

Western Forest Economists
Annual Meeting, Seattle, WA
May 15, 2025

Harvest or Set-Aside?

A Comparative Carbon Analysis Grounded in Real World Data



by

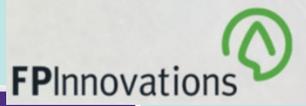
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Consortium for Research on Renewable Industrial Materials
*A non-profit corporation formed by 20 research institutions to conduct
cradle to grave environmental studies of wood products*



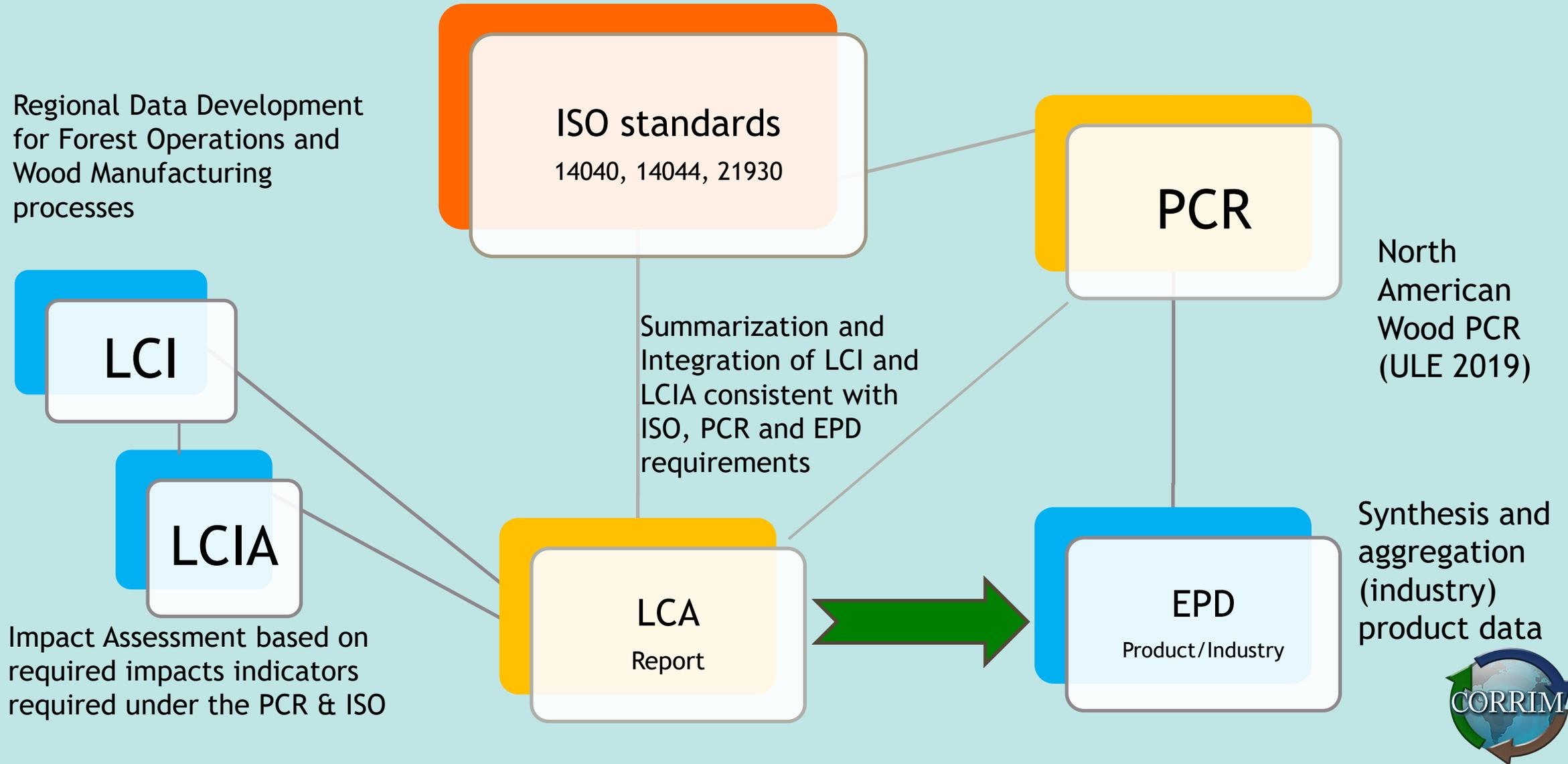


The "Go To Place for Wood LCA"

Member Research Institutions
Consortium for Research on Renewable Industrial Materials - CORRIM



Well Established International Framework & Hierarchy



Pacific Northwest

	2020	2017
Softwood Lumber	Report	Publication*
Plywood	Report	
Laminated Veneer Lumber (LVL)	Report	Report
		Publication*
Glulam	Report	Report
		Publication*
I Joist	Report	Report
		Publication*
Forestry		Publication*
Cross Laminated Timber		Report

<https://corrim.org/lcas-on-wood-products-library/>

What is an EPD?

Environmental Product Declarations, or EPDs, rely on Life-Cycle Assessment (LCA) of products over their life cycle. EPDs do not indicate that any environmental or social impacts that they do not encompass. EPDs can complement but cannot replace tools and methods that set performance thresholds – e.g. Type 1 certifications, health assessments and

EPDs regularly rely on estimations of impacts, and the level of accuracy in estimating impact. EPDs are not comparative assertions and are either not comparable or are based on different product category rules or are missing relevant environmental data to be comparable.

CORRIM has produced and contributed to a number of EPDs in conjunction with the American Wood Council. The declarations listed below are environmental product declarations.

