Abstract.—Results of a survey of mills in the Piedmont and Mountain regions of North Carolina, South Carolina and Virginia using red and white oak indicate that there are not enough of the highest quality logs grown in these regions to meet the demand. Prices and market demands may justify forest management for quality red and white oak in these regions.

Additional Keywords: log grades, log prices, red oak, white oak, *Quercus rubra, Q. alba*.

INTRODUCTION

Red and white oak (*Quercus rubra* and *Q. alba*) are two of the most valuable commercial hardwood species in the United States because of their widespread availability, large size, excellent form, early natural pruning, and the good working and performance properties of the wood. The oaks are used primarily to make furniture in the United States. In addition, the wood is used for flooring, cooperage, veneer, and lumber and is also exported.

In the past, there has been little activity among forest landowners to improve their oak stands. This can be largely

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1Gary D. Kronrad is Assistant Professor, Small Woodlot Forestry Research and Development Program, School of Forest Resources, North Carolina State University, Raleigh, NC.

Mark D. Smith is Research Assistant, Small Woodlot Forestry Research and Development Program, School of Forest Resources, North Carolina State University, Raleigh, NC.

William E. Gardner is an Extension Forest Resource Specialist, School of Forest Resources, North Carolina State University, Raleigh, NC.

Douglas R. Phillips is Project Leader, Southeastern Forest Experiment Station, USDA Forest Service, Clemson, SC.

This research was supported by the Management of Piedmont Hardwood Research Work Unit, USDA Forest Service, Southeastern Forest Experiment Station, Clemson, SC.

attributed to the uncertainty that an adequate financial return will be generated by a silvicultural treatment. Adequate financial return depends upon: species merchantability, growth response to treatments, improvement of product grade, and market conditions which compensate for grade. Any investment decision should weigh these factors against the cost of treatment and length of investment. An economic analysis of costs and returns would reflect the appropriate silvicultural guidelines to the landowner.

In this study, the grade and price structure for red and white oak in the Piedmont and Mountain regions of North Carolina, South Carolina, and Virginia was examined. The objective was to determine whether prices and local market demands could justify forest management of red and white oak in these regions.

PROCEDURES

During October 1984, a questionnaire survey was administered to the nine principal buyers and users of red and white oak in the Mountain and Piedmont regions of North Carolina, South Carolina, and Virginia. These nine mills are all that could be located which buy by grade. Information was gathered including data on: (1) the number of grades bought, (2) definition and price paid F.O.B. the mill for each grade, (3) products manufactured, (4) log hauling distances, (5) demand for prime grades, (6) availability of prime grades, (7) the desirability of a uniform, industry-wide grading system, and (8) the level of interest in establishing landowner assistance programs.

RESULTS OF THE SURVEY

Results of this survey show that the typical mill has been buying red and white oak logs by grade for an average of 19 years, ranging from 2 to 35 years. Only one of these mills is planning to expand production capacity in the near future and purchase more red and white oak. But over half of the mills would like to buy additional quantities of high quality logs if they were available.

Five firms produce red oak lumber and veneer and six firms produce white oak lumber and veneer for the furniture industry. Two firms produce flooring, three produce pallets, one produces tobacco hogshead liners, one produces handles, one produces crating, and one produces lumber. A total of nine firms, buy white oak logs by grade. Of these nine firms, eight also buy red oak logs by grade. Only one firm buys a single grade of logs. Two firms, or 22 percent, buy two grades of logs. One firm buys three grades of logs. Four firms, or 44 percent, buy four grades, and one firm buys five grades of logs.

All of the red and white oak using mills buy a "Number 1" best grade log. 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 a minimum small end diameter inside bark averaging 16 inches and ranging from 13 to 20 inches. Over 45 percent of the volume of logs bought was in Number 1 logs. The average price paid for this quality of log was $247 for red oak and $321 for white oak per thousand board feet F.O.B. the mill.

Eight of the white oak and seven of the red oak using mills buy a "Number 2" log. 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 with a minimum small end diameter inside bark averaging 14 inches and ranging from 10 to 17 inches. Twenty-four percent of the volume of oak logs purchased are in this category. The average price paid in October 1984 for this quality log was $171 for red oak and $232 for white oak per thousand board feet F.O.B. the mill.

