The Theoretical and Empirical Basis for Understanding the Impact of Thinning on Carbon Stores in Forests

Mark E. Harmon

Presentation Abstract

Thinning of forests has been proposed as a means to increase the carbon stores of forests. The justification often offered is that thinning increases stand productivity, which in turn leads to higher carbon stores. While thinning of forests clearly increases the growth of residual trees and increases the amount of harvested carbon compared to an unthinned stand, there is little theoretical or empirical basis for believing that this activity increases the average carbon stores of forests. By removing trees, leaf area is temporarily decreased and carbon input to the forest via photosynthesis is also temporarily decreased. In theory, reducing the input of carbon to a forest will reduce its average carbon stores. Moreover, by increasing the amount of carbon harvested over a rotation, a greater proportion of carbon is removed, which general ecosystem theory also predicts will lower average carbon stores.

The few empirical studies that have examined long-term impact of thinning on carbon stores have indicated that as thinning intensity increases either in amount or frequency, the average long-term carbon store decreases. Simulation models indicate very similar trends. Both results are in line with predictions from general ecosystem theory. Despite the finding that thinning reduces average carbon stores relative to not thinning, this management practice may lead to increases of carbon stores compared to a system of clearcut harvesting. By replacing clearcut harvesting with a series of partial harvests, carbon stores in forests could be increased significantly.

Keywords: thinning, uneven-aged management, regeneration, structural diversity, species diversity, Douglas-fir.

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Mark E. Harmon is a professor, Department of Forest Ecosystems & Society, Oregon State University, Corvallis, OR 97331; mark.harmon@oregonstate.edu.

Western Washington and Oregon Elk Foraging: Use and Nutritional Value by Vegetative Life-form

John G. Cook and Rachel C. Cook

Presentation Abstract

Recent research and modeling of Elk (*Cervus elaphus*) habitat selection and nutrition is establishing the key importance of nutritional value of plant communities (NV, e.g., digestible energy and protein of forage in ungulate diets) to habitat use and productivity of Elk herds in