

Comparison of impact assessments in the context of Habitats Directive 6.3 – Topic 1

Comparison of decision making approaches to determine the nitrogen deposition impacts of plans and projects in the context of the Habitats Directive.

Background Document for the 'Nitrogen Deposition and Natura 2000: Science & practice in determining environmental impacts' Workshop at the Bedford Hotel and Conference Centre, Brussels, 18th – 20th May, 2009

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1. Summary

The Habitats Directive provides a high level of protection to the Natura 2000 network by taking a precautionary approach to permitting “plans or projects” which may have a likely significant effect on a site. Article 6.3 of the directive provides a mechanism by which plans and projects can only be permitted if they are shown to have no adverse effect on a Natura 2000 site.

Emissions of nitrogen from polluting sources are considered to be a significant threat to sensitive habitats across Europe. Many countries have adopted approaches to assessing these threats which include the use of critical loads thresholds, the appraisal of the conservation objectives, and the determination of site specific conditions. These decisions include the need to understand and develop approaches for answering questions such as: what is a likely significant effect; what is a significant contribution; and how to judge whether a project/plan will have an adverse effect on the integrity of a Natura 2000 site?

This background paper looks at Article 6 of the Habitats Directive focussing in particular on Article 6.3. An introduction to the requirements of Article 6.3. is given, followed by a consideration of the assessment of nitrogen deposition impacts in relation to these requirements. The paper compares the assessment and decision-making approaches taken by a number of EU Member States.

2. Introduction

The Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora) and the Birds Directive (Council Directive 79/409/EEC) provide a high level of protection to the Natura 2000 network by taking a precautionary approach to controlling polluting activities. Plans and projects can only be permitted if they are shown to have no significant adverse effect on a Natura 2000 site, unless there is some form of overriding public interest why it should proceed.

While emphasis has been directed at reducing on-site activities, there is also a requirement for the assessment of off-site activities including the polluting effect of local and transboundary air pollution sources. Emissions of nitrogen primarily from combustion and agricultural processes clearly present off-site pressures on the Natura 2000 network. Moreover, due to the proximity of the network to agricultural sources (both being present in the rural setting) nitrogen, particularly in the form of ammonia, contributes to the widest spread effects. Across the EU there is wide exceedance of the critical load for nitrogen deposition for sensitive ecosystems. By 2010, nitrogen deposition will put the sustainability of about 70% the EU27 natural areas at risk (CCE, 2008).

3. The Habitats Directive

The provisions of the Habitats Directive require Member States to take measures to maintain or restore at favourable conservation status, the natural habitats and species of Community importance. Additionally, Member States are obligated to designate the most suitable sites for these habitats and species under a network of sites across their respective countries. The Natura 2000 network is comprised of Special Areas of Conservation (SAC) designated under the Habitats Directive, and incorporates Special Protection Areas (SPAs) (classified under the 1979 Birds Directive). Together SACs and SPAs cover around 15% of the territory of the EU. Under Article 6 of the Habitats Directive, Member States are required to establish the necessary conservation measures which correspond to the ecological requirements and conservation objectives of the site. These may be in the form of appropriate management plans or integration of other development plans, but essentially the deterioration of the habitats or species, including the disturbance of species, must be avoided. In addition, under Article 6.3 all plans and projects likely to affect a Natura 2000 site should be subjected to an assessment of the implications for the conservation objectives of the site. A plan or project can only be permitted after having ascertained that it will not adversely affect the integrity of the site concerned subject to the provisions of Article 6.4.

4. Article 6.3 and Nitrogen Deposition

Article 6.3 - Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually

*or in combination with other plans or projects, shall be **subject to appropriate assessment** of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it **will not adversely affect the integrity of the site** concerned and, if appropriate, after having obtained the opinion of the general public.*

Under Article 6.3 establishes the application of the precautionary principle for the first time for protected areas across Europe; that is, that projects can only be permitted having ascertained no adverse effect on the integrity of the site. Projects may still be permitted if there are no alternative solutions, and there are imperative reasons of overriding public interest. In such cases compensation measures will be necessary to ensure the overall integrity of network of sites. Guidance on the Article 6.3 (European Commission, 2000) states that the geographical scope is not restricted to plans and projects which exclusively occur on a protected site ('on-site activities'), but they also target developments situated outside the site ('off-site activities'). Examples of on-site activities may include a highway intersecting a designated site or extraction of minerals. These represent actual physical damage to a site directly caused by the action of that activity.

Emissions of reactive nitrogen compounds from industrial and agricultural installations represent impacts from off-site activities. In respect of sources of nitrogen emissions, permissions issued through various regulatory and planning instruments, give rise to a plan or project under the definition of the Directive. For example, an application for a permit under the IPPC Directive (Integrated Pollution Prevention and Control - EC Directive (96/61)).

In some cases, the sources may be many kilometres away (50-100 km) from the potentially affected site(s). The long-range transport potential of nitrogen pollutant species can trigger appropriate assessments where source and site are many kilometres from each other. In addition, localised impacts can also be important, for example local sources of ammonia from intensive agricultural units (<2 km). Furthermore, since these sources are usually located in rural areas, their potential for impacting on a designated site is more likely than in an industrial or urban area.

An overview of the requirements under Article 6.3 are given in the following sections.

