Stand Density Management Workshop

March 21-22, 2024

CH2M Hill Alumni Center, Oregon State University, Corvallis, OR

Agenda

Thursday, March 21 – Meeting

7:30 a.m.	Coffee and Check-in
8:00 a.m.	Welcome and introductory remarks
8:15 a.m.	Morning Presentations, Block 1
10:15 a.m.	Morning Break & Snacks
10:45 a.m.	Morning Presentations, Block 2
11:45 a.m.	Wrap-up and review
12:00 p.m.	Lunch (provided)
1:00 p.m.	Scribner Log Rule Discussion Panel
2:30 p.m.	Afternoon Break & Snacks
3:00 p.m.	SSMART talks 1-3
3:45 p.m.	Break
4:00 p.m.	SSMART talks 4-7
5:00 p.m.	Wrap-up & Field-trip Logistics
5:05 p.m.	Adjourn

Friday, March 22 – Field Trip

8:00 a.m.: Meet at the southeast corner of the Reser Stadium parking lot area, close to the intersection of SW 26th St. and SW Western Blvd. Please bring sturdy shoes or boots and a rain/wind jacket. A water bottle is recommended, as is a camera. If you have your own hard hat, please bring it.

- Cut-to-length thinning operation (courtesy Miller Timber Services and Starker Forests)
- Stand density management trials, McDonald-Dunn Forest (Lewisburg Saddle area)
- Cameron Tract: giant sequoia, ponderosa pine, and Douglas-fir

2:00 p.m.: Return to Reser parking lot; conclusion of workshop.

Proceedings

- **Drivers of site-specific controls on carrying capacity**
  Dr. Mark Kimsey, University of Idaho

- **Effects of thinning to varying residual densities on drought resistance, drought resilience, and wood production in Douglas-fir**
  Dr. Matt Powers, Oregon State University

- **Simulated yield and financial implications of different density regimes**
  Doug Mainwaring, Oregon State University

- **Incorporating risk in economic density management decision-making**
  Greg Latta, University of Idaho

- **Causal factors of thinning response across North American commercial conifer forests**
  Dr. Mike Premer, University of Maine

- **Technology in CTL Operations - focusing on data-driven decision-making…what, why and how!**
  Preston Green, Miller Timber Services

- **Discussion panel on Scribner scaling**
  Matt Mattioda, Miller Timber Services

- **Presentations on cutting edge research in forest restoration, supply chain custody, worker safety, and realized material value**
  SSMART Forestry Group

SSMART Forestry Program Speakers

- **Forest Inventory and Wood Procurement Mapping Solutions**
  Dr. Jesse Johnson, University of Montana
  Dr. John Hogland, Region 1, United States Forest Service

- **Forest Workers Health and Safety**
  Dr. Jay Kim, Oregon State University

- **Smart Forestry Technologies for Forest Operations**
  Dr. Woody Chung, Oregon State University
  Dr. Lucas Wells, SilvxLabs

- **Socio-economic Impact Assessment**
  Dr. Yong Chen, Oregon State University
  Dr. Nadia Streletskaya, Oregon State University

- **Mass Timber Manufacturing and Design Specifications**
  Dr. Lech Muszynski, Oregon State University

- **Forest Education and Workforce Training**
  Dr. Kevin Lyons, Oregon State University
  Dr. Francisca Belart, Oregon State University

- **Educational Workforce Training / Smart Forestry Technologies and Operations**
  Dr. Raffaele De Amicis, Oregon State University

Drivers of site-specific controls on carrying capacity

Dr. Mark Kimsey
Intermountain Forestry Cooperative
University of Idaho

Speaker Bio:
Mark Kimsey is Director of the Intermountain Forestry Cooperative and Co-Director of the National Science Foundation IUCRC Center for Advanced Forestry Systems at the University of Idaho. Currently, Mark's work focuses on modeling and mapping tree and stand growth dynamics across multiple scales and regions of the United States. Kimsey enjoys teaching and mentoring the next generation of foresters through his forest biometrics and forest soils courses in the College of Natural Resources. Mark serves as the Western Region representative to the SAF Forest Science and Technology Board and is SAF A-1 working group Chair-Elect.

Session Abstract:
Maximum Stand Density Index modeling of site-species relationships will be explored relative to forest conditions (climate, topography, geology) across westside and eastside forests. Current and future modeling efforts will be discussed relative to climate change projections and its potential impact on forest carrying capacity. End-user MaxSDI online applications will be demonstrated along with other MaxSDI modeling initiatives by the Intermountain Forestry Cooperative.

