ECONOMICS OF PRE-COMMERCIAL THINNING

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College of Natural Resources
University Of Idaho

Setting Stands up for Success - From Seed to PCT
Applied Early Stand Silviculture in the Inland Northwest
December 13, 2018

University of Idaho
College of Natural Resources

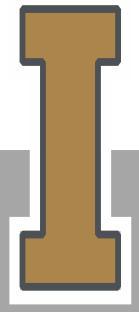
KEY CONCEPTS

- Discounting
- Opportunity Cost
- Considerations for Density Control
  - Growth and Yield
  - Product Differentiation
  - Logging Costs
    - Valuing Future Rotations
    - Rotation Ages
- Example Bringing it all Together

DISCOUNTING (TIME VALUE OF MONEY)

The idea that money today is worth more than the same amount of money in the future.

	Discount Rate				
Years from Now	0.02	0.04	0.06	0.08	0.10
0	453	208	97	46	22
5	500	253	130	68	36
10	552	308	174	99	57
15	610	375	233	146	92
20	673	456	312	215	149
25	743	555	417	315	239
30	820	676	558	463	386
35	906	822	747	681	621
40	1000	1000	1000	1000	1000



OPPORTUNITY COST

The value of the next highest alternative use

(or)

Value of Highest and Best Use

-

Value of Alternative

=

Cost of Choosing the Alternative

"It cost $699. But when you factor in the time wasted sitting in front of it, well, the real cost is enormous."

CONSIDERATIONS FOR STOCKING EVALUATIONS

Growth and Yield

- Information on how a stand will develop over time for a given silvicultural regime

Product Differentiation

- The volume and prices of products the harvest will provide

Logging Costs

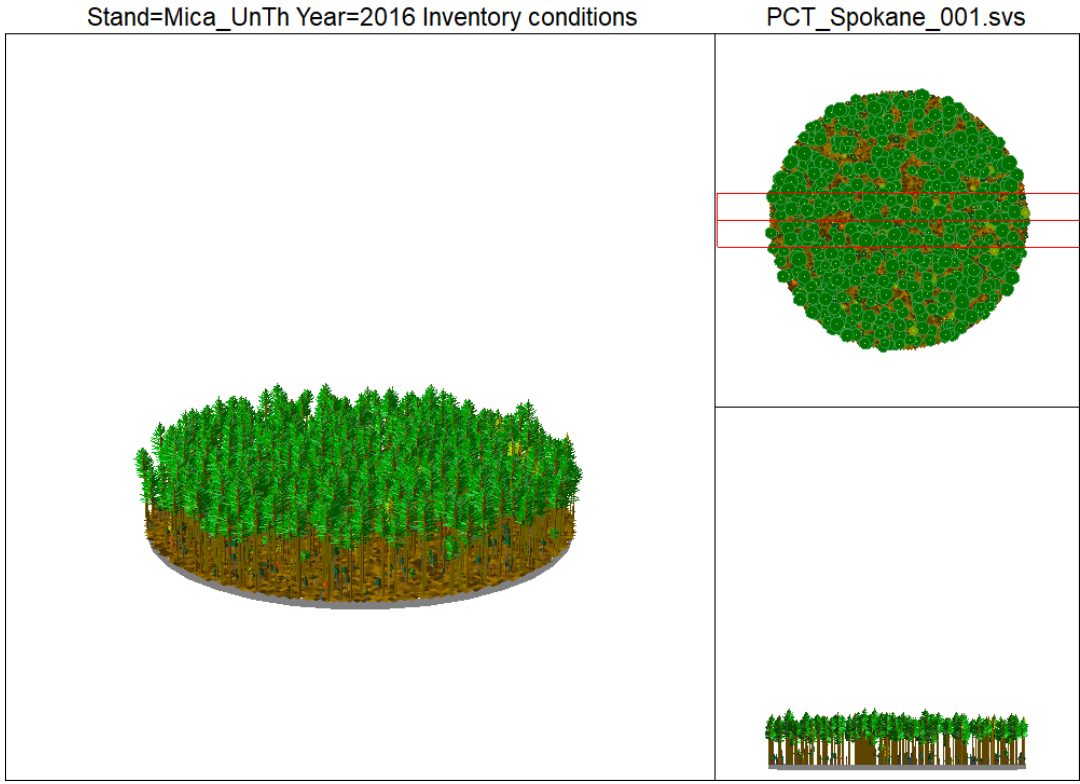
- The cost of extracting the products from the forest

Rotation Ages

- How your decisions change the timings of either the final harvest or other future thinnings

