



Task Force on Monitoring and Assessment under the UN/ECE Water Convention  
Pilot Project Programme Transboundary Rivers

# MORAVA

## Report No. 1 Inception Report

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## **Preface**

In June 1996, the Guidelines on Water-quality Monitoring & Assessment of Transboundary Rivers, drafted by the Task Force on Monitoring & Assessment under the Convention on Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 1992), were accepted by the UN/ECE Committee on Environmental Policy.

The Task Force started a pilot project programme to demonstrate the implementation of these Guidelines in a series of river basins and to support countries in the implementation. Furthermore, a revision of the Guidelines was scheduled to include the findings of the pilot projects.

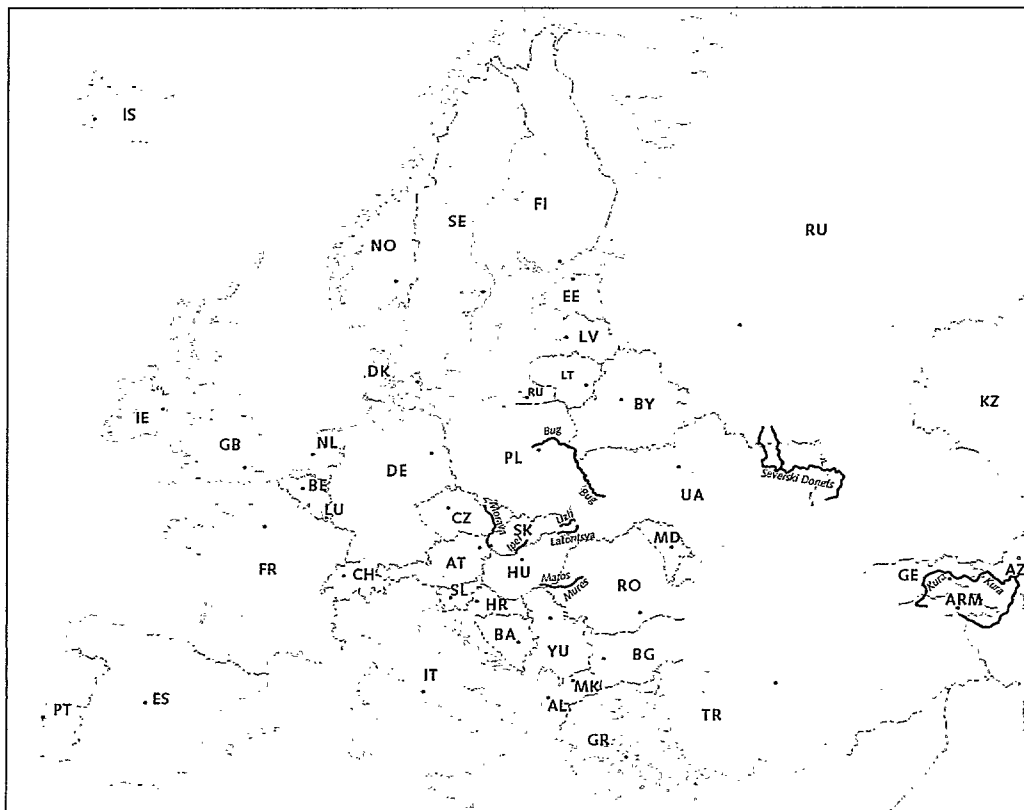
Eight river basins in Europe and Central Asia are included in the pilot project programme as shown on the map. The Core Group on Pilot Projects under the Task Force, with the Netherlands (RIZA) as lead country, prepares, co-ordinates and supports the programme.

The pilot projects are made up of two phases with a duration of 1.5 years each: the Preparatory phase and the Implementation phase.

The results of the Preparatory phase are presented in three reports:

1. *Inception Report* (including results of the project preparations).
2. *Synthesis Report* (including inventory results, evaluation of water legislation and regulations and specification of information needs).
3. *Recommendations Report* (including results of surveys, recommendations for improvement of monitoring and assessment practices and cost estimates).

### **Pilot River Basins**





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## **1. Introduction**

Under the UN/ECE Convention on Protection and Use of Transboundary Watercourses and International Lakes the Task Force on Monitoring and Assessment has drafted "Guidelines for Water Quality Monitoring and Assessment of Transboundary Rivers". It was decided that the implementation of the guidelines would be demonstrated under the auspices of the Task Force in eight transboundary river basins in Central and Eastern European Countries and Newly Independent States. The Morava has been a transboundary river between the Czech and the Slovak Republic since 1993, when former Czechoslovakia was split up. The Morava river basin is one of the selected river basins to be included in the pilot project programme. The Czech Republic and the Slovak Republic co-operate in this project.

The objectives of the pilot project are:

- to demonstrate the application of the "Guidelines on Water Quality Monitoring and Assessment of Transboundary Rivers" in the Morava river basin
- to assist in and promote the upgrading of monitoring in accordance with the guidelines
- to evaluate and improve the guidelines on the basis of experiences with the pilot-project

The project will result in effective and efficient monitoring and assessment in the Morava river basin.

## **2. International Co-operation**

The Slovak Republic and the Czech Republic are parties to the following international agreements:

- *Europe Association Agreements*, which have been concluded between the EU and countries from Central and Eastern Europe to prepare their eventual accession to the European Union. The agreements provide for increased co-operation in a number of areas including environment.
- *Environmental Action Programme for Central and Eastern Europe*, which was endorsed by the Environment Ministers of the region of the UN/ECE and the Environment Commissioner of the EU.
- *UN/ECE Convention on Protection and Use of Transboundary Watercourses and International Lakes* (Helsinki Convention), which was signed by 25 countries and the European Community in 1992 and which came into effect in October 1996. The Helsinki Convention is currently undergoing the process of adoption in the Slovak Republic.
- *The Convention on wetlands of international importance, especially as wildfowl habitat* (Ramsar, 1991) and *Convention on biological diversity* (Rio de Janeiro, 1992) were ratified by the Czech and the Slovak Republic.
- The Morava river basin is part of the Danube river basin. In 1991, the Danube river basin countries drew up an initiative to support and reinforce national actions for the restoration and protection of the Danube River -- the *Environmental Programme for the Danube River Basin* (the Danube Environmental Programme).
- The Danube river basin countries and the EU signed the *Convention on Cooperation for the Protection and Sustainable Use of the River Danube* (the Danube River Protection Convention) in Sofia in 1994. The Czech Republic was the second country to ratify the Convention (Romania being the first) in the first half of the year 1995. The convention is currently undergoing the process of ratification in the Slovak Republic.

Furthermore, the governments of the Czech Republic and the Slovak Republic have concluded an Agreement on Protection and Creation of Environment, together with the Procedure of Agreement. In accordance with the Procedure of Agreement, joint Working Groups for different environmental issues will be established. Co-operation in the Working Group for Protection and Use of Waters will be realised through the co-ordination of international activities in Danube river basin, the joint

solution of transboundary water management problems, and the exchange of information and experience.

On 22 July 1998 representatives of the relevant authorities on Transboundary Waters (the Ministry of Environment of the Czech Republic and the Ministry of Environment of the Slovak Republic) signed the "Memorandum of Understanding between the Ministry of Environment of the Czech Republic and the Ministry of Environment of the Slovak Republic on the joint participation in the Pilot Project for the demonstration of the UN/ECE *Guidelines on Water Quality Monitoring and Assessment of Transboundary Rivers* in the Morava river basin". A copy of this signed Memorandum of Understanding, as well as a translation, is included as Annex 1 of this report.

Co-operation and regular exchange of hydrological information regarding hydrological forecasts already takes place between the Czech Republic and the Slovak Republic (between Slovak and Czech Hydrometeorological Institutes).

### **3. Structure of Water Management**

#### **Czech Republic**

Competencies in the water management in the Czech Republic are divided between the Ministry of Environment and the Ministry of Agriculture.

The field of activities of the *Ministry of Environment* includes protection of natural water accumulation, water resources protection, quality protection of surface and groundwater, co-ordination of the water management state authority and water management regulation. The Water Research Institute, the Czech Hydrometeorological Institute, the Czech Environmental Inspection and the State Environmental Fund operate under the supervision of the Ministry of Environment.

The Water Research Institute T.G.M. provides complete professional services for the formation and application of the State water management policy. Its activities are focused on hydraulics, hydrology and hydrogeology, water quality and processes of its changes, water management, users' systems in the water management sector, IT, documentation, literature reviews, updating the Basic Water Management Map, etc.

The Czech Hydrometeorological Institute, amongst others, is responsible for file keeping and the quality and quantity balance of surface and ground water reserves. It also takes care of surface and ground water quality monitoring and fulfils the international obligations in this field.

The Czech Environmental Inspection (Water Protection Department) is the specialised state authority for water management, which controls enforcement of regulations and permits. It also looks after decision making of water-management authorities of all levels according to these laws and regulations.

The State Environmental Fund was set up as a significant financial source to support protection and improvement of a living environment and it is one of the basic economic tools of state politics in this field.

The state authority in different regions is carried out by 9 territorial departments of the Ministry of Environment, along with environmental departments located in district or municipal authorities.



The *Ministry of Agriculture* is responsible for water management activities. It controls public water supplies and sewer systems, takes care of water-flow management, looks after navigability, controls flood-protection, manages state grant policy and controls five administrators of significant rivers - the joint stock companies' River Basin Administration.

The River Basin Administration is responsible for:

- management of important water courses and hydraulic structures
- co-operation with managers of small streams in the basin
- surface water management aimed at water supply, production of electric power, fishery, water sports and recreation
- flood protection, protection against adverse effects of water and its accidental pollution, re-naturalisation of water flows
- laboratory water quality analyses and evaluation, hydro-ecological information systems, studies and projects, engineering

Municipality authorities of towns and villages are responsible for drinking water delivery and for waste water transportation and treatment. The operation of town and public water supplies and sewer systems is usually carried out by waterworks and sewage companies.

