The Danube Basin Analysis

icpdr iksd
International Commission for the Protection of the Danube River
Internationale Kommission zum Schutz der Donau

(WFD Roof Report 2004)

River basin characteristics, impact of human activities and economic analysis required under Article 5, Annex II and Annex III, and inventory of protected areas required under Article 6, Annex IV of the EU Water Framework Directive (2000/60/EC)

Part A – Basin-wide overview
Summary

//// Deutschland //// Österreich //// Bosna i Hercegovina //// Bălgarija //// Hrvatska //// Ceská republika //// Magyarország //// Moldova //// România //// Srbija i Crna Gora //// Slovensko //// Slovenija //// Ukraïna ////

Disclaimer

This summary highlights some of the main results of the Danube Basin Analysis Report (WFD Roof Report 2004), which responds to reporting requirements under the EU Water Framework Directive. The Danube Basin Analysis Report provides the first comprehensive characterisation and analysis for the entire Danube River Basin District, in which all 13 Danube countries with territories of more than 2000 km² have participated. The nature, extent and quality of the available data and information vary considerably depending on the issues and countries involved. The key objective was to compile comparable data and information throughout the Danube River Basin District and to generate the level of detail or aggregation required for the assessment of transboundary and basin-wide issues. For surface water, data collection focused mainly on the Danube River itself and the main rivers and lakes. For groundwater, the focus was on the important transboundary groundwater bodies. The national reports provide a more detailed analysis. Hence, the Roof Report should only be read and interpreted in conjunction with the national reports. Where inconsistencies may have occurred, the national reports may provide the latest up to date information since they have been finalised several months after the Roof Report. In other words, some of the data presented in the Roof Report – and therefore in this summary – were presented as a first approximation or at a different level of aggregation but the finally agreed result on the national level only became available after the final date of data delivery for the Roof Report.

Foreword

The Danube is the most international river basin in the world. Eighteen countries have territory within the river basin and share responsibility for management and care for the regions water resources.

Fortunately, despite large political and social differences there is a high degree of cooperation and coordination among the Danube countries to ensure an equitable and ecological management of water for today's and future generations. This report is a product of, and a reflection of that substantial cooperative effort to manage Danube waters in a sustainable way.

The report has been directly prepared to meet the requirements of the EU Water Framework Directive, the innovative and progressive EU legislation that advocates the river basin approach to management of water. Many Danube countries are not EU members, and have no legal responsibility to implement this legislation, but under the framework of the International Commission for the Protection of the Danube River all Danube countries committed to meeting the requirements of the WFD and putting together this Danube Analysis Report.

The report is intended to be a characterisation and assessment of water resources at the Danube wide level and the basis on which further efforts to improve water quality need to be based. This is a first assessment and clearly there is much work to be done to undo past damage and ensure sustainable use in future.

There is also more work needed to be done to further analyse and monitor the status of water resources to ensure that the goal of good ecological and chemical water quality can be achieved.

In conclusion, I would like to take this opportunity to thank the many people who have contributed to this report, which is intended to provide dialogue, and the basis for further assessment and action in addressing water management in the Danube. I am hopeful that this milestone report will do just that and further help in developing understanding and cooperation in managing water resources in this most international river basin in the World.

Philip Weller
ICPDR Executive Secretary

The EU Water Framework Directive

The EU Water Framework Directive (WFD) is the legislative framework for water management in Europe (all EU member states are legally bound by this legislation). It sets clear objectives that a good water quality status must be achieved by 2015 and that sustainable water use is ensured throughout Europe.

Specifically, the WFD

- sets uniform standards in water policy throughout the European Union and integrates different policy areas involving water issues,
- introduces the river basin approach for the development of integrated and coordinated river basin management for all European river systems,
- stipulates a defined time-frame for the achievement of the good status of surface water and groundwater,
- introduces the economic analysis of water use in order to estimate the most cost-effective combination of measures in respect to water uses,
- includes public participation in the development of river basin management plans encouraging active involvement of interested parties including stakeholders, non-governmental organisations and citizens.

A concise time-table for WFD implementation is as follows:

2003 Transposition of WFD into national legislation
2003 Identification of River Basin District
2004 Analysis of pressures, impacts, and water uses of surface water and groundwater [1]
2006 Monitoring programmes operational
2006 Start public participation process at the latest
2006 Publish timetable and work programme of River Basin Management Plan
2007 Publish report on most important water management issues
2008 Publish Draft River Basin Management Plan
2008 Consult public on issues and revise Draft River Basin Management Plan
2009 Publish River Basin Management Plan
2010 Water pricing policies must provide adequate incentives to use water wisely
2012 Implement Programme of Measures to achieve good status
2015 Reach environmental objectives

1 This brochure summaries the results in response to these requirements.

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Analyses required under Article 5, Annex II and Annex III, and Inventory required under Article 6, Annex IV WFD

1. Introduction

The Danube Basin Analysis Report responds to reporting obligations of the EU Water Framework Directive (WFD). It provides an overview of the Danube River Basin District by giving a description of the river basin characteristics and an analysis of the main pressures and impacts on surface waters and groundwater. It also gives information on the main water uses in the basin and reports on progress in setting up an inventory of protected areas. It is the second report to the European Commission on the progress of implementation of the WFD.

The WFD specifies that Member States should encourage interested parties to be actively involved in implementing the Directive and in the process of developing the river basin management plans. This report is therefore also addressed to all interested parties and the public, in order to inform them about the results of the first analysis of the Danube River Basin District and to prepare for the consultation process of the Danube River Basin Management Plan.

The Danube River Basin is the second largest river basin in Europe covering territories of eighteen different states (Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Italy, Macedonia, Moldova, Poland, Romania, Serbia and Montenegro, Slovak Republic, Slovenia, Switzerland, Ukraine). Eight of these are EU Member States (see Table 1). At the time of reporting, three other Danube countries are in the process of accession. Seven states have not initiated a formal process to join the EU.

The Danube River Protection Convention (see Figure 1) forms the overall legal instrument for cooperation and transboundary water management in the Danube River Basin. The main objective of the Convention is to ensure that surface waters and groundwater are sustainably and equitably used, and that the basin's riverine ecosystems are conserved and restored.

Coverage of the states in the Danube River Basin (DRB) and estimated population

(data source: Competent authorities in the DRB unless marked otherwise) *TABLE 1*

State	ISO-Code	Status in the European Union [1]	Official coverage in DRB [km²]	Digitally determined coverage in DRB [km²] [2]	Percentage of DRB [%]	Percentage of DRB in state [%]	Population in DRB [Mio.]	Percent of population in DRB [%]
Albania	AL	-		126	< 0.1	0.01	< 0.01	< 0.01
Austria	AT	Member State		80,423	10.0	96.1	7.7	9.51
Bosnia i Herzegovina	BA	-		36,636	4.6	74.9	2.9	3.58
Bulgaria	BG	Accession Country		47,413	5.9	43.0	3.5	4.32
Croatia	HR	Accession Country		34,965	4.4	62.5	3.1	3.83
Czech Republic	CZ	Member State	21,688		2.9	27.5	2.8	3.46
Germany	DE	Member State		56,184	7.0	16.8	9.4	11.60
Hungary	HU	Member State	93,030		11.6	100.0	10.1	12.47
Italy [3]	IT	Member State	565		< 0.1	0.2	0.02	0.02
Macedonia	MK	-	109		< 0.1	0.2	< 0.01	< 0.01
Moldova	MD	-		12,834	1.6	35.6	1.1	1.36
Poland	PL	Member State	430		< 0.1	0.1	0.04	0.05
Romania	RO	Accession Country	232,193		29.0	97.4	21.7	26.79
Serbia and Montenegro [4]	CS	-		88,635	11.1	90.0	9.0	11.11
Slovak Republic	SK	Member State	47,084		5.9	96.0	5.2	6.42
Slovenia	SI	Member State	16,422		2.0	81.0	1.7	2.10
Switzerland	CH	-		1,809	0.2	4.3	0.02	0.02
Ukraine	UA	-		30,520	3.8	5.4	2.7	3.33
Total				(801,463)	100		81.00	100

1 The table reflects the situation at the time of reporting (March 2005).
2 For the purpose of comparison the coverage of the states was calculated using GIS based on the DRBD overview map. These values differ slightly from the official data of some countries, since other methods of calculation have been used.
3 Data source: Autonomous Province of Bozen – South Tyrol.
4 According to the 2002 census the population in Serbia and Montenegro without the provinces of Kosovo and Metohia is 7.668.000 inhabitants. On the territory of Kosovo and Metohia the last census was in 1981. On the basis of this census and OEBS data the estimated population of Kosovo and Metohia in the Danube river basin today is about 1.300.000 inhabitants.

