

College of Forestry Update

Board of Forestry

June 6, 2024

The College of Forestry is

World-Class



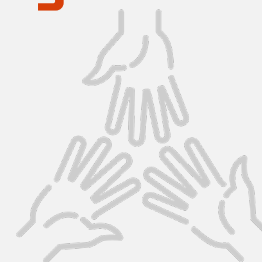
- We're ranked #1 in NA, #2 in the world
- Our students get jobs in their field- often before graduation
- Our faculty are close knit, game-changing researchers and educators

Hands-On



- Both outdoor focused majors and meaningful online curricula
- State-of-the-art facilities and accessible forests give our students real experience in the lab and in the field

Tight-Knit



- A small college community (1300 students) means more support and a place to belong
- 16:1 student to faculty ratio
- Avg class size 25-30

GRADUATE PROGRAMS

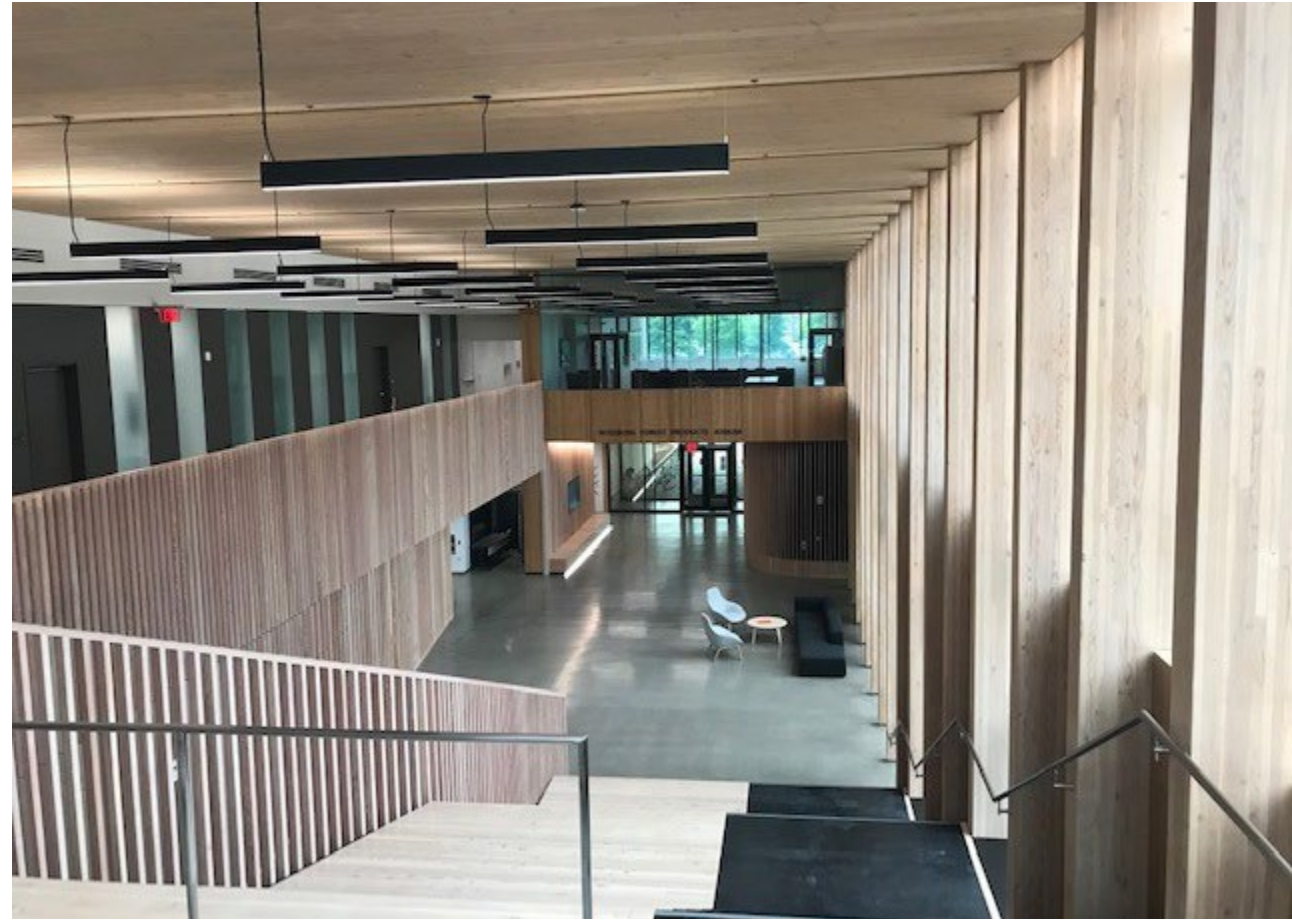
Masters of Natural Resources

Masters of Forestry

Masters of Science NR, SFM, WSE

Online Masters WSE (coming soon)

PhD in Forest Sci, SFM, WSE



AY24 Enrollment Update

- Closed AY23 with 1,274 students
 - 1% increase over prior year
 - 1,045 undergrads
 - 229 grad students
- AY24 enrollment: 1,313 students
 - Largest newly registered on-campus freshman class ever
 - 1,091 undergrads
 - 222 grad students
 - Pre-Forestry had the largest growth (+13%)
 - Demographic data
 - 49% Female, 51% Male
 - 26% first gen
 - 47% in state undergrads
 - 11% vets/military
 - 15% under-represented minority
- AY25 Commits up 67% from last year at this time



\$25M in Research Grants and Contracts in FY23

- \$8M (\$23M TDI) in Economic Development Administration Awards
 - Smart Forestry: Paving the Way from Forest Restoration to Mass Timber
 - Prototyping and Testing of Mass Timber Housing Systems
 - Oregon Fire Testing Facility Construction
- \$1.6M from U.S. Forest Service
 - Protecting Water Security from Wildfire Threats in Western U.S.
- \$8M from USDI Bureau of Land Management – “Seeds of Success”
 - BLM Pacific Northwest Tribal Conservation Corps Project
 - The Fort Belknap Indian Community Native Seed and Grassland Restoration Project
- \$800K from USDI Bureau of Land Management
 - Developing a Professional Fire Management Education, Training, and Experiential Learning Program

Strategic Planning and New Initiatives

- Indigenous Natural Resource Office Autumn 2022
- AD Inclusive Excellence & Director of Tribal Relations
- Strategic Plan released Jan 2023
- University Strat Plan Nov 2023
- Implementation plans Autumn 2024



