



## **Small, protected habitat patches within boreal production forests contribute to biodiversity conservation**

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**Small, protected habitat patches have a higher number of species and more deadwood than surrounding production forest areas although the number of individuals is similar. They have a similar number of species and individuals and deadwood volume compared to natural forests. However, species assemblages in small, protected habitat patches differ from both natural and production forests, which means they are not a substitute for larger protected areas.**

Photo: Maiju Peura

### **Why is this Evidence Synthesis Needed?**

Globally, the network of protected areas is considered inadequate to maintain species assemblages and establishing new protected areas is not possible in the magnitude needed for maintaining biodiversity. Therefore, conserving biodiversity in production forests has become increasingly important. Preservation of small patches of important habitats was introduced as a tool for biodiversity conservation in early 1990's, but has it been effective in practice? In this systematic review, small, protected habitat patches are compared to production forests and natural forests to assess effectiveness of the practice. Four aspects of biodiversity are examined: number of species, individual abundances, similarity of species assemblages, and the amount of deadwood, which is a key resource for many threatened species.

This Collaboration for Environmental Evidence systematic review examines if small, protected habitat patches within boreal production forests are effective in conserving biodiversity. The review summarises evidence from 61 studies on species richness, 34 studies on individual abundance, 27 studies on the amount of deadwood, and 44 studies on species assemblages.

## Main Findings

### *What studies are included?*

This review includes studies that evaluate the effectiveness of small, protected habitat patches to maintain biodiversity within production forests. A total of 174 studies from the period 2000 to 2019 were included in the final analysis. These studies were mostly carried out in Sweden, Finland and Norway. 65% of them compared biodiversity between small habitat patches and production forests while the rest were comparisons between small habitat patches and natural forests. Number of species was the focus in 61 studies, species assemblage in 44, number of individuals in 39, and deadwood volume in 27 studies. Most studied groups were fungi and vascular plants followed by bryophytes.

### *Are small, protected habitat patches effective in conserving biodiversity within production forests?*

In short, the answer is yes. Small habitat patches have more species and deadwood than production forests although the number of individuals is similar. The number of species and individuals in small habitat patches is similar to natural forest but their species assemblages differ. Similarly, species assemblages are different between small habitat patches and production forests.

### *What factors influence biodiversity?*

Species have a similar response to moderate and high management intensity of the surrounding production forest. None of the studies reported light management intensity so its influence could not be assessed. The owner of the forest (private or company) or age of the forest (>50 years) has no influence on the number of species, but the evidence is based on a limited number of studies.

## What are the Implications of the Review Findings?

There were more species and deadwood in small habitat patches than in production forests which indicates that setting aside small, protected habitat patches helps to protect biodiversity in production forests. However, species assemblages differed between small habitat patches and natural forests meaning that small habitat patches cannot be considered as a substitute for large natural forests like national parks and reserves.



Small habitat patches do, however, complement the protected area network and may increase connectivity between larger reserves by providing habitats for species with restricted dispersal abilities. The majority of the studies focused on rare and indicator species or species associated with deadwood, which means the results cannot be straightforwardly generalised to all species. However, because the purpose of setting aside small habitat patches is to protect especially rare species, the results indicate the success of achieving this target. More research is needed across the whole boreal forest biome, and on different species groups, especially studies on mammals and birds. Also, the evidence base for assessing the influence of environmental factors, such as management intensity, on biodiversity is limited and more research is recommended.



Photo: Sini Savilaakso

## Synthesis Time Frame

The review authors searched for studies published between 1990 and 2019. This CEE Systematic Review was published in January 2021.

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