



# Global International Waters Assessment



## Transboundary Waters in the Black Sea-Danube region; Legal and financial implications

Paleari, S., Heinonen, P., Rautalahti-Miettinen, E. and D. Daler



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## **Thematic report**



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# Preface

The riparian countries of the Black Sea have agreed to collaborate under the Black Sea Commission with the goal of mitigating the sea's problems and restoring its environment. However, due to the transitional nature of the economies of the riparian states following the collapse of the Soviet Union, there are limited finances available for countries to fully comply with cleanup objectives. The Global Environmental Facility, GEF, has therefore funded the Black Sea Ecosystem Recovery Project (BSERP). UNEP/The Global International Waters Assessment has been asked to participate in BSERP and provide a scientific assessment that can guide the process of mitigation.

The EC Water Framework Directive (WFD), which is mandatory for EU member states and assignment states, can also provide the basis for

environmental improvement of the Black Sea, particularly as the non-EU countries in the region have stated that they will comply with it. Consequently, an assessment of how the Black Sea region countries have implemented the WFD is an important task in the overall GIWA assessment. The goal of this report is to provide such an assessment and to thereby contribute to the fulfilment of the objectives of the BSERP.

This analysis has been carried out by UNEP/GIWA Global International Waters Assessment in collaboration with the Institute for Economic Research on Firms and Growth - MI (National Research Council of Italy) and the Finnish Environmental Institute (SYKE), which has provided the expertise and information about the WFD and its implementation in transboundary waters.

**Dag Daler**  
**Scientific Director**  
**UNEP-GIWA**

# Executive summary

The Black Sea and the Danube River Basin have faced severe environmental degradation over the last 30 years. Since the beginning of the 1990s, the countries of the region, with the financial assistance of the international community, have started to cooperate in order to promote the sustainable use of transboundary water resources. As a consequence, the Convention on the Protection of the Black Sea against Pollution and the Danube River Protection Convention were signed in 1992 and 1994 respectively. The two conventions have led to the establishment of several institutions that have developed concrete measures and initiatives to protect the region's shared water resources.

In 2000, the European Union adopted the Water Framework Directive (WFD, 2000/60/EC), which is intended to be the cornerstone of a new EU water strategy. The Directive, based on 25 years of EU regulatory experience in the water sector, introduces innovative principles, mainly the management of water resources using river basins as a management unit. The WFD must be transposed and implemented not only by Member States, but also by candidate countries by the date of their accession.

This report provides an overview of the Black Sea region and its environmental problems. It presents the region's socio-economic characteristics and examines the water services of the Danube/Black Sea countries. Additionally, it describes the environmental status of the Danube River and of the Black Sea, exploring the main causes behind the region's water pollution and environmental degradation.

This report analyses the process of implementation of the EU Water Framework Directive in the Black Sea region from the legal, institutional and financial points of view. The region includes the Danube River Basin countries, the Black Sea coastal states and Belarus. The work mainly

focuses on EU accession countries of the Black Sea region, but other Danube/Black Sea countries that are not EU Member States are also evaluated.

The report discusses the institutional and legal aspects related to the implementation of the WFD in the Black Sea region. It presents the multilateral arrangements and institutional structures for the protection of transboundary waters that have been adopted in the region.

The analysis focuses on the comparison between the existing regional conventions/institutional structures and the requirements of the WFD and the progress of the Danube/Black Sea countries in adapting their laws and regulations to comply with the WFD. The report also discusses the financial aspects related to the implementation of the WFD and EU water legislation in the Black Sea region.

# Abbreviations and acronyms

A	Austria
AC	Activity Centre
AEWS	Accident and Emergency Warning System
AG	Advisory Group
AG CBD	Advisory Group on the Conservation of Biological Diversity
AG ESAS	Advisory Group on the Environmental safety Aspects of Shipping
AG FOMLR	Advisory Group on Fisheries and Other Marine Living Resources
AG ICZM	Advisory Group on the Development of Common Methodologies for Integrated Coastal Zone Management
AG IDE	Advisory Group on Information and Data Exchange
AG LBS	Advisory Group on control of pollution from Land-Based Sources
AG PMA	Advisory Group on Pollution Monitoring and Assessment
APC EG	Expert Group on Accident Prevention and Control
BAT	Best Available Techniques
BEP	Best Environmental Practices
BG	Bulgaria
BIH	Bosnia-Herzegovina
BOD	Biochemical Oxygen Demand
BSC	Black Sea Commission (Commission on the Protection of the Black Sea against Pollution)
BSEP	Black Sea Environmental Programme
CAP	Common Agriculture Policy
CARDS	Community Assistance for Reconstruction, Development and Stabilisation
CE	Current Expenditure
CEEC	Central and Easter European Countries
CIS	Common Implementation Strategy
COD	Chemical Oxygen Demand
CY	Cyprus
CZ	Czech Republic
DABLAS Task Force	Danube and Black Sea region Task Force
DDT	Dichlor Diphenyl Trichlorethylene
DRB	Danube River Basin
DRPC	Danube River Protection Convention
EBRD	European bank for Reconstruction and Development
EC	European Commission
ECO EG	Expert Group on Ecology
EE	Estonia
EEA	European Environmental Agency
EEC	European Economic Communities
EECA	Eastern Europe and Central Asia
EECCA	Eastern Europe, Caucasus and Central Asia
EEE	Environmentally-related Expenditure
EG	Expert Group
EIB	European Investment Bank

EMIS EG	Expert Group on Emissions
Environment DG	Environment Directorate General (European Commission)
EPDRB	Environmental Programme for the Danube River Basin
EPE	Environmental Protection Expenditure
EPI	Environmental Protection Investments
EU	European Union
FLOOD EG	Expert Group on Flood Protection
FRY	Federal Republic of Yugoslavia
G	Germany
GDP	Gross Domestic Product
GEF	Global Environment Facility
GNI	Gross National Income
H	Hungary
HCBs	Hexachlorobenzene
HCHs	Hexachlorohexanes
HR	Croatia
ICPDR	International Commission for the Protection of the Danube River
IFI	International Financial Institutions
IPPC	Integrated Pollution Prevention and Control
JAP	Joint Action Programme for the Danube River Basin
JDS	Joint Danube Survey
JTWG	Joint ad-hoc Technical Working Group
LIFE	Financial Instrument for the Environment
LT	Lithuania
LV	Latvia
MA	Malta
MD	Moldova
MLIM EG	Expert Group on Monitoring, laboratory and Information Management
N	Nitrogen
NIS	Newly Independent States
OECD	Organisation for Economic Co-operation and Development
P	Phosphorus
PAHs	Polyaromatic Hydrocarbons
PCA	Partnership and Co-operation Agreement
PCU	Project Co-ordination Unit
PL	Poland
RBM EG	Expert Group on River Basin Management
REC	Regional Environmental Centre
REReP	Regional Environmental Reconstruction Programme
RO	Romania
SAP	Strategic Action Plan
SIP	Strategic Action Plan Implementation Programme
SK	Slovakia
SLO	Slovenia
TDA	Transboundary Diagnostic Analysis
TF	Task Force
TNMN	Trans-National Monitoring Network
TPE	Transboundary Pollution Effects
TU	Turkey
UA	Ukraine
UNECE	United Nations Economic Commission for Europe
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WB	World Bank
WFD	Water Framework Directive
WG	Working Group
WSSD	World Summit on Sustainable Development

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# Introduction

**The catchment area of the Black Sea region comprises more than 2 million km<sup>2</sup>, entirely or partially incorporating 22 countries (Albania, Austria, Belarus, Bulgaria, Bosnia-Herzegovina, Croatia, the Czech Republic, Germany, Georgia, Hungary, Italy, Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Serbia-Montenegro<sup>1</sup>, Slovenia, Switzerland, Turkey and Ukraine). It is composed of the Black Sea, the Sea of Azov and three main river basins: the Danube, the Dnieper and the Don.**

**The main goal of this report is to examine the possibilities of the EU Water Framework Directive in promoting water management in the whole Black Sea catchment area. However, the report will mainly focus on the Danube River Basin and the Black Sea coastal states in part because most of the Danube countries and the Black Sea coastal states, are already involved in the EU enlargement process and are directly interested in the implementation of the Directive.**

## The Danube

### General description of the Danube

The Danube flows about 2,850 km to the Black Sea, draining about 817,000 km<sup>2</sup>. It has about 300 tributaries, of which 30 are navigable. The basin of the Danube is the second largest in Europe and incorporates parts of Albania, Austria, Bosnia-Herzegovina, Bulgaria, Croatia, the Czech Republic, Germany, Hungary, Italy, Macedonia, Moldova, Poland, Romania, Slovakia, Slovenia, Switzerland, Ukraine and Serbia-Montenegro. Five of the 18 riparian states (Albania, Italy, Macedonia, Poland and Switzerland) have areas smaller than 2,000 km<sup>2</sup> and are therefore not covered in this

<sup>1</sup> Upon the breakup of the Socialist Federal Republic of Yugoslavia, the remaining confederation of Serbia and Montenegro was reconstituted in 1992 as the Federal Republic of Yugoslavia (FRY). The FRY was then reformed and renamed in 2002 to Serbia-Montenegro. In this paper we generally refer to the country as Serbia-Montenegro. However, with regard to tables and figures and when commenting on data presented by tables/figures we quote the same country name used by the related source.

report. Major tributaries of the Danube are the Inn, the Drava, the Tisza, the Sava, the Morava and the Prut (Figure 1).

Direct transboundary relationships in the basin are summarised in Table 1. The axis labelled "Source countries" denotes countries that are directly upstream of other countries and that discharge water and pollution to downstream countries. The axis labelled "Direct recipient countries" denotes countries, which are directly downstream of other countries and which receive water and pollution from them.

The geography of the Danube River Basin is very diverse. It includes high mountain chains, wide plains, sand dunes, large forested or marshy wetlands and, very specifically, karst topography and the river's extensive delta. The Danube delta covers an area of some 4,100 km<sup>2</sup> and is a comparatively young formation. About 6,500 years ago the delta was a shallow cove of the Black Sea coast, but it was gradually filled by river-borne silt. The delta continues to grow seaward at a rate of 24 to 30 m annually.

Climate and precipitation vary significantly and they continuously shape the basin's landscapes. Generally the Danube Basin is dominated by a continental climate. The mountain chains receive the highest annual precipitation, while the inner and outer basins and the delta region are very dry.

Dams and reservoirs are found in all mountainous areas of the Danube Basin, while most navigation canals and irrigation networks are concentrated in the lowlands along the central and lower Danube. Hydropower use and energy production varies substantially from country to country. The total capacity in the Danube Basin is in the order of 29,200 MW. The biggest hydropower dam and reservoir system is located at the Djerdap (Iron Gate) gorge (117 km long), and began production in 1970.

The reservoirs trap some 20 million tonnes of sediments per year, thus serving both as an important nutrient sink and a concentration of



**Figure 1** The Black Sea Basin.

hazardous and toxic matter for pollution originating upstream in the Danube catchment. At the same time, sediments are prevented from travelling downstream, which has created erosion problems.

**Table 1** Matrix of direct transboundary relationships within the Danube Basin.

Source countries	Direct Recipient Countries												
	G	A	CZ	SK	H	SLO	HR	BIH	FRY	BG	RO	MD	UA
Germany		X											
Austria	X			X	X	X							
Czech Republic		X		X									
Slovakia			X		X								
Hungary				X			X		X				
Slovenia					X		X						
Croatia					X			X	X				
Bosnia Herzegovina							X		X				
Federal Republic of Yugoslavia								X		X	X		
Bulgaria									X		X		
Romania					X				X	X		X	X
Moldova											X		X
Ukraine				X	X						X	X	
*		X		X					X				

*Note:* the asterisk (\*) refers to countries with small areas and discharges in the basin. These countries are Albania, Italy, Poland and Switzerland. (Source: PCU 1999a)

Navigation is a traditional activity on the Danube. All Danube dams between Regensburg (Germany) and Iron Gate serve navigation needs. The tributaries are also used for navigation. This includes the Drava, the Tisza, the Sava and the Prut. Moreover, three artificial waterways (the Danube-Tisza-Danube Canal, the Danube-Black Sea Canal and the Rhine-Main Danube Canal) have been built on the Danube (Figure 1).

## Main demographic and economic characteristics of the Danube countries

According to official figures from 1996/1997, the population of the 13 Danube countries was about 223 million, and the population living in the Danube Basin about 81 million. Hungary is completely in the basin, while 97% of Romania's territory is within the basin. In comparison, Ukraine and Germany have not more than 6% and 11% respectively of their population living in the Danube River Basin. The average population density in the basin was 101 people/km<sup>2</sup>.

The extremely dissimilar degree of economic development of the Danube countries results in great disparities in country-specific GDP. Austria and Germany have the highest GDP, as well as the most advanced industrial

**Table 2** Annual abstraction of raw water from the Danube River Basin (million m<sup>3</sup>).

State	Year	Total without cooling water	Public water supply systems	Industry Mining	Agriculture Irrigation	Cooling water	Other purposes
Bosnia Herzegovina	1997	57	7	49	ND	ND	ND
Bulgaria	1996	234	ND	211	17	176	6
Croatia	1994	104	16	79	9	242	0
Czech Republic	1995	162	54	97	11	67	0
Hungary	1996	1,148	41	171	935	4,417	0
Moldova	1996	114	17	7	79	0	11
Romania	1996	7,388	1,237	4,647	1,504	2,600	ND
Slovakia	1997	879	49	747	83	0	0
Slovenia	1995	14	8	1	4	51	0
Ukraine		ND	ND	ND	ND	ND	ND
Federal Republic of Yugoslavia	1997	1,152	271	457	424	5,300	ND
Germany	1997	164	34	130	0	1,512	0
Austria	1997	1,300	0	1,300	0	1,300	0
<b>Total</b>		12,714	1,734	7,896	3,067	15,665	17
<b>Total(%)</b>		100	14	62	24	123	0

Note: ND=No Data. (Source: PCU 1999a)

and tertiary sectors, while the share of their agriculture sector ranged, in 2001, from 1 to 2%. The four new EU countries (the Czech Republic, Hungary, Slovakia, and Slovenia) have a lower GDP as well as strong industrial and tertiary sectors. The remaining countries are characterized by very different GDP values and by a leading agriculture sector.

## Water use, wastewater and water tariffs

A tally of national abstractions of raw water from the Danube Basin is presented in Table 2. Most of the total water abstracted from the Danube Basin is used for cooling purposes.

The data provided by the National Review Reports (1998) indicate that the total volume of wastewater discharged to the Danube River Basin is about 12.6 billion m<sup>3</sup> a year. This total wastewater volume is composed of 7.4 billion m<sup>3</sup> (59%) of wastewater from public sewerage systems and 5.2 billion m<sup>3</sup> (41%) of industrial and agricultural wastewater directly discharged into the river system.

**Table 3** Estimation of pollution from point sources (tonnes/ year) in the Danube River Basin.

Sector pollution	Municipal	Industry	Agriculture	Total
BOD	250,683	73,072		323,755
COD	605,667	245,183		850,850
N	179,000-222,000	43,000-55,000	10,000-15,000	232,000-292,000
P	34,900-44,000	6,200-10,700	2,000-4,100	43,100-58,800

(Source: PCU 1999b)

<sup>2</sup> Water tariff is the price a customer connected to a central water supply system has to pay to the water utility for one m<sup>3</sup> of water consumed. Wastewater tariff is defined as the price a customer connected to a central sewerage system has to pay to the utility for the discharge of one m<sup>3</sup> of wastewater.

The extent and the standard of wastewater treatment greatly differ from country to country. From this point of view, the Danube countries can be categorized as follows:

- Germany, Austria, Slovakia and the Czech Republic: less than 10% of non-treated wastewater is discharged;
- Hungary, Moldova: between 10 and 20% of non-treated wastewater is discharged;
- Romania, Ukraine, Bulgaria and Slovenia: between 30 and 40% of non-treated wastewater is discharged;
- Croatia, Bosnia-Herzegovina, Serbia-Montenegro: more than 80% of non-treated wastewater is discharged.

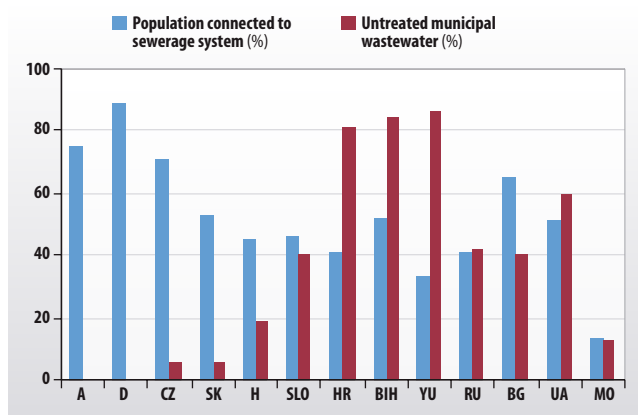
Both water and wastewater tariffs<sup>2</sup> are extremely different from country to country and there is usually a significant gap between the relatively low (and often still subsidized) tariffs for the population at large and the high (in some case extraordinary high) tariffs for industry. Moreover, in many accession countries there was a marked increase in prices during transition, resulting in lower water use.

## Causes leading to environmental problems

The Danube River Basin is under great pressure from diverse human activities, which can be allocated to the municipal, industrial and agricultural sectors. An estimation of the total pollution from point sources is presented in Table 3.

The municipal sector has an important influence on the environmental quality of the Danube River Basin, since 60% of the overall amount of wastewater comes from this sector. The type and rate of applied wastewater treatment varies widely (Figure 2). Germany and Austria,





**Figure 2** Population connected to sewerage system and untreated municipal wastewater, by country.  
(Source: PCU 1999b)

both of which have implemented the EC Urban wastewater treatment Directive (91/271/EEC), have achieved a good level of emission reduction.

Another important cause of water pollution and environmental degradation comes from municipal solid waste. In the Danube countries, except for Germany and Austria, municipal solid waste has usually been dumped in unauthorized and uncontrolled sites or together with industrial and even hazardous waste.

Industry, including mining and energy production, represents, after services, a major economic sector throughout the region. This sector abstracts water from the Danube River Basin system at a rate of 12.7 billion m<sup>3</sup> per year; an additional 15.4 billion m<sup>3</sup> per year are withdrawn for cooling purposes. Out of the former figure, 62% is abstracted for industrial and mining purposes. Moreover, according to the list of hot spots compiled by the Danube Pollution Reduction Programme (1999), there are 220 industrial hot spots within the Danube Basin, unevenly distributed among the countries. Romania alone has 122 hot spots.

On a general level, the environmental impact of the industries depends both on the structure and the performance of national economies and on the effectiveness of national legislation and institutions. Moving from the upper towards the lower Danube countries, there are visible differences in the performance of national economies, which can be seen to have a pattern with the EU Member States in one group, accession countries in another and third countries in the last. This pattern is also visible at the environmental level, as the economic transition has often resulted in a switch from heavy industries towards less-polluting lighter industries and services. With regard to the legal/institutional aspects, EU Member States, as well as the accession

countries, are required to implement many different legal acts that regulate industrial activities from an environmental perspective. These legal acts are not only directly related to water quality, but they also cover waste management, chemicals, industrial pollution control, and risk management.

