Financial Returns from Plantations Established Through the Conservation Reserve Program in Arkansas

Rebecca A. Montgomery, Matthew H. Pelkki, Richard A. Williams

Abstract: In recent years government incentive programs such as the Conservation Reserve Program (CRP) have made planting trees a very economical and environmentally sensible option for lands, especially those in the South. The program’s objectives are to help decrease soil erosion, increase water quality, and enhance wildlife on highly erodible cropland and other environmentally sensitive land through the use of cost shares and annual rental payments. Not only does the program meet its objectives, but it also provides those participants in the South who use the opportunity to plant commercial tree species with substantial income even after contract expiration. Using growth rates from studies conducted on loblolly pine and cherrybark oak in the Coastal Plain of Arkansas, financial returns were calculated for plantations established through the CRP. The heavy front end costs of establishing plantations are greatly reduced by the program through the use of cost shares and annual rental payments from the government, thus allowing landowners to increase their pre-tax internal rates of return.

Keywords: CRP, landowners, net present value

INTRODUCTION

Established by the Food Security Act of 1985, the CRP was designed to help decrease soil erosion, increase water quality, and enhance wildlife habitat on highly erodible croplands and other sensitive lands across the nation. The CRP has been beneficial to Arkansans who over the years have enrolled thousands of acres in this program. The objective of this paper is to calculate the financial returns from plantations established through the CRP.

METHODS

Growth rates of both loblolly pine (Pinus taeda) and cherrybark oak (Quercus pagoda) trees grown on quality, fertile sites in the coastal plain region of Arkansas were obtained from previous studies. Pelkki and Colvin (2003) documented growth rates of cherrybark oak trees grown on a coastal plain creek bottom in southwest Arkansas. The study used control plots (no treatments), thinned plots, and pruned/thinned plots with treatments occurring at years 21, 26, and 31. The first two thinnings reduced the stands to a 75 percent stocking level based on Gingrich’s (1971) guide. The third thinning reduced the basal area within each treatment to 80 ft² per acre. In addition to the thinnings, the pruned stand was pruned to a height of 7 feet at age 10.

Williams (unpublished) documented growth of a loblolly pine stand near Bierne, Arkansas over a period of 60 years, with both thinned (treatment) and unthinned (control) plots. Though both stands were thinned at age 10 through removal of every other row and at age 14 through removal of every other tree; in the treatment stand at age 21 and 33 select thinnings were performed to remove poor growing trees.

1 Research Specialist, School of Forest Resources, University of Arkansas at Monticello, P.O. Box 3468, Monticello, AR, 71656. montgomeryr@uamont.edu. (870) 460-1890; (870) 460-1092
Using this data along with CRP incentive data, financial analyses can be calculated for lands enrolled in the CRP using three scenarios. The first two scenarios were for land enrolled in the general CRP which was planted to loblolly pine (thinned and unthinned) or cherrybark oak (thinned, unthinned, and thinned/pruned). The third scenario dealt with land enrolled in the continuous CRP program which was planted to cherrybark oak and overcup oak (*Quercus lyrata*). Costs for the analyses were determined using the Dubois et al (2000) publication for costs of forestry practices in the South, Arkansas Forestry Commission prices (2002) for tree seedlings, and Arkansas stumpage prices from TimberMart-South (2000). Average CRP rental and maintenance payments for 2000 were determined from the FSA website (FSA 2002).

Actual rental rates and maintenance payments for CRP land vary widely across the state depending upon the site, soil type, etc. For simplicity, an average annual rental rate of $43.69 per acre along with a minimum annual maintenance payment of $3 per acre for general sign-up and $7 per acre for continuous sign-up were used. These rates were the averages for Arkansas in 2000. Management fees and taxes were assumed to be a liberal $5.00 per acre for all calculations. Returns from the land only came from CRP payments during the contract and through thinnings and harvest cuts after contract expiration. Net present value (NPV) was calculated on a pre-tax basis. A real interest rate of 4 percent was used for all calculations. For the scenario with cherrybark and overcup oak trees, it was assumed that overcup oak would not be harvested, but simply be planted to meet continuous CRP program requirements.

**RESULTS**

For each scenario, net present value, soil expectation value, and internal rate of return were calculated. The costs for all scenarios included tax/management fees, site preparation, planting costs, seedling costs, and a final cruise cost. Returns during the contract period consisted of annual rental and maintenance payments. All thinnings were conducted after contract expiration and final harvests were clear fellings conducted during year 40 for all scenarios.

**Loblolly pine plantation in the general CRP**—For this scenario loblolly pine seedlings were spaced at 7.5’ by 7.5’ (774 trees per acre). The only returns received from the first 10 years were from the CRP, which paid $43.69 per acre per year for the annual rental payment and $3 per acre per year for maintenance payments, through year 10 when the CRP contract expired. Using growth rates from Williams (unpublished) valuations can be made for two treatments, thinned and unthinned. The unthinned stand had a NPV of $1597.78 per acre. The cost associated with the thinned stand was a marking fee of $27.71 per acre during years 21 and 33. This stand however produced a higher NPV ($1653.24) than the unthinned stand. The stand enrolled in the CRP began making money by the second year of growth due to decreased initial costs which were minimized by the cost share and the first several years of rental payments.