Click [here](#) to view verified LCA reports for EPDS

AMERICAN WOOD COUNCIL

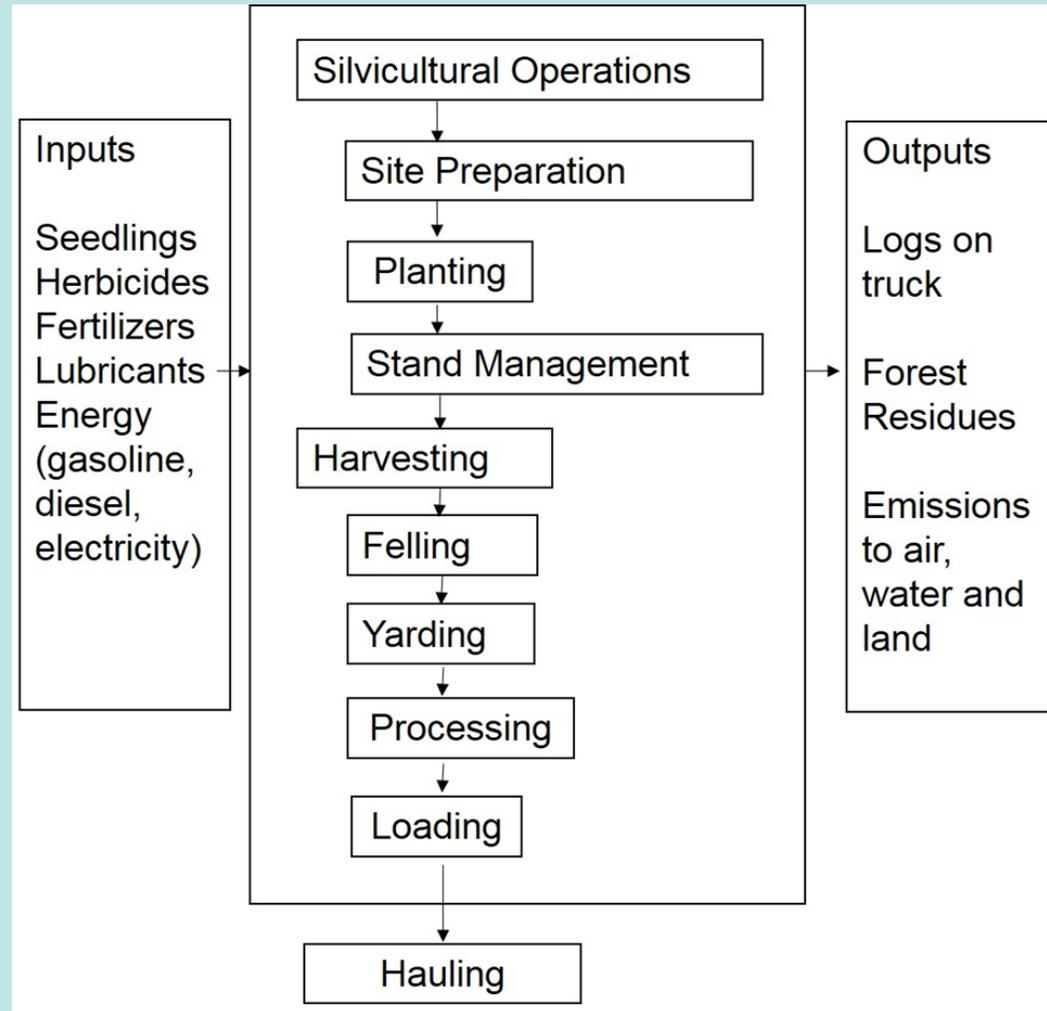
[Environmental Product Declaration – North American Wood I Joists](#)

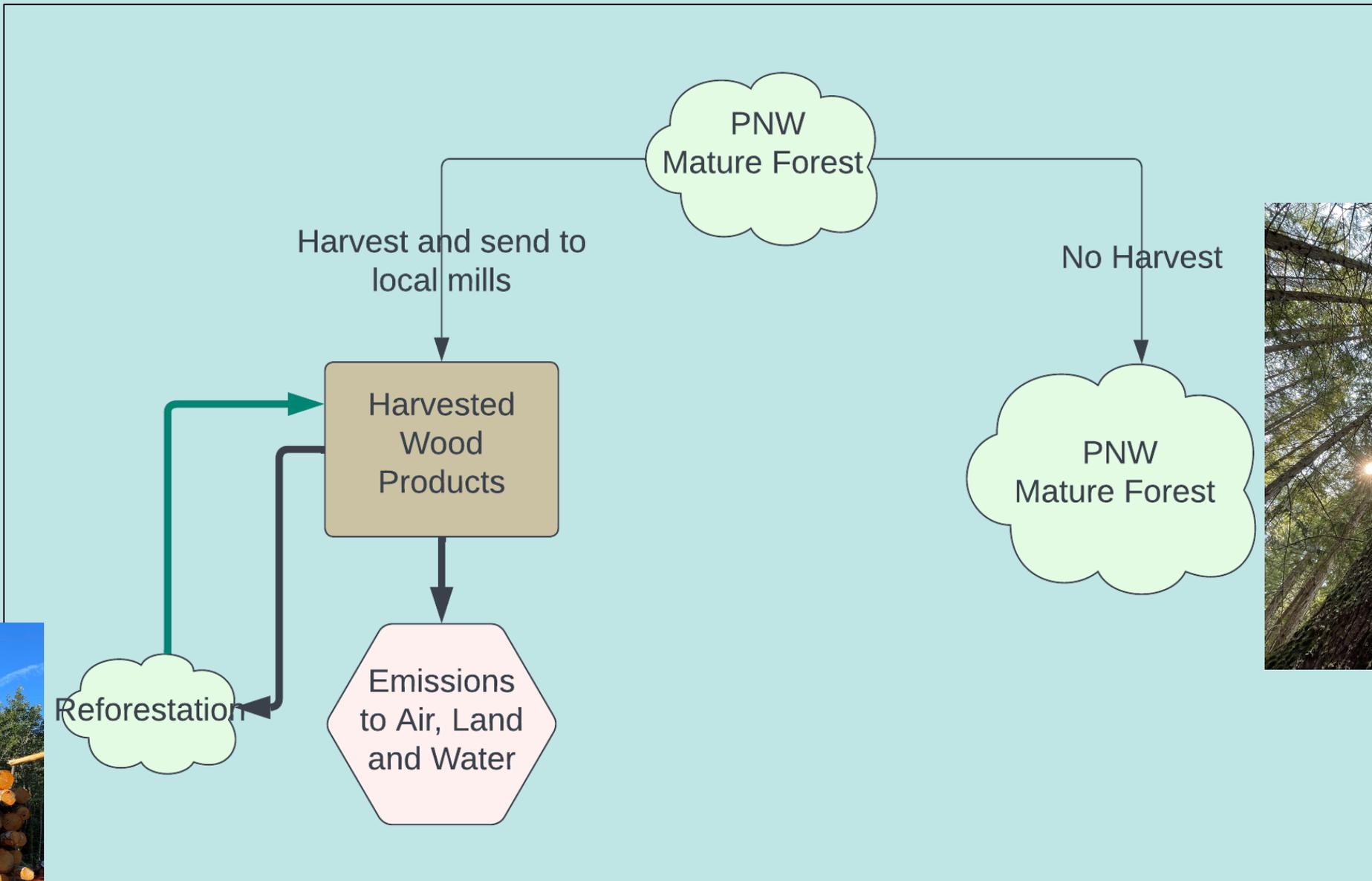
[Environmental Product Declaration – North American Softwood Plywood](#)

<https://corrim.org/environmental-product-declarations/>



System Boundaries - Attributional LCA of m³ of wood (at roadside/landing)



