Topic report No 2/1999

Inland Waters
Annual topic update 1998

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1. Background and management

The European Environment Agency (EEA)

The European Environment Agency, based in Copenhagen, was established in 1990 by a EC Regulation 1210/90 "*to provide information for framing and implementing sound environmental policies*". The Regulation laid down a number of tasks for the Agency and prime among these is the establishment and co-ordination of a network for collecting, processing and analysis of environmental data. The network is EIONET (European Environmental Information and Observation Network) and the Agency has the responsibility to co-ordinate and develop it. The mission of the Agency is defined in the EEA's mission statement for 1999-2003: "*The EEA aims to support sustainable development and help achieve significant and measurable improvement in Europe's environment through the provision of timely, targeted, relevant and reliable information to policy making agents and the public*". European Topic Centres have been appointed by the Agency to act as centres of expertise and to execute particular tasks identified in its Multi-Annual Work Programme.

The European Topic Centre on Inland Waters (ETC/IW)

The ETC/IW was appointed in December 1994 by the EEA to act as a centre of expertise for the Agency in support of its mission and to undertake specific projects of the EEA's Multi-Annual Work Programme.

ETC/IW consortium

The Water Research Centre (WRc) is the lead organisation of the European Topic Centre on Inland Waters under contract to the EEA. The ETC/IW consists of a consortium of several European organisations which each has a representative on the ETC's Management Committee. This agrees the allocation of tasks and budget and partners are accountable to the ETC Project Leader for the satisfactory execution of the Work Plan. The Management Committee is chaired by Dr Tim Lack of WRc, which also provides the services of a Technical Manager (Steve Nixon) and a Data Manager (Mike Wheeler). The organisations represented on the Management Committee and their main representatives are:

- Austrian Working Group on Water (AWW - Austria): Wilhelm Vogel;
- Centro de Estudios y Experimentacion de Obras Publicas (CEDEX - Spain): Teodoro Estrela;
- Flemish Environment Agency (VMM - Belgium, Flanders): Jan Voet;
- Instituto da Agua (INAG - Portugal): Antonio Carmona Rodrigues;
- International Office for Water (IOW - France): Dominique Preux;

- National Environmental Research Institute (NERI - Denmark): Torben Moth Iversen;

- Norwegian Institute for Water Research (NIVA - Norway): Merete Johannessen.

There are two supporting organisations which also contribute to the Topic Centre's work:

- Danish and Greenland Geological Survey (GEUS - Denmark): Peter Gravesen;

- Institute of Hydrology (IH - UK): Alan Gustard.

ETC/IW Core Team

An international team of specialists co-ordinating the Topic Centre's work plan and acting as the interface between the Agency and the Topic Centre is based at WRc Medmenham. This Core Team includes

Tim Lack (WRc) Leader	**Lucile Laffon** (IOW) Deputy Leader until July 1998 **Andre Boschet** (IOW) Deputy Leader from July 1998	**Dr Anton Steiner** (September –November 1998) and **Dr Werner Wahliss** (from November 1998) both of LAWA and the Bavarian Ministry of Land Development and the Environment
Steve Nixon (WRc) Technical Manager	**Mike Wheeler** (WRc) Data Manager	**Concha Lallana** (CEDEX)

Other Member Countries are invited to send representatives to the Core Team to improve working relationships and develop a deeper understanding of the operation of the Topic Centre and its work plan.

PHARE Topic Link on Inland Waters (PTL/IW)

The extension of the EIONET to central and eastern European countries is being made possible through the funding of the European Commission's PHARE Programme. For Inland Waters, a PHARE Topic Link (PTL/IW) was appointed in 1997. This consists of a PTL Leader, Janos Feher (Vituki Consult Rt., Hungary) with three other organisations: the Institute of Meteorology and Water Management (Poland), the Water Management Institute (Slovenia) and the Water Research Institute (Czech Republic). The PTL/IW Leader and ETC/IW Leader jointly developed the PTL/IW work plan in order to co-ordinate the technical tasks to be undertaken. In this way the PTL/IW and ETC/IW work together to form a joint extended ETC on Inland Waters.

Further information on the ETC/IW and PTL/IW, the EEA and other Topic Centres is provided on the following home pages on the world wide web:

ETC/IW : http://etc-iw.eionet.eu.int/***EEA***: http://www.eea.eu.int

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2. Work plan

This section describes the objectives of the technical work plan of the ETC/IW for 1998, and Section 3 presents some highlights from the progress in these tasks during 1998.

1998 Work Plan - Tasks and Objectives
EUROWATERNET and WATERBASE Implementation (lead WRc) **Objective:** To implement progressively the inland waters monitoring network (EUROWATERNET) across the EEA area and to populate WATERBASE the database of state and pressure information
Assistance to the EEA for the Production of the EEA State of the Environment and Outlook Report (EU 98 Report) (lead WRc) **Objective:** To assess the current status and develop potential future trends under various socio-economical scenarios on key inland water issues.
Water Resources and Human Health in Europe (lead WRc) **Objective:** To prepare, in association with the World Health Organization, a monograph on the availability and quality of water resources across Europe, and assess the implication for human health.
Sustainable Water Use in Europe: Part 2 - Demand Management, and Part 3 - Extreme Events (lead CEDEX) **Objective:** To investigate further the transition from facilitating water supply to demand side management and how this relates to the sectoral use of water (dealt with as Part 1). To analyse the importance of extreme hydrological events and human interventions in relation to sustainable water resource management.
Common Tools for Emissions and Waste: Integrated Inventories (lead NERI) **Objective:** To further develop the conceptual model for integrated inventories, in close collaboration with ETC/AE and ETC/IW and to pilot test in a small number of countries.
Support to DGXI on the Development of the Technical Annexes of the proposed Water Framework Directive (lead WRc) **Objective:** To provide technical assistance and expertise to DGXI in the development of appropriate Technical Annexes of the European Commission's proposal for a Council Directive establishing a Framework for European Community Water Policy.
Lakes and Reservoirs in the EEA area (lead WRc) **Objective:** To update and extend the Lakes and Reservoirs database (ELDRED) which was developed during 1996/1997.
Europe's Water Resources – Synthesis Report (lead WRc) **Objective:** To produce a succinct report describing the pressures on Europe's water resources and the resulting state and impacts.

3. Progress during 1998

3.1. WATERBASE and EUROWATERNET implementation

The European Environment Agency (EEA) has a mandate from the EU Council of Ministers to produce objective, reliable and comparable information to allow the Commission, Member States and the general public to judge the effectiveness of policy and the needs for policy development. The EEA and the European Environment Information and Observation Network (EIONET) are the main European system for supporting development and implementation of policy through the interactions of networking, moving from national monitoring to European reporting and the establishment of the EEA as the Reference Centre for environmental information. The Monitoring, Data, Information, Assessment and Reporting chain (MDIAR) therefore forms the backbone of the EEA's activities, as presented in EEA's Second Multi Annual Work Programme (EEA, 1999).

The European Topic Centre on Inland Waters (ETC/IW) has designed and tested an information and monitoring network, called EUROWATERNET (EEA Topic Reports 10/96 and 11/96). EUROWATERNET will provide the European Environment Agency (EEA) with information that it needs to meet the requirements of its customers including the European Commission, other policy makers, national regulatory bodies and the general public. Information is required on:

- the status of Europe's inland water resources, quality and quantity (status and trends assessments) and,
- how that relates and responds to pressures on the environment (cause-effect relationships).

EUROWATERNET will provide information on water quantity as well water quality issues. In 1998, ETC/IW produced EEA Technical Report no 7/98 on EUROWATERNET, Technical Guidelines for Implementation. This provides National Focal Points, National Reference Centres and other national experts with guidelines on how rivers and lakes should be selected for EUROWATERNET. It also provides guidelines for the design of a groundwater-monitoring network for EUROWATERNET. The guidelines primarily deal with quality issues. Further work is being undertaken by the EEA and ETC/IW to develop detailed proposals with EUROSTAT for the collection of comparable water quantity information at the required level of detail and aggregation (e.g. catchment level). Recommendations and guidelines on the water quantity aspects of EUROWATERNET will be distributed to Member Countries at a later stage.

Monitoring is expensive and is unlikely to be undertaken purely for the "European need." Therefore, EUROWATERNET is based on current national programmes. By and large national networks are likely to be more

than adequate (in terms of numbers of stations, frequency of monitoring and determinants monitored) to meet the EEA's needs but if this is shown not to be the case this would be of interest to the country in terms of possible deficiencies and subsequent development in national networks.

