A Deeper Dive into Wood Product LCA Forest Resource Accounting

Carbon Leadership Forum

CLF Wood Seminar Series

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by

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Well Established International Framework and Hierarchy

Regional Data Development

Regional Data Development for Forest Resources and Wood Manufacturing processes

ISO standards

ISO 14040
ISO 14044
ISO 21930

ISO 21930

PCR

North American Wood PCR (ULE 2019)

Summarization and Integration of LCI and LCIA consistent with ISO, PCR and EPD requirements

LCI

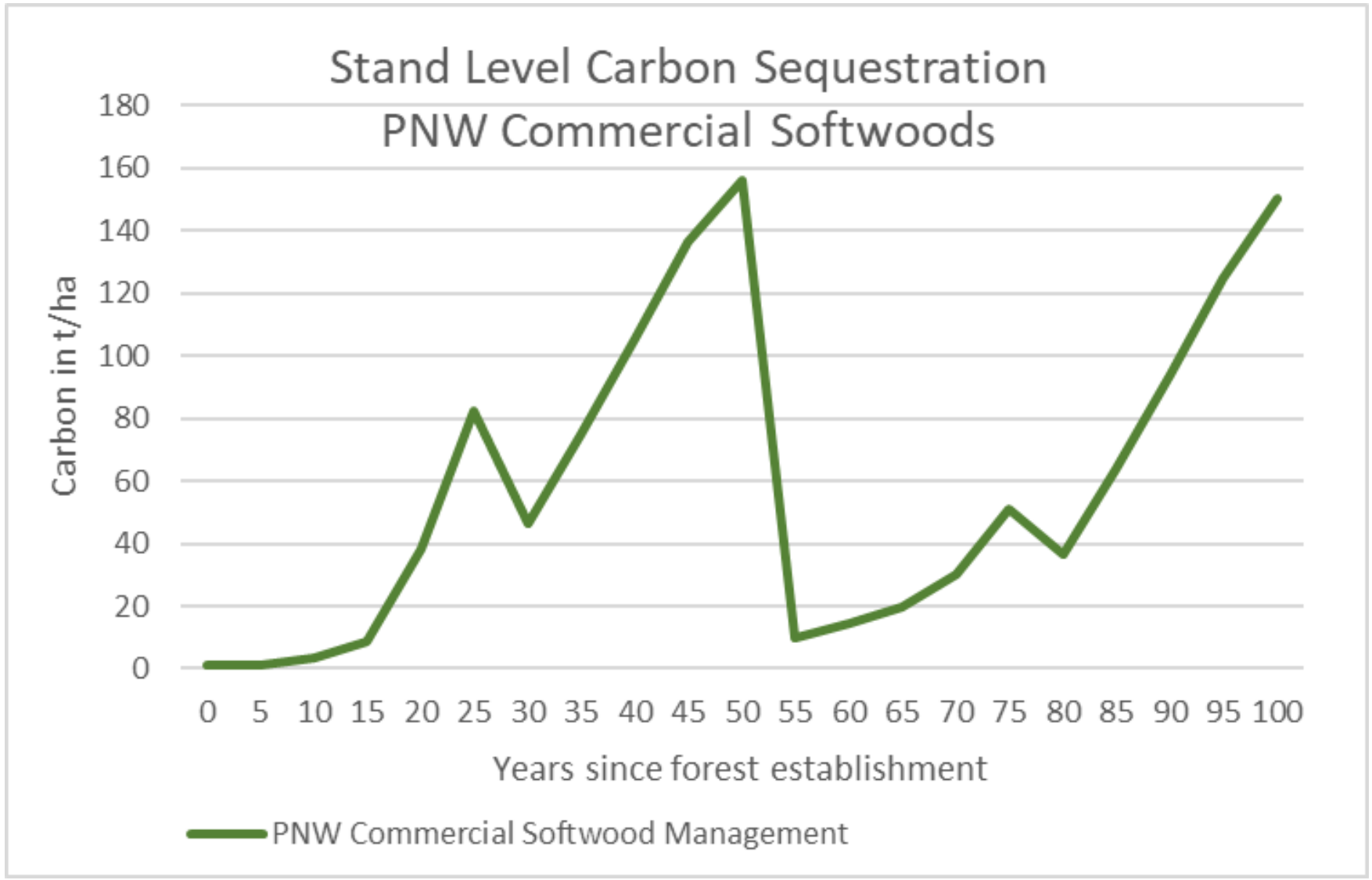
LCIA

Impact Assessment based on TRACI Criteria for all impacts required under the PCR and EPD (US EPA)

