

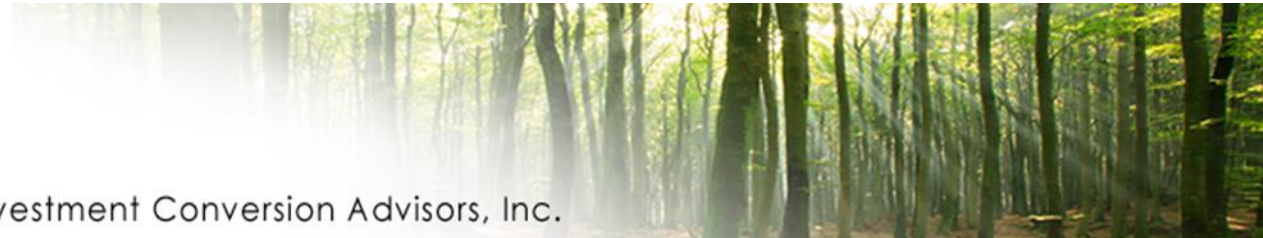
Single Tree Inventory & Forest Economic Modeling

By

Gary Cantrell – Atica, Inc.



Affiliated Timber Investment Conversion Advisors, Inc.



Presented at
43rd National Indian Timber Symposium
June 10, 2019
Hollywood, FL

Single Tree Inventory & Forest Economic Modeling Perspective

The evolution from forest sampling to LIDAR forest census has arrived.

Northwest Management, Inc., with their highly innovative and successfully proven Single-Tree Inventory capability have, for the first time, enabled our Atica Consortium to model using PSPR Suite© every individual tree in a stand through the forest products value chain and back to the acre (RTA).



Presentation Objectives

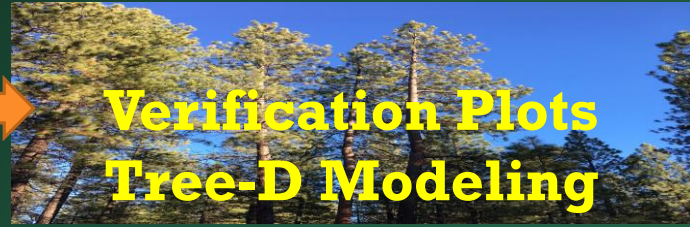
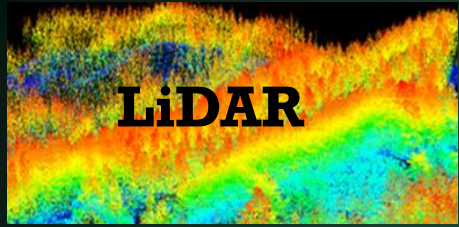
Forestland Economic Modeling using **Single-Tree Inventory** to evaluate:

- Return to Log (RTL) – net market value of each tree processed in a mill
- Return to Stump (RTS) – RTL value less harvest/haul cost to origin point
- Return to Acre (RTA) – summation of RTL values (not just sawtimber) and unique costing for all fiber utilization value chain components from an acre

Gain perspective on potential benefits of employing **PSPR Suite**®:

- Can inform and assist with strategic planning for capital projects
- Can inform and provide an advantage to harvest planning (location & timing)
- Can inform and provide an advantage to guide log marketing efforts
- Can provide insights for timber utilization, investment or forest management
- Can inform and assist with RFP proposal filtering & qualification
- These tools are user friendly and currently available.

FORESTLAND ECONOMIC ANALYSIS



**Single Tree Inventory, FVS
Modeling, Log Segments x Grade**

**Economic performance and financial analysis with:
PSPR Suite© Modeling**



**PILOT
Iterations**

**SIM
Financials**

- Profit Loss
- Cash Flow
- Balance Sheet
- Debt Metrics

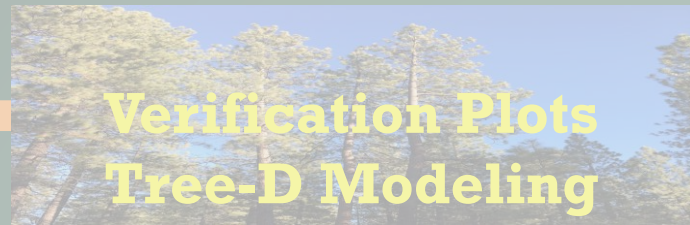
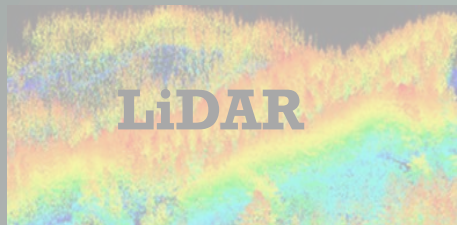
Risk Analysis

**Return to Acre
Calculations**

**POP Analysis
(by use & yr.)**

**RTA
Heat Maps**

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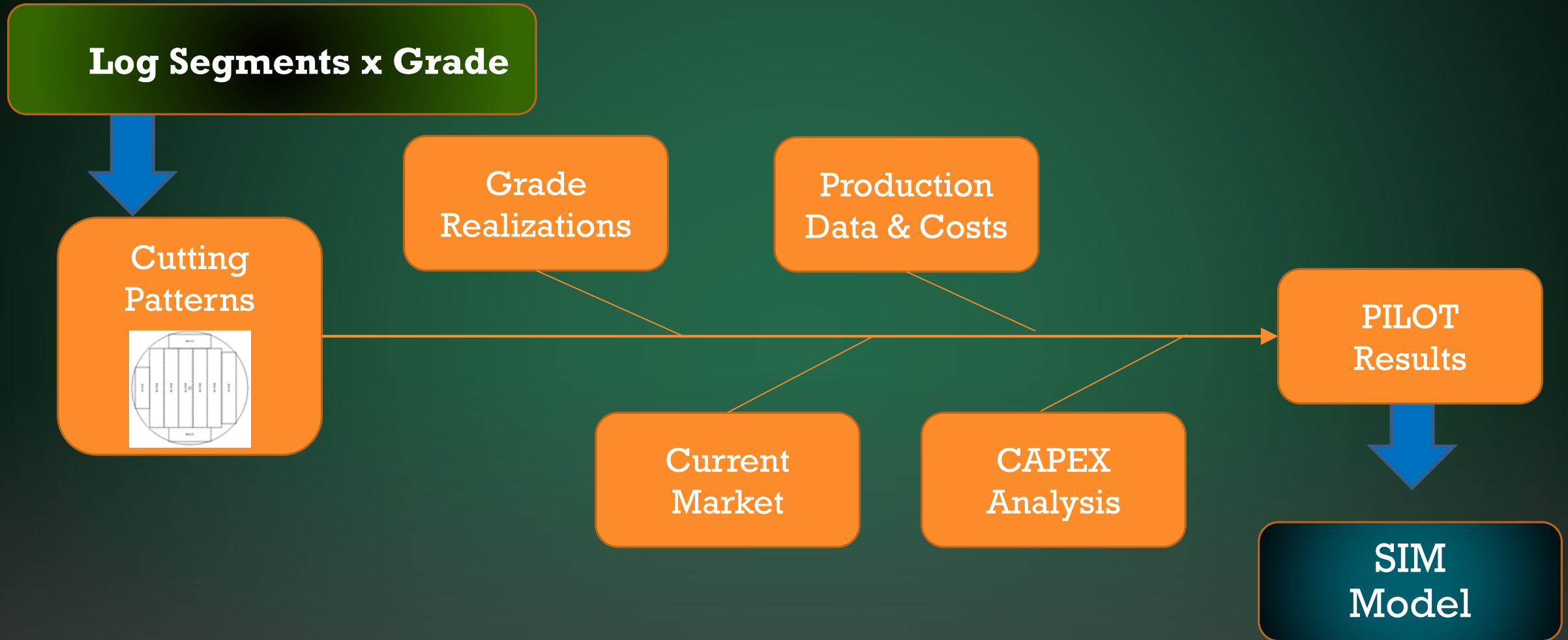
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PILOT - METHODOLOGY



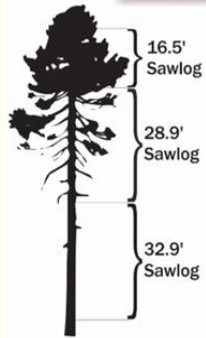
Modeling using PILOT

Lidar tree measurement attributes

Species	DBH	Height	Crown Ratio	Defect			Branch diameter			Branch count			Latitude	Longitude
				Bot	Mid	Top	Bot	Mid	Top	Bot	Mid	Top		
PP	18.5	75.44	40%	5.74	8.10	13.30	1.82	2.83	2.84	5.02	9.06	12.45	33.74271102	-109.59665231
DF	17.3	78.72	70%	4.09	4.07	6.22	1.23	1.58	1.62	11.43	15.50	17.01	33.74270471	-109.59681109
DF	15.3	78.72	70%	4.12	4.08	6.25								
DF	17.9	88.56	70%	4.37	4.16	6.60								
PP	15.6	68.88	40%	6.01	8.19	13.74								
PP	13.5	59.04	40%	6.65	8.40	14.78								
PP	9.9	36.08	40%	7.95	8.83	16.90								
ES	13.2	55.76	60%	9.85	9.59	10.10								
DF	13.8	72.16	70%	3.91	4.02	5.97								
DF	17.3	78.72	70%	4.14	4.09	6.28								
PP	11.1	65.6	40%	6.25	8.27	14.14								
PP	19.7	88.56	40%	4.94	7.83	11.99								
PP	29.5	108.24	50%	3.79	7.44	10.11								
PP	16.1	72.16	40%	5.84	8.13	13.45								

Timber cruise tree measurement attributes

Species	DBH	Height	Crown Ratio	Defect			StandID
				Bot	Mid	Top	
PP	18.5	75.44	40%	5.74	8.10	13.30	TN0066
DF	17.3	78.72	70%	4.09	4.07	6.22	TN0066
DF	15.3	78.72	70%	4.12	4.08	6.25	TN0066
DF	17.9	88.56	70%	4.37	4.16	6.60	TN0066
PP	15.6	68.88	40%	6.01	8.19	13.74	TN0066
PP	13.5	59.04	40%	6.65	8.40	14.78	TN0066
PP	9.9	36.08	40%	7.95	8.83	16.90	TN0066
ES	13.2	55.76	60%	9.85	9.59	10.10	TN0066
DF	13.8	72.16	70%	3.91	4.02	5.97	TN0066
DF	17.3	78.72	70%	4.14	4.09	6.28	TN0066



Stem merchandizing
Determines number of logs and log lengths in tree.
(Most desirable products and lengths are cut first)

Log distribution table

SED	# of Segments	Segment Length	Rough %	CF x SED	BF x CF
5	-	-	-	-	-
6	67.0	15.25	44%	390.66	3.21
7	5.0	15.75	41%	37.99	3.08
8	17.5	14.65	45%	151.02	2.53
9	7.0	14.97	37%	64.73	3.46
10	13.6	15.59	44%	181.20	3.78
11	9.1	15.35	36%	144.33	3.76
12	8.4	15.11	44%	152.89	3.95

Log Segment Population

Log Segment Population(s)
Atica Consortium supplied:
LiDAR with Quality Attributes (preferred)

Segment Population(s)
Client supplied:
Conventional Timber Cruise
Yard Scaled Population
Optimizer Processed Segments



Ponderosa Pine – Characteristics affecting product quality



Tree "A"

3 16-ft log segments

1 10.4" SED P-I type

1 14.2" SED P-I type

1 17.2" SED P-I type

Total Scale Scribner

Dec. C

= 390BF



Tree "B"

3 16-ft log segments

1 10.2" SED P-II type

1 15.4" SED P-II type

1 19.0" SED P-II type

Total Scale Scribner

Dec. C

= 470BF

PILOT MODEL – In-SD Table

Segment Distribution Table

Segment distributions are product of geospatially-located Single-Tree Inventory.
(by Northwest Management, Inc.)

Precise tree location markers are included in the SIM Model database. Trees are grown in modified FVS Model, the client harvest prescription is applied, the crop trees are “harvested” and merchandized according to market specifications. Resulting acre-specific segment populations are provided to Atica.
(by Delphi Advisors)

Segment population can be modeled individually or “grouped” (**Column 12**) to emulate a period harvesting plan.

SED (inches)	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input checked="" type="checkbox"/>	4 <input checked="" type="checkbox"/>	5 <input checked="" type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	10 <input type="checkbox"/>	11 <input type="checkbox"/>	12
Source Name	2019 A14 PI	2019 A14 PII	2019 B177 P	2019 B177 PII	2019 B177 P3	2020 B92 PI	2020 B92 PII	2020 C33 P	2020 C33 PII	2020 C33 P3		
	10	90		90	50	10	90		90	50		48.8
5					13,687					26,660		13,687
6					7,989					12,762		7,989
7					10,633					20,067		10,633
8					12,831					25,700		12,831
9					15,892					27,336		15,892
10					12,005					21,004		12,005
11	338	4,856	1,887	6,905	874	1,272	7,041	4,455	18,038	2,018		9,666
12	462	2,723	2,577	4,609	382	1,584	5,562	7,003	13,486	608		7,568
13	520	1,473	2,778	2,721	275	1,891	4,019	7,395	8,121	575		5,774
14	496	591	2,831	1,501	160	2,034	2,305	7,846	4,373	285		4,492
15	451	237	2,570	675	28	1,891	1,184	7,053	2,005	49		3,273
16	305	96	2,187	494		1,452	622	5,734	1,392	2		2,681
17	191	40	1,638	292		1,146	306	4,305	805	5		1,930
18	127	19	1,347	192		846	153	3,367	500	1		1,539
19	94	12	1,112	152		650	103	2,800	402	0		1,264
20	62	12	797	156		457	91	2,115	425			953
21	36	8	621	150		310	75	1,544	384			771
22	34	4	451	60		272	36	1,310	176			511
23	15	2	299	42		196	28	815	120			341
24	16	2	162	28		127	22	458	81			190
25	3	-	75	18		87	21	166	40			93
26	2	-	26	4		50	8	53	8			30
27	-	-	17	2		28	4	8	1			19
28	-	-	1	-		7	1	1	-			1
29	-	-	1	-		6	-	-	-			1
30	-	-	-	-		4	-	-	-			-

Unit #
B-177

Unit #
C-33

Modeling using PILOT

Cutting Pattern DB

Patterns are drawn:

Every 2/10" SED diameter
5.0" to 30.0"

