

# A BETTER WAY—UNEVEN-AGED MANAGEMENT OF SOUTHERN YELLOW PINE

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**Abstract**—Uneven-aged management of southern yellow pine offers family forest owners in the Coastal Plain and Piedmont of the Southeast an attractive economic alternative to the two most common forestry scenarios. First, the great majority of owners practice no management. Too often they call in a timber buyer or procurement forester who high grades the forest. Second are the owners who follow the widely promoted industrial model of even-aged plantations. In either scenario, the owner can expect one major income event in a lifetime, followed, if he chooses, by a significant investment in site preparation and replanting. The return from either of these once-in-a-lifetime events is generally significantly less than what could be earned over time under uneven-aged management. With the help of a trained forester, owners have historically earned over \$100 per acre per year while maintaining full stocking of their forest.

## INTRODUCTION

This advocacy paper is directed at two related audiences—family forest owners in the Coastal Plain and Piedmont of the Southeast and the willing foresters who are capable of serving them. Family forest owners control 70 percent of the forests in the region (Baker and others 1996). How these forests are managed is important. Will forestry be competitive with conversion to 5-acre ranchettes? The answer will be highly significant to both the regional economy and environment. Uneven-aged management offers the potential for higher and more continuous income from the forest than even-aged management of a plantation or simply holding onto unmanaged forest. The message for family forest owners is that ... there is a better way! We believe uneven-aged management of pine is the best option for most family forest owners.

## Two Groups of Family Forest Owners

The first group of landowners, controlling the great majority of family forests, are the individuals who own, inherit, or buy a block of unmanaged forest land with varying proportions of pine (*Pinus* spp.) and low-value hardwoods. Into this group fall the first wave of the largest intergenerational transfer of family forest land in American history according to the Pinchot Institute (The Pinchot Letter 2005). Current owners, many in their 50s, are often not certain what their heirs are likely to do with the land. Few current owners practice active management and their offspring are only marginally knowledgeable about the value of the family's forest. Falling within this category also are more traditional southern landowners who see their forests as an untouched reserve, to be logged only in a dire emergency. Both tend to fall victim to the timber buyer with his "we buy timber" signs along rural roads, who offers what appears to be a whopping price for the timber, removes every merchantable stem, and leaves the forest trashed. For too many, income from the forest translates into a once-in-a-lifetime liquidation of the forest cover. Without past experience in active management, these owners may opt to sell their land rather than make the considerable investment in site preparation and replanting.

The second group of landowners has stands of planted pine. The owner practicing active management will carry out one to three thinnings as the trees grow to rotation age at 25 or more years. The owner may contract a consulting forester who will inventory the stand, get lump sum bids for the timber, and supervise the sale. Once the clearcut has been carried out, the forester may be called on to hire a crew to carry out site preparation and replanting. However, when the landowner contemplates the expense of replanting and waiting a generation before receiving appreciable income, he may call upon the same forester, as a licensed realtor, to sell the land.

## An Inappropriate Model

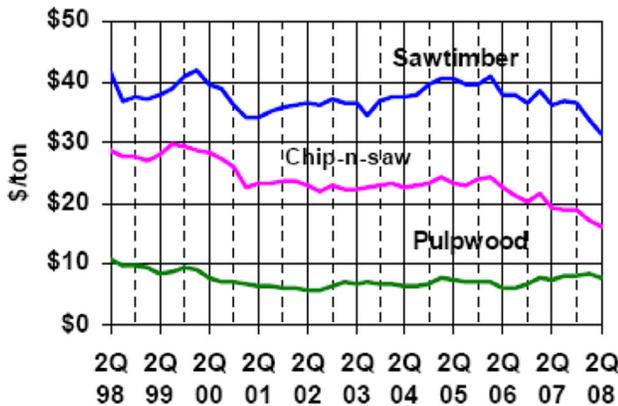
Currently family forest owner's interests are not well served, either by the prevailing industrial forestry model or by the foresters trained in the application of that model. Since the 1960s continuing expansion of fast-growing plantations has assured forest industry a continued supply of cheap raw material for conversion into value-added products such as paper, oriented strand board, and low-quality lumber. A result has been the declining prestige of southern yellow pine as a quality building material. Experiment stations and industry in the Southeast have selected pines for maximum radial growth in plantations. Chipping saws recover one or two boards from larger pulpwood logs, with the remaining chips going into pulp. The two growth-rings-per-inch lumber entering the market in increasing volumes is despised by builders because of its tendency to warp.