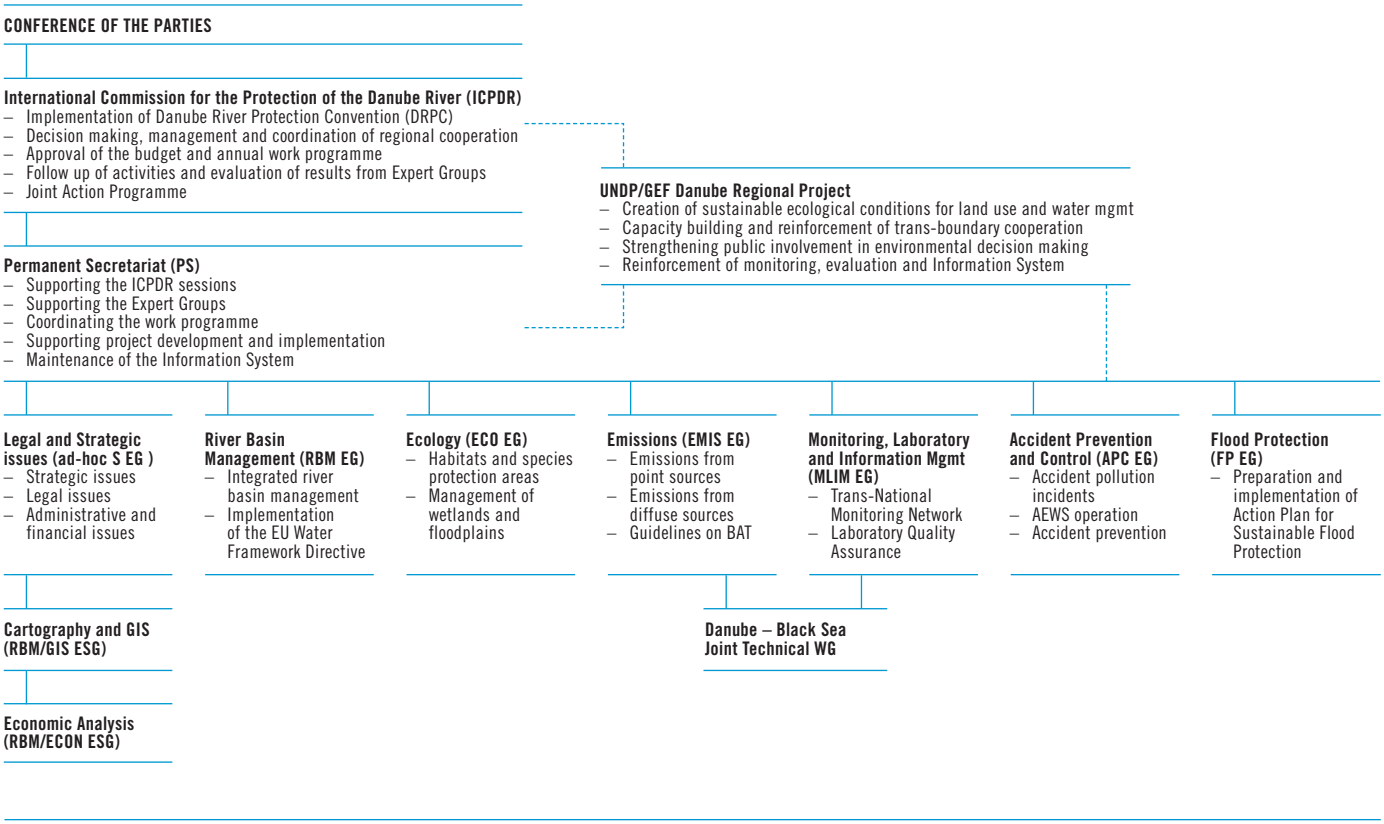
The International Commission for the Protection of the Danube River (ICPDR) is the implementing body under the Danube River Protection Convention (Convention on Cooperation for the Protection and Sustainable Use of the Danube River). Germany, Austria, Czech Republic, Slovak Republic, Hungary, Slovenia, Croatia, Bosnia and Herzegovina, Serbia and Montenegro, Bulgaria, Romania, Moldova, Ukraine and the European Commission are the Contracting Parties. The Danube countries have committed themselves to jointly develop the Danube River Basin Management Plan by the end of 2009. They chose the ICPDR as the platform for coordination for WFD implementation on issues of joint concern at the multilateral and basin-wide level. The Danube Basin Analysis Report is therefore the result of the successful cooperation in the framework of the ICPDR.

There are two parts to the report: The Danube River Basin Roof Report 2004 (Part A) gives an overview of the situation in the Danube River Basin District and sets the framework for the understanding of the detailed national reports (Parts B) which provide further information at the national level and information coordinated at the bilateral level. The Roof Report provides information on the main surface waters of the Danube River Basin District and the important transboundary groundwaters. It includes an overview of the main pressures in the Danube River Basin District and the related impacts exerted on the environment.

The Danube Delta, shared by Romania and Ukraine, is the largest delta in Europe and a wetland of global importance.

Organisational Structure under the Danube River Protection Convention

FIGURE 1



2. The Danube River Basin District

The Danube River Basin District (see Map 1 and Table 2) covers:

- the Danube River Basin
- the Black Sea coastal catchments on Romanian territory
- the Black Sea coastal waters along the Romanian and partly the Ukrainian coast.

The Danube River Basin covers more than 800,000 km² and more than 99 % of the Danube River Basin District. It lies to the west of the Black Sea in central and south-eastern Europe (see Figure 2).
To the west and north-west the Danube River Basin borders on the Rhine River Basin; in the north on the Weser, Elbe, Odra and Vistula River basins; in the north-east on the Dnjestr; and in the south on the catchments of the rivers flowing into the Adriatic Sea and the Aegean See.

The Danube River Basin shows a tremendous diversity of habitats, including glaciated high-gradient mountains, forested midland mountains and hills, upland plateaus and plains and wet lowlands near sea level. The Danube River Basin also shows great differences in climate because of the wide area it covers. The Danube rises in the Black Forest in Germany, then flows predominantly south-east and reaches the Black Sea after 2,780 km. The Danube has many large tributaries. Some of these catchments have the size of other international river basins such as the Elbe or Odra river basin (see Table 3). The tributaries show great variability in their discharge as can be seen from the longitudinal profile of the Danube (see Figure 3), which shows the gradient of the Danube as well as the amount and location of its tributaries. There are also many natural lakes in the Danube River Basin, mainly small but some very large (see Table 4), as well as several navigation canals.

Before the Danube reaches the Black Sea it divides into three main branches where it forms the magnificent Danube Delta, a World Nature Heritage Site. The entire protected area covers 675,000 ha, including flood plains, more than 600 natural lakes larger than one hectare, and extended marine areas harbouring many rare wildlife species. With respect to the Black Sea the Danube is its largest tributary.

Floodplain forests, marshlands, deltas, floodplain corridors, lake shores and other wetlands are essential components in the Danube River Basin fostering a great biodiversity of species and habitats. The Danube River Basin extends into five of the eight biogeographical regions of Europe: the Alpine, the Continental, the Pannonic, the Steppic and the Black Sea Region. Each of these shows characteristic wetlands, some of them are protected, others not. Many of the larger wetland areas are transboundary in nature. The current extent of wetlands is only a remnant of the former wetland systems in the Danube River Basin.

Groundwater resources are also diverse and represent as much as 30 % of the total internal renewable water resources of some countries. Aquifers are the main source for drinking water and are also used for industrial purposes. In addition to porous aquifers, there are many karstic aquifers in the Danube River Basin, which are highly vulnerable to contamination.