More specifically, there are many interlinked causes related to the industrial sector that contribute to water pollution. These include the use of dirty and obsolete technologies, the discharge of wastewater without pre-treatment, the shortcomings of the management system and the inadequate disposal of wastes and hazardous substances.

Agriculture is a traditionally prominent economic sector, especially in the middle and lower Danube Basin countries. It covers different activities, including crop production, livestock, fish farming, and forest management. In earlier times, large quantities of cheap fertilisers and pesticides were used, causing degradation of rivers and groundwater. Poor land management also encouraged soil erosion.

The situation has changed since the early 1990s. In the first place, due to the economic crisis and to the reduction of agricultural subsidies, there has been a significant reduction in the total agricultural and livestock production which, along with a decreased application of fertilisers (Table 4) and pesticides, has resulted in some positive changes for the environment.

Secondly, environmental legislation in support of adequate agricultural practices began to be developed after 1990. The ongoing process toward EU accession is a major motivating factor in this sense. The harmonisation

**Table 4** The consumption of fertilisers in Danube countries.

State	Fertiliser consumption (Hundreds of grams per hectare of arable land)	
	1978-1981	1997-1999
Austria	2,615	1,774
Bosnia Herzegovina	/	663
Bulgaria	2,334	381
Croatia	261	306
Czech Republic	/	951
Germany	4,249	2,485
Federal Republic of Yugoslavia	1261	/
Hungary	2,906	832
Moldova	/	279
Romania	1,448	325
Slovakia	/	716
Slovenia	/	4,442
Ukraine	/	151

(Source: World Bank 2002)

of agricultural legislation with the EU *acquis communautaire* has already been completed in many respects. However, several gaps still exist, especially in institutional frameworks and in rural financial systems.

Although the changes have produced positive environmental impacts, it should be underscored that agriculture still makes a great contribution to water degradation in the Danube countries. The most important causes of point and diffuse sources discharges from the agricultural sector are the inadequate use and application of pesticides and fertilisers, the discharge of liquid waste from farms without pre-treatment, the leakage of on-site septic tanks and inappropriate forest management and land use. Models and expert forecasts show that the implementation of the Common Agriculture Policy (CAP) in accession countries will lead to moderately higher agricultural and livestock production, so that environmental pressure generated by this sector could rise again in the near future.

## Environmental problems in the Danube River Basin

As reported by the Strategic Action Plan for the Danube River Basin 1995-2005 (PCU 1999b), the core environmental problem of the Danube River Basin identified by the Danube countries can be described as “ecologically unsustainable development and inadequate water resources management”. The core problem is generated by different causes, such as: inadequate management of wastewater/solid waste, ecological unsustainable industrial activities, and inadequate land management and improper agricultural practices. Such a problem produces, on the one hand, three direct consequences:

- pollution of surface/groundwater,
- eutrophication, and
- accelerated runoff/erosion.

These consequences have, on the other hand, the following main effects:

- decline in quality of life,
- human health risks,
- degradation of biodiversity,
- economic decline, and
- reduced availability of water.

Water quality in Danube has recently been examined by the Trans-National Monitoring Network, TNMN (ICDPR 2001) and the Joint Danube Survey, JDS (ICDPR 2002). The TNMN Report is based on data collected in 1996-2000. The JDS was conducted from August to September 2001 and it has produced a consolidated picture of the Danube and its major tributaries in terms of water quality. The main results are summarised in Box 1.

### Box 1 Environmental status of the Danube.

#### Ecological status

- The saprobity (Standard ONORM M 6232) of the Danube, assessed on the basis of the zoobenthos, varied between water class II (moderately polluted) and II/III (critically polluted). The Danube showed good water quality (class II) all the way to Budapest. Arms and tributaries were found to be more polluted and reached water quality class III (strongly polluted) or worse.
- With regard to phytoplankton, high values indicated eutrophic conditions in the middle reaches, particularly downstream of Budapest, as well as in some tributaries (the Iskar, the Velika Morava, the Ipoly, and the Sio). In some tributaries (the Jantra, the Russenski Lom, the Arges, the Siret and the Prut) high concentrations of nutrients indicated eutrophic conditions, but only low phytoplankton biomass values were found, probably due to some inhibitory effects.
- The microbiological results showed faecal pollution reached the highest values in the tributaries (the Russenski Lom, the Arges, the Siret and the Prut). Lower bacteria values could be observed in the upper Danube Basin, as well as in and downstream of the Iron Gate reservoir. Higher levels were found in the middle part, particularly downstream of Budapest and Beograd.

#### Chemical status

- According to the TNMN for most of the heavy metals, the general pattern is increasing from the upper and middle to the lower Danube; the heavy metals content in some tributaries is higher than the content in the Danube itself. The contamination is rather high in case of lead and copper, with 57.3% of values for lead and 56.7% of values for copper above the target limit. The contamination of the Danube itself for cadmium and mercury is characterised with 47.4% of values exceeding the cadmium target level and 36.6% of values exceeding the mercury target level. In tributaries, the situation is better for cadmium, but worse for mercury.
- The results of the JDS show that contamination by chromium, lead and mercury is rather low. Instead, serious contamination of the Danube and several of its tributaries with copper, nickel and particularly arsenic was observed.
- The organochlorine compounds (lindane and DDT) show the same spatial profile, with an increasing pattern from the upper and middle to the lower Danube; with respect to levels that exceed the target value for lindane (23.8%) and for DDT (70.5%). The pesticide atrazine is undetectable at most of the monitoring sites along the Danube, but 12.5% of the data are above target limit. In tributaries, 30% of values are above the target; chloroform values are above the target limits by 29.0% in the Danube and 39.5% in tributaries.
- The concentrations of polyaromatic hydrocarbons (PAHs) in sediments were usually lower than the quality target, while their concentration in mussels showed an increasing trend as one moved downstream to the Danube delta. The highest concentrations were measured in mussels collected from tributaries in the middle reaches of the Danube.

## Transboundary environmental effects

According to EEA (2003), at European level, the new EU Member States and accession countries of the Danube Basin have the highest dependency on external water resources (about 70% of their total resources). Transboundary relationships within the basin make each Danube country very vulnerable to water pollution and degradation generated by the others.

Transboundary pollution effects (TPE) can be seen with respect to all economic sectors. In the municipal sector, major towns that are situated directly along the river systems and that discharge large amounts of untreated wastewater are often the cause of TPE. The downstream countries, as a consequence, face problems of limited use of water resources and risk for human health and biodiversity. In the industrial sector, TPE have been observed in the whole Danube Basin, and are more pronounced in the middle and low sections. Agriculture activities also result in transboundary effects, which might primarily affect surface water, causing pollution and thereby presenting a threat to the health of the downstream water quality and biota.

The areas most affected by the TPE described are the Danube delta and, ultimately, the Black Sea. About 340 million m<sup>3</sup> of Danube water pour into the Black Sea every year, passing through the delta and representing more than 50% of the sea's total riverine inflow. The Danube delta is an environmental buffer between the Danube River and the Black Sea, filtering out pollutants and permitting both water quality conditions and natural habitats for fish in the delta and in the environmentally vulnerable shallow waters of the north-western Black Sea. Additionally, it is Europe's broadest remaining natural wetland, with unique ecosystems with extensive reed beds, forests, sand dunes, and grasslands. It is home to several rare bird species, an important resting point for migrating birds, and is rich in fish and unusual flora.

## The Black Sea

### Geography and hydrological factors

The Black Sea is a very isolated sea, and due to its geomorphologic structure and specific hydrochemical conditions, it is very vulnerable to pressure from land-based sources of pollution. Eutrophication is one of the most serious problems facing the Black Sea and one of the key explanations for its environmental decline. However, the loads of nutrients entering the Black Sea from the Danube have fallen in recent years due to several reasons: the collapse of the economies of many of the Danube and former Soviet countries, the dramatic reduction in the use of fertilisers in many middle and lower Danube countries, and considerable improvement in the treatment of wastewater in the upper (Germany and Austria) and central Danube countries (Czech Republic, Hungary, Slovenia, and Slovakia).

The Black Sea has a surface area of 423,000 km<sup>2</sup>, with a total volume of 547,000 km<sup>3</sup> and a maximum depth of around 2,200 m. The Black Sea is an almost entirely landlocked sea (Figure 1). At the north-eastern corner, the Kerch Strait links the Black Sea to the Sea of Azov, which has an area of 40,000 km<sup>2</sup> and an average depth of 8 m. In the southwest, the outlet to the Mediterranean is via the Bosphorus Strait.

More than 300 rivers flow into the Black and Azov Seas, including the second, the third and the fourth major European rivers, namely the Danube, Dnieper and Don. The estimated annual volume of river discharge entering the Black Sea fluctuates from 294 to 480 km<sup>3</sup>. Vast quantities of silt are brought by rivers, resulting in low transparency of coastal waters especially in the north-western Black Sea area and in the Sea of Azov. The construction of dams for irrigation and power generation purposes has resulted in a substantial net decrease in the

runoff to the Black Sea and the Sea of Azov. This, in turn, has caused a reduction in the freshwater and sediment inflow into these areas, with concomitant coastal erosion and changes in salinity.

In a major part of the Black Sea Basin, the climate is similar to the Mediterranean (warm humid winters and hot dry summers). The south-eastern part, surrounded by the mountains, is characterised by a humid subtropical climate (abundant precipitation, warm winter, hot summer). In general, the Black Sea Basin climate is favourable for tourism and resort activities.

### Main demographic and economic characteristics of the Black Sea countries

The whole catchment area of the Black Sea has about 160-170 million of inhabitants, almost half of whom are from the countries of the Danube subbasin. The population of the six coastal states living in the Black Sea region is about 110 million (Table 5).

Most of coastal areas are densely populated and even over-populated during the summer season. According to estimates based on national census statistics, permanent human population along the Black Sea shores came to 16-20 million in the 1990s, with some 4-12 million per year of these represented by tourists. These data do not include people inhabiting the coasts of the Azov and Marmara Seas, or the citizens of Istanbul.

The economies of the Black Sea countries are characterised by a robust agriculture sector and by large disparities in GDP, GDP growth and GNI per capita values. In 2001, the GDP ranged from 3.1 billion USD in Georgia to 309.9 billion USD in Russia. In 2002, the GNI per capita of Turkey was almost four times that of Georgia.

### The water sector in the Black sea countries

There is a substantial difference in water availability among the coastal states. Apart from Russia, the annual renewable water resources range from 211.9 BCM (billion m<sup>3</sup>) in Romania to 21.3 BCM in Bulgaria in

**Table 5** Black Sea population, by country.

Country	Black Sea population (Millions)	Black Sea population (% of the total)
Bulgaria	5.5	5
Romania	23	20.6
Ukraine	47.1	42.2
Turkey	7.8	7
Russia	26.1	23.4
Georgia	2	1.8
Total	111.5	100

(Source: European Commission 2001a)

absolute terms, and from 12,035 m<sup>3</sup>/capita in Georgia to 2,680 m<sup>3</sup>/capita in Bulgaria in relative terms. Most of the water resources come from rivers that have significant seasonal and annual variability, including droughts and risk of flooding. The distribution of water is uneven not only in time, but also in geographic space and does not correspond to the population distribution.

On average, about 65% of the land area of the Black Sea countries is found in international basins. The dependency ratio from transboundary waters is very high in Romania (80%) and Ukraine (62%). With reference to water use, agriculture is the prevailing sector in Bulgaria, Georgia and Turkey, while industry is the largest water user in Romania, Russia and Ukraine. Except for Turkey, which has experienced a 40% increase, water use has significantly dropped during the last decade in all the other countries of the region, partly as a result of higher water prices and partly as a result of economic decline.

The population that is connected to water supply networks ranges from 95% in Bulgaria to 65% in Georgia, while the population that has access to sewerage ranges from 86% in Russia to 52% in Romania. The lack of wastewater treatment facilities contributes to the poor quality of water resources in most Black Sea countries. Moreover, where wastewater treatment plants exist, they often are not working properly.

## Environmental problems of the Black Sea

The Black Sea is affected by severe environmental degradation. In 1995, the Black Sea was rated as having the highest concerns in five out of seven environmental categories, the worst of any of the European seas (Stanners and Boudreau 1995). Some signs of recovery have been observed in the last years, but eutrophication remains a severe problem (Box 2).

The main causes of seawater pollution (Box 3) come from point and diffuse land-based sources, river run-off, atmospheric deposition, and intentional and accidental discharges from vessels. Many coastal municipalities and industries discharge their wastewater directly to the sea with inadequate or no treatment.

The industrial sector plays an important role with regard to most of the forms of pollution illustrated in Box 3. After services, industry, including mining and energy production is the major economic sector throughout the region. The metallurgy, mining and chemical industries, along with the energy sector, are the most polluting and contribute to water contamination through untreated or inadequately treated wastewater discharge and through pollution from accidents.

### Box 2 Nutrients and eutrophication in the Black Sea.

- Eutrophication, caused by nutrients (nitrogen and phosphorus) is the primary problem of the Black Sea.
- It started particularly in the late 1960s, when fertiliser use grew markedly and urban settlements were increasingly seweraged, but nutrients were not removed from sewerage.
- The economic crisis that began in 1991, however, resulted in opportunities for improvement of ecosystems: farmers were unable to apply the quantity of fertilisers used in the former economies and many large polluting industries were forced to close. As a consequence, a decline in nutrients resulted.
- The main sectors responsible for nutrient inputs are municipal and agricultural.
- In agricultural sector, the transition to a market-oriented economy has caused a significant reduction in the total production of agriculture and livestock, with some positive consequences for the environment. Additional improvement has arisen from the enforcement of the EU Nitrate Directive 91/676/EEC in the MSs.
- The economic impact of algal blooms and, in particular, of harmful and toxic ones, include the value of damage to wild fish and shellfish stocks, and reductions in tourism and associated industries. Eutrophication, along with overfishing, pollution and *Mnemiopsis leidyi*'s invasion, contributed to the dramatic declines in landings from the middle 1980s to 1991. From 1992, a slight upward trend in fish catches began and landing levels have since recovered. However, the economic return has not recovered. Employment in the fishery sector has been vastly affected.
- With regard to the tourist sector, the number of people vacationing on the sea has dropped substantially in recent years. Furthermore, eutrophication was the direct cause of the destruction of the *Phyllophora* ecosystem in the north-western shelf. Such destruction, in turn, not only affected the entire Black Sea, but ecosystem in the north-western shelf. Such destruction, in turn, not only affected the entire Black Sea, but also had an economic impact on those industries that used gelatine extracted from *Phyllophora*.

### Box 3 Pollution of the Black Sea.

- Oil pollution in the Black Sea is predominantly concentrated in the coastal area around stationary sources, such as river mouths, sewerage outfalls, harbours and industrial plants. Accidental and operational spillage of oil and petroleum products from vessels contributes to pollution in both inshore and offshore areas.
  - Polyaromatic hydrocarbons (PAHs) have been found in bottom sediments near Odessa, the Danube coastline, and in Sochi (Russia). With regard to concentrations in marine waters, the Black Sea Commission (2002) has reported high concentrations of PAHs in different areas.
  - Synthetic pollutants are represented by organohalogenes such as DDT, polychlorinated biphenyls (PCBs), hexachlorohexanes (HCHs), and hexachlorobenzene (HCB), mainly from agriculture, industry and municipal sewage. Their levels in the seawater and sediments in some coastal appear to be quite high.
  - The source of radioactive pollution is the Chernobyl catastrophe in 1986. Anthropogenic radionuclides were introduced to the sea mainly by atmospheric precipitations and rivers. In the 1990s, the Black Sea showed relatively high concentrations of radionuclides. The preliminary results of the Marine Environmental Assessment of the Black Sea Region (IAEA) underline that radioactivity levels have no significance in terms of human health and environmental safety.
- Due to a poorly developed tourist infrastructure and the illegal disposal from marine transport and households, the Black Sea and its coasts seem to be subject to very high levels of solid wastes, although the littering of beaches and ultimately marine waters is illegal in all the coastal states. Almost all Black Sea cities and settlements currently discharge their effluents into the marine environment directly or via rivers. The estimated total volume of sewage comes to over 571 million m<sup>3</sup> per year (Mee 1993).

Because of the severe economic problems experienced by almost all of the countries in the region, many industrial plants were closed during the last ten years. Since restructuring is usually not feasible for industrial installations that have reached the end of their economic life and a shift to cleaner technologies is even more difficult, technologies that are currently in use are frequently outdated, unsafe, and highly polluting.

# The current legal and institutional framework

## The Danube River Basin

The first legal/institutional framework for cooperation in protecting the Danube water environment through joint measures was established with the signing of the Bucharest Declaration in 1985. The next step, the adoption of the Convention on the Protection and Sustainable Use of the Danube River, was taken in 1994 in response to the need to develop an international water protection strategy for the Danube River. With its entry into force in October 1998, the Convention became the key legal instrument for regulating cooperation and transboundary water management in the basin.

To facilitate its implementation, the International Commission for the Protection of the Danube River was established as the main decision-making body of the Convention. The Commission's work is supported by a Permanent Secretariat and by different Expert Groups and Working Groups.

In 1994, the Danube countries adopted a Strategic Action Plan, which provides directions for achieving the goals of regional integrated water management expressed by the Convention. The Strategic Action Plan has recently been reviewed (ICPDR 2000).

In December 2004, the first ICPDR Ministerial Meeting took place in Vienna, bringing to the approval of the Action Programme for Sustainable Flood Protection, the Danube Declaration, the Memorandum of Understanding for the Tisza River Basin and the Danube Analysis as required by the EU WFD "Roof Report 2004" (ICPDR 2005).

## The Convention on cooperation for the protection and sustainable use of the Danube River

The Convention on Cooperation for the Protection and the Sustainable Use of the Danube River (Danube River Protection Convention or DRPC) was signed on 29 June 1994 in Sofia by eleven of the Danube riparian states and the European Community. It came into force on 22 October 1998.

The Convention implements the UNECE Framework Convention on the Protection and Use of Transboundary Water Courses and International Lakes on a regional basis (Helsinki, 1992). Moreover, it supersedes the Bucharest Declaration for the Protection of the Danube River against pollution (1985). The contracting Parties to the DRPC are:

- the European Community;
- Austria and Germany, which are EU Member States;
- the Czech Republic, Hungary, Slovak Republic and Slovenia, which are new EU Member States;
- Bulgaria, Croatia and Romania, which are accession countries;
- Moldova, Serbia and Montenegro, and Ukraine, which can be considered as third countries.

Bosnia-Herzegovina is currently an accredited observer and it is completing the process to become a full Contracting Party to the Convention. Many international conventions/institutions (such as the Black Sea Protection Convention) are also accredited observers.

The Convention applies to the surface waters and the groundwater in the catchment area of the Danube River. In particular, the following activities and measures are subject to the Convention, as far as they cause or are likely to cause transboundary impacts:

- the discharge of wastewater, the inputs of nutrients and hazardous substances, both from point and non-point sources, as well as heat discharge;
- planned activities and measures in the field of water construction works, in particular regulation, as well as run off and storage level control and ice hazard abatement, as well as the effects of facilities situated in or beside the watercourse on its hydraulic regime;
- other planned activities and measures for the purposes of water utilisation, such as exploitation of hydro power, water transfer and withdrawal;
- the operation of the existing hydrotechnical constructions;
- the handling of substances hazardous to water and the precautionary prevention of accidents.

