

# **FINANCIAL ANALYSIS OF PRECOMMERCIAL THINNING, LOW-DENSITY PLANTING, AND COST SHARE PAYMENTS**

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## **FINANCIAL ANALYSIS OF PRECOMMERCIAL THINNING, LOW-DENSITY PLANTING, AND COST SHARE PAYMENTS.**

Does precommercial thinning pay? In some cases it does, especially when a landowner receives cost-share funds for the operation. A case study of the financial feasibility of pre-commercial thinning and low-density planting was recently conducted by the South Carolina Forestry Commission.

**Financial calculations pertaining to the scenarios below are based on current timber prices, an assumed rate of inflation of 3%, and are on a pre-tax basis. Annual management costs and property taxes are assumed to be \$5 and \$2 adjusted each year for inflation. Timber volumes were generated with a computer program called PTAEDA 3.1 that simulates loblolly pine growth. For purposes of the financial analyses, the landowner will accept no less than 8% on investments. South Carolina Timber prices for the fourth quarter of 2006 are used in the financial analyses. Site index (SI) for this case analysis is 60 base age 25 for planted woods-run loblolly seedlings.**

### **Case 1:**

A landowner has a tract that is reseeded naturally by loblolly pine, 1,344 trees per acre in year 9. The owner decides not to engage in active timber management until the stand is thinned for the first time at age 23. The stand is thinned again at age 35, and the final harvest occurs at age 40. Timber volumes and financial returns are listed in Tables 1 and 2 respectively.

### **Case 2:**

A landowner has a tract that is reseeded naturally by loblolly pine. Because of the high number of trees per acre, the owner is concerned about the risk of southern pine beetle infestation. He would also like to eliminate the smaller undesirable trees, so he performs a precommercial thinning (PCT) in year 9. The PCT reduces the initial forest density from 1,344 trees per acre to 482 trees per acre. The landowner does not apply for cost share funds and pays the full \$150 per acre charge for the pre-commercial thinning. The stand is commercially thinned in year 22 and 35, and the final harvest occurs in year 40 (Tables 1& 2). The precommercial thinning in year 9 accelerates growth of the residual trees and allows the first commercial thinning to be conducted in year 22 rather than in year 23 as in Case 1.

### **Case 3:**

Case 3 is the same as case 2 except the landowner receives cost share payments for the precommercial thinning, reducing per acre costs from \$150 to \$60 (Tables 1&2).

### **Case 4:**

A landowner decides to reforest a tract that was harvested the previous year. She is interested in reducing the risk of pine beetle infestation and decides to plant fewer trees per acre. Trees are planted on a 10 x 10 ft spacing for a total of 435 trees per acre. Before planting, the landowner prepares the site with herbicide to prevent grasses from competing with the trees for water and

nutrients. The landowner does not apply for cost-share payments and pays the full \$188 per acre for seedlings, site preparation and planting out-of-pocket. As a result of the more intensive management than in the natural stand, the planned life of the forest is much shorter. Thinnings take place in year 17 and 25, and the final harvest is made in year 33 (Tables 1&2).

**Case 5:**

Case 5 is the same as case 4 except the landowner receives cost share payments for the reforestation expenses, reducing per acre costs from \$188 to \$94 (Tables 1&2).

**Table 1. Management scenarios evaluated.**

Scenario <sup>2</sup>	Age	Post Thin Crown Ratio	Residual Basal Area (sq. ft.)	Harvested Products Per Acre <sup>1</sup>		
				Pulpwood (Tons)	Chip-n-Saw (Tons)	Sawtimber (Tons)
1	23	26	80	16.6	0.0	0.0
	35	24	70	18.8	19.1	0.0
	40	24	0	37.4	0.0	41.1
2 and 3	22	37	80	21.8	0.0	0.0
	35	34	70	16.3	6.4	27.1
	40	34	0	10.9	0.0	72.6
4 and 5	17	47	70	17.4	4.6	2.1
	25	41	80	6.8	7.1	3.5
	33	36	0	31.4	0.0	76.9

1. Timber volumes generated with PTAEDA 3.1.

2. WINYIELD, a forest growth and yield computer program, was used to develop forest management scenarios that would yield a high return on investment.

**Financial Analysis of the Scenarios**

Three financial calculations were used to compare the returns from investing in the five scenarios above: net present value (NPV), internal rate of return (IRR), and equal annual equivalent (EAE). Equal annual equivalent is the most easy to interpret and understand. Although positive cash flows are only produced during the two commercial thinnings and final harvest, the EAE calculation converts all costs and returns over the life of the forest investment into equal annual payments on a per acre basis. More profitable investments have higher equal annual equivalents. Remember that the financial estimates in Table 2 are overly optimistic since they ignore income taxes. However, for comparison purposes, the highest EAE will still indicate the best investment. Scenario 3 yields the highest return of the three natural forest scenarios. This

scenario uses cost-share money to help pay for a precommercial thinning in year 9. Scenario 5 is the most profitable management regime of the two pine plantation scenarios. It is also the most profitable of all five scenarios.

**Table 2. Financial comparisons of the five forest management scenarios.**

Scenario	Description	Per Acre Values		
		Equal Annual Equivalent (\$)	Internal Rate Of Return (%)	Net Present Value (\$)
<b>Natural Forest Options</b>				
1	Naturally reseeded. No precommercial thinning.	11.51	9.0	137.23
2	Naturally reseeded and thinned precommercially with no cost share.	53.91	13.9	642.90
3	Naturally reseeded and thinned pre-commercially with cost share.	<b>58.84</b>	<b>15.4</b>	<b>701.65</b>
<b>Plantation Forest Options</b>				
4	Site prepared and planted with no cost share.	64.68	13.9	771.33
5	Site prepared and planted with cost share.	<b>71.98</b>	<b>16.2</b>	<b>858.37</b>

Scenario 5 involves using cost share payments to help pay for site preparation and low-density planting.

## Conclusion

These analyses were based on several assumptions. As a result, the specific financial returns are relevant only to the cases presented here. Profitability of forest investments varies dramatically with management practices, inflation, soil fertility, and changes in timber prices. Therefore, this paper should be used only for educational purposes. However, done correctly and at the right time, precommercial thinning does have the potential to increase the profitability of forest management, especially when cost share payments are received. **In addition, risk to the forest from southern pine beetle infestations is lowered.**

## References

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