4.1. 'likely significant effect'

The first step is to consider whether the plan or project is likely to have a significant effect on a Natura 2000 site alone or in-combination. However, it is often hard to define what is **significant**. To assess a likely significant effect, the sites' conservation objectives and designated features should be considered. Finally the **likeliness** of a significant effect brings in the precautionary principle and an appropriate assessment should be carried out unless the likeliness of a significant effects can be ruled out.

4.2. 'subject to appropriate assessment'

For plans and project that are likely to have a significant effect on a site, an appropriate assessment should be undertaken. The appropriate assessment should focus on the implications for the site in view of the site's conservation objectives. In terms of the methodology used for in an appropriate assessment, this should? draw on methodology under the Environmental Impacts Assessment Directive (85/337/EEC, as amended by Directive

97/11/EC). ‘In combination’ effects need also to be addressed in an assessment to take account of cumulative impacts.

4.3. ‘not adversely affect the integrity of the site concerned’

The integrity of the site refers directly to the site’s conservation objectives of the Annex 1 habitats or the Annex 2 species for which the site was designated (Annexes refer to the Habitats Directive). Integrity can be defined as: “*the ability of a site to maintain a coherent structure as a habitat or for supporting a complex of habitats and species*” (EC 2000). The degradation of these features and their associated ecological functions would negatively affect the site’s integrity. Assessments for sites designated as SPAs (Special Protection Areas - for birds) have to take into account the broad spectrum of habitats in which the protected bird nests, feeds or roosts.

4.4. The decision – mitigation measures, compensation and overriding public interest.

Under Article 6.4 the competent authority (which will vary according to Member State) is required to arrive at a conclusion regarding the consequences of the plan or project in relation to the integrity of the site concerned. If it is concluded that the plan or project would have no adverse effect, then the plan or project can proceed. If an appropriate assessment identifies that any activity can not be proved to have no adverse effect, then the competent authority must refuse permission for the proposed plan or project.

However, overriding public interest may prevail and the plan or project may be deemed indispensable. Under these circumstances, there are a number of mechanisms that are available. Initially some form of mitigation measures may be feasible (e.g. reducing the pollutant at source), subject to these achieving ‘no adverse effect’. Compensatory measures may include or the replacement of the affected site with the creation of another site.

5. Comparison of approaches to Article 6.3 across the EU – Country Case Studies

The approaches to Article 6.3 were compared across a number of EU countries. Comparisons were made between approaches taken in the UK, Germany, Netherlands, Denmark, and Belgium. A full detailed approach for each of these countries is provided in the Appendix, with the findings summarised in **Table 1** below.

Table 1: Comparison of approaches in the implementation of Article 6.3 of the Habitats Directive across 4 EU countries.

Questions	Denmark	Germany	Netherlands	United Kingdom
Is/are distance criteria set to identify relevant sources?	The habitats of Natura 2000 sites have been mapped all over Denmark, and a map of them with buffer zones of 300 meter and 1000 meter is important in the evaluation of farm projects. Larger projects need assessment regardless of distance if they can affect a Natura 2000 site.	For appropriate assessments there are at the moment no official distance criteria, because it always depends on the project type, the emissions and the case by case situation. Independently, air pollution law prescribes that nitrogen deposition effects caused by new or to-be-expanded existing sources on sensitive areas within the evaluation area (generally 1 km for agricultural sources) have to be assessed if a likely significant effect is likely.	In the current procedure for the Netherlands no clear distance criteria are set. However, for non Habitat areas a buffer zone of 3000 metres has been identified.	The following criteria are used to screen for relevant sources. Any large combustion process within 15km of a European site. 10km for any other large industrial installation (including intensive farming) regulated under the Integrated Pollution Prevention and Control Directive. Reduced distances applied to smaller processes.
Are Critical Loads/Levels used at a site assessment level across the Natura network?	Yes, a national list of critical loads has been developed for all Natura 2000 habitat types. These have been used to classify which habitats occur in 300 and 1000 metre buffer zones.	Yes. Empirical critical loads have been used for the assessment of nitrogen deposition based on habitat type. But they are not directly used as levels for adverse effects (see below: “% contribution from project”).	The critical loads for habitats have been assigned across the Natura 2000 network. This work included the assessment of habitat sensitivity to nitrogen deposition (van Dobben & van Hinsberg 2008)	Critical loads have been assigned to designated features and mapped across the Natura network and compared with deposition values (Bealey et al 2007). Critical levels for ammonia have been assigned to Natura 2000 sites where impacted by intensive farming installations.
Are Exclusion Zones used around sensitive Natura 2000 sites?	300 metres zone prohibited for new farms and capped emissions for existing farms within this zone.	No	No	No
Does the assessment take into account multi-sources in-combination with each other?	Within 300-1000 metres the allowable extra emission of NH3 are 0.3 kg N/ha/yr for 2 or more farms N/ha/yr (and 0.7 kg N/ha/yr if there is only one	In general yes, but there are still major methodological problems.	It is important to include all relevant activities to determine cumulative effects. This cumulative effect also takes into consideration any background deposition.	In combination effects (multi-sources) are taken into consideration.