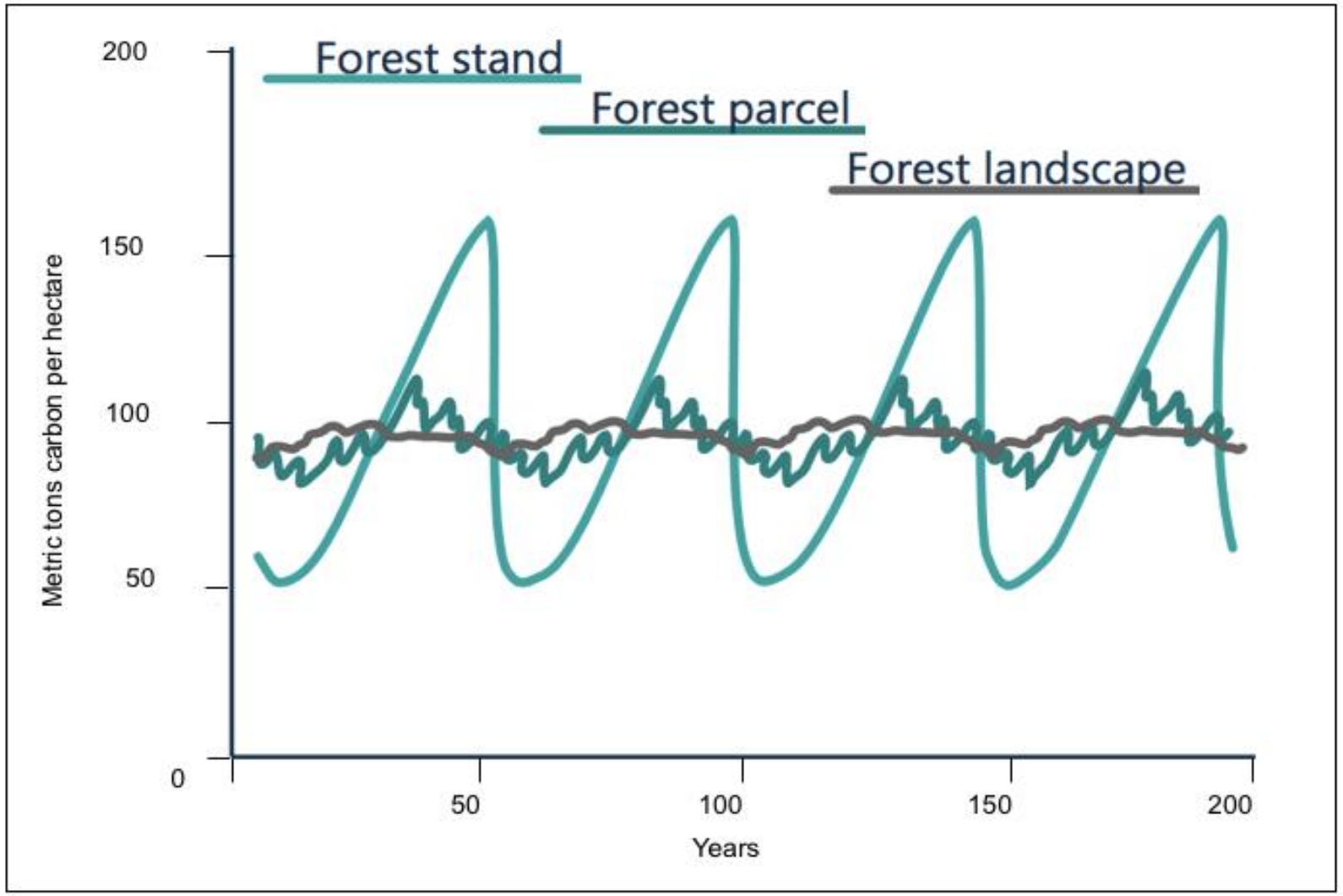
LCA

EPD

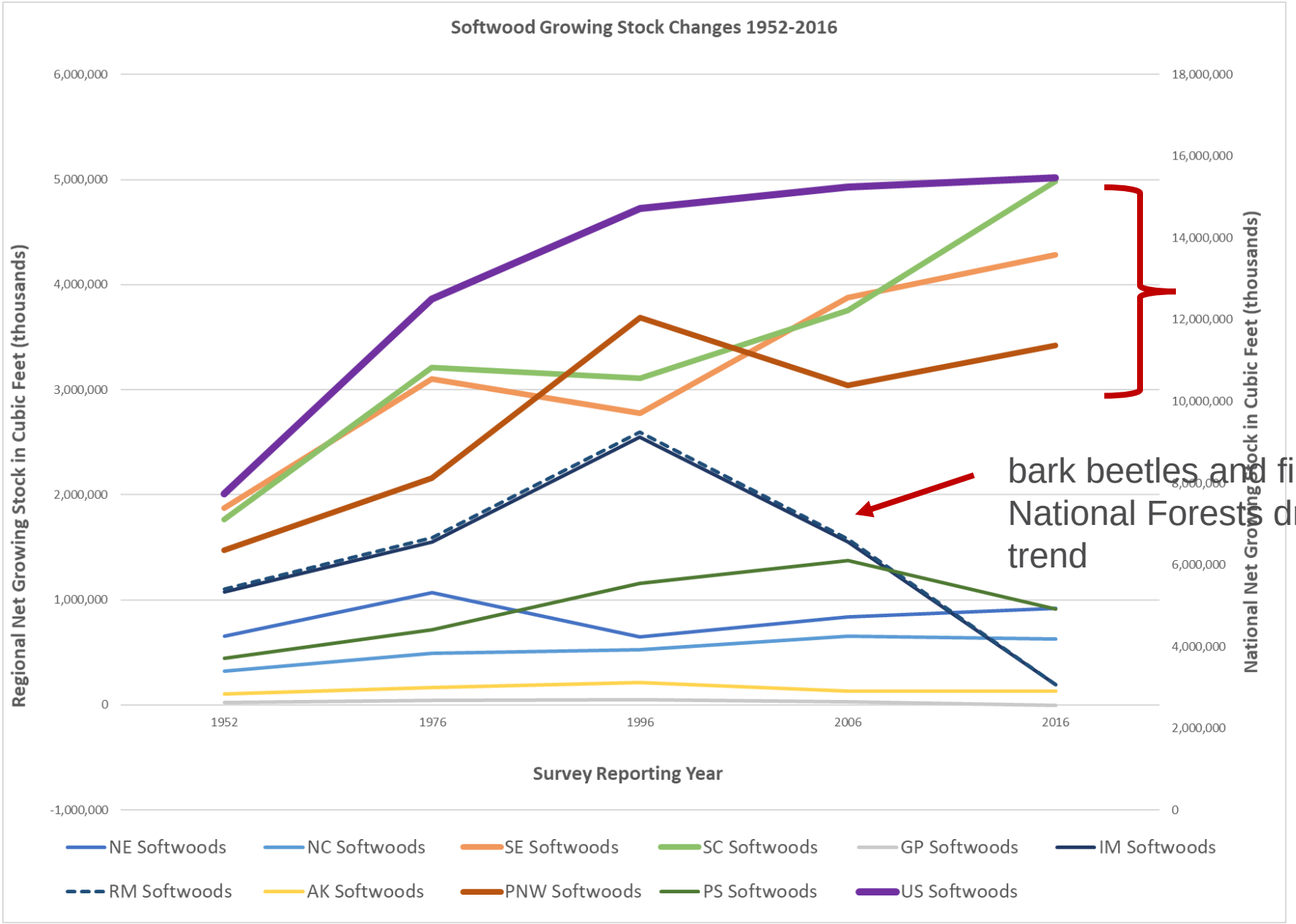
Synthesis and aggregation of national product data e.g. North American Softwood Lumber EPD (2013, 2020)


Stand Level Carbon Sequestration
PNW Commercial Softwoods
Carbon in t/ha
180
160
140
120
100
80
60
40
20
0
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
Years since forest establishment
PNW Commercial Softwood Management

Scale Matters



Graphic representation of the spatial and temporal dynamics of C storage for a typical PNW forest managed on 45-year rotations presented as: the growth and harvest cycles of **one forest stand** (in **turquoise**), an average per ha for **10 forest stands** harvested in sequential intervals (in **teal**), and an average for **100 stands** harvested sustainably as part of a "normal" forest (in **brown)**. Adapted from McKinley et al. 2011 and Janowiak et al. 2017.