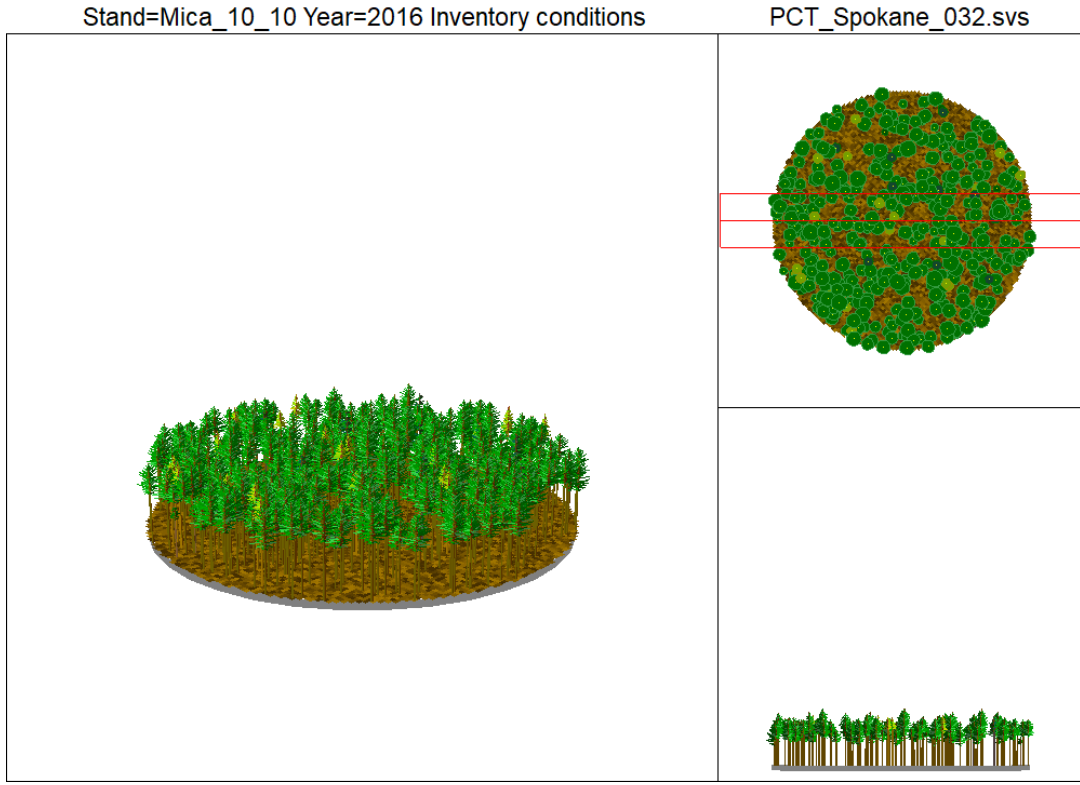
EXAMPLE: MICA UNTHINNED

- 1220 trees-per-acre mostly Douglas-fir
- 4.4 inches Quadratic Mean Diameter
- Habitat Type TSHE/ASCA
- 327 Stand Density Index
- 2,171 Cubic Feet per Acre
- 0 Board Feet per Acre



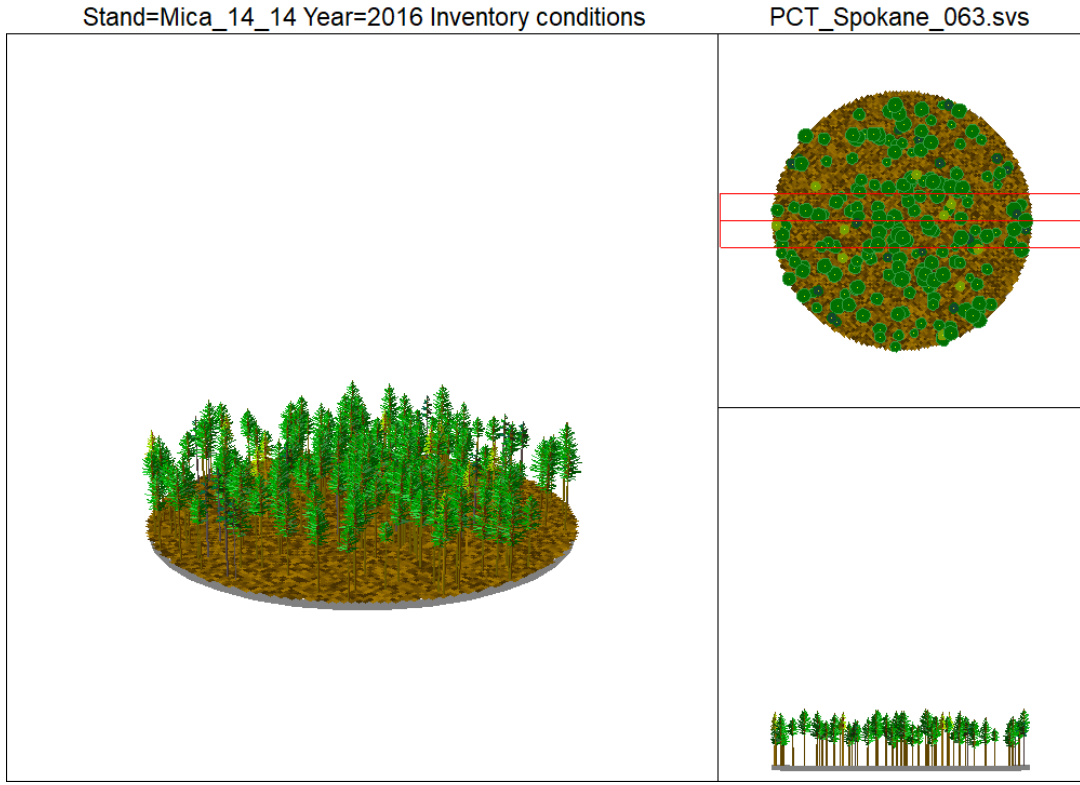
EXAMPLE: MICA 10 X 10 PCT

- 440 trees-per-acre mostly Douglas-fir
- 6.3 inches Quadratic Mean Diameter
- Habitat Type TSHE/ASCA
- 208 Stand Density Index
- 1,619 Cubic Feet per Acre
- 600 Board Feet per Acre

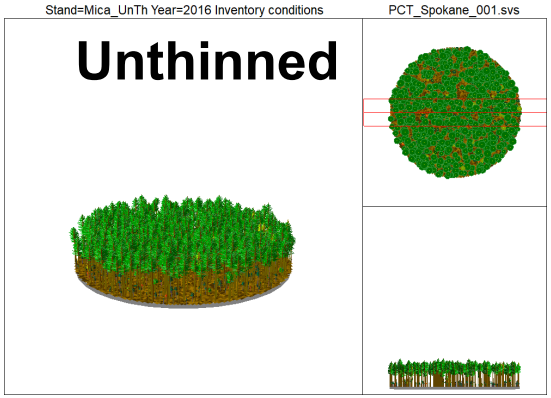


EXAMPLE: MICA 14 X 14 PCT

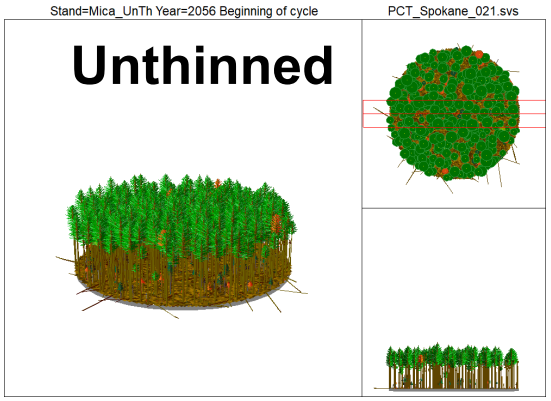
- 220 trees-per-acre mostly Douglas-fir
- 6.4 inches Quadratic Mean Diameter
- Habitat Type TSHE/ASCA
- 107 Stand Density Index
- 860 Cubic Feet per Acre
- 0 Board Feet per Acre