Progress in the development of EUROWATERNET was reported at the EEA Workshop in Budapest in October 1998, proceedings of the workshop will be reported in 1999:

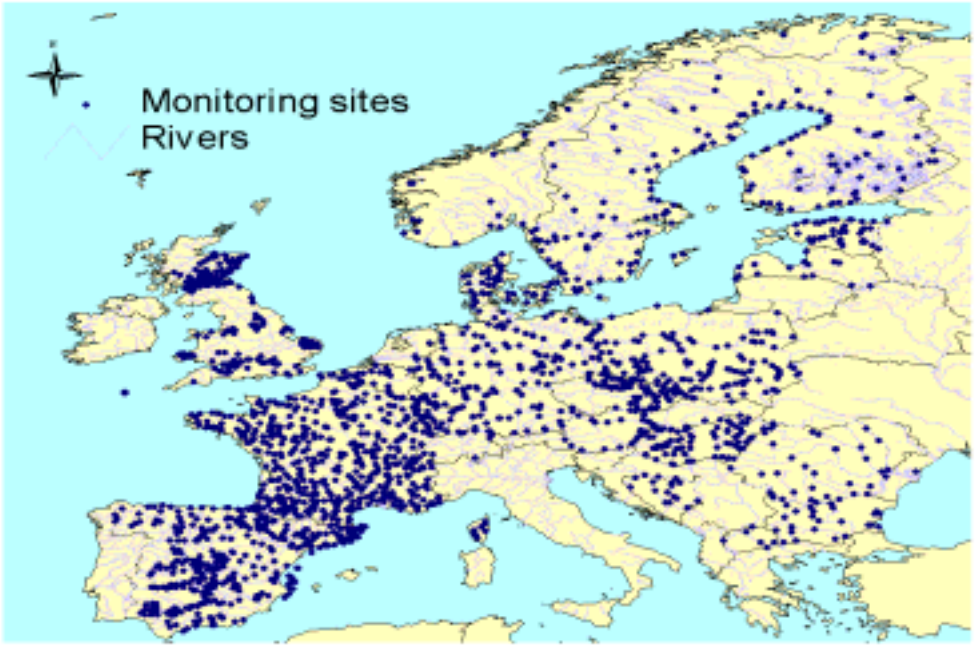
Rivers

EEA Members Countries and Phare Countries now have guidelines (Technical Report 7/98, EUROWATERNET: Technical Guidelines for Implementation) to establish their network, in particular on the process of selecting river stations according to river size typology and the gathering of pressure information. Map 3.1 shows the location of the monitoring sites (around 3600) that are now entered in WATERBASE. Figure 3.1 is an example of the type of comparative analysis of the state of Europe's rivers that can now be obtained with the appropriate catchment pressure data through EUROWATERNET.

Lakes

Progress has been made on a basic network of lakes and reservoirs, supporting each country in its choice of representative stations. Table 3.1 is an overview of the number of sites selected for inclusion in WATERBASE and frequency of monitoring in lakes in various countries.

Map 3.1: Monitoring sites for rivers in Europe through EUROWATERNET



(Source ETC/IW)

Figure 3.1: Nitrate concentrations in rivers with different upstream catchment population densities

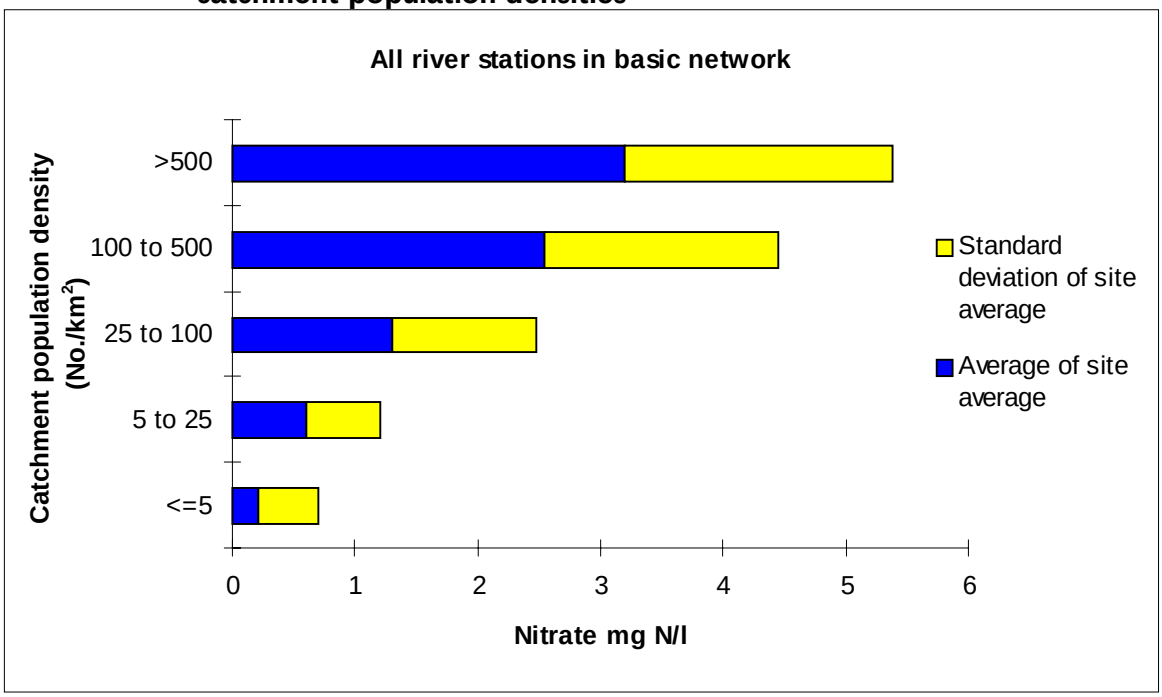


Table 3.1: Number of lakes/reservoirs with summer, winter or annual averages of phosphorus concentration and number of lakes with time series of varying length

COUNTRY	Summer	Winter	Annual	5-10 years	11-20 years	>20 years
Austria			5		2	3
Bulgaria	4		4			
Switzerland	1		2			2
Czech Republic	1		5			1
Germany			6	5		
Denmark	23	23	23	23		
Estonia	9		9	1	2	1
Finland	144		144			
France	41		49	3	6	
Hungary	4		4			
Ireland	5		8	4	4	
Latvia	6		6		2	1
Lithuania	7		1			1
FYROM	3		3	3		
The Netherlands	3		2	1		2
Norway	9		4			4
Poland	24			6	4	
Portugal	10		10			
Romania	2			1		
Slovenia	3		3		1	
Spain	102		102			
Sweden	89				1	8
United Kingdom	114		133			
Total	604	23	523	47	22	23

Groundwater

For groundwater, the national monitoring networks are generally less developed than for rivers. ETC/IW has developed guidelines (presented in EEA Topic Report 14/96) and conducted some pilot testing, on 34 groundwater bodies in 10 member countries including 3 PHARE countries. The results show that countries can provide representative views of their groundwater bodies, and, in that context, EUROWATERNET – Groundwater is now operational and will be further developed. During 1997-1998, an assessment report on European Groundwater – Quality and Quantity was developed and is scheduled for publication in mid-1999.

3.2. Assistance to the EEA for the production of the EEA SoE and outlook report (EU98 report)

In terms of assistance to the EEA for the production of the water chapters of the 1998 SOE and Outlook report (EU 98 Report), ETC/IW has produced 3 background documents: Water Quality, Water Stress, and Implementation of the Urban Waste Water Treatment Directive (UWWT) in the 10 Accession Countries (AC 10)