Major wood producing regions

bark beetles and fire – mostly National Forests driving the trend

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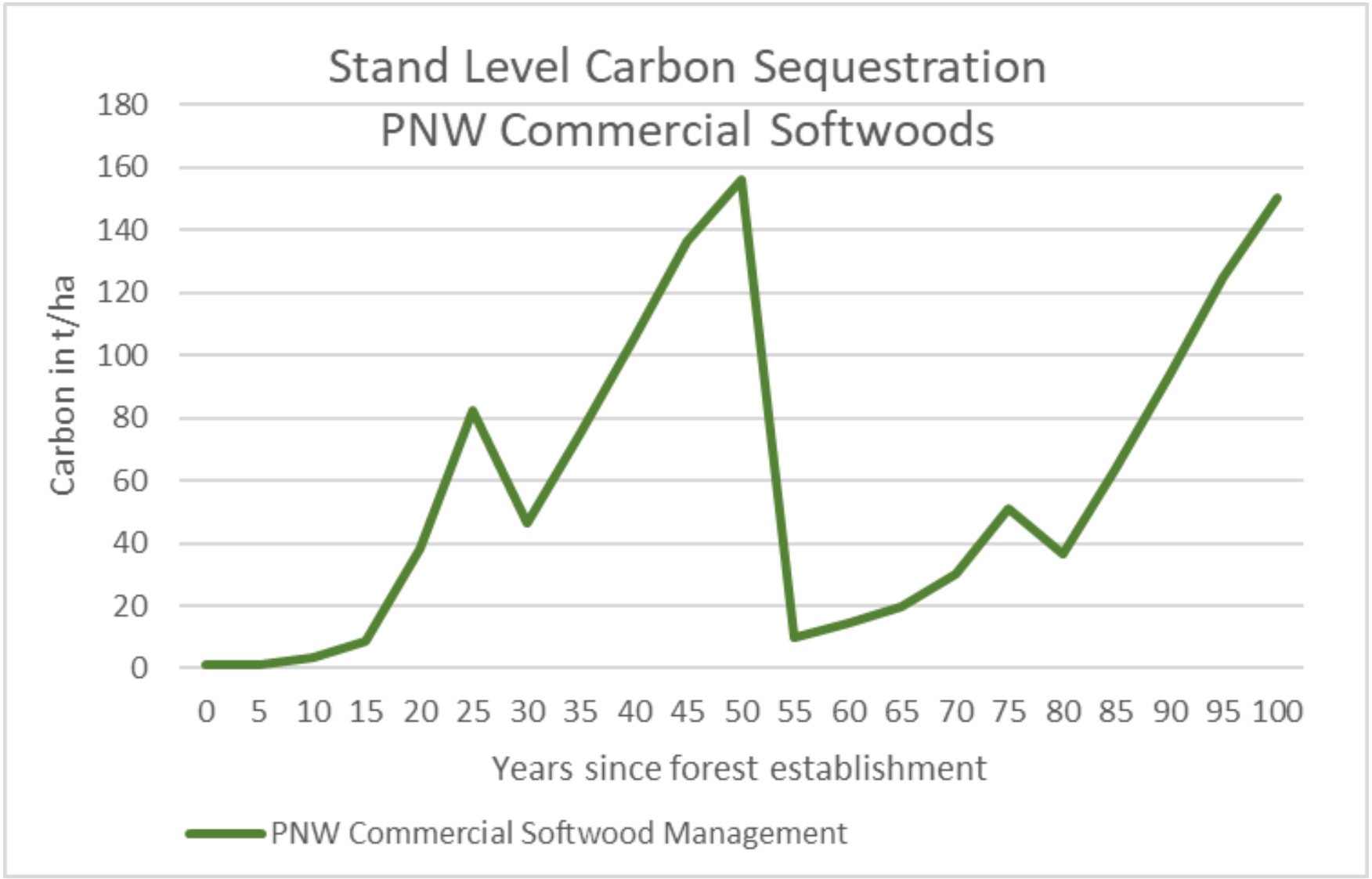
- 60 year old PNW Douglas-fir ready for harvest
- This is the result of intensive forest management that happens to be SFI certified, under a spotted owl management plan, and still part of the company's active harvesting program.



