Comparison of the effects of even and uneven-aged forest management on biodiversity: a meta-analysis.

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Clearcut is a dominant harvesting method in many areas and can negatively affect biodiversity through reducing habitats suitable for old forest species. This has motivated developing alternative forest management methods that better maintain or even enhance biodiversity. Perhaps even more importantly, clearcut is also perceived negatively by the public, creating significant pressure to change harvesting practices. One response has been increased usage of retention forestry, where up to ca. 30% of trees are left during the logging operation. Reviews find that this method has generally positive effect on many species but is not so beneficial for species requiring more closed forest conditions. Therefore, methods leaving more trees uncut have been also promoted and employed.

Selective cutting, which is one of the many terms used to describe partial cutting that is used to create and manage the uneven-aged forest, is a logging method that always leaves at least ca. 30% of trees unharvested. However, it is not clear weather uneven-aged forest management is better for biodiversity compared to even-aged forest management. The aim of this work is to review the literature and gather quantitative data and evaluate the effects.

There is no globally used term to describe partial cutting and very many different terms are used. This makes finding relevant articles difficult and studies often claim that there is a lack of studies. It motivated us to first perform a systematic search for terms used to describe partial cutting and uneven-aged forestry so that we could capture as much relevant literature as possible. We found 70 different expressions and used them is search in combination with terms describing clearcutting and forest, not restricting the search for biodiversity. The search resulted in 3219 papers. Abstracts of these papers were screened and 411 papers were found relevant. The full-text evaluation identified 90 studies directly comparing the effects of clearcut to partial cut.

At first, we performed a qualitative review that highlighted the importance of landscape context. Biodiversity declines when one type of management dominates and variation in the management in the landscape scale is the best way to maintain and improve biodiversity. Generally, clearcuts are used by species preferring open habitat and partially cut forest by species preferring closed habitat. The level of the retained canopy that is necessary for maintaining closed forest species after harvest varies greatly between species and guidelines have to be area specific.

While performing the qualitative review we saw that it is possible to also extract data for a quantitative analysis. Currently, we are extracting data to perform a meta-regression to explore the effects of these management systems in detail.

We would be very glad to present these findings at the second CEE international conference in Paris in April.