Financial Returns for Mid-Rotation Release in the Southeast

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We create chemistry

Forest Landowner Objectives

Income

- Wildlife Management
- Recreation
- Legacy



Landowner objectives vary but all can be optimized through active forest management!



Potential Income Streams from Southern Forest Investments

- Timber Income
- Hunting Leases
- Pine Straw







Return on Investments in Timber Management

"Growth lost early in a pine stand will never will recaptured"





Return on Investments of Timber Management

- Manage vegetation early
- Plant high quality seedlings
- Produce higher yields







Un-thinned Stand





Hardwood Development After Thinning





Mid-Rotation Release





Mid-Rotation Release – 1 YAT





Mid-Rotation Release 3 YAT



32 oz. Chopper GEN2 + 64 oz. Accord XRT Ground, LA



Internal

The Desired Result





- A tool to explain and compare timber management options
- Focused on mid-rotation
 - No Cost
 - Easy
 - Fast
 - Flexible
- Reports are printable



- Developed by Barry Shiver for BASF
 - University of Georgia / Smarter Forestry
- Based on Pine Management Research Cooperative Study
 - Loblolly
 - PMRC 1996-1 (Loblolly height and basal area)
 - PMRC TR2004-4 (Response to Mid-Rotation vegetation control)
 - Slash
 - PMRC 2005-3 (Response and growth & yield model)
- Combined with Virginia Tech mortality function in the FastLob model



Assumptions

- Analysis of mid-rotation release treatments (thinned or un-thinned)
- Growth and yield is based on response to competition control
 - Industry standard today
- Data for loblolly pine response is based on the average woody competition that was present in the PMRC study plots
 - In 26 of 33 (79%) of the plots woody competition comprised less than 10% of the total basal area.



Example Competition

- If you thin to a basal area of 90 (459-6 inch trees per acre)
 - 10% of the basal area (9) is equivalent to 1,800 one inch stems / ac.
 - 36 stems on a 1/50th acre plot (16.7 ft. radius)
 - 5% of the basal area (4.5) is equivalent to 900 one inch stems / ac.
 - 18 stems on a 1/50th acre plot (16.7 ft. radius)



- Tract name
- Tract size
- Species
 - Loblolly
 - Slash
- Physiographic region
 - Upper Coast Plain, Piedmont
 - Lower Coastal Plain
- Stand age
- Trees per acre
- Site Index

- Competition Type
 - Single stem hardwood
 - Waxy shrub
- Thinning and release
 - Yes / No
- Treatment cost per acre
- Products grown
 - Threshold dbh
 - Тор
 - Degrade %
 - Price per ton