The Convention is also applicable to fisheries issues and inland navigation if problems of water protection against pollution caused by these activities are concerned. The Contracting Parties are charged with achieving the goals of sustainable and equitable water management, including the conservation, improvement, and the rational use of surface waters and groundwater in the catchment area as far as possible. Additionally, they are charged with making all possible efforts to control the hazards originating from accidents involving substances hazardous to water, floods and ice on the Danube River. Finally, they are charged with reducing the pollution loads of the Black Sea from sources in the catchment area. To this end, the Contracting Parties shall establish measures aimed at sustainable development and environmental protection of the Danube River. Such an objective is directed to ensure the sustainable use of water resources for municipal, industrial and agricultural purposes, as well as the conservation and the restoration of ecosystems and other requirements that affect public health.

The Contracting Parties are charged with developing, adopting and implementing relevant legal, administrative and technical measures in order to ensure efficient water quality protection, sustainable water use and to prevent, control and reduce transboundary impact. In this regard, the following measures shall be taken:

- recording of conditions of natural water resources within the catchment area, applying agreed-to quality and quantity parameters;
- adoption of legal provisions concerning wastewater discharges;
- adoption of legal provisions for reducing input of nutrients or hazardous substances from non-point sources;
- harmonisation of regulations for a high level of protection;
- adoption of measures to avoid the transboundary impacts of wastes and hazardous substances in particular originating from transport.

The Contracting Parties, taking into account the proposals from the International Commission, are charged with setting emission limit values for hazardous substances and nutrients contained in the effluents of targeted industrial sectors and for municipal wastewater.

- The Convention includes provisions regarding periodic inventories of the relevant point and non-point sources of pollution within the catchment area. Based on these inventories, the Contracting Parties are to establish a list of further prevention and abatement measures to be taken step by step. The inventory of emissions and the list of measures to be taken should form the basis for developing joint action programmes. The Contracting Parties are requested to monitor the progress made in the implementation of the joint action programmes by establishing periodic progress reviews. Joint monitoring programmes are also to be carried out by the Contracting Parties.

The Contracting Parties are to provide for coordinated or joint communication, warning and alarm systems on a basin-wide context. Contact points are to be designated in case of emergency events like accidental pollution or floods. The relevant authorities are to establish joint emergency plans.

The Convention lays down the provisions for the establishment of an International Commission for the Protection of the Danube River (ICPRD); the framework of the Commission is to be used to allow the Contracting Parties to cooperate to implement its objectives.

Five Annexes form an integral part of the Convention: Annex I defines the concept of Best Available Techniques (BAT) and Best Environmental Practices (BEP); Annex II lists the industrial sectors and hazardous substances that fall under the scope of the Convention; Annex III provides general guidance on water quality objectives and criteria; Annex IV describes the structure and procedures of the International Commission and Annex V outlines the arbitration procedure.

## **The institutional structure of the DRPC**

The Conference of the Parties represents the highest level body of the DRPC. It meets upon the recommendation of the International Commission and is responsible for reviewing policy issues concerning the implementation of the Convention. It can adopt recommendations and decisions, provided that at least three-quarters of all Contracting Parties are present.

The International Commission consists of delegations nominated by the Contracting Parties. It is the main decision-making body under the



Convention and it ensures its implementation, through the adoption of decisions and recommendations.

The ICPDR meets two to three times a year either in Plenary or as a Steering Group. ICPDR sessions, as well as the work of the Expert Groups and the development and implementation of projects, are supported by a Permanent Secretariat that has its headquarters in Vienna.

According to the Convention, the International Commission establishes a Standing Working Group and, for certain fields of work or specific problems, standing or ad hoc Expert Groups. The Standing Working Group and the Expert Groups consist of experts nominated by delegations. Actually, six standing Expert Groups cover technical issues (Box 4). Some of the Expert Groups are supported by other specialised sub-working groups. Finally, there is an ad hoc Expert Group that addresses administrative matters arising from the implementation of the DRPC and an ad hoc Tisza Group that is responsible for developing a Tisza River Basin Management Plan, incorporating flood protection and water quality objectives.

## Measures and activities under the framework of the DRPC

Before the adoption of the DRPC, in 1991, the Danube Basin countries and internationally active donors launched the Environmental Programme for the Danube River Basin (EPDRB), which was funded through EU (Phare/TACIS) and GEF resources. A Task Force (TF) and a Programme Coordination Unit (PCU) were created for the implementation of this programme.

The major achievement of the first phase of the Programme (1992-1996) was the approval of a Strategic Action Plan (SAP), which was adopted in December 1994, when it was still unclear when the DRPC would have entered into force. The SAP provides directions and a framework for achieving the goals of regional integrated water management as expressed by the DRPC. The main specific targets of the SAP are:

- to reduce the negative impacts of activities in the Danube River Basin and on riverine ecosystems and the Black Sea;
- to maintain and improve the availability and quality of water in the Danube River Basin;
- to control hazards from accidental spills;
- to develop regional water management cooperation.

The Strategic Action Plan Implementation Programme (SIP, 1996-2000) supported the implementation of the SAP. In 1999, a resolution was taken to review the SAP and, as a consequence, a Joint Action Programme for the Danube River Basin (JAP, 2001-2005) was adopted by the ICPDR, in November 2000. The main aims of the JAP are:

### Box 4 Expert Groups under the ICPDR.

- *The Expert Group on River Basin Management (RBM)*, which defines and prepares the activities the ICPDR should towards the implementation of the WFD in the Danube River Basin;
- *The Expert Group on Ecology (ECO)*, which carries out activities related to the conservation, restoration and sustainable management of aquatic ecosystems and those terrestrial ecosystems and wetlands directly depending on them. This Expert Group should also contribute to the implementation of the ecological provisions of the WFD;
- *The Expert Group on Emissions (EMIS)*, which focuses on the reduction of pollution resulting from emissions into the waters of the Danube and its tributaries. A priority issue is the harmonisation with the EU water policies, e.g. compliance with the WFD list of priority substances;
- *The Expert Group on Monitoring, Laboratory and Information Management (MLIM)*, which is responsible for issues concerning water quality assessment and classification, including the operation of the Transnational Monitoring Network Analytical Quality Control. Special activities of this Expert Group related to the Joint Danube Survey and the investigation of the Tisza River have been completed and the final technical reports have been prepared and published;
- *The Expert Group on Accident Prevention and Control (APC)*, which is involved in the operation of the Accident and Emergency Warning System (AEWS) and the communication of alarm/warning messages during accidents. An additional task is related to pollution prevention and precautionary control in the whole Danube River Basin;
- *The Expert Group on Flood Protection (FLOOD)*, which prepares and implements an action plan for sustainable flood protection in the Danube River Basin.

- the improvement of the ecological and chemical status of the water;
- the prevention of accidental pollution events;
- the minimisation of the impact of floods.
- In order to achieve these goals, the Contracting Parties and/or the ICPDR agreed to introduce some measures along with specific deadlines, in order to: reduce pollution, restore wetlands and floodplains, to cooperate in the field of monitoring, to minimise the impact of floods, and to improve river basin management as a means to improve water quality and quantity, according to the requirements of the EU WFD.

The ICPDR and its Expert Groups have carried out several long-term activities under the framework of the SAP, the SIP and the JAP. The following are particularly notable among all the activities to date:

- *Accident Emergency Warning System (Inventory of accident risk spots):* The Inventory (June 2001) reported and ranked 611 potential accident risk spots in nine countries.
- *Inventory of old contaminated sites in potentially flooded areas:* The basin-wide inventory was completed in 2003.
- *Inventory of protected areas:* These are the protected areas designated under EU regulations (Natura 2000). Countries that are not members of the EU had to select protected areas under national regulations.
- *Emission inventories:* These inventories are in compliance with Art. 5 of the EC WFD, which requires information on the type and scale of significant anthropogenic pressures, including point and diffuse sources of pollution. The inventory of municipal and industrial discharges was updated in 2003 (reference year 2002). An outline for a first agricultural point sources inventory (reference year 2002) has also been produced thus far.

- *Monitoring programmes:* At present this includes 61 stations placed in 12 countries.

Finally, it should be noted that, ten years after the signing of the DRPC, the ICPDR decided for the first time to convene an Ordinary Meeting at the Ministerial level, which took place in Vienna on 13 December 2004. This meeting has produced four important results:

- The adoption of the Danube Declaration, which recognises the progress achieved thus far in the Danube River Basin management and sets new goals and objectives to be reached in the coming years (see Box 5);
- The adoption of the Action Programme for Sustainable Flood Protection, established by the FLOOD EG, which defines the main principles and objectives for sustainable flood protection for the entire basin of the Danube River, along with a timeframe;
- The signing of the Memorandum of Understanding by the countries of the Tisza River Basin (Hungary, Romania, Serbia-Montenegro, Slovakia and Ukraine), who have committed themselves to an integrated cooperation under the umbrella of the ICPDR (see par. 2.4).
- The approval of the WFD Roof Report 2004 (Part A – Basin wide overview), which responds to the requirements of the WFD (Art. 5, Annex II and Annex III), regarding the first characterisation and analysis of the Danube River Basin District (see par. 3.3).

#### **Box 5** Main goals established by the Danube Declaration (13 December 2004).

- To implement the EU WFD, including the development of a coordinated River Basin Management Plan for the Danube Basin by 2009;
- To reduce further the risks from floods through the implementation of the Action Programme for Sustainable Flood Protection;
- To reduce the total amount of nutrients entering the Danube and its tributaries to levels consistent with the achievement of good ecological status in the Danube;
- To stop, by 2015 at the latest, all discharges of untreated wastewater from towns with more than 10,000 inhabitants and from all major industrial installations;
- To phase out entirely the discharge of those substances that have been identified as constituting the highest risk to the aquatic ecosystems in the Danube Basin and to reduce significantly the discharge of other pollutants;
- To reverse the trend of physical degradation of aquatic ecosystems by returning sections of the Danube and its tributaries to a more natural state;
- To protect, conserve, and restore the biodiversity and diverse habitats of water-dependent ecosystems;
- To improve monitoring systems and the availability of data, in particular in relation to the assessment of transboundary impacts;
- To ensure that the development of the agricultural sector in the Danube Basin does not lead to a degradation in the environmental quality of the river and its tributaries;
- To take all the reasonable measures to prevent industrial accidents resulting in dangerous substances being released into surface or groundwater;
- To carry out in 2005 a review of the operational structures of the ICPDR.

## **The Black Sea**

Environmental cooperation in the Black Sea region is based on the Convention on the Protection of the Black Sea against Pollution, which was signed in 1992 by the six coastal states. The Convention provides for the establishment of a Commission for the Protection of the Black Sea whose main task is to promote its implementation. The Commission is supported by a Permanent Secretariat and by many other bodies.

Under the framework of the Convention, two important Ministerial Declarations have been adopted (the Odessa Declaration of 1993 and the Sofia Declaration of 2002), along with a Black Sea Strategic Action Plan. The progress made in implementing the Strategic Action Plan in the 1996-2001 period has been assessed in a recently published report.

### **The Convention on the Protection of the Black Sea against Pollution**

The Convention on the Protection of the Black Sea against Pollution (or the Bucharest Convention) was signed in 1992 by the six coastal states (Bulgaria, Romania, Georgia, the Russian Federation, Turkey and Ukraine) and entered into force in 1994. The Convention applies to the Black Sea proper, even if it is open for accession by any non-Black Sea state, provided that the non-Black Sea state is invited by all Contracting Parties and that it is interested in achieving the aims of the Convention and in contributing substantially to the protection and preservation of the marine environment of the Black Sea.

The Contracting Parties are charged with ensuring the Convention is enforced and applied in those areas of the Black Sea where they exercise their sovereignty. Moreover, they must individually or jointly take, as appropriate, all necessary measures to prevent, reduce and control pollution of the Black Sea (Art. 5 par. 2). Finally, when entering bilateral or multilateral agreements for the protection and the preservation of the marine environment of the Black Sea, they must endeavour to ensure that such agreements are consistent with the Convention.

The Convention requires the Contracting Parties to meet more specific obligations in the following areas:

- Pollution from hazardous substances;
- Pollution from land-based sources;
- Pollution from vessels;
- Pollution in emergency situations;
- Pollution from dumping;
- Pollution from activities on the continental shelf;
- Pollution from the atmosphere;



- Protection of the marine living resources;
- Pollution from hazardous wastes in transboundary movement;
- Scientific and technical cooperation and monitoring.

In order to achieve the purposes of the Convention, the Contracting Parties shall establish a Commission on the Protection of the Black Sea against Pollution (BSC), to be assisted by a permanent Secretariat.

The Annex to the Convention lists substances and matters whose discharge into the sea from any source is strictly prohibited. Three Protocols are integral parts of the Convention: a) the Protocol on the protection of the Black Sea marine environment against pollution from land-based sources; b) the Protocol on cooperation in combating pollution of the Black Sea marine environment by oil and other harmful substances in emergency situations and c) the Protocol on the protection of the Black Sea marine environment against pollution by dumping; d) the Protocol on the biological and landscape diversity protection, all signed in 2003.

## The institutional structure of the Bucharest Convention

The Conference of the Contracting Parties meets upon the recommendation by the BSC and, if necessary, within ten days at the request of one Contracting Party under extraordinary circumstances. The primary function of the Conference is to review the implementation of the Convention and of Protocols upon the report of the BSC.

The BSC consists of one representative from each Contracting Party, who may be accompanied by alternate representatives, advisers and experts. It meets once a year. The most important functions of the BSC are:

- to promote the implementation of the Convention, recommending such amendments to the Convention/Protocols that may be required;
- to make recommendations on measures necessary for achieving the aims of the Convention;
- to elaborate on criteria pertaining to the prevention, reduction and control of pollution of the marine environment and to the elimination of the effects of pollution;
- to cooperate with competent international organisations, especially with a view to developing appropriate programmes or obtaining assistance in order to achieve the purposes of the Convention.

Decisions and recommendations of the BSC are to be adopted unanimously by the Black Sea states.

The BSC is assisted in its activities by a permanent Secretariat with coordinating functions. The establishment of the BSC Secretariat was delayed until October 2000.

The BSC has established several subsidiary bodies. There are, in particular, two ad hoc Advisory Groups, seven Advisory Groups (AG) organised thematically; and an Activity Centre (AC) and a national focal point for each AG. The purpose of the AG is to provide the BSC with the best possible advice and information on topics, which are key to the implementation of the Convention and of the related Strategic Action Plan (SAP, see below). The various AGs are as follows:

- AG on the Environmental Safety Aspects of Shipping (AG ESAS)
- AG on Pollution Monitoring and Assessment (AG PMA)
- AG on the Control of Pollution from Land-Based Sources (AG LBS)
- AG on the Development of Common Methodologies for Integrated Coastal Zone Management (AG ICZM)
- AG on the Conservation of Biological Diversity (AG CBD)
- AG on Fisheries and Other Marine Living Resources (AG FOMLR)
- AG on Information and Data Exchange (AG IDE)

Each of these AG is supported by a specific Activity Centre and by specific national focal points. Moreover, two ad hoc AGs have been created for the purposes of implementing the SAP:

- *ad hoc Working Group on the WFD*, which aims at harmonising national legislation with the EU WFD and;
- *ad hoc Joint Black Sea – Danube Technical Working Group*, which was established to assure the implementation of the technical measures of the Memorandum of Understanding (see par. 2.3), signed at the ministerial meeting in Brussels, in November 2001.

## The Odessa Declaration and the Black Sea Environmental Programme

After the Bucharest Convention was signed in 1992, but before its entry into force, the Ministries of the Environment of the six Black Sea countries approved the Odessa Declaration (1993), in order to set goals, priorities and the timetables needed to bring about environmental actions. The document is largely based upon Agenda 21 (the UN Conference on Environment and Development, 1992). It has established, in particular, the adoption of measures concerning:

- hazardous substances,
- disposal of radioactive materials,
- pollution from ships,
- transboundary movements of toxic wastes,
- natural resources,
- emergency response plans,
- assessment and monitoring,

- integrated coastal management zone,
- environmental impact assessment,
- arrangements for future cooperation.

In June 1993, a three-year Black Sea Environmental Programme (BSEP) was launched, with the financial support of GEF and the EU (Phare and TACIS). The three overall objectives of the Programme, (which was later extended for an additional two years) were: a) to improve the capacity of the Black Sea countries to assess and manage the environment; b) to support the development and the implementation of new environmental policies and laws; and c) to facilitate the preparation of sound environmental investments.

The most important achievement of the BSEP was, however, the Transboundary Diagnostic Analysis (TDA), which can be considered the first step in creating the Black Sea Strategic Action Plan. Prior to the launching of the BSEP, there was a lack of objective information on the causes of the Black Sea environmental crisis and on options available to policy makers for its protection and restoration. The TDA filled this gap by providing a systematic scientific analysis of the root causes of environmental degradation in the Black Sea. The document was finalised in June 1996.

### **The Black Sea Strategic Action Plan and the first Report on its implementation**

Based upon the findings of the TDA, the Strategic Action Plan (SAP), adopted in 1996, defined policy measures, actions and timetables for setting up and achieving the environmental objectives of the Bucharest Convention. The SAP focuses on three major issues that are closely interrelated:

- the reduction of pollution;
- the management of living resources and
- sustainable human development.

The first Report on the progress made in implementing the SAP was published in 2002; it covers the 1996-2001 period. The main conclusions of the assessment are as follows:

The SAP recognises that solving the problem of eutrophication requires action to reduce the nutrient loads entering rivers across the entire basin. Therefore it calls upon all states in the basin to agree on common water quality objectives for the Black Sea and a strategy of stepwise reductions in loads until the objectives are reached.

A list of sixty sources of pollution hot spots was prepared and agreed to by the Black Sea countries. In the SAP, these countries committed

themselves to substantially reduce these inputs by the year 2006, seeking financing from donors where necessary.

The decline in economic activities that the Black Sea countries are facing has caused an overall pollution reduction from industrial and agricultural pollution sources. Moreover, these countries have developed strategies to address pollution reduction that are directed at construction/reconstruction of wastewaters treatment plants, introduction of modern treatment/processing technologies, and introduction of resource saving technologies and cost recovery. The issue of insufficiently treated sewage was given special attention in the plan.

The Protocol on the protection of the Black Sea environment from pollution coming from land-based sources has not been fully implemented. The framework legislation, regulations and licensing system, based on the “polluter pays” principle, were enforced in all Black Sea countries long before the adoption of the SAP. However, these measures are not sufficient for successful enforcement due to existing economic problems. Moreover, payments for environmental damage and discharges are not usually used for environmental protection funds or environmental protection and remedial measures.

The national policies in the Black Sea countries are aimed at waste minimisation, reuse, recycling and recovery of landfills. The major legislative and regulatory tools for waste management are adequately developed in the Black Sea countries and include basic laws, regulations, and programs.