Emulate every pattern the mill equipment
can execute including every product the
market desires from this species



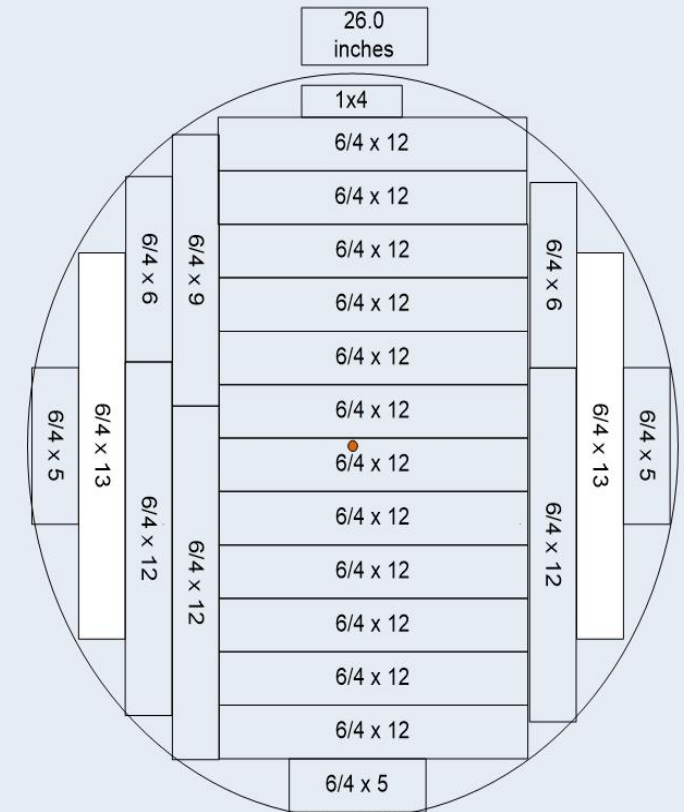
Cutting Pattern & Grade Realization DB

Grade Realization DB

Developed for every product by:

Segment SED on 2/10"

Product Details - thickness, width & length
Industry or proprietary grade classification



Modeling using PILOT



Primary Log Breakdown **Client defined:**

Throughput capability in segments/min.
SED tributary to each breakdown system
Quality attributes of segment population
Trim factors for respective product types
Mill operating shifts and hours - scheduling

Mill Emulation Process

Costing through mill processing **Client defined:**

Manufacturing Costs – FC & VC by department
Manning by department, payrates & burden
Drying costs – product specific
Surfacing costs – product specific

Additional Mill, Market & Product data

Client defined:

Product Prices – by T x W x L x Grade
Biomass Prices - internal & external sales
Drying schedules by product
Surfacing throughput rates by product



PILOT MODEL – In-PV Table

Mill Production Rate Segments per minute

Four (4) primary breakdown systems were modeled, singularly or in pairs (*to better utilize the segment population from 4.6" to 30.0" SED*).

Mill facility with all customary infrastructure;

- logyard & debarking
- waste collection & handling
- Gang Edger & Board Edgers – optimized
- Trimming & Sorting – optimized, automated
- Wood waste or fossil-fuel Boiler
- sufficient kiln capacity for every scenario
- sufficient planning capacity for every scenario
- mechanical & electrical maintenance staff
- labor, administrative & sales staff, all burden

Segment piece rate per minute by SED diameter, (*net of downtime*).

Production Rate (<i>net of downtime</i>)							
Headrig		End Dogger		Sharp Ch. Twin		DDM-10	
SED	logs / Minute	SED	logs / Minute	SED	logs / Minute	SED	logs / Minute
5.0		5.0		5.0	5.35	5.0	8.55
6.0		6.0		6.0	5.35	6.0	8.55
7.0		7.0		7.0	5.35	7.0	8.55
8.0		8.0	3.61	8.0	5.28	8.0	8.54
9.0		9.0	3.68	9.0	5.02	9.0	8.53
10.0		10.0	3.70	10.0	4.84	10.0	8.23
11.0		11.0	3.68	11.0	4.81	11.0	8.01
12.0	1.00	12.0	3.65	12.0	4.75	12.0	7.66
13.0	0.98	13.0	3.58	13.0	4.66	13.0	-
14.0	0.95	14.0	3.50	14.0		14.0	-
15.0	0.91	15.0	3.43	15.0	-	15.0	-
16.0	0.88	16.0	3.35	16.0	-	16.0	-
17.0	0.84	17.0	3.28	17.0	-	17.0	-
18.0	0.81	18.0	3.12	18.0	-	18.0	-
19.0	0.78	19.0	2.97	19.0	-	19.0	-
20.0	0.76	20.0	2.81	20.0	-	20.0	-
21.0	0.73	21.0	2.66	21.0	-	21.0	-
22.0	0.71	22.0	2.50	22.0	-	22.0	-
23.0	0.66	23.0		23.0	-	23.0	-
24.0	0.63	24.0		24.0	-	24.0	-
25.0	0.61	25.0		25.0	-	25.0	-
26.0	0.58	26.0		26.0	-	26.0	-
27.0	0.56	27.0		27.0	-	27.0	-
28.0	0.53	28.0		28.0	-	28.0	-
29.0	0.51	29.0		29.0	-	29.0	-
30.0	0.48	30.0		30.0	-	30.0	-

Pine Sawmill Configuration/Investment Scenarios

Modeling: Forest & Sawmill Interdependent Alternatives

- Lumber Products are:
 - KD S4S 1x4 – 1x12 8' – 16'
 - KD S2S 6/4RW Industrial Shop grades 8' – 16'
- Six (6) different mill configurations were modeled with the Unit# B-177 segment population, using the same cutting pattern, same lumber prices, etc.
- Variable operating costs & manpower are carefully input for each mill configuration

Pine Sawmill Configuration/Investment Scenarios

Exhibits:

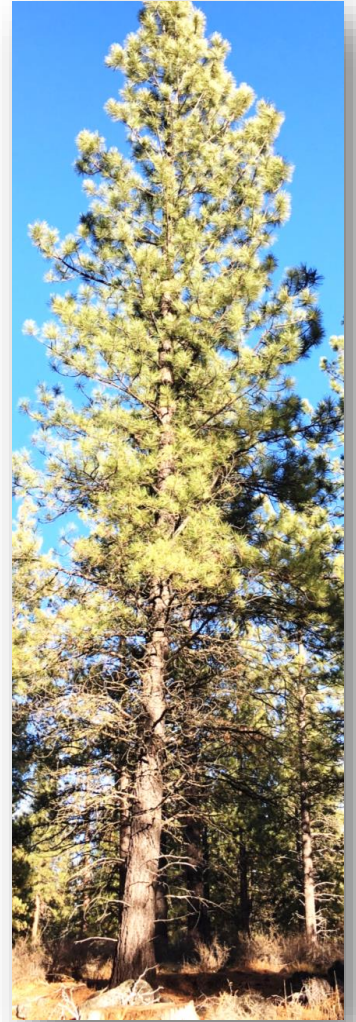
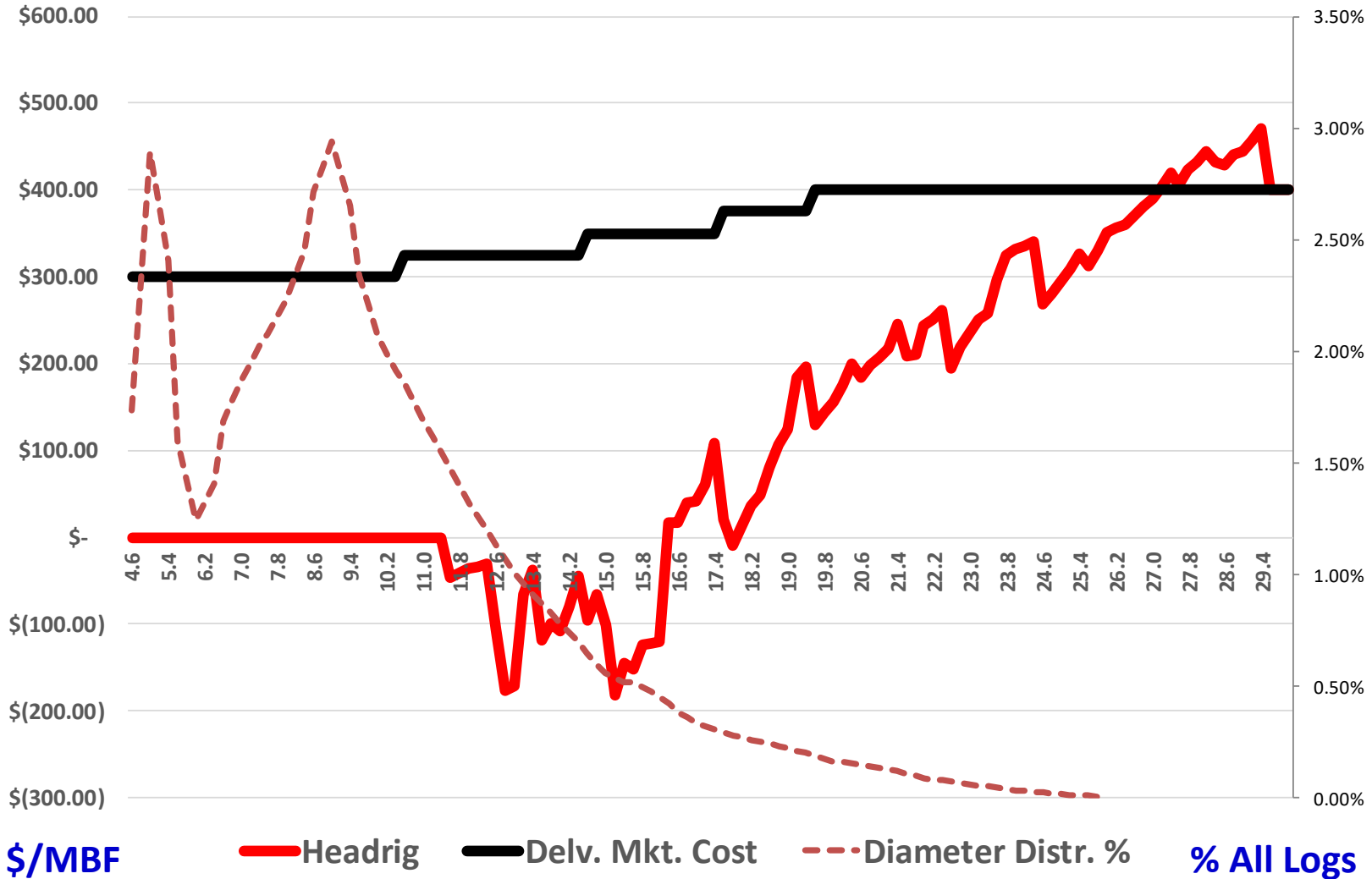
- **Slide #15** – Headrig Only, **using Unit# B-177 segment population**
- **Slide #16** – Headrig + Sharp Chain Twin, B-177
- **Slide #17** – Headrig + DDM-10, B-177
- **Slide #18** – Headrig + End Dogger, B-177
- **Slide #19** – End Dogger + Sharp Chain Twin, B-177
- **Slide #20** – End Dogger + DDM-10, B-177
- **Slide #21** – End Dogger + DDM-10, **using Unit #C-33 segment population**
- **Slide #22** – Financial performance recap – All Scenarios, B-177
- **Slide #23** – Breakeven Log Hauling Miles - All Scenarios, B-177



Configuration/Investment Scenarios

B-177

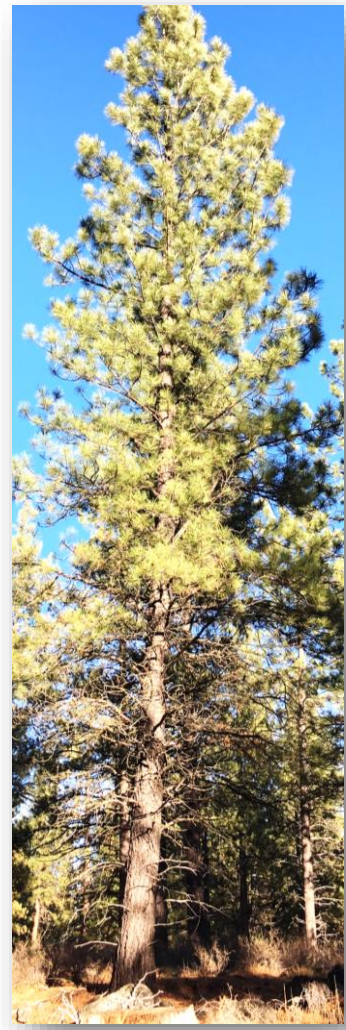
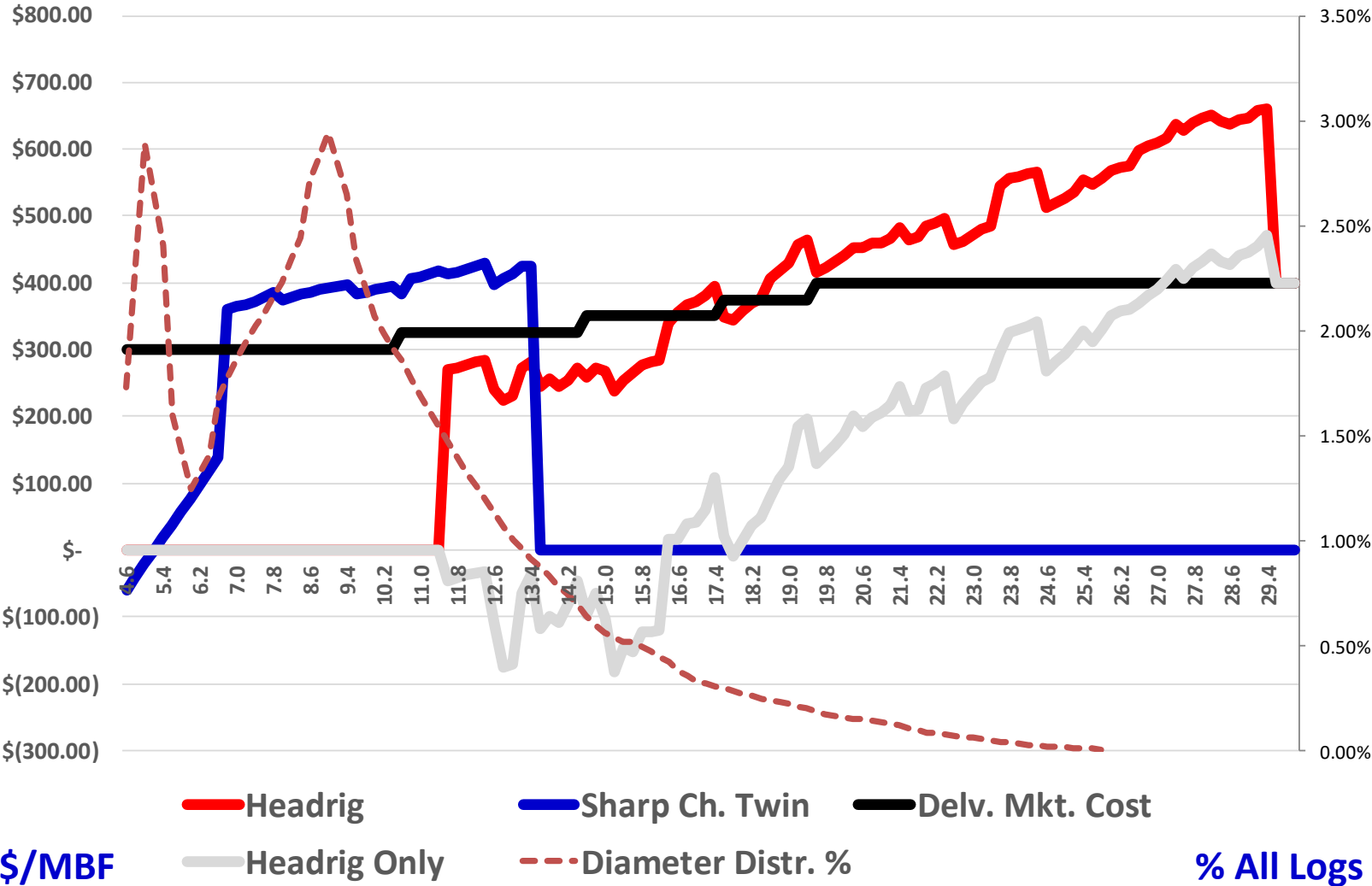
Breakeven Delivered Log Cost (per MBF)
Headrig Only