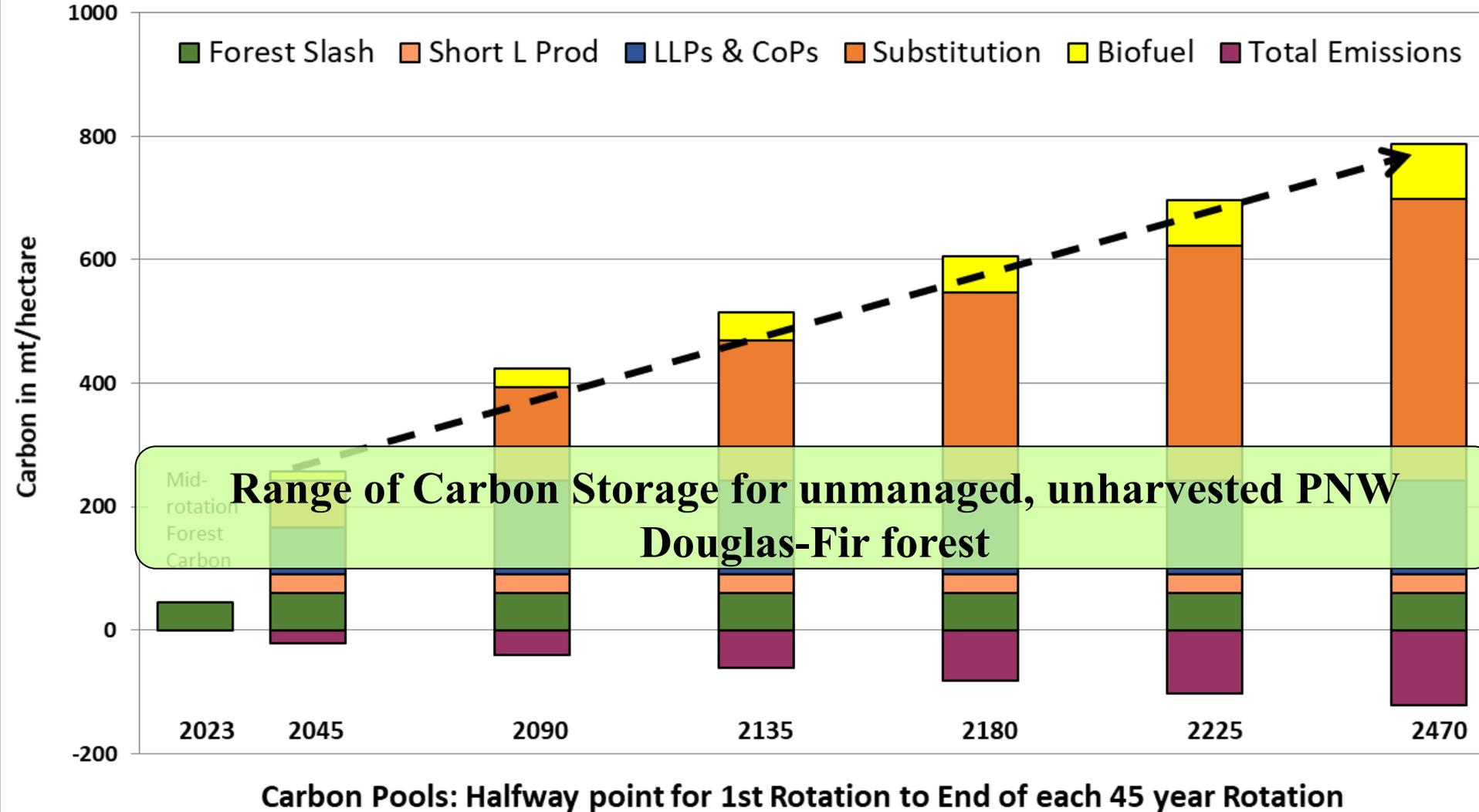


Expanding the System Boundary

- Substitution - how is the wood used?
- What about leakage?



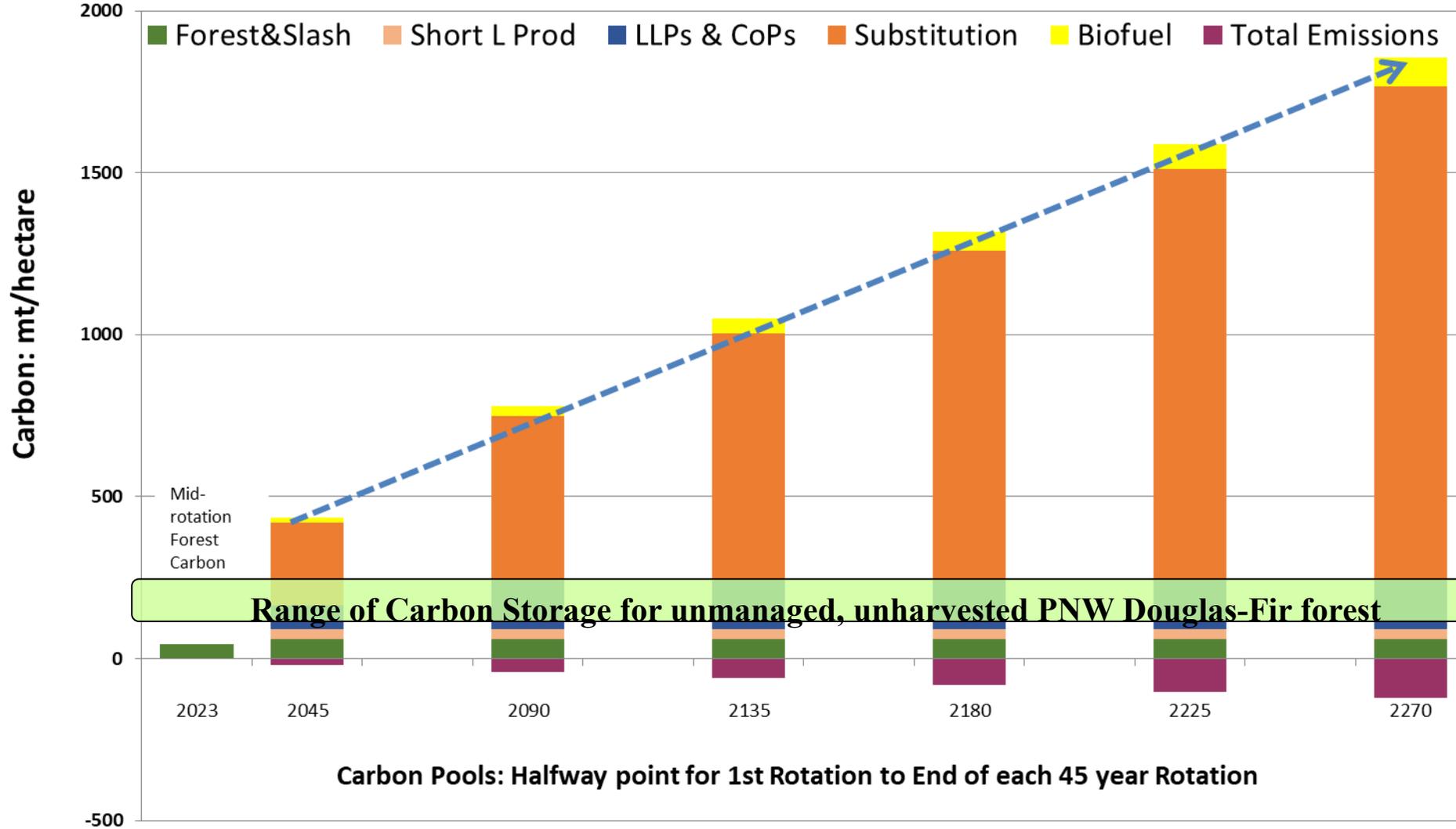
Carbon Pools : Wood Wall Stud vs Steel Stud Substitution & 90 year building life



