1997

Pulpwood vs. sawtimber: A “quick and dirty” economic analysis of hardwood timber management

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PULPWOOD VS. SAWTIMBER: A "QUICK AND DIRTY" ECONOMIC ANALYSIS FOR HARDWOODS IN THE SOUTH

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IN: Proc. 25th Annual Hardwood Symposium, "25 Years of Hardwood Silviculture: A Look Back and a Look Ahead," May 7-10, 1997, Cashiers, NC. D.E Meyer (ed.)

INTRODUCTION

A major decision in hardwood forest management is the type of final products to produce. Until recently, the only options in many areas of the South for hardwoods were sawtimber products—crossties, dimension lumber, and veneer, for example. In the past ten years, however, hardwood markets have changed dramatically. Across much of the South, hardwood pulpwood is now in very high demand.

Additional product markets provide more management options for hardwood stands, and they can therefore result in higher economic returns. They can also have a negative impact on economic returns, however, particularly if landowners are encouraged to liquidate stands prematurely, foregoing potentially higher returns from longer-term sawtimber production.

Pulpwood markets create the opportunity to remove low-grade, undesirable stems that typically occur in naturally regenerated hardwood stands. In stands that have been repeatedly high-graded for decades, pulpwood markets create the opportunity to remove low-grade, slow-growing, undesirable species, and to regenerate the stand to higher-quality, faster-growing trees. Many firms that depend on a supply of high-quality sawtimber, however, are very concerned over the harvest of young stands of high-quality hardwoods. When high-quality, pole-size stands of oak, ash, and other desirable species are liquidated for pulpwood, serious concerns over future sawtimber production are raised.

A very important question for hardwood timberland managers is: "Do I manage for pulpwood or sawtimber, or both?" A recent bibliography on the economics of hardwood timber production includes very few published reports relating to this important question (Goodson and Bullard 1997).

OBJECTIVE

The purpose of this paper was to assess hardwood pulpwood and sawtimber management options from an economic standpoint. We made several assumptions to simplify the analysis, and these obviously affect our results. We did not include a sensitivity analysis of management options, interest rates, price assumptions, etc., but the approach we use can be applied by hardwood timberland managers using assumptions more appropriate to their stand conditions and economic expectations.

METHODS AND ASSUMPTIONS

We considered two broad management options. The first was to liquidate the entire stand when it reached its optimal pulpwood value. The second broad option was to manage for sawtimber, and we included sawtimber production with and without active management.

Approved as Journal Article Number FA 084-0797, Forest and Wildlife Research Center, Mississippi State, MS 39762

In the sawtimber production options, a pulpwood thinning was assumed at age 30 in all stands; the thinnings were assumed to produce 10, 15, or 20 cords per acre depending on site quality. In the sawtimber rotations with active management, a partial harvest of sawtimber was included. The volume removed and the age where the partial harvest was assumed to occur varied by site quality.

Partial Harvest Volumes: (assumed for sawtimber rotations with active management)

SI 75	=	1.5 MBF/acre	at	Age 60
SI 90	=	2.0 MBF/acre	at	Age 55
SI 100	=	3.0 MBF/acre	at	Age 50

Additional growth and yield assumptions and economic assumptions were necessary for the analysis. There is a dearth of growth and yield information of the type necessary for this kind of hardwood stand analysis. Timber production assumptions were therefore made to reflect yields typically experienced under site and stand conditions that are prevalent in the South.

We used cherrybark oak site indices (base age 50) that represented sites that are marginal (SI 75), average (SI 90), and good (SI 100) for timber production. The pulpwood and sawtimber production assumptions varied by site. Sawtimber production was assumed to begin at age 50 for SI 75, age 45 for SI 90, and age 40 for SI 100.

Pulpwood Production:

SI 75	=	1.0 cord/acre/year
SI 90	=	1.5 cords/acre/year
SI 100	=	2.0 cords/acre/year

Sawtimber production:

SI 75	=	250 bf/acre/year
SI 90	=	325 bf/acre/year
SI 100	=	400 bf/acre/year

Pulpwood price was assumed to be $15/cord, and sawtimber price was assumed to be $400/MBF. The price of sawtimber was assumed to increase 1%/year in real terms in the analysis of actively managed sawtimber stands. These prices and the real price increase were based on discussions presented by Stewart and Wikle (1996). The discount rate used in the analysis was 4% (above inflation).

Land Expectation Value (LEV) was used to compare pulpwood and sawtimber management options. LEV reflects the value of bare land for commercial timber production. In our analysis, it represents the total present value of all future net income assuming an infinite series of identical pulpwood or sawtimber rotations (discounted at 4%).

RESULTS

Pulpwood Only Options

For pulpwood rotations, the highest LEV for all sites occurred using a 15-year rotation (Figure 1). Values ranged from $282/acre for SI 75 to $562/acre for SI 100. If fiber production is the management objective, given our assumptions, optimal returns are obtained by harvesting stands at age 15.