Under the *Ministry of Environment* the following reports are regularly prepared:

- Surface Water Quality in Czech Republic (annual report)
- The State of Water - Quality Balances (annual report)

In the Czech Republic the extensive "Morava River Project" started in 1991 and focuses on surface water quality, groundwater quality, and point and non-point sources of pollution in the Morava river basin. The priorities with regard to water management in Morava river basin are drawn up in the "Morava river basin Action Plan."

## **Slovak Republic**

In the Slovak Republic, competencies regarding water management are shared between the Ministry of Environment and the Ministry of Soil Management. This division of tasks ensures the separation of the functions related to water protection on the one hand and the functions related to water exploitation and use on the other.

The *Ministry of Environment* is the central water management authority for state administration concerning water protection and rational use of water. The Ministry of Environment is the responsible institution with regard to the monitoring of the quality of transboundary waters. It supervises institutions such as the Slovak Hydrometeorological Institute, the Slovak Environmental Inspection and the Slovak Environmental Agency.

The main responsibilities of the Slovak Hydrometeorological Institute with regard to water management are to achieve, handle, assess and archive data about surface water and groundwater quantity and quality. It is responsible for monitoring and assessment of surface water and groundwater quality, and gathering and archiving data concerning consumption of surface and groundwater and the amount and quality of waste waters entering the rivers.

The *Ministry of Soil Management* is the central authority for economic management of institutions and enterprises working in the water management sector. Activities concerning drinking water supply, sewer systems, municipal waste water treatment plants, watercourses administration, operation and maintenance of rivers, dams, lock chambers, flood protection dikes etc. are provided under supervision of The Ministry of Soil Management. Institutions such as the River Basin Authorities, the

Water Research Institute and the Waterworks and Sewerage Authorities operate under supervision of the Ministry of Soil Management.

There are four River Basin Authorities in the Slovak Republic. Their main task is the administration of rivers. They are responsible for taking care of and maintenance of rivers and waterworks (dams, locks chambers, flood protection dikes etc.). Furthermore, the laboratories of River Basin Authorities realise sampling and analysis of water samples in the framework of the national surface water quality monitoring programme. They keep basic records on surface water intake and on quality and quantity of waste waters entering the rivers.

The Waterworks and Sewerage Authorities are responsible for drinking water supply by water pipes, wastewater transportation by sewage works and waste water treatment.

The Water Research Institute provides for theoretical and experimental research activities. The National Reference Laboratory (NRL) for Water is part of Water Research Institute. Thus, the Water Research Institute also forms a methodological centre for quality assurance of analytical measurements.

Under the Ministry of Environment the following reports are regularly prepared:

- Hydroecological Plans of River Basins (prepared once per 5 years for each river basin)
- Surface Water Quality in Slovak Republic (annual report)
- Groundwater Quality in Slovak Republic (annual report)
- State Water Management Balances (annual report)

Under the Ministry of Soil Management "Water Management Plans" are regularly prepared. They contain an evaluation of the exploitable part of the water resources and water management policies including public water supply and sewerage systems in 11 river basins into which the whole area of the Slovak Republic is divided.

The state authority in regions is carried out by 8 Regional Departments of Environment along with 78 District Departments of Environmental, which are established under Ministry of Interior. The methodological guidance of the Regional and District Departments of Environment is performed by the Ministry of Environment.

#### **4. The Morava River Basin**

##### **Climatic conditions**

The Czech part of the Morava river basin is made up of different climatic regions. The cold and moist parts of Kralický Sněžník mountains, Jeseníky mountains, Moravskoslezské Beskydy mountains, Javorníky mountains, White Carpathian mountains and Dražanská Highlands, with mean temperatures of 5-6 °C and annual precipitation of 700-800 mm (in the highest parts it exceeds 1,000 mm) are alternated with very warm and dry regions with mean temperatures of 7-8.5 °C and annual precipitation in the range of 450 - 550 mm.

The warmest area of the Morava river basin, a south-eastern river basin of the Dyje river basin (area of Břeclav, Znojmo, Hodonín), is situated in a lowland climate area. Furthermore, this includes lowland climates near the river Morava from a confluence with the river Dyje up to the area of Olomouc. The valley climate embraces areas of a higher situated river basin up to a height of 500-700m above sea level. The mountain area includes areas at a height of 500-700m above sea level in a

range of hills of the Dražanská Highlands, the White Carpathian mountains, the Javorníky mountains, the Moravskoslezské Beskydy mountains, the Jeseníky mountains and the Kralický Sněžník mountains.

According to the main types of relief, the Slovak part of the river basin is situated in a lowland climate and a mountain slope climate. The lowland parts form 77% of the Slovak part of the river basin and are situated west of the Slovak part of the river basin. The annual mean temperature there is about 9°C. In the eastern and north-eastern parts there is a mountain slope climate with an annual mean temperature of about 7°C. The mean annual precipitation is 634 mm in the Slovak part of river basin, but in the highest parts it exceeds 800 mm.

## Hydrological conditions

The river Morava springs in the Czech Republic under Kralický Sněžník (1,423m above sea level). The Morava river basin is spread over three states - the Czech Republic, Austria and the Slovak Republic. 84% of the river basin belongs to the Czech territory and approximately 8,6% to the Slovak territory.

The area of the whole Morava river basin is 26,658 km<sup>2</sup>, 22,393 km<sup>2</sup> of which form the Czech part and 2,283 km<sup>2</sup> of which form the Slovak part of the river basin. The total length of river Morava is 352 km. For the last approximately 150 km, the river Morava has a typical lowland character with original flood-plain forests.

Above the confluence with the river Danube, the river Morava forms the border. Its border length is 70 km between Austria and the Slovak Republic and 40 km between the Czech Republic and the Slovak Republic. The most important tributaries of the river Morava are the rivers Dyje and Běčva, which are situated in the Czech part of the Morava river basin.

The basic hydrological characteristics of the Morava river basin can be found in Table 1 below.

*Table 1: Basic hydrological characteristics in the Morava river basin.*

River	Length of river [km]	Area of river basin [km <sup>2</sup> ]	Precipitation capacity per year [10 <sup>6</sup> m <sup>3</sup> ]	Mean annual discharge [m <sup>3</sup> .s <sup>-1</sup> ]
<b>Czech part of Morava river basin</b>				
Dyje	209	11 144,8	7 250,5	42,40
Kyjovka	87	665,8	377,5	1,09
Velická	18	65,1	45,8	0,50
Olsava	46	520,0	355,7	2,50
Dřevnice	43	434,6	316,0	3,15
Mostenka	44	363,9	232,9	1,29
Haná	57	607,8	351,3	1,70
Běčva	113	1 598,8	1 359,0	17,30
Rusava	30	147,4	98,0	0,80
Valová	46	456,4	265,2	1,37
Bystrice	55	267,4	187,7	1,80
Oskava	50	571,8	391,7	3,53
Desná	44	326,3	302,8	4,48
Branná	26	113,3	107,6	1,69
Moravská Sázava	55	507,3	374,9	4,52
Třebůvka	48	584,6	367,1	2,38
<b>Morava - Strážnice</b>	<b>232</b>	<b>9 146,9</b>	<b>6 448,6</b>	<b>58,16</b>

<i>Slovak part of Morava river basin</i>				
Chvojnica	31,5	125,4	84,0	0,64
Myjava	79	745,1	534,2	3,04
Rudava	45	417,7	293,2	1,86
Malina	47	516,6	338,9	1,80
<b>Morava - D.N.V.</b>	<b>352</b>	<b>26 658</b>	<b>16 824,9</b>	<b>118,70</b>

## Reservoirs and Ponds

In the Czech part of the Morava river basin 34 significant reservoirs and several thousands of ponds with the total volume of  $659.10^6 \text{ m}^3$  are situated. The most important reservoirs are in the Dyje river basin. The hydrological regime of the river Dyje is influenced by the operation of 20 reservoirs with a total capacity of  $520.10^6 \text{ m}^3$ . Reservoirs serve mainly for drinking water supply, flood protection and recreation, and some of them are also important as a source of water for agricultural purposes and for power generation.

In the Slovak part of the river basin there are 3 reservoirs with a volume exceeding  $1.10^6 \text{ m}^3$  - Kunov on Vrbovianka, Buková on Hrudky and Lozorno on Suchý potok. They are utilised as water sources for industry, power generation, irrigation, and also serve for flood protection and recreation purposes.

## Groundwater resources

In the Czech part of the Morava river basin the groundwater resources contribute to the drinking water supply with a capacity  $5,460 \text{ l.s}^{-1}$ . The greatest accumulation of groundwater resources occurs in the plain mead of the river Morava in its Quaternary deposits. There are groundwater resources of good quality in the area of Cretaceous formation in the watershed of the river Svitava. The resources in the area of crystalline in the north and south-west of the Morava river basin demand more treatment to improve their quality.

Table 2: The most important groundwater resources in the Czech part of the Morava river basin

<i>n.</i>	<i>Location</i>	<i>L.s<sup>-1</sup></i>			
1	Krobotova	65	20	Lazany	30
2	Vikýřovice	30	21	Brest	50
3	Lesnice	60	22	Vsetín - Ohrada	80
4	Mohelnice	135	23	Hulín	80
5	Haukovice	30	24	Postoupky	56
6	Litovel	200	25	Drnovice	40
7	Pnovice - Náklo	210	26	Kvasice	170
8	Stepánov	90	27	Tlumacov	100
9	Cernovír	200	28	Knezpole	80
10	Senice	50	29	Ostrozská n. Ves	240
11	Vel. Opatovice	60	30	Milokost	50
12	Brezová I + II	1000	31	Bzenec	200
13	Smržice	60	32	Vranovice	40
14	Hrdibořice	71	33	Míroslav	36
15	Klopotovice	30	34	Iván	30
16	Hrachovec	70	35	Hodonín	100
17	Roznov pod Radhostem	60	36	Mikulčice	70
18	Spesov - Borítov	35	37	Lednice	70
19	Troubky	90	38	Breclav	75

There are 58 important springs of natural mineral waters, the best known being the mineral waters in Luhacovice spa.

