Nitrogen Deposition and the Nature Directives

Impacts and Responses: Our shared experiences

Department for Environment Food & Rural Affairs

JNCC Joint Nature Conservation Committee

NATURA 2000

Theme 1: Working Group 3: Impact assessments for air pollution policy and nature conservation policy

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The workshop is being organised by JNCC on behalf of the UK Government, Devolved Administrations and country nature conservation bodies, in collaboration with the Dutch Ministry of Economic Affairs and in co-operation with the Task Force on Reactive Nitrogen.

1. Summary

Nature and air pollution policy development are often not closely connected. Nature conservation is very much focussed on what is happening on (and in) the ground (and waters), and the best ways to manage a nature area, given several external pressures. There often seems to be a lack of effort to actively influence external developments that put a pressure on a site or area.

Air pollution policy is driven by the assessment of abatement costs for certain emission sources and its impacts on the protection of human health and ecosystems, given the (often) transboundary dispersion of pollutants. For European air pollution policy, targets for health protection are based on WHO advice. Targets for biodiversity protection have thus far not been based on European biodiversity policy targets, but on methods developed within the Working Group on Effects of the Convention on Long Range Transboundary Air Pollution (CLTRAP). In the past decade, human health impacts have been the main driver for additional air pollution policy measures. Contrary to the situation in the 1980s, the long term protection of ecosystems against acidification and eutrophication lately became more of a secondary issue.

The challenge is to strengthen the link between the two policy processes:

- Broadening the toolbox for nature policy to influencing external developments;
- Increasing the political profile of biodiversity conservation in air pollution policy making, and:
- Co-ordinating efforts in greening agricultural practices.

2. Introduction

Almost 60% of the Natura 2000 areas show an unfavourable conservation status.

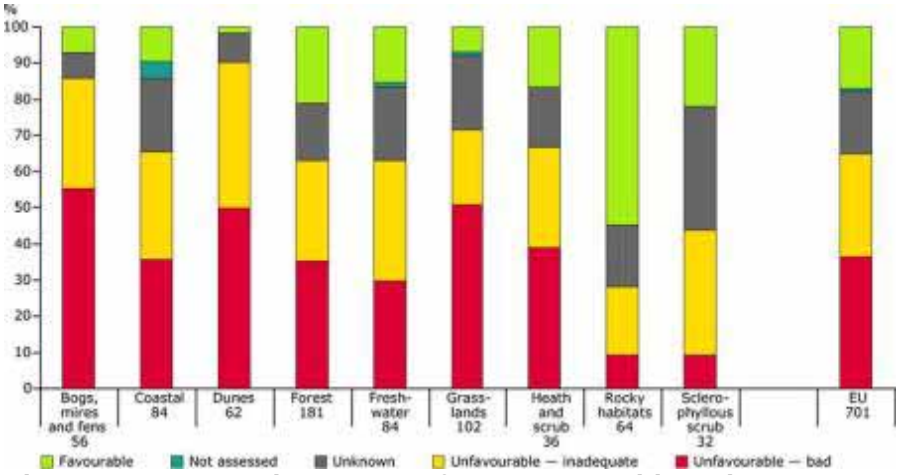

Figure1: Conservation status of European Habitats (Source: EEA, 2010)

Moreover, red list species such as butterflies, plants and birds show a continuous declining trend.

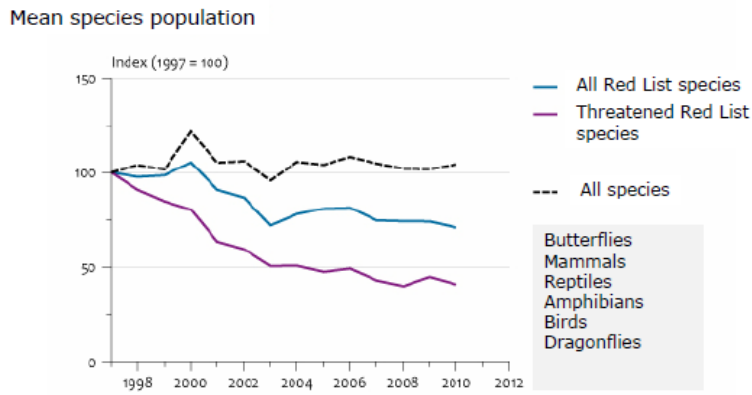

Figure 2: Trend in red list and threatened species in the Netherlands (source: PBL)

According to the Convention on Biological Diversity (CBD) the main drivers for biodiversity loss are:

1. Habitat loss and degradation;
2. Invasive alien species;
3. Pollution and nutrient load;
4. Overexploitation and unsustainable use of resources;
5. Climate change.

