

Introduction

Longleaf pine ecosystems once dominated much of the southeastern United States from Virginia to Florida to eastern Texas. Of an originally estimated seven million acres in Louisiana, less than 250,000 acres of longleaf pine remain. This is but one reason the Louisiana State Wildlife Plan lists the longleaf pine forest type as among the state's most imperiled habitats. To assist landowners in preserving and re-establishing longleaf stands NRCS in Louisiana has approved the longleaf pine ecosystem under the Wildlife Habitat Incentive Program (WHIP) Essential Habitat provisions, at an increased payment rate, as well as, a Cooperative Conservation Partnership Initiative (CCPI) payment rate through WHIP for longleaf pine establishment.

The purpose of this technical sheet is to estimate the effectiveness of the aforementioned payment rate incentives, and determine whether or not the planting of longleaf pine is as economically beneficial to landowners in Louisiana as is the planting of the more common loblolly pine species. The WHIP essential habitat approval has established a payment rate of 90% and is available to those parishes within the Louisiana historic longleaf range. At present, the CCPI payment rate (90% under essential habitat provisions) is only available to three parishes that were targeted in the CCPI agreement. They include Tangipahoa, Washington, and St. Tammany.

Economics

The comparison analysis was performed using two pine tree establishment scenarios: An Afforestation Pasture Conversion scenario and a Reforestation Regeneration Harvest – Artificial Regeneration scenario. Both longleaf / loblolly comparison scenarios involved a 30- year life cycle. A typical Allen parish soil, Ruston fine sandy loam 1 to 5% slope, was assumed for the analysis, as was an age 50 site index of 76 for Longleaf and 91 for loblolly.

The afforestation pasture conversion scenario included establishment costs comprising site preparation, seeding (450 containerized per acre), and post-plant competition suppression for both longleaf and loblolly. Maintenance costs for the afforestation scenario included an herbicide application in year 3 (competition release) for both longleaf and loblolly. The longleaf afforestation scenario required burnings in years 6, 8, 10, 12, and 14, as well as, fire break construction in year 6. The loblolly afforestation scenario required burnings only in years 12 and 14, and fire break construction in year 12; but did require a fall herbicide application in year 10.

The reforestation regeneration harvest scenario also included site preparation, seeding (450 containerized per acre), and post-plant competition suppression in its establishment costs for both pine specie. Both specie required herbicide applications in year 3, with loblolly having an additional herbicide application in year 10. Longleaf reforestation included burnings in years 6, 8, 10, 12, and 14. Burnings for loblolly reforestation were only required in years 12 and 14.

Longleaf returns, as well as, loblolly returns were the same for both scenarios. Longleaf pine returns consisted of a year 25 thinning yielding both pulp wood and chip-n-saw cords, and a final year 30 harvest of pulp wood, chip-n-saw, and saw timber (board feet). Loblolly returns consisted of a first year 20 thinning of pulp wood and chip-n-saw, a second year 25 thinning of pulp wood, chip-n-saw, and saw timber, and a final year 30 harvest of pulp wood, chip-n-saw and saw timber.

The comparison analysis was based upon per acre average annual costs, benefits, and net returns for both scenarios and species. Analysis details are presented in the accompanying appendix tables. Costs utilized in the analysis were from the FY 2010 NRCS State average cost list. Estimated yields, harvest dates, and needed inputs were supplied by the NRCS state forester. Saw timber, pulp wood and chip-n-saw prices used are state averages from the most recent quarterly forest products report, Louisiana Department of Agriculture and Forestry.

Results

Gross returns by specie over the 30 year analysis period were \$2,069.5/ac longleaf, and \$2,135.2/ac loblolly, respectively. The equivalent present day value of these gross returns for both longleaf and loblolly were \$583.3/ac and \$686.8/ac, respectively. And their average annual value was \$36.3/ac for longleaf and \$42.8/ac for loblolly.

