

Evaluating the Effectiveness of Slash Walls After Four Years

Peter Smallidge

State Extension Forester, Arnot Forest Director
Cornell University Cooperative Extension



Brett Chedzoy

Regional Extension Forester, Arnot Forest Manager
Cornell Cooperative Extension Schuyler County



Paul Curtis

Professor Cornell University
State Extension Wildlife Specialist



*Updated from:
Society of American Foresters. October 29, 2020*



Cornell University
College of Agriculture and Life Sciences
Department of Natural Resources



United States Department of Agriculture
National Institute of Food and Agriculture



Project Objectives:

1. Determine if commercially operable slash walls exclude deer.
2. Determine the longevity of slash walls.
3. Assess the operational barriers to and economic inputs for constructing slash walls.
4. To evaluate the response of beech sprouts relative to desirable hardwood species.
5. To document regeneration response and vegetation dynamics.



Acknowledgements

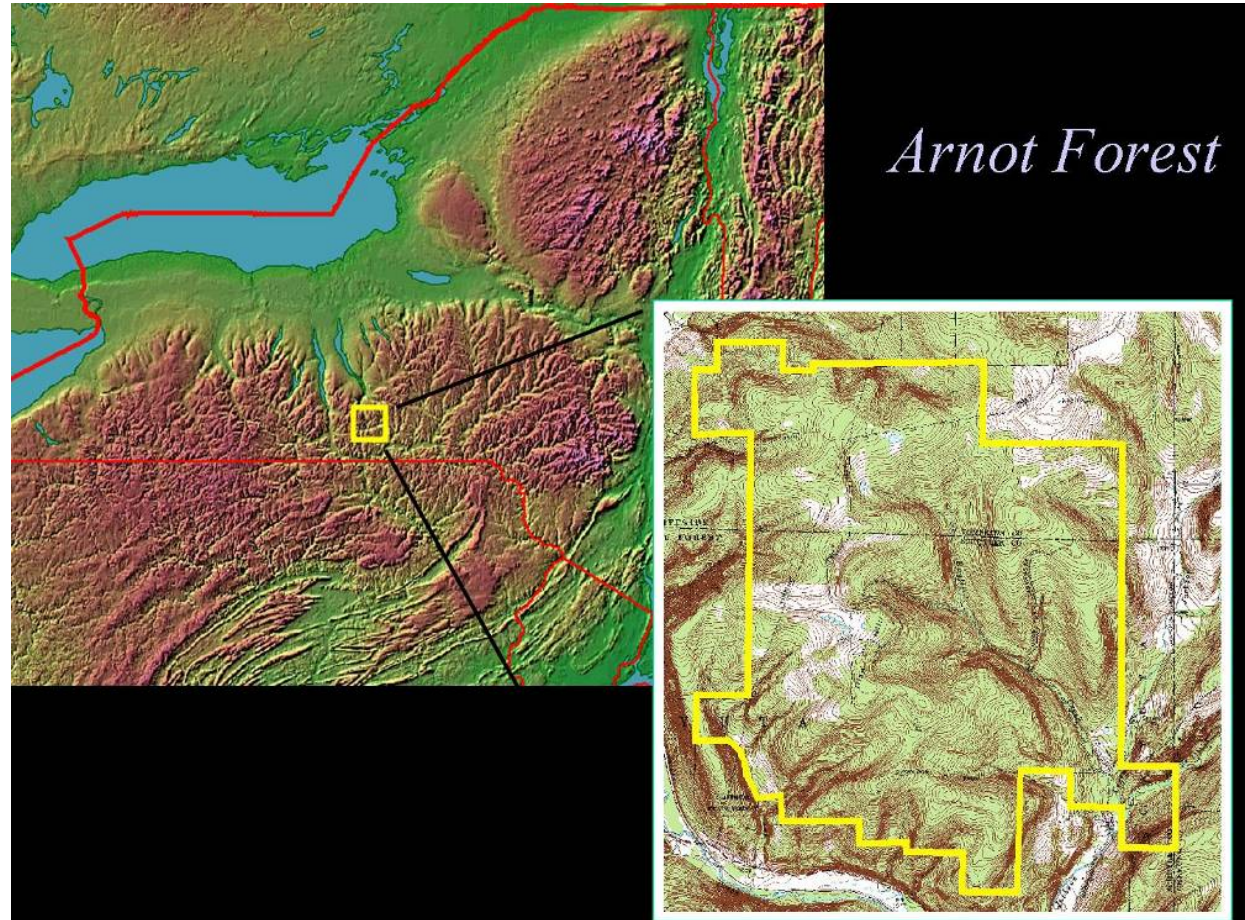
- Dr. Bill Bragg
- Mike Ashdown
- Cole Lake
- Katie Sims
- Zook-Ebersol Logging (Aden, Chris, Abram, Trevor)
- Dr. Jeffrey Ward (CT. Agric Expt Sta)
- Drs. Sullivan and Therkildsen (Cornell DNRE)

