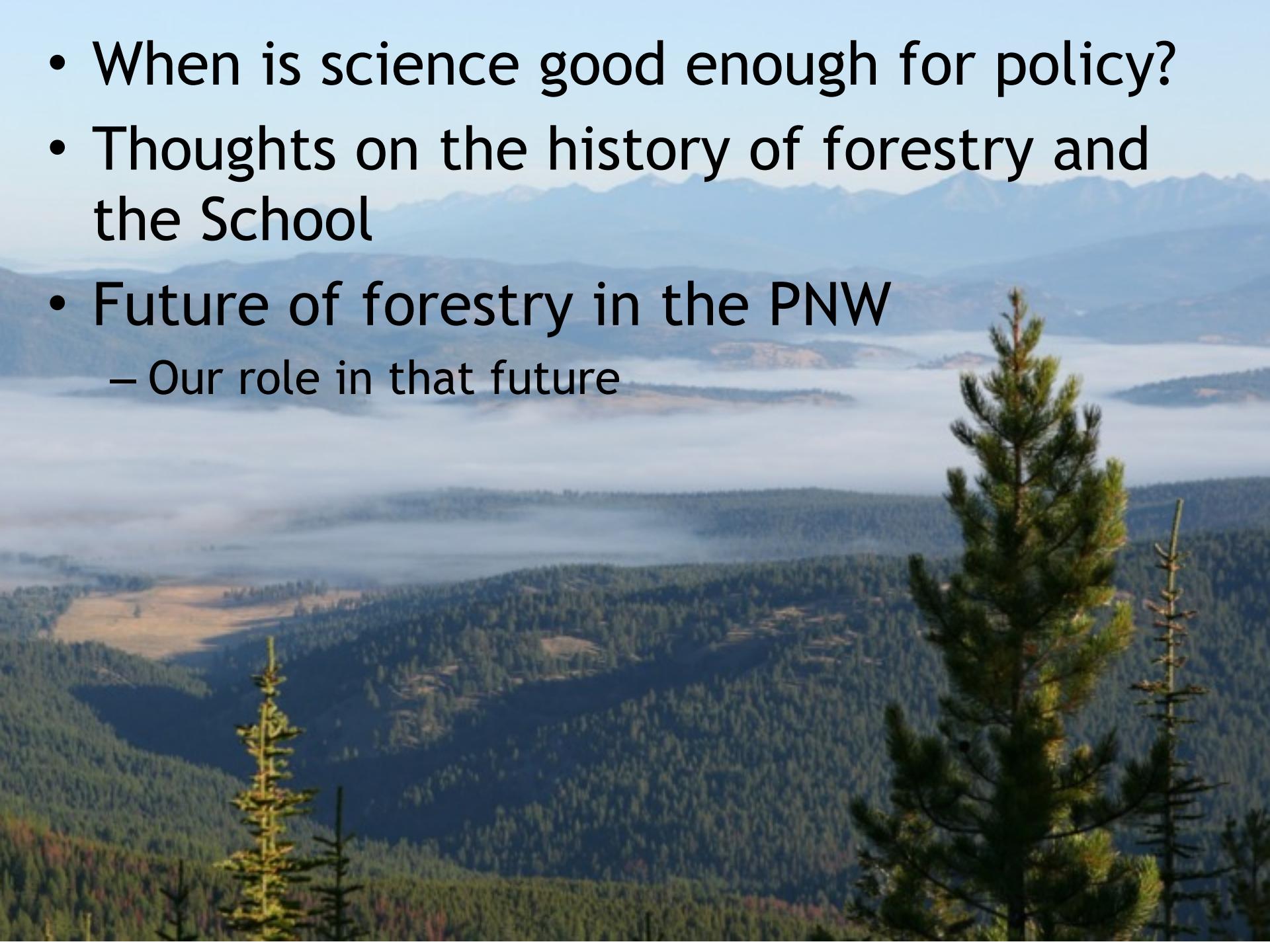


Forestry and Forest Sciences for the 21st Century

T. H. DeLuca

Acknowledgement:
Steve Anderson, Forest History
Society

- When is science good enough for policy?
- Thoughts on the history of forestry and the School
- Future of forestry in the PNW
 - Our role in that future



When is science good enough for policy?

- What is ‘good enough?’
- Science: evolutionary process, probabilities
- Perhaps we should ask:
 - When do policy limitations require the latest science?
- Consider 40 years of climate science!

Two take home messages

- We can always do better. We will do better
- Forestry is conservation, forest science is an environmental science: we are part of the solution



Logging of the PNW, ca 1860s – 1890s

Engineering facilitated lumbering. Extraction rate created alarm

<http://www.foresthistory.org/>





The beginnings of Conservation in the PNW

“No woods, no game;
no woods, no water;
no water, no fish.”

George Bird Grinnell
Forest & Stream, April 13, 1882
Co-founder Boone and Crocket Club



“The methods adopted by the lumbermen of western Washington are wasteful in the extreme...”

Charles Sprague Sargent
Chair, National Forest Commission, 1896-97

President Harrison



President Roosevelt



Forest reserves/National Forests

“Conservative Forestry”

- Forest is treated as working capital to produce successive crops
- A plan is prepared and followed
- Leave standing trees and the young growth nearly unharmed
- Conservation ethic



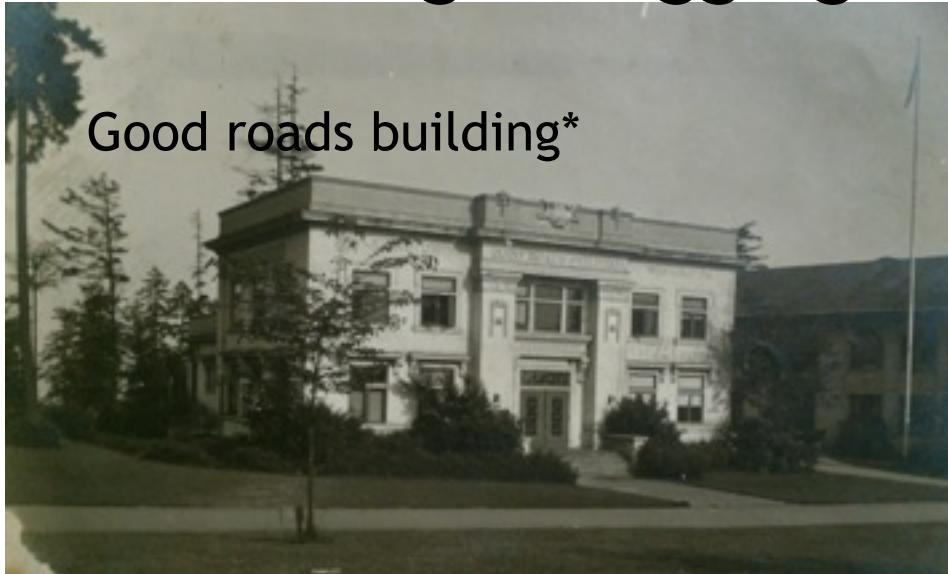
Gifford Pinchot, *A Primer of Forestry*, 1905