Industrial forestry is in flux. Traditional forest industries like Georgia Pacific and International Paper have discovered that owning forests is not a prerequisite for meeting their raw material needs. As they divest, holdings have been bought by Timber Investment Management Organizations, i.e., Wachovia (Wells Fargo?) and John Hancock, and Real Estate Investment Trusts such as Plum Creek. This new class of owners is likely to continue the forestry practices of their predecessors, with real estate sales as an integral part of their business model.

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### South-wide Pine Stumpage Prices quarterly averages over 10 years



#### Timber Mart-South

Figure 1—Southwide pine stumpage prices. Source: TimberMart-South, 2008, 13(2).

A continuing shift of pulpwood production offshore to countries with even higher growth rates and lower production costs such as Brazil and New Zealand assures that pulpwood remains cheap. Environmentalist pressure on industry to increase recycled content in paper will also tend to drive pulpwood prices lower, as will the shift from print to electronic media. Family forest owners that have been induced by extensionists and industry to convert their land to short-rotation plantations are stuck, they are assured bottom dollar for their pulpwood as supply continues to outstrip demand. As is clear in figure 1, producing pulpwood as a final product is a losing proposition for the family forest owner. Prices have not exceeded \$10 per ton for a decade. Despite the no-win bind they find themselves in, family plantation owners are recognized by the forestry profession as progressive tree farmers.

There are good reasons why the great majority of family forest owners have not bought into the even-aged plantation model. Prominent is the realization that following the investment in site preparation and planting of seedlings one significant income event in a lifetime will occur when a plantation can be logged for sawtimber at rotation age. Some owners find the site disturbance associated with plantation establishment to be environmentally and aesthetically unacceptable. Others, particularly absentee inheritors of forest land, may be so disengaged that they give little consideration to any type of management. Family forest owners who follow the literature may be influenced by the significant bias against uneven-aged management and natural forest management in general (Bragg and others 2006, Cafferata and Kemperer 2000).

The environmental impact of plantation forestry is significant. Conversion to even-aged plantations negatively impacts an array of species, including a number that are threatened or endangered, the red-cockaded woodpecker (*Picoides*

*borealis*) and flatwoods salamander (*Ambystoma cingulatum*) for example. Intensive site preparation results in habitat disruption and erosion of both soil and nutrients, negatively impacting aquatic ecosystems. Dense plantation monocultures of genetically similar trees are vulnerable to pest and disease outbreak. Aesthetically, even-age plantations are monotonous and uninteresting. The magnitude of the environmental threat is enormous. The U.S. Forest Service Southern Forest Resource Assessment predicts that the area in plantations is expected to increase from 32 to 54 million acres by 2040 and natural forest types to decrease from 149 to 122 million acres during the same period (Wear and Greis 2002).

#### Uneven-Aged Management—History

Uneven-aged management is not new, only largely forgotten—by foresters and forest owners. The practice of what evolved into uneven-aged management dates back to the mid-1920s in Arkansas when foresters L.K. Pomeroy and E.P. Connor founded the Ozark Badger Lumber Company. Their approach stood in sharp contrast to the “cut and run” logging of old-growth pine forests that had prevailed for decades. Pomeroy’s perspective was strongly influenced by a 1934 trip to visit forests in Germany where management had been practiced for centuries. Pomeroy noted, “Their attitude of guardianship of this [forest] wealth for future generations was a point entirely strange to me as an American lumberman.” (Pomeroy 1989). Pomeroy’s epiphany can be compared with that wrought by Gifford Pinchot and German, Carl Schenck, at the Biltmore Estate in North Carolina two decades earlier.

The Arkansas model also differed markedly from the “sustainable” forestry models advocated by leading forestry schools and the U.S. Forest Service. Good forestry at the time consisted of cutting all trees over a given diameter and leaving three to five seed trees per acre. This system was appropriate for large operations with many stands of different ages. However, for family forest operations envisioned by Pomeroy and Connor, this practice would leave the owner with long periods with no income from the forest. In the simplest terms, other foresters advocated cutting two-thirds of the stand and leaving up to five seed trees per acre; their approach to uneven-aged management involved leaving two-thirds of the stand and cutting up to five mature trees per acre.

