
Groundwater Guidance

icpdr **iksd**

International
Commission
for the Protection
of the Danube River

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Kommission
zum Schutz
der Donau



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LIST OF USED ABBREVIATIONS

CIS – Common Implementation Strategy of the WFD
DG – Directorate General of the European Commission
DPSIR – Driver, Pressure, State, Impact and Response
DRB – Danube River Basin
DRBMP – Danube River Basin Management Plan
EC – European Commission
GIS EG – GIS Expert Group (of the ICPDR)
GW – Groundwater
GW-body – Groundwater Body or group of bodies of groundwater
GWD – Groundwater Directive (2006/118/EC)
GW TG – Groundwater Task Group (of the ICPDR)
MS – Member State
QA, QC – Quality assurance, Quality control
RBD – River Basin District
RBMP – River Basin Management Plan
RBM EG – River Basin Management Expert Group (of the ICPDR)
RTD – Research and Technological Development
TNMN – Transnational Monitoring Network
WFD – Water Framework Directive (2000/60/EC)
WG C – Working Group Groundwater (of the EC)

1. Groundwater Task Group and Scope of the Guidance

The contracting parties of the Danube River Protection Convention, EU Member States and non-Member States, committed to make all efforts to draw up a co-ordinated international River Basin Management Plan (RBMP) for the Danube River Basin and that the ICPDR should serve as a common platform for the implementation of the Water Framework Directive (WFD) on a basin wide scale. It is the coordinating platform for compiling the WFD ‘Roof Reports’, the Danube RBMPs and for compiling a joint programme of measures.

1.1. ICPDR Groundwater Task Group

During the data and information collection for the Roof Reports for the Danube River Basin many technical questions arose especially concerning the identification of transboundary GW-bodies of basin-wide importance, bilateral agreements and harmonisation of the activities. Member countries of the ICPDR stated their need for a Drafting Group Groundwater to deal with groundwater related issues of basin wide concern. The Groundwater Task Group¹ was established in 2004. Up to now, its main objective was the definition of criteria for the identification of transboundary GW-bodies of basin wide importance, the development of guidelines for the harmonised characterisation, the collection of that information, the drafting of the Roof Report on the risk assessment (Article 5 WFD), the collection of information on the groundwater chemical and quantity monitoring networks, the drafting of the Roof Report on monitoring (Article 8 WFD) and the drafting of the groundwater related chapters and annexes (including the collection of relevant data and information) for the Danube River Basin Management Plan 2009 (Article 13 WFD).

Currently there are two meetings a year on expert level, dealing with actual groundwater issues according to the workplan of the ICPDR. The Groundwater Task Group decided that a guidance document, summarising the particular groundwater related procedures according to the needs within the ICPDR framework should be prepared to further support cooperation within the Danube river basin.

1.2. Danube River Basin Management Plans (DRBMP)

River basin management plans and programmes of measures according to the WFD are developed at three levels in the DRB, which are:

1. Part A – International level, ‘Roof Reports’;
2. Part B – National level and/or Sub-basin level (for selected sub-basins e.g. Tisza, Sava, Prut, Danube Delta);
3. Part C – National level, covering data which are to be provided by Member States on request to the European Commission (EC).

As outlined in the strategic document on the *Development of the River Basin Management Plan in the DRB* (ICPDR document 101) the information increases in detail from Part A to Part B and to Part C. The content of the RBM Plan 2009 on the A-level is highlighting all relevant issues of basin-wide importance and is strongly based on findings and actions on the national/sub-basin level. The interrelation between the different levels is manifold and should be exploited in the best possible way

¹ [Groundwater Task Group at the ICPDR \(restricted area\)](#)

to achieve the objectives on all levels in the most efficient way. Adverse overlaps and duplication of work should be prevented.

The approach on the A-(basin wide) level must be complementary and inspirational to the national planning and implementation, and vice versa. To enable this approach in practice, visions and specific operational objectives (= management objectives) on the international scale are defined to guide the Danube countries towards a commonly agreed aim.