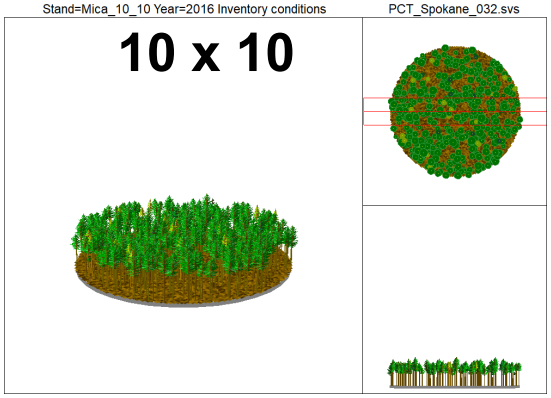


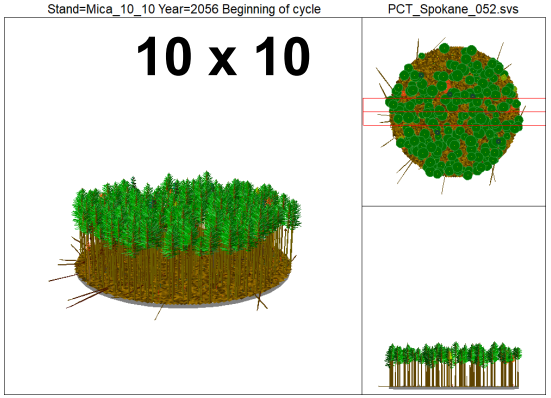
DENSITY CONTROL: GROWTH & YIELD

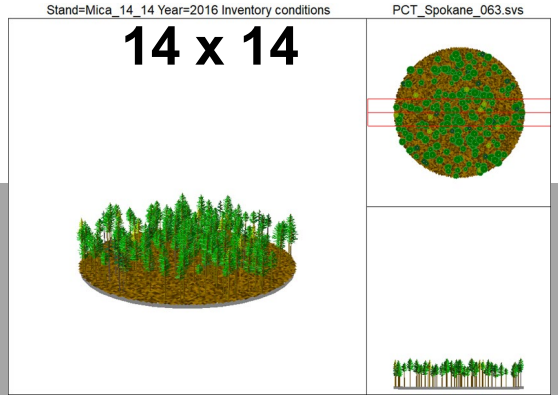


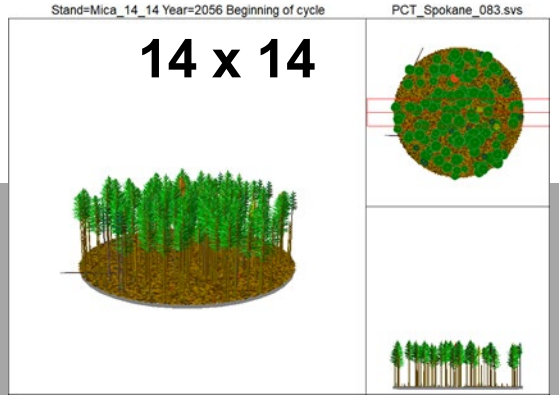
2016 → 2056



