

The Economics of Longleaf Pine Management



**A Road to Making Dollars
and Sense**

Longleaf Values from Wood Products

4-year-old longleaf, Macon County, Alabama



Photo: Dean Gierstad

Landowners and land managers often ask about the economic case for longleaf pine. The concern is rooted in the historic difficulty in regenerating longleaf and perceived slow growth compared to other southern pine species. Today, we have largely solved the mysteries of establishing and growing longleaf including natural regeneration techniques. Once height growth is initiated (usually by the end of the second year after planting or three years after regeneration from seed), longleaf can grow as quickly as other southern pines on most sites and better on some. On poor sites, such as deep sands or borrow pits, longleaf often catches up with and passes loblolly or slash pine in seven or eight years. On sites with average or good productivity, longleaf may take a year or two longer to reach commercial size but pulpwood thinnings should be achieved in less than 18 years after planting. Longleaf produces high quality lumber; noted for strength, durability, and appearance. Experience suggests that prime production of utility poles occurs at stand ages between 40 and 50 years on most sites. Longleaf produces poles in proportions far exceeding other pine species. It is not unusual for more than half of all trees in longleaf stands at appropriate ages to meet exacting standards for utility poles, the highest valued southern pine product. Typically, stands of loblolly and slash pine contain less than 15% pole quality trees. One study of 39-year-old trees shows fewer than 8% of the loblolly stems and about 11.5% of the slash pine stems were of pole quality. Nearly 72% of the longleaf trees were of pole quality.

Over the past 59 years, stumpage paid for poles (the amount paid to the landowner for standing timber) exceeds that of sawtimber by about 40%. **In short, longleaf grows value faster than it grows wood!** Poles are not only the most valuable of southern pine products, they add stability to investments, as those markets have demonstrated low volatility over time and have little correlation with other timber products. This 26-year-data set presented on the following page represents actual stumpage values

Cover Photo: Beth Young



Longleaf pole stand

Photo: Beth Young

from timber sales conducted in south Mississippi by John Guthrie and Sons, a forestry consulting firm. In good markets and in bad, sales that were predominantly longleaf returned more per thousand board feet than sales of loblolly stands, reflecting the value of poles and the quality sawtimber longleaf produces.

In short, pole prices have risen faster than other products and have maintained their value over time. The increased value of poles, coupled with the lower volatility of those markets, raises returns and reduces volatility for forest investments. The graph below illustrates the impact of adding poles to timber sales in the Southeast between 1980 and 2000, indicating both higher returns and lower risk, as measured by standard deviation.

Figure 1: Average stumpage returns from timber sales in Mississippi by John Guthrie & Sons, 1981-1997.

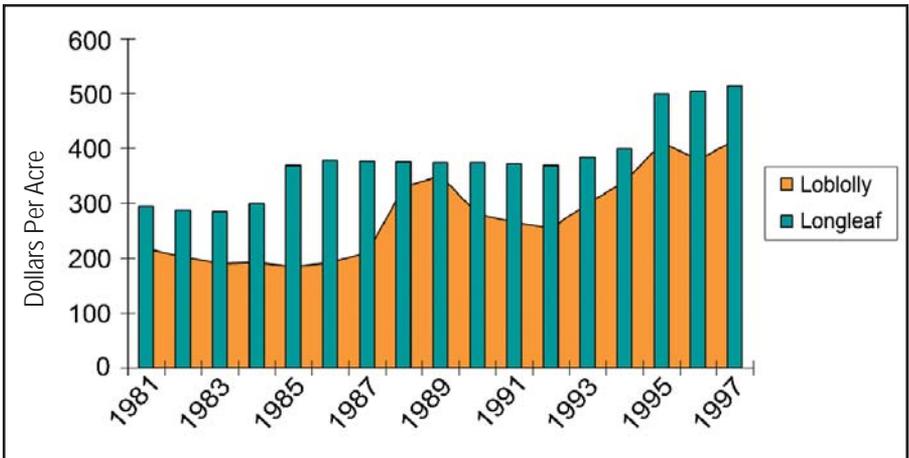
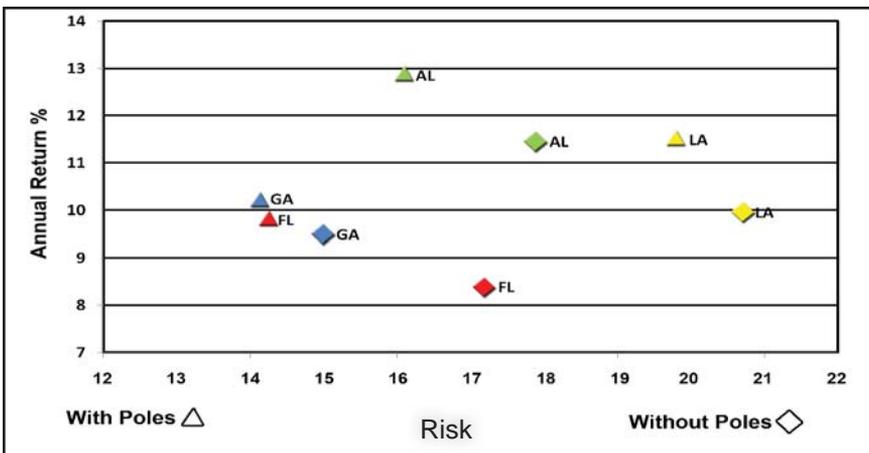