Formation of the School of Forestry*

1907

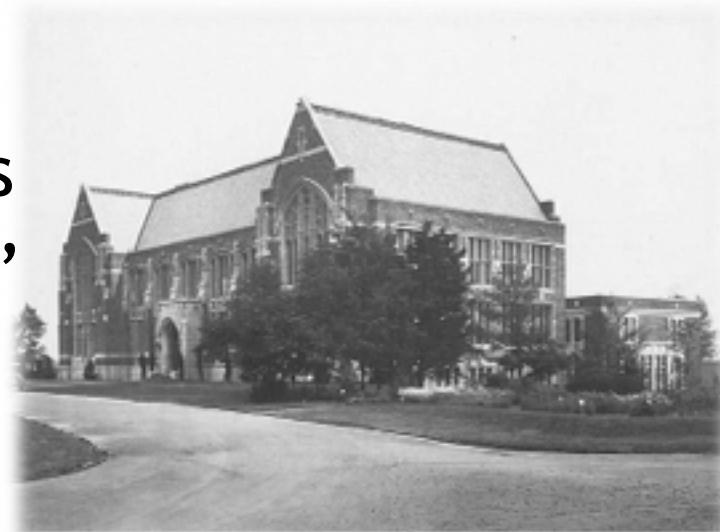
- Address the need for conservation of forests
- Train Forest Service employees
- Geared toward public lands management
- Training in logging engineering

Good roads building*



Building a Forestry Program

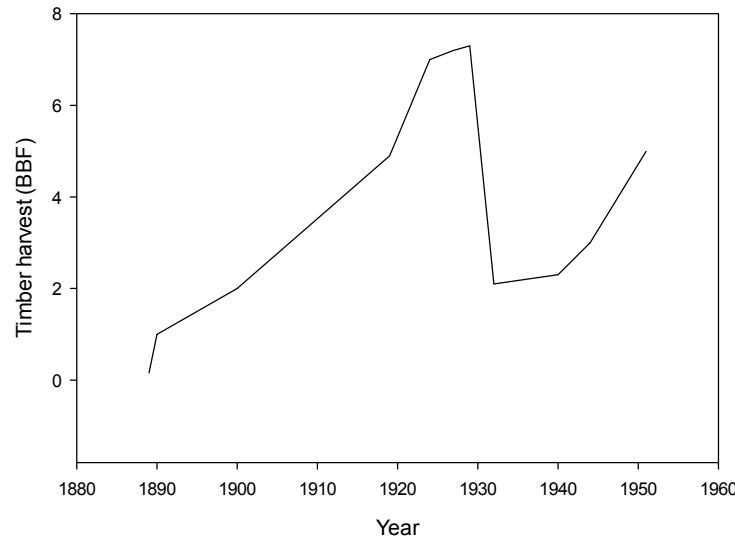
- Miller & Winkenwerder
- Objectives:
 - Instruction in forestry sciences
 - “Right use of forest resources”
- Radical ideas
- ‘Forestry’ vs “cut-out and get-out” lumbering
- Not appreciated by lumbering industry



Property of University of Washington Libraries, Special Collections Division

Timber harvest in WA 1910 - 1940

- Timber harvest peaked in 1920
- 7 billion bf/yr ...
- A land ethic
 - Leopold, Marshall, Muir ...
- Preservation as an objective



<http://www.washington.edu/uwired/outreach/cspn/Website/index.html>



http://azstateparks.com/find/images/Aldo_Leopold_cliff.jpg

Forest management in the 20th Century

- 1950s - 1970s, heavy harvesting of public lands
- FS the number one road builder
- 59,000 miles of logging road built in Montana in late 1950s
- Maximum harvestable volume taken
- Loss of compass in forest conservation
- Polarized political landscape

Bolle and Monongahela Reports and the beginning of a new era



So where are we now?

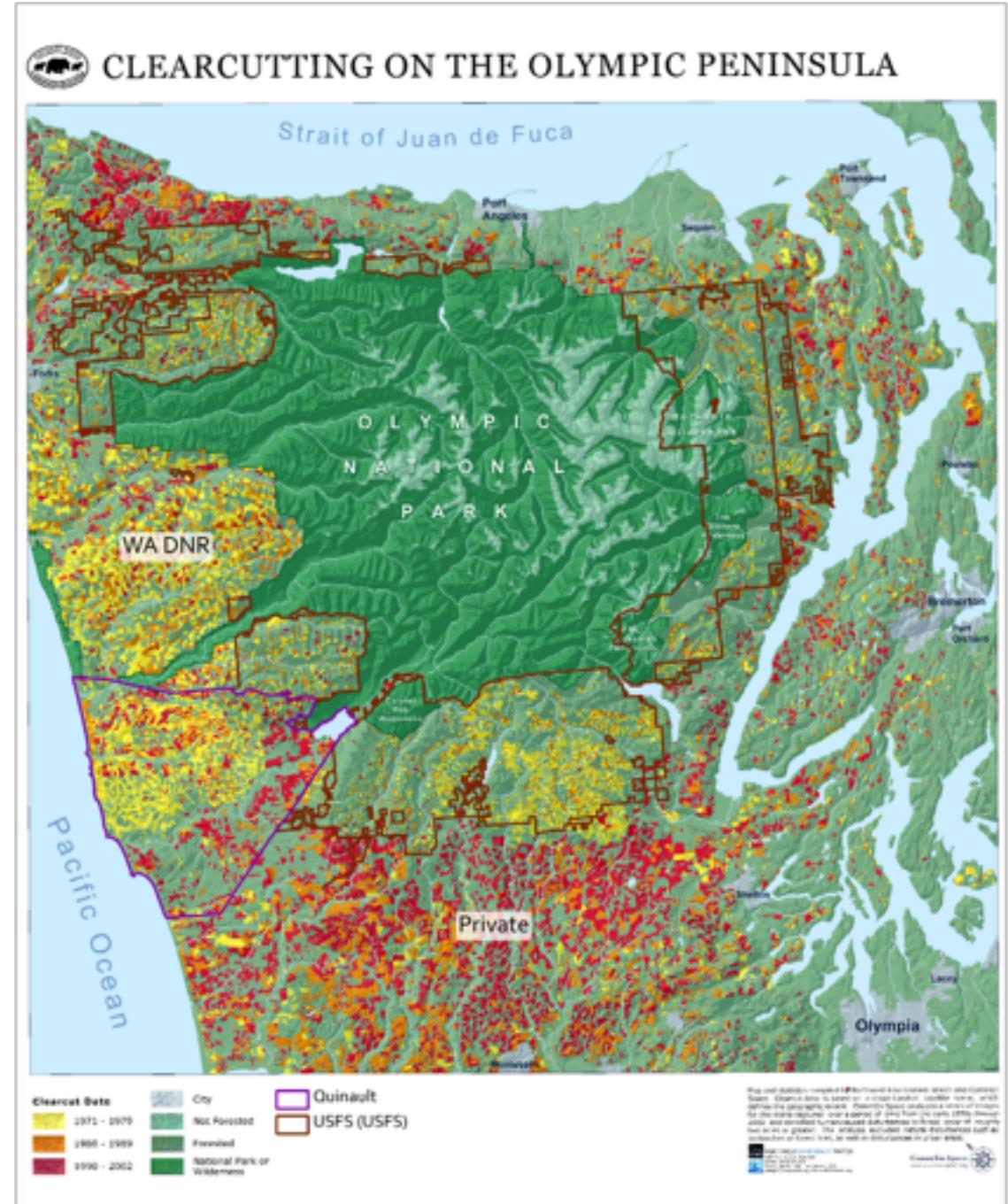
- Some of the strongest environmental stewardship laws in nation
- Large portion of private timber going overseas
- State is 50% federal land
 - Protection of species
 - Stopped the flow of timber from federal lands
 - Slowed harvest on State trust lands
 - Discontinued harvesting of old growth
- Recovery of harvested landscapes?

