



Northern Ireland Environment Agency  
Gníomhaireacht Comhshaoil Thuaisceart Éireann  
Northern Ireland Environment Agency

# Revised Operational Protocol for assessing ammonia and air pollution impacts on the natural environment

A guide for planners and developers



Department of  
**Agriculture, Environment  
and Rural Affairs**

An Roinn

**Talmhaíochta, Comhshaoil  
agus Gnóthaí Tuaithe**

Department of

**Fairmin, Environment  
an' Kintra Matthers**

[www.daera-ni.gov.uk](http://www.daera-ni.gov.uk)

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living, working, active landscape  
valued by everyone.*

## Introduction

- This document provides guidance on the impacts of ammonia emissions, oxides of nitrogen and associated nitrogen deposition on designated sites and protected habitats arising from development which is subject to planning permission within the Strategic Planning Policy Statement.
- This replaces the previous guidance published in 2018 which has been withdrawn because of a change in the approach undertaken by NIEA in considering air quality impacts for planning applications and environmental permits. This new guidance has been developed following the publication of the Call for Evidence on the Future Operational Protocol to Assess the Impacts of Air Pollution on the Natural Environment in July 2023<sup>1</sup>. The Call was issued to assist DAERA in developing an approach to addressing the challenging and growing problem of the impact of ammonia emissions on protected sites in Northern Ireland. The 'NI Environmental Statistics Report 2023' shows that overall, ammonia emissions in NI have increased by 12.1 per cent from 2001 (28.5kt) to 2021 (32.0kt).<sup>2</sup>
- This new approach is based on the Decision-Making Threshold (DMT) project<sup>3</sup> commissioned by the Joint Nature Conservation Committee (JNCC).
- This guidance describes the legislative and regulatory framework within which these impacts must be considered, and the approach taken by DAERA in assessing potential impacts on designated sites and protected habitats when replying to planning consultations. The Revised Operational Protocol reflects the most up to date evidence available and if new evidence emerges it will be taken into consideration.
- It is aimed primarily at planning authorities, applicants and consultants who are seeking to apply for planning permission for developments that have potential air

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<sup>1</sup> [Future Operational Protocol to Assess the Impacts of Air Pollution on the Natural Environment - A Call for Evidence \(daera-ni.gov.uk\)](https://www.daera-ni.gov.uk/sites/default/files/publications/daera/ni-environmental-statistics-report-2023.pdf)

<sup>2</sup> <https://www.daera-ni.gov.uk/sites/default/files/publications/daera/ni-environmental-statistics-report-2023.pdf>

<sup>3</sup> Chapman, C. & Kite, B. 2021. Guidance on Decision-Making Thresholds for Air Pollution. JNCC Report No. 696 (Main Report), JNCC, Peterborough, ISSN 0963-8091. Air Quality Consultants Ltd. 2021. Decision-Making Thresholds for Air Pollution. JNCC Report No. 696 (Technical Report), JNCC, Peterborough, ISSN 0963-8091. [Guidance on Decision-making Thresholds for Air Pollution | JNCC Resource Hub](#)

quality impacts on the natural environment, including applications to build and operate new livestock developments and replace, upgrade, or extend existing developments.

## **Types of Development**

- The types of development that most commonly give rise to potentially significant air pollution impacts on designated sites and priority habitats are livestock installations, which includes indoor facilities for the rearing of pigs and poultry, egg production or milking and holding of cattle.
- The most damaging pollutant from livestock units is the ammonia gas that arises from the decomposition of animal waste. Ammonia is a colourless gas that has a characteristic pungent smell.
- Studies have been carried out on the effects of high local ammonia concentrations and excessive nitrogen deposition to sensitive sites in Northern Ireland. These have shown clear evidence of direct damage to sensitive species as well as signs of nutrient enrichment affecting the species diversity and condition of the habitat.
- High ammonia concentrations in the air are directly harmful in contact with plant tissue; however, habitats can experience damage through the process of nitrogen deposition, which occurs when nitrogen compounds (including ammonia) are deposited to the ground, often in rainfall. Deposition effects can happen at long distances from the original ammonia source.
- Nitrogen oxides in addition contribute to nitrogen deposition, and can also have direct effects on habitats. Important sources of nitrogen oxides include road transport (exhaust emissions) as well as industrial combustion processes.
- Anaerobic Digester plants where feed materials are stored are also a source of ammonia emissions.

