

EU policy on nutrients emissions: legislation and implementation

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Abstract After 25 years of EU water legislation the European Union has just thoroughly restructured its water policy. The European Parliament and the Council, following a tough conciliation procedure between the two legislators, have in summer 2000 agreed a proposal by the European Commission for a Water Framework Directive. This legislation will have the following main objectives:

- integrated river basin management across borders, with coordinated programmes of measures
- protection of *all* waters, surface waters and groundwater, in quality and quantity with a proper ecological dimension
- emissions and discharges controlled by a “combined approach” of emission limit values and quality standards, plus the phasing out of particularly hazardous substances
- introducing water pricing policies
- strengthening public participation

This new Water Framework Directive adopted in September 2000 will complement existing EU water legislation on nutrients reduction – the 1991 Directive on nitrates pollution from agricultural sources and the 1991 Directive on urban waste water treatment. These Directives will remain main pillars of EU water policy whilst at the same time being integrated into the river basin management in a coherent way.

Keywords European Union; nutrients emissions; water management; water protection

The 1970s and 1980s: early EU water legislation

Early European water legislation addressed only a rather limited number of waters, such as those rivers and lakes used for drinking water abstraction (Surface Water Directive, 1975). This “first wave” of EU water legislation culminated in 1980 in setting binding quality targets for drinking water (1980 Drinking Water Directive). Nutrient control was at that time not the main line of thrust; only quality standards for nitrates were set to ensure the use of selected surface waters for drinking water abstraction.

At the same time, over-exploitation, pollution and shortsighted management objectives led inter alia to eutrophication, ecological degradation and disappearance of wetlands and salination of coastal groundwaters. It is well documented that degradation of groundwater, aquatic ecosystems and water quantity seriously accelerated during the 1980s and early 1990s.

Adding the nutrients dimension: addressing pollution from urban waste water and from agriculture

Pollution and degradation of Europe’s waters as well as an increasing awareness by citizens and policy makers led to increased efforts to address water pollution. This resulted in a “second wave” of EU water legislation. Its first results were, in 1991, the adoption of

- the Urban Waste Water Directive (1991), addressing water pollution from all settlements but the small villages, as well as a range of industries with biodegradable waste water;
- the Nitrates Directive (1991), addressing water pollution by nitrates from agriculture.

Other environmental initiatives of those years were Commission proposals for an Integrated Pollution Prevention and Control Directive (1996) (IPPC) and a new Drinking Water Directive (1998).

The *Urban Waste Water Directive* has set ambitious objectives

- waste water collection and treatment for all settlements above 2000 population equivalents
- biological (secondary) treatment as a general rule, plus nutrients removal where the affected waters show an elevated nitrates level and/or eutrophication.

The deadlines for achieving these objectives are 1998, 2000 and 2005 respectively (depending on the size of the discharge and the character of the receiving waters).

With the Urban Waste Water Directive, EU water legislation has for the first time in a comprehensive way taken on board the nutrients dimension, both in terms of environmental objective (nitrogen and/or phosphorus elimination, depending on the relevant facts) and in terms of ambitious deadlines (only 7½ years for agglomerations above 10,000 population equivalents in the catchment of sensitive areas). Bearing in mind that both the Baltic Sea and the North Sea fit into this description, as do parts of the Mediterranean, the objective seems environmentally sound.

Table 1 "Sensitive areas" under the urban waste water directive

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- natural freshwater lakes, other freshwater bodies, estuaries and coastal waters which are found to be eutrophic or which in the near future may become eutrophic if protective action is not taken;
 - surface waters intended for the abstraction of drinking water which could contain more than 50 mg/l concentration of nitrate as laid down under Directive 75/440/EEC if action is not taken;
 - areas where advanced treatment is necessary to fulfil EU Directives.
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Member States have the choice either to designate such sensitive areas individually in accordance with these criteria, or to apply the more stringent provisions of the Directive over all their territory.

Table 2 "Advanced treatment" for treatment plants >10,000 p.e.

	effluent concentration	minimum elimination rate
total phosphorus	2 mg/l for plants ≤100,000 p.e. 1 mg/l for plants >100,000 p.e.	80%
total nitrogen	15 mg/l for plants ≤100,000 p.e. 10 mg/l for plants >100,000 p.e.	70–80%

Member States may choose between nutrient control by effluent concentration or by elimination rate. One or both nutrient parameters may apply depending on the local and regional situation.

