Eutrophication Series

Towards the 50% reduction target for nutrients

Assessment of Implementation of PARCOM Recommendations 88/2 and 89/4

OSPAR Commission
2008

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR Convention") was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Community and Spain.

La Convention pour la protection du milieu marin de l'Atlantique du nord-est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. La Convention a été ratifiée par l'Allemagne, la Belgique, le Danemark, la Finlande, la France, l'Irlande, l'Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d'Irlande du Nord, la Suède et la Suisse et approuvée par la Communauté européenne et l'Espagne.

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Executive Summary

This is the fourth overview assessment since 1996 to evaluate progress by Contracting Parties in implementing PARCOM Recommendations 88/2 and 89/4 on the reduction at source of nutrient inputs to the sea. The aim is to achieve reductions in inputs of nitrogen and phosphorus to areas affected or likely to be affected by eutrophication, in the order of 50% compared to input levels in 1985.The target to achieve this goal by 1995 had not been met. Since then, progress has been under review.

Large reductions achieved since 1985: 50% target achieved for phosphorus, three countries achieved reductions in the order of 50% for nitrogen

In 2005, six of nine reporting Contracting Parties met the 50% reduction target for phosphorus. However, most of the Contracting Parties have not yet achieved the 50% target for nitrogen. In 2003, Denmark achieved a 50% reduction in nitrogen inputs; in 2005 Germany and the Netherlands achieved reductions in the order of 50%. Reported national reductions for 1985 – 2005 ranged between 20% for Sweden and 48% for Germany. Compared to 2003, most Contracting Parties made clear progress in reducing input levels of phosphorus. The picture of achievements in 2003 – 2005 for nitrogen is less coherent and explicit. In a number of cases, levels remained around the same levels as in 2003.

Agriculture and sewage remain sources of main concern; significant reductions achieved by the industrial sector

In 2005, agriculture and sewage were the main anthropogenic sources of releases of nutrients to the environment. While agriculture was the biggest contributor to nitrogen releases, sewage accounted for the highest releases of phosphorus. Since 1985, large reductions have been achieved by the industrial sector and for losses from households through progressive connection to waste water treatment plants and improved treatment.

Further efforts are needed to reduce nutrient inputs; implementation of EU directives will reduce nutrient inputs further

In recent years, extensive nutrient reduction measures have been put in place to prevent eutrophication. Yet, in a number of cases, measures targeting point sources as well as agricultural sources have been taken later than envisaged under OSPAR and/or relevant EU legislation. The full implementation, for example, of the EU Nitrates Directive and the Urban Waste Water Framework Directive are important to make progress in reducing nutrient inputs to areas sensitive to nutrient loads and affected, or likely to be affected, by eutrophication. The recent assessment under the OSPAR Common Procedure of the Eutrophication Status of the OSPAR Maritime Area confirmed that further efforts are needed to reduce anthropogenic nutrient inputs to the sea in order to combat eutrophication in the North-East Atlantic.

Need for revision of reporting mechanism

The basis for calculating the reductions varies from country to country, and is not all based on the same sources of discharges, emissions and losses. Therefore, data can only be compared internally and it is not possible to compare the achievements of Contracting Parties on a common basis. OSPAR 2008 agreed that implementation reporting for Recommendation 89/4 should cease. Further work is under way to improve the current reporting arrangements for PARCOM Recommendation 88/2 to support future implementation reporting.

Récapitulatif

Il s'agit de la quatrième évaluation récapitulative, depuis 1996, des progrès réalisés par les Parties contractantes dans la mise en oeuvre des Recommandations PARCOM 88/2 et 89/4 sur la réduction à la source des apports en nutriments à la mer. L'objectif est de parvenir à des réductions des apports d'azote et de phosphore aux zones affectées, ou susceptibles d'être affectées, par l'eutrophisation, de l'ordre de 50% par rapport aux apports relevés en 1985. L'objectif, à savoir y parvenir en 1995, n'a pas encore été atteint. Depuis lors, on maintient à l'étude les progrès réalisés.

Réductions importantes réalisées depuis 1985 : objectif de 50% atteint pour le phosphore, trois pays parviennent à des réductions de l'ordre du 50% pour l'azote

En 2005, six des neuf Parties contractantes qui notifient ont atteint l'objectif de réduction de 50% pour le phosphore. La plupart des Parties contractantes n'ont cependant pas atteint l'objectif de 50% pour l'azote. En 2003, le Danemark est parvenu à une réduction de 50% des apports d'azote; en 2005, l'Allemagne et les Pays-Bas sont parvenus à des réductions de l'ordre de 50%. Les réductions nationales notifiées entre 1985 et 2005 se situent entre 20% pour la Suède et 48% pour l'Allemagne. La plupart des Parties contractantes ont fait de nets progrès, par rapport à 2003, dans la réduction des apports de phosphore. Le tableau des progrès réalisés entre 2003 et 2005 pour l'azote est moins cohérent et explicite. Dans un certain nombre de cas les niveaux sont les mêmes qu'en 2003.

Agriculture et eaux usées: cause des principales préoccupations; réductions significatives réalisées par le secteur industriel

En 2005, l'agriculture et les eaux usées représentent les principales sources anthropiques d'apports de nutriments dans l'environnement. L'agriculture est le plus gros contributeur d'apports d'azote alors que les eaux usées sont responsables des apports de phosphore les plus élevés. Depuis 1985, des réductions importantes ont été réalisés par le secteur industriel et les foyers grâce au branchement progressif aux stations d'épuration des eaux usées et à un meilleur traitement.

Efforts supplémentaires nécessaires pour réduire les apports de nutriments; la mise en œuvre des directives de l'UE permettra une réduction plus importante des apports de nutriments

Ces dernières années, des mesures importantes de réduction de nutriments ont été mises en place pour empêcher l'eutrophisation. Dans un certain nombre de cas, cependant, les mesures visant les sources ponctuelles ainsi que les sources provenant de l'agriculture ont été prises plus tard que prévu dans le cadre d'OSPAR et/ou de la législation de l'UE. La mise en œuvre intégrale, par exemple, de la Directive sur les nitrates et de la Directive cadre sur les eaux usées de l'UE est importante pour pouvoir progresser dans le sens de la réduction des apports de nutriments dans des zones sensibles aux charges de nutriments et affectées ou susceptibles d'être affectées par l'eutrophisation. L'évaluation récente de l'état d'eutrophisation de la zone maritime OSPAR, qui a été réalisée dans le cadre de la Procédure commune OSPAR, confirme que des efforts supplémentaires sont nécessaires pour pouvoir réduire les apports anthropiques de nutriments à la mer et lutter contre l'eutrophisation dans l'Atlantique du Nord-est.

Nécessité de réviser le mécanisme de notification

La base de calcul des réductions varie d'un pays à l'autre et ne se fonde pas nécessairement sur les mêmes sources de rejets, d'émissions et de pertes. On ne peut donc comparer les données que sur le plan interne et il n'est pas possible de comparer les réussites des Parties contractantes sur une base commune. OSPAR 2008 a convenu de cesser la notification de la mise en œuvre de la Recommandation PARCOM 89/4. Des travaux supplémentaires sont en cours permettant d'améliorer les dispositions relatives à la notification à l'appui de la notification future de la mise en œuvre de la Recommandation PARCOM 88/2.

1. Introduction

1.1 Eutrophication strategy

For the purpose of the OSPAR Eutrophication Strategy (OSPAR, 2003a), eutrophication is defined as the anthropogenic enrichment of water by nutrients causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned. It can lead to depletion of oxygen (anoxia) followed by loss of bottom dwelling animals and shifts in the structure of the food web. OSPAR's objective under the Eutrophication Strategy is to combat eutrophication in the OSPAR maritime area, in order to achieve and maintain a healthy marine environment where eutrophication does not occur by 2010. The strategy to achieve this objective includes the implementation of the PARCOM Recommendations on the reduction of nutrient inputs at source:

- PARCOM Recommendation 88/2 on the Reduction in Inputs of Nutrients to the Paris Convention Area;
- PARCOM Recommendation 89/4 on a Coordinated Programme for the Reduction of Nutrients; and
- PARCOM Recommendation 92/7 on the Reduction of Nutrient Inputs from Agriculture into Areas Where These Inputs are Likely, Directly or Indirectly, to Cause Pollution.

These Recommendations request Contracting Parties to put in place effective national steps to achieve a substantial reduction, of the order of 50% compared to input levels in 1985, in inputs of phosphorus and nitrogen into areas where these inputs are likely to cause pollution, and to apply best available techniques to specifically reduce nutrient inputs from agriculture.

To set priorities for implementing these measures and to assist Contracting Parties in identifying those areas where nutrient inputs are likely, directly or indirectly, to cause pollution, marine areas are characterized by the Common Procedure for the Identification of the Eutrophication Status of the OSPAR Maritime Area (the "Common Procedure"), adopted by OSPAR in 1997 and revised in 2005, in terms of problem areas, potential problem areas and non-problem areas (OSPAR, 2005a). The results of the latest assessment of the eutrophication status of the OSPAR maritime area covering the years 2001 – 2005 are presented in Figure 3.1 under chapter 3.2 (OSPAR, 2008). The target of 50% reduction of input levels of nutrients is applicable for Contracting Parties that have identified problem areas (red areas on the maps).

Progress towards achieving the aims of the OSPAR Eutrophication Strategy is reviewed on a regular basis. This is done by means of assessments of the eutrophication status of the OSPAR Convention area under the Common Procedure. In addition, Contracting Parties are committed under the OSPAR Convention to report on the implementation of PARCOM Recommendations 88/2, 89/4 and (until 2006) 92/7 and the effectiveness of measures. National implementation reporting is co-ordinated through an agreed reporting format and harmonised quantification and reporting procedures.

The report at hand presents the outcome of the latest round of implementation reporting on PARCOM Recommendations 88/2 and 89/4 for the year 2005. The previous overview assessment on implementation reporting was based on data for the year 2003 and covered PARCOM Recommendations 88/2, 89/4, and 92/7 (OSPAR, 2006a). In 2006, OSPAR decided to cease implementation reporting for PARCOM Recommendation 92/7 since reporting on measures to address releases of nutrients from agriculture was covered by implementation reporting on PARCOM Recommendation 89/4.

1.2 Policy context, including link to international measures and EU

The implementation of the Eutrophication Strategy takes place within the framework of other international and European obligations of Contracting Parties in this field. International obligations include for example the Convention on Long-range Transboundary Air Pollution (LRTAP) and its Protocols (concerning the control of nitrogen oxides or their transboundary fluxes) which entered into force on 14 February 1991. Relevant EC legislation includes for example the Urban Waste Water Treatment Directive (91/271/EEC), the Nitrates Directive (91/676/EEC), the 1996 Integrated Pollution Prevention and Control (IPPC) Directive as recently codified (2008/1/EC). The Urban Waste Water Treatment Directive and the Nitrates Directive require Member States of the European Community and the European Economic Area to identify "sensitive areas" and nitrate "vulnerable zones", respectively, as basis for the implementation of targeted measures to reduce nutrient inputs to these areas. Under the Water Framework Directive (2000/60/EC) an assessment framework, closely linked to the conceptual approach of the Common Procedure, has been set up to assess, classify and monitor the ecological quality of a water body in transitional and coastal waters up to 1 nm from the baseline from which the territorial sea of a Member State is measured.

2. What are the causes of the problem?

2.1 Pressures in the OSPAR maritime area

The most important sources contributing to eutrophication in the OSPAR maritime area are agriculture, atmospheric deposition, urban waste water, industry and aquaculture. In the previous round of implementation reporting the major sources of nitrogen and phosphorus input in the environment were diffuse losses (agriculture and atmospheric deposition) and sewage treatment works (OSPAR, 2006a). A major contribution to atmospheric deposition, and thereby to the overall input of nitrogen in the environment, is the emission by international ship traffic (OSPAR, 2007).

The main nutrient pressures are briefly discussed below for each of the OSPAR regions. Information in this chapter is mainly based on RID and CAMP data, representing nutrient loads to the OSPAR maritime area and is therefore not directly comparable with the source-based information presented in this report.

Region I: Arctic Waters

Total inputs of nutrients in Region I are very low compared to the other regions. In Arctic Waters atmospheric deposition of nitrogen is predominant and it accounts for six to ten times the riverine and direct discharges (OSPAR, 2005band 2005c). The atmospheric deposition level is estimated to have gone down by 25% between 1990 and 2001. However, there is an increase in total waterborne inputs of both nitrogen (up 32%) and phosphorus (up 135%) as a result of increases in direct discharges (e.g. aquaculture). In terms of absolute loads, however, this increase and resulting input levels are very small (OSPAR, 2006b).

Region II: Greater North Sea

The Greater North Sea is the most problematic region in the North-East Atlantic in terms of eutrophication (OSPAR, 2008). Reasons for this are high population densities and related high nutrient inputs, mostly by rivers. Furthermore the shallow character of the shelf sea and its hydrodynamics enhance eutrophication processes. For the Greater North Sea atmospheric deposition of nitrogen is estimated to represent one third of all nitrogen inputs (OSPAR, 2007).

Region III: Celtic Seas

In the Celtic Seas eutrophication is restricted to fjords, estuaries and harbours, where the pressures are associated with higher population densities and agriculture activities (OSPAR, 2008). Atmospheric deposition of nitrogen is estimated to provide about one-third of all inputs of nitrogen (OSPAR, 2007). In the period 1990-2002 the total waterborne inputs of nitrogen and phosphorus have reduced (OSPAR, 2005b).

Region IV: Bay of Biscay and Iberian Coast

The Bay of Biscay and the Iberian Coast are also less affected by eutrophication processes because the hydrographic conditions at the open ocean (e.g. fast dilution) inhibit the conversion of discharged nutrients to extended phytoplankton blooms. Eutrophication is, therefore, limited to a few inshore areas (OSPAR, 2008).

Region V: Wider Atlantic

Total inputs of nutrients in Region V are very low compared to the other regions. Atmospheric deposition is estimated to be the largest source of input of nitrogen (OSPAR, 2000).

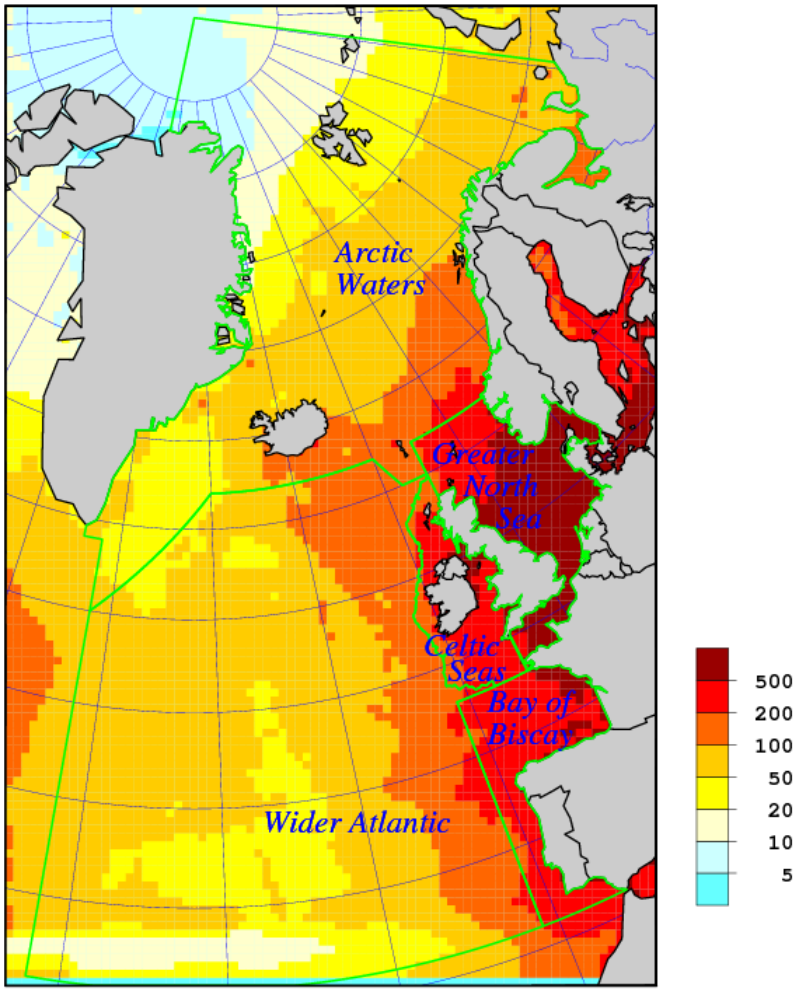

Figure 2.1 EMEP map of modelled annual total nitrogen (oxidized and reduced) deposition in the five main OSPAR regions in 2004. Unit: mg nitrogen m^{-2}. Grid 50 x 50 km. Source: OSPAR, 2007.

2.2 Trends in sources

The urbanisation of coastal areas is associated with nutrient releases and related pressures on the marine environment, e.g. from waste water treatment plants or from economic activities. Population sizes in Europe's coasts are steadily increasing (EEA, 2006). Coasts are converted to manmade artificial surfaces at a fast pace, replacing agricultural and natural land (EEA, 2006).

Aquaculture

European aquaculture production has continued to increase rapidly during the past 10 years due to expansion in the marine sector in the EU and EFTA countries (Figure 2.3). The growing aquaculture industry has become a relevant point source in some Contracting Parties. Both Norway and Sweden reported an increase of inputs of nitrogen and phosphorus in 2005. However, compared with the input from other sources, the absolute input through aquaculture is insignificant and is considered negligible for eutrophication. The precise level of local impact will vary according to production scale and techniques as well as the hydrodynamics and chemical characteristics of the region (EEA, 2008).

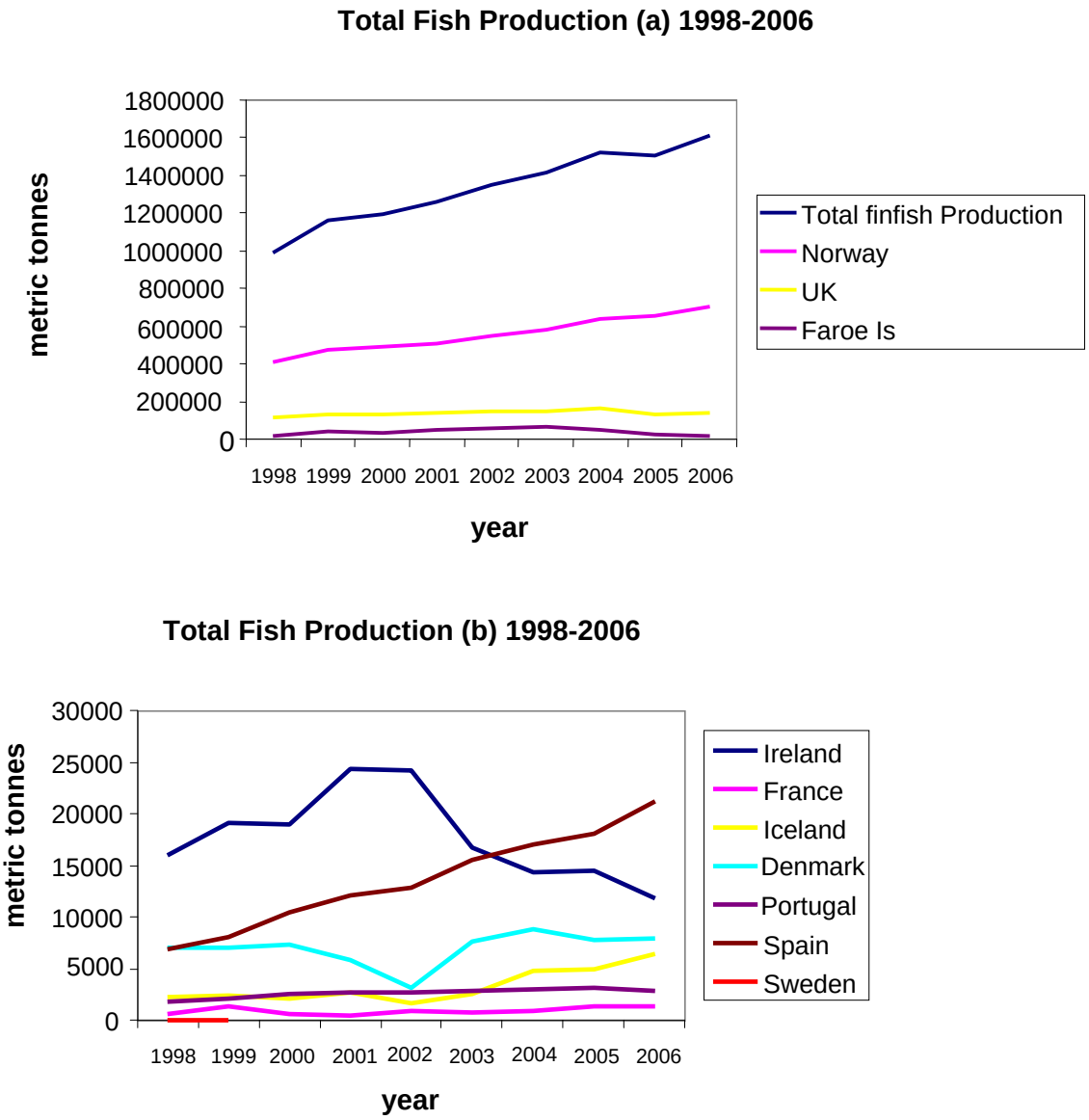

Figure 2.2. Total mariculture fish production (1998-2006) for (a) Faroes, UK and Norway; (b) Denmark, France, Germany, Portugal, Spain, Sweden, Iceland and Ireland. (Data from FAO FishStat 2008 and submissions from CPs)[1].

Urban waste water

Waste water, in particular untreated waste water, is a source for nutrient inputs to the sea and may cause eutrophication. However, the connection of industry and households to waste water treatment has been constantly improving in the last years. By 2005, the percentage of the population in OSPAR Contracting Parties connected to waste water treatment plants reached levels ranging from 55% in Belgium to 99% in the Netherlands (Eurostat, 2008). By 2005, the percentage of the population connected to waste water treatment using biological and chemical processes to remove nitrogen and phosphorus reached a range of 85 – 99% in six OSPAR Contracting Parties (Eurostat, 2008).

Industry

Some of the major industrial centres in Contracting Parties bordering the North-East Atlantic are located along estuaries and close to the main coastal cities and ports. However, industries situated downstream at the rivers and estuaries entering the sea also contribute to the nutrient load that will finally reach coastal

[1] Production values are for marine aquaculture for the OSPAR region only. Production values for Mediterranean and Baltic Sea mariculture in OSPAR countries have been omitted.

waters and the open sea. The pressures from these industries include discharges, emissions and losses of nutrients and hazardous substances to the environment. Industrial discharges have reduced significantly since 1985 and comprise at present only a small percentage of the total nitrogen and phosphorus losses.

Agriculture

Farmland accounts for more than 50% of the total land in most Contracting Parties, reaching 60 – 70% in countries bordering the North Sea and the Celtic Seas, but less than 10% in Iceland, Norway and Sweden. In agriculture, the trend towards greater intensification and higher productivity during much of the past fifty years was accompanied by an increase in the use of both inorganic nitrogen and phosphate fertilisers. Since the mid-eighties, the trend turned and a progressive reduction in fertiliser consumption has been recorded. The reduction in use of fertilisers in the period 2000 – 2003 compared to 1996 – 1999 was more explicit for phosphate fertiliser (15%) than for nitrogen (6%), with downward trends continuing in 2004 and 2005 (EC, 2007a). One of the changes over the period 1998 – 2005 was the steady increase, at the EU-15 level, in organic farming, which avoids or largely excludes the use of synthetically compounded fertilisers and pesticides (see Figure 2.2). However, at 4%, the share of agricultural land subject to organic farming is still small. Another important aspect has been the reform of the Common Agricultural Policy in 2003, which improved the framework for environmental integration through new or amended measures to promote the protection of the farmed environment. There has been no general trend in the density of livestock units per hectare of utilised agricultural land in the period 1998 – 2006 in the OSPAR area, which could indicate trends in the use of fertilisers and risk of nutrient leakage.

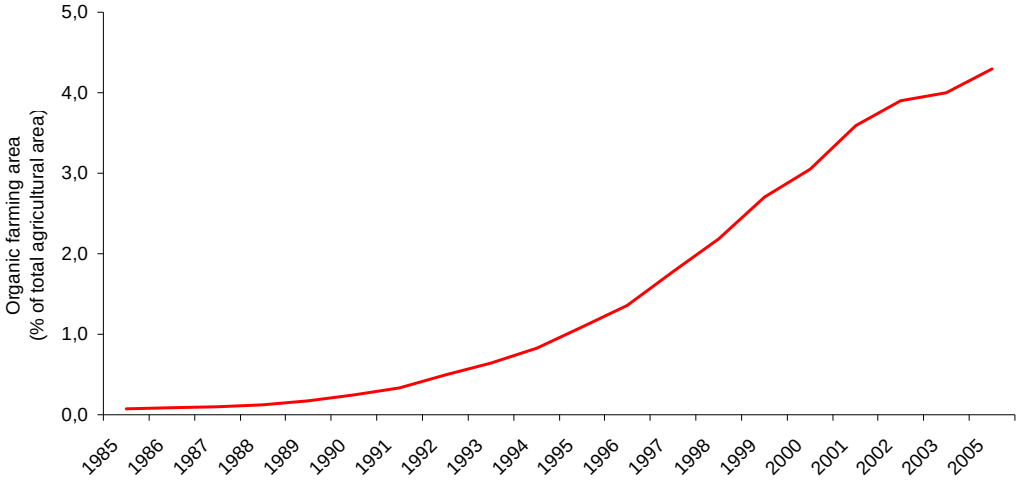

Figure 2.3 Area under organic farming (% of total agricultural area) in the European Union (CSI 026). Note that data from 2002-2005 are provisional. Source: EEA 2007a.

Diffuse sources

As a consequence of the reduction of inputs at source between 1985 and 2003, the relative share of the total anthropogenic nitrogen inputs from diffuse sources like agriculture and atmospheric deposition on inland surface waters increased. In 2005, agriculture was still a main diffuse source for nitrogen releases to the environment mainly via drainage and leaching to groundwater. The retention of nitrogen and phosphorus within catchments is responsible for a considerable time lag before reductions at source can be reflected in further decreased loads of nitrogen reaching the marine environment.

The portion of atmospheric inputs (i.e. deposition) of nitrogen from land based sources, such as traffic and power plants, and sea based sources, such as shipping, into the OSPAR maritime area accounted for one third of the total nitrogen inputs in the period 1990 – 2001.

Transport by land, air and sea has been growing over the past years. More goods are transported over longer distances and more frequently than ever before. As a result, the freight transport volume has grown by 43% since 1992. After some years of more moderate growth, volumes grew strongly once again in 2004. Over the same period Gross Domestic Product (GDP) grew by 30%. Therefore, freight transport intensity has increased over the past decade. Growth in the volume of passenger transport has nearly paralleled that in GDP (EEA 2007b).

3. What has been done so far?

3.1 Objectives of the recommendations

As a result of their concern about the alarming algal blooms in the Skagerrak and Kattegat in the spring of 1988, which resulted in widespread and serious damage to the marine environment, PARCOM Contracting Parties agreed in 1988 (PARCOM Recommendation 88/2) (PARCOM, 1988):

a. to take effective national steps in order to reduce nutrient inputs into areas where these inputs are likely, directly or indirectly, to cause pollution;

b. to aim to achieve a substantial reduction (of the order of 50%) in inputs of phosphorus and nitrogen into these areas between 1985 and 1995, or earlier if possible.

In order to implement this Recommendation Contracting Parties agreed, with respect to the North Sea, Skagerrak and the Kattegat, on actions to be taken before the end of 1995 (PARCOM Recommendation 89/4) (PARCOM, 1989).

Recognising that a substantial part of the eutrophication problems observed in Paris Convention waters was caused by nutrient inputs from agricultural sources, Contracting Parties to the Paris Convention agreed in 1992 to reduce the nutrient load from agriculture in areas where these inputs are likely, directly or indirectly, to cause pollution, and to apply all, or part of a list of measures, giving preference to those which involve reduction of emissions at source (PARCOM Recommendation 92/7) (PARCOM, 1992).

The implementation of these Recommendations in the OSPAR maritime area is an integral part of the OSPAR Eutrophication Strategy, adopted in 1998 and confirmed in 2003.