1.3. Scope of the Guidance

The guidance document should summarise the particular groundwater related procedures according to the needs within the ICPDR framework. It provides brief technical information on the characterisation and grouping of GW bodies and necessary explanation on monitoring parameters, aggregation procedures, data reporting including reporting frequencies, the presentation of status and information reporting on the programme of measures in order to contribute to a harmonisation of approaches within the DRB. Furthermore, the guidance documents the ways of data exchange towards the ICPDR TNMN Groundwater, either when fulfilling the WFD reporting requirements or when contributing to the Annual Yearbook.

A lot of work on harmonisation has already been done and is still needed in the coming years, which should be covered and assisted by the guidance. Within the Groundwater Task Group groundwater bodies of basin-wide importance have been identified, characterisation of groundwater bodies and monitoring have been coordinated and harmonised as well as status assessment and the joint programme of measures. Data and information relevant for the preparation of the reports required by the WFD have been collected and analysed and respective chapters for the reports have been prepared. Experiences and best practice have been exchanged and relevant discussions at European level have been followed.

Due to the ongoing process of the WFD and GWD implementation and due to the increase of knowledge in time, this guidance is intended as a living document being updated and completed according to the further development and agreements within the ICPDR Groundwater Task Group.

The guidance intends to contribute to the following issues of harmonisation:

- Bilateral coordination and bilateral agreements on approaches and principles in the transboundary GW-bodies. First steps have been initiated but there is a need for further refinements.
- The need of further harmonization concerning (the update of) the delineation of GW-bodies and the development of common conceptual models for each transboundary GW-body (as a whole).
- Need of further harmonisation within the revision of the risk assessment.
- Harmonisation of monitoring activities.
Differences in the implementation progress of the WFD in the Danube countries concerning groundwater quality and quantity monitoring were identified; Since the monitoring networks are already established according to national requirements a wide spectrum of approaches for the network design was applied. The monitoring frequency and the list of parameters might be more easily adaptable than the selection of monitoring points. Monitoring with regard to dependent terrestrial ecosystems and respective assessment criteria still needs further discussion.
- Need of coordination of status and trend assessment for transboundary GW-bodies.
Harmonization and coordination in the establishment of groundwater threshold values.
- Establishment of a data flow of groundwater data to the ICPDR and data exchange between the member countries sharing a transnational GW-body of basin-wide importance. At all stages emphasis should be put on QA and QC aspects.

The information in this document is based on already existing information: the outcome of working group meetings, results of the work of the Groundwater Drafting/Task Group, ICPDR documents and reports, CIS documents, the WFD and the GWD. Moreover, other documents dealing with transboundary groundwater issues were considered e.g. UN/ECE-Report on Guidelines on Monitoring and Assessment of Transboundary Groundwaters. Since the process within ICPDR is among others driven by the implementation of the WFD across Europe, some issues may also be discussed at the European Commission (EC) level in the Common Implementation Strategy (CIS) Working Group Groundwater (WG C) in parallel. Hence, respective results and other helpful information should be taken into account in this guidance.

The guidance document shall support the achievement of the underlying ICPDR visions for groundwater quality and quantity which are as follows:²

- The ICPDR's basin wide vision is that the emissions of polluting substances do not cause any deterioration of groundwater quality in the Danube River Basin. Where groundwater is already polluted, restoration to good quality will be the ambition.
- The ICPDR's basin wide vision is that the water use is appropriately balanced and does not exceed the available quantity of groundwater resource in the Danube River Basin, considering future impacts of climate change.

This guidance documents the results of the continuous harmonization process for groundwater at the ICPDR level in the Groundwater Task Group as well as the data and information exchange between the countries and the ICPDR. This guidance document also serves as a starting kit to get familiar with the work of the Groundwater Task Group already performed and the goals achieved.

