

## Patterns and consequences of local-scale plant biodiversity change over time

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Biodiversity is in decline at the global scale, and it has been assumed that such declines are also manifested at the local scale—that is, the scale at which species interact, and therefore at which biodiversity impacts the functioning of ecosystems. However, because local species losses can be countered by immigration of species from elsewhere, global biodiversity loss need not translate into local biodiversity loss. Studies from my lab using re-surveys of decades-old vegetation plots on Vancouver Island and in southern Québec reveal some decreases but also pronounced increases in plant species diversity over the past four decades. More broadly, our global meta-analysis of > 150 studies and > 16,000 repeat-survey vegetation plots from all major terrestrial ecosystem types across the globe, revealed no net temporal change in local-scale plant species richness (median plot size = 44m<sup>2</sup>) over the past century. These results have important implications for our interpretation of the hugely influential small-scale experimental studies showing that ecosystem function (e.g., productivity) declines as species are lost from an ecosystem. Specifically, since there is no general tendency for plant biodiversity declines in the real world at the relevant scales, the results of such experiments do not provide a strong scientific basis to make a general argument that ecosystem function should be a strong motivation for large-scale biodiversity conservation. On a more speculative note, if we view ecological communities as complex adaptive systems, the types of real-world community composition changes we see under heavy anthropogenic influence (e.g., in urban areas or places experiencing marked climate warming) may often enhance rather than impair ecosystem function.

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