A Carbon Calculator for tracking climate benefits of managed forests

What we do not want to see a lot more of

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Fountain Fire Reforestation


Using an evidence-based approach for both in-forest carbon and product carbon (and all of the carbon storage benefits

25 years of measured growth at Blodgett

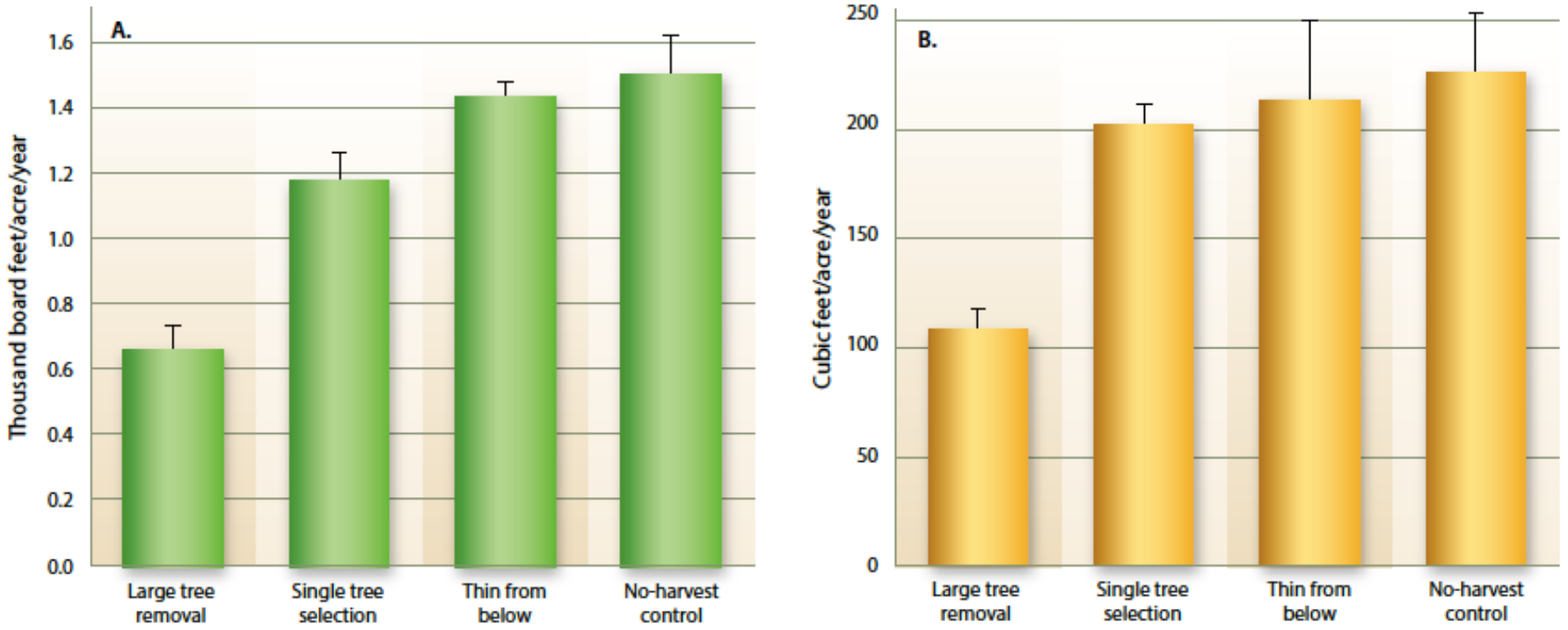
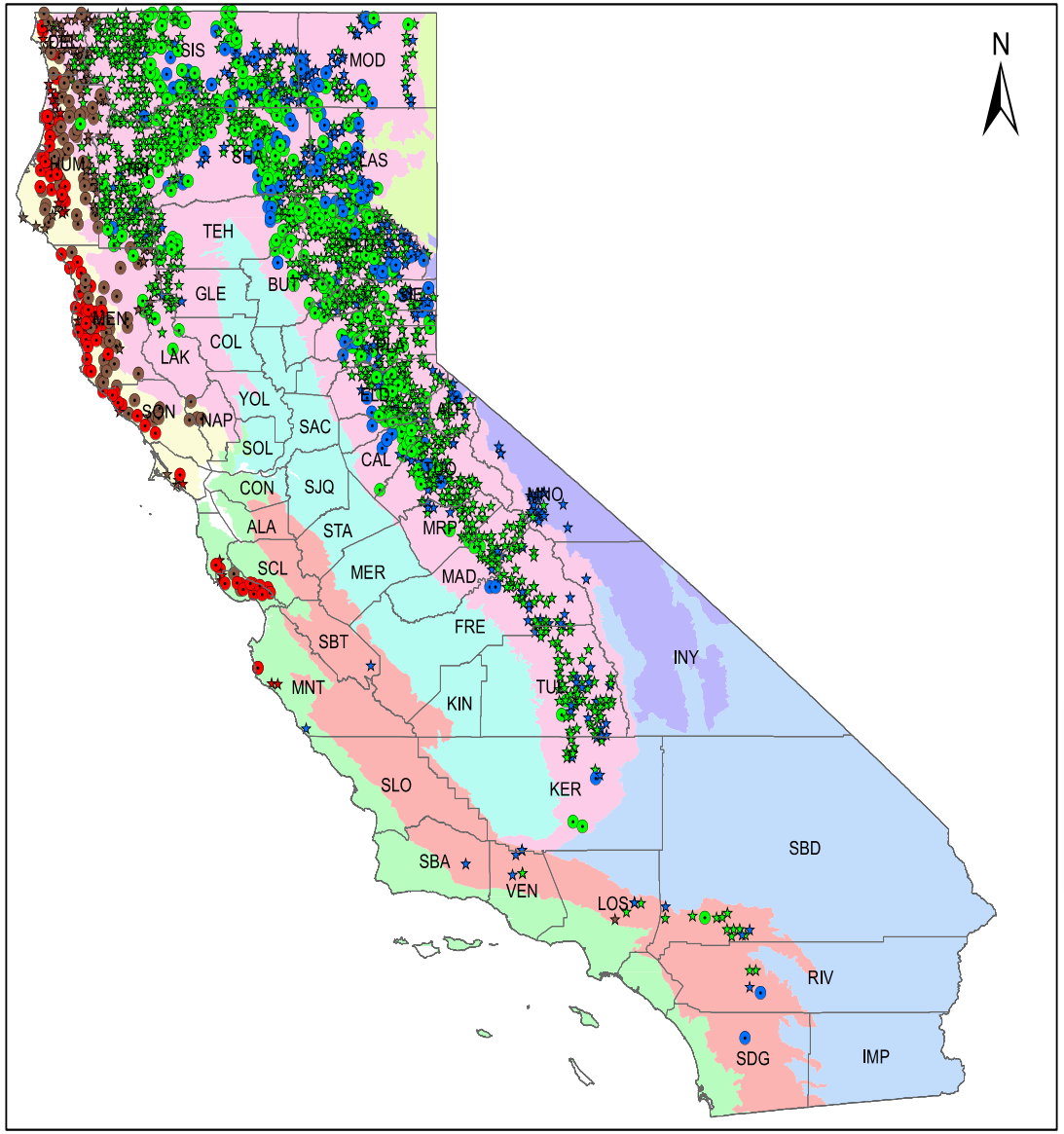