Questions	Denmark	Germany	Netherlands	United Kingdom
	farm)			
Is location of interest feature and extent of impacts assessed?	Annex 1 habitats are mapped in all N2K sites and buffer zones (300 and 1000 metres) applied.	A concept of assessing the size of the affected area could be introduced for future guidance	The location of a particular feature is taken into account as much as possible when assessing the impacts	An assessment is made of the size of the site and the location of a particular feature
Is a % contribution of nitrogen deposition from the project compared with Critical Loads/Levels?	Within 300-1000 metres the allowable extra emission of NH ₃ are 0.7 kg N/ha/yr for one farm to 0.3 kg N/ha/yr for 2 or more farms N/ha/yr	For appropriate assessments, a project/plan contribution of 10% of the critical load is tolerable even if the background (or background + the source) is already exceeded. This not applicable if the site is in unfavourable status caused by nitrogen inputs. These cases are assessed on a case by case basis.	At the moment no particular % nitrogen deposition in comparison with critical loads is taken into account	Yes, likely significant effect based on a proportional contribution of the critical load or level. Intensive farming – 4% alone or in-combination. Large combustion plant 1% individually or 10% in-combination with other LCP. Other large IPPC Installations – 1% alone or in-combination.
Is the legal status of a designated site taken into consideration when comparing thresholds (e.g. Natura site vs a local nature reserve*) ? [* Appropriate Assessments are only carried out for Natura 2000 sites]	Yes. Natura sites have more strict protection, but all oligotrophic lakes (type 3110), all raised bogs (type 7110+7120), and all large (>10 ha) heaths & grasslands also have buffer zones with similar protection even outside Natura 2000 sites.	Appropriate Assessments are only carried out for Natura 2000 sites. In general the Natura 2000-sites are protected the most strictly. The assessment of Nitrogen Deposition effects in German air pollution abatement law sets a mandatory target based on the critical load (x=1). Other lower designation status sites can vary between x=1 to x= 3 of the critical load.	These assessments are only carried out for Natura 2000 sites. For non-Natura sites, 'normal' Dutch legislation applies, taking into account emission ceiling zones around nature areas.	Yes – precautionary approach for Natura 2000 sites. For example, for ammonia impacts from (existing) intensive farming the allowable process contribution of the critical load or level is 20% for SACs/SPAs, 50% for SSSIs, 100% for county wildlife sites.
Are abiotic conditions taken into account?	In some cases hydrology, roughness of habitat or e.g. harvest of biomass are checked in order to better resolve local deposition and/or local critical loads.	The abiotic conditions that are important to a habitat or species are taken into account. The focus is on the most important abiotic condition(s). But until now it's not completely worked out which abiotic factors are relevant for the assessment of nitrogen deposition.	The abiotic conditions that are important to the continued integrity of a habitat or species are identified. The initial focus is on the most limiting abiotic condition(s). Abiotic conditions include acidity, water content, salinity, nutrient availability,	Any potential hazard from the proposal, which could affect the interest features are noted. This include some 'abiotic' factors e.g. Toxic contamination, nutrient enrichment, acidification, changes in salinity regime and changes in thermal regime.

Questions	Denmark	Germany	Netherlands	United Kingdom
			tolerance to flooding, groundwater level.	
Is the site assessed for current condition status? (favourable/unfavourable)	The annex 1 habitats are mapped including condition assessment. Habitats have protection whether or not they are in favourable condition.	A project contribution of 10% of the critical load is not applicable if the habitats or species of a site are in unfavourable conservation status caused by nitrogen inputs. These cases are assessed on a case by case basis.	The present condition of the habitat or species is assessed.	The condition of the site is taken into account to a certain degree but it is recognised that current SSSI condition monitoring is not sensitive enough to detect and attribute air pollution effects (it was not designed for this). Questions asked include how long the project has been there, has there been any monitoring done on site and its relevance in relation to impact from the project.
Are long-range effects taken into account?	Yes – sources at larger distances from a Natura site are also included in the assessment of nitrogen deposition.	Yes – sources at larger distances from a Natura site are also included in the assessment of nitrogen deposition if there is a possible causal connection.	Yes – sources at larger distances from a Natura site are also included in the assessment of nitrogen deposition	Yes – long-range contribution taken into account in determining background pollutant contributions. Long-range process contributions taken account of for major combustion processes beyond 15 km.

It is not surprising to find that most countries reviewed share some common approaches in the assessment of new/existing plans and projects and their impacts on Natura 2000 sites. Some key approaches are summarised below:

- **Site Relevant Critical Loads**

Each country reviewed has carried out a process of linking designated features (habitats and species) and empirical critical loads for nitrogen. This has also included the assessment of whether a particular habitat/species is sensitive to nitrogen deposition. This approach is commonly used for determining likely significant effects and to assist with an assessment of potential effects on site integrity.

- **Distance parameter**

Threshold distances are used by some countries as an initial step to identify relevant sources. This supports the screening process to exclude sources that are not going to impact on a particular Natura site. However, such distances take a rather different form between countries. In the UK, 10 and 15 km are used as distances that require screening assessment of individual activities regulated under the IPPC directive. In Denmark and the Netherlands, thresholds of 1 and 3 km are used for assessment of farm activities, though larger distances can apply in some circumstances.

- **Application of Threshold factors**

Critical loads and levels are typically used for comparing thresholds. They serve both to identify likely significant effects to a Natura site, and to determine whether an adverse effect will occur. There are a number of things to consider in assessing likely significant effects. The principle of what is a significant effect is defined by what is *de minimis* (trivial/inconsequential). In other words *de minimis* can be described as a process contribution that is small enough to be ignored or too small that would not raise reasonable question. For example, the <1% contribution of a critical load/level (as used for some installations in the UK) could be seen as *de minimis* and having no significant effect as this represents 0.05 kg N/ha/yr for the lowest empirical critical load (or 0.01 µg/m³ for the lowest critical level for NH₃). However, there remains the question of what would be *de minimis* for the consideration of the cumulative effect of multiple projects. This presumably depends on the distribution of projects contributing to overall deposition (e.g. a few large combustion plants or many small farms).