Photo: Jerry Franklin

A shift in management

Federal and state timber harvest in the 70s shifts to private lands in the 90s

WA = 48% fed land
23% state lands



Unintended consequences

- Not being managed doesn't = natural
- Loss of jobs and milling infrastructure
- Poor condition as habitat
- Not supporting species of concern
- Opportunity??



Can we improve habitat,
generate products, conduct
smart planning, and improve
green building?



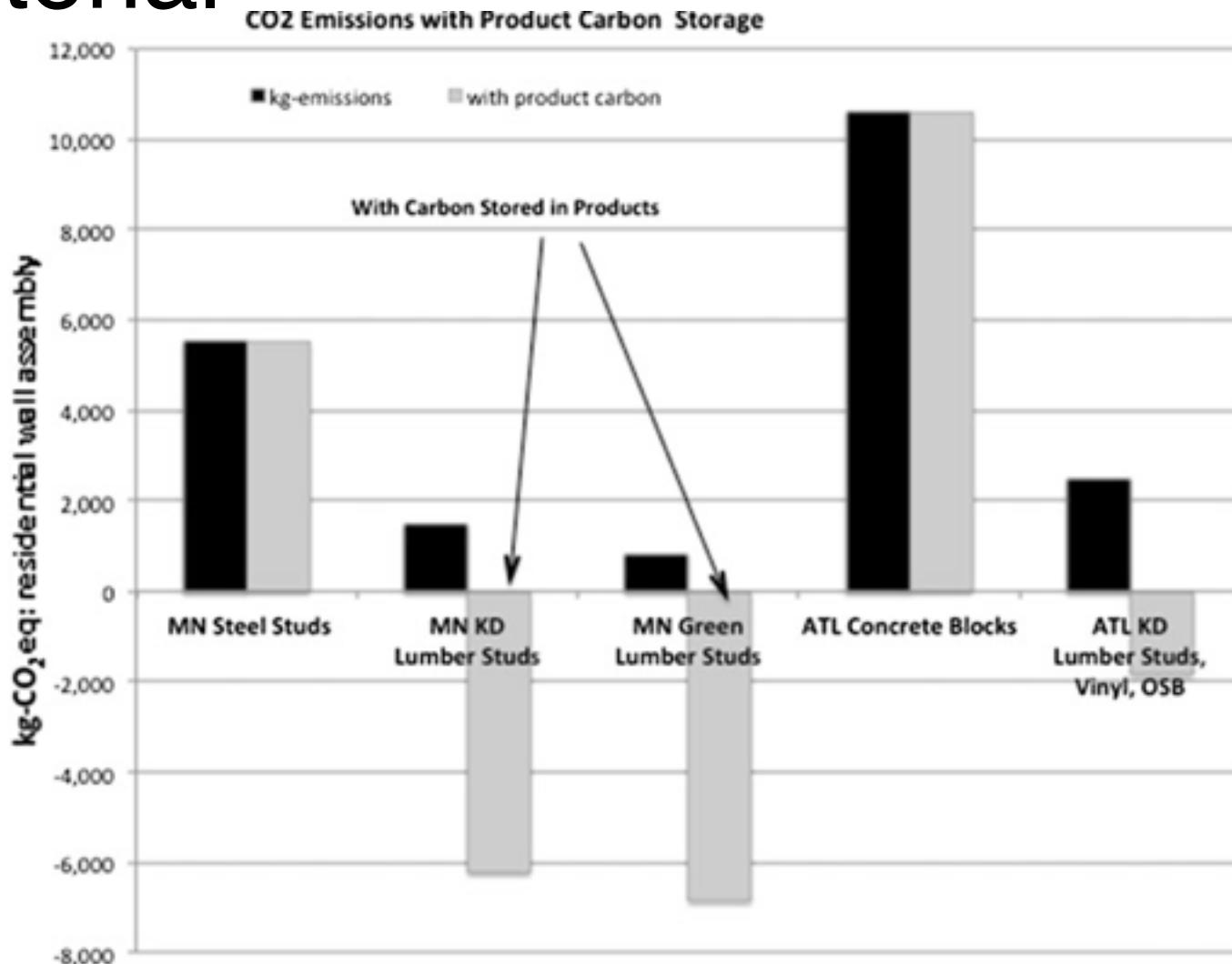
T.H. DeLuca

Need to integrate across
disciplines...!