3.2 Common Procedure/Eutrophication status report

To assist Contracting Parties in identifying those areas where nutrient inputs are likely, directly or indirectly, to cause pollution (and with that in identifying where implementation requirements exist for the three PARCOM Recommendations), marine areas are characterized by the Common Procedure for the Identification of the Eutrophication Status of the OSPAR Maritime Area (the "Common Procedure"), adopted by OSPAR in 1997 and revised in 2005. The Common Procedure characterises the quality of the marine environment with regard to eutrophication in terms of problem areas, potential problem areas and non-problem areas (OSPAR, 2005a).

Following a first application of the Common Procedure in 2007/2008, the second assessment in 2007/2008 covered the period 2001-2005 and concluded that eutrophication is still a problem in 106 areas of the North-East Atlantic (Figure 3.1) (OSPAR, 2008). Since the last application in 2002/2003 only 9 problem areas improved to potential problem areas or non-problem areas. Table 1.1 gives an overview of the Contracting Parties with problem areas with regard to eutrophication where PARCOM Recommendations 88/2 and 89/4 apply and where Contracting Parties are committed to report on their implementation.

Table 3.1. Overview of Contracting Parties' situation as regards eutrophication status as reported in the first application of the Comprehensive Procedure of the Common Procedure for the Identification of the Eutrophication Status of the Maritime Area

Countries with problem areas with regard to eutrophication	**Countries with only potential problem areas with regard to eutrophication**	**Countries which have not identified any problem areas with regard to eutrophication**	**Countries without coastline in the maritime area, but which have accepted PARCOM Recommendations 88/2, 89/4 and 92/7**
Belgium, Denmark, France, Germany, Ireland, the Netherlands, Norway, Sweden, and the United Kingdom	Portugal, Spain	Iceland	Finland, Luxembourg and Switzerland

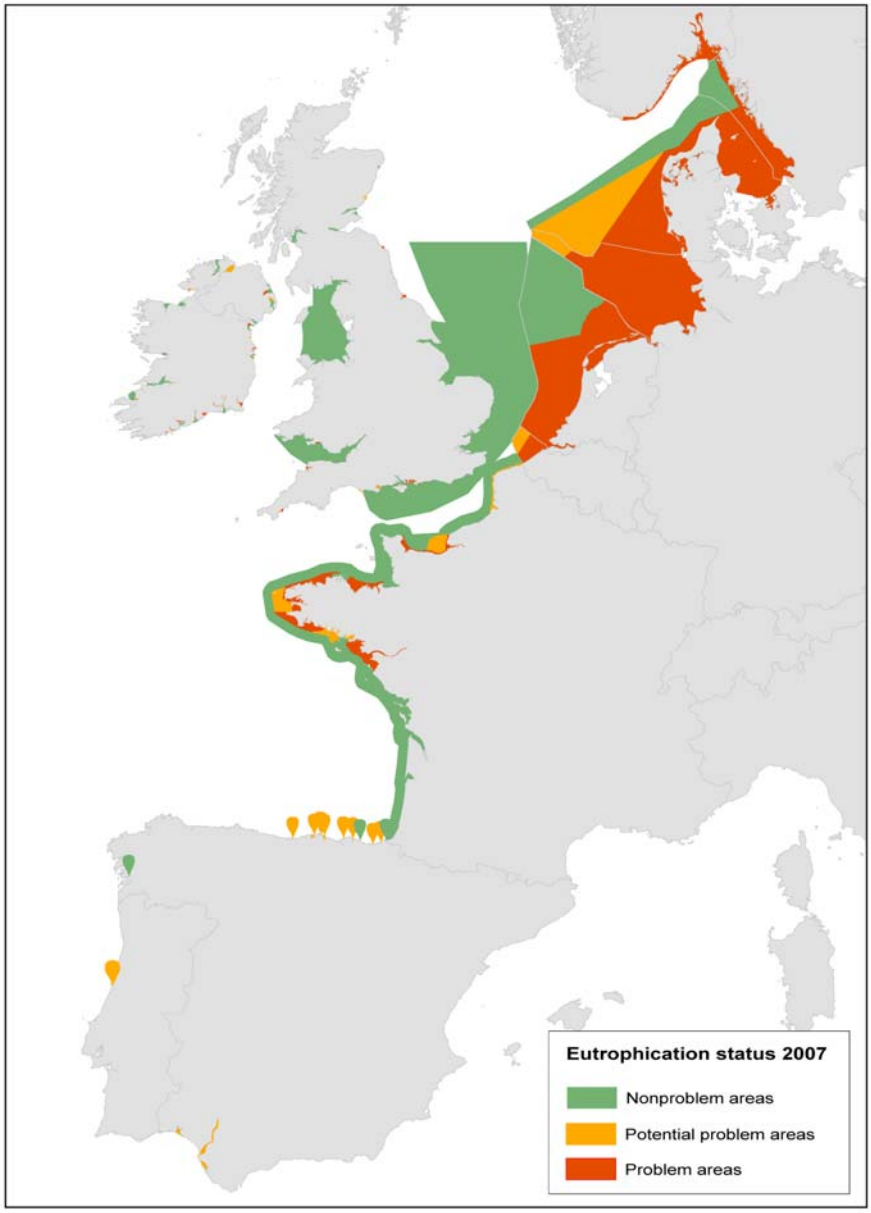

Figure 3.1 Eutrophication status of areas of the OSPAR maritime area assessed in 2007. Source: OSPAR, 2008

3.3 Monitoring frameworks

Implementation reporting on PARCOM Recommendations 88/2 and 89/4 provides data on emissions, discharges and losses at source and reductions achieved in key sectors.

This is complemented by regular monitoring programmes under the OSPAR Joint Assessment and Monitoring Programme (OSPAR 2003c):

- the Comprehensive Atmospheric Monitoring Programme (CAMP) covers monitoring at coastal stations of the concentrations of selected contaminants (including nitrogen) in precipitation and air and their depositions in order to annually assess the atmospheric inputs of these contaminants to the OSPAR Convention area;
- the Comprehensive Study on Riverine Inputs and Direct Discharges (RID) covers monitoring of concentrations of selected contaminants (including nutrients) in rivers and direct discharges in order to annually assess the waterborne load of these contaminants to the OSPAR Convention area;

- the Eutrophication Monitoring Programme as part of the Co-ordinated Environmental Monitoring Programme (CEMP) covers monitoring of nutrients and eutrophication effects parameters in the marine environment in order to assess the eutrophication status of the OSPAR maritime area under the Common Procedure.

Transboundary air pollution within Europe is monitored under EMEP (European Monitoring and Evaluation Programme) by a network of more than 1000 stations in 25 countries and covering a number of contaminants, including nitrogen species. All OSPAR Contracting Parties are parties to the UNECE Convention on Long-Range Transboundary Air Pollution and are subject to emission reporting to EMEP. A recent EMEP report prepared for OSPAR indicated a reduction of nitrogen oxide emissions for the period 1990 – 2004 in the OSPAR maritime area (OSPAR, 2007). International ship traffic on the OSPAR Convention Waters was identified as the largest single source category of NO_2 emissions.

3.4 Implementation of international measures and EU

The Eutrophication Strategy is also implemented through obligations within the framework of the other international obligations of Contracting Parties in this field. The main EU directives and international agreements are listed below and with the exception of the NEC Directive (2001/81/EC), apply to EU member states and to Norway and Iceland as members of the European Economic Area.

EU Directives

Directive 91/676/EEC - Nitrates Directive

An important step towards reducing eutrophication in coastal waters is the Nitrates Directive (91/676/EEC), which was adopted in 1991. It is an environmental measure designed to reduce water pollution by nitrate from agricultural sources and to prevent such pollution occurring in the future. The Directive requires Member States to designate as Nitrate Vulnerable Zones (NVZs) all land draining to waters that are affected by nitrate pollution, and to establish a voluntary code of good agricultural practice and Action Programmes of measures for the purposes of tackling nitrate loss from agriculture. Finally, it requires EU and EEA Member States to review the extent of their NVZs and the effectiveness of their Action Programmes at least every four years and to make amendments if necessary.

The various requirements were to be implemented by EU-15 Member States in three stages by 1996, 2000 and finally 2004. At present, the implementation of the Nitrates Directive is still incomplete, as confirmed by several infringement procedures, mainly for insufficient designation of NVZs and non-conformity of action programmes. However, significant progress has been made in recent years (EC 2007a). Considerable further work in improving NVZ designations and the quality of action programmes will be required in order to fully achieve the objectives of the Directive with regard to water quality (SEC(2007)339). In 2009, EU Member States will have to establish 4th national action programmes (2010-2015).

Directive 91/271/EEC - Urban Waste Water Treatment (UWWT) Directive

A key driving force in the reduction of nutrient inputs to coastal waters in the OSPAR area is the EC Urban Waste Water Treatment Directive (91/271/EEC). The various requirements for collection and specified treatment of waste water for agglomerations and industries and the designation of “sensitive areas”, were to be implemented by EU-15 Member States in three stages by 1998, 2000 and finally 2005. These stages were functions of the size of the agglomerations, the quality of the receiving waters and the specification of the treatment imposed. At present, despite improvements having taken place, major delays in implementing the Directive still exist for most Member States. This has resulted in several infringement procedures, mainly because of major delays in the implementation programmes and insufficient designation of sensitive areas (EC 2007c).

Directive 2008/1/EC - Integrated Pollution and Prevention Control (IPPC) Directive

With the adoption in 1996 of the IPCC Directive on integrated pollution prevention and control, the European Community has taken an important step in pollution abatement. The IPPC Directive pursues reductions of discharges to water and emissions to air of nutrient species from main industrial installations through the use of Best Available Techniques (BAT) and emission/discharge limit values. After a two-year review process, the Commission adopted on 21 December 2007 a proposal for a directive on industrial emissions which is intended to 'recast' existing relevant legislation (COM(2007) 844 final) (EC, 2007b). The Commission’s proposal does not address the aquaculture sector, for which separate policy development is taking place following a broad consultation during 2007.

Directive 2001/81/EC - National Emission Ceilings (NEC) Directive

This Directive sets upper limits for each EU Member State for the total emissions in 2010 of the 4 pollutants responsible for acidification, eutrophication and ground-level ozone pollution (SO_2, NO_x, VOCs and ammonia). The NEC Directive required Member States to draw up national programmes by 2006 in order to demonstrate how they were going to meet the national emission ceilings by 2010. Member States are obliged to report each year their national emission inventories and projections for 2010 to the European Commission and the European Environment Agency. Currently the NEC Directive is being revised as part of the implementation of the Thematic Strategy on Air Pollution. The new proposal will set emission ceilings to be respected by 2020 for the four already regulated substances. The proposal for the revision of the NEC Directive, foreseen for spring 2008, was still under preparation when this report was published. OSPAR countries that are EU Member States will have to respect the new emission ceilings by 2020.

Directive 2000/60/EC - Water Framework Directive (WFD)

The WFD requires Member States to achieve “good ecological and chemical status” of surface water by 2015. A Guidance Document provides a harmonised methodology for assessing the risk of eutrophication in the context of EU policy. All Member States have reviewed the environmental impact of human activities on the status of surface and groundwater and reported to the Commission in 2005. The reports show that eutrophication is still a major problem and that in many river basins, pollution from phosphorus and nitrogen arises from a number of different sources. Member States must prepare a programme of measures by December 2009 in order to reach “good ecological status” by 2015. In cases where WFD monitoring and assessment shows that nitrogen or phosphorus inputs are significantly contributing to eutrophication, Member States must implement measures to address this problem. The WFD uses a river basin approach; for each river basin district - some of which will traverse national frontiers - a "river basin management plan" will need to be established and updated every six years, and this will provide the context for the co-ordination requirements identified above.

Regulation (EC) No 648/2004 on detergents concerning the use of phosphates

At present the EC is evaluating whether restrictions on phosphates in detergents are justified at EU level. The decision will be taken once sufficient evidence has been gathered and various policy options have been assessed. An impact assessment was initiated in 2007 with the aim of concluding it in 2008. The Commission will present a legislative proposal without delay once a decision is taken on whether restrictions are justified.

International Conventions

UNECE Convention on Long-range Transboundary Air Pollution

An important convention aiming at reducing air pollution is the Convention on Long-range Transboundary Air Pollution under the United Nations Economic Commission for Europe (UNECE) (UNECE, 1979). The Convention has been extended by eight protocols that identify specific measures to be taken by its 51 state parties to cut their emissions of air pollutants, including nitrogen species. The aim of the Convention is that Parties shall endeavour to limit and, as far as possible, gradually reduce and prevent air pollution including long-range transboundary air pollution. Parties develop policies and strategies to combat the emission of air pollutants through exchanges of information, consultation, research and monitoring.

International Maritime Organisation

Under the International Maritime Organisation, the MARPOL Convention is the main international instrument to aim at preventing and minimizing pollution from ships - both accidental pollution and that from routine operations - and currently includes six technical Annexes. MARPOL Annexes IV and VI deal with the prevention of pollution from ships by sewage discharged to water and exhaust fumes emitted to air, respectively. Annex VI sets limits on sulphur oxide and nitrogen oxide emissions from ship exhausts and prohibits deliberate emissions of ozone depleting substances. Annex VI has undergone a comprehensive review by the IMO Marine Environment Protection Committee (MEPC) resulting in a revised Annex VI early in October 2008. OSPAR countries that are IMO member states and have ratified the agreement are obliged to implement the regulations. (http://www.imo.org)

4. Reporting obligations, data submission and reporting methods

4.1 Reporting obligations

All Contracting Parties that have identified problem areas with regard to eutrophication are committed to the 50% reduction target for nutrients for the problem areas and are required to report on the implementation of PARCOM Recommendations 88/2 and 89/4 and the effectiveness of measures to reduce nutrient inputs into those problem areas (see Table 3.1 and Figure 3.1).

4.2 Data submission

The deadline for the submission of reports was 1 May 2007, which was extended to 31 December 2007. By that date national reports on PARCOM Recommendations 88/2 and 89/4 had been received from six Contracting Parties with eutrophication problem areas (Belgium, Germany, the Netherlands, Norway, Sweden and the United Kingdom) and Switzerland (a land-locked country that discharges into the OSPAR maritime area). Ireland submitted their national implementation reports on PARCOM Recommendation 89/4 and 88/2 with figures for 2005 on 26 May 2008, too late to be taken into account in the over view assessment; the national reports are included in the addenda. Two Contracting Parties that have identified problem areas did not report (Denmark and France).

Denmark informed OSPAR that due to technical problems their reporting of data on discharges, emissions and losses had been delayed. Denmark reported that no major changes had occurred on measures since the last reporting round and that the information from the previous report is still valid (OSPAR, 2006a). France reported that they had problems with the data format and that they intended to report on nutrient reduction under relevant EC legislation. Ireland informed OSPAR that they had not been able to submit figures for earlier years against which a reliable estimate of reductions achieved for nitrogen and phosphorus could be made.

4.3 Reporting methods PARCOM Recommendation 88/2

4.3.1 Reporting methods, approach and coverage

The methods for reporting discharges, emissions and losses in the context of Recommendation 88/2 (PARCOM, 2008) vary between Contracting Parties. Table 4.1 gives an overview of the methods used. Some Contracting Parties gave a more detailed explanation in their national reports (see Addendum 2).

The reporting year for nitrogen and phosphorus data is 2005, compared to 1985.

For the purpose of reporting on the 50% reduction target (PARCOM Recommendation 88/2), six countries applied a full source-oriented approach (Belgium, Germany, Ireland, the Netherlands, Sweden and Switzerland). The United Kingdom applied the load-oriented approach for the total of the country (as used by the United Kingdom for reporting under the OSPAR RID Study). The reason for this is the size and nature of the United Kingdom catchments; the catchments that the United Kingdom identified as problem areas or potential problem areas are generally small estuarine, coastal and harbour locations where detailed local knowledge and expertise is required to obtain the relevant data. The relevant infrastructure for collecting these data is still evolving. Norway applied the source-oriented approach and calculated retention in watercourses (HARP-NUT Guideline 9). Ireland based their calculations for industry emissions on licence limits rather than on monitoring data and their calculations for waste water treatment and sewerage on plant population equivalents rather than on served populations and industries/paved areas.

Contracting Parties, for which identified problem areas cover most of their marine areas, reported data for the entire OSPAR catchment area (Belgium, Netherlands, Germany and Sweden). Norway reported on the coastline from the Swedish border to the southernmost part of Norway - Lindesnes. Ireland reported on three River Basin districts located along Ireland's eastern and southern coast. The majority (>80%) of Irish problem areas with regard to eutrophication are located within these three River Basin districts.

4.3.2 Calculation methods and models

The format for implementation reporting on PARCOM Recommendation 88/2 was revised in 2006 for this reporting round to include a request for information on applied models and calculation methods, especially for diffuse sources (agriculture, atmospheric deposition, natural background losses).

This resulted in information from Contracting Parties indicating that the way in which they report on the category "diffuse sources" varies. Germany, Norway, Sweden and Switzerland report on agriculture, atmospheric deposition and natural background losses (including forestry for Sweden). Belgium only reports on agriculture, the Netherlands and the United Kingdom report on agriculture (for the Netherlands this figure includes natural background losses) and atmospheric deposition (on fresh water systems for the United

Kingdom). Ireland reports on agriculture and natural background losses. Information about calculation methods and models used is summarised in Table 4.1.

The Netherlands and Germany have recalculated some of the 1985 figures since the last round of implementation reporting.

Because the basis for calculating reductions varies from one Contracting Party to another, figures can only be compared internally and it is not possible to compare the achievements of Contracting Parties on a common basis.

4.4 Quality assurance

The reporting format asks for a brief description of the quality assurance procedures followed for the model applications, such as references to Good Modelling Practice, data handling procedures, and validation procedures. Belgium, Norway, Switzerland and Sweden did not include such a description in their implementation reports.

The Netherlands and the United Kingdom reported that the modelling practice was carried out by accredited laboratories and qualified personnel. The United Kingdom reported that the results had been checked for consistency and anomalies had been investigated. For the Netherlands a review by external experts in nutrient science had taken place before the models could be applied for scenario analyses.

4.5 Evaluation of the use of HARP-NUT Guidelines

4.5.1 HARP-NUT Guidelines

In the past 10 years, OSPAR has developed a suite of Guidelines for harmonised quantification and reporting procedures for nutrients (HARP-NUT). They are intended to serve as a tool for Contracting Parties to report, in a harmonised manner, their different commitments with regard to nutrients under the OSPAR Convention and the Eutrophication Strategy on:

- nitrogen and phosphorus discharges and losses from point and diffuse sources into inland surface waters; and
- nitrogen and phosphorus inputs into the maritime area.

The use of the HARP-NUT Guidelines is intended to facilitate the assessment of effectiveness of reduction measures and the progress towards complying with the 50% reduction target and any future targets agreed by OSPAR. It may also facilitate the collection of data that is required for the assessment or review of the eutrophication status of the maritime area, in line with the OSPAR Common Procedure. The HARP-NUT system encompasses nine Guidelines (OSPAR, 2004) which address the main entry routes and fluxes of nutrients in the environment (Figure 4.1), except atmospheric deposition, losses (e.g. denitrification) from marine waters, dumping of nitrogen and phosphorus at sea and nitrogen and phosphorus fluxes to and from water masses outside the maritime area. Guideline 1 provides the framework and approach of the HARP-NUT system. Each Guideline is accompanied by a specific reporting format, and four summary-reporting formats concerned only with the annual figures of the total discharges/losses/inputs of nitrogen and phosphorus per source category and catchment.

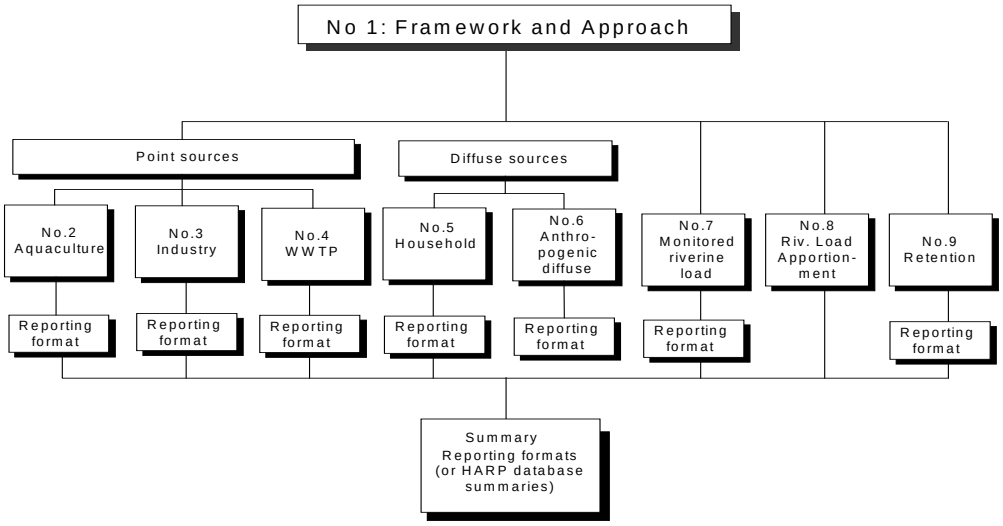

Figure 4.1. Structure of the HARP-NUT system with the nine Guidelines and their associated reporting formats (OSPAR, 2004)

OSPAR 2000 adopted on a trial basis the OSPAR Guidelines for Harmonised Quantification and Reporting Procedures for Nutrients (HARP-NUT) number 1-9, except for number 6 on diffuse sources. OSPAR 2004 adopted revised versions of HARP-NUT Guidelines 1, 3, 4, 5, 7, 8 and 9. OSPAR 2007 adopted the HARP-NUT Guideline 6 on a trial basis for the 2007/2008 and 2009/2010 implementation reporting rounds under PARCOM Recommendation 88/2.

4.5.2 Application of HARP-NUT Guidelines

The Netherlands reported on the application of HARP-NUT Guidelines 3, 4, 5 and 6. Norway applied Guidelines 2, 5 and 6. Norway commented that the figures for industrial discharges, and waste water treatment and sewage, had been submitted by industry and municipalities, respectively. This made it difficult to get an overview of the extent to which Guidelines 3 and 4 had been used. The Netherlands did not encounter this problem because the authorities calculated the total discharges from data supplied by the plants. Sweden applied a simplified form of Guideline 2. Guideline 3 was applied based on self-monitoring data and Guideline 6 was applied to calculate natural background losses. The United Kingdom remarked that their problem areas and potential problem areas consist of very small catchments and it had generally not been feasible to apply the detailed procedures set out in Guidelines 2, 3, 5 and 6.

4.5.3 Evaluation of the trial application of HARP-NUT Guideline 6

The reporting format includes an evaluation of the trial application of HARP-NUT Guideline 6, with the following questions:

- Did you find the HARP-NUT Guideline 6 useful to help you select the tools you needed for quantification and reporting of losses of nitrogen and phosphorus from diffuse sources?
- Did you apply several models for the same catchment, and if so, what were your experiences?
- If models other than those referred to in the Guideline were used, please explain why other models were used and whether the Guideline was helpful for evaluating their suitability for your purposes;
- Did you encounter any specific problems or a need for more precision or clarification in the Guideline? If so, please elaborate;
- If you encountered problems, please suggest improvements.

Ireland and Switzerland have not provided input to these questions. For Belgium, only the Flemish region provided answers. The answers received are summarised as follows:

Ad 1. The United Kingdom did not apply Guideline 6. The United Kingdom explained that the Guideline was a difficult tool to use for the very small catchments, which comprised the United Kingdom problem areas and potential problem areas. Getting the data to run the models was difficult, time-consuming and expensive. The United Kingdom feared that because the various assumptions and estimates that would have to be used the results might be misleading.

The Flemish region of Belgium also did not apply Guideline 6. They commented, however, that it was useful to compare the information and methods.

Norway had not gone through the process of selecting a new model for estimating nutrient discharges and losses, but continued to use the TEOTIL model that was developed around 1990. Routines for reporting according to the Guideline 6 format as well as other international reporting requirements had been implemented by Norway.

Germany applied the MONERIS model, scrutinised in Guideline 6. They encountered no problems.

The model applied in the Netherlands to estimate losses from agriculture (NL CAT) was part of the EUROHARP project and, therefore, already assessed in the context of and included in Guideline 6.

Ad 2. Germany applied the conceptual-deterministic nutrient emissions model MONERIS to many international river systems in recent years. It could be shown from this exercise that MONERIS was able to describe the observed dissolved inorganic nitrogen (DIN), total nitrogen (TN) and total phosphorus (TP) loads for river catchments with a size from several hundred km² down to less than 50 km², for both single year data and means of periods.

As part of the EUROHARP project, other models had been tested on a catchment in the Netherlands. This experience assisted in the verification of the quality of the Dutch model with respect to shortcomings and strong features.

Also as part of the EUROHARP project, several models were tested on a Norwegian catchment. The results of this comparison showed that there was no indication that, for aggregating information to river basins or larger parts of the country, more data-intensive process-orientated models would produce more accurate results.

Ad 3. The Flemish region in Belgium used the same model as before (SENTWA) to quantify the diffuse losses of nitrogen and phosphorus from diffuse sources.

Sweden adopted an American model CREAM/ICECREAM. The main reason was that the model had been further developed by Finland to take into account freeze/thawing of the soil, which made it relevant for Swedish conditions.

Norway continued using the TEOTIL model because the routines for gathering the information and updating the annual coefficients needed for this model were well-established and the method was good for screening and aggregating large areas.

Ad 4. An observed problem was that model development was rapid and in a few years the recommendations may be outdated (Sweden).

If reporting on OSPAR measures related to nutrient discharges and losses continued, harmonisation between reporting under the Water Framework Directive and OSPAR was necessary (Norway).

Ad 5. An observed problem was that the data for 1985 was old and difficult to update. The comparison between 1985 and 2005 would thus not be very accurate (Sweden).

The differentiation between the Guideline 6 reporting format between monitored and unmonitored areas was felt unnecessary for the Norwegian approach unless it was compared with RID results (Norway).

Table 4.1. Overview of calculating methods and/or models used by Contracting Parties for reporting on PARCOM Recommendation 88/2 in their national implementation reports (see also addendum 2). Nitrogen is referred to as 'N' and phosphorus as 'P'.

	Belgium	**Germany**	**Ireland**	**The Netherlands**	**Norway**	**Sweden**	**Switzerland**	**United Kingdom**
Aquaculture	Reporting 2006 Eurostat (Brussels-Capital region)	NA	GL 2, Approach 2	NA	TEOTIL, GL 2	Simplified GL 2	NI	NI
Industry	Reporting 2006 Eurostat (Brussels-Capital region)	MONERIS	Simplified G L3	GL 3	TEOTIL, Figures submitted by industry	GL 3 based on self monitoring data	NI	NI
Waste water treatment and sewerage	Reporting 2006 Eurostat (Brussels-Capital region)	MONERIS	Simplified GL 4	GL 4	TEOTIL, Figures submitted by municipalities	All plants > 25 pe	NI	NI
Households not connected to public sewerage	Reporting 2006 Eurostat (Brussels-Capital region)	MONERIS	Simplified GL 5	GL 5	TEOTIL, Principle for calculation based on GL 5	National inventory + removal coefficients	NI	NI
Agriculture	SENTWA version 7.04 (Flemish region). Reporting 2006 Eurostat (Brussels-Capital region)	MONERIS	2000 Agricultural census loads * loss coefficients	GL 6, model 1 (NL CAT)	TEOTIL, Calculation based on GL 6	SOILNDB model (for N); ICECREAM model (for P)	NI	NI
Atmospheric deposition on fresh water systems	Reporting 2006 Eurostat (Brussels-Capital region)	MONERIS	NI	Monitoring combined with emission and dispersion modelling (for N)	NI	EMEP & MATCH models (for N)	NI	NI
Natural background losses	NI	MONERIS	Area * Nutrient losses per area	Included in figure for agriculture	TEOTIL, According to principles of GL 6	GL 6	NI	NI

NA Not Applicable
NI No Information
GL HARP-NUT Guideline
N Nitrogen
P Phosphorus

5. Reporting results

5.1 Implementation reports on measures to reduce nutrient inputs (Recommendation 89/4)

The implementation reports on PARCOM Recommendation 89/4 provide the details of the actions taken by Contracting Parties to achieve reduction of nutrient inputs. The national reports received are compiled in Addendum 1.