- Arnot Forest
- USDA NIFA McIntire-Stennis & Smith-Lever
- USDA NIFA RREA



Cornell University Arnot Teaching and Research Forest

- 1927
- 4275 acres
- Working forest
 - Timber
 - Maple syrup





Arnot Forest: Like much of central and western NY

- Heavily forested region
- Northern and Allegheny Hardwoods
- Mixed oak & hardwoods
- 1800's agricultural landscape



Regeneration Challenges



Photo credit J. Michael

Weak evidence for successful regeneration

- Shirer and Zimmerman 2010. 57% fair or poor regeneration.
- Connelly et al. 2010. 70% marginal or failed regeneration.
- Vickers et al. 2019.
> 2/3 permanent plots are not “regeneration ready”



Primary Barriers, as % of Stands, having Marginal or Failed Regeneration

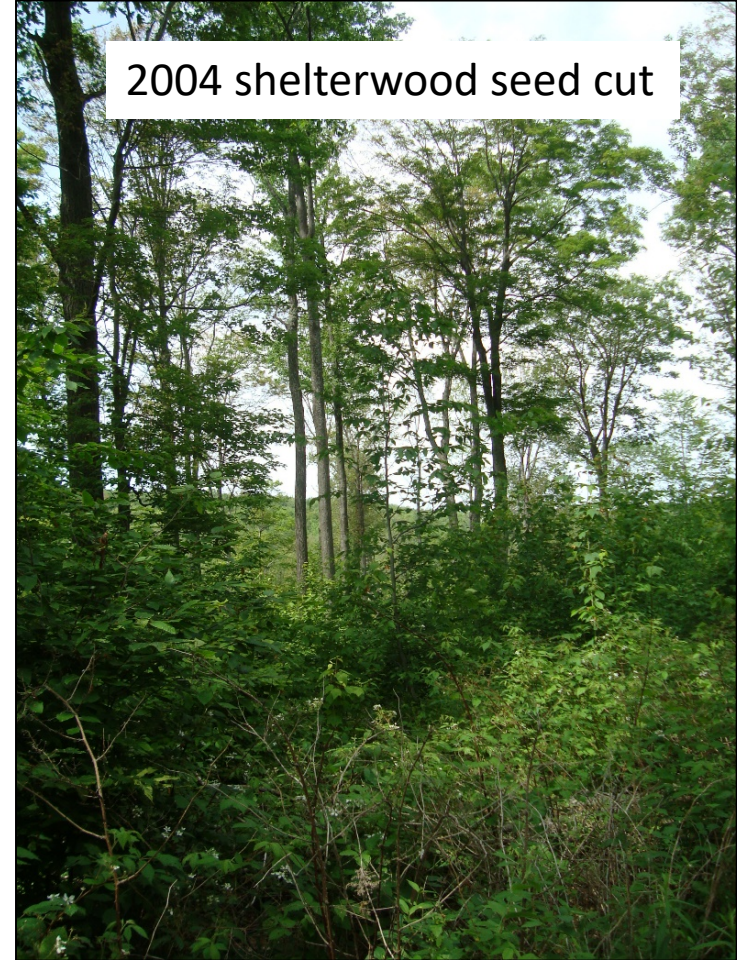
	Statewide	Adirondacks	So. Highlands	Other
Deer	65	38	59	91
Interfering Vegetation	47	47	46	49
Owner Attitude	25	16	25	32
Owner Finances	21	18	29	12
Soil/Site	14	18	9	17
Forest Health	10	12	8	11

Connelly, NA, PJ Smallidge, GR Goff and PD Curtis. 2010. Foresters perception of forest regeneration and possible barriers to regeneration in New York State. Cornell University Department of Natural Resources Human Dimensions Research Unit HDRU 10-2. 37 pp.

