

Science for Environment Policy

Sulphur and nitrogen pollution falling - but still harming ecosystems

European emissions of sulphur and nitrogen pollution have fallen greatly in recent decades, a new report shows. However, even at present levels they harm sensitive ecosystems, and will continue do so for some years to come.

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www.eea.europa.eu/publications/effects-of-air-pollution-on

Contact:
Anke.Luekewille@eea.europa.eu

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Air pollution damages ecosystems as well as human [health](#). Sulphur and nitrogen are both acidifying air pollutants which travel long distances, affecting water, forests, grasslands and buildings. They were responsible for the acid rain that killed many fish and damaged forests in the 1960s and 1970s. Nitrogen also causes eutrophication – an excess of nutrients – that can disrupt some ecosystems. Key sources of sulphur and nitrogen include coal or petrol combustion, and agricultural fertiliser.

The report, from the [European Environment Agency](#), presents an evaluation of the effects of nitrogen and sulphur air pollution on Europe's ecosystems between 1880 and 2030, using pollution data from the [European Monitoring and Evaluation Programme \(EMEP\)](#). The EMEP provides models and observations to support European air policies.

The study assessed the proportion of sensitive ecosystems (as defined by the [European Nature Information System \(EUNIS\)](#) Habitats classification system) which have been, or will be, exposed to levels of pollution that exceed 'critical loads'. A critical load is the maximum exposure to one or more pollutants that an ecosystem can tolerate without damaging its function or structure.

The results show that acidification has fallen significantly since its peak in 1980, thanks to cuts in sulphur pollution. In 1980, critical loads for acidification were exceeded in 43% of sensitive ecosystems, in terms of area, in all 28 countries that make up the EU today. In 2010, just 7% of the EU-28's ecosystem area was affected by exceeded critical loads. By 2020, the study predicts that figures will return to 1880 levels, with just 4% affected.

This latter result assumes that the amended [UNECE's Gothenburg Protocol](#) will be fully implemented by 2020. This protocol sets national limits for key pollutants, including sulphur, nitrogen oxides and ammonia. It was revised in 2012 with new targets for 2020, and is implemented in the EU through the [National Emission Ceilings Directive](#) (currently under revision).

Eutrophication peaked in 1990, according to the study. At this time, 79% of the EU-28's ecosystem area suffered from exceeded critical loads for eutrophication. In 2010, 63% of the EU-28's ecosystem area was affected. If the revised Gothenburg Protocol is implemented by 2020, the percentage of affected area will drop to 54%.

Even if all 'maximum technically feasible reductions' are applied by 2030, nitrogen pollution will still be above safe levels of nutrients, putting 51% of the EU-28's ecosystems at risk of eutrophication.

The study ran separate calculations for [Natura 2000](#) sites. Patterns and figures for acidification and eutrophication broadly matched those of the EUNIS ecosystems. In 2030, 2% of Natura 2000 sites will experience exceeded critical loads for acidification, results indicate. Sixty-one per cent will have critical loads for eutrophication exceeded.

Legislation, a decline in heavy industry and technological improvements have reversed the trend for increased sulphur emissions in an industrialised society. Encouragingly, nitrogen pollution is also falling. However, it appears that it will still be emitted at levels that are harmful to plants and animals for at the least the next 15 years.

