1 INTRODUCTION

1.1 The Danube River Protection Convention – Its Role in the Protection of the Danube River

Since rivers know no borders they are an integrating element in international co-operation. In the Danube River basin, hydrological and environmental co-operation has a long-standing history. The first institutional framework for joint measures designed to protect the water environment was established under the Bucharest Declaration in 1980s.

However, there was still the need to develop an international strategy for the protection of water resources in the Danube catchment area. Therefore, on the basis of the UN/ECE Convention on the Protection and Use of Transboundary Waters (Helsinki Convention) a corresponding agreement relating to the international law for the Danube River Basin was developed. The Convention on the Protection and Sustainable Use of the Danube River (Danube River Protection Convention, DRPC) was signed in June 1994 in Sofia. The DRPC was designed to encourage the Contracting Parties to intensify their water management cooperation in the field of water protection and use. With its entry into force on 22 October 1998, the DRPC became the overall legal instrument for cooperation and transboundary water management in the Danube River Basin.

The main objective of the Convention is the protection and sustainable use of ground and surface waters and riverine ecology, directed at basin-wide and sub-basin-wide cooperation with transboundary relevance. Joint activities and actions are focused on coordination and enhancement of policies and strategies, while the implementation of measures is within the responsibility of the executive bodies at the national level.

In order to achieve substantial progress in implementing the Convention, the following overall strategic goals and targets were agreed:

- maintain and improve the status of water resources as to quality and quantity;
- prevent, reduce and control water pollution, including accidental pollution;
- improve the environmental conditions of the aquatic ecosystems and biodiversity;
- contribute to the protection of the Black Sea from land-based sources of pollution.

At the time of the Joint Danube Survey, in 2001, Contracting Parties to the DRPC included Austria, Bulgaria, Croatia, the Czech Republic, the European Community, the Federal Republic of Germany, Hungary, Moldova, Romania, the Slovak Republic and Slovenia. Ukraine was a Signatory to the Convention and Bosnia-Herzegovina had an observer status in the ICPDR. The Federal Republic of Yugoslavia had applied for membership of the DRPC and started the process of ratification.

With the entry into force of the DRPC, the International Commission for the Protection of the Danube River (ICPDR) was legally established as the main decision making body under the Convention. The ICPDR represents a common platform for the sustainable use of the Basin's resources in relation to its aquatic ecology and for a coherent and integrated river basin management.

The ICPDR's current water management policy is substantially influenced by Directive 2000/60/EC adopted by the European Parliament and the Council on 23 October 2000. The Directive (EC Water Framework Directive) establishes a framework for Community action in the field of water policy. The Contracting Parties to the ICPDR have agreed to make the implementation of the EC Water Framework Directive the ICPDR's high-est priority. They have

agreed that the ICPDR will provide a basin-wide platform for the co-ordination necessary to develop a River Basin Management Plan for the Danube River Basin. The Joint Danube Survey, designed to contribute to the characterization of the ecological and chemical status of the Danube River, represents a major step forward in that direction.

1.2 Assessment of Water Quality in the Danube River Basin – the Need for and the Aims of the Joint Danube Survey

According to Article 9 of the Danube River Protection Convention, the Contracting Parties to the DRPC have agreed to co-operate in the field of monitoring and assessment of water resources. For this purpose, they agreed to:

- Harmonize or make comparable their monitoring and assessment methods;
- Develop concerted or joint monitoring systems applying stationary or mobile measurement devices, communication and data processing facilities;
- Elaborate and implement joint programmes for the monitoring of riverine conditions in the Danube catchment area concerning both water quality and quantity, sediments and riverine ecosystems
- Periodically assess the quality conditions of the Danube River and the progress made by the measures taken to prevent, control and reduce transboundary impacts

To achieve these goals, the Monitoring, Laboratory and Information Management (MLIM) Expert Group was established in 1992 (originally as a Sub-Group under the EC Environmental Programme for the Danube River Basin). The tasks of the MLIM EG were confirmed in the Joint Meeting of the Task Force of the Environmental Programme for the Danube River Basin and the interim ICPDR in Sofia in March 1996. The overall objective of the MLIM EG is to create a strengthened and more strategic approach to monitoring, laboratory and information management for surface waters and for transboundary ground waters according to Article 9 of the DRPC.

The key role of the MLIM EG is to address the organizational and operational aspects related to the monitoring of river water conditions in the Danube River Basin and to provide basic data as an input to the ICPDR Information System. To accomplish this key role, the ICPDR in 1996 launched a Transnational Monitoring Network (TNMN). For Phase I of the TNMN, altogether 61 sampling profiles were selected. Criteria for the selection of these stations were as follows:

- Located just upstream/downstream of an international border;
- Located upstream of confluences between Danube and main tributaries or main tributaries and larger -sub-tributaries (mass balances);
- Located downstream of the biggest point sources;
- Located according to control of water use for drinking water supply.

The operation of TNMN is supported by a basin-wide network of National Reference Laboratories that supervise all water quality measuring activities under the ICPDR and guarantee the quality of the results of the analyses. However, the harmonization of methods and improvement of comparability of analytical results is an ongoing process. Although there are some major achievements in this respect which demonstrate that progress has been made (running ICPDR analytical quality control programme, first examples of standard operational procedures available), much more effort will be needed to achieve full comparability of results between various institutions, and between respective riparian countries.

As an important contribution to improving the comparability of water quality data, the MLIM Expert Group proposed that a Danube longitudinal survey focusing on chemical and biological determinands should be launched and that it should rely on the sampling and laboratory expertise available in the Danube countries. The laboratories selected to participate in the survey should have a high level of expertise in water analysis and use state-of-the-art analytical instrumentation operating under conditions of internationally acceptable AQC procedures.

The use of a single sampling platform, the application of the same sampling methods along the entire length of the Danube as well as the selection of a single laboratory to analyze a particular determinand would lead to the elimination of interlaboratory variance. In general, the Joint Danube Survey had the following goals:

- To produce a homogenous data set for the Danube River based on a single laboratory analysis of specified determinands;
- To identify and confirm specific pollution sources;
- To carry out the screening of pollutants as specified in the EU Water Framework Directive;
- To provide a forum for riparian/river basin country participation for sampling and intercomparison exercises;
- To meet specific training needs and improve in-country experience;
- To promote public awareness.

During the survey, special attention was paid to the analysis of persistent organic and inorganic micropollutants in sediment, biota and suspended solids. This should improve the knowledge on the contamination not perceivable within the framework of TNMN. Simultaneous analysis of the collected samples by the JDS Reference Laboratories and by the national laboratories in the Danube countries was considered as an analytical intercomparison exercise contributing to the overall improvement of the analytical quality of the ICPDR laboratories. The documentation of the survey activities concerning the sampling and analytical techniques should serve as training material for widespread distribution in the Danube countries. Last but not least, this unique international monitoring activity should increase the general public's interest in issues related to water protection.

2 PREPARATION FOR THE SURVEY

2.1 Survey Plan

The proposed sampling locations list included 74 sampling locations on the main river and 24 locations on the major tributaries and arms of the Danube. Sampling at each of the 98 locations included five different sample types: water, sediments, suspended solids, mussels and biota. Each sample type was analysed for a different set of determinands and taken at different sampling points: left, middle and right at the cross-sections of the main river, and in the middle of the cross-section of the tributaries. Prior to and during the survey, the list of determinands was significantly expanded to include the majority of the EU Water Framework Directive priority pollutants. Detailed information on the actual sampling programme is shown in Table 2.1 below.