² Significant Water Management Issues in the Danube River Basin District. [Final document](#) & [Annex 1](#)

2. Groundwater bodies at ICPDR level

2.1. The transboundary groundwater bodies of basin-wide importance

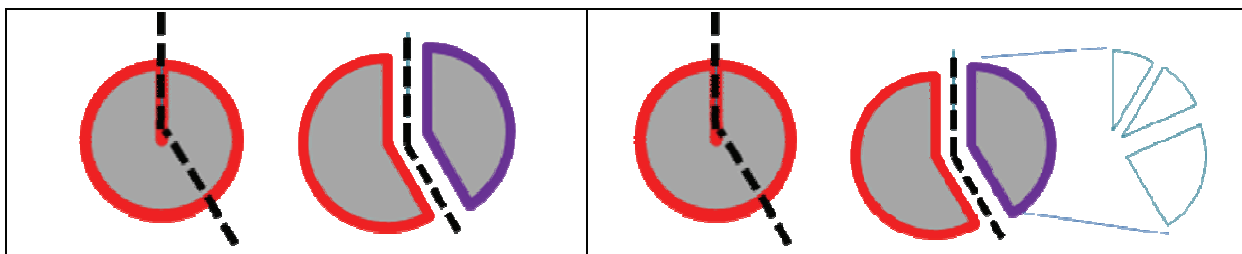
Already in 2002³ and 2003⁴ workshops were dealing with questions concerning GW-bodies of basin-wide importance to be dealt with at ICPDR level. An important recommendation of these workshops was the proposed set up of a Drafting Group “Strategy for the implementation of the WFD regarding transboundary groundwater issues”. Finally in 2004 on February 13 the 1st meeting of the Drafting Group ‘Groundwater’ of the RBM EG of the ICPDR took place in Vienna.⁵

The following criteria for the selection of GW-bodies at ICPDR level have been agreed:

- GW-bodies at ICPDR level are important transboundary GW-bodies in the Danube River Basin. They are defined as follows:
 - important due to the size of the GW-body which means an area > 4,000 km²;
 - or**
 - important due to various criteria e.g. socio-economic importance, uses, impacts, pressures, interaction with aquatic eco-system.
- The criteria need to be agreed bilaterally. This means although there are other GW-bodies with an area larger than 4,000 km² and fully situated within one country of the DRB, they are dealt with at the national level as they are not transboundary and not of basin-wide importance.
- The link between the GW-bodies of the ICPDR reports and the GW-bodies of the national reports is given by the national codes of the GW-bodies.
- The importance of groundwater sources for associated ecosystems is dealt with in the national reports.

The bilateral and partly multilateral discussions concerning the identification of GW-bodies of basin-wide importance lead to the following 11 nominated GW-bodies or groups of GW-bodies as listed in Table 1. The data presented in this table are in line with the data presented in the DRBM Plan 2009.

Transboundary GW-bodies of basin wide importance (ICPDR GW-bodies) are divided into national parts of ICPDR GW-bodies which can furthermore consist of a number of individual national GWBs. Only ICPDR GW-bodies and national parts of ICPDR GW-bodies are under the focus of the GW TG and TNMN Groundwater.



³ 1st Workshop on Identification, Characterisation and Monitoring of GW-Bodies for the Danube Countries, February 4-5, 2002 in Budapest.

⁴ 2nd Groundwater Workshop on the Implementation of WFD in the Danube River Basin, May 12 and 13, 2003 in Budapest.

⁵ Summary Report of the 1st Drafting Group Meeting

GWB-1	AT-1 & DE-1	GWB-9	SK-9 & HU-9	HU_sp.2.5.2 HU_p.2.5.2
ICPDR GW-body: Transboundary GW-body of basin-wide importance (e.g. GWB-1). ICPDR GW-bodies are divided into national parts of ICPDR GW-bodies (e.g. AT-1 & DE-1)		If the whole national part of an ICPDR GW-body (e.g. HU-9) consists of several individual national GW-bodies, it is called aggregated GW-body .		

Definitions

- **ICPDR GW-body:** Transboundary GW-body of basin-wide importance. Transboundary GW-bodies of basin wide importance (ICPDR GW-bodies) are divided into → *national parts of ICPDR GW-bodies*
- **National part of an ICPDR GW-body:** Whole part of an ICPDR GW-body which falls under the territory of a member country (e.g. HU-9). Such a GW-body can be identical with a single national GW-body (or a group of GW-bodies).
- **Aggregated GW-body:** If the whole national part of an ICPDR GW-body consists of a number of individual national GWBs (or groups of GW-bodies) it is called aggregated GW-body. The individual national GW-bodies (e.g.: HU_sp.2.5.2 + HU_p.2.5.2) need to be aggregated to an aggregated GW-body (HU-9) which forms the whole Hungarian part of the ICPDR GW-body GWB-9.
- **Group of GW-bodies:** Groundwater bodies can be grouped according to Annex II of the WFD (e.g. for the purpose of characterisation, monitoring and status assessment).