In addition, there still needs to be a judgement on whether the plan or project is seen as causing no adverse effect. This leads to the key question - what is an acceptable contribution? For Germany the extra nitrogen deposition for a project/plan has been set to 10% of the critical load. This represents around 1 kg N/ha/yr for a 'typical' critical load of 10 kg N/ha/yr and is seen as within the precision of measurement. In the UK an acceptable process contribution of 20% of the critical level/load has been used in the assessment of impacts from the intensive livestock sector, 10% in other cases. It should be discussed what is the basis for choosing to apply different % thresholds for different source types. However, there are still numerous scenarios at the edges of these potential outcomes and decisions should be based on the site-specific situation and should be precautionary. If there is any doubt about there being no risk to the integrity of the Natura 2000 site it will not be possible to conclude that there is no adverse effect. This provides a challenge for the risk assessment process, since where critical loads and levels are

already exceeded, it remains a matter of doubt for example, whether to apply a threshold of 20%, 10%....5%. It is therefore clear that defining a *de minimis* contribution remains a major uncertainty for the risk assessment process.

The need to deal with cumulative effects of multiple projects also remains a challenge for the decision-making process. The appropriate assessment should ensure that suitable processes are taken in handling multi-sources and the in-combination test. For contributions that are seen as not significant on their own, there is a clear requirement for countries to hold a register of relevant authorisations to avoid potential ‘critical load exceedance creep’. Therefore, existing sources should be taken into account when assessing impacts from more than one source.

Alternatively, thresholds can be placed on total emissions and not deposition and critical loads. Denmark applies a threshold based on emissions where any new agricultural ‘installation’ within 300-1000 metres of a Natura 2000 is allowed an extra emission of 0.7 kg N/ha/yr. This goes down to 0.3 kg N/ha/yr where 2 or more farms are concerned. This is an interesting alternative and eliminates the use of critical loads/levels.

- **Conservation objectives and favourable status**

For most countries, consideration is given to the conservation status of the site. Further additions of nitrogen are avoided when a site is deemed to be at unfavourable status, particularly when this is caused by nitrogen inputs. Similarly, judgements on ‘likely significant effect’ and ‘no adverse effect’ must be made in relation to the interest features for which the Natura site is designated, focusing on the conservation objectives of each feature, and not forgetting the supporting habitat for any species features. The appropriate assessment should also examine the ecological requirements a feature may have, looking at ecological function, sensitivities to nitrogen and the extent of impact across the site. The ecosystem/habitat has to sustain the feature at a favourable status.

We have been able to present information in this paper for selected European countries, but the question may be asked how these regulatory practices compare in other Member States. The countries reviewed above are the most prominent in terms of guidance and practice in tackling the issue of atmospheric nitrogen deposition and ecosystem impacts. It is interesting to learn that in France there is a lack of consideration paid to nitrogen deposition impacts from atmospheric sources, and as yet no assessment of plan or projects in relation to the effects of atmospheric nitrogen deposition. This might be considered surprising considering the very high estimated ammonia emissions in parts of France, especially in Normandy and Brittany. There is, however, knowledge of nitrates within areas of intensive agriculture, and there is interest amongst Natura site managers on the issues of nitrogen deposition.

6. Conclusions and Discussion for the Workshop

It is clear from the country reviews that there are some key issues that are important in assessing impacts of nitrogen on the Natura 2000 network. Article 6.3 of the Habitats Directive brings to light a number of important challenges for assessing any plan or project impact on a Natura site. Key points for discussion include:

1. What is a likely significant effect and how is it defined? Different countries are left to interpret how this is defined.

2. What is a significant contribution from a project/plan in relation to either a habitats critical load or an emission target?
3. Re-above what if the background is already exceeded? How much more additional nitrogen is seen as having no adverse impact on the integrity of a site?
4. How should in-combination (multi-source) effects be handled? For example, can *de minimis* values be set for the consideration of individual project contributions where the cumulative effect of many projects is being considered?
5. Is there sufficient knowledge within the scientific community on effects to be able to guide practitioners into making decisions on site integrity and what constitutes a likely significant effect?
6. Where are the relevant gaps in this scientific knowledge?
7. Are critical loads and levels fit for the purpose of site relevant assessments since as they were originally developed for national risk assessments?
8. What rules should apply for new plans or projects where background critical loads and levels are already exceeded? How should *de minimis* be defined and cumulative (in combination) effects be handled in this instance?

One theme running through the country reviews is that decisions often have to be made at the site specific level. Each site has its own set of ecological requirements and sensitivities.

9. Is there enough information at every site to be able to inform a regulator/site manager about these requirements when it comes to nitrogen deposition?
10. Is sufficient information available on conservation status to conduct an appropriate assessment for different Member States?

Potential mitigation measures have not been discussed at any length within this background paper. For example, an adverse effect is often identified when an existing agricultural processes falls under IPPC.