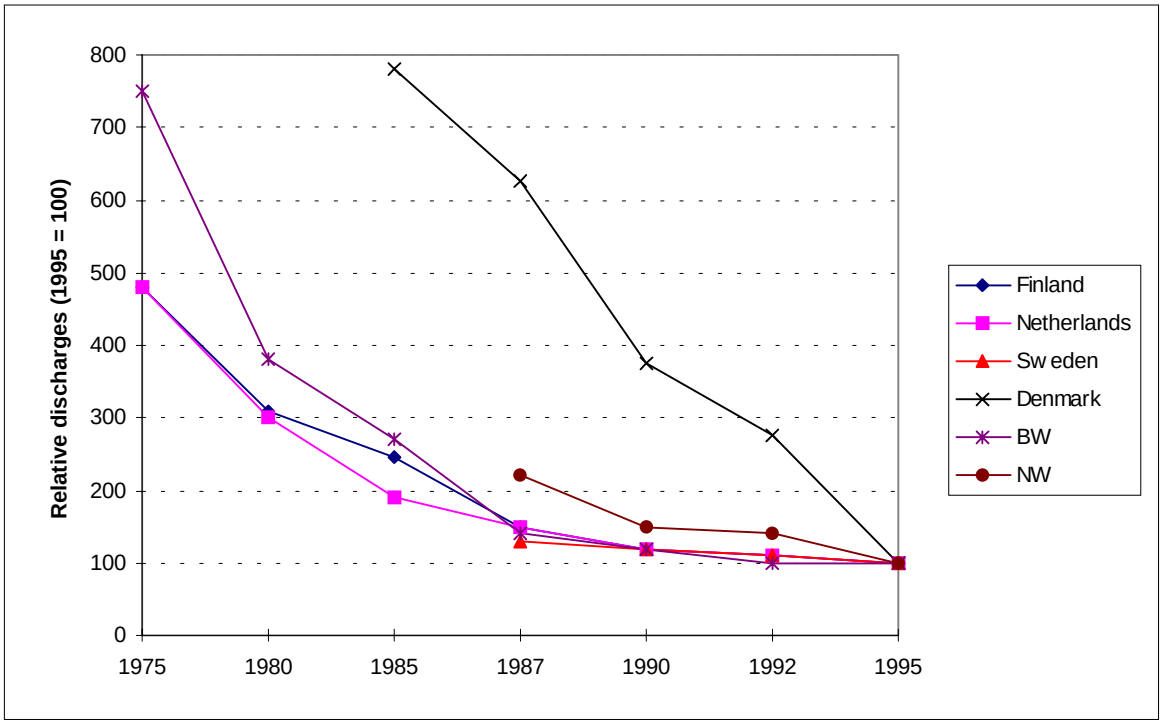
The main issues of water quality to be presented in the EU 98 report are:

Water pollution problems, considered here, are caused by discharge of:

- Organic matter - mostly point sources from humans and industry,
- Phosphorus - mostly point sources from humans and industry,
- Nitrogen - mostly diffuse sources from agriculture.

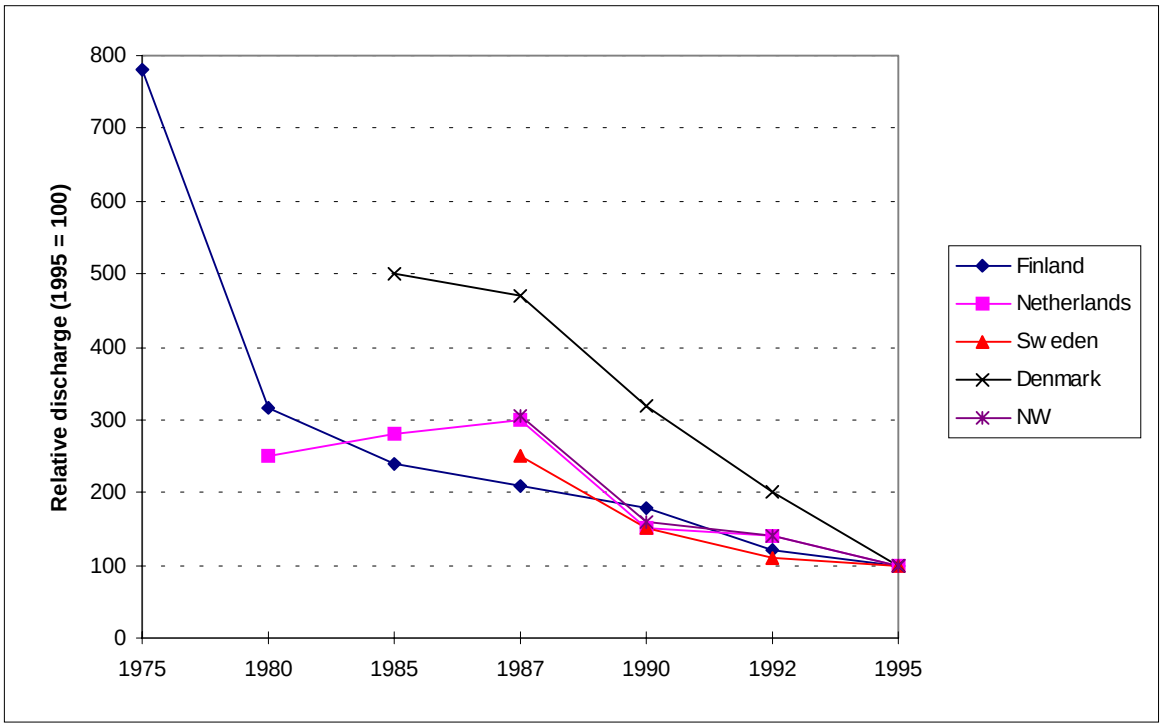
Figure 3.2 shows that organic matter discharges have been significantly reduced (by 50% to 80% over the last 15 years in north-western Europe) giving a significant decrease in the number and the extent of heavily polluted rivers (i.e. with a BOD greater than 5 mg O_2/l). The reductions in organic matter are from 24% to 6% in Western Europe where there has been greater investment in urban waste water treatment, 30% to 25% in Southern Europe and 40% to 28% in Eastern Europe. In addition to improvement in urban waste water treatment the emissions of oxygen-consuming substances from industries (especially paper production) have been greatly reduced by the introduction of new and cleaner techniques.

Figure 3.2: Discharge of organic matter from UWWT



Notes:
Please note that the X-axis is not linear
BW = Baden-Württemberg
NW = Nordrhein-Westfalen (1993 = 100)

Figure 3.3: Discharge of phosphorus from UWWT



Notes:
Please note that the X-axis is not linear
NW = Nordrhein-Westfalen (1993 = 100)

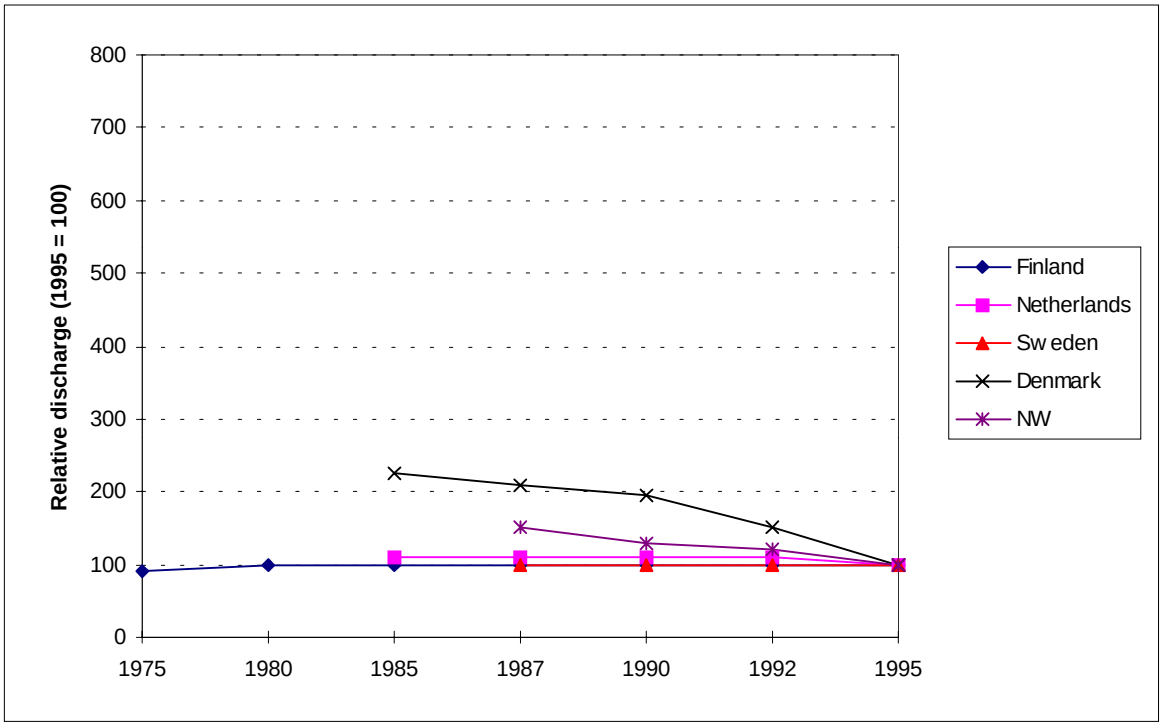
Point source phosphorus discharges have also been reduced (Figure 3.3). The reduction generally started in the late 1980s, and can partly be explained by upgrading of waste water treatment plants with treatment steps to remove phosphorus and use of clean technology in industry. In addition, the shift to phosphate-free detergents has contributed to the reduction. This has resulted in a major reduction in phosphorus concentrations in water bodies.