New Faculty & Staff Appointments

- **Jake Barker**, Extension Forester in Columbia, Washington, and Yamhill Counties
- **Kevin Bladon**, Department Head, Forest Ecosystems & Society
- **Mindy Crandall**, Associate Department Head, FERM
- **Jenna Diebel**, Extension Forester in Deschutes, Crook, and Jefferson Counties as well as Warm Springs
- **Dr. Kidane Gebremedhin**, Extension Forester in Klamath and Lake Counties
- **Shannon Murray**, Director of Strategic Initiatives
- **Michael Nelson**, Director CFFS
- **Georgia Seyfried**, Assistant Professor, Forest Carbon Cycle and Mycorrhizal Relationships (FERM)
- **Lorelle Sherman**, Extension Forester in Linn, Polk Counties
- **Mark Swanson**, Associate Professor and Starker Chair in Family Forestry (FERM)
- **Joanna Tan**, Admissions Coordinator
- **Heesung Woo**, Assistant Professor of Advanced Forestry Systems (FERM)
- **Wenjia Wang**, Assistant Professor of Advanced Wood Manufacturing (WSE)

Ongoing searches and new faculty hires

New Hires

- **Annette Patton**, Assistant Professor and Watershed Extension Specialist

Ongoing searches

- **Indigenous Natural Resources**, Interviewed two finalists
- **Christmas Tree** Extension Specialist, Interviews complete, checking references
- **Strachan Chair in Forest Operations**, Interview stage
- **Director of Research Forests and Extension Silviculture Specialist**, Interview stage

Ongoing searches (cont)

- **Professor of Teaching, Art and Design, WSE**, Interviews complete
- **Urban Forestry Extension Specialists (2)**, interview stage
- **Forest Health Extension Specialist**, Planned to start Summer 2024
- **Forest Genetics**, Planned to start search Autumn 2024

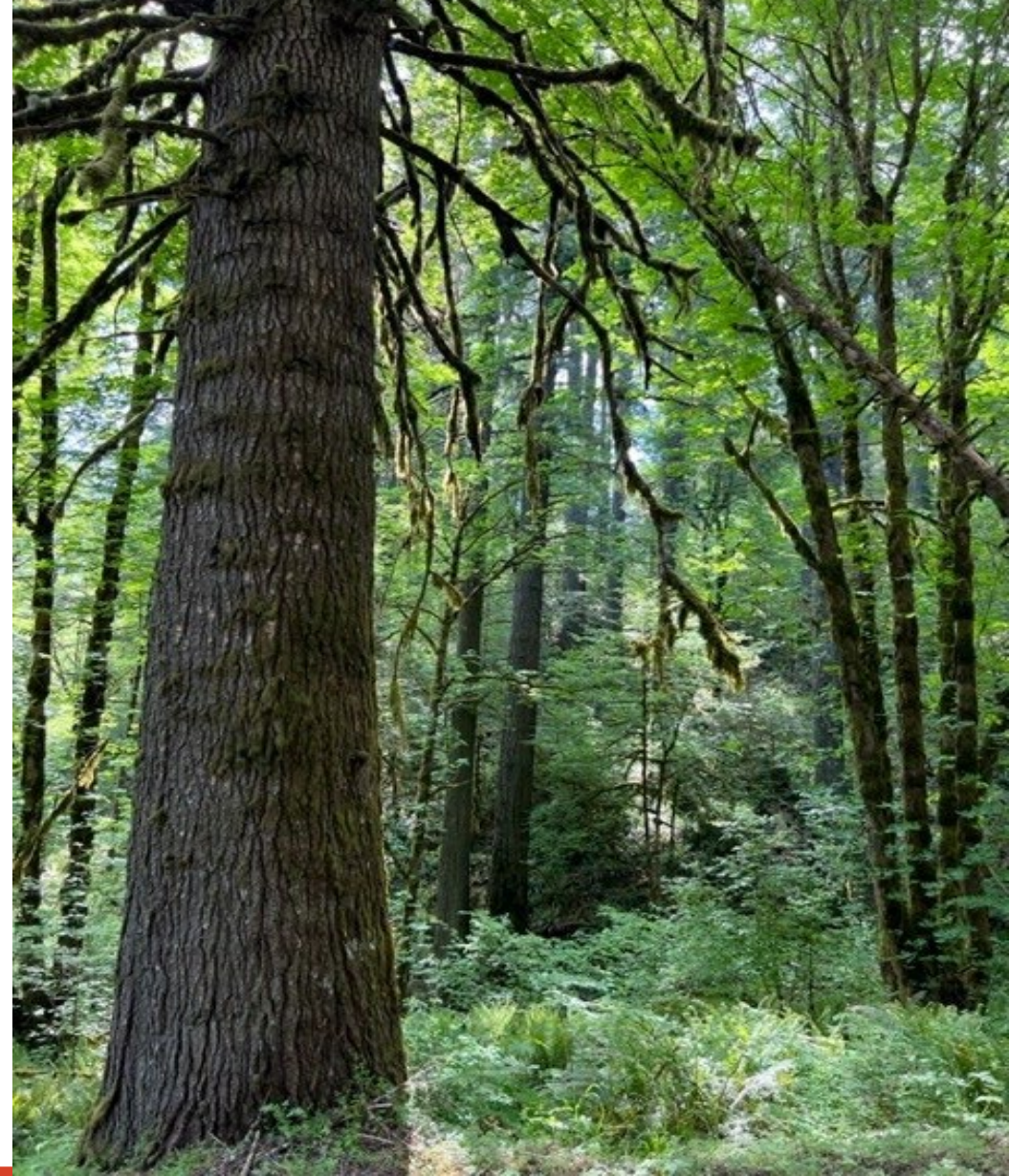
New faculty (past 3 years)

- **Andres Susaeta**, Assistant Professor in Natural Resource Economics
- **Islam Hafez**, Assistant Professor of Composites and Adhesion Science
- **Vahid Nasir**, Assistant Professor, Advanced Wood Manufacturing
- **Jacob Bukoski**, Assistant Professor, Forest Carbon Cycle Science
- **Suhyun Jung**, Assistant Professor, Economics and Policy Dimensions of Forest-Based Climate Solutions
- **Loren Albert**, Assistant Professor, Forest Carbon Cycle Science
- **Georgia Seyfied**, Assistant Professor, Forest Carbon Cycle and Mycorrhizal Relationships
- **Holly Ober**, Associate Dean for Forestry and Natural Resource Extension, WBIO background
- **Cristina Eisenberg**, Associate Dean for Inclusive Excellence and Tribal Initiatives, Restoration Ecology and IK background