Fig. 1. Means and standard errors of growth + yield (G + Y), expressed in merchantable board feet (A) and total stem volume (B), among four treatments after two harvests at Blodgett Forest Research Station, CA.

http://californiaagriculture.ucanr.org/ Rob York in January/March 2015 edition

Remeasuring trees on FIA or ownership specific plots – rather than remeasuring the top of tree canopy height classes with satellites – is the most accurate way to measure change in live and dead tree C in forests



Dominant forest in FIA Timberland Plots

Pvt Fed

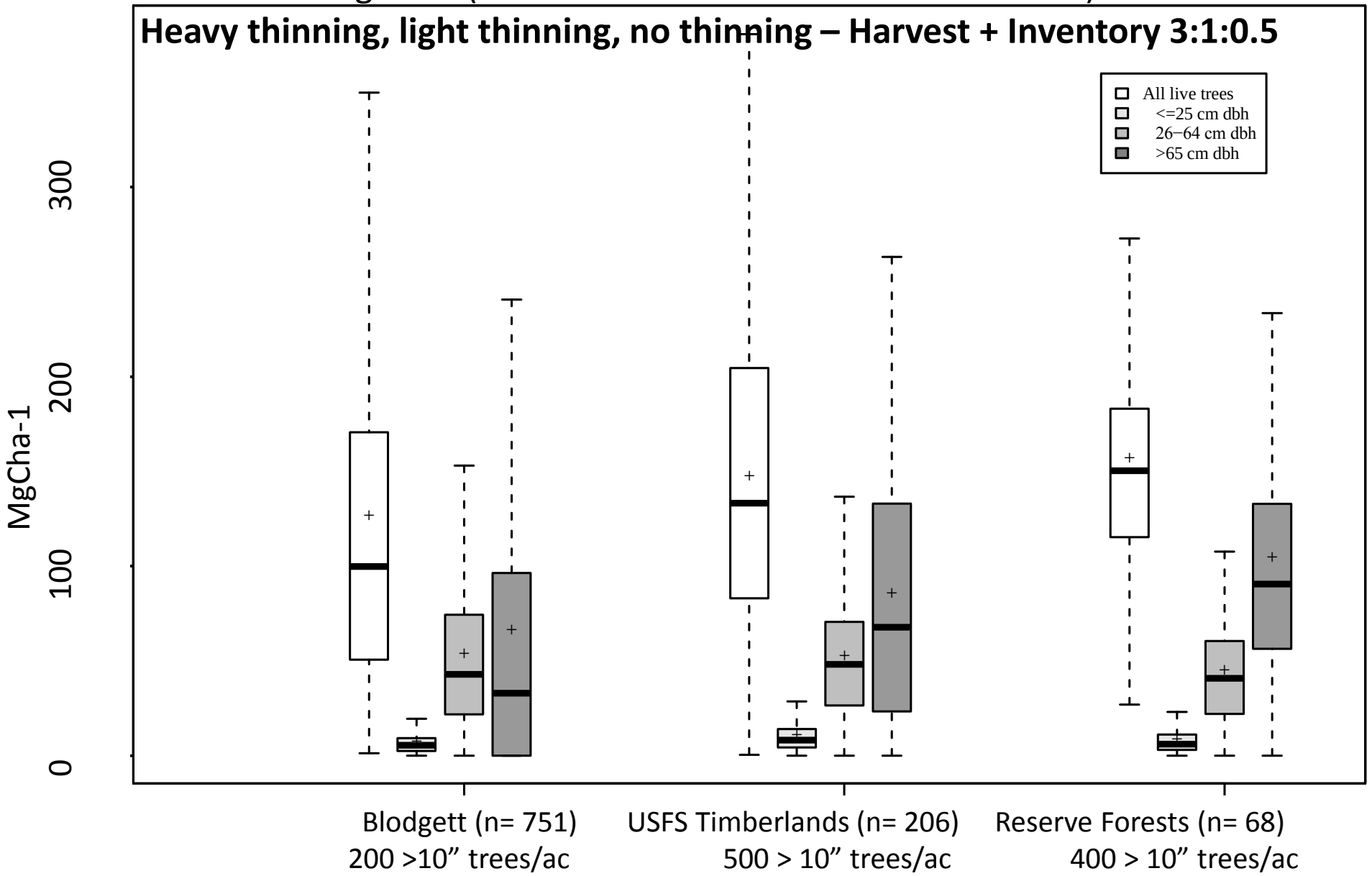
- Redwood
- Douglas fir
- Mixed Conifer
- P. Pine