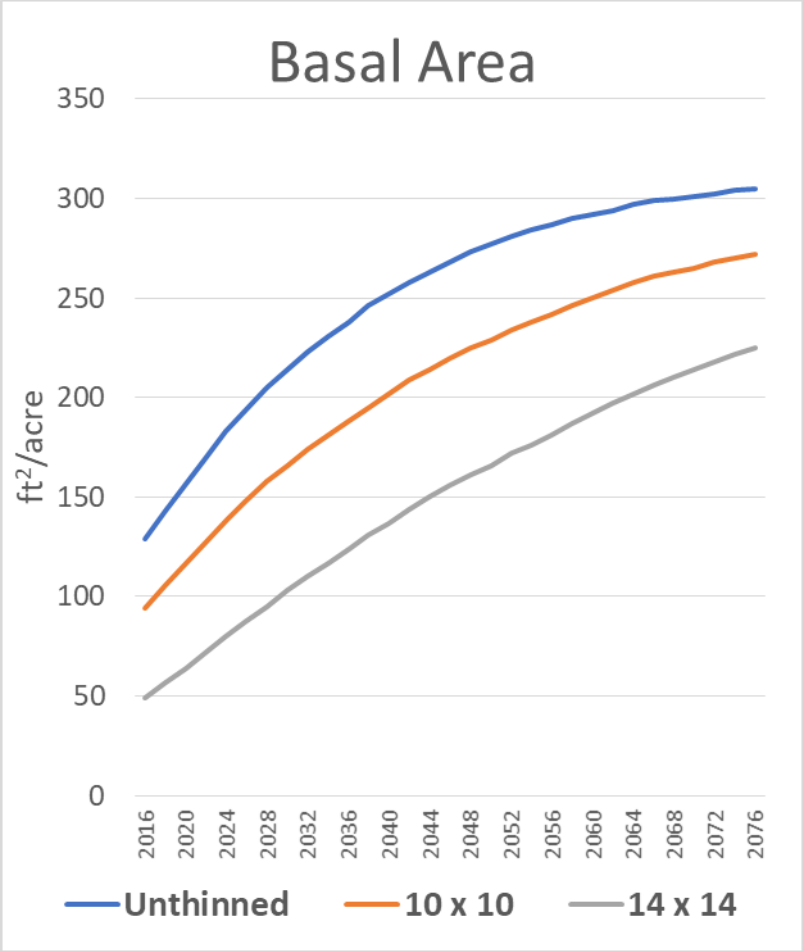


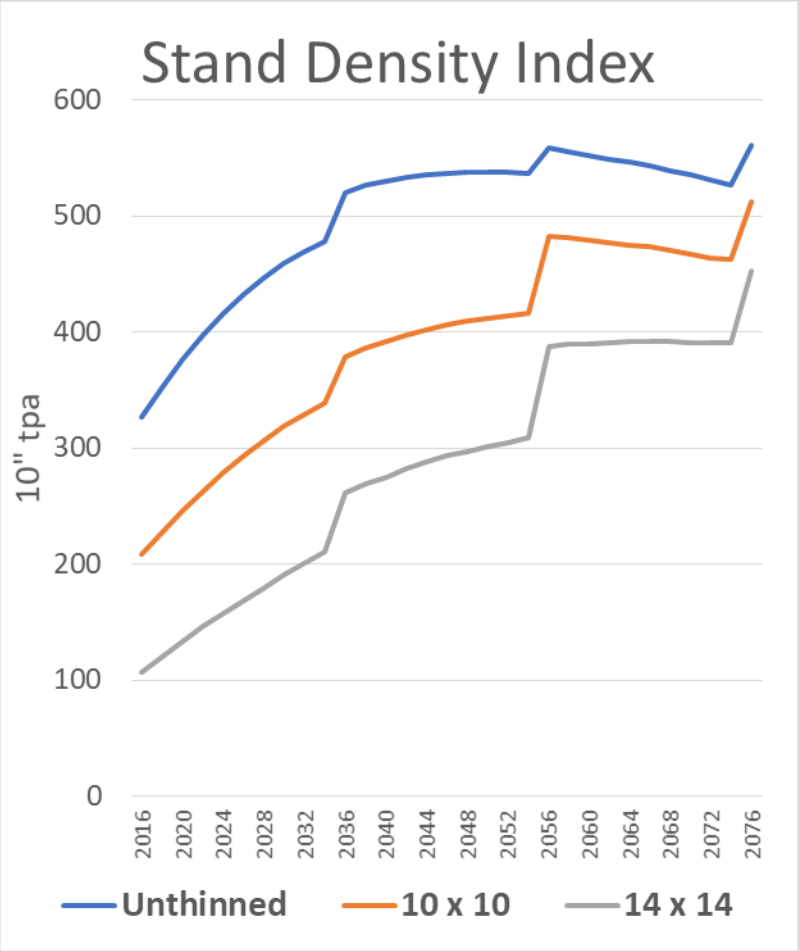






DENSITY METRICS

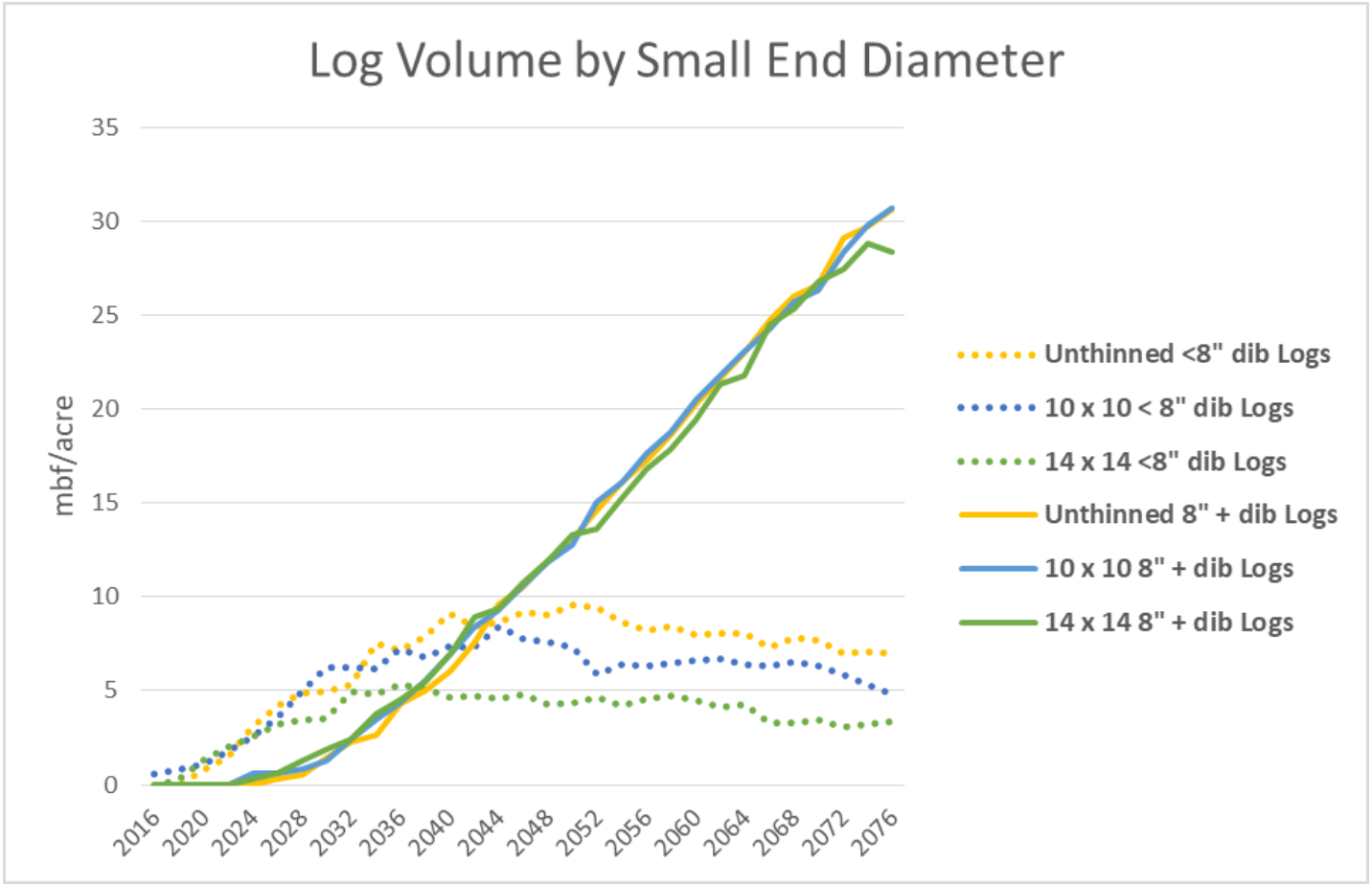




LOG PRODUCT DIFFERENTIATION

Not exactly what I was hoping for:

Curse you FVS!