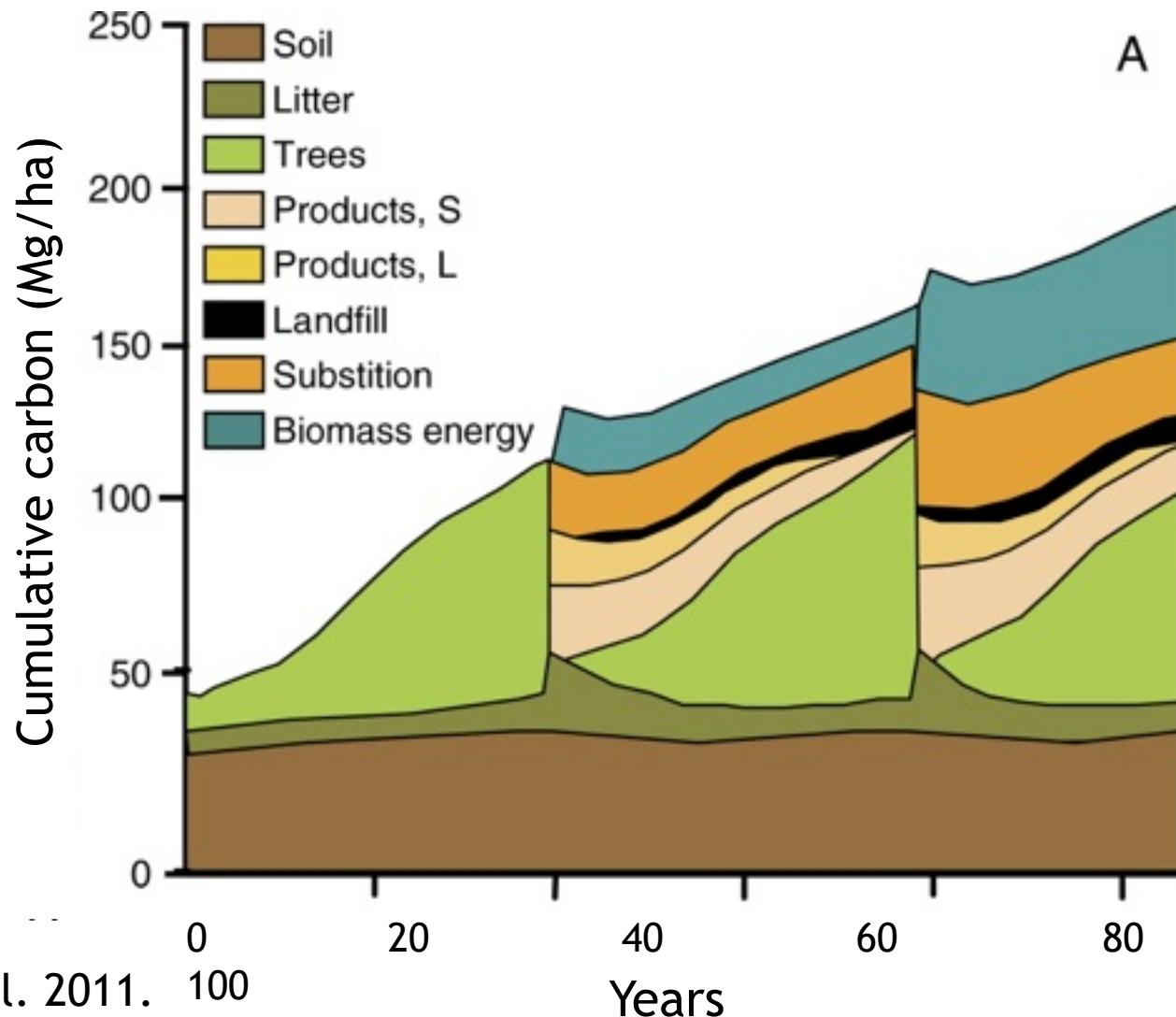


<http://www.bullittcenter.org/building/photo-gallery/>

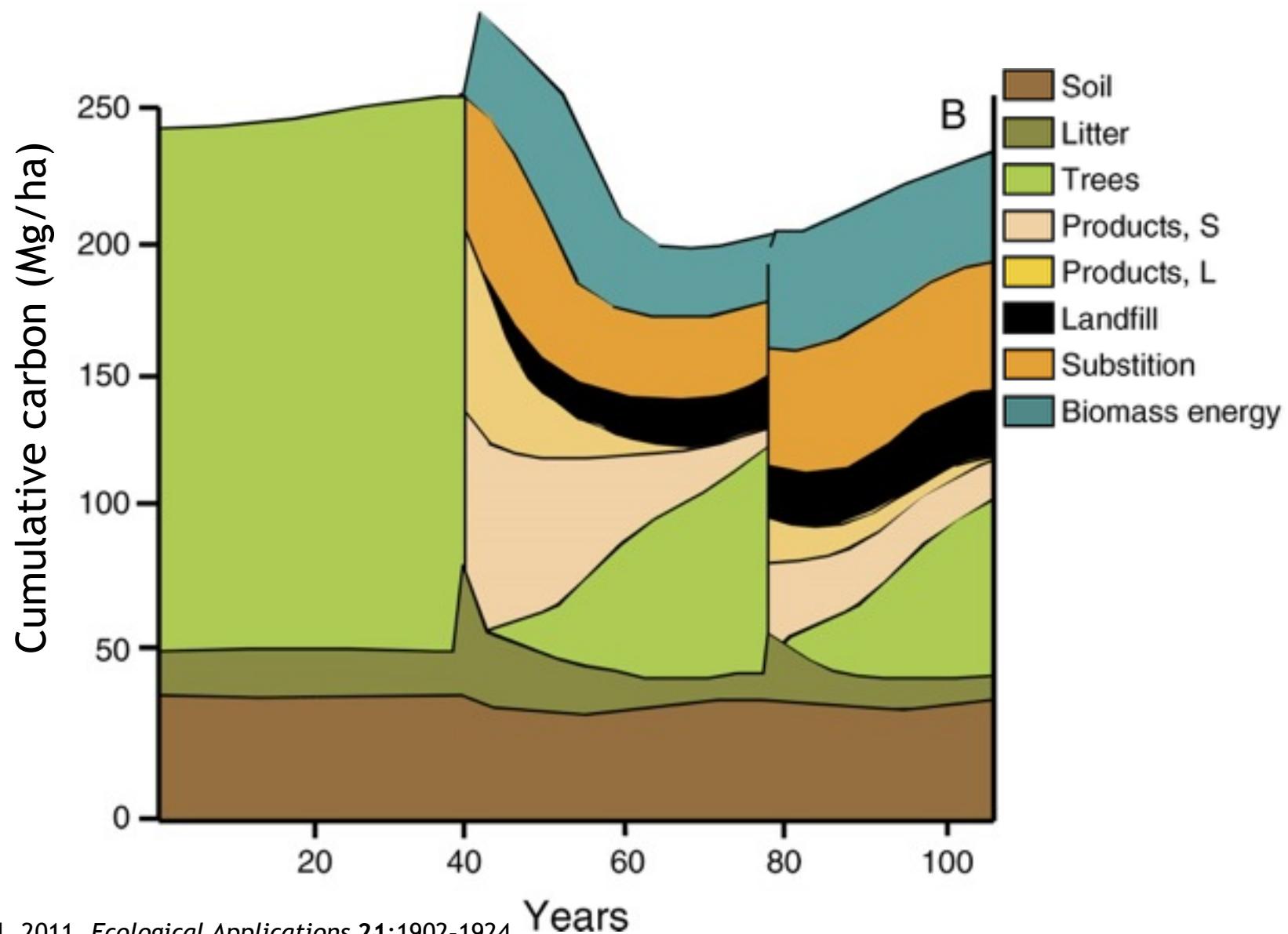
Wood and C storage in building material



Carbon accumulation with active forest management can increase C, but...

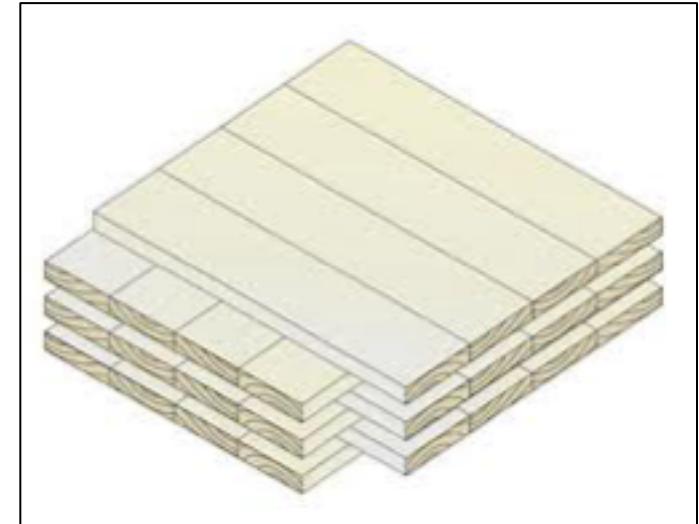


...declines and recovers when starting with forest



Mass Timber Construction

- Heavy panel wood products
 - Cross-laminated timber (CLT)
 - Laminated veneer lumber (LVL)
 - Laminated strand lumber (LSL)
 - Parallel strand lumber (PSL).
- Structural panels and beams
- Generated from small boards
- Use of small diameter roundwood?



Hines Plans Tall Wood Building Minneapolis, <http://www.bdcnetwork.com/hines-planning-tall-wood-office-building-minneapolis>

Assembly of the pre-cut CLT panels

<http://www.popsci.com/article/technology/worlds-most-advanced-building-material-wood-0>



Cut & Assemble Cross-laminated timber (CLT) panels are cut to spec in a factory and assembled at the construction site. *KLH UK*

- A new outlet: Timber demand shouldn't compete with conventional lumber...

From lemons...