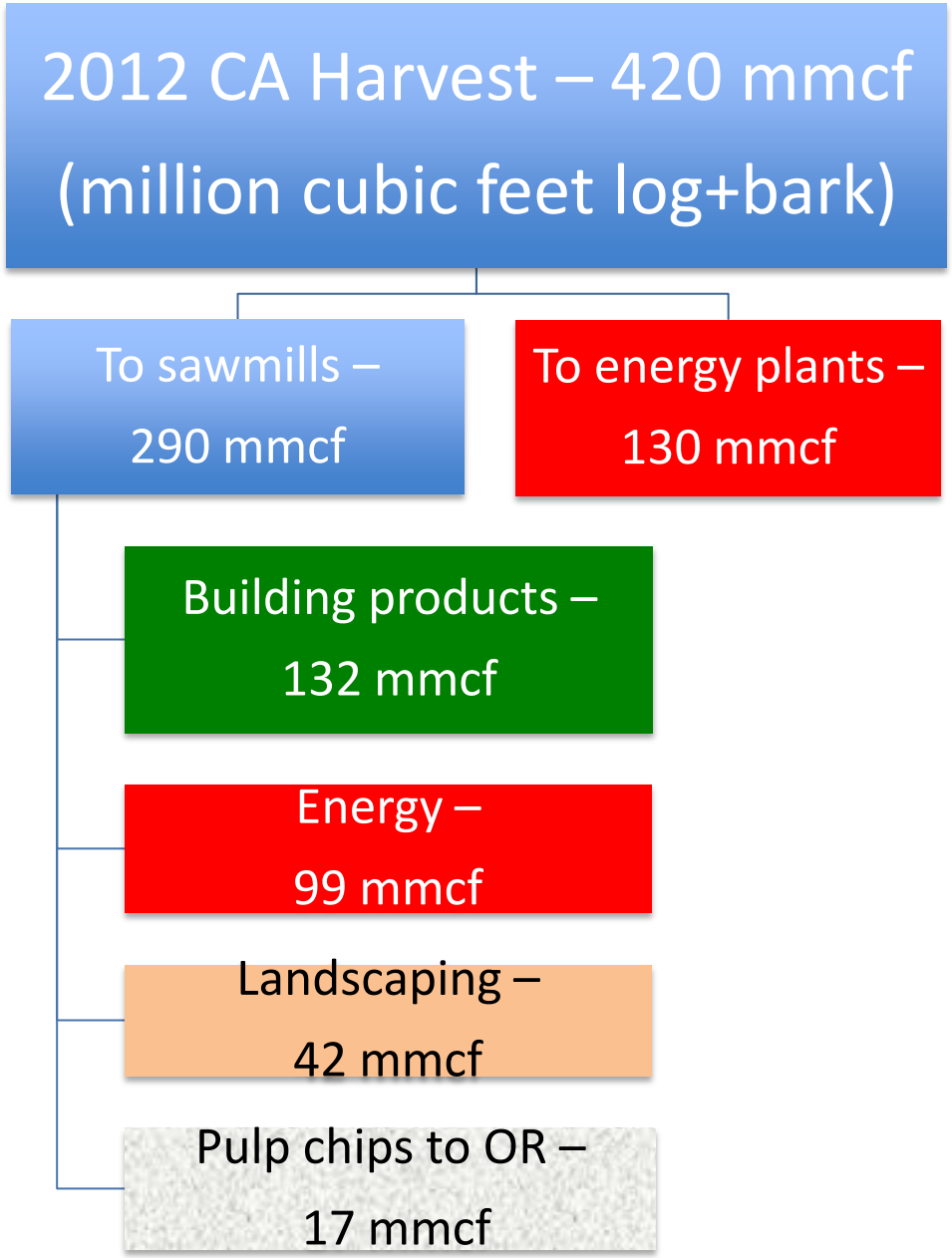
Timberland Forests	Million Acres	FIA plots
Redwood	0.6	118
Douglas fir	0.9	187
Mixed conifer	6.4	1,374
Pond. Pine	1.9	263

Timberlands	10 million acres
Other forests	10 million acres
Woodlands	10 million acres

Stewart et al. 2015. *Forestry* in **Ecosystems of California**. Mooney and Zavleta eds. University of California Press

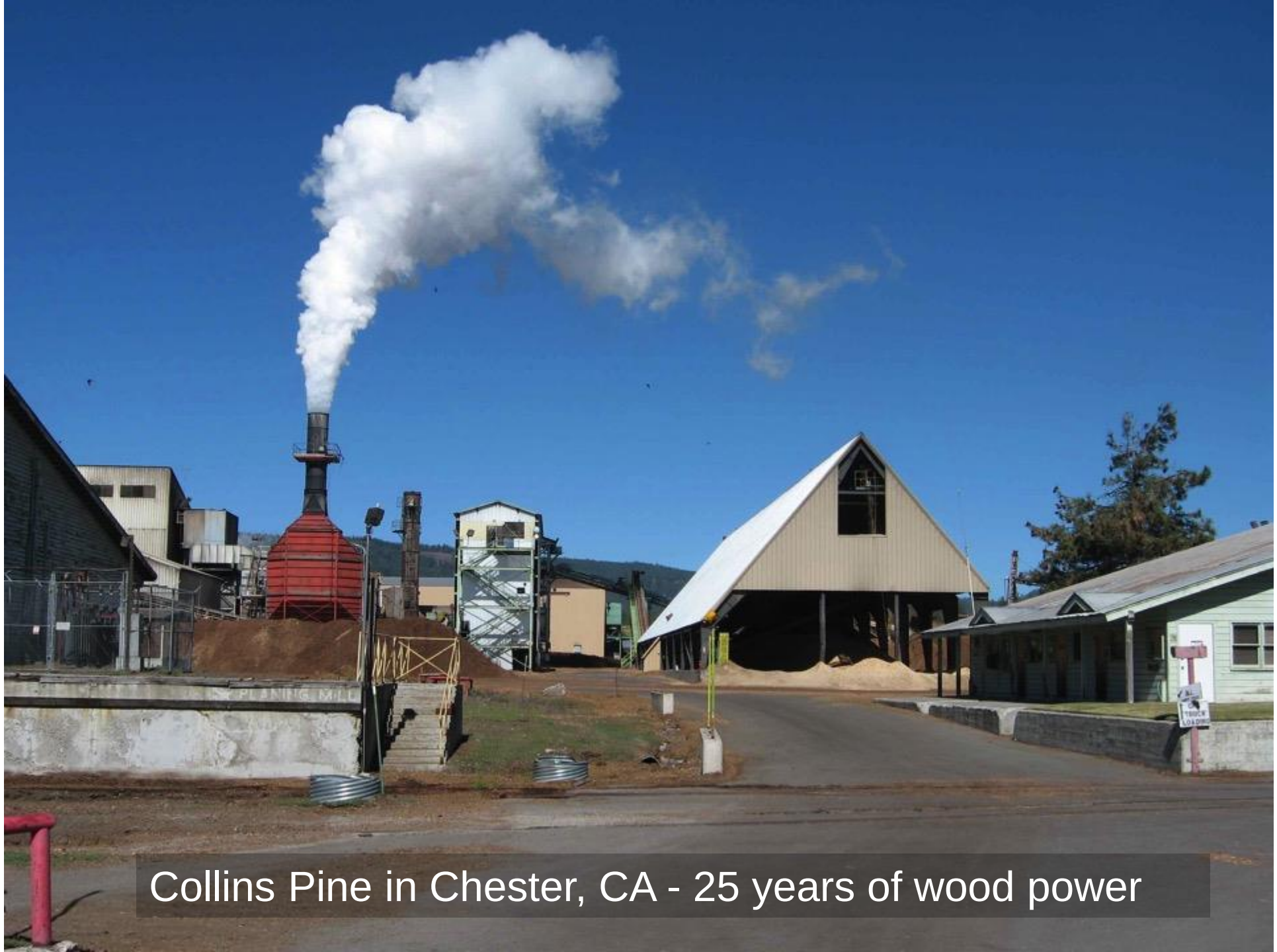
100 Year Forest Management Productivity Quasi-Experiment:
High site (FIA >site 3 Sierra Mixed Conifer Forests)