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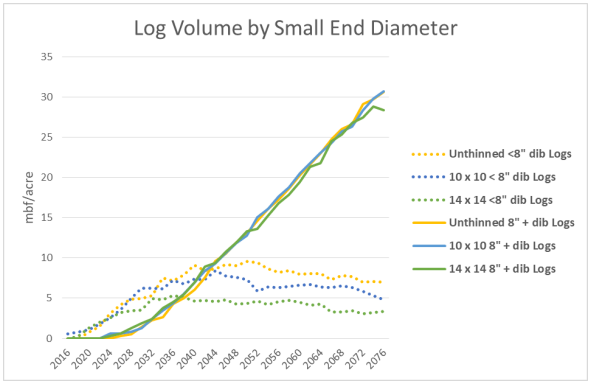
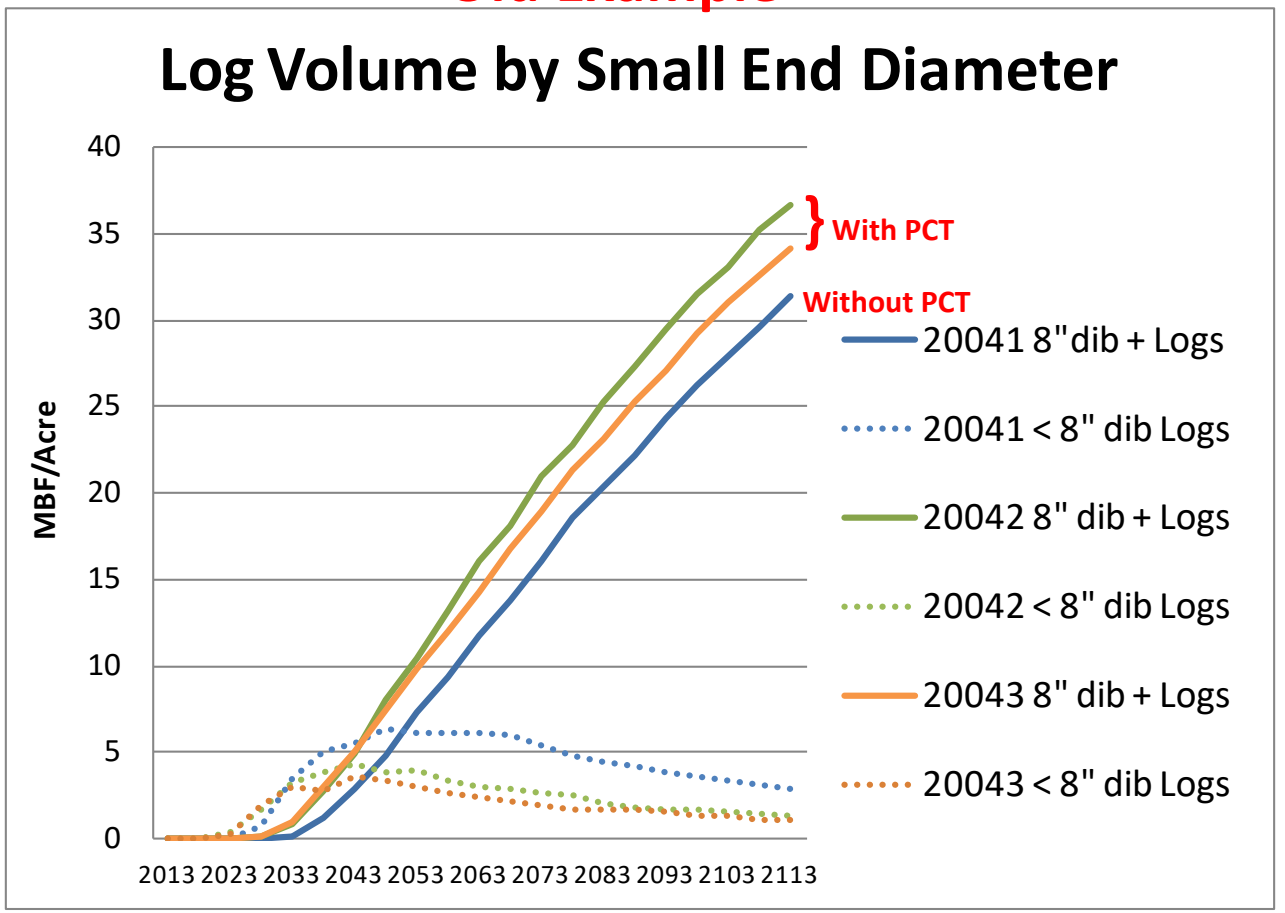


Old Example



LOG PRICES

Guy Bennett Lumber Company

P.O. Box 670
Clarkston, Washington 99403
Office (509) 758-5558 + Sales (208) 875-1321

GUY BENNETT LUMBER COMPANY LOG PRICES

Date: **08/01/08** Expiration: **09/15/08**

SFI CERTIFIED PARTICIPANT

Dave Fritts – Ext.203
Mike Miraglio – Ext.209
Scott Bruce – Ext.217

SPECIES	NET F.O.B.	NET F.O.B.	SPECIES	NET F.O.B.	NET F.O.B.
LENGTHS	Incr of 16.6′	All Other	LENGTHS	Incr of 16.6′, 18.6′, 20.6′	All Other
P. Pine 6″-7″	225	200	DF/L 6″-7″	225	200
P. Pine 8″-12″	300	275	DF/L 8″-24″	350	325
P. Pine 13″-19″	350	325	DF/L 25″+	350	325
P. Pine 20″+	450	425	GF 6″-7″	225	200
Blued Pine or Spruce	125	125	GF 8″-24″	300	275
LP 6″-7″	225	200	GF 25″+	250	225

NORTHWEST MANAGEMENT, INC.

Inland Northwest Market Report
Northwest Management, Inc.

3rd QUARTER LOG MARKET REPORT 2018
Price Ranges for Domestic Delivered Logs ($/mbf)

Market Area (County)	Species	Present Quarter	Past Quarter
NORTH IDAHO AND EASTERN WASHINGTON			
AREA 1			
Boundary, Bonner,	DF, WL	325-475	325-480
Kootenai, Shoshone,	GF,WH	325-465	325-460
Pend Oreille,	WP	245-425	245-425
Spokane, Stevens,	PP	225-400	225-380
Ferry	SP	325-465	325-460
	RC	400-1200	400-1275
	LP	325-465	325-460
	pulp	25-30/ton	28-32/ton
	tonwood	45-52/ton	55/ton
AREA 2			
Benewah, Latah,	DF, WL	440-565	450-575
Nez Perce, Whitman	GF,WH	490-550	450-550
Asotin, Columbia, Garfield and	WP	350-410	350-410
Port of Wilma	PP	280-440	280-470
	SP	350-510	350-510
	RC	800-1150	950-1325

PLETE AUTHORIZED FORMS.