11. What are some of the mitigation measures that can, or are being applied across the EU? For example, mitigation of the effects with the use of tree shelter-belts have been used to capture N pollutant species. Are there other experiences of such landscape level mitigation practices?
12. What would constitute an outline of ‘best practice’ in conducting such assessments, and what are the main limitations among the Member States to implementing this?

Working Group 1 will discuss many of these points sharing their experiences and knowledge with the aim of developing standard practices across the EU. This will ensure a better unified approach to the management of atmospheric nitrogen impacts across the Natura 2000 network.

7. Acknowledgements

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9. Appendix – Country Case Studies

9.1. United Kingdom – Bill Bealey, Centre for Ecology and Hydrology, UK

In the UK the Habitats Directive is transposed into national law by means of the Conservation (Natural Habitats & c.) Regulations 1994 (as amended), including separate, but related regulations for the devolved regions Scotland and Northern Ireland.

In relation to assessing emissions of air pollutants from new plans and projects, including nitrogen emissions, the responsibility lies with a range of competent authorities depending on the relevant licensing regime. New plans or projects will require planning permission which is often the responsibility of local planning authorities. In addition, polluting activities above a certain size will require a pollution control permit from the appropriate regulator local or national regulator. The UK Habitats Regulations require that an assessment of the impact of the site for Habitat Directive purposes is carried out by the most appropriate authority.

This country review focuses on the application of Article 6.3 by the Environment Agency in England and Wales of applications for pollution control permits under the IPPC Directive (such as power stations and agricultural installations). For this, the Environment Agency and the statutory conservation agencies (Natural England and Countryside Council for Wales) have developed a staged risk assessment requiring increasing detail at each stage if effects have not been discounted, in line with the tests of the Habitat Regulations. The exact form of the assessment will depend on the characteristics of the industrial sector concerned. Furthermore, in this approach, critical loads and levels are instrumental to the assessment of nitrogen impacts from industrial and agriculture installations. The four stage process outlined below uses the concept of critical loads and levels to assess impacts on designated features making up a given Natura 2000 site.

9.1.1. Stage 1 – Identification of all ‘relevant’ permissions.

This early stage has been set up to identify any projects or plans, which need further assessment, based on distance-based criteria from a designated site. These are:

- Any application within the boundary of a Natura site
- Any centrally dispatched coal or oil-fired power station within 15km of a European site
- Any other major installation (including intensive livestock farms) within 10km of a European site

Additionally, long-range effects of major combustion processes should also be taken into account an project or plan beyond 15km.

9.1.2. Stage 2 – Assessment of whether the permission is likely to have a significant effect (alone and/or in combination).

This is the key Stage in determining whether a project requires an appropriate assessment. Under the Habitat Regulations a likely significant effect is described as:

“..any effect that may reasonably be predicted as a consequence of a plan or project that may affect the conservation objectives of the features for which the site was designated, but excluding trivial or inconsequential effects.”

Stage 2 is based on source modelling to predict process concentrations and depositions to the Natura 2000 site(s). This procedure acts as a screening process to separate out inconsequential sources. In the UK critical loads and levels are used as an ‘environmental benchmark’ to assess the potential impact on a site. The significance of the effect of an emission will depend on both the ambient (background) concentration/deposition at the site and the relative contribution of the process under consideration. Atmospheric dispersion models are often used to estimate the process contribution at the site. The critical loads/levels of the designated features of the site are established (Bealey et al 2007) and are then compared with the modelled process contribution and the background. This procedure is often described by the following equation:

$$PEC = PC + BC$$

where PEC is the Predicted Environmental Concentration, PC is the Process Contribution and BC is the current background concentration (for Concentration you can also read Deposition PED, PD etc.).

As an initial test, the Environment Agency and conservation bodies have allocated an initial test of between 1 and 4% of a critical load or level depending on the industrial sector. Therefore, a process contribution of less than 1 - 4% of the critical load or level is seen as not significant, alone or in combination. If the $PEC < 70\%$ of the critical load/level then there is also an assumption of no likely significant effect (even if $PC > 1-4\%$ of critical load/level).

9.1.3. Stage 3 –Where ‘a likely significant effect’ on the site has been identified, undertake an appropriate assessment to determine adverse effect.

The outcome for an appropriate assessment, under Article 6.3, is to determine that there is no adverse effect on the integrity of the site concerned from the project or plan proposed. The assessment should be carried out in view of the sites Conservation Objectives. It should take into account uncertainties in the modelling and the critical load/levels and must clearly demonstrate how a specific impact on an interest feature then relates to the integrity of the interest feature and thus the site. There are however some general assumptions which the decision should be based upon, all of which rely on the basis of scientific uncertainty and what is a **significant/acceptable contribution**:

1. If the $PEC < 100\%$ of the CL then there is an assumption of no adverse effect.
2. If the $BC < CL$, but a small PC leads to an exceedance then a decision should be made on the basis of local circumstances, taking into account the magnitude of exceedance, the likely ecological effect of exceedance on the features and site integrity, relative contributions from different sources (in combination) and whether the environmental criteria are likely to be met a some future date.
3. If the $BC > CL$ and the PC will cause an additional small increase then, as above, the decision will have to be made on a case by case basis and on individual circumstances.

4. If the $BC < CL$, but the PC is significant and leads to an exceedance, then the application should be refused. The PC can be viewed as adding a significant additional risk to the site's integrity.