2.2 Preparatory Phase/Cruise Manual

Preparations for the Joint Danube Survey involved clarifying Survey objectives and selecting teams of experts to fulfill them, selecting the parameters to be measured, identifying the sam-

pling and analysis methods and choosing the sampling sites. These tasks were carried out by the Monitoring, Laboratory and Information Management (MLIM) expert group of the ICPDR. During JDS preparatory phase in 1999, a Cruise Manual was developed by experts from DHI (Denmark), VITUKI (Hungary) and WRc (United Kingdom). Besides a well-thought-out cruise plan, the manual contains a detailed description of the tasks to be accomplished in the preparation of the survey, the actual sampling and analyses programme, the reporting procedures and the budget.

2.3 JDS Core Team

Members of the JDS Core Team and Reserve Core Team were nominated by individual Danube countries. Core Team members, responsible for sampling and on-board analyses, were permanently on board the two ships – ARGUS and SZECHENYI.

JDS Core Team

Peter Literathy – team leader
Haide Bernerth – biologist
Boyan Boyanovsky – biologist
Béla Csányi – biologist
Carmen Hamchevici – chemist
Aleksandar Miletic – chemist
Erich Pötsch – microbiologist
Birgit Vogel – biologist
Peter Woitke – chemist

JDS Reserve Core Team

Wolfgang Tobias – biologist
Gabriel Chiriac – biologist
Peter Juhasz – biologist
Violeta Astratinei – microbiologist

2.4 JDS National Teams

Upon entering a country, the two survey ships were boarded by that country's JDS National Team, whose members stayed on board until the ships left their country and collected samples together with the JDS Core Team. One part of each sample collected within a particular country was also analysed in the National Reference Laboratories (NRLs) in Germany, Austria, the Czech Republic, Slovakia, Hungary, Croatia, Yugoslavia, Bulgaria, Romania and Ukraine. Representatives of JDS National Teams were on board during the collection of samples and arranged their transport to the NRLs for parallel analyses. Leaders of the JDS National Teams actively helped the Core Team with all logistical arrangements within their respective countries.

2.5 Workshops and Logistics

Before the survey started, the JDS Core and Reserve Core Teams held two preparatory meetings. The first was held in Wiesbaden, Germany, on 11 – 12 April 2001, and the second took place in Regensburg, Germany on 10 – 11 August 2001. At the kick-off meeting in Wiesbaden, the composition of the Core Team was finalized, the methods to be used were agreed upon,

potential logistical problems were specified and the equipment necessary for the survey was identified. Consumables, sample containers, chemicals and smaller equipment were purchased and delivered to the Argus and Szechenyi ships in July and August 2001. A significant part of the equipment was loaned by the laboratories of the JDS Core Team members and Danube laboratories.

Acknowledgements

Special thanks are owed to the Leica company from Germany and Amedis, s.r.o. from the Slovak Republic for the generous loan of the Leica MZ 12.5 Stereomicroscope with Videocamera KL1500LCD and CARY 50 Probe UV-VIS Spectrophotometer respectively. The instruments were essential for on-board analyses.

2.6 The Ships

The survey was carried out with two ships, Szechenyi and Argus, sailing under the Hungarian and German flag respectively. Technical information on the ships are as follows:

Szechenyi – an icebreaker with accomodation facilities,
a dining room, and meeting rooms.
Captain: Zoltan Szemerady
Cruising speed: 18 km/h
Dimensions
Length: 40.5 m
Width: 9.3 m
Draught: 1,8 m
Height: 8.15 m
Power: 2 x 1470 kW
Crew: 11 persons

Argus – a research vessel normally used for water quality surveys, equipped with sampling devices, in-built field instrumentation and laboratory desks.
Captain: Manfred Wenner
Cruising speed: 25 km/h
Dimensions
Lenght: 33.0 m
Width: 4.5 m
Draught: 1.3 m
Height: 5 m
Motor boat
Mounted grab
Crew: 2 persons

2.7 Financial Arrangements

The total cost of JDS was 557,373 EUR. The German Federal Environmental Agency provided 458,263 EUR and the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management secured 99,110 EUR. Activities of the JDS National Teams, including their analytical work, were financed by the individual participating countries in the form of in-kind contribution.

2.8 Public Awareness

During JDS, press conferences were organised in Regensburg (Germany), Vienna (Austria), Bratislava (Slovakia), Budapest (Hungary), Osijek (Croatia), Belgrade (Yugoslavia), Ruse and Silistra (Bulgaria), Ismail (Ukraine), Orsova and Tulcea (Romania).

Results of the JDS analyses are available on the web site of the ICPDR (www.icpdr.org). The chemical determinands data are stored in a format that allows them to be compared with those contained in the Trans-National Monitoring Network database. Biological and GC-MS results were included in the database for the first time.

2.9 The Survey

Logistics Arrangements

The Argus ship was used for sampling and on-board laboratory analyses, while the Szechenyi served for accommodation of the Core Team members and National Team members and for hosting the operational meetings. Small boats from both ships were used for parallel biological on-shore sampling. This allowed up to 15 persons, excluding the crew, to participate in the sampling.

Chronology of Sampling

Sampling at each station included five different sample types (water, sediment, suspended solids, mussels and biota). A brief description of on-board activities is given below.

Water samples were taken in the middle of the Danube and its tributaries for on-board measurements of temperature, conductivity, dissolved oxygen and analyses of alkalinity, ammonium (NH_4^+), nitrate (NO_3^-), nitrite (NO_2^-), ortho-phosphate (PO_4^{3-}), pH, suspended solids, chlorophyll-a and microbiological parameters (total coliforms (37°C), faecal coliforms (44°C) and faecal streptococci). Chlorophyll-a samples were taken in the middle of the River and on its left and right bank. Transparency was measured in the middle of the river from the small boat provided by Szechenyi.

Samples for analyses of heavy metals were filtered through 0.45 µm pore size membrane filters. A parallel portion of the sample stayed unfiltered for determination of the total heavy metal content. Samples for analyses of volatile organic substances were spiked with deuterated standards. Altogether 98 samples were collected.

Sediment samples were taken from the left and right banks of the river either with a sampling net or with the grab sampler mounted on the Argus. This was followed by on-board grain size fractioning with wet sieving in order to get a less-than-63-µm fraction for later analyses in JDS Reference Laboratories. Fractions below 200 µm and less than 20 µm from selected sediments were stored for additional analyses. Sediment core samples were taken from the Gabcikovo Reservoir, the Soroksar arm in Budapest and two locations within the Iron Gate Reservoir. They were sliced into 10-cm sections and analysed for the same parameters as the river sediments. In total, 187 sediment and core sediment sections were sent to JDS Reference Laboratories.

TABLE 2.1: List of sampling locations and samples collected during JDS.