**Cherrybark oak in the general CRP**—Cherrybark oak seedlings were planted on a 10’ by 12’ spacing on land which was assumed to be well suited to the species. Returns for the first 15 years were from the CRP, which paid $43.69 per acre per year for the annual rental payment and $3 per acre per year for maintenance, through year 15 when the CRP contract expired. Using the growth rates from Pelkkii and Colvin (2003) for cherrybark oak, the NPV for the unthinned stand was $796.34 per acre. The cherrybark oak stand that was thinned periodically at years 21, 26 and 31 had a higher NPV of $1105.85 per acre at year 40.
Table 1  Summary of financial analyses for land enrolled in the CRP for a 40 year period.

<table>
<thead>
<tr>
<th></th>
<th>Loblolly pine</th>
<th>Cherrybark oak</th>
<th>Cherrybark oak/ overcup oak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>low intensity</td>
<td>high intensity</td>
<td>No thin</td>
</tr>
<tr>
<td>NO CRP</td>
<td>$1,104.04</td>
<td>$1,141.51</td>
<td>$136.90</td>
</tr>
<tr>
<td>SEV</td>
<td>$1,597.78</td>
<td>$1,653</td>
<td>$796.34</td>
</tr>
<tr>
<td>IRR</td>
<td>10%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>CRP</td>
<td>$2,018.14</td>
<td>$2,087.89</td>
<td>$1,005.85</td>
</tr>
<tr>
<td>SEV</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A cost of $27.71 per acre for marking the thinned stand prior to thinnings was incurred in the years 21, 26, and 31. The addition of pruning to a thinned stand of cherrybark oak trees decreased the NPV of the stand slightly to $992.73 per acre. The costs incurred with this management technique included marking costs of $27.71 per acre in years 21, 26, and 31 as well as a pruning cost $84.70 per acre in year 10. Planting cherrybark oak trees on good sites even without the incentives the CRP offers, was also found to be a viable investment producing positive NPV for all three types of management and internal rates of return which remained above inflation.

Cherrybark oak and Overcup oak in the Continuous CRP—The continuous CRP is a program which allows more sensitive lands such as riparian buffers, to be enrolled at any time during the year with additional financial benefits. Lands enrolled in this program must meet specific enrollment qualifications and require slightly different planting practices.

At least two native hardwood tree species are required to be planted on continuous CRP land used for trees. For this scenario cherrybark oak and overcup oak trees were planted to meet this requirement. These trees were chosen based on their growth forms. Cherrybark oak trees were designated as the crop trees while overcup oak trees were planted to shade the boles of the cherrybark trees thus decreasing the probability of epicormic branching. Overcup oak trees were not harvested in this scenario. The planting spacing was 10’ by 12’ with equal numbers of overcup oak and cherrybark oak.

The first return from the land in the continuous CRP was received as a signing bonus of $10 per acre per year of contract; so with a 15 year contract $150 per acre was received for signing land into the program. The annual rental payment for land in this program was increased by 20 percent to $52.43 per acre and received for the duration of the contract period, which in this case was 15 years. In addition to this, the annual maintenance fee was increased to $7 per acre and the cost share was enhanced by 40 percent which brings the total cost share to 90 percent.

The unthinned stand produced a NPV of $951.43 after the harvest of all crop trees. The thinned stand produced a slightly higher NPV of $1091.38 per acre. Costs associated with the thinned stand included a marking fee of $27.71 per acre in years 21, 26, and 31. Once again, the stand that was thinned and pruned did not produce as high an NPV as the thinned only stand ($1034.44 per acre). In addition to the marking fees of $27.71 per acre in year 21, 26, and 31, this stand had a pruning cost of $42.35 per acre. The continuous CRP allowed landowners to plant two hardwood species on their lands at no cost through the use of enhanced cost shares, sign-up bonuses, and increased rental and maintenance payments. Without the program, planting hardwoods on these sensitive areas was not an economically feasible option according to the
NPVs for stands which are not thinned or stands which are thinned and pruned. The thinned stand produced a positive NPV of $39 per acre and made an internal rate of return of 4 percent.

CONCLUSIONS

Making sound investment decisions in today's fluctuating stock market can be difficult. Investing in trees is one opportunity to consider especially for landowners who have highly erodible or sensitive land eligible for enrollment in the Conservation Reserve Program. This program makes it possible for landowners to reduce erosion, improve water quality, enhance wildlife habitat, and increase their returns on an investment while planting trees on their erodible land. This is especially true in the southern United States where growing conditions and good timber markets make this an opportunity not to be missed. Using the CRP to plant plantations of trees on qualified lands in Arkansas allows landowners to offset the high costs of establishment and increase pre-tax internal rates of return.

It was found that establishing plantations of loblolly pine and cherrybark oak through the CRP increased net present values, soil expectation values, and internal rates of return. Using the continuous CRP to establish a mix of hardwood trees such as cherrybark oak and overcup oak was also found to be a sound investment leaving the landowner with no-out-of-pocket expenses. Thinning stands occasionally throughout the rotation increased the NPV in each of the three scenarios. Pruning cherrybark oak trees during year 10 in the general CRP and the continuous CRP, though still producing a higher NPV than unthinned stands, decreased the overall returns. Unthinned stands had the lowest NPV for each scenario indicating that proper management throughout the rotation regardless of species (loblolly pine or cherrybark oak) increases the return on investment. Utilization of programs such as the CRP can help landowners begin a lifetime of fruitful timber investment opportunities as well as improve the overall quality of a site.

LITERATURE CITED