Configuration/Investment Scenarios

B-177

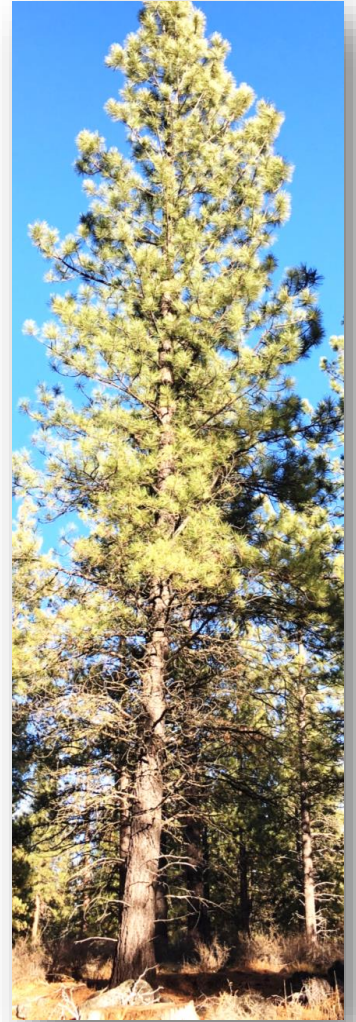
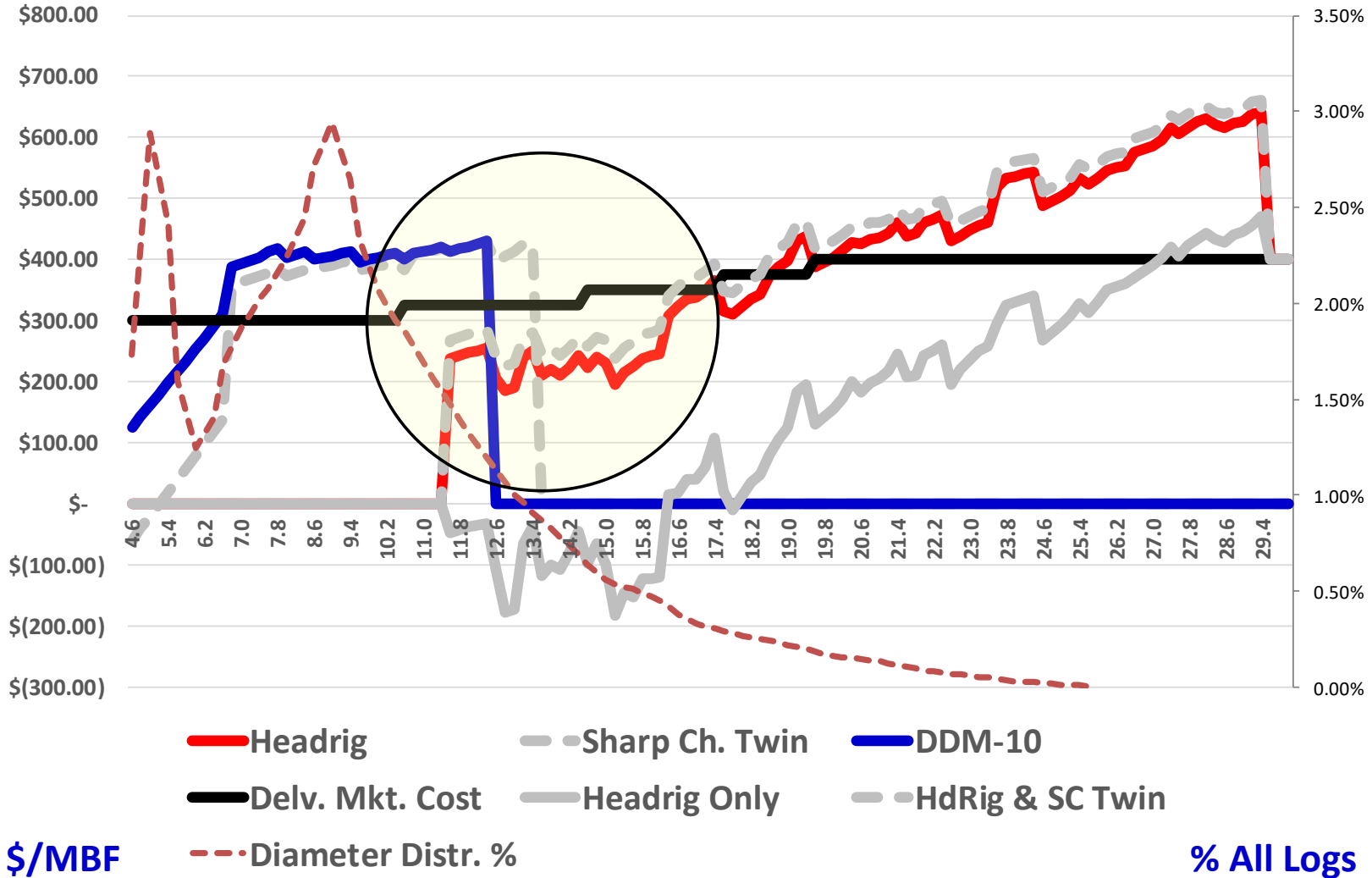
Breakeven Delivered Log Cost (per MBF)
Headrig & Sharp Chain Twin



Configuration/Investment Scenarios

B-177

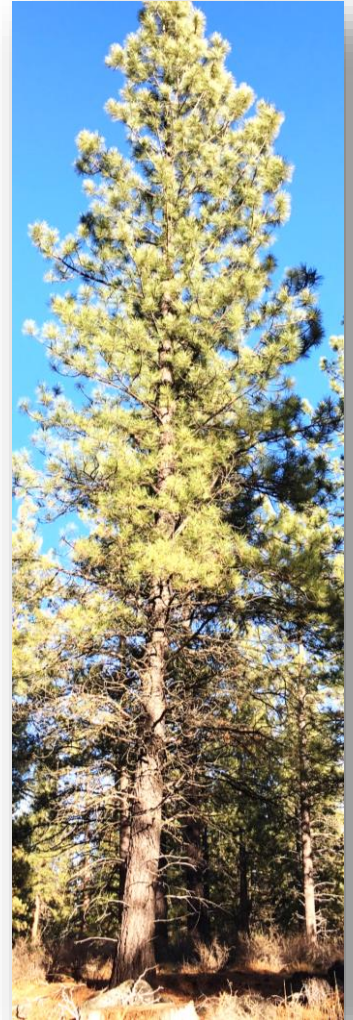
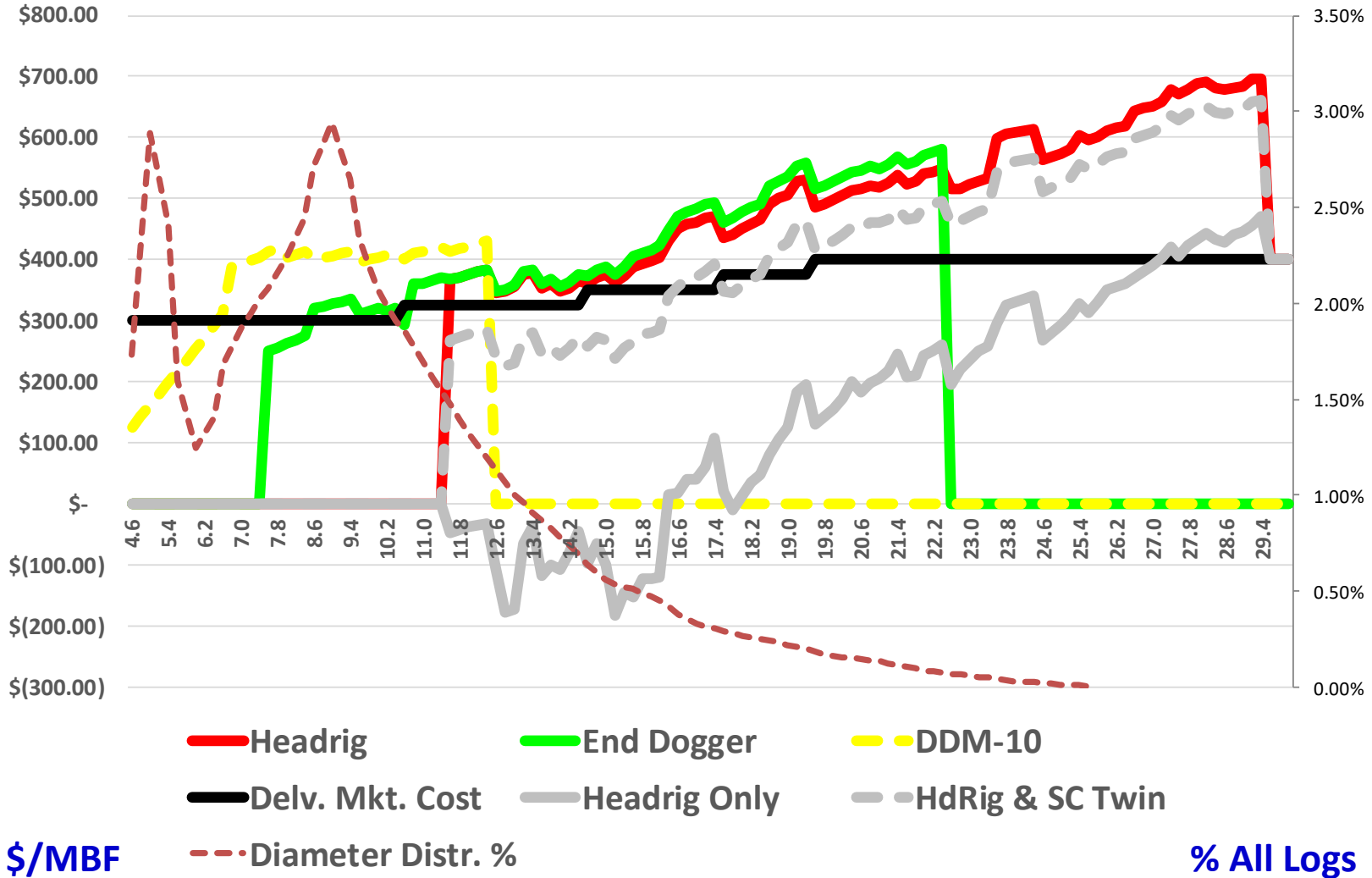
Breakeven Delivered Log Cost (per MBF)
Headrig & DDM-10