R.R. Reynolds of the U.S. Forest Service established the Crossett Experimental Forest near Crossett, AR, in 1933 and directed its activities for the next 34 years (Reynolds 1980). In 1939, Reynolds established the “Good Farm Forestry Forty,” a well-stocked shortleaf/loblolly (*P. echinata/P. taeda*) stand, to demonstrate to farmers that good income can be generated under uneven-aged management, even from relatively small forest properties. This 40-acre parcel is still being managed and harvested today. The secret to the success of uneven-aged management for the family forest owner is the frequent sale of high-value, mature trees. This periodic thinning assures abundant replenishment of young seedlings and competition control in a multiaged forest, while maintaining near full stocking. Assuming that a competitive sale can be made on 50 acres of well-stocked timber, an owner with 300 acres could expect to have a sale every year, if desired.

Steady income coupled with the hydrological and wildlife benefits of maintaining a fully stocked forest ecosystem are among the benefits on uneven-aged management.

### The Economics of Uneven-Aged Management

Don Handley grew up near Crossett, AR. Prior to college he did inventories and logging in forests under uneven-aged management for L.R. Pomeroy. His degree work in forestry at Arkansas A&M College at Monticello was closely linked to Reynolds' work at Crossett Experimental Forest. After graduating, Handley moved to South Carolina where he introduced uneven-aged management to family forest clients with a total of several thousand acres of forest. The examples addressed below are representative of the typical smaller forested ownership unit in the southeastern Coastal Plain.

The first example is from across the border from Handley's base in Florence, SC, in southeastern North Carolina.

Handley helped this client convert a 45-acre, 20-year-old plantation over to uneven-aged management after the first thinning. Harvest from this property should rival the Crossett "Good Farm Forestry Forty" when it reaches full stocking (table 1).

Comparison of even- and uneven-aged management is complex, but critical if family forest owners are to have a valid basis for judging which management option to choose. The 85-acre property in Florence County, SC, used as an illustration here is broadly representative of the great majority of family forests in the southeastern Coastal Plain and lower Piedmont (tables 2 and 3). In 1988 the 85-acre unmanaged successional forest had a mixture of loblolly pine and low-value hardwoods with hardwoods dominating the understory and little or no pine regeneration. The beginning inventory was approximately 300 cords (800 tons) of pulpwood and 430,000 board feet (3,225 tons) of sawtimber.

**Table 1—45-acre family forest**

Year	Activity	Costs	Income
----- dollars -----			
1988	First pulpwood thinning		10,800
1993	Timber sale		35,367
1997	Timber sale		49,148
2003	Timber sale		40,650
2008	Timber sale	-9,000	31,605
Total net income (10 years)			158,570
Residual value		94,000	

**Table 2—85-acre family forest, even-aged management**

Year	Activity	Volume	Costs	Income
----- dollars -----				
1988	Sale	300 cords and 430,000 board feet	7,455	74,550
1990	Site prep and planting		14,900	
2010	First thinning		4,080	40,800
Totals			26,435	115,350
Net income			88,915	(\$48 per acre per year)
2010	Residual value of standing timber		81,600	

Note: All costs and income estimated.

Assumptions—1988 prices for pulpwood: \$12 per cord (\$4.50 per ton), sawtimber: \$165 per 1,000 board feet (\$22 per ton). Assume \$20 per cord pulpwood price in 2008.

**Table 3—85-acre family forest, uneven-aged management**

Year	Activity	Volume	Costs	Income
			----- dollars -----	
1988	Timber cruise		510	
1988	Prescribed burn		1,275	
1989	Pole sale	772 poles (88,580 board feet)	2,354	23,543
1989	Clear hardwood		200	2,000
1998	Herbicide application for pine release		4,845	
2000	Timber sale	152 cords pulpwood 231,018 board feet timber	8,853	88,530
2005	Timber sale	138 cords pulpwood	5,525	55,251
Total to date			23,562	169,324
Net income to date			145,762 (\$100 per acre per year)	
Residual value of stand				178,500

Note: All costs and income amounts are actual.

Assume \$20 per cord pulpwood price in 2008.

Assumptions—1988 prices for pulpwood: \$12 per cord (\$4.50 per ton), sawtimber: \$165 per 1,000 board feet (\$22 per ton). Assume \$20 per cord pulpwood price in 2008.

For comparison, table 2 represents the typical costs and returns to be expected from even-aged management had the owner chosen to practice even-aged management. Following common practice the forester who cruised the timber would have supervised a sale, and after the clearcut, overseen replanting. The first thinning would come in about 20 years. Data for even-aged management is extrapolated from local experience.

This comparison of even- and uneven-aged management is valid for the majority of private forest owners in the Southeast. Why? In practice, the unmanaged forest owner considering adopting either even- or uneven-aged management is starting with a mixed forest that has received little or no prior investment. The owner either (a) harvests marketable timber, clears, and plants seedlings; or (b) selectively harvests, removes competing hardwoods, and manages a naturally reproducing stand. This reality contrasts with studies that use either bare ground or rotation age plantations as the points of departure for comparing even- and uneven-aged management (Henderson 2008).