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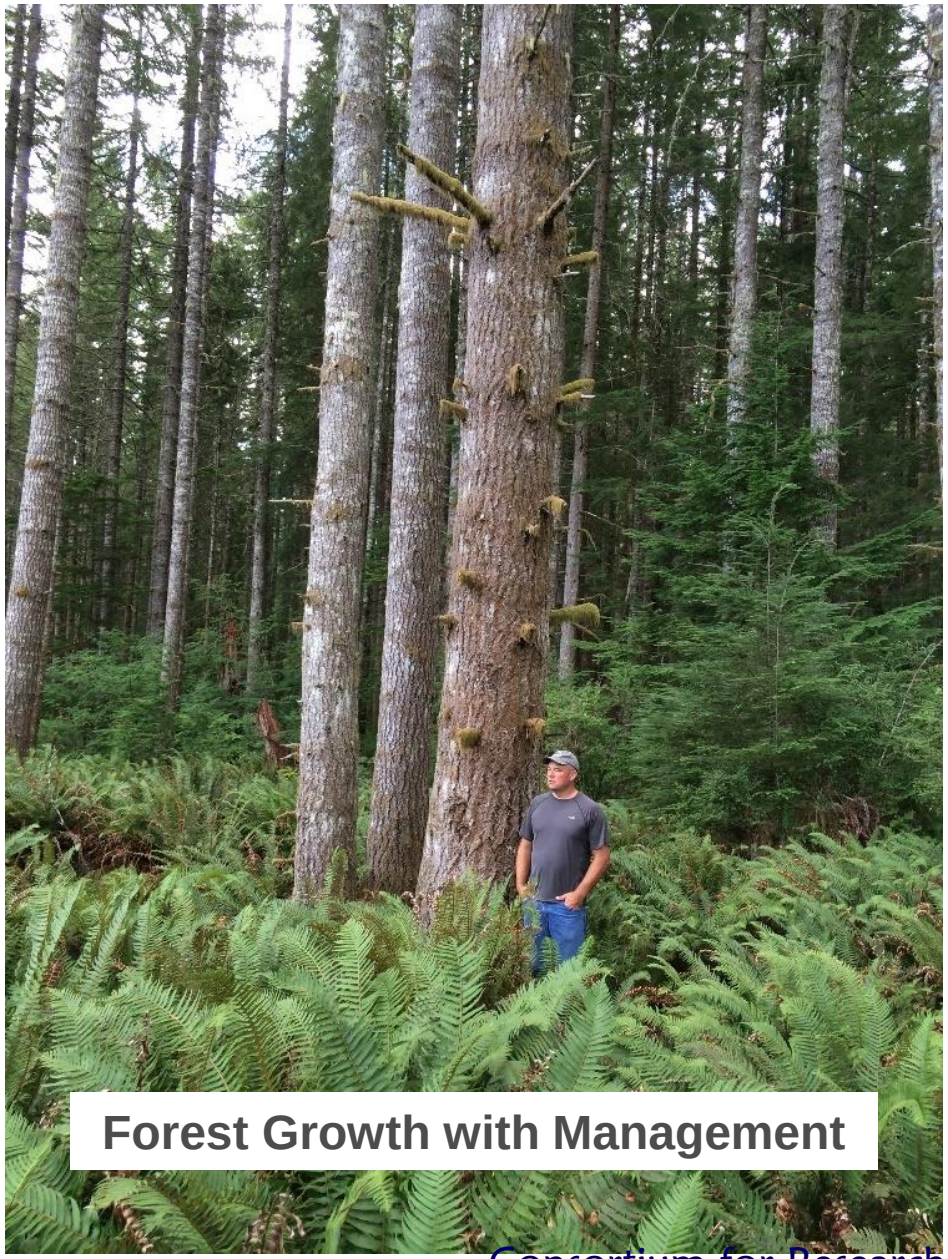