Within the European Natura 2000 network further habitat loss, overexploitation and the introduction of alien species are likely to be addressed. Currently the main remaining challenge is the load of nutrients that often comes from agricultural sources in and around the protected areas. In Scandinavian lakes the process of acidification still continues but at a slower pace than in the 1980s. Recovery will take decades. In Southern Europe climate change (desertification) is important and this is expected to pose an additional challenge to the protection of Natura 2000 areas in many more parts of Europe.

Within the CLRTAP the accumulation of nitrogen in soils and waters has been identified as process that has insufficiently been tackled in the past decades and will (with current legislation under the Gothenburg Protocol - GP) remain to continue over large parts of Europe.

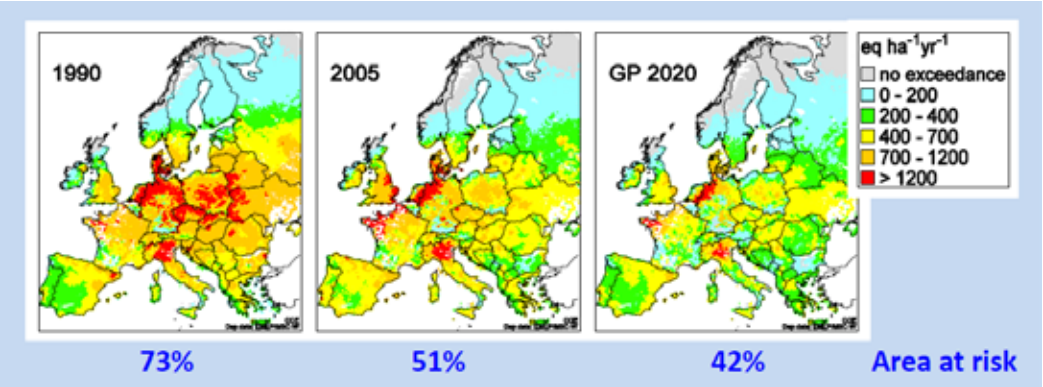

Figure 3: Exceedance of nitrogen critical loads across Europe

The impacts of nitrogen accumulation can be observed in the field, e.g. the increased dominance of grasses on heathland, the changing undergrowth in forests and the loss of flowers in natural grasslands (figure 4).

