

# Air Pollution Bulletin

Number 8 - January 2017

JNCC and the country conservation bodies (CCBs) collaborate on air pollution work through the Inter-agency Air Pollution Group (IAPG). Through the group, we work together to provide evidence and advice on air pollution impacts on biodiversity and ecosystems.

The *Air Pollution Bulletin* provides an overview of the IAPG's key activities, with links to further information. It is principally an update for conservation agency staff but we hope it is also of interest to other organisations, the research community and the general public. If you have any comments, or would like more details on any of the topics covered, please email [Clare Whitfield](mailto:Clare.Whitfield@jncc.gov.uk).

Since the last *Bulletin* in 2014, our work has focused on developing a decision framework to determine the effects of nitrogen deposition on site condition and habitat conservation status; on identifying measures to address nitrogen deposition impacts and; on ways in which their uptake can be encouraged. Details of these topics and other relevant updates are contained in this edition of our *Bulletin*. We welcome any comments you may have on the content of the bulletin.

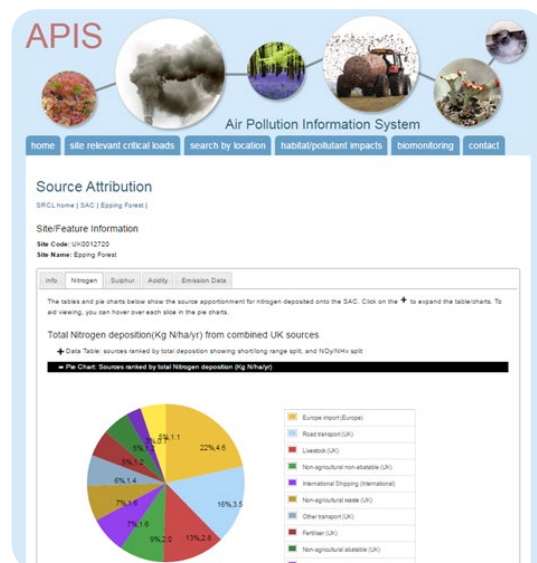
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# Brief Updates

## Updates to the Air Pollution Information System (APIS)

Together with our partners at the Environment Agency, Scottish Environmental Protection Agency (SEPA), and Centre for Ecology & Hydrology (CEH) we have been continuing to update and improve APIS. Each year, the pollution data in the Search by Location and Site Relevant Critical Loads tools is updated. This year we've also provided more up to date "source attribution" estimates: this provides a breakdown of the different sources contributing to nitrogen and acid deposition at protected sites. The new version also provides an estimate of the extent to which deposition is from local or distant sources. This information can help assess where to target measures to reduce deposition at sites.



## Research Framework

In March 2015, the IAPG published a framework for UK research and evidence needs relating to air pollution impacts on ecosystems. These needs are organised into three high-level themes and linked to policy and operational drivers.

- Theme 1: Ecosystem responses to changes in air pollution.
- Theme 2: Assessing and reporting air pollution impacts.
- Theme 3: Measures and remedies.

The Framework is designed to be shared to help inform the work of others with similar interests and responsibilities. It aims to provide a structure to promote discussion on establishing agreed research priorities.

See <http://jncc.defra.gov.uk/page-6983>

## UK Biodiversity Indicators

In January 2016, JNCC published an update of the UK Biodiversity Indicators. This suite of indicators includes the pressure from air pollution, based on area of exceedance of critical loads for acidification and eutrophication. The latest results are presented in the table below.

**Percentage of area of sensitive UK habitats exceeding critical loads for acidification and eutrophication for average deposition for 2012 (2011 to 2013)**

	Acidification (%)	Eutrophication (%)
UK	44.5	62.5
England	62.1	96
Wales	74.4	90.3
Scotland	31.0	40.7
Northern Ireland	69.4	89.9



## Air Quality Inquiry by the Environment, Food and Rural Affairs (EFRA) Committee

JNCC provided written evidence to the EFRA Committee's Inquiry on Air Quality. The Committee published their report in April 2016 referencing the JNCC evidence in a number of areas.