/// România //// Srbija i Crna Gora //// Slovensko //// Slovenija //// Ukraïna //// Deutschland //// Österreich //// Bosna i Hercegovina //// Bălgarija //// Hrvatska //// Ceská republika

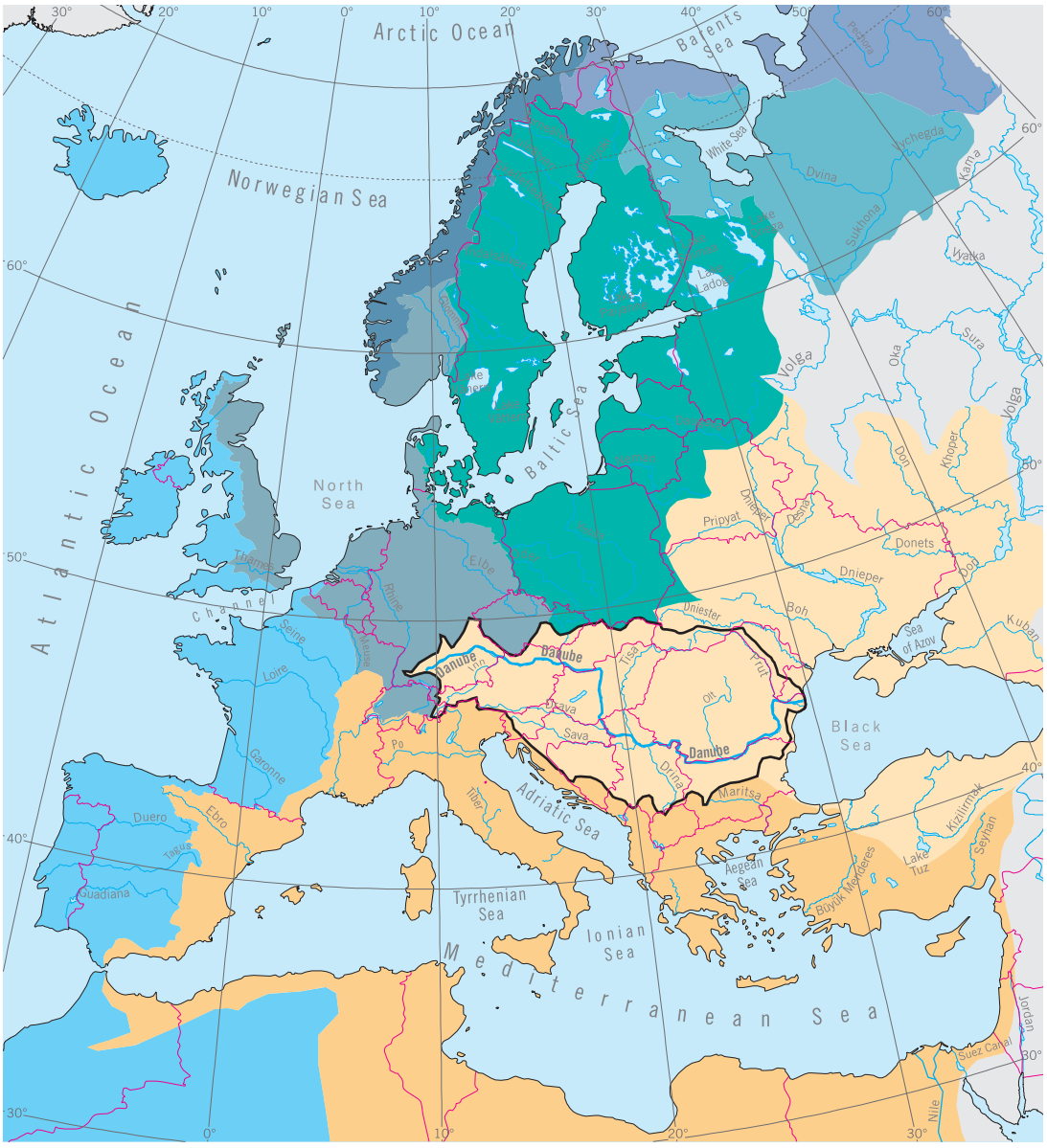
Area of the Danube River Basin District *TABLE 2*

	Territory	Official area [km²]	Digitally determined area [km²] [1]
Danube River Basin (DRB)	18 countries (see Table 1)		801,463
Black Sea coastal river basins	Romania	5,198	5,122
Black Sea coastal waters	Romania and Ukraine		1,242
Danube River Basin District (DRBD)			807,827

1 For the purpose of comparison the areas were calculated using GIS on the basis of the DRBD overview map. The value for the Black Sea coastal river basins differs slightly from the official data, since other methods of calculation have been used.

Location of the Danube River Basin in Europe

FIGURE 2



The Danube River Basin in Europe

Drainage basins of regional seas

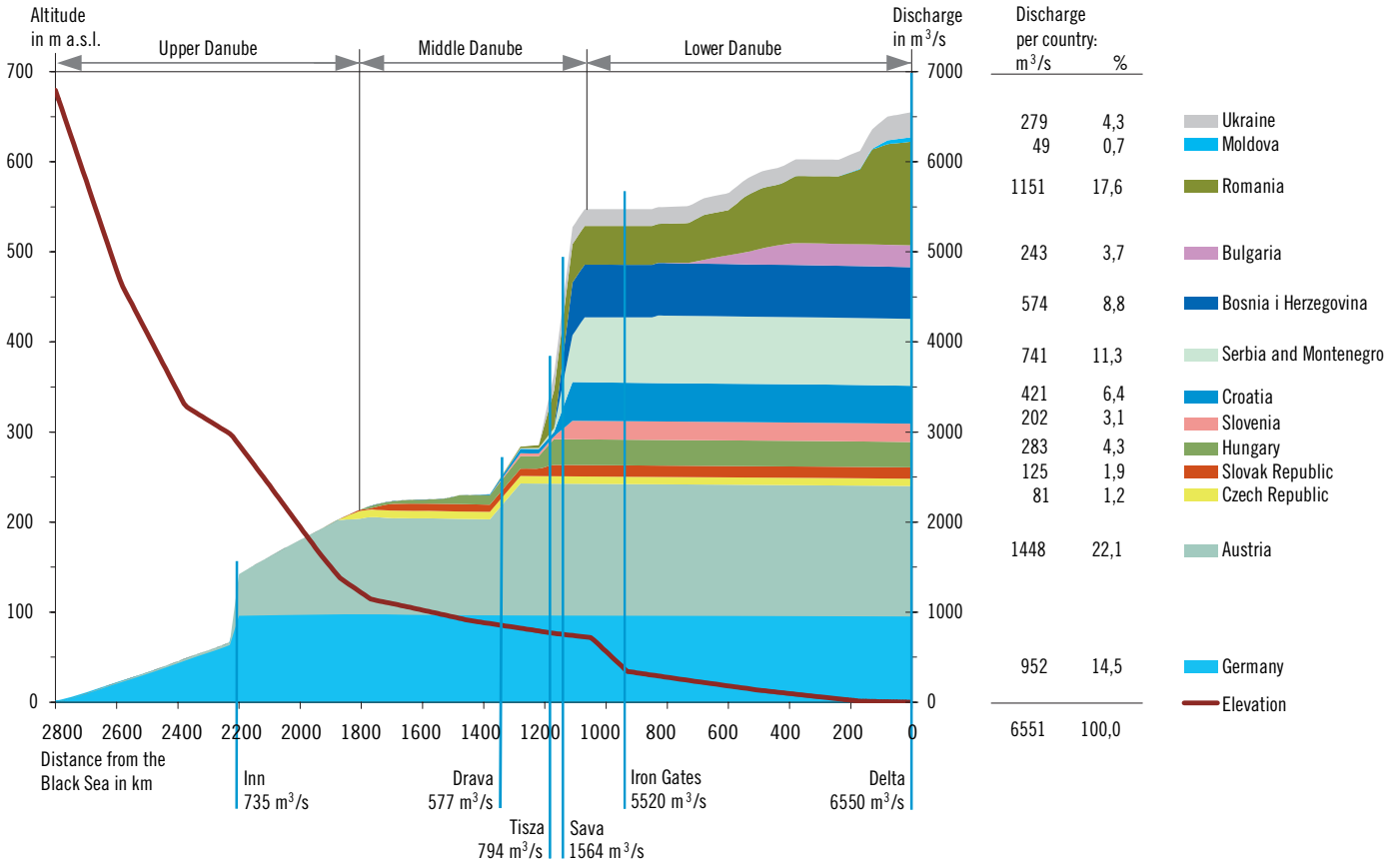
0 500 km

- White Sea
- Barents Sea
- Baltic Sea
- Norwegian Sea
- Mediterranean Sea
- Black Sea and Sea of Azov
- Atlantic Ocean
- North Sea
- not classified

Source: European Commission, adjusted for ICPDR, 2004

Longitudinal profile of the Danube River and contribution of water from each country (in %)
to the cumulative discharge of the Danube (in Mio m³/year), based on data for 1994-1997 using the Danube Water Quality Model

FIGURE 3



The Tysa/Tisza/Tisa River basin is the largest sub-basin in the Danube River Basin (157,186 km²). It is also the longest tributary (966 km) of the Danube. By flow volume it is second largest after the Sava River. The Tysa/Tisza/Tisa River basin can be divided into three main parts:

- the mountainous Upper Tysa in Ukraine (upstream of the Ukrainian-Hungarian border),
- the Middle Tisza in Hungary (receiving the largest tributaries: Bodrog River and Slaná/Sajó River collecting water from the Carpathian Mountains in Slovak Republic and Ukraine as well as the Somes/Szamos River, the Crisul/Körös River System and Mures/Maros River draining Transylvania in Romania), and
- the Lower Tisa (downstream of the Hungarian border with Serbia and Montenegro, where it receives the Bega/Begej and other tributaries indirectly through the Danube – Tisza – Danube Canal System).