The main action in various Contracting Parties to achieve (further) reduction of nutrient inputs is the adequate implementation of the EU Water Framework Directive, the Nitrates Directive and the Urban Waste Water Treatment Directive. This includes amongst others the improved designation of "sensitive areas" under the Urban Waste Water Treatment Directive and "vulnerable zones" under the Nitrates Directive. The following relevant specific/special actions have been mentioned in the implementation reports on PARCOM Recommendation 89/4:

- **Aquaculture:** maximum on nitrogen and phosphorus releases by aquaculture in problem areas (Norway); phosphorus tax for fresh water fish farms (Denmark); codes of good practice (the United Kingdom);
- **Sewage:** implementation of the Urban Waste Water Directive, tertiary treatment at (urban) waste water treatment plants (for phosphorus often implemented, for nitrogen on-going); reduction of inputs from overflows (the Netherlands, Sweden); actions on scattered dwellings (the Netherlands, Denmark), decree on yacht basins/marinas (the Netherlands); ban of phosphorus-containing detergents for household uses (Sweden); codes of practice on the application of sewage sludge to land (United Kingdom), implementation of the national Waste Water Discharge Regulations (Ireland);
- **Industry:** EC Directive on Integrated Pollution Prevention and Control (IPPC-Directive), application of Best Available Technique (BAT), application of Environmental Code;
- **Agriculture:** Implementation of the EU Nitrates Directive and the Water Framework Directive:
  - application of codes of good agricultural practice in the use of fertilisers (Germany, the United Kingdom);
  - decree on application of manure on arable land (the Netherlands), general rules on greenhouses (the Netherlands);
  - regulations on autumn and winter grown land (Sweden);
  - environmental fees to reduce the use of fertilisers (Sweden);
  - incentives to stimulate more environmentally friendly farming (Norway, United Kingdom)
  - training programmes and advice to farmers on the use of fertilisers (Sweden, United Kingdom);
  - reduction of agricultural excess phosphorus by 50% in 2015 compared to levels in 2001/2002, and of nitrogen leaching by a minimum of 13% by 2015 compared to levels in 2003 (Denmark);
  - implementation of national phosphorus regulations to improve all polluted rivers and lakes to a level consistent with the beneficial uses of their waters (Ireland);
  - establishing 50 000 hectares of buffer zones (Denmark);
  - protection of ammonia-sensitive habitats (Denmark);
  - implementation of the Groundwater Directive (Ireland);
  - implementation of the Sewage Sludge Directive (Ireland).
- **Atmospheric deposition:** only Germany indicated measures to address atmospheric emissions by referring to various EU Directives dealing with traffic, combustion and ambient air quality;
- **Forestry:** only Norway and Sweden mentioned forestry as a source. Norway did not report on specific actions. Sweden reported that some actions to protect streams and wetlands had been taken, e.g. several information/education programmes for foresters.

5.2 Emissions, discharges and losses of nutrients reported under PARCOM Recommendation 88/2

The national reports are compiled in Addendum 2. Only Contracting Parties with eutrophication problem areas identified under the Common Procedure are required to report. Contracting Parties are asked to report only on nutrient losses and discharges affecting areas identified as problem areas. Because the basis for calculating reductions varies from one Contracting Party to another, figures can only be compared internally and it is not possible to compare the achievements of Contracting Parties on a common basis.

5.2.1 Aquaculture

Table 5.1 Discharges of nutrients (tonnes) from aquaculture plants

Country	Nitrogen			Phosphorus		
	1985	2005	% Reduction	1985	2005	% Reduction
Belgium	NA	NA	NA	NA	NA	NA
Denmark	NI	NI	NI	NI	NI	NI
France	NI	NI	NI	NI	NI	NI
Germany	NA	NA	NA	NA	NA	NA
Ireland	NI	58	NI	NI	11	NI
Netherlands	NA	NA	NA	NA	NA	NA
Norway	12	28	increase	3	5	increase
Sweden	80[1]	145	increase	10	25	increase
Switzerland	30	30	0	4	3	25
United Kingdom[2]	NA	NA	NA	NA	NA	NA

NI No Information

NA Not Applicable

1 1985 figure is rounded off, and thus differs from the figure in the last reporting round.

2 Aquaculture is not believed to be a significant contribution in the United Kingdom (nitrogen and phosphorus) problem areas and potential problem areas.

5.2.2 Industry

Table 5.2 Discharges of nutrients (tonnes) from industries not connected to municipal sewerage systems

Country	Nitrogen			Phosphorus		
	1985	2005	% Reduction	1985	2005	% Reduction
Belgium	29 280	3 834*	87	5 460	806	85
Denmark	NI	NI	NI	NI	NI	NI
France	NI	NI	NI	NI	NI	NI
Germany	102 590[1]	9 300[1]	91	4 750[1]	310[1]	94
Ireland	NI	403	NI	NI	652	NI
Netherlands	19 528	3 932	80	13 422	377	97
Norway	5 659[3]	1 298	77	133[3]	103	23
Sweden	1 040[2]	1 000	4	118[2]	80	32
Switzerland	1 000	800	20	153	20	87
United Kingdom	NI	9 500**	NI	NI	NI	NI

NI No information

1 In the previous report the 1985 figure was total emission from Germany (North Sea and Baltic Sea). Since 2002 an extended database has been used and figures can be differentiated in accordance with both drainage areas.

2 A smaller number of industrial sectors were included in the figure for 1985, compared to 2005.

3 The figure in the 2003 data report for 1985 was different; the figures presented here are correct.

* Reporting 2006 Eurostat for the Brussels-Capital Region

** 2003 figure; see Addendum 2 for further explanation

5.2.3 Sewage

Table 5.3 Nutrient discharges (tonnes) from sewage treatment works and sewerage

Country	Nitrogen			Phosphorus		
	1985	2005	% Reduction	1985	2005	% Reduction
Belgium[1]	31 960*	23 574*	26*	9 870*	4 114*	58*
Denmark	NI	NI	NI	NI	NI	NI
France	NI	NI	NI	NI	NI	NI
Germany	272 490[1]	83 430	69	49 940[1]	7 910	84
Ireland	NI	4 069	NI	NI	803	NI
Netherlands	38 412	21 742	43	10 810	2 651	75
Norway	11 929*[3]	6 737*	44*	928*[3]	176*	20*
Sweden	7 420[2]	4 500	39	262	120	54
Switzerland	18 000	10 700	41	2 000	900	55
United Kingdom	216 000**	184 000***	15**/***	NI	NI	NI

NI No information.

1 In former report only WWTP

2 The population size was different in 1985, compared to 2005.

3 Last report's figure for 1985 was different. The figures presented here are correct.

* Includes Households not connected to public sewerage.

** 1983 data, including industrial discharges

*** 2003 data, including industrial discharges, see Addendum 2 for further explanation

5.2.4 Households not connected to public sewerage

Table 5.4 Nutrient losses (tonnes) from households not connected to public sewerage

Country	Nitrogen			Phosphorus		
	1985	2005	% Reduction	1985	2005	% Reduction
Belgium	NI	9 447*	NI		1 710*	NI
Denmark	NI	NI	NI	NI	NI	NI
France	NI	NI	NI	NI	NI	NI
Germany	8 070[1]	3 730[1]	54	2 450[1]	470[1]	81
Ireland	NI	1 686	NI	NI	251	NI
Netherlands	3 301	402	88	569	56	90
Norway	*	1 138	*	*	77	*
Sweden	900	500	44	216	90	58
Switzerland	1 500	816	46	300	162	46
United Kingdom	NI	3 900**	NI	NI	NI	NI

NI No information

1 In former report Combined Sewer Overflows (CSO) and storm water included

* The nutrient losses from households not connected to public sewerage are included in the figures on discharges from waste water treatment and sewerage.

** 2003 figure; see Addendum 2 for further explanation

5.2.5 Agriculture

Table 5.5 Discharges of nutrients (tonnes) from agriculture

Country	Nitrogen			Phosphorus		
	1985	2005	% Reduction	1985	2005	% Reduction
Belgium	31 895	34 124	-7	2 128	1 969	7.5
Denmark	NI	NI	NI	NI	NI	NI
France	NI	NI	NI	NI	NI	NI
Germany	313 570	240 600	23	6 630	7 170	-8
Ireland	NI	30 822	NI	NI	639	NI
Netherlands	73 220[1]	54 481[1]	26	4 070[1]	3 786[1]	7
Norway	14 631	10 505	28	401	247	38
Sweden	20 000	14 800	26	390	380	3
Switzerland	14 327	11 419	20	405	241	40
United Kingdom	287 000*	330 000**	-15	NI	NI	NI

NI No information

[1] The Dutch figures on agriculture comprise the natural background losses of nutrients.

* Figure for 1983

** Figure for 2003; see Addendum 2 for further explanation

5.2.6 Diffuse anthropogenic sources

Diffuse anthropogenic sources include agriculture, atmospheric deposition on fresh water systems and natural background losses.

Table 5.6 Nutrient losses (tonnes) from diffuse anthropogenic sources and the reductions achieved (including agriculture)

Country	Nitrogen			Phosphorus		
	1985	2005	% Reduction	1985	2005	% Reduction
Belgium[2]	31 895	34 124	-7	2 128	1 969	7.5
Denmark	NI	NI	NI	NI	NI	NI
France	NI	NI	NI	NI	NI	NI
Germany	422 850[4]	321 550[4]	24	8 640[4]	8 700[4]	-1
Ireland	NI	33 058	NI	NI	788	NI
Netherlands	96 220[3]	64 391	33	4 070[2/3]	3 786[2]	7
Norway	32 291[1]	25 649	21	770[1]	399	48
Sweden	38 100	32 100	16	1 020[1]	1 005	1
Switzerland	19 219[1]	16 310	15	547[1]	383	30
United Kingdom[5]	287 000[1/2]	332 100**	-15[2]	NI	NI	NI

NI No information

[1] The figure for 1985 in the 2003 data report was different. The figures presented here are correct.

[2] Only including agriculture

[3] Figure for 1985 has changed since last report (OSPAR, 2006a) due to the application of a different model.

[4] In the previous report (OSPAR, 2006a), the 1985 figure was total emission from Germany (North Sea and Baltic Sea), since 2002 an extended database has been used and figures can be differentiated in accordance with both drainage areas.

** 2003 figure; see Addendum 2 for further explanation

5.2.7 Total losses and discharges

Table 5.7 Losses and discharges of nutrients (tonnes) per country and anthropogenic source in 2005. Nitrogen is referred to as 'N' and phosphorus as 'P'.

Country	Diffuse losses (including agriculture)		Sewage treatment works, sewerage		Households not connected		Industry		Aqua-culture		Agriculture	
	N	P	N	P	N	P	N	P	N	P	N	P
Belgium	34 124	1 969	23 574**	4 114**	**	**	3 834	806	NI	NI	34 124	1 969
Denmark	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
France	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	Ni	NI
Germany	321 550	8 700	83 430	7 910	3 730	470	9 300	310	NI	NI	240 600	7 170
Ireland	33 058	788	4 069	803	1 686	251	403	652	58	11	30 822	639
Netherlands	64 391	3 786	21 747	2 651	402	56	3 932	377	0	0	54 481	3 786
Norway	25 649	399	5 599	99	1 138	77	1 298	103	28	5	10 505	247
Sweden	32 100	1 005	4 500	120	500	90	1 000	80	145	25	14 800	380
Switzerland	16 310	383	10 700	900	816	162	800	20	30	3	11 419	241
United Kingdom	332 100*	NI	184 000*	NI	3 900*	NI	9 500*	1 589	0	0	330 000*	NI

NI No information

* 2003 figure; see Addendum 2 for further explanation

** The nutrient losses from households not connected to public sewerage are included in the figures on discharges from waste water treatment and sewerage (see Figure 5.3).

5.3 Source apportionment

In Figure 5.1, source apportionment is shown for nitrogen and phosphorus. Not all Contracting Parties provide separate data for discharges from agriculture and other diffuse losses. For Belgium, only data for agriculture are given. This results in an underestimate of the share of diffuse losses. For the Netherlands and the United Kingdom no figures on natural background losses are presented. Hence the data for diffuse losses only includes atmospheric deposition and it is thus an underestimate. The United Kingdom data are based on national figures.

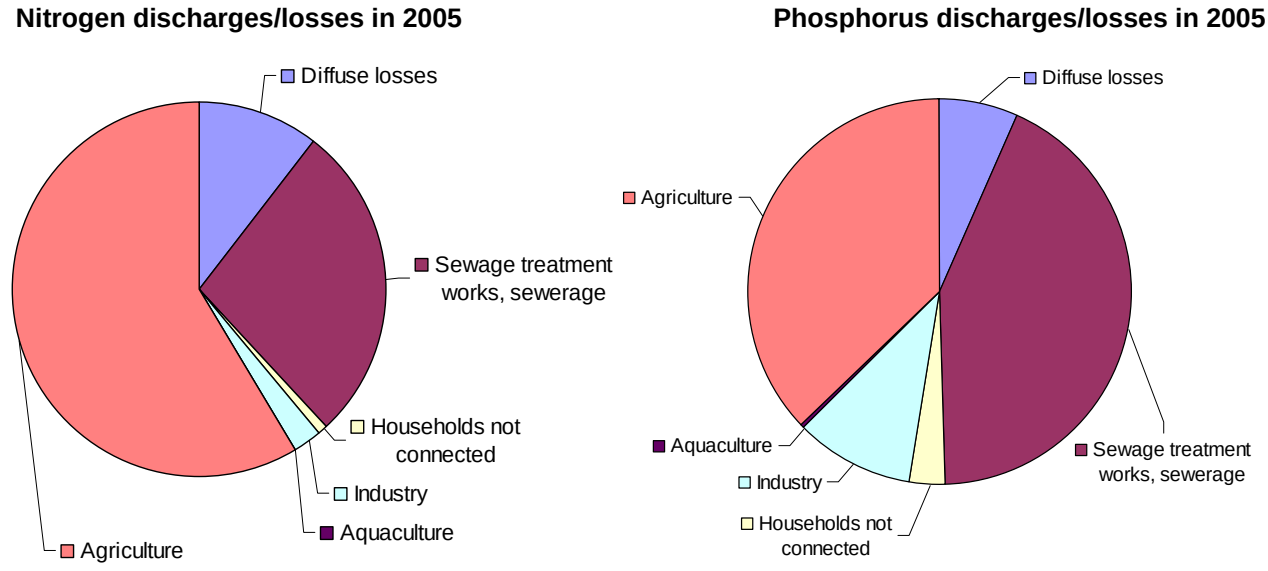

Figure 5.1 Contribution of the different anthropogenic sources to the total losses and discharges of nutrients in 2005. Data are taken from Table 5.6.

5.4 Trends in emissions, discharges and losses of nutrients since 1985

Table 5.8 Achieved percentage reductions of nutrients per anthropogenic source between 1985 and 2005 by OSPAR Contracting Parties in areas draining into their defined problem areas / the OSPAR maritime area. Nitrogen is referred to as 'N' and phosphorus as 'P'.

Country	Diffuse losses		Sewage treatment works, sewerage		Households not connected		Industry		Agriculture	
	N	P	N	P	N	P	N	P	N	P
Belgium	-7	7.5	26*	58*	**	**	87	85	-7	7.5
Denmark	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
France	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Germany	24	-1	69	84	54	81	91	94	23	-8
Ireland	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Netherlands	33	7	43	75	88	90	80	97	26	7
Norway	21	48	56*	19*	**	**	77	23	28	38
Sweden	16	1	39	54	44	58	4	32	26	3
Switzerland	15	30	41	55	46	46	20	87	20	40
United Kingdom	-15[2]	NI	15[1]	NI	NI	NI	NI	NI	-15	NI

(-) Increase

NI No information

1 Using 1983 and 2003 data, and including industrial discharges

2 Only includes agriculture.

* Includes households not connected to public sewerage.

** Data included in waste water and sewage treatment

Table 5.9 Discharges/losses (tonnes) from anthropogenic sources in 1985 and 2005 and the reductions achieved

Country	Nitrogen			Phosphorus		
	1985	2005	% Reduction	1985	2005	% Reduction
Belgium	93 135	61 532	34	17 458	6 889	61
Denmark	NI	NI	NI	NI	NI	NI
France	NI	NI	NI	NI	NI	NI
Germany	806 000[1]	418 020	48	65 790[1]	17 390	74
Ireland	NI	39 275	NI	NI	2 506	NI
Netherlands	168 163[1/2]	92 203[2]	45[2]	30 895[1/2]	6 959[2]	77[2]
Norway	49 891[1]	33 712	32	1 834[1]	683	63
Sweden	47 540	38 245	20	1 626	1 320	19
Switzerland	39 749[1]	28 656	28	3 004[1]	1 468	51
United Kingdom[3]	76 000*	61 500	19*	4 300[3]*	3 150	27*

NI No information

1 The figure for 1985 in the 2003 data report was different (OSPAR, 2006a).

2 These figures include overflows and discharges of collected untreated rainwater and sewage from yachts and inland vessels.

3 These are the values for riverine and direct discharges from the sampling regions in which the United Kingdom's problem and potential problem areas are situated.

* The United Kingdom data are for 2002; reduction figure is the reduction between 2002 and 2005.

5.5 Assessment of achievement of the 50% reduction targets

In the period 1985-2003, all countries, except Sweden and the United Kingdom, reached the target for phosphorus (OSPAR, 2006b). Only Denmark achieved the 50% reduction target for both nitrogen and phosphorus. Since that last round of reporting the reduction achievements have improved or remained at the same level (see Tables 5.6 and 5.7, Figures 5.2 and 5.3).

By 2005, Belgium, Germany, the Netherlands, Norway and Switzerland achieved a reduction of more than 50% for phosphorus but not for nitrogen. The situation for nitrogen has improved or stayed the same since the last round of implementation reporting, except for Norway. Substantial reductions in nitrogen releases of the order of 50% (PARCOM, 1998) have been achieved by Germany and the Netherlands (48% and 45% respectively).

Sweden has not reached any of the targets, either for nitrogen or for phosphorus. The indicated increase in phosphorus losses for the period 1985-2005 is caused by the change in methodology for calculating phosphorus losses from agricultural soils. Difficulties to update the load estimate for 1985 give an uncertainty in the figures for 1985, especially for diffuse sources. Besides, the data for 1985 are based on somewhat fewer point sources than in 2003 and 2005. The reference year does not take into account substantial reductions achieved by Sweden prior to 1985. In the last reporting round for the year 2003, Sweden stated that, in reality, no increase in either nitrogen or phosphorus loadings had occurred. Sweden has national objectives relating to the 1995 – 2010 period. The targets are 30% reduction for nitrogen (net loss to the sea, south Sweden) and 20% for phosphorus (gross, all country). Sweden achieved larger reductions for both nitrogen and phosphorus since 2003.

The United Kingdom only identified OSPAR problem areas and potential problem areas in 2002, and identified no such areas to which commitments applied in 1988. The United Kingdom catchments are generally small catchments where detailed local knowledge is required to obtain relevant data. The infrastructure for obtaining these data is still evolving and is proving more difficult than expected. Due to these problems, some of the United Kingdom information does not comply with the specified years and reporting formats.

In 2005, agriculture and sewage are in all countries the main anthropogenic sources for releases of nutrients to the environment. Agriculture is the largest source for nitrogen releases (on average 61%) and the second-largest source for phosphorus (32%). The reductions achieved for agriculture vary greatly between Contracting Parties, from a small increase in nitrogen releases for Belgium (7%) and United Kingdom (15%) to a 20-28% decrease since 1985 for the other Contracting Parties, and from a 38-40% decrease in phosphorus releases in Norway and Switzerland to almost no change (from an increase of 7% to a decrease of 7.5%) in other Contracting Parties. Sewage is the largest source of phosphorus releases (43%) and the second-largest source for nitrogen (28%). Releases from aquaculture have been marked as relevant in the reports of Ireland, Norway and Sweden. Both Norway and Sweden reported an increase in the discharges of nutrients from aquaculture plants for nitrogen and phosphorus. The absolute amount of nutrient input from aquaculture is, however, negligible compared to other sources (see also Figure 5.1).

In general, large reductions since 1985 have been achieved by the industrial sector. Especially in Belgium, Germany and the Netherlands discharges of nitrogen and phosphorus by the industrial sector have decreased significantly (80-97%). Only the phosphorus reduction by the Norwegian and Swedish industries and the reduction of nitrogen by the Swedish and Swiss industries are below 50%.

The contribution of nutrient losses from households not connected to public has been reduced since 1985 through their progressive connection to waste water collection systems and treatment plants. There has been a further clear progress since 2003. The strong reduction of losses from this sector reported by Sweden (for nitrogen from an increase of 9% in 2003 to a decrease of 44% in 2005), is caused by a changed methodology in 2003 for calculating discharges.

Almost all Contracting Parties explained why they did not achieve the 50% reduction target. Belgium and Norway indicated problems or delays with the implementation of both the Nitrates Directive and the Urban Waste Water Treatment Directive. The Netherlands reported a delay in the nitrogen removal programme of sewage treatment plants and difficulties to develop and implement measures in the agricultural sector (within the context of the Nitrates Directive). Despite the delay in the implementation, the Netherlands did achieve a nitrogen reduction in the order of 50%.

Norway explained that the agreed reduction target for nitrogen has not been met due to uncertainty about the degree of contamination of the receiving water bodies and cost-benefit for meeting the reduction target. During the last couple of years, Norway has focused on monitoring surveys. Their results will be the basis for further action plans. As a downstream country, Norway has put efforts into modelling work to estimate the

contribution from domestic sources compared to long-range transport of nutrients. The results indicate a huge contribution from sources other than anthropogenic Norwegian sources.

Sweden explained that the main reasons for not reaching the target for nitrogen are difficulties to reduce and assess nitrogen losses from diffuse sources. For phosphorus, the main reason is that most of the measures, e.g. improving waste water treatment in municipalities and industries, were done before 1985. Sweden estimated that the anthropogenic phosphorus discharges to water in 1970 amounted to 12600 tonnes/year compared to 1130 tonnes in 2003, a reduction of 91 %.

All countries, except Belgium reported figures on atmospheric deposition on fresh water. The Netherlands and Sweden indicated that phosphorus was not relevant for atmospheric deposition. Norway, Germany and Switzerland reported on atmospheric deposition of phosphorus. In Norway, the contribution of phosphorus from atmospheric deposition is around 5%, while in Germany and Switzerland it is respectively 1.2% and 0.3% of the total. In the Netherlands and Sweden the contribution of nitrogen from atmospheric deposition is approximately 10%, for Norway approximately 5%, Germany 2% and Switzerland 0.6%. Germany, Norway, Sweden and Switzerland also provided separate figures on (natural) background losses.

6. Conclusions

6.1 Lessons learnt

Since the last round of reporting in 2006 on year 2003, the reductions in releases of nutrients achieved by Contracting Parties have improved or remained at the same levels (see Figures 5.2 and 5.3). However, it should be recognised that the basis for calculating the reductions varies from country to country, and is not all based on the same sources of discharges, emissions and losses. Therefore, data can only be compared internally and it is not possible to compare the achievements of Contracting Parties on a common basis. In 2005 Belgium, Germany, the Netherlands, Norway and Switzerland achieved 50% reduction for phosphorus but not for nitrogen. No data are available for 2005 to confirm the trend in Denmark of achieved 50% reductions for phosphorus and nitrogen reported for 2003. The United Kingdom and Sweden have not achieved 50% reduction for either nitrogen and phosphorus.

Agriculture is in all countries the main anthropogenic source for releases of nutrients to the environment. The main tool in various Contracting Parties to achieve (further) reduction of nutrient inputs is the implementation of the EU Water Framework Directive, the Nitrates Directive, the Urban Waste Water Treatment Directive and the Directive on Integrated Pollution Prevention and Control (IPCC).

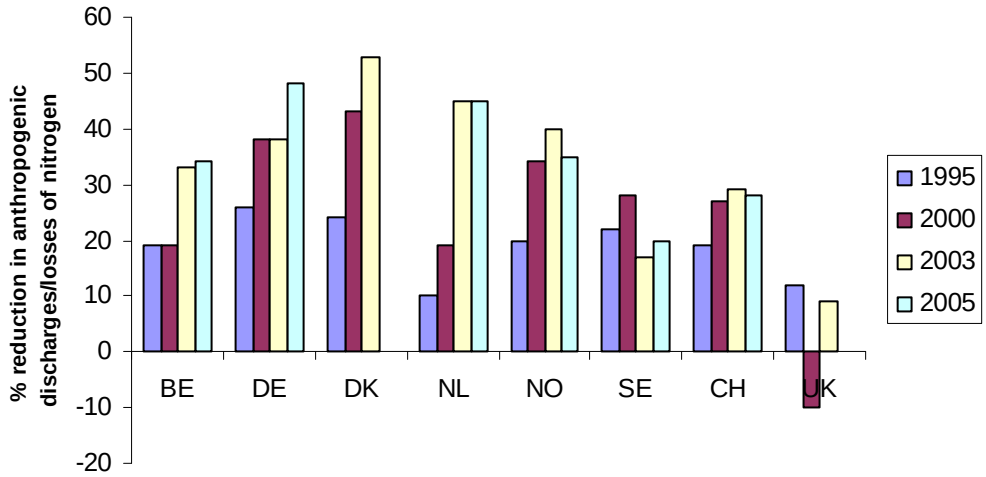

Figure 5.2 Percentage reductions in anthropogenic discharges/losses of nitrogen between 1985 – 1995, 1985 – 2000, 1985 – 2003, and 1985 – 2005. France and Ireland have not reported complete data and are therefore not included in the figure. Source: Nutrients in the Convention Area. Overview of the Implementation of PARCOM Recommendation 88/2, National Action Plans to achieve the 50% reduction target and PARCOM Recommendation 89/4 (publication number: 191-2003).

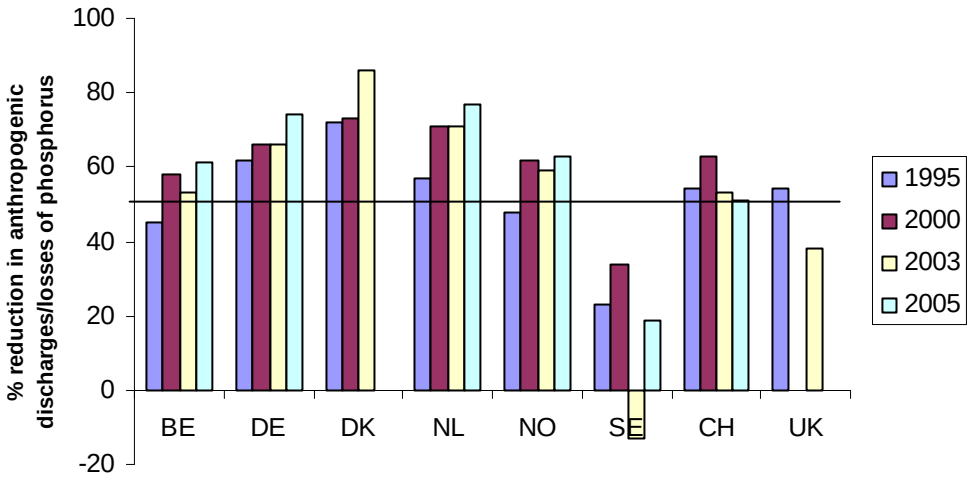

Figure 5.3 Percentage reductions in anthropogenic discharges/losses of phosphorus between 1985 – 1995, 1985 – 2000, 1985 – 2003, and 1985 – 2005. France and Ireland have not reported complete data and are therefore not included in the figure. Source: Nutrients in the Convention Area. Overview of the Implementation of PARCOM Recommendation 88/2, National Action Plans to achieve the 50% reduction target and PARCOM Recommendation 89/4 (publication number: 191-2003).

6.2 Next steps

OSPAR 2008 considered recommendations on the need and means for future implementation reporting of PARCOM Recommendations 88/2 and 89/4.

OSPAR 2008 agreed that implementation reporting on PARCOM Recommendation 89/4 should cease for all Contracting Parties as it added little value.

OSPAR 2008 agreed that, pending a pause in implementation reporting, the format of future reporting on PARCOM Recommendation 88/2 should be reviewed in the 2008/2009 meeting cycle. The purpose of the review includes addressing difficulties raised by a number of Contracting Parties with reporting in relation to the reference year 1985 and associated uncertainties in evaluating progress towards the 50% reduction target. Information collected by OSPAR under PARCOM Recommendation 88/2 is still unique as it does not duplicate other reporting commitments, e.g. under EC legislation, and it provides a focused answer to the source-oriented objective of the Eutrophication Strategy.