<http://www.publications.parliament.uk/pa/cm201516/cmselect/cmenvfru/479/479.pdf>

# Nitrogen Deposition: reporting impacts and finding solutions

In our last bulletin we reported our joint work to:

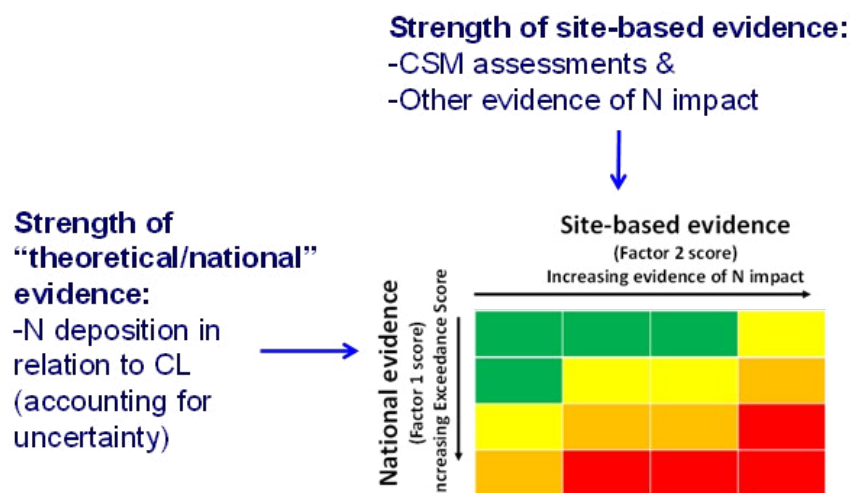
- a) develop methods for accounting for and attributing nitrogen impacts in reporting of site condition; and
- b) establish solutions and mechanisms for implementation (i.e. remedies or actions).

Over the last year we've published the outputs from this work. In the next sections we provide further details of a new approach to improve the accounting for nitrogen impacts in site reporting - the so-called "Nitrogen Decision Framework" - and follow this with a summary of the progress in each country to address impacts through targeted measures.

## Reporting Impacts: Nitrogen Decision Framework

Whilst there is strong evidence of the effects of nitrogen deposition on habitats and plant species in the UK, this is not well reflected in reporting of site condition based on Common Standards Monitoring (CSM). To address this, an inter-agency group developed a "Nitrogen Decision Framework" to provide a means of attributing nitrogen deposition as a threat to, or cause of, unfavourable habitat condition on protected sites.

The decision framework consists of two components which are combined to produce an overall outcome. These two components are: the national/theoretical evidence that a Habitat Feature is being affected by N deposition which results in an "Exceedance Score" (Factor 1 Score), and the site-based evidence that there are discernible impacts of N deposition on the Habitat Feature (Factor 2 Score). These components are brought together in a matrix to provide an overall assessment. A simplified schematic is shown below.



The decision framework is described in [JNCC Report 579](#). This is supported by a series of Annexes which provide a more detailed rationale for the approach. A series of spreadsheets are also provided for calculating Factor 1 and Factor 2 scores.

Responsibility for the policy as regards to whether, or how, to implement the framework rests with the country conservation bodies and they are currently looking into this.

## Finding Solutions

### Identification of Potential "Remedies" for Air Pollution Impacts on Designated Sites ([RAPIDS](#))

A [study](#) commissioned by Defra has shown that local targeting of measures around protected sites is a cost-effective approach to reducing atmospheric nitrogen impacts on these sites. This may include technical measures to reduce emissions from sources or landscape methods (e.g. tree belts) to influence pollutant dispersion and recapture of pollutants.



An inter-agency group was brought together to determine what solutions (or “remedies”) are available for nitrogen deposition, what their effectiveness is and what mechanisms there are to increase uptake. To inform this, Natural England and Defra funded a research study, RAPIDS, to draw together existing information to:

- a) identify measures and delivery mechanisms to reduce nitrogen deposition on designated nature conservation sites, and in the wider countryside;
- b) provide a detailed assessment of key aspects surrounding the implementation of identified measures and remedies for reducing nitrogen deposition in the context of potential legislative, voluntary and financial instruments; and
- c) develop a framework for identification of the key nitrogen threats for each site and for site-level application of the measures.

### Advice on permitting and local development

The country conservation bodies are statutory consultees under planning legislation and pollution control (e.g. Environmental Permitting). Through this, and working in close collaboration with the pollution regulators and planning authorities, nitrogen deposition from regulated sources or those requiring planning permission can be addressed.

### Other sources

There are a range of sources which are not captured by this regulation or planning. The range of measures and approaches for these sources identified in the RAPIDS project has helped inform the wider approach by the country conservation bodies.

## England

Through the LIFE Improvement Programme for England’s Natura 2000 Sites (IPENS) Natural England have published a series of [Theme Plans](#), including one for nitrogen deposition. These are strategic plans explaining how they intend to deal with priority issues affecting multiple Natura 2000 sites.

Through the IPENS project and to inform the Nitrogen Theme Plan, Natural England commissioned a study to evaluate the RAPIDS framework ([IPENS049](#)). The study applied a more detailed approach to attribution of local sources at case study sites to give an understanding of the detail necessary for appropriate targeting of measures.