## **Current Position**

- Current reports show that 100% of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) have ammonia concentrations in air that are greater than the

levels above which environmental damage is known to occur.<sup>4</sup> Ammonia emissions as a whole in Northern Ireland are also continuing to rise. As a result, NIEA have developed a new assessment procedure based on the Decision-Making Threshold (DMT) project commissioned by the Joint Nature Conservation Committee (JNCC) for the assessment of nitrogen-emitting developments.

- The DMT project recommends the application of a *De-minimis* Threshold which signifies when emissions from a project would be unlikely to act together with other emissions in such a way that would require further, more detailed air pollution impacts assessment. The *De-minimis* Threshold is therefore an evidence-based screening threshold which can also speed up the air pollution assessment process.
- The DMT project also recommends the application of a Site Relevant Threshold for those developments where a *De-Minimis* Threshold is considered too conservative, i.e. where surrounding development pressure is low.
- This new assessment procedure provides a legally and scientifically robust approach to undertaking environmental assessments whilst protecting sensitive sites and habitats from the environmental damage attributable to ammonia emissions and nitrogen deposition.

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<sup>4</sup> [https://uk-air.defra.gov.uk/library/reports?report\\_id=1087](https://uk-air.defra.gov.uk/library/reports?report_id=1087)

## The Assessment Procedure

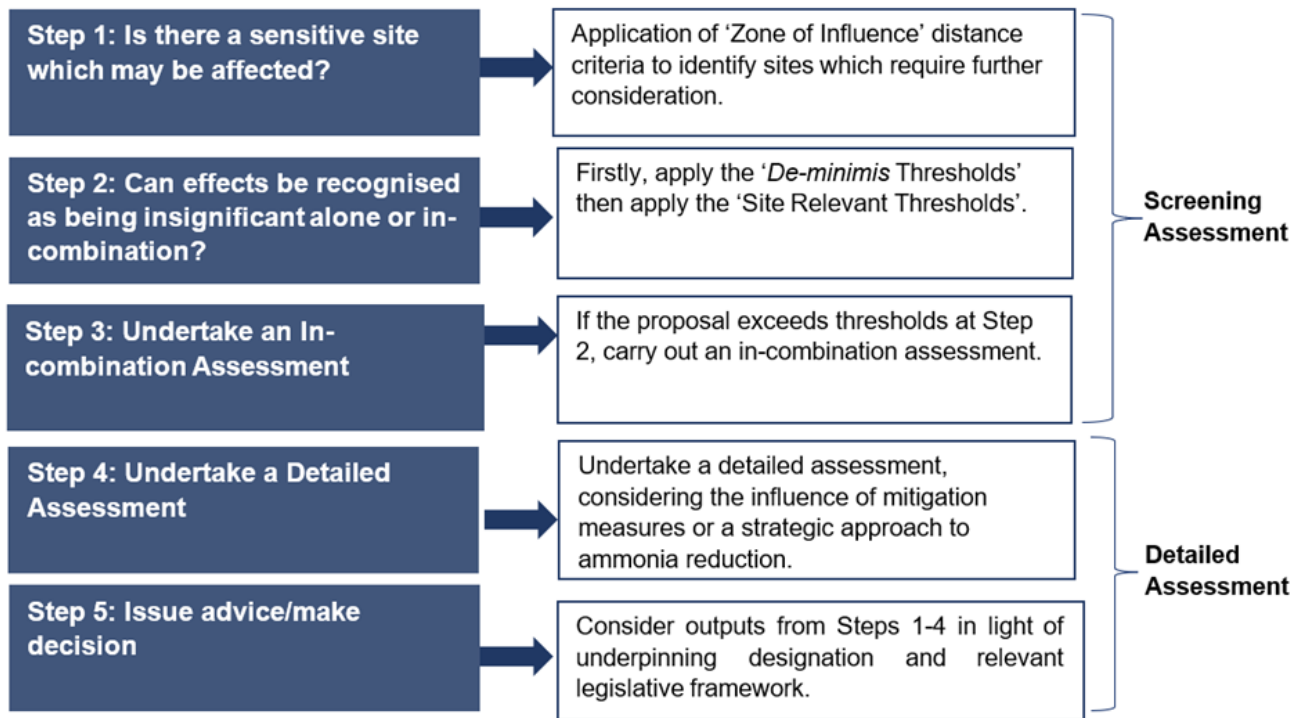


Figure 1. Overview of the five step Decision and Advisory Framework

The full flowchart of the Assessment Procedure can be found in Appendix 1. The details of the steps contained within the procedure and sources of information are outlined in the table below.

Screening Assessment			
<b>Step 1: Is there a sensitive site which may be affected?</b>	Determine the 'Zone of Influence', depending on the type of proposal and identify if any nitrogen sensitive sites are affected.	Zones of Influence differ on the type of proposal and pollutant.	Refer to <b>Appendix 2</b> to identify appropriate Zone of Influence.  For Medium Combustion Plant (MCP), the MCP screening tool on APIS will identify designated sites based on the thermal capacity of a plant and location <a href="#">MCP screening tool   Air Pollution Information System (apis.ac.uk)</a>