Table 1: Nominated transboundary GW-bodies or groups of GW-bodies of basin-wide importance in the DRBD

CODE/NAME	MS_CD	Size (km ²)	National size (km ²)	Aquifer characterisation		Main use	Overlying strata	Criteria for importance	bilaterally agreed with
				Aquifer Type	Confined:				
1: Deep Groundwater Body – Thermal Water	DEGK1110	5,900	4,250	K	Yes	SPA, CAL	100 – 1000	Intensive use	AT, DE
	ATGK100158		1,650						
2: Upper Jurassic – Lower Cretaceous GWB	BG1G0000J3K0511	24,465	13,034	F, K	Yes	DRW, AGR, IND	0–600	>4000 km ²	RO, BG
	RO_DL06		11,427						
3: Middle Sarmatian - Pontian GWB	ROPR05	21,626	11,964	P	Yes	DRW, AGR, IND	0 –150	>4000 km ²	MD, RO
	MDPR01		9,662						
4: Sarmatian GWB	RODL04	5,486	2,178	K, F-P	No	DRW, AGR, IND	0–60	>4000 km ²	BG, RO
	BG1G00000N1049		3,308						
5: Mures/ Maros	RO_MU20 RO_MU22	7,699	2,710	P	No/ Yes	DRW, IRR, IND	2–30	Important GW resource, protection of DRW res.	RO, HU
	HU_sp.2.13.1 HU_p.2.13.1 HU_sp.2.13.2 HU_p.2.13.2		4,989						
6: Somes/	RO_SO01 RO_SO13	2,475	1,440	P	No/ Yes	DRW, IRR	2–30	Important GW	RO, HU

	HU_sp.2.1.2 HU_p.2.1.2 HU_sp.2.3.2 HU_p.2.3.2		1,035						
7: Upper Pannonian – Lower Pleistocene/ Vojvodina/ Duna-Tisza köze deli r.	ROBA18	29,012	11,408	P	Yes/ Yes/ No	DRW, AGR, IND, IRR	0–30, 4–190, 2–125	> 4000 km ² , GW use, Important GW resource, protection of DRW res.	RO,RS, HU
	RS_TIS_GW_I_1 RS_TIS_GW_SI_1 RS_TIS_GW_I_2 RS_TIS_GW_SI_2 RS_TIS_GW_I_3 RS_TIS_GW_SI_3 RS_TIS_GW_I_4 RS_TIS_GW_SI_4 RS_TIS_GW_I_7 RS_TIS_GW_SI_7 RS_D_GW_I_1 RS_D_GW_SI_1		10506						
	HU_sp.1.15.1 HU_p.1.15.1 HU_sp.1.15.2 HU_p.1.15.2 HU_sp.2.11.1 HU_p.2.11.1 HU_sp.2.11.2 HU_p.2.11.2 HU_sp.2.16.1 HU_p.2.16.1		7,098						
8: Podunajska Basin, Zitny Ostrov / Szigetköz, Hanság- Rábca	SK1000300P SK1000200P	3,363	2,211	P	No	DRW, IRR, AGR, IND	2–5	Important GW resources, protection drinking water	SK,HU
	HU_sp.1.1.1 HU_p.1.1.1 HU_sp.1.1.2 HU_p.1.1.2		1,152						
9: Bodrog	SK1001500P	2,216	1,466	P	Yes	DRW, IRR	2–10	Important GW resource	SK, HU
	HU_sp.2.5.2 HU_p.2.5.2		750						
10: Slovensky kras / Aggtelek-hgs.	SK200480KF	1,090	598	K,F K	Yes/ No	DRW, OTH	0–500	Protection of drinking water resources, GW depend. ecosystems (springs, caves)	SK, HU
	HU_k.2.2		492						
11: Komarnanska Vysoka Kryha / Dunántúli-khgs. északi r.	SK300010FK SK300020FK	3,811	250 313	F,K	Yes/ No	DRW, SPA, CAL	0–2500	Thermal water resource	SK, HU
	HU_k.1.2 HU_kt.1.2 HU_k.1.4		3,248						

[Source/Status: DRBM Plan 2009]

*) The different national parts don't show a unique assessment.