150 ye	ars		SN	AR1	ER		Prepared for: Tract Name:	John Do	o <mark>e</mark> ck 2 Fort	ies	
We create	chemistry		FO	REST	FRY		Tract Size:	80.0	Acres		
			www.smart	erforestry.co	m						
Welcome to	the BASE	/Smarter Forestry	Mid-Rotati	on Vegetatio	n Control A	nalvsis An	nlication				
		/Similar i Orestry	Mild-Rotati	on vegetatio							
This spreads	heet estimat	tes return on investu	nent for mid-1	rotation vegeta	ation control	treatments i	n loblolly and slash	pine pla	ntations a	assuming	r an 8 vea
for unthinned	stands and	a 7 year investmen	t after treatme	ent for thinned	l stands			pine pin			, un o yeu
	stands and	r a 7 year investmen			i stands.						
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Decute for t	eu, just ch	ange the inputs in	yenow to yo	ur desired in	iputs. rou c	can immedi	atery see results D	y chekir	ig on the	summa	ary and C
Responses for si	analyses use	woods are based on pu	blished research	from PMRC in 2	cesearcn Coope	rauve (PMRC	y at the University of Ge	orgia ustmente u	vere made l	N Barry S	hiver of Sm
Responses for si	ligie stem nare	iwoods are based on pu	blished research				y pines. waxy stern adj			by Dairy S	
Species:	Loblolly	Physiographic Region	UCP/Pied	Use the drop dov	wn box to select	viable options	for these inputs				
Current Age:	14 V	alid values are whole nun	bers between 5	and 20							
Current rige.	1-	ind values are whole num	ibers between 5								
Trees per Acre		605	Valid values are	whole numbers t	between 300 and	1 700					
Site Index:	65 U:	se the drop down box to s	select viable optic	ons for these inpu	ts						
Competition Ty	/pe: Si	ngle stem Hardwood	Use the drop do	wn box to select	viable options fo	r these inputs					
Thinning:	Analysis for	Thin at this age and Relea	ase in one year?	Yes	Use the drop de	own box to sele	ect viable options for thes	e inputs			
				NOTE: If basa	al area for the s	pecies, age, s	site, and density is not ad 100% return on th	high enou	igh to supj Tobe - A b	port a thin ighor site	or ogo mo
				results will be		inary rabs a	lu -100 /8 letuin on th	e Graphs		igner site	of age ma
Cost per Acre f	for Treatmen	t:	\$60	(Allowable value	es are whole num	nbers between	\$10 and \$100)				
Products ¹		Threshold Dbh(in)	Top d (ob)	Degrade % ²	Price (\$/ton)						
Pine Pulpwood		4.5	2.5		\$7.00						
Pine Super PW		7.5	4	50%	\$11.00						
Pine CNS		9.5	6	25%	\$15.00						
The SAW		12.3		10%	\$25.00						
² For products the	at don't exist f	or your region, input 99 f	or the threshold d	ibn							
For degrade %	enter a propo	tion of degrade between	0 and 1 (for exa	mple .5 is 50%)							