The afforestation pasture conversion scenarios total, present value equivalent, and average annual costs for longleaf pine were \$631/ac, \$535/ac and \$33.3/ac, respectively. The same scenario's loblolly costs were \$600/ac total, \$490.5/ac present value, and \$30.6/ac average annual. Net annual return, without payment incentive, was \$3/ac for longleaf and \$12.2/ac for loblolly.

Total, present value equivalent, and average annual costs of longleaf pine for the reforestation artificial regeneration scenario was \$815/ac, \$731.7/ac, and \$45.6/ac, respectively. The loblolly pine's reforestation scenario costs were \$784/ac total, \$696.7/ac present value, and \$43.4/ac average annual. Net return for this scenario, without payment incentive, was (-) \$9.3/ac for longleaf, and (-) \$0.6/ac for loblolly.

Applying the available WHIP essential habitat and CCPI payment rate (90% cost-share), as well as, the state wide available EQIP payment rate (75% cost-share) to the two analysis scenarios resulted in significant reductions to longleaf establishment costs, and resulting increases in net return. The estimated net return to longleaf, afforestation scenario, with the aforementioned WHIP payment rate is \$31.5/ac and with EQIP

payment rate is \$23.5/ac. Estimated net return to longleaf, reforestation scenario, with the same WHIP payment rate is \$30.1/ac and with the same EQIP payment rate is \$20.2/ac.

The only available payment rate for loblolly is the standard EQIP rate (50%). Net returns for both scenarios using loblolly, and the aforementioned payment rate, was \$23.7/ac for afforestation, and \$19.8/ac for reforestation.

It should be noted that WHIP incentive payments are available for only the first 14 years of a 15 year contract, and EQIP payments for only the first nine years of an available 10 year contract.

Summary

Findings from the analysis show that the afforestation scenario is generally a more profitable option to the forest land owner than the reforestation scenario; particularly when no incentive payment is applied / available. The analysis further shows that under normal circumstances, such as the presented 30 year rotations, and without a government incentive; loblolly is the more profitable alternative for the land owner in Louisiana. But by applying more management intensive production operations, combined with favorable longleaf incentives, the difference in loblolly and longleaf profitability/return becomes minute. In fact both scenarios net returns for longleaf, when utilizing the WHIP essential habitat and CCPI payment, were significantly greater than their loblolly counter part, and slightly greater with the longleaf EQIP payment for the reforestation scenario.

And while we are reminded that the WHIP essential habitat and CCPI incentives are available in portions of the state only, there are in fact many intangible benefits (wildlife habitat, aesthetics, storm resistance, disease resistance, etc.) to longleaf pine for which placing a monetary value is near impossible. We should also remember that while virtually all longleaf sites are adaptable to loblolly, longleaf pine is not adaptable to all loblolly sites.

References

Conversations with several NRCS State specialists including:

Dr. Terry Clason, State Forester

John Pitre, State Wildlife Biologist

Tim Landreneau, State Program Specialist

Draft "2010 State Wide Average Cost List", NRCS, Alexandria, LA, Oct. 2009

Louisiana Department of Agriculture & Forestry; "Quarterly Report of Forest Products", Volume 55 Report 2, April – June, 2009.

United States Department of Agriculture; "Longleaf Pine Ecosystem Restoration: Establishing Longleaf Pine Seedlings", NRCS, Forestry Tech. Note 43, June 2004

Appendix Tables A1 and A2 'Total Present Value and Average Annual Returns' 1/ 2/

Table A1.