- Sustained trend of 2.3 t C/ha/year
- 1.9 times the no-harvest maximum by year 135



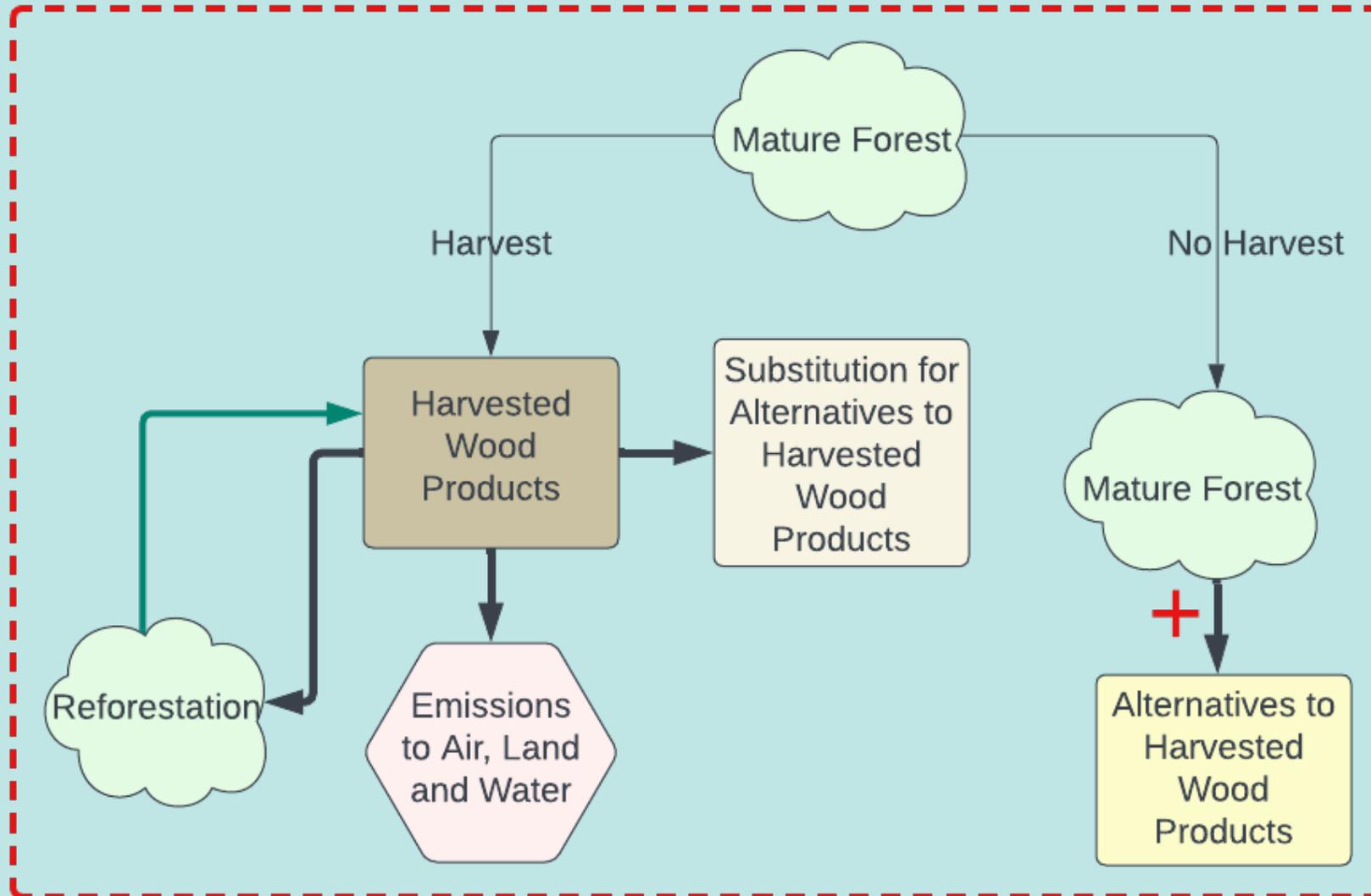
Carbon Pools: Wood wall vs Concrete Block & Gypsum wall