Effects of thinning to varying residual densities on drought resistance, drought resilience, and wood production in Douglas-fir

Dr. Matt Powers
Department of Forest Engineering, Resources and Management
Oregon State University

Speaker Bio:
I am an Assistant Professor of Silviculture at Oregon State University. My work focuses on developing innovative science and educating students, forest managers, and forest scientists to promote resilient forest ecosystems capable of providing sustainable levels of a wide range of ecosystem services to meet the diverse and changing needs of landowners and society. I conduct research in the areas of silviculture and applied forest ecology focused on understanding how silvicultural practices and natural disturbances affect leaf to landscape-level processes that influence a variety of resource management outcomes including wood production, carbon storage, conserving biodiversity, and fostering adaptive responses to the effects of climate change and associated disturbances.

Session Abstract:
Drought frequency and severity are projected to increase in many coastal Douglas-fir forests, contributing to potential declines in productivity and increases in mortality. Thinning often increases drought resistance and resilience, but these effects vary with thinning intensity, shift over time, and may have tradeoffs with fiber production. We used annual growth data from trees in a long-term thinning study with four residual density levels replicated across both uniform thinning and thinning with gaps to investigate responses to droughts occurring 8 and 21 years after thinning. For the first drought, both drought resistance and resilience were higher in treatments with lower residual densities. For the second drought, there were no differences in drought response between the lowest and highest residual density treatments, and all treatments had lower drought resistance and resilience than for the first drought. Thinning pattern (uniform thinning vs. thinning with gaps) had little impact on drought resistance or resilience, but residual density level had a significant effect on the periodic annual volume increment—drought resistance tradeoff. Our results suggest that thinning can promote short to medium-term drought adaptation in Douglas-fir forests, but these effects dissipate over time and may be associated with small tradeoffs in wood production at higher thinning intensities.

Simulated yield and financial implications of different density regimes

Doug Mainwaring
Department of Forest Engineering, Resources and Management
Oregon State University

Speaker Bio:
With degrees from the University of Oregon (1990, Chemistry) and Oregon State University (2000, Forestry), Mainwaring has been at OSU since 2001, and with the Center for Intensive Planted-forest Silviculture since its inception. His professional interests include pursuing a wide variety of questions of practical relevance to CIPS members, and getting enough field time to fact-check what would otherwise only appear on a computer screen.

Session Abstract:
Five-year old operational plantation data was projected with CIPSANON, comparing simulations of unthinned plantations to the same plantations pre-commercially thinned at age 8, 10, or 12 years to three residual densities (225, 275, or 325 TPA), or commercially thinned to 225 TPA when crown ratios had receded to 50%. Financial analysis of the output found that although early density control through pre-commercial or commercial thinning can be useful for growing larger trees/logs or creating a variety of stand structural attributes, given the current log price breaks, such treatments generally result in a decrease in the internal rate of return. For stands subjected to a pre-commercial thin, early entry and a lighter touch are financially beneficial. Recognizing that accurate financial analysis must account for innumerable variables not necessarily accounted for here, yield estimates from these simulations will be made available upon request.

Incorporating risk in economic density management decision-making

Greg Latta
Policy Analysis Group, Department of Natural Resources and Society
University of Idaho

Speaker Bio:
Latta is a Research Associate Professor of Forest Economics and Director of the Policy Analysis Group at the University of Idaho. Dr. Latta's research focuses on the application of economic optimization models for policy analysis, with extensive experience in the forestry, land use, bioenergy, and climate policy domains. He holds a bachelor's degree in economics from the University of California at Santa Barbara, a master's degree in forest resources from Oregon State University and a Ph.D. in forest and resource economics from the Norwegian University of Life Sciences.

Session Abstract:
Density management is one of the primary tools a forester must consider as he/she develops a silvicultural plan addressing ecological and economic outcomes. The decision to alter stand density through actions like thing affect not only current stand conditions, but also place the stand on a different trajectory affecting all potential future ecological and economic outcomes. This talk will address the typical components of deriving such a plan including growth and yield, log merchandizing and prices, harvesting costs, and rotation ages. It will then layer in how risks relating to things like fire, forest health, and policy can be included in a silvicultural plan derivation. The concepts will be articulated in an example of whether or not to thin a Douglas-fir forest stand and how that decision affects log grades and residual tree diameters, logging costs, rotation age, and net present value. Though simple in nature, the example highlights a simple way forest managers can evaluate and address the consequences of risk on the ecological and economic viability of their silvicultural plans.