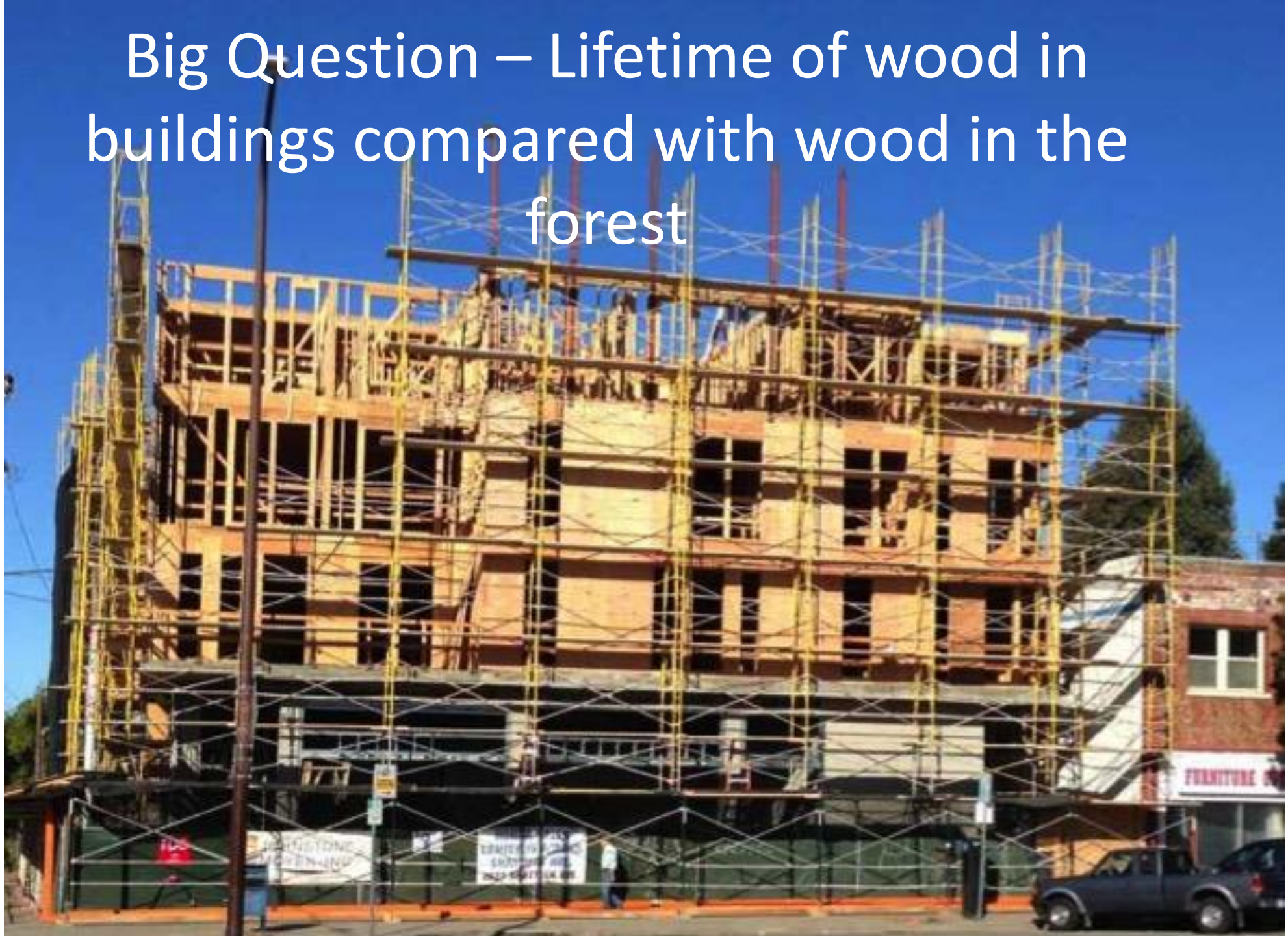
- Some carbon accounting rules only track building products even though more than half of the harvest volume has other uses
- Using wood for energy reduces the use of other energy sources such as coal, natural gas, and other renewables
- Landscaping mulch reduces irrigation water
- BUT building products still have the best financial and climate benefits per ton

Source: McIver et al. (in press)



Collins Pine in Chester, CA - 25 years of wood power

Big Question – Lifetime of wood in buildings compared with wood in the forest



From US Census data, Sheng Xie (2015) estimated ½ of houses will last more than 137 years, longer than 80 years (Skog 2008) or 35 years (FAO) estimates

