



D3: Current EU regulations

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1 EXECUTIVE SUMMARY

The aim of the EUROLAKES project is to formulate recommendations to EU policy arising from the management of lakes in EU. To this aim first of all it is necessary to understand the policy and legislation influencing Lake Management. This report shall give a description of relevant policies and regulations and therefore be a basis for the further research within the EUROLAKES project. A deeper analysis will take place in a further step. Finally, at the end of the project recommendations will be formulated.

Although EU legislation is the same for all Member States, it is transposed in the currently 15 Member States differently into national law. A long record of struggles between the European Commission (in the name of European Union) and the respective Member States at the European Court of Justice, witnesses the huge amount of problems experienced throughout the implementation of EU Water Policy. However it should not be forgotten that these court cases are concerning legal acts that have been the result of negotiations between the Member States and the European Parliament. In most of the cases they have been agreed on in a unanimous vote by the 15 Member States.

To be able to formulate recommendations for future management decisions, the current situation need to be analysed. Therefore the description of the status quo in European Water Policy will be a basis for all further work in the EUROLAKES project concerning Water Policy and recommendations addressed to it.

However a major change of European Water Policy has recently come into force. The new Water Framework Directive [1] will provoke changes in most European water management systems. These changes will be more important in Member States where a river basin approach has not yet been applied. In other Member States other instruments, newly required by European legislation, need to be introduced. Especially trans-border co-operation in water management is an innovative and demanding task. This will especially influence the management of some European lakes as well.

As the new concept of Water Framework Directive leaves much responsibility to the Member States, it will depend much on national decision making processes if the potential that Water Framework Directive bears will be exploited in order to achieve a sustainable water management. Participative mechanisms therefore are important to be set in place.

Sustainable water management refers to the threefold concept of sustainability, considering environmental, economic and social performance of the management system applied. The environmental performance need to consider the impact that the use of water (i.e. its abstraction and release of used water) has on the environment and influences that other activities have on the water resources. The economic dimension of sustainable water management refers to water pric-

ing, full cost recovery and liberalisation of the water market. The social aspects refer to the right to water and equal access to water. The performance of water management is depending on the design and use of relevant instruments.

River basin management is an important and central instrument that gives the possibility to integrate other activities into water management. The concept of a river basin management is already applied in the Rhine basin since the 1950s. With the Water Framework Directive it is now introduced in European Water Policy. It provides the frame that allows using various other instruments in order to design a concept for sustainable water management.

Some trans-sectoral policies have an indirect but severe influence (i.e. Regional Policy, Liberalisation, Agriculture, and Industry). Common Agricultural Policy (CAP) influences water quality and quantity available. The implementation of CAP lies in the hands of European Union. Concerning water management, diffuse pollution by Nitrates and Pesticides, deriving mainly from agricultural activities, is tackled by European legislation. The latest developments in European Agricultural Policy aim at paying financial compensation for additional environmental services to farmers. They include agro-environmental measures in order to reduce the agricultural impact on the environment. It would be highly advisable to include measures reducing water pollution and to increase the efficiency of water use for irrigation.

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4 INTRODUCTION

This report is a final deliverable of the EUROLAKES project. It is the result of Workpackage 37 "Current EU Regulations".

4.1 OBJECTIVE

Deep lakes represent an enormous stock of freshwater. Therefore they play an important role in the hydrographic system and are important resources for a variety of different uses. Water management is highly regulated in the EU Member States and by the EU itself. Within the Environmental Policy of European Union there can be identified a number of regulations relevant for water management. Other policies are influencing the management and the exploitation of resources.

The objective of this report is to highlight within EU policy legislation that is relevant for the management of deep European lakes in the context of EUROLAKES.

4.2 TASK

This report shall provide a description of policies and legislation influencing Lake Management. This includes the transformation and implementation of EU legislation into national legislation for the case countries (i.e. Finland, France, Germany, Poland, Switzerland, and United Kingdom). The knowledge gathered in this report will be used in the workpackages "First Analysis of Legislation" (WP 38) and "Recommendations" (WP 39) during the further run of the project.

4.3 AIM

This report should identify instruments that result from European legislation. This includes management instruments, which are required, suggested or linked to EU legislation.

5 EU WATER POLICY

5.1 GENERAL SETTING

The management and use of water and water resources has been the focus of EU Water Policy since the 1960ies. This section gives an overview of EU policies that are relevant for water management.

When European Communities first agreed on legislation tackling environmental issues, the aim was to protect the environment. Therefore, the early European legislation focused on qualitative aspects: i.e. to reach a high quality environment in all Member States (Art. 174 [2]).

For water policy this approach manifested in different types of legal acts. The first type consisted of directives leading to protect water determined for a specific use of the water (including use as drinking water) and providing quality objectives:

- Fresh waters needing protection or improvement in order to support fish life (78/659/EEC);
- Water intended for the abstraction of drinking water (75/440/EEC);
- Quality required of shellfish waters (79/923/EEC);
- Quality of bathing water (76/160/EEC) and
- Quality of water intended for human consumption (80/778/EEC).

In a second type of legal acts Emission Limit Values were agreed for certain substances:

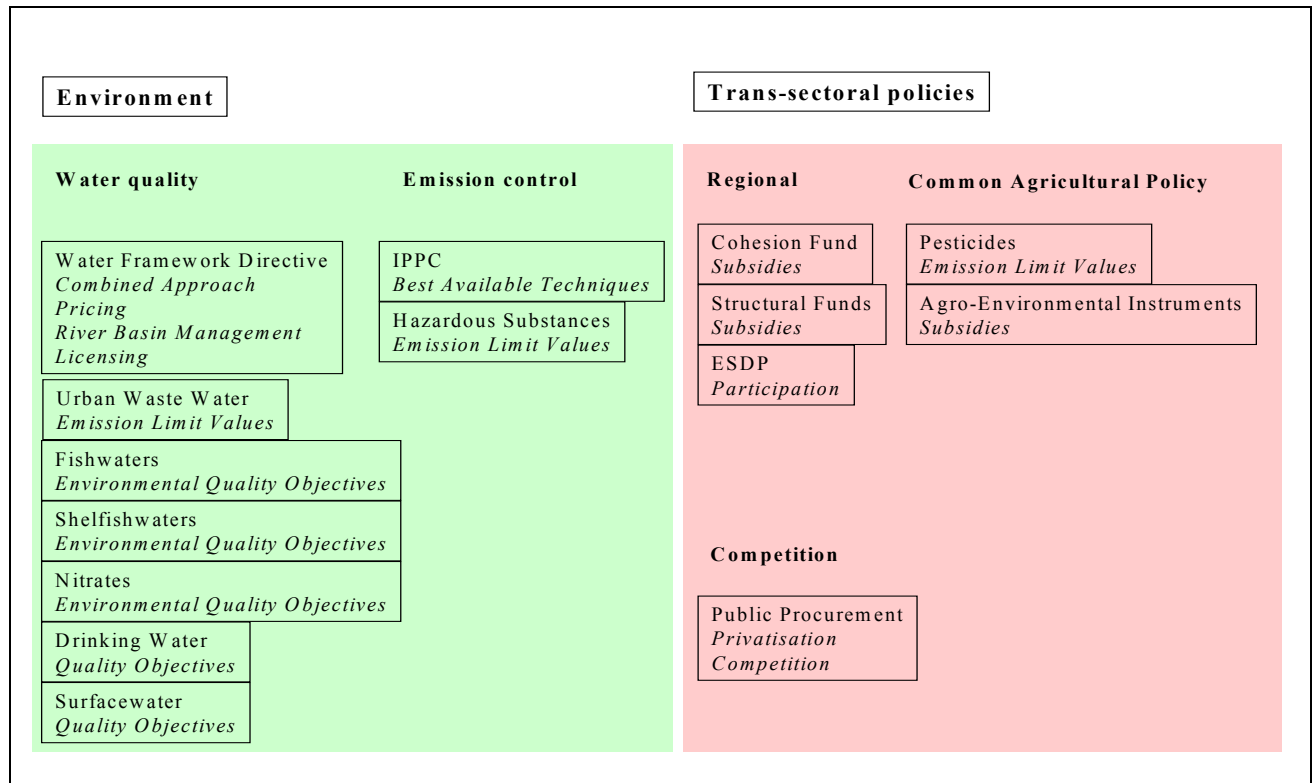
- Pollution caused by certain dangerous substances discharged into the aquatic environment (76/464/EEC) and daughter directives;
- Urban waste water treatment (91/271/EEC);
- Protection of waters against pollution caused by Nitrates from agricultural sources (91/676/EEC) and
- Placing of plant protection products on the market (91/414/EEC).

These directives tackled the pollution from point sources and diffuse sources. They were aiming at the protection of water against pollution. However, it is obvious that only appropriate modification of the activities that cause pollution would lead to reduction of pollution and respect of Emission Limit Values.

By the mid-1980s it became obvious that broader strategies were necessary to regulate the use of natural water resources. Thus the 1990s saw the emergence of 'horizontal' directives to regulate environmental sensitive activities. On this background a third type of legislation was developed referring to an integrative approach. The Integrated Pollution Prevention and Control Directive (96/61/EC)

is tackling pollution to the environment in general, taking into account not only water but also all environmental media receiving pollution.

Table 1 EU-Legislation and instruments relevant for Water Management (after [3])



5.2 THE LEGAL ACTS

In the following section the most relevant directives are described in more detail. These directives have a direct influence on water management and are therefore relevant for the management of lakes.

5.2.1 Dangerous Substances Directive (76/464/EEC)

The Dangerous Substances Directive intends to reduce emissions of certain substances discharged by industry to the aquatic environment. These substances have in common that they are toxic, persistent and bio-accumulated. This Framework Directive leaves it to the discretion of the Member States either to choose Emission Limit Values or to lay down Environmental Quality Standards to reach this aim. Besides the United Kingdom all Member States have chosen the Emission Limit Values' approach. Emission Limit Values should have been agreed for every single substance, out of a list of 129. Until 2000 Emission Limit Values have been laid down for only 18 substances. Although they had to develop 129 Emission Limit Values, Member States and EU-Commission did not

succeed in complying with the demands of this Directive to set out more Emission Limit Values.

The new Water Framework Directive incorporates in its article 16 the aim to reduce the emission of dangerous substances into the aquatic environment. In this context a new procedure (COMMPS - combined monitoring-based and modeling-based priority setting) was developed to identify relevant substances [4]. After identification a risk assessment is applied to suggest a reasonable limit value. A decision establishing the list of substances is under preparation [5]. A list of 32 "priority substances" for early regulation has been proposed in January 2001 [6].

5.2.2 Urban Waste Water Directive (91/271/EEC)

In the 1980ies excessive eutrophication caused undesirable ecological changes and harmful algae blooms in inland water bodies and coastal zones. They also have adverse public health implications. Urban Waste Water Directive was an important contribution for the amelioration of the water quality in rivers and on the shore of European Union [7].

The Urban Waste Water Directive [8] aims to contribute to the reduction of pollution by urban sources. The Directive lays down basic Emission Limit Values for urban waste water treatment plants. It defines, according to a precise timetable (see Table 2), the steps in which the facilities for the treatment of captured sewage have to be applied in all Member States until 2005. Member States can determine in their own responsibility „sensitive areas“ (see Map 1) with the option to establish treatment facilities for a more efficient degradation of nutrients. In those „sensitive areas“, waste water treatment facilities have to include some special treatment to reduce the content of phosphorous and nitrogen. In some Member States (e.g. Germany that identified large parts of the North Sea and Baltic Sea catchments as sensitive areas) this Directive provoked high additional costs for the consumers¹. In other Member States (e.g. Portugal, that only identified hot spots as sensitive and most of the West Coast as less sensitive areas) important investments covered by EU Structural Funds were realised [9]. The Urban Waste Water Directive has a direct influence on Lake Management because it improves collection and treatment of sewerage and waste water - that often are discharged into lakes.

¹ The EU-wide costs of the implementation of Directive 91/271/EEC has been estimated to € 130 Billion (value 1994 - 1995) during the period 1993 - 2005. In regions of lagging development, EU aid under the Structural funds and the Cohesion Funds is granted to support the investments. [9]

Table 2: Deadlines as laid down in Directive 91/271/EEC concerning urban waste-water treatment.

Inhabitants	0-2000	2000-10.000	10.000-15.000	15.000-150.000	>150.000
Sensitive areas	if collection 31/12/2005 appropriate treatment	collection 31/12/2005 secondary* treatment	collection 31/12/1998 more advanced treatment	collection 31/12/1998 more advanced treatment	collection 31/12/1998 more advanced treatment
Normal areas	if collection 31/12/2005 appropriate treatment	collection 31/12/2005 secondary* treatment	collection 31/12/2005 secondary treatment	collection 31/12/2000 secondary treat- ment	collection 31/12/2000 secondary treat- ment
Less sensitive areas (coastal waters)	if collection 31/12/2005 appropriate treatment	collection 31/12/2005 appropriate treatment	collection 31/12/2005 primary or sec- ondary treatment	collection 31/12/2000 primary or sec- ondary treatment	collection 31/12/2000 primary (excep- tional) or sec- ondary treatment

* appropriate treatment if discharge to coastal waters

5.2.3 Nitrate Directive (91/676/EEC)

High nitrate leakage from mainly diffuse agricultural sources led to contamination of wide ranges of groundwater resources [7]. Main sources of these nutrients are fertilisers intensely used, and often applied in too high concentrations, in agriculture. The Nitrate Directive intends to tackle these diffuse agricultural sources of nitrates by regulating the use of natural fertiliser. To comply with this task Member States have to define „good agricultural practice“ including the use of fertiliser. Further they have to identify vulnerable zones (see Map 2).

In 1997 EU-Commission stated that in most Member States this Directive has not been properly implemented, hence 13 Member States were brought to court [10]. The reduction of the diffuse nitrate emissions coming from agricultural sources (fertiliser and livestock manure) is relevant for water quality in lakes. Examples prove that specific requirements of the end-user on the quality of agricultural products - including special production techniques in regard to fertiliser - can influence agricultural practices and help to reduce pollution. Products from so called „eco-farming“ are supposed to leak less nutrients to groundwater. Further, water suppliers of urban areas can have influence on the production techniques applied in the catchment of their wells (e.g. Leipzig, Germany [11], [12]).

5.2.4 IPPC-Directive (96/61/EEC)

Directive 96/61/EEC concerning integrated pollution prevention and control, requires Member States to have a system for issuing operating permits for certain industrial installations based on Best Available Techniques (BAT) as defined by the Directive. Small installations however are not covered by IPPC. These small industries are mainly based in urban areas and are responsible for an important share of industrial emissions from these areas. EU-Commission expressed the

intention to include the requirements of the IPPC-Directive into the Water Framework Directive in the sense that BAT would be applicable at least for those small installations emitting into waters. The implementation of the IPPC-Directive is still ongoing [13], [14]. It is supposed to influence industrial production and reduce resulting pollution to all media, i.e. air, soil and water. It is relevant for industrial emissions at least from big installations situated in urban areas.

5.2.5 Drinking Water Directive (98/83/EC)

The Drinking Water Directive [15] was first agreed in 1980 and revised in 1998. It currently contains 48 parameters defining the quality of drinking water for human consumption. The limit value for lead was changed in the 1998 updating. The change to a more stringent limit value was foregone by a highly controversy discussion about the costs that would arise by the necessary exchange of lead pipes. During the discussion of the proposal for an amended Directive, limit values for endocrine disrupting substances and bacteria *Legionella Pneumophila* were discussed, but finally not accepted. Limit values for pesticides and nitrates had an influence on agricultural policy. Limit values for asbestos and lead have an impact on the installations. Although the drinking water directive aims to protect the end-user, its limit values are important for the quality of the resource, its protection and the purification of the water abstracted from the resource. Even the Pesticides marketing Directive² makes direct reference to the respective limit value in the Drinking Water Directive.

The Directives described above have been identified as elements of European Water Policy that have major influence on water management relevant for EUROLAKES, i.e. deep lakes. From these descriptions it may already become clear that water policy and water management are severely influenced by activities which fall under different European policy. Therefore, in the context of EUROLAKES, it seems to be necessary to have a closer look to policies beyond the Water Policy. In Section 6 "Trans-sectoral policies" a number of sectoral policies will be analysed in order to understand how the interaction between water management and other sectoral policies functions.