Ongoing collaboration with WSU to create CLT from hemlock



Dense hemlock growth Olympic NF Photos: Jason Cross

Todd Beyreuther, WSU wood lab, hemlock CLT

Some challenges

- CLT not established for building in US
- Building codes: allow wood to 5 stories
- CLT panels use a lot of wood/ft²
- CLT most feasible in tall structures



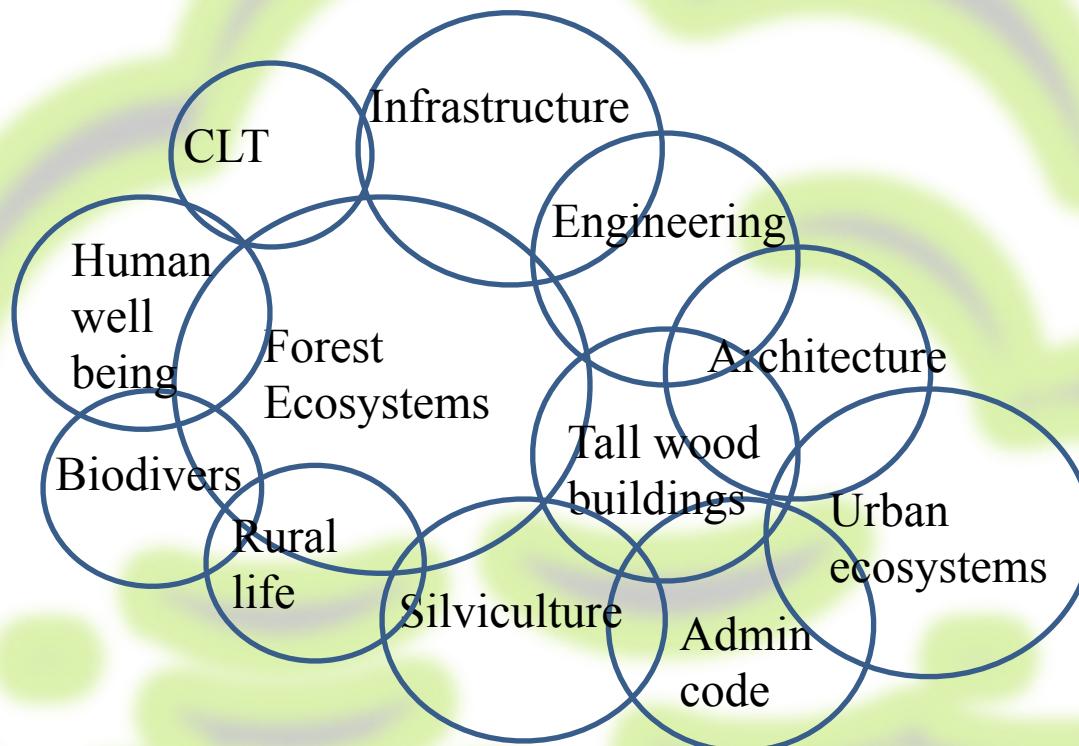
MGA: Michael Green Architecture

Sustainability

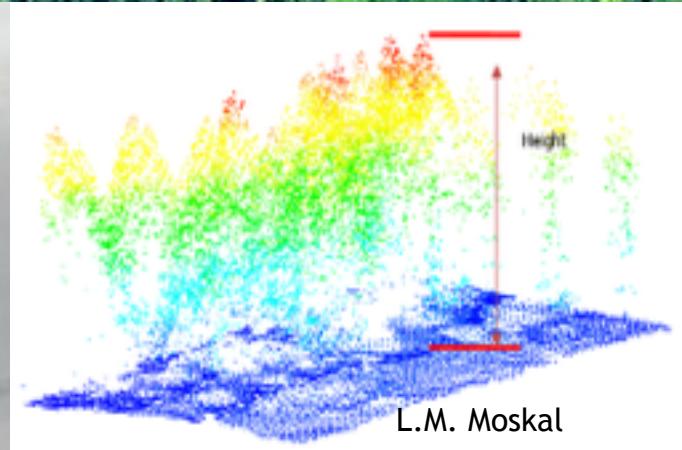
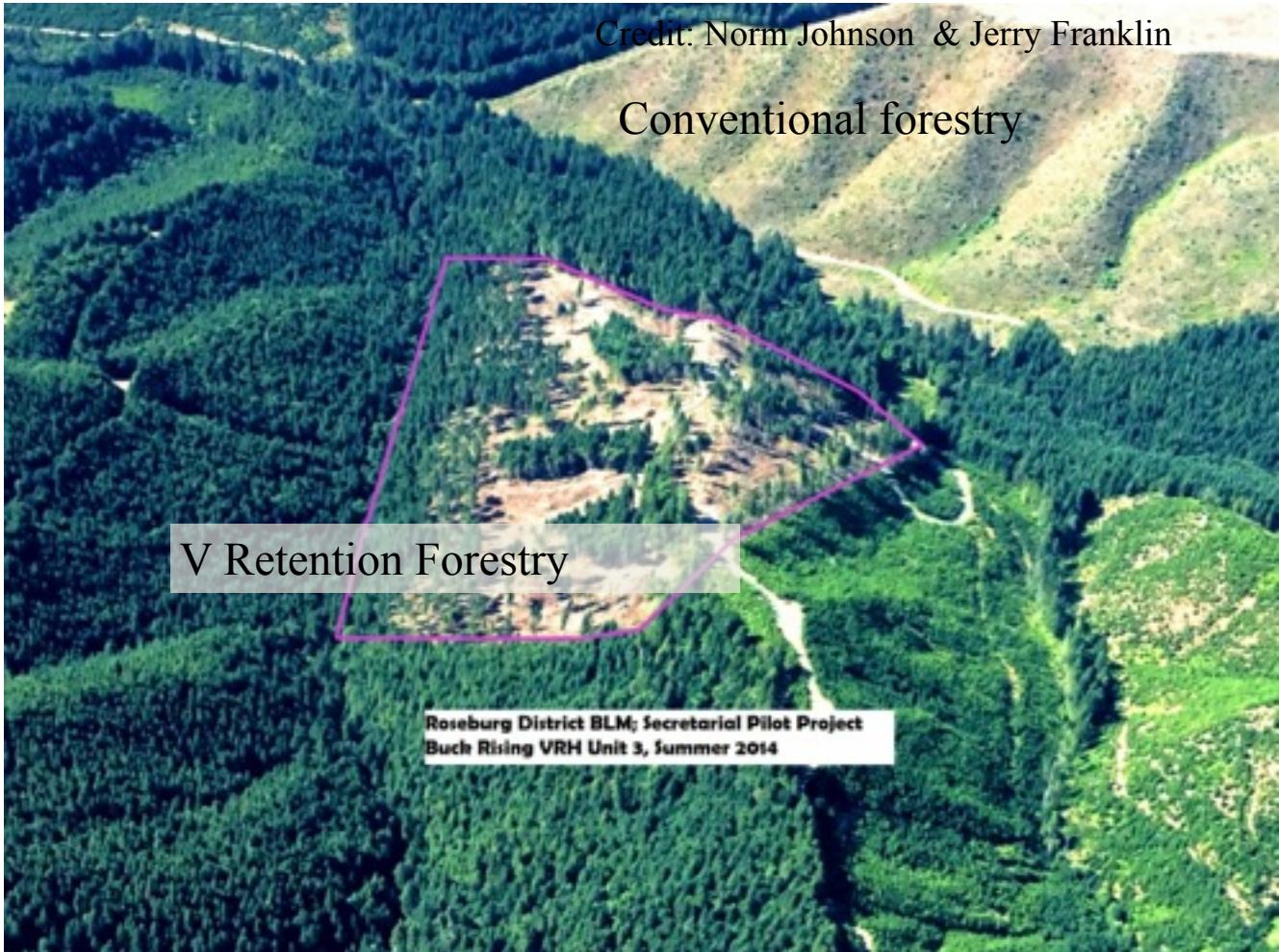
A system where human needs are indefinitely met without degradation of the environment

Sustainability can only be addressed by the integration of knowledge and efforts of multiple disciplines!