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8. Glossary and abbreviations

anthropogenic	Caused or produced by human activities
assessment level	Under the OSPAR Common Procedure, assessment levels have been set for each of the harmonised assessment parameters based on levels of increased concentrations and trends as well as on shifts, changes or occurrence. For concentrations, for example, assessment levels are defined by the Common Procedure as justified area-specific % deviation from background not exceeding 50%.
background level	Under the OSPAR Common Procedure, background levels are defined as salinity-related and/or specific to a particular area, and which had been derived from data relating to a particular (usually offshore) area or from historic data. Background levels serve as basis for setting assessment levels.
CAMP	Comprehensive Atmospheric Monitoring Programme. OSPAR agreement 2001-7
CEMP	Coordinated Environmental Monitoring Programme. OSPAR agreement 2008-8 (latest update)
climate	The long-term average conditions of the atmosphere and/or ocean
Common Procedure	Common Procedure for the Identification of the Eutrophication Status of the OSPAR Maritime Area. OSPAR agreement 2005-3
Comprehensive Procedure	The second phase of the Common Procedure which follows the one-off Screening Procedure and provides guidance for periodic comprehensive assessments of maritime areas in a three-step approach to classify their trophic status.
DIN	Dissolved Inorganic Nitrogen
EC	European Community
EEA	European Economic Area. The EEA Agreement associates the EFTA States Iceland, Liechtenstein and Norway with the European Community to participate in the Internal Market on the basis of the application of the relevant EC legislation
EEC	European Economic Community
EFTA	European Free Trade Area
EMEP	Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe. Set up under the UNECE Convention on Long-Range Transboundary Air Pollution (http://www.emep.int)
EU	European Union
eutrophication	For the purpose of the OSPAR Eutrophication Strategy, eutrophication means “the enrichment of water by nutrients causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned, and therefore refers to the undesirable effects resulting from anthropogenic enrichment by nutrients as described in the Common Procedure”. (Appendix 1 to the OSPAR Convention)
Eutrophication Strategy	OSPAR thematic strategy to address eutrophication. Adopted by OSPAR 1998 and revised in 2003 as part of the revised Strategies of the OSPAR Commission for the Protection of the Marine Environment of the North-East Atlantic. OSPAR agreement 2003-21.
JAMP	Strategy for a Joint Assessment and Monitoring Programme. OSPAR agreement 2003-22
N/P ratio	Ratio of the concentrations of Nitrogen and Phosphorus
non-problem area	Non-problem areas with regard to eutrophication are defined by OSPAR for the

	purpose of the Eutrophication Strategy as "those areas for which there are no grounds for concern that anthropogenic enrichment by nutrients has disturbed or may in the future disturb the marine ecosystem" (Appendix 1 to agreement 2003-21). The characterisation of waters as non-problem areas is done through the methods and procedures described by the Common Procedure.
nutrients	Dissolved phosphorus, nitrogen and silica compounds.
OSPAR Commission	Forum set up by the OSPAR Convention through which OSPAR Contracting Parties co-operate, supported by six main committees (for each OSPAR Strategy) and their working groups. The Eutrophication Committee set up for the Eutrophication Strategy is one of the main committees.
OSPAR Contracting Parties	Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom of Great Britain and Northern Ireland, and the European Community.
OSPAR Convention	Convention for the Protection of the Marine Environment of the North-East Atlantic opened for signature at the Ministerial Meeting of the Oslo and Paris Commissions, Paris, 21-22 September 1992; entered into force on 25 March 1998
OSPAR maritime area	The maritime area consisting of the internal waters and the territorial seas of the OSPAR Contracting Parties, the sea beyond and adjacent to the territorial sea under the jurisdiction of the coastal state to the extent recognised by international law, and the high seas, including the bed of all those waters and its sub-soil, situated within the following limits: (1) those parts of the Atlantic and Arctic Oceans and their dependent seas which lie north of 36 north latitude and between 42 west longitude and 51 east longitude, but excluding: (a) the Baltic Sea and the Belts lying to the south and east of lines drawn from Hasenore Head to Gniben Point, from Korshage to Spodsbjerg and from Gilbjerg Head to Kullen, (b) the Mediterranean Sea and its dependent seas as far as the point of intersection of the parallel of 36 north latitude and the meridian of 5 36' west longitude; (2) that part of the Atlantic Ocean north of 59 north latitude and between 44 west longitude and 42 west longitude.
PARCOM	Paris Commission. Set up under the 1974 Paris Convention for the Prevention of marine Pollution from Land-Based Sources and succeeded by the OSPAR Commission. Measures and programmes adopted by PARCOM remained applicable by virtue of Article 31(2) of the OSPAR Convention.
phytoplankton	Microscopically small plants which float or swim weakly in water
potential problem area	Potential problem areas with regard to eutrophication are defined by OSPAR for the purpose of the Eutrophication Strategy as "those areas for which there are reasonable grounds for concern that the anthropogenic contribution of nutrients may be causing or may lead in time to an undesirable disturbance to the marine ecosystem due to elevated levels, trends and/or fluxes in such nutrients" (Appendix 1 to agreement 2003-21). The characterisation of waters as potential problem areas is done through the methods and procedures described by the Common Procedure.
problem area	Problem areas with regard to eutrophication are defined by OSPAR for the purpose of the Eutrophication Strategy as "those areas for which there is evidence of an undesirable disturbance to the marine ecosystem due to anthropogenic enrichment by nutrients" (Appendix 1 to agreement 2003-21). The characterisation of waters as problem areas is done through the methods and procedures described by the Common Procedure.
RID	Comprehensive Study on Riverine Inputs and Direct Discharges. OSPAR agreement 1998-5
salinity	A measure of the total amount of dissolved salts in sea water. Salinity is expressed without unit.
sedimentation	Pocess in which suspended particles in the water settle to the bottom.
sensitive area	Water areas designated under Article 5 of the Urban Waste Water Treatment Directive (91/271/EEC) which are found to be eutrophic or which in the near

	future may become eutrophic if protective action is not taken
TN	Total Nitrogen
TP	Total Phosphorus
nitrate vulnerable zone	Areas designated under Article 3 (2) of the Nitrates Directive (91/676/EEC), concerning all known areas of land in the territories of EU Member States which drain into the waters which have been identified to be affected by pollution and could be affected by pollution if no action is taken

Addendum 1

PARCOM Recommendation 89/4 on the Coordinated Programme for the Reduction of Nutrients

NATIONAL IMPLEMENTATION REPORTS 2007/2008

REPORTS received from:

BELGIUM

1. National action plans to reduce nutrient inputs

Country: Belgium	Please answer yes or no to the following questions
Are the national plans related to:	
1. Nutrient inputs to surface waters:	Yes
2. Nutrient inputs to the Maritime Area:	Yes, indirectly (Direct inputs are prohibited)
Do national procedures for estimating nutrient discharges take account of:	
3. Relevant procedures for calculating the discharges/emissions at source.	Yes
Background and retention estimations?	Partly (Depending on River Basin)
Are the national procedures based on:	
4. A catchment area approach?	Yes

2. Fulfilment of the 1988 commitments

Please describe HOW your country is going to reach the agreed reduction target for phosphorus, and indicate the year WHEN it is expected that the reduction target for phosphorus will be achieved:

Flanders Region

In the 90's, much attention was paid to a sector-based approach in Flanders. Specific measures (cf. below in the questionnaire) have been developed for agriculture, sewage collection and treatment and industrial pollution. In 2003, the decree on integral water policy has been adopted in Flanders. This decree transposes the European Water Framework Directive into Flemish legislation. In 2005, the reduction target for P for Flanders is still reached. The different measures on sector basis are developed further and the instruments of the new decree will also contribute to a better water quality once the execution of it is at speed. There is no information available on the exact timing for achieving the reduction target.

Brussels Capital Region

The main source of phosphorus from the Brussels Region is coming from the households. All the wastewater from Brussels Region will be treated by the new WWTP from the north of Brussels. It will be operational in October 2007, with tertiary treatment.

It is also planned to increase the connection rate from the sewer system, or by dispensation to article 2 from decree dated 23/03/94 related to Urban Waste Water Treatment (Arrêté du gouvernement de la RBC relatif au traitement des eaux résiduaires urbaines M.B. 05/05/94) to use individual systems or any other appropriate systems leading to the same level of protection of the environment.

Walloon Region

La Région wallonne a pris depuis 1985 toute une série de mesures dans les principaux secteurs concernés par l'application des Directives européennes et de législations / réglementations wallonnes propres (91/271/CEE pour les eaux urbaines, IPPC et permis d'environnement pour les industries, 91/676/CEE pour l'agriculture, les mesures en vue de réduire les nitrates ayant aussi un impact favorable pour le phosphore).

L'évolution de la courbe montre une hausse qui n'est pas le reflet d'une augmentation des émissions en phosphore mais simplement la conséquence d'une modification dans la méthode d'estimation des quantités de phosphore présentes dans les apports urbains, industriels et agricoles. Cette méthode paraît plus fiable et repose sur des données plus nombreuses. Il aurait été judicieux de recalculer rétrospectivement les valeurs pour les années antérieures mais l'absence de données rend cette opération impossible. Le point de départ ainsi que la courbe d'évolution auraient sans doute été supérieurs à ce qui a été renseigné jusqu'ici. La tendance à la baisse devrait être à nouveau visible dans les prochains rapports car des efforts en matière d'épuration des eaux résiduaires urbaines et en matière d'agriculture ont été et seront encore fournis afin de répondre aux exigences de la Directive Cadre sur l'Eau.

La réduction de 50% reste toutefois acquise.

Toute la législation/ réglementation relative à l'eau en Région wallonne a été rassemblée dans le Code de l'Eau, qui constitue le livre 2 du Code de l'Environnement (voir au lien suivant : http://mrw.wallonie.be/dgrne/legis/tabledesmatieresCodeEau.htm)

Belgium National level:

Annex 1 shows the evolution of Belgian phosphorus emissions since 1985. The phosphorus reduction target of 50% has been realized at national level. For the sub-regions, only the Brussels region did not reach the target yet, but nearly (47%).

Please describe HOW your country is going to reach the agreed reduction target for nitrogen, and indicate the year WHEN it is expected that the reduction target for nitrogen will be achieved:

Flemish Region

In the 90's, much attention was paid to a sector-based approach. Specific measures (cf. further on in the questionnaire) have been developed for agriculture, sewage collection and treatment and industrial pollution. In 2003, the decree on integral water policy has been adopted in Flanders. This decree transposes the European Water Framework Directive into Flemish legislation. In 2005, the reduction target for N is almost reached. The different measures on sector basis are developed further and the instruments of the new decree will also contribute to a better water quality once the execution of it is at speed. There is no information available on the exact timing for achieving the reduction target.

Brussels Capital Region

The main source of nitrogen from the Brussels Region is coming from the households. All the wastewater from Brussels Region will be treated by the new WWTP from the north of Brussels. It will be operational in October 2007, with tertiary treatment.

It is also planned to increase the connection rate from the sewer system, or by dispensation to article 2 from decree dated 23/03/94 related to Urban Waste Water Treatment (Arrêté du gouvernement de la RBC relatif au traitement des eaux résiduaires urbaines M.B. 05/05/94) to use individual systems or any other appropriate systems leading to the same level of protection of the environment.

Walloon Region

Les mesures prises pour réduire les apports en nitrates concernent les mêmes législations/ réglementations évoquées ci-dessus pour le phosphore. Cependant, une grosse partie des apports en Nitrates provenant d'apports diffus, les mesures prises ne verront leurs effets qu'à moyen voire long terme selon la nature des sols, la géologie et la climatologie locale. Ces délais de réponse sont difficiles à appréhender mais la Région wallonne a procédé à des études visant à modéliser le cycle complet de l'eau (programme PIRENE) dans le cadre de l'établissement des états des lieux exigés par la Directive Cadre Eau. Dans la foulée de ce programme, des études spécifiques à l'agriculture sont menées pour évaluer les effets du programme d'action mis en place pour répondre aux exigences de la Directive Nitrates et de la Directive Cadre sur l'Eau.

Pour les autres sources, la Région wallonne poursuit ses efforts en matière d'épuration des eaux usées. De même, depuis 2002, la procédure relative au permis d'environnement est d'application.

Toute la législation/ réglementation relative à l'eau en Région wallonne a été rassemblée dans le Code de l'Eau, qui constitue le livre 2 du Code de l'Environnement (voir au lien suivant : http://mrw.wallonie.be/dgrne/legis/tabledesmatieresCodeEau.htm).

Belgium National level:

Annex 2 shows the evolution of Belgian nitrogen emissions since 1985. The nitrogen reduction target of 50% has not been realized at national level or at any of the regions, but the Flemish region with 45% is nearly reaching the target. The Brussel and Walloon regions are still far off the target, with respectively 21% and 13% reduction. Based on the assumption that the average rate of decline of national emission values realized in the 1985 – 2005 timeframe is maintained, it is expected that the 50% reduction goal will be met during the period 2015-2020.

3. Measures on a sector by sector basis

Sector	Type of measures implemented since 1995 or planned to be implemented
Agriculture	**Flemish Region** • Decree on the protection of the environment against the pollution by fertilizers • Codes of good agricultural practice Decision of the Flemish Government to consider, to revise and to complete the vulnerable zones in 2002
	• Compliance with the Nitrate Directive (91/676/EEC) is one of the cross compliance conditions for direct payments in the CAP-framework • New Manure Decree end 2006, which is the new Action Program for the Nitrates Directive. **Brussels Capital Region** • Arrêté du 19/11/98 du gouvernement de la RBC relatif à la protection des eaux contre la pollution par les nitrates à partir des sources agricoles. (M.B. 29/01/99) • Une zone vulnérable a été délimitée par l'arrêté ministériel du 25 mai 1999. **Walloon Region** • Arrêté du Gouvernement Wallon du 10/10/2002 relatif à la gestion durable de l'azote en agriculture en application de la Directive Nitrates 91/676/CEE paru au Moniteur belge le 29/11/2002 encore appelé Plan de gestion durable de l'azote ou PGDA. • AGW du 15/02/2007 modifiant le livre II du code de l'Environnement constituant le code de l'Eau en ce qui concerne la gestion durable de l'azote en agriculture. Depuis décembre 2006, 3 zones vulnérables ont été ajoutées aux 4 zones déjà existantes depuis 2001 afin de prendre en compte l'eutrophisation de la Mer du Nord de manière plus efficiente. Environ 50% de la superficie agricole de la Région wallonne se trouve désormais incluse en zone vulnérable. - Arrêté ministériel du 22 décembre 2006 désignant le territoire situé au nord du sillon Sambre et Meuse en zone vulnérable (MB du 06/03/2007) - l'Arrêté ministériel du 22 décembre 2006 modifiant les limites de la zone vulnérable du territoire dit « Sud Namurois » (MB du 06/03/2007) Programmes d'action obligatoire sur l'ensemble du territoire. Des mesures plus sévères sont d'application dans les zones vulnérables. Les mesures concernent le stockage des effluents, les épandages de fertilisants, les quantités maximales à épandre, le principe du taux de liaison au sol des exploitations, l'existence d'une structure d'encadrement appelée Nitrawal pour conseiller les agriculteurs dans la gestion de leurs effluents d'élevage.
Sewage	**Belgium – national level** • A further implementation of the European Urban Waste Water Directive (91/271/EEC)

	• Development of zoning plans per municipality in which all together (for the whole of Flanders) a decision will be taken on individual versus collective treatment of wastewater. For each zoning plan, an implementation plan will be developed afterwards. **Flanders Region** • The whole of Flanders is assigned as vulnerable area in 1995. • The Investment and Renovations programs contain measures to increase the connection and treatment rate for households and to optimize the working WWTP's. • In 2004, the effluent standards for WWTP's were tightened. • End 2004, a reorganization of the wastewater treatment sector, focusing on ecological and economical regulation, was initiated. • In 2006, the procedure for a decision on zoning plans was started for each of the Municipalities. Through an implementation plan, the (phasing of the) realizations of these engagements will be made concrete. **Brussels Capital Region** • The law implementing a tax on discharge of waste water (29th of March 1996) • Implementation of directive 91/271: Arrêté du 23/03/94 du gouvernement de la RBC relatif au traitement des eaux résiduaires urbaines (M.B. 05/05/94). Finalization of North WWTP and new main sewer. **Walloon Region** • Désignation de toute la Région wallonne en zone sensible au sens de la Directive 91/271/CEE en 2001 • Création de la Société publique de gestion de l'Eau (SPGE) par décret du Gouvernement wallon le 15 avril 1999 dont une des missions est de mettre en œuvre la politique définie par la Gouvernement en matière d'épuration (stations + réseau égouttage + collecte) (voir http://mrw.wallonie.be/dgrne/legis/Codeenvironnement/codeeau.htm - D. 331) Mise en œuvre du programme 2005-2009 en assainissement donnant la priorité aux agglomérations de plus de 2000 EH pour répondre aux impositions de la Directive 91/271/CEE. Toutes les stations de plus de 10 000 EH ont été/sont/ seront équipées pour le traitement tertiaire de l'azote et du phosphore d'ici 2009.
Aquaculture	**Flanders Region** **Aquaculture is negligible in the Flemish Region, no specific measures are taken.** **Brussels Capital Region** Not concerned **Walloon Region** Sectorial conditions on fish farming are stated in the decision of the Walloon Government of 10-03-2005.
Industry	**Belgium – national level** • A further implementation of the European Urban Waste Water Directive (91/271/EEC) and the IPPC Directive (96/61/EC) • There is an emission reduction program by optimizing the permit system for industrial wastewater. Effluent standards in permits are based on BAT. **Brussels Capital Region** • Transposition of IPPC directive with the decree of the Brussels Capital Region Government from 18 April 2002 (Arrêté du gouvernement de la RBC imposant une obligation de notification aux exploitants de certaines installations classées)

	• Implementation of directive 91/271 : Arrêté du 23/03/94 du gouvernement de la RBC relatif au traitement des eaux résiduaires urbaines (M.B. 05/05/94). Finalization of North WWTP and new main sewer. • The law for Permit of discharge (environmental legislation 30th of July 1992 and 5th June 1997) • The law implementing a tax on discharge of waste water (29th of March 1996) **Walloon Region** • Application du décret du Gouvernement wallon relatif au permis d'environnement à partir du 01/10/2002. Les mesures reprises dans les permis tiennent compte de conditions de déversement générales, sectorielles et particulières pour prévenir tout type de pollution de l'environnement dont la pollution par l'azote et le phosphore. Les mesures liées à la Directive IPPC et à la décision EPER qui en découle sont intégrées dans le Permis d'Environnement.
Forestry	**Flemish Region** **In the Flemish Region, no specific measures are taken to reduce nutrients inputs from forestry because nutrient losses from forestry are negligible.** **Brussels Capital Region** No use of nutrients in the "forêt de Soignes" **Walloon Region** La fertilisation azotée en milieu forestier est interdite.
Other	**Brussels Capital Region** The law on general quality and different executive texts (dangerous substances 18th March 2005; fish protection 18th March 1992).

Additional information:

Decree on the protection of the environment against the pollution by fertilisers: The Flemish manure decree is the transposition into Flemish law of the European Nitrates Directive (Directive 91/676/EEC) and aims to reduce and further prevent the pollution of groundwater, surface water and the soil.

At the end of 2006 a new fertiliser decree was adopted in Flanders, which is the third and new action program for the Nitrates Directive.

In the new fertiliser decree the complete Flemish Region was designated as a vulnerable zone.

As a consequence more stringent fertilisation standards and fertilisation periods are applicable in the whole of Flanders and an extension of the obliged manure storage capacity is imposed. Additional measures for horticulture are imposed in this new fertiliser decree.

The fertiliser policy is based on the principle of self-regulating manure disposal. This means that a livestock farmer may only keep animals to the extent and as long as he is able to dispose of the nutrients produced in an environmentally responsible manner by use on their own land, on others' lands, or by way of manure processing or export.

The temporary nutrient stop imposed in 2002 will be replaced by a permanent system of limited nutrient emission rights. With this system a percentage of the emission rights that are traded will be cancelled by the government on transfer.

Further stimulating the use of feeds with low nutrient content and the use of improved feeding techniques is continuing the efforts made in the second action programme for the reduction of nutrient production in Flanders.

The rules on low emission application from the second action programme are being taken over and remain in full force.

A more strict and proper enforcement is foreseen in the third action programme. The monitoring of water quality will be used to detect problem areas and take appropriate measures. The farm is the basis for enforcement and monitoring, supplemented by focused check at parcel level.

4.Reasons for not achieving the 1988 commitment with regard to nitrogen

Please indicate the problems encountered:

Flemish Region

Difficulties in the implementation of the directives 91/271 and 91/676.

Brussels Region:

- Late implementation of the 91/271 European directive
- Technical difficulties related to the dilution factor of the sewage, the mixed water system, the low flow regime of the main river stream in Brussels Capital Region (typical for plain rivers)

Walloon Region

En raison de la nature même des pollutions azotées qui sont essentiellement diffuses, les mesures prises à l'heure actuelle n'auront un effet que dans 10, 15, 20 ans voire plus car les temps de transfert dépendent des caractéristiques des sols, de la géologie et de la climatologie locale. De plus, à cause du caractère diffus de certains apports en nutriments, il est très difficile d'évaluer avec exactitude si les mesures prises auront l'effet escompté au contraire des pollutions ponctuelles telles que les apports par l'industrie et les ménages.

5.Main catchment areas

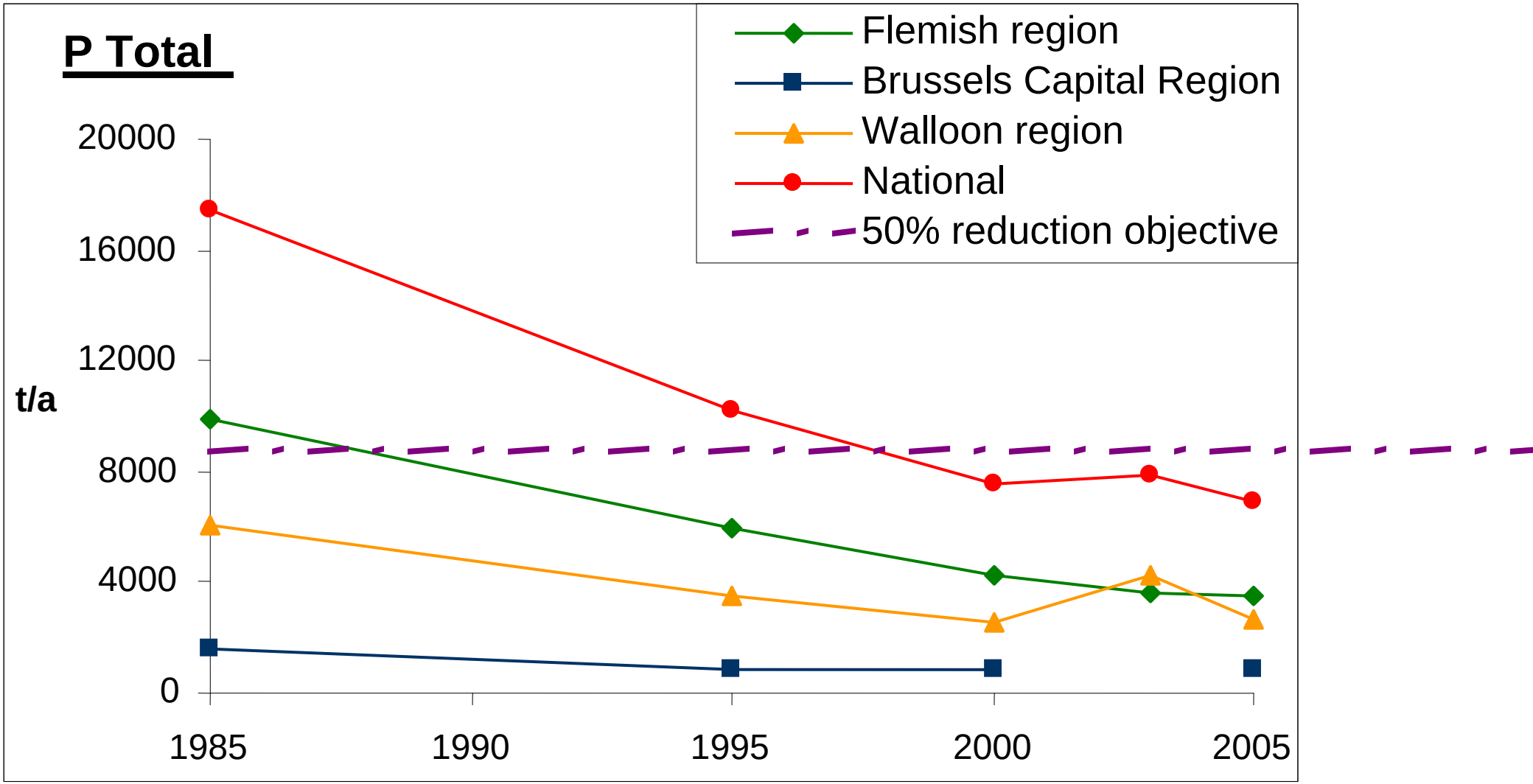
Catchment	Type of measures implemented since 1995 or planned to be implemented
Scheldt and Meuse	**Flemish Region** • The international river basin aspects of the implementation of the Water Framework Directive are dealt with in the International Scheldt and Meuse Commission. • The Flemish Decree on Integrated Water Policy (Belgium Law Gazette, 14.11.2003) transposed the WFD into regional law. It goes even further by regulating and fully integrating all qualitative and quantitative aspects of the surface- and groundwater. • The Decree constitutes the general framework for the water policy in Flanders on a river basin basis. It lays the foundation of an integrated water management in Flanders. Moreover, it creates new tools for integrated water management, such as the 'water test'. This instrument is part of the permitting procedure for construction, housing or industrial activity applications. The 'water test' should determine whether or not the construction or activity can cause any damage to the water system. In this respect, nature takes up a central part of the licensing procedure. The same evaluation of possible damages to water has to be made by making up policy plans. • The Decree describes the administrative organisation as well as the planning of integrated water management. The decree distinguishes 4 levels: othe River Basin District (Scheldt and Meuse); othe Flemish Region with the Water Policy Note; othe sub-basin (11); othe sub-sub-basin (± 100). • For the main districts and each basin at the different levels, catchment area management plans will be elaborated. The integrated water management plans contain the highlights of the water policy, including different measures and actions. The management plans for the 11 river sub-basins have been prepared. A procedure of public consultation is organised from end 2006 until May 2007.

	The plans will be finalised before end 2007.
	Brussels Region The territory of The Brussels region is part of the Scheldt River Basin District. The active participation to the coordination activities of the International Scheldt Commission is the way to start implementation of Water Framework Directive at relevant scale. The ratification of the Gent Agreement between the Scheldt partners (26th April 2004) formally institutes this coordination. Further transposition of WFD is ongoing at Brussels level. The Nutrients aspects are included into the physico-chemical parameters supporting the biological elements and the ecological status. **Walloon Region** Hormis toutes les mesures déjà évoquées ci-dessus, on ne peut conclure sans évoquer la mise en œuvre de la Directive Cadre sur l'Eau (2000/60/CE). La Région wallonne a transposé celle-ci dans le Code de l'Eau déjà évoqué ci-dessus. Elle a définit pour les 4 districts que compte le territoire wallon, 15 sous-bassins hydrographiques et un certain nombre de masses d'eau dont certaines ont été jugées à risque de ne pas atteindre le bon état d'ici 2015. L'azote et le phosphore ont été bien évidemment pris en compte pour la définition de ces masses d'eau à risque. Pour certaines masses d'eau, ils sont d'ailleurs l'élément essentiel générateur du risque. Les états des lieux ont été remis en temps et heure à la Commission. Ceux-ci constitueront la base pour l'élaboration des plans de gestion. Les plans de gestion reposeront également sur les législations et réglementations existantes déjà évoquées ci-dessus tels que le PGDA pour les aspects relatifs à l'agriculture ou le Permis d'Environnement pour les aspects liés à l'activité industrielle. La Région wallonne met tout en œuvre pour tenir les délais imposés par la Directive. La Région wallonne participe au même titre que les deux autres Régions aux Commissions Meuse et Escaut. Ayant une petite partie de son territoire dans le basin du Rhin, elle participe également aux travaux de la Commission du Rhin. Par ces contacts, la Région wallonne participe aux travaux visant à une mise en œuvre coordonnée de la Directive sur les districts internationaux qui relèvent de son autorité.

