

Science You Can Use *in 5 minutes*

Multi-Age, Multi-Use: Tips for transforming Rocky Mountain ponderosa pine forests from even-aged to multi-aged structures

Have you ever looked at a towering ponderosa pine forest and wondered how old the trees are? Were all the trees of a similar age, known as an “even-aged structure,” such as often results from a reforestation effort where all the seedlings were planted at the same time. Or were there a mixture of young and old trees? That sort of “multi-aged structure” in ponderosa pine forests is desirable as it can meet many of the goals of multi-use land management. A forest stand with different-aged trees can support timber production, livestock grazing, recreation opportunities, wildlife habitat, and native plant diversity.

Until recently, the steps that a silviculturist could take to move a forest in that direction were vague, and multi-aged practices were often incorrectly perceived

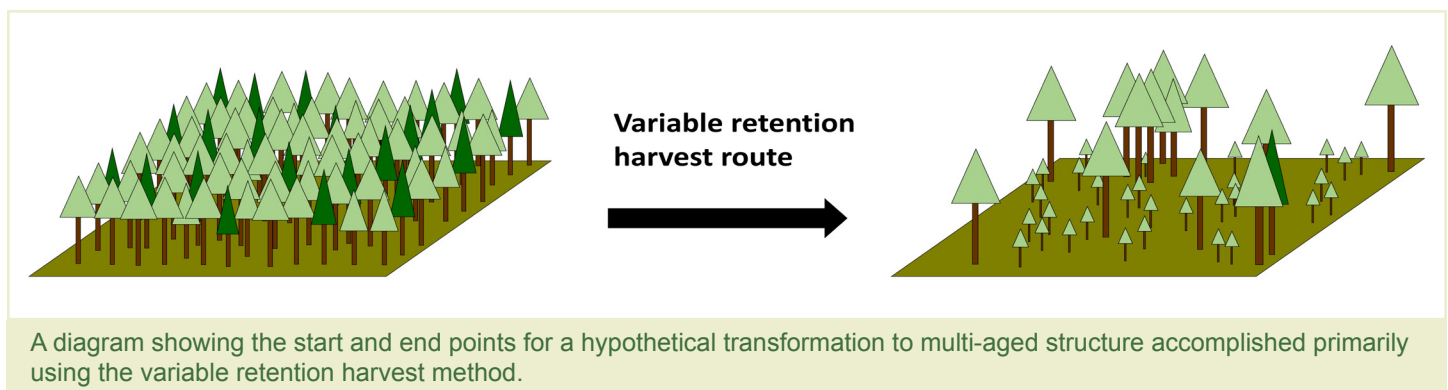
as inherently complex, rigid, or unsuited to a shade-intolerant species.

Additionally in some regions it has been tough for silviculturists to learn the skills needed to create a multi-aged structure because there simply aren’t many good examples to learn from. Now, a new practical [guidebook](#) fills this gap.

To help silviculturists transform even-aged ponderosa pine forests to multi-aged structures, Neil Williams (a postdoctoral fellow with the Oak Ridge Institute for Science and Education) and Justin Crotteau (a research forester with Forest Service Research and Development) worked with Forest Service colleagues to create a new guidebook. Their ‘how-to’ enables managers to plan and visualize forest

transformations from multiple angles while responding and adapting to the unexpected. The authors’ goal is to help guide land managers through the forest transformation process and show that multi-aged silviculture in ponderosa pine stands doesn’t need to be cumbersome and resource intensive.

Transformation is a process that begins with an “existing condition” and is complete when the desired multi-aged structure, the “desired future condition”, has been reached. But these starting and ending points may look very different from one forest stand to the next. The guidebook addresses this variability by exemplifying a range of common “existing condition types” and some of the diverse potential “future



conditions” that can be maintained in ponderosa pine forests.

Later chapters describe the wide range of silvicultural practices that can be used to build a transformation sequence that links the existing condition to the desired future condition. This includes methods for regenerating new ponderosa pine, tending existing trees in the stand, and controlling stand density. Methods range from “light touch” treatments that simplify managing multi-aged stands, to more complex approaches. The authors also include hypothetical examples and real-world case studies showing ponderosa stands 10 to 30 years into the multi-aged structure transformation process.

The printer-friendly guidebook contains reference pages that can be used in the field. Although it is centered on the Northern Rocky Mountains, the content is adaptable throughout ponderosa pine’s range across inland western North America. “This is a guidebook we hope will reduce complexity and perceived red tape to encourage foresters that they do have the skills and knowledge to make transformational changes in forest structures already,” said Crotteau.



A multi-aged ponderosa pine stand at Primm Meadow, MT, managed by The Nature Conservancy. Many cohorts of trees of widely varying age are present in the overstory, stand density is low, and the spatial structure is variable. Forest Service photo by Neil Williams.

Management Implications

- Multi-aged silviculture is suitable for ponderosa pine stands, and transformation to a multi-aged structure is achievable.
- There is no single “best” transformation strategy, but awareness of the wide range of silvicultural tools, knowledge of species and site characteristics, and flexibility to adapt to the unpredictable are useful.
- A huge variety of potential multi-aged stand structures can be conceived to match the wide range of conditions and contemporary management objectives found in ponderosa pine forests.

Featured Scientists

[Neil Williams](#) is an Oak Ridge Institute of Science and Education Postdoctoral Fellow at the U.S Forest Service, Rocky Mountain Research Station.

[Justin Crotteau](#) is a Research Forester with the U.S Forest Service, Rocky Mountain Research Station.

[Sharon M. Hood](#) is a Research Ecologist with the U.S Forest Service, Rocky Mountain Research Station.

[Annabelle Moore](#) is the author of this Science You Can Use.

Further Reading

Williams, Neil G.; Crotteau, Justin S.; Hood, Sharon M.; Hartless, Cheri; Fox, Shelagh. 2026. [Silvicultural transformation to multi-aged structures in northern Rocky Mountain ponderosa pine stands](#). Gen. Tech. Rep. RMRS-GTR-446. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 238 p.

Fox, S.; Hartless, C.; Hood, S., Crotteau, J., 2022. [Transitioning from even-aged to multi-aged forest structure in second-growth ponderosa pine](#). In: Jain, Theresa B.; Schuler, Thomas M. [comp.]. 2022. In: Foundational concepts in silviculture: Emphasis on reforestation and early stand improvement – Proceedings: 2022 National Silviculture Workshop; 2022 July 12-14; Kellogg, ID. Proceedings RMRS-P-80. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 4 p.



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