In the Slovak part of the Morava river basin groundwater resources are exclusively used for drinking water supply. Total exploitable groundwater resources are 2,177 l.s<sup>-1</sup> in quaternary gravel and sand in *Záhorská nížina*, 200 l.s<sup>-1</sup> in Artesian horizons of neogene sediments, 300 l.s<sup>-1</sup> in Mesozoic limestone-dolomite series of *Malé Karpaty* and 330 l.s<sup>-1</sup> in crystalline rocks.

Significant interactions between surface waters and groundwaters occur mainly along the rivers Morava and Myjava in the several hundred meters wide zone. During high water levels in rivers, the surface water moves to the groundwater collectors and in case of low levels this movement is opposite. Thus, the groundwater quality in these parts of the river basin is strongly dependent on the quality of surface water....

There are 26 springs of natural mineral or geothermal waters, the best known being the sulphite waters in Smrdáky, which are regarded as a world rarity from the balneological point of view.

In the Slovak part of the Morava river basin 237 springs with a yield exceeding 0,2 l.s<sup>-1</sup> are registered by the Slovak Hydrometeorological Institute.

### **Land use**

The Czech and the Slovak parts of the Morava river basin together have 2,9 million inhabitants, 2,7 million of whom live in the Czech and 0,2 million in the Slovak part of the river basin. The towns of Brno, Olomouc and Zlín-Otrokovice are the most urbanised areas in the catchment area. The population density in the Czech-Slovak part of the Morava river basin is about 117 inhabitants per km<sup>2</sup> (Czech part: 123 inhabitants per km<sup>2</sup>, Slovak part: 87 inhabitants per km<sup>2</sup>). Large cities are situated in the Czech part only. More than 50,000 inhabitants live in each of the six biggest towns (Brno, Olomouc, Zlín, Jihlava, Prostějov and Přerov). The Czech part of the river basin area is formed by 60% of agricultural land and by 30% of forests, the Slovak part is covered for 52% by agricultural land and for 35% by forests.

### **Use of water**

The surface water in the Morava river basin is used for drinking water supply (in the Czech Republic only), industry, irrigation, power generation, recreation and fishery. In the Czech part of river basin about 85% of the population are connected to drinking waterworks and 73% are also connected to the sewer system. In the Slovak part of the river basin 80% of the population are connected to drinking waterworks and about 40% to a sewer system. In the Slovak Republic groundwater resources are used exclusively for drinking water supply.

Information about withdrawal of surface waters in both parts of the river basin can be found in Table 3.

Table 3: Withdrawal of surface water in the Morava river basin.

	Withdrawals of surface water [m <sup>3</sup> .s <sup>-1</sup> ]				Amount of withdrawn surface water [10 <sup>6</sup> m <sup>3</sup> ]			
	CR		SR		CR		SR	
	1995	1996	1995	1996	1995	1996	1995	1996
drinking water	1,46	1,30	0,000	0,000	46,2	40,9	0,00	0,00
industry	4,97	4,98	0,116	0,087	156,6	156,9	3,65	2,75
agriculture	0,24	0,21	0,068	0,022	7,4	6,7	2,14	0,70
<b>Total</b>	<b>6,67</b>	<b>6,49</b>	<b>0,184</b>	<b>0,109</b>	<b>210,2</b>	<b>204,5</b>	<b>5,79</b>	<b>3,45</b>

## 5. Point Sources of Pollution

Table 4 shows the total load of selected determinands (tons.year<sup>-1</sup>) discharged from point sources of pollution to surface water in Morava river basin.

Table 4: Total load of pollution in 1995-96

Year	BOD <sub>5</sub> [tons.y <sup>-1</sup> ]		COD <sub>Cr</sub> [tons.y <sup>-1</sup> ]		TDS [tons.y <sup>-1</sup> ]		SS [tons.y <sup>-1</sup> ]		Q [10 <sup>6</sup> m <sup>3</sup> .y <sup>-1</sup> ]	
	CR	SR	CR	SR	CR	SR	CR	SR	CR	SR
1995	8900	817	22400	1937	-	22443	11100	873	256	21,6
1996	6628	706	23864	2525	53500	21097	10780	795	263	21,1

Notes: BOD<sub>5</sub> - biochemical oxygen demand  
 COD<sub>Cr</sub> - chemical oxygen demand  
 TDS - total dissolved solids  
 SS - suspended solids

In the Czech part 502 important point sources of pollution were registered in 1996. The most important point sources of pollution can be found in Table 5. In the Czech part of the river basin municipal waste water treatment plants with more than 30,000 PE and industrial waste water treatment plants with more than 500,000 m<sup>3</sup> waste water discharge in 1996 are registered.

Table 5: The most important point sources of pollution in the Morava river basin

	Source of pollution	Recipient	River km	Type of industry
	<b>Czech part of River Basin</b>			
1.	Brno	Svratka	39,08	municipal
2.	Olomouc	Morava	160,93	municipal
3.	Zlín	Drevnice	6,46	municipal
4.	Jihlava	Jihlava	139,56	municipal
5.	Prostejov	Valová	15,44	municipal
6.	Prerov	Becva	8,1	municipal
7.	Uherské Hradiste	Morava	88,18	municipal
8.	Třebíč	Jihlava	94,68	municipal
9.	Znojmo	Dyje	126,84	municipal
10.	Vsetín	Vs. Becva	17,5	municipal
11.	Sumperk	Bratr. potok (Desná)	0,003	municipal
12.	Kromeríz	Morava	120,616	municipal
13.	Hodonín	Morava	39,075	municipal
14.	Valasské Meziříčí	Becva	59,34	municipal
15.	Breclav	Dyje	23,815	municipal
16.	Precheza Prerov	Becva	10,52	chemical industry

17.	Jaderná elektrárna Dukovany	Jihlava - Mohelno	58,325	nuclear power station
18.	Kozeluzny Otrokovice	Drevnice	107,265	industry
19.	Gumárny Zubří	Roznovská Becva	7,209	rubber industry
20.	Deza Val. Meziříčí	Becva	59,425	chemical industry
21.	Technoplast Chropyně	Malá Becva	15,773	chemical industry
22.	Brněnské papírny Predklásterí	Svratka	77,99	industry
23.	San Valentino Bílá Voda	Brezná	18,55	textile industry
24.	Rudné doly Staré Město	Vrbenský potok	0,75	industry
25.	Morpa Jindřichov	Branná	5,6	paper industry
26.	Morpa Olsany	Morava	239,00	paper industry
27.	CKD Blansko	Punkva	0,65	engineering industry
28.	JIP PACK Přebyslavice	Jihlava	110,575	paper industry
29.	Díamo Geam Rožná	Rožínka	1,065	industry
30.	Díamo Geam Bukov	Bukovský potok	3,44	industry
31.	Elektrárna Hodonín	Morava	40,3	electric industry
32.	Fatra Napajedla	Morava	102,915	chemical industry
33.	Teplárna Přerov	Becva	11,47	industry
34.	Morpa Lukavice	Morava	214,6	paper industry
	<b><i>Slovak part of River Basin</i></b>			
1.	Slov. rybářský svaz	Kopčiansky kanál	7,3	water from ponds
2.	ZVL Skalica	Kopčiansky kanál	7,9	engineering industry
3.	ZS VAK Holíč	Kištor	4,5	municipal
4.	ZS VAK Myjava	Myjava	62,4	municipal
5.	ZS VAK Brezová pod Bradlom	Brezovský potok	7,7	municipal
6.	ZS VAK Senica	Teplica	1,6	municipal
7.	Slovenský hodváb	Teplica	1,8	chemical industry
8.	Bana Córy	Hádmaš	14,5	mine waters
9.	ZS VAK Rohozník	Rudávka	4,5	municipal
10.	Salvátor	Dolec	9,1	food industry
12.	ZS VAK Malacky	Bahno kanál	1,6	municipal
13.	ZS VAK Plavecký Štvrtok	Oliva	2,75	municipal
14.	VAK Devínska Nová Ves	Mláka	1,25	municipal
15.	Volkswagen	Mláka	1,5	engineering industry

In some cases, both in the Slovak Republic and the Czech Republic, industrial waste waters are transported by a municipal sewer system. They are treated and discharged to recipients together with municipal waste waters.

## **6. Surface Water Quality Monitoring**

Both in the Czech Republic and in the Slovak Republic surface water quality monitoring has been realised since 1963. The Czech Hydrometeorological Institute and the Slovak Hydrometeorological Institute are responsible for national monitoring and assessment of surface water quality.

There are 62 sampling sites in the Czech part and 17 sampling sites in the Slovak part of the Morava river basin. In addition to this national network, there is also a regional network in the Czech part, consisting of 85 sampling sites situated in reservoirs and on tributaries of reservoirs.

Surface water quality monitoring of the Czech Hydrometeorological Institute is completed with control profiles of the river basin administrator of the Morava river basin joint stock company. Some of the data are obtained within the national research projects and programmes. The polluters ensure monitoring of a revealed water outlet and a check is carried out by Czech Environmental Inspection.

Water samples are taken with a monthly frequency. A list of sampling sites can be found in Table 6.