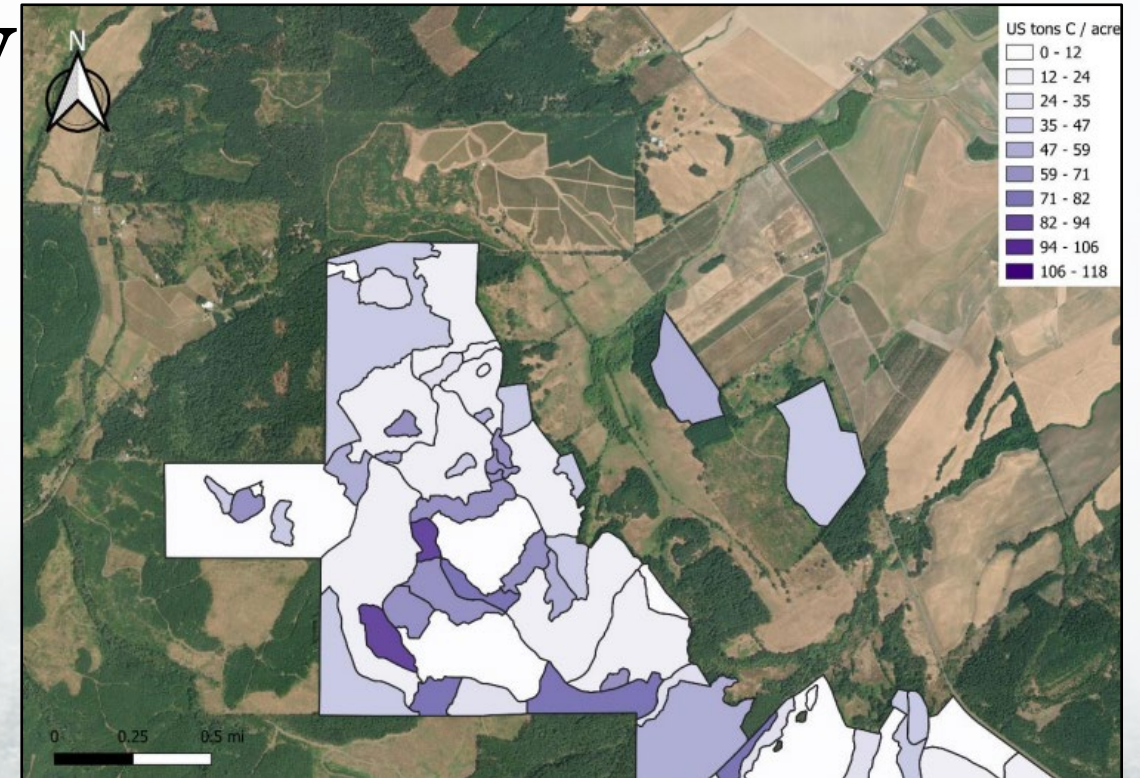
Research Forest Updates

- Draft McDonald-Dunn FMP being finalized by August 2024
 - First full draft by end of summer 2024
- Huang CIC, mass timber, MD sourced
- Two separate C inventories completed on MD, one published
- Tualatin Mountain Forest (3K acres in Portland Metro area) progressing



Forest Carbon Inventory

- Average aboveground tree carbon estimates:
 - Remote sensing: 58.41 US tons C/ac.
 - Ground inventory: 56.1 US tons C/ac.
- Total carbon for project area
 - **564,542 US tons of carbon**
- Soil carbon inventory 2024/25:



Carbon map of northern portion of the Dunn Forest

	Ground Inventory	Remote sensing inventory
Measured Stands	409,687 US tons C	393,541 US tons C
Project Area	--	564,542 US tons C

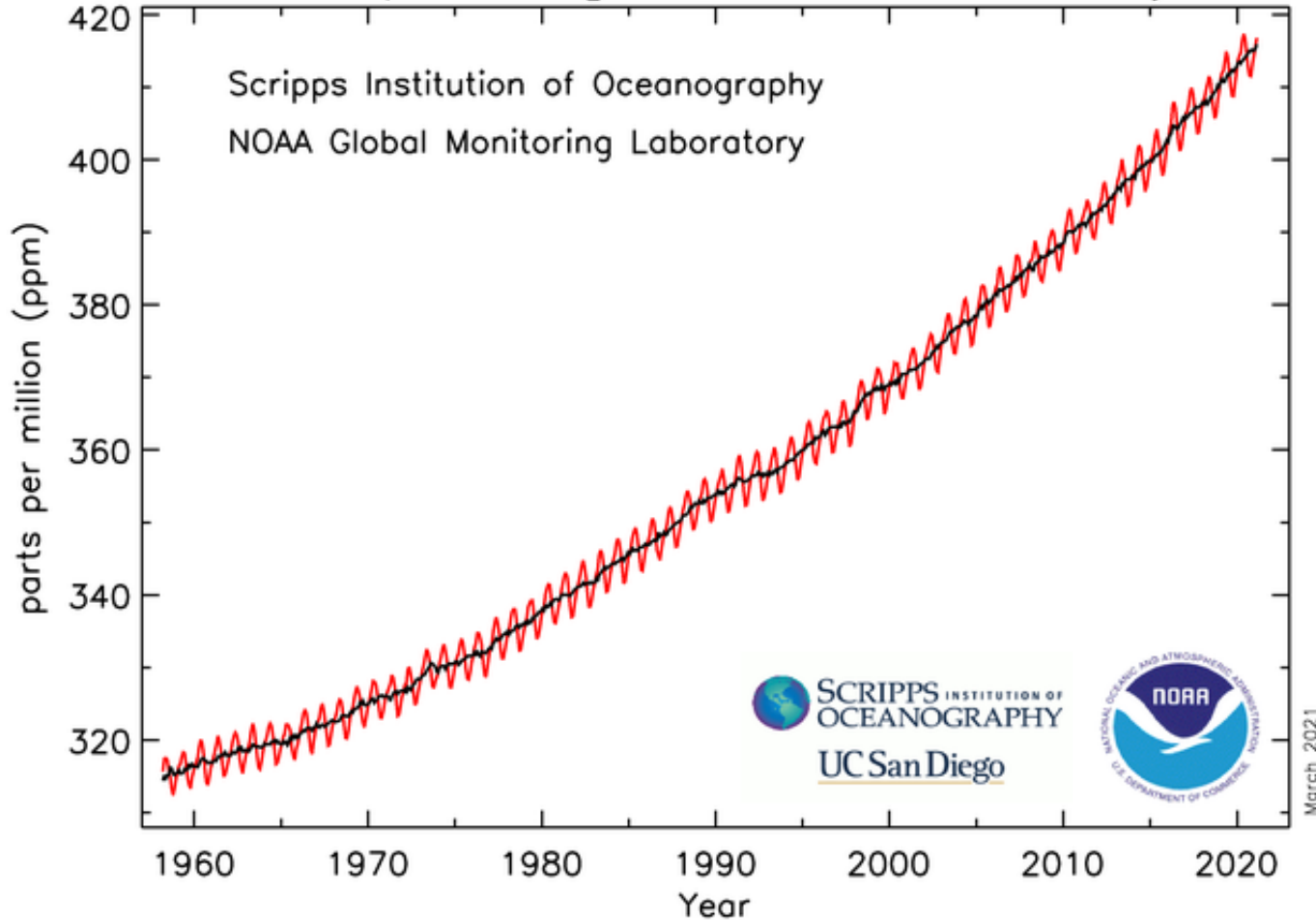
Elliott State Research Forest Updates

- DSL pushing forward with research forest concept
- OSU on sidelines, still interested in research forest concept, but concerns over carbon, Tribes, and commitment from state to research still pending
- Installing monitoring equipment from federal funding