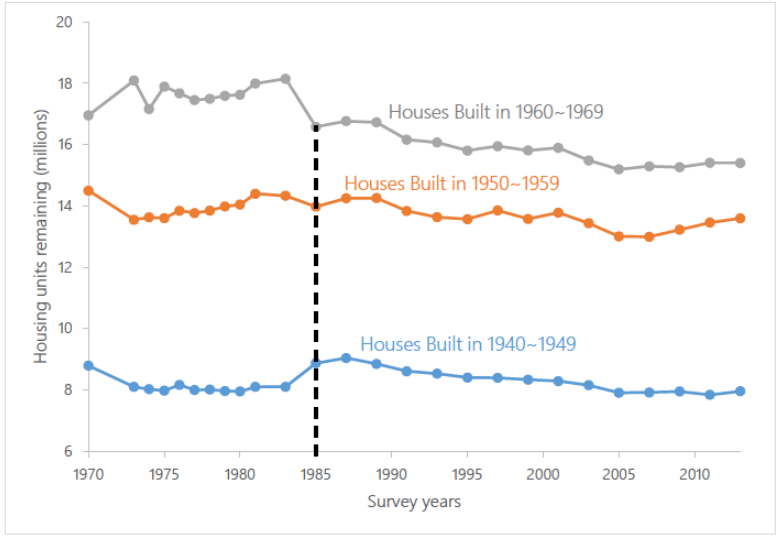
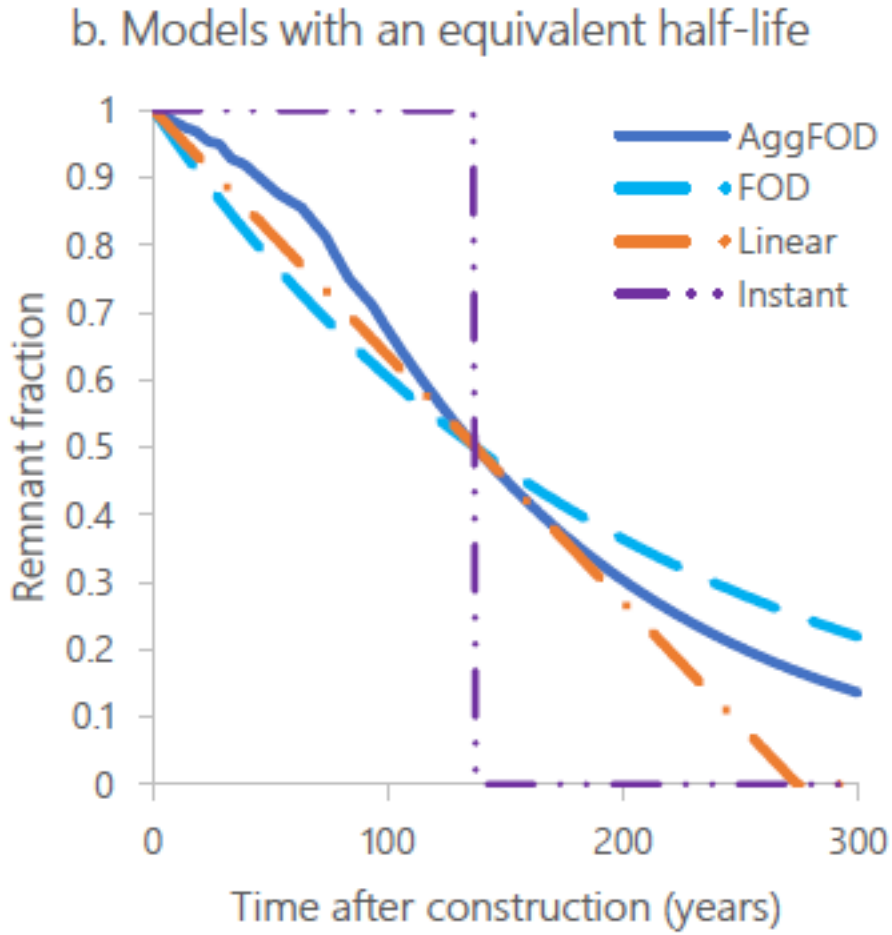
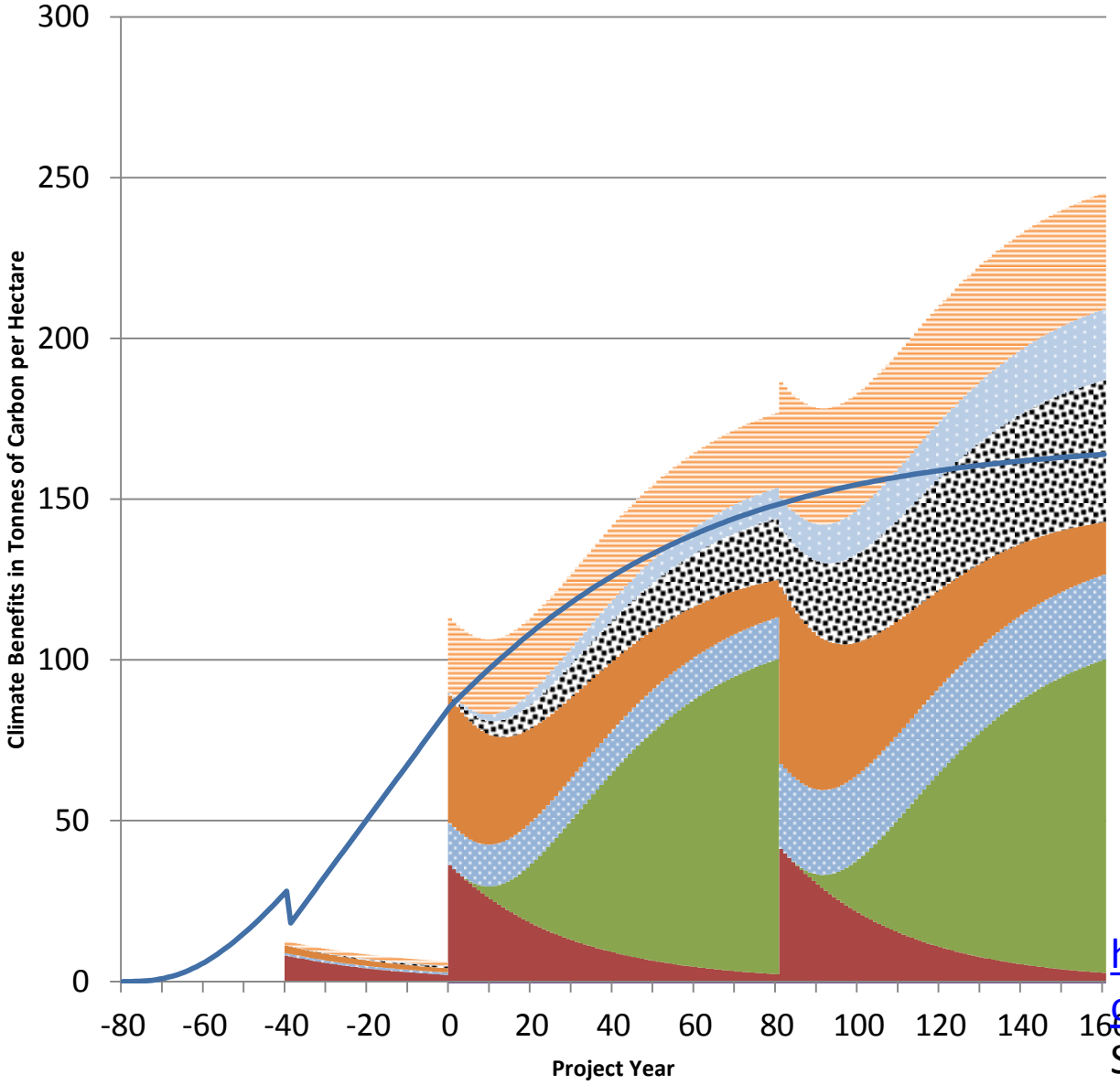


Figure 3-2 Comparison of housing units remaining data reported in "Surveys 1973~1983" and "Survey 1985 or later"



Do you think ½ of our current mature trees will last another 137 years?