Table 6: List of sampling sites in the Morava river basin

Name of sampling site	River	River km
<b>Czech part of River Basin</b>		
Morava - Hanusovice	Morava	325,3
Morava - Bohutín	Morava	310,0
Morava - Moravicany	Morava	272,8
Morava - Cernovír	Morava	237,0
Morava - Blatec	Morava	225,7
Morava - Kojetín	Morava	202,5
Morava - Kromeriz	Morava	193,0
Morava - Spytihnev	Morava	170,0
Morava - Nedakonice	Morava	152,0
Morava - Hodonín	Morava	108,0
Morava - Lanzhot	Morava	79,0
Branná - Hanusovice	Branná	1,7
Desná - Sudkov	Desná	1,8
Moravská Sázava - Rájec	Moravská Sázava	1,6
Třebuvka - Lostice	Třebuvka	4,3
Oskava - Unicev	Oskava	23,0
Oskava - Pnovice	Oskava	12,7
Bystrice - Mariánské údolí	Bystrice	10,0
Vset. Becva - Vsetín	Vset. Becva	77,0
Vset. Becva - Val.Mežiricí	Vset. Becva	64,7
Rozn.Becva - Val. Mežiricí	Rozn. Becva	4,2
Becva - Choryne	Becva	55,5
Becva - Troubky	Becva	1,8
Valová - Polkovice	Valová	4,0
Haná - Pod Vykovem	Haná	29,5
Haná - Bezmerov	Haná	1,8
Drevnice - Otrokovice	Drevnice	1,5
Olšava - Bojkovice	Olšava	37,9
Olšava - Kunovice	Olšava	2,5
Velička - Strážnice	Velička	3,8
Moravská Dyje - Písečné	Moravská Dyje	255,3
Dyje - Podhradí	Dyje	203,0
Dyje - Nad Znojmem	Dyje	132,7
Dyje - Pod Znojmem	Dyje	121,0
Dyje - Hevlín	Dyje	94,5
Dyje - Drnholec	Dyje	79,0
Dyje - Breclav	Dyje	26,8
Jevišovka - Jevišovka	Jevišovka	0,6
Svratka - Vír	Svratka	112,5
Svratka - Tišnov	Svratka	74,6
Svratka - Pisárky	Svratka	49,7
Svratka - Pod Brnem	Svratka	35,0
Svratka - Zidlochovice	Svratka	28,5
Svratka - Vranovice	Svratka	12,8
Svitava - Letovice	Svitava	60,0
Svitava - Obrany	Svitava	11,0
Svitava - ústí	Svitava	0,5
Litava - Zidlochovice	Litava	0,5
Jihlava - Batelov	Jihlava	170,3



Jihlava - Beranov	Jihlava	138,5
Jihlava - Vladislav	Jihlava	88,8
Jihlava - Mohelno	Jihlava	57,0
Jihlava - Ivancice	Jihlava	38,0
Jihlava - Ivan	Jihlava	3,5
Oslava - Námestí n. Oslavou	Oslava	34,8
Oslava - Oslavany	Oslava	2,4
Rokytná - Jaromerice	Rokytná	71,0
Rokytná - Ivancice	Rokytná	1,1
Trkmanka - Boretice	Trkmanka	14,5
Trkmanka - Podivín	Trkmanka	0,5
Kyjovka - Pod Kyjovem	Kyjovka	50,1
Kyjovka - Lanžhot	Kyjovka	12,0
<b><i>Slovak part of River Basin</i></b>		
Morava - Brodské	Morava	79,0
Morava - Moravský Ján	Morava	67,1
Morava - Gajary	Morava	44,5
Morava - Devínska Nová Ves	Morava	1,5
Myjava - Nad Myjavou	Myjava	67,8
Myjava - Pod Myjavou	Myjava	60,4
Myjava - Jablonica	Myjava	38,5
Myjava - Dojc	Myjava	23,9
Myjava - Kúty	Myjava	3,0
Brezovský potok - Osuské	Brezovský potok	1,7
Teplica - Nad Senicou	Teplica	7,5
Teplica - Pod Senicou	Teplica	0,8
Rudava - Malé Leváre	Rudava	4,1
Malina - Jakubov	Malina	19,6
Malina - Zohor	Malina	4,2
Zohorský kanál - Gajary	Zohorský kanál	23,9
Mláka - Pod Devínskou Novou Vsou	Mláka	0,5

In all water samples general determinands, trophic status determinands, organic pollution determinands and microbiological determinands are analysed. Sampling sites, of which samples are analysed for heavy metals and organic micropollutants, are chosen on the basis of specific conditions in locality.

Surface water quality is evaluated once a year according to Czech Technical Standard CSN 75 7221 and Slovak Technical Standard STN 75 7221. These national standards used for surface water quality classification are the same in both countries, because they had been adopted before the split of former Czechoslovakia.

In the Czech Republic the quality of waste waters is controlled in accordance with "Government Regulation No. 171/92 Coll.," regulating the indicators for a permissible degree of water pollution as amended by "Government Regulation No. 185/1996 Coll."

In the Slovak Republic the Slovak Technical Standard STN 75 7241 "Control of waste and special waters" is valid for the control of the amount and quality of waste waters discharged to surface waters. The indicators of the permissible water pollution level are given by the "Regulation of the Slovak Government No. 242 from 12<sup>th</sup> Oct. 1993".

In some Czech parts of the Morava river basin surface waters are eutrophic. Eutrophication processes may have an impact on the aquatic ecosystems (wetlands, branches of main streams, etc.). The main

sources of N and P compounds are agricultural activities in this region and municipalities (low percentage treatment effect in the wastewater treatment plants).

In some parts of the Slovak part of the river basin specific pollution by heavy metals from point sources (chemical and engineering industries) occurs.

## **7. Project Organisation**

The organisational structure of the project is illustrated in Annex 3.

The leading institutes for the pilot project are the Water Research Institute (Czech Republic) and the Slovak Hydrometeorological Institute (Slovak Republic).

In both countries the activities to be carried out under the pilot project will be realised by institutions participating in the process of monitoring and assessment of surface water quality. The workplan and the time schedule of the preparatory phase of the Morava River Basin Pilot Project are presented in the Annex 4.

The financial proposal of the preparatory phase of the Morava River Basin Pilot Project is presented in the Annex 5.

The project proposal for PHARE funding of Surveys and a contribution to funding of the workshops for the Morava River Basin Pilot Project is included as Annex 6 (Pilot project on strengthening of the Water-Quality Monitoring and Assessment of Transboundary Rivers in the Danube region).

## Annex 1: Memorandum of Understanding

### MEMORANDUM POROZUMENIA


#### MEDZI MŽP SR A MŽP ČR O SPOLOČNEJ ÚČASTI NA PILOTNOM PROJEKTE PRE OVERENIE SMERNÍC EHK OSN PRE MONITOROVANIE A HODNOTENIE HRANIČNÝCH TOKOV V POVODÍ MORAVY

Po rozdelení Československej federatívnej republiky v roku 1993 prechádza povodím Moravy štátna hranica medzi Českou republikou a Slovenskou republikou. Ministerstvá životného prostredia obidvoch strán uznali dôležitosť prehĺbenia spolupráce v oblasti životného prostredia v rámci Dohody medzi vládou Slovenskej republiky a vládou Českej republiky o spolupráci pri ochrane a tvorbe životného prostredia, podpísanej v Prahe dňa 29. októbra 1992 a Vykonávacieho protokolu k tejto dohode, podpísaného v Znojme dňa 12. apríla 1996.

V tejto súvislosti sa ministerstvá životného prostredia obidvoch strán dohodli na spolupráci pri overení „Smerníc pre monitorovanie a hodnotenie hraničných tokov“, vypracovaných pracovnou skupinou Task Force pri EHK OSN, v spoločnom pilotnom projekte „Povodie Moravy“. Okrem toho sa ministerstvá dohodli, že vytvoria spoločnú pracovnú skupinu expertov, ktorá vypracuje podklady pre realizáciu pilotného projektu a pre získanie finančného príspevku zo zdrojov PHARE prostredníctvom Environmentálneho programu pre povodie Dunaja. Podrobnosti dohodnutej spolupráce sú uvedené v prílohe, ktorá je neoddeliteľnou súčasťou tohoto memoranda.

Dané v Bratislave dňa 22. 7. 1998 v dvoch exemplároch v jazyku slovenskom a v dvoch exemplároch v jazyku českom, pričom obidve znenia majú rovnakú platnosť.

za Ministerstvo životného prostredia  
Slovenskej republiky

  
.....  
Ing. Ivan Zavadský  
generálny riaditeľ SOŽŽPaER

za Ministerstvo životného prostredia  
Českej republiky

  
.....  
Ing. Michael Barchánek  
náместník ministra ŽP a riaditeľ STOŽP

## **PRÍLOHA**

### **MEMORANDA POROZUMENIA**

#### **MEDZI MŽP SR A MŽP ČR O SPOLOČNEJ ÚČASTI NA PILOTNOM PROJEKTE PRE OVERENIE SMERNÍC EHK OSN PRE MONITOROVANIE A HODNOTENIE HRANIČNÝCH TOKOV V POVODÍ MORAVY**

Obidve strany sa dohodli, že pre potreby realizácie pilotného projektu „Povodie Moravy“ zahrňujúceho celé povodie, budú postupovať nasledovne :

- využijú všetky podklady z aktuálnych projektov a programov hradených zo štátnych prostriedkov, ktoré sú relevantné k uvedenému projektu
- zaistia monitorovanie a vyhodnotenie údajov podľa vyššie uvedených „Smerníc pre monitoring a hodnotenie hraničných tokov“ v troch základných profiloch rieky Moravy a v koncovom profile rieky Dyje
- pri monitorovaní v iných riečnych profiloch, iných ukazovateľoch a zložkách životného prostredia, ako sú obidvoma stranami pravidelne uskutočňované, budú tieto činnosti hradené z externých zdrojov (PHARE)
- poskytnú expertov k vyhodnoteniu údajov a vypracovaniu dielčích a záverečných správ pilotného projektu, vrátane potrebných úprav podľa požiadaviek medzinárodných koordinátorov
- pokryjú náklady na rokovania a prácu expertov a koordináciu pilotného projektu na národnej úrovni

## MEMORANDUM OF UNDERSTANDING

**between the Ministry of Environment of the Czech Republic and the Ministry of Environment of the Slovak Republic on the joint participation in the Pilot Project for the demonstration of the UN/ECE *Guidelines on water quality monitoring and assessment transboundary rivers* in Morava river basin**

After splitting up former Czechoslovakia in 1993 border between the Czech Republic and the Slovak Republic passes through the Morava river basin. The Ministries of Environment of both countries recognised the importance of intensified co-operation in the field of protection of environment in the framework of *Agreement between the Government of the Slovak Republic and the Government of the Czech Republic on co-operation on protection of the environment*, signed on October 29, 1992 in Prague and in the *Executive protocol of the Agreement*, signed on April 12, 1996 in Znojmo.