Forest Growth with Management

Forest Growth without Management

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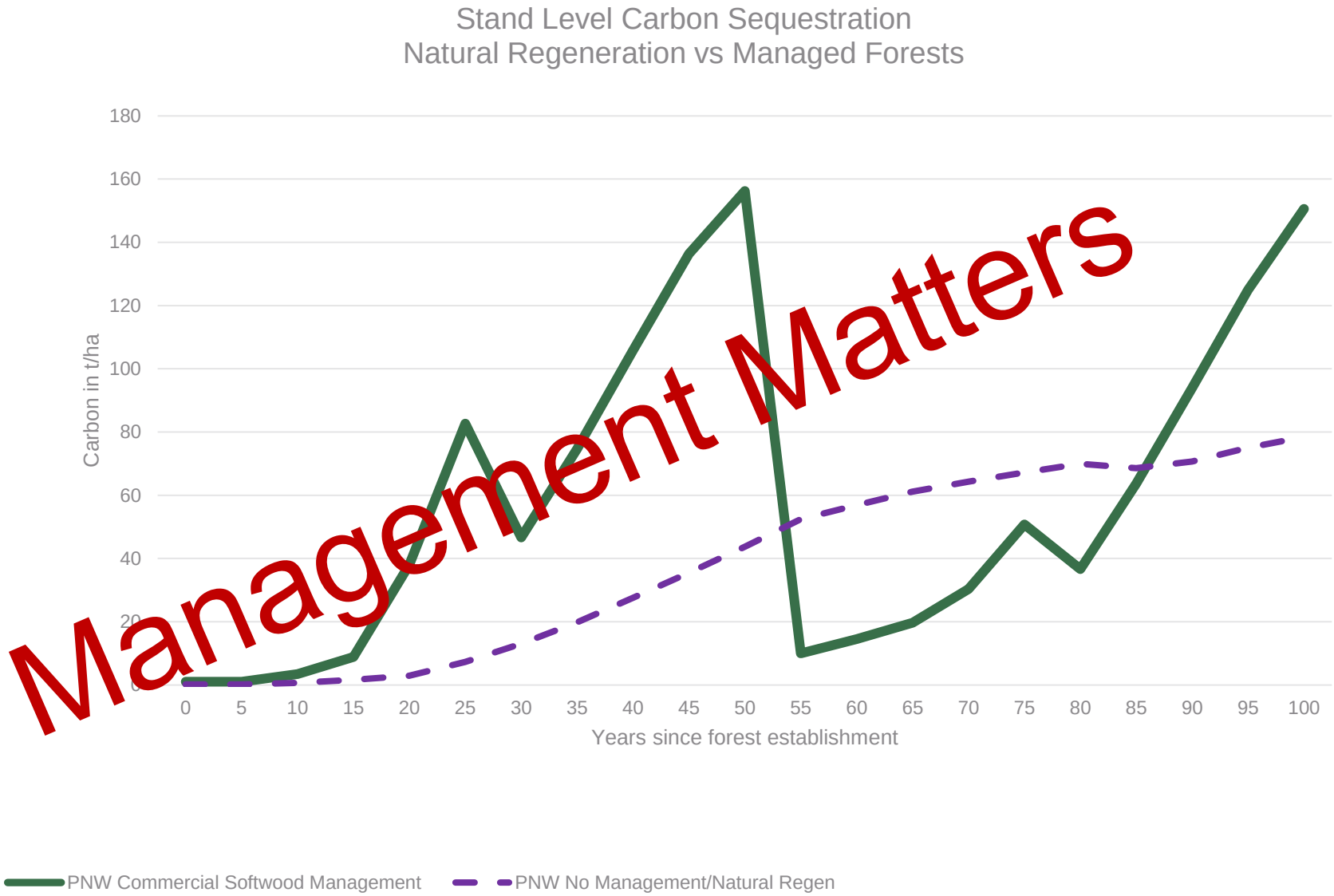
Stand Level Carbon Sequestration
Natural Regeneration vs Managed Forests
Carbon in t/ha
180
160
140
120
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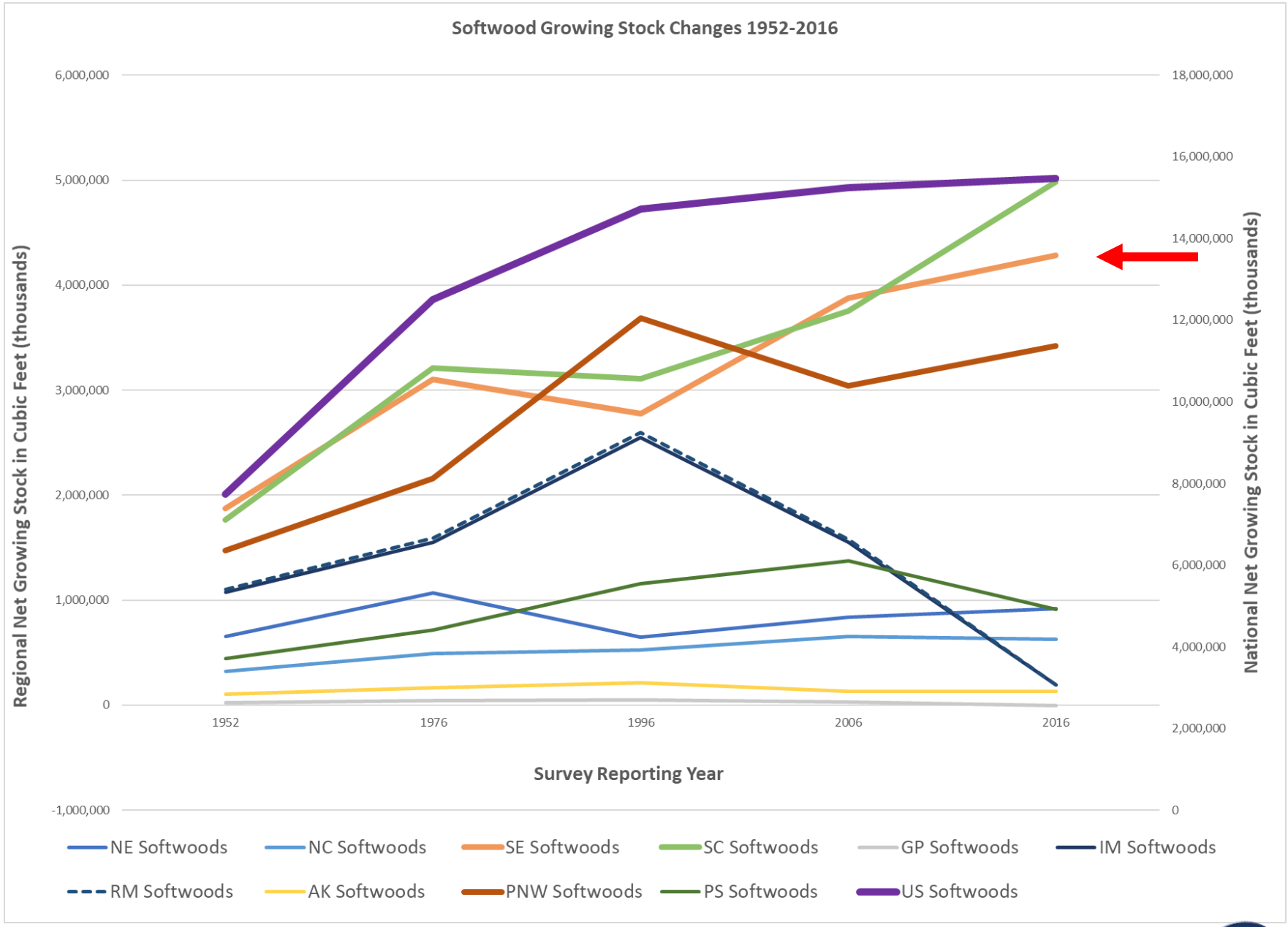
60
40
20
0
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
Years since forest establishment
Management Matters
PNW Commercial Softwood Management
PNW No Management/Natural Regen