Figure 2: The impact of poles on risk and return on investment.



Risk Aversion

An undervalued attribute of longleaf pine is its ability to withstand attack by or loss to most damaging agents common to other southern pines. It is resistant to southern pine bark beetle attack, seldom reaching epidemic stage. It is resistant to fusiform rust, perhaps the most damaging of diseases in southern pine forests. It has proven to be less vulnerable to windstorm damage than other pines, with vivid and dramatic examples provided in the aftermath of hurricanes like Opal, Hugo, Ivan, and Katrina. Degrees of and types of damage are dramatically

Southern Pine Beetle



Photo: Ronald F. Billings, Texas Forest Service, Bugwood.org

Fusiform Rust



Photo: Robert L. Anderson, USDA Forest Service, Bugwood.org

decreased with longleaf over other pines, reducing risk and loss of value. Perhaps most importantly, longleaf is tolerant of fire throughout its entire life, enduring most fires without significant mortality or damage when it is used wisely. Unless fuels have accumulated to dangerously high levels, longleaf also survives most wildfires. This insurance against catastrophic loss of investment value has significant economic implications.

Photo: Rhett Johnson



Hurricanes are a fact of life in the longleaf pine region, particularly in the coastal plain. Longleaf is not only more resistant to damage from hurricane winds than other southern pines, the type of damage suffered differs as well. Broken or snapped trees are a total loss and actually become a management cost. Leaning and uprooted trees can be salvaged and can even, in many cases, be held for a period of time to avoid flooded and depressed post-storm markets.



Photo: NOAA Satellite and Information Service

The following table reflects actual damage assessments on one property in Mississippi following Hurricane Katrina. The stands were side by side and 22 years old at the time. We know intuitively that risk aversion has value, it's how insurance companies make their money. Longleaf provides that investment protection for free!

Table 1: Hurricane Katrina Damage by Frequency and Type in Mississippi.

Species	No Damage	Snapped	Uprooted	Leaning
Loblolly	16.3%	75.9%	2%	5.7%
Slash	52.4%	38.1%	1.7%	7.8%
Longleaf	64%	8.9%	10.2%	16.9%

Longleaf Pine



Photo: Rhett Johnson

Loblolly Pine



Photo: Ronald F. Billings, Texas Forest Service, Bugwood.org

Other Values

In addition to high quality lumber, longleaf pine straw – long popular as a landscaping mulch across the region – has become an exceptionally valuable product of longleaf forests. Longleaf straw is favored by a wide margin over other pines due to its durability, color, and structural appearance. The potential for returns early in the life of a longleaf stand has positive economic implications. Although management of nutrients and woody brush are required for any successful pine straw scheme; many longleaf landowners achieve returns of \$50 to \$300 per acre from pine straw sales annually.



Photo: Rhett Johnson

Wildlife leases, mitigation opportunities, and carbon trading all have potential to become profitable for forest landowners, and longleaf owners are well suited to participate in any of those markets. Opportunities to mitigate adverse impacts on threatened or endangered species in return for additional revenue streams are in development at this time. Emerging markets in

ecosystem services, such as open space, clean water, clean air, and biodiversity maintenance favor managed longleaf pine forests.

Real estate values tend to favor well-managed, attractive forest lands and there are few more aesthetically appealing forests than fire-maintained longleaf forests. There is ample evidence that markets recognize these values in the region.