Systems thinking in a complex and fluid landscape



Cannot let
current
technology
& approach
limit our
imagination
for
tomorrow



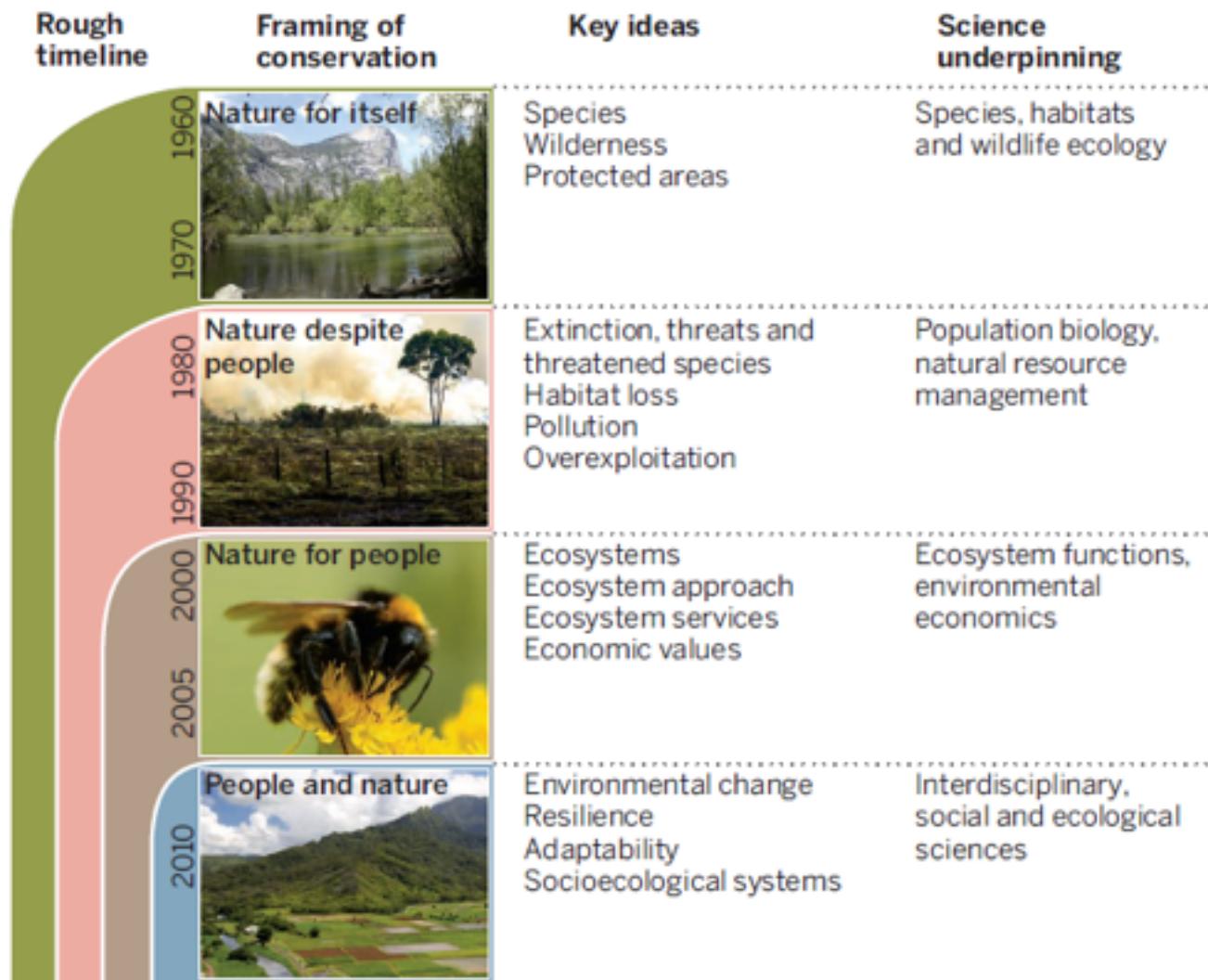
L.M. Moskal

Forestry IS part of the solution!

- Carbon storage
- Wood products
- Habitat and Biodiversity
- Goal:
 - Simultaneously manage for biodiversity, habitat and volume



Shifting views on conservation



We can always do better ...

Can we set the environmental agenda for the
21st Century?



The School today, sustainability and reflecting the complexities of resource management



Forest management
Climate change and species migration
Soils
Remote sensing and landscape projections
Water resources and C, N, P cycling
Human dimensions of resource management
Ecological forestry
Biofuels and bioproducts

What are some constraints and drivers?

- US: 80% urban growing by 1.2%/yr
- Flow of nutrients/resources



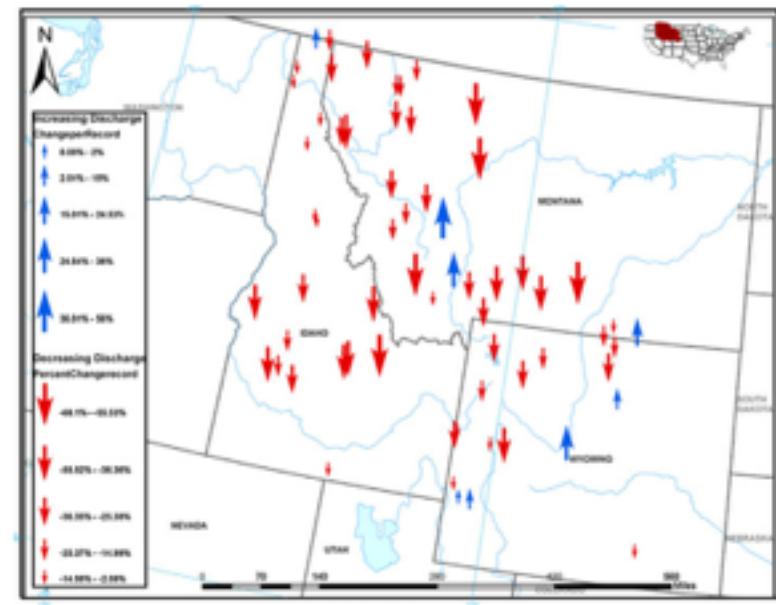
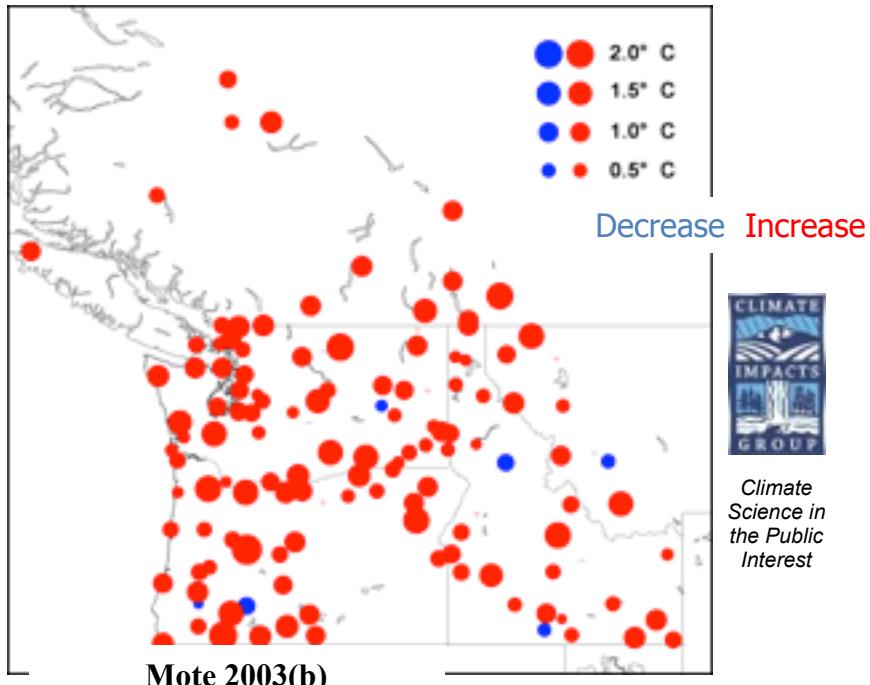
Urban environs: People, but high impact