SE region productivity increase

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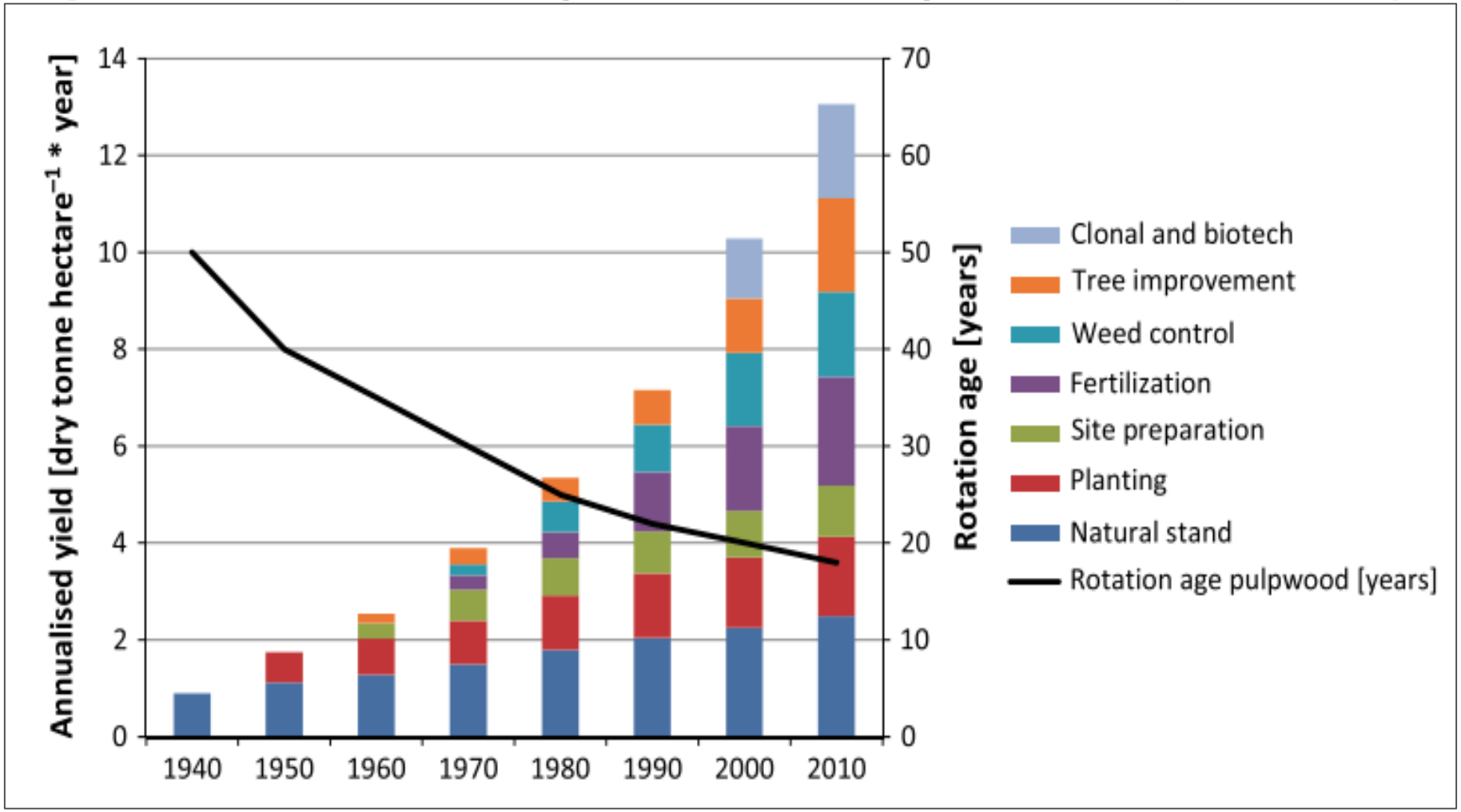
Improved Forest Management aka High Intensity Forestry



Silvicultural developments over 8 decades that have led to increased pine plantation productivity, heightened C uptake and storage, and shortened time to harvest in the US SE. Adapted from Fox et al. 2004.