Climate change, forests, and soils

Atmospheric CO₂ at Mauna Loa Observatory



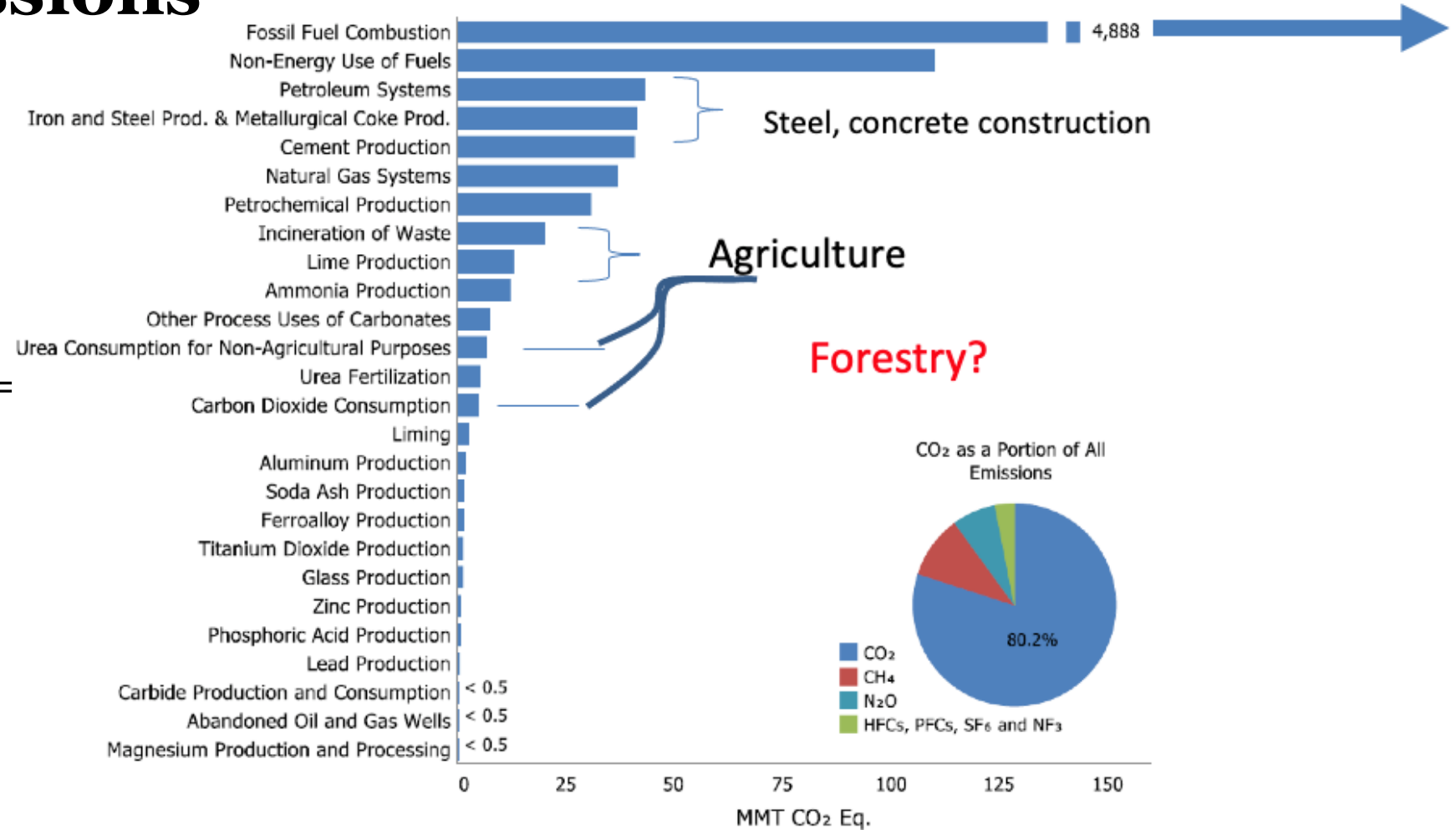
<https://www.esrl.noaa.gov/gmd/ccgg/trends/>

Why do we care about forest carbon?

- GHG concentrations now over 420 ppm
- Multitude of impacts
 - Sea level rise
 - Increased drought
 - Increased extreme events
 - Increased wildfires
 - Displacement of communities

U.S. CO_{2eq} emissions

- Fossil fuel combustion = 93% of US CO₂ emissions in 2019
- Energy, transportation, construction, agriculture = 7%
- Forestry? Wood construction?
A net C sink!