Overlay of climate change

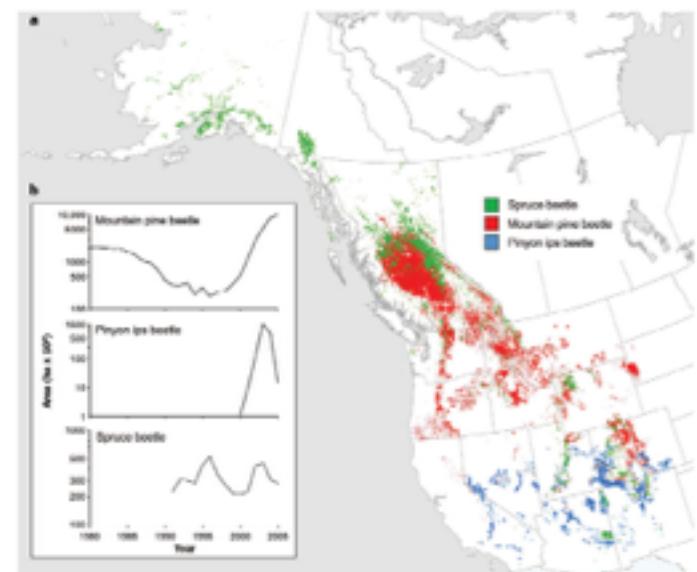
50 yr August streamflow trends

Leppi et al. 2011

Trends in annual temperatures

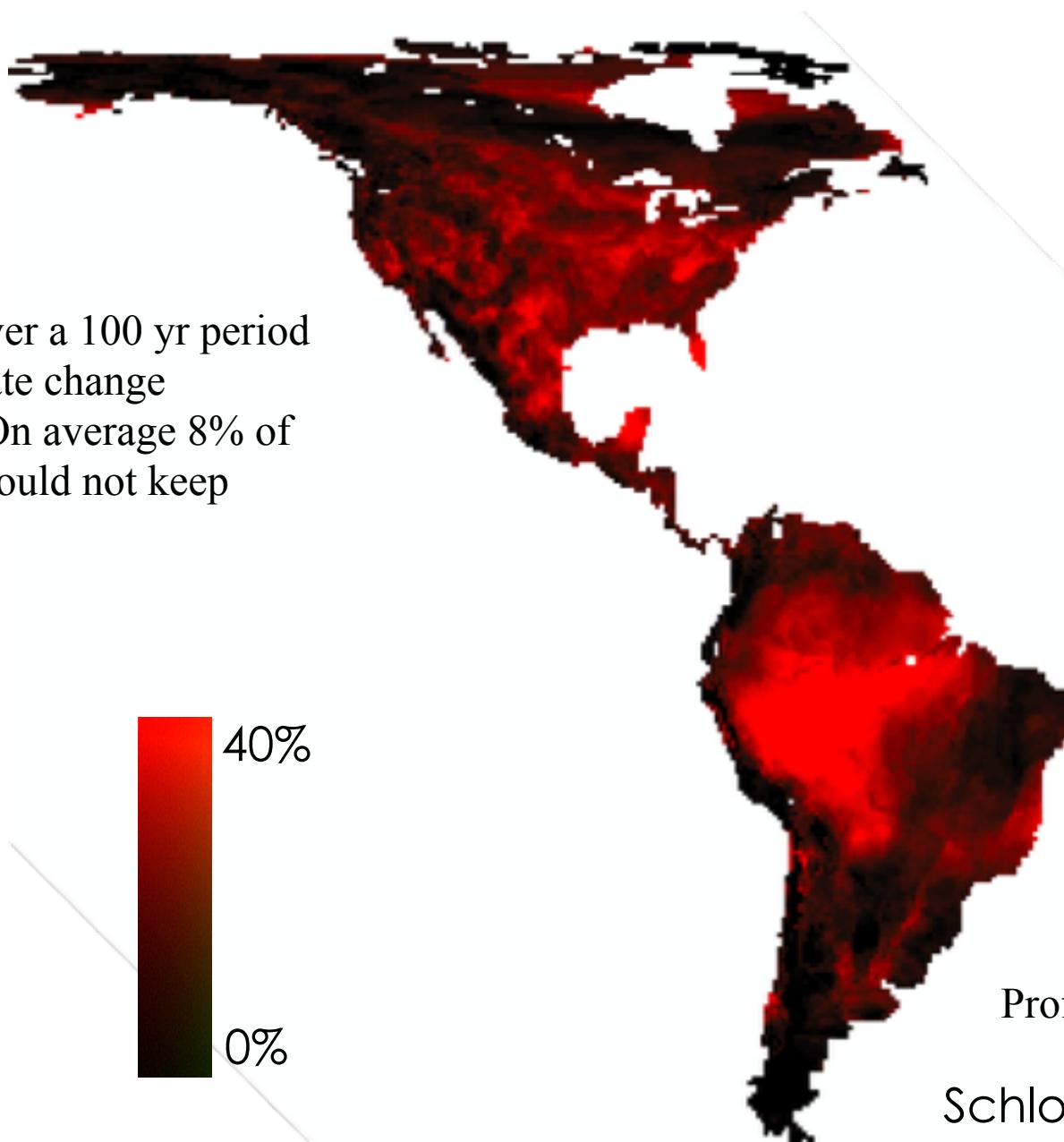


Insects and forest fires



Percentage of mammals that cannot keep pace

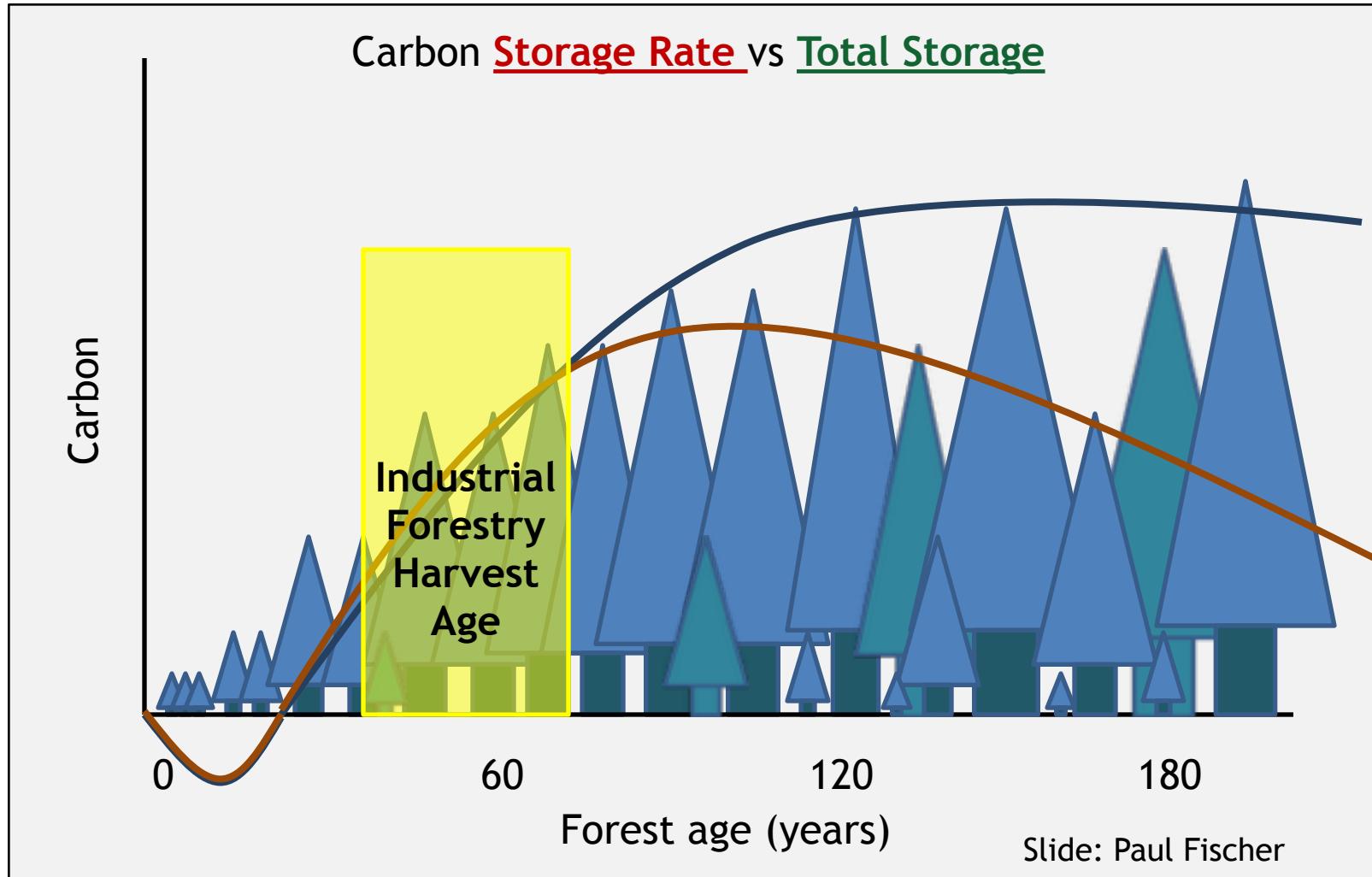