80 Year Rotation, 0% Residue Utilization



Substitution Benefits for ~57% of wood going into buildings

Energy from post-consumer residues

Landfill storage

Wood products

Energy from sawmill residues

Regenerated forest

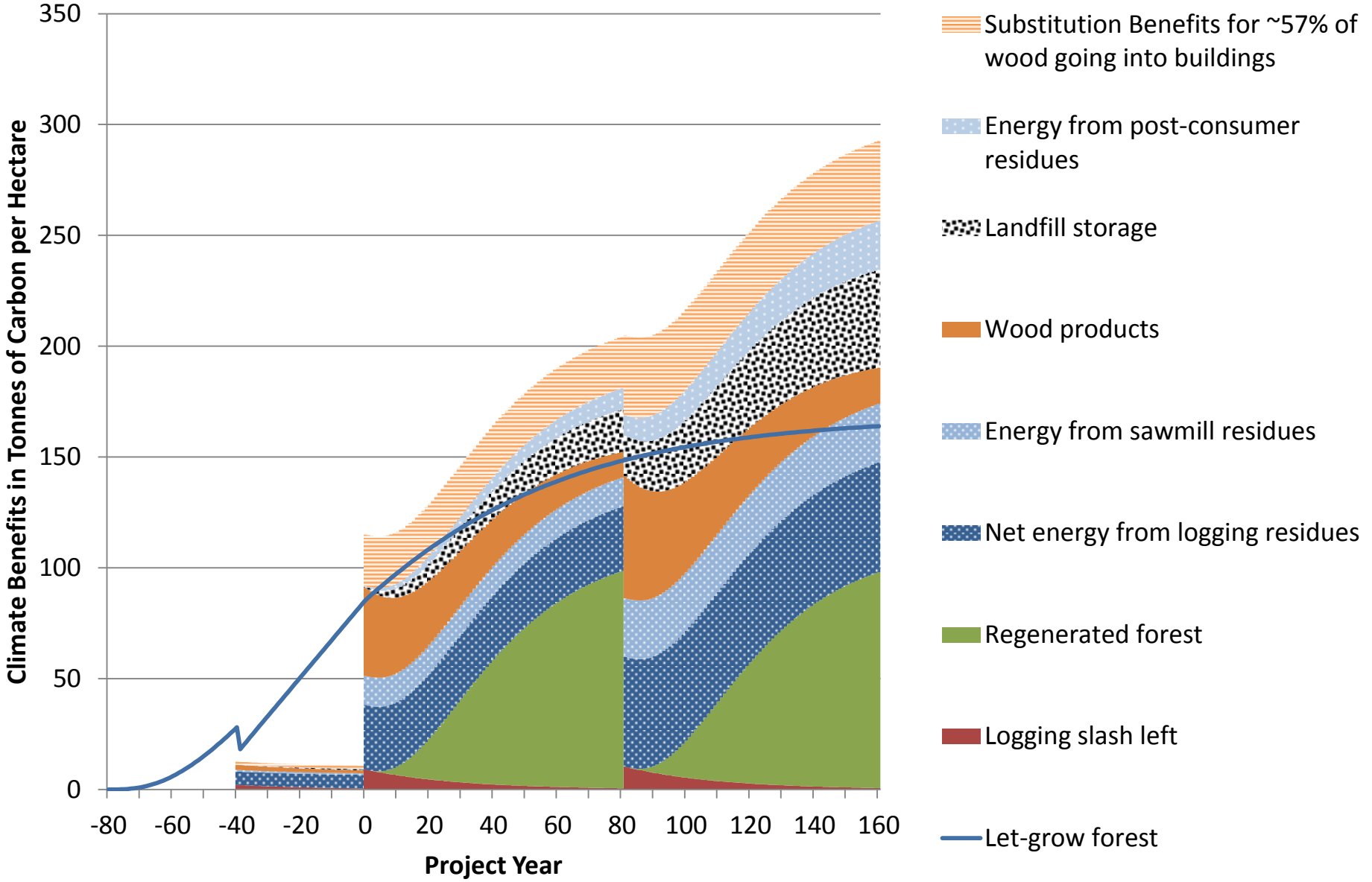
Logging slash left

Let-grow forest

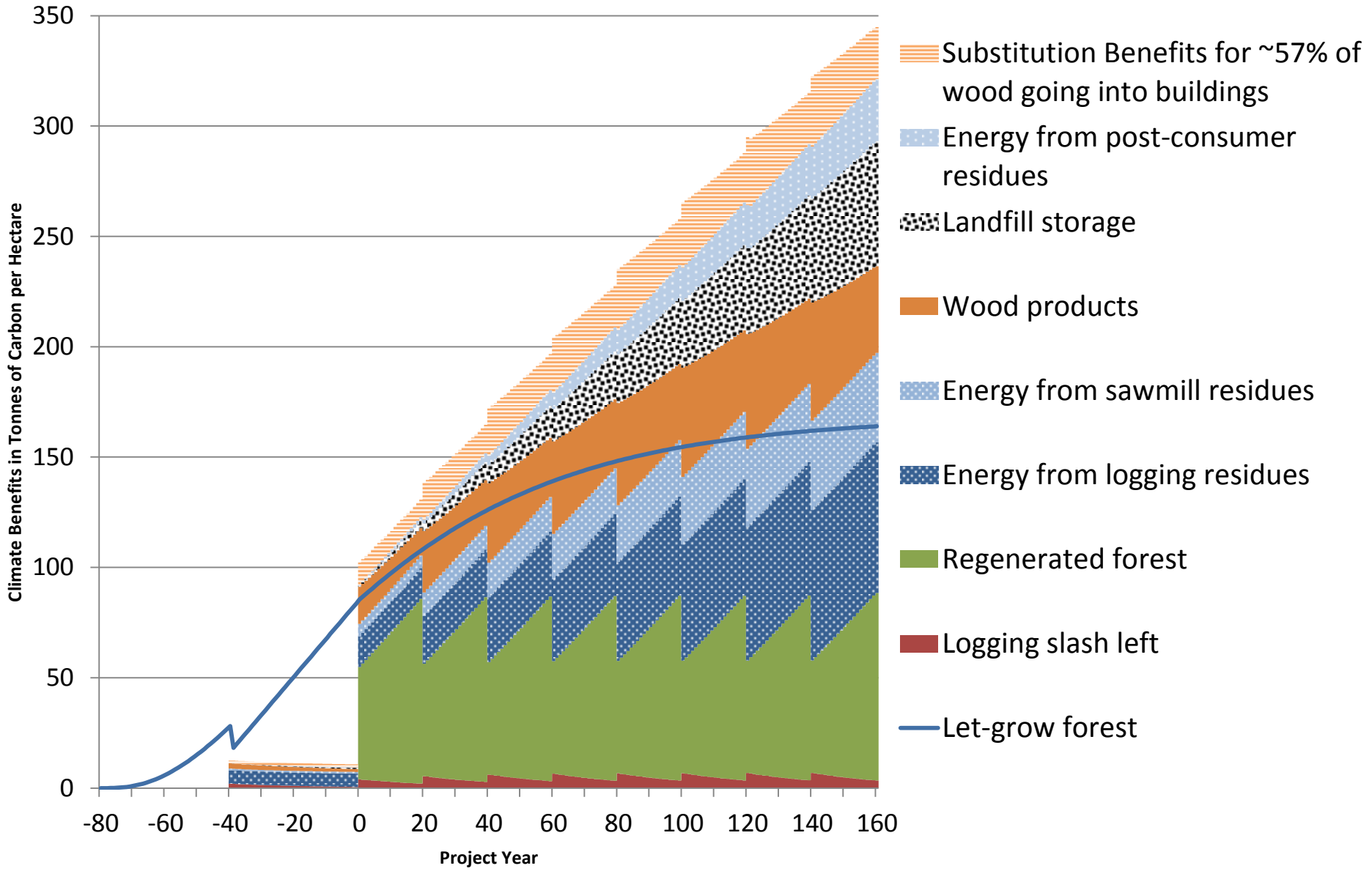
http://californiaagriculture.ucanr.org/

Stewart, Jan/Mar 2015

80 Year Rotation,
75% Residue Utilization

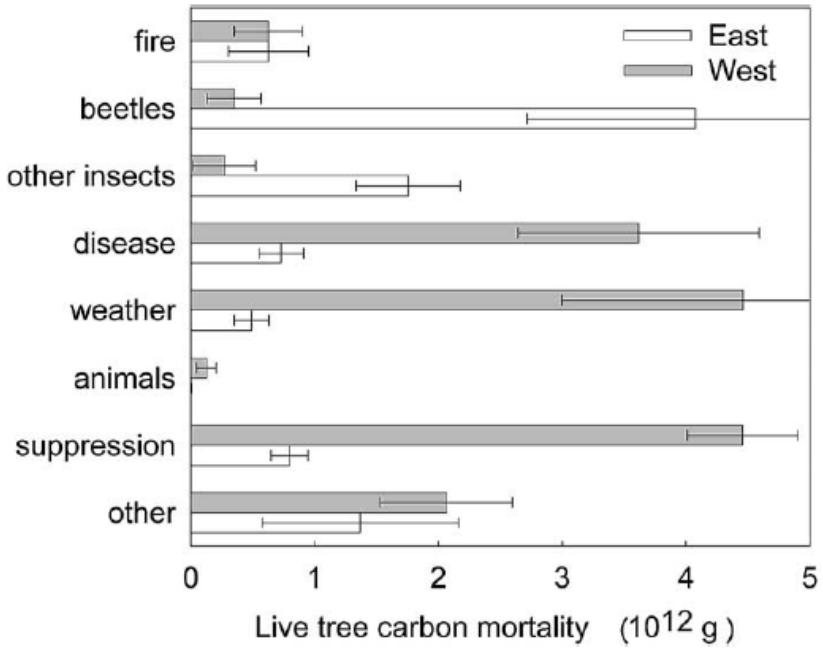


Uneven with 20 year reentry
75% residue utilization

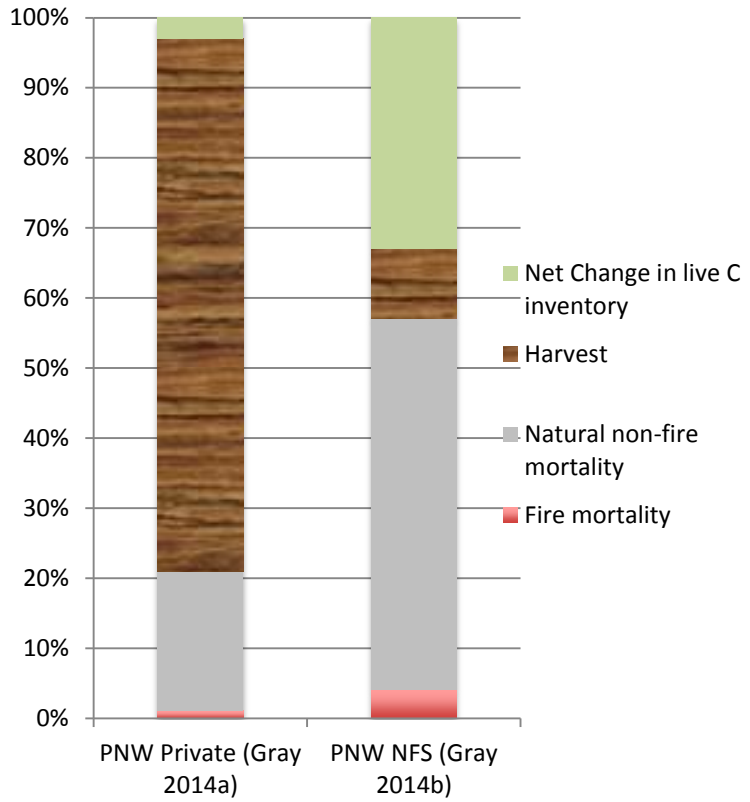


Why does my ‘let grow’ carbon growth flatten out over time? - mortality