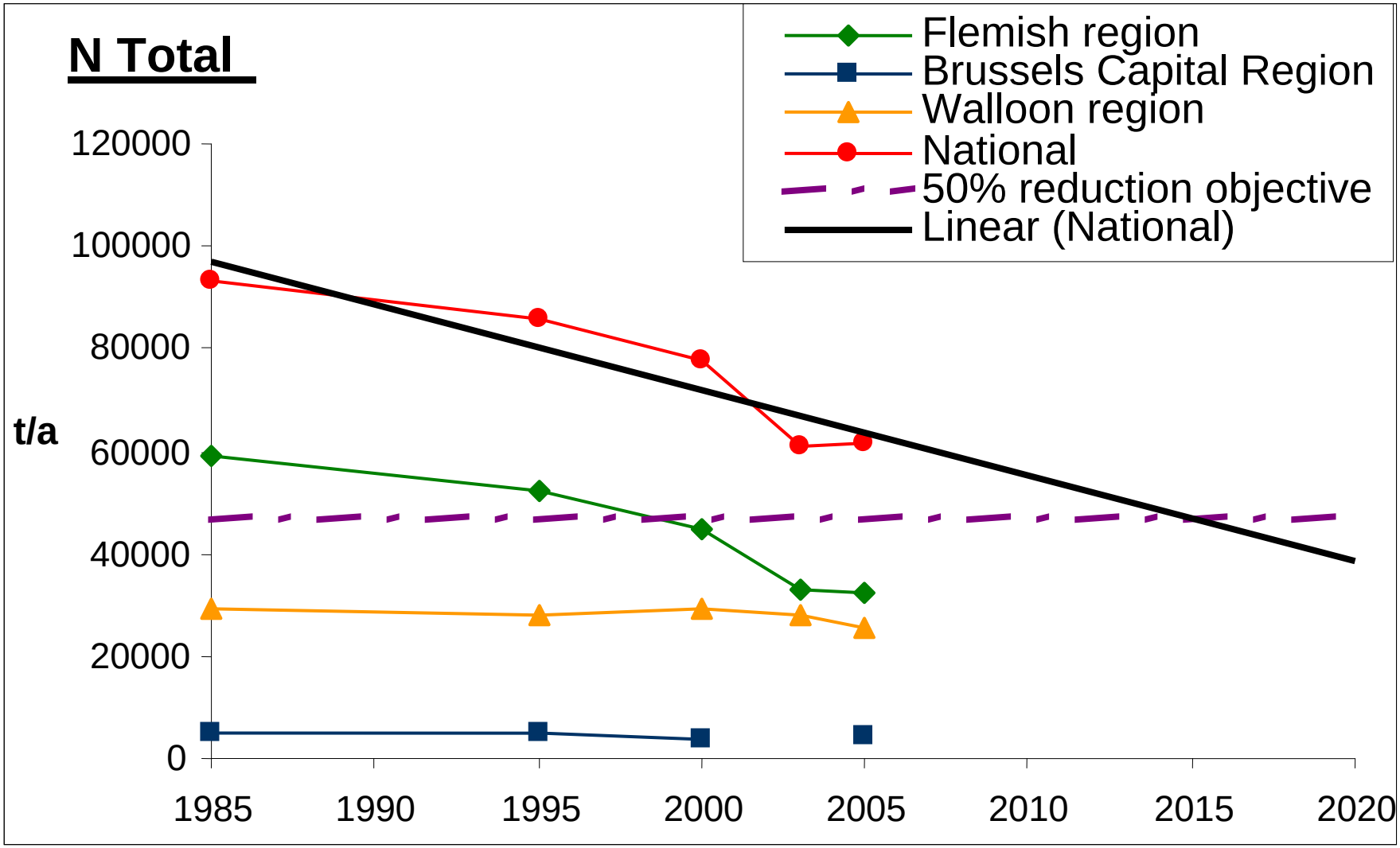
6. Coastal areas not included in the catchments listed in Table 5

Area/region/catchment	Type of measures implemented since 1995 or planned to be implemented
	The Belgian Coastal Waters (up to 12 nautical miles) are part of the International Scheldt River Basin District, listed in Table 5. More offshore marine waters are not, but the Federal Law of 1999 on the protection of the marine environment applies in this area and specifically outlaws direct discharges.

ANNEX 1


P Total
Flemish region
Brussels Capital Region
Walloon region
National
50% reduction objective
t/a
20000
16000
12000
8000
4000
0
1985
1990
1995
2000
2005

ANNEX 2


N Total
Flemish region
Brussels Capital Region
Walloon region
National
50% reduction objective
Linear (National)
t/a
120000
100000
80000
60000
40000
20000
0
1985
1990
1995
2000
2005
2010
2015
2020

GERMANY

1.National action plans to reduce nutrient inputs

Country: Germany	Please answer yes or no to the following questions
Are the national plans related to:	
1. Nutrient discharges/losses into surface waters	Yes
2. Nutrient inputs to the maritime area	Yes
Do national procedures for estimating nutrient discharges take account of:	
3. Relevant procedures for calculating the discharges/emissions at source.	Yes
Background and retention estimations?	Yes
Are the national procedures based on:	
4. A catchment area approach?	Yes

2.Fulfilment of the 1988 commitments

Please describe HOW your country is going to reach the agreed reduction target for phosphorus, and indicate the year WHEN it is expected that the reduction target for phosphorus will be achieved:
Reduction target reached in 1995 (see Progress Report 5th North Sea Conference)
Please describe HOW your country is going to reach the agreed reduction target for nitrogen, and indicate the year WHEN it is expected that the reduction target for nitrogen will be achieved:
The preliminary results for 2005 appear to indicate, that the target for nitrogen reduction has been achieved. Monitoring will continue. It is also intended to continue reduction measures in the relevant sectors listed in section 3.

3.Measures on a sector-by-sector basis

Sector	Type of measures implemented since 1995 or planned to be implemented
Agriculture	• Council Directive 91/676/EEC concerning the protection of waters against pollution caused by Nitrates from agricultural sources • Ordinance on principles of good professional practice in the use of fertilisers (Use of Fertilisers Ordinance – DüngeVO) as promulgated in 2006 • PARCOM Recommendation 92/7 • German Federal Government, 2002: “Perspectives for Germany – Our Strategy for Sustainable Development”. The Strategy contains the goal “to reduce the nitrogen surplus for the whole of the agricultural sector, i.e. surpluses arising on famland and in animal housing, passing into air, soil and water, to 80 kilograms/ha by 2010”.
Sewage	• Implementation of Council Directive 91/271/EEC (Urban Waste Water) has been fulfilled since 2002 (76.5% reduction of the generated nitrogen load from UWWTP,

	according to article 5(4) UWWTD)
Aquaculture	
Industry	Continued implementation of requirements for the discharges of nitrogen and phosphorus in nutrient relevant sectors of industry (food and animal feedstuffs industries, fertilizer production and organic chemistry)
Forestry	
Other - Water	• Implementation of Council Directive 200/60/EC, Water Framework Directive (WFD)
- Traffic	• Council Directive 2001/27/EC amending Council Directive 91.524.EEC and Directive 88/77/EEC on the approximation of the laws of the Member States relating to the measures to be taken against the emissions of gaseous pollutants from diesel engines for use in vehicles • Directive 2003/27/EC of the European Parliament and of the Council amending Directive 96/69/EC and Directive 70/220/EEC on the approximation of the laws of the Member States relating to measures to be taken against air pollution by emissions from motor vehicles • Directive 2003/77/EC amending Directives 97/24/EC and 2002/24/EC of the European Parliament and of the Council relating to the type-approval of two- or three-wheel motor vehicles • Directive 2003/37/EC of the European Parliament and of the Council amending Directive 97/68/EC on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery • Motor Vehicle Tax Act 2002 (KraftStG 2002) as promulgated 2002
- Atmospheric emissions	•Council Directive 96/62/EC of September 1996 on Ambient Air Quality Assessment and Management •Council Directive 1999/30/EC of 22 April 2001 Relating to Limit Values for Sulphur Dioxide, Oxides of Nitrogen, Particulate Matter and Lead in Ambient Air •Council Directive 2001/80/EC of 23 October 2001 relating to the limitation of pollutant emissions from large combustion plants into the Air (LCP Directive) •Council Directive Council Directive 2001/81/EG on national emission ceilings for certain atmospheric pollutants (NEC Directive) •The 1999 Gothenburg Protocol to the 1979 Convention on long-range Transboundary Air Pollution to abate Acidification, Eutrophication and Ground-Level Ozone •The 1988 Sofia Protocol to the 1979 Convention on long-range Transboundary Air Pollution concerning the Control of Emissions of Nitrogen Oxides or their transboundary Fluxes, as amended in 1991 •Ordinance of Avoidance Ground-Level Ozone, Acidification and Eutrophication (33. BImSchV of 2004) transposes Council Directive 2001/81/EG (NEC Directive) into German Law •Ordinance on Small Combustion Installations (1. BImSchV as promulgated 1997 and last amended on 2003) •Ordinance on Large Combustion Plants (13. BImSchV of 2004)

	•Ordinance on incinerators for waste and similar combustible material (17. BImSchV as promulgated 2003) •Technical Instructions on Air Quality Control (TA Luft of 2002) and additional Decisions by the Federal Government/Federal States Pollution Control Committee concerning dynamic clauses •CO2-Reduction Programme •Termal Insulation Ordinance (Wärmeschutz-VO)

4.Reasons for not achieving the 1988 commitment with regard to nitrogen

Please indicate the problems encountered:

5. Main catchment areas

Catchment	Type of measures implemented since 1995 or planned to be implemented
Rhine	See table 3
Weser	See table 3
Elbe	See table 3
Ems	See table 3

6.Coastal areas not included in the catchments listed in Table 5

Area/region/catchment	Type of measures implemented since 1995 or planned to be implemented
North Sea (Lower Saxony)	See table 3
North Sea (Schleswig Holstein)	See table 3

IRELAND

1. National action plans to reduce nutrient inputs

Ireland	Please answer yes or no to the following questions
Are the national plans related to: 1. Nutrient discharges/losses into surface waters: 2. Nutrient inputs to the maritime area:	*Yes* *No*
Do national procedures for estimating nutrient discharges take account of: 3. Relevant procedures for calculating the discharges/emissions at source. Background and retention estimations?	*Yes*
Are the national procedures based on: 4. A catchment area approach?[2]	*Yes*

2. Fulfilment of the 1988 commitments

Please describe HOW your country is going to reach the agreed reduction target for phosphorus, and indicate the year WHEN it is expected that the reduction target for phosphorus will be achieved:

Ireland has established a national nutrient reduction plan for phosphorus, and is implementing the Urban Waste Water Treatment, Nitrates and IPPC Directives. Ireland's entire land area has been designated a Nutrient Vulnerable Zone and as such the conditions specified in Ireland's national Nitrates Action Programme will apply to the entire territory. Ireland is implementing the Cross Compliance element of the Common Agricultural Policy. Ireland is also in the process of implementing the Water Framework Directive.

Overall there has been a 21 per cent reduction in phosphorus discharges/losses between 1995 and 2005. In percentage and absolute terms the largest reduction has been achieved from waste water treatment plants which have seen a 54 per cent or just over 900 tonnes reduction in losses/discharges. The percentage reduction from agriculture is much smaller at only 4 per cent but this still represents a considerable reduction of about 150 tonnes. Losses of phosphorus from households not connected to public sewerage have increased while discharges from industry have decreased.

Based on this analysis it is unlikely that Ireland will meet the 1988 reduction target for phosphorus in the foreseeable future.

It should be pointed out, however, that the occurrence of eutrophication in Irish waters is restricted to inshore estuarine waters that cover a relatively small area of Ireland's maritime province. A broad source based reduction target of 50 per cent may not be the most appropriate approach Ireland can take in combating eutrophication in these waters. A more effective approach would be to set reduction targets for individual catchments containing problem or potential problem areas with regard to eutrophication.

Such an approach is likely to be followed in individual WFD river basin management plans which have the objective of achieving at least 'good status' in all water bodies by 2015.

2 If so and when the relevant information is available, please fill in Table 5 with the name of the river catchments, the size of the catchments and the measures implemented or planned to be implemented.

Please describe HOW your country is going to reach the agreed reduction target for nitrogen, and indicate the year WHEN it is expected that the reduction target for nitrogen will be achieved:

Ireland is implementing the Urban Waste Water Treatment, Nitrates and IPPC Directives. Ireland's entire land area has been designated a Nutrient Vulnerable Zone and as such the conditions specified in Ireland's national Nitrates Action Programme will apply to the entire territory. Ireland is also implementing the Cross Compliance element of the Common Agricultural Policy. Ireland is also in the process of implementing the Water Framework Directive.

Overall there has been a 7 per cent reduction in nitrogen discharges losses/between 1995 and 2005. In percentage terms the largest reductions have been achieved from industry (34%) and waste water treatment plants (36%). In absolute terms the greatest reduction of just over 3,000 tonnes was achieved in agriculture corresponding to a 4 per cent reduction in losses from the sector.

Based on this analysis it is unlikely that Ireland will meet the 1988 reduction target for nitrogen in the foreseeable future.

It should be pointed out, however, that the occurrence of eutrophication in Irish waters is restricted to inshore estuarine waters that cover a relatively small area of Ireland's maritime province. A broad source based reduction target of 50 per cent may not be the most appropriate approach Ireland can take in combating eutrophication in these waters. A more effective approach would be to set reduction targets for individual catchments containing problem or potential problem areas with regard to eutrophication.

Such an approach is likely to be followed in individual WFD river basin management plans which have the objective of achieving at least 'good status' in all water bodies by 2015.

3. Measures on a sector-by-sector basis

Sector	Type of measures implemented[3] since 1995 or planned to be implemented[4]
Agriculture	**Implementation of the EU Nitrates Directive** Ireland's entire land area has been designated as a Nutrient Vulnerable Zone. Implementation of Ireland's national Nitrates Action Programme (NAP) was given statutory effect by the European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2006 which were made on 19 July 2006. The regulations set legally binding limits on the amounts of both nitrogen and phosphorus that may be applied to land. The measures given in the 2006 regulations will be applied from 2008 and will be enforced by the respective local authority. Ireland's Department of Agriculture, Fisheries & Food (DAFF) will principally be responsible for ensuring 'cross compliance' and the administration of 'derogation farms'. Implementation of the 'cross compliance'' element of the Mid Term Common Agriculture Policy agreement which requires farmers to comply with a number of statutory management requirements (SMRs) set down in EU legislation (Directives and Regulations) on the environment. The SMRs pertaining directly to the environment, and which may lead directly or indirectly to measures that may reduce loss of nutrients from agricultural sources include: Council Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (Groundwater Directive) Council Directive 86/278/EEC on the protection of the environment, an in particular of the soil, when sewage sludge is used in agriculture (Sewage Sludge Directive) Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources (Nitrates Directive) **Implementation of the national Phosphorus Regulations** In 1997, the Irish government established a pollution reduction programme for phosphorus and laid down interim quality standards over a ten-year timeframe. The long-term target is to improve all polluted rivers and lakes to a level consistent with the beneficial uses of their waters. To reach these targets - and to meet, in part, the requirements of the EU Dangerous Substances Directive - the Government introduced the Local Government (Water Pollution) Act, 1977 (Water Quality Standards for Phosphorus) Regulations, 1998. These require water quality to be maintained or improved by reference to the biological quality rating (of rivers) or trophic status (of lakes) that the EPA assigned in the 1995-97 review period or at the first occasion thereafter. Where water quality is unpolluted (that is, where the EPA has given a river biological quality rating of Q4, Q4-5 or Q5, or assigned an oligotrophic / mesotrophic lake status), under the regulations the existing quality level must be maintained. Where quality levels are unsatisfactory, the regulations require that the water be improved by 2007 at the latest for waters surveyed by the EPA in the 1995-97 period, or within ten years for waters first surveyed after 1997. The degree of improvement required is based on the baseline quality and on the standards prescribed by the regulations. These standards may be met • **For rivers:** by achieving either the target biological quality rating or the target median molybdate-reactive phosphorus (MRP)

3 Please make use of the "Additional information" table whenever further information about the measure(s) should be given.

4 Please indicate by 'NMI' (no measure implemented), if no measures have been implemented since 1995 or are planned to be implemented.

	concentration • **For lakes:** by achieving either the target trophic status classification or the target average total phosphorus concentration The regulations require that local authorities and the EPA take all appropriate steps to reach these quality standards. Local authorities prepare implementation reports every two years following which the EPA reports on implementation at national level. **Implementation of the Water Framework Directive** The Directive aims to provide a new, strengthened framework, for the protection and improvement of water resources and water-dependent ecosystems. It aims at preventing any deterioration in the existing status of waters, including the maintenance of "high status" where it exists, and at ensuring that all waters achieve at least "good status" by 2015. A key element of the Directive is the development of River Basin Management Plans that set out the measures or actions that each individual river basin will put in place to achieve the environmental objectives of the Directive (as set out in Article 4). Many of the measures referred to above in relation to wastewater treatment and reducing and controlling pollution from agricultural sources, are likely to form an important part of individual river basin management plans. These measures will support the basic measures of the WFD and the requirements of the other 11 Directives listed in Annex VIII of the Directive. The status of all surface waters (including transitional and coastal waters) will be provisionally classified by the EPA in early 2008 and subsequently published in the first draft river basin management plans in summer 2008. Updated classification will be reported in the RBMP in June 2009. These classifications will be used to identify the measures and actions that will be required to be implemented to meet the objectives of the Directive.
Sewage	**Implementation of the Urban Waste Water Treatment Directive** Ireland has seen significant infrastructural investment in waste water treatment facilities in recent years with 70 per cent of waste water arising in 2004-2005 receiving at least secondary treatment (EPA, 2007). This represents a significant improvement from the period 2000-2001, when only 21 per cent of discharges received secondary treatment, and 41 per cent of discharges received only primary treatment. A number of major plants, that discharge to estuarine waters, were commissioned during the period 2004-2005, including, Cork city (Lough Mahon), Limerick city (Upper Shannon estuary) and Galway city (Inner Galway Bay). The level of treatment of discharges is expected to increase further as additional treatment plants come into operation in the coming years. Plans for the provision of new plants and upgrades to existing plants has already been put in place as part of Ireland's National Water Services Investment programme 2005-2007. Implementation of the national Waste Water Discharge (Authorisation) Regulations (SI 684 of 2007). The EPA has been given the responsibility of authorising waste water discharges. In granting a licence the Agency must have regard for the environmental objectives established under Article 4(1)(a), 4(1)(b) and 4(1)(c) of the Water Framework Directive. The Agency will set emission limit values (ELVs) for pollutants present in the discharge and a timeframe within which these ELVs are to be achieved to ensure that achievement of good surface water status (or good ecological potential and good surface water chemical status in the case of an artificial and heavily modified body of water), and good groundwater status by not later than 22 December 2015. The regulations also stipulate that compliance with any standards and objectives established for associated protected areas by the dates specified for the individual protected areas and in any event by not later than 22 December 2015.

	The authorisation of waste water treatment plants by the EPA is expected to result in significant improvements in the quality of waste water discharges.
Aquaculture	Not considered to be a significant source of nitrogen or phosphorus in the River Basin Districts included in this assessment.
Industry	**Implementation of the IPPC Directive** **Integrated Pollution Prevention Control (IPPC) Licensing** The EPA has been licensing certain large-scale industrial and agriculture activities since 1994. Originally the licensing system was known as Integrated Pollution Control (IPC) licensing, governed by the Environmental Protection Agency Act, 1992. The Act was amended in 2003 by the Protection of the Environment Act, 2003 which gave effect to the Integrated Pollution Prevention Control (IPPC) Directive 96/61/EC. IPPC licences aim to prevent or reduce emissions to air, water and land, reduce waste and use energy/resources efficiently. An IPPC licence is a single integrated license which covers all emissions from the facility and its environmental management. All related operations that the licence holder carries in connection with the activity are controlled by this licence. Before a licence is granted, you must satisfy the Environmental Protection Agency that emissions from the activity do not cause a significant adverse environmental impact.
Forestry	
Other	

Additional information:

4. Reasons for not achieving the 1988 commitment with regard to nitrogen

Please indicate the problems encountered:

5. Main catchment areas

Catchment	**Type of measures implemented since 1995 or planned to be implemented**[3]
	Please see above – the measures listed above are national measures and have therefore been applied across Ireland's national territory.

6. Coastal areas not included in the catchments listed in Table 5

Area/region/catchment	Type of measures implemented since 1995 or planned to be implemented[3]
	Please see above – the measures listed above are national measures and have therefore been applied across Ireland's national territory.

THE NETHERLANDS

1.National action plans to reduce nutrient inputs

Country: The Netherlands	Please answer yes or no to the following questions
Are the national plans related to:	
1. Nutrient discharges/losses into surface waters:	Yes
2. Nutrient inputs to the Maritime Area:	Yes
Do national procedures for estimating nutrient discharges take account of:	
3. Relevant procedures for calculating the discharges/emissions at source.	Yes
Background and retention estimations?	The estimations for leaching/run-off from agriculture include background loads not originating from agriculture (leaching out of peat, atmospheric deposition); the estimations take account of retention processes.
Are the national procedures based on:	
4. A catchment area approach?	Yes, the procedures have been adapted to a catchment area approach. However, if the sea is concerned, normally the whole territory is taken into account, as all catchments end up in the sea. Moreover, the reduction target (and the related measures) is applicable for the whole area.

2.Fulfilment of the 1988 commitments

Please describe HOW your country is going to reach the agreed reduction target for phosphorus, and indicate the year WHEN it is expected that the reduction target for phosphorus will be achieved:

The reduction target for phosphorus has been achieved.

Please describe HOW your country is going to reach the agreed reduction target for nitrogen, and indicate the year WHEN it is expected that the reduction target for nitrogen will be achieved:

The reduction will be achieved mainly by measures in the agricultural sector. A reduction of about 50 % compared to 1985 can be expected to be achieved in 2010 if all the planned measures for the agricultural sector (within the context of the Nitrate Directive) will be/have been fully implemented. The indicated rather slow process of achieving reductions in the field is due to residual effects of past fertilisation due to soil processes.

3.Measures on a sector by sector basis

Sector	Type of measures implemented since 1995 or planned to be implemented
General	Since the drafting of the last implementation report in 2005, no new measures have been developed and agreed. Progress in reduction was made due to the further implementation of existing measures. Atmospheric deposition figures are higher in 2005 than in 2003. It has to be further investigated whether this is only due to changes in calculation method or (also) due to a real increase in deposition.
Agriculture	In 1995 the Netherlands started to introduce a balance approach in its fertilizer policy. This so-called mineral accounting system (MINAS) focused on the difference between inputs and outputs of minerals on the farm. This difference (i.e. the surplus) should be lower than the loss standards that were defined by the government. The European Commission, however, questioned whether this system would be adequate to implement the Nitrates Directive. On 2 October 2003, the Court of Justice decided that the Nitrates Directive requires application standards, not loss standards. It also concluded that other parts of the first Action Programme introduced by the Netherlands were not adequately in line with the Nitrates Directive. As a direct consequence of the Court judgement, the Netherlands is fundamentally changing its approach to the implementation of the Nitrates Directive. On 1 July 2004, the European Commission and the Netherlands reached an agreement on the matter. The obligations of this agreement and the outlines of the new minerals policy were laid down in the Netherlands Third Action Programme. This Third Action Programme relates to the period from the year 2004 to 31 December 2009, and applies to all Dutch territory. The Third Action Programme implements the Court judgement and the objectives of the Nitrates Directive based on the measures provided for by article 5 of the Nitrates Directive. It introduces a system of application standards, both for animal manure, total nitrogen and total phosphate, in combination with additional regulations on conditions for use of fertilizers (such as the introduction of buffer strips) and clear regulations regarding the minimum storage capacity for animal manure on farms. The MINAS system has remained in force to regulate mineral application and prevent nitrate pollution until the new system of application standards had come into effect from 1 January 2006. The application standards aim at realisation of 50 mg nitrate per litre or less in the upper groundwater and drainage water in 2009, at realisation of equilibrium fertilization for phosphate in 2015 and to combat eutrophication of natural freshwater lakes, other freshwater bodies, coastal waters and marine waters. In this way, the Third Action Programme ensures that the objectives of the Nitrates Directive are achieved and is establishing the basis for the current derogation request. Other measures since 1995: • Decree on arable farming (open air) and livestock farming • General rules for greenhouses
Sewage	• the completion of the programme of nitrogen removal in sewage treatment plants (implementation of Decree on urban waste water). Renovation and replacement of some big treatment plants has been finalised in 2006, which already resulted in a further reduction in 2006 for this sector. The 2006 figure on reduction for this sector compared to 1985 is about 50% (the reported figure for 2005 is 43%).

	• the implementation of further measures to reduce discharges from sewage overflows (amongst others by shutting overflows and connecting them to sewage treatment systems) • the further implementation of measures related to scattered dwellings (e.g. by a Decree within the framework of the Soil Protection Act) • Decree on yacht basins/marinas with provisions on sewage treatment of waste water from yachts/vessels
Aquaculture	
Industry	(Further) implementation of fixed measures in company environmental plans and target group agreements
Forestry	
Other	

4. Reasons for not achieving the 1988 commitment with regard to nitrogen

Please indicate the problems encountered:

Delay in the nitrogen removal programme of sewage treatment plants
Difficulties to develop and implement measures in the agricultural sector that result in a rapid reduction

NORWAY

1.National action plans to reduce nutrient inputs

Country: Norway	Please answer yes or no to the following questions
Are the national plans related to:	
1. Nutrient discharges/losses into surface waters:	Yes
2. Nutrient inputs to the Maritime Area:	Yes
Do national procedures for estimating nutrient discharges take account of:	
3. Relevant procedures for calculating the discharges/emissions at source.	Yes
4. Background and retention estimations?	Yes
Are the national procedures based on:	
5. A catchment area approach?	Yes

2.Fulfilment of the 1988 commitments

Please describe HOW your country is going to reach the agreed reduction target for phosphorus, and indicate the year WHEN it is expected that the reduction target for phosphorus will be achieved:

The reduction target for phosphorus has been met.

Please describe HOW your country is going to reach the agreed reduction target for nitrogen, and indicate the year WHEN it is expected that the reduction target for nitrogen will be achieved:

Norway is committed to reaching the OSPAR 50% reduction target for anthropogenic nitrogen reductions to the Norwegian coast from the Swedish border to the southernmost part of Norway; Lindesnes.

At present Norway focuses on the implementation of the Urban Waste Water Directive and the Nitrates Directive in prioritised catchments draining to the Oslofjord region. Action plans on how/when to reach the 50% reduction target have not been revised since 1995. The inner Oslofjord and Hvaler/Singlefjorden area are defined as sensitive areas according to the Urban Waste Water Directive and the areas draining these areas as Vulnerable Zones according to the Nitrates Directive.

Norway has focused on monitoring surveys of sensitive areas according to the EU directives and the Norwegian parts of the OSPAR maritime area to which the comprehensive procedure will be applied (from the Swedish border to the southernmost part of Norway). The results from the surveys will form the basis for further action plans according to defined sensitive areas.

The last few years the Eutrophication Monitoring Programme has revealed huge loss of the sugar kelp (*Saccharina latissima* former Laminaria saccharina) along the Norwegian coast. Whether the reason for this is eutrophication, climate change or a combination of these two still has to be investigated. Norway is in a process to evaluate further actions related to loss of the sugar kelp.