For the uneven-aged management scenario provided here in table 3, income per year is significantly higher than what would have prevailed under even-aged plantation management. Under uneven-aged management, income per sale can be expected to increase as the stand reaches its full volume potential. Annual return from a stand can be expected

to well exceed \$100 per acre per year with harvests at 5-year intervals. On larger properties with multiple stands, a timber sale every year could be anticipated. The residual value would also increase substantially as full stocking is reached.

### Justification for Recruitment of Foresters With a Family Forest Commitment

The two vignettes presented here are illustrative of a widespread dysfunction in how timber buyers serve the family forest owner.

**First example**—A widow was concerned about the large mortgage on her home. With her modest income, it just wasn't possible to make much of a dent in the principal. Her sister came to the rescue by offering her the opportunity to sell the timber from their jointly owned 100 acres of unmanaged forest to help pay off her mortgage. With a copy of the deed and the letter from her sister in hand, she called a local timber dealer referred to her by a friend.

The dealer had long experience in procuring timber for the local mills. He visited the property the following week and cruised the timber. He offered a contract for clearcutting all merchantable timber on the 100 acres. This would net her \$70,000, just a little more than she owed on her home. She called her accountant to ask what her tax liability would be. Her accountant suggested she get a second opinion

from an independent consulting forester and gave her the name of Handley Forestry Services in Florence, SC. Don Handley responded to her call. He cruised the 100 acres of unmanaged pine and low-value hardwoods. He suggested a different approach. Rather than clearcutting, the pines were selectively marked for harvest. The mature trees, >16 inches d.b.h., and the lower quality or crowded smaller trees were selected for harvest as sawtimber and pulpwood. The low-value hardwoods that were large enough were cut for pulpwood. The rest was chipped for fuel to be used by a local paper mill. Handley's fee for the cruise, marking the trees to be cut, and handling the sale was \$9,360. The sawtimber, pulpwood, and chips brought \$84,608, netting Mrs. Williams \$75,248.

More important, the skidder left the forest floor clean and prepared to receive seed from the residual pines. This results in a new stand of pine seedlings in the understory and a well-spaced stand of healthy trees of different sizes overhead. The sisters were left with a healthy uneven-aged stand of pine with a prolific crop of new seedlings on the ground. They have dedicated the extra revenue to be used for improvements on the property. These improvements include a better access road, new gates, and herbicide application to control the hardwoods that will compete with the young pines. In 5 years they will be able to have another selective cut, estimated at \$65,000. The best trees will be left to grow into a more valuable diameter class, making future harvests, every 5 to 7 years, worth even more.

**Second example**—Timber buyers employ “spotters” as they are called locally. They “spot” forested properties for potential sale. An elderly African-American couple was approached by someone they knew in the community who told them their timber was worth a lot of money and they should consider selling their timber to a timber buyer.

Later, the spotter told the couple that the company was going to offer \$7,000 for their timber, but he knew it was worth more and recommended they take nothing <\$8,000. The lady decided to call the State forestry office. Someone there suggested she contact Handley Forestry Services. Don Handley and his son cruised the timber on the couple's property and calculated the timber was worth \$32,000, four times what the spotter had offered. Don recommended that the owners thin the stand, probably earning more than the buyer had offered, and practice uneven-aged management for an even greater return over the long term. In this case, the couple decided to take the full \$32,000, investing some of the money in replanting.

## CONCLUSION

It is clear from preceding tables and vignettes that the family forest owner would be better served by practicing uneven-aged management. The problem is that uneven-aged management requires continuing guidance from a knowledgeable forester. Few foresters have appropriate training because demand for their services has come through either procuring wood for industry or helping a

relatively small number of private clients practice even-aged forest management oriented toward meeting industry's fiber demand.

Foresters should note how many years Handley Forest Services has worked with each client represented in the preceding tables. Uneven-aged management represents a potential lifetime engagement with the client. The consulting forester is not under constant pressure to find new clients willing to have their plantations clearcut or unmanaged forests high-graded in a once-in-a-lifetime fee-generating event. Even when the forester is engaged to oversee site preparation and planting of seedlings following harvest, a generation will pass before he might be called upon to direct a thinning operation.

We are launching a program to reach out to family forest owners and to foresters willing to learn how to serve them and show them a better way; uneven-aged management of southern yellow pine.

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