		Designated sites to consider: <ul style="list-style-type: none"> <li>• Areas of Special Scientific Interest (ASSIs)</li> <li>• Special Areas of Conservation (SACs)</li> <li>• Special Protection Areas (SPAs)</li> <li>• Ramsar sites</li> </ul>	Details on the location of designated sites can be found here: <a href="#">Natural Environment Map Viewer   Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk)</a>  The free, online <a href="#">SCAIL - Simple Calculation of Atmospheric Impact Limits (ceh.ac.uk)</a> tool is recommended as a screening tool. You can select either SCAIL Agriculture or SCAIL Combustion. A SCAIL user guide is available to guide you through the process.
<b>Step 2: Can effects be recognised as being insignificant alone or in-combination?</b>	Apply the <i>De-minimis</i> Threshold (DMT)	DMTs are: <ul style="list-style-type: none"> <li>• 0.08% of the Critical Level for Ammonia</li> </ul>	Refer to <b>Appendix 3</b> .

<b>Screening Assessment</b>			
	<p>Emissions are assessed against the DMT, by determining what the Process Contribution (PC) from the proposal is. The PC is a figure derived by comparing pollutant concentration or deposition from the proposal against the relevant Critical Level or Load for the site in question and is expressed as a percentage.</p>	<ul style="list-style-type: none"> <li>• 0.05% of the Critical Level for NOx</li> <li>• 0.09% - 0.13% of the Critical Load for Nitrogen deposition</li> </ul> <p>If a PC is below or equal to the DMT, it is screened out of further assessment.</p>	
	<p>Apply the Site Relevant Threshold (SRT). The SRT is used to identify those cases where the DMT is deemed too conservative.</p> <p>If any PC exceeds the DMT, a SRT must be calculated, and the PC of the proposal is then assessed against this.</p>	<p>SRTs range between Very Low and High and are an estimation of the predicted development density around the proposal between 2017-2030.</p> <p>SRTs range from:</p> <ul style="list-style-type: none"> <li>• 0.08% - 0.75% of the Critical Level for Ammonia</li> <li>• 0.05% - 0.29% of the Critical Level for NOx</li> <li>• 0.09% - 1.3% of the Critical Load for Nitrogen deposition</li> </ul> <p>If a PC is below or equal to the SRT, it is screened out of further assessment.</p>	Refer to <b>Appendix 4</b> .
<b>Step 3: Undertake an In-combination Assessment</b>	<p>An in-combination assessment is required where the PC of the proposal is above the DMT and SRT but less than the screening threshold.</p>	<p>Screening Thresholds, also known as Test of Likely Significance (ToLS) thresholds are:</p> <ul style="list-style-type: none"> <li>• 1% of the Critical Level for Ammonia</li> </ul>	Refer to <b>Appendix 5</b> .