Description

CODE/NAME	GWB code which is a unique identifier. Name of the transboundary groundwater body.
MS_CD	Member State Code –Codes of individual national GW-bodies. (Starting with the 2-digit ISO-Code of the member country)

Size: km²	Whole area of the transboundary GW-body covering all countries concerned in km ²
National size: km²	Each country indicates the size on the national territory in km ²
Aquifer characterisation	[Aquifer Type: Predom. P = porous/ K = karst/ F = fissured] Multiple selections possible: Predominantly porous, karst, fissured and combinations are possible. Main type should be listed first. [Confined: Yes / No]
Main use	[DRW = drinking water / AGR = agriculture / IRR = irrigation / IND = Industry / SPA = balneology / CAL = caloric energy / OTH = other] Multiple selection possible.
Overlying strata	Range in metres. Indicates a range of thickness min, max in metres.
Criteria for importance	If size < 4 000 km ² criteria for importance of the GW body have to be named and bilaterally agreed upon.
Bilaterally agreed with	Country which has been bilaterally agreed with has to be indicated, 2-digit ISO-Code of the country

As the Groundwater Guidance is a living document this table will be updated regularly, in line with the elaboration of DRBM Plans.

For the next RBM plan period (2015–2021) it should be considered to allow for a new category of confined: ‘partly’.

3. Characterisation and Risk Assessment (review of impacts of human activity on the status)

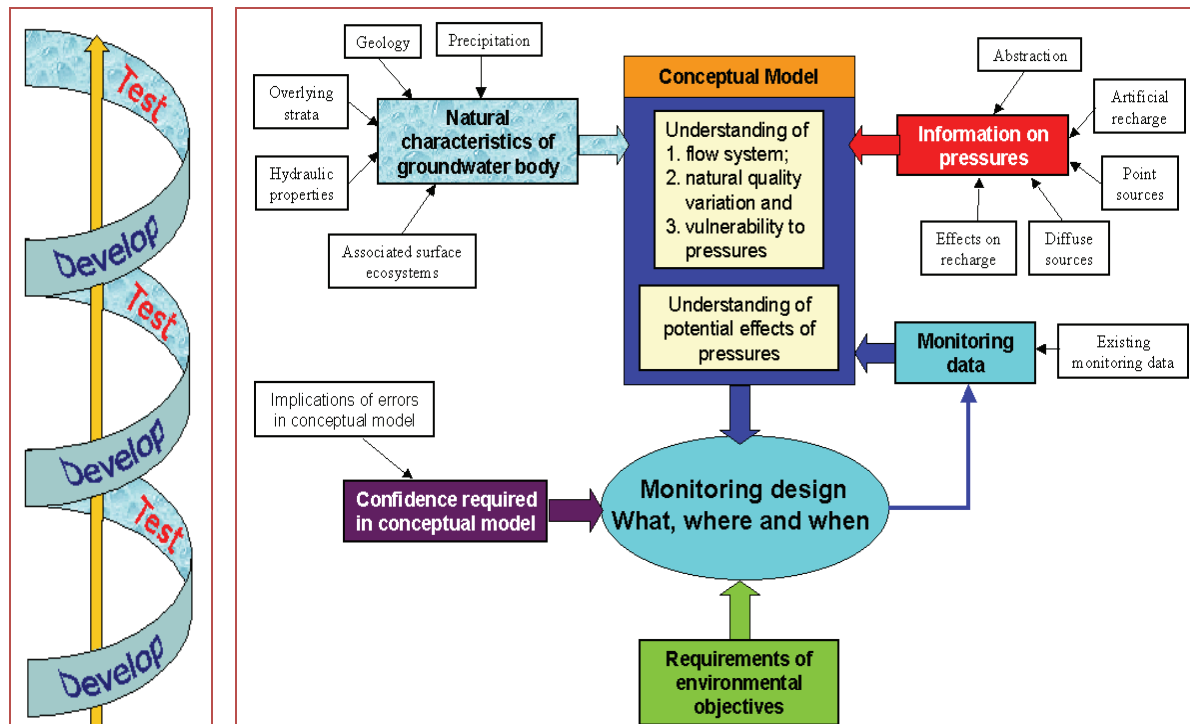
Article 5 of the WFD requires the characterisation of each RBD and a review of the impact of human activity on the status of surface waters and on groundwater, as well as an economic analysis of water use, has to be undertaken. Detailed specifications are laid down in Annex II of the WFD where specific provisions concern those bodies of groundwater which cross the boundary between two or more Member States, focusing mainly on quantitative aspects such as the location of groundwater abstraction points serving more than 10 m³ a day or more than 50 persons, the abstraction rates, direct discharges to groundwater etc.