In general, the decision as to where it can be concluded that there is no adverse effect on the integrity of the site will be a matter of judgement for the regulator. However, in some circumstances, for example, intensive livestock farms, specific assessment criteria have been developed to enable decisions to be taken in a consistent manner when dealing with a large number of permit applications over a short period.

9.1.4. Stage 4 –Determination of the application

The appropriate assessment of the impacts of a plan or project on a site, provided for in Stage 3 enables the competent authorities to arrive at a conclusion whether the project or plan has an adverse effect on the integrity of the site. Article 6.4 of the Habitats Directive gives the competent authority to permit the project on reasons of overriding public interest, including those of a social or economic nature, which require the realisation of the plan or project in question. Under such circumstances compensatory measures should be taken. This compensatory mechanism has applied in certain circumstance in the UK in relation to existing projects where conditions have been set against the permit to reduce emissions by a certain deadline.

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9.2. The Netherlands – Albert Bleeker, ECN

Like in the UK, the Habitats Directive is transposed into national law by means of the Nature Conservation Law (1998). The Nature Conservation Law makes it possible to address the Habitats Directive issues, by means of maintenance plans for individual nature areas (under the Habitats Directive) and/or via specific environmental permit procedures for activities that potentially contribute to a decrease of the quality of the habitat or a significant disturbance of species. The responsibility for the implementation of these regulations lies with different competent authorities, but mainly on the local administrative level (as far as environmental permits are concerned).

The overall procedure with respect to the implementation of the Habitats Directive (and especially the procedure concerning the assessment of activities in the vicinity of nature areas) has been subject to much debate in the Netherlands over the last few years. Especially the implementation of it in relation to existing ammonia emission regulation caused problems. This is mainly due to the fact that the existing ammonia emission regulation is not strictly effect based, while the Habitats Directive implementation definitely requires some sort of effect based approach.

Because of the many problems that emerged during the implementation phase, a guidance document was developed describing possibilities of judging environmental permit applications in relation to existing and/or future activities in the context of the maintenance

plans. This guidance document focuses mainly on the aspect of nitrogen deposition and its purpose is to guide the legal authorities at a local, provincial, national level in the construction of maintenance plans. The basis for this guidance document forms the recommendation from the so-called ‘TaskForce Trojan’ that for judging existing use and possible future activities (where nitrogen deposition is involved), all factors that influence meeting the ecosystem targets need to be taken into account. Nitrogen deposition is only one of these factors.

The guidance document doesn’t provide a complete solution for the overall process of judging environmental permits and therefore the legal authorities are responsible for making ‘site specific’ decisions, taking into account all relevant factors. In the following parts, a further description of the guidance document is given in relation to the maintenance plans.

9.2.1. Role of the Habitats Directive maintenance plan

In the maintenance plan, the overall picture with respect to meeting the ecological targets is laid down and choices are made: which factors are the most important for meeting the targets; which measures are needed; what is the relation with existing use; what are the local conditions; how are the targets developing in size, space and time.

The maintenance plans give a better understanding about which activities are allowed and which activities are (without further conditions) not possible in relation to the targets.

Question to be answered:

The legal authorities are responsible for judging permit requests for individual situations with respect to potentially harmful (future) activities and to include (as much as possible) all the relevant factors. The following questions are important:

1. What are the targets for the species and habitat types under protection and sensitive to nitrogen deposition?

Not all species and habitat types are equally sensitive to nitrogen deposition. An overview of the sensitivity of Habitat areas is given in Van Dobben et al. (2008). If the species or habitat type is not sensitive to nitrogen deposition, a new activity that is being investigated can be permitted (unless other effects of the activity are not meeting the targets for the Habitat areas).

2. What is the location within the nature area of these species and habitat types?

For judging the activities, it is important to know where the nitrogen sensitive habitat types and species are located within the Habitat area. This is important since nitrogen deposition can vary significantly between different locations in the Habitat area.

3. What is the present state for these species and habitat types?

The present state describes the condition of the habitat type or species. For the Netherlands, the best available information about the present state can be found in so-called profile documents that were constructed for all habitat types and species for which targets were formulated. The exact state on the level of a specific area is not known at a national level. In order to define this, the legal authority has to collect further information. When this information is not available from e.g. the provincial authorities or conservation organisations, further ecological research is needed.

4. What are the abiotic conditions that are important for these species and habitat types and which (limiting) conditions determine the present state?

In the profile documents the 'ecological demands' describe the abiotic conditions needed for an optimal development of habitat types and species. The ecological demands look at the following abiotic conditions:

- Acidity
- Water content
- Salinity
- Nutrient availability
- Tolerance for flooding
- Groundwater level

Nitrogen deposition is influencing the abiotic conditions related to acidity and nutrient availability. Nitrogen deposition has an acidifying and nitrifying effect. Habitat types and species have demands with regards to different abiotic conditions. When judging existing use or future activities it is important to find out which abiotic conditions are important for the development of habitat types and/or species and which abiotic conditions are limiting for realising the targets. This means: which abiotic conditions are important for the specific habitat types and species and need to be improved or maintained to reach the targets. In first instance the focus is on the most limiting abiotic condition(s). However, eventually all abiotic conditions that are limiting for the targets have to be optimal.