<https://ecommons.cornell.edu/bitstream/handle/1813/40444/HDRUReport10-2.pdf>



Multiple “good” regen cuts failed !





Challenges for Regeneration

The conditions in much of NY (NE) can be summarized as:

- High deer impacts to palatable (usually commercial) species
- High density of interfering vegetation resulting from deer impacts
- In most situations, hunting is not sufficient to control deer impacts





Pennsylvania:
Fences work



Photo credit: Gary Alt



Slash Walls





Slash Wall Regeneration Harvests

- Mechanized felling and windrowing
- Built from low-value stems and slash (tops) near perimeter
- Integrated cutting of all understory vegetation (“brushing”)



Progress to Date

- 9 harvests ranging from 6 to 150 acres
- > 450 acres
- Nearly ten miles of slash walls

No deer, strong favorable regeneration response!





Harvest Layout Considerations

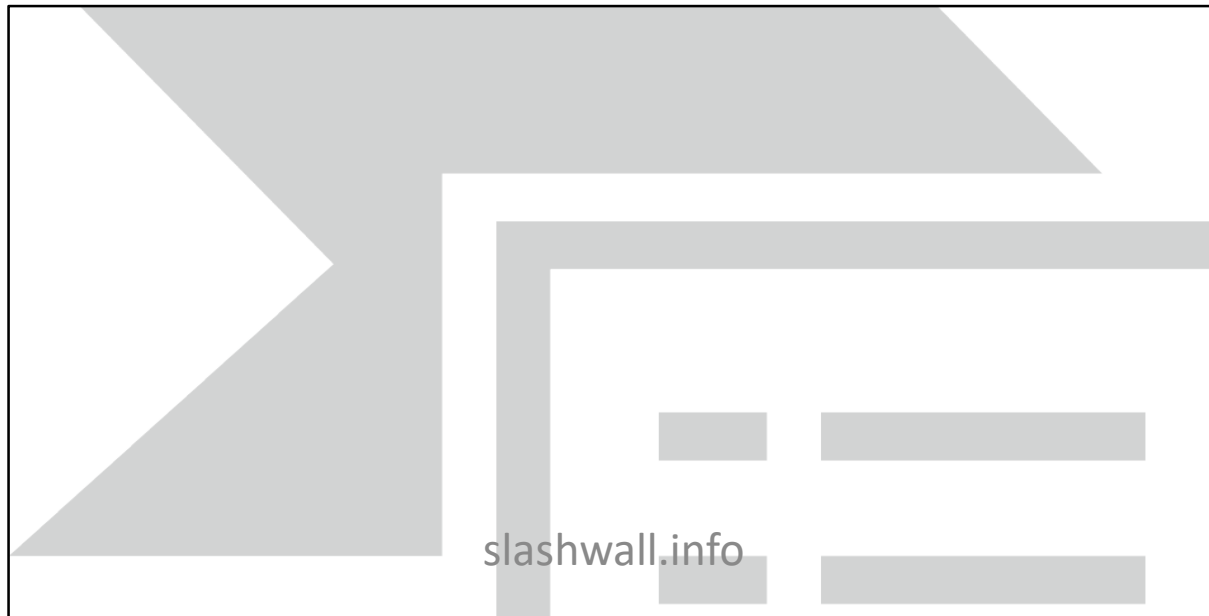
- Topography and natural obstacles
- Limit residual trees near wall
- Gates / future access





Contracts

- Minimum 10' high to 3" diameter and 20' wide, plus “sufficiently dense to exclude deer” as determined by Forest Manager
- Negotiated percentage sales
- Loggers compensated for slash wall construction and cutting the “interfering” understory vegetation