The final provisions on pollution of the SAP cover future monitoring of the state of the Black Sea. A “State of Pollution of the Black Sea” report will be prepared and published every five years, beginning in 1996. Moreover, a Black Sea Monitoring System will be established in compliance with the Bucharest Convention. Data regarding actual and assessed contaminant discharge measurements from point sources, rivers, and, where possible, diffuse sources, is to be compiled and freely exchanged every five years, beginning in 1996.

Although the collection of data on actual discharges is a common practice in the Black Sea countries, a regional reporting system has not yet been established.

With respect to sustainable human development, the SAP states that by 1998, all Black Sea coastal states will adopt criteria for environmental impact assessment and environmental audits that will be compulsory for all private and public projects. These criteria are to have to been harmonised by 1999.

Environmental impact assessments are fully integrated in the national legislation of the Black Sea coastal states and are mandatory for new projects. Environmental audits, which have not received the same level of development, are not compulsory in Russia and Ukraine.

The SAP takes a positive approach towards promoting a “green agenda” for economic growth. It suggests that aquaculture and tourism are two areas considered to have potential for economic growth in the Black Sea and to benefit the region in general. In order to avoid environmental damage resulting from these activities, their development shall be managed along common environmental norms, which were to be established by 1999.

With the exception of Turkey, environmental norms for aquaculture are still under development in most of the Black Sea countries. Regulatory norms should be established and control and monitoring systems should be set up. The issue did not receive proper attention both on the national and regional levels.

“Green tourism” is well developed in some specific areas of the Black Sea countries. Moreover, environmental protection has become one of the key principles of the Turkish tourism policy.

### **The Sofia Declaration**

In June 2002, the Ministries of the Environment of the six Black Sea countries adopted the Sofia Declaration, by which they commit themselves to further improve the Black Sea and the state of its marine and coastal ecosystems. In particular, an agreement was reached on the following measures:

- to support at a national level the ratification process for the Protocol on biological and landscape diversity protection;
- to intensify member countries’ endeavours to implement the SAP;
- to actively sustain the implementation of the Black Sea Ecosystems Recovery Project (see par. 4.5);
- to improve the data collection and management process in the framework of the BSC;
- to strengthen work at the national and regional level in sectoral integration in the environmental management, introduction and extensive use of economic environment management tools;
- to implement and further develop and enlarge the scope of the Memorandum of Understanding between the BSC and the ICPDR (see par. 2.3).

## **Co-operation between the Black Sea and the Danube countries**

Institutional co-operation between the Black Sea and the Danube countries started in 1997 when representatives of the BSC and the ICPDR, with the assistance of UNDP/GEF and UNEP, set up a Joint ad-hoc Technical Working Group (JTWG) in a Meeting at Costanta (8-9 December 1997).

The broad mandate of the JTWG, which is still operative, is to reinforce cooperation among the states of the Danube River Protection Convention and of the Bucharest Convention in relation to taking practical actions to protect the transboundary waters in the wider Black Sea Basin. In particular, the JTWG aims at creating a common base of understanding and agreement on the changes over time of the Black Sea ecosystem and the reasons for these changes, and to propose practical goals and objectives for remedial actions to address them.

To reach this goal, the following primary activities must be carried out:

- an assessment of the nutrient loads to the Black Sea from all sources in the Black Sea Basin, and their impacts on the Black Sea ecosystems;
- an assessment of the nutrient loads to the Black Sea from the Danube River Basin, and their impacts on the Black Sea ecosystem, with an emphasis on the Black Sea shelf;
- an analysis of other types/sources of pollution in the Black Sea and their impacts on the Black Sea ecosystem, with an emphasis on the input from the Danube River;
- assemblage and assessment of the available information on the likely response of the Black Sea ecosystem to specified reduction in nutrient loads; and
- recommendations for a joint mechanism to evaluate progress over time and report to both Commissions.

The JTWG has promoted the adoption of another important tool for strengthening regional cooperation. In November 2001, in fact, a Memorandum of Understanding was signed between the ICPDR and the BSC. This document establishes a long-term and an intermediate goal for the wider Black Sea Basin:

- the long-term goal is to take measures to reduce the loads of nutrients and hazardous substances discharged to the levels necessary to permit the Black Sea to recover to conditions similar to those observed in the 1960s;

- as an intermediate goal, urgent measures should be taken to prevent the loads of nutrients and hazardous substances discharged into the Black Sea and the Sea of Azov from exceeding those that existed in the mid 1990s (it has been specified, however, that these discharges are only incompletely known).

In 2001, the Ministers responsible for water protection in the countries of the Danube and Black Sea region signed a declaration (Declaration on Water and Water-related Ecosystems in the wider Black Sea region) announcing their aim to improve the water quality of the region, their wish to strengthen cooperation and pursue regional priorities for water quality and improvement projects.

Ministers also endorsed the European Commission's proposal to establish an informal Task Force for cooperation on water-related issues in the Danube and Black Sea Region (DABLAS Task Force, see par. 4.4.6). It consists of representatives from the countries of the region, the ICPDR and the BSC, other regional/international organisations active in the protection of water and water-related ecosystems in the region, international institutions (such as the European Bank for Reconstruction and Development, the European Investment Bank, the World Bank, UNDP/GEF, UNEP, and the Stability Pact for South Eastern Europe, as examples) interested EU Member States, other bilateral donors and the European Commission. The European Commission DG Environment includes the Secretariat of the Task Force. Its main tasks are:

- to support implementation of the Memorandum of Understanding;
- to provide suggestions to the ICPDR and the BSC concerning further strategic priorities;
- to develop a series of concrete activities, including a short list of prioritised projects for the rehabilitation of the waters of the region (the criteria for prioritisation are of both an environmental and financial nature).

In January 1995, representatives of Belarus, Russia and Ukraine signed a Memorandum in Kiev and GEF provided financial assistance to the by which they applied to UNDP assistance in developing an international programme on environmental rehabilitation of the Dnieper River Basin, implemented under the aegis of GEF. In June 1996, the Ministers of the Environment from the Dnieper countries signed a joint statement in Helsinki, expressing their intention to provide resources and share equal participation in this programme. The long-term objectives of the DRBP are: a) to remedy the serious environmental effects of pollution and habitat degradation of the basin, b) to ensure sustainable use of its resources and c) to protect biodiversity. Among the specific objectives of the Programme are the creation of a transboundary management regime and coordinating body, the formulation of a Strategic Action Programme (SAP) and the building of the capacity needed for SAP implementation.

Moreover, on 22 May 2003, the Ministers of the Environment of Belarus, Russia and Ukraine signed a new Declaration to codify their common political will to achieve sustainable use of the basin's natural resources, preservation of its ecosystems and restriction/reduction of transboundary pollution impacts. The Ministers stated their readiness to prepare an international agreement to serve as the main organisational mechanism for ensuring stable international cooperation among Dnieper countries, and which should define the general principles, goals, objectives and commitments of the signatories for the basin's environmental rehabilitation. Following such a Declaration, a draft agreement has been prepared as well as a draft SAP.

It should be noted that most of the countries in this region have ratified the 1992 Helsinki Convention on the protection and use of transboundary watercourses and international lakes. The Convention, which entered into force in 1995, establishes a framework for cooperation between the member countries of the United Nations Economic Commission for Europe on the prevention and control of pollution of transboundary watercourses, from a perspective of sustainable development.

## Other relevant multilateral water conventions/ institutions

Aside from the water conventions/institutions that we have examined with reference to the Danube River Basin and the Black Sea, other important initiatives are currently being carried out by the Dnieper countries and by the countries sharing some Danube River subbasins (such as the Sava and the Tisza subbasins).

# The EC Water Framework Directive and its implementation in the Black Sea region

## The Water Framework Directive

### The Water Framework Directive: an integrated legislative approach to the water sector

Water is one of the most comprehensively regulated areas of EU environmental legislation. A “first wave” of legislation began with the Surface Water Directive in 1975 and culminated in the Drinking Water Directive in 1980. These directives focused mainly on water quality objectives for particular water types and uses such as fishing waters, shellfish waters, bathing water and groundwater.

A 1988 review of European water legislation found room for improvement in a number of areas and gaps that had to be filled in a “second wave” of water legislation, which developed an emission limit value approach. This resulted in two new directives in 1991, namely the Urban Waste Water Treatment Directive and the Nitrates (from Agricultural Sources) Directive. The Integrated Pollution Prevention and Control Directive, IPPC (1996) was the last of these water directives.

From the beginning of the 1990s, there has been an increasing pressure for fundamental reform of the European Community water policy, as it was highly fragmented in terms both of objectives and means. The resulting Water Framework Directive (2000/60/EC, Decision 2455/2001/EC), based on a more holistic approach, is intended to be the cornerstone of the water strategy for the European Union.

The Water Framework Directive (WFD) contains many interesting new elements: it extends water protection to all waters; it adopts river basins as water management units; it combines the use of quality objectives

with the one of emission limit values; it promotes measures on quantity to serve the purpose of ensuring good water quality; and it establishes the principle of the recovery of the costs of water services.

The WFD introduces an integrated legislative approach to the water sector. In fact, it repeals different directives belonging to the “first wave” of legislation, even if their fundamental provisions have been updated and fitted into the unified legislative framework shaped by the Directive itself. Other pieces of water legislation, instead, will remain in force. Among the most significant of these are the Bathing Water Quality Directive (76/160/EEC), the Drinking Water Quality Directive (80/778/EEC) and its revision (98/83/EC), the Urban Wastewater Treatment Directive (91/271/EEC) and the Nitrates Directive (91/676/EEC).

In general, full implementation of the relevant existing directives, as long as they remain in force, seems to be a prerequisite for meeting the WFD objectives. In particular, the implementation of EC legislation for the protection of water is identified by the Directive as a minimum requirement.

**Table 6** Directives to be repealed by the WFD.

By December 2007	Information exchange Decision (77/795/EEC)
	Surface Water Directive (75/440/EEC) and its Daughter Directive (79/869/EEC)
	Fish Water Directive
By December 2013	Dangerous Substances Directive (76/464/EEC)
	Fish Water Directive (78/659/EEC)
By December 2013	Shellfish Water Directive (79/923/EEC)
	Groundwater Directive (80/68/EEC)

The WFD does more than make the whole of the EU's water legislation more consistent. It also aims at coordinating this legislation with the relevant international legal instruments, including those on pollution of the marine environment (the UNECE Convention of 1992, the Barcelona Convention, OSPAR, HELCOM, etc.).

### **Integrated land, water, and ecosystem management on a basin scale**

Experience clearly shows that uses of land and water resources are closely linked, so that they must be managed together, with full consideration of biodiversity. This means that environmental objectives for rivers can be reached only if the land they flow through is managed in a sustainable manner.

In general terms, it should be noted that at the EU level, the importance of environmental integration is recognised in Art. 6 of the EC Treaty, which stipulates that "environmental protection requirements must be integrated into the definition and implementation of the Community policies". The Council has identified agriculture, transport, energy, internal markets and development as priority areas where integration of environmental concerns can be improved or initiated.

With specific regard to the water sector, the WFD's treatment of river basins as a whole undoubtedly has the potential for integrated land and water management. In fact, the Directive requires each river basin district to carry out activities concerning both water use and land use/biodiversity, such as: review of the impact of human activity on the status of surface and groundwater (focusing on point and diffuse source pollution); identification of heavily modified water bodies (which, as a result of physical alterations by human activities, are substantially changed in character) and artificial water bodies (which are created by human activities); to establish a register of protected areas; and to adopt measures to control and reduce emissions from point and diffuse sources.

It should be noted that, as stated by the Common Strategy for the Implementation of the Directive, the European Commission (Environment DG) has committed itself to pursue further integration of the specific requirements of the WFD into other Community policies. Integration will be strengthened in some policy sectors (regional, agricultural, fisheries, development, marine, energy, transportation and internal market policies) most of which affect land management.

### **The environmental objectives**

The fundamental purpose of the WFD is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater, which:

- prevents further deterioration and protects and enhances the status of aquatic ecosystems and associated wetlands;
- promotes sustainable water use based on long-term protection of available water resources;
- aims at enhanced protection and improvement of the aquatic environment, and
- contributes to mitigating the effects of floods and droughts.

To this end, Art. 4 requires Member States to achieve "good" status for all waters (Box 6), with a few exceptions. In particular, water bodies that are artificial in construction or where the physical structure has been irrevocably and heavily modified are required to achieve a status of "good ecological potential". Demotions from "good" status are also allowed in unforeseen or exceptional circumstances, such as floods or droughts. In these cases, Member States must take all practical means to restore the water body to its previous status. Member States can also designate "protected areas" for specific water uses, where more stringent objectives apply.

### **Tools for the implementation of environmental objectives**

One of the fundamental principles adopted by the WFD adopts is that of water management at the level of the river basin, which appropriately reflects geographical and hydrological units, instead of administrative or political boundaries. Member States are to first identify and assign the individual river basins in their national territory to river basin districts, with coastal waters and groundwater assigned to the nearest or most appropriate district. A river basin covering the territory of more than one Member State should be assigned to an international river basin district.

Member States should then appoint a competent authority to coordinate the implementation of the Directive for each river basin district in their territory. The appointed authority is also responsible for producing a river basin management plan. In the case of an international river basin district, each Member State shall identify the appropriate authority for application of the Directive in the portion of the district within its territory. Existing national or international bodies may be identified by Member States as the appropriate authorities for the above-described purposes.

Additionally, Member States are to ensure that for each river basin district or for the portion of an international river basin district falling within their territory, the following documents are prepared according to technical specifications set out in Annex II and III:

- an analysis of its characteristics;

## Box 6 Criteria that define “good” as a status for surface waters and groundwater.

For **surface waters**, “good” status is determined using two criteria:

1. “Good ecological status”, which is defined by Annex V and has to be assessed using biological, hydromorphological, and physico-chemical elements of quality.
2. “Good chemical status” that means the chemical status achieved by a water body under which concentrations of pollutants do not exceed the environmental quality standards established in Annex IX, under Art 16 par. 7, and under other relevant Community legislation.

Annex IX makes reference to quality objectives set up by the Daughter Directives of the Dangerous Substance Directive (76/464/EEC), which has subsequently been replaced. Moreover, the Directive provides a mechanism for renewing these standards and introducing new ones by means of a prioritisation mechanism for hazardous chemicals. Art. 16 par. 7 thus requires the Commission to submit proposals for quality standards applicable to the concentrations of the priority substances in surface water, sediments or biota (Decision 2455/2001/EC).

The quality objective and the emission limit value approaches are both used by the WFD (Art. 10). In fact, the Directive first requires all discharges into surface waters to meet emission limit values, based on the best available technology, and as set out in the existing Directives. When these limits are not sufficiently stringent to reach a quality objective or a quality standard, whether established pursuant to the WFD or to any other Community legislation, then more stringent ones shall be established accordingly.

For **groundwater**, “good status” is determined using the following criteria:

1. “Good quantitative status” means that of the total annual recharge volume to a groundwater body, a portion is needed to achieve the ecological quality objectives for connected surface waters or associated terrestrial systems such as wetlands. For good environmental management, the Directive requires that only the volume above the amount required to sustain the surface ecology be available for abstraction.
2. “Good chemical status” is based on an assessment of general elements (such as saline intrusion) and conductivity.

It should be noted that the case of groundwater is somewhat different from surface water. The presumption in relation to groundwater is that it should not be polluted at all. For this reason, setting chemical quality standards would give the incorrect impression that Member States are allowed to discharge pollution up to an approved level.

- a review of the impact of human activity on the status of surface waters and groundwater, and
- an economic analysis of water use.

These documents play an important role in the development of both the river basin management plan and the programme of measures.

Once the river basin district has been characterised, Member States are then required to analyse the impact of human activity on the status of surface waters and groundwater within that district, focusing on both point and diffuse source pollution.

Taking into account the characterisation of the river basin and the analysis of human impact as outlined above, the environmental objectives for each water body must be established, and the water bodies at risk of failing to meet these objectives should be identified. Since this evaluation has to be made before monitoring programmes are put in place, the evaluation should essentially be conducted as a risk analysis. This information is then to be used to design monitoring programmes.

The results of the analyses required under Art. 5 are to be considered by Member States when preparing the programme of measures, which in turn is central to each river basin management plan. In order to achieve

environmental objectives, such a programme has to be established by Member States for each river basin district or for the part of an international river basin district within their territory.

Specific provision is made in the WFD for obligatory coordination between Member States sharing an international river basin district (in this case existing structures stemming from international agreements may be used), especially with reference to the programmes of measures. Member States are also charged with endeavouring to co-ordinate responses for international river basins that are shared between Member States and non-Member States.

The economic analysis required under Art. 5 should help to make decisions regarding the most cost-effective combination of measures needed to protect water resources. A second purpose of the analysis is to provide information on estimates of volume, investments, prices and costs of water services, to make the relevant calculations for the full cost recovery of water services.

Each programme of measures includes compulsory basic measures, such as those measures required to implement Community legislation for the protection of water; measures deemed appropriate for recovery of costs for water services; measures to promote efficient and sustainable water use in order to avoid compromising the achievement of environmental objectives; measures to meet the requirements related to waters used for the abstraction of drinking water; controls over the abstraction of fresh surface water and groundwater, and fresh surface water impoundments, including a register or registers of water abstractions and a requirement of prior authorisation for abstraction and impoundment.

(Member States can be exempt from these controls, abstractions or impoundments that have no significant impact on water status); controls, including a requirement for prior authorisation of artificial recharge or augmentation of groundwater bodies; for point source discharges liable to cause pollution, a requirement for prior regulation, such as a prohibition on the entry of pollutants into water or of prior authorisation; for diffuse sources liable to cause pollution, measures to prevent or control the input of pollutants; for any other significant adverse impacts on the status of water, measures to ensure that the hydromorphological conditions of the bodies of water are consistent with the achievement of the required ecological status; a prohibition of direct discharges of pollutants into groundwater subject to some specified conditions; measures to eliminate pollution of surface waters by those substances included in the list of priority substances and to progressively reduce pollution by other substances which would otherwise prevent Member States from achieving the environmental



objectives for surface waters; any measures required to prevent significant losses of pollutants from technical installations and to prevent and/or to reduce the impact of accidental pollution incidents.

When basic measures are not sufficient to achieve environmental objectives, supplementary measures (a non-exclusive list of which is provided by Annex VI Part B) can be designed and implemented.

The programme of measures and other detailed information regarding the river basin district are presented in a key document called the river basin management plan. This plan includes, among other things, a general description of the river basin district, a summary of significant pressures and impact of human activities, a summary of an economic analysis of water use, and a presentation in map form of the results of the monitoring programmes for the status of surface water and groundwater.

In the case of international river basins (whether they fall entirely within the EU or extend beyond the boundaries of the Community), Member States are asked to ensure coordination and cooperation with the goal of producing a single international river basin management plan.

## Monitoring water body status

According to Art. 8, Member States are charged with ensuring the establishment of programmes for the monitoring of water status. For surface waters, such programmes shall cover: a) the volume and level or rate of flow (to the extent this is relevant for ecological and chemical status and ecological potential) and b) the ecological and chemical status and ecological potential. Monitoring activities shall permit the classification of surface water bodies into five classes consistent with the normative definitions of the WFD (high, good, moderate, poor and bad).

There are three types of monitoring for surface waters: surveillance, operational, and investigative monitoring. For groundwater, monitoring programmes shall cover the quantitative and chemical status of water bodies and their results should be used to classify groundwater into two classes consistent with the normative definitions of the WFD (good and poor).