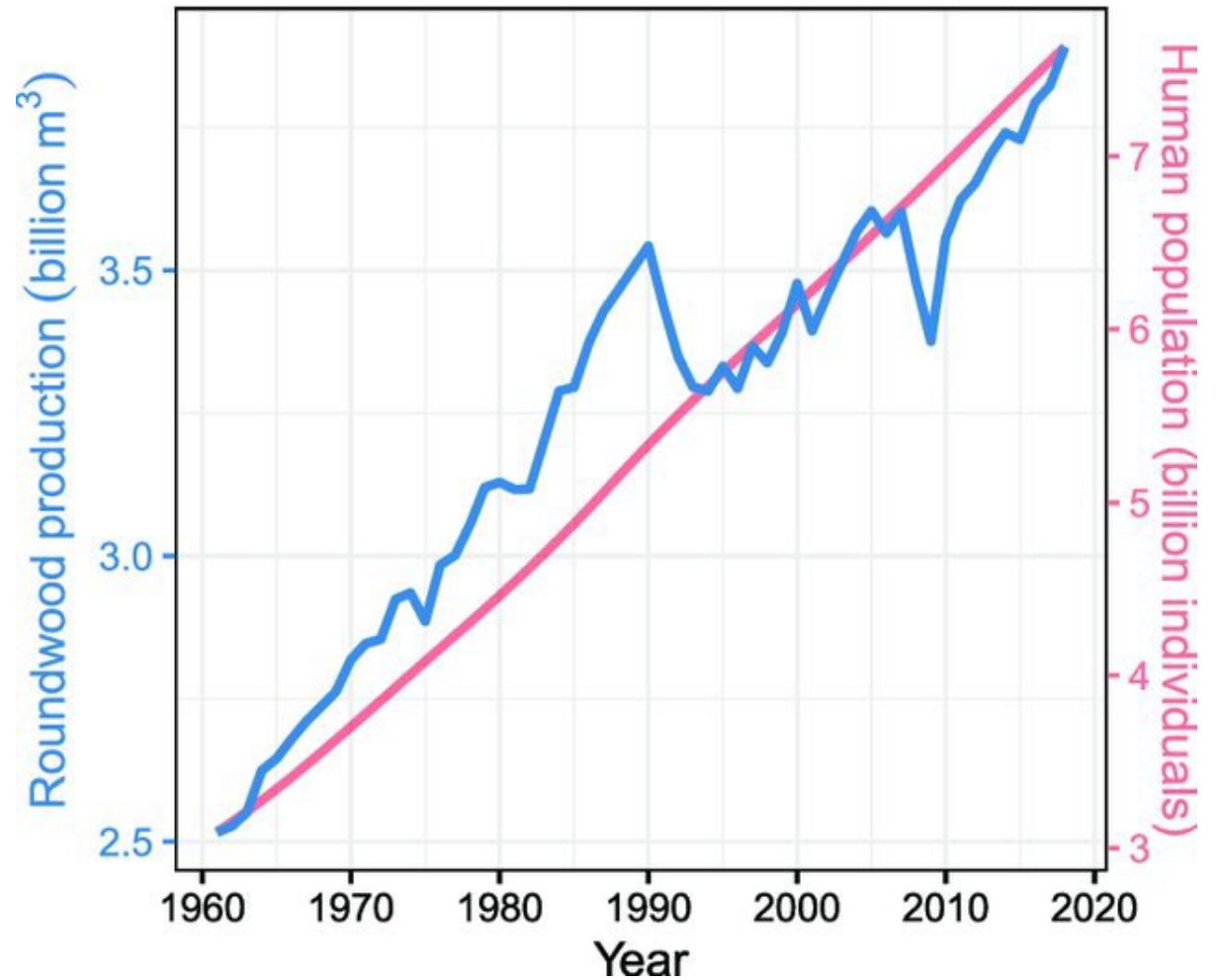
US EPA 430-R-21-001: Inventory of US greenhouse gas emissions and sinks (1990 – 2019)



But can soil or
forest carbon
actually make a
difference?

1. **Small additionality** compared to consumption rates
2. **Reduced wood production** in OR has consequences elsewhere
 - Leakage = C & biodiv losses in global south
 - PNW forestry produces with **native species**. Most large timber baskets are exotic species
3. **Carbon storage in forests is temporary**
 - Fire, insects, & windthrow
 - Climate change is increasing disturbance rates
 - Fossil additions permanent to cycled pool
4. Most forest C storage is below ground, yet **management has modest effect on soil C** (James and Harrison, 2016)

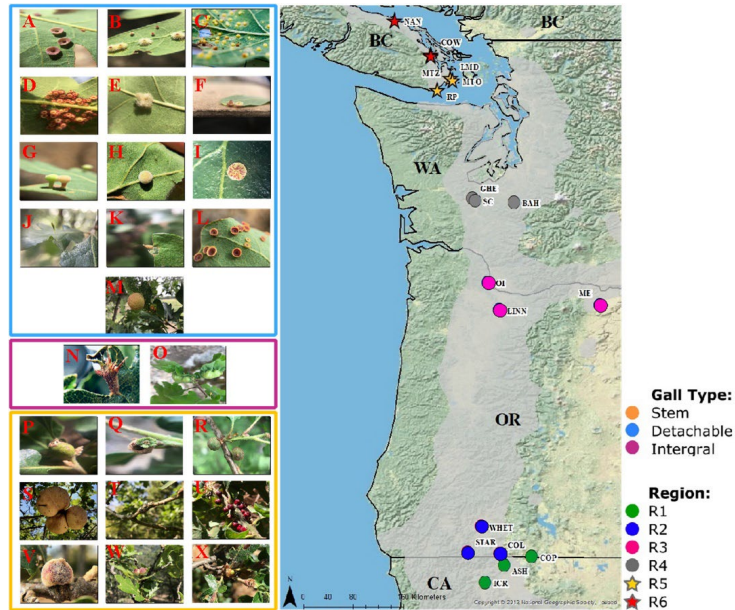
But can soil or forest carbon actually make a difference?



Betts et al 2021

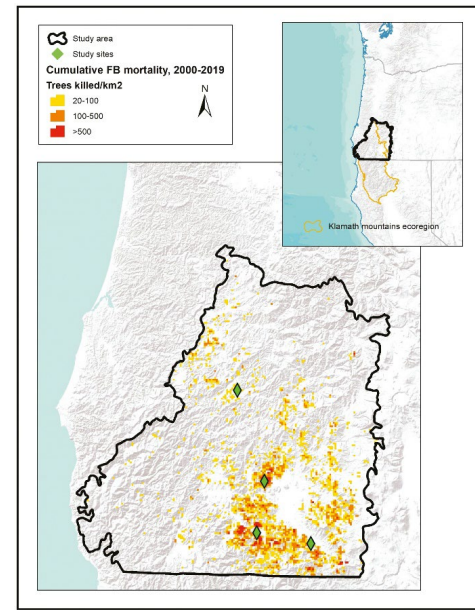
More important: Forest resilience! Climate change and insects, drought stress, fire, heat...

Novel insects, pathogens, overstocking and drought



Jones et al. 2022.

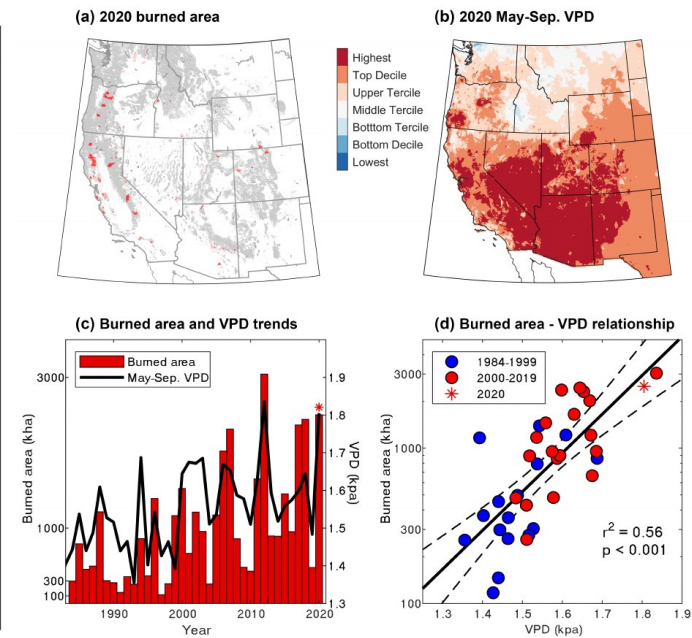
<https://doi.org/10.1111/1365-2656.13780>



Bennett et al. 2023.