In continuity to this, the Ministries of Environment of both countries agreed on co-operation on demonstration of the *Guidelines of water quality monitoring and assessment of transboundary rivers*, drafted by Task Force under UN/ECE, in the common pilot project "Morava river basin". In addition, the Ministries agreed on creation of common working group of experts, which would prepare documents necessary for pilot project realisation and obtaining of financial support from PHARE through the Danube Environmental Programme.

Details on agreed co-operation are in the enclosed Annex, which is inseparable part of the Memorandum.

Bratislava, July 22, 1998

In two copies in Slovak language and two copies in Czech language with the same validity of both versions.

by the Ministry of Environment  
of the Slovak Republic

by the Ministry of Environment  
of the Czech republic

Ing. Ivan Závadský

Ing. Michael Barchánek

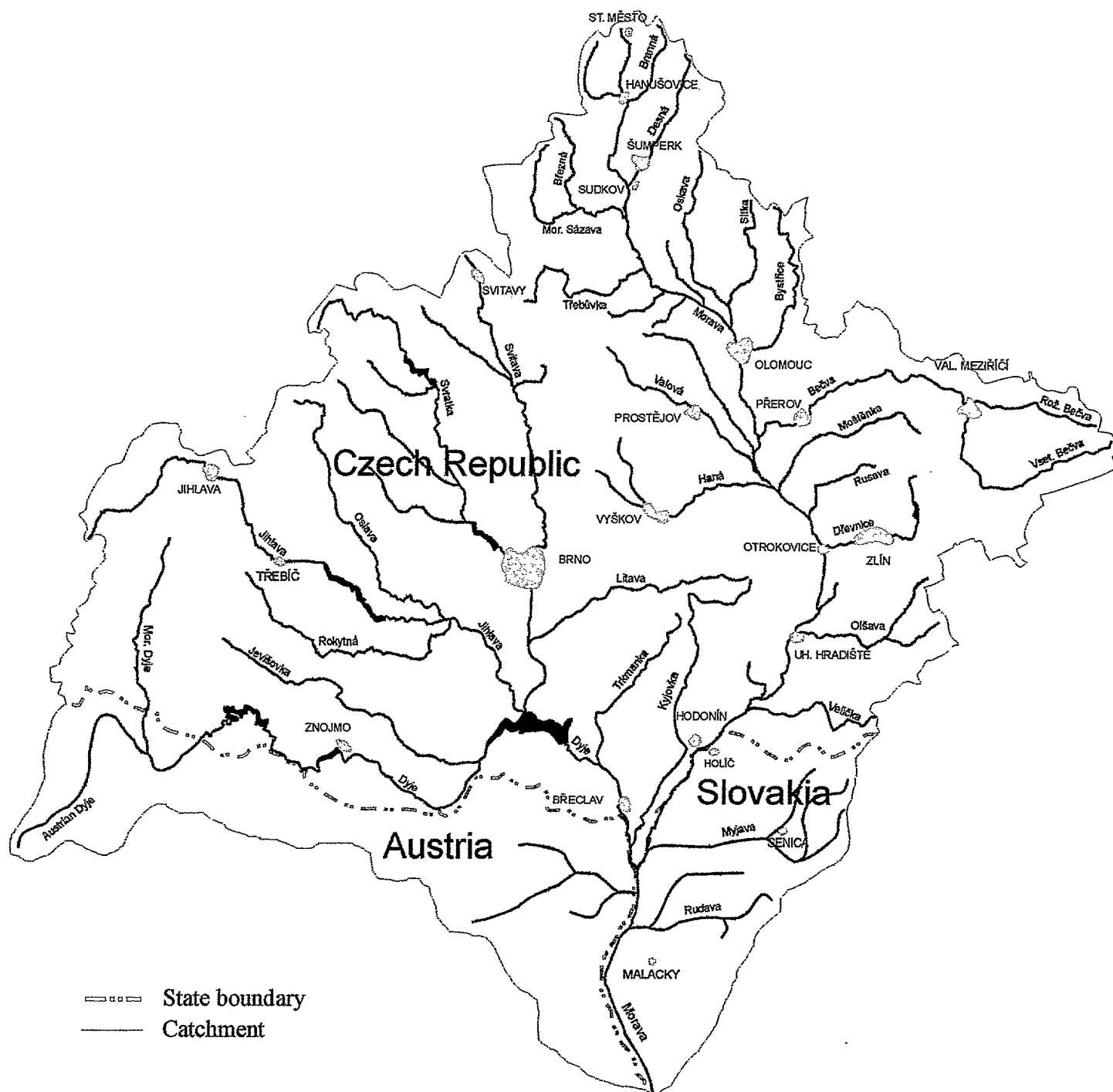
## **Annex of MEMORANDUM OF UNDERSTANDING**

**between Ministry of Environment of Czech Republic and Ministry of Environment of Slovak Republic on the common participation in the Pilot Project for the demonstration of the UN/ECE *Guidelines on water quality monitoring and assessment transboundary rivers* in Morava river basin**

Both countries agreed on the following approach in the realisation of Morava river basin Pilot Project, in which the whole river basin will be included:

- all available information relevant to the pilot project from actual projects and programmes funded from state budget will be used
- countries will ensure monitoring and assessment in accordance to the *Guidelines on water quality monitoring and assessment transboundary rivers* in three sampling sites on River Morava and at the last sampling site on Dyje River
- monitoring activities in the sampling sites, determinands and media which are not included in the current monitoring programme of both countries will be funded from external resources (PHARE)
- countries will provide experts to assessment and preparing partial and final reports of Pilot project, international co-ordinators requirements taking into account
- countries will be funding personnel costs of experts on the national level

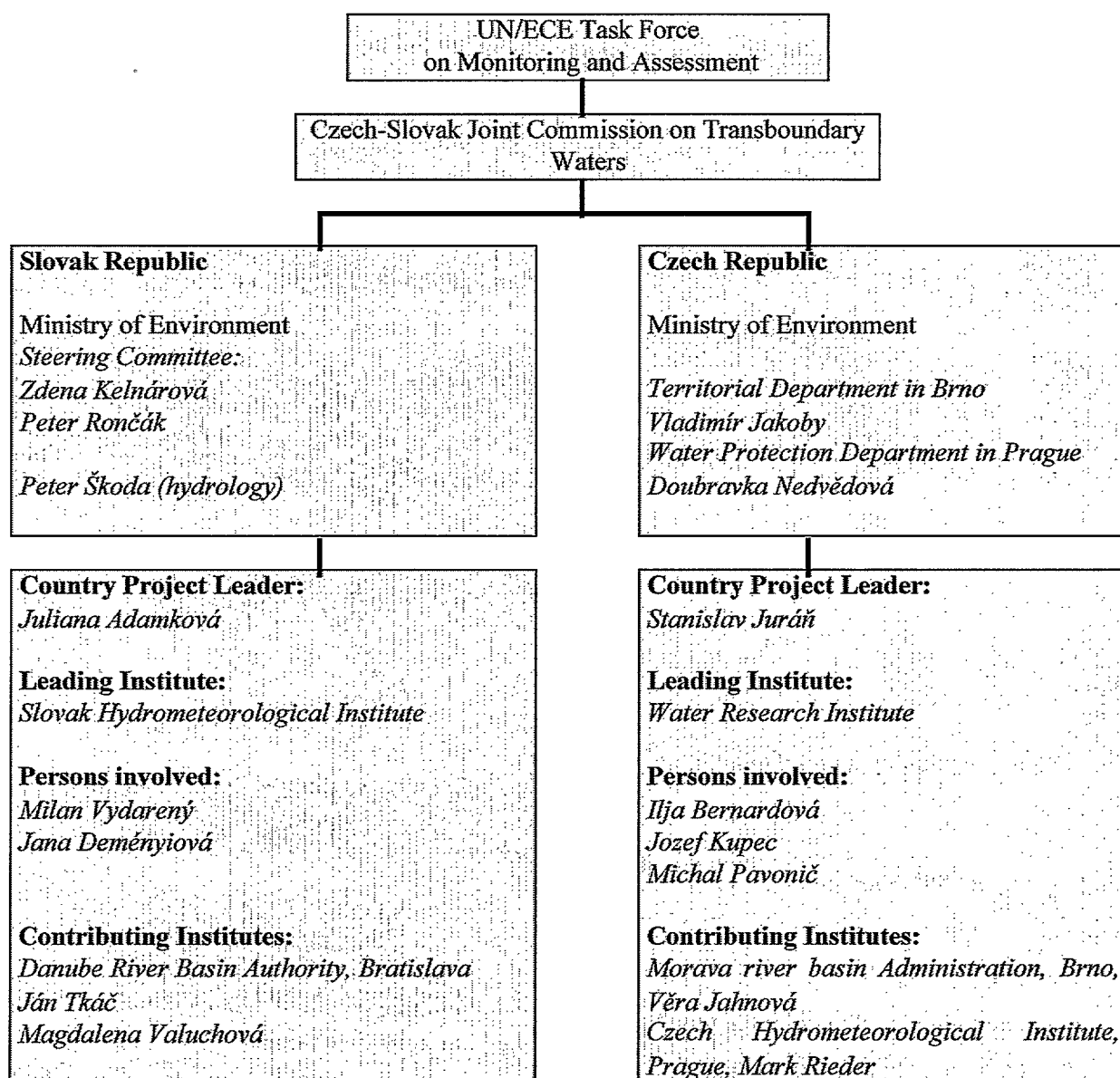
## Annex 2: Map of the Morava River Basin