					SAMPLE												
JDS No.	rkm	Location in profile	Sampling location	Country	Water	Suspended solids	Sediments	Mussels	Phytoplankton	Zooplankton	Chlorophyll-A	Macrozoobenthos	Macrophytes	Phytobenthos	Sediment core sample (cm)	DATE	Reach
01	2581	M	Neu-Ulm	DE	Y		Y		Y	Y	Y					13/08/01	1
01	2581	L	Neu-Ulm	DE		Y	Y				Y	Y	Y	Y		13/08/01	1
02	2412	M	Kelheim	DE	Y				Y	Y	Y					13/08/01	1
02	2412	R	Kelheim	DE			Y				Y	Y	Y	Y		13/08/01	1
02	2412	L	Kelheim	DE			Y	Y			Y	Y	Y	Y		13/08/01	1
02-S	2415	M	River km 2415 – 2382	DE		Y										13/08/01	1
03	2358	M	Upstream dam Geisling (Regensburg)	DE	Y				Y	Y	Y					14/08/01	1
03	2358	R	Upstream dam Geisling (Regensburg)	DE			Y	Y			Y	Y	Y	Y		14/08/01	1
03	2357	L	Upstream dam Geisling (Regensburg)	DE			Y	Y			Y	Y	Y	Y		14/08/01	1
03-S	2375	M	River km 2375-2355	DE		Y										14/08/01	1
04-S	2327	M	River km 2327-2245	DE		Y										14/08/01	1
04	2233	M	Upstream dam Kachlet (Passau)	DE	Y				Y	Y	Y					15/08/01	1
04	2233	R	Upstream dam Kachlet (Passau)	DE			Y				Y	Y	Y	Y		15/08/01	1
04	2233	L	Upstream dam Kachlet (Passau)	DE			Y	Y			Y	Y	Y	Y		15/08/01	1
05	2225	M	/Inn 0.6 km	DE/AT	Y		Y		Y	Y	Y					15/08/01	2
05	2225	R	/Inn 0.6 km	DE/AT								Y				15/08/01	2
05	2225	L	/Inn 0.6 km	DE/AT								Y		Y		15/08/01	2
05-S	2227	M	River km 2227-2204	DE/AT		Y										16/08/01	2
06	2204	M	Jochenstein	DE/AT	Y				Y	Y	Y					16/08/01	2
06	2204	R	Jochenstein	DE/AT			Y				Y	Y	Y	Y		16/08/01	2
06	2204	L	Jochenstein	DE/AT			Y				Y	Y	Y	Y		16/08/01	2
06-S	2200	M	River km 2200-2164	AT		Y										16/08/01	2
07	2165	M	Upstream dam Aschach	AT	Y				Y	Y	Y					16/08/01	2
07	2165	R	Upstream dam Aschach	AT			Y				Y	Y	Y	Y		16/08/01	2
07	2165	L	Upstream dam Aschach	AT			Y				Y	Y	Y	Y		16/08/01	2
08	2120	M	Upstream dam Abwinden-Asten	AT	Y				Y	Y	Y					17/08/01	2
08	2120	R	Upstream dam Abwinden-Asten	AT			Y				Y	Y	Y	Y		17/08/01	2
08	2120	L	Upstream dam Abwinden-Asten	AT			Y	Y			Y	Y	Y	Y		17/08/01	2
09	2096	M	Wallsee	AT	Y				Y	Y	Y					17/08/01	2
09	2096	R	Wallsee	AT							Y	Y		Y		17/08/01	2
09	2096	L	Wallsee	AT			Y				Y	Y	Y	Y		17/08/01	2
10	2061	M	Upstream dam Ybbs-Persenbeug	AT	Y				Y	Y	Y					17/08/01	2
10	2061	R	Upstream dam Ybbs-Persenbeug	AT			Y				Y	Y	Y	Y		17/08/01	2
10	2061	L	Upstream dam Ybbs-Persenbeug	AT			Y				Y	Y	Y	Y		17/08/01	2
10-S	2060	M	River km 2060-2040	AT		Y										17/08/01	2
11-S	2037	M	River km 2037-1983	AT		Y										18/08/01	2
11	1950	M	Upstream dam Greifenstein	AT	Y				Y	Y	Y					18/08/01	2
11	1950	R	Upstream dam Greifenstein	AT			Y	Y			Y	Y	Y	Y		18/08/01	2
11	1950	L	Upstream dam Greifenstein	AT			Y	Y			Y	Y	Y	Y		18/08/01	2
12	1942	M	Klosterneuburg	AT	Y				Y	Y	Y					18/08/01	2
12	1942	R	Klosterneuburg	AT			Y				Y	Y	Y	Y		18/08/01	2
12	1942	L	Klosterneuburg	AT			Y	Y			Y	Y	Y	Y		18/08/01	2
12-S	1949	M	River km 1949-1929	AT		Y										18/08/01	2
-L	1928	L		AT				Y				Y	Y	Y		20/08/01	2
13-S	1929	M	River km 1929-1913	AT		Y										20/08/01	2
13	1913	M	/Schwechat 0.1 km	AT	Y		Y		Y	Y	Y	Y		Y		20/08/01	2
14	1895	M	Wildungsmauer	AT	Y				Y	Y	Y					20/08/01	2
14	1895	R	Wildungsmauer	AT			Y				Y	Y	Y	Y		20/08/01	2
14	1895	L	Wildungsmauer	AT			Y				Y	Y	Y	Y		20/08/01	2
15	1881	M	Upstream Morava (Hainburg)	AT	Y				Y	Y	Y					21/08/01	2
15	1881	R	Upstream Morava (Hainburg)	AT			Y	Y			Y	Y	Y	Y		21/08/01	2
15	1881	L	Upstream Morava (Hainburg)	AT			Y				Y	Y	Y	Y		21/08/01	2
16	1880	M	/Morava 0.08 km	AT/SK	Y		Y	Y	Y	Y	Y					21/08/01	2
16	1880	R	/Morava 0.08 km	AT/SK			Y	Y				Y				21/08/01	2
16	1880	L	/Morava 0.08 km	AT/SK			Y	Y				Y		Y		21/08/01	2
16-S	1880	M	Morava	AT/SK		Y										21/08/01	2
17	1869	M	Bratislava	SK	Y				Y	Y	Y					21/08/01	3