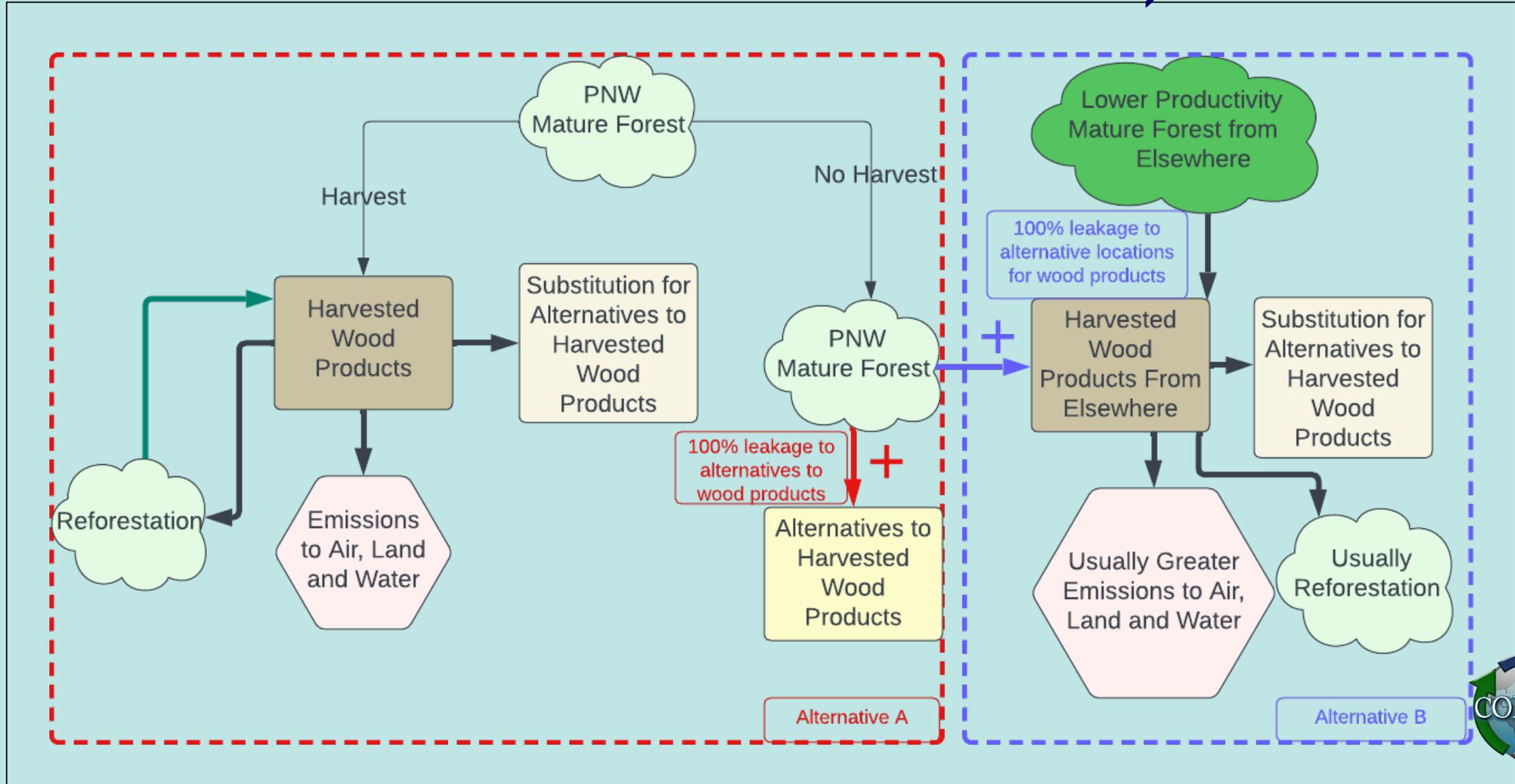
- Sustained trend of 5.9 t C/ha/year
- Exceeds no-harvest maximum at year 45
- Seismic code standards



What the atmosphere sees without leakage



Alternatives if there is leakage (wood harvested elsewhere)

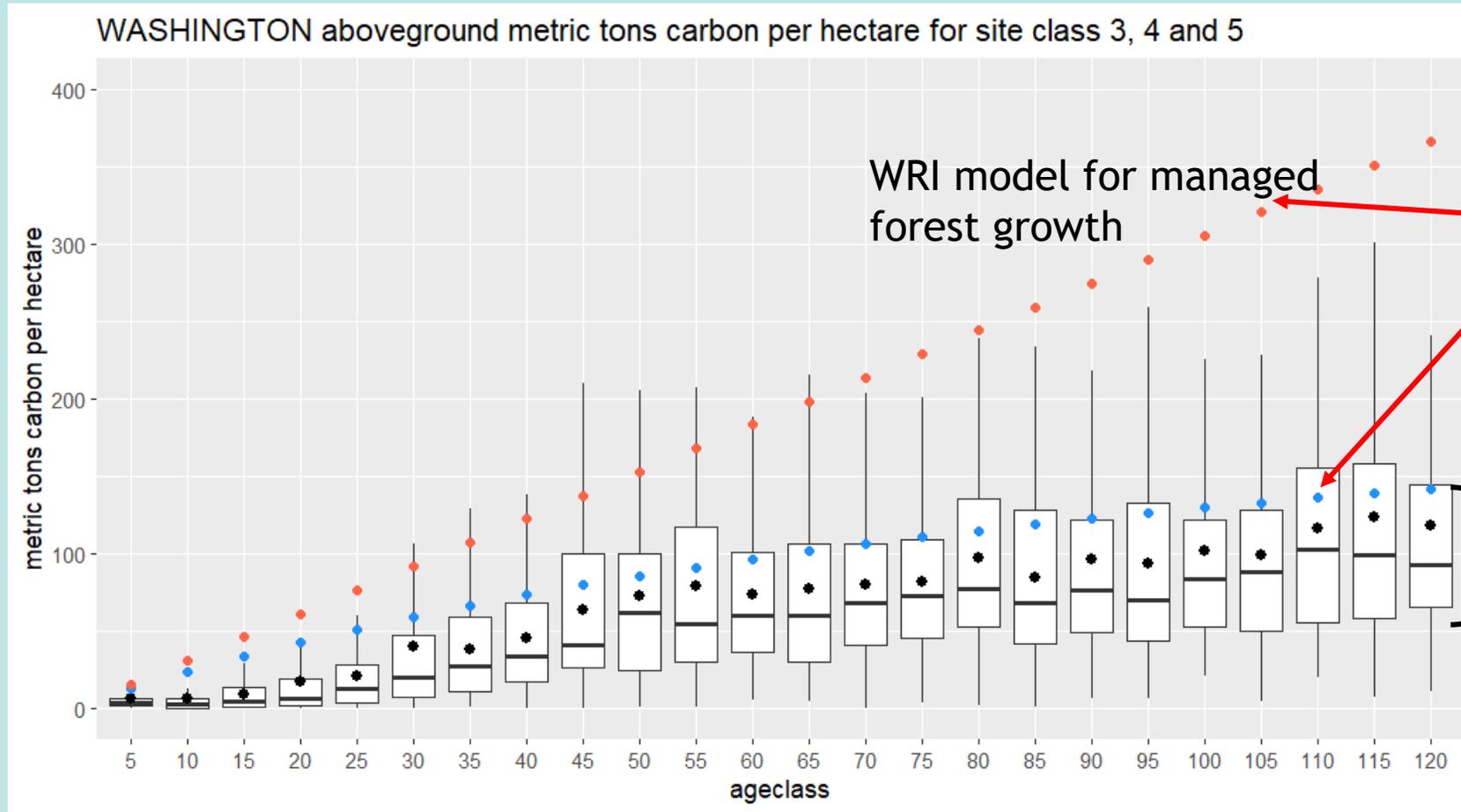


Expanding the System Boundary

- Substitution - how is the wood used?
- What about leakage?
- **What happens to the unharvested stand?**



Center for Responsible Forestry touts “latest science” by WRI to support “lock it up” narrative



Modeled growth from World Resources Institute (Peng et al 2023)