The European Commission is currently preparing its next implementation report on this Directive, evaluating inter alia the designation of sensitive areas and waste water treatment in the major agglomerations in the catchment of those sensitive areas. The pattern of European waters has started to change. Reports by the European Environment Agency (1998, 1999a) clearly signal improvement. The number of heavily polluted rivers has declined significantly, in particular as the pressure from organic matter and phosphates in urban waste water has decreased due to the successful implementation of the Directive in many regions.

Whilst progress has been made in many areas, there are deplorable delays in others, e.g. in the case of Brussels (European Court of Justice, 2000a) and Milano.

The objectives of the *Nitrates Directive* are twofold

- to reduce water pollution caused or induced by nitrates from agriculture;
- to prevent further such pollution.

To ensure this objective, Member States have to identify waters (surface waters and groundwaters) affected by nitrates pollution, and waters which could be affected by such pollution.

Within such vulnerable zones, mandatory measures ('action programmes') have to be taken:

- restrictions to land application of livestock manure in terms of time and location as well as maximum amounts to be applied to land every year;
- minimum storage capacities for livestock manure;
- measures based on a balance between the nitrogen requirements of the crops and the nitrogen supply to the crops from the soil and from fertilisation.

Table 3 "Vulnerable zones" under the nitrates directive

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- freshwaters which contain or could contain (if no action is taken) > 50 mg/l nitrates
 - groundwaters which contain or could contain (if no action is taken) >50 mg/l nitrates
 - natural freshwater lakes, other freshwater bodies, estuaries, coastal waters and marine waters found to be eutrophic or which may become eutrophic if action is not taken
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Member States have the choice either to designate individual vulnerable zones in accordance with these criteria, or to apply the more stringent provisions of the Directive over all their territory (this option has been taken up by Denmark, Germany, Luxembourg, the Netherlands and Austria).

Outside those affected areas (vulnerable zones) Member States have to promote codes of good agricultural practice on a voluntary basis. A monitoring system as assessment tool as well as planning instrument supports the system.

From a policy point of view it seems important that the EU has addressed in the same year 1991 both nitrogen impacts from waste water sources (Urban Waste Water Directive) and from agricultural sources (Nitrates Directive).

Table 4 Deadlines for meeting the obligations under the directive (outline)

• designation of vulnerable zones (review every 4 years)	20.12.1993
• codes of good practice	20.12.1993
• establishment of first action programme	20.12.1995
• start of year during which a maximum of 210 kg nitrogen/hectare.year may be applied	20.12.1998
• start of year during which a maximum of 170 kg nitrogen/hectare.year may be applied	20.12.2002
• completion of 1st action programme	20.12.1999
• completion of 2nd action programme	20.12.2003

Whilst the Urban Waste Water Directive has already achieved considerable progress in getting our surface waters cleaner, nitrates remain a major problem, and the implementation of the Nitrates Directive is unsatisfactory. This view by the European Commission in its 1st implementation report (European Commission, 1998) is still valid, and shared by the European Environment Agency (1999b). Nitrates levels in rivers still remain high. As for groundwater no firm conclusions about state and trends of pollution can be drawn, *inter alia* because of the lack of comparable data on groundwater. Establishing a sound monitoring system as an assessment tool and planning instrument providing comparable data will be one of the main objectives of the new Water Framework Directive.

Implementation of water policies has required and will keep requiring a range of instruments, scientific and technical cooperation at regional and European level, information and participation of the public, but also, where appropriate, enforcement action at the European Court of Justice. It seems important in this context that the European Court of Justice has, in July 2000, for the first time imposed a penalty on a Member State for failure to comply with a previous judgement on environmental legislation, with a penalty of 20,000 EUR per day of non-compliance (European Court of Justice, 2000b).

New European water policy: the water framework directive

Whilst EU actions such as the Drinking Water Directive and the Urban Waste Water Directive can duly be considered milestones, European Water Policy had to address the increasing awareness of citizens and other involved parties about their water. At the same time water policy and water management are to address problems in a coherent way. This is why the Commission developed the new European Water Policy in an open consultation process involving all interested parties.