17	1865	R	Bratislava	SK			Y	Y			Y	Y		Y		21/08/01	3
17	1865	L	Bratislava	SK			Y	Y			Y	Y		Y		21/08/01	3
17-S	1869	M	Bratislava	SK		Y										21/08/01	3
18	1856	M	Gabcikovo reservoir entrance	SK	Y		Y		Y	Y	Y					21/08/01	3
18	1856	R	Gabcikovo reservoir entrance	SK			Y	Y			Y	Y	Y	Y		21/08/01	3
18	1856	L	Gabcikovo reservoir entrance	SK			Y	Y			Y	Y		Y		21/08/01	3
19	1852	M	Gabcikovo reservoir	SK	Y				Y	Y	Y					22/08/01	3
19	1852	R	Gabcikovo reservoir	SK			Y					Y		Y		22/08/01	3
19	1852	L	Gabcikovo reservoir	SK			Y					Y	Y	Y		22/08/01	3
20	1846	M	Gabcikovo reservoir 2	SK	Y				Y	Y	Y				0-60	22/08/01	3
20	1846	R	Gabcikovo reservoir 2	SK			Y					Y	Y			22/08/01	3
20	1846	L	Gabcikovo reservoir 2	SK			Y	Y				Y		Y		22/08/01	3
20-S	1852	M	River km 1852-1846	SK		Y										22/08/01	3
21	1812	M	Sap (Outlet-channel)	SK	Y				Y	Y	Y					22/08/01	4
21	1812	R	Sap (Outlet-channel)	SK			Y				Y	Y	Y	Y		22/08/01	4
21	1812	L	Sap (Outlet-channel)	SK/HU			Y				Y	Y		Y		22/08/01	4
21-S	1811	M	River km 1811-1794	SK/HU		Y										22/08/01	4
22	1812	M	Ásványráró (old Danube)	SK/HU	Y				Y	Y	Y					22/08/01	4
22	1812	L	Ásványráró (old Danube)	SK/HU			Y	Y				Y		Y		22/08/01	4
22	1812	R	Ásványráró (old Danube)	SK/HU			Y					Y	Y	Y		22/08/01	4
23	1806	M	Medvedov/Medve	SK/HU	Y				Y	Y	Y					22/08/01	4
23	1806	R	Medvedov/Medve	SK/HU			Y				Y	Y	Y	Y		22/08/01	4
23	1806	L	Medvedov/Medve	SK/HU			Y	Y			Y	Y	Y	Y		22/08/01	4
24	1794	M	/Moson Danube 0.1 km	HU	Y		Y	Y	Y	Y	Y					22/08/01	4
24	1794	R	/Moson Danube 0.1 km	HU			Y	Y				Y		Y		22/08/01	4
24	1794	L	/Moson Danube 0.1 km	HU			Y					Y				22/08/01	4
25	1768	M	Komarno/Komarom	SK/HU	Y				Y	Y	Y					22/08/01	4
25	1768	R	Komarno/Komarom	SK/HU			Y	Y			Y	Y		Y		22/08/01	4
25	1768	L	Komarno/Komarom	SK/HU			Y				Y	Y		Y		22/08/01	4
25-S	1780	M	River km 1780-1761	SK/HU		Y										23/08/01	4
26	1766	M	/Vah 0.8 km	SK	Y		Y	Y	Y	Y	Y					23/08/01	4
26	1766	R	/Vah 0.8 km	SK			Y	Y				Y		Y		23/08/01	4
26	1766	L	/Vah 0.8 km	SK			Y					Y		Y		23/08/01	4
27	1761	M	Iza/Szony	SK/HU	Y				Y	Y	Y					23/08/01	4
27	1761	R	Iza/Szony	SK/HU			Y	Y			Y	Y		Y		23/08/01	4
27	1761	L	Iza/Szony	SK/HU			Y	Y			Y	Y		Y		23/08/01	4
28	1719	M	Sturovo/Esztergom	SK/HU	Y				Y	Y	Y					23/08/01	4
28	1719	R	Sturovo/Esztergom	SK/HU			Y	Y			Y	Y		Y		23/08/01	4
28	1719	L	Sturovo/Esztergom	SK/HU			Y				Y	Y		Y		23/08/01	4
28-S	1761	M	River km 1761-1715	SK/HU		Y										23/08/01	4
29	1716	M	/Hron 0.5 km	SK	Y		Y		Y	Y	Y					23/08/01	4
30	1708	M	/Ipel/Ipoly 0.7 km	SK/HU	Y		Y	Y	Y	Y	Y					24/08/01	4
31	1707	M	Szob	HU	Y				Y	Y	Y					24/08/01	4
31	1707	R	Szob	HU			Y	Y			Y	Y		Y		24/08/01	4
31	1707	L	Szob	HU			Y				Y	Y		Y		24/08/01	4
31-S	1707	M	River km 1707-1692	HU		Y										24/08/01	4
32	1691	M	Upstream end of Szentendre Island	HU	Y				Y	Y	Y					24/08/01	4
32	1691	R	Upstream end of Szentendre Island	HU			Y	Y			Y	Y		Y		24/08/01	4
32	1691	L	Upstream end of Szentendre Island	HU			Y				Y	Y		Y		24/08/01	4
33	1691	M	/Upstream end of Szentendre Island	HU	Y		Y		Y	Y	Y					24/08/01	4
33	1691	R	/Upstream end of Szentendre Island	HU			Y	Y				Y		Y		24/08/01	4
33	1691	L	/Upstream end of Szentendre Island	HU			Y					Y		Y		24/08/01	4
34	1659	M	Budapest upstream	HU	Y				Y	Y	Y					24/08/01	4
34	1659	R	Budapest upstream	HU			Y	Y			Y	Y		Y		24/08/01	4
34	1659	L	Budapest upstream	HU			Y	Y			Y	Y		Y		24/08/01	4
34-S	1692	M	River km 1692-1659	HU		Y										24/08/01	5
35	1659	M	/Budapest (old Danube) end of S.arm	HU	Y		Y		Y	Y	Y					24/08/01	5
35	1659	R	/Budapest (old Danube) end of S.arm	HU			Y	Y				Y		Y		24/08/01	5
35	1659	L	/Budapest (old Danube) end of S.arm	HU			Y					Y		Y		24/08/01	5
36	1642	M	/Soroksar Arm Kvassay-sluice	HU	Y		Y	Y	Y	Y	Y				0-60	28/08/01	5
36	1642	R	/Soroksar Arm Kvassay-sluice	HU			Y	Y				Y	Y	Y		28/08/01	5
37	1632	M	Budapest downstream	HU	Y				Y	Y	Y					28/08/01	5
37	1632	R	Budapest downstream	HU			Y	Y			Y	Y	Y	Y		28/08/01	5
37	1632	L	Budapest downstream	HU			Y	Y			Y	Y	Y	Y		28/08/01	5
37-S	1648	M	River km 1648-1632	HU		Y										28/08/01	5
38	1586	M	/Soroksar ArmTass-sluice	HU	Y		Y	Y	Y	Y	Y					28/08/01	5
38	1586	R	/Soroksar ArmTass-sluice	HU			Y	Y				Y	Y	Y		28/08/01	5
39	1586	M	Tass	HU	Y				Y	Y	Y					28/08/01	5
39	1586	R	Tass	HU			Y	Y			Y	Y	Y	Y		28/08/01	5