Longleaf Pine Benefits/returns:					<i>Present Value (\$)/ac</i>	<i>Discount Amort/Fac</i>
	<i>Yield/ac</i>	<i>Price/Unit</i>	<i>Return</i>	<i>Year</i>		
<i>First Thinning</i>						
<i>Pulp Wood (cords)</i>	4.2	\$22.4	\$94.1	25		
<i>Chip-n-saw (cords)</i>	8.1	\$83.3	\$674.7	25		
<i>Sub-Total</i>			\$768.8	25	\$248.2	0.3229
<i>Final Harvest</i>						
<i>Pulp Wood (cords)</i>	1.4	\$22.4	\$31.4	30		
<i>Chip-n-saw (cords)</i>	12	\$83.3	\$999.6	30		
<i>Sawtimber (board feet)</i>	1.1	\$245.2	\$269.7	30		
<i>Sub-Total</i>			\$1,300.7	30	\$335.1	0.2576
Present Value (Total)					\$583.3	
<i>(In today's' dollars)</i>						
Average Annual Return					\$36.3	0.0623

Table A2

Loblolly Pine Benefits/returns:					<i>Present Value (\$)/ac</i>	<i>Discount Amort/Fac</i>
	<i>Yield/ac</i>	<i>Price/Unit</i>	<i>Return</i>	<i>Year</i>		
<i>First Thinning</i>						
<i>Pulp Wood (cords)</i>	4.3	\$22.4	\$96.3	20		
<i>Chip-n-saw (cords)</i>	6.8	\$83.3	\$566.4	20		
<i>Sub-Total</i>			\$662.8	20	\$268.3	0.40485
<i>Second Thinning</i>						
<i>Pulp Wood (cords)</i>	0.8	\$22.4	\$17.9	25		
<i>Chip-n-saw (cords)</i>	6.1	\$83.3	\$508.1	25		
<i>Sawtimber (board feet)</i>	0.3	\$245.2	\$73.6	25		
<i>Sub-Total</i>			\$599.6	25	\$193.6	0.3229
<i>Final Harvest</i>						
<i>Pulp Wood (cords)</i>	0.4	\$22.4	\$9.0	30		
<i>Chip-n-saw (cords)</i>	3.6	\$83.3	\$299.9	30		
<i>Sawtimber (board feet)</i>	2.3	\$245.2	\$564.0	30		
<i>Sub-Total</i>			\$872.8	30	\$224.8	0.2576
Present Value (Total)					\$686.8	
<i>(In today's' dollars)</i>						
Average Annual Return					\$42.8	0.0623

Appendix Tables B1, B2, C1 and C2 ‘Present Value Cost, Average Annual Cost, Average Annual Net Return’ 1/ 2/

Table B1. Afforestation Pasture Conversion

Longleaf Pine Costs:		<i>Year</i>	<i>Present</i>	<i>Discount</i>	<i>w/WHIP</i>	<i>w/EQIP</i>
	<u>Cost/ac</u>	<u>Occurred</u>	<u>Value</u> <u>/ac</u>	<u>Amort/Fac</u>	<u>Payment</u>	<u>Payment</u>
<i>Establishment costs</i>						
<i>Planting (450 seedling)</i>	\$139.0					
<i>Herbicide med. Cover</i>	\$83.0					
<i>Mech. Deep rip</i>	\$33.0					
<u><i>Post Plant Herbicide</i></u>	<u>\$66.0</u>					
Total Establishment	\$321.0	1	\$321.0		\$32.10	\$80.25
<i>Age 3 Competition Release</i>						
<i>Banded herbicide appl.</i>	\$83.0	3	\$72.5	0.87316	\$18.12	\$36.24
<i>Age 6 Burn</i>	\$29.0				\$2.21	\$5.53
<u><i>and Fire break Constr.</i></u>	<u>\$53.0</u>				<u>\$10.10</u>	<u>\$20.20</u>
Total age 6 burn	\$82.0	6	\$62.5	0.76241		
<i>Age 8 Burn</i>	\$29.0	8	\$20.2	0.69649	\$2.02	\$5.05
<i>Age 10 Burn</i>	\$29.0	10	\$18.5	0.63628	\$1.85	\$18.45
<i>Age 12 Burn</i>	\$29.0	12	\$16.9	0.58127	\$1.69	\$16.86
<i>Age 14 Burn</i>	\$29.0	14	\$15.4	0.53101	\$1.54	\$15.40
<i>Age 28 Burn</i>	\$29.0	28	\$8.2	0.28197	\$8.18	\$8.18
Total Present Value			\$535.1		\$77.8	\$206.2
Total Average Annual Costs			\$33.3	0.0623	\$4.8	\$12.8

