Air Pollution Bulletin

Number 5 - April 2010

News from the Air Pollution Lead Co-ordination Network (APLCN)

The APLCN was established in 2000 to assist JNCC and the UK statutory conservation agencies with their air pollution work. The APLCN brings together the air pollution work of JNCC and the country conservation bodies; provides strategic advice on air pollution impacts on nature conservation to a wide constituency; develops air pollution policy and manages air pollution research projects.

Contents

1. Introduction

The Air Pollution Bulletin provides an overview of the APLCN's key work areas, with links to further information. The Bulletin is principally an update for conservation agency staff, but we hope it is also of interest to other environmental organisations, the research community and the general public. We welcome feedback on its format and content. If you have any comments, or would like more details on any of the topics covered, please email clare.whitfield@jncc.gov.uk

2. Membership of the network

The APLCN involves specialist staff from the three GB country conservation agencies and JNCC. We are currently without a member from the Northern Ireland Environment Agency.

Network Chair - Simon Bareham - Countryside Council for Wales
Network Officer - Dr Clare Whitfield - Joint Nature Conservation Committee
Other members – Dr Ian Strachan - Scottish Natural Heritage; Dr Zoe Masters – Natural England; Khalid Aazem - Countryside Council for Wales

3. News

- **New JNCC air pollution publications and contract reports**

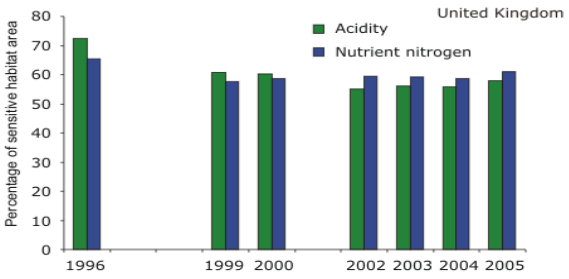
Detecting and attributing air pollution impacts during SSSI condition assessment. JNCC Report 426.

The most recent assessments of the effects of air pollution on semi-natural habitats in the UK, using critical loads, show that a substantial area is at risk from either acidification or eutrophication. However, the conservation agencies' common standards monitoring (CSM) is not designed to detect and attribute air pollution impacts. Therefore, our reporting of the condition of SSSIs underplays the effects of air pollution. As a result it is commonly questioned whether there is scope to do more to within the CSM framework to help attribute air pollution (particularly nitrogen deposition) as a cause of unfavourable condition and to ensure that for sites which are being adversely 'impacted' by air pollution this is recorded. This report makes recommendations for how detection and attribution of N deposition could be incorporated into CSM monitoring and the indicators that would be needed to do this. The work was funded by JNCC and Natural England. Whilst the study did show some potential for new attributes for some habitats, there remain considerable uncertainties, preventing implementation at this stage.

European Air Pollution Policy and synergies with Biodiversity Policies.
In 2009, JNCC commissioned the Institute of European and Environmental Policy (IEEP) to produce a discussion paper assessing the policy coherence or divergence between different EU policies on air pollution and on biodiversity to help prioritise and focus of JNCC's work in this policy area. The internal report was made available to conservation agency staff through the IEEP weekly briefings. Contact clare.whitfield@jncc.gov.uk if you would like further details.

- **Biodiversity Indicators in Your Pocket (BIYP) 2009**

BIYP describes a set of biodiversity indicators for the UK. These have been updated for 2009. The air pollution indicator selected for the Focal Area "Threats to Biodiversity" remains the "Area of sensitive UK habitats exceeding critical loads for acidification and eutrophication". The results have been updated to include the latest deposition data (2005). The percentage of semi-natural habitat area where eutrophying pollutants exceeded critical loads was 66 per cent in 1996. It decreased to 61 per cent by 2005.



Notes: Since 2002 inclusion of nitric acid deposition increases the area of critical load exceedence compared to earlier periods; each bar represents a 3 year average to reduce year to year variability

Source: Centre for Ecology and Hydrology

- **Conservation status and Article 17**

The UK submitted its second report under Article 17 of the Habitats Directive to the Commission in 2007. This included an assessment of conservation status of the habitats and species listed in the directive which occur in the UK. An assessment of risks of nitrogen and acid deposition to conservation status was undertaken (www.jncc.gov.uk/pdf/FCS2007_techIII_airpollution.pdf). Air pollution was reported as a pressure and threat to a large proportion of sensitive Annex I habitats. More recently, JNCC has published a report identifying the main actions required to address the threats to Annex I habitats.