5. What is the prognosis for the development of the relevant abiotic conditions?

Based on an ecological analysis and recent developments of the abiotic conditions, a prognosis can be made for the future. This prognosis can be used for assessing existing or future activities and can be based on information about:

- Recent or proposed measures on national or area scale
- Recent development of (economical) activities on national or area scale

For the assessment also the timescale for reaching the targets for the nitrogen sensitive habitats and species is important. If the abiotic conditions in a Habitat area are clearly improving and these improvements are sufficient with respect to reaching the targets, the effects of the (future) activities do not need to be judged as being significant. At the moment of permitting an activity no reasonable scientific doubt may exist about the positive effects occurring and that the extent of these permitted activities is thus not significant.

6. What is the effect of the (future) activities on the abiotic conditions?

Here only the effect of nitrogen deposition due to the (future) activity is of relevance. This amount of nitrogen deposition can be assessed by means of dispersion and deposition models. For the Dutch local situation the model Aagrostacks is used.

7. What are relevant activities in and near the Habitats Directive area and what is their cumulative effect?

When assessing the cumulative effect of different relevant activities, it is important to include all effects that have an effect on the different abiotic conditions relevant for the specific habitat type or species. The cumulative effect deals with both the additional negative effects of nearby other activities as well as the positive effects of mitigating measures.

When assessing the cumulative effect of nitrogen deposition, not only the deposition due to sources in or around the Habitat area has to be considered but also the background deposition. For the effect on the abiotic conditions it doesn't make a difference if the deposition is caused by a source located nearby or on larger distances from the nature area. It also doesn't make a difference if the deposition is caused by an agricultural source, industry, energy producer or traffic. The total amount of deposition is relevant and the effect it has on the nitrogen sensitive habitats or species.

The more a complete answer can be given to these questions, the better a motivation can be given for whether or not a permit for new activity can be given.

Judging these 7 points/questions in an integral way is very important. The factors that are important for question 6 (effect of the activity) is different for each situation, but the total 'answer' also depends on e.g. the accumulation of effects of other activities (question 7).

9.2.2. What if the (future) activity doesn't meet the targets?

The outcome of the integrated investigation (based on answering the 7 questions) can be that the (future) activities in a specific Habitats Directive area will result in not meeting the targets for that area. Whether this is because of significant negative effect or an unacceptable deterioration of the situation is irrelevant: in both cases the activity will not be permitted.

The legal authority than has the following options:

- Start discussing further conditions for the (future) activity. The applicant can be advised to take emission reduction measures, by which a sufficient nitrogen deposition can be achieved.
- Start discussing alternatives for the (future) activity. The applicant can be advised to start looking for an alternative, like e.g. move to another location
- Take additional measures, enabling meeting the targets despite the (future) activity. It should be monitoring however, that these measures are indeed implemented.

If these options do not bring a solution, the activities can not be permitted. In the case of existing activities the legal authorities can think of facilitating finalizing the activity, e.g. by subsidizing the relocation of farms.

References:

van Dobben H., van Hinsberg A. 2008 Overzicht van kritische depositiewaarden voor stikstof, toegepast op habitatypes en Natura 2000-gebieden. ALTERRA, 1654.

9.3. Denmark – Erik Buchwald, Ministry of Environment

In Denmark two national regulations are relevant for assessing plans and projects regarding air pollution in relation to article 6.3. One is a general regulation requiring appropriate assessment of all plans and projects which might significantly affect a Natura 2000 site. The other is a regulation dealing with husbandry farms. Farm production can only be established

or enlarged/changed if the regional authority grants permission. Permission may only be granted if the farm uses Best Available Technology for pollution control (BAT) and the authority ascertains that the plan/project will not adversely affect any Natura 2000 site.

Denmark has a list of Nitrogen deposition critical loads for all Natura 2000 habitat types on its Ministry of Environment website. They are in line with the UN-ECE Critical loads. This list together with assumptions and modelling of deposition to each type forms the basis for which habitats are included as vulnerable to ammonia in the regulations - see below. The habitats of Natura 2000 sites have been mapped all over Denmark, and a map of them with buffer zones of 300 meter and 1000 meter is important in the evaluation of farm projects.

As part of the preparation for the upcoming Danish Natura 2000 plans, several studies have looked into the deposition of N compared to local critical loads of the most vulnerable habitats. The Danish deposition of N ranges from about 14 to about 25 kg N/ha/year modelled in a 16 x 16 km grid. More detailed studies have revealed that many Natura 2000 sites have lower actual deposition than modelled, due to fewer farms and other local factors. Nevertheless, several habitats have problems with deposition exceeding the critical load in parts of Denmark.

The regulation on husbandry farms includes many details including how to find out what are the thresholds in relation to adverse effects regarding ammonia, phosphorous and nitrate. Existing permissions to farms must be updated at least every 10 years in order to comply with the newest regulations and thresholds. Thresholds have gotten stepwise stricter over time and there are plans to make them stricter yet. Farms with 3 or less animals are not regulated.

The thresholds are set in a way that it can be assumed that no significant adverse effects on Natura 2000 qualities can be anticipated when keeping below them. In exceptional cases the thresholds may not be strict enough, and in such cases the regulation says the regional authority shall only permit the farm project on stricter conditions preventing adverse effects.