Modeled over a 100 yr period under climate change scenarios. On average 8% of mammals could not keep pace



Prof Josh Lawler

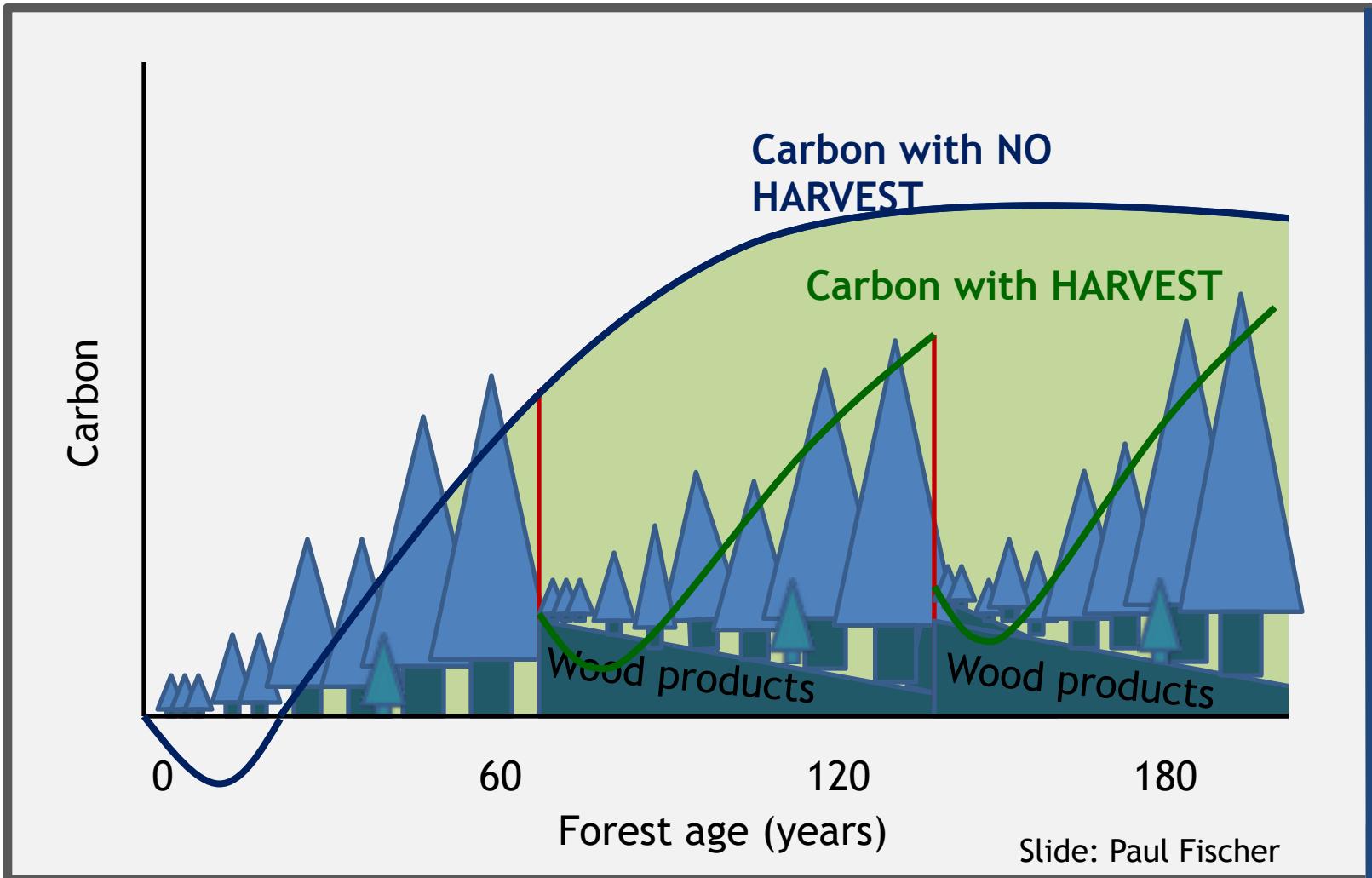
Schloss et al. 2012

Managing 2nd growth to increase carbon storage



¹ Canadell and Raupach 2008. *Science* 320: 1456-7.

Harvest and carbon pools



Slide: Paul Fischer