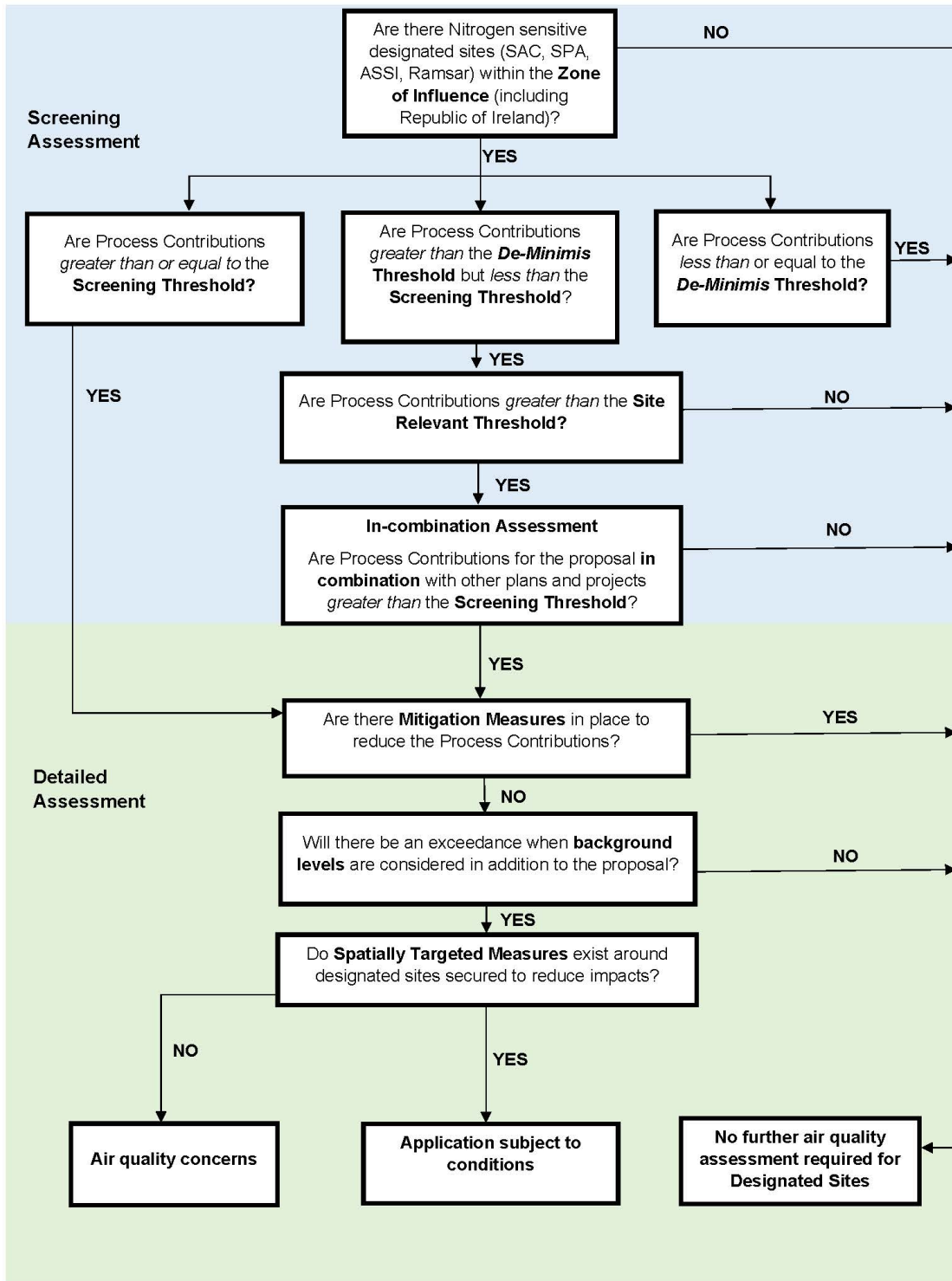
Screening Assessment			
	<p>The assessment will consider the in-combination effects from other plans or projects whose effects could combine with the effects of the proposal.</p>	<ul style="list-style-type: none"> <li>• 0.4% of the Critical Level for NOx</li> <li>• 0.8% - 8.5% of the Critical Load for Nitrogen.</li> </ul> <p>If a PC, in combination with other plans or projects, is below or equal to the Screening Threshold, it is screened out of further assessment. If a PC alone or in combination with other plans or projects, is above the Screening Threshold, a detailed assessment must be undertaken.</p>	