	<i>W/out</i>	<i>w/WHIP</i>	<i>w/EQIP</i>
	<u>Payment</u>	<u>Payment</u>	<u>Payment</u>
Total Average Annual Benefits	\$36.3	\$36.3	\$36.3
Longleaf Pine Net Return	\$3.0	\$31.5	\$23.5

Appendix Tables B1, B2, C1 and C2 ‘Present Value Cost, Average Annual Cost, Average Annual Net Return’ 1/ 2/

Table B2. Afforestation Pasture Conversion					
Loblolly Pine Costs:		<i>Year</i>	<i>Present</i>	<i>Discount</i>	<i>w/EQIP</i>
	<u>Cost/ac</u>	<u>Occurred</u>	<u>Value /ac</u>	<u>Amort/Fac</u>	<u>Payment</u>
<i>Establishment costs</i>					
<i>Planting (450 seedling)</i>	\$112.0				
<i>Herbicide med. Cover</i>	\$83.0				
<i>Mech. Deep rip</i>	\$33.0				
<i>Post Plant Herbicide</i>	\$66.0				
<i>Total Establishment</i>	\$294.0	1	\$294.0		\$147.00
<i>Age 3 Competition Release</i>					
<i>Banded herbicide appl.</i>	\$83.0	3	\$72.5	0.87316	\$36.24
<i>Age 6 Burn</i>	\$0.0				
<i>and Fire break Constr.</i>	\$0.0				
<i>Total age 6 burn</i>	\$0.0	6	\$0.0	0.76241	\$0.00
<i>Age 8 Burn</i>	\$0.0	8	\$0.0	0.69649	\$0.00
<i>Age 10 Burn</i>	\$83.0	10	\$52.8	0.63628	\$52.81
<i>Age 12 Burn</i>	\$29.0				\$0.00
<i>and Fire break Constr.</i>	\$53.0				
<i>Total age 12 burn</i>	\$82.0	12	\$47.7	0.58127	\$47.66
<i>Age 14 Burn</i>	\$29.0	14	\$15.4	0.53101	\$15.40
<i>Age 28 Burn</i>	\$29.0	28	\$8.2	0.28197	\$8.18
Total Present Value			\$490.5		\$307.3
Total Average Annual Costs			\$30.6	0.0623	\$19.1

	<i>W/out Payment Rate</i>	<i>w/EQIP Payment</i>
Total Average Annual Benefits	42.8	42.8
Loblolly Pine Net Return	\$12.2	\$23.7

Appendix Tables B1, B2, C1 and C2 ‘Present Value Cost, Average Annual Cost, Average Annual Net Return’ 1/ 2/

Table C1. Reforestation Regeneration Harvest - Artificial Regeneration

Longleaf Pine Costs:	<u>Cost/a</u> <u>c</u>	<u>Year</u> <u>Occurre</u> <u>d</u>	<u>Present</u> <u>Value /ac</u>	<u>Discount</u> <u>Amort/Fa</u> <u>c</u>	<u>w/WHIP</u> <u>Paymen</u> <u>t</u>	<u>w/EQIP</u> <u>Paymen</u> <u>t</u>
<i>Establishment costs</i>						
<i>Planting (450 seedling)</i>	\$139.0				\$13.90	\$34.75
<i>Herbicide med. Cover</i>	\$125.0				\$12.50	\$31.25
<i>Prescribed burn w/</i>	\$29.0				\$2.90	\$7.25
<i>fire break total</i>	\$53.0				\$13.25	\$26.50
<i>Mech.Debris dispersal</i>	\$129.0				\$12.90	\$32.25
<i>Post Plant Herbicide</i>	\$83.0				\$8.30	\$20.75
Total Establishment	\$558.0	1	\$558.0			
<i>Age 3 Competition Release</i>						
<i>Banded herbicide appl.</i>	\$83.0	3	\$72.5	0.87316	\$18.12	\$36.24
<i>Age 6 Burn</i>	\$29.0					
<i>and Fire break Constr.</i>	\$0.0					
Total age 6 burn	\$29.0	6	\$22.1	0.76241	\$2.21	\$5.53
<i>Age 8 Burn</i>	\$29.0	8	\$20.2	0.69649	\$2.02	\$5.05
<i>Age 10 burn</i>	\$29.0	10	\$18.5	0.63628	\$1.85	\$18.45
<i>Age 12 Burn</i>	\$29.0	12	\$16.9	0.58127	\$1.69	\$16.86
<i>Age 14 burn</i>	\$29.0	14	\$15.4	0.53101	\$1.54	\$15.40
<i>Age 28 Burn</i>	\$29.0	28	\$8.2	0.28197	\$8.18	\$8.18
Total Present Value			\$731.7		\$99.3	\$258.4
Total Average Annual Costs			\$45.6	0.0623	\$6.2	\$16.1

