

England Biodiversity Indicators 2020

This document supports

19a. Air pollution

**Technical background document:
Advice on the trends in acidity and nutrient nitrogen
critical load exceedances**

For further information on the England Biodiversity Indicators visit
<https://www.gov.uk/government/statistics/england-biodiversity-indicators>

Updates to trends in UK critical load exceedances

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 18,000 square kilometres of UK terrestrial habitats are considered to be sensitive to acid deposition, and 20,000 square kilometres 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 to below the critical load reduces the risk of damage even when critical load has previously been exceeded. Where exceedance remains, reductions in the magnitude of exceedance may also benefit sensitive habitats and could allow some species to return, especially those for which conditions are only just unsuitable.

The trends in critical loads exceedances are based on 1 times 1 kilometre national critical loads data (<http://www.cldm.ceh.ac.uk>) and 5 times 5 kilometre national pollutant (sulphur and nitrogen) deposition maps (<http://www.pollutantdeposition.ceh.ac.uk>). A rolling 3-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 and the report can be viewed on the [NERC website](#). The research assessed the current DELTA sampler configuration’s specificity for nitric acid measurement and showed additional sampling of other atmospheric oxidised nitrogen species (including nitrous acid, dinitrogen pentoxide, and chloronitrite). From the research a correction factor was obtained and applied to the nitric acid concentrations used in the CBED mapping. Hence the trends in critical loads exceedances for the period (2004 to 2006) to the period (2011 to 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, since 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 so gives an indication of change in the magnitude of exceedance.

AAE is calculated as:

(exceedance times exceeded habitat area) divided by (total sensitive habitat area)

The trend results show that the area of sensitive habitats exceeding acidity critical loads decreased from 77 percent in 1996 to 58 percent in 2017; over this timescale, the magnitude of exceedance (AAE) has fallen by two-thirds (from 1.33 keq per hectare per year in 1996, to 0.41 keq per hectare per year in 2017). During the same period, the area of sensitive habitats where eutrophying pollutants (i.e., nutrient nitrogen) exceed critical loads fell slightly from 98 percent to 95 percent and the AAE across England decreased by 7.5 kilogram to 11.5 kilogram of nitrogen per hectare per year.