Configuration/Investment Scenarios

B-177

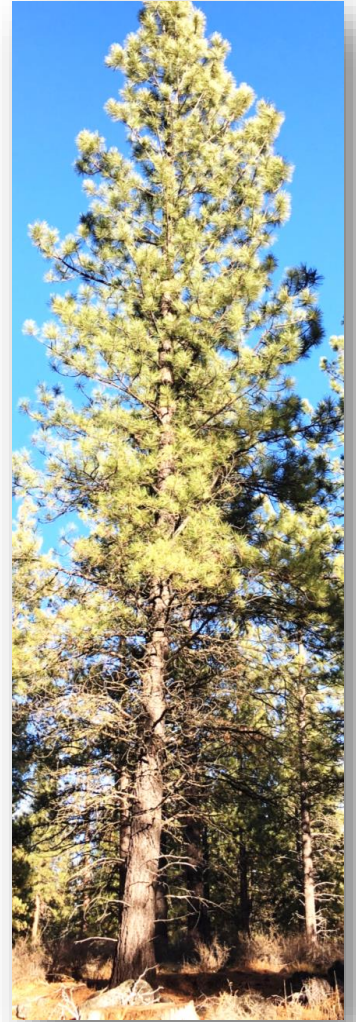
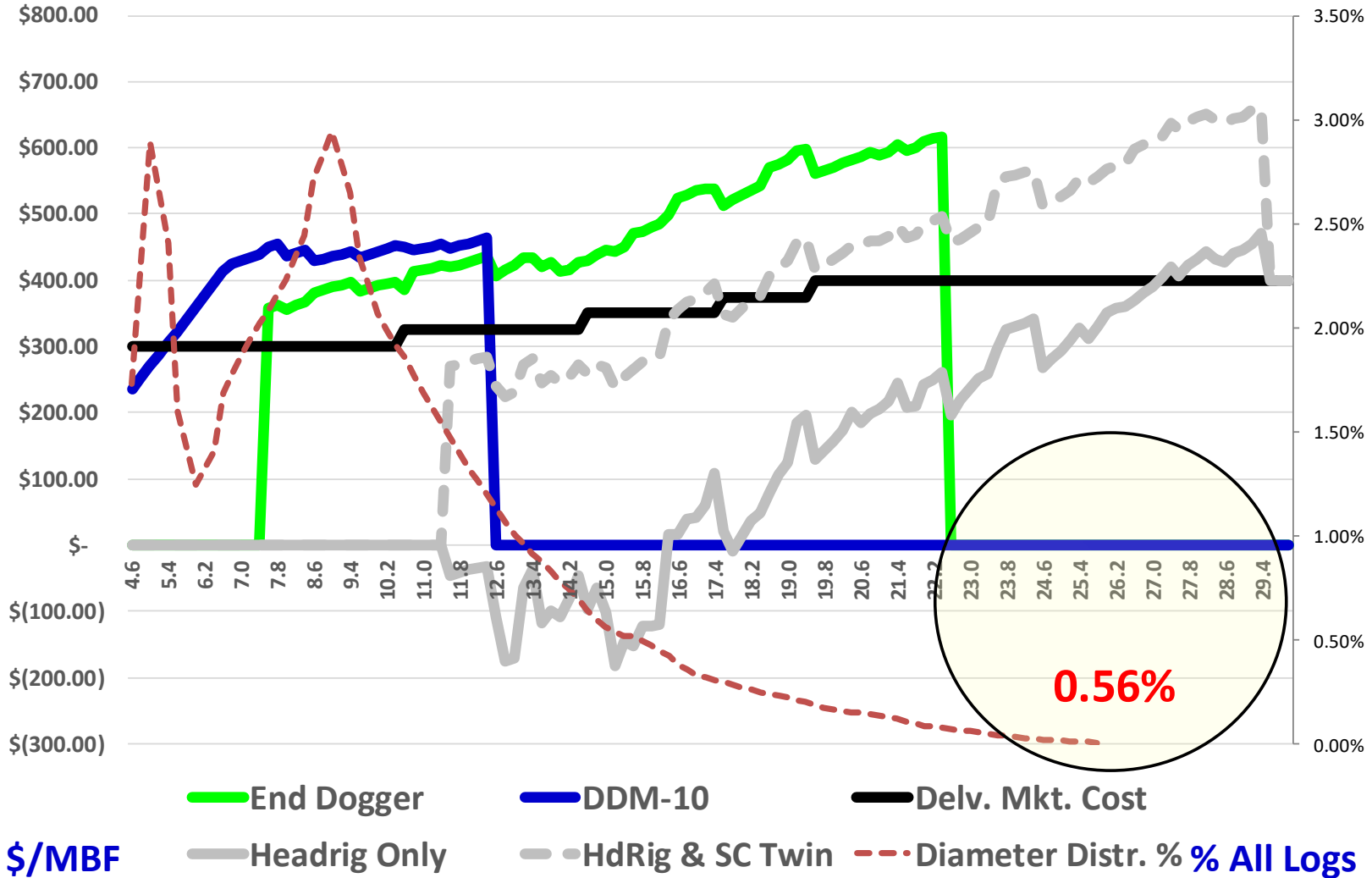
Breakeven Delivered Log Cost (per MBF)
Headrig & End Dogger



Configuration/Investment Scenarios

B-177

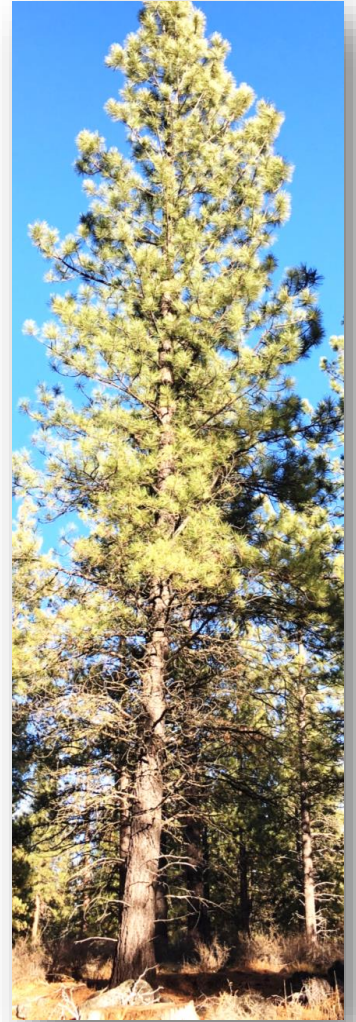
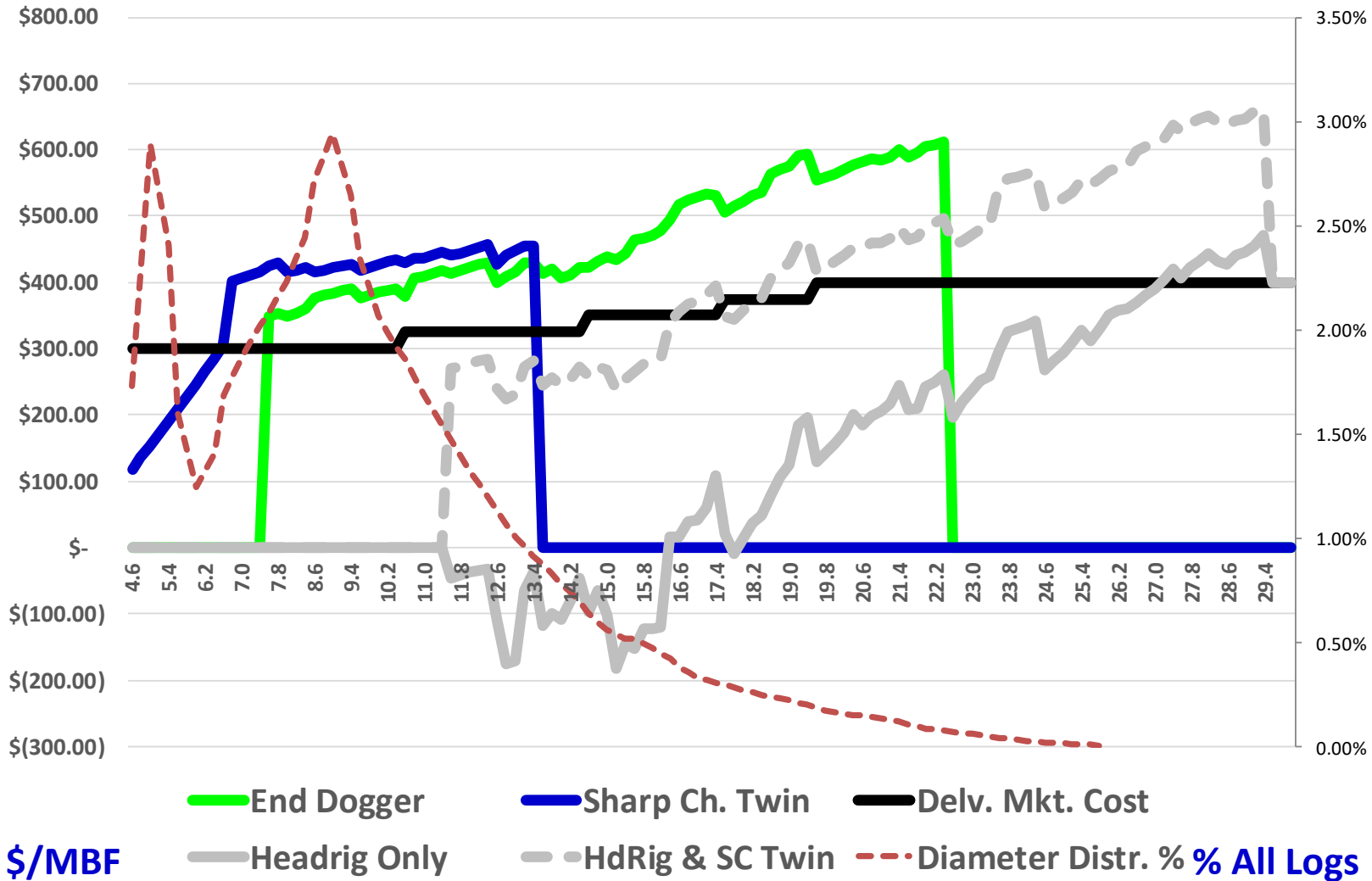
Breakeven Delivered Log Cost (per MBF)
End Dogger & DDM-10



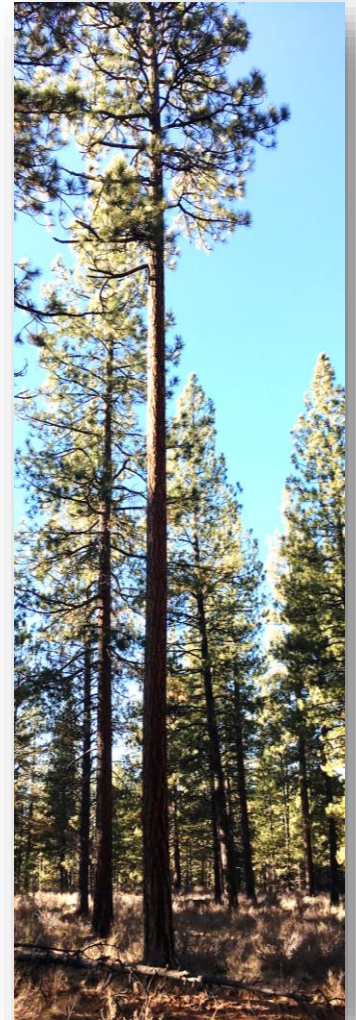
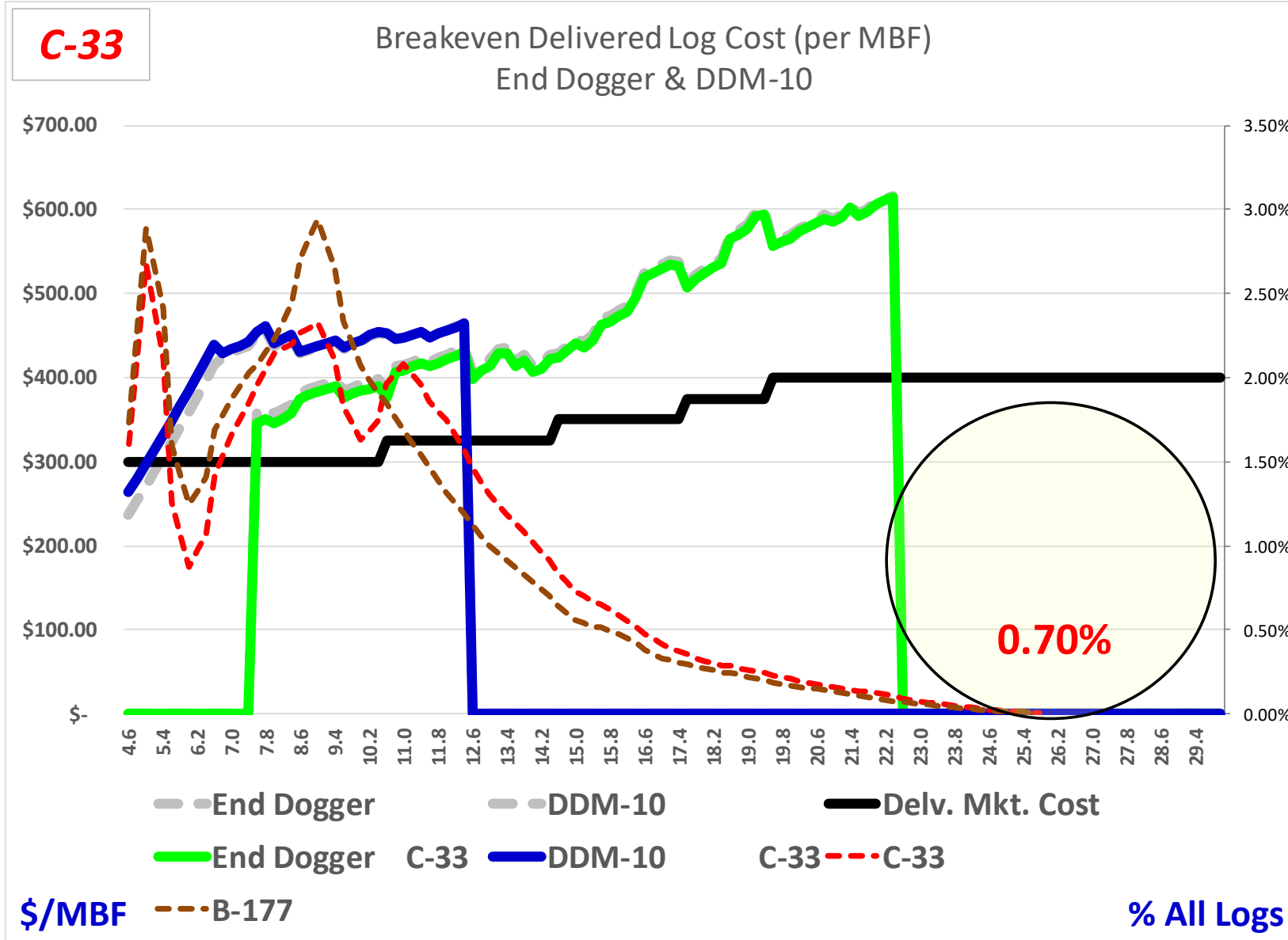
Configuration/Investment Scenarios