The Sava River is the largest Danube tributary by discharge (average 1,564 m³/s) and the second largest by catchment area (95,419 km³). It rises in the western Slovenian mountains and passes through Croatian lowland before forming the border between Croatia and Bosnia i Herzegovina. Continuing through Serbia and Montenegro it reaches its confluence with the Danube in Belgrade. Its main sub-tributaries are Krka, Kolpa/Kupa, Una, Vrbas, Bosna, Drina and Kolubara.

The Inn is the third largest by discharge and the seventh longest Danube tributary. At its mouth in Passau, it brings more water into the Danube than the latter itself. However, its catchment area of 26,130 km² is only nearly half as big as the Danube at this point. The main tributary of the Inn is the Salzach River.

TABLE 3

River	Mouth at Danube [rkm]	Length [km]	Size of catchment [km²] [1]	Average discharge [m³/s]	Time series for discharge values
Danube	0	2,780	801,463	6,460	(1914-2003)
Lech	2,497	254	4,125	115	(1982-2000)
Naab	2,385	191	5,530	49	(1921-1998)
Isar	2,282	283	8,964	174	(1926-1998)
Inn	2,225	515	26,130	735	(1921-1998)
Traun	2,125	153	4,257	150	(1961-1999)
Enns	2,112	254	6,185	200	(1961-1999)
Morava/March	1,880	329	26,658	119	(1961-1999)
Raab/Rába	– [2]	311	10,113	88	(1901-2000)
Vah	1,766	398	18,296	161	(1931-1980)
Hron	1,716	278	5,463	55	(1931-1980)
Ipel/Ipoly	1,708	197	5,108	22	(1931-1980)
Sió [3]	1,498	121	9,216	39	(1931-1970)
Drau/Drava	1,382	893	41,238	577	(1946-1991)
Tysa/Tisza/Tisa	1,214	966	157,186	794	(1946-1991)
Sava	1,170	861	95,719	1,564	(1946-1991)
Tamis/Timis	1,154	359	10,147	47	(1946-1991)
Morava (CS)	1,103	430	37,444	232	(1946-1991)
Timok	846	180	4,630	31	(1946-1991)
Jiu	694	339	10,080	86	(1921-2003)
Iskar	636	368	8,684	54	(1936-1998)
Olt	604	615	24,050	174	(1921-1995)
Yantra	537	285	7,879	47	(1936-1998)
Arges	432	350	12,550	71	(1914-2003)
Ialomita	244	417	10,350	45	(1915-2003)
Siret	155	559	47,610	240	(1921-2003)
Prut	132	950	27,540	110	(1928-2003)

1 For the purpose of comparison the size of the catchments was calculated using GIS on the basis of the DRBD overview map. These values may differ slightly from the official data, because other methods of calculation have been used.
2 The Raab/Rába flows into the Mosoni Duna, an arm of the Danube, at rkm 14.
3 Sió River is the outflowing river of Lake Balaton, which has in itself a catchment area of 5,737 km². The total catchment area of Lake Balaton and Sió River is 14,953 km².

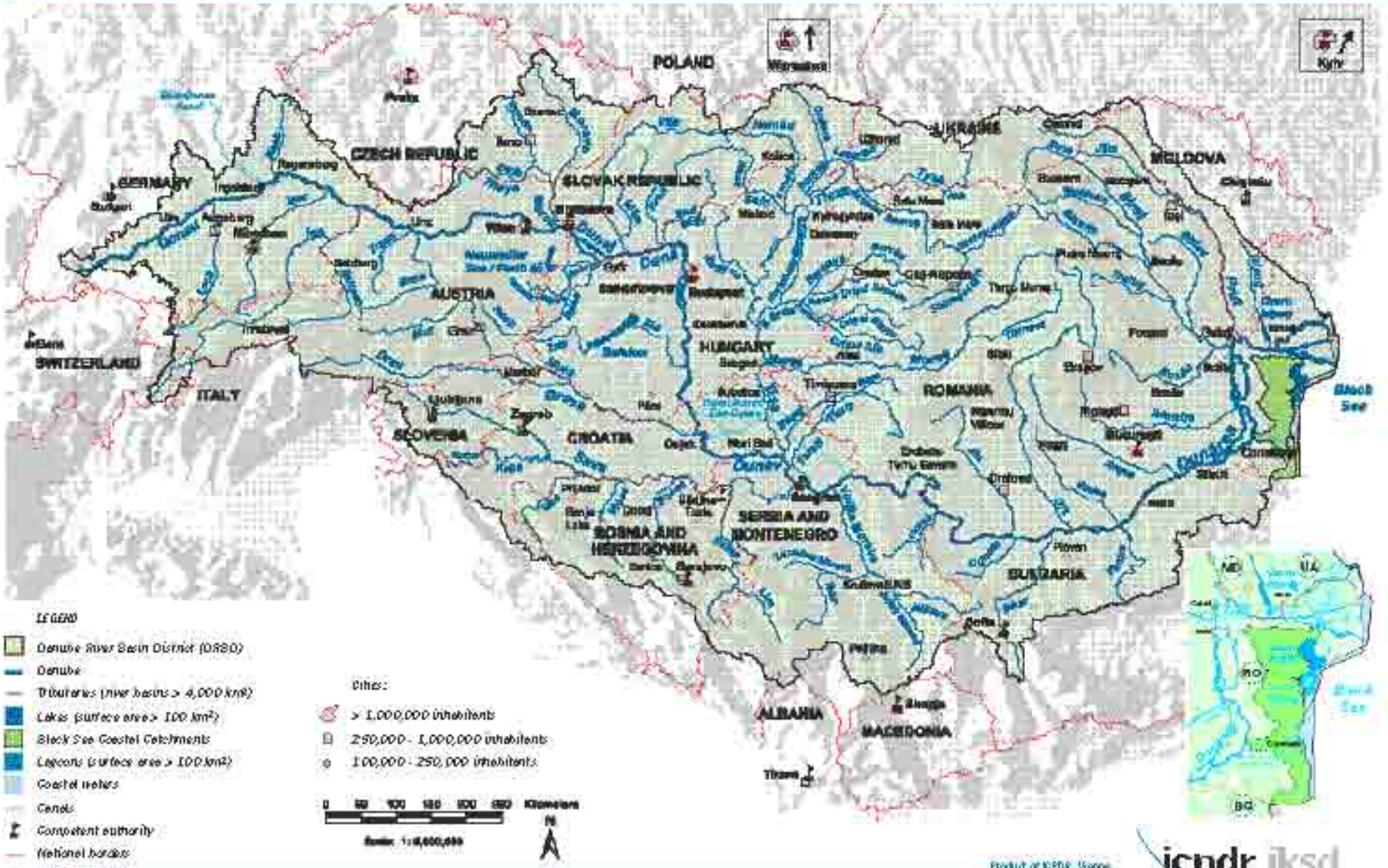
The main lakes (with a surface area > 100 km²) in the Danube River Basin

(data source: Competent authorities in the DRB unless marked otherwise)

TABLE 4

Lake	Country(ies)	Surface area [km²]	Average depth [m]	Maximum depth [m]
Neusiedler See / Fertő-tó	AT, HU	315	1.10	1.80
Lake Balaton	HU	605	3.60	10.60
Ozero Ialpug [4]	UA	149	na	na
Lacul Razim / Razelm	RO	392	2.05	3.50
incl. L. Golovita and L. Zmeica	RO	520	na	na
Lacul Sinoe / Sinoie	RO	162	1.25	2.30

4 The size of the surface area was calculated using GIS on the basis of the DRBD slightly from the official data, because another method of calculation has been used.



The product includes geographical data licensed from European National Mapping Agencies. EuroGlobalMap v2.0 (EuroGeographics) was used as the base topographic layer for DE, AT, CZ, IT, SI and HR. The data for the other countries is based on Middle Level 0 data from ARAM. The water border of the DRBD is based on national information from DE, AT, CH, CZ, SK, SI, HR, BA, CS, RO, BG, HU and MD. For AL, MK, MK and IT the data of the European Commission Joint Research Centre was used.