A detailed structure of various monitoring programmes has been presented in the Annex V of WFD. Additionally, the CIS Guidance on Monitoring presents a number of important applications for practical monitoring.

## Recovery of costs for water services

The WFD introduces the principle of recovery of the costs of water services. According to Art. 9, Member States shall take account of the recovery of the costs of water services, including environmental and resources costs, with regard to the economic analysis specified under Art. 5 and according to the polluter-pays principle.

The Directive does not clarify the meaning of either “environmental costs” or “resources costs”. A previous Commission Communication on pricing policies for enhancing the sustainability of water resources (COM/2000/477fin.), however, has defined both the expressions. In particular, it underscores the following:

- that “environmental costs” represent the costs of damage that water uses impose on the environment and ecosystems and those who use the environment (e.g. a reduction in the ecological quality of aquatic ecosystems or the salinisation and degradation of productive soils); and
- that “resource costs” represent the costs of foregone opportunities that other uses suffer due to the depletion of the resource beyond its natural rate of recharge or recovery (e.g. linked to the over-abstraction of groundwater).

The second paragraph of Art. 9, which is more strictly binding, states that Member States shall ensure:

- that water-pricing policies provide adequate incentives for users to use water resources efficiently, thereby contributing to the environmental objectives of the Directive;
- an adequate contribution of the different water uses, disaggregated into at least industry, households and agriculture, to the recovery of the costs of water services, based on the economic analysis required under Art. 5 and taking account of the polluter-pays principle.

Moreover, it should be noted that, when establishing water pricing policies under Art. 9, Member States can take into account social, environmental and economic effects, as well as geographic and climate conditions. This might be justified in some cases, while leaving room to manoeuvre. Secondly, Art. 9 does not prevent the funding of specific “preventive or remedial measures” in order to achieve the environmental objectives of the WFD. Therefore, Member States still retain some latitude for subsidising some infrastructures, which, may be reasonable in economic terms. Member States can simply decide not to establish any water pricing policy for a specific water use activity (i.e. irrigation) as long as this does not compromise the achievement of the Directive’s objectives. But in this circumstance, Member States will have to report the reasons behind such a derogation under the river basin management plan.



## Implementation of the WFD

The WFD sets out specific deadlines for each of the requirements, which add up to an ambitious overall timetable. The key milestones of such timetable are 2009, when river basin management plans, including programmes of measures, have to be finalised, and 2015, when the environmental objectives have to be reached.

The full implementation of the WFD by Member States also depends partly on the adoption of new Community law for some areas, which is required under the Directive itself. In addition to the list of priority substances (which will have to be revised and updated), the Commission shall issue other relevant legislative proposals concerning:

- quality standards applicable to the concentrations of priority substances in surface water, sediments or biota;
- measures and controls for the progressive reduction of discharges, emissions, and releases of priority substances;
- measures and controls for the cessation or phasing out of discharges, emissions, and releases of the priority hazardous substances (that is, priority substances classified in the related list as hazardous); and
- measures to prevent and control groundwater pollution.

In order to address these challenges in a cooperative and coordinated way, the Member States, Norway and the Commission agreed a Common Implementation Strategy (CIS) for the WFD just five months after its entry into force. The aim of the CIS is to develop supporting technical and scientific information to assist in the practical implementation of the Directive. The guidance documents that have been prepared for this purpose have an informal and non-legally binding nature.

In particular, key activities for the implementation process identified by the CIS Strategic Document are: 1) information sharing, 2) developing guidance on technical issues, 3) information and data management, and 4) application, testing and validation. In addition, under the CIS, three multi-stakeholder consultative fora have been created, with the task of helping the Commission, respectively, to prepare daughter directives on priority substances and priority hazardous substances; to prepare proposals on criteria and definitions for groundwater; and to comply with its reporting obligations.

## The Danube River Protection Convention and the Bucharest Convention as compared to the EC Water Framework Directive

According to the Water Framework Directive, the Danube shall be assigned to an international river basin district. The Danube River Basin, as defined by the WFD, is subject to two relevant regional water conventions; the Danube River Protection Convention (DRPC), to which the European Commission is a contracting party, and the Convention on the Protection of the Black Sea against Pollution (the Bucharest Convention). The former covers inland surface waters, transitional waters and groundwater in the Danube catchment area, while the latter concerns the Black Sea, including the coastal waters that are part of the Danube River Basin, as shaped by the WFD. In addition, transitional

**Table 7** Main deadlines set out by the WFD.

Year	Issue	Reference
2000	Directive entered into force	Art. 25
2003	Transposition in national legislation	Art. 23
	Identification of river basin districts and authorities	Art. 3
2004	Analysis of the river basin districts: characteristics, environmental impact of human activity and economic analysis (Update by 2013 and review every 6 years thereafter)	Art. 5
	Register of protected areas established	Art. 6
2006	Monitoring networks and programmes operational	Art. 8
2008	Publication of draft river basin management plans	Art. 13
2009	River basin management plans published (Revision and update by 2015 and every 6 years thereafter)	Art. 13
	Programme of measures established (Revision and possible update by 2015 and every 6 years thereafter)	Art. 11
2010	Pricing policies introduced	Art. 9
2012	Programmes of measures operational (New/revised measures under updated programmes to be operational within 3 years of their establishment)	Art. 11
2015	Environmental objectives met	Art. 4

(Source: European Council 2000)

waters also fall within the scope of the Protocol to the Bucharest Convention on the protection of the Black Sea marine environment against pollution from land-based sources.

To avoid inefficiencies and overlapping, there is a need for close coordination among the measures provided by the above-mentioned legal instruments and for cooperation among related institutions. Institutional cooperation between the Black Sea and the Danube countries is already taking place and has recently been strengthened through the signing of the Memorandum of Understanding (see par. 2.3) by the International Commission for the Protection of the Danube River (ICPDR) and the Black Sea Commission (BSC).

The WFD also fosters international cooperation. Member States are required at least to prepare a programme of measures and to produce a river basin management plan for the part of an international river basin district within their territory; however, with regard to the area of the river basin extending beyond the EU boundaries, Member States shall endeavour to establish appropriate coordination with relevant non-Member States, with the aim of achieving the objectives of the Directive and of producing a single international river basin management plan.

Table 8 gives a general overview of the work that has already been carried out under the framework of the DRPC or which falls within the scope of the Convention in comparison with the requirements of the WFD. Only the most important articles of the WFD have been analysed.

Some of the principles and measures of the WFD are also incorporated into the DRPC, even if sometimes they are therein developed to a lesser extent. The DRPC, like the WFD, adopts the river basin as its water management unit; it covers surface and transitional waters and groundwater (but not coastal waters); it aims at reducing pollution through the combined use of quality objectives and emission limit values; it promotes some measures on quantity; and it regulates cooperation in the field of monitoring.

As a consequence, part of the work that is needed in order to implement the WFD in the Danube River Basin has already been carried out. Although harmonisation and adjustment with the requirements of the Directive are still necessary, the WFD appears to set out more stringent and far-reaching provisions in many respects, along with clear deadlines as far as environmental water protection is concerned. Some of the related activities are not foreseen by the Convention (e.g. the identification of bodies of groundwater for which lower environmental objectives have to be reached), while others, although within its scope,

have not yet been developed. It is important to highlight that Art. 18 of the DRPC allows the ICPDR to deal with all the tasks (not yet fully specified by the Convention) the Commission is entrusted with by mandate from the Contracting Parties.

In addition, it should be noted that the integration of economics into water management and policy that is provided by the WFD (Art. 5, Annex III, and Art. 9) is something new for the Danube River Basin. The DRPC requires the Contracting Parties to prepare and implement “relevant legal, administrative and technical measures” (Art. 5) to ensure water quality protection and to control and reduce transboundary impact. The Convention, hence, does not appear to use economic instruments to reach its objectives.

If we take the reverse point of view, focusing on those aspects of the DRPC that are not covered by the WFD or that are therein developed to a lesser extent, we can observe that a wide range of planned activities and ongoing measures are subject to the Convention, while they play a minor role in the context of the WFD. With this regard, Art. 3 of the DRPC lists, amongst others, planned activities/measures in the field of water construction works; activities/measures for the purposes of water use (such as water power utilisation, water transfer, etc.) and the operation of existing hydrotechnical constructions (reservoirs, water power plants, etc.). Without doubt, such measures/activities are also relevant for the implementation of the WFD (in the first place, they have to be taken into account when artificial or heavily modified bodies are to be designated), but the Directive deals with them in a more marginal way.

Furthermore, Art. 3 clarifies the reasons for the interest of the DRPC in the above-mentioned activities/measures, since it specifies that they are subject to the Convention “as far as they cause or are likely to cause transboundary impacts”. “Transboundary impact” is defined by the DRPC as “any significant adverse effect on the riverine environment resulting from a change in the conditions of waters caused by human activity and stretching out beyond an area under the jurisdiction of a Contracting Party” (Art. 1). The fact that the Convention is primarily concerned about the impacts that have a transnational character is due to the nature of the Convention itself. In fact, international environmental conventions are often developed as a response to transboundary environmental problems and as an attempt to solve them in a cooperative way.

On the other hand, the WFD focuses on the protection of waters as a whole, independent of the national or transboundary character of the environmental impacts and pressures. The Directive has, in fact, a different origin and performs partially different functions as compared to the DRPC. It frames the fundamental principles of the EU water

**Table 8** Important requirements of the WFD as compared to the DRPC.

WFD		Work already carried out or under the scope of the DRPC (or of the Bucharest Convention, when specified)
Ref.	Requirement	
<b>Art. 3.1; Annex I</b>	Identification of the river basin.	The DRPC has not been signed by all the countries in the river basin. Moreover, Danubian states with a share of less than 2,000 km <sup>2</sup> can only be given a consultative status.
<b>Art. 1</b>	Scope: inland surface waters, transitional waters, coastal waters and groundwater. Territorial waters are covered with respect to chemical status.	Inland surface waters, transitional waters and groundwater are within the scope of the DRPC.
		Transitional waters are also covered by the Protocol on the protection of the Black Sea environment against pollution from land-based sources. Coastal and territorial waters are within the scope of the Bucharest Convention.
<b>Art. 4.3</b>	Identification of artificial or heavily modified bodies of surface water.	A map of the hydraulic structures and navigation routes of the Danube is available and can constitute an element in the designation of those surface waters.
<b>Art. 4; Annex VII</b>	Establishment of a list of environmental objectives for surface and groundwater.	This requirement is partially covered by the Strategic Action Plan (1994). Groundwater appears not to be considered.
<b>Art. 5.1; Annex II</b>	Analysis of the characteristics of the river basin district.	Some data are already available, even if there is the need to collect further information (especially with regard to groundwater). Work is in progress to fill existing gaps.
<b>Art. 5.1; Annex II</b>	Review of the impact of human activities on the status of surface water in the river basin district.	Some data are already available, even if there is the need to collect further information. Work is in progress to fill existing gaps.
<b>Art. 5.1; Annex II</b>	Review of the impact of human activities on the status of groundwater in the river basin district.	Very few data are already available; hence, there is a need to collect further information. Work is in progress to fill existing gaps.
<b>Art. 5.1; Annex III</b>	Economic analysis of water use for the river basin district.	This falls outside the scope of the DRPC.
<b>Art 6.1; Annex IV</b>	Establishment of the register of protected areas.	This refers to EC legislation. However, a map of protected areas has been established.
<b>Art. 5.1; Art. 7.1; Annex II</b>	Identification of bodies of water used for the abstraction of water intended for human consumption.	With reference to groundwater, these bodies of water shall be identified according to Art. 6 of the DRPC.
<b>Art. 11</b>	Establishment of a programme of measures.	A Joint Action Programme (2001-2005) has already been set up for the Danube, but it should be adjusted with regard to the requirement of the WFD.
<b>Art. 13</b>	Preparation of a single international river basin management plan.	Some of the contents of the plan are partially covered by the DRPC, but this instrument as a whole is something new for the Danube states.
<b>Art. 8.2; Annex V</b>	Establishment of a surface water monitoring network .	A Transnational Monitoring Network has been set up. The concordance of the parameters should be checked. Monitoring programmes shall be established according to Art. 9 of the DRPC.
<b>Art. 8.2; Annex V</b>	Establishment of groundwater monitoring network .	Monitoring of groundwater has been carried out, in particular regarding nitrate, phosphate, chloride, sulphate, ammonia and phenol. The DRPC does not cover quantitative aspects. A monitoring network has not yet been established.
<b>Art. 16.2</b>	Preparation of a list of priority substances selected amongst those which present a significant risk to or via the aquatic environment.	Annex II contains a list of hazardous substances the discharge of which from point and non-point sources shall be prevented or considerably reduced. The list is to be used for purposes that are partially different from the ones identified by the WFD. Moreover, concordance among the substances should be checked.
<b>Art. 16.7</b>	Establishment of environmental quality standards for priority substances (surface waters, sediments, biota).	According to Art. 7.4 of the DRPC, contracting parties shall define water quality objectives and apply water quality criteria. General guidance for setting quality objectives is provided in Annex III.
<b>Art. 10</b>	Establishment of emission limit values (ELV) for point and diffuse sources.	According to Art. 7.1 of the DRPC, the contracting parties, taking into account the proposals from the ICPDR, shall set ELV for individual sectors/industries and municipal wastewater.
<b>Art. 9</b>	Establishment of appropriate water pricing policies.	This appears to fall outside the scope of the Convention.

(Source: revised from ECOSYSTEMS.ltd 2000)

policy, ensuring a certain degree of coordination with all other relevant Community pieces of legislation. The WFD is, thus, a very comprehensive instrument and its implementation can be reached only through the implementation of all the other EU water directives and decisions.

It should be noted that the DRPC contains specific measures related to the conditions and problems of the Danube River Basin. Great importance, for example, is given to warning/alarm systems and to emergency plans in the case of events such as accidental pollution, other critical water conditions, and floods and ice hazards, which have frequently occurred within the basin. Warning systems are instead simply listed by the WFD, without further details, as a mandatory requirement of the programme of measures, in order to prevent

significant losses of pollutants from technical installations and to prevent/reduce the impact of accidental pollution incidents (Art. 11). In general, because the WFD must be implemented by all EU Member States in many different river basins, it is not the most suitable piece of legislation for addressing local or basin-specific environmental problems. The DRPC, like all the basin conventions, appears to be a more useful and flexible instrument in this regard.

A final important difference between the DRPC and the EU Directive concerns their implementation. It should be noted, in fact, that although the transposition and implementation of the EU water legislation by Member States has usually been subject to substantial

delays, the EU is obviously better equipped than the ICPDR to make its legislation enforced.

The WFD covers all surface waters including transitional and coastal waters (to one nautical mile from the baseline). With respect to chemical status it also covers territorial waters (the 12 nautical mile zone from the baseline). Coastal and territorial waters are within the scope of the Bucharest Convention, while transitional waters are within the scope of the Protocol for the Convention on the protection of the Black Sea marine environment against pollution from land-based sources.

While the WFD aims at protecting the water environment of river basins, the purpose of the Bucharest Convention is to preserve the marine environment of the Black Sea. The WFD, hence, considers transitional, coastal, and ultimately territorial waters from a land-based point of view. The Bucharest Convention, instead, takes a more holistic approach, focusing on the sea as a whole. Consequently, many provisions of the Convention and many initiatives that have been undertaken within its framework are of little relevance for the implementation of the Directive. The measures related to the reduction/control of pollution from vessels or to the conservation of biological diversity are good examples of this.

However, the Bucharest Convention also recognises that pollution from land-based sources is primarily responsible for the degradation of the Black Sea environment. A Protocol on pollution from land-based sources has been adopted and different specific measures have been introduced by the Strategic Action Plan (SAP). Looking at the results that have been achieved so far, the first Report on the progress made in implementing the SAP (2002) underscores that the following components of the Protocol are still missing:

- common emission standards and timetables for pollution reduction;
- common guidelines, standards and criteria dealing with special characteristics of marine outfalls;
- pollution prevention criteria and recommended measures for pollution reduction, control and elimination;
- information exchange and reporting systems for pollution reduction and related measures.

With regard to the SAP, the Report observes that a regional monitoring/assessment program and common quality objectives for the Black Sea have not yet been agreed to. National monitoring programs have been conducted by some coastal States within their territorial waters, but the data are often irregularly collected and, as the programs are not harmonised, they cannot be compared.

The importance of pollution from land-based sources has also encouraged the Black Sea Commission to cooperate with the Danube institutions and to establish common initiatives. The signing of the Memorandum of Understanding (2001), as previously noted, is a fundamental step in this respect. It is therefore possible to state that integrated water and land management is a key feature of the Bucharest Convention, the DRPC (and the related SAPs), as well as of the WFD. In fact, the two conventions and the Directive, which treat the river basin as a whole, require the implementation of measures that affect both land and water uses, thus highlighting that their management must be considered collectively to make environmental progress.

In particular, in the case of the WFD, this kind of approach is strongly linked to the importance, at a Community level, of the principle of environmental integration. With regard to the DRPC/Bucharest Convention, it should be noted that the preparation of the two related Strategic Action Plans has been strongly influenced by the Transboundary Diagnostic Analysis (TDA), which has been carried out for the Danube River Basin as a result of the Environmental Programme for the Danube River Basin, and for the Black Sea coastal states as a result of the Black Sea Environmental Programme. The aim of the TDA is to produce a science-based assessment of key transboundary problems and their root causes through a causal chain analysis. Both the Danube and Black Sea TDA have stressed the importance of land use (agriculture, urbanisation, industrial activities, etc.) for the environmental problems of the Danube/Black Sea region.

## First steps towards the implementation of the WFD in the Black Sea region

All the cooperating countries under the DRPC have committed themselves to making the necessary efforts to implement the WFD within their territory (ICPDR 3rd Plenary Session, 27-28 November 2000). As has already been stated, the ICPDR has been identified by all these countries as a coordination platform.

The Expert Group on River Basin Management (RBM EG) has been created to prepare all related activities. One of its first tasks has been the development of a Strategic Paper for the river basin management plan. The paper deals with the definition of the institutional framework and coordination mechanisms at a national, bilateral, and multilateral level. In addition, it describes an approach for the production of the plan

and reporting mechanisms to the European Commission. According to the Strategic Paper, the Danube River Basin management plan will consist of:

- The roof report, covering issues of basin-wide importance, and
- The national reports, covering all national issues and those that have been coordinated bilaterally.

Sub-basin plans are also envisioned for later in the process.

In 2002, the RBM EG started working on a technical outline for the roof report. The report (part A) published in 2003 has identified the responsible authorities and established international relationships for WFD implementation. A 2004 report (part A) has provided for the characterisation of both surface and groundwater (Art. 5 and Annex II of the WFD), for the inventory of protected areas (Art. 6 and Annex IV of the WFD) and for an economic analysis of water use (art. 5 and Annex III of the WFD).

Other expert groups are also contributing to the implementation of the WFD. For example, the Expert Group on Emissions is focusing on compliance with the WFD list of priority substances and on effects of human activities on water, the Expert Group on Ecology is dealing with ecological requirements of the WFD, and the Expert Group on Monitoring, Laboratory and Information Management is concerned with the articles of the WFD concerning the typology of surface water bodies, the definition of reference conditions and the likelihood that these bodies will fail to achieve “good” status.