B-177

Breakeven Delivered Log Cost (per MBF)
End Dogger & Sharp Chain Twin



Configuration/Investment Scenarios



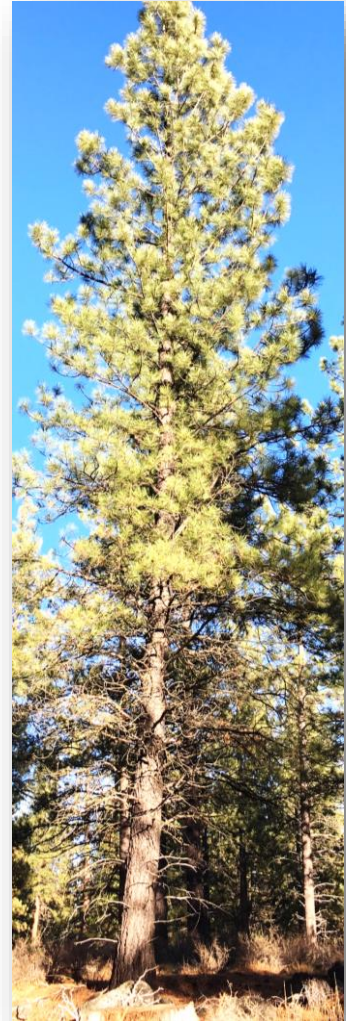
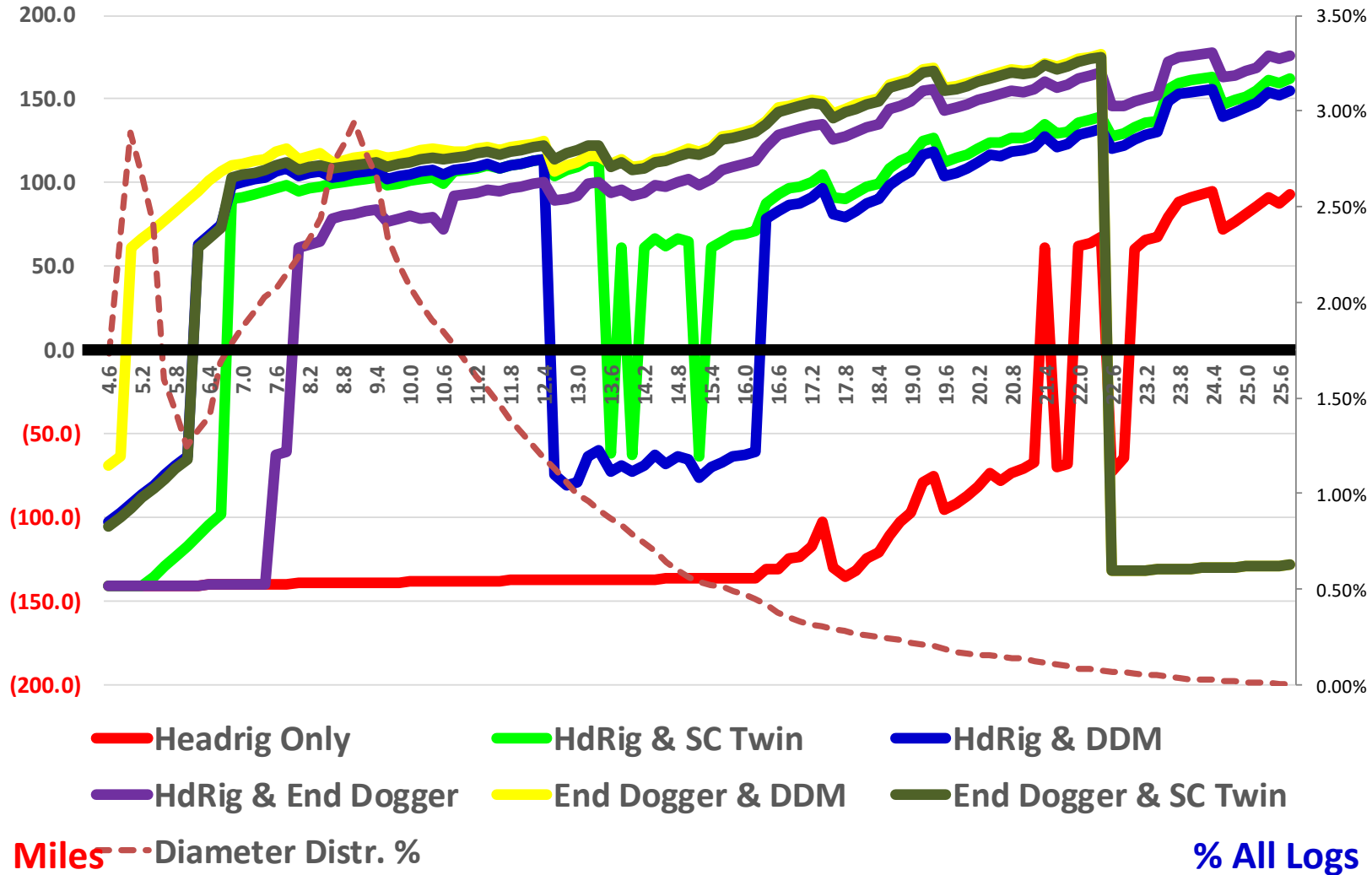
Configuration/Investment Scenarios

SNAP REPORT	End Dogger & DDM-10	End Dogger & SC Twin	Headrig & End Dogger	Headrig & DDM-10	Headrig & SC Twin	Headrig Only
Pre-Tax Income - Annual	\$ 10,424,988	\$ 2,650,780	\$ 2,701,710	\$ 125,095	\$ 1,027,602	\$ (5,736,190)
Lumber Sales Avg. - \$/MBF	\$ 493.15	\$ 496.21	\$ 496.21	\$ 497.87	\$ 497.94	\$ 507.97
Lumber Overrun - %	125.7%	126.1%	126.1%	122.7%	122.9%	110.8%
Composite Mnfg Cost	\$ 90.93	\$ 147.07	\$ 147.16	\$ 171.45	\$ 160.45	\$ 449.51
Lumber Sawn - MBF/Mo.	6,042	3,543	3,543	2,278	2,719	1,142
Logs Used - MBF/Mo.	4,805	2,809	2,809	1,857	2,213	1,031
% Rough Logs	49.0%	49.0%	49.0%	49.0%	49.0%	49.0%
% Bow Logs	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%
Mancount	90	77	77	78	76	76
Avg. Annual Total Comp.	\$ 51,349	\$ 53,587	\$ 52,906	\$ 52,702	\$ 52,798	\$ 52,798
Log Sale Origin Selected	B-177	B-177	B-177	B-177	B-177	B-177
Sawmill Months Req'd for Sale	2.92	4.80	4.80	8.01	6.71	9.98
Planer Months Req'd for Sale	2.66	4.74	5.22	5.98	5.98	3.11
Kilns Months Req'd for Sale	2.81	2.84	2.84	2.84	2.80	2.85
Timber Sale BE Bid Value/MBF	\$ 190.43	\$ 133.45	\$ 134.04	\$ 66.07	\$ 97.31	\$ (210.52)
Timber Sale BE Bid Value/Ton	\$ 16.01	\$ 11.22	\$ 11.27	\$ 5.55	\$ 8.18	\$ (17.70)

Configuration/Investment Scenarios

B-177

Breakeven Log Hauling Distance (Miles)
All Iterations



PILOT REPORTS – examples

Financial performance by Machine

	Monthly Average	
	End Dogger	DDM-10
Lumber Sales, \$'s	\$ 1,922,483	\$ 1,057,111
By-product Credit Revenue, \$'s	293,432	145,657
Total Revenue, \$'s	\$ 2,215,915	\$ 1,202,768
Delivered Log Cost, \$'s	\$ 1,204,473	\$ 484,004
Variable Costs (Excl Log Cost, incl Othr VC & Inv Ch	445,028	210,605
Non-Cash Expenses, \$'s	22,509	51,449
SG&A and Fixed Cash Expenses, \$'s	57,565	87,437
Total Costs	\$ 1,729,575	\$ 833,495

Margin by Product Grade & Length

\$/mbf

4/4											
1 x 4	M	3 Clr	#1 S	#2 S	C Btr.	D Sel	St. Sel	#2 Btr.	#3 C	#4 C	
Price	800	760	595	495	1,340	855	775	705	500	410	
avg margin	286	246	81	(19)	826	341	261	191	(14)	(104)	
6	110	70	(95)	(195)	650	165	85	15	(190)	(280)	
8	170	130	(35)	(135)	710	225	145	75	(130)	(220)	
10	287	247	82	(18)	827	342	262	192	(13)	(103)	
12	289	249	84	(16)	829	344	264	194	(11)	(101)	
14	291	251	86	(14)	831	346	266	196	(9)	(99)	
16	298	258	93	(7)	838	353	273	203	(2)	(92)	
18	304	264	99	(1)	844	359	279	209	4	(86)	
20	309	269	104	4	849	364	284	214	9	(81)	

Profit Margin by Product (TxWxLxGrade)

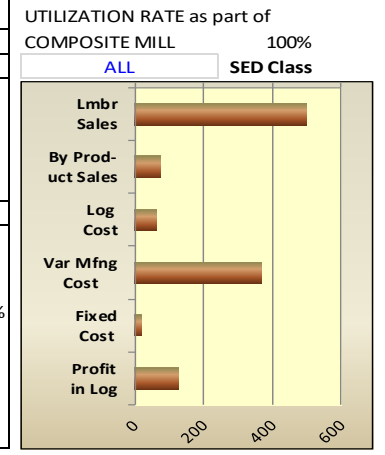
1 x 6	M										
Price	800										
avg margin	317	277	112	12	1,562	572	522	207	(58)	(173)	

Volume of Lumber (MBF)

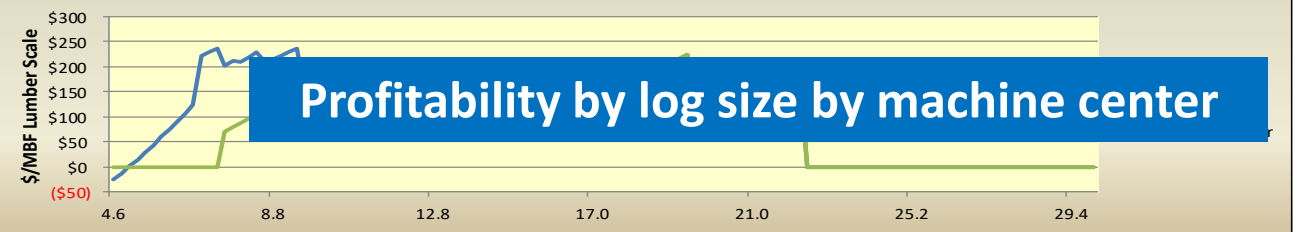
Product Class	Lumber Grade	Thick-ness	Width - in inches							
			4	5	6	7	8	9	10	11
ALL	ALL	ALL	2,592	1,163	6,189	1,311	1,251	1,026	1,140	827
Shop	ALL	ALL	106	442	402	263	266	397	770	650
	M Btr.	ALL	2	14	10	12	9	13	21	25
	M	ALL	-	-	2	-	2	-	2	-
	St. M	ALL	2	9	5	3	4	7	15	12
	3 Clr	ALL	-	-	-	-	-	-	-	-
	#1 S	ALL	0	1	69	9	14	6	6	11
	#2 S	ALL	27	13	106	15	27	18	35	40
	#3 S	ALL	36	190	105	101	103	162	325	283
	St. S	ALL	10	51	30	23	26	41	85	73
	P-99	ALL	29	159	75	93	80	149	282	206
Outs	ALL	1	5	-	5	1	3	-	-	
Commons	ALL	ALL	2,486	721	5,787	1,049	985	629	370	177
	#2 Btr.	ALL	550	137	1,410	224	228	118	37	-
	#3 C	ALL	1,353	309	3,047	494	485	259	79	-
	#4 C	ALL	583	275	1,330	330	272	252	177	-

Lumber produced by timber sale unit

End Dogger		SED Classes					
PERFORMANCE REPORTED AT FULL UTILIZATION		4.6-7.4	7.6-12.4	12.6-18.4	18.6-25.4	25.6-30.0	ALL
Sales Avg.		0.00	466.70	484.24	595.12	0.00	501.91
Log Cost @ Lumber Scale		0.00	207.50	323.43	403.82	0.00	314.46
Mfg. Cost less Byprdts.		0.00	138.38	51.00	10.99	0.00	61.73
Profit in Log		0.00	120.82	109.81	180.30	0.00	125.72
B/E Delv. Log Cost		0.00	392.00	445.34	577.39	0.00	459.53
Sales Lumber & Byprdts		0.00	529.50	565.31	673.06	0.00	578.52
Var Mfg. Cost [incl. logs]		0.00	386.62	433.44	470.70	0.00	430.74
Contribution Margin ["CM"]		0.00	142.87	131.87	202.36	0.00	147.78
CM Ratio (Lmbr Price)		0.0%	30.6%	27.2%	34.0%	0.0%	29.4%
Fixed Cost		0.00	22.06	22.06	22.06	0.00	22.06
Marginal Breakeven Sales Price		0.00	345.89	374.43	414.81	0.00	376.19
Breakeven Sales Volume		0	378	1,172	238	0	1,788
MBF Produced		0	2,362	6,673	2,157	0	11,191
Monthly MBF Produced		0	808	2,284	738	0	3,830

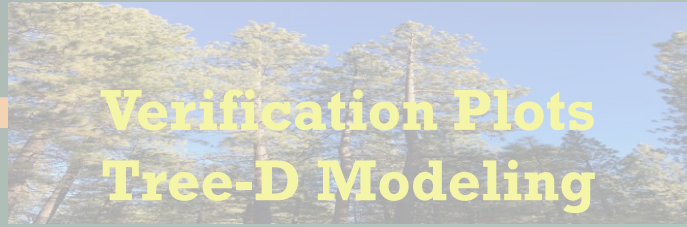
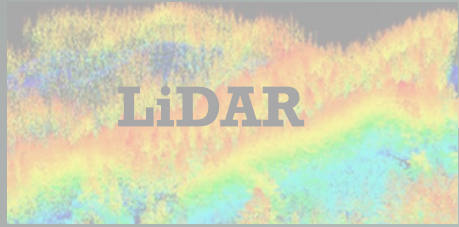