Prepared by FLOVIUS, Vienna, March 2005

3. Characterisation of surface waters

The report provides an overview of the main surface waters of the Danube River Basin District (see Map 1). They are defined as follows:

- all rivers with a catchment size larger than 4000 km^2
- all lakes with an area larger than 100 km^2
- the main canals.

The current analysis shows that in the last two decades, considerable improvements in environmental conditions in the Danube basin have been made. Where investments, e.g. in wastewater treatment, have taken place, the improvement of the water quality is visible. However, a major part of pollution reduction can be attributed to the decline of industries and agricultural activities in the middle and lower parts of the basin since 1989. In these areas investments for a sustainable reduction of pollution levels has just started and will have to continue for another 10 to 20 years.

Some sections of the Danube River are still rather untouched ecosystems and, despite possible pollution problems, constitute a unique heritage to be preserved. In addition, the Danube River Basin still hosts many species and habitats of outstanding ecological value and unique importance for biodiversity. In particular the Danube Delta is of global significance. The future management of the river basin needs to ensure that the focus of measures is not only the restoration of affected water bodies but equally important is the preservation of those few areas that are still ecologically intact.

3.1 Organic pollution

In surface waters, the loads of organic pollution are still unacceptably high in most of the Danube tributaries and in some parts of the Danube River. The considerable discharge of untreated or insufficiently treated wastewater from municipal, industrial and agricultural point sources is widespread, in particular in the middle and lower part of the basin. The indicators for impact from organic pollution show that the water quality is significantly affected, the major cause being insufficient treatment of waste-water from municipalities.

A significant reduction potential for organic pollution exists through the application of best available techniques for wastewater treatment facilities. Considerable efforts, in particular as regards financial investment will be necessary to reduce organic pollution to acceptable levels in some parts of the middle and lower basin. Financial programmes and initiatives from the EU and other international donors are already set up. The preparation of concrete projects and measures needs to be pursued without delay even well before 2009 since the successful resolution of this basic problem will be the first essential step to implement the Water Framework Directive and other relevant EU legislation. It will remain to be seen whether these load reductions will be sufficient to achieve the “good ecological status”, which are linked to organic pressures.

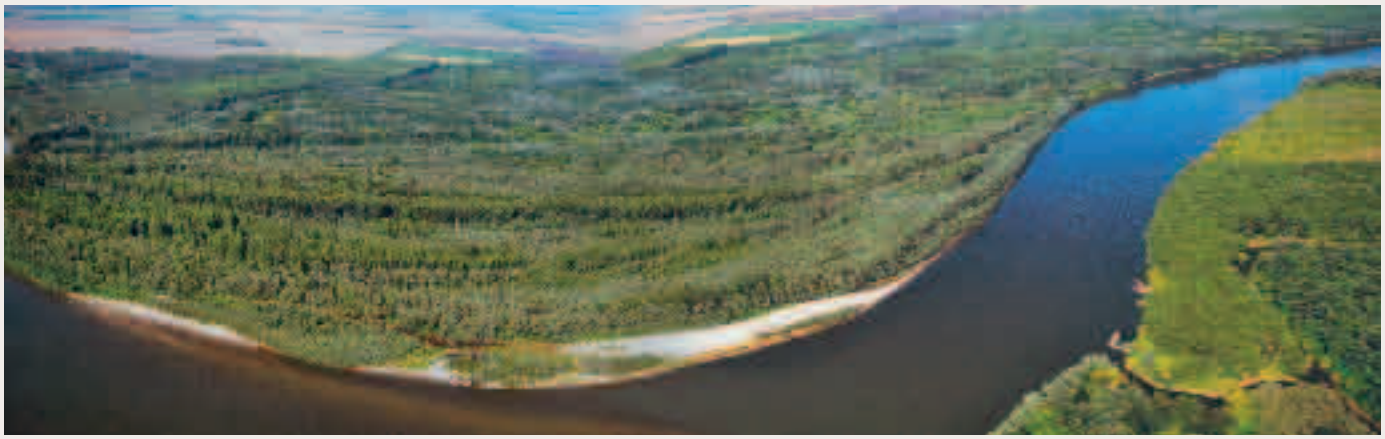
3.2 Nutrient pollution

Overall, nutrient loads into the Danube basin have significantly decreased over the past 20 years, however, they are still well above the levels of 1955. In the future this improvement in reduction of nutrient pollution may be lost, because of an increase in diffuse pollution from agriculture. Impacts from nutrients can mainly be seen in the receiving coastal waters of the Black Sea but also in many lakes and groundwater bodies throughout the basin. While in rivers nutrients generally cause fewer problems due to turbulent flow conditions, some slow flowing river stretches such as the middle Danube, impounded river sections, and lakes show effects of eutrophication.

In order to ensure the further reduction or at least stand-still of nutrient loads, the expected increase of diffuse sources needs to be compensated by the reduction of point source inputs. In addition to the investment strategies already described for dealing with organic pollution, the introduction of phosphate-free detergents throughout the Danube basin appears to be a cost-effective and necessary measure. Introducing such an instrument in a mandatory way could be undertaken at the EU level, however, options of voluntary instruments are already being explored in the context of the ICPDR.

As mentioned above, economic development in the middle and lower parts of the Danube region will inevitably increase diffuse nutrient inputs. It should be ensured that best environmental and agricultural practices are being developed and applied in order to create a sustainable agriculture in the long term. In this respect, there is still room for reduction of nutrient loads in the upper part of the Danube basin. The potential of the reformed EU Common Agricultural Policy should be fully explored in this regard.

The lower Drava in Croatia meanders before joining the Danube.



3.3 Hazardous substances

Hundreds of hazardous substances are being used and released into the Danube River Basin. Pollution from hazardous substances is significant although the full extent cannot be evaluated to date. There are only few data available for some hazardous substances such as heavy metals and pesticides, which indicate the transboundary scale of the problem. Cadmium and lead can be considered as the most serious heavy metals exceeding the target values considerably in many locations on the lower Danube. Also, pesticides show alarming concentrations in some tributaries and in the lower Danube. It will be necessary to improve the data base on pressures and impacts from hazardous substances, e.g. through further development of the existing inventories such as the European Pollutant Emission Register to a comprehensive European Pollutant Release and Transfer Register. Despite the "knowledge gap" it is essential that measures for the introduction of "best available techniques" and "best environmental practices" are being developed without delay, otherwise it will be impossible to achieve "good ecological" and "good chemical status".

As mentioned above, many requirements and guidelines for appropriate measures exist in the European Union and other international bodies, however, the appropriate investments need to be secured on the basis of a clear priority setting.

3.4 Hydromorphological alterations

The extent of the hydromorphological alterations in the Danube basin has been significant over the past centuries. Such alterations include, inter alia, the building of dams, weirs and sluices, the canalisation of rivers and subsequent disconnection of their floodplains and old arms, erosion (incision) of the river bed and lowering of water tables with consequently higher flood risks. Some of these changes are irreversible, however, there is a potential for rehabilitation, which should be explored to the fullest extent. This is particularly the case, where floodplains could be reconnected with the main river thereby improving natural flood retention and enhancing fish migration to their natural habitats. In addition, migration path-ways would be needed on barriers on the Danube and most of its tributaries.

Due to these significant hydromorphological changes large parts of the Danube River and of numerous tributaries have been provisionally identified as heavily modified water bodies on the basin-wide scale. Dams and weirs on the Danube as well as bank reinforcements and fixations on the tributaries put these stretches "at risk" of failing to reach the "good ecological status".

Future infrastructure projects such as planned hydropower developments and plans to expand navigation threaten the status of the riverine ecosystem on the Danube and its tributaries further, in particular, since some of these projects would affect the few remaining free-flowing sections of the Danube. It needs to be ensured that these future projects minimise environmental impacts in the Danube River Basin and compensate inevitable environmental damage through appropriate mitigation measures.

3.5 Wetlands

The Danube River Basin contains a large number of wetlands offering unique habitats for a rich and diverse aquatic community. Many of these areas have high protection status such as the large wetland complexes protected under international conventions, others still deserve to be designated as protected areas, but have not been granted such status. 80 % of the historical floodplain on the large rivers has been lost during the last 150 years mainly from significant hydromorphological alterations, and many already protected areas deteriorate due to new human interventions. Still today, many wetlands are under pressure from navigation, hydropower plants, intensive agriculture and forestry as well as from new infrastructure projects. Wetland restoration can bring many benefits, in particular for flood protection. As a first step, an inventory of the most important water-related protected areas for species and habitat protection has been established for the Danube River Basin.