The outcome of this study informed the concept of Site Nitrogen Action Plans (SNAPs), introduced in the Nitrogen Theme Plan, to co-ordinate the implementation of locally targeted measures, in order to address all sources of atmospheric nitrogen pollution at a site level in an integrated fashion using the range of tools available. Natural England is piloting SNAPs at a handful of SACs in 2016-2017.



Alongside SNAPs, incentive measures are being used to increase the uptake of measures to reduce the impacts of ammonia emissions. The Countryside Stewardship Scheme in England offers a range of options that can reduce ammonia emissions, such as covers for slurry stores and lagoons; as well as options that can be used to capture ammonia emissions e.g. higher tier woodland creation to produce pollution buffers. Further information can be found on the [Countryside Stewardship Scheme web pages](#) and a selection is provided below.

IPENS project team discussing Natura 2000 management issues at Woodwalton Fen NNR, Fenland Special Area of Conservation (SAC) © Natural England

Option Code	Option Description	Higher Tier	Mid-Tier	Stand-alone Water Quality Grant
<u>RP28</u>	Roofing (sprayer washdown area, manure storage area, livestock gathering area, slurry stores, silage stores)	X	X	X
<u>RP29</u>	Self-supporting covers for slurry stores	X	X	X
<u>RP30</u>	Floating covers for slurry stores and lagoons	X	X	X
<u>TE4</u>	Supply and plant tree (for creating new woodland)	X		
<u>WD1</u>	Woodland creation - maintenance payments	X		

In parallel, the current Countryside Productivity Scheme, also with support from Defra, now includes measures to tackle ammonia emissions as part of an overall approach to improve resource use efficiency. The scheme includes grants for equipment for slurry management (e.g. low emission manure application), recycling ammonia and heat emissions in animal houses, and poultry litter drying systems; as well as providing funding to help farmers improve their skills.

Natural England are also raising awareness of the ammonia issue through advice on the measures that farmers can take to prevent farm nitrogen losses to the atmosphere. Thereby promoting the farm resource efficiency and bringing other benefits of taking action (alongside the improvements in ammonia emissions).

## Wales

A similar study was carried out in Wales to the England IPENS049 project: The Assessing and Addressing Atmospheric Nitrogen on Sites (AAANIS) project applied the RAPIDS framework to identify sources of nitrogen deposition at Welsh SACs and the spatial targeting of mitigation measures. Two sites were selected as case studies to assess how a more detailed approach can contribute to better targeting of locally effective measures. Local ammonia emissions and the likely contributions from key agricultural sectors were estimated for all terrestrial Welsh SACs. This approach, combined with auxiliary data for the two selected sites, allowed a much more detailed assessment of likely management practices associated with each sector and a more targeted selection of locally suitable mitigation measures. For the two study sites, the refined methodology allowed a reliable distinction of the main threats from atmospheric N (e.g. diffuse versus point sources; and local versus long-range inputs) to sensitive habitats and species. The AAANIS project also concluded that in many areas of Wales concentrations of ammonia and nitrogen oxides remain relatively low. The report recommended that good air quality should be maintained as well as the need to improve air quality in more polluted areas.

A Nitrogen Thematic Action Plan has been produced by NRW under the LIFE Natura 2000 Programme in Wales. It provides details of priority strategic actions to address nitrogen deposition impacts on Natura 2000 features across the network. NRW is well placed to use its permitting function and its conservation advice to local authorities to collectively tackle air quality issues, including nitrogen pollutants. Such a joined up approach will be a significant first step, while targeted measures addressing site specific issues will be identified via a programme of Site Nitrogen Action Plans (SNAPs). These will be shared with stakeholders to deliver measures on the ground to address nitrogen pollution in an implementation phase referred to as SNAP-DRAGONS (Delivering Regional Action on the Ground On Nature Sites).

## Northern Ireland

NIEA have commissioned a study “Evaluating and mitigating nitrogen deposition impacts on Northern Ireland Natura 2000 network” which builds on the approach developed for the Welsh AANIS. This is due for completion very shortly.

Ammonia emissions have increased in Northern Ireland in recent years. The anticipated increases in agricultural activity set out in the Going for Growth Strategy will present further challenges to dealing with Northern Ireland’s ammonia emissions and protecting at-risk habitats.

Over the next four years, conservation management plans will be developed for all SACs. Where nitrogen deposition has been identified as a significant pressure, these will include a nitrogen plan analogous to the concept of SNAPs in England and Wales.