Nitrate run-off from agricultural sources has been more difficult to control. The use of fertilisers and manure has been lowered in comparison to the highest levels of the 1980s due mainly to Common Agriculture Policy reforms, reduced cattle livestock numbers, and to economic recession in the Accession Countries. However, the nutrient input from agriculture is still high. Agricultural land generally receives much higher nutrient input than is removed by the crops. Generally, the regions that have particularly high surpluses of nutrients are also the regions with high concentration of intensive livestock production. The discharge of Nitrogen from Urban Waste Water Treatment plants has been approximately constant since 1975 (Figure 3.4) contributing to eutrophication in coastal areas. Nitrate contamination of aquifers is a problem particularly where shallow wells are used for drinking water thus exposing the population (usually rural) to greater risk of disease.

There are still possibilities for improvements in waste water treatment as scenarios on implementation of the Urban Waste Water Treatment Directive indicate. When the Directive is fully implemented in EU15, organic matter and phosphorus discharges will decrease from present levels by 65% and 31%, respectively.

In the Accession Countries upgrading of waste water treatment plants to north-western European standards (Figure 3.5) would result in considerable reductions in pollutant discharges. The organic matter discharge may be reduced to one third and the nutrient discharge may be reduced to 50-60% of the current point source discharge.

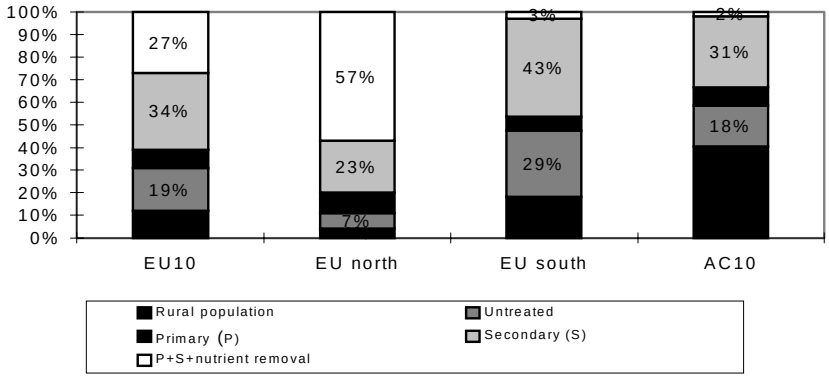
Figure 3.4: Discharge of nitrogen from UWWT



Notes:
Please note that the X-axis is not linear
NW = Nordrhein-Westfalen (1993 = 100)

Despite the advances made in controlling point sources of phosphorus, excessive nutrients still give rise to problems in surface waters and it may now be necessary to take measures against the diffuse nutrient loads from agricultural areas, through control or limitation of the use of fertilisers. The diffuse load of nitrates is covered by the measures in the Nitrates Directive. However, there are at the moment no direct measures to reduce the diffuse phosphorus load.

Figure 3.5: Comparison of waste water treatment in different parts of Europe



EU10: DE, ES, FI, FR, GR, IT, LU, NL, PT, UK

EU north: DE, FI, LU, NL, UK

EU south: ES, FR, GR, IT, PT

Main findings on water quantity

Water Stress occurs when the demand for water exceeds the amount available during a certain period or when human activities prejudice its availability or quality.

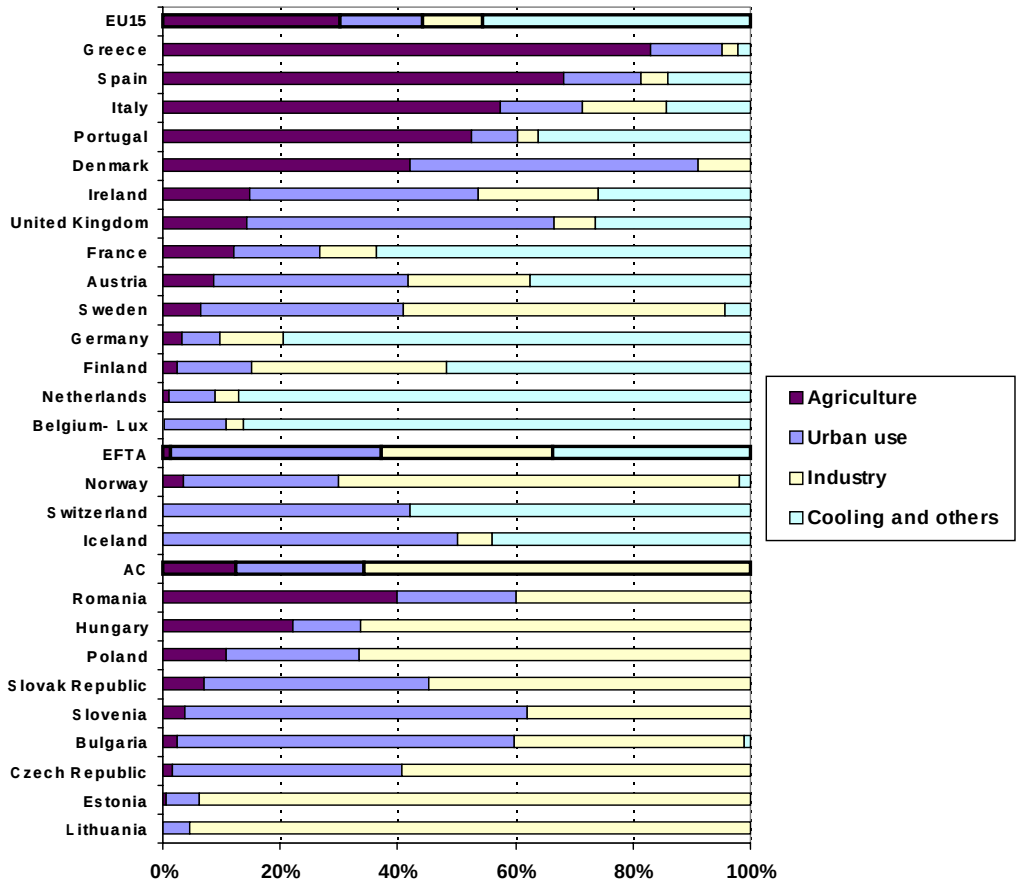
Water resources are unevenly distributed over Europe with annual average run-off ranging from more than 3000 mm in western Norway, 100 mm over much of Eastern Europe and less than 25 mm in central and southern Spain. Some countries are heavily dependent on water flowing into their country from another. Hungary “imports” more than 95% of its total resource, while the Netherlands, Slovak Republic and Germany rely on external sources for more than 50% of their total water.

Droughts are a major environmental, economic and social problem and they affect large parts of Europe but there is no evidence (from gauging stations with long records) of any consistent upward or downward trend in river flows.

The EU countries are, on average, abstracting around 21% of their renewable freshwater resources each year, which is regarded as a sustainable position. Belgium abstracts twice the average, which leads to high water stress.

In the EU, power generation cooling water accounts for 47% of the total water use, 29% for agriculture, 14% for drinking and 10% for industry. As shown in Figure 3.6 there are large regional variations: e.g. agriculture accounts for 50-80% of the total water used in Mediterranean countries and only 10% in others.