3.1. Risk of failure to reach the environmental objectives (overview)

The groundwater risk assessment is part of the characterisation and the review of the impacts of human activity on the status of groundwater. For each GW-body the degree to which it is at risk of failing to meet the objectives under Article 4 WFD has to be assessed. If the GW-body fails to meet the environmental objectives, or is at risk of failing to meet the objectives by 2015, then the cause of this failure (i.e. the pressure or combinations of pressures) must be investigated.

The Driver, Pressure, State, Impact and Response (DPSIR) analytical framework is widely-used. Possible approaches for groundwater risk assessment combine pressure data, vulnerability information and monitoring data. The assessment of whether a pressure on a GW-body is significant must be based on the knowledge of the characteristics of the GW-body and the pressures within the catchment area: a kind of conceptual understanding/model. There must be some knowledge that a pressure may cause an impact because of the way the catchment system functions. Such a conceptual model (see Figure 1) is the basis of the monitoring network design and it is subject to regular revision, validation and improvement depending on the increase of knowledge (e.g. by the obtained monitoring data) and depending on the need of further improvement to properly understand the system.

Figure 1: Conceptual model / understanding



[Source: Guidance Document No. 7: Monitoring under the WFD (2003)]

3.1.1. Approach for the risk assessment on groundwater

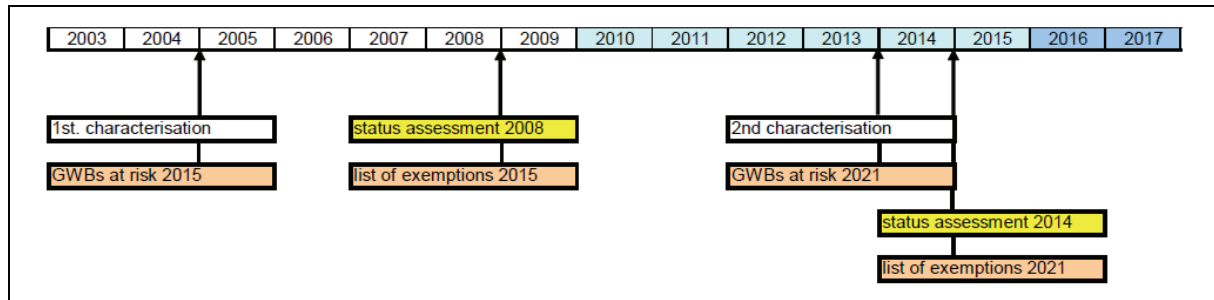
The risk assessment is performed on national criteria both for quality and quantity. Hence the approaches are different. As a consequence the result of the risk assessment may differ for the national shares of a transboundary GW-body of basin-wide importance. At EU level a technical report⁶ (workshop report) has been elaborated summarizing the elements of the general approach for the analysis of pressures and impacts and tools to assist and contributing to a harmonization of approaches and procedures.

Within the first WFD planning cycle (2009–2015) a review of risk assessments is to be performed by December 2013 and thereby prepare for the second cycle of river basin management starting in December 2015, as noted in Figure 2. A recently developed guidance⁷ from CIS WG C describes the generic elements of risk assessment, the use of conceptual models and their specific implementation for groundwater under the WFD.