Sources of Mortality on Oregon Private Timberlands

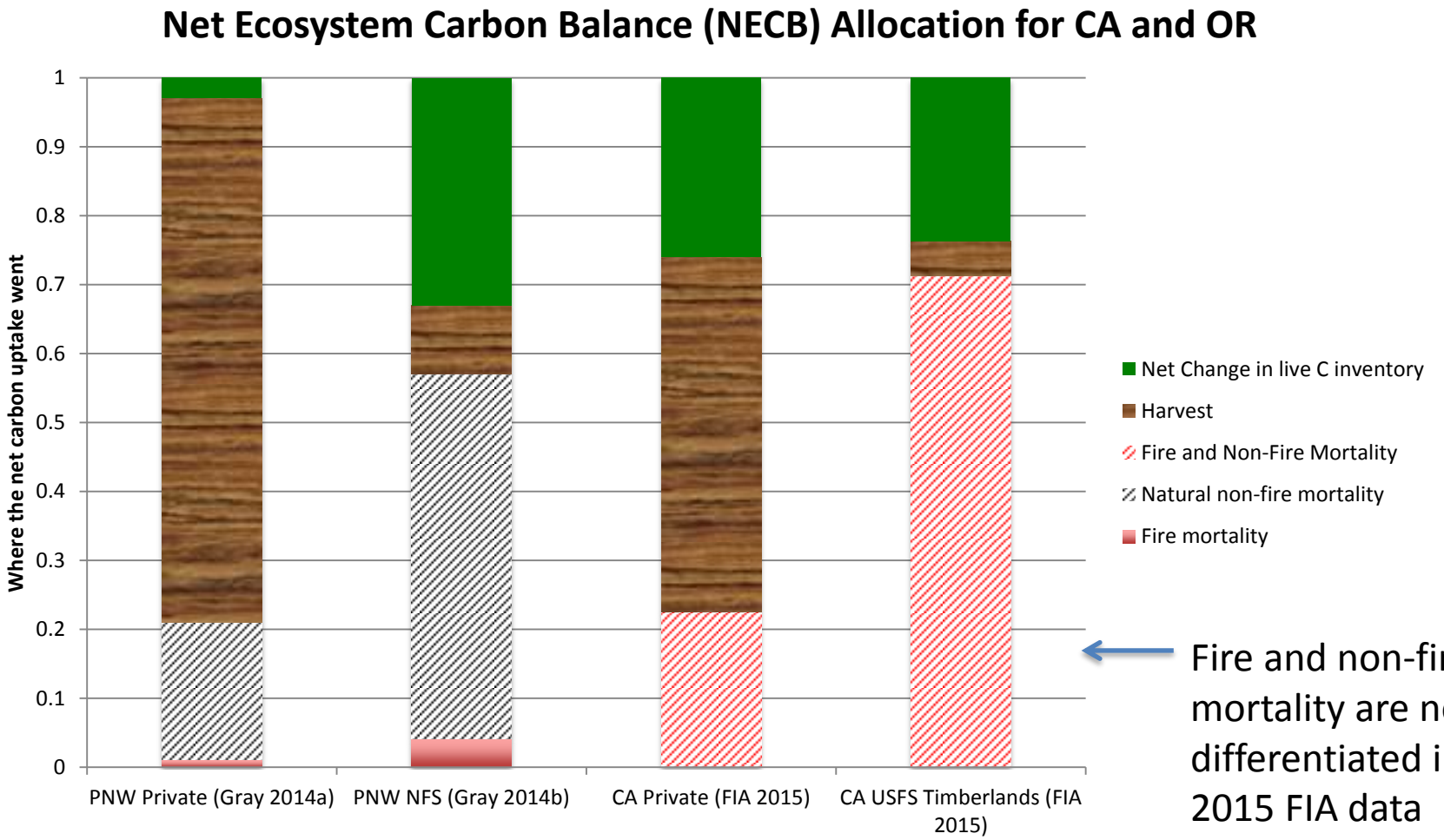


Allocation of Gross Growth Pacific Northwest



Gray et al. (2014a) Forest Science
Gray & Whittier (2014b) Forest Ecology and Management

NECB = Net Ecosystem Exchange + Harvest + Flux(CO, CH_4, VOC, DIC, DOC, black carbon)
From "Reconciling Carbon-cycle Concepts, Terminology, and Methods', Chapin et al. **Ecosystems** 9:1041-1050 (2006)



Fire and non-fire mortality are not differentiated in 2015 FIA data analysis

The two major forest ownerships in the West have very different carbon fluxes independent of Net Ecosystem Exchange (NEE)

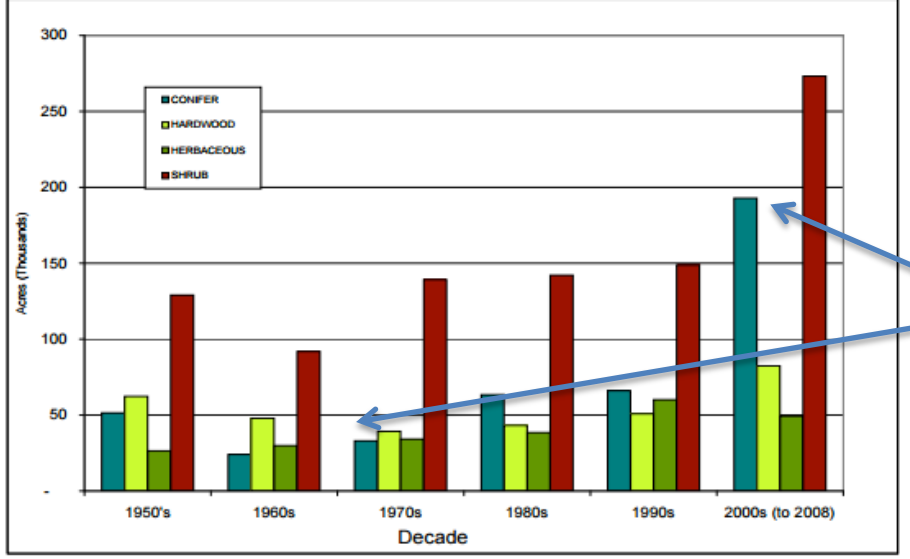