3.Measures on a sector by sector basis

Sector	Type of measures implemented since 1995 or planned to be implemented
Agriculture	The implementation of planned measures has continued after 1995. Measures and means concerning soil tillage methods, catch crops, and more efficient use of nutrients in plant production have been further developed. Incentives to stimulate more environmental farming such as ecological farming, making dams and vegetation strips and some technical measures favour the environment have been introduced. The measures are in accordance with the demand and recommendation in the Nitrate directive. The system to estimate and evaluate the effects of means and measures is improved. The aim is to ensure a cost-efficient policy and to form a basis for administrative decisions and dimensions of measures. A new assessment of the effects of actual measures combined with a revision of the methodology to calculate losses of nitrogen and phosphorus from the agricultural field based on data from monitoring surveys was carried out in 2001. Regulation of environmental plan was introduced in Norway in 2003. It states that all farms must have an environmental plan (concerning erosion, nutrient run off, pollution, cultural landscape, biodiversity etc) to be eligible for full government support. The requirement of having an environmental plan is part of a cross-compliance mechanism, and is linked to the area- and cultural landscape scheme. (98 % of all farmers meet the obligations in 2004). From 2005 all counties will make regional environmental programmes, and will define local environmental challenges and make proper means to deal with these challenges. Measured related to agriculture are and will be highly connected to the Water Framework Directive (WFD). Although the WFD is not yet a part of the EEA agreement, Norway has given high priority to its follow-up. In 2001, Norway started to prepare for implementation by focusing especially on characterisation of water bodies. In addition we looked at what could be done at the national level to help regional authorities to prepare for their tasks. The regulation (the Water Management Regulation) which transposes the WFD into Norwegian legislation was adopted on 15 December 2006 and entered into force on 1 January 2007. WFD will be important in the work to further reduce the inputs of particles, nutrients and hazardous chemicals into Norwegian coastal waters.
Sewage	New municipal waste water treatment regulations came into force 1.1.2007. All discharges into defined sensitive areas have to undergo 90 % phosphorous removal from 31.12.2008. In addition six waste water treatment plants have requirements to remove 70 % nitrogen.
Aquaculture	Norwegian aquaculture mainly takes place outside the Norwegian OSPAR problem area. On the Skagerrak coast, defined as OSPAR problem area with regard to eutrophication, there is a limit of 16 tonnes phosphorous and 100 tonnes of nitrogen from aquaculture. No new permits for aquaculture will be given within this area if the limits for P and N are exceeded. A Norwegian standard, NS 9410 is currently amended. There is still ongoing work for new regulations
Industry	No measures implemented
Forestry	No measures implemented
Other	No measures implemented

4. Reasons for not achieving the 1988 commitment with regard to nitrogen

Please indicate the problems encountered:

The agreed reduction target for nitrogen has not been met due to uncertainty about the degree of contamination of the recipient and cost-benefit for meeting the reduction target. Norway has the last couple of years focused on monitoring surveys and the results of the surveys will be basis for further action plans. The EU directives on UWW and Nitrates define the inner Oslofjord and the Glomma estuary as sensitive areas (UWW Directive) and areas draining nitrogen from to these areas as vulnerable zones (Nitrates Directive). Actions to reduce nitrogen inputs are taken according to the Urban Waste Water Directive within the OSPAR problem area.

As a downstream country Norway has put efforts into modelling work to estimate the contribution from domestic sources compared to long range transport of nutrients. The results indicate a huge contribution from other sources than antrophogenic Norwegian.

5.Main catchment areas

Catchment	Type of measures implemented since 1995 or planned to be implemented
Glomma	
Drammenselva	
Numedalslågen	
Skienselva	
Otra	
Orreelva	
Suldalslågen	
Orkla	
Vefsna	
Altaelva	

4.Coastal areas not included in the catchments listed in Table 5

Area/region/catchment	Type of measures implemented since 1995 or planned to be implemented

SWEDEN

1.National action plans to reduce nutrient inputs

Country: Sweden	Please answer yes or no to the following questions
Are the national plans related to:	
1. Nutrient discharges/losses into surface waters:	Yes
2. Nutrient inputs to the maritime area:	Yes
Do national procedures for estimating nutrient discharges take account of:	
3. Relevant procedures for calculating the discharges/emissions at source.	Yes
4. Background and retention estimations?	Yes
Are the national procedures based on:	
5. A catchment area approach?	No

2.Fulfilment of the 1988 commitments

Please describe HOW your country is going to reach the agreed reduction target for phosphorus, and indicate the year WHEN it is expected that the reduction target for phosphorus will be achieved:

The official P-reduction target in Sweden is a reduction of discharges to water between 1995 and 2010 by at least 20%. This target refers to gross load of P to water (inland + coast) in the wholöe country. The largest reductions shall be made in the most sensitive areas. There is no action plan in Sweden for fulfilment of the PARCOM 50% reduction target from 1985, but further efforts are made to continue the reduction of phosphorus from all sectors. One reason for the difficulty in reaching the 50% target is that Sweden made massive efforts to reduce P from urban waste water treatment and industry between 1970 and 1985; during this period discharges of P from these two sectors fell by ca 80%. This has reduced the potential for further reductions; e.g. to find effective measures to reduce P from agriculture has been much more problematic. Besides, the fulfilment of the target is difficult to monitor since there are problems to update the estimate of P loss from agriculture in 1985, which was made by a method that is not comparable with later estimates. Finally, P is not considered the limiting nutrient in Kattegat and Skagerrak and is thus considered a less sensitive area than the Baltic Proper. Thus, the main efforts to reduce nutrient input to the Swedish West Coast will focus on the reduction of nitrogen. In summary, we can not give a precise estimate when the target has been achieved, but probably not before 2010.

Please describe HOW your country is going to reach the agreed reduction target for nitrogen, and indicate the year WHEN it is expected that the reduction target for nitrogen will be achieved:

The present official target for N input to sea areas of southern Sweden is a 30% reduction between 1995 and 2010. As for phosphorus, no action plan exists for reaching the PARCOM 50% target for nitrogen. Sweden reduced N input to the OSPAR area by 22% between 1985 and 1995, primarily due to actions taken in agriculture, sewage treatment and industry. According to current plans a reduction in the order of 30% will be reached between 1995 and 2010, but the improvements taken so far is to be evaluated in 2007. In total, fulfilment of this latter target would mean a reduction by 45% from 1985 to 2010, and thus the 50% reduction target would be reached some time between 2010 and 2015.

3. Measures on a sector-by-sector basis

Sector	Type of measures implemented since 1995 or planned to be implemented
Agriculture	In June 1988 the Swedish Parliament launched a special action programme to reduce the loss of nitrogen from agriculture, which is progressing largely according to plan. The national programme is built on legislation, advice and information to farmers, R&D programmes, and economic incentives. Regional efforts have also gathered momentum, and most county administration boards have developed proposals for regional goals and measures, together with a joint structure for monitoring progress, based on indicators. A reinforced action programme has also been initiated in order to further reduce the load of nitrogen by 10 000 tonnes and ammonia by 7 300 tonnes per year between 1995 and 2020. The programme contains increased used of catch crops, increased share of agricultural land being cultivated in spring instead of autumn, reduced number of incidents when excessive amounts of fertilizers are used, reduced spreading of fluid manure in autumn, and the construction of 12 000 ha of wetland. **Implementation of the EU Nitrate Directive (91/271/EEC)** The Nitrate Directive has been implemented in various Regulations from the Board of Agriculture. These are the main components: - Apply Good Agricultural Practice by introducing special rules for storage capacity for stable manure as well as requirements on supply rate, spreading times and spreading techniques for fertilizer in sensitive areas (vulnerable zones). - Restricted supply of manure to arable land to a maximum of 22 kg P/ha yr. This also reduces N supply well below the stipulated 170 kg N/ha yr. **Regulations on autumn and winter grown land** In the three southernmost counties in Sweden, a regulation from the Board of Agriculture (SJVFS 2004:62) stipulates that 60 per cent of arable land shall have a green cover during autumn/winter. In the rest of southern Sweden, the corresponding figure is 50 per cent. The rules entered into force in 1992. There are also rules on first tillage for certain crops in order for them to be approved as autumn or winter grown land. **Financial incentives** Since 1996 there are various forms of agri-environmental schemes for reducing plant nutrient losses, partly financed by the EU. The Environmental and Rural Development Plan for Sweden 2000-2006 as well as that for 2007-2013 include riparian strips, catch crops, spring tillage, and wetlands and ponds. Sweden applies environmental fees since 1984 in order to reduce the use of mineral fertilisers. **Extension services and information** In 1995, extension services became a part of the Environmental and Rural Development Plan. Each regional authority has, in co-operation with organisations of their counties, developed programmes including regional objectives for the activities. Training has been offered both in the form of advising individual farmers and arranging classes for groups of farmers. In contacts with individual farmers it has been possible to design environmentally sound solutions for handling manure and other plant nutrients, all based on the needs of the individual farm. **R&D developments** In connection with the introduction of the plan of action against plant nutrient

	losses from agriculture, research and development activities were initiated with the aim of finding methods that may reduce plant nutrient losses from agriculture e.g. through the refinement of methods to handle manure and to use catch crops.
Sewage	Sweden has taken far-reaching measures to remove phosphorus at the urban wastewater treatment plants. At present, the mean removal rate for phosphorus >95 %. Since 1995, more than 70 large (> 10 000 pe) sewage treatment plants situated mainly in the southern part of Sweden and located near the coast have received new discharge permits according to the requirements of the EC UWWT-directive. These plants have subsequently been upgraded for nitrogen removal. The mean removal rate for all treatment plants > 2000 p.e > 60%. To further reduce the load of phosphorus and nitrogen to meet the Swedish environmental quality objective "Zero eutrophication", improvements of the sewerage system are made. This will reduce overflows at the sewage treatment plants. In order to further reduce the load, municipalities are requested to improve small-scale wastewater treatment in rural areas and thus consider e.g. source separation techniques and wetland filters. The Government has expressed its intention to ban the use P-containing detergent for households from 1 January 2008.
Aquaculture	Not reported. Improvements have been made by adjusting the feed composition.
Industry	Application of the main legal instrument for reducing environmental impacts – The Environmental Code – has resulted in considerable reduction of nitrogen and phosphorus from industrial installations. The improvements have been achieved by improved water treatment facilities in combination with process changes.
Forestry	The Forestry Law (§30) requires the following: - forest owners should leave protective buffer zones with trees along streams, lakes and sea shores. - Forest cuttings should be performed in a way to avoid nutrient leaching – restrictions on forest fertilization (application technique, dose, and regionalisation) Several information and education programmes for forest owners and forest contractors have been performed. Information material with regard to the Water Framework Directive is under preparation.
Other	

Additional information:

4. Reasons for not achieving the 1988 commitment with regard to nitrogen

Please indicate the problems encountered:

All Environmental Objectives in Sweden decided by the Parliament has the base year 1995.
Sweden has no official 50% reduction target objective; the interim target for nitrogen under the Environmental Quality Objective is to reduce the waterborne emissions into the Sea by 30% between 1995-2010.
Difficulties to update the load estimate for 1985 gives an uncertainty. Losses from diffuse sources is uncertain and more point sources have been included in the estimates since 1985.
Difficulties to reduce losses from diffuse sources

5. Main catchment areas

Catchment	Type of measures implemented since 1995 or planned to be implemented
Kattegat	No specific measures for individual catchment areas. All legal environmental instruments apply for industry in the whole country. Enhanced reduction requirements for Urban Wastewater Treatment Plants apply to all plants > 10 000 pe in southern Sweden. For Agriculture regional the following regional measures apply; - incentives for construction of wetlands - storage capacity for manure containers - rules for manure spreading and winter grown land
Skagerrak	See Kattegat

6. Coastal areas not included in the catchments listed in Table 5

Area/region/catchment	Type of measures implemented since 1995 or planned to be implemented

SWITZERLAND

1. National action plans to reduce nutrient inputs

Country: Switzerland	Please answer yes or no to the following questions
Are the national plans related to:	
1. Nutrient discharges/losses into surface waters:	*Yes*
2. Nutrient inputs to the Maritime Area:	*No*
Do national procedures for estimating nutrient discharges take account of:	
3. Relevant procedures for calculating the discharges/emissions at source.	*Yes*
Background and retention estimations?	*Yes*
Are the national procedures based on:	
4. A catchment area approach?	*Yes*

2. Fulfilment of the 1988 commitments

Please describe HOW your country is going to reach the agreed reduction target for phosphorus, and indicate the year WHEN it is expected that the reduction target for phosphorus will be achieved:
See Annex 2 “SWITZERLAND” in the report “Nutrients in the Convention Area, 2003”

Please describe HOW your country is going to reach the agreed reduction target for nitrogen, and indicate the year WHEN it is expected that the reduction target for nitrogen will be achieved:

See Annex 2 “SWITZERLAND” in the report “Nutrients in the Convention Area, 2003”

3. Measures on a sector by sector basis

Sector	Type of measures implemented since 1995 or planned to be implemented
Agriculture	See Annex 2 “SWITZERLAND” in the report “Nutrients in the Convention Area, 2003”
Sewage	See Annex 2 “SWITZERLAND” in the report “Nutrients in the Convention Area, 2003”
Aquaculture	See Annex 2 “SWITZERLAND” in the report “Nutrients in the Convention Area, 2003”
Industry	See Annex 2 “SWITZERLAND” in the report “Nutrients in the Convention Area, 2003”
Forestry	See Annex 2 “SWITZERLAND” in the report “Nutrients in the Convention Area, 2003”
Other	See Annex 2 “SWITZERLAND” in the report “Nutrients in the Convention Area, 2003”

4. Reasons for not achieving the 1988 commitment with regard to nitrogen

Please indicate the problems encountered:

5. Main catchment areas

Catchment	Type of measures implemented since 1995 or planned to be implemented
Rhine basin downstream of the lakes inside Switzerland	See tables 1,2 and 3

6. Coastal areas not included in the catchments listed in Table 5

Area/region/catchment	Type of measures implemented since 1995 or planned to be implemented

UNITED KINGDOM

1. National action plans to reduce nutrient inputs

Country: UK	Please answer yes or no to the following questions
Are the national plans related to: 1. Nutrient discharges/losses into surface waters: 2. Nutrient inputs to the maritime area:	Yes: A number of national plans cover nutrient discharges (Good Environmental Practice and Countryside Stewardship) and specific problem catchments are covered by more detailed plans (e.g Nitrate Vulnerable Zones NVZ)
Do national procedures for estimating nutrient discharges take account of: 3. Relevant procedures for calculating the discharges/emissions at source. Background and retention estimations?	Yes, to some extent. However. expertise on the "source approach" is still developing and UK procedures have still not yet been established.
Are the national procedures based on: 4. A catchment area approach?	Yes – where this is appropriate and relevant information is available

2. Fulfilment of the 1988 commitments

Please describe HOW your country is going to reach the agreed reduction target for phosphorus, and indicate the year WHEN it is expected that the reduction target for phosphorus will be achieved:

The UK only identified OSPAR problem areas in 2002 and had no areas to which commitments applied in 1988. However, on a national scale, this target has probably been met, mainly due to stricter effluent standards, reductions in discharges and changes in detergent composition.

Please describe HOW your country is going to reach the agreed reduction target for nitrogen, and indicate the year WHEN it is expected that the reduction target for nitrogen will be achieved:

The UK only identified OSPAR problem areas in 2002, and had identified no areas in 1988 to which the commitments applied. We will aim to achieve a substantial reduction in inputs of nitrogen into the designated problem areas through improved sewage treatment (e.g. intoduction of tertiary treatment) and improved agricultural practice such as designation as a NVZs under the Nitrates Directive . Northern Ireland declared "total territory" designation under the Nitrates Directive in 2004.

It is not yet possible to say in which year the reduction target for Nitrogen will be achieved. Experience shows that reduction measures in agriculture take a long time to lead to changes in concentrations in rivers and the marine environment.

3. Measures on a sector-by-sector basis

Sector	Type of measures implemented since 1995 or planned to be implemented
Agriculture	The UK has imposed a number of obligations on farmers receiving the "single farm payment" under the under the Cross Compliance Regime of EC Regulation 1782/2003 which involve Statutory Management Requirements and Good Agricultural and Environmental Condition requirements. The Environmental Stewardship Scheme encourages more extensive farming systems and use of soil, nutrient and manure planning. These will protect the environment and lead to reductions in inputs of nitrogen and phosphorus to surface waters. The UK has also designated specific areas as NVZs and "total territory" under the Nitrates Directive in Northern Ireland to which stricter control measures apply. In particular, the UK has implemented a number of policies that aim to improve agricultural practice and reduce losses of nutrients. • Codes of Good Agricultural Practice have been promoted throughout the UK and are intended to provide a baseline level of protection against the pollution of water. • The England Catchment Sensitive Farming Delivery Initiative has operated within 40 priority catchments within England since 2006. It promotes best practice in the use of, for example, fertiliser and manure, through intensive provision of advice and access to a capital grant. • The Environment Sensitive Farming advice scheme has also provided advice to farmers on the use of fertilisers and manures. • Agri-environment schemes have encouraged more extensive farming systems and the use of soil, manure and fertiliser management planning. • Farmers within Nitrate Vulnerable Zones (NVZs) are required by law to implement an Action Programme of measures designed to reduce losses of nitrogen from agricultural land. In 2004, Northern Ireland announced that all farmers in the Province would have to comply with the Action Programme. • The Farm Waste Grant Scheme provided financial support to farmers in Nitrate Vulnerable Zones to help them improve their manure storage facilities and comply with the NVZ Action Programme. • Farmers receiving the single farm payment under the cross-compliance regime of EC Regulation 1782/2003 are obliged to comply with a number of Statutory Management Requirements (which includes the NVZ Action Programme) and keep their land in Good Agricultural and Environmental Condition. Further measures to tackle diffuse water from agriculture are being developed under the Catchment Sensitive Farming programme.
Sewage	Installation of tertiary treatment at relevant sewage treatment plants and Codes cf Practice on the application of sewage sludge to land.
Aquaculture	Aquaculture is covered by Codes of Good Practice which address nutrients. However, aquaculture has not been reported a being a significant source in UK problem areas.

Industry	Application of Best Available Techniques (e.g under the EC IPPC Directive) and treating effluents to enable discharge consents and water quality standards in receiving waters to be met.
Forestry	Generally not a significant contributor to UK problem areas.
Other	Not applicable

4. Reasons for not achieving the 1988 commitment with regard to nitrogen

Please indicate the problems encountered:

As mentioned above, the UK had not identified any problem areas or potential problem areas in 1998 and first identified these in 2002. Nevertheless, a number of mesures to reduce nutrient inputs to water and air have been put in place.

5. Catchment areas of concern

Note: the table below shows the UK Problem Areas and Potential Problem Areas reported to OSPAR in first application of the Comprehensive Procedure in 2002; sensitive areas (SA) under the UWWT Directive and nitrate vulnerable zones (NVZ) under the Nitrates Directive.

Assessment area	OSPAR status in 2002	Status under UWWT and.or Nitrates Directive
Portsmouth Harbour	PA	SA
Chichester Harbour	PA	SA
Langstone Harbour	PA	SA
Pagham Harbour	PA	SA
Loughor estuary	PPA	SA
Seal Sands (Tees estuary)	PA	SA
Lindisfarne NNR area	PA	NVZ
Holes Bay	PA	SA
Poole Harbour	PPA	SA & NVZ
The Fleet	PPA	NVZ
Truro, Tresillian and Fal estuaries	PA	SA & NVZ
Taw estuary	PA	SA & NVZ
Tawe	PA	SA
Ythan estuary	PA	SA & NVZ
Quoile Pondage (in Strangford Lough Catchment)	PPA	SA
Inner Belfast Lough & tidal Lagan impoundment	PA	SA

Measures taken to reduce the inputs of Nutrients from UK Problem Areas and Potential problem areas

Areas designated as Nitrate Vulnerable Zones under the Nitrates Directive

An Action Programme of measures has been implemented by farmers within NVZs to reduce losses of nitrate from agricultural land. The Action Programme promotes best practice in the use and storage of fertiliser and manure, and builds on the guidelines set out in the 'Code for Good Agricultural Practice for the Protection of Water'; http://www.defra.gov.uk/farm/environment/cogap/.

There are four key aspects to the Action Programme which require farmers to:

- Limit inorganic nitrogen fertiliser application to crop requirements, after allowing fully for residues in the soil and other sources.
- Limit organic manure applications to 170 kg ha^{-1} of total nitrogen each year averaged over the area of the farm not in grass and 250 kg ha^{-1} of total nitrogen each year averaged over the area of grass on the farm.
- On sandy or shallow soils not to apply slurry, poultry manures or liquid digested sludge between 1 September and 1 November (grassland or autumn sown crop) or 1 August and 1 November (fields not in grass without autumn sown crop). The storage capacity available for those animal manures which cannot be applied during the autumn closed period must be sufficient to cover these periods unless other environmentally acceptable means of disposal are available.
- Keep adequate farm records, including cropping, livestock numbers and the use of organic manures and nitrogen fertilisers.

Four NVZs were designated in Scotland in 2002, comprising 14% of the land area. They incorporate areas earlier designated, one of which was the Ythan catchment.

In 1999 and 2003 Northern Ireland designated seven small Nitrate Vulnerable Zones (NVZs) due to elevated nitrate levels in groundwaters. In October 2004 a total territory approach to the implementation of the Directive was adopted in Northern Ireland due to eutrophication of surface waters and the 'Nitrates Action Programme Regulations (Northern Ireland) 2006' (the NAP Regulations) came into operation on 1 January 2007. The introduction of these regulations meets Northern Ireland's legal and environmental obligations and the 'Phosphorus (Use in Agriculture) Regulations (Northern Ireland) 2006', which also became operational on 1 January 2007, support these obligations. These regulations bring into operation measures to improve the use of nutrients on farms and as a result improve water quality throughout Northern Ireland.

Some of the key measures in the NAP Regulations include:

- A closed period for the spreading of organic (15 Oct to 31 Jan) and inorganic fertilisers (15 Sept to 31 Jan);
- A minimum livestock manure storage requirement (26 weeks for pig/poultry and 22 weeks for other livestock);
- A limit on the amount of nitrogen that can be applied to land from livestock manures (170kg N ha^{-1} $year^{-1}$); and
- The inclusion of nitrogen efficiency measures.

In addition to the measures described in action plans, Member States are required to carry out effectiveness monitoring of the action plans. In Northern Ireland, the effectiveness of the programmes is measured by:

- Monitoring surface (~600) and groundwater (~90) stations on a monthly basis for compliance with the 50mg l^{-1}

- Trophic status monitoring of rivers, lakes and transitional/coastal waters, measuring both chemical and biological determinands on a rolling programme.
- Detailed nutrient budgeting of catchments
- Intensive survey at targeted mini-catchments, with known eutrophication problems
- Soil mineral N analysis

The studies outlined above are carried out in conjunction with other government laboratories.

Waters Designated as Sensitive under the Urban Wastewater Treatment Directive

The Urban Waste Water Treatment Directive (UWWTD) sets requirements for the collection, treatment and discharge of urban wastewater and also establishes timetables for the achievement of these standards according to the sensitivity of the waters.

The Directive requires that sewage being discharged to SAs should be subjected to tertiary treatment to standards given in the Directive, within seven years of designation.

The SAs mentioned above were designated in 2002 or earlier. Appraisals of wastewater treatment plants discharging into the SAs and the installation of remedial measures where appropriate are either completed or underway, but a full report on how the various measures have been implemented will not be available until after the seven year deadline has been reached in 2009.

Improvements in the ecology of the waters in Belfast Lough have already been noticed since the installation of nitrogen removal at four wastewater treatment plants discharging into the Lough.

6. Coastal areas not included in the catchments listed in Table 5

Area/region/catchment	Type of measures implemented since 1995 or planned to be implemented

Addendum 2

PARCOM Recommendation 88/2 on the reduction on inputs of nutrients to the Paris Convention area

NATIONAL IMPLEMENTATION REPORTS 2007/2008

(Implementation reporting format revised by EUC 2006 used. All footnotes from the reporting format have been deleted)

Reports received from:

BELGIUM

1. Surface waters - maritime area - catchments

Country: BELGIUM	**Please answer yes or no to the following questions**
Is your country committed to the 50% reduction target?	*Yes*
If yes,	
Are the figures given based on:	
1. Nutrient discharges/losses into surface waters:	*Yes*
2. Nutrient inputs to the maritime area:	*No*
Are the national reporting procedures based on a catchment area approach?	*Yes*

2. Nitrogen loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes nitrogen 1985	Tonnes nitrogen 2005	% reduction in nitrogen discharges/ losses between 1985 and 2005	Calculation method/model used	Remarks
Aquaculture (GL 2)				Reporting 2006 Eurostat for the Brussels-Capital Region	
Industry (GL 3)	29280	3834	87	Reporting 2006 Eurostat for the Brussels-Capital Region	*A small uncertainty of +/- 11 tonnes of nitrogen loads of the industry for the Brussels-capital region. See remark 2) in annex 2
Waste water treatment and sewerage (GL 4)	31960	14127	26	Reporting 2006 Eurostat for the Brussels-Capital Region	See remark 1) in annex 2
Households not connected to public sewerage (GL 5)		9447		Reporting 2006 Eurostat for the Brussels-Capital Region	See remark 1) in annex 2
Point Sources Total	**61240**	**27408**	**55**		
Agriculture (GL 6)	31895	34124	-7	SENTWA version 7.04 (Flemisch region) see annex 1 Reporting 2006 Eurostat for the Brussels-Capital Region	*A small uncertainty of +/- 5 tonnes of nitrogen loads of the industry for the Brussels-capital region. See remark 3) in annex 2
Atmospheric deposition on fresh water systems (GL 6)					See remark 3) in annex 2
Natural background losses (GL 6)					
Diffuse sources total (GL 6)	**31895**	**34124**	**-7**		
GRAND TOTAL	**93135**	**61532**	**34**		

3. Phosphorus loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes phosphorous 1985	Tonnes phosphorous 2005	% reduction in nitrogen discharges /losses between 1985 and 2005	Calculation method/model used	Remarks
Aquaculture (GL 2)					
Industry (GL 3)	5460	806*	85	Reporting 2006 Eurostat for the Brussels-Capital Region	*A small uncertainty of +/- 2 tonnes of phosphorous loads of the industry for the Brussels-capital region. See remark 2) in annex 2
Waste water treatment and sewerage (GL 4)	9870	2404	58	Reporting 2006 Eurostat for the Brussels-Capital Region	See remark 1) in annex 2
Households not connected to public sewerage (GL 5)		1710		Reporting 2006 Eurostat for the Brussels-Capital Region	See remark 1) in annex 2
Point Sources Total	**15330**	**4920**	**68**		
Agriculture (GL 6)	2128	1969	7.5	SENTWA version 7.04 (Flemisch region) see annex 1 Reporting 2006 Eurostat for the Brussels-Capital Region	See remark 3) in annex 2
Atmospheric deposition on fresh water systems (GL 6)					See remark 3) in annex 2
Natural background losses (GL 6)					
Diffuse sources total (GL 6)	**2128**	**1969**	**7.5**		
GRAND TOTAL	**17458**	**6889**	**61**		

4. Specific/normalised years – use of RID figures

Please indicate whether the input figures for 2005 and, if relevant, for 1985 are based on:	*Please indicate by a 'x' whether the input figures obtained from RID are used:*
these specific years	as a basis for the nutrient load figures notified
normalised years:[5]	to check the nutrient load figures obtained:
Description of 'Normalised year procedure':	Comparison between nutrient input figures from RID and the figures emanating from the approach chosen by your country

5. Evaluation of the trial application of HARP-NUT Guideline 6

The Flemish region provided the answers below, no evaluation was reported by the Walloon region and it was not considered relevant for the Brussels-capital region

1. Did you find the HARP-NUT GL 6 useful to help you select the tools you needed for quantification and reporting of losses of nitrogen and phosphorus from diffuse sources?

   The Flemish region in Belgium used the same model to quantify the diffuse losses of nitrogen and phosphorus from diffuse sources as before. It was useful to compare the information and methods reported in GL 6.

2. Did you apply several models for the same catchment, and if so, what were your experiences?

Not relevant

3. If models other than those referred to in the Guideline were used, please explain why other models were used and whether the Guideline was of help in evaluating their suitability for your purposes.

See Annex on the SENTWA model.

4. Did you encounter any specific problems or a need for more precision or clarification in the Guideline? If so, please elaborate.

No

5. If you encountered problems, please suggest improvements.

6.Quality assurance

Please include a brief description of quality assurance procedures followed for the model applications, such as references to Good Modelling Practice, data handling procedures, and validation procedures.

Further details of the requirements of Good Modelling Practice are available for model users at http://www.info.wau.nl/research%20projects/gmp.htm and www.HARMONIQUA.org.

5 For those having used normalised years, please describe the factors taken into account as in HARP-NUT Guideline 7 (reference number: 2004-2g).

ANNEX 1: Description of the SENTWA model and its calibration and validation for the Flemish region

A.Description of the model

The SENTWA model 'System for the evaluation of the nutrient transport to surface water' is a semi-empirical, deductive emission model to simulate the nutrient emissions from agriculture (manuring) to the surface water. This model was developed by the CODA (Center for research in veterinary medicine and agrochemicals) from the Federal Ministry of Agriculture in 1993 on the basis of a German pilot study in the Elbe region. The CODA has adjusted the model for Belgium and has refined the model by validation and calibration of the model for the Regions 'Zwalm' (sandy loam) and 'Mark' (sandy) in Flanders in 1997 for the Flemish Environment Agency (VMM). The SENTWA model is managed by VMM since 1997.

The information used consists of easily available statistical data. The model takes into account specific geographical circumstances. Several research projects have improved the calculation of different emission routes.

SENTWA is a semi-empirical model that quantifies orders of magnitudes of the nutrient emissions from agriculture. It quantifies the load total N and total P (kg or ton N/P; kg or ton N/P per ha) on an annual or monthly basis and per river catchment. There are 11 river catchments in Flanders.