Species Loblolly Image: Species Loblolly	150 years	SF nistry orestry Mic	l-Rotatio	F (D R E	STR ion Con	R Y trol Analy	sis Sum	mary						
Species Lobiolity Image of the stand stan		T 11 H													
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Theory ParticleSocialat age14Image: Social of the stand, there was not enough basal area tThin?Yesat age14Image: Social of the stand, there was not enough basal area tCompeting vegetationSingle stem HardwoodImage: Social of the stand, there was not enough basal area tCompeting vegetationSingle stem HardwoodImage: Social of the stand, there was not enough basal area tCompeting vegetationSingle stem HardwoodImage: Social of the stand, there was not enough basal area tCrowth Projection for Thinned and UntreatedImage: Social of the stand, there was not enough basal area tInvestment length with no thinning is 8 years; Investment period with thinning is 7 years.Image: Social of the stand, there was not enough basal area tResults by Product:TonsTonsValue (\$)Value (\$)Image: Social of the stand, there was not enough basal area tPine Pulpwood\$7.0046.046.0\$12\$39Image: Social of the stand, there was not enough basal area tPine CNS\$15.000.51.6\$12\$39Image: Social of the stand, there was not enough basal area tPine SAW\$25.000.51.6\$845\$988Image: Social of the stand, there was not enough basal area tImage: Social of the stand, there was not enough basal area tPlease run your simulation unthinned OR change site index, age, or trees per are to a combination that will support	Trees per Acre	605													
Competing vegetationSingle stem HardwoodIndicator<	Thin?	Yes	atage	14											
Treatment Cost/Acre\$60at age15Image: Construct on the stand st	Competing vegetation	Single stem Har	dwood												
Growth Projection for Thinned and Unthinned Stands were for 8 years or to age 22 Image: Construct of thinning is 8 years; Investment period with thinning is 7 years. Investment length with no thinning is 8 years; Investment period with thinning is 7 years. Tons Tons Value (\$) Value (\$) Image: Construct of thin thinning is 7 years. Results by Product: Tons Tons Tons Value (\$) Value (\$) Image: Construct of thin thin thinning is 7 years. Product Price (\$/ton) Untreated Treated Untreated Treated Image: Construct of thin thin thin thin thin thin thin thin	Treatment Cost/Acre	\$60	at age	15											
Investment length with no thinning is 8 years; Investment period with thinning is 7 years. Tons Tons Value (\$) Value (\$) Image: Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4"Colspan="4">Colspan="4"Cols	Growth Projection for T	hinned and Unt	hinned Stan	ds were for 8 y	ears or to age	22									
Results by Product:TonsTonsTonsValue (\$)Value (\$)Value (\$)IIIIIProductPrice (\$/ton)UntreatedTreatedUntreatedTreatedTreatedIII <t< td=""><td>Investment length with</td><td>no thinning is 8</td><td>years; Inve</td><td>stment period v</td><td>vith thinning is</td><td>7 years.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Investment length with	no thinning is 8	years; Inve	stment period v	vith thinning is	7 years.									
ProductPrice (\$/ton)UntreatedTreatedUntreatedTreatedIncasedInca	Results by Product:			Tons		Tons	Value (\$)	Value(\$)							
Pine Pulpwood\$7.0046.046.0\$322\$322Image: Constraint of the stand sta	Product	Price (\$/ton)		Untreated		Treated	Untre ate d	Treated							
Pine Super PW \$11.00 19.2 19.5 \$211 \$215 Image: Constraint of the stand	Pine Pulpwood	\$7.00		46.0		46.0	\$322	\$322							
Pine CNS \$15.00 20.0 27.5 \$300 \$412 Image: CNS in the stand in the	Pine Super PW	\$11.00		19.2		19.5	\$211	\$215							
Pine SAW \$25.00 0.5 1.6 \$12 \$39 Image: Constraint of the stand of	Pine CNS	\$15.00		20.0		27.5	\$300	\$412							
TOTALS 85.7 94.6 \$845 \$988 Image: state of the stand state of the stat	Pine SAW	\$25.00		0.5		1.6	\$12	\$39							
If you get 0.0 tons for treated and untreated and you were trying to thin the stand, there was not enough basal area t Please run your simulation unthinned OR change site index, age, or trees per acre to a combination that will support	TOTALS			85.7		94.6	\$845	\$988							
Please run your simulation unthinned OR change site index, age, or trees per acre to a combination that will support				If you get 0.) tons for trea	ited and u	ntreated and	you were	trying to t	hin the	stand	, there was no	t enou	gh basal a	rea to thin
				Please run y	our simulation	n unthinne	d OR change	e site inde	x, age, or	trees pe	er acr	e to a combina	ation tl	hat will su	pport a thi
The mid-rotation release resulted in production of 8.9 more tons of wood per acre and \$143 per acre more value over the 7 year investmen	The mid-rotation release resulted in production of			8.9	more tons	of wood per	acre and	\$143	per acre	e more	e value over the	7	year inves	tment.	
This amounts to \$11,475 increase in value for the stand for a \$4,800 investor						This amount	ts to	\$11,475	increase	e in va	lue for the stan	d for a	\$4,800	investment	
The marginal rate of return for the investment of \$60 13.3%	The marginal rate of ret	urn for the inve	stment of		\$60	13.3%									
Negative returns mean that the treatment gained less than the cost of the treatment			•		1 1 62	Negative r	eturns mean t	hat the trea	itment gain	ed less th	han the	e cost of the tre	atment		1
NOTE: These return on investment percentages are based off computer models that on average represent responses to treatment for pine plantations in the South.	NOTE:	These return on	investment	percentages an	re based off co	mputer mod	iels that on av	erage repro	esent respo	nses to t	reatme	ent for pine plar	itations	in the Sou	n.