## Scotland

The Agri-Environment Climate Scheme (AECS) is the new Scottish Rural Development Programme (SRDP) scheme which promotes land management practices for protecting and enhancing Scotland’s habitats and water quality, managing flood risk and mitigating/adapting to climate change. The scheme includes options aimed at improving water quality which will also result in reduced volatilisation of ammonia such as slurry storage and application measures.

In addition, where diffuse water pollution is a pressure/potential pressure on a designated site, management options or capital items will be promoted for reducing nutrient inputs from across the catchment. Whilst these are focussed on protecting waters from nutrients they should bring co-benefits for ammonia emissions.

In addition to AECS, there are a range of other incentive or advice based programmes aimed at improving nutrient efficiency on farms in Scotland. These are driven by climate change or water pollution objectives but they will bring co-benefits in respect of reducing ammonia emissions. Examples include:

[http://www.farmingandwaterscotland.org/info/7/soil\\_and\\_nutrients](http://www.farmingandwaterscotland.org/info/7/soil_and_nutrients)

[http://www.sruc.ac.uk/info/120175/farming\\_for\\_a\\_better\\_climate](http://www.sruc.ac.uk/info/120175/farming_for_a_better_climate)

<http://www.scottishwater.co.uk/about-us/corporate-responsibility/new-sustainable-land-management>



Mire Loch, Scotland © Matthew Hartley/ Creative Commons Licence



# Nitrogen Study Tour: The Netherlands

In December 2013, JNCC held the Nitrogen Deposition and the Nature Directives European Workshop which was summarised in our last [Bulletin](#) and described in [JNCC Report 521](#). As a follow up to this, in November 2015, the Dutch government held a “N study tour” to showcase their Integrated Approach to Nitrogen (known as PAS). This was attended by representatives from JNCC, Natural England and NIEA, as well as representatives from the Environment Agency and farming industry in the UK.

Nitrogen deposition exceeds critical loads at the vast majority of sensitive Natura 2000 habitats in the Netherlands and there are widespread impacts. Although deposition is generally falling at a national level, the permitting of additional contributions from new plans and projects, including expansions, was heavily challenged in the Dutch courts from the mid-2000s. This led to a deadlock in the issuing of permits. The PAS was developed in response, via collaboration between public and private sectors and nature conservation organisations.

Its aims are to:

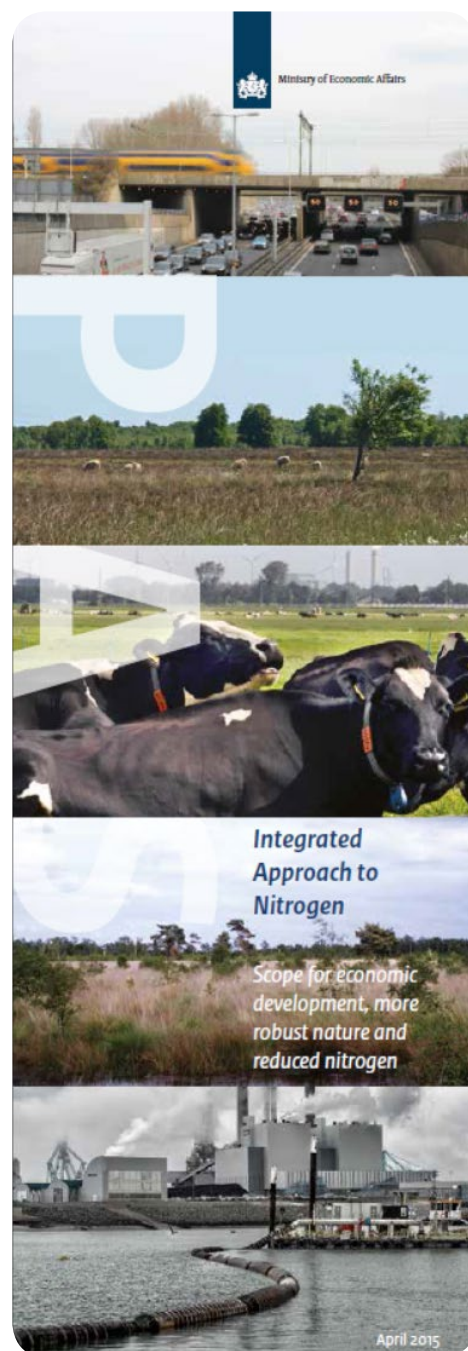
- Ensure Natura 2000 goals are met.
- Provide scope for economic development.
- Ease and simplify the process of issuing permits.
- Provide a user-friendly calculation tool (AERIUS), for issuing permits.
- Offer clarity and security to applicants and developers.

