

Nitrogen Deposition and Natura 2000

Science and practice in determining
environmental impacts



Nitrogen deposition is a major threat to European biodiversity, including sensitive habitats and species listed under the Habitats Directive

Results of an international workshop that reviewed
science, assessment procedures and policy

Scientific evidence

There is convincing evidence of nitrogen deposition impacts on (semi-) natural habitats across Europe, but there is also a high spatial variability in the magnitude of nitrogen deposition and its impacts on the Natura 2000 network. The latest scientific evidence:

- provides a clear picture of the scale of the threat from nitrogen deposition;
- demonstrates the different effects caused by the various forms of reactive nitrogen compounds, for example, ammonia versus nitrogen oxides and dry versus wet deposition;



Examples of plant species in a Natura 2000 site - Portugal

© T. Dias

- supports and strengthens the use of critical loads and critical levels as effects thresholds at the European and site levels.

Implications for the Habitats Directive



Harmonisation of nitrogen deposition impact assessment methodologies is required across Europe

© K. E. Nielsen

Conservation Status

The Habitats Directive promotes the maintenance of biodiversity and requires Member States to take measures to maintain or restore natural habitats and species at a ‘favourable conservation status’. An assessment of conservation status of the listed habitats and species is required every six years.

Despite the convincing evidence of nitrogen deposition effects, there is currently no standardisation of how to consider the impacts of nitrogen on conservation status. There is a high likelihood that the scale of nitrogen deposition effects on conservation status of habitats and species is not being accurately reported.

Harmonisation of the methodologies for nitrogen deposition impact assessment in conservation status reporting is required. Assessment techniques should build on established air pollution assessment methods, for example, those developed under the Convention on Long Range Transboundary Air Pollution.

Assessing impacts on Natura 2000 sites

The provisions of the Habitats Directive (Article 6) require strict protection measures for Natura 2000 sites and the avoidance of deterioration. There is no common approach for evaluating the effects of nitrogen deposition and concentrations on these sites. The workshop expressed concern that the requirement of the Habitats Directive to ensure assessment of plans or projects likely to affect Natura 2000 sites is frequently not being met.

A particular challenge is faced in situations where local background levels of nitrogen deposition or concentrations, resulting from existing activities, already lead to exposure in excess of critical loads/levels. This is often due to the contribution of agricultural ammonia emissions and distant sources of air pollution. The Habitats Directive prescribes that a 'plan or project' can only be agreed if it will not adversely affect the integrity of a site. The workshop concluded that from a scientific stand point any additional contribution of nitrogen above the critical load/level will have an effect. Therefore, a decision to allow an exceedance should be a policy one unless there are sound ecological justifications that it will not adversely affect site integrity e.g. judgement of the spatial extent of damage.



Contrasting flora on birch tree trunks at sites with low nitrogen, left, and high nitrogen, right

© left, Ian Leith; right, Mark Sutton



Nitrogen related moss damage - severe algal invasion

© Ian Leith



Ammonia release experiments like this one at Whim Bog in Scotland have provided important information on effects of different nitrogen forms.

© Ian Leith

Policy requirements

- Existing legislation controlling emissions to the air of reactive nitrogen compounds does not adequately, or systematically address the impacts of nitrogen on the Natura 2000 network, or the wider objectives of the Habitats Directive.
- A common approach to assessing nitrogen deposition impacts on individual Natura 2000 sites, and on the conservation status of habitats and species, is urgently needed to provide reliable information on the stock at risk, evidence of recovery, and potential for restoration. There is a need to standardise approaches for nitrogen impact assessment, building on established methods such as critical loads, for the 2013 reporting round under Article 17 of the Habitats Directive.
- Further reductions in nitrogen emissions are required to reduce their adverse impacts on the Natura 2000 network, supporting the case for more ambitious commitments in revision of the Gothenburg Protocol and National Emissions Ceilings Directive.
- Policy options that require further consideration include:
 - the strengthening of existing legislation and its implementation, including opportunities within the Common Agricultural Policy for reducing nitrogen impacts on the habitats and species listed under the Habitats Directive;
 - the development of spatial planning policies linking nitrogen and Natura 2000;
 - establishing a limit value for ammonia applicable over Natura 2000 sites;
 - incorporating the concept of ecosystem services into assessment techniques.

Further information:

W.K. Hicks, C.P. Whitfield, W.J. Bealey and M.A. Sutton (eds.) (2011) *Nitrogen Deposition and Natura 2000: Science & practice in determining environmental impacts*. COST729/Nine/ESF/CCW/JNCC/SEI Workshop Proceedings, published by COST. Available at: <http://cost729.ceh.ac.uk/n2kworkshop>

The following websites provide information on the Habitats Directive, nitrogen impacts, assessment methods and mitigation options:

Habitats Directive (<http://ec.europa.eu/environment/nature/legislation/habitatsdirective/>)

International Nitrogen Initiative (<http://www.initrogen.org>)

Nitrogen in Europe: (<http://www.nine-esf.org>)

CLRTAP (<http://www.unece.org/env/lrtap/>) and its International Co-operative Programmes on Effects of Air Pollution on Natural Vegetation and Crops (<http://icpvegetation.ceh.ac.uk/>) and on Modelling and Mapping of Critical Loads and Levels and Air Pollution Effects, Risks and Trends (<http://www.icpmapping.org/>)

TFRN (<http://www.clrtap-tfrn.org/>)