### Annex 3: Project Organisational Structure





## Annex 4: Workplan for the Preparatory Phase of the Morava River Basin Pilot Project

### Workplan and time schedule of preparatory phase of Morava river basin

Task	Implementing Institution	Deadline	Result
<b>Inception Workshop</b>	CR: WRI SR: SHMI	12-13 November 1998	Workshop report
Inventory of the state of river basin	CR: WRI SR: SHMI + DRBA	December 1998	Draft Inventory report
Evaluation of legislation and regulations	CR: WRI SR: MoE	December 1998	Draft Legislation report of CR Draft Legislation report of SR
Synthesis of legislation reports	CR: WRI SR: SHMI	January 1999	Interim Report on Legislation and Regulation
Information needs specification	CR: WRI + MRBA + CHMI SR: SHMI	March 1999	Report No. 2: <i>Synthesis report</i> (summarising results of previous tasks)
<b>Synthesis Workshop</b>	CR: WRI SR: SHMI	April 1999	Workshop report
Surveys	CR: WRI + PHARE contractor SR: SHMI + PHARE contractor	October 1999	Report on surveys
Recommendations for improvement of current practices	CR: WRI + CHMI SR: SHMI + DRBA + WRI	November 1999	Report No. 3: <i>Recommendations for improvement of monitoring and assessment</i>
<b>Evaluation workshop</b>	CR: WRI + CHMI + MRBA SR: SHMI + DRBA + WR	December 1999	Recommendations report

Notes: WRI - Water Research Institute  
SHMI - Slovak Hydrometeorological Institute  
CHMI - Czech Hydrometeorological Institute  
DRBA - Danube River Basin Administration  
MRBA - Morava river basin Administration  
MoE - Ministry of Environment



## **Annex 5: Financial Proposal for the Preparatory Phase of the Morava River Basin Pilot Project**

### **The financial proposal of preparatory phase of Morava river basin.**

<b>Task</b>	<b>Implementing Institution</b>	<b>Manpower requirements in man days</b>	<b>Total costs [ ECU ]</b>	<b>Financial resources</b>
Inception Workshop	CR: WRI SR: SHMI			local + external local + external
Inventory of the state of river basin	CR: WRI SR: SHMI + DRBA	30 10	6000 2000	local local
Evaluation of legislation and regulations	CR: WRI SR: MoE	14 7	2800 1400	local local
Synthesis of legislation reports	CR: WRI SR: SHMI	3 3	600 600	local local
Monitoring and assessment needs specification	CR: WRI + MRBA + CHMI SR: SHMI	20 15	4000 3000	local local
Monitoring and Assessment needs analysis Workshop	CR: WRI SR: SHMI			local + external local + external
Surveys	CR: WRI + PHARE contractor SR: SHMI + PHARE contractor		36750 16550	external external
Recommendations for improvement of current practises	CR: WRI + CHMI SR: SHMI + DRBA	10 5	2000 1000	local local
Evaluation workshop	CR: WRI + CHMI + MRBA SR: SHMI + DRBA			local + external local + external

Notes: WRI - Water Research Institute  
SHMI - Slovak Hydrometeorological Institute  
CHMI - Czech Hydrometeorological Institute  
DRBA - Danube River Basin Administration  
MRBA - Morava river basin Administration  
MoE - Ministry of Environment



## **Annex 6: Project Proposal for PHARE Funding of Part of the Morava River Basin Pilot Project<sup>1</sup>**

**Draft project proposal PHARE (dd 14.03.97)**

**Pilot project on strengthening of the Water-Quality Monitoring and Assessment of Transboundary Rivers in the Danube region**

### **A. PROJECT AS A WHOLE**

- A.1. Problem description
  - Background and policy context
  - Problem description
  - Scope of project
  - Pilot river basins
- A.2 Wider objective
- A.3 Objective of the project
- A.4 Tasks for full implementation
- A.5 Expected results of the project as a whole
- A.6 Expected duration of the project as a whole

### **B. PREPARATORY PHASE**

- B.1 Objectives of the preparatory phase
- B.2 Tasks for the preparatory phase
- B.3 Expected results of the preparatory phase
- B.4 Duration of the preparatory phase
- B.5 Organisation of the preparatory phase
- B.6 Inputs to the preparatory phase

### **C. IMPLEMENTATION PHASE**

- C.1 First indication of duration and costs of the follow up.

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<sup>1</sup> This proposal was accepted under the Danube programme of PHARE for 200,000 ECU. Contrary to what is mentioned in paragraph B.6. of this proposal, it was decided that this budget should also include the Czech part of the Morava river basin pilot project.

## **A. PROJECT AS A WHOLE**

### **A.1. Problem description**

#### **A.1.1 Background and policy context**

In Europe, transboundary water pollution is increasingly recognised as an environmental problem of first priority. Recently, the European Union's environmental policy focuses on the protection of water resources as the main objective for following years, alongside with nuclear safety. Especially in Central and Eastern Europe water pollution is severe, also in the transboundary context. Notwithstanding emerging economies in the Central and Eastern Europe Countries (CEEC) cleaning up past and present pollution is a heavy burden on the pressured system. Financial and advisory support from the European Commission's PHARE and TACIS Programmes are recognised as essential for the development of a multi-country programme to enhance monitoring and assessment of river water quality.

The Central and Eastern European countries have a priority goal of joining the EU whose members are subject to extensive environmental legislation. In recognition of environment's role, the European Commission has developed a new strategy in cooperation with its CEEC partners to ensure that PHARE's programme fully support the approximation and pre-accession efforts in environment. As one of the main areas on which the PHARE environmental support will focus, was chosen the support to legislation and policy development, especially when focused on policies relating to implementation and enforcement and on approximation and EU integration.

Cooperation on transboundary riverbasins, which will be one of the cornerstones in the new Water Framework Directive of the EU, is also the basis of the UNECE Convention on Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 1992), which was ratified by the EU in September 1995 and entered into force at 6 October 1996. Under this Convention, the Parties bordering the same transboundary waters will have to set up joint or coordinated systems for monitoring and assessment of the conditions of transboundary waters, and set up coordinated or joint communication, warning and alarm systems. The clear objective of adequate monitoring and assessment systems and appropriate exchange and presentation of information is to prove that changes in the conditions of transboundary waters caused by human activity do not lead to significant adverse effects on flora and fauna, human health and safety, soil, etc. The exchange of information and the set up of agreed and adequate systems of water pollution control are basic principles of the management of a river basin in a transboundary context.

#### **A.1.2 Problem description**

Especially in Central and Eastern Europe, countries riparian to a river basin have to cope with serious problems in preparing common monitoring programmes. This mainly concerns the awareness of (and insight in) the environmental problems, the realisation of adequate monitoring infrastructure, comparability of data, and capacity building in a situation of institutional weakness. Countries have to agree on which information is relevant to indicate transboundary impacts; they have to analyse the issues in river basin management, to specify information needs and to select suitable indicators. Comparability of data has to be assured by common approaches in methodologies for monitoring and assessment and by quality control procedures for sampling, analytical work and data interpretation. Besides, countries have to find cost-effective practices which are economically feasible (sustainable), not only with respect to the investments to be made but even more concerning the operation and maintenance costs in the economic context of the countries.



### A.1.3 Scope of project

Under the UNECE Water Convention the Task Force on Monitoring and Assessment has drafted "Guidelines for Water-Quality Monitoring and Assessment of Transboundary Rivers". Designated experts from twenty countries, in cooperation with representatives of WMO, EEA/Inland Waters Topic Centre and Danube/MLIM subgroup agreed on these strategic guidelines, setting a code of practice for effective and efficient assessment of international river basins. The Guidelines were adopted by the UNECE Committee on Environmental Policy in June 1996. They are in line with the last developments concerning EU environmental legislation and include the monitoring of surface waters as well as effluents and early warning practices. Reference is made to:

- the Commission Proposal for a Council Directive Establishing a Framework for European Community Water Policy (latest draft of the EU Water Framework Directive, dated 04.12.96); the river basin approach as a characteristic feature.
- the Integrated Pollution Prevention and Control Directive (IPPC) (No. 96/61/EC); monitoring and assessment of emissions to the water environment, and self-monitoring of effluents.
- the recent discussions on the drafting of the EU Ecological Directive, which will now be included in the Water Framework Directive; ecological assessment of river basins

It is true that guidelines for monitoring and assessment in fact are a piece of paper. They need practical examples of river basins, where the applicability is proved and illustrated.

By that reason, in a three-year pilot project, under auspices of the before mentioned Task Force, the implementation of the guidelines will be demonstrated in a series of transboundary river basins in Central and East European Countries and New Independent States. For the selection of pilot projects, the Task Force has included the following criteria:

- The willingness of countries to implement the guidelines through a joint pilot project, acceptance of participation by experts from countries not riparian to the chosen water course and of those experts acting in advisory capacity.
- Existing (i.e. signed or ratified) bilateral or multilateral agreement(s) and established joint body(ies), which function at least on an interim basis.
- The existence of a pollution situation which is 'common' to many European watercourses rather than of a specific pollution problem. Moreover, a monitoring network should exist.
- The project should include the entire catchment area of a 'manageable' size, and at least cover the relevant parts of the country with the river source and the first downstream country. Rivers may cross the border (one component of the pilot project) or may form the border (second component of the pilot project).
- Participation of 2 or 3 countries riparian to that river. These countries should be represented in the task force (or should have made contributions to it).
- The workload should be reasonable (project duration 2-3 years) and has to be borne by riparian countries with financial/scientific support by possible donor organisations.