	<u>W/out</u> <u>Payment</u> <u>Rate</u>	<u>w/WHIP</u> <u>Paymen</u> <u>t</u>	<u>w/EQIP</u> <u>Paymen</u> <u>t</u>
Total Average Annual Benefits	\$36.3	\$36.3	\$36.3
Longleaf Pine Net Return	-\$9.3	\$30.1	\$20.2

Appendix Tables B1, B2, C1 and C2 ‘Present Value Cost, Average Annual Cost, Average Annual Net Return’ 1/ 2/

Reforestation Regeneration Harvest - Artificial Regeneration					
Table C2.					
Loblolly Pine Costs:		<i>Year</i>	<i>Present</i>	<i>Discount</i>	<i>w/EQIP</i>
	<u>Cost/ac</u>	<u>Occurred</u>	<u>Value /ac</u>	<u>Amort/Fac</u>	<u>Payment</u>
<i>Establishment costs</i>					
<i>Planting (450 seedling)</i>	\$112.0				
<i>Herbicide med. Cover</i>	\$125.0				
<i>Prescribed burn w/</i>					
<i>fire break total</i>	\$82.0				
<i>Mech.Debris dispersal</i>	\$129.0				
<i>Post Plant Herbicide</i>	\$83.0				
Total Establishment	\$531.0	1	\$531.0		\$265.50
<i>Age 3 Competition Release</i>					
<i>Banded herbicide appl.</i>	\$83.0	3	\$72.5	0.87316	\$36.24
<i>Age 6 Burn</i>	\$0.0				
<i>and Fire break Constr.</i>	\$0.0				
Total age 6 burn	\$0.0	6	\$0.0	0.76241	\$0.00
<i>Age 8 Burn</i>	\$0.0	8	\$0.0	0.69649	\$0.00
<i>Fall herbicide release</i>	\$83.0	10	\$52.8	0.63628	\$26.41
<i>Age 12 Burn</i>	\$29.0				
<i>and Fire break Constr.</i>	\$0.0				
Total age 12 burn	\$29.0	12	\$16.9	0.58127	\$16.86
<i>Age 14 burn</i>	\$29.0	14	\$15.4	0.53101	\$15.40
<i>Age 28 Burn</i>	\$29.0	28	\$8.2	0.28197	\$8.18
Total Present Value			\$696.7		\$368.6
Total Average Annual Costs			\$43.4	0.0623	\$23.0

	<i>W/out</i>	<i>w/EQIP</i>
	<i>Payment</i>	<i>Payment</i>
	<i>Rate</i>	<i>Rate</i>
Total Average Annual Benefits	42.8	42.8
Loblolly Pine Net Return	-\$0.6	\$19.8

1/ Yields and cost estimates provided by NRCS State Forester. Prices from Louisiana Department of Agriculture and Forestry, Baton Rouge, LA.

2/ Present day and average annual values based upon discount and amortization factors for 4.625% (09' national projects