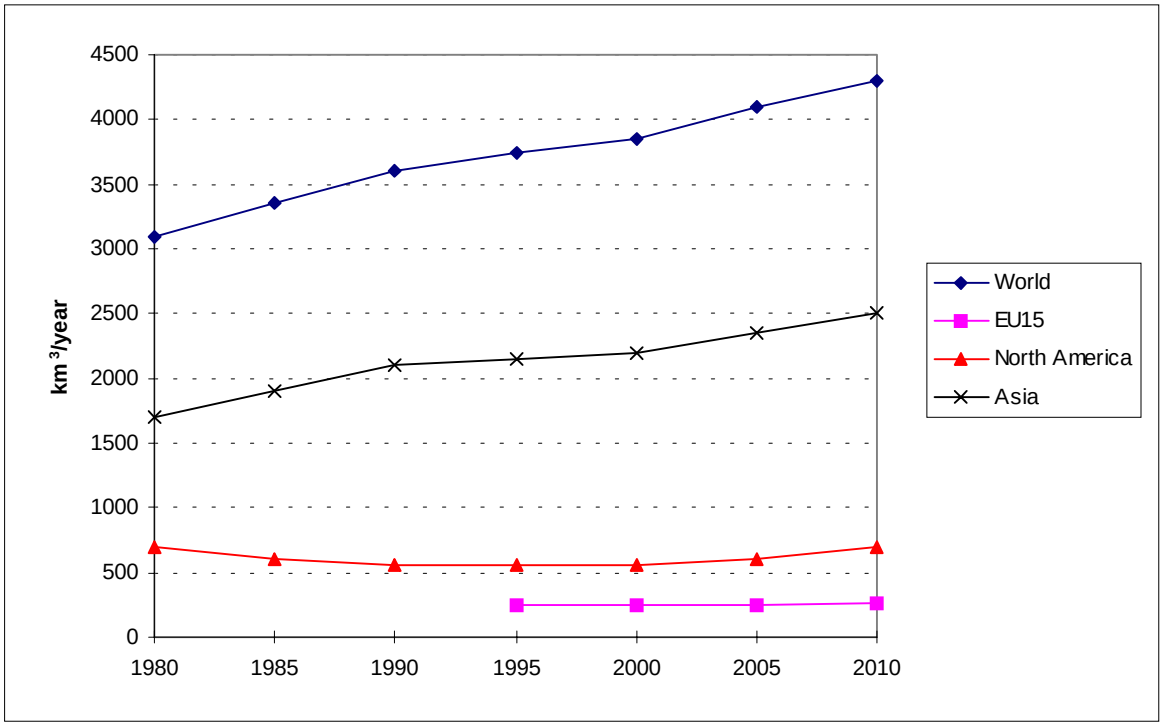
Figure 3.6: Sectoral water use in Europe



Future total abstractions in EU15 are predicted to show only very small increases because of: stable population growth, industrial decline, improved water use technologies, greater water re-use (industry) and stabilisation of agricultural water use (especially irrigation).

Infrastructural (or supply-side) responses to water stress (more reservoirs, more wells, water transfers etc) are now being critically assessed against demand-side responses such as water conservation, water saving, water re-use, leakage reduction. The importance of economic principles and pricing of water (full cost recovery) is now an important consideration in the development of water policy.

Figure 3.7: Total water demand trends and projections



3.3. Water resources and human health in Europe

In 1998 the ETC/IW prepared the text for the report " Water Resources and Human Health in Europe" which is to be published jointly in 1999 by the EEA and the World Health Organization Regional Office for Europe. It takes forward some of the issues raised in the joint publication "Environment and Health 1, Overview and Main European Issues" which raised the importance of the quality and availability of water ameliorating health effects and complements other publications by both organisations.

The report is intended as a substantiation document for the Third Ministerial Conference on Environment and Health to be held in London in 1999.

The report reviews the availability and quality of water supply across Europe including groundwater, rivers, lakes, reservoirs and coastal waters, and the main pressures challenging these resources. The issue of transboundary sources has also been addressed. Attention has been given to the extent of provision of treated, piped water to the populations of the countries of the Region. Aspects of the quantity and quality are presented as geographical trends across the continent and the associated health impacts reviewed.

Shortage of water may currently be the most urgent environmental problem facing some countries, exacerbated by geography and hydrology. Climate change is predicted to have an influence especially in coastal areas where flooding may cause disruption of sanitation infrastructure and resultant contamination of watercourses. While many parts of Europe are currently well provided with freshwater, the water resources of the Region are unevenly distributed between and within countries, leading to

inadequacy of supply in many areas. Groundwater and surface waters have a limited capacity for renewal and pressures from agriculture, industry and domestic users impact on the quantity of water sources. Sustainable management of these resources is essential to protect the environment and human health. The extent of provision of piped water supplies to households varies across Europe and between urban and rural populations, with rural populations in the east of the continent least well provided. Continuity of supply is also a problem in some areas. Inefficient use of the water resources, due to factors such as network leakage and inappropriate irrigation practices, appears to be a significant problem in many areas.

The immediate area of public health concern across the continent is microbiological contamination, which can affect large numbers of people across the Region. Treatment and disinfection of drinking water is insufficient in some countries, particularly those where economic and political changes have led to infrastructure deterioration. It appears that an increased number of outbreaks of water-borne diseases have occurred in these countries. Figure 3.8 presents an example of the incidence of bacillary dysentary across Europe. However, there is a lack of reliable data on the quality of source and drinking waters in many areas throughout the Region and disease-reporting varies from country to country. The tracing of the origin of such outbreaks is generally poor. In some Central and Eastern areas, inadequate sewerage systems are a significant threat to public health. Private and small public supplies are identified, by a number of countries, as those most liable to receive insufficient treatment and thus to be of poor quality. However, the installation of advanced treatment works is increasing in many countries.

A wide range of chemicals is found throughout the aquatic environment, but often evidence of any impact on human health, except for some accidental releases, is difficult to obtain. Problems of significant chemical contamination are often localised and may be influenced by geology or anthropogenic contamination. Concern about the impact of agriculture on the quality of water resources is often related to diffuse sources - contamination by agrochemicals, nutrients and microbiological pathogens in particular. Within the EU there has been a decreasing trend in the quantity of pesticide active ingredients sold since 1985 but the use of pesticides depends upon economic conditions, as well as the accepted practice in the country concerned, and varies widely across Europe.

Considerable evidence has been accrued linking the quality of bathing waters with minor illnesses. The use of water for recreational activities is intrinsically linked to economics through the tourism industry and thus the quality of such waters is of considerable importance to communities dependent on such activities.

Fig 3.8: Incidence of bacillary dysentery

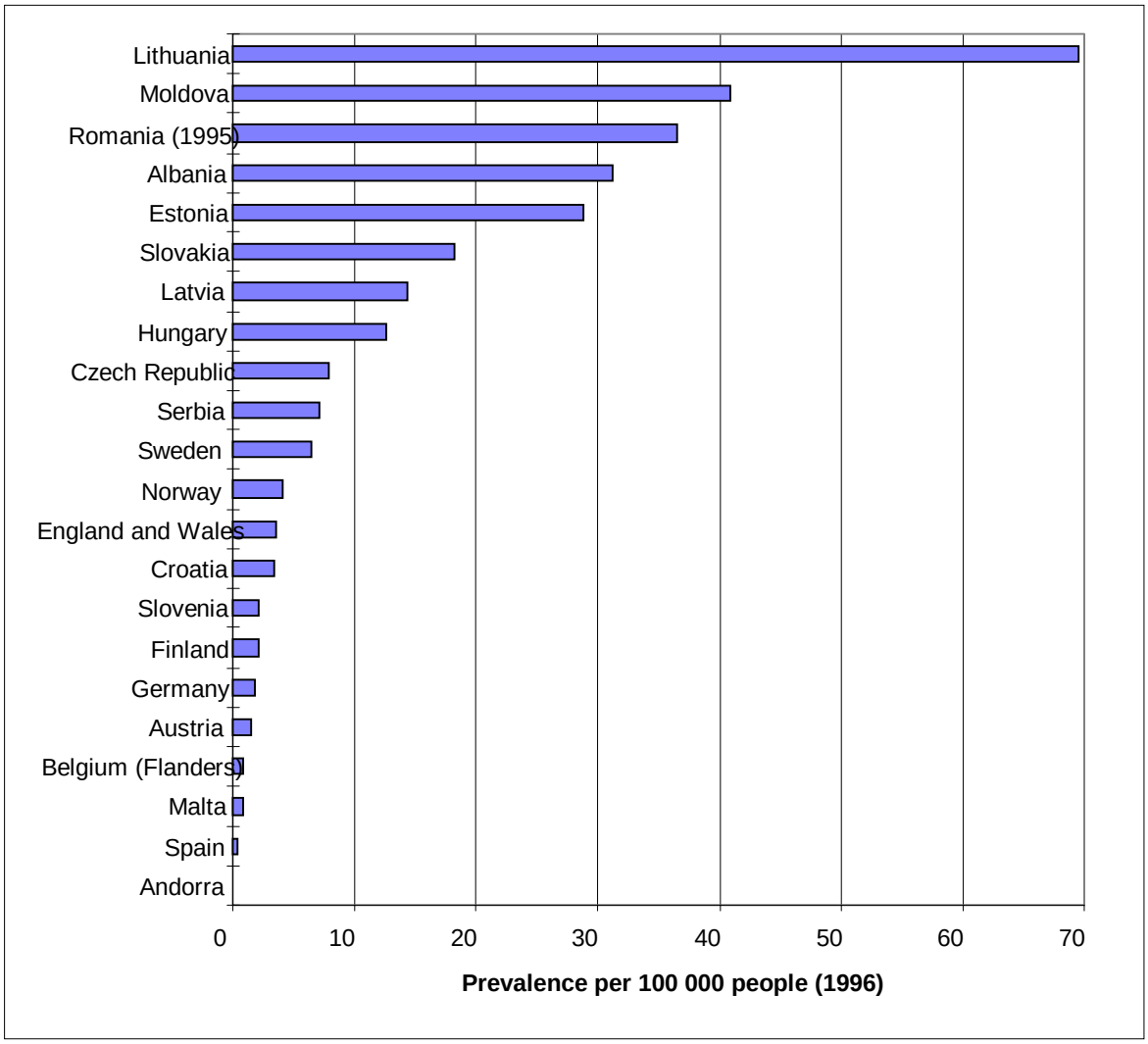


Figure 3.9: Sea and freshwater sampling points in EU15.