Low Up-front Costs and Early Returns

The wide range of cost-share and supplemental funding sources available to private landowners provide an opportunity to reduce upfront costs and/or provide early income for longleaf establishment. The USDA Conservation Reserve Program (CRP) reimburses landowners for up to 90% of the cost of establishing longleaf on cropland that meets program criteria and provides an annual rental payment. The Environmental Quality Incentives Program (EQIP) and Wildlife Habitat Incentives Program (WHIP) reimburse landowners for establishment

and management costs and also favor longleaf. Information on these programs is available at county level USDA-NRCS and FSA offices. The Partners for Fish and Wildlife program also provides funds for longleaf establishment and management. Information on participation in this program can be found at U.S. Fish and Wildlife Service offices in each state. Many state cost-share programs can also provide funds for longleaf establishment and management.



Photo: Dean Gjerstad

A peanut field 15 years ago, this longleaf stand in Lee, Florida was thinned at age 13.

In any investment, lowering up-front costs and achieving early returns are keys to profitability. The addition of annual rental payments available through CRP or other early income streams, such as pine straw, profoundly affect the profitability of a longleaf investment.

The following graphs depict the Internal Rate of Return (IRR) and Net Present Values (NPV) calculated on a range of longleaf investment scenarios including with and without cost-share and with and without pine straw. The projections of growth and yield are based on limited available models. Accordingly, conservative estimates were used for both growth and product yields. Forest product markets fluctuate regularly and median prices were used in these calculations. These assumptions are detailed in the following tables. IRR and NPV are parameters regularly used to compare investments and determine profitability.

Photo: Beth Young

Investment Analysis Assumptions

Photo: Michael Kyser, Alabama Forestry Commission



Data needed for analysis of forest investments include upfront or establishment costs, anticipated revenues, interim costs and income during the investment period, a timeline for these costs and returns, and an alternative rate of return or discount rate. We can be fairly confident about establishment costs such as site preparation, seedlings, planting, prescribed fire, and other management costs. Income is more tentative, with timber markets and other markets less predictable over time. To further complicate analysis, there are no truly satisfactory models to predict longleaf growth or product yield. The alternative rate varies with the general economic climate and individual expectations. In general, the most attractive investments of any type have low upfront costs, low risk, and

early return on investment. Typically, forestry investments are just the opposite, with high upfront costs and late returns.

The tables and graphs on the following page were developed using a moderate set of assumptions of growth, product yield, and market prices. The analysis assumes plantation establishment at 544 trees per acre with management for 45 years, resulting in a shelterwood stand capable of natural regeneration. The cost assumptions used were establishment cost of \$235/acre, a release treatment at a cost of \$35/acre at age 1, burning costs of \$15/acre starting at age 3 and repeating every three years, and fertilization at \$50/acre for pine straw production starting at age 10 and continuing at five-year intervals. Income projections included a first thinning at age 19 yielding \$180/acre, second and third thinnings at age 29 and 39 yielding \$450/acre and \$750/acre respectively, and a fourth thinning to a shelterwood stand (approximately 25-30 trees per acre) yielding \$1500/acre. Pine straw yields, where incorporated, were projected at \$50/acre beginning at age 6, with straw raked for two consecutive years followed by a year of "rest." Straw yields are projected to rise to \$75/acre per year at age 10 and to \$100/acre per year at age 15. Straw income was projected to be \$125/acre per year, at age 30 and continue throughout the rotation. Finally, cost-share assumptions were for 50% of establishment cost, CRP contracts for 15 years with an annual rental payment of \$45/acre per year, and CRP at those rates followed by pine straw raking. Calculations of Net Present Value and Internal

Rate of Return discount both income and expenditures at an alternative discount rate over time to year zero. Positive IRRs and NPVs indicate a profitable investment compared to the alternative discount rate and are helpful in comparing investments.

The scenarios analyzed are listed in Table 2:

- No cost share or pine straw
- No cost share with pine straw
- 50% establishment cost share without straw
- CRP without straw
- CRP with straw

Table 2: Financial analysis of Investment Scenarios at discount rates of 4.5% and 6%.