- **Review of Transboundary Air Pollution**

The Government have commissioned a review of transboundary air pollution. The draft report of the expert group (ROTAP) was consulted on in late 2009, see (www.rotap.ceh.ac.uk) and the final report will be published in summer 2010. The RoTAP report aims to review the current state of rural air pollution issues in the UK, evaluate the extensive measurements of atmospheric pollutants and their effects, and produce a synthesis of current understanding which will be used to inform air quality policies. The APLCN will be making a response on behalf of the conservation agencies.

- **Air Quality Inquiry**

The Environmental Audit Committee of the UK Parliamentary Select Committee recently published their report from an inquiry on Air Quality. The inquiry largely focussed on urban air quality in respect of the UK's obligations to meet human-health based air quality standards for particulates and nitrogen dioxide under European legislation. The Committee concluded that air pollution is contributing to tens of thousands of early deaths each year and the Government is not doing enough to tackle the problem. They warn that Britain could face millions of pounds in fines if our cities continue to breach EU air quality targets supposed to protect public health.

According to evidence presented to the inquiry, air pollution could be contributing to as many as 50,000 deaths per year - as it makes asthma worse and exacerbates heart disease and respiratory illness. Averaged across the whole UK population it is estimated that poor air quality is shortening lives by 7-8 months. In pollution hotspots it could be cutting the most vulnerable people's lives short by as much as 9 years. Despite these considerable impacts on public health very little effort is being put into reducing air pollution levels, compared with efforts to tackle smoking, alcohol misuse and obesity.

The report details can be found at http://www.publications.parliament.uk/pa/cm/cmenvaud.htm

JNCC and the conservation agencies provided written evidence and this is available through the Environmental Audit Committee website.

- **Air Pollution Information System (APIS)**

APIS provides a comprehensive source of information on air pollution and the effects on habitats and species. It is funded by JNCC and country conservation agencies together with the UK environment agencies, SNIFFER and the Centre for Ecology and Hydrology (CEH). We are currently updating the website to incorporate new deposition maps, updated overviews and improved information and sign-posting of critical loads information. We are also exploring options for improving the functionality for spatial data such as deposition data. In a parallel project we are also extending and updating the 'search by site' tool to incorporate new site relevant critical loads and deposition data (see item 4 below). We always welcome feedback on APIS, if you have any comments please use the feedback form on the website.

- **International Nitrogen Initiative (INI) workshop**

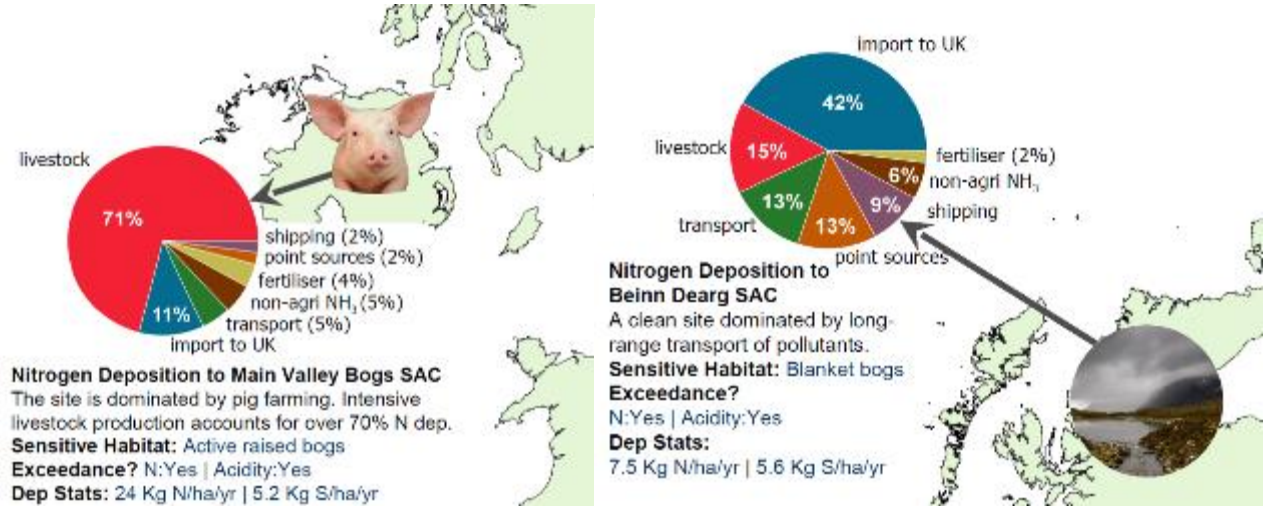
Members of the APLCN recently attended an international workshop on Nitrogen Deposition, Critical Loads and Biodiversity held in Edinburgh and run by INI and partners. The workshop aims were to

- assess N deposition estimates at regional to global scales;
- evaluate N critical loads and their exceedances as suitable tools/indicators;
- consider options for the assessment of ecosystem responses to nitrogen addition in different regions of the world;
- integrate global scientific knowledge and promote policy and management actions.