Following a wide-ranging consultation of interested parties, including the Brussels Water Conference of May 1996, the Commission presented its 1997/98 Proposals for a Water Framework Directive, with the following main objectives:

- integrated water management across borders, based on river basins and with coordinated programmes of measures
- expanding the scope of water protection to *all* waters, groundwater and surface waters (rivers, lakes and coastal waters)
- achieving “good status” for all waters by a set deadline of 15 years
- emissions and discharges controlled by a “combined approach” of emission limit values and quality standards, plus a mechanism for phasing out particularly hazardous substances
- getting the prices right: mandatory pricing policy for water, contributing to the wise use of water and thus to resources protection
- getting the citizen involved more closely: strengthening public participation
- streamlining legislation: The Water Framework Directive will “absorb” the operational obligations of seven acts of legislation of the 1970s and 1980s, allowing for their repeal at a later stage.

All of Europe’s waters will be subject to protection under the Water Framework Directive, surface waters and ground water (so far only a limited number of water subject to specific human use, such as fish waters, shellfish waters, bathing waters are protected under European legislation).

Member States will have to ensure that “good status” is achieved or kept in all waters by a set deadline of 15 years.

A range of parameters defines “good status”, and nutrients play an important role as shown by the examples below. Compared to earlier EU legislation, this concerns now nitrogen *and* phosphorus, and the programme of measures with the river basin have, wherever necessary, to address them both.

One of the Water Framework Directive’s main innovations is that rivers and lakes will need to be managed by river basin – the natural geographical and hydrological unit – instead of according only to administrative or political boundaries. Several EU Member States already take a river basin approach but this is at present not the case everywhere. For each river basin district – some of which will transcend national frontiers – a “river basin management plan” will need to be established and updated every six years. This plan will have to include an analysis of the river basin’s characteristics, a review of the impact of human activity on the status of waters in the basin, and an economic analysis of water use in the district.

The European Parliament and the Council have, in September 2000, finally adopted the Water Framework Directive (2000).

Preparations for the implementation of the Water Framework Directive have already started before final adoption in many regions of Europe. As for the European Commission, we are committed to continue the process that has proved so successful in developing the Directive. Implementation of this new European water policy should be a process between all interested and involved parties, not only governments, but regional and local authorities,

Table 5 Quality elements for the classification of ecological status: "rivers"

<ul style="list-style-type: none">• Biological elements<ul style="list-style-type: none">composition and abundance of aquatic floracomposition and abundance of benthic invertebrate faunacomposition, abundance and age structure of fish fauna• Hydromorphological elements supporting the biological elements<ul style="list-style-type: none">hydrological regime: quantity and dynamics of water flow; connection to ground water bodiesriver continuitymorphological conditions: river depth and width variations; structure and substrate of the river bed; structure of the riparian zone• Chemical and physicochemical elements supporting the biological elements<ul style="list-style-type: none">General:<ul style="list-style-type: none">thermal conditionsoxygenation conditionssalinityacidification statusnutrient conditionsSpecific pollutants:<ul style="list-style-type: none">pollution by all priority substances identified as being discharged into the body of waterpollution by other substances identified as being discharged in significant quantities into the body of water	H. Bloch
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Table 6 Definition for good ecological status: "lakes"

<ul style="list-style-type: none">• Biological quality elements<ul style="list-style-type: none">Phytoplankton:<ul style="list-style-type: none">There are slight changes in the composition and abundance of planktonic taxa compared to the type-specific communities. Such changes do not indicate any accelerated growth of algae resulting in undesirable disturbances to the balance of organisms present in the water body or to the physico-chemical quality of the water or sediment.A slight increase in the frequency and intensity of the type specific planktonic blooms may occur.Macrophytes and phytobenthosBenthic invertebrate fauna• Physico-chemical quality elements:<ul style="list-style-type: none">General conditions. . . Nutrient concentrations do not exceed the levels established so as to ensure the functioning of the ecosystem and the achievement of the values specified above for the biological quality elements.

enforcement agencies, the scientific community, water providers, water users such as industry or agriculture and, not least, consumers and environmentalists.

Conclusion

Europe's waters are in need of more protection, in need of increased efforts to get them clean or to keep them clean. After 25 years of European water legislation this is a demand not only by the scientific community and other experts, but also to an ever-increasing extent by citizens and environmental organisations. Nutrients from various sources will continue to be a major challenge for water protection and water management.

Let us take up the challenge of water protection, one of the great challenges for the European Union, as it approaches the new millennium and negotiates on accession with a range of countries in Central and Eastern Europe and the Mediterranean.

Let us seize the initiative generated by the present political process on the Water Framework Directive for the benefit of all Europe's citizens and waters.

This contribution reflects the views of the author and not necessarily those of the European Commission.

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