<https://doi.org/10.1093/jofore/fvad007>

Increasing fire size and severity



(Higuera and Abatzoglou, 2020 GCB
<https://doi.org/10.1111/gcb.15388>)

Forest soils and conservation

- Biden and UN: Achieve 30% land Conservation by 2030
- Why? Carbon and biodiversity objectives
- But what is conservation?
- Preservation? That excludes humans and human needs
- Is there an answer in forest soils?
- We think so!

Photo T.H. DeLuca, Willamette Valley, OR

Forests and ecosystem C

Boreal example

- Boreal ex. 100% cover of forest floor
 - Overstory is only part of the story!
 - Understory
 - *Ericoids, grasses, sedges*
 - Bottom layer
 - *Feather moss bottom layer*
- NPP Allocation (Xia et al. 2019)
 - *Fine roots ~35%*
 - *Exudates ~10%*
 - *Wood ~45%*
 - *Leaves ~20%*
- Root exudates not an error –
An obligate symbiosis

Photo T.H. DeLuca, Northern Sweden

Lack of plant cover starves soil, emits carbon

Bare soil results in:

- Lack of exudates and litter
- Net C mineralization
- Leaching of DOC, nutrients
- Raindrop impact, erosion

Time as Bare Soil Over 100 yrs. (spatial and temporal):

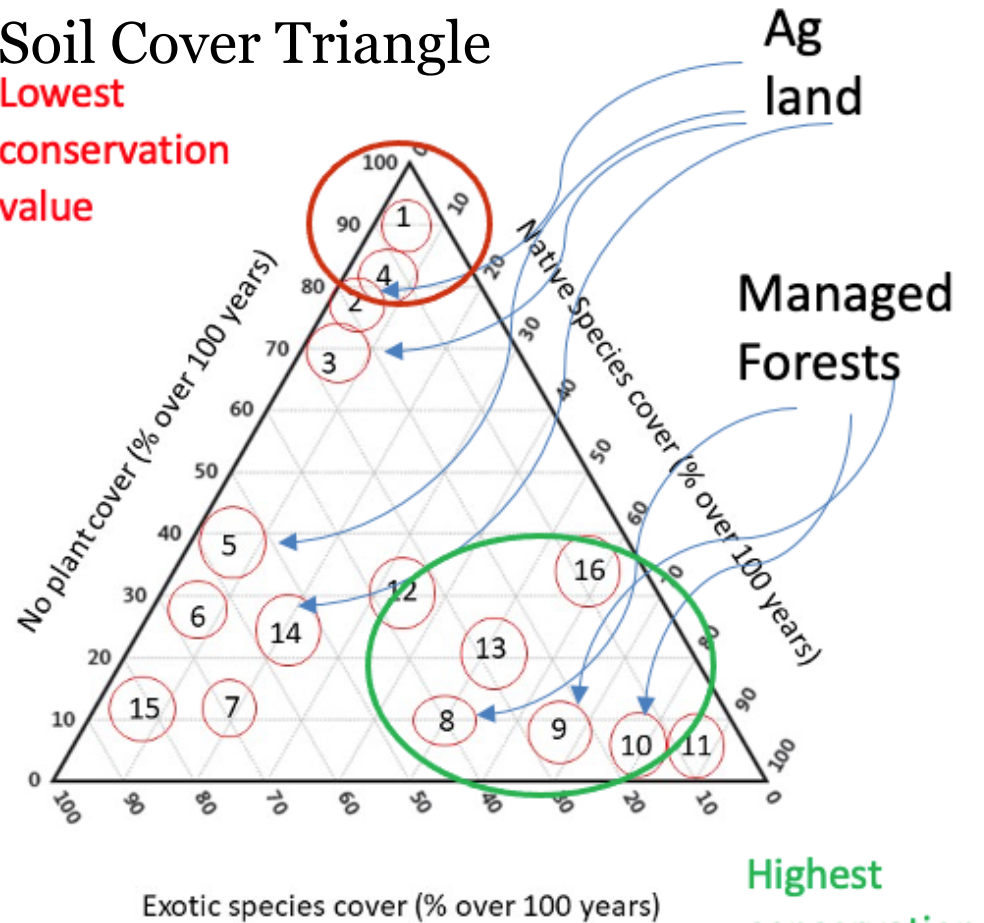
- **Row crops = 30 - 90% bare soil**
- **Managed forests = 1 - 20% bare soil**

Photo: Leopold Center, Iowa State University

Soil cover over 100-year period

The Soil Cover Triangle

Lowest
conservation
value



Exotic species cover (% over 100 years)

Highest
conservation
value

Adapted from DeLuca and Hatten,
2024. Anthropocene



Photo T.H. DeLuca, McDonald-Dunn Forest, Oregon

Sustainability?

Meet human resource needs, provide habitat, store carbon, recreation...

Land use categories and their capacity to provide resources for human needs, habitat for a diversity of species, carbon storage, and recreational activities.

	Resource needs	Habitat	Carbon storage	Recreational value
Urban landscape	High	Low	Low	Moderate
Row crop production	High	Low	Low	Low
Regenerative row crop production	High	Low	Moderate	Low
Oil and gas field	High	Low	Extremely low	Low
Shrublands	Low	Moderate	Low	Moderate
Plantation forest Short	High	Low	Moderate	Low
Plantation forest Long	High	Moderate	High	Moderate
Uneven-age managed forest	Moderate	High	High	High
Preserved native forest	Low	High	High	High
Preserved native prairie	Low	High	High	Moderate

DeLuca and Hatten, 2024. Anthropocene

All biomass has the potential to burn

From Hart et al. 2005; Zouhar 2021

Potential Climax Vegetation	Pre-European Fire Frequency (yrs)
Tallgrass Prairie	1 – 5
Ponderosa pine	2 – 38
Mixed Conifer	6 – 150
Boreal Scots Pine	70 – 250
Cedar-hemlock	60 – > 400
Lodgepole pine	25 – 500
Subalpine-fir & spruce	50 – 350

Indigenous peoples managed with fire for millennia

Example: Historial Fire Frequency, ponderosa pine MT (Barrett, 1981)			
Years	1695 – 1860	1861 – 1910	1911 – 1980
Heavy Use Villages (Bitterroot)	9.1 years	10.8 years	25.9 years



Photo: Rob Mutch



Management & Fuels



1910 fires and the era of fire suppression



97% of fire starts extinguished

The 3% make up the 5-9 million acres of fire in U.S.