The Danube Delta has suffered significant impacts from anthropogenic pressures in the last 50 years. These were caused in part by high nutrient loads and heavy metals from the Danube. Nutrient inflow has led to eutrophication of the delta arms and its lakes; elevated concentrations of heavy metals occur especially in the delta lakes. In addition, severe hydromorphological alterations and intensive agriculture and forestry have led to the loss and deterioration of large areas of land formerly unused and interconnected within the delta. As a consequence species and habitat diversity has declined. The large number of hydraulic structures on the Danube and its tributaries has also considerably reduced the sediment transport thereby bringing the growth of the Danube Delta into the Black Sea in parts to a halt.

Although considerable restoration measures have been undertaken in the last decade new canalisation projects are still being planned and implemented. Sound environmental impact assessments need to be carried out and alternative solutions found in order to protect this unique natural heritage of global importance.

3.6 Coastal waters

The coastal waters and the larger marine environment of the Black Sea have been strongly influenced by high nutrient loads from the inflowing rivers especially in the period up to the mid 1980s. Since then a significant reduction of nutrient input has taken place, but the nutrient level is still significantly higher than in the 1960s. The effects of reduced nutrient inputs are clearly visible particularly in the North-western Shelf of the Black Sea, which is shallow and therefore particularly susceptible to eutrophication. The marine ecosystem of the Black Sea is highly complex and strongly influenced not only from high nutrient loads from the Danube and other Black Sea tributaries but also from other pressures such as over-fishing and changes in the food web.

Also, another problem on the Black Sea shore is the coastal erosion, which is mainly determined by the reduction of the sediment discharge carried by the Danube (consequence of the hydro-technical works from the entire Danube river basin), and by the reduction of the amount of sand due to reductions in the mussel population (consequence of the increase of water pollution).

Cooperation is crucial for the successful implementation of the EU Water Framework Directive.

3.7 Risk of failure to reach the environmental objectives

The Danube and its tributaries are to a large extent “at risk“ or “possibly at risk“ to fail to reach the environmental objectives set out by the WFD. Reasons for this risk in the upper Danube basin are mainly the hydromorphological alterations, which are also reflected in the fact that several stretches have been provisionally identified as heavily modified water bodies. From the middle Danube region, currently only a limited data set is available. In the lower Danube region, hydromorpho-logical alterations, organic and nutrient pollution as well as pollution from hazardous substances play an important role.

Regarding the lakes selected for the basin-wide overview in the report only Neusiedler See/Fertő-tó is “not at risk” of failing to reach the environmental objectives. Lake Balaton is “possibly at risk” due to hydromorphological alterations. Lacul Razim is “at risk” due to nutrient pollution and “possibly at risk” due to organic pollution, hazardous substances and hydro-morpho-logical alterations. It is also provisionally identified as a heavily modified water body. For Ozero Yalpug there is no information available.

The transitional and coastal waters are all “at risk” or “possibly at risk” to reach the environmental objectives, mainly due to nutrient pollution. More information is needed regarding organic pollution and hazardous substances.

The Kopački rit, formed at the confluence of the Drava and the Danube, is a excellent example for a well-preserved floodplain area.

Hercegovina //// Bălgarija //// Hrvatska //// Ceská republika //// Magyarország //// Moldova //// România

4. Characterisation of groundwater

The report provides an overview of important transboundary groundwater bodies in the Danube River Basin District (see Map 2). They are defined as follows:

- important due to the size of the groundwater body which means an area > 4000 km^2 or
- important due to various criteria e.g. socio-economic importance, uses, impacts, pressures interaction with aquatic eco-system. The criteria need to be agreed bilaterally.

4.1 Pressures and impacts on groundwater

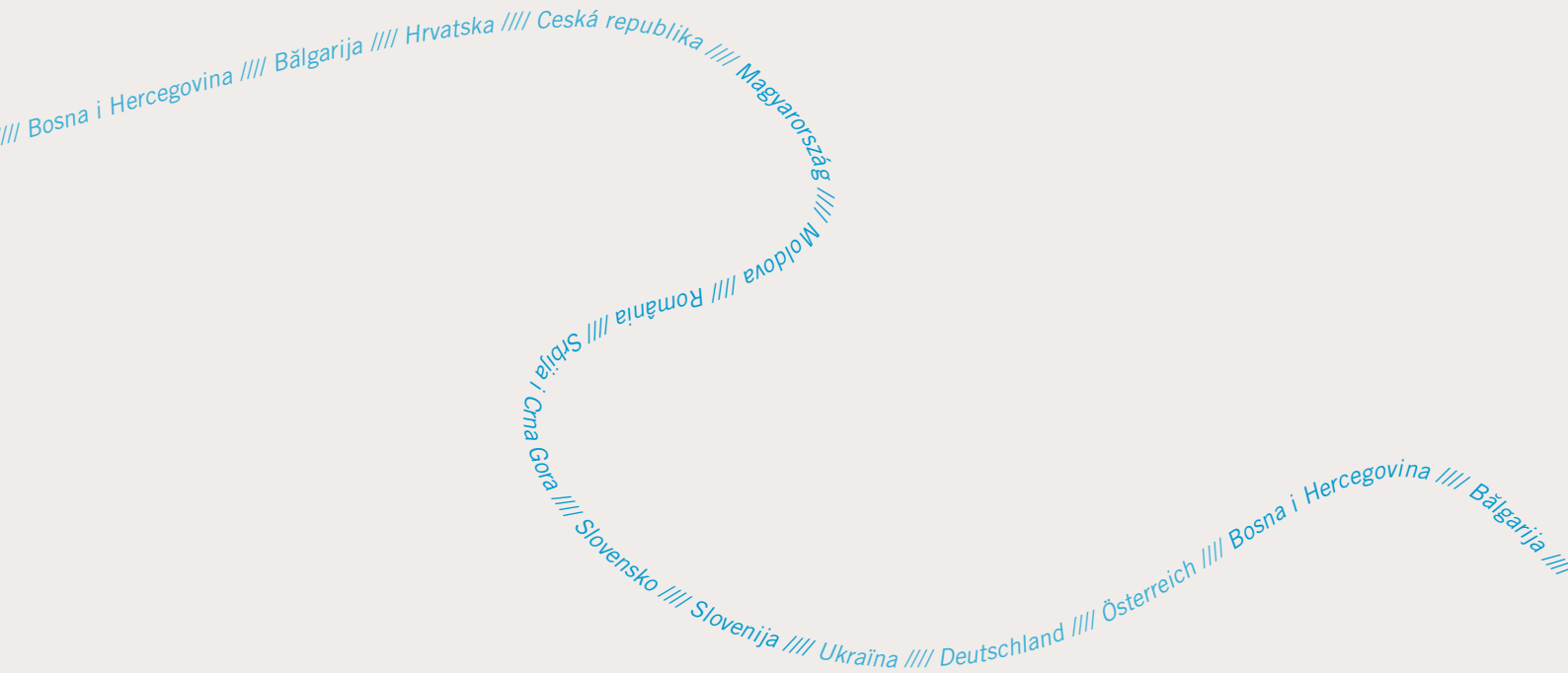
The main uses of the identified important transboundary groundwater bodies are drinking water supply, agriculture and industry. Some of these groundwater bodies show multiple uses mostly combining use for drinking water, agriculture and industrial use. Some groundwater bodies are also used for spas and caloric energy.

Intensive agriculture and inadequate waste and sewage treatment are a major threat to the quality of the groundwater. These pressures in combination with the high vulnerability of some aquifers require the development of groundwater protection strategies. Quantitative aspects of the groundwater resources are affected by intensive water management activities.