Detailed Assessment			
<b>Step 4: Undertake a Detailed Assessment</b>	<p>Take account of Mitigation Measures: Mitigation measures may be effective in reducing emissions so that the PC falls below DMT/SRT/ToLS threshold.</p>	<p>Considerations when applying Mitigation measures:</p> <ul style="list-style-type: none"> <li>• proven efficacy from the manufacturer</li> <li>• appropriate conditions will be recommended to secure the implementation of the mitigation measures</li> <li>• if a novel mitigation measure or technology is proposed, further consultation with NIEA may be required.</li> </ul>	Refer to <b>Appendix 6</b> .
	<p>Take account of Exceedance Levels: Determine the Predicted Environmental Level (PEL), which is the combination of existing</p>	<p><i>Predicted Environmental Level (PEL) = Process Contribution PC (either concentration or deposition) +</i></p>	The background data for the grid square which is potentially affected can be found on the Air Pollution



Detailed Assessment			
	background levels of pollutants and the PC of the proposal.	<i>Background (either concentration or deposition)</i> Background pollution data for the UK is updated every year using the latest measurement data from the various networks around the UK.	Information Service (APIS) GIS map tool. <a href="#">APIS app   Air Pollution Information System</a>
	Take account of Spatially Targeted Measures	Spatially targeted measures aim to reduce high concentrations of ammonia and high levels of nitrogen deposition at the site in question in order to create 'room for development'.	A separate Site-specific programme is to be developed to take forward spatially targeted measures at Designated Sites, as part of DAERA's Combined Approach to Ammonia.
Step 5: Issue advice/make decision	Advice issued may include: <ul style="list-style-type: none"> <li>• Air Quality Concerns Identified</li> <li>• Approval Subject to Conditions</li> <li>• Further Air Quality Assessment Required</li> </ul>		

# Appendix 1



## Appendix 2

Proposal type	Pollutant Emissions	Zone of Influence for SACs, SPAs, Ramsar sites & ASSIs
Livestock unit including associated storage and land-spreading	NH <sub>3</sub>	7.5km
Anaerobic digester (feedstock) without combustion plant	NH <sub>3</sub>	7.5km
Anaerobic digester (feedstock) with combustion plant	NO <sub>x</sub>	Use combustion criteria below
<u>General Combustion Source (measured as energy input to the process):</u>	NO <sub>x</sub> , SO <sub>2</sub>	
Greater than 50MW		10km
MCP Between 20-50MW		Refer to APIS screening tool
MCP Up to 20MW		
<u>Composting*</u>	NH <sub>3</sub>	
Less than 500 Tonnes per year		500m
Less than 75,000 Tonnes per year		1km
Over 75,000 Tonnes per year		2km
*Note if animal material (e.g. litter/manure) being composted use 7.5km 'zone of influence'		
Roads	NO <sub>x</sub> , NH <sub>3</sub>	200m
Proposal which generates dust ( <i>not included within this guidance</i> )	Dust	200m
Other sources – general rule		7.5km

Adapted from UKCEH<sup>5</sup>

<sup>5</sup> <https://www.ceh.ac.uk/>

### Appendix 3

<b><i>De minimis</i> Thresholds for on-site emission sources, adapted from DMT Main Report<sup>6</sup></b>		
	<b><i>De-minimis</i> Threshold</b>	<b><i>De-minimis</i> Threshold as % of Critical Level/Load</b>
NH <sub>3</sub> (lichens/bryophytes) (µg/m <sup>3</sup> )	0.00079	0.08%
NH <sub>3</sub> (vascular plants) (µg/m <sup>3</sup> )	0.0024	0.08%
Annual Mean NO <sub>x</sub> (µg/m <sup>3</sup> )	0.014	0.05%
N Deposition (woodland) (kg N/ha/yr)	0.013	0.13%*
N Deposition (grassland) (kg N/ha/yr)	0.0093	0.09%*

\* Assumed Critical Load of 10kg N/ha/yr – the percentage will vary for other Critical Loads and can be derived by applying the following formula (*De-minimis* Threshold/Critical Load x 100).