Causal factors of thinning response across North American commercial conifer forests

Dr. Mike Premer
School of Forest Resources
University of Maine

Speaker Bio:
Mike Premer is an Assistant Professor of Forest Management at the University of Maine. He holds a B.A. in Environmental Science from Northeastern Illinois University, a Master of Forestry and PhD in Forest Science from Michigan Technological University in the Upper Peninsula of Michigan. From 2017-2022 he worked as Forest Research and Development Coordinator, and Manager of Silviculture Research for Rayonier Inc. based out of Olympia, Washington. His work focuses on quantifying site-vegetation dynamics and precision forest management, specifically, digital soil and vegetation mapping, strategic diversification of managed forested landscapes, and planted-forest silviculture.

Session Abstract:
Thinning is a common silvicultural method for production of timber commodity goods, stimulation of tree regeneration, stand quality improvement, and enhancement of forest C sequestration. While a rich collection of research has examined thinning practices under a variety of timing and intensities, questions remain regarding the relative influence of edaphic, climatic, and physiologic mechanisms on the duration and magnitude of tree response to thinning across the working forest regions of North America. Therefore, quantifying the site-specific limiting factors to growth is imperative to adaptative management strategies and appropriate silviculture. In emerging studies, tree ring stable isotopes ($\delta^{13}C$ and $\delta^{18}O$) and remote sensing-based estimates of site water availability have independently been used to disentangle the influential factors of silvicultural treatments and site conditions on stem growth response and water use efficiency. This project leverages regional plot networks in working forests of the Pacific Northwest, Inland Empire, Southeast, and Northeast regions that have been established for thinning research programs in the past. The overall goals of this work are to quantify the causal mechanisms of thinning response through the integration of tree-ring stable isotopes with high spatiotemporal resolution remote sensing estimates of evapotranspiration across commercial conifer forests of the U.S. Findings from this work can offer insight to the limiting factors of site carrying capacity and thinning response, leading to refined site-specific density guidelines, silvicultural planning, and C sequestration.

Technology in CTL Operations - focusing on data-driven decision-making…what, why and how!

Preston Green
Assistant Vice President of CTL Systems
Miller Timber Services

Speaker Bio:
Preston Green currently serves as the Assistant Vice President of CTL Systems and Director of University Outreach for Miller Timber Services in their Cut-to-Length (CTL) Division. Preston started with Miller Timber Services in December of 2018 while completing two master's degrees at Oregon State University. From 2016 to 2019 Preston worked on a Master of Science in Sustainable Forest Management and a Master of Business Administration in Supply Chain and Logistics Management, completing both with Honors. His graduate work in forestry was centered around exploring the economic and environmental impacts of steep-slope harvesting in the western US. With Miller Timber, Preston helps oversee all aspects of operational and strategic management for the company's fleet of over 50 Ponsse machines, and is the technical lead for collecting and analyzing harvesting productivity and simulation data on the same fleet.

Session Abstract:
Though sometimes characterized as slow to change, innovation continues to drive improvements and efficiencies in harvesting practices in the timber industry. On a worldwide scale, cut-to-length (CTL) harvesting accounts for over half of the way wood is harvested today. And that number continues to grow. As CTL harvesting grows in technology, it's unique applications and technologies adapted from other disciplines make it a continuously adaptable platform to many different silvicultural objectives. Miller Timber Services is known world-wide for not only its large fleet and application of Ponsse CTL systems, but also for its innovative applications of CTL machines. This presentation focuses on the Ponsse machine's ability to traverse steep terrain, technology in place to maximize value recovery, and innovative tools available in Miller Timber's fleet of over 50 Ponsse machines.

Discussion panel on Scribner scaling

Matt Mattioda
Senior Vice President, CTL Systems/Chief Forester
Miller Timber Services

Speaker Bio:

Matt earned his B.S. in Forest Management from Oregon State University in 1995. He has worked for Willamette Industries, Jeld-Wen, and his family's construction business. Since 2010, Matt has been with Miller Timber Services and is currently Chief Forester and Senior Vice President of CTL Systems. This position finds him working in Oregon, Washington, and California for a variety of private and public landowners. Matt is a member of the Society of American Foresters. In 2017 he was in the Pioneer Class of REAL Oregon (Resource Education for Agricultural Leadership) and is now on the Board of Directors of REAL. Matt is also on the Board of Directors of the Oregon Logging Conference.

Session Abstract:

The Scribner log rule, devised in 1846, has a long history of use in the Pacific Northwest. The utility of this log rule has been debated and commented upon since at least the 1950s, and this discussion continues today. This panel will discuss the utility of the Scribner log rule in the face of changing markets, smaller log sizes in contemporary harvesting, improved harvest and milling technologies, and other considerations.