Profit in Log by Segment SED



Profitability by log size by machine center

FORESTLAND ECONOMIC ANALYSIS



**Single Tree Inventory, FVS
Modeling, Segments x Grade**

**Economic performance and financial analysis with:
PSPR Suite© Modeling**

**PILOT
Iterations**

**SIM
Financials**

- **Profit Loss**
- **Cash Flow**
- **Balance Sheet**
- **Debt Metrics**

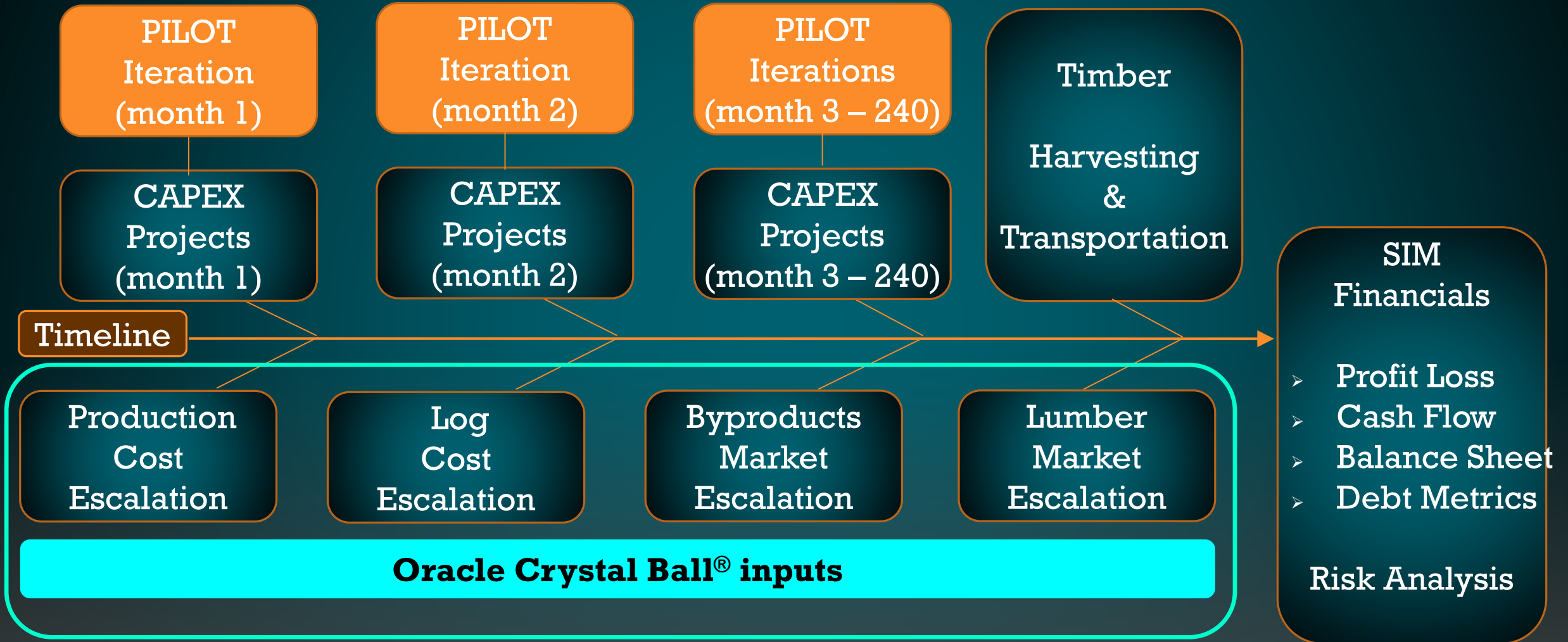
Risk Analysis

**Return to Acre
Calculations**

**POP Analysis
(by use & yr.)**

**RTA
Heat Maps**

SIM - METHODOLOGY



SIM Methodology

Modeling:

- Investment-grade financials are; P&L, Cash Flow, Balance Sheet, Debt Metrics
- PILOT log segment distributions are geo-located back to the forest in SIM database
- Single Species per iteration
- Capital Expenditure (CAPEX) project(s) are inputted in significant detail. Each project has discrete scheduling, capital draws, working capital, capital repairs & depreciation. CAPEX performance is simulated in PILOT (monthly) and downloaded to the appropriate period in SIM. Mill performance & CAPEX meet in SIM.
- Forecasting - product prices and operating costs are escalated/de-escalated monthly
- Risk Assessment – Oracle Crystal Ball® inputs imbedded in the SIM Forecast Model
- 20-year model in 1-month increments (240 iterations if required), banks regularly require 36-months (3-years), then 8 quarters (2-years), then annual for X-years thereafter



SIM Reports

Exhibits:

- **Slide #29** – Key Financial Metrics Snapshot; NPV, IRR, Net Profit, Cash Flow
- **Slide #30** – Risk Modeling

SIM - REPORTS

Investment Grade Financials

Operating Financials* and Key Statistics - CASE TWO

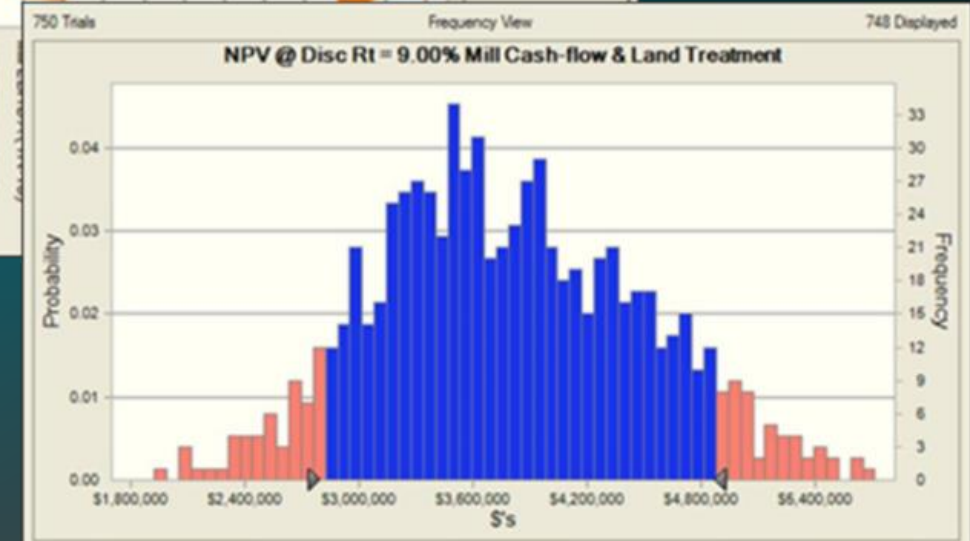
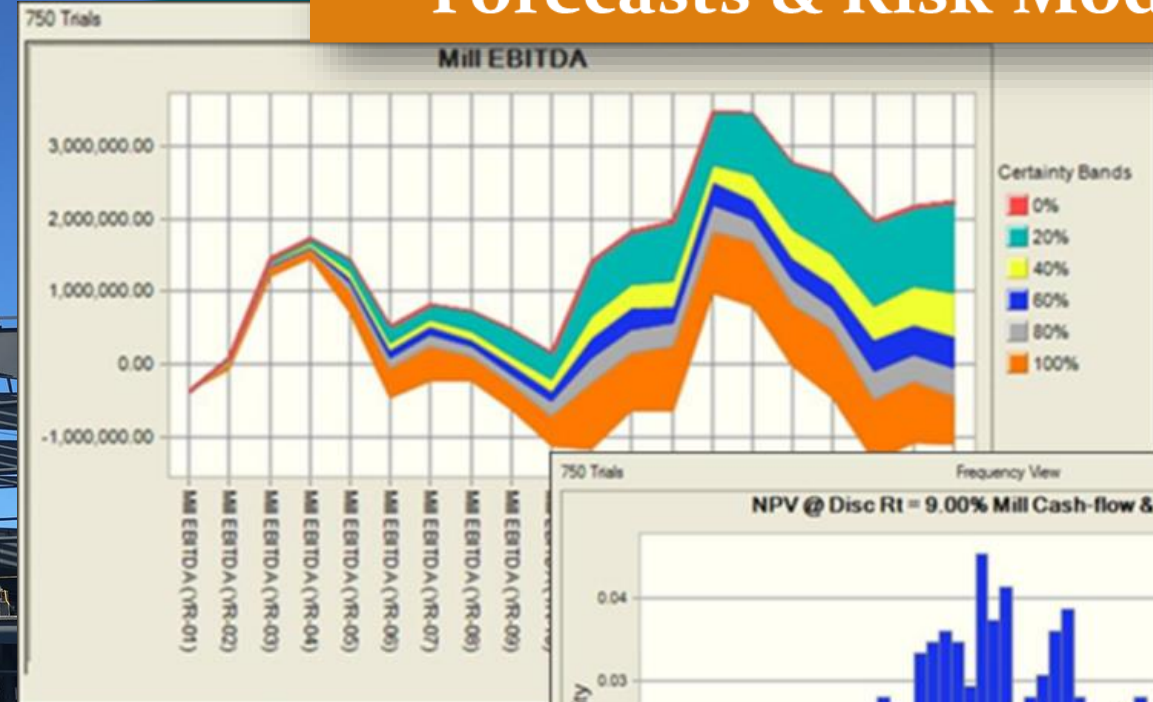
Thousands of Dollars unless otherwise indicated

	Investment Time Periods, Years										
	1	2	3	4	5	6-8	9-11	12-14	15-20		
	2016	2017	2018	2019	2020	2021-2023	2024-2026	2027-2029	2030-2035		
	IRR	Annual					Annual Average				
Sales Revenue	\$ 1,079.8	\$18,819.0	\$17,819.4	\$18,152.5	\$20,215.5	\$22,154.1	\$20,192.4	\$18,824.8	\$21,820.1		
By Product Sales	49.35	867.60	884.95	902.65	920.70	958.02	1,016.66	1,079.61	1,186.18		
Log Costs	948.75	9,264.84	7,366.92	10,084.89	10,898.30	11,530.73	11,335.31	10,231.80	11,804.32		
Variable Manufacturing Costs	824.6	7,334.9	7,441.1	7,548.8	7,658.1	7,882.1	8,229.5	8,590.7	9,143.9		
Gross Profit	(644.3)	3,086.9	3,896.4	1,421.4	2,579.7	3,699.3	1,644.2	1,081.9	2,058.1		
Cash Fixed Costs	98.3	372.2	379.4	386.6	394.0	409.3	433.2	458.4	497.7		
Depreciation	13.3	165.5	173.0	180.5	188.0	203.0	224.9	225.4	259.2		
Net Profit ("EBIT")	\$ (755.9)	\$ 2,549.1	\$ 3,344.0	\$ 854.3	\$ 1,997.7	\$ 3,087.0	\$ 986.1	\$ 398.1	\$ 1,301.2		
EBITDA	(742.5)	2,714.7	3,517.0	1,034.8	2,185.7	3,290.0	1,211.0	623.5	1,560.3		
Capital Spending	3,237.5	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0		
Change in Est Net Wrkng Cap*	2,253.3	1,544.4	(264.7)	275.6	327.8	115.2	(142.4)	66.5	18.4		
Mill Terminal Value									10,922.4		
Net Investment	5,477.5	7,006.3	6,718.6	6,963.6	7,253.4	7,463.0	7,046.0	6,606.2	6,719.7		
"Controlled" Tmbr Delvr'd to Mill, MBF	3,454	28,246	28,246	28,246	28,246	28,246	28,246	28,246	28,246		
External Timber Purchased, MBF											
Logs (All Sources) Processed, MBF	-	-	-	-	-	-	-	-	-		
Cost of Logs Processed, \$/MBF											
Lumber Produced, MBF	2,097	36,140	36,140	36,140	36,140	36,140	36,140	36,140	36,140		
Lumber Price Realization, \$/MBF	515.00	520.73	493.07	502.29	559.37	613.02	558.73	520.89	603.77		
Composite Overrun (Net Log Scale)	0.607	1.279	1.279	1.279	1.279	1.279	1.279	1.279	1.279		
Net "Cntrl'd Tmbr" Stmpg**, \$/MBF	100.06	99.46	99.67	110.72	135.72	156.42	147.55	103.79	156.53		
Total Cntrl'd Stmpg Revenue, 000's	\$ 346	\$ 2,809	\$ 2,815	\$ 3,127	\$ 3,833	\$ 4,418	\$ 4,168	\$ 2,932	\$ 4,421		

- Monthly &/or Annual Reports
 - Profit-loss statement
 - Balance sheet
 - Statement of cash flow
 - Investment performance, inventories & debt ratios
- Key Operating Statistics are customizable

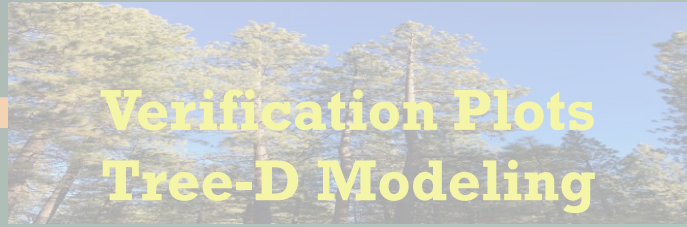
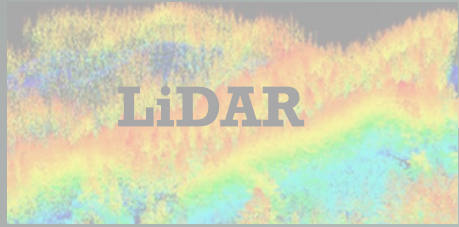
SIM - REPORTS