Six mills buy a "Number 3" grade white oak log and five mills buy a Number 3 grade red oak log. Logs must have a minimum small end diameter inside bark averaging 13 inches (ranging from 11 to 16 inches) and have three clear faces. Over 18 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 $143 for red oak and $180 for white oak.

Five mills buy a "Number 4" grade white oak log and four mills buy a Number 4 grade red oak log. A log must have a minimum small end diameter inside bark averaging 11 inches (ranging from 10 to 12 inches) and have two clear faces. Over 10 percent of the volume of all logs purchased were Number 4's. The average price paid for a thousand board feet F.O.B. the mill was $104 for red oak and $94 for white oak.

"Number 5" logs are utilized by only one firm. The only requirement for a Number 5 log is that it be at least 12 inches in diameter at the small end. Almost two percent of the total volume of all logs purchased are in this grade. This mill pays $125 for red oak and $90 for white oak per thousand board feet F.O.B. the mill.

When buying logs, 41 percent of the mills use the Doyle log rule, 23 percent use the Doyle-Scribner log rule, 23 percent use the International 1/4 inch, and 12 percent use the Scribner Decimal C log rule. Under the Doyle-Scribner log rule, the Doyle rule is used for logs up to 28 inches in diameter and the Scribner rule is used for larger logs.

Each of the nine mills contacted in this study was asked about difficulty getting particular grades of oak logs.

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2 Price is per thousand board feet based on the Doyle log rule.
Forty-four percent said they do have difficulty getting as much as they want of the prime grades. In addition, 55 percent of the firms said they would buy more prime logs at the current price if they had the opportunity.

Each of the oak mills contacted purchased logs on a regular bases from an average of 14 loggers; the range was from 3 to 30 loggers. Forty-four percent of the firms purchase stumpage directly from landowners. Of these, three-fourths of the firms take grade into consideration when pricing the timber but all bids are "lump sum" and are based on an average price; none of the firms itemizes quantity and value of stumpage by grade for the landowner.

The maximum truck hauling distance for these mills averages 105 miles. One firm buys some logs grown 200 miles away while 56 percent of the firms buy some logs grown over 100 miles from the mill. Only one of the firms receives logs by rail. Fifty-six percent of all the mills are willing to compensate a hauler or logger for all of the transportation cost beyond a certain distance.

Each of the firms contacted in this study was asked if it 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 red and white oak logs. Unfortunately, each firm wanted their particular grading system adopted.

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 oak logs. Two-thirds 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, and half of the firms were willing to provide managerial services.

**SUMMARY AND CONCLUSIONS**

Higher prices are paid for Number 1, 2 and 3 saw logs than for ungraded saw logs; the prices paid for lower grades of red and white oak logs are lower than the prevailing price for ungraded saw logs (Figure 1 and 2). This suggests that the landowners who have good quality oak stands should take an active role in properly marketing or merchandising their timber in order to maximize revenue.

Landowners must realize a profit from timber sales if they are to have an incentive to engage in forest management. Silvicultural investments will be encouraged if landowners share in the premium prices paid for the better logs at the mill. To
accomplish this landowners must be better informed. Landowners must know not only the grade and value of their stumpage but how much they can afford to invest in forest management to increase production of the better grades of red and white oak.

So far, this study has found that the red and white oak using mills in the Piedmont and Mountain regions of North Carolina, South Carolina, and Virginia demand the highest grade of logs. The problem is that there are not enough logs of the best quality to meet the quantity demanded at current prices. Thus there is pressure for price increases in the future.

To increase their woodland profits landowners must begin to manage their forests to grow the best grades of red and white oak 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 study in this continuing project will determine appropriate silvicultural guidelines for the management of red and white oak based upon current market situations, labor costs, stumpage prices, and growth response to thinning. Basically, the next phase of this study will determine the optimal time to conduct a commercial thinning and the final harvest age to maximize net revenue.
Figure 1. Average price and range per MBF F.O.B. the mill for each grade of veneer logs and for ungraded white oak saw logs.
Figure 2. Average price and range per MBF F.O.B. the mill for each grade of veneer logs and for ungraded red oak saw logs.