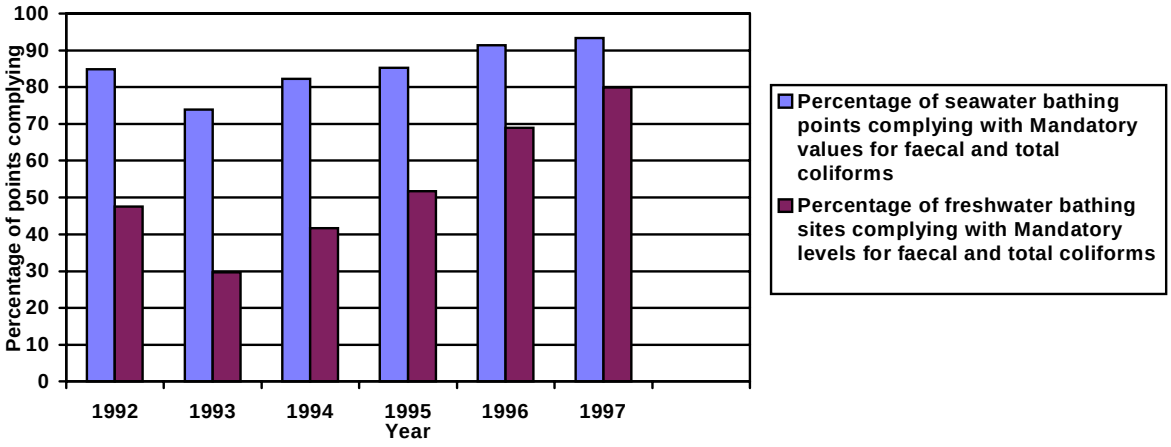


Figure 3.9 shows that some improvements have been made over the past decade, co-ordinated efforts are still needed to ensure that Europe's population is supplied with wholesome and clean water. These include

measures to control demand and prevent, contain and reduce contamination through improving water and sanitation management at international, national and local level. One particular problem that has been highlighted through the compilation of the joint EEA/WHO report "Water Resources and Human Health in Europe" is the need to standardise monitoring procedures where possible.

There is a need for partnerships and co-operation between the environment and health sectors at all levels of government in order to disseminate technology, improve management and to provide financial and institutional support in order to ensure access to safe water and sanitation to all. It is not only long-term management that should be considered, responses are required to unexpected events such as natural disasters or accidents with large-scale impacts that can heavily influence the quality and quantity of water used for consumption.

Trends in water management in Europe include moves towards catchment-level management and improved inter-sectoral co-ordination and co-operation and frameworks facilitating stakeholder participation. This approach is now developed by the EU in a proposal for a Water Framework Directive, which sets target of good ecological status for all types of surface water bodies and good quantitative status for groundwater. A radical reappraisal of the roles of government and especially private sector participation in water management and in drinking water supply and sanitation in particular is occurring. The extent of this varies across the continent. International action plans and conventions have been agreed upon, with targets for the reduction of pollution and measure necessary to reach the targets.

3.4. Sustainable water use in Europe

The ETC has produced a report (Sustainable Water Use in Europe: Part 1:Sectoral Use of Water) to be published by EEA in 1999 which reviews water use in various sectors across Europe.

The project examines and assesses the available information on the Sectoral Use of Water with the aim to improve the state of information and to prepare the way for future research and policy-making towards the sustainable use of water in Europe. It highlights the need to improve existing information by establishing reliable definitions, a common understanding, and quantitative and consistent records on a European scale. Some of the main findings and recommendations presented in the report are:

1. The principal source of abstracted freshwater in the EU Member States is surface water (about 75% of the total water abstracted for all uses) with a large part of the remainder from groundwater (about 25% and only minor contributions from desalination of seawater and from re-use of treated effluents).

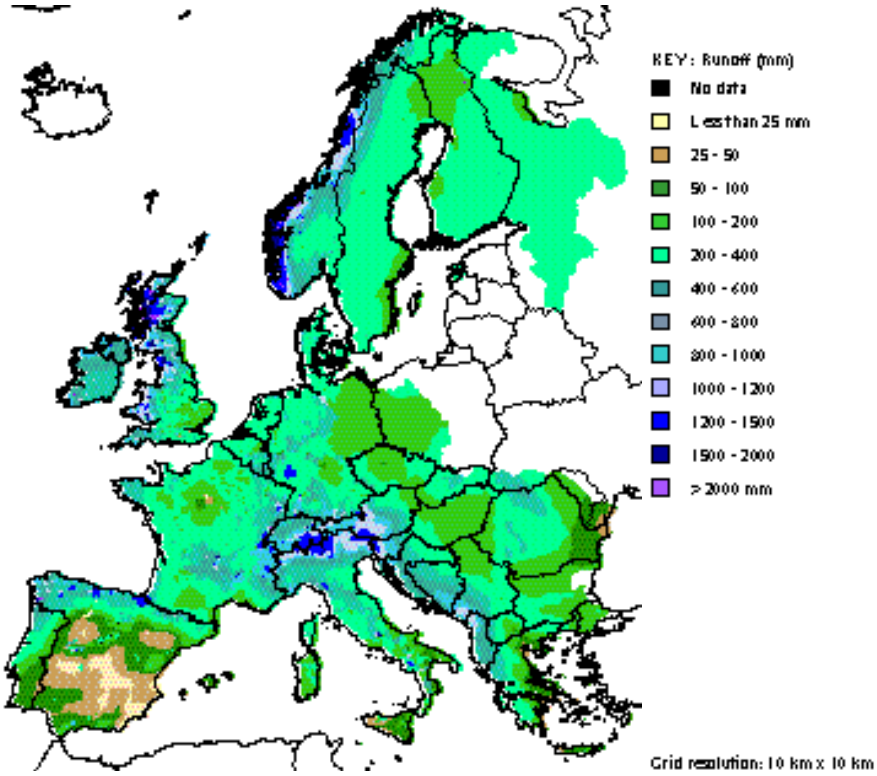
2. One of the biggest driving forces and pressures on water resources is agriculture and the changes in its practices. The most important agricultural water demand is for irrigation. In many EU Member States there has been a relative decrease in importance of agriculture in comparison with other economic sectors. In terms of water use agriculture accounts for more than 50% of consumptive water uses. However, in Southern European Countries (Greece, Italy, Portugal and Spain), this percentage rise to 73%. Agriculture is still a very important economic sector in the Accession Countries.

3. Water use by households and small businesses shows large differences between countries. Denmark, Germany, Luxembourg and Sweden have decreased their consumption whereas in countries like Austria, Belgium, France, Italy, the Netherlands, Switzerland and especially Norway, there have been increases.

4. In many European countries, industrial water demand has been decreasing through the 1980's and 1990's. This is due primarily to economic recession with plant closures in heavy water using industries. Technological improvements in water using equipment and increased recycling are also contributing to the decline.

Potentially, all countries have sufficient resources to meet national demand. However there may be problems on the regional or local scale. (Map 3.2)

Map 3.2: Long-term average annual run-off in Europe



(Source: Rees et al., 1997)

Water stress is generally related to over-abstraction of water in relation to the resources available in a particular area. Demand for freshwater can exceed the local long-term availability of the resource, especially in Southern Europe and the industrial centres of the North. In these areas such demand cannot be sustained unless action is taken. Seasonal or inter-annual variation in the availability of freshwater resources will, at times, induce problems of water stress.

There is a general shift between infrastructure responses to demand side management responses such as introduction of economic instruments.

It is recommended that national monitoring and data gathering concentrate on the improvement of the present state of the information, trying to establish reliable records on a European scale.

Data collection on water resources and demand should be co-ordinated at international level, with the aim to provide users and policy-makers with reliable and homogeneous data based on the same definitions and concepts. Reliable and comparable information is required to ensure that existing policies are effective and that any new policies are targeted correctly so that there can be a sustainable use of water in Europe.

