

Updates to trends in UK critical load exceedances, May 2015

Critical loads are defined as thresholds below which significant harmful effects on sensitive habitats do not occur, according to present knowledge. When pollutant loads (atmospheric deposition) exceed the critical load, it is considered that there is a risk of harmful effects to sensitive habitats. Approximately 78,000km² of terrestrial habitats are considered to be sensitive to acid deposition, and 73,000km² sensitive to nitrogen deposition (eutrophication), with much of this area sensitive to both. The excess deposition above the critical load is referred to as the “exceedance”. Decreasing pollutant deposition below the critical load is seen as a means for preventing the risk of damage. Where exceedance remains, reductions in the magnitude of exceedance may also benefit sensitive habitats and could favour some species to return, especially those where conditions are only just unsuitable.

The trends in critical loads exceedances are based on 1x1 km national critical loads data and 5x5 km national pollutant (sulphur and nitrogen) deposition maps. A rolling three-year average of deposition is used to calculate the exceedance of critical loads. The deposition data sets for 2004 to 2013 have been updated following research by NERC CEH and Defra (report under review). The research assessed the current DELTA sampler configuration’s specificity for HNO₃ measurement and showed additional sampling of other atmospheric oxidised nitrogen species (HONO, N₂O₅, ClNO₂). From the research a correction factor has been obtained and applied to the HNO₃ concentrations used in the CBED mapping. Hence the trends in critical loads exceedances for the period 2004-06 to 2011-2013 have also been updated. The percentage area of habitat with exceedance of critical loads is a useful metric but can be insensitive to changes between years, as the area exceeded can remain the same, even if there is a change in the magnitude of the exceedance. The “Average Accumulated Exceedance” (AAE) averages the exceedance across the entire habitat area and gives an indication of change in the magnitude of exceedance even if the area exceeded remains the same.

The trend results show that the area of sensitive habitats exceeding acidity critical loads has decreased by 28.1% (from 72.6% to 44.5%) from 1996 to 2013; over this timescale the magnitude of exceedance (AAE) has more than halved. During the same period, the area of sensitive habitats where eutrophying pollutants (ie, nutrient nitrogen) exceed critical loads has fallen by 12.5% (from 75% to 62.5%) and the AAE across the UK has decreased by 3.3 kg N ha⁻¹ year⁻¹.

AAE is calculated as:

(exceedance * exceeded habitat area) / (total sensitive habitat area)