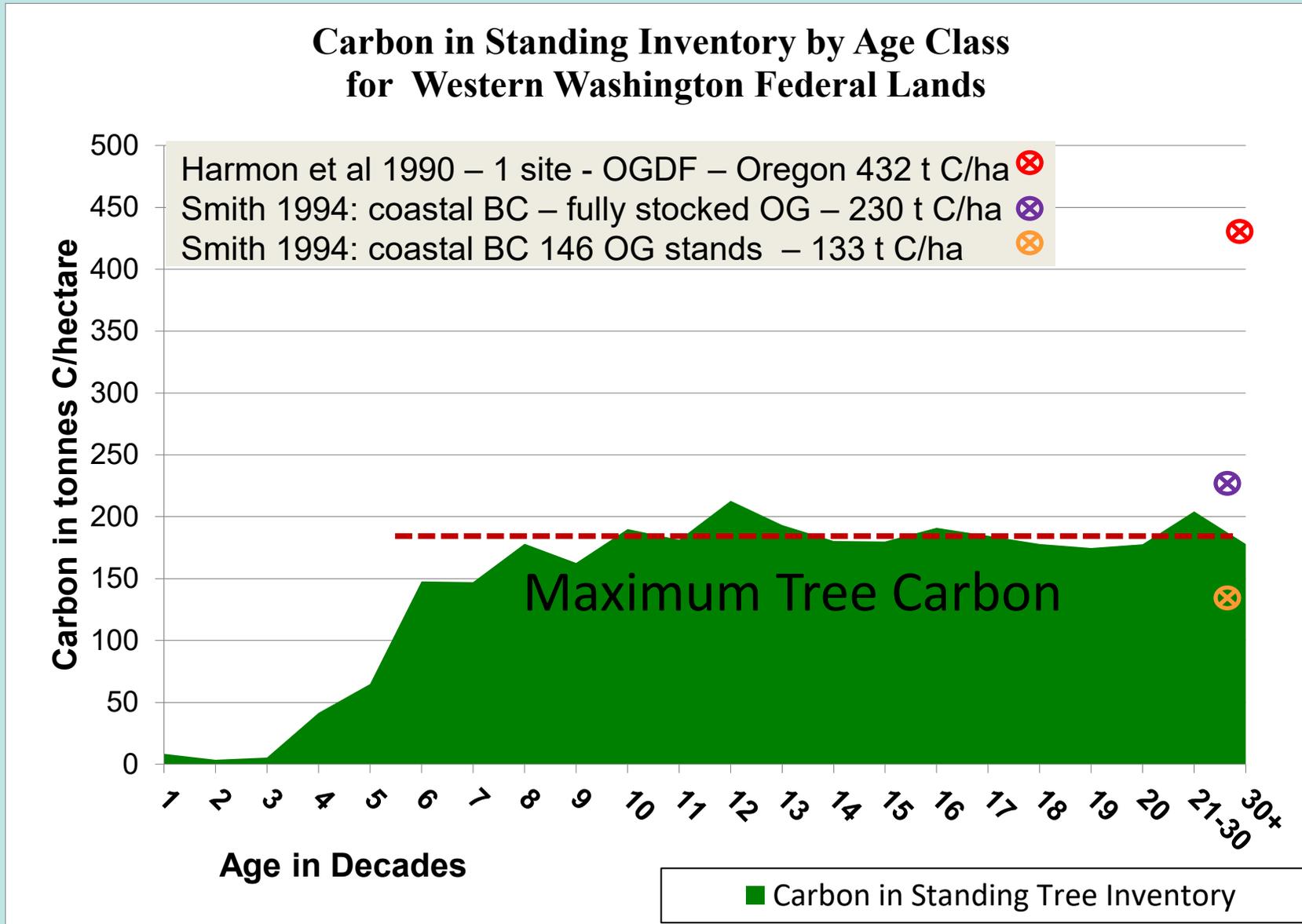
WRI model for natural forest growth

Reality Check: average and +/- 25% measured growth on sample plots by age in regional USFS inventory

Analysis courtesy of Lieke Drooge, UW CINTRAFOR, 2024

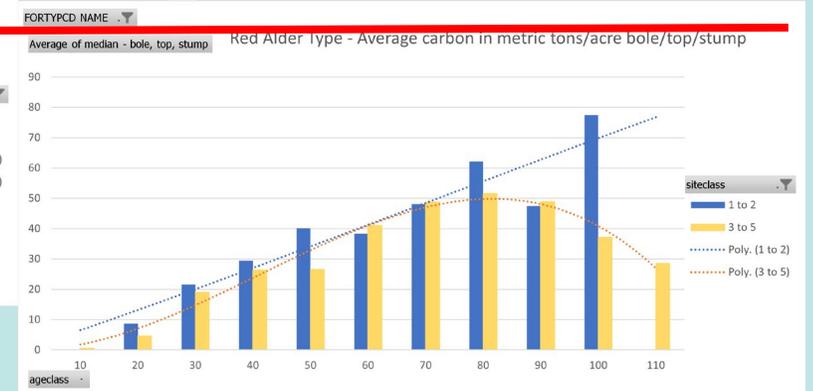
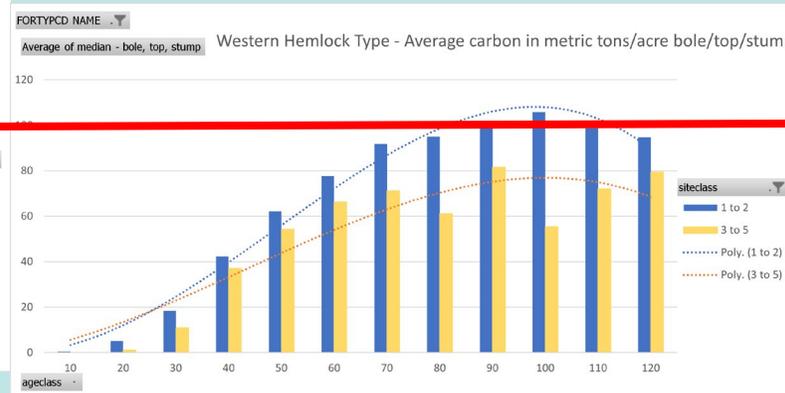
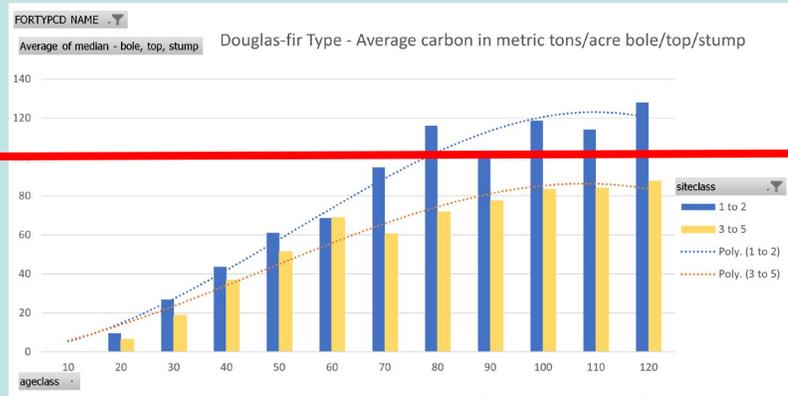