In 1999, Parts 2 and 3 of the report will be finalised for publication by EEA.

3.5. Common tools for emissions and waste: integrated inventories

In support of the implementation of the IPPC Directive, a project was undertaken jointly with the ETC on Air Emissions to develop a conceptual model for Integrated Emissions Inventories (IEI). The objective of the task undertaken by the ETC/IW was to propose a draft methodology for estimating emissions to water, including the requirements from various EU Directives (e.g. the proposed Water Framework Directive), and other international requirements, such as emissions registers and inventories, which are important tools for the formulation and monitoring of pollution control policies.

Emission inventories are required under a number of EU directives aimed at controlling and reducing pollution in the water environment. Many of these directives are likely to become subsumed under the Water Framework Directive but the need for Member States to monitor and collect information on the state of inland waters and the pressures arising from catchment activities will still be a fundamental legal requirement. In particular, the Integrated Pollution, Prevention and Control (IPPC) Directive requires the Commission to report every three years an inventory (Polluting Emissions Register - PER) of the "principal emissions and sources" based on data supplied by the Member States.

The approach taken by the European Topic Centres on Inland Waters and Air Emissions (ETC/IW and ETC/AE) is presented in EEA Technical Report no. 8/98, "A European Inventory of Emissions to Inland Waters, a first proposal", and concentrates on four main issues:

- **The substances to report**. Determinants to be selected should represent a pollution threat to the environment. Methods to be used for the selection should be based on legal requirements, environmental needs, and feasibility. Compatibility with the substances used by other international organisations is an important criterion.

- **The sources generating emissions.** These to be described either in terms of economic activities or the technical processes involved.

- **The spatial scale for reporting**. The river or lake basin is the relevant unit for the assessment of emissions to water in line with the catchment management approach taken more broadly. For the purposes of EEA, it seems reasonable and appropriate to consider only the topographic surface catchments. However, there are potential problems in that currently much pressure data is gathered on the basis of administrative units rather than the catchment level.

- **The time scale for reporting**. The current definition most commonly used for air emissions inventories is "the mass of substance emitted per year to the atmosphere". For water issues, different temporal resolutions are needed for different purposes although annual reporting will still be appropriate for many legal purposes and for state of the environment reporting.

A guideline methodology for the estimation of point and diffuse source emissions to water has been prepared, based on existing models used in France, Denmark and the Netherlands.

The methodology and further details are presented in EEA Technical Report 8/98 (A European Inventory of Emissions to Inland Waters. A first proposal).

3.6. Support to DGXI on the development of the technical annexes of the framework water directive and other directives

Further support has been provided to the Commission on the development of the Technical Annexes of the proposed Framework Water Directive (COM997) 49 final) especially Annex II Characterisation of Water Types, and V Definitions of Water Status. In addition the ETC has worked with the Commission to make the monitoring and assessment requirements of the proposed Directive and the aims of EUROWATERNET compatible, as far as possible,. This is to ensure that Member States do not have to develop two separate monitoring, assessment and reporting systems. A further advantage is that the Commission and the EEA will have a common source of information for their different needs. A number of inconsistencies between the proposed Directive described in a Council paper (9265/98) and the needs of the EEA were identified and communicated to the Commission as part of the consultation process.

The Topic Centre has been working with the Commission on the analysis of Member States' returns on the Standardised Reporting Directive (91/692/EEC) for the period 1993-1995 and a report has been produced for the Commission who will distribute it to Member States in mid-1999. This report gives detailed information on the national reports formally submitted by Member States covering 8 Directives and 5 Daughter Directives of the Dangerous Substances Directive. The analysis revealed that despite the provisions of the questionnaires adopted for the Standardised Reporting Directive, the quality, accuracy and comparability of data is exceedingly poor and is of relatively little value. This has given additional importance to the development of electronic templates to further standardise and speed-up the reporting process. These templates have been developed by the ETC during 1998 and versions are now with the Member States for use in the next reporting period (1996-1998).

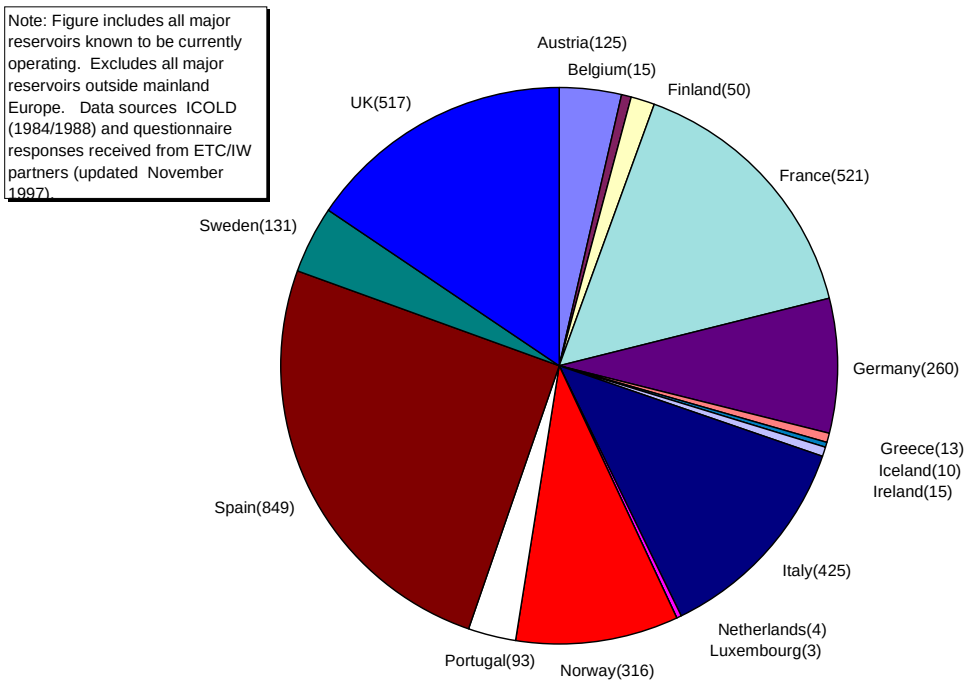
The Topic Centre has also acted in support of the Commission and Member States by providing technical advice at National Expert and Inter-service Meetings on the Urban Waste Water Treatment Directive and the Nitrate Directive.

3.7. Lakes and reservoirs in the EEA area

In 1998, ETC/IW prepared a report (Lakes and Reservoirs in the EEA area) to be published by EEA in 1999. This report presents the results of work carried out between 1995 and 1997. The objectives were to overview the physical, chemical and ecological characteristics of lakes and reservoirs, as well as to describe their uses and evaluate their environmental state and trends. The geographical scope of the report was the 18 EEA member countries but only 15 supplied data.

A database, known as the European Lakes, Dams and Reservoirs Database (ELDRED), was constructed through two questionnaires to organise data collected from National Focal Points. Other information from the World Register of Dams and from OECD/Eurostat publications was also entered in the database. The ELDRED database now contains information concerning over 3500 reservoirs and over 300 natural lakes. Figure 3.10 shows the distribution of reservoirs in some European countries.

Figure 3.10: Numbers of major reservoirs by country



The study indicates a wide range of environmental situations for lakes and reservoirs in Europe. Two main themes emerged: environmental problems affecting lakes and reservoirs ecosystems and uses, and impacts on the environment caused directly or indirectly by reservoir construction.