The model consists of 6 routes of emissions:

- Direct losses:
  - * direct losses by use of fertilizer (chemical manure);
  - * direct losses by grazing of animals (organic manure);
  - * direct losses by stabling animals (organic manure);
  - * direct losses by saps of manure or silo's;
- Drainage losses (these are the losses at normal agricultural manuring);
- Ground water losses (these are the losses at normal agricultural manuring);
- Excess losses (these are the losses at excessive manuring);
- Erosion losses;
- Run off losses.

Additional clarification on the different routes of emission

The direct losses consist of 4 parts that quantify the nutrients that are lost 'directly' into surface water via different routes.

The drainage, groundwater and (negative) excess losses have to be considered together. The first two losses of three estimate the nutrient losses via drainage and groundwater in case of present, normal agricultural practices. The loss coefficients for N are expressed in kg N/ha and take into account the specific properties of crops and soils. The coefficients are derived for 8 crops and 6 agricultural regions. The different crops are: pasture, industrial plants, potatoes, grains/cereals, vegetables, legumes, corn and fodder crops. The agricultural regions are Dunes and Polders, Sandy Region, Campines, Sand-Loamy Region, Loamy Region and 'Pasture' Region. The (negative) excess losses take into account the effectively used nutrient in the considered region. In case of higher use than 'normal agricultural practice', additional losses are taken into account. In case of lower N-use, N-losses become lower than what was calculated for drainage and groundwater losses.

The limits for (negative) excess losses originally were the legally allowed maxima of the Manure Decree of 1995. In 2002 they where adjusted as consequently as possible during the new calibration and validation study by BDB. (BDB, 2002).

Because nitrate is water soluble, the soil related losses (drainage, groundwater, erosion and run-off) are dependant on precipitation. High precipitation leads to higher nutrient loads. To assess the changing impact of the agriculture sector, a mean precipitation is derived (based on the monthly mean precipitation per agricultural region in the period 1990 – 2001). This 'normal' precipitation allows deriving the impact from agriculture, independently from precipitation.

The erosion and run-off losses calculate the contribution of superficial nutrient losses. The calculation of the erosion losses is based on the RUSLE-equation where the specific Flemish circumstances are being taken into account.

Which input is demanded?

Year independent data:

- municipalities
- hydrographic zones and basins
- agricultural areas
- phosphate-risk and phosphate-saturated zones (based on data of the Flemish Land Agency)

Year dependent data:

- agricultural land use and of different kind of animals (cattle);
- excretion coëfficients for the different kind of animals (cattle);
- use of fertiliser;
- transport and treatment of manure;
- precipitation;
- yields of different crops;

The data of the National Institute for Statistics and the Centre for Agricultural Economy are used to allow a consistent time series since 1990. These input factors are available on the scale of municipality, or provinces, or agricultural region.

The use of the results

The model is designed as a tool for supporting and evaluation of the policy of agriculture/environment. It is used for various purposes.

In 2004, a time series for the period 1990 – 2003 and different policy-relevant scenarios have been calculated (VMM, 2004) and (VMM, 2004 (a)).

Since 2005 the results are being used in the Environmental Cost Model. This model is in development by the Flemish Institute for Technological Research (VITO) for the cost-effectiveness analysis for the Water Framework Directive.

In 2006, it has been used in collaboration between the agricultural administration (department monitoring and study) and the Flemish Environment Agency (AMS, 2006). In this project, long-time (economic) scenario's were run for the Flemish Agriculture by changing economic and environmental boundary conditions. The consequences for the evolution of environmental pressures were calculated with SENTWA.

The results are used for various reporting purposes. In Flanders, the results are used in the reporting of the Flemish Environment Agency, the yearly Environment and Nature report, water quality models, … Internationally, the results have been used in the Art. 10 reporting of the Nitrates Directive, the Art. 5 reporting of the Water Framework Directive, OSPAR reporting on nutrients, North Sea Conference reporting and OECD reporting.

B.The calibration and validation of the SENTWA model: three independent approaches

The SENTWA-model has been built by CODA in the early 1990's. The CODA has adjusted the model and refined it by validation and calibration of the model for the Regions 'Zwalm' (sandy loam) and 'Mark' (sandy) in Flanders in 1997 (CODA, 1997). This calibration and validation made use of a balance method. In two small basins, where the other sources (point sources from households and industry, contributions from atmospheric deposition, natural losses) were known, the remaining nitrogen load was compared to the loads calculated by SENTWA.

In the period 2000-2002 two study projects have been carried out to refine, recalibrate and revalidate the model.

In a first project (BDB (2002)), the drainage, groundwater and (negative) excess losses have been ameliorated, based on the N-eco² project (Determination of the amount of mineral nitrogen in the soil as a policy tool. (N-eco², 2002)). In this project, the drainage and groundwater losses have been adjusted based on the scientific work (monitoring, modelling) that had been carried out to clarify the relations between the presence of mineral nitrogen in soil in autumn and leaching via drainage and groundwater during winter.

In 2003 - 2005, a new calibration and validation study was carried out (BDB, 2005). In this study, the calibration and validation of the model was carried out by translating the loads that were calculated by the model into concentrations. These concentrations were compared with the results of the MAP-monitoring

network. The conclusion of the study was that the method developed leads to correct indicative information on the size of the concentrations.

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ANNEX 2

Remarks from the Brussels-Capital region about the calculation:

1) Les rejets domestiques ont été évalués dans une étude de mars 2002 intitulée "Schatting van aanbreng van watervervuilende stoffen op het grondgebied van het Brussels Hoofdstedelijk Gewest : Vuilvrachtbalans " (ERM - Belgroma). Ils distinguent 4 groupes de personnes : 1/ les personnes qui à la fois habitent & travaillent ou étudient en RBC; 2/ les personnes qui habitent en RBC mais qui travaillent ou étudient en dehors; 3/ les personnes qui habitent en dehors de RBC mais qui travaillent ou étudient en RBC; 4/ les personnes qui ne font qu'un séjour temporaire en RBC (touristes principalement). Pour chacun de ces 4 groupes, un nombre équivalent d'EH a été déterminé. L'étude avait permis de définir la méthode et avait fourni des résultats pour une seule année. L'actualisation des données sources grâce aux statistiques fournies par l'INS a permis d'obtenir les résultats pour les autres années. La pollution domestique a donc été estimée sur base du nombre d'EH de l'année i* définition d'Aquafin d'1 EH (cf. valeurs ci-dessous).

La définition de l'EH qui a été utilisée est : EP (N10), (P2) en g / jour.EP
Le volume moyen du rejet domestique est estimé à 150 L / jour.EP.

2) Les eaux usées produites par les industries sont estimées, par catégorie et par année, grâce aux données de la taxation des eaux usées gérée par l'IBGE-BIM, qui sont disponibles à partir de l'année 2001. L'année 2005 est incomplète, car les charges polluantes de certaines industries n'ont pas encore été comptabilisées.

3) Toutes les charges polluantes correspondant à la pollution diffuse sont issues du rapport déjà cité ci-dessus: " Schatting van aanbreng van watervervuilende stoffen op het grondgebied van het Brussels Hoofdstedelijk Gewest : Vuilvrachtbalans " (ERM - Belgroma)" maart 2002.
Les valeurs sont calculées pour l'année 2002 et sous-estimées : la lixiviation des sols pollués n'a pas été évaluée. Il est supposé que ces valeurs restent constantes au fil des années : les valeurs inscrites pour les autres années comportent donc une marge d'erreur.

La pollution diffuse en RBC résulte de différentes sources:

* Les dépôts atmosphériques (source de N et dans une moindre mesure de Zn et Pb)

* La lixiviation des sols pollués (quantités inconnues mais présumées importantes!)

* Le lessivage des sols agricoles (principale source de N et unique source de P)

* Les émissions liées aux activités de transport (quantités relativement importantes de métaux notamment Cu, Ni, Pb, Zn, Cr)

* Le lessivage des matériaux de construction (rejets de quantités importantes de Pb, Zn, Cr)

Chaque valeur de charge est donnée accompagnée d'un ordre de grandeur (valeur minimum - valeur maximum). Dans le tableau, c'est la valeur moyenne qui a été indiquée. Il est précisé que les charges en N et P ne tiennent compte, pour la pollution émise par lessivage des sols agricoles, que des surfaces agricoles incluses en RBC. N'est donc pas prise en compte la charge polluante issue des sols agricoles de la Région Flamande, qui est transférée vers l'exutoire situé en RBC.

GERMANY

1. Surface waters - maritime area - catchments

Country	Please answer yes or no to the following questions
Is your country committed to the 50% reduction target?	Yes
If yes,	
Are the figures given based on*:*	
1. Nutrient discharges/losses into surface waters:	Yes
2. Nutrient inputs to the maritime area:	No
Are the national reporting procedures based on a catchment area approach?	Yes

2. Nitrogen loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes nitrogen		% reduction in nitrogen discharges/losses between	Calculation method/model used	Remarks
	1985	2005	1985 and 2005		
Aquaculture (GL 2)	NI	NI	NI	-	No information available. Inputs from aquaculture in Germany are of lesser importance.
Industry (GL 3)	122 227	7 744	94	MONERIS	
Waste water treatment and sewerage (GL 4)	246 027	98 238	60	MONERIS	
Households not connected to public sewerage (GL 5)	24 664	11 763	52	MONERIS	
Point Sources Total	**392 918**	**117 745**	**70**		
Agriculture (GL 6)	448 349	247 366	45	MONERIS	
Atmospheric deposition on fresh water systems (GL 6)	8 477	7 179	15	MONERIS	
Natural background losses (GL 6)	24 852	19 110	23	MONERIS	
Diffuse sources total (GL 6)	**481 678**	**273 655**	**43**		
GRAND TOTAL	**874 596**	**391 400**	**55**		

3. Phosphorus loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes phosphorous		% reduction in phosphorus discharges/losses between	Calculation method/model used	Remarks
	1985	2005	1985 and 2005		
Aquaculture (GL 2)	NI	NI	NI	-	No information available. Inputs from aquaculture in Germany are of lesser importance.
Industry (GL 3)	6 124	301	95	MONERIS	
Waste water treatment and sewerage (GL 4)	57 786	10 346	82	MONERIS	
Households not connected to public sewerage (GL 5)	9 336	2 755	70	MONERIS	
Point Sources Total	**73 246**	**13 402**	**82**		
Agriculture (GL 6)	9 119	6 805	25	MONERIS	
Atmospheric deposition on fresh water systems (GL 6)	297	220	26	MONERIS	
Natural background losses (GL 6)	1 847	1 268	31	MONERIS	
Diffuse sources total (GL 6)	**11 263**	**8 293**	**26**		
GRAND TOTAL	**84 509**	**21 695**	**74**		

4. Specific/normalised years – use of RID figures

Please indicate whether the input figures for 2005 and, if relevant, for 1985 are based on:	*Please indicate by a 'x' whether the input figures obtained from RID are used:*
these specific years:	as a basis for the nutrient load figures notified
normalised years:[6]	to check the nutrient load figures obtained:
Description of 'Normalised year procedure':	Comparison between nutrient input figures from RID and the figures emanating from the approach chosen by your country

5. Evaluation of the trial application of HARP-NUT Guideline 6

1. Did you find the HARP-NUT GL 6 useful to help you select the tools you needed for quantification and reporting of losses of nitrogen and phosphorus from diffuse sources?

   - MONERIS is one of the models scrutinised in GL 6.

2. Did you apply several models for the same catchment, and if so, what were your experiences?

   - No.

3. If models other than those referred to in the Guideline were used, please explain why other models were used and whether the Guideline was of help in evaluating their suitability for your purposes.

   - Not applicable.

4. Did you encounter any specific problems or a need for more precision or clarification in the Guideline? If so, please elaborate.

   - No.

5. If you encountered problems, please suggest improvements.

6. Quality assurance

Please include a brief description of quality assurance procedures followed for the model applications, such as references to Good Modelling Practice, data handling procedures, and validation procedures.

Further details of the requirements of Good Modelling Practice are available for model users at http://www.info.wau.nl/research%20projects/gmp.htm and www.HARMONIQUA.org.

The conceptual-deterministic nutrient emissions model MONERIS has been applied to many international river systems in recent years. It could be shown that MONERIS was able to describe the observed dissolved inorganic nitrogen (DIN), total nitrogen (TN) and total phosphorus (TP) loads for river catchments with a size from several hundred km² down to less than 50 km², for both single year data and means of periods.

During the last year several model modifications (i.e. riverine retention, erosion) have been implemented in the model and the application to the German river systems is one of the first applications of the model using this new approaches. Although the observed loads are described well by the model, the results should be considered as preliminary. Further detailed analysis of the results and the functioning of the new approaches and eventually also a fine calibration of the model may be needed. So far it was not yet possible to take recent input data like N-surplus on agricultural areas into consideration. But apparently the recent N-surplus in some areas decreases about 10% whereas in other areas it is nearly unaltered compared to those from 1999.

The inventory data of 2005 for the industrial direct dischargers showed considerable discrepancies to the data of the former calculations, except for Rhine and Weser. This is due to changes in the methods of data collection. Whereas the former data were based on various information sources, for the period 2003 to 2005 the official 2004 EPER inventories of the German Federal States were used

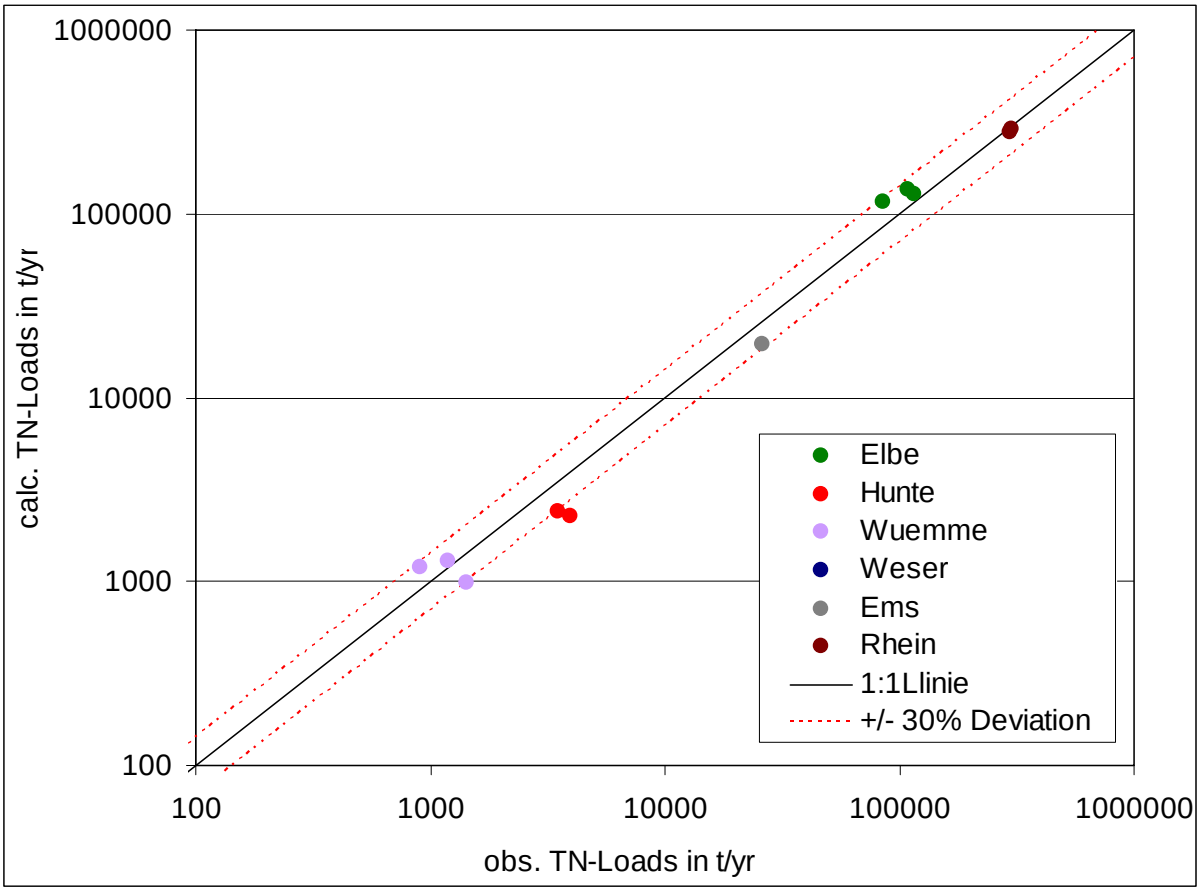
6 For those having used normalised years, please describe the factors taken into account as in HARP-NUT Guideline 7 (reference number: 2004-2g).

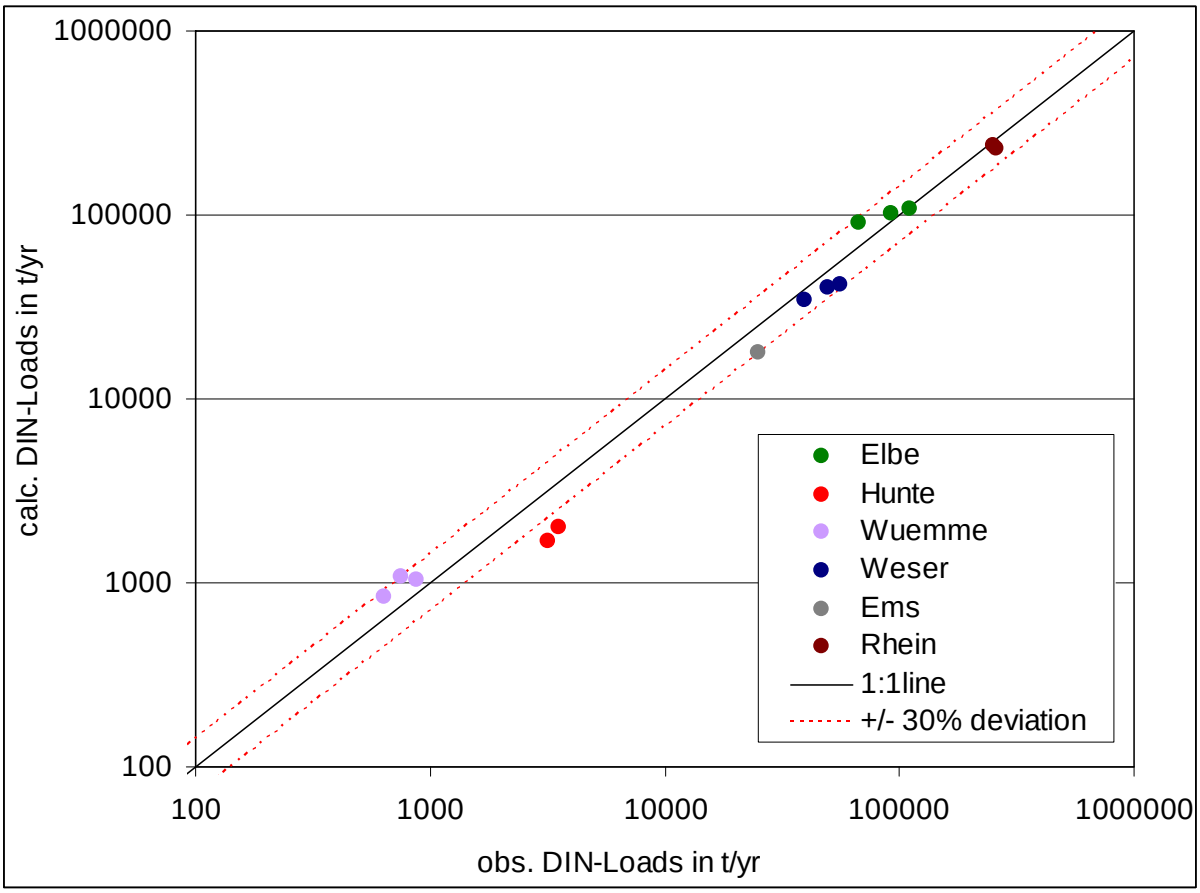
as a basis. Harmonisation of the approaches taken is required but will only be achieved by the end of 2007.

After fine calibration of the model and when using all recent data available, the modelled emissions and the modelled loads will probably not change considerably, nevertheless the results should be seen as preliminary.

The calculated emissions only refer to the German parts of the river systems. The comparison of modelled and observed loads below was conducted taking into account the emissions from the total river systems.

	Number of years	mean deviation	r^2	modelling effiency
TP loads	54	16.3	0.96	0.97
TN loads	34	25.5	0.99	0.99
DIN loads	53	26.4	0.99	0.98

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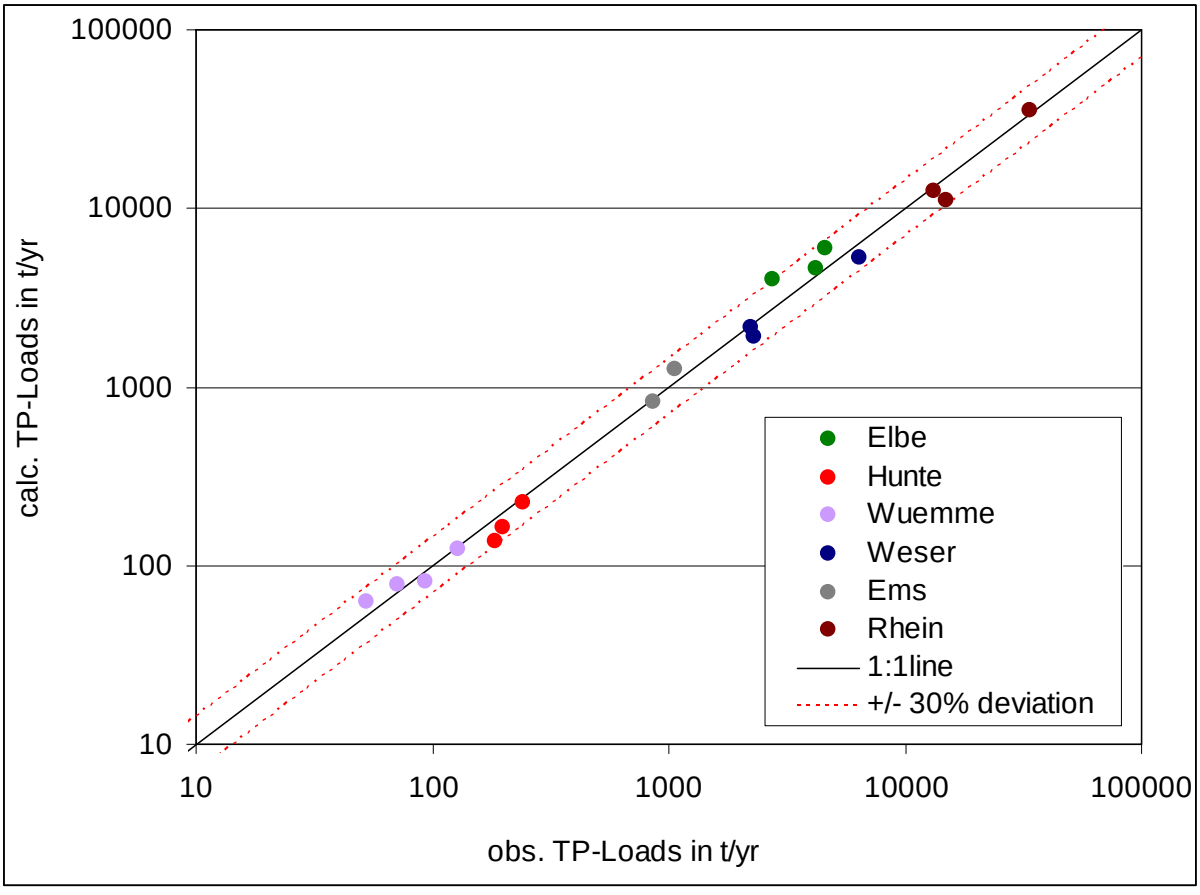
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Wuemme
Weser
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Rhein
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+/- 30% deviation

IRELAND

1. Surface waters - maritime area - catchments

Country	Please answer yes or no to the following questions
Is your country committed to the 50% reduction target?	*Yes*
If yes,	
Are the figures given based on*:*	
1. Nutrient discharges/losses into surface waters:	*1.*
2. Nutrient inputs to the maritime area:	
Are the national reporting procedures based on a catchment area approach?	*2005 data is based on a catchment area approach. The catchments included in this assessment are restricted to three River Basin Districts located along Ireland's eastern and southern coasts, namely the Eastern RBD, Southeastern RBD, and Southwestern RBD. The majority (>80 per cent of Irish problem areas with regard to eutrophication are located downstream of catchments within these three RBDs.*

2. Nitrogen loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes[7] nitrogen		% reduction in nitrogen discharges/losses between 1995 and 2005 (negative value indicates increase)	Calculation method/model used[8]	Remarks
	1995 (Tonnes per annum)	2005 (Tonnes per annum)			
Aquaculture (GL 2)		58.50		HARP-NUT GL 2 Approach 2	
Industry (GL 3)	609.83	402.98	34%	HARP-NUT GL 3 Loss coefficient (max allowable wastewater volume * max allowable nutrient concentration)	GL 3. Annex I, Para 6.7 This calculation was performed in the same way in both years
Waste water treatment and sewerage (GL 4)	6438.92	4069.04	36%	HARP-NUT GL 4 Treatment reduction factor (PE * per person nutrient production)	Simplification of GL 4. All calculations were based on plant population equivalents rather than on served populations This calculation was performed in the same way in both years

7 The reduction of 50% of the nutrient load (i.e. inputs) to Convention Waters concern nutrients from human activities (the anthropogenic load) and nutrients both discharged to water and emitted to air should be taken into account. However, discharges to water and emissions to air are not additive and should be reported separately.

8 Please indicate whether you have used the HARP-NUT GL, and for HARP-NUT draft GL 6 also which model. If alternative methods/models have been used please indicate which, including a reference to a description of the method. The remarks column or an extra sheet of paper should be used if needed.

Households not connected to public sewerage (GL 5)	1430.22	1686.04	-18%	HARP-NUT GL 5 (1995) Reduction factors (unsewered population * per capita nutrient emission) (2005) Unsewered population * per person nutrient loss from OSWTSs	This calculation was performed differently in 1995 than in 2005
Point Sources Total	**8388.96**	**6216.57**	**26%**		
Agriculture (GL 6)	69079.54	66292.10	4%	Agricultural census loads loss coefficients	This calculation was performed in the same way in both years Loss coefficients were based on experience gained in small catchment studies
Atmospheric deposition on fresh water systems (GL 6)				Not calculated	
Natural background losses (GL 6)[9]	2509.6	2236.67	11%	HARP-NUT GL 6 Total catchment area Nutrient losses per area	GL 6 Annex I and III This calculation was performed in the same way in both years
Diffuse sources total (GL 6)	**71588.85**	**68528.67**	**4%**		
GRAND TOTAL	**79977.81**	**74745.34**	**7%**		

* Contracting Parties should complete these cells to the extent possible. Where sub division of figures is difficult, combined figures may be submitted.

9 For the purpose of this report, the background losses of nutrients are defined in HARP-NUT Draft Guideline 6 (reference number: 2004-2f)

3.Phosphorus loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	**Tonnes[10] phosphorus**		**% reduction in phosphorus discharges/losses between**	**Calculation method/model used[11]**	**Remarks**
	1995 (Tonnes per annum)	**2005 (Tonnes per annum)**	**1995 and 2005**		
Aquaculture (GL 2)	Data awaited	11.45		HARP-NUT GL 2 Approach 2	
Industry (GL 3)	267.11	250.20	6%	HARP-NUT GL 3 Loss coefficient (max allowable wastewater volume * max allowable nutrient concentration)	GL 3. Annex I, Para 6.7 This calculation was performed in the same way in both years
Waste water treatment and sewerage (GL 4)	1730.12	802.93	54%	HARP-NUT GL 4 Treatment reduction factor (PE * per person nutrient production)	Simplification of GL 4. All calculations were based on plant population equivalents rather than on served populations and industries/paved areas. This calculation was performed in the same way in both years

10 The reduction of 50% of the nutrient load (i.e. inputs) to Convention Waters concern nutrients from human activities (the anthropogenic load) and nutrients both discharged to water and emitted to air should be taken into account. However, discharges to water and emissions to air are not additive and should be reported separately.

11 Please indicate whether you have used the HARP-NUT GL, and for HARP-NUT draft GL 6 also which model. If alternative methods /models have been used please indicate which, including a reference to a description of the method. The remarks column or an extra sheet of paper should be used if needed.