Papers and posters from the workshop can be found at http://initrogen.org/144.0.html. Recommendations from the workshop have been submitted to the Convention on Long-Range Transboundary Air Pollution and to the Convention on Biological Diversity.

4. New Critical Loads Data for SSSIs and European sites

Over the last two years JNCC, the country agencies and partners at CEH and the Environment Agency have developed 'site relevant critical loads' (SRCL) for interest features on A/SSSIs. We have also updated SRCL for European sites. New deposition model runs have been undertaken to provide estimates of acid and nutrient nitrogen deposition for emissions in 2005 and for a scenario for 2020. The output provides deposition data and source apportionment for each A/SSSI and European site in the UK. Two examples are given below: Main Valley Bogs SAC in Northern Ireland and Beinn Dearg SAC in Scotland (reproduced courtesy of Bill Bealey at CEH).



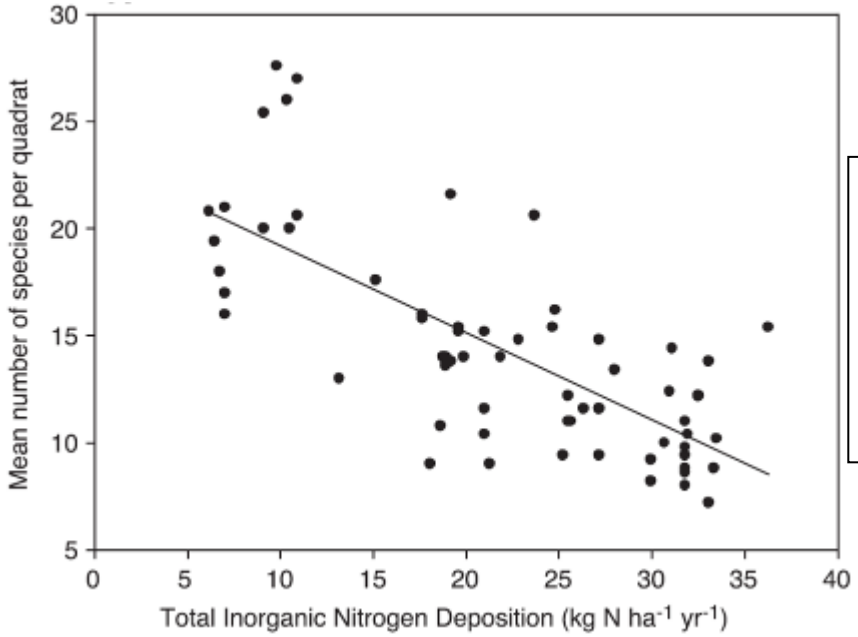
The next stage is to make the date available on APIS, updating the current 'search by site' tool, to allow searches by A/SSSI or European sites for use in casework. This work will take place in 2010 and is funded by SNIFFER. As a part of the project we will be looking at improving the functionality of the current system. To inform this, CEH are currently undertaking a consultation via the APIS website (until early April 2010) to gather views of users on how to improve functionality. Please use this opportunity to provide your views on improving the search facility.

In addition to site-specific data, the outputs include a range of summary statistics of exceedance on protected sites. For example, overview results of exceedance at A/SSSIs or European sites can be provided at the country level for feature, site number or site area. Natural England are also using the SSSI exceedance data to give an assessment of 'at risk from air pollution' for reporting alongside condition assessment, since CSM is thought to underestimate the impacts of air pollution. The new critical loads will also be used by contractors working for Defra in integrated assessment modelling used to optimise future emission reductions.

An overview of some of the outputs and uses of the site relevant critical loads and source attribution project is provided in http://initrogen.org/fileadmin/user_upload/2009_edinburgh/posters/bealey_et_al.pdf.

5. Nitrogen impacts on UK biodiversity

There is substantial evidence of the impacts of nitrogen deposition on vegetation across the UK. For example, Carly Stevens and co-workers have shown a correlation between species richness of acid grasslands and nitrogen deposition across the UK.



Acid grassland species richness plotted against N deposition for 68 field sites visited in 2003 and 2004.
From Stevens et al. 2004. Impact of Nitrogen Deposition on the Species Richness of Grasslands. Science 303.