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150 years			30	I AA	\ DTI	FD -		Pre	pared for:	John Doe				
H-DAG			mer	IVI				Tra	ct Name:	The Back	2 Forties	;		
LI-BAS					E C T	DV								
We create chemi	stry			UK	EJI	R I		Tra	ct Size:	80.0	Acres			
								_						
BASE/Smorter Fo	roctry I	Mid Dote	tion Co	marterio	Vegetation	Control	Anolycic	Pos	lte for					
John Doe	The B	nd-Kota	ties	80.0	Acres	Condorz	marysis	Resi	101					
An investment of	\$60	resulted i	n a margi	nal rate of i	return of	13.3%	over an i	investi	ment period of	7	vears.			
On a per tract basis an in	vestment	of	\$4,800	returned	\$11,475	1010 / 0	over uni		nene period or		years			
NOTE:	These ret	urn on inves	tment perc	entages are	based off com	puter models	that on ave	erage re	epresent respons	es to treatme	nt for pine p	lantations in the	South.	
	There is v	ariability in	response f	rom stand to	stand and neit	her BASF no	r Smarter F	orestry	guarantee that	any user will	obtain the e	stimated respons	se in any stand.	
By comparison, the S&	P 500 ov	er the sam	e time pe	riod to 1/1/	15 returned	5.0%	and inflat	tion ac	ljusted	3.3%				
with dividends include	n the S&	r returns v	ere	7.376	and infraction	adjusted	5.076		Comp	arison of	the invest	tment in mie	d-rotation ve	getation
S&P	5.0%	value \$6.732							contro	ol vs stock	s for this	stand over t	he investmer	it period
S&P + Dividends	3.3%	\$6,021						\$14	,000					
S&P Inflation Adj.	7.3%	\$7,845						\$12	000					
S&P Inf. Adj+ Div.	5.6%	\$7,015												
Woody Veg. Control	13.3%	\$11,475						\$10	,000					
Value is the value of	\$4,800	invested	at the end	l of the invo	estment perio	bd	.	\$8	,000					
The comparison of val	ues for a	\$4,800	investme	nt vs. stock	ks is shown g	raphically h	$ \rightarrow $	\$6	,000					
If Woody Veg. Control	ROI is -1	100% and y	ou were t	rying to thi	n, your comb	ination		\$4	.000					
of site index, trees per	acre, and	l age did no	ot result i	n a stand wi	th enough ba	sal area Sthese foots			000					
to thin. Please run you that will support a thin.	r simulat	ion unthinr	ed OK cr	ange to a c	ombination o	i these facto	rs	\$2	,000					
Negative returns mean	the trea	tment retu	rned less	than the co	st of the trea	atment			\$0					
Product	UT Tons	T Tons	Added To	n: UT Value	T Value	Added Valu	e		58	۹۷ ח	S&P + ividends	S&P Inflation	+ Div	Woody Veg.
Pine Pulpwood	46.0	46.0	0.0	\$322	\$322	2 \$0		_			Iviacitas	Auj.		control
Pine Super PW	19.2	19.5	0.3	\$211	\$215	5 Ş4								
Pine SAW	0.5	1.6	1.1	\$300	\$39	9 \$27								
TOTAL	85.7	94.6	8.9	\$845	\$988	8 \$143								
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	Add	ed Produ	tion by	Product f	or Release					٨ط	had Value	by Product	for Peleaso	
10.0			~~~~					\square	¢160	Au	acu value	. sy riouuci	ior neiease	
10.0									Ş160 —					



- Tract size: 80 acres
- Species: Slash
- Physiographic region: LCP
- Stand age: 15
- Trees per acre: 600
- Site Index: 65
- Competition Type: Waxy shrubs
- Thinning: Yes
- Treatment cost per acre: \$90

Products ¹	Threshold Dbh(in)	Top d (ob)	Degrade % ²	Price (\$/ton)
Pine Pulpwood	6.0	2.5		\$6.00
Pipe Super PM	6.0	2.5	100%	00 A2
	0.0	2.5	100 %	φ0.00
Pine CNS	10.0	6	30%	\$17.00
Pine SAW	12.0	8	30%	\$22.00