SE Region Forest Carbon Stocks and Cumulative Harvest

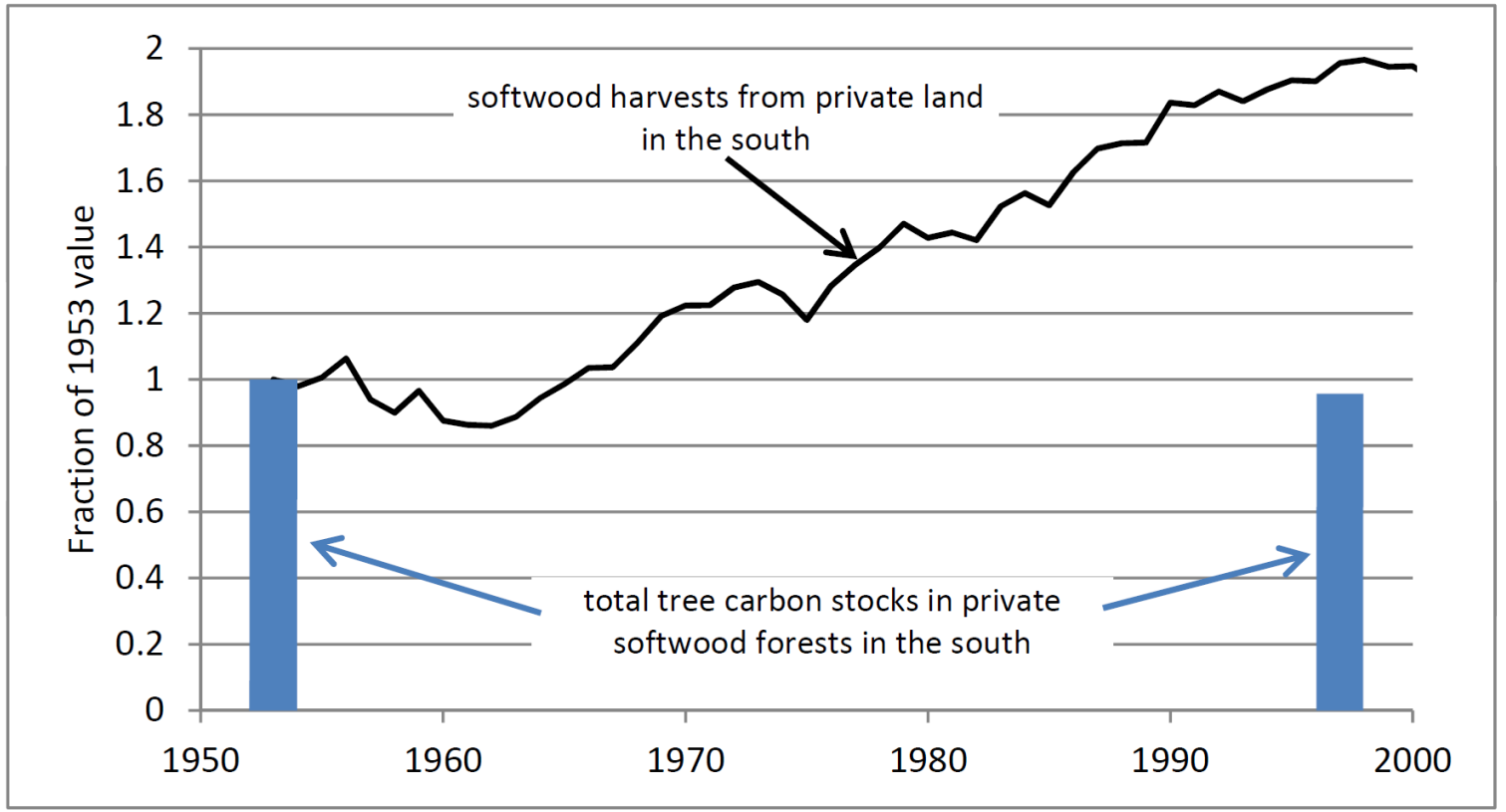
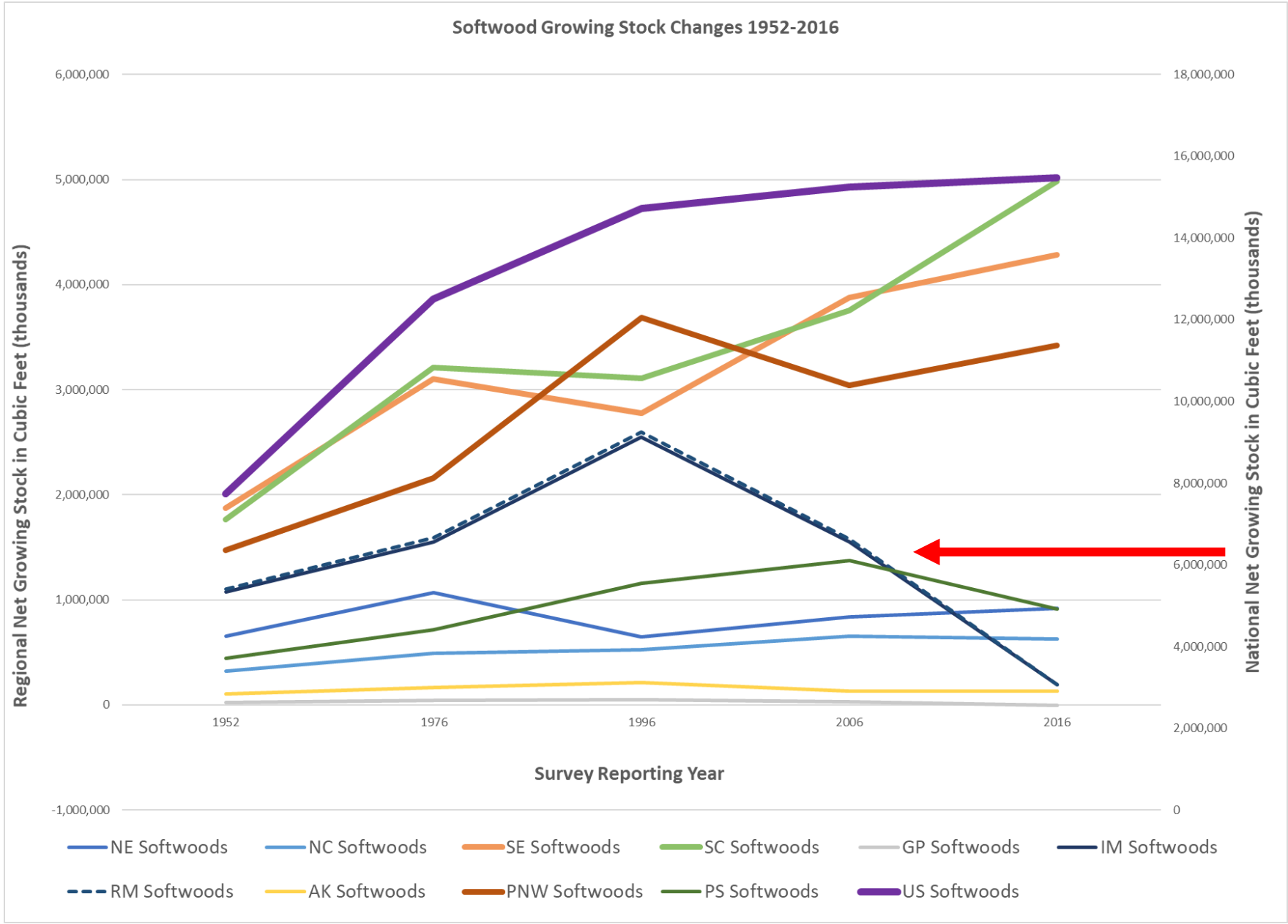