With respect to the Black Sea institutions, it should be noted that an ad hoc Working Group (WG) on the WFD has been set up under the framework of the Bucharest Convention, with a view of harmonising national legislation with the provisions of the Directive. However, so far no public information is available on the initiatives undertaken by such a WG. Moreover, the Black Sea Commission has agreed to investigate the consequences of the implementation of the WFD in the Strategic Action Plan for the Black Sea, in order to adapt the plan to the obligations resulting from the Directive. TACIS is providing financial assistance for this initiative (par. 4.4.4).

## The implementation of the WFD by new EU Member States and accession countries that are part of the Danube River Basin

According to the criteria for membership established by the European Council of Copenhagen of 1993, the candidate countries shall have the whole *acquis communautaire* transposed, implemented and enforced by the date of their accession. However, some transition periods can be agreed to during negotiations. As a general rule, transition periods may be considered in exceptional cases, e.g. where financially demanding investments are required or where immediate compliance would have unacceptable social consequences. On the contrary, no derogations can be granted with respect to all internal market-related legislation and all framework directives.

In the case of water legislation, the adoption of the WFD is non-negotiable, while several transitional arrangements were concluded by the new EU Member States and the candidate countries that are part of the DRB, covering mainly the Urban Wastewater Treatment Directive (Table 10).

The full implementation of the relevant existing directives, as long as they remain in force, is a prerequisite for meeting the WFD objectives. Therefore, the above-mentioned transitional arrangements are very important during the discussions regarding adoption of the WFD by the new EU Member States and the candidate countries. In particular, the Dangerous Substances Directive will be repealed by the WFD by 2013, while the Urban Wastewater Treatment Directive will remain in force. The fact that a transition period has been granted to Slovakia and Romania for the implementation of the Dangerous Substances Directive suggests that the candidate countries are also required to comply with the water directives to be repealed.

As far as the implementation of the WFD is concerned, the EU Water Directors, during their meeting in Valencia of 10th June 2002, decided to fully incorporate candidate countries into the joint process set up by the CIS and enable their participation as equal members at all levels. Moreover, the network of pilot river basins for integrated testing under the CIS includes the Szamos international River Basin (part of the Danube River Basin), which is located partly in Hungary (2%) and mostly in Romania (98%).

At a national level, new EU Member States and accession countries that are part of the DRB are working on both the transposition and the

**Table 9** Status of transposition/implementation of the WFD in the Danube/Black Sea new EU Member States and accession countries.

Country	Information sources
<b>Bulgaria</b>	
<p>The new Water Act, in force since 28 January 2000, enters into national law important requirements of the WFD and changes fundamentally the way water is managed in Bulgaria. It orders the regulation of water resources and quality in four river basin districts (the Danubian, the Black Sea, the East-Aegean and the West-Aegean districts). Additionally, it identifies four river basin directorates as the new responsible management authorities, charged with information collection, database creation, water monitoring, water management, etc. A special regulation concerning responsibilities, organisation of work and structure of the basin directorates was issued on January 2002. A basin council was also created for each basin directorate, to support its operation and to make contribute to the joint and balanced water management for the benefit of the population, human health, the preservation of the natural aquatic habitats and water bodies, and sustainable development.</p> <p>On the basis of the new Act, a licensing system was established for the use of water and water facilities, as well as a related fee for business purposes.</p> <p>The effective implementation of the Water Act requires the preparation and adoption of a series of regulations and corresponding implementing acts, some of which are currently under preparation (e.g. for the improvement of the permitting system, the development of a regulation system for tariff-setting for water services, monitoring, etc.). Moreover, fourteen regulations have been introduced to translate the requirements of the other EU water directives. In this way the Bulgarian legislation has been harmonised with the EU provisions.</p> <p>Now the challenge is to strengthen the capacity of the national and regional institutions involved in water management in order to achieve the effective implementation of the new legislation.</p>	<p>EBDR and WB 2003</p> <p>International Network of Basin Organizations 2003</p>
<b>Czech Republic</b>	
<p>A new Act on Water and the Act on Water Supplies and Sewage Systems were adopted in 2001, with the goal of aligning national legislation with obligations from all EC water directives.</p> <p>At present, legislation is in place and in line with the <i>acquis</i>, except for bathing water and the WFD.</p> <p>The necessary implementing structures are in place and functioning. However, due to the large number of bodies in the water sector, particular attention needs to be paid to the coordination between the various organisations involved.</p> <p>Water quality monitoring also needs to be enhanced. The inventory of an authorisation for discharges of dangerous substances needs to be completed and programmes for nitrates and dangerous substances need to be finalised and adopted by accession.</p>	<p>European Commission 2001b, 2002b, 2003c</p>
<b>Hungary</b>	
<p>Hungary has a long tradition of water management at a river basin level (in 1953 the central body of water administration, the National Water Authority, was established together with 12 regional water authorities, based on the basin principle).</p> <p>The transposition of EU water legislation has been completed with regard to nitrate pollution from agricultural sources, the discharge of dangerous substances, the quality of bathing water, the designation of wastewater agglomerations, and registration and reporting obligations concerning urban wastewater and sewage fines.</p> <p>By the end of January 2003, Poland had crafted a document (publicly available) outlining its strategy for the implementation of the WFD; had completed the review of the existing national legislation as compared to the WFD; had started the elaboration of transposing law and had identified its river basin districts. The transposition process was scheduled to be finalised by the end of 2003.</p>	<p>European Commission 2002a, 2003a</p> <p>WWF 2003</p>
<b>Poland</b>	
<p>In 2001 Poland achieved significant progress in the coordination of national legislation with the EU water <i>acquis</i>, through the approval of three national laws: the Act on Environmental Law, the Act on Water Law, and the Act on the collective water supply and water discharge systems.</p> <p>The Act on Water Law, which is of major importance in the transposition process for the WFD, regulates the management of water resources in line with the principle of sustainable development. It aims at ensuring the good ecological status of water resources and identifies two basic river basins (the Vistula and the Oder River Basins), covering 99.5% of the territory of Poland. The provisions of the Act of Water Law need to be specified in detail under executive regulation.</p> <p>By the end of January 2003, Hungary had crafted a document outlining its strategy for the implementation of the WFD (even if not publicly available); had completed the review of existing national legislation as compared to the WFD; had started the elaboration of transposing law and, as mentioned above, had identified its river basin districts.</p>	<p>Blaszczyk 2004</p> <p>WWF 2003</p>
<b>Romania</b>	
<p>The Water Law of 1996 is the fundamental legal act on water management in Romania. It covers all water bodies and affirms that the protection, restoration and sustainable development of water resources are actions in the public interest. It also establishes the river basin concept for the management of water resources, both surface and groundwater, and introduces water use rights through water management licenses and wastewater discharges for no more than 5 years.</p> <p>In July 2000, about 35% of the water directives had been transposed; the most advanced were the directives on dangerous substances, on drinking water and on wastewater, while less advanced were the WFD (12%) and those related to fish water.</p> <p>Since then, a number of laws have been adopted for drinking water, bathing water, pollution caused by nitrates, discharges of hazardous substances and integrated coastal zone management. A preliminary inventory of discharges of dangerous substances into surface waters has also been completed. A committee for the coordination and monitoring of the implementation of the WFD has been set up. The approximation with the WFD was scheduled to be accomplished by 2003, via legislative amendments to the above-mentioned Water Law.</p> <p>Two current institutional changes deserve attention. Firstly, at the end of 2002, the national company "Apele Romane" (Romanian Waters) was transformed into a Water Authority under the national administration. Secondly, a recent government decision (20 September 2002) provides the Water Authority with the power to function as the central public authority in the water sector and to undertake the implementation of EU requirements. This authority is responsible for the management of 11 river basins (through regional branches and local offices).</p>	<p>DANCEE 2003</p> <p>EBDR and WB 2003</p> <p>European Commission 2003c</p> <p>UNECE 2001</p>
<b>Slovakia</b>	
<p>With respect to water quality, good progress has been made with the entry into force, in June 2002, of the Water Act, which transposes individual water directives, but does not fully transpose the WFD.</p> <p>The Act on the Protection of People's Health, entered into force in January 2002, and its implementing decrees transpose the requirements for bathing water and drinking water.</p> <p>The Act on Public Water Supply and Sewage, entered into force in July 2002, partly transposes the Urban Wastewater Directive.</p> <p>By the end of January 2003, Slovakia had completed review of the existing national legislation as compared to the WFD, while approval (a step further than "elaboration") of the transposing law was ongoing.</p>	<p>European Commission 2002c, 2003d</p> <p>WWF 2003</p>
<b>Slovenia</b>	
<p>The Water Act, adopted in July 2002, regulates the management of the whole water system and provides for a special fund to be set up. It divides the country into two river basin districts: the Danube and the Adriatic districts. Some provisions of the WFD have also been transposed by means of secondary legislation.</p> <p>Slovenia legislation is now aligned with respect to the discharge of dangerous substances and surface waters intended for aquaculture.</p> <p>Various decrees on water quality have been approved. Two programmes have been adopted concerning the collection and treatment of urban wastewater and the implementation of projects connected with the distribution of water.</p>	<p>European Commission 2002d, 2003b</p> <p>Ministry of the Environment 2003</p>
<b>Turkey</b>	
<p>In line with its efforts to adopt the European Community <i>acquis</i>, Turkey has already started preliminary activities to adapt its water legislation and administrative structure to meet the challenging WFD objectives. However, there are still almost 50 laws related to water resources, including ones identifying responsibilities of related organisations. The current institutional framework is not efficient and there are several problems of lack of coordination and overlapping duties in the same area by several organisations.</p> <p>In 2001, a project ("Implementing the WFD in Turkey") for assisting the Turkish Government in the transposition and implementation of the WFD began under the coordination of the Turkish Ministry of the Environment and with the financial support of The Netherlands (MATRA Fund). The aim of this project is to foster collaboration among institutions and organisations responsible for water management in Turkey to reach a participatory and integrated approach in water management planning. The project will also help to define the river basin districts and to formulate a pilot river basin management plan that will be replicable in other basins in Turkey.</p>	<p>EBDR and WB 2003</p> <p>WWF 2003</p>



implementation of the WFD. The collection of information about these national initiatives, which is already a highly problematic task for the old EU Member States, is even more complicated for new EU Member States and accession countries. Table 9 contains the publicly available information concerning the status of transposition/implementation of the WFD and, to a lesser extent, of other EU water legislation in all the new EU Member States and accession countries that are part of the DRB, including Poland. Turkey is also covered, although it is not part of the Danube River Basin, because it is relevant for the implementation of the WFD in the Black Sea region.

## Concurrence on the WFD by third countries of the Black Sea region

Third countries in the Black Sea region can be divided into two main groups: the Balkan countries (Bosnia-Herzegovina, Croatia, Serbia and Montenegro plus Albania and Macedonia, which share a very limited part of the Danube catchment area, and the Newly Independent States (NIS), which include Belarus, Georgia, Moldova, Russia and Ukraine. These countries play a role in the implementation of the EC WFD, for at least three main reasons.

Firstly, all receive EU financial assistance in order to improve national water infrastructures/management, and the conditions under which such assistance is provided reflect the fundamental principles of EU water policy.

Secondly, most of the countries are contracting parties to the DRPC, the Bucharest Convention or both. The ICPDR and the Black Sea

Commission are currently working on the implementation of the Directive. In particular, the Danube countries have committed to making the necessary efforts to implement the WFD within their territory (ICPDR 3<sup>rd</sup> Plenary Session, 27-28 November 2000), while, from the official point of view, the position of the Black Sea countries is less clearly defined.

The Report on harmonisation of environmental legislation of the Dnieper River countries with the legislation of EU Member States has been recently produced within the framework of the Dnieper Basin Environment Programme.

The adoption of the key provisions of the WFD should fill the gap generated by the lack of statutory environmental water policy in the Dnieper countries. The main expected results will be the application of principles related to river basin management and the collection of water fees along with their allocation for environmental water protection purposes.

A third reason that explains the interest of some third countries in the implementation of the WFD is their willingness to join the EU. The adjustment of national legislation to EU requirements can be described as an expedient to speed the accession process. For example, it is meaningful that the water legislation of Croatia was already consistent with some of the principles of the WFD before EU leaders granted the country official candidate status. The Croatian Water Law, issued at the end of 1995, divides the national territory into four water basins (the Sava River catchment area, the Drava and Danube catchment areas, the Littoral and Istrian catchment areas, and the Dalmatian catchment area) plus Zagreb city. Each catchment area, which includes both surface and groundwater, has been conceived as a territorial unit for water management purposes.

It should be noted that most of the third countries of the Black Sea region have stated their commitment to work towards convergence rather than approximation of their environmental legislation with the EU. Compliance is an obligation of membership, which entails the full alignment of national laws with the entire body of the EU law contained in the *acquis communautaire*. Convergence is a somewhat different process. It means bringing two legal systems close together. Hence convergence implies that the main principles/features of one legal system should be reflected and integrated into the other legal system, taking into account the specificity of the latter and without necessarily adopting exactly the same requirements in details. In particular, many NIS have expressed their interest in convergence in the Partnership and Cooperation Agreements (PCAs), which were negotiated between the

**Table 10** Transitional arrangements concluded by the Danube accession countries in the water sector.

Country	Directive	Agreed deadline for implementation
Bulgaria	Urban Wastewater Treatment Directive (91/271/EEC)	2014
Czech Republic	Urban Wastewater Treatment Directive (91/271/EEC)	2010
Hungary	Urban Wastewater Treatment Directive (91/271/EEC)	2015
Romania	Urban Wastewater Treatment Directive (91/271/EEC)	2018
	Drinking Water Directive (98/83/EC)	2015
	Dangerous Substances Directive (74/464/EEC)	2009
Slovakia	Urban Wastewater Treatment Directive (91/271/EEC)	2015
	Dangerous Substances Directive (74/464/EEC)	2006
Slovenia	Urban Wastewater Treatment Directive (91/271/EEC)	2015

(Source: European Commission 2004a)

NIS and the EU in 1992 to replace the Trade and Cooperation Agreement signed with the Soviet Union in 1989. Each PCA establishes a strong and comprehensive political and economic partnership between the EU and the partner country and includes an article that defines areas of environmental cooperation.

Most of Danube/Black Sea third countries have general legislation concerning environmental protection and water management, which broadly outlines institutional expertise and relevant procedural requirements. The main legal barriers to convergence towards the WFD can be summarised as follows:

- *River basin approach:* Although transboundary co-operation is already well advanced for the Danube Basin and for the protection of the Black Sea, water management is not currently carried out everywhere on a river basin basis.
  - *Water quality and effluent standards:* The current NIS system of standards is comprised of two main elements: environmental quality (ambient) standards and effluent standards. The former define the maximum allowed concentration of a substance in water and are based on a criterion of zero human exposure, resulting in a set of comprehensive and ambitious standards, covering hundreds of pollutants; the latter represent the limits of pollutant concentrations in effluent discharges and are aimed at ensuring that concentrations in the aquatic environment do not exceed the applicable ambient standards. The inability of industry to meet the effluent standards necessary to comply with the ambient standards has led to a system of “temporary permits” which fix higher discharge limits, often in line with actual discharges. The standards system needs to be reformed in order to apply both the standards, according to the combined approach suggested by the WFD.
  - *Updated standards:* Most Balkan countries are in the process of updating their system of environmental standards for water quality and effluents, to put them in line with EU standards. The challenge, also in this case, is to account for national circumstances when complying with EU directives, to set up a limited number of realistic standards that can be adequately monitored and enforced and to make sure that the benefits of new water-related regulations exceed the costs of compliance.
- Monitoring:* The number of hazardous substances regulated by the NIS exceeds the number of substances monitored. Moreover, due to the lack of resources, there is no routine monitoring even for contaminants that can be measured, and the main responsibility for monitoring lies with enterprises themselves. The lack of reliable data and the inadequacy of existing water monitoring systems are also common problems in the Balkan countries.

**Table 11** List of EU directives subject to comparative analysis within the Dnieper River Basin.

Document	Priority
Water Framework Directive (2000/60/EC)	I
Directive on Integrated Prevention of Pollution and Control (96/61/EC)	II
Urban Wastewater Treatment Directive (91/271/EEC)	II
Drinking Water Directive (80/788/EEC)	III
Bathing Water Quality Directive (80/788/EEC)	III
Nitrates Directive (91/676/EEC)	III

(Source: Dnipro Basin Environmental Programme 2003)

- *Water use permits, discharge permits and related charge systems:* Most of the Balkan and NIS countries have adopted a water use permit system to regulate water withdrawals and a discharge permit system to protect water resources from pollution. These systems are generally associated with payments for water use in the form of water abstraction and effluent charges. However, enforcement capacity is generally weak because of limited staff, budgets and equipment but, more fundamentally, because of the fragile financial situation of many of the major water users and polluters and the limited political support for regulatory agencies.
- *Ownership rights:* The lack of clear allocation of property rights and of decision-making responsibilities usually represents a key regulatory issue. In particular, in most NIS, local authorities own the utilities, but the absence of a clear identification of assets and the definition of property rights over these assets creates obstacles for efficient management and financing in the sector.

## The main institutional problems affecting the implementation of the WFD in the Black Sea region

The implementation of the WFD and of the other EU water directives in the Black Sea region is affected by different problems, mainly related to the legal, financial and the institutional sectors. The past ten years have seen rapid and massive changes in the political and administrative systems and, consequently, in the way in which responsibilities and costs for water management are distributed. A system dominated almost exclusively by the state has been replaced by governance structures based on decentralisation and greater levels of autonomy at the regional/local level. As a result, different elements essential to water and



river management are actually in the hands of several public authorities and, sometimes, of private individuals, land-owners and companies.

Unfortunately, decentralisation has often taken place before the establishment of a clear legal framework and the development of institutional capacity for environmental management at the regional/local level. Basic water laws and regulations have been generally subject to repeated adjustments and modifications. These, in turn, have made long-term planning and financing difficult and have generated an unpredictability that is not attractive to private investors.

Moreover, decentralisation has in some cases been accompanied by disintegration. New ownership structures (especially concerning agricultural land tenure) and the transfer of control of water and sewage facilities to regional authorities have, from a certain perspective, made the system more unstable and negatively affected the level of security and effectiveness of water resources management.

The Black Sea region has been subject not only to decentralisation, but also to internationalisation. While this has led to greater responsibilities in the former situation for local and regional authorities, and greater co-operation at the inter-state level in the case of the latter, the practical links between these two processes have yet to be adequately built. Even though in a highly inter-connected basin such as the Black Sea, one region's problem is every region's problem, there is still insufficient emphasis on or institutional facilities for co-operation and experience sharing at the region-to-region level, both within and among the Danube/Black Sea states. The situation is complicated by the differences among the systems of water administration and

governance of the Danube/Black Sea states, ranging from those which remain highly centralised (such as Croatia), to nations where local and regional authorities have been granted prime responsibility (such as Hungary), to full federal systems (such as the German Bundesländer and Swiss Cantons), which makes region-to-region cooperation and the identification of counterparts more difficult, as they do not have the same kinds of responsibilities and expertise.