Although an overall concept for European Water Policy was missing, the water directives aimed all towards the same environmental objective: to assure in all Member States a high level environmental quality (EC Treaty Art. 174). Nevertheless a commonly agreed aim for the waters in European Union was lacking. Therefore for every legal act the precise aim to be achieved had to be negotiated by the Member States. The legal acts did not concern water polluters in general, and only within a few activities the overall concept of the reduction of water pollution was developed [16]. Only specific sources of pollution were concerned by the legislation. Therefore the task to fulfil the requirements of the directives i.e., assure water quality, laid only in the hands of a well defined type of actor: farmers, certain industries and communes.

² Directive 91/414/EEC on placing of plant protection products on the market

With the development of an integrated approach for the protection of the environment, other policies became more concerned with the requirements of the Water Policy. With the development of the reference documents on the best available techniques (BAT) foreseen in the IPPC Directive an important process started, leading to the review of industrial processes responsible for environmental pollution. New measures regarding the protection of the environment were adopted in the reform of the CAP proposed in the Agenda 2000 (see section 6.1 Common Agricultural Policy (CAP)).

5.2.6 Water Framework Directive 2000/60/EC

On the background of numerous problems that were encountered during the implementation and application of community water directives in the Member States the European Council of Ministers asked for a reform. The European Parliament and European Council adopted water Framework Directive in September 2000, it was published in December 2000 [1].

The Water Framework Directive intends to simplify the legislation in order to assure a more effective water policy. Further it outlines an overall strategy for water management in Europe and formulates environmental objectives for all European water bodies. It focuses much more on water resource management, i.e. the management and conditions to exploit and use water resources, than the previous legislation did. It sets the ultimate frame for water management in Europe, including the description of instruments appropriate to achieve the agreed aims. In relation to Lake Management the proposed Water Framework Directive contains a number of important aspects:

- River basin management (e.g. inter basin water transportation);
- Cost recovery and pricing of water services;
- Participation of all stakeholders in relevant decision;
- Reporting (i.e. implementation process and effects) and
- Protection of Groundwater and Wetlands.

Water Framework Directive is not covering all tasks of the management of water resources³. Although it is referred to in the Water Framework Directive, no extended requirements are foreseen for the management of water quantity, or for the management of wetlands [18]. Further provisions for flood or drought management are missing.

Many water suppliers announced that charge on water services would increase as a result of the introduction of cost recovering provisions with the Water Framework Directive. During the decision making process the requirements were

³ A critical analysis of the Water Framework Directive has been done by the European Environmental Bureau, EEB. [17]

changed into less binding formulations which leave much more possibilities for individual design by the Member States as it originally was envisaged.

However and this especially is true for countries receiving water from upstream neighbours, potential gains of the Water Framework Directive are expected from a better water quality policy up-stream. However threats are expected when 7 years after coming into force of the Water Framework Directive, some existing directives will be cancelled (e.g. 75/440/EEC). It is feared that this cancellation will take place at a moment when it isn't yet really clear if the new set of instruments will be sufficient [19].

With the Water Framework Directive however regarding water quality requirements a change of paradigm takes place. It will no longer be EU legislation that formulates measurable Emission Limit Values or quality objectives. Moreover - following the principle of subsidiarity and the motivation for deregulation of legislation [20] - it is left to Member States to define quality objectives, e.g. "good water status" which then set targets for single river basins. Even the "combined approach" only provides instruments (i.e. emission control, Emission Limit Values, control of diffuse impacts) to be applied by the Member States. Only for dangerous substances a uniform set of Emission Limit Values is planned. However the process of determination of these substances has been separated from the Water Framework Directive [4]. After the identification of substances the determination of the Emission Limit Values itself will take place. Although this process seems very time demanding it was agreed to replace the process that appeared unsatisfactory in the past, required by Directive 76/464/EEC.

The Water Framework Directive is a challenging piece of legislation that tries to amend EU water legislation in the light of the problems that appeared during the application of the previous water legislation. However it leaves more possibilities to the Member States concerning the interpretation of the provisions (e.g. Annex V, pricing, cost recovery) Member States have the possibility to go far beyond the minimal requirements set by the Water Framework Directive. However this only will be done in Member States where the general conditions and policy are in favour of such measures.

5.3 TRANSPOSITION IN MEMBER STATES

In the context of EUROLAKES the transposition of EU legislation into national legislation of EU Member States is of special interest for Finland (Längelmävesi-Roine), France (Lac du Bourget and Lake Geneva), Germany (Lake Constance), United Kingdom (Loch Lomond). Moreover the diffusion of EU policy [21] outside the legal validity of European legislation, i.e. in Poland (Zegrzynski Reservoir) and Switzerland (Lake Constance and Lake Geneva), is of special interest.

Member States frequently felt that existing Directives caused problems during implementation at national level. The result was an undisciplined transformation into national legislation [22]. Consequently, many Member States were involved in infringement procedures because they had not satisfactorily - or even not at all - transposed the EU-Directives into their national law. Almost 25% of the environmental infringement proceedings in 1998 concerned water [23] [24] (see Table 3). In October 1997 [25] only four Member States had implemented the Nitrate Directive properly, thus 13 Member States were brought to court see (Table 5). Although the urban waste water Directive can be implemented until 2005, already court cases against four Member States were handled at the Court of Justice [26] (see Table 4). This situation lead to the revision of the community's water policy.

Besides the general problem of the wide range of possibilities to interpret European legislation, political disagreement with the content was the reason for non-implementation of some directives. In the case of the Nitrate Directive agricultural lobby opposed against changing agricultural practise, which is supposed to be the main reason for diffuse pollution by nitrates.

Table 3 Infringement procedures against Member States related to water management (since 21/03/1997)

	Bathing 76/160/EEC ¹	Water 80/68/EEC ²	Groundwater 80/68/EEC ²	Fish Water 78/659/EEC ³	Dangerous Substances 76/464/EEC ⁴	Nitrates 91/676/EEC ⁵	Shellfish 79/923/EEC ⁶	Water 91/271/EEC ⁷	Urban Waste 91/271/EEC ⁷	Surface Water 75/440/EEC ⁸	Drinking Water 98/83/EEC ⁹	Water
AT	Reasoned Opinion ¹⁰					Sup. Reasoned Opinion ¹¹			Court application ¹²			
BE	Condemned ¹³ Court application ¹⁴				Condemned ¹⁵	Reasoned Opinion ¹⁶			Condemned ¹⁷ Reasoned Opinion ¹⁸ Court application ¹⁹			
DE	Condemned ²⁰				Condemned ²¹	Court application ²²			Court application ²³ Reasoned Opinion ²⁴			
DK	2 nd warning ²⁵ Formal Notice ²⁶											
ES	Condemned ²⁷			1 st warning ²⁸	Condemned ²⁹	Condemned ³⁰ Court application ³¹ Reasoned Opinion ³²			Reasoned Opinion ³³			
FIN	2 nd warning ³⁴ Formal Notice ³⁵ Court application ³⁶			Reasoned Opinion ³⁷		Reasoned Opinion ³⁸						
FR	Court application ³⁹ Court application ⁴⁰ Reasoned Opinion ⁴¹	1 st warning ⁴²		Reasoned Opinion ⁴³	1 st warning ⁴⁴	Court application ⁴⁵ Reasoned Opinion ⁴⁶ Reasoned Opinion ⁴⁷	Reasoned Opinion ⁴⁸			Court application ⁴⁹	Court application ⁵⁰	
GR					Condemned ⁵¹ Condemned ⁵²	Reasoned Opinion ⁵³ Court application ⁵⁴		Court application ⁵⁵ Reasoned Opinion ⁵⁶				
IR		1 st warning ⁵⁷ Court application ⁵⁸		1 st warning ⁵⁹	1 st warning ⁶⁰ , 1 st warning ⁶¹	Reasoned Opinion ⁶²						
IT	Court application ⁶⁴ Formal Notice ⁶⁵	1 st warning ⁶⁶			Condemned ⁶⁷	Condemned ⁶⁸ Court application ⁶⁹ Reasoned Opinion ⁷⁰	Condemned ⁷¹		Court application ⁷² Condemned ⁷³ 2 nd application ⁷⁴ , 75			
LU					Condemned ⁷⁶ Condemned ⁷⁷	Sup. Reasoned Opinion ⁷⁸ Court application ⁷⁹						
NL	Court application ⁸⁰ Reasoned Opinion ⁸¹				Court application ⁸²	Reasoned Opinion ⁸³ Reasoned Opinion ⁸⁴						
PT	Court application ⁸⁵ Reasoned Opinion ⁸⁶	Condemned ⁸⁷			Reasoned Opinion ⁸⁸ Reasoned Opinion ⁸⁹	Reasoned Opinion ⁹⁰ Reasoned Opinion ⁹¹ Court application ⁹²		Court application ⁹³		Condemned ⁹⁴ Condemned ⁹⁵ Reasoned Opinion ⁹⁶	Court application ⁹⁷	
SE	Court application ⁹⁸ Formal Notice ⁹⁹											
UK	Reasoned opinion ¹⁰⁰					Court application ¹⁰¹ Reasoned Opinion ¹⁰²	Reasoned Opinion ¹⁰³				Condemned ¹⁰⁴ Condemned ¹⁰⁵	

Note: Find footnotes at the end of this report

Table 4: Progress on Implementation of Directive 91/271/EEC concerning urban waste-water treatment on 15/07/1998. After: [27]

<i>Deadline</i>	Legal Transposition (Art. 19)	Identification of sensitive waters (Art. 5)	Regulation (Art. 11)	Regulation (Art. 13)	Implementation Programme (Art. 17)
	30.06.1993	31.12.1993	31.12.1993	31.12.1993	30.06.1994
Germany	1992-1998	1992-1998	1992-1998	1992-1998	1994
France	1994	1994	1976-1993	1976-1993	1994
Finland	1994	1994 (Art. 5.8)	1994	1994	1997
United Kingdom	1994-1996	1994-1995	1972-1991	1972-1991	1994 & 1998

Table 5: Transposition of Nitrate Directive into National Law (30.07.97) (Four years after the deadline only four Member States have complied with the requirements of the directive.). After: [28]

Country	Date of Communication (Due 20.12.93)	Conformity
Finland	24.03.95	No
France	27.08.93	Yes
Germany	01.04.96	No
United Kingdom	28.06.96	No

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Table 6: Implementation of Water policy in United Kingdom, Germany and France.

Member State	75/440/EEC	80/778/EEC	91/271/EEC	78/659/EEC	91/676/EEC	96/61/EC
United Kingdom	The Water Act 1945 The Water Act 1973 The Rivers (Prevention of Pollution (Scotland) Act 1951 The Rivers (Prevention of Pollution (Scotland) Act 1961 5. The Control of Pollution Act (Scotland) 1974	The Water Act 1945 The Water Act 1973 Water Supply (Water Quality) (Scotland) Regulations 1990	Urban Waste water treatment (Scotland) Regulations 1994		The Code of Good Agricultural Practice for the Protection of Water (Scotland) of March 1992 The Protection of Water against Agricultural Nitrate Pollution (Scotland) Regulations 1996, Statutory Instruments number 1564 (1996)	Pollution Prevention and Control (Scotland) Regulations 2000 Part II of the Control of Pollution Act 1974 and the Integrated Pollution Control regime introduced by the Environment Protection Act 1990
Germany	<i>Oberflächenwasserqualitätsverordnung (Verordnung des Ministeriums für Umwelt und Verkehr über die Entnahme von Wasser aus oberirdischen Gewässern zum Zweck der Trinkwasserversorgung, 26/03/1997, GBl. S. 146)</i>	<i>Oberflächenwasserqualitätsverordnung (Verordnung des Ministeriums für Umwelt und Verkehr über die Entnahme von Wasser aus oberirdischen Gewässern zum Zweck der Trinkwasserversorgung, 26/03/1997, GBl. S. 146)</i>	<i>Reinhalteordnung kommunales Abwasser (Verordnung des Umweltministeriums zur Umsetzung der Richtlinie 91/271/EWG des Rates vom 21. Mai 1991 über die Behandlung von kommunalem Abwasser, 10.12.1993, GBl. S. 746)</i>	<i>Fischgewässerverordnung (Qualität von Fischgewässern, 28.7.1997, GBl. S. 340)</i>	<i>Düngerverordnung (Grundsätze der guten fachlichen Praxis beim Düngen, 26.1.1996, BGBl. I S. 118)</i> <i>Anlagenverordnung (VawS, Anlagen zum Umgang mit wassergeführten Stoffen und über Fachbetriebe, 11.2.1994, GBl. S. 182)</i>	<i>Artikelgesetz (federal) under preparation</i>
France	Decree of 7 March 1991	Decree n° 89-3, 3 January 1989	Decree n° 94-469		Decree 97-113	

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5.3.1 United Kingdom

It has been accepted by the Scottish Executive and SEPA that EU policy, specifically the EU water directives discussed below shall be the basis of current and future water policies in Scotland. Accordingly EU directives are accepted as the legal framework within which Scottish water policy operates. The nature of policy, and the SEPA strategy to implement the EU directives is discussed below. Though SEPA has primary role in implementation of water quality legislation, other agencies have specific responsibilities, and take actions which are governed by legal requirements set out by the Scottish Executive, and which have the aim of maintaining water quality. Both for SEPA and other agencies, legal acts in Scotland, which maintain water quality, require the implementation of the EU directives on water quality.

The intention of SEPA is that EU Water Directives form the basis of all water management by 2004. It is intended that there be no need for action by the European Court. In Scotland the whole management is directed towards compliance, and it is not possible to give any other response to this question.

The following sections describe briefly how European legislation has been transposed to national law (see as well Table 6).

5.3.1.1 Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water

The following UK acts apply; these are incorporated in Scottish legislation

1. The Water Act 1945
2. The Water Act 1973
3. The Rivers (Prevention of Pollution (Scotland) Act 1951
4. The Rivers (Prevention of Pollution (Scotland) Act 1961
5. The Control of Pollution Act (Scotland) 1974

Since 1975 EC directives have generally been accepted as the legal requirements for water quality (Hammerton, 1994, 357).

5.3.1.2 Directive 80/778/EEC concerning quality of water intended for human consumption (amended by Directive 98/83/EC on the quality of water intended for human consumption)

1. The Water Act 1945
2. The Water Act 1973
3. Drinking Water Directive (EU, 1980) effective in Scotland from 15/7/85 replacing earlier "guidance" that drinking water quality be "wholesome" (Report 71, Department of Health and Social Security, 1935 *et seq.*) Until this time the latter statement was the only statement on statutory quality requirements.
4. Water Supply (Water Quality) (Scotland) Regulations 1990

5.3.1.3 Directive 91/271/EEC concerning urban waste-water treatment

1. Urban Waste water treatment (Scotland) Regulations 1994

Most sewage pollution is caused by water authority discharges, which affect rivers, lochs, estuaries and tidal waters. Discharges of sewage effluent from private houses and trade premises have only local impacts.

The forecast increase in the number of households is expected to lead to greater volumes of waste water being discharged. Initiatives to reduce water use and to recycle and reuse waste have the potential to restrict the production of waste water and consequently reduce the cost of future sewerage upgrades. SEPA will continue to promote and support waste minimisation initiatives targeted at both industrial dischargers to sewer and at domestic water users.

SEPA sets effluent standards to protect the environment from the effects of sewage discharges and to implement the requirements of legislation based upon directives such as the EC Urban Waste Water Treatment Directive (91/271/EEC). The substantial investment over the past five years by the water authorities and their predecessor bodies, the regional and island councils, has contributed to the large reductions in polluted water described earlier. However, current projections by SEPA suggest that sewage effluent will remain an important cause of pollution in 2010.