4.2 Risk of failure to reach the environmental objectives

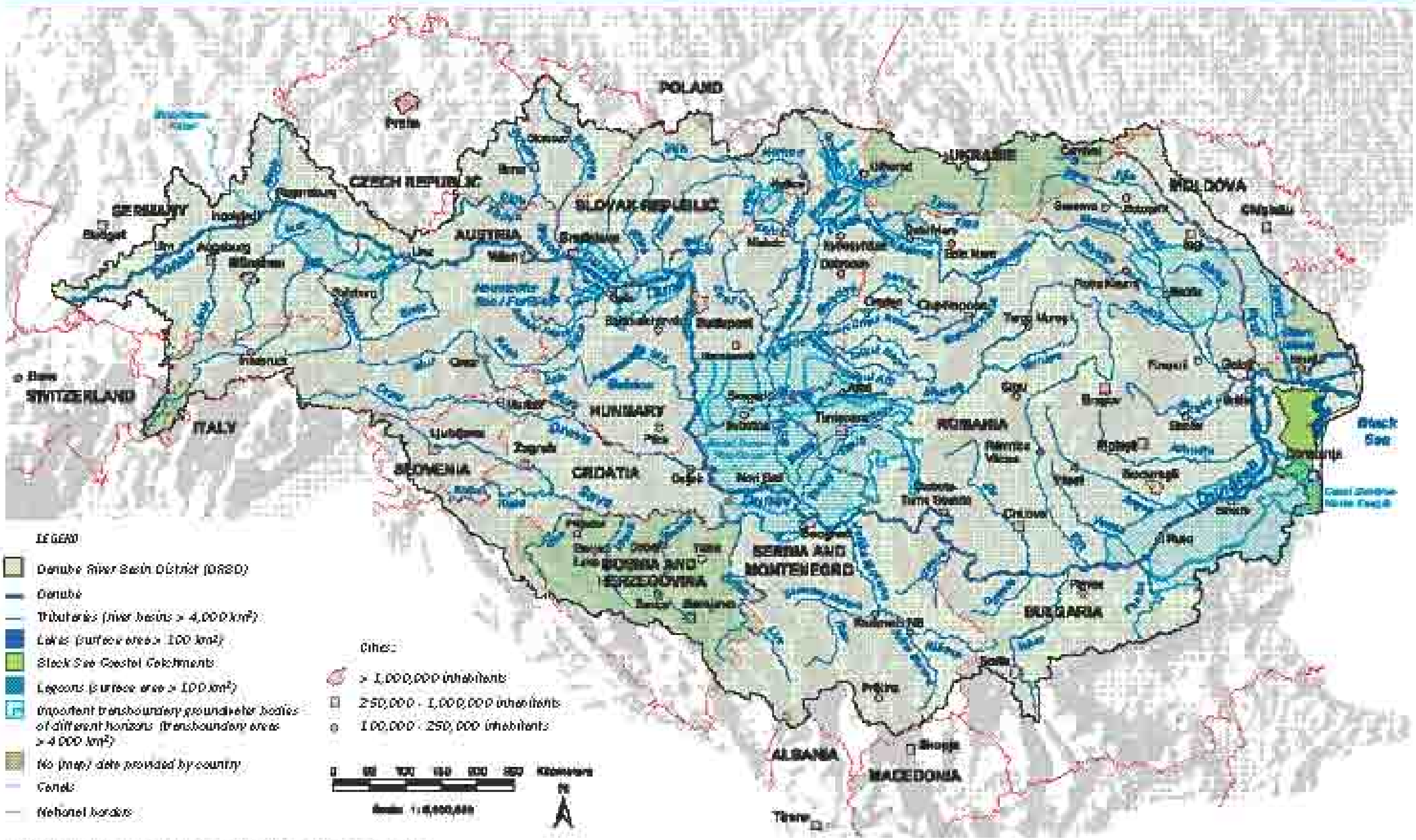
Regarding the quantitative status of these transboundary groundwater bodies none were estimated as being “at risk” of failing the environmental objectives. Six groundwater bodies are clearly “not at risk”. In three cases the data is insufficient and therefore additional monitoring is needed. Regarding the qualitative status none of the 11 identified important transboundary groundwater bodies is estimated unambiguously to be “at risk”. However, for seven of these bodies the assessment of the national shares varies in their results. For one water body the available data or knowledge is insufficient and it is therefore classified as “possibly at risk”.

The present report is based on an initial collection of available national information concerning important transboundary groundwater bodies. Further development may of course lead to changes of already defined important transboundary groundwater bodies. Improved knowledge may also lead to the definition of additional transboundary groundwater bodies.



Danube River Basin District: Important Transboundary Groundwater Bodies

Map 2



2) transboundary groundwater bodies < 4000 km², if they are very important; the identification as important has to be bilaterally agreed.

Product of ICPDR, Vienna

Prepared by FLOVIUS, Vienna, March 2005; The production of this map was financially supported by

5. Inventory of protected areas

Wetlands in the Danube River Basin play an important role in hydrological processes, in particular in flood prevention, recharging of groundwater as well as for habitat and species diversity. The Danube River Basin still contains a large variety of important wetlands.

The ICPDR has set up an inventory of protected areas for species and habitat protection as requested in the WFD. Many of the identified wetlands have already been designated as protected areas under EU law and/or under global conventions. The inventory of protected areas gives geographical, technical and legal information on the situation, character and relevance of each protected area in the Danube River Basin. This is important basic information e.g. for preparing the River Basin Management Plan and its Programme of Measures. The timetable for the finalisation of the inventory is based on the European Commission's progress in the establishment of the Natura 2000 network.

Dynamic processes of the rivers ensure the biodiversity of species and habitats.

Danube River Basin District: Important Water-related Protected Areas for Species and Habitat Protection

MAP 2

POLAND
UKRAINE
MOLDOVA
CZECH REPUBLIC
SLOVAK REPUBLIC
GERMANY
AUSTRIA
HUNGARY
ROMANIA
SLOVENIA
CROATIA
SERBIA AND MONTENEGRO
BOSNIA AND HERZEGOVINA
BULGARIA
ALBANIA
MACEDONIA
SWITZERLAND
ITALY
Praha
Wien
Budapest
Zagreb
Ljubljana
Sarajevo
Beograd
Bucuresti
Sofia
Chisinău
Bern

LEGEND

- Danube River Basin District (DRBD)
- Danube
- Tributaries (river basins > 4,000 km²)
- Lakes (surface area > 100 km²)
- Black Sea Coastal Catchments
- Lagoons (surface area > 100 km²)
- Habitat and species protection areas (< 10,000 ha, 10,000 - 50,000 ha, >50,000 ha)
- Transboundary co-operation
- Canals
- National borders

Cities:

- > 1,000,000 inhabitants
- 250,000 - 1,000,000 inhabitants
- 100,000 - 250,000 inhabitants

0 50 100 150 200 250 Kilometers

Scale: 1:6,000,000

N

Prepared by FLUVIUS, Vienna, March 2005. The production of this map was financially supported by

icpdr International Commission for the Protection of the Danube River

ikscd Internationale Kommission zum Schutz der Donau

6. Economic analysis of water uses

The Water Framework Directive is one of the first environmental policy EC Directives, which explicitly integrates economic considerations into the process of achieving its objectives.

According to the requirements of WFD an economic analysis of water uses has to be carried out by 2004. The analysis covers the following issues:

- assessment of the economic importance of water uses for the economy and the socio-economic development of the basin
- projection of trends in key economic indicators and drivers up to 2015, particularly for the influence of variables on the pressures and consequently on the water status
- assessment of the current levels of the recovery of the costs of water services.

The Danube Basin Analysis Report presents comparable data for the whole Danube River Basin District. A complete economic analysis of the Danube River Basin District was not possible because several gaps and uncertainties in the process of data gathering were encountered. Nonetheless, the following conclusions can be drawn.

The report firstly presents basic socio-economic data of all eighteen countries belonging to the Danube River Basin. Based on the size of the gross domestic product (GDP) per capita three groups of countries become apparent. The first group is composed of the three EU Member States Austria, Germany, Italy and in addition Switzerland (GDP per capita exceeding 20,000 EUR). The second group consists of countries which joined the EU in May 2004, i.e. Czech Republic, Hungary, Poland, Slovak Republic and Slovenia, and in addition Croatia (GDP per capita between 2,000 EUR and 20,000 EUR). The remaining countries, i.e. the two EU Accession countries Bulgaria and Romania, as well as Albania, Bosnia i Herzegovina, Macedonia, Moldova, Serbia and Montenegro, and Ukraine constitute the third group (GDP per capita below 2,000 EUR).

Regarding the characteristics of water uses the data shows that there are great differences in the economic structure of the Danube countries which are mainly due to the relative importance of the agricultural sector. While in Bulgaria, Croatia and Romania around ten percent of the gross domestic product is generated from agriculture, this share is between one and 3.7 percent in the remaining countries. Regarding industry and electricity generation the share is more consistent between the countries.

Navigation is an important water use, but it can also affect the status of the river.

7. Public participation

The active involvement of the public is a core principle in sustainable water management. This fact was already recognised when the Danube River Protection Convention was signed on 29 June 1994.

The Convention foresees the involvement of the organised public in the framework of its implementation. To date, ten organisations have taken the opportunity to become accredited observers to the ICPDR. This cooperation, which grants observers the right to participate at ICPDR decision-making meetings and expert group meetings, has proven to be successful in ensuring that different aspects and approaches can influence and shape water management in the Danube River Basin.