It is widely accepted that in areas of high nitrogen deposition there have already been changes in species composition driven by nitrogen deposition. Despite this growing evidence base and a substantial number of reviews on the subject, a significant gap is that these have not fully considered the implications in relation to UK conservation policy targets and commitments. This was the conclusion of a workshop held by JNCC in April 2009, which brought together vegetation surveillance experts and air pollution experts to review gaps in evidence and recommend further work. The workshop recommended key broad scale vegetation surveillance data sets and analysis which would be useful to support the evidence base as well as the requirement to interpret these in view of conservation commitments.

The workshop report can be found at www.jncc.gov.uk/page-4424. In addition to providing a record of the discussion and recommendations of the workshop, it sets out JNCC's and the country agencies policy and advocacy requirements which need to be underpinned by evidence.

In response to the workshop recommendations, JNCC, Defra and the country conservation agencies are funding a collation of nitrogen impacts on biodiversity. The project runs from November 2009 until October 2010. The objectives are twofold. Firstly the project will provide an analysis of broad-scale vegetation datasets (such as the Vascular Plant Database and BSBI Local Change) in order to correlate vegetation with nitrogen deposition. It will use the results, together with other air pollution research and the Countryside Survey, to provide evidence of the effects of nitrogen deposition on vegetation. Secondly, this evidence will be interpreted to show the current impacts on, and predicted future prospects for, biodiversity in the context of the UK's and devolved administrations' conservation policy obligations and targets, for example, BAP, FCS. The project will conclude with an assessment of the adequacy of the evidence base and consequently whether there is a gap in our surveillance, subsequently informing the UK Terrestrial Biodiversity Surveillance Strategy.

6. Nitrogen Deposition and Natura 2000 Workshop, Brussels, May 2009

Nitrogen deposition represents a serious challenge to many sensitive natural habitats and species recognised of Community importance under the Habitats Directive. JNCC worked with partners from Stockholm Environment Institute (SEI) and CEH to run a European workshop to bring together scientists, environmental managers and policy makers to clarify our understanding of the key issues, to develop best practice when conducting assessments (i.e. of plans and projects *sensu* Article 6.3, or of nitrogen effects on favourable conservation status for Article 17 reporting) and to recommend options for consideration in future strategies. The workshop was attended by 73 delegates from across Europe. It was funded by COST 729; European Science Foundation, JNCC, CCW and CEH.

The workshop was structured into five themes and APLCN members were actively involved across the groups:

- **Theme 1:** Comparison of impact assessment and decision making approaches to determine the nitrogen deposition impacts associated with plans and projects in the context of Habitats Directive Article 6.3 obligations;
- **Theme 2:** Comparison of approaches to assessing and reporting nitrogen deposition impacts on conservation status (Habitats Directive Article 17) and discussion of harmonising approaches for future reporting rounds;
- **Theme 3:** New science on the effects of nitrogen deposition and concentrations on Natura 2000 sites, including bio-indicators, effects of nitrogen form (e.g. reduced nitrogen, NHx, versus oxidized nitrogen, NOy,), and the relationships between critical thresholds and biodiversity loss;
- **Theme 4:** Approaches to modelling local nitrogen deposition and concentrations in the regulatory context of Natura 2000;
- **Theme 5:** Options for future policy development to manage and mitigate the impacts of nitrogen deposition effects on the Natura 2000 network.

Kevin Hicks of SEI introduces the workshop

A summary for policy makers has been published and the workshop proceedings will be published during 2010, including full background papers and working group reports.

The workshop agreed that nitrogen deposition represents a major threat to European biodiversity, including sensitive habitats listed under the Habitats Directive. Many of Annex I habitats are naturally adapted to low nitrogen supply, so that fertilization with nitrogen compounds from the atmosphere alters the natural ecological balance. This results in the loss of the most sensitive species, which are often a priority for protection, and their replacement by invasive species that prefer high rates of nitrogen supply. In addition, the evidence also points to a net loss of overall numbers of species.

The workshop noted that both atmospheric nitrogen deposition and air concentrations of reactive nitrogen compounds were appropriate indicators of the scale of threat. The use of critical loads

and critical levels, as effects thresholds for nitrogen deposition and air concentrations, respectively, have demonstrated their usefulness at the European and site scales.

The outcomes of the workshop will be used to inform future research, environmental practice and policy development in relation to the threat of nitrogen deposition on European habitats.

The scientific outcomes, regulatory experience and policy options reported at the workshop will be considered for feeding into future plans at national, European and international scales. In particular, the messages will be fed into the Expert Group on Reporting under the Nature Directives and the UNECE Convention on Long Range Transboundary Air Pollution.