5.3.1.4 Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources

1. The Code of Good Agricultural Practice for the Protection of Water (Scotland) of March 1992
2. The Protection of Water against Agricultural Nitrate Pollution (Scotland) Regulations 1996, Statutory Instruments number 1564 (1996)

5.3.1.5 Directive 96/61/EC concerning integrated pollution prevention and control Measuring environmental quality

Pollution Prevention and Control (Scotland) Regulations 2000

Part II of the Control of Pollution Act 1974 and the Integrated Pollution Control regime introduced by the Environment Protection Act 1990 define SEPA's pollution control powers. This emphasis on pollution control has been widened by the 1995 Environment Act which includes general duties relating to natural heritage whilst the proposed EC Water Framework Directive explicitly requires the monitoring and protection of ecological status, which includes consideration of water quality, water quantity and habitat quality.

5.3.1.6 Directive 97/11/EC on the Assessment of the Effects of Certain Public and Private Projects on the Environment

This area of legislation in Scotland is rather unclear, but is based on the Town and Country Planning Act (Scotland (1949) *et seq.* The following are of particular relevance to Loch Lomond:

1. Ramsar Convention on Wetlands of International Importance (U.K. ratification 1976)
2. Town and Country planning (Notification of Applications) (Scotland) Direction 1980
3. National Scenic Area (Scotland) Order, 1987

The EU Directive on Environmental Impact Assessment was adopted by the UK in 1988.

5.3.1.7 Directive 78/659/EEC on the quality of fresh waters needing protection or improvement in order to support fish life

The Scottish Office has designated 36,658 km of river as salmonid waters and a further 73 km as cyprinid waters (Forth and Clyde Canal) under the EC Freshwater Fish Directive (78/659/EEC). This Directive specifies chemical water quality standards, which will ensure that the waters will continue to support healthy fisheries. In 1995, 95% of the designated waters complied with the required standards.

SEPA's loch classification scheme

SEPA assesses the quality of lochs on the mainland and the islands using a classification scheme, which is based upon chemical measures to assess the degree of eutrophication, acidification and damage by toxic chemicals. SEPA used 1995 loch water quality data in this Report as lochs are only classified nationally every five years. Concentrations of total phosphorus and acid neutralising capacity were measured and modelling techniques were used to compare these with historical levels likely to have been present in the mid-nineteenth century before significant human impact on lochs. The classification scheme reflects the degree of change from this baseline state.

Loch water quality is classified as being:

- *excellent/good*
- *fair*
- *poor*
- *seriously polluted*

1995 loch water quality

SEPA recognises that the existing loch water quality classification scheme, which is based solely upon chemical parameters, has limitations and considers that biological information should eventually be included. Of those lochs classified as fair quality, 20 (53 km²) were affected by eutrophication (e.g. from a sewage treatment works) and ten (57 km²) by acidification.

5.3.1.8 Directive 76/160/EEC concerning the Quality of Bathing Water

In 1998, SEPA monitored and reported on a range of microbiological, physical and chemical parameters at Scotland's 23 bathing waters identified under the EC Bathing Waters Directive. SEPA also monitored water quality at 93 additional coastal and inland sites. SEPA is concerned that water quality at the identified bathing waters has deteriorated recently and is working with the water authorities and other organisations to bring about improvements. In 1998, 12 bathing waters passed the mandatory bacteriological standards, compared with 18 in 1997, and 21 in 1996. In 1998, SEPA adopted new policies on the initial dilution of discharges and microbiological standards in order to protect all bathing waters, recreational waters and foreshores visited by the public.

In early 1999, a review of Scotland's bathing waters resulted in the Secretary of State for Scotland identifying an additional 37 bathing waters. SEPA has therefore been monitoring a total of 60 EC identified bathing waters during the 1999 bathing season.

5.3.1.9 Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances

SEPA has not developed a groundwater quality classification scheme. A description of the available data on groundwater quality is provided below together with a brief assessment of future monitoring needs.

No strategic groundwater monitoring network exists which can give an overall assessment of groundwater quality. Regular groundwater monitoring is largely limited to site specific monitoring of landfill sites or contaminated land.

The quality of public water supplies, including groundwater sources, is monitored by the water authorities against drinking water standards defined by the EC Drinking Water Directive (80/778/EEC).

A large proportion of the 30,000 private water supplies is derived from boreholes or springs, which utilise shallow aquifers. Private water supplies are sampled by local authority environmental health departments under the Private Water Supplies (Scotland) Regulations 1992.

The public drinking supplies do not provide a means of assessing overall groundwater quality as, by necessity, drinking water is extracted from aquifers, which have high quality water.

Only one of the 73 sources exceeds the 50 mg/l nitrate limit specified in the EC Nitrate Directive (91/676/EEC) and the EC Drinking Water Directive (80/778/EEC), with a further 11 boreholes exceeding the guideline value of 25 mg/l.

A regulatory regime exists which provides protection from pollution for all groundwaters. SEPA has powers to control direct discharges to groundwater. It has more limited powers to regulate indirect discharges to groundwater via land application of sewage sludge and wastes exempt from the waste management licensing requirements. As a consequence, SEPA has made a number of recommendations to The Scottish Office on improving controls over the application of organic wastes to land.

Groundwater Regulations were introduced in 1998, which provide controls over the disposal to land of toxic and persistent substances as defined under the EC Groundwater Directive (80/68/EEC). Local authorities and SEPA will acquire powers and duties during 1999 for remediating contaminated land. A higher level of protection is provided to important aquifers, which may be vulnerable to pollutants passing through permeable overlying soils and rock strata. Local authority planning controls are especially important in directing potentially high risk developments away from vulnerable aquifers.

The British Geological Survey recently undertook a review of the requirements for groundwater quality monitoring on behalf of SEPA.¹² The report recommended the creation of 45 primary sites and 90 secondary sites for monitoring groundwater quality in the main productive aquifers.

5.3.2 Germany

Most of water related legislation is transposed on regional level (*Länder*). However, the Federal Water Act (*Wasserhaushaltsgesetz, WHG, 1957*) sets a common frame. It lays down basic provisions relating to water resources management. For Lake Constance mainly the legislation in Baden-Württemberg is relevant.

The following sections describe briefly how European legislation has been transposed to national law (see as well Table 6).

5.3.2.1 Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water

Oberflächenwasserqualitätsverordnung (Verordnung des Ministeriums für Umwelt und Verkehr über die Entnahme von Wasser aus oberirdischen Gewässern zum Zweck der Trinkwasserversorgung, 26/03/1997, GBl. S. 146)

5.3.2.2 Directive 80/778/EEC concerning quality of water intended for human consumption

Oberflächenwasserqualitätsverordnung (Verordnung des Ministeriums für Umwelt und Verkehr über die Entnahme von Wasser aus oberirdischen Gewässern zum Zweck der Trinkwasserversorgung, 26/03/1997, GBl. S. 146)

5.3.2.3 Directive 91/271/EEC concerning urban waste water treatment

Reinhalteordnung kommunales Abwasser (Verordnung des Umweltministeriums zur Umsetzung der Richtlinie 91/271/EWG des Rates vom 21. Mai 1991 über die Behandlung von kommunalem Abwasser, 10.12.1993, GBl. S. 746)

5.3.2.4 Directive 78/659/EEC on the quality of fresh waters needing protection or improvement in order to support fish life

Fischgewässerverordnung (Qualität von Fischgewässern, 28.7.1997, GBl. S. 340)

5.3.2.5 Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources

Düngeverordnung (Grundsätze der guten fachlichen Praxis beim Düngen, 26.1.1996, BGBl. I S. 118)

Anlagenverordnung (VawS, Anlagen zum Umgang mit wassergefährdenden Stoffen und über Fachbetriebe, 11.2.1994, GBl. S. 182)

5.3.2.6 Directive 96/61/EC concerning integrated pollution prevention and control *Artikelgesetz (federal) under preparation.*

5.3.2.7 Problems in responding to EU requirements

Problems arose during the implementation of water relevant directives. E.g. because requirements for the elimination of nutrients in waste water treatment plants have only be complied with by enormous and in the little time almost not possible to finance investments to extend the plants. Meanwhile requirements are complied with more or less

in Baden-Württemberg. A reduction of Nitrates concentration linked to this EU Directive and its implementation in Germany can not be proved. Due to formal legislative problems, the legal implementation (through *Verwaltungsvorschriften*) was not accepted by the European Court of Justice (which demanded *Rechtsverordnungen*). This made necessary a change in the national legal frame⁴.

⁴ Communication by Mr. Bühler, Ministry for the Environment and Traffic, Baden-Württemberg, 28.11.2000.

5.3.3 France

The main legal acts on the water management which are applied to the Lac du Bourget and its watershed are: water law from 1992 (see below), littoral law (*loi littoral*, which gives some information about the littoral management for example the distances between the urban zone and the coasts) and the SDAGE (see below).⁵

Law n° 92-3 of the 3rd January 1992 about water (*Loi Sur L'eau*), institute water and aquatic environment as a common and a vulnerable patrimony. A global and well-balanced water management is provided by decentralised planning tools.

On the one hand, SDAGE– *Schémas Directeurs d'Aménagement et de Gestion des Eaux* – (global framework for the water management) are done in each of the 6 hydro-graphic basins. It sets-up fundamentals in a way of a well-balanced management of water resource.

On the other hand, SAGE –*Schémas d'Aménagement et de Gestion des Eaux* – (to manage water in a watershed) are built on a local and consistent area (river watershed, homogenous littoral area, etc.) by local commissions.

These planning have a juridical significance for public decisions, and local communities.

Juridical nature of the SDAGE

SDAGE is a limited regulation:

- The administration system can not be in opposition to the SDAGE decisions and directives ;
- It does not create right but give water management way, quantity and quality objectives, and development plans ;
- Administration should take into account in a strong way all the decisions concerning water and in a weak way the other cases. Administrative decisions or programs should be compatible with SDAGE objectives.

SDAGE

SDAGE is a reference framework. It is instituted by the law on water of 3 January 1992. SDAGE subscribes to the whole of the obligations set down by the law, the European directives; it takes into account the current public utility programmes and decides on the priorities of the public water policy within the catchment area for the next fifteen years.

The State services, the territorial collectivities and their public establishments will in future have to take it into account in all their decisions concerning water and aquatic environments. Permits from the administration as well as development and management programmes of owners of works will reflect its priorities. The State, water agencies, regions and departments will see to it that the financial assistance granted by them contributes to the implementation of projects compatible with the SDAGE.

⁵ Interview between SOGREAH and M. Renaud Jalinoux (CISALB). CISALB – *Comité Intersyndical pour l'Assainissement du lac du Bourget - Intersyndical committee for the management of the Lac du Bourget*

Adapted at local level

This guidance scheme coordinates and orientates the local collective management initiatives: water improvement and management plans (SAGE), river, bay contracts, etc

The Birth of the Loire-Bretagne SDAGE:

- 4 years of intense planning
- adopted by the catchment area committee on the 4 July 1996 and approved by the State on 26 July 1996
- came into force on 1 December 1996

Contents of the document

- report on level of knowledge and locality
- diagnosis formulated from this report on locality
- 7 vital objectives fixed by the catchment area to remedy the situation
- general courses of action advocated touching on all the aspects of water management and local courses advocated to reach the vital objectives.

7 vital objectives

- to win the battle for supply of drinking water
- to continue the improvement of the quality of surface waters
- to recover living rivers and manage them better
- to protect and valorise wetlands
- to preserve and restore coastal ecosystems
- to achieve concerted planning, in particular with agriculture
- to be better prepared for flooding

SAGE:

The master plan for development and management of the waters of the Loire-Bretagne catchment area came into force on 1 December 1996. It serves as the coherence framework for the SAGE water improvement and management plans recommended by the law on water of 3 January 1992.

What is the SAGE for?

- it sets the quality objectives to be met within a given term
- it distributes the water between the various categories of users
- it identifies and protects sensitive aquatic environments
- it defines the actions for development and protection of water resources and for fight against floods

A local initiative

The initiative belongs to local agents who prepare a file and present it to the prefect. After consulting the collectivities concerned and the catchment area committee, the prefect:

- sets the perimeter limits
- sets up a local water commission

The perimeter

This is a territorial unity dominated by physical and human solidarities: rainfall collection area, groundwater, wetland, and estuary...

The local water commission

Presided by an elected official, it is composed of elected officials (one half), representatives of the users (one quarter) and representatives of the State (one quarter).

Legal bearing

After being drawn up and consulted upon, the SAGE is approved by a decree of the Prefecture. All the decisions taken in the matter of water by the State services and public collectivities will then have to be compatible with the SAGE.

The following sections describe briefly how European legislation has been transposed to national law (see as well Table 6).

5.3.3.1 Directive 75/440/EEC

Decree of 7 March 1991.

5.3.3.2 Directive 80/778/EEC

Decree n° 89-3, 3 January 1989.

5.3.3.3 Directive 91/271/EEC concerning urban waste-water treatment

Decree n° 94-469 concerning wastewater collection and treatment. This decree takes note of this directive. It translates this directive into French law. Decree n°94-469 concerning wastewater treatment defined:

- Collection system, wastewater system and organic pollution charge.
- Collective and no-collective cleaning-up area (a no-collective cleaning-up area can be defined environment have not interest or if set up a collective cleaning-up is too expensive)
- In urban area, a single cleaning-up system is set-up.
- Sensible area:
 - All urban area which products more than 120 kg of organic pollution charge have to have a cleaning-up system.
 - Water has to have a biologic treatment and has to be allowed to settle.
 - Decree gives the set-up timetable and the exception.
- Waste water mud residue are not allow to be through out into the aquatic environment.

5.3.3.4 Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources

Decree 97-113 concerning mud coming from wastewater.

6 TRANS-SECTORAL POLICIES

European Policy aims at supporting the general tasks of European Union, laid down in the European Treaty⁶ [2]. These tasks are supported by 21 different activities⁷, among which we find a number of activities that have an influence on water management. Although they don't aim at explicitly, other policies strongly influence Lake Management. Especially the following policies⁸:

- Structural Funds
- Spatial planning (ESDP)
- Agricultural policy (CAP)
- Environmental Liability
- Liberalisation

6.1 COMMON AGRICULTURAL POLICY (CAP)

6.1.1 Contents

Common Agricultural Policy (CAP) was established with the founding of the EEC in 1957. At that time it aimed to overcome the under-supply with agricultural products. Later it combated the overproduction. Only with the CAP reform in 1992 attention was paid to environmental influences.

The Common Agricultural Policy (CAP) is a matter reserved exclusively for the Community. Under Article 33 of the EC Treaty (former Article 39) [2], its aims are to ensure reasonable prices for Europe's consumers and fair incomes for farmers, in particular by establishing common agricultural market organisations and by applying the principles of single prices, financial solidarity and Community preference.

The CAP is one of the most important Union policies (agricultural expenditure accounts for some 45% of the Community budget). With a view to enlargement a new reform package was adopted in 1999 for the period 2000-2006. Under the approach proposed by the Commission in Agenda 2000 [29] in July 1997, it reinforces the changes made in 1992 and puts the emphasis on food safety, environmental objectives and sustainable agriculture.

The aim of the new reform of the CAP, an integral part of Agenda 2000, is to achieve the necessary structural adjustments in the main markets and to introduce a strong rural development policy, which becomes the second pillar of the CAP.

⁶ Article 2 [2]: *"The Community shall have as its task, by establishing a common market and an economic and monetary union and by implementing common policies or activities referred to in Articles 3 and 4, to promote throughout the Community a harmonious, balanced and sustainable development of economic activities, a high level of employment and of social protection, equality between men and women, sustainable and non-inflationary growth, a high degree of competitiveness and convergence of economic performance, a high level of protection and improvement of the quality of the environment, the raising of the standard of living and quality of life, and economic and social cohesion and solidarity among Member States."*

⁷ Ibis Art. 3.

⁸ In this report we start to look at some trans-sectoral policies. During the further work in EUROLAKES (i.e. WP 38 and WP 39) more analysis will be done.

Five main objectives cover the CAP reform proposals of the Commission [30]:

- to increase competitiveness;
- to assure food safety and food quality;
- to maintain a fair standard of living for the agricultural community and stabilise farm incomes;
- to better integrate environmental goals into the CAP and
- to develop alternative job and income opportunities for farmers and their families.