For ammonia the following thresholds are listed in the regulation:

- Compared to BAT in 2005/2006 ammonia emissions must be 15% lower in 2007, 20% lower in 2008 and 25% lower in 2009.
- Within 300 meters from habitat types vulnerable to ammonia/nitrogen deposition in Natura 2000 sites, new farms are not allowed, and emissions may not rise from existing farms.
- The vulnerable habitat types are defined in the regulation as all heath and grassland types, bogs, most lake types and a few others.
- Within 300 - 1000 meters from the vulnerable habitats in Natura 2000 sites, the allowable extra emission of ammonia from a farm project is 0,7 kg N/ha/year if there are no other farms within 1 km, and down to 0,3 kg N/ha if there are more than 2 other farms.

The regulation on ammonia is politically discussed for the time being. It is anticipated that the regulation will be changed in a way that forests are included as vulnerable, and with thresholds for actual emissions instead of thresholds for extra emissions.

For phosphorous and nitrates all of Denmark has been mapped in relation to sensitive soils and sensitive Natura 2000 sites including marine sites. Depending on location in Denmark farms must comply with thresholds for these issues also.

9.4. Germany – Dirk Bernotat, Federal Agency for Nature Conservation & Till Spranger, Federal Environment Agency

Nitrogen deposition in Natura 2000-sites is currently a high priority issue in Germany. In several court decisions regarding road projects the judges ruled that nitrogen deposition might lead to significant effects and therefore will likely affect the integrity of the site. Examples are the ruling of the Federal Court of Justice (BVerwG) on the Highway A 143 west bypass Halle (from January 17, 2007) and the highway A 44 Lichtenauer Hochland (from March 12, 2008). The Court also notes that there currently seem to be no generally accepted effect assessment standards, and that methods should be considered with regard to competence, impartiality and objectivity.

The Association of the German Länder's nature conservation authorities (LANA) has therefore audited currently available approaches with a view to their possible applicability to the Appropriate Assessment.

9.4.1. Assessment of Nitrogen Deposition effects in German air pollution abatement law

The TA Luft (Technical Instruction Air), despite not being a law in legal terms, is used to directly implement source-related air pollution laws and regulations in Germany, e.g. for licensing newly built or extended air pollution sources. Section 4.8 states that "significant impediments" caused by nitrogen deposition due to new/extended sources has to be assessed - in practice in the ca. 1 km² surroundings of the source.

A consensus-oriented expert group mandated by the responsible Federal/Länder body (LAI) designed a methodology (which presently undergoes a 2 (3) year test phase mandated by the Conference of Federal & Länder Environment Ministers) which is based inter alia on critical loads: Total deposition (i.e. "background" deposition without the source plus the deposition prognosed to be caused by the source) is compared to critical loads or a multiple (x) of critical loads.

The magnitude of the factor x (which characterises the "significance" of N deposition in the individual case) varies between 1 and 3; it is determined by 1. the legal status of the area to be protected, 2. the biochemical status (e.g. presence of N indicating species, pH, nitrate concentrations etc.) of the area to be protected.

For N sensitive protected areas (e.g. Natura 2000-sites protected by the Habitats Directive), x = 1, i.e. for these areas, critical loads is used as the mandatory target value for total deposition. In addition, it is recommended to apply standard procedures within the nature conservancy law framework (see below).

The Länder have implemented the regulation in various ways, some as a standard procedure in present licensing cases, some only for ex-post analyses of cases where licenses have been issued. The test phase ends by the end of this year and will be reported to the Environment Ministers by autumn 2009.

9.4.2. Appropriate Assessment of Nitrogen Deposition effects regarding Article 6.3 HD in German nature conservation law

Nevertheless, the nature conservation authorities (LANA) came to the result that the described approach, designed for licensing of air pollution sources, in its present form does not have sufficient explanatory power for the necessary assessment of nitrogen inputs into Natura 2000 sites in the context of Appropriate Assessments. The present procedure can not meet the special requirements of the precautionary principle which is necessary for the protection of Natura 2000 sites under the Habitats Directive.

For Appropriate Assessments, the LANA recommends at the moment a guideline of the Brandenburg State Office for the Environment (Landesumweltamt Brandenburg 2008). It also uses empirical Critical Loads for the assessment of nitrogen deposition in habitat types, but in a modified way: If critical loads of nitrogen are already exceeded - which happens in many parts of Germany - or will be reached by the project, the exceedance of the Critical Load would still be tolerable, if the additional load of the project is less than 10 % of the critical load.

There is an exception if a habitat or species is already in an unfavourable conservation status caused by nitrogen inputs. In this case an individual case by case decision is necessary, which in particular has to take into consideration whether the achievement of conservation objectives and the improvement of the situation could become at risk.

A revision of the concept in future may particularly aim at further preventing a creeping deterioration due to cumulative effects of projects.

Furthermore, the concept could be improved by regarding the dimension of the affected area in absolute terms and in relation to the whole amount in the Natura 2000 site. Therefore suggestions from a scientific standard / guideline of the Federal Agency for Nature Conservation dealing with permanent losses in habitat types in Natura 2000 sites can be integrated (Lambrecht & Trautner, 2007, http://www.bfn.de/0316_ffhvp.html).

In addition, 2009 a research project of Federal Highway Research Institute (BASt) currently starts to work out a guideline for the emissions of nitrogen along streets in the context of Appropriate Assessments.

References:

Landesumweltamt Brandenburg (2008): Vollzugshilfe zur Ermittlung erheblicher Beeinträchtigungen und irrelevanter Stoffeinträge in Natura 2000-Gebiete, Stand November 2008, <http://www.mluv.brandenburg.de/cms/media.php/2338/vh2008e.pdf>.