Forecasts & Risk Modeling



Capital Expenditures (CAPEX) Modeling

FORESTLAND ECONOMIC ANALYSIS



**Single Tree Inventory, FVS
Modeling, Segments x Grade**

**Economic performance and financial analysis with:
PSPR Suite© Modeling**

**PILOT
Iterations**

**SIM
Financials**

- Profit Loss
- Cash Flow
- Balance Sheet
- Debt Metrics

Risk Analysis

**Return to Acre
Calculations**

**POP Analysis
(by use & yr.)**

**RTA
Heat Maps**

POP RTA - PERSPECTIVE

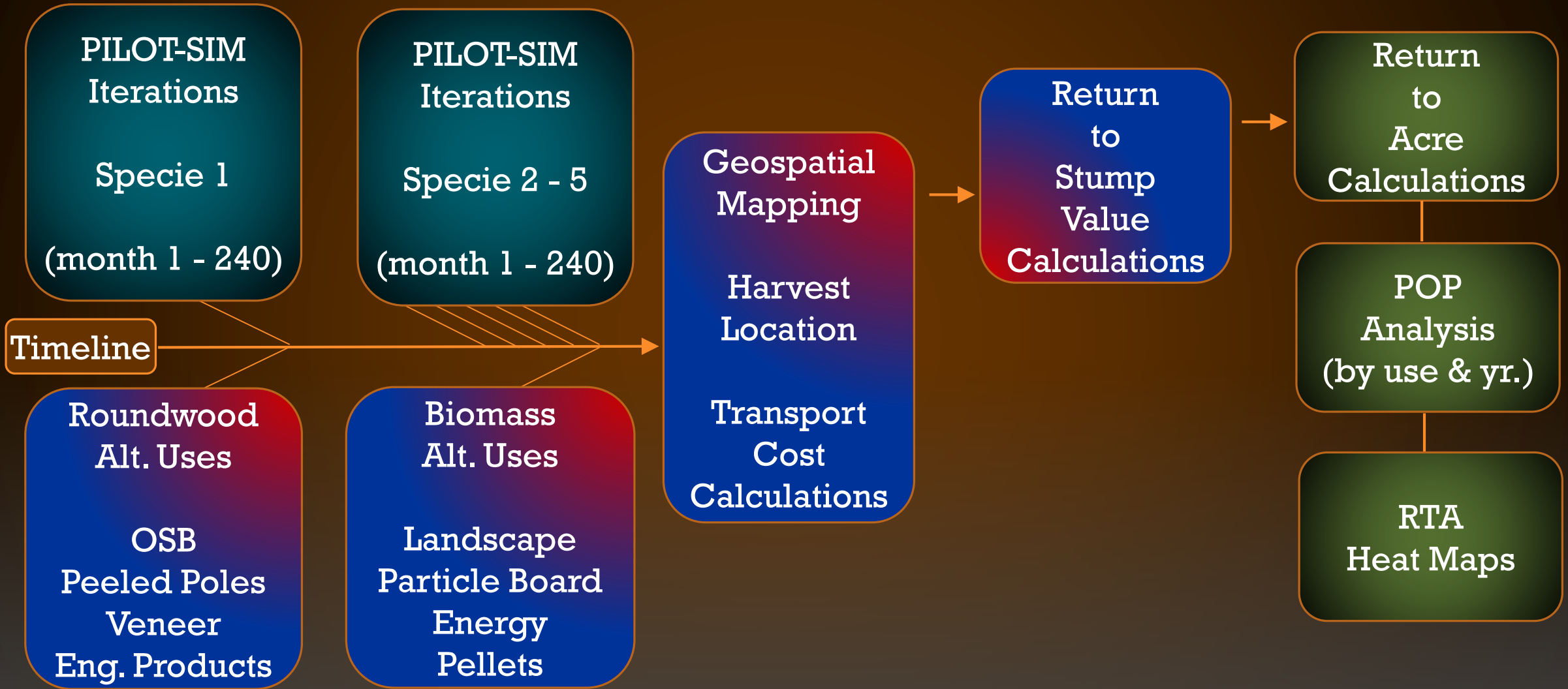
Return to Acre, or RTA, reflects a holistic measure of the value generated throughout the entire forest products value chain summarized back to the foundational unit of production, the acre.

It becomes a measure of efficiency of the entire value chain, from the acre to the customer.

Further, changes in RTA indicate net changes within the value chain that can be translated into socio-economic impacts.

Finally, divergences between market values and marginal RTA contributions differentiate forest management outcomes & entrepreneurial opportunities.

POP RTA - METHODOLOGY



POP-RTA Methodology

Modeling:

- Investment-grade financials; P&L, Cash Flow, Balance Sheet, Debt Metrics
- Return to Log & all logical fiber utilization RTL's are compiled in the RTA database by harvest location (client specified size)
- Return to Stump is calculated based upon assembled RTL values, site specific log hauling to log market&/or mill, and harvesting costs
- Multi-Species or species groups - (5) per iteration
- 20-year model in 1-month increments (240 iterations if required), banks regularly require 36-months (3-years), then 8 quarters (2-years), then annual for X-years thereafter



POP RTA - METHODOLOGY

Return to Acre



Type of Manufacturing	METRIC					TOTAL RTA
High Grade Sawlog	RTS, \$/Unit	160	185	215	245	501
	Unit/Acre	1.450	0.850	0.150	0.325	
	RTA	232	157	32	80	
Peeler Poles	RTS, \$/Unit	195				68
	Unit/Acre	0.350				
	RTA	68				
Firewood	RTS, \$/Unit	5				16
	Unit/Acre	3.25				
	RTA	16				
Low Grade Sawlog	RTS, \$/Unit	115	130	150		418
	Unit/Acre	1.650	0.950	0.700		
	RTA	190	124	105		
Biomass	RTS, \$/Unit	(10)				(150)
	Unit/Acre	15				
	RTA	(150)				
TOTAL RTA						854

POP-RTA Reports

Exhibits: illustrations only

- **Slide #37** – RTA Strategy Evaluation Table
- **Slide #38** – Profitability Opportunity Pyramid (POP)
- **Slide #39** – Heat Map – focus metric is haul time
- **Slide #40** – RTA Strategy Comparison over Time
- **Slide #41** – RTA Strategy Evaluation Table over Time
- **Slide #42** – PSPR power to generate a Net Present Value for all stakeholders

POP RTA - REPORT

Return to Acre Iteration

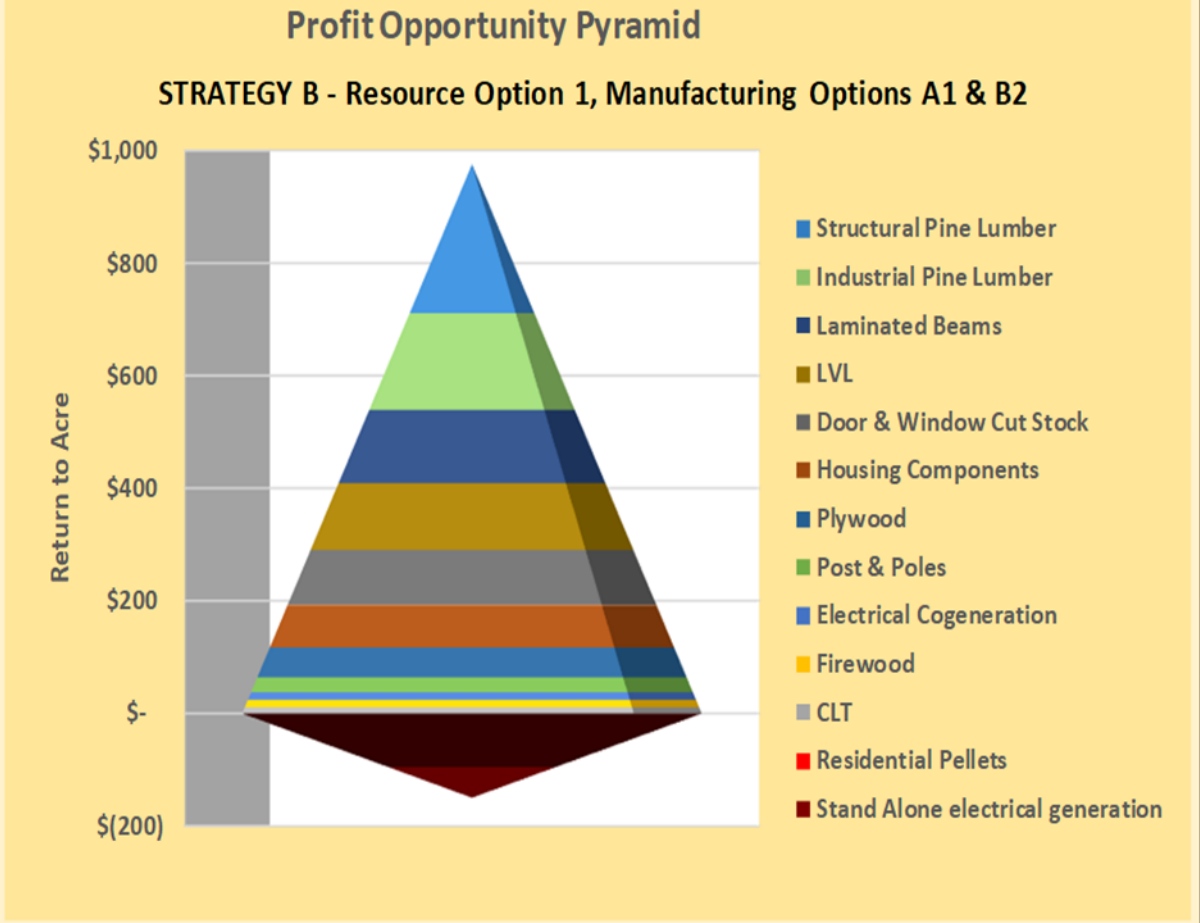
STRATEGY B - Resource Option 1, Manufacturing Options A1 & B2		Return to Acre Categories												
		2,000+	1,600- 1,999	1,200- 1,599	800- 1,199	400- 799	0- 399	-400- -1	-800- -401	-1,200- -801	-1,600- -1,201	-2,000- -1,601	-2,001 & lower	ALL
Number of Acres by RTA Category		90,850	145,830	356,711	1,009,819	283,747	110,775	29,829	21,603	161,173	72,995	1,925	33,989	2,319,245
Conversion Methodology		RTA Contribution by Conversion Method												
Primary Wood Products Options	Industrial Pine Lumber	435	342	239	226	107	90	(57)	(60)	(120)	(164)	(208)	(284)	172
	Structural Pine Lumber	669	526	367	348	165	138	(88)	(93)	(185)	(252)	(320)	(436)	265
	OSB													
	Plywood	134	105	73	70	33	28	(18)	(19)	(37)	(50)	(64)	(87)	53
	Post & Poles	67	53	37	35	17	14	(9)	(9)	(19)	(25)	(32)	(44)	26
	Livestock bedding products													
	Firewood	33	26	18	17	8	7	(4)	(5)	(9)	(13)	(16)	(22)	13
Secondary Wood Products Options	MDF or Particleboard													
	Laminated Beams	335	263	183	174	72	60	(47)	(50)	(97)	(132)	(168)	(229)	130
	CLT	28	22	15	15	6	5	(4)	(4)	(8)	(11)	(14)	(19)	11
	Nail & Dowel Laminated Timbers													
	LVL	307	241	168	160	66	55	(43)	(45)	(89)	(121)	(154)	(210)	119
Renewable Energy Products	Door & Window Cut Stock	251	197	138	131	54	45	(35)	(37)	(73)	(99)	(126)	(172)	97
	Housing Components	195	153	107	102	42	35	(27)	(29)	(57)	(77)	(98)	(134)	76
	Electrical Cogeneration	22	18	12	12	7	6	6	6	23	31	40	55	14
	Residential Pellets	(89)	(70)	(49)	(46)	(28)	(23)	(24)	(25)	(93)	(126)	(160)	(218)	(54)
Renewable Energy Products	Export Pellets													
	Bio Fuels													
	Stand Alone electrical generation	(156)	(123)	(86)	(81)	(49)	(41)	(41)	(43)	(162)	(220)	(280)	(382)	(95)
TOTAL		2,231	1,752	1,223	1,160	500	419	(393)	(413)	(927)	(1,258)	(1,602)	(2,182)	826



POP RTA - REPORT

POP Iteration

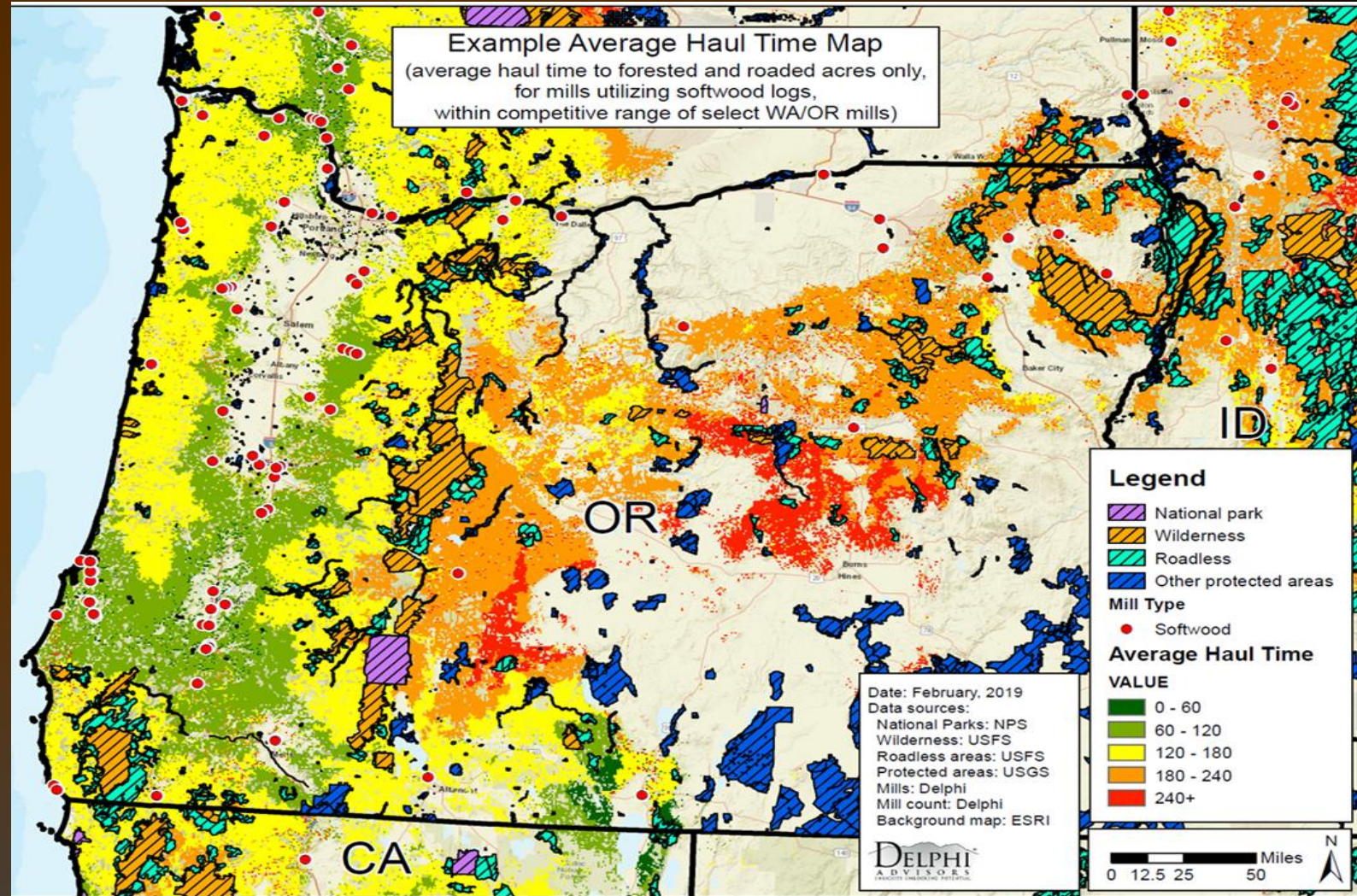
Conversion Methodology	RTA
Stand Alone electrical generation	\$ (95)
Residential Pellets	(54)
CLT	11
Firewood	13
Electrical Cogeneration	14
Post & Poles	26
Plywood	53
Housing Components	76
Door & Window Cut Stock	97
LVL	119
Laminated Beams	130
Industrial Pine Lumber	172
Structural Pine Lumber	265
COMPOSITE RTA	\$ 826