Eight river basins in CEEC and NIS were proposed by riparian countries to be included in the pilot project. Amongst these are four tributaries of the Danube, included in this project proposal:

- the Ipel/Ipoly between Slovakia and Hungary,
- the Mures/Maros between Romania and Hungary,
- the rivers Latorytsya/Latorica and Uz/Uh between Ukraine and Slovakia,
- the Morava between Czech Republic and Slovakia

Close cooperation with the Danube Environmental Programme is considered. The pilot projects will especially focus on the monitoring and assessment of the upper part of the tributaries (including the source area), laying emphasis on aspects as effluent monitoring, specification of information needs, selection of indicators, etc. The project is complementary with the Danube Environmental Programme, which programme was until now mainly directed to the monitoring of the main course of the Danube and the development of the accident emergency warning system.

#### **A.1.4 Pilot river basins**

##### **A1.4.1 Ipel/Ipoly (Slovakia/Hungary)**

###### *\* The existing situation*

The length of the Ipel/Ipoly river is almost 250 km, 150 km of which forms the border between Slovakia and Hungary. The river basin area is 5121 km<sup>2</sup>, from which 3650 km<sup>2</sup> belongs to Slovakia. River water is used for drinking water supply, industry and agriculture. Also recreation on the Ipel river is important; part of the basin is subject of nature protection. The Ipel river basin has more than 300,000 inhabitants, 60% of them rely on drinking water from the Ipel river.

The main problem is formed by the pollution from municipalities, agriculture and industries. Also the high variability of annual discharges forms a problem for the water management in the river basin.

Time series and statistical data of oxygen budget and nutrient parameters during the last decade indicate that the Ipel/Ipoly river is moderately polluted. The water quality has improved in case of some components (e.g. ammonium), mainly after 1990, likely due to the decrease of pollution load from point and diffuse sources. The information about pollution sources is limited. Only the major point sources are monitored for a restricted number of pollutants with insufficient sampling frequency. Serious discrepancy exists between ambient water quality monitoring and pollution source monitoring. Pollution load calculations (comparison of the loads in the Ipel/Ipoly and the loads of the monitored sources) show that the dominant part of the pollution is not measured at the discharge sites. During the previous ten years the characteristic frequency of accidental pollution cases was one per year. Oil pollution and activated sludge release were the typical causes of accidental pollution. In some cases with fish kills on Hungarian side the cause of the pollution could not be identified.

###### *\* Related projects*

In cooperation between Hungary and Slovakia the exchange of hydrological data and flood forecast is being improved. Investigation of the quality of sediments and biomonitoring has the objective to survey pollution of sediments in the Danube and main tributaries along the Austrian, Slovak and Hungarian section. The hydrological, biological and water quality monitoring system in Hungary and Slovakia is being improved, based on EU practices. In general, projects under the Danube Environmental Programme have as objectives the improvement of water quality in the Danube basin and the sustainable use of water.

###### *\* Major concerns*

The same shortcomings are felt in both countries: the monitored media is restricted to water and should be extended to bottom sediments, special pollution parameters, ecotoxicological and biological monitoring; the weakness of effluent monitoring; implementation of revised legislation; training for local experts and scarcity of financial resources. Also the slow data exchange (especially in case of emergency situations) and limited information on water uses has to be mentioned.

##### **A1.4.2 Mures/Maros (Romania/Hungary)**

###### *\* The existing situation*

The Mures/Maros river is a tributary of the Tisza river. The total length of the river on Romanian territory is 761 km; a 24 km long section forms the Hungarian-Romanian boundary. Downstream a 27 km long stretch is in Hungary. The area of the Mures/Maros river basin is 28310 km<sup>2</sup> on the Romanian territory.

In the river basin surface water resources are used for drinking water (for 2 million persons), industrial and agricultural water supply. Industrial and urban utilities are the two major polluters that

affect the quality of the river. Of those with effluent discharge permits, 20% are considered to be major pollutants. Pollution decreased since 1989, however is still significant.

The rivers are classified into three categories of water usability, plus an additional "beyond use" classification; along the Mures river no section is of "beyond use" category.

Within the Mures/Maros river basin, quantitative water resources management fulfils all the requirements.

In Romania a warning system for accidental pollution is in operation (SAPAROM), which provides a general framework for the operational management of Romanian surface water quality. It also includes a transboundary warning sub-system integrated with the transnational AEWS-Danube.

In the Hungarian part, water quality data over the last ten years of the oxygen budget, nutrients and metals indicate that the Maros is polluted. Actual water uses require improvement of the water quality of the river. The point pollution sources in the Hungarian part of the watershed discharge 10 000 m<sup>3</sup> waste water per day, mainly originating from municipal waste water treatment plants. The pollution load discharged along the Hungarian section has only a small impact on the water quality of the Mures/Maros.

During the past ten years five cases of serious accidental pollution occurred in the downstream section of the river. Main pollutants were ammonium, nitrate, oil, cyanide and heavy metals.

*\* Related projects*

Only some activities on the national scale in Hungary are relevant for the pilot project. The water quality management legislation is being improved on the basis of the river basin approach and the surface water monitoring system is being improved by EU practices.

*\* Major concerns*

Shortcomings in the existing situation need improvement: the monitored media is restricted to water and should be extended to bottom sediments, special pollution parameters, and biological monitoring; the weakness of effluent monitoring; implementation of revised legislation; training for local experts and scarcity of financial resources.

Also the slow data exchange (especially in case of emergency situations) and limited information on water uses has to be mentioned.

#### **A1.4.3 Latorytsa and Uzh /Latorica and Uh (Ukraine/Slovakia)**

*\* Existing situation*

The Latorytsa (with the Uzh river as its tributary) is a tributary of the Bodrog river in the Upper-Tisza region. Two third of the rivers Latorytsa and Uzh is located in Ukraine. The length of the Ukraine part of the Latorytsya is 145 km, while the Slovakian part is 55 km. The basin area is 3140 km<sup>2</sup>, of which 2900 km<sup>2</sup> in Ukraine. Total population is more than 700,000. The Uh river drains an area of 2600 km<sup>2</sup> with a total length of the main stream of 125 km, from which 21 km on the territory of Slovakia. At the border crossings with Slovakia the rivers Latorica and Uzh have mean annual discharges of 34 and 32 m<sup>3</sup>/s respectively.

The major water uses of Latorica and Uzh are industry, irrigation, recreation and water tourism. The major industries are machine building, metal processing, wood processing and paper mills; major agricultural sectors are animal raising, grain, vegetable and tobacco production. In both river basin areas on the Slovak territory sources of drinking water are located. However, these sources of groundwater are jeopardised by human activities in the region. The main sources of pollution are corrosive crude oil pipelines crossing the river basin, railway depots at the border and agricultural activities.

Although average water quality in the rivers Latorytsa and Uzh is in compliance with Ukraine norms, during seasons with scarce precipitation the content of heavy metals (copper, zinc, cadmium), oil and oil products, and phenols exceeds the maximum allowable concentrations. Besides, there is permanent threat of oil spills. River pollution with organic matter and nutrients is also an environmental concern. Some components of the water quality indicate the improvement of the surface water quality, mainly after 1990.

*\* Related projects*

The GEF project "Accident Emergency Warning System between Ukraine and the Slovak Republic", supported by USAID will provide Slovakia with technical equipments and software for early warning system in case of oil spills in the Latorica river. Furthermore there are some screening activities related to the groundwater quality aspects in this region.

*\* Major concerns*

Although the legislative system on different aspects of water management is rather developed in Ukraine, legislative issues of transboundary water courses require further development to approach the EU environmental legislation. River basin management is not enough established. Monitoring networks have to be optimised and equipment, analytical techniques, and quality assurance have to be improved.

In Slovakia major concerns include the implementation of revised legislation; the monitored media is restricted to water and should be extended to bottom sediments, special pollution parameters, and biological monitoring; effluent monitoring is weak; training for local experts and scarcity of financial resources. Improvement of bilateral cooperation between the countries on the field of accidental pollution caused by oil spills is required.

#### **A1.4.4 Morava (Czech Republic/Slovakia)**

*\* Existing situation*

The Morava River is one of the most important tributaries of the Danube River. The total area of the Morava River Basin is 26.658 km<sup>2</sup> of which approximately 8,4 % belongs to the Slovak territory and about 84 % to the Czech territory. The length of the border part of the river between the Slovak and Czech Republic is approximately 30 km. The downstream part of the Morava River creates a border between the Slovak Republic and Austria approximately 70 km in length until its confluence with the Danube River. The total length of the Morava River is 352 km.

The mean annual discharge at the downstream side is about 110 m<sup>3</sup>/s. There are 3 reservoirs in the Slovak part of the Morava river basin area with higher volume than 10<sup>6</sup> m<sup>3</sup>.

The region has high density of settlements (350 000 inhabitants on Slovak side). Fertile soil and climatic conditions give a basis for intensive agricultural activities. There are also significant forest areas within this territory.

Wetlands and flood-plain forests at the alluvial part of the Morava river basin are excellent attractive beauties for tourism. Wildlife and biodiversity of these habitats are great heritage for next generation to be protected.

Surface waters of Morava river can be classified as eutrophic waters with high content of nutrients. Eutrophication processes may have impact on the aquatic ecosystems. The main sources of nutrient compounds are municipalities (low percentage of waste water treatment plants) and agricultural activities in this region. Water-quality is also worsened last years by expanding food industries. Furthermore, pollution by heavy metals from point sources (textile and engineering industries) and agriculture practices is a permanent threat for aquatic ecosystems on the tributaries.

#### *\* Related projects*

Some research activities on the national scale are relevant for the pilot project. The Hydroecological Plan of the Slovak part of the Morava river basin is in a preparation (sustainable water management and water protection). This year a project started on the Morava/Dyje floodplane restoration.