Most of the public authorities across the region have identified insufficient funds as the principal reason for their inability to carry out needed management reforms and infrastructure development. Since international resources are limited, most local/regional authorities still heavily rely on support from the state for both construction and maintenance of infrastructure and subsidising operational costs. Such support, however, is often unpredictable and is usually conditioned on the ability of the authority concerned to cover at least a portion of the costs. In this regard, the use of economic instruments, including appropriate water tariffs, is a necessary element for effective water management that needs to be strengthened throughout the whole region. Additionally, the involvement of the private sector in the construction, operation and management of water and wastewater facilities can be an important source of financing, efficiency and innovation, even if it may appear to have produced conflicting results in the countries where privatisation has been carried out.

Finally, many public authorities report a severe lack of practical knowledge and skills in water resources management and identify this problem as having the same importance as the lack of financing.

# Costs, benefits and the role of international assistance from the perspective of implementation of the WFD

The following paragraphs describe financial aspects related to the implementation of the WFD in the Black Sea region. Attention will be paid primarily to available estimates of the size of investments in the water sector required to approximate to the Directive and to the EU water legislation, as well as the expected economic benefits. Secondly, the flows of financial resources provided by the EU and international institutions for investing in water-sector infrastructures and management in the countries of the Black Sea catchment area will

be discussed. The analysis will not be strictly homogeneous in terms of geographical coverage. In particular, the discussion will centre on new EU Member States and accession countries (including Turkey) as far as costs and benefits from compliance are concerned, while all the countries of the region will be discussed with respect to international financial assistance.

**Table 12** Total investments for compliance with the CEEC (billion EURO).

Country	Water			Air	Waste		Total investment		Total/capita
	Supply	Waste water	Tot.		Min.	Max	Total Min.	Total Max.	
Poland	4.4	13.7	18.1	13.9	2.2	3.3	34.1	35.2	927
Hungary	3.5	3.1	6.6	2.7	2.1	4.4	11.5	13.7	1,306
Czech Rep.	2.2	1.1	3.3	6.4	8	3.8	10.4	13.4	1,427
Slovakia	1	0.9	1.9	1.9	0.3	1.6	4.1	5.4	760
Bulgaria	2.2	2.7	4.9	5.1	1.8	5.1	11.7	15	1,668
Romania	3.8	6.3	10.1	9.1	1	2.7	20.2	22	943
Baltic Total	ND	ND	ND	8.45	0.45	0.85	8.9	9.3	1,148
Estonia	0.13	1.38	1.5	ND	ND	ND	1.5	1.5	ND
Latvia	0.11	1.6	1.71	ND	ND	ND	1.71	1.71	ND
Lithuania	0.11	2.27	2.38	ND	ND	ND	2.38	2.38	ND
Slovenia	ND	ND	ND	0.69	1.15	1.15	1.84	1.84	ND
Total	17.5	33.1	50.5	48.2	9.7	22.7	108.4	121.5	1,140
Total Max (%)	14%	27%	42%	40%		19%		100%	

Note: ND=No Data

(Source: EDC and EPE 1997)

# The costs of compliance with EU environmental and water legislation

In 1997, a report prepared for the European Commission by EDC & EPE estimated that the costs of all investments needed to comply with the EU environmental *acquis communautaire* for drinking water supply, wastewater management (including sewerage), large combustion plants, and waste management were around 120 billion EURO for the ten countries of Central and Eastern Europe and 71 billion EURO for the Danube accession countries (Table 12).

The above-mentioned data were refined in 2000 by several subsequent assessments. Compared to the 1997 estimates, these recent studies indicate lower values of between 80-110 billion EURO (Table 13). The figure of 120 billion EURO, published in 1997, was basically calculated using unit costs and per capita expected costs of infrastructure per sector. Subsequent assessments show that unit costs are lower than predicted, while substantial investment in some candidate countries since 1997 has reduced the estimated gaps. On the other hand, the new figures do not include the investment needs for some new and forthcoming legislation, such as the WFD and the planned revision to the Large Combustion Plant Directive (2001/80/EC).

It should be noted that all the studies/reports described do not specifically cover the costs of approximating the WFD. As the Directive is largely an over-arching framework for a number of other directives, the costs of its implementation might in general be marginal. The main types of costs are illustrated by Table 14; some of them (such as the costs concerning the establishment of a river basin management structure and the establishment of monitoring schemes) seem to have been lowered for the Danube countries by their participation into the DRPC and the related institutions.

However, the real cost impact of the WFD depends upon the extent to which the new Member States and the candidate countries have already embarked on the process of providing/allowing for user

**Table 14** Checklist of the types of costs incurred to implement the WFD

<b>Initial set-up costs:</b>
- Establish new river basin management structures if none exist at present
- Undertake survey and monitoring work associated with data gathering
- Prepare the river basin management plans
- Consultation
- Establishment of monitoring schemes if none exist at present, including the establishment of laboratories
<b>Capital expenditures:</b>
- Laboratory capacity (if none exists)
- Construction of wastewater treatment plants with more stringent objectives than required by the Urban Wastewater Treatment Directive (91/271/EEC) and of other relevant infrastructures (e.g. animal waste storage facilities)
<b>Ongoing running costs:</b>
- Costs associated with operating new facilities
- Monitoring and reporting costs
- Reviewing river basin plans
- Regulatory investigations and taking enforcement action

(Source: European Commission 2004b)

charges in line with the principle of full recovery. It also depends, in a major way, on the extent to which compliance with other water-related community instruments and other associated legislation has been or is projected to be met, for example under the Urban Wastewater Treatment Directive (91/271/EEC), the Nitrates Directive (91/676/EEC), and the IPPC Directive (96/61/EC). In fact, the full implementation of the existing water directives, as long as they remain in force, and of the other relevant community legislation is a prerequisite for fully meeting the WFD objectives.

Apart estimates for new member States and accession countries, only a few attempts have been made in order to estimate the costs of complying with the EU water legislation in the other Black Sea countries. One of the most important is the study conducted for Khmel'nitska Oblast in Ukraine (population 1,442,000), which evaluates the capital investment needed to comply with the Urban Wastewater Directive (91/271/EEC). The costs of upgrades and construction of wastewater treatment plants amount to 88-141 million EURO. The total investment needs, including the extension and development of the sewerage systems, is 189.8 million EURO. The total investment needed to finance compliance with the Directive has been calculated to be around 132 EURO per capita.

**Table 13** New estimates of environmental financing needs in candidate countries (million EURO).

Country	BG	CY	CZ	EE	H	LV	LT	MT	PL	RO	SK	SLO	Tot
<b>1997 estimates, total cost</b>	15,000	1,118 - 1,264	13,400	1,500	13,700	1,710	2,380	n.a.	35,200	22,000	5,400	1,840	122,618 - 122,764
<b>Recent figures, total cost</b>	8,610	1,086	6,600 - 9,400	4,406	4,118 - 10,000	1,480 - 2,360	1,600	130	22,100 - 42,800	22,000	4,809	2,430	79,260 - 110,001

(Source: European Commission 2001c)

# The benefits of compliance with EU environmental and water legislation

Along with investment costs, the successful implementation of the environmental *acquis* will lead to considerable benefits for human health and the environment in the new Member States and accession countries. A report prepared for the European Commission by ECOTEC (2001) explores the benefits of compliance in three ways:

- Qualitative benefits: what types of benefits arise from implementing the *acquis*?
- Quantitative benefits: what is the extent of these benefits?
- Monetised benefits: what is the economic value of the avoided costs?

Due to different technical, ethical and methodological problems, not all the qualitative benefits have been quantified and not all the quantitative benefits have been monetised. According to ECOTEC, the overall benefits over the period 1999-2020 for the ten CEEC, plus Cyprus, Malta and Turkey from implementing EU environmental directives, amount to between 134 and 681 billion EURO, assuming full implementation is achieved by 2010. Reduced air pollution accounts for around half of the total benefits.

For the Danube accession countries, the overall benefits over the period 1999-2020 from implementing EU environmental directives by 2010

**Table 15** Benefits of compliance: the *acquis communautaire* related to water and the associated level of analysis required.

Water directive		Level of analysis
Water Framework Directive	2000/60/EC	Qualitative analysis
Dangerous Substances to aquatic environment	74/464/EEC and amendments	Monetary assessment
Urban Wastewater	91/271/EEC and amendments	Monetary assessment
Nitrates	91/676/EEC	Monetary assessment
Bathing Water	76/160/EEC	Monetary assessment
Drinking Water	80/778/EEC and amendments	Monetary assessment
Surface Water for drinking	75/440/EEC and amendments	Qualitative analysis
Measurement sampling of drinking water	79/869/EEC and amendments	Not estimated
Groundwater	80/68/EEC and amendments	Qualitative analysis
Fish Water	78/659/EEC and amendments	Qualitative analysis
Shellfish Water	79/923/EEC and amendments	Qualitative analysis

(Source: ECOTEC 2001)

amount to between 57 and 300 billion EURO, again with air pollution accounting for around half of the total benefits

For the ten CEEC, Cyprus, Malta and Turkey, the annual benefits arising from full implementation amount to between 12,5 and 69 billion EURO. At a national level, Poland, Turkey, the Czech Republic and Romania stand to benefit the most in absolute terms (Table 16).

With respect to the benefits related to the water sector, the qualitative analysis highlights the types of benefits, divided into health, resources,

**Table 16** Total benefits over the benefit period (until 2020), by media, by candidate country (million EURO).

Country	Air		Water		Waste		Total	
	Low	High	Low	High	Low	High	Low	High
BG	1,070	11,000	1,580	4,200	195	6,620	2,580	21,800
CY	290	1,400	260	960	75	730	630	3,050
CZ	7,100	35,050	15,230	24,050	925	11,200	23,260	70,300
EE	390	2,050	260	985	95	1,750	750	4,780
H	5,740	39,920	2,720	10,490	1,120	18,500	9,590	68,900
LV	485	3,120	380	1,340	50	1,070	915	5,500
LT	1,555	7,980	1,230	2,750	55	2,000	2,840	12,750
MT	75	390	125	460	30	390	230	1,250
PL	25,800	149,930	13,590	31,960	1,600	26,300	41,000	208,200
RO	7,590	56,950	3,960	12,150	825	26,300	12,380	95,400
SK	3,400	21,900	3,000	6,610	290	4,280	6,700	32,800
SLO	680	4,620	1,470	3,440	240	2,820	2,400	10,900
TU	21,220	94,440	8,640	33,200	750	18,000	30,600	145,600
<b>Total</b>	<b>75,400</b>	<b>428,700</b>	<b>52,400</b>	<b>132,600</b>	<b>6,270</b>	<b>112,000</b>	<b>134,000</b>	<b>681,000</b>

(Source: ECOTEC 2001)

ecosystems, social and wider economic benefits, resulting from compliance with each directive (Table 17, Step I). These benefits are then quantified and monetised (Table 17, Steps II and III) for five water directives (Table 15). Only a qualitative analysis is provided for the Water Framework Directive. Such an analysis highlights the fact that the most important benefits arising from the implementation of the WFD relate to improvements in ecosystems (improved river water quality).

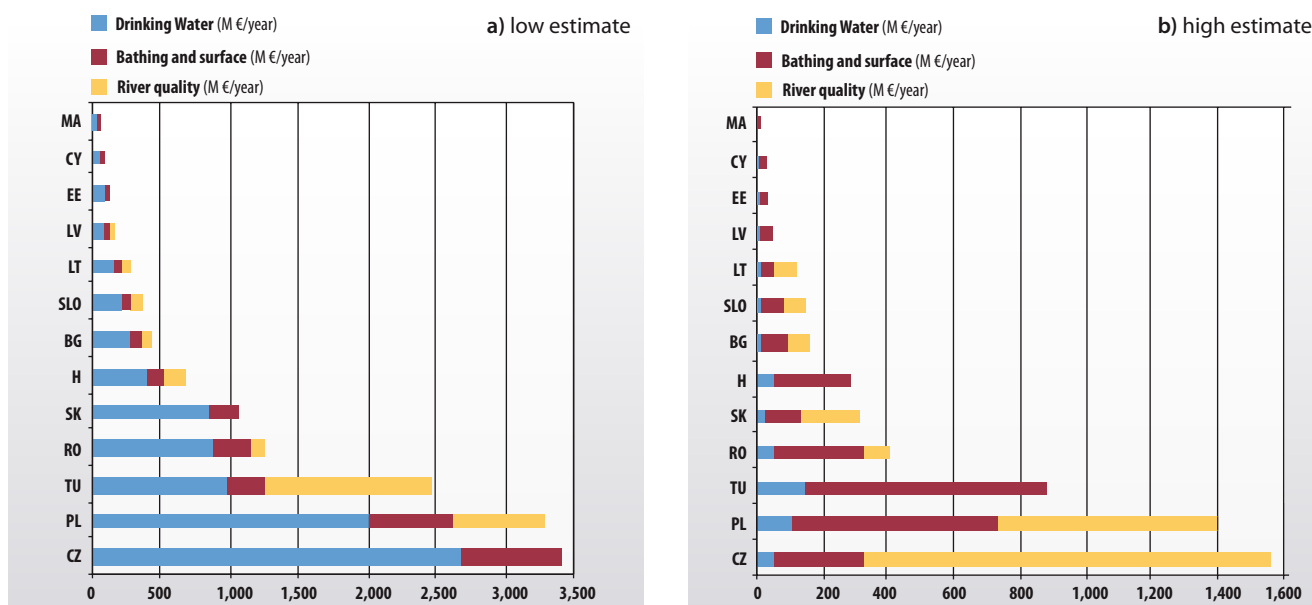
The overall benefits for the candidate countries from implementing these five previously described water directives amount to between 52 and 133 billion EURO (between 28 and 61 billion EURO for the Danube accession countries), assuming full implementation is achieved by 2010. The total annual benefit of compliance has been estimated at around 5.4 billion EURO/year upon full compliance (low estimate) and 13.6 billion EURO/year (high estimate);

In absolute terms, the country that stands to benefit the most from implementing the water directives is the Czech Republic. Poland also stands to benefit significantly. Turkey is the third largest beneficiary in the lower estimate (with 0.89 billion EURO/year), but the largest under the upper estimate (around 3.4 billion EURO/year upon full compliance).

With regard to the different types of benefits, the total drinking water benefits across the candidate countries range from 504 million EURO/year to 8,734 million EURO/year, while the total benefits related to bathing/surface water and to river quality amount respectively to

2,512 and 2,373 million EURO/year. The total benefits from improving river ecosystem quality has been estimated only for some candidate countries (Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia), as it has not been possible to obtain sufficient data to derive a sensible estimate for some candidate countries. For the Danube accession countries total drinking water benefits range from 209 to 3,593 million EURO/year, while the total benefits related to bathing/surface water and to river quality amount respectively to 1,028 and 1,638 million EURO/year.

At a national level, the largest benefits of clean drinking water accrue to Turkey and Poland. These countries are also the ones that benefit the most in terms of access to quality bathing and surface waters. As far as improved river ecosystem quality is concerned, the largest benefits accrue to the Czech Republic, which stands to benefit around 1.2 billion EURO/year, given the extent and quality of rivers in that country, and possibly influenced by differences in river grading system across candidate countries.



**Figure 3** Annual benefits of full compliance with the water directive.  
(Source: ECOTEC 2001)

**Table 17** Water benefits qualification, quantification and monetisation.

Step I	Qualitative benefits of compliance				
	Health	Resources	Eco-systems	Social	Wider economic
Description	Household access to and confidence in clean drinking/bathing water	Cleaner groundwater, surface waters and bathing water	Improved river water quality	Angling and recreation in rivers, lakes and beaches	Increased tourism to recognised clean beaches; reduced pre-treatment costs and attraction of investment given locational quality
WFD	*	*	***	**	**
Dangerous Substances	**	**	***	***	**
Urban Wastewater	***	**	***	**	*
Nitrates	**	**	**	**	*
Bathing Water	**	**	**	**	***
Drinking Water	**	**	**	**	*
Surface water for drinking	**	**	**	*	*
Groundwater	**	**	**	*	*
Fish Water	**	***	**	**	**
Shellfish Water	*	**	**	*	*
Step II	Quantitative benefits of compliance				
	Health	Resources	Eco-systems	Social	Wider economic
Description	Number of households benefiting from improved water quality	Reduction of contaminants in surface water	Likely changes in river water quality	Not quantified	Employment
Step III	Monetisation of the benefits				
	Health	Resources	Eco-systems	Social	Wider economic
Description	Willingness to pay for clean drinking water	Willingness to pay for clean bathing water	Willingness to pay for improvements in river quality	Not monetised	Not monetised

(Source: ECOTEC 2001)

## Financing investments in the environmental and water sector: the role of international assistance

Compliance with EU environmental requirements poses a major financial challenge to new Member states and accession countries. To face such a challenge, these countries must, in first place, rely on domestic sources of funding, in particular on public and private expenditures/investments in the environmental sector (European Commission 2001c). In fact, EU support and other external assistance, although important, are only able to meet a small proportion of total needs.

With respect to most accession countries, available data show that the total environmental protection investments (EPI) between 1996 and 2000 represent a minor share of the total environmental investment needs. Total EPI are part of the total environmental protection expenditure (EPE), which also includes total current expenditure (CE).

According to Eurostat (2002), only the Czech Republic and Poland are characterised by a high level of investments compared to their investment needs, both in general terms and with respect to the wastewater sector. It should be noted that the Eurostat data cover the public sector (central and local government), industry (mining and quarrying, manufacturing, energy and water supply) and specialised producers of environmental services involved in waste collection and treatment and sewage treatment.

**Table 18** Estimated environmental investment needs and expenditure – UNECE.

State	Total investment needs for full compliance (M EURO)	Min. average investment needs per year (M EURO)	Actual environmental investment expenditure in 2000/1 (M EURO)	Time that would be needed to comply with total investment needs with 2000 expenditure level	Maximum length of transition period	Prospects for financing investment needs with agreed transitional periods
BG	8,610	Na (344)	90	2096	Na	
CZ	6,600-9,400	660-940	559	2012-2017	2010	
EE	4,406	339	46	2096	2013	
H	4,118-10,000	275-667	475	2009-2021	2013	
LV	1,480-2,360	99-157	11	2135-2215	2015	
LT	1,600	107	53	2030	2015	
PL	22,100-42,800	1,473-2,853	1,539	2014-2028	2015	
RO	22,000	Na (880)	180	2122	Na	
SK	4,809	321	82	2059	2015	
SL0	2,430	162	97	2025	2015	
Tot.	79,260-110,001	7,810-9,430	3,132			

(Source: UNECE 2003)

Another study showing partially different results has been recently published by UNECE. It compares the updated official estimates of total investment needs (Table 18) in each accession country with Eurostat data of that country's current level of environmental investments in the last available year. It then contrasts the time that would be required to cover the estimated investment needs (if current levels of expenditure remain unchanged) with the longest transition period agreed to for any individual directive. With the exception of Poland and Hungary, the current levels of environmental investments in new EU Member States/accession countries may not be sufficient to cover the official estimates of investment needs, according to the schedules contained in transitional agreements.