7. Thresholds workshop

In September last year, the UK conservation agencies (Natural England, CCW, SNH, JNCC, NIEA) and pollution regulators (Environment Agency, SEPA, NIEA) met with scientific advisors and legal specialists to discuss their air pollution risk assessment approach and the challenging subject of assessment thresholds. An application for a permit from the pollution regulators* triggers an assessment of the potential risks to designated sites, as required under the nature conservation legislation**. Permitting decisions need to be made along with the understanding that around two thirds of all designated sites are already predicted to exceed their critical loads (and in some cases critical levels) as a result of existing levels of air pollution. Current guidance states that a 'small' addition may be acceptable, but the precise definition of 'small' is the subject of debate. The group focused on the assessment of impacts from industrial and agricultural installations and discussed critical loads and levels and their links to site integrity, modelling uncertainties, and other issues. The aim was to develop a reasoned and transparent rationale for setting thresholds. The workshop report, including a number of recommendations for further work, is available from APLCN members.

* Under the Environmental Permitting Regulations 2008, or Pollution Prevention & Control Regulations (England) (Scotland) 2000 as amended, (Northern Ireland, 2003)

** the Habitats Regulations 2000, The Wildlife & Countryside Act 1981, as amended by the Countryside and Rights of Way (CRoW) Act 2000 in England and Wales, the Nature Conservation (Scotland) Act 2004, and the Environment (Northern Ireland) Order 2002.

8. Pig and poultry

Intensive livestock units release ammonia, which can have harmful effects on semi-natural habitats via direct toxicity, nitrogen enrichment or acidification. Natural England and CCW have initiated a programme of specially designed biological surveys at designated sites (SSSIs and SACs) to help inform the Environment Agency's permitting of (existing) intensive pig/poultry units. The surveys have/will involve a range of techniques, including visual assessment (looking for more obvious signs of significant enrichment), detailed vegetation surveys (to look for more subtle impacts), tree macro-lichen surveys, and in a few cases analysis of foliar nitrogen concentrations and/or some soil sampling. A number of different habitat types involved, including woodlands, heathlands, grasslands, bogs and sand dunes. This is an ongoing programme and the agencies are still in the process of analysing and interpreting the field data. Results will be available once the analysis has been completed. SNH are also collaborating with SEPA concerning investigations on sites in Scotland.

Further information on the biological effects of ammonia is available via APIS.

9. Research update

A list of the projects the network is currently involved in is provided below:-

- **Collation of evidence of nitrogen impacts on vegetation in relation to UK biodiversity objectives.** See section 5 for more details
- **Development of Site-Relevant Critical Loads - updating and extending APIS SRCL data.** Funded by SNIFFER, this project will make the new SRCL and source attribution data for SSSIs and European sites available through APIS as a site-based look up tool. See section 4 for more details.
- **Air Pollution Information System (APIS).** Supporting and co-ordinating the ongoing maintenance of this web-based database of air pollution information, and considering future directions, in collaboration with SNIFFER on behalf of the project funders CCW, Natural England, SNIFFER, SNH, JNCC, Environment Agency, SEPA, EHS and CEH. See www.apis.ac.uk
- **PhD Studentship: Epiphyte biomonitoring for atmospheric nitrogen effects on terrestrial habitats.** JNCC is co-funding a PhD studentship in collaboration with CEH and SNIFFER. The project aims to develop robust methods to quantify the impact of atmospheric nitrogen concentrations and deposition on sensitive epiphyte species of macrolichens and bryophytes.
- JNCC and the country agencies also work closely with the UK environment agencies and Defra to collaborate on, or advise on, air pollution research initiatives**.**

10. Looking ahead – priority work areas

JNCC is currently undertaking a review of inter-agency science working, which includes the work of the APLCN. This could affect how the APLCN operates in the future and 2010/11 will act as a transition year.

The main focus of the network over the following year will be:-

- Responding to Government consultations and requests for advice.
- Overseeing the project of N impacts on biodiversity. Use the results to quantity the impact of air pollution on nature conservation objectives.
- Publishing the proceedings of the Nitrogen Deposition and Natura 2000 workshop.
- Representing JNCC and the country agencies on the steering groups of a number of research projects with partners.
- Attending relevant CCE/CLRTAP meetings to promote collaboration over method and critical loads development in relation to nitrogen assessment for Habitats Directive requirements.
- Support Natural England to develop an evidence base and information for an ammonia scoping project, helping to identify where to target mitigation.
- Communicating air pollution information through APIS; JNCC publications; JNCC website and presentations.

Further details of the APLCN's work programme can be obtained from clare.whitfield@jncc.gov.uk