<sup>6</sup> [Main Report: Guidance on Decision-making Thresholds for Air Pollution \(jncc.gov.uk\)](http://jncc.gov.uk)

## Appendix 4

Site Relevant Thresholds for on-site emission sources based on development density				
Development Density	Very Low	Low	Medium	High
NH <sub>3</sub> (lichens/bryophytes) (µg/m <sup>3</sup> )	0.0075	0.0034	0.0020	0.00079
NH <sub>3</sub> (vascular plants) (µg/m <sup>3</sup> )	0.022	0.010	0.0060	0.0024
NO <sub>x</sub> (µg/m <sup>3</sup> )	0.087	0.046	0.030	0.014
N deposition (woodland) for CL (kg/N/ha/yr)	0.13	0.057	0.034	0.013
N deposition (grassland) for CL (kg/N/ha/yr)	0.088	0.040	0.024	0.0093

Site Relevant Thresholds for on-site emission sources based on development density as a % of Critical Level/Load				
Development Density	Very Low	Low	Medium	High
NH <sub>3</sub> (lichens/bryophytes) (µg/m <sup>3</sup> )	0.75%	0.34%	0.20%	0.08%
NH <sub>3</sub> (vascular plants) (µg/m <sup>3</sup> )	0.75%	0.34%	0.20%	0.08%
NO <sub>x</sub> (µg/m <sup>3</sup> )	0.29%	0.15%	0.10%	0.05%
N deposition (woodland) for CL (kg/N/ha/yr)	1.3%*	0.57%*	0.34%*	0.13%*
N deposition (grassland) for CL (kg/N/ha/yr)	0.88%*	0.40%*	0.24%*	0.09%*

\* Assumed Critical Load of 10kg N/ha/yr – the percentage will vary for other Critical Loads and can be derived by applying the following formula (*De-minimis* Threshold/Critical Load x 100).

## Appendix 5

Screening Thresholds (Test of Likely Significance ToLS) for on-site emission sources		
	Screening Threshold	Screening Threshold as % of Critical Level/Load
NH <sub>3</sub> (lichens/bryophytes) (µg/m <sup>3</sup> )	0.001	1%
NH <sub>3</sub> (vascular plants) (µg/m <sup>3</sup> )	0.003	1%
Annual Mean NO <sub>x</sub> (µg/m <sup>3</sup> )	0.12	0.014%
N Deposition (woodland) (kg N/ha/yr)	0.17	1.7%*
N Deposition (grassland) (kg N/ha/yr)	0.12	1.2%*

\* Assumed Critical Load of 10kg N/ha/yr – the percentage will vary for other Critical Loads and can be derived by applying the following formula (*De-minimis* Threshold/Critical Load x 100).

## Appendix 6

Mitigation	
<a href="#">Defra RAPIDS Reports</a>	Appendix 3 'Measures table'. Estimates reductions that may be achieved and confidence.
<a href="#">Tree shelter Belts for Ammonia Mitigation</a>	CEH Web tool
<a href="#">An Inventory of Mitigation Methods and Guide to Their Effects on Water Pollution, Greenhouse Gas Emissions and Ammonia Emissions from Agriculture (2011)</a>	Mitigation Methods 1A - 83
<a href="#">Code of Good Agricultural Practice (COGAP) for Reducing Ammonia Emissions (2019)</a>	Provides explanation of possible measures but does not quantify reductions.
<a href="#">Options for Ammonia Mitigation: Guidance from the UNECE Task Force on Reactive Nitrogen (Long Range Transboundary Air Pollution, 2014)</a>	Chapters 3-9 for management measures of N from agricultural sources. Chapter 10 for non-agricultural sources.
<a href="#">Guidance Document on Integrated Sustainable Nitrogen Management   UNECE (2022)</a>	This guidance document focuses on agriculture and identifies principles of integrated sustainable nitrogen management, including measures to promote nutrient recovery.
<a href="#">Review of interventions to improve outdoor air quality and public health (Public Health England, 2019)</a>	Chapter 8 Promising Intervention Strategies (p183) and p213 General Principles and Recommendations. <i>Interventions that improve air quality for public health may also have benefit for ecosystems if they reduce pollutant concentration and deposition.</i>
<a href="#">The ecological effects of air pollution from road transport: an updated review (Natural England Commissioned Report NECR199, 2016)</a>	Section 3.4 consider different mitigation options for road projects.
<a href="#">Ecological Assessment of Air Quality Impacts (CIEEM Advisory Note, 2021)</a>	Part 2: Mitigation and Monitoring