1950s – 1970s, heavy harvesting on federal and state lands



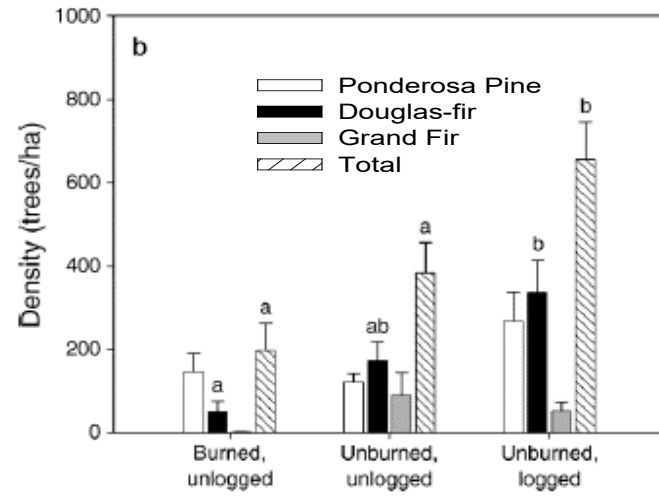
Reduced harvest in 1980s



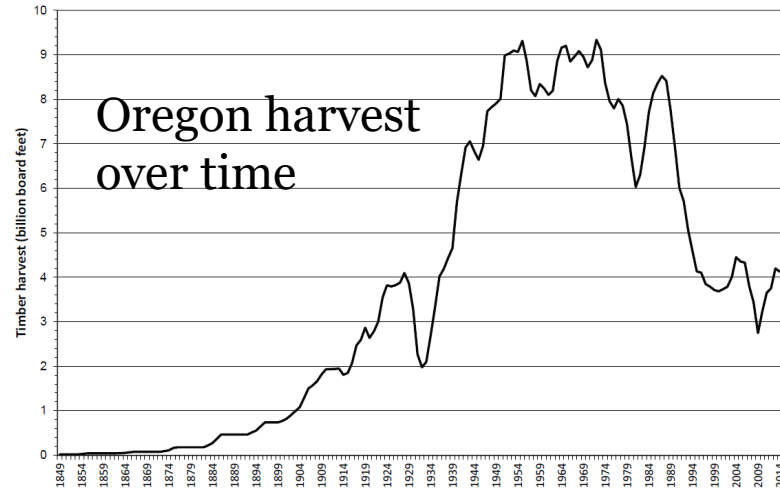
Fuel accumulation = more severe fires



Fire suppression in OR started as early as 1830



Naficy et al. 2010



Simmons et al. 2016. GTR-942



Photos: T.H. DeLuca



Mature forests
can be resilient,
but ladder fuels &
climate change
put them at risk

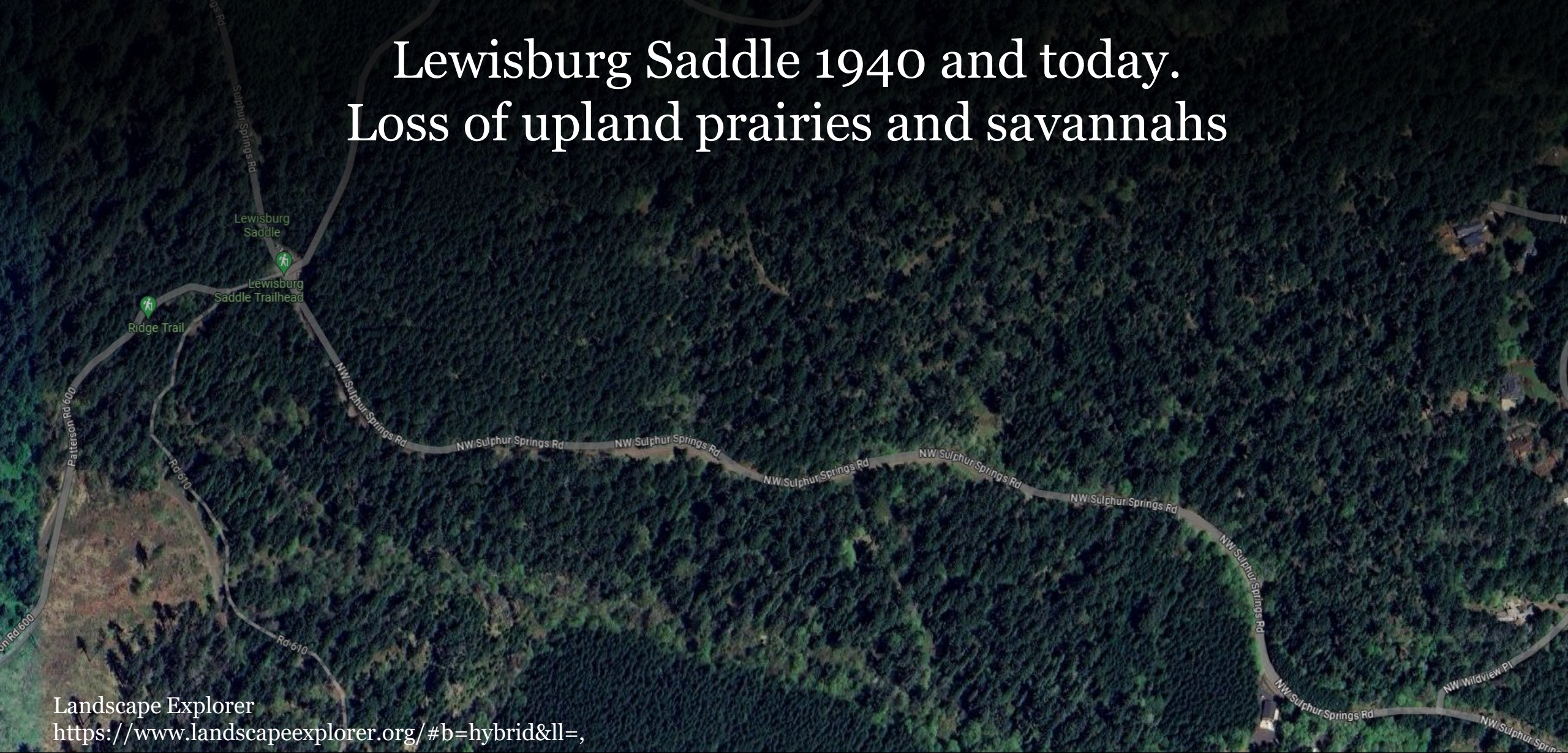
Low severity fires maintained more open forests