In 1999 the report to the Helsinki European Council⁹ pays special attention to water policy.

The Council recognised that the Directives on pollution prevention and control¹⁰ (IPPC), environmental impact assessment¹¹, birds¹², habitat¹³, ground water¹⁴, surface water¹⁵, drinking water¹⁶, water quality¹⁷ and nitrate¹⁸ are of significance for agriculture.

The Council agreed further that [33]

- "Targeted action should continue to reduce pollution from agriculture sources into both ground and surface water. Pollution should be reduced at least to levels compatible with sustainability. Losses of nitrate and phosphates from agricultural sources, where these lead to eutrophication and raise levels of nitrate in drinking water, should be reduced by improving the use of nutrients and minimising nutrients inputs beyond crop need.
- Irrigation is necessary for the continuation of agricultural production in certain areas of the EU. When negative impacts on the environment occur, they are usu-

⁹ In response to the invitation of the Cardiff European Council [31] in June 1998 and the Vienna conclusions [32] of December 1998, the Agriculture Council approved, during the Agricultural Council [33] on 15th November 1999, the report to the Helsinki European Council [34] on 10-11 December 1999 concerning the strategy on environmental integration and sustainable development in the common agricultural policy.

¹⁰ Directive 96/61/EC concerning integrated pollution prevention and control

¹¹ Directive 97/11/EC on the Assessment of the Effects of Certain Public and Private Projects on the Environment

¹² Directive 79/409/EEC on the conservation of wild birds

¹³ Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora

¹⁴ Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances

¹⁵ Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water

¹⁶ Directive 80/778/EEC concerning quality of water intended for human consumption

¹⁷ Directive 76/160/EEC concerning the Quality of Bathing Water, Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into the aquatic environment, Directive 78/659/EEC on the quality of fresh waters needing protection or improvement in order to support fish life, Directive 79/923/EEC on the quality required of shellfish waters, Directive 86/280/EEC on limit values and quality objectives for discharges of certain dangerous substances included in List I of the Annex to Directive 76/464/EEC

¹⁸ Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources

ally caused by inappropriate use of water for irrigation (e.g. salinisation, intrusion of seawater, water shortages). Irrigation should be used in line with good agricultural practices.

- In addition to EU rules to control maximum levels of pesticides in farm produce and measures to reduce the environmental risks of pesticide use (water contamination, deterioration of biodiversity etc), further measures should be developed for sensitive areas.
- Plant protection products and biocides should only be used when needed and in accordance with the principles of good plant protection practices.
- There is a need further to reduce the risks to the environment from the use of plant protection products and biocides and to continue to ensure that there are no risks to health in their use.
- High ammonia emissions lead to soil and water acidification and eutrophication and contribute to damage to forests through acidity in rainfall. Agriculture should aim to decrease ammonia emissions by developing good agricultural practices, applying proven and cost-effective techniques and reducing if necessary the amount of animals in areas with high animal density."

The ambitious outline of necessary measures now needs to be translated into practical measures. Therefore the definition of some key elements seems to be necessary, like: "pollution levels compatible with sustainability", "sensitive areas", "good plant protection practices", and "no risk health". A central role for the environmental integration in the CAP is the principle of "good farming practice", which is referred to as "corresponding to the type of farming which a reasonable farmer would follow in the region concerned" [35].

The general role for farmers in respect of environmental demands therefore would be:

- "As a minimum, farmers should respect general requirements as regards environmental care without specific payment. This means that all farmers should follow compulsory laws in relation to pesticide use, to fertiliser application, water use and where appropriate, national or regional guidelines on good farming practice.
- However, wherever society asks farmers to pursue environmental objectives beyond good farming practice, and the farmer incurs a cost or foregoes income as a result, then society must expect to pay for that environmental service." [35]

Further more the Member States shall take environmental measures. These measures may include [36]:

- support in return for agro-environmental commitments,
- general mandatory environmental requirements,
- specific environmental requirements constituting a condition for direct payments."

Member States can decide on penalties in order to reduce payments to farmers to support CAP (under the "Guarantee" section of the EAGGVF) not observing the environmental requirements [36].

The core of the Community's environmental strategy within the CAP is the application of targeted agro-environment measures throughout the territories of the Member States. The agro-environment programmes offer payments to farmers who, on a voluntary and contractual basis, provide environmental services to protect the environment and maintain the countryside. The payments are based on the costs incurred and income foregone by the farmer who carries out the environmental activity. In addition, where necessary, a limited incentive element may be added. Payment would only be made for measures, which go beyond the application of good agricultural practice, which implies that the farmer already respects minimum environmental requirements. [37]

It seems advisable and may facilitate the implementation of appropriate measures to limit the room for interpretation and to find a common definition for "good farming practice" which is lacking so far.

To reach this aim appropriate it is planned to develop agro-environmental indicators to help to provide information to those involved in the development and implementation of these policies. Indicators need to meet at least five criteria. They should enable those who implement and make policy as well as the broader public:

- "to identify the key agro-environmental issues that are of concern in Europe today,
- to understand, monitor and evaluate the relationship between agricultural practices and their beneficial and harmful environmental effects,
- to assess the extent to which agricultural policies respond to the need to promote environmentally friendly agriculture and to communicate this to policymakers and the wider public,
- to monitor and evaluate the site specific environmental contribution of Community programmes to sustainable agriculture,
- to map the diversity of agro-ecosystems in the European Union and Candidate Countries. This has particular relevance in explaining to the EU's trading partners the specificity of the farmed environment in Europe." [35]

Data, which could be used to set up this type of agricultural indicators, is partly available (e.g. OECD, EUROSTAT, European Environment Agency, FAIR). The British Ministry of Agriculture Fisheries and Food suggests a pilot set of indicators [38].

6.1.2 Impact on Water Management

Agricultural activities have an important influence on many water resources. Problems arise from the use of fertiliser, pesticides and the abstraction of water. To assure a sustainable development, it is evident that agricultural policy has to react to solve these problems. This chapter aims at giving an update on the current developments in European Common Agricultural Policy (CAP), in particular regarding the integration of environment concerning the Common Agricultural Policy, and its relevance for water policy and especially lake management.

Table 7 Some of the arising effects from agricultural activities on the environment. (After: [35])

Effect	Processes
Pollution of environment	Build-up of nitrate, phosphorous and other mineral residues, pesticide residues, salination, ammonia and methane emissions
Depletion of environmental resources	Overexploitation of water and soil, destruction of wetlands, semi-natural and natural land-cover.
Preservation and Enhancement of the environment	Creation/preservation of cultivated landscapes, habitats, land-cover, preservation of genetic diversity in agriculture, production of renewable energy sources

Common Agricultural Policy (CAP) influences water quality and quantity available. The implementation of CAP lies in the hands of European Union. Concerning water management, diffuse pollution by Nitrates and Pesticides, deriving mainly from agricultural activities, is tackled by European legislation. Agriculture with its need for irrigation-water is a direct competitor to drinking water supply. This is especially true in southern European countries like Spain (as well as Israel), which is a net exporter of water due to agricultural exportation (e.g. tomatoes and strawberries). However, no European regulation on the use of water for irrigation exists. In some cities, local agreements exist between the water supplier and the farmers in the catchment area of the water resource to apply a certain agricultural practice in order to avoid contamination resulting from agricultural production (e.g. Leipzig, Germany [12], [11]). This is the result of political decisions on a local level reflecting the strong position farmers' organisations have on European level, compared to water suppliers.

The latest developments in European Agricultural Policy aim at paying financial compensation for additional environmental services to farmers. They include agro-environmental measures in order to reduce the agricultural impact on the environment. It would be highly advisable to include measures reducing water pollution and to increase the efficiency of water use for irrigation.

The proposal for a Water Framework Directive [39] is supposed to establish a frame for European water policy. As agricultural activities have to respect the requirements laid

down in this Directive, it will have a trend setting function for agricultural activities and therefore should consider these in particular.

The purpose of the Water Framework Directive is to establish a framework for the protection of Community waters. *"For surface fresh water, estuaries, coastal waters and groundwater it aims at preventing further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and promotes sustainable water consumption based on a long-term protection of available water resources"* (Article 1).

Under the responsibility of the Member States programmes of measures shall be drawn up and made operational within a comprehensive River Basin Management Plan. These programmes should aim at (Article 4):

- "(a) prevent deterioration of ecological quality and pollution of surface waters and restore polluted surface waters, in order to achieve good surface water status in all surface waters;*
- (b) prevent deterioration of groundwater quality, restore polluted groundwater, and ensure a balance between abstraction and recharge of groundwater, in order to achieve good groundwater status in all groundwaters; and*
- (c) comply with all standards and objectives relating to Protected Areas."*

Finally it is planned to repeal most of the current water Directives, in order to replace them by provisions supporting the aim and purpose of the Water Framework Directive. These Directives will be (Article 26):

- "- Directive 75/440/EEC¹⁵;*
- Decision 77/795/EEC¹⁹;*
- Directive 78/659/EEC²⁰;*
- Directive 79/869/EEC²¹;*
- Directive 79/923/EEC²²;*
- Directive 80/68/EEC¹⁴; and*
- Directive 76/464/EEC²³."*

Repeal of Directives 76/160/EEC¹⁷, 91/676/EEC¹⁸, 91/414/EEC²⁴ is not planned.

The definition of *"good quality"*²⁵ - the plans of measures for the various river basins are aiming at - will have to be based on outlines given in Annex V of the proposal for a Water Framework Directive [39]. These outlines are mainly based on the significance of

¹⁹ Decision 77/795/EEC establishing a common procedure for the exchange of information on the quality of surface fresh water in the Community

²⁰ Directive 78/659/EEC on the quality of fresh waters needing protection or improvement in order to support fish life

²¹ Directive 79/869/EEC concerning the methods of measurement and frequencies of sampling and analysis of surface water intended for the abstraction of drinking water in the Member States

²² Directive 79/923/EEC on the quality required of shellfish waters

²³ Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into the aquatic environment

²⁴ Directive 91/414/EEC on placing of plant protection products on the market

²⁵ see Article 1 of the Proposal for a Water Framework Directive

human influence on the natural system concerned in order to give more flexibility for adoption to the specific situation in the Member States. Therefore it is most likely that resulting requirements concerning agricultural activities and its impact on the water resources, e.g. concentrations of nitrates²⁶, phosphorous and pesticides²⁷, will differ between the various river basin districts²⁸. This could lead to a heterogeneous pattern of requirements between different river basins. This heterogeneity could result in unequal demands to the farmers: in river basin districts with less stringent requirements it will be less demanding for farmers to comply with environmental requirements than it will be for their colleagues in districts with more ambitious requirements. As costs resulting from the compliance with current legislation are not compensated, this situation could lead to unequal production costs depending on the level of activity necessary to comply with the requirements and will have an influence on competition and the positioning at the market.

Besides the important issue of water quality it is however not foreseen in the Water Framework Directive to refer directly to water quantity requirements as such. Water quantity only plays a role as far as it is important to assure the wanted water quality. Therefore water quantity policy will remain in the responsibility of the Member States²⁹.

²⁶ The Nitrate Directive¹⁸ sets out requirements for waters in sensitive areas and requires to establish action programmes concerning the application and storage of fertilisers. However it does not fix an overall limit concentration for nitrates.

²⁷ The Directive concerning Placing of plant protection products on the market (91/414/EEC)²⁴ requires for newly marketed pesticides not to extend a concentration in groundwater over the limit value of the Drinking Water Directive (98/83/EEC) - currently 0,1 µg/l. No overall limit value for pesticides in water bodies are laid down.

²⁸ Water Framework Directive requires the nomination of river basin district to which the same river basin management plan will be applied.

²⁹ For any legislation concerning water the management of water resources the European Treaty requires unanimous vote (Art. 175).[2]

6.2 REGIONAL POLICY

6.2.1 Structural Funds

The building of Europe is creating a group of States that are forging close economic links and regulating issues of common interest together. However, the concept of European Union integration can only be considered credible if these States maintain a sufficient level of economic and social cohesion.

The cohesion policy provisions of Agenda 2000 package aim to meet two challenges:

- firstly, to improve the effectiveness of the structural policy instruments so that economic and social cohesion can be achieved;
- secondly, to ensure that structural policy plays a continuing role in the Union's future enlargement, bringing in the countries of central and eastern Europe.

The Amsterdam Treaty sets out the basic principles of balanced and sustainable development and of a high level of environmental protection. The Structural Funds constitute one of the most important financial instruments to support the implementation of Community policies consistent with these principles. To put these policy objectives into practice in the context of the Structural Funds Programme period 2000 - 2006, the regional development strategies - designed by Member States - contribute to further building up of environmental considerations into priority sectors such as transport, energy agriculture, industry and tourism.

Mechanisms of the Structural Funds for promoting the process of environmental integration and for providing transparent information to a greater interested public are:

- high environmental quality strategic assessments and evaluations at all relevant stages of programme design and implementation;
- a partnership as wide ranging as possible including environmental authorities, across sectors and at all relevant geographical levels;
- greater share of Community co-funding for environmentally-friendly operations;
- decentralised management of global grants close to the beneficiaries and the application of the 'polluter-pays' principle.

The Structural Funds will continue to fund programmes in the fifteen Member States but there will be greater concentration on the regions, which need this assistance the most.

The aims are:

- to improve the effectiveness of the structural instruments by strengthening concentration through a reduction in both the structural policy objectives and the Community Initiatives, by improving management and by clarifying the share-out of responsibilities between the various parties involved (I);
- to maintain the budget for economic and social cohesion (II);
- to extend efforts on regional cohesion to the future Member States (III).

6.2.2 Spatial planning

The European Spatial Development Perspective (ESDP) [40] is based on the EU aim of achieving a balanced and sustainable development, in particular by strengthening economic and social cohesion³⁰. In accordance with the definition laid down in the United Nations Brundtland Report³¹, sustainable development covers not only environmentally sound economic development which preserves present resources for use by future generations but also includes a balanced spatial development. This means, in particular, reconciling the social and economic claims for spatial development with the area's ecological and cultural functions and, hence, contributing to a sustainable, and at larger scale, balanced territorial development. The EU will therefore gradually develop, in line with safeguarding regional diversity, from an Economic Union into an Environmental Union and into a Social Union (see Figure 1).

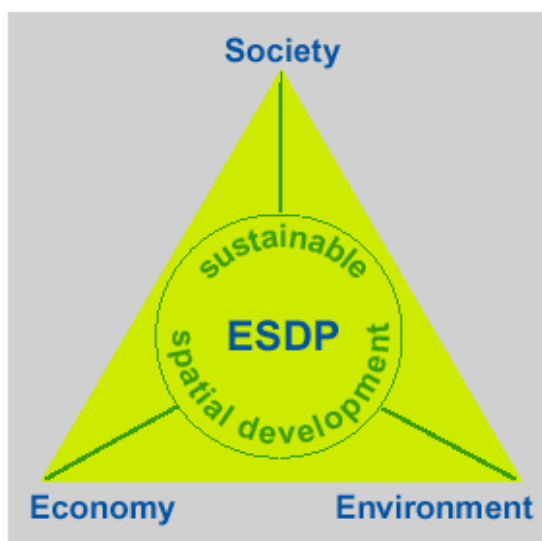


Figure 1: Triangle of Objectives: a Balanced and Sustainable Spatial Development [40]

National spatial development policies of the Member States and sectoral policies of the EU require clear spatially transcendent development guidelines in order to complement each other best. Therefore the Member States divided to draw up in cooperation with the European Commission the European Spatial Development Perspective.

The ESDP provides the possibility of widening the horizon beyond purely sectoral policy measures, to focus on the overall situation of the European territory and also take into account the development opportunities, which arise for individual regions. New forms of cooperation proposed in the ESDP should, in future, contribute towards a cooperative setting up of sectoral policies – which up to now have been implemented independently – when they affect the same territory. The Community also requires the active coopera-

³⁰ See Title 1, Article 2 of the version of the Treaty on EU which has been consolidated by the Treaty of Amsterdam

³¹ World Commission on Environment and Development: Our Common Future. New York: 1987

tion of cities and regions in particular to be able to realise the objectives of the EU in a citizen friendly way. This is how the subsidiarity principle is realised.