It delivers these via two overarching strategies:

- reducing **nitrogen deposition**, whilst allowing economic development (room for development); and
- implementing **ecological restoration** measures.

Underpinning the PAS is an online, open source tool, [AERIUS](#), that allows all users to calculate the impacts of development projects (such as a road or a poultry farm) in terms of nitrogen deposition on Natura 2000 sites.

The study tour was an excellent opportunity to learn further about the measures underlying PAS as well as the AERIUS tool and to bring lessons back to the UK to inform our approaches. JNCC and Natural England are pleased to be continuing a dialogue with the AERIUS team to find out more about this exciting tool.



Passive Sampling of Ammonia on a Special Area of Conservation © JNCC/Clare Whitfield



Field visit to Bargerveen Nature Reserve to see restoration measures and ammonia monitoring © JNCC/Clare Whitfield

# UK-Ireland Ammonia and Natura 2000 meeting

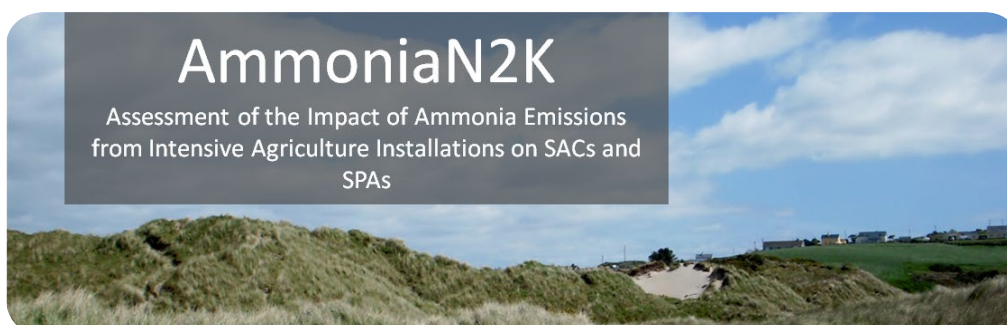
Many of the issues regarding agricultural ammonia emissions and the impacts on biodiversity in the UK are also current in Ireland. In October 2016, the IAPG brought together representatives from the UK conservation and environment agencies with representatives from the Irish government, Environmental Protection Agency (EPA) and University College Dublin, to share information on current work and approaches; and to discuss common issues and identify areas for future collaboration.

This was a great opportunity to hear more about the “[AmmoniaN2K project](#)”; a project commissioned by the EPA to quantify and assess the impact of ammonia emissions from intensive pig and poultry units on Natura 2000 sites in Ireland, to assist their licensing of intensive agriculture installations, and to:

- support Appropriate Assessments under the Habitats Directive;
- contribute to national inventory reporting;
- assist in the assessment of developments under Food Harvest 2020 (and now its successor Food Wise 2025); and
- support work on trans-boundary air pollution.

The IAPG shared recent work on assessing and addressing nitrogen impacts (see section 3). A visit to Ballynahone Bog NNR provided an excellent opportunity to discuss the complexities and challenges of the issues faced by all the agencies.

We are very grateful to NIEA for hosting the meeting. A follow up meeting is planned for 2017/18.



## The Lichen App

In our last bulletin we brought to your attention a [field guide](#) for using a lichen based index to determine air quality at a site, with respect to concentrations of ammonia and oxides of nitrogen. Since then we have published a [field manual](#) to accompany the guide which provides further information on applying the guide as well as recording sheets.

We are excited to report that a new mobile App, based on the field guide, has been produced by the Centre for Ecology & Hydrology (CEH). This free app includes some simple elements:

- Lichen identification key guide for nitrogen sensitive and tolerant species.
- Simple recording system for surveying lichens on tree trunks and branches.
- Field guide with instructions on carrying out the survey.
- Auto-calculation to determine nitrogen pollution levels using a standardised nitrogen air quality index (NAQI).
- Identification of four pollutant zones - 'Clean', 'At risk', 'Nitrogen Polluted' or 'Very Nitrogen Polluted'.



You don't have to be a lichen expert to use the guide or App – so why not give it a try – just click on the picture!



# *Membership of the IAPG*

The IAPG involves specialist staff from the four UK statutory nature conservation bodies and JNCC.

- **JNCC** – Dr Clare Whitfield
- **Natural England** – Dr Zoe Russell and Dr Susan Zappala
- **Northern Ireland Environment Agency** – Keith Finegan
- **Natural Resources Wales** – Simon Bareham and Khalid Aazem
- **Scottish Natural Heritage** – Alison Lee (IAPG) and Mike Shepherd (casework group)

Further details of the IAPG work plan can be obtained from [Clare Whitfield](#).