39	1586	L	Tass	HU			Y	Y			Y	Y	Y	Y		28/08/01	5
-S	1586	M	River km 1586-1564	HU		Y										28/08/01	5
40	1560	M	Dunafoldvar	HU	Y				Y	Y	Y					29/08/01	5
40	1560	R	Dunafoldvar	HU			Y	Y			Y	Y	Y	Y		29/08/01	5
40	1560	L	Dunafoldvar	HU			Y	Y			Y	Y	Y	Y		29/08/01	5
40-S	1560	M	River km 1560-1533	HU		Y										29/08/01	5
41	1533	M	Paks	HU	Y				Y	Y	Y					29/08/01	5
41	1533	R	Paks	HU			Y	Y			Y	Y	Y	Y		29/08/01	5
41	1533	L	Paks	HU			Y				Y	Y	Y	Y		29/08/01	5
41-S	1527	M	River km 1527-1497	HU		Y										29/08/01	5
42	1497	M	/Sio 1.0 km	HU	Y		Y	Y	Y	Y	Y					29/08/01	5
42-S	1497	M	/Sio 1.0 km	HU		Y										29/08/01	5
43	1481	M	Baja	HU	Y				Y	Y	Y					29/08/01	5
43	1481	R	Baja	HU			Y	Y			Y	Y	Y	Y		29/08/01	5
43	1481	L	Baja	HU			Y				Y	Y	Y	Y		29/08/01	5
43-S	1479	M	River km 1479-1447	HU		Y										29/08/01	5
44	1434	M	Hercegszanto	HU	Y				Y	Y	Y					30/08/01	5
44	1434	R	Hercegszanto	HU			Y	Y			Y	Y	Y	Y		30/08/01	5
44	1434	L	Hercegszanto	HU			Y	Y			Y	Y	Y	Y		30/08/01	5
44-S	1434	M	River km 1434-1445	HU		Y										30/08/01	5
45	1429	M	Batina	HR/YU	Y				Y	Y	Y					31/08/01	5
45	1425	R	Batina	HR/YU			Y	Y			Y	Y	Y	Y		31/08/01	5
45	1425	L	Batina	HR/YU			Y				Y	Y	Y	Y		31/08/01	5
45-S	1427	M	River km 1427-1424	HR/YU		Y										31/08/01	5
46-S	1423	M	River km 1423-1392	HR/YU		Y										31/08/01	5
46	1384	M	Upstream Drava	HR/YU	Y				Y	Y	Y					31/08/01	5
46	1384	R	Upstream Drava	HR/YU			Y	Y			Y		Y	Y		31/08/01	5
46	1384	L	Upstream Drava	HR/YU			Y				Y	Y	Y	Y		31/08/01	5
47	1379	M	/Drava 1.4 km	HR	Y	Y	Y	Y	Y	Y	Y			Y		31/08/01	5
47	1379	R	/Drava 1.4 km	HR			Y	Y				Y	Y	Y		31/08/01	5
47	1379	L	/Drava 1.4 km	HR			Y					Y	Y	Y		31/08/01	5
47-S	1379	M	River km 1379	HR		Y										31/08/01	5
48	1367	M	Downstream Drava (Erdut/Bogojevo)	HR/YU	Y				Y	Y	Y					01/09/01	5
48	1367	R	Downstream Drava (Erdut/Bogojevo)	HR/YU			Y	Y			Y	Y	Y	Y		01/09/01	5
48	1367	L	Downstream Drava (Erdut/Bogojevo)	HR/YU			Y	Y			Y	Y	Y	Y		01/09/01	5
49-S	1367	M	River km 1367-1357	HR/YU		Y										01/09/01	5
49	1355	M	Dalj	HR/YU	Y				Y	Y	Y					01/09/01	5
49	1355	R	Dalj	HR/YU			Y	Y			Y	Y	Y	Y		01/09/01	5
49	1355	L	Dalj	HR/YU			Y	Y			Y	Y	Y	Y		01/09/01	5
50-S	1355	M	River km 1355-1333	HR/YU		Y										01/09/01	5
50	1300	M	Ilok-Backa Palanka	HR/YU	Y				Y	Y	Y					01/09/01	5
50	1300	R	Ilok-Backa Palanka	HR/YU			Y	Y			Y	Y	Y	Y		01/09/01	5
50	1300	L	Ilok-Backa Palanka	HR/YU			Y	Y			Y	Y	Y	Y		01/09/01	5
51-S	1300	M	River km 1300-1271	HR/YU		Y										01/09/01	5
51	1259	M	Upstream Novi Sad	YU	Y				Y	Y	Y					01/09/01	5
51	1259	R	Upstream Novi Sad	YU			Y	Y			Y	Y	Y	Y		02/09/01	5
51	1259	L	Upstream Novi Sad	YU			Y	Y			Y	Y	Y	Y		02/09/01	5
52	1252	M	Downstream Novi-Sad	YU	Y				Y	Y	Y					02/09/01	5
52	1252	R	Downstream Novi-Sad	YU			Y	Y			Y	Y	Y	Y		02/09/01	5
52	1252	L	Downstream Novi-Sad	YU			Y				Y	Y	Y	Y		02/09/01	5
52-S	1253	M		YU		Y										02/09/01	5
53-S	1242	M	River km 1242-1226	YU		Y										02/09/01	5
53	1216	M	Upstream Tisza (Stari Slankamen)	YU	Y				Y	Y	Y					02/09/01	5
53	1216	R	Upstream Tisza (Stari Slankamen)	YU			Y	Y			Y	Y	Y	Y		02/09/01	5
53	1216	L	Upstream Tisza (Stari Slankamen)	YU			Y	Y			Y	Y	Y	Y		02/09/01	5
54	1215	M	/Tisza 1.0 km	YU	Y	Y	Y		Y	Y	Y			Y		02/09/01	5
54	1215	R	/Tisza 1.0 km	YU			Y	Y				Y	Y	Y		02/09/01	5
54	1215	L	/Tisza 1.0 km	YU			Y					Y	Y	Y		02/09/01	5
55	1202	M	Downstream Tisza/Upstream Sava (Belegis)	YU	Y				Y	Y	Y					02/09/01	5
55	1202	R	Downstream Tisza/Upstream Sava (Belegis)	YU			Y	Y			Y	Y	Y	Y		02/09/01	5
55	1202	L	Downstream Tisza/Upstream Sava (Belegis)	YU			Y				Y	Y	Y	Y		02/09/01	5
55-S	1202	M	River km 1202-1186	YU		Y										02/09/01	5
56	1170	M	/Sava 7 km	YU	Y	Y	Y	Y	Y	Y	Y			Y		03/09/01	6
56	1170	L	/Sava 7 km	YU			Y	Y				Y	Y	Y		03/09/01	6
56-S	1170	M	River km 1170	YU		Y										03/09/01	6
57	1161	M	Upstream Pancevo/Downstream Sava	YU	Y				Y	Y	Y					04/09/01	6
57	1161	R	Upstream Pancevo/Downstream Sava	YU			Y	Y			Y	Y	Y	Y		04/09/01	6
57	1161	L	Upstream Pancevo/Downstream Sava	YU			Y	Y			Y	Y	Y	Y		04/09/01	6
57-S	1164	M	River km 1164-1151	YU		Y										04/09/01	6