To further enhance the involvement of the public and to respond to the public participation requirements of WFD a strategy has been developed for public participation in the Danube River Basin. The objectives of this strategy are to ensure public participation in the implementation of the WFD, especially for the development of the Danube River Basin Management Plan, and to facilitate the establishment of effective structures and mechanisms for public participation that will continue operating beyond the first cycle of river basin management planning. The ICPDR Operational Plan provides an overall framework for activities at the basin-wide level.

Organisations with observer status in the ICPDR

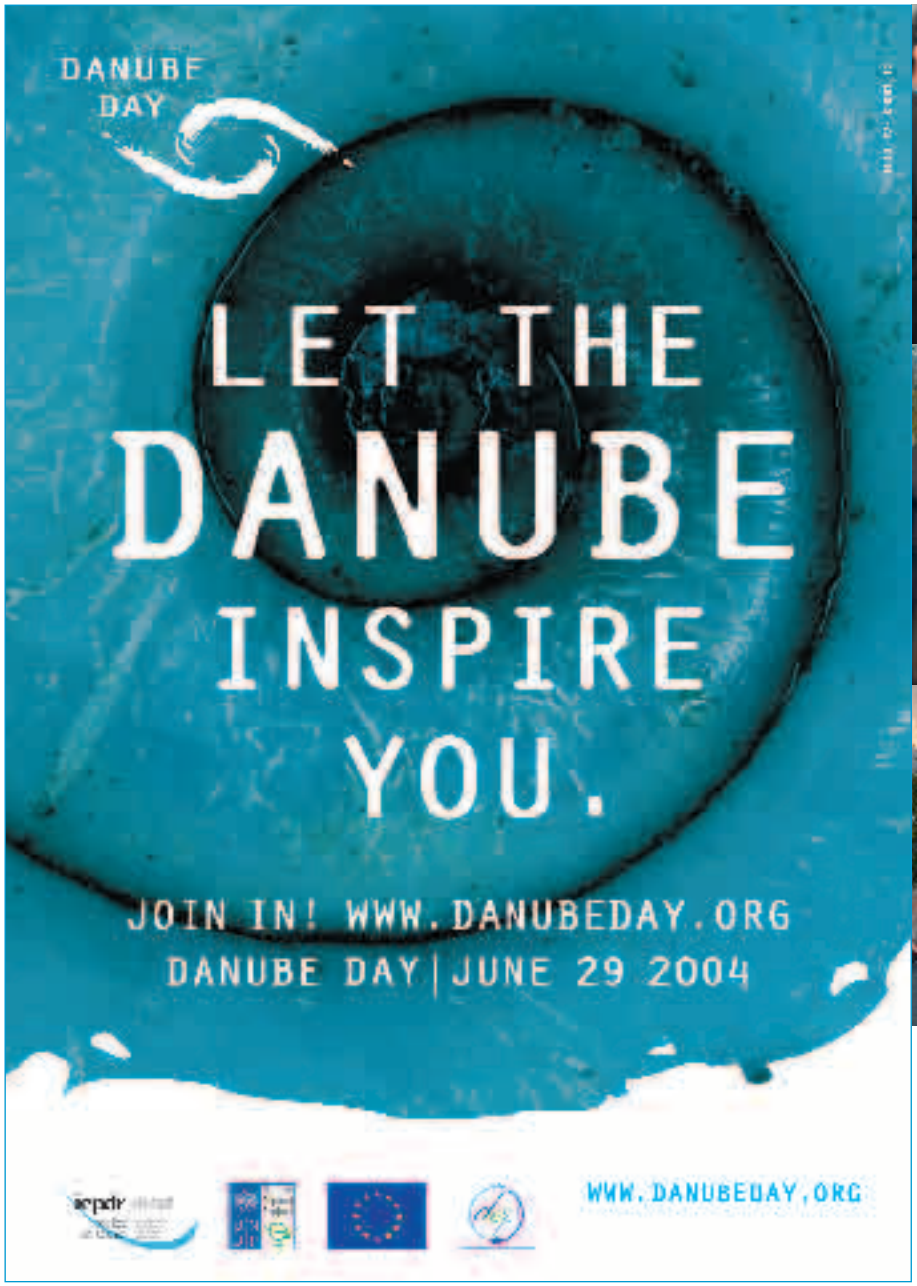
- Black Sea Commission (BSC)
- Danube Environmental Forum (DEF)
- Danube Commission
- Danube Tourism Commission
- Global Water Partnership (GWP)
- International Association for Danube Research (IAD)
- International Association of Water Supply Companies in the Danube River Catchment Area (IAWD)
- International Hydrological Programme of the UNESCO (IHP)
- RAMSAR Convention on Wetlands
- Regional Environmental Center for Central and Eastern Europe (REC)
- World Wide Fund for Nature – Danube-Carpathian Programme (WWF-DCP)

Danube Day: All Danube countries celebrate the Danube rivers with a wide range of activities.

Danube Day

The ICPDR initiated the basin-wide celebration of Danube Day on 29 June 2004 and this will now be an annual event. The general character of the Danube Day activities was light-hearted and celebratory. Danube Day aimed to increase the awareness with citizens and stakeholders alike of sharing one river basin and depending on each other, stimulating Danube solidarity.

Over 100 events and celebrations were held throughout the Danube River Basin and all 13 Danube River countries contributed greatly to make Danube Day 2004 a success. The International School Competition "Danube Art Master" reported more than 1000 contributions. A Danube Day website was launched (www.danubeday.org), which presented information on activities in all the Danube River Basin countries. Looking back on this very successful first Danube Day, there is a strong hope that the annual celebration of Danube Day will further stimulate Danube solidarity and become a vital link between the people sharing the river basin.



Everybody lives downstream: Celebrating the Danube and promoting the protection of its resources on Danube Day 2004.

8. Outlook

This first analysis of the Danube River Basin District is based on available data and is the best result that was possible within the given time frame. It thereby reflects the current level of preparation of a harmonised and integrated river basin analysis. The starting point and the availability of data is vastly different throughout the Danube River Basin District. The extent, the quality and the degree of harmonisation of the data will improve with future reviews and updates of the characterisation and analysis, which will make later assessments more comprehensive and robust.

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Based on the results of the risk assessment follow-up actions will be needed. The focus will be on the adaptation of existing monitoring networks and programmes so they will be operational by the end of 2006. These will deliver data on both the national and the basin-wide scale. The data on the ecological and chemical status assessments from surveillance, operational and investigative monitoring sites will add to the knowledge on the current ecological and chemical status of the water bodies. Consequently, these assessments will verify the accuracy of the current risk estimations, which have been based on available information.

In the next phase of the preparation of the river basin management plan the focus will be on the integration of the results of the pressure and impact analysis with the results of the economic analysis of water uses. The goal is to develop a programme of measures for the water bodies “at risk” of failing to reach the environmental objectives that will be part of the overall Danube River Basin Management Plan. In addition, the first stakeholder conference will be held on June 28 and 29, 2005 to inform all interested parties and the public about the results of the first analysis of the Danube River Basin District and to prepare the public participation process. Public information and consultation needs to start at the end of 2006 at the latest and will – in a serious of steps – lead to the ultimate goal, the development of an agreed, coherent and integrated Danube River Basin Management Plan by the end of 2009.

For more information

The complete Danube Basin Analysis Report (WFD Roof Report 2004) can be downloaded from the website of the International Commission for the Protection of the Danube River (ICPDR) at **www.icpdr.org**

In addition, the following links may used to find the corresponding national reports:

Austria:	www.lebensministerium.at/en/wasser
Bosnia and Herzegovina:	www.grida.no/enrin/htmls/bosnia/soe/html/
Bulgaria:	www.moew.government.bg/index_e.html
Croatia:	www.mzopu.hr/ (local language)
Czech Republic:	www.env.cz/env.nsf/homeie?OpenFrameSet
Germany:	www.bmu.de/en/1024/js/base/?nav=vorwen
Hungary:	www.ktm.hu/ (local language)
Moldova:	www.moldova.md (local language)
Romania:	www.mappm.ro/ (local language)
Serbia and Montenegro:	www.minpolj.sr.gov.yu
Slovakia:	www.lifeenv.gov.sk/minis/ (local language)
Slovenia:	www.sigov.si/mop/en
Ukraine:	www.menr.gov.ua/index.php?lng=eng

For more information on the EU Water Framework Directive please consult the website of the European Commission at **europa.eu.int/comm/environment/water/**

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