## Glossary

Term	Meaning
<b>Appropriate Assessment (AA)</b>	A Habitats Regulations Assessment (HRA) must be undertaken in accordance with the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended) to determine if a plan or project has the potential to affect the qualifying features of a European site (SACs and SPAs). The Appropriate Assessment is Stage 2 of the HRA, following Stage 1 (Test of Likely Significance), which focuses exclusively on the qualifying features of the European site and conservation objectives for those features. A plan or project can only be authorised if it can be ascertained that it will not adversely affect the integrity of any European site.
<b>Critical Level (CL<sub>e</sub>)</b>	Estimate of the concentration of pollutants in the atmosphere above which direct adverse effects on receptors such as plants and ecosystems may occur. Expressed in micrograms of pollutant per cubic metre (µg/m <sup>3</sup> ).
<b>Critical Load (CL)</b>	Estimate of exposure, in the form of deposition, of one or more pollutants, above which direct adverse effects on receptors such as plants and ecosystems may occur. Expressed in units of kg/ha/year (kilograms of nitrogen deposited per hectare per year).
<b><i>De-minimis</i> Threshold</b>	A quantifiable contribution from an individual source, below which associated effects can properly be ignored for the purpose of decision-making. The cumulative effects of proposals excluded by this threshold will not undermine the achievement of the conservation objectives. Further assessment would not change the outcome of the decision to be taken.
<b>Deposition</b>	The transfer of a pollutant carried in the atmosphere to the biosphere i.e. where a pollutant settles onto a surface (vegetation or the ground).



<b>Term</b>	<b>Meaning</b>
<b>Exceedance</b>	Where the concentration of a pollutant is greater than the Critical Level or the annual deposition of nitrogen per hectare is greater than the Critical Load.
<b>In-combination Assessment</b>	A formal assessment of the effects of 'other plans and projects' which are relevant at the point at which a specific plan or project is subject to assessment.
<b>Predicted Environmental Level (PEL)</b>	An indication of the expected concentration and deposition of nitrogen pollutants in the environment, taking account of the background concentration and deposition. $PEL = \text{Process Contribution (PC)} + \text{background level}$ .
<b>Process Contribution (PC)</b>	The additional nitrogen loading to the site as a result of the plan or project, subject to assessment.
<b>Site Relevant Threshold (SRT)</b>	Taking account of site-specific considerations, a quantifiable contribution from an individual source, below which associated effects can properly be ignored for the purpose of decision-making. The cumulative effects of proposals excluded by this threshold will not undermine the achievement of the conservation objectives for the site concerned.
<b>Screening Threshold</b>	Also known as the Test of Likely Significance Threshold, which identifies if the plan or project is likely to have a significant effect on the qualifying feature(s) of a protected site, either alone or in-combination with other plans or projects. If there is a potential significant effect, an Appropriate Assessment is required.

## Useful Links

[Effects of air pollution on natural ecosystems | Department of Agriculture, Environment and Rural Affairs \(daera-ni.gov.uk\)](#)

[Ammonia emissions and agriculture | Department of Agriculture, Environment and Rural Affairs \(daera-ni.gov.uk\)](#)

[Draft Ammonia Strategy Consultation \(daera-ni.gov.uk\)](#)

[Environmental Advice for Planning | Department of Agriculture, Environment and Rural Affairs \(daera-ni.gov.uk\)](#)

[Standing Advice | Department of Agriculture, Environment and Rural Affairs \(daera-ni.gov.uk\)](#)

[Air Pollution Information System | Air Pollution Information System \(apis.ac.uk\)](#)



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