POP RTA - REPORT

Heat Map Representation

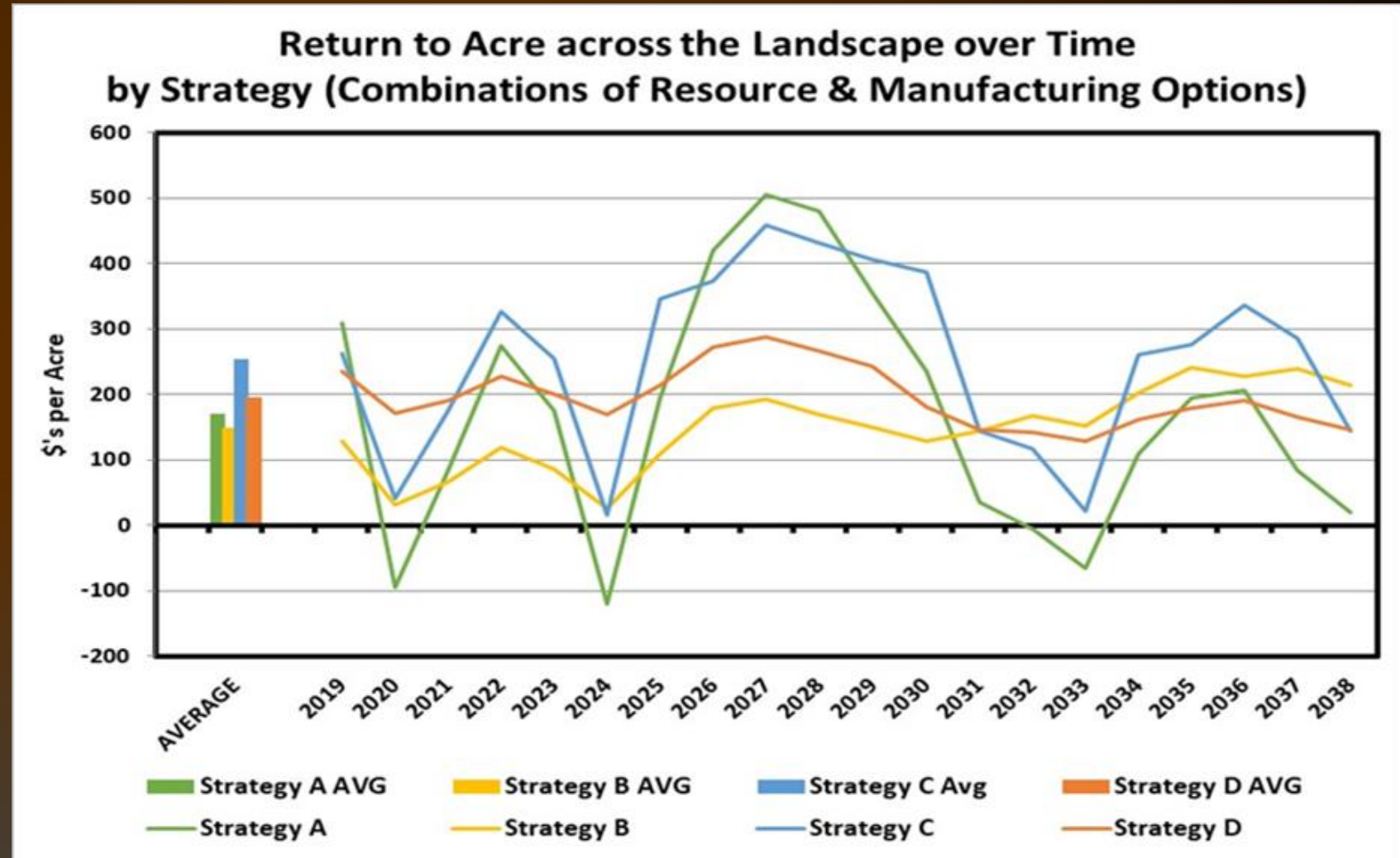
- “Heat Map” geospatial illustration of RTA outputs can as example include:
 - Expected returns – dollars per acre
 - Temporal supply surfaces
 - Harvest & Transport costs per acre
- Quick visualization of area of focus value
- Relative to RTA & time ...



POP RTA - REPORT

RTA & Time

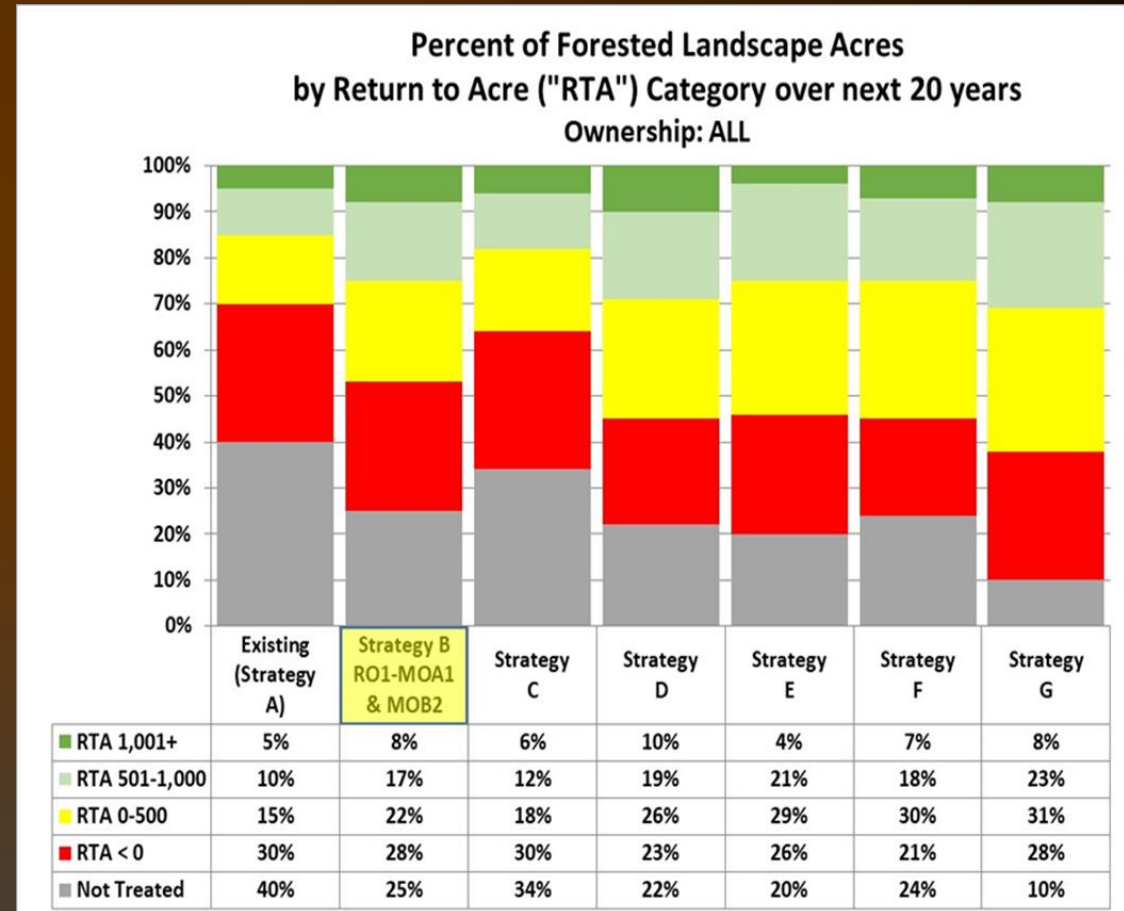
- RTA changes over time based on market conditions & on the traits and characteristics of timber being converted.
- Successful strategies are not necessarily those that generate the highest RTA but also need to weather the ups and downs of the market cycle.
- The PSPR suite provides tools to assess impacts of resource and management strategies based on conditions encountered over time.



POP RTA - REPORT

- A variety of metrics can be measured comparing strategies:
 - Acreage weighted return to acre
 - Reducing percentage of negative RTA acres
 - Proportion of landscape treated
- In addition to financial-oriented metrics (i.e. valuing volume removed from the forest) the forest that remains after treatment can be projected and evaluated regarding desired future conditions such as; stream shade, wildlife forage, thermal cover, pathogen control, nesting sites, etc.

RTA Scenario Comparison

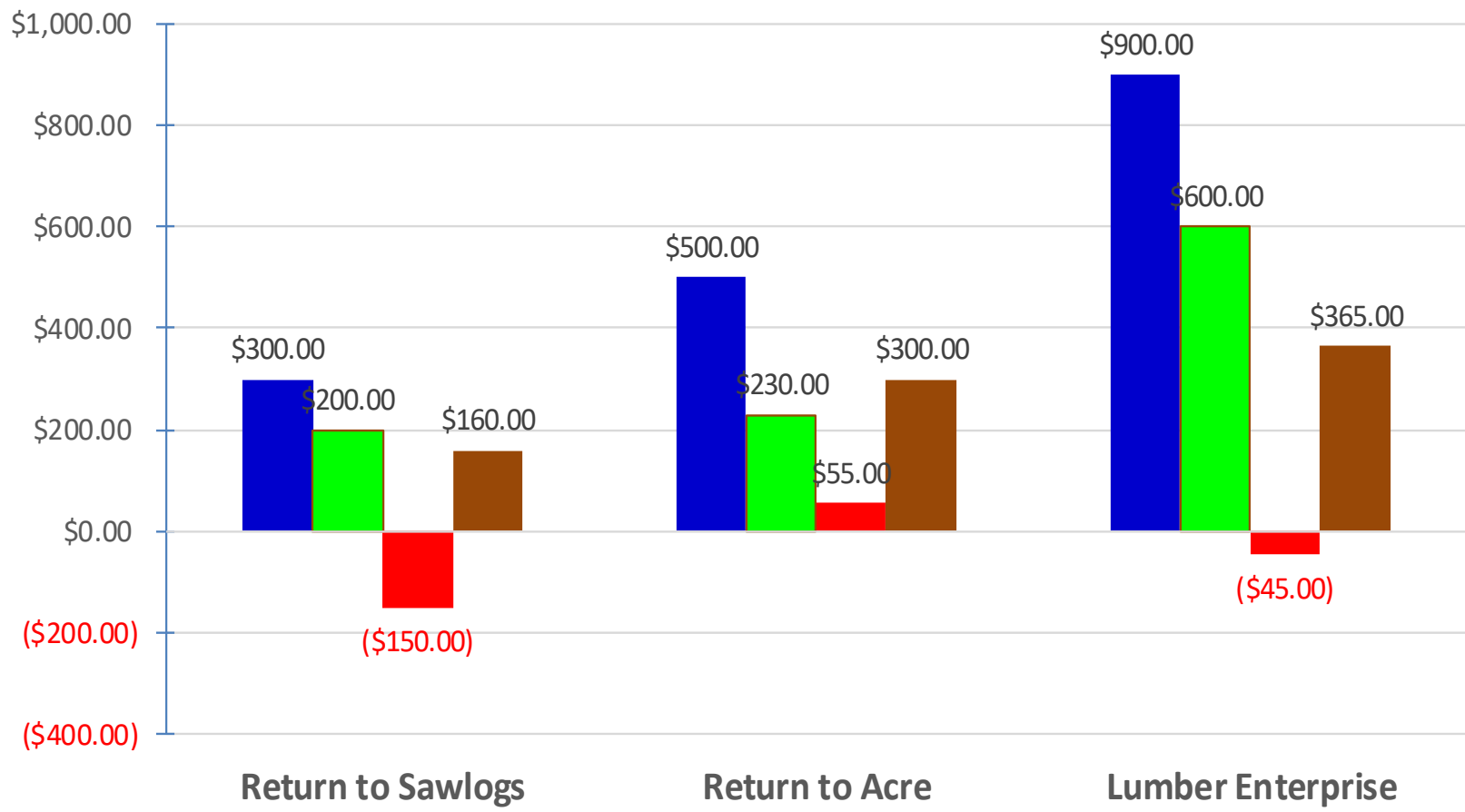


POP RTA - REPORT



PSPR Suite - Power to Look Forward for All Stakeholders

20 Year Net Present Value Per Acre $i=8%$ (\$)



- Forest Management Alternative One
- Forest Management Alternative Two
- Forest Management Alternative Three
- Forest Management Alternative Four

FOREST ECONOMIC ANALYSIS “net RETURN TO ACRE” PSPR SUITE© MODELING TECHNOLOGY - TAKEAWAYS **FORESTRY**

- The evolution from forest sampling to LIDAR forest census has arrived. Northwest Management, Inc., with their highly innovative and successfully proven Single-Tree Inventory capability have, for the first time, enabled our consortium to model using PSPR Suite© every individual tree in a stand through the forest products value chain and back to the acre (RTA).
- PSPR Suite© analysis tools open the door for every Natural Resources Stakeholder to economically visualize natural resources management and investment decisions, near and long term, at highly flexible geographic scales
- PSPR Suite© analysis tools allow the development and reporting of forest restoration wildfire direct avoided cost and community financial benefits



FOREST ECONOMIC ANALYSIS “net RETURN TO ACRE” PSPR SUITE© MODELING TECHNOLOGY - TAKEAWAYS **MILL OPERATIONS & CAPITAL PROJECTS**

- The PILOT-SIM platform is both a project feasibility analysis model as well as a highly detailed return to log model – bundled as a user-friendly application.
- PILOT-SIM uses include; mill performance benchmarking, timber appraisals, new product development, sales forecasting, annual budget development, etc.
- Investors & lenders require highly detailed analysis presented as investment grade financial statements. In addition, PILOT-SIM provides both near and long term financial risk analysis and mitigation strategies
- PILOT-SIM modeled financials are field-proven and have earned acceptance by lenders and Wall Street hedge fund managers.
- ATICA is committed through coaching PSPR users to building bridges of understanding that span the forest products value chain



Forestland Economic Modeling using PSPR Suite©

Consortium

Partners



A large industrial machine is shown in operation, processing a thick, light-colored sheet of material. The machine's rollers and guides are visible, and the material is being fed through a series of rollers. The scene is illuminated by warm, yellowish light, likely from the factory's overhead lights. The text "THANK YOU!" is overlaid in a large, bold, black font across the center of the image.

THANK YOU!