- Fire frequency in the Willamette Valley once very high
- Indigenous cultural burning maintained prairies, savannahs, and open conifer forests
- Dendrochronology combined with soil record



Andrew Merschel

Lewisburg Saddle 1940 and today. Loss of upland prairies and savannahs

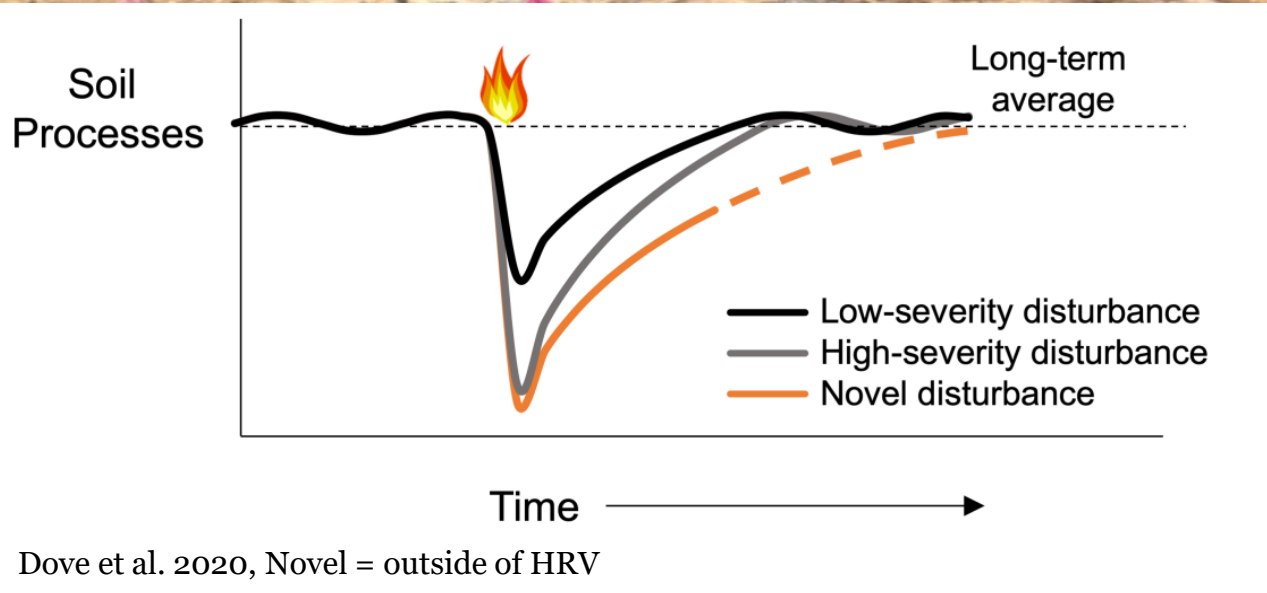


Landscape Explorer
<https://www.landscapeexplorer.org/#b=hybrid&ll=>,

McCulloch Peak, 1940 and today. Huge increase in stocking rate on the MD. Imagine 1840, 1490!



Landscape Explorer
[https://www.landscapeexplorer.org/#b=hybrid&ll=,](https://www.landscapeexplorer.org/#b=hybrid&ll=)



Fire severity and carbon loss

- **Low severity:** Retain seedbank, rapid sprouting, retention of some of O horizon, retention of PyC, quicker recovery
- **High severity:** Loss of seedbank, less sprouting, loss of O horizon, loss of PyC, more runoff, longer recovery

Creating resilience

Eastside:

- Reduce stand density
- Rx fire, cultural burning & ecosystem function

Westside:

- Reconstruct fire history for westside
- Uneven aged management may be more resilient, but less productive
- Even aged forestry at risk with increasing fire, role for hardwoods, species diversity (alder case study)

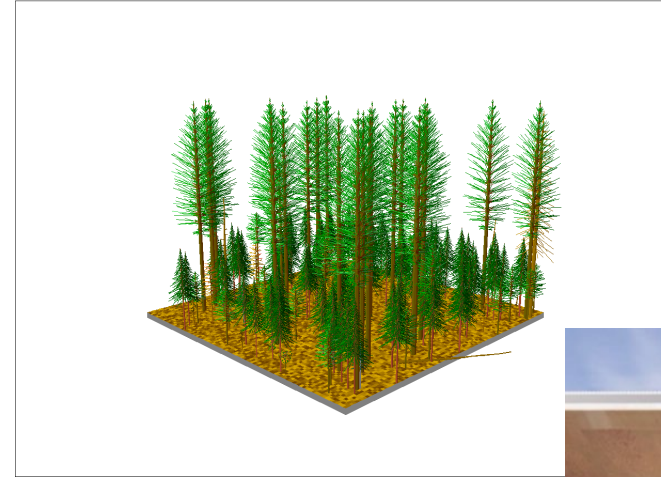


Photo: D. DeLuca

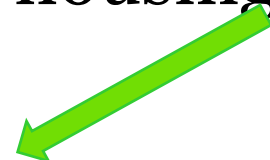
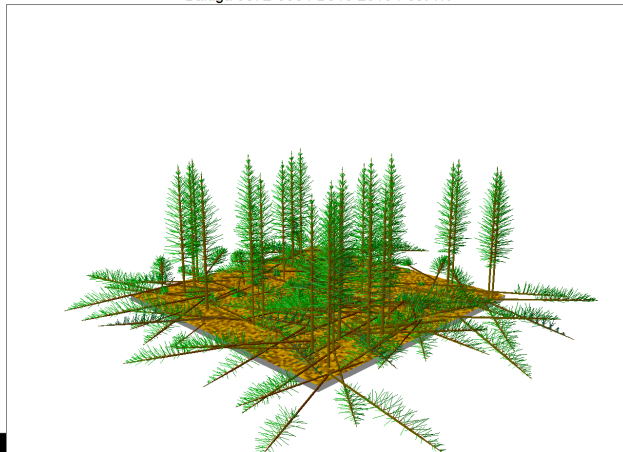
Mass timber, fuels, C storage

- Longer rotations, VRH – more C
 - Incentives?
- EDA – Restoration, less fire more C
 - Low value wood in mass timber
- Smart planning, affordable housing

Baluga 9872-5034 B310 2050



Baluga 9872-5034 B310 2010 Post Trt





Thank You!