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The development of an approach to assess critical loads of acidity for woodland habitats in Great Britain

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Abstract. Alongside other countries that are signatories to the UNECE Convention Long Range Transboundary on Air Pollution, the UK is committed to reducing the impact of air pollution on the environment. To advise and guide this policy in relation to atmospheric emissions of sulphur and nitrogen, a critical load approach has been developed. To assess the potential impact of these pollutants on woodland habitats a steady state, simple mass balance model has been parameterised. For mineral soils, a Ca:Al ratio in soil solution has been used as the critical load indicator for potential damage. For peat and organic soils critical loads have been set according to a pH criterion. Together these approaches have been used with national datasets to examine the potential scale of acidification in woodland habitats across the UK. The results can be mapped to show the spatial variability in critical loads of the three principal woodland habitat types (managed coniferous, managed broadleaved/ mixed woodland and unmanaged woodland). The results suggest that there is a wide range of critical loads. The most sensitive (lowest) critical loads are associated with managed coniferous followed by unmanaged woodland on peat soils. Calculations indicate that at steady state, acid deposition inputs reported for 1995–1997 result in a large proportion of all the woodland habitats identified receiving deposition loads in excess of their critical load; i.e. critical loads are exceeded. These are discussed in relation to future modelled depositions for 2010. Whilst significant widespread negative impacts of such deposition on UK woodland habitats have not been reported, the work serves to illustrate that if acid deposition inputs were maintained and projected emissions reductions not achieved, the long-term sustainability of large areas of woodland in the UK could be compromised.

Keywords: critical loads, acid deposition, acidification, woodland, simple mass balance model, sustainability

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