Carbon Carrying Capacity PNW Douglas-fir Forests



Forest inventory shows the variability and limits to average growth by site class

Red line is 100 metric tons/acre of above ground carbon stores



Takeaways

- Douglas-fir outperforms other species on higher quality sites
- Western hemlock and Douglas-fir have nearly identical performance on average quality sites
- Red alder outperforms conifers until about 30 years; with rapid growth decline after age 60-80 and no alder dominated sites by 120 years

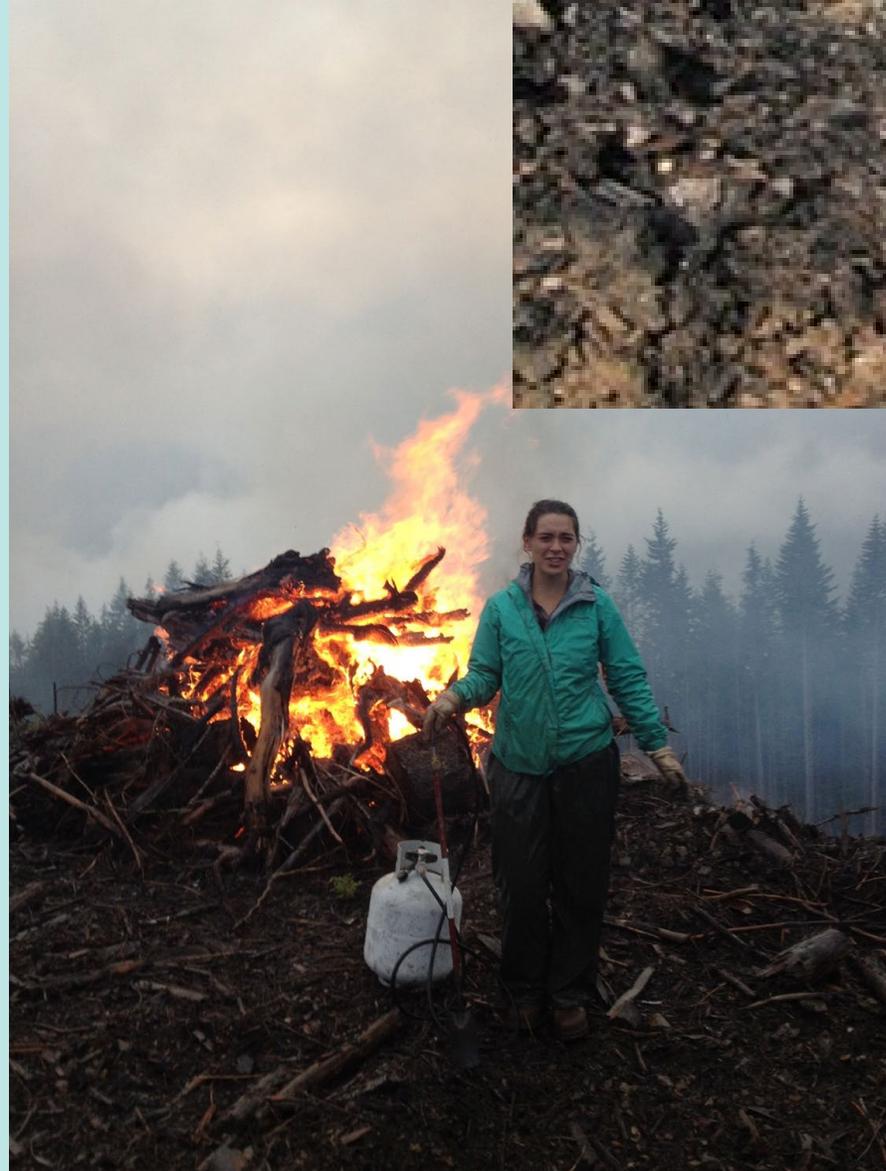


Expanding the System Boundary

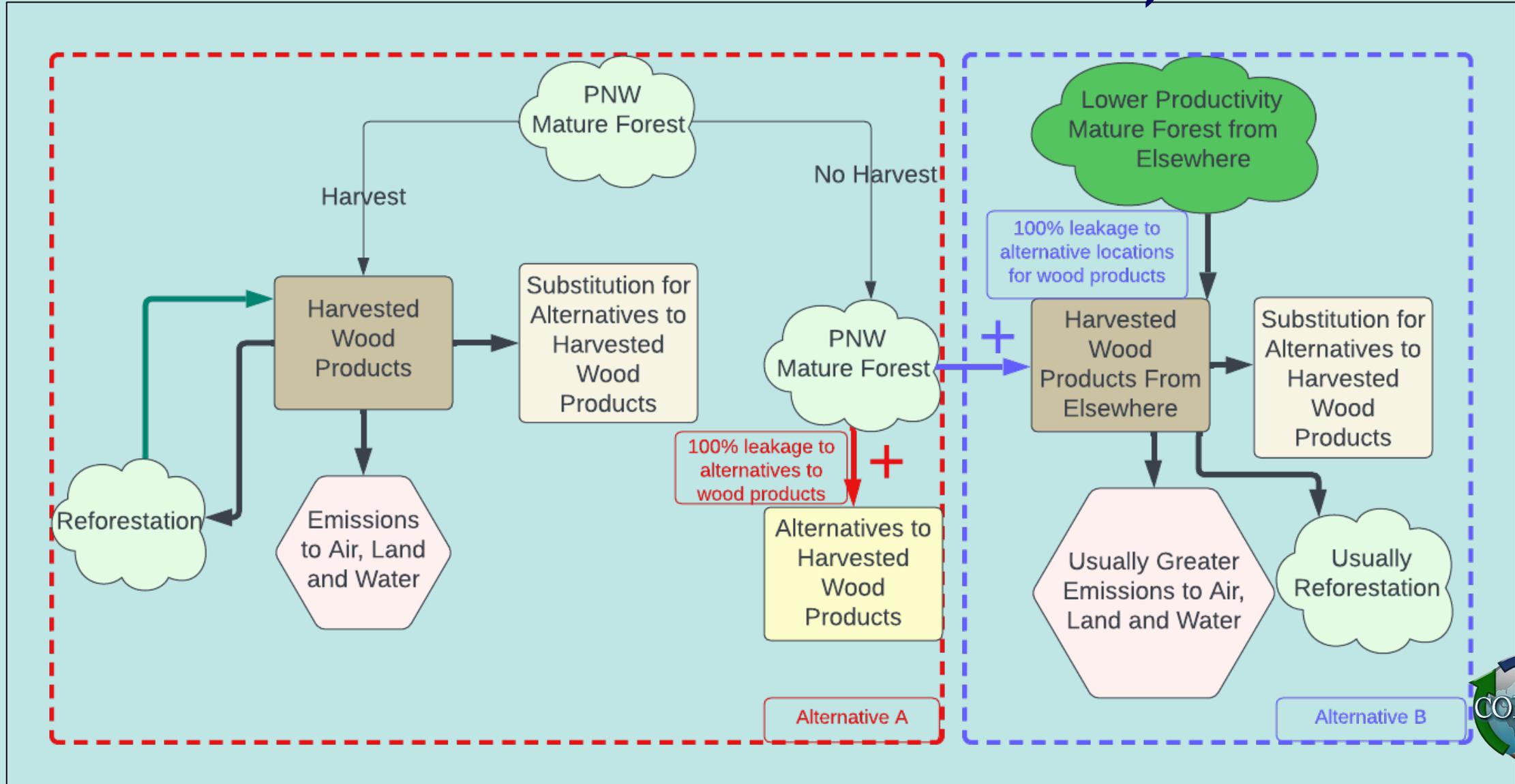
- Substitution - how is the wood used?
- What about leakage?
- What happens to the unharvested stand?
- **What happens to residuals?**