Image courtesy of Reid Miner, NCASI, 2014



Rocky Mountain region productivity decrease

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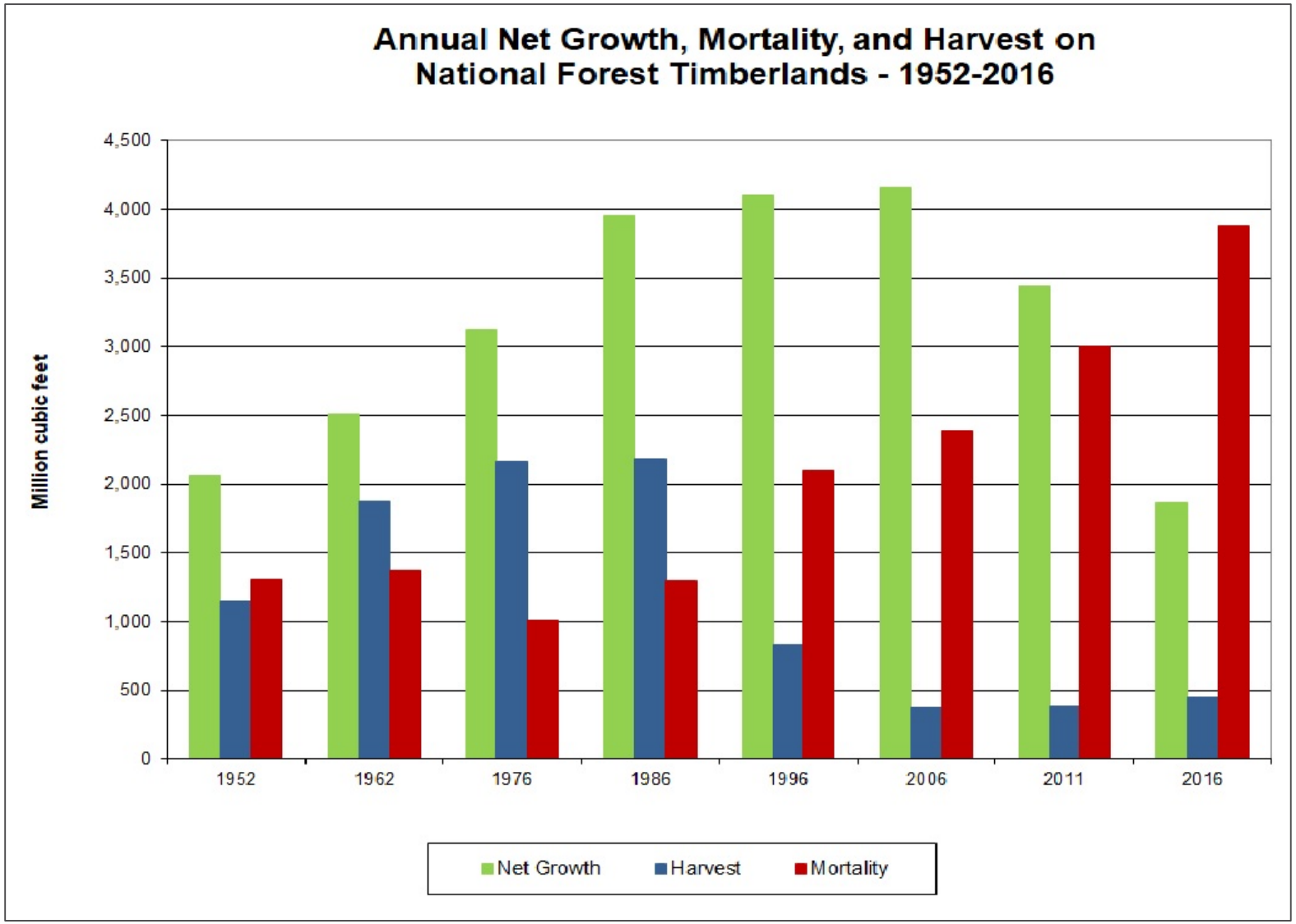
Management Matters



Growth, Mortality, and Harvest on National Forest Timberlands 1952-2016. Data provided by Oswalt et al. 2018.

EPD "Nutritional" Label
Wood Product

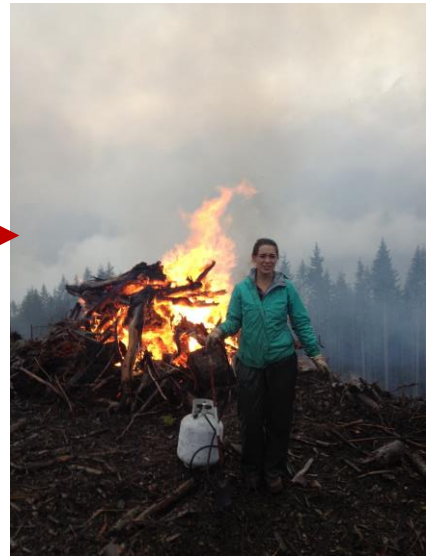
Amount per Unit

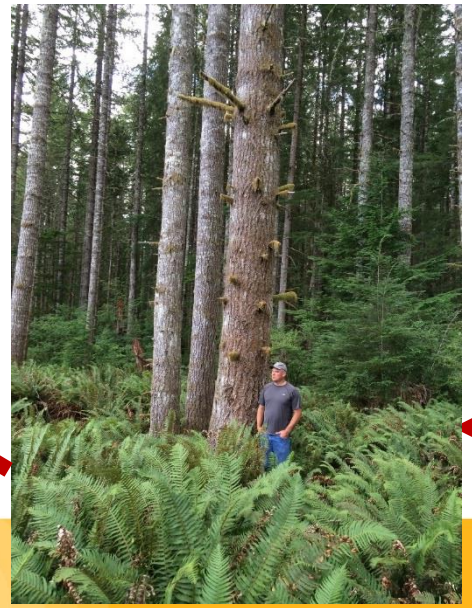
LCA Impact Assessment		Total	Forestry Operations	Wood Product Production
Global Warming Potential	kg CO_2 eq.	143	11	132
Acidification Potential	SO_2 eq.	1.60	0.15	1.45
Eutrophication	kg N eq.	0.06	0.01	0.05
Smog	kg O3 eq.	25	5	20
Total Energy	MJ	7,425	165	7,260
Non-Renewable Resources	kg	6	0.01	6
Renewable Resources	kg	640	0.00	640
Water Use	L	1,061	11	1,050

Ingredients: Carbon

Puettmann et al 2018

Forest Management Cycle





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Carbon Footprint per m^3

	Reference Unit	Herbicide Treatment only	Herbicide plus Pile and Burn Treatment	*Broadcast Burn Treatment
Standard TRACI methodology for the treatment of biogenic carbon				
Production Emissions	kg CO_2 eq/m^3	10.74	18.14	23.16
co2 sequestered per m3 log	kg CO_2 eq/m^3	960.37	960.37	960.37
Net sequestration	kg CO_2 eq/m^3	-949.63	-942.23	-937.21
Modified TRACI methodology that includes biogenic carbon emissions				
Production Emissions	kg CO_2 eq/m^3	10.74	141.31	315.83
co2 sequestered per m3 log plus residues	kg CO_2 eq/m^3	1615	1615	1615
Net sequestration	kg CO_2 eq/m^3	-1604.25	-1473.69	-1299.17

Oneil and Puettmann, 2017, A Life-Cycle Assessment of Forest Resources of the Pacific Northwest, USA, Forest Prod. J. 67(5/6):316–330

Thank You

For More Information

www.corrim.org

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