2017 Wall Construction Costs

Sale	Acres	Perimeter (ft)	Machine Hours	\$ / Ft*
01 – Gas Line	74	7400	62	\$1.68
02 – Red Pine	11	2800	14	\$1.00
03 – Sta. Rd.	16	3800	15	\$0.80
04 - Wedge	12	2700	25	\$1.88

* At feller-buncher rate of \$200/hour
slashwall.info



2019 – Volume and Time In Walls

(volume as tons estimated per 100 feet of wall)

Stand Type	Total (tons)	> 6" Hdwd (tons)	> 6" Conifer (tons)	Feet / minute
Hdwd Pole	27	15	0	2.4
HEM-Hdwd Small-SWT	33	13	10	2.6
Old-field Pole	29	4	16	2.6
Overall AVG	31	12	9	2.6

- Avg. wall cost \$2.25/ft (\$1.50 – labor, \$0.75 – wood)
- ~ half the cost of fencing



Etcetera...

- Crew needs to “buy in”
- Prioritize low-grade into wall
- Anticipate future wall and harvest locations
- Logger learning curve





Results





Post-Harvest Residual Basal Area

Harvest Name	Sample Location	Area (acres)	Residual BA (sq. ft./ac)
Boot & Wedge	Interior	12 & 9	37
Boot & Wedge	Perimeter		23
Boot & Wedge	Control	2 - 4	39
Gas Line	Interior	74	8
Gas Line	Perimeter		8
Gas Line	Control	1 - 3	31
Red Pine	Interior	13	8
Red Pine	Perimeter		2
Red Pine	Control	2 - 3	18

Height Growth of Tagged Seedlings in Protected vs. Control Areas Using AVIDdeer.com Protocols