With more than 370 million inhabitants covering an area of 3.2 million km² and with an annual gross domestic product (GDP) of 6.8 trillion €, the EU is one of the largest and economically strongest regions in the world.

Nevertheless, the EU shows serious economic imbalances impeding the realisation of regionally balanced and sustainable spatial development. The associated imbalanced distribution of economic potential could be described as follows. The area in the centre of the EU including the metropolises of London, Paris, Milan, Munich and Hamburg has 40% of the EU's population, accounts for 50% of the EU's GDP and covers 20% of the EU territory. However, at the southern border of the EU -from Portugal to Southern Spain, Southern Italy and Greece - as well as in the new *Länder* in Germany, the GDP per capita only reaches about 50% to 65% of the EU average. In some regions at the northern periphery of the EU territory - e.g. Northern Finland and the North of the United Kingdom - the economic situation is not much better. The ESDP is meant to contribute to achieving, in the medium term, a spatially more balanced development.

The triangle of objectives linking the three following fundamental goals of European policy reflects the aim of ESDP: economic and social cohesion; conservation of natural resources and cultural heritage; and more balanced competitiveness of the European territory.

The ESDP comprises of the following guidelines: development of a balanced and poly-centric urban system and a new urban-rural relationship; securing parity of access to infrastructure and knowledge; and sustainable development, prudent management and protection of nature and cultural heritage. The objectives set out in the ESDP should be pursued by the European institutions and government and administrative authorities at national, regional and local level.

This is consistent with the political principles, agreed in 1994,

- spatial development can contribute in a decisive way to the achievement of the goal of economic and social cohesion,
- the existing competencies of the institutions responsible for Community policies remain unchanged. The ESDP may contribute to the implementation of Community policies which have a territorial impact, but without constraining the responsible institutions in exercising their responsibilities,
- the central aim will be to achieve sustainable and balanced development,
- it will be prepared respecting existing institutions and will be non-binding on Member States, it will respect the principle of subsidiarity,
- each country will take it forward according to the extent it wishes to take account of European spatial development aspects in its national policies³².

³² Ibid.

On the basis of the “First Official Draft of the ESDP” (Noordwijk Document/June 1997) comprehensive consultations took place in the fifteen Member States, involving central governments, regions and social groups.

6.2.3 Impact on Water Management

In the context of ESDP water also represents a threat. Spatial planning, above all at transnational level, can make an important contribution to the protection of people and the reduction of the risk of flood. Flood prevention measures can be combined with nature development or restoration measures.

The demand for water is continuing to increase, particularly as a result of the growing use by households, agriculture and tourism. In the Mediterranean areas, the problem is particularly acute. Concerning activities with a high demand for water, spatial planning can already make an important contribution by identifying uses that require less water within the planning process. These problems require a broadly-based public debate, since only a broad awareness of the issue among the population can ensure the sustainable use of water resources.

Drainage projects and the overuse of ground water also have negative impacts on environmentally sensitive areas. Large areas of moist biotopes have been destroyed and some wetlands have disappeared completely. In terms of their biological value and their natural cleaning and regulating functions, wetlands are a valuable resource. Their preservation and restoration should have high priority.

Chemical and organic compounds in the seas and their overuse threaten maritime ecosystems and lead to an overall degradation of the environment. This is of particular importance for the management of waste water treatment in areas close to the sea.

6.2.4 ESDP Policy Options

1. Improvement of the balance between water supply and demand, particularly in areas which are prone to drought. Development and application of economic water management instruments, including promotion of water-saving agricultural methods and irrigation technology in areas of water shortage.
2. Promotion of transnational and interregional cooperation for the application of integrated strategies for the management of water resources, including larger ground water reserves in areas prone to drought and flooding, particularly in coastal regions.
3. Preservation and restoration of large wetlands which are endangered by excessive water extraction or by the diversion of inlets.
4. Concerted management of the seas, in particular preservation and restoration of threatened maritime ecosystems.
5. Strengthening of regional responsibility in water resource management.
6. Application of environmental and territorial impact assessments for all large-scale water management projects.

6.3 TRANSPOSITION IN MEMBER STATES

6.3.1 United Kingdom

There are many pressures upon the aquatic environment resulting from population, industry, agriculture, forestry, mining and other human activity. These cause environmental impacts, which in turn determine the quality of any particular part of the aquatic environment. This section describes the causes of the environmental impacts identified in the previous section.

An assessment was carried out of all sites classified as fair, poor or seriously polluted in 1995/96. Either one or two sources of pollution were selected as the primary factors determining each site's classification. A total of 54 types of pollution were identified which could be ascribed to 12 major causes. The seven most important causes of pollution account for approximately 98% of polluted waters in Scotland. These are listed below and are also detailed in the following summary tables for rivers, lochs, estuaries and coastal waters:

- Sewage effluent
- Agriculture - diffuse sources
- Acidification
- Urban drainage
- Mine drainage
- Agriculture - point sources
- Industrial effluent

Agriculture - diffuse sources

Diffuse agricultural pollution results from the run-off of pesticides, organic waste, soil and nutrients from agricultural land. Many of the sites affected by diffuse agricultural pollution are found along the east coast where rivers drain arable areas. In areas of intensive livestock farming, such as south west Scotland, diffuse pollution results from the loss of soil, phosphorus, ammonia and organic matter from the land.

Diffuse agricultural pollution has increased over the last 50 years as farming methods have intensified. It poses a serious long-term threat to the water quality of rivers, lochs, groundwaters and estuaries. Increasing levels of agricultural production have been shaped by technological change, market demands, Government policies and innovation by farmers.

These factors also represent the main tools for reducing the environmental impact of agriculture. In this respect, the economic framework provided for the industry by the EC Common Agricultural Policy is crucial. It is essential that its progressive reform increases the importance of agro-environment schemes which provide financial support for farmers to deliver environmental benefits. At a Scottish level, SEPA will contribute to the development of agro-environment options appropriate to Scotland and to the promotion and further development of The Scottish Office Code of Good Practice for the Prevention of Environmental Pollution from Agricultural Activity.

Current projections suggest that unless significant improvements occur in pollution control from farm land, diffuse agricultural pollution will be the most important cause of river pollution by 2010.

Acidification

The acidification of Scotland's water environment results mainly from the deposition of acidic sulphur and nitrogen compounds from combustion processes.

Nitrogen oxide emissions are deposited in rainfall and in dry deposition and are augmented by nitrogen compounds derived from agricultural sources. Not all deposition is from local sources.

The ultimate solution to acidification lies in the reduction of acid emissions at their source. In this respect, SEPA has a role in authorising emissions from processes covered by the Integrated Pollution Control and Air Pollution Control regimes. Although some streams will recover rapidly with a reduction in acid deposition, many are not expected to recover for several decades. Ameliorative techniques can, in the interim, play an important role in reducing current damage and restoring acid buffering capacity in affected catchments. SEPA is working with the Forestry Commission to ensure that new forestry design and replanting proposals minimise the impact of acidification. Reducing acid emissions and changing forestry practices may not be sufficient to restore affected catchments in the short-term and active intervention (such as liming of soils) to restore the buffering capacity may be necessary.

Urban drainage

Drainage from roads, yards and roofs in urban areas is typically contaminated by metals and oils. The misconnection of sewage and trade effluent into surface water drains also contributes to urban drainage pollution. Clearly, the distribution of urban drainage impacts is linked to population centres.

The Scottish authorities responsible for regulating urban developments have devised a co-operative approach to the issue of urban drainage. The Sustainable Urban Drainage Scottish Working Party (SUDSWP) comprises representatives from SEPA, The Scottish Office, the water authorities, local authorities and developers. This partnership is jointly preparing an urban drainage design manual, which will provide guidance on the use of new techniques to drain urban areas.

Mine drainage

The impact of mining is reviewed separately from other industrial activity because of the legacy of pollution from abandoned mines. Outbreaks of water from abandoned mines and leachate from old spoil heaps (bings) are frequently highly acidic with elevated metal concentrations. The bulk of the environmental damage is associated with abandoned mines and bings.

Environmental improvements are dependent on government funds to address pollution from abandoned deep mines. In Scotland, the Coal Authority intervened to prevent the uncontrolled breakout of minewater from four recently abandoned mines. SEPA is working with the Coal Authority to prioritise the existing discharges which can then be considered for treatment.

Agriculture - point sources

Farms hold large quantities of potentially polluting material:

- Agricultural fuel oil.
- Cattle, pig and chicken slurry/manure.
- Animal feeds such as silage and distillery based animal feeds.
- Agro-chemicals, mainly fertilisers and pesticides.

SEPA has considerable statutory powers to require farmers to undertake work to bring facilities for the collection and storage of silage, slurry/manure and fuel oil up to legally defined standards. As a consequence, SEPA expects the scale of point source agricultural pollution to fall progressively.

Industrial effluent

Industry is the second most important source of pollution in estuaries and is responsible for 43% of polluted waters. In rivers, industrial effluent affects only about 2% of the polluted river length and is ranked as seventh in the list of sources of polluted river waters.

During the 1990s, continued improvements have been made by companies, which appreciate that good environmental practice is linked to good market performance.

Regulation will continue to play an essential role in requiring industry to implement treatment and management improvements. Implementation of the EC Integrated Pollution Prevention and Control Directive (96/61/EC) will further reduce the discharge of pollutants and increase the emphasis upon waste minimisation. Industrial sectors not covered by this new Directive will continue to be regulated under the Control of Pollution Act (1974). The introduction of the works and enforcement notice provisions would considerably enhance the regulatory framework by providing powers to prevent pollution from occurring.

Causes of pollution in groundwater

There are four main causes of groundwater pollution:

- Diffuse agricultural pollution
- Abandoned mines
- Waste disposal
- Contaminated land

Diffuse agricultural pollution

Concerns over the risks of groundwater contamination have led to the requirement, under the 1998 Groundwater Regulations, to license the disposal of specified chemicals and monitor any impacts on groundwater.

Abandoned mines

Large areas of the central lowlands are underlain by Lower and Middle Carboniferous rocks which include the oil shale formation of the Lothians and several coal bearing formations. Although a few boreholes are in use, abstracted water frequently requires pre-treatment as past mining activity has led to high concentrations of sulphate, iron and aluminium associated with the old workings.

Waste disposal

During the mid-twentieth century, abandoned mine workings were used by some industries for the disposal of waste in the central lowlands.

Until Regulation 15 of the Waste Management Licensing Regulations was introduced in 1994, most sites were run on the 'dilute and disperse' principle. Modern sites are engineered to contain leachate and the surrounding groundwater is monitored by sampling boreholes.

Contaminated land

Industrial development over the past 200 years has left a range of industrial sites, both derelict and operational, where the ground has become contaminated.

Pressures affecting water quantity

The existing controls relating to hydro-electricity developments and public water supplies are implemented by The Scottish Office. Local authority planning departments may impose planning conditions limiting the amount of water that can be removed by proposed abstractions. SEPA can licence abstraction for irrigation in designated catchments where SEPA has applied for, and The Scottish Office has issued, a 'Control Order'. This piecemeal approach is very different to the comprehensive abstraction licensing system, which has operated in England and Wales since 1963. SEPA has sought powers to control all new abstractions and those existing abstractions in areas where problems have arisen or are expected.

There are three main categories of pressures affecting water quantity:

- Groundwater abstraction
- Surface water abstraction
- Flow regulation
-

Groundwater abstraction

The Water (Scotland) Act 1980 requires that owners of boreholes deeper than 15 m send information to the British Geological Survey.

In the absence of a comprehensive scheme for controlling groundwater abstractions there is no means of managing the abstractions from the aquifer to ensure that the safe yield from an aquifer is not exceeded.

Surface water abstractions

Most Scottish drinking water is derived from lochs or reservoirs.

In addition to the direct impoundment of main rivers, hydro schemes typically involve a substantial degree of cross catchment transfer. Many of the off-takes divert all the water during low flow conditions, so that there may be little water left in the river for several kilometres downstream. More recently, smaller 'run-of-river' hydro-power schemes have been developed under the Scottish Renewables Order. A wide range of industrial sites abstract water for process or cooling water.

During dry summers, irrigation is virtually essential for potato farms in eastern Scotland. A combination of recent dry summers and the requirement for a high quality product has led to widespread pressure on the water resources of small east coast rivers leading in some circumstances to the removal of all the river water.

Powers to require the licensing of abstraction for irrigation are only available in two small river catchments. The extent to which irrigation will extend to other crops will de-

pend on changes in agricultural practice and, in the longer term, on the possible effects of climate change. The irrigation of pasture has already become common in the River Tweed catchment.

Flow regulation

Most major dams in Scotland must pass a minimum flow forward to protect downstream users but the form in which these compensation flows are specified varies. Some compensation flows are specified in the Statutory Instrument or Acts of Parliament, which initiated the water supply or hydro-power scheme. In other cases, these compensation agreements are specified in informal agreements between the operator and downstream users or with the former river purification authorities.

Protecting water resources

The deficiencies in the regulatory regime covering surface water and groundwater abstraction in Scotland are widely recognised. SEPA looks to The Scottish Office to promote legislation for the introduction of abstraction control by the Scottish Parliament. Until such time as abstraction controls are introduced, SEPA will maximise the opportunities available under the existing legislation to protect water resources and environmental quality by working closely with The Scottish Office and the local authority planning departments.

In contrast to the near consensus on abstraction control, there has been little discussion in Scotland on whether the development of codes of good practice or regulatory powers should be introduced to cover the management of river flows downstream of dams.

Pressures affecting habitat quality

RHS has given SEPA its first view of the relative importance of the different pressures, which affect the habitat quality of Scottish rivers. Similar information is not currently available for lochs or the intertidal zones of estuaries or coastal waters.

There are two main categories of pressures affecting habitat quality:

- River engineering
- Agriculture

River engineering

The development of housing, industry and transport links along river or coastal flood plains has led to river habitat damage. These pressures may also have indirect results such as the need to provide engineered flood or erosion protection. Rivers in urban areas are often perceived to present a flood threat and to occupy valuable space. Constraint and control of rivers by engineering works have been the norm until recently, resulting in the culverting of many small watercourses in Scottish towns and cities.

Local authority planning departments have legislative control over a range of proposed developments. Such proposals may involve works or operations in the river bed or on the banks of rivers and streams, for which SEPA is a statutory consultee.

River resectioning (the straightening and deepening of rivers) and the reinforcement of river banks are generally responsible for most of the direct damage to habitats.

Agriculture

Rural land use has major implications for the habitat quality of rivers, lochs and coastal waters. The resultant increased input of silt, nutrients, agro-chemicals and organic wastes from intensive agricultural land management poses risks to downstream water users and generates additional erosion control costs for farmers.

Improving habitat quality

Damage caused by river engineering can have serious and long-term implications for the aquatic environment. Restoring rivers damaged by inappropriate engineering can be expensive. Clearly, flood protection, erosion control and drainage work are necessary to protect property but it is essential that work is carried out in a manner that takes account of best environmental practice. Local authorities have powers to require best practice as part of the conditions associated with planning consent. SEPA works with planning authorities to protect rivers, which can provide important semi-natural habitats with a high amenity value in urban settings.

If the work falls outside the planning system, it can be difficult to persuade farmers and estate managers to follow best environmental practice. The Environment Act 1995 includes a requirement for prior consultation with SEPA where drainage work is proposed. When implemented, these powers will improve the controls over pollution caused by drainage work but they are not expected to significantly enhance SEPA's ability to protect river habitats.

Although the impacts of agricultural land management upon river habitats, and probably also loch habitats, are extensive there is considerable potential for improvements. Financial incentives may be appropriate in some circumstances. For example, EC Structural Funds have been used to provide fencing to exclude livestock from river edges. In addition, existing EC agro-environment schemes offer funding to remove water margins from cultivation.

SEPA's statutory framework

SEPA is a non-governmental agency currently responsible to the Secretary of State for Scotland for providing a range of environmental protection services. SEPA came into being on 12 October 1995, and became fully operational on 1 April 1996 when it assumed the environmental regulatory functions previously carried out by its predecessor bodies. SEPA's capacity to describe, protect and improve the environment is determined by its powers and duties defined in statute. The main functions relating to the aquatic environment are described below. Virtually all matters relating to the environment are devolved to the Scottish Parliament to whom SEPA is accountable.