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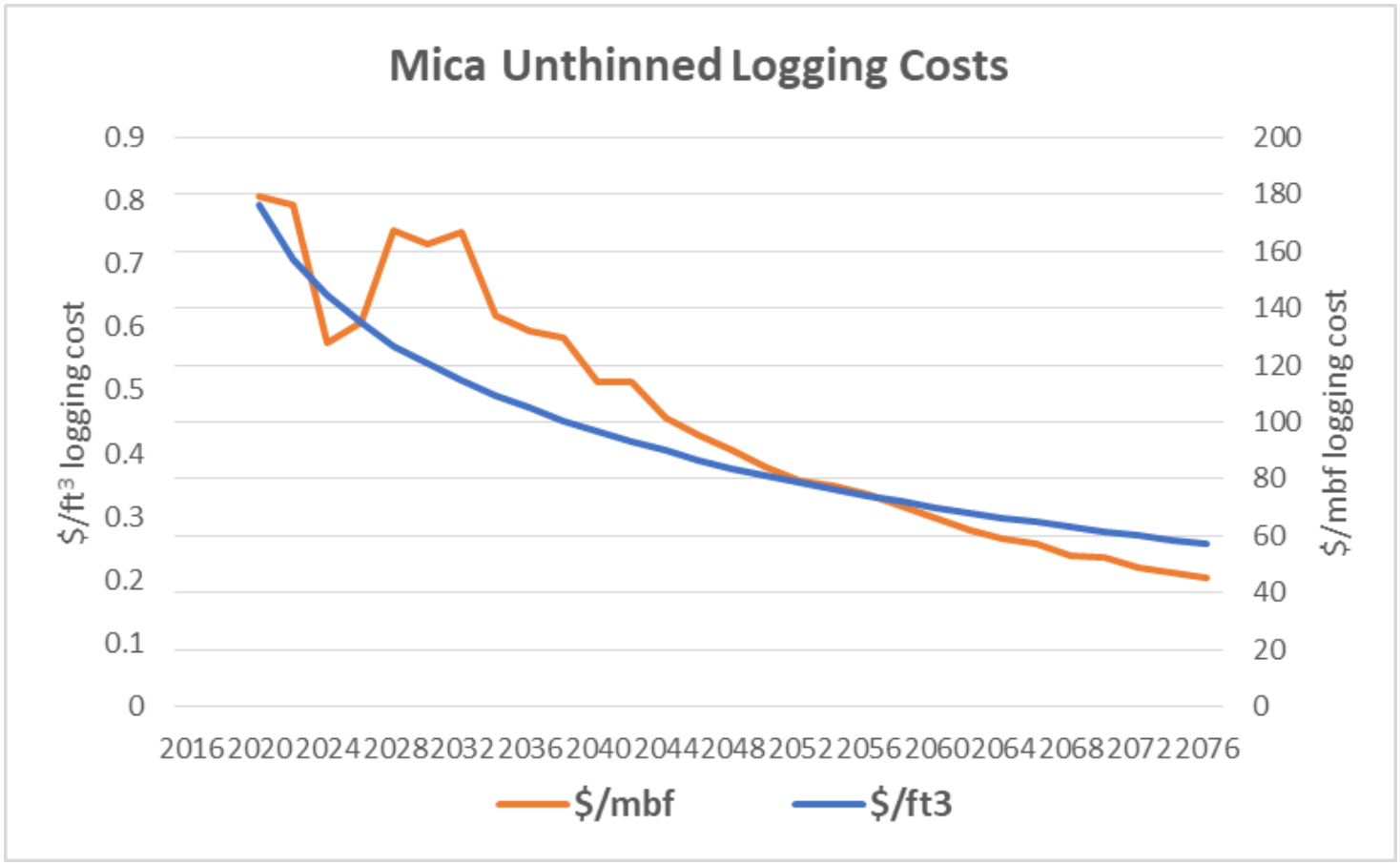
f Natural Resources