Results by Product:		Tons	Tons	Value (\$)	Value(\$)
Product	Price (\$/ton)	Untreated	Treated	Untreated	Treated
Pine Pulpwood	\$6.00	75.0	78.9	\$450	\$473
Pine Super PW	\$6.00	0.0	0.0	\$0	\$0
Pine CNS	\$17.00	13.8	21.5	\$235	\$365
Pine SAW	\$22.00	0.3	1.0	\$6	\$23
TOTALS		89.2	101.3	\$692	\$860

A mid-rotation release investment of \$7,200

- Produced <u>12.2</u> more tons
- Added <u>\$169</u> per acre over 7 years
- Increased value by <u>\$13,518</u>
- Resulted in a <u>9.4%</u> rate of return















Conclusion

- There is a strong financial return for a mid-rotation release treatment in this situation
- Timber returns tend to be countercyclical to the stock market
- Good portfolio diversification tool



- Tract size: 80 acres
- Species: Loblolly
- Physiographic region: UCP / Piedmont
- Stand age: 14
- Trees per acre: 600
- Site Index: 75
- Competition Type: Single stem woody
- Thinning: Yes
- Treatment cost per acre: \$85

Products ¹	Threshold Dbh(in)	Top d (ob)	Degrade % ²	Price (\$/ton)
Pine Pulpwood	6.0	2.5		\$6.00
Pine Super PW	6.0	2.5	100%	\$6.00
Pine CNS	10.0	6	30%	\$17.00
Pine SAW	12.0	8	30%	\$22.00



Results by Product:		Tons	Tons	Value (\$)	Value(\$)
Product	Price (\$/ton)	Untreated	Treated	Untreated	Treated
Pine Pulpwood	\$6.00	66.3	66.3	\$398	\$398
Pine Super PW	\$6.00	0.0	0.0	\$0	\$0
Pine CNS	\$17.00	28.0	33.1	\$476	\$563
Pine SAW	\$22.00	7.3	11.7	\$161	\$258
TOTALS		101.5	111.1	\$1,034	\$1,218

A mid-rotation release investment of \$6,800

- Produced <u>9.5</u> more tons
- Added <u>\$184</u> per acre over 7 years
- Increased value by <u>\$14,727</u>
- Resulted in a <u>11.7%</u> rate of return















Conclusion

- There is a strong financial return for a mid-rotation release treatment in this situation
- Timber returns tend to be countercyclical to the stock market
- Good portfolio diversification tool



Financial Projections

Consult your financial planner for projections based on your portfolio.

- Based on your investment risk tolerance
- Specific investments
- Tailored to your situation



Now you have a tool to demonstrate to a landowner the benefits of an investment in mid-rotation release treatments!



Limitations

- Maximum rotation is 28 years
 - Increase in higher value products may require more years
- Does not include thinning income in returns
- Only allows for one thinning
- Site index range 55 75

Conclusion

- There is a strong financial return for mid-rotation release treatments in most situations!
- Competition control significantly increases crop tree volume growth



- How do you have an evaluation done?
 - Contact your local BASF ProVM Distributor





BASF Mid-Rotation Release Options

- Aerial Overstory
 - Arsenal AC
- Ground Understory
 - Chopper GEN2
 - Arsenal AC
 - Detail
 - Finale VU







Don't Forget Site Preparation!





Don't Forget Wilding Pine Control

June Application

2 MAT



2 oz. Detail + 4 qts. Accord XRT + 40 oz. Chopper GEN2





Internal

BASF ProVM Podcasts

- 5 7 Minute Podcasts
 - Posted on the ProVM website
 - Timely subjects

www.bettervm.basf.us





BASF ProVM Webinars

15 – 30 Minutes

- Slides and Audio
- Posted on the ProVM website
- Timely subjects



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Visit our website at <u>www.bettervm.basf.us</u> for additional product information!



Internal

Thank You!





Internal