SEPA has duties to promote the cleanliness of inland waters, groundwaters and tidal waters and has powers to license discharges and to issue statutory notices. These powers must be used to either prevent, minimise, remedy or mitigate the effects of pollution on the environment.

The context for these duties is provided by guidance from the Secretary of State for Scotland, which defines SEPA's principal aim:

'to provide an efficient and integrated environmental protection system for Scotland which will both improve the environment and contribute to the Government's goal of sustainable development'

It is noteworthy that SEPA has commented that the EU water directive will not only be the most important element of its legally underpinned objectives for the foreseeable fu-

ture, but is “the most important piece of environmental legislation in Scotland in the past 40 years”.

Targets for improving the water environment

SEPA is determined to set targets, which are demanding, realistic, achievable and measurable. Targets for water quality improvements have been set at three levels: for Scotland, for each of the three SEPA Regions and for individual bodies of water. It has not been possible to provide targets relating to water quantity and habitat quality at the same level of detail. As a result, targets for water quantity and habitat quality relate mostly to the establishing of initiatives aimed at improving SEPA's understanding of their impact on the aquatic environment.

These targets take account of SEPA's duties to comply with EC Directives and duties defined under UK legislation to prevent, minimise, remedy or mitigate pollution. These targets must also have regard to the likely costs and benefits of the exercise of SEPA's powers as well as considering social and economic needs.

This section describes how SEPA has defined ambitious targets to improve water quality by 2000 and 2005. The targets will direct how SEPA will use its powers to prevent, minimise, remedy or mitigate the effects of pollution upon the environment. The approach taken to setting these surface water quality targets is described in some detail, starting from the policy framework within which the targets were defined. The methodology used to define targets for each polluted site in Scotland is explained and finally these are aggregated to set demanding targets for overall water quality in Scotland. Operational targets up to the year 2000 are also defined for groundwater quality, water quantity and habitat quality. These targets will help SEPA identify how it will improve its understanding of the impacts of water abstraction, flow regulation and habitat damage. The targets also illustrate the extent to which SEPA considers it desirable to promote the conservation and enhancement of the natural beauty and amenity of inland and tidal waters and of land associated with such waters.

Surface water quality targets

Policy for setting water quality targets

SEPA's Environmental Strategy sets out strategic statements, which will direct the development of all of the Agency's future policy and operations. The policy objectives below build upon these strategic statements to provide a framework within which water quality improvement targets can be set.

- SEPA will work to prevent the deterioration of waters from their current class. In particular, this relates to the protection of excellent and good quality waters. This requires careful licensing of discharges to ensure that receiving waters have the capacity to assimilate treated effluent throughout normal variations in weather patterns. Sufficient assimilative capacity must be retained to allow for foreseeable increases of pollution from non-controllable sources.
- SEPA's long-term aim is to bring all polluted waters up to at least the good quality class. This is the primary objective for restoring polluted waters and ensures that water bodies can be subject to a wide range of potential uses ranging from drinking water abstraction through to amenity and recreation. Typically, this will

improve ecological quality to a level that represents only a slight degradation from the natural biodiversity of a site.

- SEPA will work wherever practicable to bring waters to the excellent quality class. Many of Scotland's coastal and upland freshwaters are of excellent quality. Where the degradation of previously excellent waters has occurred, SEPA will aim to return these waters to excellent quality. In particular, this will apply to areas of high importance for nature conservation, recreation, fisheries and water supply.
- Where it is considered impractical to improve waters up to good quality by 2010, SEPA will set interim quality objectives. SEPA will identify all polluted waters which it considers cannot be restored to good quality and will set interim targets for the year 2010. It is anticipated that these interim targets may apply to catchments which have a high proportion of urban development or intensive agriculture, or to waters which are affected by mine drainage or litter which are not subject to SEPA's regulatory powers.

Achieving surface water quality targets

In setting water quality improvement targets and defining the actions necessary for their achievement, SEPA will ensure that its actions are based upon the following principles:

- SEPA works in partnership with other organisations to develop an efficient and co-ordinated approach to the improvement of the environment whilst taking account of social and economic needs. SEPA recognises that environmental protection and improvement have economic and social costs and benefits. Costs must be proportionate to the benefits and be affordable in the context of social and economic priorities.
- SEPA ranks pollution problems and environmental risks so that investment can deliver maximum environmental benefits. Organisations, such as the Coal Authority, the water authorities and major industrial groups, may have responsibility for large numbers of discharges. SEPA ensures that allocated financial resources achieve the maximum benefit by prioritising the investment requirements in terms of the scale of the potential environmental benefits. SEPA will work with dischargers in defining these priorities.
- SEPA regulates discharges by ensuring that licences are set to protect the environment. SEPA works with dischargers to ensure that the correct standards, based upon best available scientific information and methods, are set to protect the environment and that compliance with the defined standards is achieved. Where serious or consistent failure to comply with standards is recorded, SEPA's enforcement policy specifies that evidence will be collected and referred to the Procurator Fiscal.
- SEPA encourages dischargers to reduce the discharge of effluents below the standards required by the regulatory framework. In co-operation with other organisations, SEPA promotes waste minimisation initiatives, development of codes of good practice, environmental management schemes and the adoption of the best available technology.

SEPA national targets for groundwater quality

- SEPA will provide by the end of 2000 a national database of groundwater quality in Scotland, which will include public and private drinking water supplies.
- SEPA will support the development of detailed groundwater vulnerability maps, which will ensure that the appropriate level of protection is provided for groundwater.
- SEPA will work towards the establishment of a strategic groundwater quality monitoring network which will allow any threats (caused by pollution) to the continued use of Scotland's main groundwater resources to be assessed and identified.

SEPA national targets for water quantity

- By the end of 2000, SEPA will develop and apply a methodology, which can describe the scale and severity of impacts due to abstraction and flow regulation upon river flows and water levels in lochs.
- SEPA will promote the merits of a strategic groundwater level monitoring network which will allow any threats (caused by over abstraction) to the continued use of Scotland's main groundwater resources to be assessed and identified.
- SEPA will work with The Scottish Office and local authority planning departments to endeavour to prevent environmental damage caused by abstractions.

SEPA's habitat improvement targets

The SEPA Natural Habitat Enhancement Initiative has defined the following objectives for promoting habitat improvement up to the end of the year 2000:

- Extend the application of RHS to SEPA's key biological monitoring sites.
- Use research and development funds to assess the potential for extending the methodology developed for RHS to lochs, estuaries and coastal waters.
- Work in partnership with other organisations to develop and promote best practice in engineering work and habitat protection for rivers, lochs and tidal waters.
- Aim to make a substantial contribution to developing at least five habitat improvement schemes in each SEPA Region every year.

Monitoring Scotland's water environment

SEPA holds detailed databases covering aspects of environmental quality such as surface water quality and water resources. In particular, classification schemes, which cover chemical, biological and aesthetic aspects of the environment, have been developed for rivers, lochs, estuaries and coastal waters. Some of these datasets are of international importance. However, there are also aspects of environmental quality about which SEPA holds little or no information.

SEPA must define an appropriate balance between the demands for environmental monitoring across all media and its existing resources. However, a significant expansion of environmental monitoring may be required to protect important Scottish natural resources and to prepare for UK obligations under the proposed EC Water Framework Directive. It is recognised that this range of environmental monitoring can be best provided by a co-ordinated multi-agency approach in partnership with other organisations such as SNH, the water authorities and the fishery boards and trusts which already collect environmental data. A co-operative and co-ordinated approach to monitoring by

these organisations would allow the effective use of existing resources and those additional resources required to cover new duties.

Enhancing the water environment

SEPA has proposed targets for protecting and enhancing Scotland's water environment based upon its existing powers and resources. These indicate that substantial progress can be achieved in improving polluted waters in Scotland. This Report has also identified many issues, which will constrain the rate at which improvements can be achieved. This particularly applies to the protection of water resources and riparian or aquatic habitats. SEPA also has concerns over progress in controlling pollution from sewage effluent, diffuse agricultural sources, urban drainage and abandoned mines.

SEPA has identified the following areas where specific actions would assist in protecting and enhancing the aquatic environment:

Economic actions

- The rate at which water authorities can address existing pollution problems associated with sewage effluent and urban drainage is dependent upon the available resources. SEPA stresses that additional investment in sewerage and treatment systems is essential to achieve a high quality environment for Scotland.
- The maintenance and further development of a sewerage network is fundamental to protecting water quality. In most cases environmental risks are reduced if discharges are made to sewers rather than being subject to private treatment. It is important that water authority charging systems do not provide a disincentive to this sound environmental practice.
- Action is needed at a European level to continue the reform of the Common Agricultural Policy, so that more emphasis is placed upon agro-environment programmes which provide financial support for more environmentally sensitive farming practices. Progress will largely determine the extent to which the problems of diffuse agricultural pollution and habitat damage caused by agricultural activities can be addressed.
- SEPA has regulatory powers to deal with point source agricultural pollution caused by slurry, silage and agricultural fuel oil. However, the ability of farmers to pay for the collection and storage facilities specified by the regulations often limits the rate at which improvement can be achieved. A grant provision for this important area of pollution control could provide measurable benefits in environmental improvement.

The level of resources provided to the Coal Authority will determine the rate at which pollution from abandoned mines can be controlled or stopped.

Statutory powers

- SEPA has sought powers to introduce abstraction controls to allow for the integrated management of water quality and quantity and to protect valuable water resources.
- SEPA considers that the Coal Authority should have powers of compulsory purchase to acquire land for treatment schemes designed to protect waters from abandoned mine discharges.

- The existing water pollution control legislation based upon the Control of Pollution Act has been very effective at addressing problems of industrial and sewage pollution. The early introduction of regulations to implement works and enforcement notices would strengthen the regime.

The land use planning system

The local authority land use planning system is central to providing environmental protection. Consultations with SEPA by planning departments already deal effectively with many potential environmental concerns. However, opportunities exist for enhancing the extent to which the system proactively addresses some environmental problems:

- The development of open cast coal sites has the potential to restore polluted waters by the removal or reworking of previously mined coal seams together with contaminated land and waste spoil (bings). In addition, the construction of wetland treatment systems following the restoration of a site can prevent damage by any future breakout of mine water and enhance the biodiversity of the landscape. SEPA looks to the mining industry, the Coal Authority and local authority planning departments to take advantage of the environmental 'planning gain' which can result.
- Local authority planning departments have a central role in influencing the environmental impacts of urban development upon the aquatic environment. In particular, structure and local plans can assist developers by identifying environmental issues and providing guidance on how these can be addressed. This ensures that developers consider such concerns early in the planning process, considerably facilitating the dialogue between developers and the relevant agencies. Some strategic environmental concerns are relevant in all local authority areas, for example:
 - the promotion of sustainable urban drainage designs; and
 - protecting and enhancing habitats associated with rivers, lochs, estuaries and coastal waters.

Working in partnership

SEPA has set improvement targets, which are appropriate to its environmental protection duties. The economic and regulatory framework will ensure that these targets will be achieved. However, there is also a wide range of environmental problems, which can only be tackled by a co-operative approach between The Scottish Office, industry, regulators and interest groups.

SEPA recognises that many other organisations have their own targets and objectives for improving aspects of Scottish environmental protection. There are considerable environmental advantages in ensuring that these targets are compatible and that organisations recognise the value of contributing to the achievement of each other's relevant targets and objectives.

A partnership approach allows for the co-ordinated application of statutory powers and ensures that a consistent approach can be taken to educate, influence and provide focused advice. Examples of where this has further potential to improve environmental protection include:

- Waste minimisation initiatives involving regulators, industry and NGOs.

- Catchment management, estuary and coastal zone management schemes provide a mechanism for ensuring that environmental protection and improvement is incorporated into wider social and economic considerations.

Designation of a National Park

Loch Lomond has been designated Scotland's first National Park (Scottish Executive National Parks Act, 2000). Detailed legislation for Loch Lomond has not yet been completed and the formal establishment of the park has been delayed from an initial date of July 2001 to July 2002. The main issues, which have to be clarified, are the boundaries of the park, and representation on the park management body. The former issue in particular is contentious in the context of this review. It seems likely that not only will areas outside the Loch Lomond catchment be included within the park boundaries, but also not all of the Loch Lomond catchment will be included (i.e. no congruence between park and natural watershed boundaries). The upper parts of the Endrick and Blane river systems are likely to be excluded. This system is the largest input into the loch, and the source of current water quality concerns³³.

Privatisation

The water agencies in Scotland remain public bodies, and there seems little prospect of privatisation occurring. Prior to local government reform in April 1996, Strathclyde Regional Council conducted an opinion poll on the control of water. A high return was achieved (>60% of the electorate responded) and 97% voted in favour of public control of water. The Conservative administration (reluctantly) accepted this expression of public opinion, and there is little likelihood of this changing in the foreseeable future. Substantial sums are being expended currently to upgrade water treatment and sewerage facilities to meet the EU water directives. This work is being funded from the public purse and accordingly local government charges for these have risen substantially. Thus the financial base for improved water quality in Scotland remains in the public sector.

³³ It is not possible at this stage to be more precise about the nature of the National Park but the following references give a general view of the current position: Loch Lomond Local (Subject) Plan, 1996, Scotland's Mountain Areas, CCS 1991, National Parks (Scotland) consultative paper, undated but came out in 1999, Scottish Executive, Edinburgh

Agriculture

To say that the farming industry is in a state of flux in Scotland is a considerable understatement. There are likely to be further changes following the reform of CAP begun a decade ago. Likely effects of changes in policy which may affect water quality includes a further decline in hill sheep farming. This may result in further intensification in low-land areas, such as the southern part of the Loch Lomond catchment, and replacement of hill farm land use by afforestation (but see forestry below), or recreational and conservation land use. Evidence of these trends can be observed at Loch Lomond. Change will take place in a market environment and it is difficult to see a role for planning or legislation in these trends other than in a reactive or protective capacity.

Forestry

The Forestry Authority, the government agency responsible for forest management, and having considerable land holdings on Loch Lomond side has introduced a policy from 2000 for the removal of non-native species (such as the widely planted Sitka Spruce, *Picea sitchensis*) from the Loch Lomond area as part of reorientation of forest policy towards higher priority for landscape and biological conservation. This policy may have a significant impact on water quality through for example, impacts on sediment budgets. It will also have short and long term impacts on the visual landscape.

Integrated Water Management

A scoping survey on water quality and management in the Endrick system is being carried out by a consortium of SEPA/Scottish Natural Heritage (SNH)/East of Scotland Water aimed at development of an integrated policy on water quality. It should be noted that there is a commitment to sustainable development in charter of SNH.

6.3.2 Germany

Traditionally German water management is organised on a local and regional level. Therefore the obligation of the federal government to transpose EU policy into national law sometimes caused severe problems in the past. Since the entry into force of the Maastricht Treaty, a new law on the Cooperation of Federal and Regional Governments in affairs of the European Union regulates the cooperation of these Governments. [41]

Much effort and investment was put into the transposition of EU water legislation in order to meet the requirements. The quality of rivers and lakes improved since the 1970s. At the same time an enormous environmental awareness developed pushing for measures in order to improve environmental quality. Especially big point sources of pollution were tackled and quality of water improved. [42]

However, water management in Germany is very much dependent on other activities, dependent on various political developments and decisions. Agricultural activities still represent an important diffuse source for pollution, especially nutrients and pesticides. Regarding competing uses a strategy of prioritisation is necessary in order to assure the protection of aquatic ecosystems and respect their needs. [43]

Influence of EU policy and EU activities on the water management in Baden-Württemberg are difficult to quantify. Subsidies for agriculture surely have a negative impact on the environment and on the protection of waters. EU subsidies for the protection of the environment have not yet reached an important impact on the protection of waters. EU measures tend to cause the opposite of deregulation. Trans-boarder cooperation however is supported in some fields. All these positive influences in future will have a more important impact with the implementation of the future Water Framework Directive³⁴.