LOGGING COST DIFFERENCES



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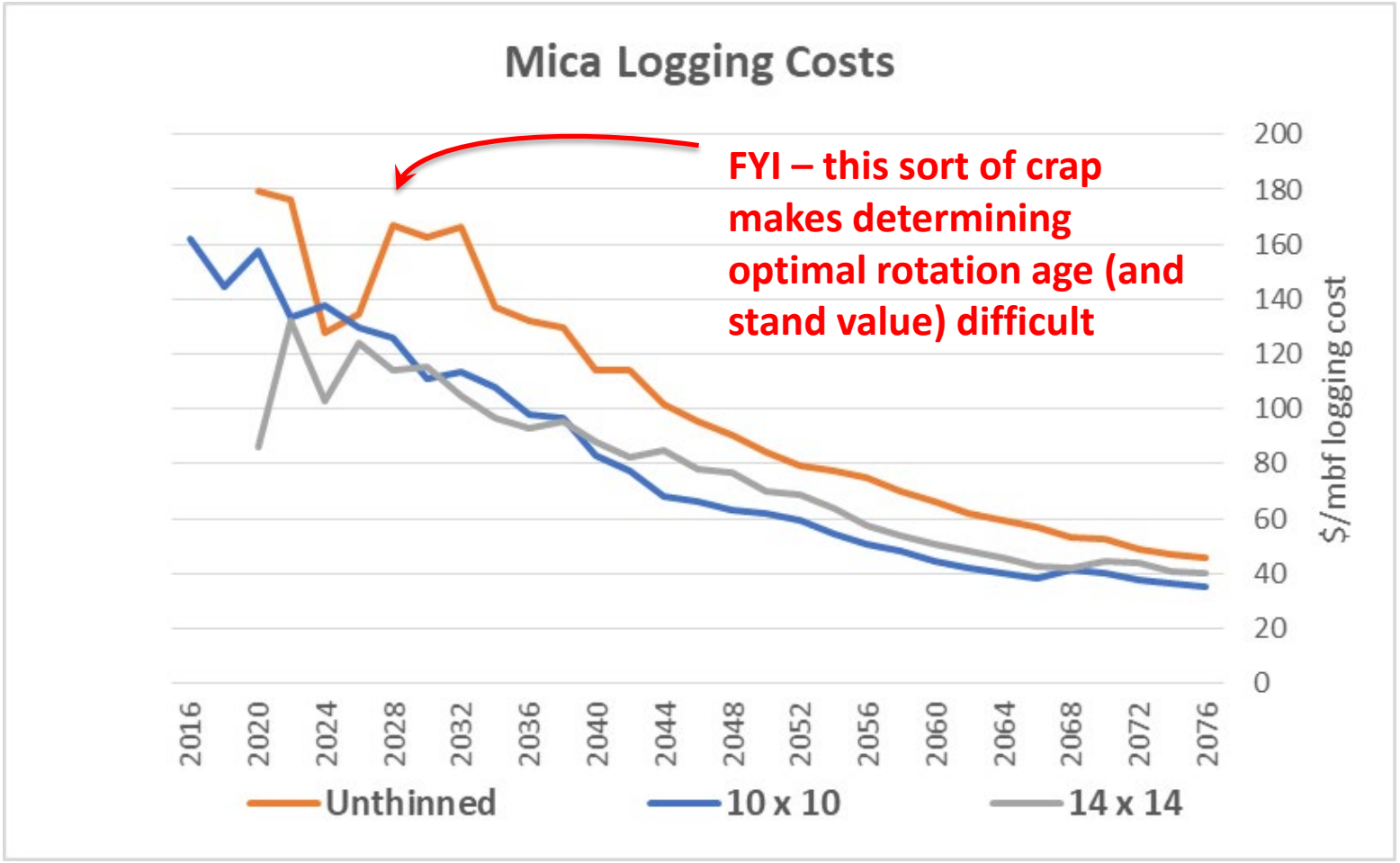
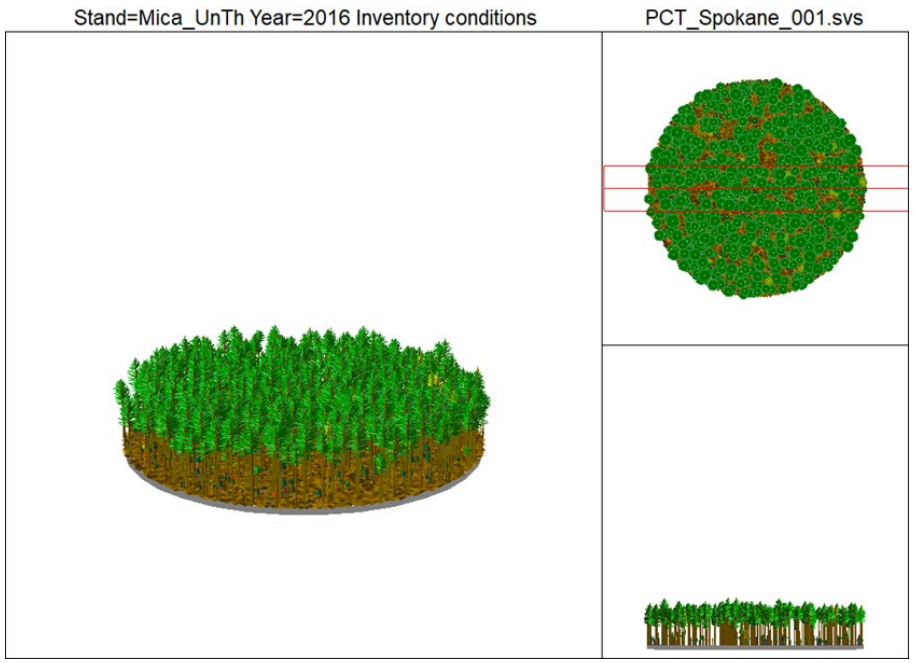


EXAMPLE BRINGING IT ALL TOGETHER

Using the same stand, log prices, harvest costs and a range of discount rates we will evaluate:

- Unthinned Control
- PCT to 10’ spacing
- PCT to 14’ spacing



We use a Land and Timber Value (LTV) equation

$$LTV = \max \frac{\sum_{age=0}^{Rotation} \left(Logprice * LogQuantity_{age} - Costs_{age}\right)\left(1 + DiscountRate\right)^{Rotation-age} + SEV}{\left(1 + DiscountRate\right)^{Rotation-current_age}}$$

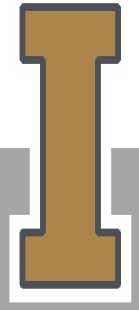
LAND AND TIMBER VALUE (NPV $/ACRE)

$$LTV = \max \frac{\sum_{age=0}^{Rotation} \left(Logprice * LogQuantity_{age} - Costs_{age}\right)\left(1 + DiscountRate\right)^{Rotation-age} + SEV}{\left(1 + DiscountRate\right)^{Rotation-current_age}}$$

Year you would harvest

	With 6% Discount Rate		
	Unthinned	10 x 10	14 x 14
2036	390	553	528
2038	430	549	516
2040	528	632	562
2042	537	670	649
2044	622	701	597
2046	625	678	624
2048	615	662	600
2050	617	625	599
2052	605	608	557
2054	580	595	549
2056	522	509	455

Doesn't account for PCT that cost $160/acre in 2016



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Year you would harvest

With 6% Discount Rate

	Unthinned	10 x 10	14 x 14
2036	390	393	368
2038	430	389	356
2040	528	472	402
2042	537	510	489
2044	622	541	437
2046	625	518	464
2048	615	502	440
2050	617	465	439
2052	605	448	397
2054	580	435	389
2056	522	349	295

With 4% Discount Rate

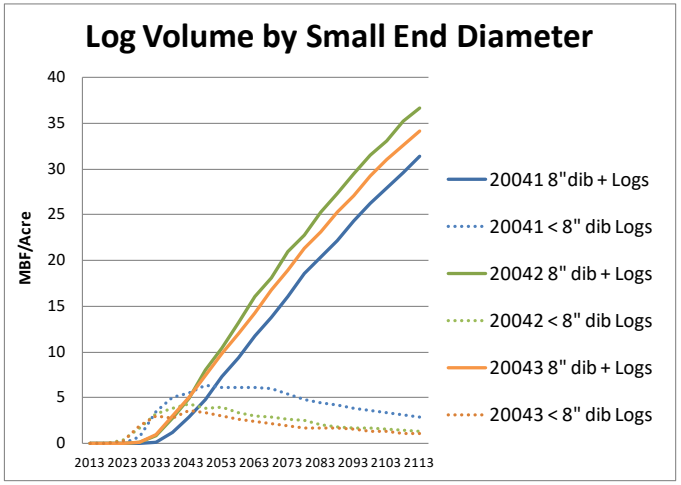
	Unthinned	10 x 10	14 x 14
2036	570	649	613
2038	653	674	625
2040	834	838	728
2042	881	939	904
2044	1,061	1,035	858
2046	1,107	1,041	945
2048	1,131	1,058	945
2050	1,179	1,035	984
2052	1,201	1,047	946
2054	1,197	1,067	972
2056	1,118	931	816