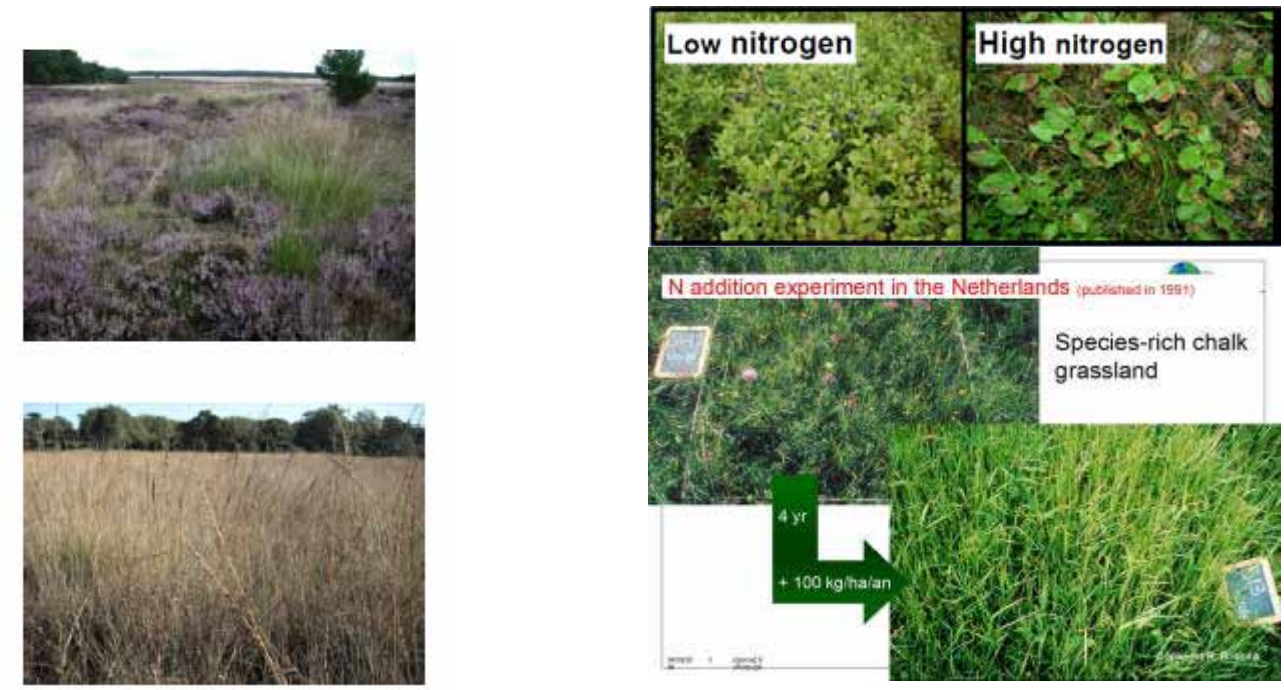

Figure 4: Observations of nitrogen impacts on heathland (left), forests (right above) and grassland (right below)

The relationship between nitrogen deposition and species richness has been estimated by Stevens *et al* (2010) (Figure 5). This relationship has been used by the Coordination Centre

for Effects (CCE) of the CLTRAP to assess the loss of biodiversity in Europe due to air pollution (Figure 6).