Households not connected to public sewerage (GL 5)	142.28	251.25	-77%	HARP-NUT GL 5 (1995) Reduction factors (unsewered population * per capita nutrient emission) (2005) Unsewered population * per person nutrient loss from OSWTSs	This calculation was performed differently in 1995 than in 2005
Point Sources Total	**2139.51**	**1315.84**	**38%**		
Agriculture (GL 6)	2115.07	2029.15	4%	Agricultural census loads * loss coefficients	This calculation was performed in the same way in both years Loss coefficients were based on experience gained in small catchment studies
Atmospheric deposition on fresh water systems (GL 6)				Not calculated	
Natural background losses (GL 6)[12]	165.94	149.11	10%	HARP-NUT GL 6 Total catchment area * Nutrient losses per area	GL 6 Annex I and III This calculation was performed in the same way in both years
Diffuse sources total (GL 6)	**2281.01**	**2178.26**	**5%**		
GRAND TOTAL	**4420.52**	**3494.11**	**21%**		

**Contracting Parties should complete these cells to the extent possible. Where sub division of figures is difficult, combined figures may be submitted.

12 For the purpose of this report, the background losses of nutrients are defined in HARP-NUT Draft Guideline 6 (reference number: 2004-2f)

4. Specific/normalised years – use of RID figures

Please indicate whether the input figures for 2005 and, if relevant, for 1985 are based on:	*Please indicate by a 'x' whether the input figures obtained from RID are used:*
these specific years	as a basis for the nutrient load figures notified
normalised years:[13]	to check the nutrient load figures obtained:
Description of 'Normalised year procedure':	Comparison between nutrient input figures from RID and the figures emanating from the approach chosen by your country

5.Evaluation of the trial application of HARP-NUT Guideline 6

1. Did you find the HARP-NUT GL 6 useful to help you select the tools you needed for quantification and reporting of losses of nitrogen and phosphorus from diffuse sources?
2. Did you apply several models for the same catchment, and if so, what were your experiences?
3. If models other than those referred to in the Guideline were used, please explain why other models were used and whether the Guideline was of help in evaluating their suitability for your purposes.
4. Did you encounter any specific problems or a need for more precision or clarification in the Guideline? If so, please elaborate.
5. If you encountered problems, please suggest improvements.

6.Quality assurance

Please include a brief description of quality assurance procedures followed for the model applications, such as references to Good Modelling Practice, data handling procedures, and validation procedures.

Further details of the requirements of Good Modelling Practice are available for model users at http://www.info.wau.nl/research%20projects/gmp.htm and www.HARMONIQUA.org.

13 For those having used normalised years, please describe the factors taken into account as in HARP-NUT Guideline 7 (reference number: 2004-2g).

THE NETHERLANDS

Based on data for the year 2005
Drafted in May 2007

1. Surface waters - maritime area - catchments

Country: Netherlands	**Please answer yes or no to the following questions**
Is your country committed to the 50% reduction target?	*Yes*
If yes,	
Are the figures given based on*:*	
1. Nutrient discharges/losses into surface waters:	*Yes*
2. Nutrient inputs to the maritime area:	*No*
Are the national reporting procedures based on a catchment area approach?	*The Dutch emission inventory procedures have been adjusted to a catchment area approach, so the data stored in information systems are detailed enough to report on the catchments of Rhine, Meuse, Scheldt and Ems. However, for OSPAR measures we normally report for The Netherlands as a whole, as all the catchments finally end up in the North Sea. Moreover, the reduction target (and the related measures) is applicable for the whole area.*

2. Nitrogen loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes nitrogen		% reduction in nitrogen discharges/losses between	Calculation method/model used	Remarks
	1985	2005	1985 and 2005		
Aquaculture (GL 2)	0	0	NA		
Industry (GL 3)	19528	3932	80%	GL 3	
Waste water treatment and sewerage (GL 4)	38412	21742	43%	GL 4	
Overflows and discharges of collected untreated rainwater (including deposition)	10518	1513	86%		
Sewage from yachts and inland vessels	184	223	-21%		
Households not connected to public sewerage (GL 5)	3301	402	88%	GL 5	
Point Sources Total	**71943**	**27812**	**61%**		
Agriculture (GL 6)	73220	54481	26%	GL 6, model 1 (NL CAT)	New calculations of 1985 figures since last round of implementation reporting
Atmospheric deposition on fresh water systems (GL 6)	23000	9910	57%	Monitoring combined with emission ad dispersion modelling (Europe wide) – more detailed discription will become available the near future.	New calculation method since last reporting round (on the year 2003)
Natural background losses (GL 6)					Figures on agriculture comprise the natural background losses of nutrients
Diffuse sources total (GL 6)	**96220**	**64391**	**33%**		
GRAND TOTAL	**168163**	**92203**	**45%**		

3. Phosphorus loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes phosphorous		% reduction in nitrogen discharges/losses between	Calculation method/model used	Remarks
	1985	2005	1985 and 2005		
Aquaculture (GL 2)	0	0	NA		
Industry (GL 3)	13422	377	97%	GL 3	
Waste water treatment and sewerage (GL 4)	10810	2651	75%	GL 4	
Overflows and discharges of collected untreated rainwater	1992	51	97%		
Sewage from yachts and inland vessels	31	38	-23%		
Households not connected to public sewerage (GL 5)	569	56	90%	GL 5	
Point Sources Total	**26824**	**3173**	**88%**		
Agriculture (GL 6)	4070	3786	7%	GL 6, model 1 (NL CAT)	New calculations of 1985 figures since last round of implementation reporting
Atmospheric deposition on fresh water systems (GL 6)					
Natural background losses (GL 6)					Figures on agriculture comprise the natural background losses of nutrients
Diffuse sources total (GL 6)	**4070**	**3786**	**7%**		
GRAND TOTAL	**30895**	**6959**	**77%**		

4. Specific/normalised years – use of RID figures

Data for leaching and run-off from farmlands are, with respect to hydrology, based on a standard year. In The Netherlands the RID figures are not used as a basis/check for the figures on load reduction (at source).

5. Evaluation of the trial application of HARP-NUT Guideline 6

1. Did you find the HARP-NUT GL 6 useful to help you select the tools you needed for quantification and reporting of losses of nitrogen and phosphorus from diffuse sources?
2. Did you apply several models for the same catchment, and if so, what were your experiences?
3. If models other than those referred to in the Guideline were used, please explain why other models were used and whether the Guideline was of help in evaluating their suitability for your purposes.
4. Did you encounter any specific problems or a need for more precision or clarification in the Guideline? If so, please elaborate.
5. If you encountered problems, please suggest improvements.

The model applied in the Netherlands to estimate losses from agriculture (NL CAT) was part of the EUROHARP project and therefore already assessed in the context of and included in Guideline 6. As part of the EUROHARP project, other models have been te4sted on a catchment in The Netherlands. This experience assisted in the verification of the quality of the NL model with respect to shortcomings and strong features. No problems have been encountered.

6. Quality assurance

Please include a brief description of quality assurance procedures followed for the model applications, such as references to Good Modelling Practice, data handling procedures, and validation procedures.

Further details of the requirements of Good Modelling Practice are available for model users at http://www.info.wau.nl/research%20projects/gmp.htm and www.HARMONIQUA.org.

The modelling practice in The Netherlands is in line with the requirements referred to:

- *ISO certification: review and audit of all projects*
- *Software quality procedure for Status A models (internal procedure)*
- *External review by experts in nutrient science (agronomical, biological, physical, chemical aspects) regarding the evaluation of the impact of implemented model changes on the model outcome before the model can be applied for scenario analyses for the Ministries (plausibility)*
- *Management: A Steering Committee (representatives of three Ministries and their governmental research institutes) for the financial control of the development of the national tool*

NORWAY

1. Surface waters - maritime area - catchments

Country	Please answer yes or no to the following questions
Is your country committed to the 50% reduction target?	*Yes, but only on the coastline from the Swedish border to the southernmost part of Norway; Lindesnes. The figures in this report are that particular coastline and not the whole country.*
If yes,	
Are the figures given based on*:*	
1. Nutrient discharges/losses into surface waters:	*No*
2. Nutrient inputs to the maritime area:	*Yes*
Are the national reporting procedures based on a catchment area approach?	

2. Nitrogen loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes nitrogen		% reduction in nitrogen discharges/losses between	Calculation method/model used	Remarks
	1985	2005	1985 and 2005		
Aquaculture (GL 2)	12	28	-	Harp GL 2 used. Both fodder and produced biomass included.	
Industry (GL 3)	5659	1298	77	Figures submitted by industry, so it is difficult to get an overview to which extend GL 3 have been used.	
Waste water treatment and sewerage (GL 4)	11929	5599		Figures submitted by municipalities, so it is difficult to get an overview to which extend GL 3 have been used.	
Households not connected to public sewerage (GL 5)	Included in WWTP	1138		The principles for calculation is based on GL 5.	
Point Sources Total	**17600**	**8063**	**55**		
Agriculture (GL 6)	14631	10505	28	The calculation of losses from agriculture is based on GL 6.	

Atmospheric deposition on fresh water systems (GL 6)	2134	1745			
Natural background losses (GL 6)	15526	13399	-	According to the principles of GL 6.	
Diffuse anthropogenic total	16765	12250	28		
Anthropogenic total	**34365**	**20313**	**41**		
Diffuse sources total (GL 6)	32291	24185	**-**		
GRAND TOTAL	49891	32248	**-**		

3. Phosphorus loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	**Tonnes Phosphorous**		**% reduction in nitrogen discharges/losses between 1985 and 2005**	**Calculation method/model used**	**Remarks**
	1985	**2005**			
Aquaculture (GL 2)	3	5	-	Harp GL 2 used. Both fodder and produced biomass included.	
Industry (GL 3)	133	103	23	Figures submitted by industry, so it is difficult to get an overview to which extend GL 3 have been used.	
Waste water treatment and sewerage (GL 4)	928	99		Figures submitted by municipalities, so it is difficult to get an overview to which extend GL 3 have been used.	
Households not connected to public sewerage (GL 5)		77		The principles for calculation is based on GL 5.	

Point Sources Total	**1064**	**284**	**73**		
Agriculture (GL 6)	401	247		The calculation of losses from agriculture is based on GL 6.	
Atmospheric deposition on fresh water systems (GL 6)	82	31			
Natural background losses (GL 6)	287	121		According to the principles of GL 6.	
Diffuse anthropogenic total	483	278			
Anthropogenic total	**1465**	**562**	**62**		
Diffuse sources total (GL 6)	770	399	**-**		
GRAND TOTAL	1834	683	**-**		

4. Specific/normalised years – use of RID figures

Please indicate whether the input figures for 2005 and, if relevant, for 1985 are based on:	*Please indicate by a 'x' whether the input figures obtained from RID are used:*
these specific years	as a basis for the nutrient load figures notified
normalised years:	to check the nutrient load figures obtained:
Description of 'Normalised year procedure':	Comparison between nutrient input figures from RID and the figures emanating from the approach chosen by your country

Comments:

The figures are inputs to the OSPAR maritime area. The principles of HARP GL 9 have been used to calculate retention on lakes and watercourses.

Norway can also submit figures on losses/discharges to surface waters if necessary.

Atmospheric deposition on fresh water systems is a combination of domestic Norwegian emissions and long range atmospheric transport. Norway is a downstream country receiving substances from both continental Europe and UK in addition to emissions released even further away. As a rule of thumb 20% of deposition of different substances in Norway is because of domestic emissions, 80% is long range transported to Norway.

SWEDEN

1. Surface waters - maritime area - catchments

Country	Please answer yes or no to the following questions
Is your country committed to the 50% reduction target? **If yes,** **Are the figures given based on***:* 1. Nutrient discharges/losses into surface waters: 2. Nutrient inputs to the maritime area: **Are the national reporting procedures based on a catchment area approach**?	*Yes,* *1. For phosphorus.* *2. For nitrogen.* *Data on nitrogen are based on discharges/losses into surface waters including retention during transport to the maritime area (net load on the sea). Figures for phosphorous are based on discharges/losses into surface waters without retention (gross load).* *YES, the national reporting procedure is based on a catchment area approach both for N and P*

2. Nitrogen loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes nitrogen		% reduction in nitrogen discharges/losses between	Calculation method/model used	Remarks
	1985	2005	1985 and 2005		
Aquaculture (GL 2)	80	145	+ 81	Simplified H-N GL2	
Industry (GL 3)	1 040	1 000	- 4	H-N GL 3 Based on self monitoring data	Fewer industry categories in 1985
Waste water treatment and sewerage (GL 4)	7 420	4 500	- 39	All plants > 25 pe	1985; plants > 2000 pe
Households not connected to public sewerage (GL 5)	900*	500	- 44	National inventory + removal coefficients	Poor data in 1985
Point Sources Total	**9440**	**6 145**	**- 35**		
Agriculture (GL 6)	20 000	14 800	- 26	SOILNDB model	1985; simple loss coefficients
Atmospheric deposition on fresh water systems (GL 6)	6 600	4 300	- 35	EMEP+MATCH models	1985; measurement data
Natural background losses (GL 6)	11 500	13 000	+ 13	H-N GL6	Includes forestry
Diffuse sources total (GL 6)	**38 100**	**32 100**	**- 16**		
GRAND TOTAL	**47 540**	**38 245**	**- 20**		

3. Phosphorus loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes phosphorous 1985	2005	% reduction in nitrogen discharges/losses between 1985 and 2005	Calculation method/model used	Remarks
Aquaculture (GL 2)	10	25	+ 150	Simplified H-N GL2	
Industry (GL 3)	118	80	- 32	H-N GL 3.Based on self monitoring data	Fewer industry categories in 1985
Waste water treatment and sewerage (GL 4)	262	120	- 54	All plants > 25 pe	1985; plants > 2000 pe
Households not connected to public sewerage (GL 5)	216	90	- 58	National inventory + removal coefficients	Poor data in 1985
Point Sources Total	**606**	**315**	**- 48**		
Agriculture (GL 6)	390	380	- 3	ICECREAM model	
Atmospheric deposition on fresh water systems (GL 6)	[6]			Not estimated	Included in background losses
Natural background losses (GL 6)	630	625	+ 1	H-N GL6	
Diffuse sources total (GL 6)	**1 020**	**1 005**	**- 1**		
GRAND TOTAL	**1 626**	**1 320**	**- 19**		

4. Specific/normalised years – use of RID figures

Please indicate whether the input figures for 2005 and, if relevant, for 1985 are based on:	*Please indicate by a 'x' whether the input figures obtained from RID are used:*
these specific years	as a basis for the nutrient load figures notified: X
normalised years: X	to check the nutrient load figures obtained: X
Description of 'Normalised year procedure':	Comparison between nutrient input figures from RID and the figures emanating from the approach chosen by your country
For 2005 the following applies: Mean runoff values (l/s km^2) for the period 1985-2004 was calculated for all subcatchments of the Kattegat and Skagerrak catchment basins. Thereafter the loads of N and P on water from diffuse sources in all subcatchments was calculated by multiplying runoff (Q) with land use specific (long-term) concentration in the runoff (mg/l). The following land use classes was identified: arable land, forest, wetland, urban areas, mountains and other open land. For agricultural land, forest and urban areas whole sets of concentrations were used depending on crop, vegetation, climate and soil type. The loads were thereafter aggregated to larger units; main catchments and basins. For nitrogen the retention in lakes and rivers was calculated using the HBV-N model (part of the TRK-system).	*Data on discharges from coastal point sources are taken from the same database as RID. For this report also inland point sources are included. Riverine input data is used in RID has been used for the calibrating the N retention calculated with the HBV-N model.*

5. Evaluation of the trial application of HARP-NUT Guideline 6

1. Did you find the HARP-NUT GL 6 useful to help you select the tools you needed for quantification and reporting of losses of nitrogen and phosphorus from diffuse sources?

   Yes, but we feel that the GL is very much in line with the methods an procedures already in use in Sweden.

2. Did you apply several models for the same catchment, and if so, what were your experiences?

   No.

3. If models other than those referred to in the Guideline were used, please explain why other models were used and whether the Guideline was of help in evaluating their suitability for your purposes.

   For caclulating phosphorus losses from agriculture we have adopted an American model CREAM/ICECREAM.. The main reason is that the model has been further developed Finland to take into account freeze/thawing of the soil, which makes it relevant for Swedish conditions.

4. Did you encounter any specific problems or a need for more precision or clarification in the Guideline? If so, please elaborate.

   There is always need for more precision, but on the other hand this will make the GL less flexible. A problem is that model development is rapid and in a few years the recommendations may be a bit outdated.

5. If you encountered problems, please suggest improvements.

A great problem is that the data from 1985 is old and difficult to update. The comparison between 1985 and 2005 will thus not be very accurate. Activity data for agriculture is practically impossible to update and apply to the same models and with the same spatial resolution. In reality the estimates are not comparable. Data on industrial facilities and urban waste water treatment plants have been improved over the years and today the reported plants cover a larger part of the total plant population. This will tend to underestimate the changes from 1985.

In earlier reporting the 1985 data has been updated. Here we use the same data for 1985 as in the last report, covering the period 1985-2003.

6. Quality assurance

Please include a brief description of quality assurance procedures followed for the model applications, such as references to Good Modelling Practice, data handling procedures, and validation procedures.

Further details of the requirements of Good Modelling Practice are available for model users at http://www.info.wau.nl/research%20projects/gmp.htm and www.HARMONIQUA.org.

SWITZERLAND

1. Surface waters - maritime area - catchments

country	Please answer yes or no to the following questions
Is your country committed to the 50% reduction target?	*Yes*
If yes,	
Are the figures given based on*:*	
1. Nutrient discharges/losses into surface waters:	*Yes*
2. Nutrient inputs to the maritime area:	*No*
Are the national reporting procedures based on a catchment area approach?	*Yes*

2. Nitrogen loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes nitrogen		% reduction in nitrogen discharges/losses between	Calculation method/model used	Remarks
	1985	2005	1985 and 2005		
Aquaculture (GL 2)	30	30	0		
Industry (GL 3)	1000	800	20		
Waste water treatment and sewerage (GL 4)	18’000	10’700	41		
Households not connected to public sewerage (GL 5)	1500	816	46		
Point Sources Total	**20530**	**12346**	**40**		
Agriculture (GL 6)	14327	11419	20		
Atmospheric deposition on fresh water systems (GL 6)	163	162	1		
Natural background losses (GL 6)	4729	4729	0		
Diffuse sources total (GL 6)	**19219**	**16310**	**15**		
GRAND TOTAL	**39749**	**28656**	**28**		

3. Phosphorus loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes phosphorous 1985	2005	% reduction in nitrogen discharges/losses between 1985 and 2005	Calculation method/model used	Remarks
Aquaculture (GL 2)	4	3	25		
Industry (GL 3)	153	20	87		
Waste water treatment and sewerage (GL 4)	2000	900	55		
Households not connected to public sewerage (GL 5)	300	162	46		
Point Sources Total	**2457**	**1085**	**56**		
Agriculture (GL 6)	405	241	40		
Atmospheric deposition on fresh water systems (GL 6)	5	5	0		
Natural background losses (GL 6)	137	137	0		
Diffuse sources total (GL 6)	**547**	**383**	**30**		
GRAND TOTAL	**3004**	**1468**	**51**		

4. Specific/normalised years-use of RID figures

Please indicate whether the input figures for 2003 and, if relevant, for 1985 are based on:	*Please indicate by a 'x' whether the input figures obtained from RID are used:*
these specific years	as a basis for the nutrient load figures notified
normalised years:[14]	to check the nutrient load figures obtained:
Description of 'Normalised year procedure':	Comparison between nutrient input figures from RID and the figures emanating from the approach chosen by your country

[14] For those having used normalised years, please describe the factors taken into account as in HARP-NUT Guideline 7 (reference number: 2004-2g).

UNITED KINGDOM

Relevant Factors to be considered regarding the Content of the UK Implementation Report

The following points and observations have been put forward in order to put the answers in the implementation report into context, to help the Lead Countries and other OSPAR Contracting Parties to make sense of the information and to explain why some components are not covered.

Reporting obligations for measures are recent. The UK only identified OSPAR problem areas and potential problem areas with respect to eutrophication in 2002, and had identified no such areas to which commitments applied in 1988. This means that we are relatively new to the type of reporting required, particularly using the source-related HARP NUT guidelines. Also we do not yet have a fully joined up OSPAR reporting approach for these Recommendations between England, Wales, Scotland and Northern Ireland.

***Size and nature of the UK catchments*.**The catchments that the UK has identified as Problem Areas and Potential Problem Areas are generally small estuarine, coastal and harbour locations where detailed local knowledge and expertise is required to get the relevant data. The relevant infrastructure for getting the relevant information is still evolving and is proving to be more difficult than was expected.

Reporting information not strictly according to the requirements in the implementation format

Due to the problems mentioned above, the UK took the view that it was better to be transparent and report information that was available rather than to only report information according to the timeframes and specifications set out in the reporting format. Therefore, some of the information does not comply with the specified years, and in some cases, there is a mix of catchment specific information, and national information (e.g. using the RID data). It is recognised that this causes difficulties in comparison with other countries, and that it makes a measured analysis of the reduction targets at this stage very difficult.

Use of footnotes to clarify UK dataThe UK has used footnotes in its implementation report to clarify specific aspects of the data and information. It is hoped that this will enable Contracting Parties to understand why particular entries have been reported in a particular way.

Main messages from the UK reportThe main messages coming from the UK report are as follows:

- National figures for England and Wales indicate that since 1983, there has been a slight reduction of nitrogen from sewage treatment works and a slight increase of inputs from agriculture.
- The national RID data shows that between 2002 (when the UK first designated OSPAR Problem Areas and Potential problem Areas) and 2005, there was a reduction of 19.1% in the combined riverine and direct inputs of nitrogen and 26.7% in the combined riverine and direct inputs of phosphorous between 1990 and 2003. However , it must be born in mind that these reductions are dependent to some degree on the amount of rainfall that occurred during the period.
- The UK has implemented a number of key measures for reducing inputs of nitrogen and phosphorus described in the implementation report on Recommendation 89/4 that should, over time, play an important role in achieving the reduction targets set out in the OSPAR measures.

1. Surface waters - maritime area - catchments

Country - UK	**Please answer yes or no to the following questions**
Is your country committed to the 50% reduction target?	Yes: However, Recommendation 88/2 requires Contracting parties to aim to achieve a substantial reduction (of the order of 50%) between 1985 and 1995 in inputs of phosphorus and nitrogen into areas where these inputs are likely, directly or indirectly, to cause pollution. The UK first identified such areas as Problem Areas (PA) or Potential; problem Areas (PPA) in **2002** under the OSPAR Comprehensive Procedure, and therefore the 1985 – 1995 reduction period set out in the recommendation is not applicable. However, the UK is committed to achieving nutrient reductions in PAs and PPAs identified in 2002. Measures to achieve such reductions are given in the implementation report for OSPAR recommendation 89/4.
If yes, **Are the figures given based on***:* 1. Nutrient discharges/losses into surface waters: 2. Nutrient inputs to the maritime area:	Figures provided are based on a) national figures (generally England and Wales) calculating nitrogen apportionment, and b) riverine inputs, sewage inputs and industrial inputs which will reach the maritime area from RID sampling zones which contain the identified problem and non problem areas.
Are the national reporting procedures based on a catchment area approach?	Yes. The nutrient inputs are derived from the catchment areas used by the UK for reporting under the OSPAR RID Survey. However, as mentioned below, these are generally significantly larger than the small catchments which comprise Problem areas and potential Problem Areas.

2. Nitrogen loads per country:

Discharges/losses into water (GL=HARP-NUT Guideline) from:	Tonnes nitrogen		% reduction in nitrogen discharges/losses between	Calculation method/model used	Remarks
	1985	2005	1985 and 2005		The UK PAs and PPAs consist of very small catchments and it has generally not been feasible to apply the detailed procdures set out in GL2, 3, 5 and 6 to such small areas.
Aquaculture (GL 2)					No significant inputs from aquaculture to identified UK PAs and PPAs
Industry (GL 3) (national figures)		9.5 kT (in 2003)			
Waste water treatment and sewerage (GL 4) (national figures)	216 kT (in 1983 inc. industrial discharges)	175 kT (in 2003, or 184 kT if inc industrial discharges)	15% reduction		
Households not connected to public sewerage (GL 5) National figures		3.9 kT (in 2003)			
Point Sources Total					
Agriculture (GL 6) National figures	287 kT (in 1983)	330 kT (in 2003)	15% increase		A small desk study reported in the 2005 UK implementation report for this recommendation showed that there was no significant decrease in discharges/losses from agriculture from the UK PAs and PPAs between 1980 and 2000.

Atmospheric deposition on fresh water systems (GL 6) National figures		2.1 kT (in 2003)			
Natural background losses (GL 6)					
Diffuse sources total (GL 6)					
GRAND TOTAL	The value for riverine and direct Discharges of total nitrogen discharged from the sampling regions in which UK PAs and PPAs are situated in 2002 was 76,000 tonnes (RID higher value).	The value for riverine and direct Discharges of total nitrogen discharged from the sampling regions in which UK PAs and PPAs are situated in 2005 was 61,500 tonnes (RID higher value).	The percentage reduction between 2002 and 2005 is 19.1 %.		

3.Phosphorus loads per country

Discharges/losses into water (GL=HARP-NUT Guideline) from:	**Tonnes phosphorous**		**% reduction in nitrogen discharges/losses between**	**Calculation method/model used**	**Remarks**
	1985	**2005**	**1985 and 2005**		The UK PAs and PPAs consist of very small catchments and it has generally not been feasible to apply the detailed procdures set out in GL2, 3, 5 and 6 to such small areas.
Aquaculture (GL 2)					No significant inputs from aquaculture to identified UK PAs and PPAs
Industry (GL 3)					
Waste water treatment and					

sewerage (GL 4)					
Households not connected to public sewerage (GL 5)					
Point Sources Total					
Agriculture (GL 6)					
Atmospheric deposition on fresh water systems (GL 6)					
Natural background losses (GL 6)					
Diffuse sources total (GL 6)					
GRAND TOTAL	The value for riverine and direct Discharges of total phosphorus discharged from the sampling regions in which UK PAs and PPAs are situated in 2002 was 4300 tonnes (RID higher value).	The value for riverine and direct Discharges of total phosphorus discharged from the sampling regions in which UK PAs and PPAs are situated in 2005 was 3150 tonnes (RID higher value).	The percentage reduction between 2002 and 2005 is 26.7 %.		

4. Specific/normalised years – use of RID figures

Please indicate whether the input figures for 2005 and, if relevant, for 1985 are based on:	*Please indicate by a 'x' whether the input figures obtained from RID are used:*
these specific years	as a basis for the nutrient load figures notified
normalised years:[15]	to check the nutrient load figures obtained:
Description of 'Normalised year procedure':	Comparison between nutrient input figures from RID and the figures emanating from the approach chosen by your country
The figures for specific years are used for the years 2002 and 2005	
Flow normalisation has not been used, as flow information is only held centrally on riverine inputs, and not for direct and industrial discharges	

5. Evaluation of the trial application of HARP-NUT Guideline 6

1. Did you find the HARP-NUT GL 6 useful to help you select the tools you needed for quantification and reporting of losses of nitrogen and phosphorus from diffuse sources?
2. Did you apply several models for the same catchment, and if so, what were your experiences?
3. If models other than those referred to in the Guideline were used, please explain why other models were used and whether the Guideline was of help in evaluating their suitability for your purposes.
4. Did you encounter any specific problems or a need for more precision or clarification in the Guideline? If so, please elaborate.
5. If you encountered problems, please suggest improvements.

As stated above, HARP-NUT guideline 6 is not an easy tool to use for the very small catchments which comprise the UK PAs and PPAs. Our view is that it is difficult, time-consuming and prohibitively expensive to get the data to run the models and produce meaningful results. The various assumptions and estimates that would have to be used would mean that the results might be misleading.

The implementation reporting format is difficult to use when using RID information.

6. Quality assurance

Please include a brief description of quality assurance procedures followed for the model applications, such as references to Good Modelling Practice, data handling procedures, and validation procedures.

Further details of the requirements of Good Modelling Practice are available for model users at http://www.info.wau.nl/research%20projects/gmp.htm and www.HARMONIQUA.org.

The samples collected for the UK RID Reporting is collected by trained sampling officers and the analyses are carried out by accredited laboratories. The results are checked for consistency, and any anomalies are investigated.

15 For those having used normalised years, please describe the factors taken into account as in HARP-NUT Guideline 7 (reference number: 2004-2g).