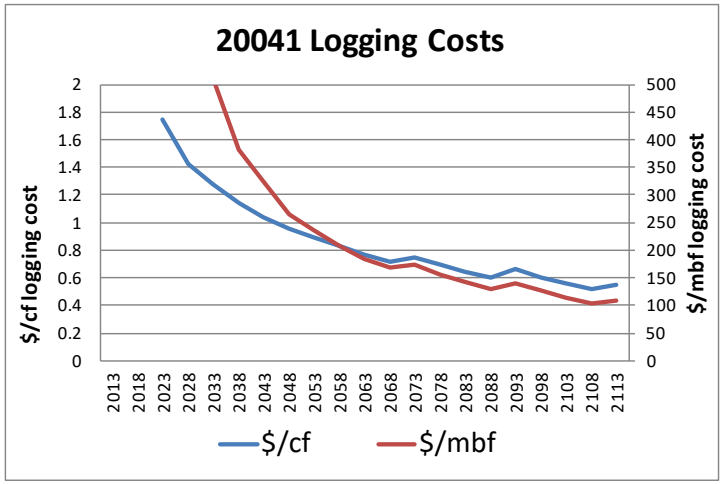
With 8% Discount Rate

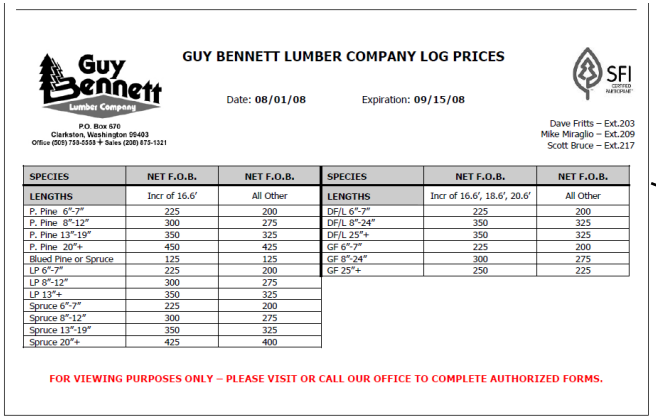
	Unthinnec	10 x 10	14 x 14
2036	268	221	203
2038	285	204	182
2040	337	243	199
2042	330	252	239
2044	369	255	194
2046	357	227	196
2048	338	204	170
2050	327	171	157
2052	309	150	124
2054	285	132	110
2056	247	81	56

Opportunity Cost: At 6% reducing density costs you $84/acre

ROTATION LENGTHENERS







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LP 6"-7"	225	200	GF 25"+	250	225
LP 8"-12"	300	275			
LP 13"+	350	325			
Spruce 6"-7"	225	200			
Spruce 8"-12"	300	275			
Spruce 13"-19"	350	325			
Spruce 20"+	425	400			

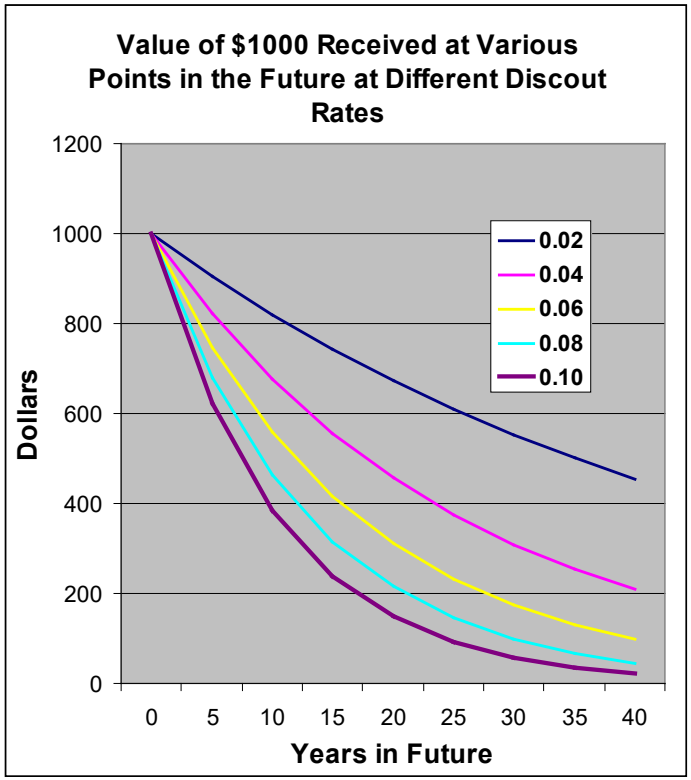
FOR VIEWING PURPOSES ONLY – PLEASE VISIT OR CALL OUR OFFICE TO COMPLETE AUTHORIZED FORMS.

The longer we wait to harvest… The more volume, concentrated in higher value products, that can be removed at a lower per-unit cost.

Rotation

University of Idaho
College of Natural Resources

ROTATION SHORTENERS



Consideration of Future Rotations rather than a single rotation value. (SEV)

The sooner the harvest…

We have our money in hand and can use it for other things or start the next rotation

Rotation

OPPORTUNITY COST

In our particular case the density reduction options yield mixed results.

If you choose to reduce the Mica installation down to a 10x10 stocking the opportunity cost would is **$84/acre** at a 6% discount rate

If you do choose to reduce the Mica installation down to a 14x14 stocking the opportunity cost would is **$137/acre** at a 6% discount rate

OTHER THINGS TO CONSIDER

- Stumpage vs. Delivered Log Price
- Future Log Price Expectations
- Defect and Breakage
- Taxation
- We looked at Discount Rate, but MaxSDI / MaxBA is similarly important