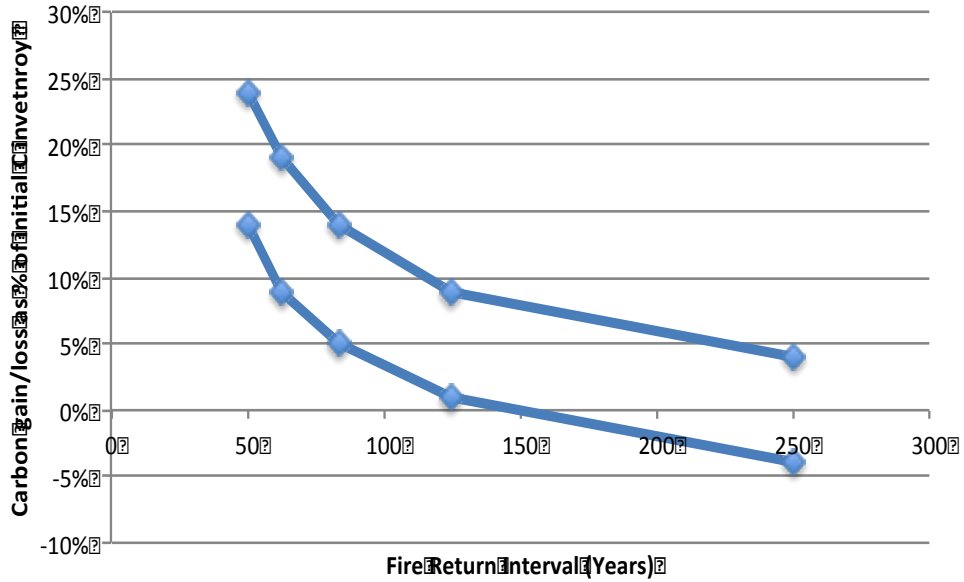


Figure 2.1.2.
Annual acres burned by decade and by life form, 1950s to 2000s.
Data Sources: Fire Perimeters, FRAP (2009 v1); Statewide Land Use / Land Cover Mosaic, FRAP (2006)

Annual Conifer Forest Burned Acres jumped more than 4x since 2000 (FRAP 2010 Assessment)

Whether fuels treatments increase carbon stocks (ignoring financial value) depends on if removals can be used AND the estimated future fire frequency

Commercial Thins (top) and Mixed Tmts. (bottom) impact on Forest Carbon Inventory



http://ucanr.edu/sites/forestry/Carbon_Sequestration_Tool_for_THPs/

80 Year Rotation, 25% residue utilization