58	1151	M	Downstream Pancevo	YU	Y				Y	Y	Y					04/09/01	6
58	1151	R	Downstream Pancevo	YU			Y	Y			Y	Y	Y	Y		04/09/01	6
58	1151	L	Downstream Pancevo	YU	Y		Y				Y	Y	Y	Y		04/09/01	6
58-S	1147	M	River km 1147-1103	YU		Y										04/09/01	6
59	1132	M	Grocka	YU	Y				Y	Y	Y					04/09/01	6
59	1132	R	Grocka	YU			Y	Y			Y	Y	Y	Y		04/09/01	6
59	1132	L	Grocka	YU			Y	Y			Y	Y	Y	Y		04/09/01	6
60	1107	M	Upstream Velika Morava	YU	Y				Y	Y	Y					04/09/01	6
60	1107	R	Upstream Velika Morava	YU			Y				Y	Y	Y	Y		04/09/01	6
60	1107	L	Upstream Velika Morava	YU			Y	Y			Y	Y	Y	Y		04/09/01	6
61	1103	M	/Velika Morava	YU	Y	Y	Y	Y	Y	Y	Y			Y		04/09/01	6
61	1103	R	/Velika Morava	YU			Y	Y				Y	Y	Y		04/09/01	6
62	1097	M	Downstream Velika Morava	YU	Y				Y	Y	Y					05/09/01	6
62	1097	R	Downstream Velika Morava	YU			Y	Y			Y	Y	Y	Y		05/09/01	6
62	1097	L	Downstream Velika Morava	YU			Y	Y			Y	Y	Y	Y		05/09/01	6
63	1077	M	Stara Palanka - Ram	YU	Y				Y	Y	Y					05/09/01	6
63	1077	R	Stara Palanka - Ram	YU			Y	Y			Y	Y	Y	Y	0-90	05/09/01	6
63	1077	L	Stara Palanka - Ram	YU			Y				Y	Y	Y	Y	0-70	05/09/01	6
63-S	1097	M	River km 1097-1075	YU		Y										05/09/01	6
64	1071	M	Banatska Palanka/Bazias	YU/RO	Y				Y	Y	Y					05/09/01	6
64	1071	R	Banatska Palanka/Bazias	YU/RO			Y	Y			Y	Y	Y	Y		05/09/01	6
64	1071	L	Banatska Palanka/Bazias	YU/RO			Y				Y	Y	Y	Y		05/09/01	6
65-S	1071	M	River km 1071-1058	YU/RO		Y										05/09/01	6
65	1040	M	Iron Gate reservoir (Golubac/Koronin)	YU/RO	Y				Y	Y	Y					06/09/01	6
65	1040	R	Iron Gate reservoir (Golubac/Koronin)	YU/RO			Y	Y			Y	Y	Y	Y		06/09/01	6
65	1040	L	Iron Gate reservoir (Golubac/Koronin)	YU/RO			Y	Y			Y	Y	Y	Y		06/09/01	6
66-S	1040	M	River km 1040-954	YU/RO		Y										06/09/01	6
66	956	M	Iron Gate reservoir (Tekija/Orsova)	YU/RO	Y				Y	Y	Y					06/09/01	6
66	956	R	Iron Gate reservoir (Tekija/Orsova)	YU/RO			Y				Y	Y	Y	Y		06/09/01	6
66	956	L	Iron Gate reservoir (Tekija/Orsova)	YU/RO			Y				Y	Y	Y	Y		06/09/01	6
67	924	M	Vrbica/Simijan	YU/RO	Y				Y	Y	Y					07/09/01	7
67	924	R	Vrbica/Simijan	YU/RO			Y	Y			Y	Y	Y	Y		07/09/01	7
67	924	L	Vrbica/Simijan	YU/RO			Y				Y	Y	Y	Y		07/09/01	7
67-S	943	M	River km 943-915	YU/RO		Y										07/09/01	7
68	849	M	Upstream Timok (Rudujevac/Gruia)	YU/RO	Y				Y	Y	Y					08/09/01	7
68	849	R	Upstream Timok (Rudujevac/Gruia)	YU/RO			Y	Y			Y	Y	Y	Y		08/09/01	7
68	849	L	Upstream Timok (Rudujevac/Gruia)	YU/RO			Y	Y			Y	Y	Y	Y		08/09/01	7
69	845	M	/Timok 0.2 km	YU/BG	Y		Y		Y	Y	Y					08/09/01	7
70	834	M	Pristol/Novo Selo Harbour	RO/BG	Y				Y	Y	Y					08/09/01	7
70	834	R	Pristol/Novo Selo Harbour	RO/BG			Y	Y			Y	Y	Y	Y		08/09/01	7
70	834	L	Pristol/Novo Selo Harbour	RO/BG			Y	Y			Y	Y	Y	Y		08/09/01	7
70-S	844	M	River km 844-795	RO/BG		Y										08/09/01	7
71	795	M	Calafat	RO/BG	Y				Y	Y	Y					08/09/01	7
71	795	R	Calafat	RO/BG			Y	Y			Y	Y	Y	Y		08/09/01	7
71	795	L	Calafat	RO/BG			Y	Y			Y	Y	Y	Y		08/09/01	7
71-S	775	M	River km 775-687	BG/RO		Y										09/09/01	7
72	685	M	Downstream Kozloduy	BG/RO	Y				Y	Y	Y					09/09/01	7
72	685	R	Downstream Kozloduy	BG/RO			Y	Y			Y	Y	Y	Y		09/09/01	7
72	685	L	Downstream Kozloduy	BG/RO			Y				Y	Y	Y	Y		09/09/01	7
73	640	M	Upstream Iskar (Bajkal)	BG/RO	Y				Y	Y	Y					09/09/01	7
73	640	R	Upstream Iskar (Bajkal)	BG/RO			Y	Y			Y	Y	Y	Y		09/09/01	7
73	640	L	Upstream Iskar (Bajkal)	BG/RO			Y				Y	Y	Y	Y		09/09/01	7
74	637	M	/Iskar 0.3 km	BG	Y		Y		Y	Y	Y					09/09/01	7
74	637	R	/Iskar 0.3 km	BG			Y					Y	Y	Y		09/09/01	7
75	629	M	Downstream Iskar	RO/BG	Y				Y	Y	Y					10/09/01	7
75	629	R	Downstream Iskar	RO/BG			Y				Y	Y	Y	Y		10/09/01	7
75	629	L	Downstream Iskar	RO/BG			Y				Y	Y	Y	Y		10/09/01	7
75-S	630	M	River km 630-605	BG/RO		Y										10/09/01	7
76	606	M	Upstream Olt	RO/BG	Y				Y	Y	Y					10/09/01	7
76	606	R	Upstream Olt	RO/BG			Y				Y	Y	Y	Y		10/09/01	7
76	606	L	Upstream Olt	RO/BG			Y	Y			Y	Y	Y	Y		10/09/01	7
77	605	M	/Olt 0.4 km	RO	Y		Y		Y	Y	Y					10/09/01	7
77	605	R	/Olt 0.4 km	RO			Y					Y	Y	Y		10/09/01	7
78	602	M	Downstream Olt	RO/BG	Y				Y	Y	Y					10/09/01	7
78	602	R	Downstream Olt	RO/BG			Y	Y			Y	Y	Y	Y		10/09/01	7
78	602	L	Downstream Olt	RO/BG			Y	Y			Y	Y	Y	Y		10/09/01	7
78-S	605	M	River km 605-579	RO		Y										10/09/01	7
79	579	M	Downstream Turnu-Magurele/Nikopol	RO/BG	Y				Y	Y	Y					10/09/01	7
79	579	R	Downstream Turnu-Magurele/Nikopol	RO/BG			Y	Y			Y	Y	Y	Y		10/09/01	7