#### *\* Major concerns*

Nowadays, only traditional chemical monitoring is applied in the Morava river basin completed by saprobic indices of bioeston. Monitoring activities should be concentrated also on the other subsystems of the ecosystem (sediment and biota). Furthermore, effluent quality monitoring does not cover information needs and objectives for decision making process. In this part ecotoxicological and biological procedures should be used as part of the monitoring activities. Data exchange, mainly in the case of accident situation, is completely missing as well as further information on water uses.

### **A.2 Wider objective**

The wider objective of this project is to give guidance to upgrading of the monitoring and assessment to perform adequate information for protection and use of transboundary river basins and to make results comparable with water quality objectives under EU environmental legislation. The scarce availability of funds requires the development of tailor-made strategies for monitoring and assessment which are feasible in the economic context of CEEC and NIS countries.

Bilateral and multilateral cooperation has consequently to lead to institutional strengthening and capacity building, both in national and international environmental monitoring and collaboration.

### **A.3 Objective of the project**

The objectives of this project are

- to demonstrate the application of the Guidelines on Water-quality Monitoring and Assessment of Transboundary Rivers in a series of river basins in CEEC and NIS,
- to promote and assist in the upgrading of the monitoring in accordance with the guidelines and
- to evaluate and improve the guidelines after the experiences with these pilot-projects.

### **A.4 Tasks for full implementation**

In the project four parts can be recognised as indicated below with their successive tasks.

#### **1. Preparatory phase**

##### **1.1 Inception**

- arrangement of agreements between countries upon cooperation in the project
- preparation of planning and funding of the project

##### **1.2 Monitoring and assessment analysis**

- inventory of available information concerning water quality issues of the river basin, and current practices for monitoring and assessment, including results of previous investigations
- preliminary surveys to obtain omissions in information
- specification of information needs and development of strategy for monitoring and assessment
- recommendations for improvement and cost estimate of improvements

## **2. Implementation phase**

### **2.1 Implementation**

- redesign of monitoring programmes
- implementation of the recommended improvements in methodologies
- procurement of missing equipment
- training of technical staff

### **2.2 Evaluation**

- evaluation of the upgraded situation
- recommendations for review of the guidelines on the basis of the findings of the pilot-project
- reporting

## **A.5 Expected results of the project as a whole**

The project will result in examples of effective and efficient monitoring and assessment of transboundary river basins. They will constitute an experienced Code of Practice for tailor-made monitoring in the economic context of Central and Eastern European countries.

## **A.6 Expected duration of the project as a whole**

The pilot-project started 1 January 1997.

The expected duration of the project is 3 years, and is scheduled as follows:

Phase 1: Preparatory Phase - 1,5 year

Inception and Monitoring and Assessment needs analyses;

Phase 2: Implementation Phase - 1,5 year;

Implementation of improvements and Evaluation.

## **B PREPARATORY PHASE**

The upgrading of the monitoring and assessment of a transboundary river basin should be based upon a careful specification of the information needs and on the development of adequate strategies for monitoring and assessment. As these tasks highly determine the contents of the follow up, a step wise approach is the best strategy for the project.

Note: The present project is limited to the preparatory phase, which is described below.

### **B.1 Objective of the preparatory phase**

The objective of the monitoring and assessment needs analysis is to review the water management problems and pollution situation of the river basin, to specify the information needs and to develop the strategy for monitoring and assessment in the international context. As the project should lead to a sustainable solution, the former should include an evaluation of the current practices, recommendations for cost-effective upgrading in the economic context of the countries concerned, and cost estimates for improvements (investment costs, operation and maintenance costs)

### **B.2 Tasks for the preparatory phase**

#### **Task 1 Project Inception**

Agreement between countries on cooperation, project planning, organisation and funds. Preparation of an Inception report giving a general description of the water management of the river basin and the monitoring practice.

#### **Task 2 Inventory**

Inventory the current situation of the river basin, based on available information, making optimal use of results of previous studies.

Inventory the state of the river basin water quality and the most important sources of pollution, for industries, land use and municipal wastes; prepare inventory of the use of fertilisers and pesticides in agriculture; identify the monitoring stations and assess their equipment for gathering samples; identify the laboratories for chemical and biological analysis, assess their equipment and the reliability of the generated data; identify procedures of quality assurance and quality control.

#### **Task 3 Review of legislation and regulations**

Identify the existing laws, regulations and standards in the riparian countries and evaluate their monitoring obligations; compare water quality regulations and standards in between the riparian countries as well as with the EC Directives.

#### **Task 4 Monitoring and assessment needs analysis**

Specify the information needs from analysis of the water management in the river basin; identify functions and human uses of the river basin, the issues and pressures and the water management policy; identify representative indicators for the water environment and methods of presentation of information that sufficiently support decision making processes in river basin management; identify the needs for early warning; prepare a monitoring and assessment strategy to cover in-stream water quality and effluents from major pollution sources; evaluate the existing cooperative arrangements.

**Task 5    Supplementary surveys**

Prepare a programme of surveys at hot spots and key locations, making optimal use of earlier surveys; analyse the water quality using chemical (incl. mass spectrometry screening techniques) and ecotoxicological methods; define from results of surveys the character of pollution and adequate indicative methods for monitoring and assessment of water quality.

**Task 6    Recommendations for improvement of current practice**

Evaluate the current situation of monitoring and assessment of surface waters and effluents; assess the existing technical possibilities and identify missing necessary equipment and methodologies if any; design the upgrading of the existing monitoring programmes, the methodology for sample collection and laboratory analysis; identify the needs for ensuring the information flow for the responsible institutions in the riparian countries; establish a rigid scheme for bilateral exchange of information between the responsible institutes. Specify recommendations for improvements of the existing monitoring practice, estimation of costs of investment and operation & maintenance costs of upgraded facilities.

**Task 7    Workshops/training**

Comprehensive workshops and trainings will be carried out to support project leaders and local staff involved in the preparatory phase, with knowledge on methodologies for specification of information needs and monitoring strategies and for plenary discussion of the results of the preparatory phase.

**B.3      Expected results of the preparatory phase**

The results of the preparatory phase will be a specification of the information needs which is relevant for the management of the river basin in the international context. This will be based on a review of the water management of the river basin (functions, problems and policy measures), inventories of available information on pollution sources, and surveys of hot spots in the river and in effluents.

A strategy for adequate monitoring and assessment will be presented (including water, sediments, biota; in-stream quality, effluents, early warning if necessary) including recommendations for improvements of the current practices. Additionally a cost estimate will be made of investments and operation & maintenance costs of implementation of improvements. This will finally lead to a proposal concerning further activities for the full implementation of the project.

**B.4      Duration of the preparatory phase**

The preparatory phase started in January 1997 by the countries on their own costs. It is designed to have a duration of 18 months and will be completed by the end of June 1998.

**B.5      Organisation of the preparatory phase**

For each of the four river basins the preparatory phase will be implemented in cooperation between the countries riparian to the river basin. The countries are responsible for the execution of the pilot project; national designated project leaders are responsible for the activities per river basin and for communication of the results.

A Steering Committee for each pilot river basin would have the task of giving broad guidance to the project, on priorities, approving terms of reference for tendering and workplans, and serving as liaison to solve matters of principle at the government level. The Steering Group would consist of high level representatives of the Governments of the participating countries, the national project leaders, as well



as representatives from the MLIM group, and the UNECE Task Force (for coordination with the other pilot projects).

A Core Group on pilot projects under the UN/ECE Task Force on Monitoring and Assessment will prepare and coordinate the pilot projects, will discuss the results of activities and will draft recommendations for improvement of the guidelines. For each pilot river basin the national project leaders will be involved in the core group. The Netherlands as lead country for the UNECE Task Force on Monitoring and Assessment, will provide the leading institution for the core group. Some international experts in advisory capacity will be involved, as well as representatives of international organisations (HELCOM, Danube MLIM group). If required the core group leader will visit national representatives to support the pilot projects, project organisation, coordination and management and organisation of meetings.

## B.6 Inputs to the preparatory phase

Personal and financial resources of the initial phase will partly be born by the riparian countries and the lead country of the UNECE Task Force. However, external support is required for some activities, concerning consultancy services and funding of workshops and travel expences as listed below per pilot river basin; except for the Czech part of the Morava River, which will fully rely on national resources.

### a. Tasks in preparatory phase

Tasks	1	2	3	4	5	6	7	Total
budget (in kECU) per pilot river-basin *)					40		20	60

\*) For the Morava river 50 % of budget is required (only Slovak part).

- Task 1 Project Inception
- Task 2 Inventories
- Task 3 Review of legislation and regulations
- Task 4 Monitoring and assessment needs analysis
- Task 5 Supplementary surveys
- Task 6 Recommendations for improvement
- Task 7 Training, workshops

### b. Steering Committee

The frequency of meeting of the Steering Group will be ones in 4 months.

The needed budget for meetings (travel, accommodation) is calculated of 20 kECU.

### c. Core Group activities

Core Group meetings will take place every 4 months. To save costs meetings will be combined as much as possible with scheduled workshops and training courses. Core Group leader will coordinate developments with national project leaders. For these activities 30 kECU (travel, accomodation) is required for the Danube pilots together.

#### **d. Programme Coordination Unit**

PHARE programme coordination and administrative support will be given by the Danube PCU in Vienna.

Summarized: The total budget needed for the Preparatory Phase of the pilot-project for the four Danube tributaries amounts 260 kECU.

### **C. IMPLEMENTATION PHASE**

#### **C.1 First indication of duration and costs of the follow up**

A proposal for the Implementation phase will be submitted in March 1998, based on the recommendations of the Preparatory phase.

The Implementation phase will have a duration of 18 months and is scheduled to start in July 1998.

First cost estimate of the Implementation phase: 200 kECU per pilot river basin.

Some additional remarks has to be given next to this estimate:

- the results of the preparatory phase will include a proper cost estimate of recommended improvements (investments and operation & maintenance costs);
- procurement of equipment is expected to be restricted, because of the substantial institutional strengthening under the PHARE and TACIS programme during last years.