Eutrophication affects significant numbers of lakes and reservoirs across the whole of Europe. It can render these water bodies unsuitable for human use, causing serious problems for public water supply, and also impacting the lake ecosystem. In most cases, phosphorus is the principal cause of eutrophication. Only in sparsely populated regions such as parts of

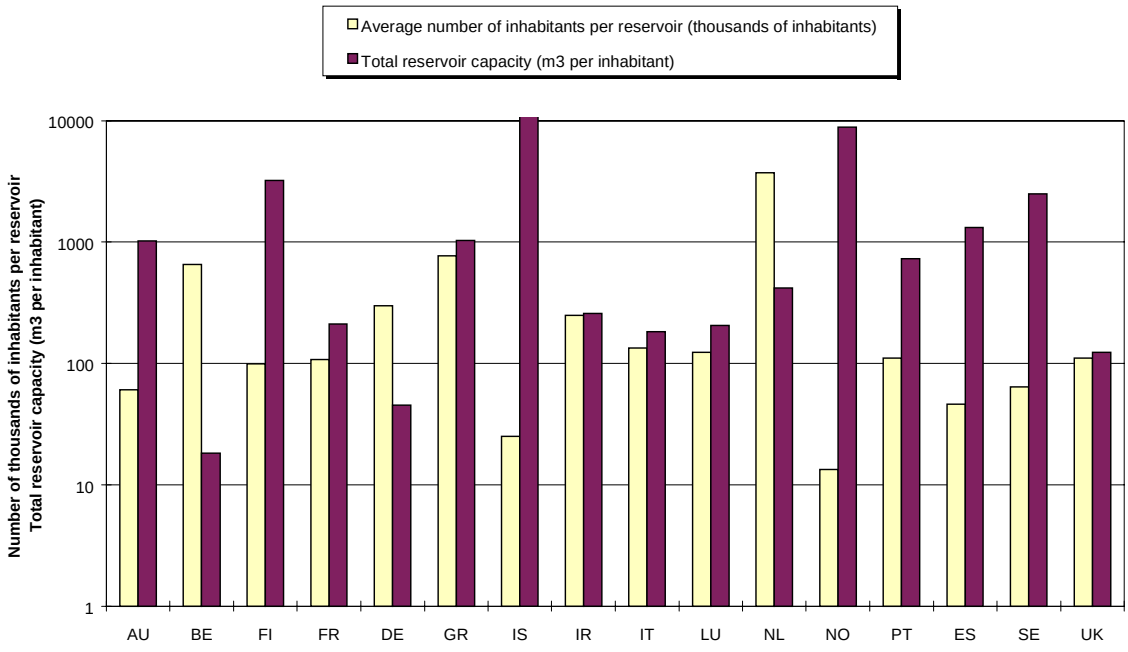
the Nordic regions, Ireland and Scotland are there a high proportion of lakes with low phosphorus concentrations.

Several lakes have been the subject of detailed studies and efficient action programmes to reduce nutrient loads in the catchment and several are showing signs of improvement. Some of these lakes will nevertheless require several decades and strong preventive and curative measures for restoration because of nutrient accumulation in the lakes and in their catchments.

Although the lack of data does not permit satisfactory conclusions, it would appear that the proportion of lakes with high phosphorus concentrations has gradually decreased over the last few decades, in all likelihood due to specific action programmes and general improvements in wastewater treatment facilities. However, the state of European lakes and reservoirs is still of concern, since the situation seems to be worsening in many other lakes with previously moderate or low phosphorus levels.

The marked contrasts in reservoir use (and importance) across Europe reflect both geographical influences (water resource availability) and national energy policies (hydropower production). The numerous hydropower reservoirs often located in mountainous or Nordic regions can be distinguished from the generally smaller irrigation and public water supply reservoirs situated in lowland and southern regions, which tend to have longer renewal times. These latter reservoirs are more likely to be subject to higher nutrient loads and their uses are particularly sensitive to eutrophication issues. Figure 3.11 shows reservoir capacity in relation to population in some European countries.

Figure 3.11: Reservoir capacity in relation to population



Data sources: National Focal Points, ICOLD 1984/1988 and UN population statistics 1990, updated November 1997, Note that useful storage data instead of total reservoir capacity data has been used for Norway.

Lakes and reservoirs ecosystems and uses are particularly sensitive to several types of water quality pollution because of their tendency to accumulate pollutants in water or in sediments. Occurrences of elevated concentrations of heavy metals and persistent organic pollutants have been observed in several lakes and reservoirs in the EEA area.

The 'artificialisation' effects on rivers and their ecosystems as a result of dam / reservoir construction and operations were also considered significant.

Dams constructed in earlier periods when environmental considerations were not systematically integrated into their design tend to lack facilities which would enable their environmental impact to be minimised. Examples of such facilities include permanent constructions such as fish ladders or outlets sized to permit emptying during less sensitive periods.

Impacts on flow regime, temperature regime and water levels are particularly apparent in the case of some hydropower dams, since they are often located in remote sensitive mountainous regions. However, impacts have also been reported for other types of reservoir - for example impacts due to poor water quality during emptying operations or the creation of migration barriers for fish.

4. Products/outputs produced by ETC/IW (1994-1998)

Published reports

The following table summarises the reports produced by the ETC/IW and published by EEA (except where indicated).

Report Ref.	Title
ISBN 92-827-8952-7	Quality of surface freshwaters. Common procedure for the exchange of information. 1990-1992. Synthesis Report. August 1995. CEC (1995)
Topic Report 1/96	Requirements for Water Monitoring
Topic Report 2/96	Surface Water Quality Monitoring
Topic Report 3/96	Surface Water Quantity Monitoring
Topic Report 4/96	Water Quality of Large Rivers
Topic Report 5/96	Annual Summary Report 1995
Topic Report 10/96	European Freshwater Monitoring Network Design
Topic Report 11/96	European Freshwater Monitoring Network (Summary)
Topic Report 13/96	Human Interventions in the Hydrological Cycle
Topic Report 14/96	Groundwater Monitoring in Europe
Topic Report 15/96	Water Resources Problems in Southern Europe
Topic Report 16/96	International Water Databases
Topic Report 1/97	Annual Summary Report 1996
Topic Report 1/98	Annual Summary Report 1997
Technical Report 7/98	EUROWATERNET: Technical Guidelines for Implementation
Technical Report 8/98	Common tools for emissions and waste : integrated inventories, a European Inventory of Emissions to Inland Waters: a first proposal.

Reports to be published in 1999 by EEA (Except where indicated)

Title
Environmental Assessment reports :
Environmental effects of excessive nutrients in European Ecosystems.
European Groundwater-Quality and Quantity.
European Water Resources : synthesis report.
Joint EEA/WHO Monograph on Water Resources and Human Health in Europe.
Environmental Issues reports
Sustainable Water Use in Europe: Part 1: Sectoral Use of Water.
Sustainable Water Use in Europe: Part 2: Demand Management.
Sustainable Water Use in Europe: Part 3: Extreme hydrological events, human interventions and their importance to water resource management.
Standardised Reporting Directive: Report on Member States Returns for 1993-1995 Reporting Period (to be published by the Commission).
Topic reports
Annual Topic Update 1998
Lakes and reservoirs in the EEA area
Technical reports
Comparative analysis of river quality classification

5. Plans and projects for 1999

The most important products are listed in the following tables. The products are divided into key and second priority products.

Key products

Product	ETC Delivery date
Annual Topic Update Report 1999	15 January 2000
Contribution to annual indicator report	31 July 1999 (to be confirmed)

Second priority products

Product	ETC Delivery date
Progress report on the implementation of EUROWATERNET and WATERBASE (Technical Report)	30 November 1999
Recommendations for the standardisation of water resource data and indicators (Technical Report)	30 June 1999
Guidelines on the gathering of data on emissions to water (Technical Report)	30 November 1999
Draft report on the ETC/IW contribution of data to 'Europe's biodiversity' report (Internal working document)	30 November 1999
Sustainable Water Use in Europe: Parts 2 and 3	30 March 1999

Summary ETC/IW Workplan 1999

Event/activity	Event date	Response deadline	Expected output	Output date
Workshops				
PTL/IW-ETC/IW	22-23 April 1999 Budapest		Implementation of EUROWATERNET in the PHARE Countries. Workshop proceeding	June 1999
ETC/IW	29-30 November 1999 Silkeborg, DK		Progress in the implementation of EUROWATERNET Workshop Proceeding	Dec 1999
Country visit to :				
Belgium	15 February 1999		Implementation of EUROWATERNET Mission report	March 1999
Greece	3 March 1999		Implementation of EUROWATERNET Mission report	April 1999
Other Countries	1999 on request		Implementation of EUROWATERNET Mission report	Within 1 month
Questionnaires			(None planned**)**	
Data Update Requests	Some data collection may be needed in Q2		Contribution to Annual Indicator Report	Q4 1999
Draft reports for review				
Sustainable Use of Water Parts 2 and 3.	Q3 1999	Q3 1999	Environmental Issues Reports	Q4 1999
Comparative Analysis of River Quality Classification	Q2 1999	Q2 1999	Technical Report	Q3 1999
Guidelines on the gathering of data on emissions to water	Q2 1999	Q3 1999	Technical Report	Q3 1999
Other main events				
	June 1999		Water Resources and Health Monograph launched at Inter-Ministerial meeting, London	
	June 1999		Three key water reports[(1)] launched during Copenhagen Environment Week.	

[(1)] The three reports are: European Groundwater-Quality and Quantity; Environmental Effects of Excessive Nutrients in European Ecosystems and Sustainable Water Use in Europe: Part 1: Sectoral Use of Water.