79	579	L	Downstream Turnu-Magurele/Nikopol	RO/BG			Y				Y	Y	Y	Y		10/09/01	7
80	550	M	Downstream Zimnicea/Svishtov	RO/BG	Y				Y	Y	Y					11/09/01	7
80	550	R	Downstream Zimnicea/Svishtov	RO/BG			Y				Y	Y	Y	Y		11/09/01	7
80	550	L	Downstream Zimnicea/Svishtov	RO/BG			Y	Y			Y	Y	Y	Y		11/09/01	7
81	537	M	/Jantra 1.0 km	BG	Y	Y	Y	Y	Y	Y	Y			Y		11/09/01	8
81	537	R	/Jantra 1.0 km	BG			Y	Y				Y	Y	Y		11/09/01	8
82	532	M	Downstream Jantra	RO/BG	Y				Y	Y	Y					11/09/01	8
82	532	R	Downstream Jantra	RO/BG			Y	Y			Y	Y	Y	Y		11/09/01	8
82	532	L	Downstream Jantra	RO/BG			Y				Y	Y	Y	Y		11/09/01	8
82-S	532	M	River km 532-495	RO/BG		Y										11/09/01	8
83	500	M	Upstream Ruse	BG/RO	Y				Y	Y	Y					11/09/01	8
83	500	R	Upstream Ruse	BG/RO			Y	Y			Y	Y	Y	Y		11/09/01	8
83	500	L	Upstream Ruse	BG/RO			Y				Y	Y	Y	Y		11/09/01	8
84	498	M	/Russenski Lom	BG	Y		Y		Y	Y	Y					11/09/01	8
84	498	R	/Russenski Lom	BG			Y					Y	Y	Y		11/09/01	8
84-S	488	M	River km 488-465	BG/RO		Y										12/09/01	8
85	488	M	Downstream Ruse/Giurgiu	BG/RO	Y				Y	Y	Y					12/09/01	8
85	488	R	Downstream Ruse/Giurgiu	BG/RO			Y				Y	Y	Y	Y		12/09/01	8
85	488	L	Downstream Ruse/Giurgiu	BG/RO			Y				Y	Y	Y	Y		12/09/01	8
86-S	465	M	River km 465-433	RO/BG		Y										13/09/01	8
86	434	M	Upstream Arges	RO/BG	Y				Y	Y	Y					13/09/01	8
86	434	R	Upstream Arges	RO/BG			Y	Y			Y	Y	Y	Y		13/09/01	8
86	434	L	Upstream Arges	RO/BG			Y	Y			Y	Y	Y	Y		13/09/01	8
87	432	M	/Arges	RO	Y		Y		Y	Y	Y					13/09/01	8
87	432	R	/Arges	RO			Y					Y	Y	Y		13/09/01	8
88	429	M	Downstream Arges, Oltenita	RO/BG	Y	Y			Y	Y	Y			Y		13/09/01	8
88	429	R	Downstream Arges, Oltenita	RO/BG			Y	Y			Y	Y	Y	Y		13/09/01	8
88	429	L	Downstream Arges, Oltenita	RO/BG			Y				Y	Y	Y	Y		13/09/01	8
89	378	M	Chiciu/Silistra	RO/BG	Y				Y	Y	Y					13/09/01	8
89	378	R	Chiciu/Silistra	RO/BG			Y	Y			Y	Y	Y	Y		13/09/01	8
89	378	L	Chiciu/Silistra	RO/BG			Y				Y	Y	Y	Y		13/09/01	8
89-S	375	M	River km 375-322	RO/BG		Y										13/09/01	8
90	295	M	Upstream Cernavoda	RO	Y				Y	Y	Y					15/09/01	8
90	295	R	Upstream Cernavoda	RO			Y	Y			Y	Y	Y	Y		15/09/01	8
90	295	L	Upstream Cernavoda	RO			Y	Y			Y	Y	Y	Y		15/09/01	8
90-S	293	M	River km 293-253	RO		Y										15/09/01	8
91	235	M	Giurgeni	RO	Y				Y	Y	Y					15/09/01	8
91	235	R	Giurgeni	RO			Y	Y			Y	Y	Y	Y		15/09/01	8
91	235	L	Giurgeni	RO			Y				Y	Y	Y	Y		15/09/01	8
91-S	236	M	River km 236-203	RO		Y										15/09/01	8
92	167	M	Braila	RO	Y				Y	Y	Y					15/09/01	8
92	167	R	Braila	RO			Y	Y			Y	Y	Y	Y		15/09/01	8
92	167	L	Braila	RO			Y				Y	Y	Y	Y		15/09/01	8
93	154	M	/Siret 1.0 km	RO	Y	Y	Y		Y	Y	Y			Y		16/09/01	8
93	154	R/L	/Siret 1.0 km	RO			Y					Y	Y	Y		16/09/01	8
94	135	M	/Prut 1.0 km	RO/MD	Y	Y	Y	Y	Y	Y	Y					16/09/01	8
94	135	R/L	/Prut 1.0 km	RO/MD			Y	Y				Y	Y	Y		16/09/01	8
95	130	M	Reni - Chilia/Kilia arm	RO/UA	Y				Y	Y	Y					16/09/01	9
95	130	R	Reni - Chilia/Kilia arm	RO/UA			Y	Y			Y	Y	Y	Y		16/09/01	9
95	130	L	Reni - Chilia/Kilia arm	RO/UA			Y				Y	Y	Y	Y		16/09/01	9
95-S	110	M	River km 110 - 84	RO/UA		Y										17/09/01	9
96-S	94	M	River km 94 - 56	RO/UA		Y										17/09/01	9
96	56	M	Kilia arm	RO/UA	Y				Y	Y	Y					17/09/01	9
96	56	R	Kilia arm	RO/UA			Y	Y				Y	Y	Y		17/09/01	9
96	56	L	Kilia arm	RO/UA			Y	Y				Y	Y	Y		17/09/01	9
96-S	56	M	River km 56 - 94	RO/UA		Y										17/09/01	9
96-S	71	M	Tulcea	RO/UA		Y										18/09/01	9
97	12	M	Sulina arm	RO	Y		Y		Y	Y	Y					18/09/01	9
97	12	R	Sulina arm	RO			Y	Y				Y	Y	Y		18/09/01	9
97	12	L	Sulina arm	RO			Y	Y				Y	Y	Y		18/09/01	9
97-S	3	M	River km 3 - 11	RO		Y										18/09/01	9
98-S	74	M	River km 74 - 64	RO/UA		Y										19/09/01	9
98	64	M	St. George arm	RO/UA	Y		Y		Y	Y	Y					19/09/01	9
98	64	R	St. George arm	RO/UA			Y					Y	Y	Y		19/09/01	9
98	64	L	St. George arm	RO/UA			Y	Y				Y	Y	Y		19/09/01	9
-S	64	M	River km 64 - 74	RO/UA		Y										19/09/01	9

[a]S, suspended solids.

[b]L, R, left and right bank of the river; M, middle.

[c]Division of the Danube into Reaches according to Vogel & Pall (cf. REF in the text).

Suspended solids were collected in the middle of the river by on-board pumping and centrifugation of water. Due to the long time required for collection of a sufficient amount of sample, the centrifugation was usually carried out during the cruise between two adjacent sampling sites. With this method, 63 suspended solids samples were collected.

Mussels samples were collected from the left and right bank of the river, prepared and stored to be later analysed for heavy metals, PAHs, PCBs and organochlorinated compounds. A sufficient number of mussels for laboratory analyses was found at 134 locations.

Biological samples were taken from the left and right banks of the River. Macrozoobenthos and phytobenthos were sampled with both the grab sampler mounted on the Argus and from the small boats. The small boats were also used for the sampling of macrophytes on the shores of the River. Phytoplankton and zooplankton samples were filtered out of the water in the middle of the river. Macrozoobenthos and phytobenthos samples were collected at 165 and 212 sampling locations respectively. Higher-level plants (macrophytes) and mosses were found at 120 and 34 sampling sites respectively.

All samples were preserved/stored according to the procedures described here below.

Transport of Samples to JDS Reference Laboratories

Samples collected during three or four days were transported by a shuttle service to the JDS Central Storage Facility at WRRC VITUKI, Hungary, and were then sent on to JDS Reference Laboratories for analyses of specific sets of parameters. Parallel samples of sediments and suspended solids were stored in the JDS Central Storage Facility for future processing and/or reference analyses. Storage of macrozoobenthos samples was facilitated by CBR Frankfurt a.M., Germany.

List of Determinands

Detailed lists of determinands for each sample type are given below.

SURFACE WATER SAMPLES

On-board analyses	GROUP I	GROUP III	GROUP IV	GROUP V
Alkalinity	Organic nitrogen	Atrazine	Benzene	GC-MS screening
Ammonium ($NH4^{+}$ -N)	Total phosphorus	Alachlor	1,2-Dichlorethane	
Conductivity @ 20 °C	Dissolved silicate	Chlorfenvinphos	Dichlormethane	
Dissolved oxygen		Chlorpyrifos	Trichlormethane	
Nitrate ($NO3^{-}$ -N)	**GROUP II**	Diuron	Trichlorbenzenes	
Nitrite ($NO2^{-}$ -N)	Aluminium (Al) – dissolved	Endosulfan (alpha-endosulfan)		
Ortho-phosphate ($PO4^{3-}$ -P)	Arsenic (As) – dissolved	Isoproturon		
pH	Cadmium (Cd) – dissolved	Simazine		
Suspended solids	Chromium (Cr) – dissolved	Trifluralin		
Temperature	Copper (Cu) – dissolved			
	Lead (Pb) – dissolved			
Total Coliforms (37 °C)	Mercury (Hg) – dissolved			
Faecal Coliforms (44 °C)	Nickel (Ni) – dissolved			
Faecal Streptococci	Zinc (Zn) – dissolved			
Chlorophyll - a				