A commitment to address environmental issues in other Black Sea countries (excluding new EU Member States and accession countries) can be illustrated by analysing environmentally-related expenditures (EEE). According to UNECE, the countries of Eastern Europe, Caucasus and Central Asia (EECCA) with the highest total EEE are Russia and Ukraine, which have the largest populations, the largest economies and the highest levels of industrialisation (EAP 2003). The data show, on the other hand, that the environmental market is very small in Moldova and Georgia. Such a small market is unlikely to attract significant private financiers in the short-to-medium term, since the transaction costs of developing and marketing financial products would be high relative to the expected size of operations.

The EEE, as a share of GDP, reflects the priority assigned to environment in the country's economy, and varies significantly among EECCA countries. Moldova, Ukraine, Russia and Georgia appear to devote a

significant share of their incomes to EEE (e.g. up to 3.1% in Moldova). This is more than in some accession countries and most EU Member States. Using this indicator, it appears that most EECCA countries are more committed to improving environmental and water supply quality than is commonly thought.

One interesting policy issue is to what extent countries rely on their domestic funds in financing environmental and water expenditures. Among EECCA countries, the domestic share of total environmental-related-expenditures (EEE) varies widely from country to country. According to UNECE, Russia, Moldova and Ukraine finance more than 90% of their EEE from domestic sources. Georgia appears to be more dependent on foreign resources of financing, which account for 62% of the total EEE in this country.

For many SEE countries foreign sources of financing play a dominant role in financing environmental investments. This is especially true for Albania, Bosnia-Herzegovina, and Serbia-Montenegro, while in Croatia and Macedonia domestic sources are relatively more important.

Finally, in the new EU Member States and candidate countries, external sources of financing, in particular pre-accession funds of the EU, are important, especially in small countries (such as Slovenia).

With respect to international environmental assistance to the Black Sea region, a distinction should be made between bilateral donors (including individual countries, but also other institutions and organisations such as the European Commission) and International Financial Institutions (IFI) loans. During the period from 1996-2001,

the total bilateral environmental assistance to EU accession countries amounted to about 2.5 billion EURO, whereas in EECCA countries it was 0.8 billion EURO. Environmental assistance to EU accession countries was boosted in 2000 and 2001 with pre-accession financial instruments to support investments, mainly Ispa. Moreover, EU pre-accession funds have been slowly replacing bilateral environmental assistance from individual countries. This trend, coupled with the overall growth in bilateral assistance to EECCA countries, suggests that some “refocusing” towards EECCA has taken place.

The total volume of IFI loans committed to environmental projects in the period 1996-2001 has amounted to almost 4 billion EURO in EU accession countries and 1.3 billion in EECCA countries. Time trends in the commitments of IFI loans show larger annual variations due to fewer but larger projects, programming and project development cycles and local conditions.

## Assistance from the European Union

### Pre-accession assistance: Phare, Ispa and Sapard

In the period from 2000-2006, financial assistance from the EU to the candidate countries of Central and Eastern Europe is being provided through three instruments: the Phare programme (Regulation 3906/89/EEC) as revised in 2000, Ispa (Regulation 1267/99/EC) and Sapard (Regulation 1268/99/EC). The overall pre-accession assistance has totalled to about 3 billion EURO per year (1997 figures: 1,620 million EURO from Phare; 1,080 million EURO from Ispa; 540 million EURO from Sapard).

Phare focuses on two priorities: institution building and *acquis*-related investments. The first priority, institution building, accounts for some 30% of the budget and is defined as the process of helping the candidate countries develop the structures, strategies, human resources and management skills needed to strengthen their economic, social, regulatory and administrative capacity. An innovative tool that was introduced to serve this purpose is the long-term twinning of administrations and agencies. It is a very pragmatic, case-by-case method of reforming public administration. Several twinning initiatives concern the implementation of the WFD.

The second priority, *acquis*-related investment, which accounts for 70% of the budget, consists of two major types of activities: a) co-financing of investment in all the equipment that is necessary to operate the

internal market (i.e. putting a food safety structure in place, making frontiers secure, etc.), and b) co-financing of investment in economic and social cohesion, through measures similar to those supported in Member States.

Ispa is the instrument for structural policies for pre-accession and provides financial support for investment in the areas of environment and transport in order to accelerate the compliance with EU legislation in accession countries.

Environmental Assistance is focused on the “investment heavy directives”, which are related to drinking water, wastewater treatment, solid waste management and air pollution. Up until the beginning of 2002, wastewater treatment was the main sub-sector, followed by drinking water, sewage and solid waste management. In the first year there were no projects in the air pollution field.

Sapard aims at supporting the efforts made by the candidate countries to prepare for their participation in the Common Agriculture Policy (CAP) and the single market. It involves two major explicit operational objectives:

- to help to solve the priority and specific problems in agriculture and rural development;
- to contribute to the implementation of the *acquis communautaire* concerning the CAP and other agricultural priorities.

Sapard assistance focuses on 15 measures, among which each country should select its national priorities. These measures include water resources management. However, according to 2001 data, of the Sapard measures for the ten candidate countries, investment in processing and marketing was the most popular with 26% of the total public aid, followed by investment in agriculture holdings and investment in the rural infrastructure, with each just over 20%. Water resources management was rarely ranked as a priority.

### Pre-accession assistance for Turkey and the MEDA Programme

Turkey receives EU pre-accession assistance via specific instruments, budget lines and procedures. From 1964 to 1981, it benefited from three successive financial protocols for a total value of 680 million EURO, made up of EC reduced-interest loans and EIB loans. Some of these resources were invested in water-related projects, mainly concerning irrigation and dams.

The MEDA Programme is the principal financial instrument for the implementation of the EU Mediterranean policy as defined by the



Barcelona Declaration of 1985. Within this context, water is recognised as a priority issue. In the 2002-2004 period, about 4% of total MEDA resources have been allocated to water supply and sanitation.

In the framework of MEDA I (1995-1999), a total amount of 376 million EURO were committed by the EU for Turkey, while European Investment Bank (EIB) loans to the country under the New Mediterranean Policy from 1992 to 1996 and under the Euro-Mediterranean Partnership from 1997 to 1999 totalled 554.5 million EURO. In the framework of MEDA II (2000-2006), Turkey will receive about 127 million EURO per year from the EU. It will also be eligible for the EIB Euro-Mediterranean Partnership II, benefiting from 210 million EURO per year. No detailed information is available about MEDA assistance to Turkey related to the water sector.

In December 1999, the Helsinki European Council stated that Turkey was an applicant for accession on the basis of the same criteria applied to other candidate countries. Consequently, Regulation 2500/2001/EC has refocused the Community's financial assistance to Turkey on the priorities described in Turkey's Accession Partnership. The 2003 Accession Partnership lists among the short-term environmental priorities the transposition and implementation of the *acquis* related to the framework legislation and water quality and the development of transboundary water cooperation in line with the WFD and international conventions to which the EC is a party.

### Assistance to South-Eastern Europe: Community Assistance for Reconstruction, Development and Stabilisation (CARDS)

Since 1991, the European Union has been the largest donor to South-Eastern Europe (SEE). In May 2000, the European Commission made a proposal to simplify and accelerate financial support to the five countries of the region by replacing all previous programmes with a single new instrument: the Community Assistance for Reconstruction Development and Stabilisation (CARDS). Under the Council Regulation on CARDS (2666/2000/EC), adopted in December 2000, more than 5 billion EURO has been allocated to the region for the 2000-2006 period, with assistance focusing on reconstruction and infrastructure,

promotion of democracy, economic and social development and regional co-operation in the following five priority sectors: a) justice and home affairs; b) administrative capacity building; c) economic and social development; c) democratic stabilisation and e) environment and natural resources.

With respect to the Danube countries, for the 2001-2004 period, CARDS financial resources have been allocated as follows: 395.4 million EURO to Bosnia-Herzegovina, 267.3 million EURO to Croatia, 1,105.5 million EURO to Serbia-Montenegro, 832.4 million EURO to Kosovo and 80 million EURO to regional programmes (which also cover Albania and Macedonia). Among the priority sectors, the ones that are particularly relevant for water management/protection are "economic and social development" as well as water and "environment and natural resources". Table 19 contains the Danube countries allocations in these sectors for the 2002-2004 period.

### Assistance to Eastern Europe and Central Asia: TACIS

The TACIS programme provides grant-financed technical assistance to 12 countries of Eastern Europe and Central Asia (EECA), supporting the process of transition to market economies and democratic societies. Among eligible areas are Belarus, Georgia, Moldova, Ukraine and Russia. In the first nine years of its operation (1991-1999), TACIS committed a total of 4,226 million EURO, 20% of which was allocated to nuclear safety and the environment (being the major receiving sector). In particular, in the 2002-2003 period, 4% of TACIS resources has been allocated to water supply and sanitation.

From 1991 to 1999, the five Black Sea countries together received 78% of this financing. Different national, cross-border and regional projects concerning water supply, wastewater treatment, water quality, and joint river management have been financed through these funds.

A Regulation (99/2000/EC), adopted in January 2000, opened a new phase of cooperation between the EU and its partner EECA countries, with the goal of providing assistance totalling 3,138 million EURO until the end of 2006 and with a focus on certain key activities in the

**Table 19** CARDS assistance to Danube countries in water related sectors.

Country	Economic development (Million EURO)			Environment (Million EURO)		
	2002	2003	2004	2002	2003	2004
BIH	13.4	2.4	14.1	6.5	10.1	1.4
HR	18	17.5	16.5	3	3	3
YU*	142	149	102.5	n.a.	n.a.	n.a.
Kos	101	30	18	n.a.	n.a.	n.a.

\* YU represents Serbia-Montenegro, excluding Kosovo

(Source: European Commission 2004a)

region. The development of infrastructure networks, the promotion of environmental protection, the management of natural resources and the development of rural economy are the most relevant activities with regard to the water sector.

At a regional level, TACIS has already given substantial financial support to several Danube/Black Sea programmes. The 2002-2003 programme for regional co-operation required assistance to be focused, in the Black Sea area, under the Regional Seas Programme, on the development of river basin management plans, with approaches building as much as possible on the main elements of the EU Water Framework Directive. In fact, the Black Sea Commission has agreed to investigate the consequences of the implementation of the Directive in the Strategic Action Plan for the Black Sea, with the view to adapt the plan to the obligations resulting from the Directive. Assistance was to have also been directed towards the promotion of sustainable management of fish resources, biodiversity and reduction of environmental risks from oil transport.

Following the agreements on the EU-EECA Strategic Partnership on water for sustainable development at the World Summit of Johannesburg and on the Environment Partnership Strategy for EECCA countries at the "Environment for Europe" Ministerial Conference of Kiev, it is expected that TACIS contributions in this area will increase.

### **LIFE: the Financial Instrument for the Environment**

Launched in 1992, LIFE (the Financial Instrument for the Environment) co-finances environmental initiatives in the European Union and in some accession and third countries. "LIFE III", which covered the 2000-2004 period and had a budget of about 638 million EURO (Regulation 1655/2000/EC), has been extended (2005-2006) by Regulation 1682/2004 with a further budget of 317 million EURO.

LIFE consists of three thematic components: LIFE Environment, LIFE Nature and LIFE Third Countries. With respect to geographical coverage, beneficiaries from LIFE Environment and LIFE Nature are EU Member States and EU accession countries that have decided to participate in LIFE (all accession countries except for Bulgaria), while LIFE Third Countries concerns third countries bordering on the Mediterranean and the Baltic Sea (among which are Albania, Bosnia-Herzegovina, Croatia, and Turkey). Many LIFE projects are related to the sustainable management of groundwater and surface waters. In particular, LIFE Environment has contributed to the drafting of the WFD, serving as a "demonstration tool" in this field. Out of a sample of 75 LIFE-Environment projects on water, 43% are aimed at the management of river basins; 16% are aimed at the protection of groundwater; 16% are aimed at the treatment of

wastewater; 16% are aimed at pollution prevention and reduction and 9% are aimed at planning and organisation for water management.

As protection of habitats and listed species is closely linked to water quality, LIFE-Nature has also been important for EU water policy. The territorial approach for the network of protected areas, Natura 2000, which LIFE Nature supports, is in line with the spirit of the WFD.

Finally, LIFE Third Countries also plays a role, providing assistance to eligible countries in order to create technical and human expertise capacities and organisation for the management of waters, as well as contributing to the development of water policies and programmes.

### **The DABLAS Task Force**

The DABLAS Task Force was set up in November 2001 with the goal of providing a platform for cooperation for the protection of water and water-related ecosystems in the Black Sea region. This was in response to an EC Communication adopted in 2001, which highlighted priority actions required to improve the environmental situation in the area (see also par. 2.3).

The Task Force consists of representatives from the Danube/Black Sea countries, the International Commission for the Protection of the Danube River and the Black Sea Commission, other regional/international organisations active in the protection of water and water-related ecosystems in the area, international institutions (such as the EBRD, the EIB, the WB, UNDP, UNEP, GEF, the Stability Pact for South Eastern Europe, etc.), interested EU Member states, other bilateral donors and the European Commission, which also holds the Secretariat of the Task Force.

As part of its mandate, the DABLAS Task Force formed a Prioritisation Working Group in March 2002, which developed a framework for project financing. A priority project list was then produced in February 2003, using environmental and financial criteria and comprising 30 water infrastructure investment projects.

### **The EU Water Initiative**

At the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg, the EU signalled its intention to expand its role in the international effort to achieve water and sanitation-related targets, with the launch of the new EU Water Initiative. The Initiative, which is being taken forward with the active involvement of EU Member States and the European Commission, the European Investment Bank, the private sector and civil society, provides a platform for strategic partnerships to achieve the following targets:

- Halving by 2015 the proportion of people who do not have access to safe drinking water and adequate sanitation (Millennium Development Goal);
- Developing integrated water resources management and water efficiencies plans in all countries.

In the light of these objectives, the main priorities of the EU Water Initiative are to: a) evaluate the situation in different countries and regions, analysing the main shortcomings and financial needs; b) prepare a coordinated action programme with a long-term financial strategy providing specific targets to 2015; and c) establish a monitoring and reporting mechanism to measure progress in implementation and to steer further action.

The Initiative is characterised by a strong regional focus. With regard to the Danube/Black Sea countries, a partnership between EU and Eastern Europe, Caucasus and Central Asia (EECCA) countries was endorsed at the ministerial level during the WSSD. Following this agreement, a Working Group has been set up to address the two pillars of the partnership, which are: a) urban water supply and sanitation, including financing of water infrastructure and b) integrated water resources management, including transboundary river basin management and management of other water bodies, lakes and regional seas.

## Assistance provided by other international financial institutions

Aside from the EU, a number of other international financial institutions provide assistance to the Danube/Black Sea countries in the environmental and water sectors or play a role as coordinators of such assistance:

*European Investment Bank (EIB):* "Environmental protection and improving the quality of life" is one of the five main operational priorities of the Bank. EIB investments in the water sector include sewage collection and treatment, the supply of potable water and flood protection schemes, in a context of sustainable integrated water resource management, according to the objectives and principles of the EU WFD.

*European Bank for Reconstruction and Development (EBRD):* as of May 1998, the European Bank for Reconstruction and Development had committed 540 million EURO of financing in the municipal and environmental infrastructure sector. Most of the funds were towards water projects.

*World Bank (WB):* As of 10 June 2003, the WB water-related projects in the Black Sea/Danube countries amounted to 526 million USD, with respect to projects under implementation, and to 384 million USD, with respect to proposed projects. Romania, Russia and Croatia were the recipient countries that benefited from the higher overall water-related assistance.

*Global Environmental Facility (GEF):* GEF has promoted both national and regional projects concerning international waters in the Black Sea area. At a regional level, three important programmes have already been implemented: the Environmental Programme for the Danube River Basin (1992-1996, Strategic Action Plan; 1997-2000, and the Danube River Basin Pollution Reduction Programme

Finally, there are at least two international initiatives that have important financial implications for the environmental/water sectors of the Danube/Black Sea countries. First is the *Environmental Action Programme for Central and Eastern Europe*, adopted in 1993 at the "Environment for Europe" Ministerial Conference in Lucerne as a broad strategy to guide environmental reform in those countries.

The second initiative is the Stability Pact for South Eastern Europe, adopted in 1999, at the EU's behest, and which is comprised of more than 40 partner countries and organisations. The Stability Pact is articulated in three Working Tables (WT I: democratisation and human rights; WT II: economic reconstruction, cooperation and development; WT III: security issues). The European Commission and the World Bank were appointed to coordinate economic assistance measures for the region.

Working Table II is particularly interesting as far as water protection/management is concerned, since it includes initiatives related both to infrastructures and the environment. In particular, the Regional Environmental Reconstruction Programme (REReP) was endorsed in 2000, with the European Commission as the lead agency and the Regional Environment Centre (REC) for Central and Eastern Europe as the secretariat. In 2002 there were REReP projects underway or completed to the value of 15 million EURO, the major donor being the European Commission. Several of such projects concern water protection/management.

# Conclusions

The countries surrounding the Black Sea have increasingly recognised the need to work together in order to promote sustainable use of transboundary water resources. The Danube River Protection Convention and the Convention of the Protection of the Black Sea have developed concrete measures for water pollution. The EC Water Framework Directive introduces water resource management principles for river basins.

This report describes the process of implementation of the EC Water Framework Directive in the Black Sea Basin from the legal, institutional and financial point of view and makes comparisons among existing conventions in the basin.

The EU WFD has proved to be an effective tool for improving water resources management, with respect to both water quantity and quality measures in the member countries. It has also already shown favourable benefits in other Black Sea Basin countries. The WFD focuses on the protection of waters as a whole, independent of the national or transboundary character of the environmental impacts. In the Black Sea Basin, waterways and their management have many similarities regarding geography, hydrology and economic activities. Current water pollution control mechanisms may serve as an acceptable foundation upon which new water resources policies created in accordance with the WFD could be developed.

Most of the Black Sea third countries have general legislation regarding environmental protection and water management. The implementation of the EU Water Framework Directive is mandatory for the EU member states and other accession countries have committed themselves to making efforts necessary to implement WFD. The main problems facing the implementation of the WFD in the Black sea basin are related to legal, financial and institutional constraints. The main legal barriers are as follows:

- Water management is not currently carried out everywhere in the basin.
- The water quality standards systems need to be reformed according to the approach introduced by the WFD.
- Monitoring systems need to be harmonised and inadequacies in existing data need to be improved.
- The system of water permits and ownership rights needs to be re-evaluated.

In the countries where decentralisation has taken place before the establishment of a clear legal framework and development of environmental management capacity, it has been difficult to finance the required rehabilitation and modernisation of the water sector infrastructure. However, investments and their successful implementation will lead to considerable benefits for human health and the environment. The financial aspects related to implementation of the WFD and EU and other international institutions for investing in water sector infrastructures and management are described in this report.

The WFD introduces the concept of recovery of costs of water services, including environmental and resources costs regarding the polluter-pays principle. This will provide a long-term financial basis for the required investments. However in the short term, EU environmental requirements pose a financial challenge for the new member states and accession countries, which must primarily rely on domestic sources of funding, particularly on public and private expenditures and investments in the environmental sector. However, all countries in the Black Sea Basin receive EU financial assistance in order to improve national water management the conditions reflect the principles of the EU water policy.

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