better grades of yellow-poplar. Sixty percent of the firms were interested in establishing some type of landowner assistance program. Of these, all of the firms were willing to provide free information and advice, two firms would be willing to provide managerial services, and one firm was interested in entering into long-term contracts with landowners for their mature timber.

CONCLUSIONS DERIVED FROM SURVEY

Certain conclusions can be drawn from the results of this survey.

1. A better demand for the high quality veneer logs is evident by the price being paid for Number 1 logs. In addition, 60 percent of the firms surveyed said that they would buy more Number 1 logs if they were available.

2. Forty percent of the firms reported that it has become increasingly difficult, over the past 10 years, to obtain the better quality logs.

3. The best "home-grown" high quality logs are in short supply. Two-thirds of the Number 1 logs are arriving at the mill from over 100 miles away; Twenty percent of the logs are being shipped as much as 400 miles. This can add more than $100 onto the price of every thousand board feet of logs.
4. Landowners receive a higher price for Number 1 veneer logs than for ungraded saw logs (Figure 1). It is interesting to note that the prices paid for lower grades of yellow-poplar veneer logs are lower than the prevailing price for ungraded saw logs; which means that the landowner must take an active role in properly marketing or merchandising his timber.

5. This study gathered data on delivered log prices (F.O.B. the mill). But in relation to stumpage prices, three situations exist:

a. Some stumpage buyers are explicitly paying landowners for the better grades of logs.

b. Some stumpage buyers are paying landowners for the better grades of logs, although not explicitly.

c. When landowners don't know any better, buyers are pocketing the difference.

Landowners must realize a profit from timber sales if they are to have an incentive to engage in forest management. One way to transfer the higher prices paid for prime logs at the mill to landowners is already available. The landowner simply splits the price paid by the mill with the logger. The mill mails a check directly to the landowner. Other methods will depend upon better informed landowners. This process would be greatly facilitated by the acceptance of a standardized grading system.

But the question remains: how much can the landowner afford to invest in forest management to increase production of the better grades of yellow-poplar?

AN EXAMPLE

As an example of what we mean, the following tables have been developed based on data from Beck and Della-Bianca (1981). Table 1 contains a description of a 40 year-old yellow-poplar stand (site index 100 at 50 years), along with anticipated yields in 20 years if thinned and if not thinned. A range of stumpage prices from $50 to $180 per MBF Doyle has been applied to individual saw logs in each stand increasing with log diameter from 10 to 15 inches.

It is important to note that the thinned stand supports a greater volume (after 20 years) on a much smaller number of stems, even a lower basal area, than the untreated stand. In this case the thinning treatment increased the diameter growth of individual trees enough to produce 30 percent more volume (the
Figure 1. Average price and range per MBF F.O.B. the mill for each grade of veneer logs and for ungraded saw logs.
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Age at Harvest</th>
<th>Basal Area (Sq. ft.)</th>
<th>Trees per Acre</th>
<th>Diameter (In.)</th>
<th>Volume Bd. Ft. Doyle</th>
<th>Value at Harvest</th>
<th>Average Value per MBF Doyle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvest Now</td>
<td>40</td>
<td>104</td>
<td>200</td>
<td>9.7</td>
<td>5-16</td>
<td>3,975</td>
<td>$ 237</td>
</tr>
<tr>
<td>Do Nothing Harvest in 20 years</td>
<td>60</td>
<td>121</td>
<td>150</td>
<td>12.2</td>
<td>5-20</td>
<td>10,580</td>
<td>$1004</td>
</tr>
<tr>
<td>Thin Now To 70 BA, Harvest in 20 Years</td>
<td>60</td>
<td>113</td>
<td>80</td>
<td>16.1</td>
<td>11-22</td>
<td>14,035</td>
<td>$1498</td>
</tr>
</tbody>
</table>

1 Adapted from Donald E. Beck and Lino Della-Bianca, 1981.
Doyle rule exaggerates the difference. With the price scale applied, this translates into nearly 50 percent greater harvest value.

To compare the three management alternatives, a discount rate must be selected and a present value calculated for each option (Table 2). If the value of the current harvest exceeds both values for delayed harvests, the stand should be cut. This is more likely with higher interest rates, and is indeed the case at 10 percent.

With lower discount rates the delayed harvesting alternatives look better and in this example both exceed the current stand value. The thinning option has a higher present value than doing nothing. Therefore, it is the better alternative so long as the treatment cost is less than the difference ($187 at 5 percent, $128 at 7 percent). If, for example, the thinning or TSI was estimated to cost $150 per acre to perform, that option would still be selected at a 5 percent discount rate. Having selected a 7 percent interest rate, doing nothing would be superior to a treatment costing more than $128.

WHERE DO WE GO FROM HERE?

So far, this study has found that the veneer mills in the Piedmont of North Carolina demand the highest quality of yellow-poplar veneer logs. The problem is that there are not enough logs of this quality available in North Carolina. This has meant that logs must be shipped into the state from as far away as Maryland, New Jersey, and Pennsylvania - a 400 mile haul. As stated previously, this adds more than $100 onto the price of every thousand board feet of logs.

In order to reduce hauling cost and improve the local economy, landowners must begin to manage their forests to grow the best grades of yellow-poplar logs. But landowners must earn a fair return on their investment if they are going to engage in a program of forest management.

The next phase of this study will determine, for many different stands of yellow-poplar at various ages, levels of stocking, growth rates, and diameter distributions, how much landowners can afford to invest in forest management and what management regimes should be applied to produce the better grades of yellow-poplar.
Table 2. Present value of harvesting options in existing stand of yellow-poplar, site index 100.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Present Value of Harvest at Several Discount Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>A. Harvest Now</td>
<td>$237</td>
</tr>
<tr>
<td>B. Do Nothing, Harvest in 20 Years</td>
<td>$378</td>
</tr>
<tr>
<td>C. Thin Now, Harvest in 20 Years</td>
<td>$565*</td>
</tr>
<tr>
<td>Money which could be spent in thinning (C-B)</td>
<td>($187)</td>
</tr>
</tbody>
</table>

*Maximum

LITERATURE CITED