SEDIMENT SAMPLES

GROUP I	GROUP II	GROUP III	GROUP IV	GROUP V	GROUP VI
Organic nitrogen	Aluminium (Al)	PAH – 16 EPA	Nonylphenols (4-para-nonylphenol)	Organotin-compounds (tributyltin-cation)	GC-MS screening
Total phosphorus	Arsenic (As)	PCB – 7 (each)	Octylphenols (para-tert-octylphenol)		
Calcium (Ca^{2+})	Cadmium (Cd)	Lindane (gammahexachlorocylohexane)	Pentachlorophenol		
Magnesium (Mg^{2+})	Chromium (Cr) – total	Hexachlorobenzene	Di(2-ethylhexyl) phthalate (DEHP)		
TOC	Copper (Cu)	Hexachlorobutadiene	Brominated diphenylethers (pentabromo-biphenylether)		
Petroleum hydrocarbons	Iron (Fe)	Pentachlorobenzene			
Total extractable matter	Lead (Pb)	pp'DDT			
	Manganese (Mn)				
	Mercury (Hg)				
	Nickel (Ni)				
	Zinc (Zn)				

SUSPENDED SOLIDS SAMPLES

GROUP I	GROUP II	GROUP III	GROUP IV	GROUP V	GROUP VI
Organic nitrogen	Aluminium (Al)	PAH – 16 EPA	Nonylphenols (4-para-nonylphenol)	Organotin-compounds (tributyltin-cation)	GC-MS screening
Total phosphorus	Arsenic (As)	PCB – 7 (each)	Octylphenols (para-tert-octylphenol)		
Calcium (Ca^{2+})	Cadmium (Cd)	Lindane (gammahexachlorocylohexane)	Pentachlorophenol		
Magnesium (Mg^{2+})	Chromium (Cr) – total	Hexachlorobenzene	Di(2-ethylhexyl) phthalate (DEHP)		
TOC	Copper (Cu)	Hexachlorobutadiene	Brominated diphenylethers (pentabromo-biphenylether)		
Petroleum hydrocarbons	Iron (Fe)	Pentachlorobenzene			
Total extractable matter	Lead (Pb)	pp'DDT			
	Manganese (Mn)				
	Mercury (Hg)				
	Nickel (Ni)				
	Zinc (Zn)				

MUSSEL SAMPLES

GROUP I	GROUP II	GROUP III
Arsenic (As)	PAH – 16 EPA	PCB – 7 (each)
Cadmium (Cd)		Lindane (gamma-hexachlorocylohexane)
Chromium (Cr) – total		Hexachlorobenzene
Copper (Cu)		Hexachlorobutadiene
Lead (Pb)		Pentachlorobenzene
Mercury (Hg)		pp'DDT
Nickel (Ni)		
Zinc (Zn)		

BIOLOGICAL SAMPLES

Macrozoobenthos
Phytobenthos
Macrophytes
Phytoplankton
Zooplankton

The original list of determinands was additionally extended to include the following parameters:

VITUKI Volatile organic compounds	OFZ Seibersdorf Polar pesticides	ARGE Gewässerschutz Heavy metals	UBA Berlin Pharmaceuticals
1,1-Dichloroethylene	Buturon	Aluminium (Al) - total	3,5-Dibromoanthranilic acid
1,1-Dichloroethane	Chlorbromuron	Arsenic (As) - total	Bezafibrate
1,2-Dichloroethylene	Chlorotoluron	Cadmium (Cd) - total	Clofibric acid
Carbon tetrachloride = Tetrachloromethane	Desethylatrazine	Chromium (Cr) - total	Diclofenac
Trichloroethylene	Desizopropylatrazine	Copper (Cu) - total	Fenofibrate
Bromodichlormethane	Hexachlorbenzol	Lead (Pb) - total	Fenoprofene
Toluene	Hexazinone	Mercury (Hg) - total	Gemfibrozil
Dibromochloromethane	Lindane (gammahexachlorocyclohexane)	Nickel (Ni) - total	Ibuprofen
Tetrachloroethylene	Linuron	Zinc (Zn) - total	Indometacin
Chlorobenzene	Metobromuron		Ketoprofen
Ethylbenzene	Metoxuron		Naproxen
m+p Xylene	Monolinuron		1-Acetyl-1-methyl-2-phenylhydrazide
o-Xylene	Monuron		3,5-Dibromoanthranilic acid methyl ester
1,3-Dichlorobenzene	Neburon		Ambroxol

1,4-Dichlorobenzene	Neburon		Bromhexine
1,2-Dichlorobenzene			Clonidin
1,3,5-Trichlorobenzene			Clotrimazol
1,2,4-Trichlorobenzene			Dimetridazole
Naphtalene			Isopropylphenazone
1,2,3-Trichlorobenzene			Methyl-2(methyl-sulphonamido)-benzoate Metronidazole
Content of oil and humic acids identified by fluorescence measurements			Na873 = 6,8-Dibromo-3-(trans-4-hydroxy-cyclohexyl)-1,2,3,4-tetrahydro-quinazoline
Zooplankton			N-Acetyl-4-aminoan tipyrine
			Naphazoline
			N-Formyl-4-aminoan tipyrine
			Oxyphenbutazone
			Paracetamol
			Phenazone
			Phenylbutazone
			Ronidazole
			Timolol
			Xylometazoline

Besides a detailed quantitative evaluation, species determination was also carried out for macrozoobenthos, phytobenthos, macrophytes, phytoplankton and zooplankton.

JDS Reference Laboratories and Their Responsibilities

An open international tender was launched prior to the Survey in order to select the most suitable JDS Reference Laboratories for carrying out a laboratory analyses of JDS samples. The following laboratories were selected:

1. ARGE Gewässerschutz, Vienna, Austria.
2. DVGW-Technologiezentrum Wasser (TZW), Karlsruhe, Germany.
3. Gruppe Gewässerökologie GesmbH and Systema Bio & Management Consulting GmbH (GG&SBMC), Vienna, Austria.
4. Österreichisches Forschungszentrum (ÖFZ) Seibersdorf, Austria.
5. Research Institute and Museum for Natural History Senckenberg, Center for Biodiversity Research (CBR), Frankfurt a.M., Germany.

6. Umweltbundesamt GmbH (UBA), Austrian Federal Government Agency, Vienna, Austria.
7. Umweltbundesamt (UBA), Berlin, Germany.
8. Water Research Institute (WRI), Bratislava, Slovak Republic.
9. Water Resources Research Centre (WRRC) Vituki, Budapest, Hungary.

JDS Reference Laboratories analysed the following groups of determinands:

Surface water samples

Group I	WRRC VITUKI, Hungary
Group II	ARGE Gewässerschutz, Austria
Group III	ÖFZ Seibesdorf, Austria
Group IV	WRRC VITUKI, Hungary
Group V	WRI Bratislava, Slovak Republic

Sediment samples

Group I	ARGE Gewässerschutz, Austria
Group II	UBA Berlin, Germany
Group III	WRRC VITUKI, Hungary
Group IV	TZW Karlsruhe, Germany
Group V	UBA Vienna, Austria
Group VI	ARGE Gewässerschutz, Austria

Suspended solids samples

Group I	ARGE Gewässerschutz, Austria
Group II	UBA Berlin, Germany
Group III	WRRC VITUKI, Hungary
Group IV	TZW Karlsruhe, Germany
Group V	UBA Vienna, Austria
Group VI	ARGE Gewässerschutz, Austria

Mussels samples

Group I	WRRC VITUKI, Hungary
Group II	WRRC VITUKI, Hungary
Group III	WRRC VITUKI, Hungary

Biological samples

Macrozoobenthos	CBR Frankfurt a.M., Germany
Phytobenthos	WRI Bratislava, Slovak Republic
Macrophytes	GG&SBMC Vienna, Austria
Phytoplankton	WRRC VITUKI, Hungary
Zooplankton	WRRC VITUKI, Hungary