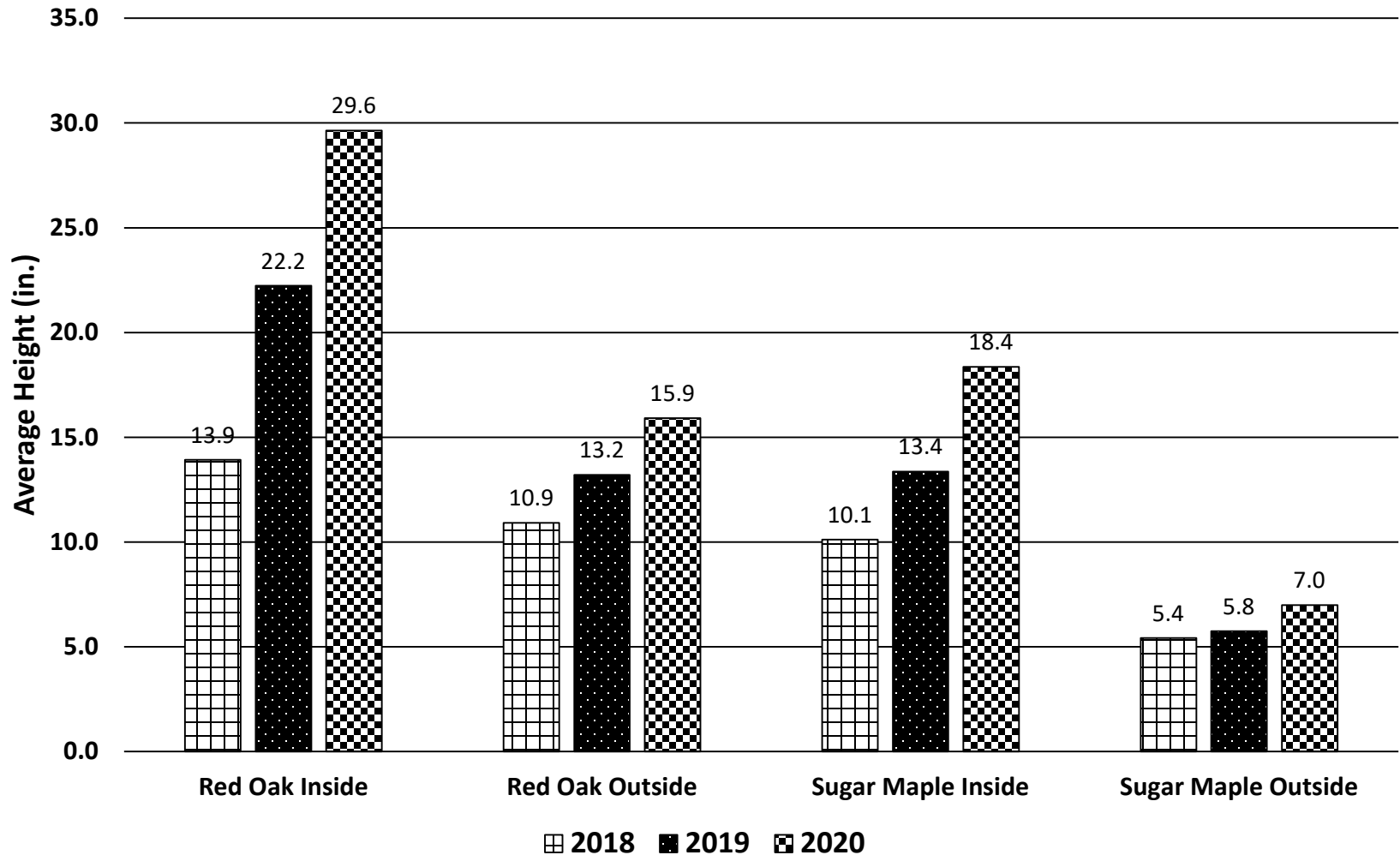


Figure x. Data from AVID plots in the “gas line” slash wall illustrate that seedling height growth rate inside the slash wall is greater than outside the slash wall. Seedling height growth inside fences inside the slash wall (data not shown) was similar to unfenced seedlings inside the slash wall. (Smallidge, Curtis, Chedzoy, Ashdown, unpublished data 2020)



Average Height of Seedlings (All Origins) in Control and Slash Wall Plots after 3 Growing Seasons