Sawtimber Options

For sawtimber rotations, LEVs were first calculated assuming no active management and no increase in prices above inflation. With these assumptions, the optimal rotation for SI 100 was 65 years, SI 90 was 70 years, and

SI 75 was 75 years (Figure 1). For each site quality, the 15-year pulpwood rotation yielded a higher LEV than any of the sawtimber rotations—if you assume no active management and no real price increase for sawtimber.

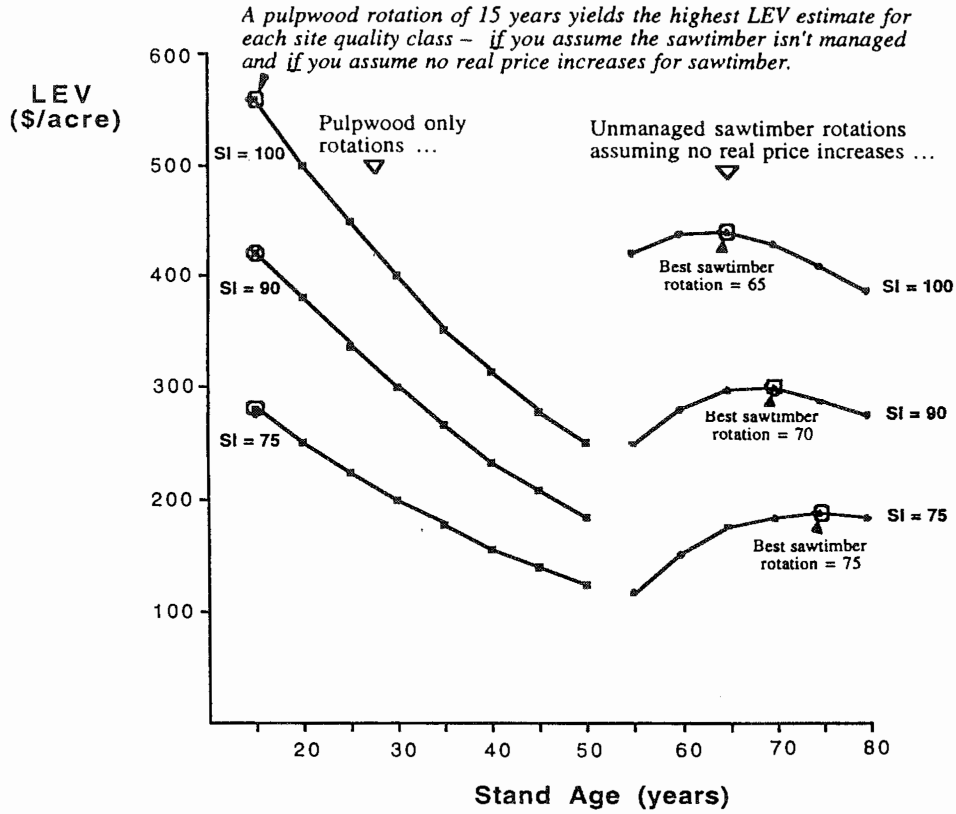

Figure 1. Land expectation values for pulpwood only rotations from 15 to 50 years, and for sawtimber rotations up to 80 years. The sawtimber LEVs assume no management and no real price increases.

Using these rotation ages and the partial harvest information stated earlier, LEVs for managed sawtimber rotations were calculated assuming a 1% real increase in the price of sawtimber. Three sets of LEVs—pulpwood only, unmanaged sawtimber without price increase, and managed sawtimber with price increase—are therefore presented in Table 1. With management and a 1% annual real rate of price increase, the sawtimber production option yields higher land values than the 15-year pulpwood option on each site (Table 1).

CONCLUSIONS

Overall, LEVs are strongly affected by stand management and a real price increase expectation (Table 1). The LEV estimate more than doubled on the marginal site and it increased by 96% and 67% on the average and good sites, respectively. More importantly, these analyses demonstrate that the highest LEVs result from managed stands producing both pulpwood and sawtimber, assuming a relatively modest 1% real increase in prices per year. The worst choice a landowner can make from an economic standpoint is to allow their hardwood stands to

Table 1. Land expectation values for different hardwood management scenarios.

Site[1]	Rotation Age (yrs)	Management Scenario	LEV ($/A)
SI 75	75	Managed sawtimber with price increase	382
	75	Unmanaged sawtimber without price increase	188
	15	Pulpwood only	281
SI 90	70	Managed sawtimber with price increase	585
	70	Unmanaged sawtimber without price increase	297
	15	Pulpwood only	421
SI 100	65	Managed sawtimber with price increase	721
	65	Unmanaged sawtimber without price increase	440
	15	Pulpwood only	562

[1]Site indices for cherrybark oak.

develop unmanaged for prolonged periods of time. If the landowner is unwilling to manage hardwood resources, the best economic alternative may be to cut the timber as pulpwood at an early age. However, the time and effort spent in pulpwood thinnings and improvement cuttings (small sawlog thinnings) pay great dividends with reasonable expectations of future price increases for sawtimber products.

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