Currently water management in Germany needs to be prepared for the new provisions of Water Framework Directive. This includes especially the river basin management. Measures in this context will be of utmost importance for the management of lakes and of special interest for the EUROLAKES project.

³⁴ Communication by Mr. Bühler, Ministry for the Environment and Traffic, Baden-Württemberg, 28.11.2000.

6.3.3 France

6.3.3.1 Actual and near future changes on the management of the Lac du Bourget and its watershed

CISALB³⁵:

- **Agricultural policy:** the main action in this new agricultural policy is focused on the management and reduction of the organic pollution. Some actions are already in progress on the manure and on the pesticide.
- **Industrial policy:** Putting in place of an agreement for the industrial emission.
- **Domestic sewerage policy:** The “*Loi sur l’eau*” and the European Directive 91/271/EEC concerning urban waste-water treatment are used in order to elaborate some new management and planning for the waste water treatment plant, new sewerage network, etc.

MATE³⁶:

- In the framework of the “*Loi sur l’eau*” and the SDAGE RMC (*Rhône Méditerranée Corse*), la CIPEL (International commission for the protection of the water of the Lake Geneva) which is both a French and a Swiss commission developed some key actions on the lake and its watershed : limitation of the phosphorus in the lake (objective < 20 mg/l) , development of several waste-water treatment plants, improvement of the watershed knowledge, etc.
- Since 1963, the 3 Swiss cantons and the 2 French departments around the lake are developing a common management plan in order to improve the quality of the water and the knowledge concerning the environmental resources. In last September, the Directive Cadre which is a communal policy in the water domain, defined the water quality objective of the water resources (ecological criteria, measurements program, etc) in order to get a high degree of quality of the lakes, rivers and watersheds in the 20 next years.

6.3.3.2 Activities beyond European Union on water management :

The “*Loi Sur L’eau*” and the SDAGE, which are the two main French regulations concerning the quality of the water, are occasionally not respected.

The second main problem of the non-respect of the European Union Directive is concerning urban development; the local authorities who are in charge of the development do not respect all the time the soil planning.

6.3.3.3 Studies and rules which are in progress or which will be develop in a near future on the Lac du Bourget and its watershed

Studies³⁷:

³⁵ Interview between SOGREAH and M. Renaud Jalinoux (CISALB). CISALB – *Comité Intersyndical pour l’Assainissement du lac du Bourget Intersyndical committee for the management of the Lac du Bourget*

³⁶ Interview between SOGREAH and Mrs Genève Golaszewski (MATE). MATE: Ministry of the land management and environment - Water Division

- *Schéma de cohérence* (1993)
keeping of the main balances between natural space and harmonious development of activities (protection of natural environments, installations, distribution of the activities on the lake and the banks)
- *Contrat de bassin versant* (1998)
protection of an environment of high quality for the local inhabitants (water quality, aquatic environments, valorisation and sensibilisation)
- *LIFE Natura 2000* (1998)
protection of natural environments and biodiversity
- *Projet Grand Lac* (1998)
durable development strategy to create a life space where human and nature are in interaction (ecological, human and economical challenge)

Rules³⁸:

- *Contrat de lac* (definition of the different conflicted uses on the lake and its watershed)
- *SAGE* (in a near future)
- *Contrat de rivière* (4 river contracts are in progress around the lake, these studies take into account all the conflicted uses of the river, the different local and national authorities which are involved in the river and try to find some solutions thanks to common management strategies)³⁹

6.3.3.4 Applications to the European Court of Justice for not responding to requirements of EU water legislation

The French government is involved in 3 infringement procedures related to EU water legislation⁴⁰:

- Nitrate Directive,
- Urban waste water,
- Dangerous substances.

The other directives are quite good applied at the French national level, but at the local level (department, commune) there is some non respect of the directive (e.g. some communes do not declare their vulnerable zones)⁴¹.

³⁷ Interview between SOGREAH and M. Renaud Jalinoux (CISALB). CISALB – *Comité Intersyndical pour l'Assainissement du lac du Bourget - Intersyndical committee for the management of the Lac du Bourget*

³⁸ Ibid.

³⁹ Interview between SOGREAH and Mrs Genèvre GOLASZEWSKI (MATE). MATE: Ministry of the land management and environment - Water Division

⁴⁰ Ibid

⁴¹ Ibid

7 INSTRUMENTS

7.1 MANAGEMENT INSTRUMENTS

To achieve a sustainable development is the objective of the 5th Environmental Action Programme and needs to be integrated into all other European Policies. The water legislation and trans-sectoral legislation described before, suggests or even requires the use of certain instruments. The aim of this report is to identify those instruments in order to make a deeper analysis throughout the further run of the EUROLAKES project.

7.1.1 River Basin Management

In the river basin of the Rhine, in the 1950s a management strategy was applied that involved all relevant actors. This concept could be seen as an early attempt of river basin management. With the new Water Framework Directive this concept becomes compulsory for all Member States.

The new concept of a water management is no longer limited by administrative but following the hydrographic limits of a river basin. This concept is not entirely new in Europe. There are already some examples (exp. France, Great Britain and the Netherlands) where this conception is applied. The new Water Framework Directive however requires even river basin management for international river basins. An always cited example for this type of management is the work of the International Commission for the Protection of the Rhine (ICPR). This Commission founded on a Dutch initiative already exists since 1950 and is based on transnational co-operation between the Rhine-bordering [44].

7.2 ECONOMIC INSTRUMENTS

7.2.1 Pricing

The proposal for a Water Framework Directive [39] comprises a provision for a *"full cost recovery for water services"*. In the final version of Water Framework Directive, however, only after changes resulting from political discussion in the European institutions a provision (Art. 9) remained saying that Member States shall *"take account of the principle of recovery of the costs of water services including environmental and resource costs"* [1]. The European Commission published a Communication complementing this article [45].

Apart from the total revenues arising from the tariff system, also the structure of the tariff system is relevant from an economic point of view. Essentially, four requirements can be imposed on a tariff system for water services⁴². These requirements describe the minimum elements a pricing system should comprise under sustainability criteria:

- achieving *full cost recovery*, meaning that revenues should (at least) be equal to some measure of costs where – depending upon the precise cost measure – financial, social and environmental costs are incorporated;
- assuring *equity* in social (right to water), economic (economic activities) and environmental (high level of protection) terms;

⁴² See horizontal report on Economic Aspects of Sustainable Water Use.

- assuring *efficiency* in terms of economy (providing incentives to engage in water saving technologies), social (providing sufficient water but avoiding waste of water), environmental (optimal but not over exploitation of resources);
- assuring *administrative feasibility and efficiency*, concerning metering, collection of revenues, etc.

7.2.2 Competition

In order to create a Single Market, Member States agreed that public procurement in the water, energy and transport sectors should be open to general competition⁴³, i.e. to private entrepreneurs. Directive 93/38/EEC [46], which recently is in the process of amending [47], regulates the procurement procedures of public authorities for water, energy and transport sectors.

Traditionally, water supply in European Union falls under the responsibility of local authorities that control and execute water supply [41]. Today it can be observed that in some Member States (e.g. France and the UK) water supply is carried out more and more by private enterprises whereas in other Member States the supply is still mainly carried out by publicly owned entities (e.g. The Netherlands and Germany). A change towards private supply is taking place. Developments over the last decade demonstrate that besides their activities in the water sector, private entities are becoming active in other sectors, developing themselves into so called "multi utilities" (e.g. Vivendi, Lyonnaise des Eaux); the share of the total turnover covered by the water sector is diminishing. Recently, companies with a traditionally different main activity (e.g. the energy-based RWE) see the water sector as a new playing ground for profit making (either directly or indirectly through tying arrangements). Management approaches and values that traditionally were applied by the water suppliers risk to get changed and replaced by purely profit making concepts.

In preparation of privatisation, the production and provision of water services needs to be an economically viable activity, and at least a situation of service full-cost-recovery has to be achieved without any flow of subsidies. To make it attractive for private investors it is even necessary that profit making can be expected (i.e. they should be allowed to charge sufficiently high prices). Otherwise, they will invest their money in other sectors where they can earn a decent profit. Public supply services that are operated under full-cost-recovery conditions are well prepared for privatisation. The Water Framework Directive gives legal ground to prepare public water supply complying with the cost recovery provisions.

The development described above is therefore somehow going backwards; towards one entity (formerly local authorities) supplying all domestic services. Given that there is competition for services of supply of electricity, telecommunication, gas etc., competition in the sense of free selection of the supplier by the end-user, is unlikely for water services. Therefore the activities in the water sector for enterprises especially multi-utilities can have the function for a positioning on the market for public services. End-users may prefer to receive other services, such as energy supply and telecommunica-

⁴³ Member States shall take care that "... services of general economic interest ... operate on the basis of principles and conditions which enable them to fulfil their missions", Article 16, EC Treaty.

tion, from the same provider that already is operating water supply. Water supply therefore may become a key activity for the public services sector. In the scenario that one multi-utility is providing water and energy supply, telecommunication and other public services (e.g. mail) a situation could arise that makes it difficult to control the performance of the service. Appropriate information may be difficult to obtain, internal cross sectoral subsidies could be used in order to combat competitors. Such a situation would bring the enterprise in a very strong position but would be in contrast to the objectives of EU policy, namely open competition, no monopolies and (full) cost recovery of water services.

From the UK experience it can be concluded that the existence of a regulating institution is important in the situation of privatised water supply. However, the possibilities of the regulating institution are limited. Information about the water supply network, resources and the performance of the company can only be provided by the company itself and lack a neutral quality control. The obligation to provide certain information and the verification by an independent institution would help to improve the situation. The control of necessary needs, e.g. the maintenance of the distribution network, is difficult to establish and carry out, as information from an independent side about the state of the network is not available. Investments into the network therefore depend on the policy of the supplier himself.

7.3 ENVIRONMENTAL INSTRUMENTS

For a more efficient emission control of surface and groundwater, the Water Framework Directive requires⁴⁴ the application of a "combined approach" for emission reduction in the Member States. This includes measures for emission control based on Best Available Techniques (BAT), relevant emission limit values and Best Environmental Practices.

Within this combined approach, the conception of identification of Emission Limit Values used in the Dangerous Substances Directive will be complemented by a risk assessment (COMMPS - combined monitoring-based and modelling-based priority setting [4]). This procedural innovation distinguishing priority hazardous substances out of a list of priority substances is aiming at being more efficient than the procedure used in Directive 76/464/EEC.

Thus the approach followed by the Water Framework Directive on the one hand will comprise uniform requirements being the same for all Member States.

On the other hand, the Water Framework Directive leaves it to the discretion of the Member States to apply stricter provisions where this seems appropriate. This approach is in line with the subsidiarity principle, introduced to European policy with the Amsterdam Treaty. However, there will only be a very limited number of uniform requirements. Furthermore, there do not exist yet definitions of Best Environmental Practice and only a limited number of definitions for Best Available Techniques are agreed upon (in the IPPC process). Therefore, one could conclude that the smallest common nominator for the combined approach is on a low level, but that indeed there exists the

⁴⁴ Art. 10 in [48].

possibility to change them to a stricter level in the individual Member States. The latter is, however, depending on the political decisions in the Member States themselves.

7.4 SOCIAL INSTRUMENTS

7.4.1 Structural Funds

In the context of Water Management, European Regional Policy plays an important role especially for Greece and Spain (as well as Italy and Portugal). The Directorate-General for Regional Policy is responsible for European activities in support of the socio-economic development of the least-favoured regions of the European Union. European subsidies through structural funds intend to assist underdeveloped European regions in catching up with the socio-economic development and fulfilling requirements formulated in European policy. Through the Structural Funds [49] funding is provided that in the past mainly was used for projects to improve drinking water supply and waste water treatment. However, the European Commission does not directly fund projects. In the part-financing structure of structural funds' programmes Member States are responsible for identifying their priorities for funding and for selecting individual projects.

It is primarily the responsibility of the Member States and regions to define their priorities for development. However, account should be taken also of Community priorities, in order to promote the Community dimension of economic and social cohesion [50]. The programmes therefore aim at solving water problems to assure the availability of sufficient water. However, no common standards or guidelines concerning sustainable water management exist that consider the protection of resources or the environment. The decision on projects eligible for funding is a result of negotiation between Member States and European Commission.

7.4.2 Participation

Since 1997 within the European Spatial Development Perspective (ESDP) [40] European Commission is developing plans to improve spatial planning in the Member States. However, heading towards non-binding but consensus agreements, for the time being ESDP is only an accompanying tool in order to increase awareness and to demonstrate options.

The participation of actors involved in water management appears to be of extreme importance in order to comply with the requirements of an integrative and sustainable water management. The design of the participation process varies between the different Member States. A European initiative (European Spatial Development Perspective, ESDP) bears the potential to encourage such activities. However, in the Netherlands a model is applied that could be taken as example for a participative management strategy. The so-called "Green Polder Model" is based on a consensus concept involving all relevant actors in order to achieve a management system that considers the demands of all parties concerned.

8 LAKE MANAGEMENT AND EU POLICIES

European Water Policy comprises a set of legal acts that **directly** influence the management of lakes. An overview about the most relevant legal provisions and the historical developments that lead to them is given in this section. Further, national and local activities are described.

The aim of water management is to assure the supply of the population and certain activities with sufficient water complying with quality requirements. Lakes are influenced by a variety of activities in their catchment area or by direct uses, which may be competing with the abstraction for water supply. These activities do not always fall under the responsibility of decision-makers or of the water supplier in charge.

The quality of surface waters used as drinking water resources is regulated in the Surface Water Directive⁴⁵ where limit values for certain pollutants and quality criteria are laid down. Further, the purification technology to be applied is determined as a function of the crude water quality in order to assure compliance with the requirements of the Drinking Water Directive⁴⁶. Other existing quality objectives⁴⁷ are concerning uses, which are not directly related to the quality of drinking water resources.

Industrial pollution to aquatic ecosystems is tackled by the dangerous substances Directive⁴⁸ and its daughter directives. This Directive is limiting the emissions of sixteen dangerous substances by establishing Emission Limit Values. During its lifetime⁴⁹, this Directive could not develop its full capacity; it was supposed to set up limit values for 129 substances.

With the adoption of the IPPC⁵⁰-Directive this development is ongoing. However, not many Member States have yet implemented the IPPC-Directive and not yet all BREF⁵¹ notes are available. The IPPC Directive is relevant for certain industries over a defined capacity; it is not covering small installations or manufactures. The latter, however, are situated mainly in urban areas and sign responsible for urban industrial emissions [13].

Problems occurred during the transposition of European legislation into national law. Where the provisions of a European Directive left room for interpretation, problems were already encountered in the phase of transposition into national law (e.g. Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates

⁴⁵ Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water.

⁴⁶ Directive 98/83/EC on the quality of water intended for human consumption.

⁴⁷ E.g.: Directive 78/659/EEC on the quality of fresh waters needing protection or improvement in order to support fish life; Directive 79/923/EEC on the quality required of shellfish waters.

⁴⁸ Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into the aquatic environment.