Burn, Rot, or Stay?



Alternatives if there is leakage (wood harvested elsewhere)



Inner Workings....

- Calculate expected growth of reserved (82 year old) stand based on extant inventory
- Use component ratio method to estimate below and above ground residuals
- Apply management preferences for residuals

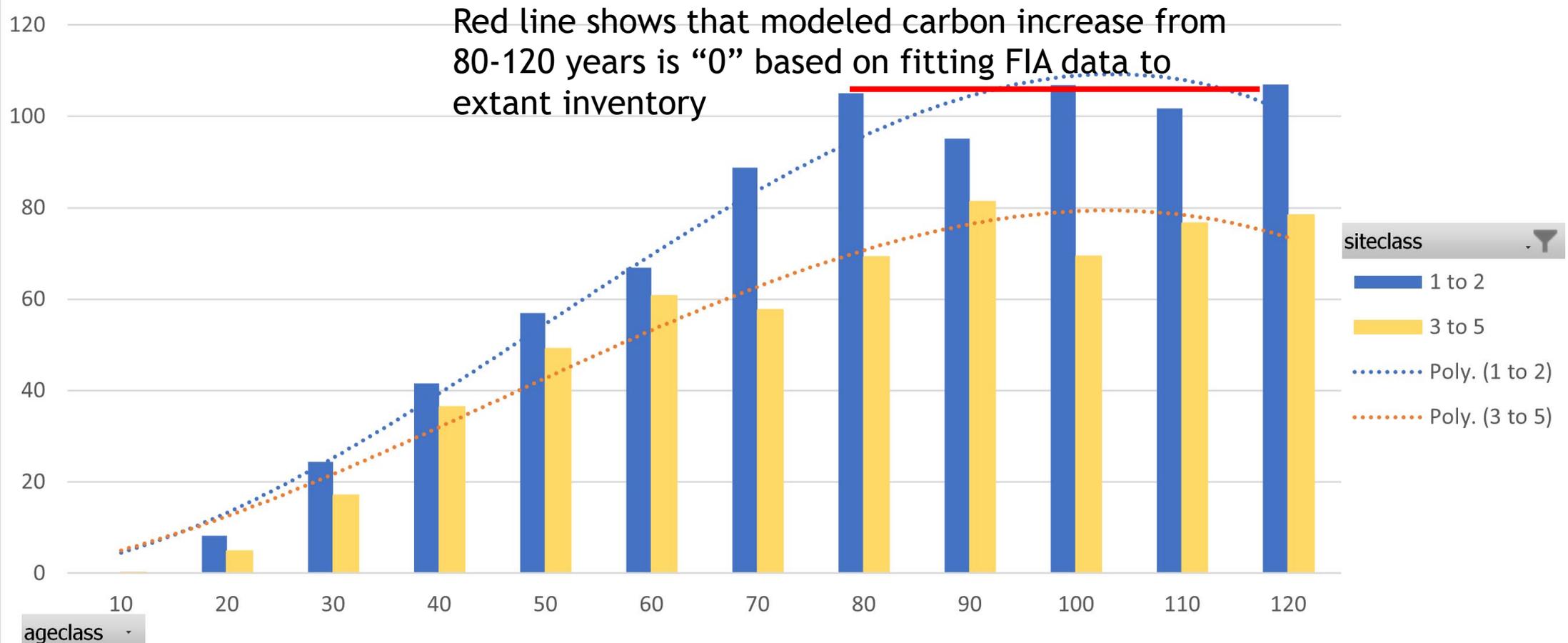


Forest inventory and analysis (FIA) data on westside PNW species by age class

FORTYPCD NAME

Average of median - bole, top, stump

Penny Composite Type - Average carbon in metric tons/acre bole/top/stump



Inner Workings....

- Calculate life cycle of harvesting, hauling, and reforestation
- Calculate life cycle of milling by log sort
- Identify alternatives for major products (lumber, poles, plywood, doors)
- Compare alternatives to harvested wood for carbon storage and life cycle emissions



Case Study Analysis of Alternative “A”

Comparison of Alternatives to Harvest - PNW Case Study					
Year since harvest	0	10	20	30	40
	Metric Tons of Carbon per Acre				
Harvested forest: roots and slash remaining; decayed at 2%/decade)	30.81	30.2	29.59	29	28.42
Regenerating forest roots		0.36	2.29	5.43	10.04
Regenerating forest boles/tops/stump		0	7.46	21.76	42.32
Embodied carbon emissions from harvest/ reforestation/ haul/manufacturing	-3.45	0	0	0	0
Primary products	24.57	24.57	24.57	24.57	24.57
Substitution benefit of primary products	18.87	18.87	18.87	18.87	18.87
Hogfuel and wood fuel burned	-12.87				
Manufacturing co-products (leave system boundary); decayed at 5% per decade	31.84	30.24	28.73	27.3	25.93
Carbon outcomes of harvest (sum of above)	89.76	104.24	111.52	126.93	150.15
Alternative to harvest					
Unharvested 80-year-old forest (trees including roots)	99.14	99.14	99.14	99.14	99.14
Substitution benefit foregone	-21.08	-21.08	-21.08	-21.08	-21.08
Carbon consequences of no harvest alternative	78.06	78.06	78.06	78.06	78.06
Comparative Outcomes – difference between no harvest and harvest scenarios	-11.71	-26.19	-33.46	-48.87	-72.1



Take Aways

- There is no 'carbon debt' when considering this expanded system boundary
- Sensitive to the expected growth of stand if left unharvested
- Sensitive to the quantity and quality of products produced and their common substitutes



Thank You

For More Information

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