No.	Scenario	NPV@ 4.5%	NPV@ 6%	IRR
1	No cost share or pine straw	\$197.35	-\$2.60	6%
2	No cost share with pine straw	\$893.65	\$481.81	11%
3	50% cost share without pine straw	\$282.15	\$81.41	7%
4	CRP without pine straw	\$787.15	\$544.68	29%
5	CRP with pine straw after 15 years	\$1,317.28	\$882.50	30%

Standard calculations of Net Present Value at alternative discount rates of 4.5% and 6%, and accompanying Internal Rates of Return yield the results as follow in Tables 3 and 4.

Figure 3: Internal Rate of Return (IRR).

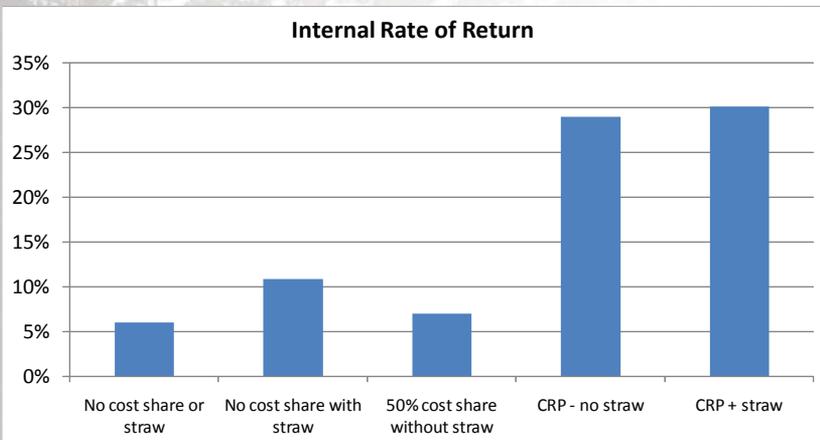
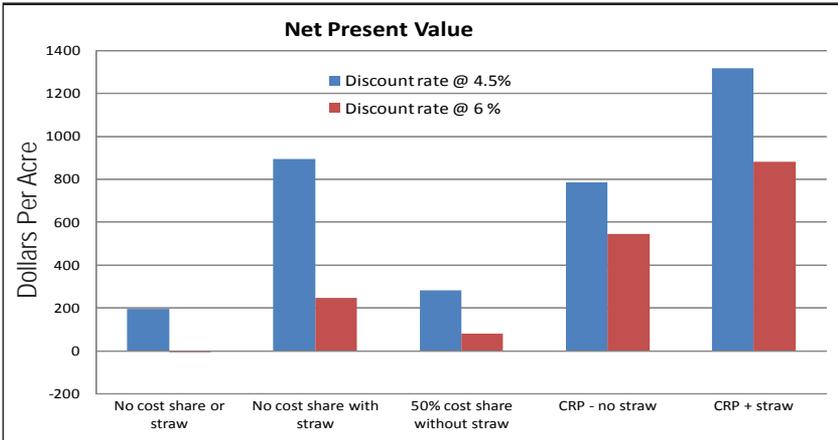


Figure 4: Net Present Value (NPV) in \$/acre at 4.5% and 6% discount rates.



The advantages of early returns on investment and reduced upfront costs are immediately obvious. Still, in all scenarios, with and without cost-share, annual payments, or pine straw, the analyses suggest that longleaf is a profitable investment.

In Summary

Longleaf pines, when managed correctly, grow competitively with other southern pines on most sites and better on some. These forests can produce high proportions of quality forest products, such as utility poles, premium lumber, pine straw, and other commercially valuable amenities. An additional economic advantage is the reduced risk of catastrophic loss to wildfire, insects, disease, wind-storms, and ice that longleaf offers. Widely available cost-share opportunities preferential to longleaf reduce upfront out-of-pocket establishment and management costs.



Natural regeneration techniques for longleaf pine are consistently successful where longleaf forests exist. In short, longleaf is a competitive, low-risk positive economic investment for most landowners. As a stand-alone forest investment, longleaf forests reduce risk of catastrophic loss to natural disturbances and can produce a product – poles – with low-market volatility in quantity. As an asset in a forest investment portfolio, longleaf adds diversity and stability to the portfolio much as blue chip stocks or bonds do in a diversified financial portfolio. Unlike strictly financial investments, longleaf investments can be enjoyed for their recreational and aesthetic value while they accrue financial worth. These economic benefits can be achieved without sacrificing the rich ecological attributes of longleaf forests.



Photo: Beth Young

Photo: Stephen Hudson



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