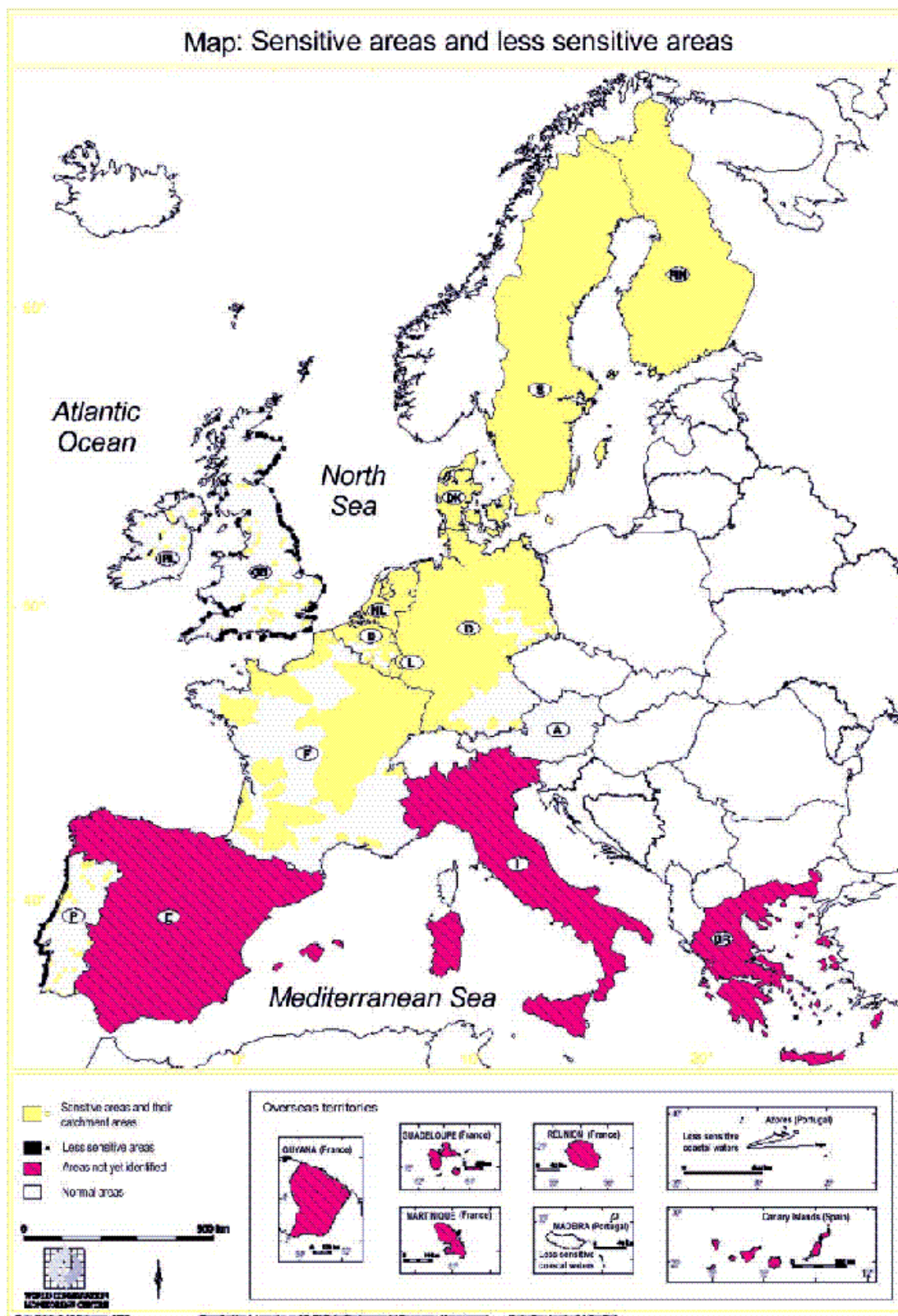
⁴⁹ Except of its Art. 6, Directive 76/464/EEC will be withdrawn 13 years after the entry into force of Water Framework Directive.

⁵⁰ Directive 96/61/EC concerning integrated pollution prevention and control.

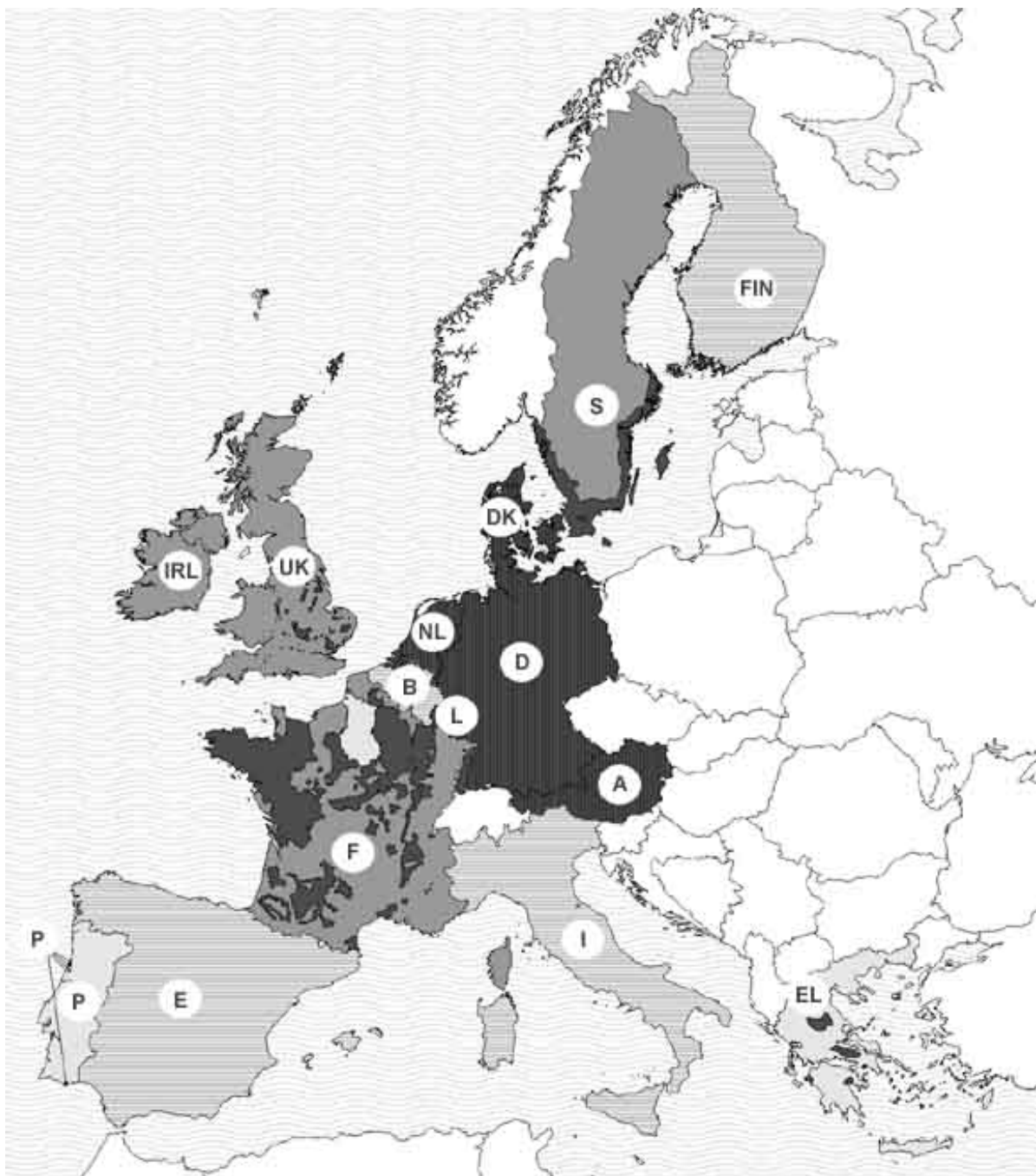
⁵¹ "BAT (best available techniques) Reference Documents"; which Member States are required to take into account when determining best available techniques generally or in specific cases.

from agricultural sources). Precise concentrations facilitated the **transposition** into national law (e.g. Directive 80/778/EEC concerning quality of water intended for human consumption). However, difficulties appeared in the application phase, when limit values turned out to be too ambitious and were not respected.

Other legislation failed because the aims to be achieved were too ambitious for some Member States or the integration into the given institutional frame did not comply with the requirements. This type of legislation already failed in the stage of formulation of the requirements between the European institutions when it was even not possible to achieve agreement between Member States (e.g. IPPC-complement for small installations [13]).



Map 1: Directive 91/271/EEC concerning urban waste-water treatment (Art. 5): Designation of sensitive and less sensitive areas as of 15/07/1998. Source: [27]



Map 2: Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources (Art. 3): Designation of vulnerable zones as of 30/07/1997. Source: [28]

9 GLOSSARY

Abstraction	The removal of water from a source of supply (which can either be surface waters or groundwater).
Aquifer	Permeable underground rock formation capable of storing and transmitting groundwater in significant quantities.
Benchmarking	has been defined as a continuous, systematic process for comparing performances of, for example, organisations, functions, processes or economies, policies or sectors of business against the "best in the world", aiming to not only match those performance levels, but to exceed them. Benchmarking allows us to analyse and improve key business processes, eliminate waste, improve performance, profitability and market share.
Bioaccumulation	The process by which a substance, such as pesticide or a heavy metal, becomes concentrated in living organisms.
Biochemical	The amount of dissolved oxygen (in mg/l) consumed by oxygen demand chemical and biological action when a sample is incubated for (BOD) five days at 20°C in the dark.
Borehole	A narrow shaft, normally drilled mechanically into the ground, used for taking samples of groundwater for monitoring purposes or for the extraction of drinking water from a groundwater supply.
Buffering capacity	Capacity to resist acidification.
COMMPS	<i>Combined monitoring-based and modelling-based priority setting.</i> Approach to rank substances for which sufficient data are available according to their relative risk to the aquatic environment in an automated manner and to apply expert judgement for the final selection of priority substances [5].
Culvert	A drain or covered channel.
Dangerous substances	Substances defined under the EC Dangerous Substances Directive (76/464/EEC) because they are toxic, persistent and/or accumulate in animals and plants.
Diffuse pollution	Pollution which originates from various activities and which cannot be traced to a single source, for example, fertiliser running off land and entering a river.
DWI	Drinking Water Inspectorate
EA	<i>Environmental Agency of England and Wales</i>
Ecosystem	A community of interdependent organisms and the environment which they inhabit.
Eutrophication	Process by which nutrient enrichment of water results in a growth of plants and/or algae to nuisance proportions.
Groundwater	Water contained in underground strata, which fills voids in soils and permeable geological formations.
Morphology	Form and structure.
NGO	Non-governmental organisation.

Nitrate Vulnerable Zone An area designated under the terms of the EC Nitrate Directive (91/676/EEC) as a result of high nitrate concentrations in surface or groundwater.

Point source pollution Pollution from a discrete source such as a discharge pipe, a septic tank or a spillage from an underground storage tank leaking into groundwater.

River Basin District means the area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, as the main unit for management of river basins. [48]

River basin means the area of land from which all surface run-off flows through a sequence of streams, rivers and, possibly, lakes into the sea at a single river mouth, estuary or delta. [48]

RWA *Regional Water Authority*

Surface waters Rivers, lakes, estuaries and coastal waters.

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Footnotes (see Table 3)

- *"IP"-references refer to Commissions press releases to be found under:
<http://europa.eu.int/rapid/start/cgi/guesten.ksh>*
- *"C"-references refer to Cases at European Court of Justice, to be found at:
<http://europa.eu.int/jurisp/cgi-bin/form.pl?lang=en>*

¹ Directive 76/160/EEC concerning the Quality of Bathing Water

² Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances

³ Directive 78/659/EEC on the quality of fresh waters needing protection or improvement in order to support fish life

⁴ Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into the aquatic environment

⁵ Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources

⁶ Directive 79/923/EEC on the quality required of shellfish waters

⁷ Directive 91/271/EEC concerning urban waste-water treatment

⁸ Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water

⁹ Directive 98/83/EC on the quality of water intended for human consumption (former 80/778/EEC)

¹⁰ IP/98/634, 7 July 1998

¹¹ IP/00/30, 13 January 2000

¹² IP/00/762, 5 July 2000

¹³ C-307/98; 25 May 2000 failing to comply with the directive

¹⁴ IP/98/1, 7 January 1998

¹⁵ C-207/97, 21 January 1999

¹⁶ IP/99/450, 2nd July 1999

IP/98/637, 7 July 1998

¹⁷ C-236/99, 6 July 2000

¹⁸ IP/00/762, 5 July 2000

¹⁹ IP/99/248, 22 April 1999

²⁰ C-198/97; 08/06/1999 failing to ensure adequate quality standards or to inspect its sites often enough

²¹ C-184/97, 11 November 1999

²² IP/99/450, 2nd July 1999

IP/98/637, 7 July 1998

²³ IP/00/762, 5 July 2000

²⁴ IP/99/507, 14 July 1999

²⁵ IP/00/384, 14 April 2000

²⁶ IP/99/599, 29 July 1999

²⁷ C-92/96, 12 February 1998

²⁸ IP/00/344, 7 April 2000

- 29 C-214/96, 25 November 1998
30 Ends Daily, 2 October 1998
31 IP/98/331, 6 April 1998
32 Ends Daily 30 June 1997
33 IP/98/1, 7 January 1998
34 IP/00/384, 14 April 2000
35 IP/99/599, 29 July 1999
36 IP/99/519, 16 July 1999
37 IP/99/506, 14 July 1999
38 IP/98/331, 6 April 1998
39 IP/00/14, 11 January 2000
40 IP/00/14, 11 January 2000
41 IP/99/599, 29 July 1999
42 IP/00/344, 7 April 2000
43 IP/99/603, 30 July 1999
44 IP/00/344, 7 April 2000
45 IP/99/813, 29 October 1999
46 IP/99/450, 2nd July 1999
47 ip/98/331, 6 April 1998
48 IP/99/603, 30 July 1999
49 IP/98/607, 2 July 1998
50 Ends Daily 18 September 1997
51 C-384/97, 25 May 2000, for failure to comply with the directive
52 C-232/95 and C-233/95, 11 June 1998
53 IP/98/1102, 11 December 1998 (Art. 169 of the Treaty)
54 IP/00/30, 13 January 2000
55 IP/99/507, 14 July 1999
56 IP/99/507, 14 July 1999
57 IP/00/344, 7 April 2000
58 IP/98/635, 7 July 1998
59 IP/00/344, 7 April 2000
60 IP/00/344, 7 April 2000
61 ENDS Daily, 20 May 1999: Irish river water quality in "long-term decline"
62 Ends Daily 21 March 1997
63 IP/99/509, 14 July 1999
64 IP/00/14, 11 January 2000
65 IP/99/599, 29 July 1999
66 IP/00/344, 7 April 2000
67 C-285/96, 1 October 1998
68 C-195/97, 25 February 1999
69 IP/98/883, 12 October 1998
70 IP/98/1, 7 January 1998
71 C-225/96, 4 December 1997
72 IP/00/726, 5 July 2000
73 C-95/302, 12 December 1996 for "failure to adopt and communicate to the Commission"
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⁷⁴ Article 171 gives the Commission the right to take legal action against a Member State which does not comply with a previous Court judgement. Following changes inserted by the Treaty on EU ("the Maastricht Treaty"), the article also allows the Commission to ask the Court to impose a financial penalty on the Member State concerned. In this concrete case European Commission suggested a daily penalty of ECU 185,850.

⁷⁵ IP/98/1103, 11 December 1998

⁷⁶ C-261/98, 9 March 2000: "for failure to comply with the directive"

⁷⁷ C-206/96, 11 June 1998

⁷⁸ IP/00/30, 13 January 2000

⁷⁹ IP/99/450, 2nd July 1999

IP/98/637, 7 July 1998

⁸⁰ IP/00/14, 11 January 2000

⁸¹ IP/98/634, 7 July 1998

⁸² Ends Daily 30 June 1997

⁸³ IP/99/450, 2nd July 1999

⁸⁴ IP/98/1, 7 January 1998

⁸⁵ IP/99/519, 16 July 1999

⁸⁶ Ends Daily 30 June 1997

⁸⁷ C-183/97, 18 June 1998

⁸⁸ IP/99/462, 7 July 1999

⁸⁹ IP/98/1, 7 January 1998

⁹⁰ IP/98/883, 12 October 1998

⁹¹ IP/98/331, 6 April 1998

⁹² Ends Daily 21 March 1997

⁹³ Ends Daily 30 June 1997

⁹⁴ C-214/97, 17 June 1998

⁹⁵ C-97/21, 26 June 1996

⁹⁶ IP/99/462, 7 July 1999 (Art. 228)

⁹⁷ IP/99/509, 14 July 1999

⁹⁸ IP/00/14, 11 January 2000

⁹⁹ IP/99/599, 29 July 1999

¹⁰⁰ IP/00/14, 11 January 2000

¹⁰¹ IP/99/45, 25 January 1999

¹⁰² ip/98/331, 6 April 1998

¹⁰³ IP/99/506, 14 July 1999

¹⁰⁴ C-340/96, 22 April 1999

¹⁰⁵ C-92/96, 12 February 1998