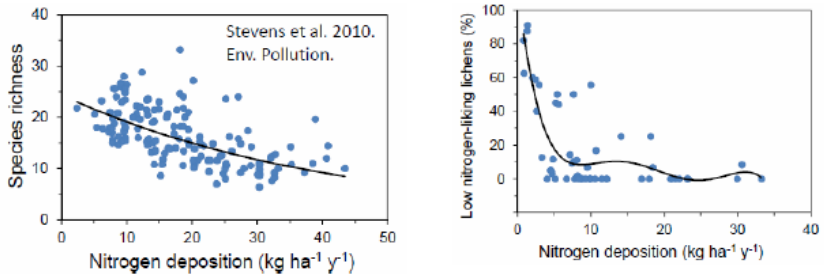

Figure 5: Relationship between nitrogen deposition and species richness

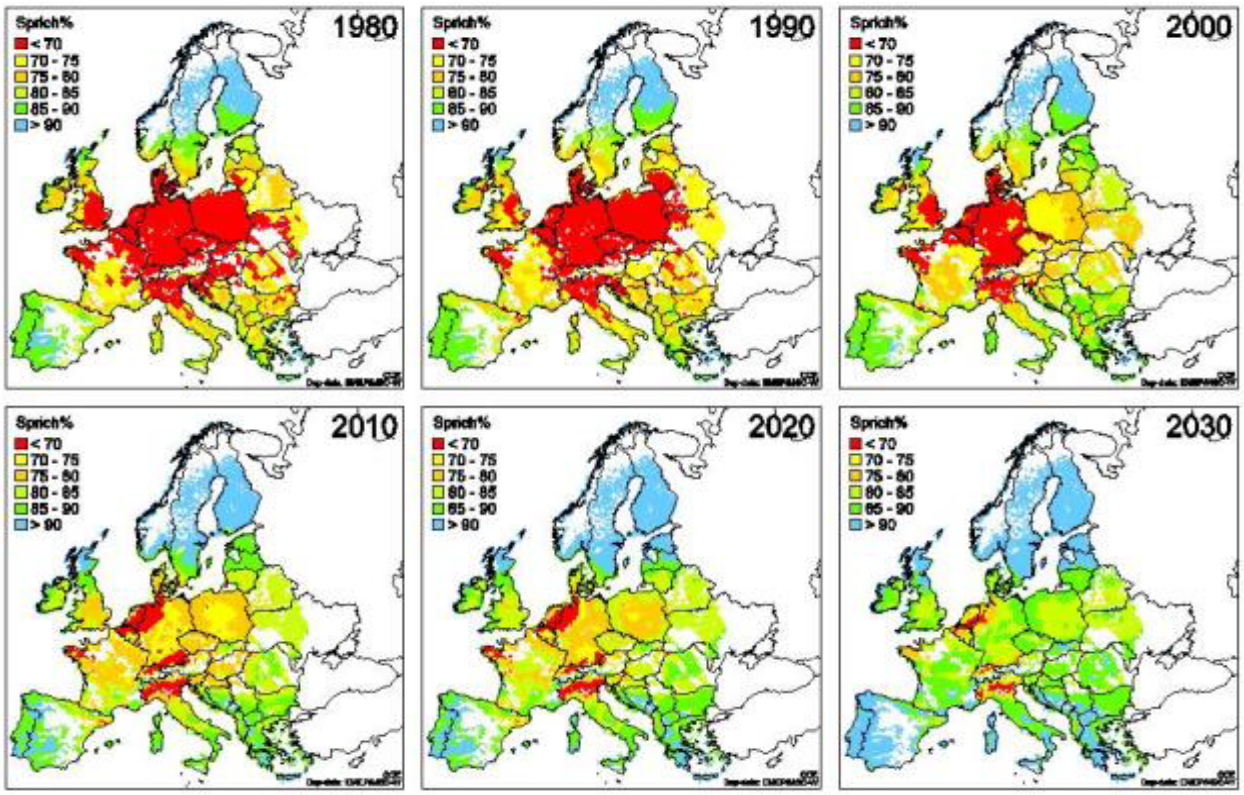

Figure 6: Average species richness (%) in Natura 2000 grasslands (Eunis class E1, E2, E3). The 2030 map refers to the maximum technical feasible reduction scenario) (Source: CCE)

Improvements in habitat and species protection are the result of emission reductions of NO_x and NH_3. At the European scale (EU 27) emissions of NO_x have declined by about 35% from 1990-2005 and will have decreased by about 65% from the 1990 level by 2020. Across the EU NH3-emissions will have fallen by approximately 40% by 2020 from 1990 levels. However, deposition will continue to exceed critical loads over large areas.

Currently this species information and critical loads exceedance information from the CCE is provided to support the revision of the Thematic Strategy on Air Pollution of the European Union and the National Emission Ceiling Directive (NECD). This revision should lead to further reductions of pollutants including nitrogen dioxide (NO_x) and ammonia (NH_3), both major constituents of nitrogen deposition.

However questions remain as to how measures such as species richness used in the example above, relate to objectives set for the Habitats Directive (and measures of favourable conservation status) or other policy objectives, such a provision of ecosystem services. For example:

- What is the relationship between species richness and the long term resilience of habitats?

- What is the meaning of the species richness for the ecosystem services that are provided by the Natura 2000 network (e.g. the appreciation by visitors, gathering and hunting, wood production, carbon sequestration, nutrient cycling, etc.)?

The challenge is, at local, national and European scales to improve the join up between conservation practice and policy and air pollution policy. In each of the scales, two key questions arise, with respect to the objectives of the Habitats Directive (or other biodiversity policy commitments) are a) what evidence is required of nitrogen impacts to trigger a policy response and b) what measures (or response variables) are used to assess the impacts of nitrogen deposition and the benefits of emission reductions scenarios.

3. Objectives of the working group

The aim of this working group is to identify the key biodiversity and air pollution policy drivers and what the scientific and evidence requirements are to enable a better integration of these two policy areas. The working group will draw on examples from local, national to EU scales, identifying examples of good practice and the examining the various challenges to better integration.

The outcomes include:

- To identify linkages in information requirements for nature policy and air pollution policy;

- To identify examples of good practice at different scales, and the challenges at each scale;
- To get an overview of indicators or measures/response variables used in the countries for assessing impacts on biodiversity and the integrity of habitats, e.g. is there a focus on specific species (and if so which?), on species richness (what is the reference state) or on the abiotic conditions for a favourable conservation status?
- To identify requirements for further research.

To support this Member state experts are requested to share experience of what evidence they collect and what evidence they require to be confident of ongoing nitrogen impacts at different scales in order to drive a policy response.

4. Discussion points

Members of this group are asked to bring along information and examples of the following and be willing to discuss:

a. To what extent does your country include abatement of nitrogen emissions in local, regional or national nature policy?
b. To what extent are nature policy targets taken into account in air pollution policy or agricultural policy?
c. Is nitrogen policy seen as local, regional, national or European responsibility?
d. What indicators and/or response variables are used to support nature policy and nitrogen impacts?

5. How the group will operate

Members of the group are invited to provide a short presentation on questions raised above on the linkages between nitrogen and nature policy. Ideally a representative of each Member State participating in the workshop will provide such a presentation.

A digital projector and power point will be provided. Presenters are encouraged to bring printed handouts of their presentation, so these can be circulated amongst the group. Following the information gathering from presentations, the group will discuss the points in section 5, looking at similarities and differences, and ultimately with an aim to address the objectives in section 4.

Towards the end of the session, we will identify successful examples and useful indicators to be presented in the plenary and the workshop report, and formulate the need for further research.

6. References

STEVENS, C., DUPRE, C., DORLAND, E., GAUDNIK, C., GOWING, D.J.G., BLEEKER, A., DIEKMANN, M., ALARD, D., BOBBINK, R., FOWLER, D., CORCKET, E., MOUNTFORD, J.O., VANDVIK, V., AARRESTAD, P.A., MULLER, S. & DISE, N.B. 2010. Nitrogen deposition threatens species richness of grasslands across Europe. *Environmental Pollution*, **158**, 2940-2945.