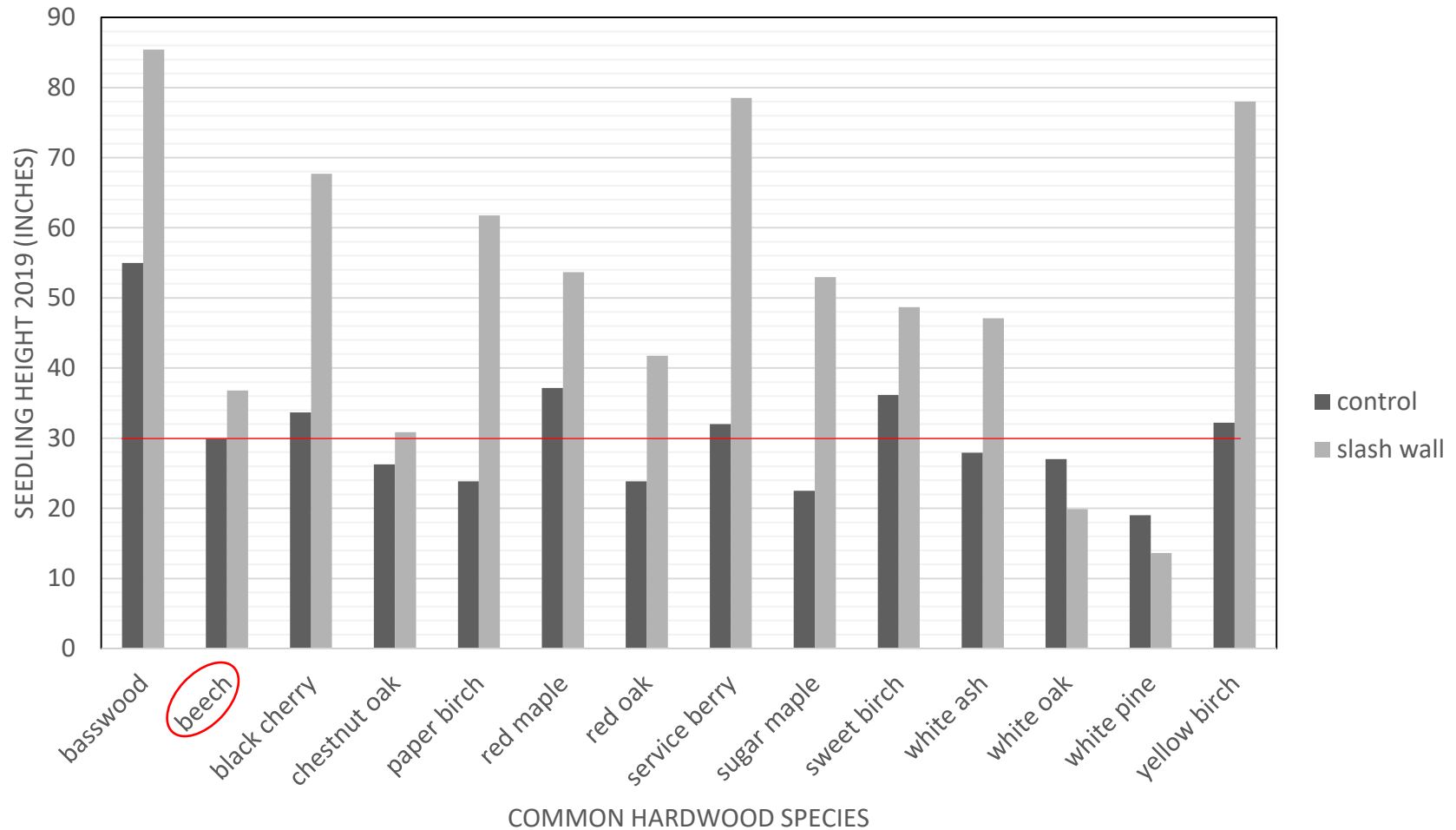


Figure 2. The total height of seedlings in the 2017 slash walls varied with controls for some species. Most species had greater height inside than outside the slash wall. Several species had better growth than beech inside the slash wall, but poorer growth than beech outside the slash wall. (Smallidge, Curtis, Chedzoy, Ashdown, unpublished data 2020)



Abundance of commercial seedlings among plot types as of 2019 growing season. FTG = Free To Grow

Plot Type	6" to 12" (stems / ac)	1 – 4.5 ft (FTG stems / ac)	4.5 ft – 9.0 ft (FTG stems / ac)
Control	11,575	5639	115
Perimeter	32,615	3107	703
Interior	39,340	6128	626



Stocking with commercial species after 3 growing seasons in slash wall harvests. Threshold follows SILVAH (> 5775 stems/ac if less than 1 ft)

Plot Type	# plots	% stocked: < 1 ft tall	% stocked: 1 – 4.5 ft, free to grow	% stocked: 4.5 ft – 9 ft, free to grow
Control	79	41	48	0
Perimeter	39 (74)	85	36	5
Interior	48 (94)	98	36	7



Changes in Slash Wall Dimension

Hardwood (3 harvests)	Year 1 (ft)	Year 2 (ft)	Year 3 (ft)	%
width, horizontal	23	22	23	3
total height	11	9	8	-25
height to 2" dia stem	8	6	5	-28

Red Pine (1 harvest)	Year 1 (ft)	Year 2 (ft)	Year 3 (ft)	%
width, horizontal	26	26	25	-4
total height	9	8	6	-33
height to 2" dia stem	5	5	4	20

What's Next?

- Seedling height growth and stand development
- Wall functional longevity
- Test alternative wall designs and dimensions
- Calibrate pre-harvest volume to wall supply zone
- Economic metrics
- RI-1, NY-2, NH-1
- NY(5), CT(2), MI



... and Extension!



Peter Smallidge

pjs23@cornell.edu

607-592-3640

Brett Chedzoy

bjc226@cornell.edu

607- 742-3657

Paul Curtis

pdc1@cornell.edu

607-227-5927



Photo by RJ Andersen, CCE Media

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