⁶ [Groundwater Risk Assessment. Technical report on groundwater risk assessment issues discussed at the workshop of 28th January 2004.](#)

⁷ [Guidance on Risk Assessment and the Use of Conceptual Models for Groundwater.](#)

Figure 2: Implementation of the WFD–timetable 1st and 2nd cycles



The main components of the methodologies for assessing the risk of failure to achieve good **chemical status** are the available monitoring data on water quality, data on existing pressures and possible impacts, data on the overlying strata of the GW-bodies and the corresponding vulnerability of the aquifer. Derived from the available data the evaluation can be carried out e.g. in a stepwise approach by using threshold values for each of the criteria and expert knowledge. However, the risk assessment methods are rather country specific and range from using combinations of the above mentioned data sets to focusing on interpreting water quality data.

The assessment of the risk of failure to achieve good **quantitative status** concentrates on the evaluation of changes in groundwater levels and estimating the available water resources taken into account information on groundwater abstraction. Being “at risk” is mainly defined by a threshold ratio of annual withdrawal rate and exploitable groundwater amounts. Hydrogeological and mathematical models are also used for assessing the risk by some countries.

3.2. Procedures for data provision and data exchange – Characterisation and Risk

According to the stratified approach of 3 level reports which supplement each other, the content of the “WFD Roof Report 2004” (Part A (basin-wide) level under Article 5 WFD) is intended to give relevant summary information on the characteristics and the review of impacts for the selected transboundary GW-bodies of basin wide importance (see Table 1). Detailed information is to be found in the Part B (national level) reports.

In order to fulfill the requirements and receive harmonized data on characterisation, templates for reporting on GW-bodies were prepared and discussed at the 1st meeting of the Drafting Group ‘Groundwater’ of the RBM EG of the ICPDR.⁸

The information for the initial characterisation (including risk information) of the transboundary GW-bodies was collected and presented via Table 3 (in the Annex) and information on further characterization was collected and presented via Table 4 (in the Annex).

⁸ [1st Meeting of the Drafting Group Groundwater of the River Basin Management Expert Group of the ICPDR on February, 13 2004 in Vienna](#)

4. Status, Impacts, Significant Pressures and Measures

According to the stratified approach of 3 level reports which supplement each other (see chapter 1.2), the content of the “DRBM Plan 2009” is giving relevant summary information on the status of the GW-bodies, the description of the methodologies applied for the assessment of status of the selected transboundary GW-bodies of basin wide importance (see Table 1), information on the related impacts on these GW-bodies, the significant pressures causing poor status and the measures implemented in order to reach good status by 2015. Detailed information is to be found in the Part B (national level) reports.

In order to comply with these requirements and by considering the reporting sheets developed by the EC, the GW TG discussed about the scope and the details of reporting, about harmonising the provided information and on templates that should be used for information collection and exchange within the group.

4.1.1. Groundwater status presentation

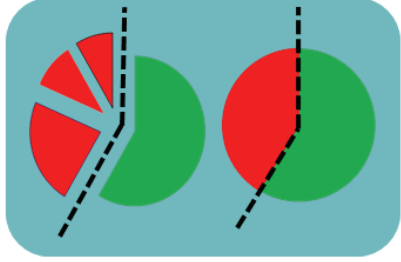
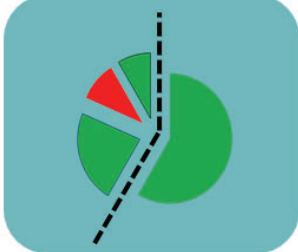
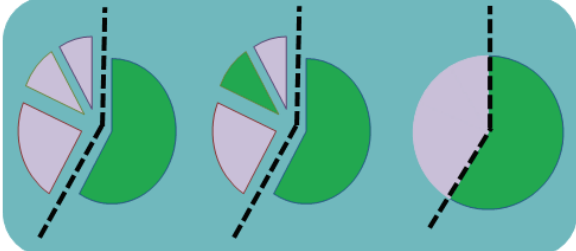
As decided by the GW TG, the result of the status assessment is solely to be provided for the whole national part of an ICPDR GW-body.

If a national part of an ICPDR GW-body consists of several individual national-level GW-bodies then the poor status of only one national-level GW-body is decisive for characterising the whole national part of an ICPDR GW-body in poor status.

4.1.2. Confidence in the status presentation

At the 7th Meeting of the GW TG in October 2008 the issue of confidence was intensively discussed. Based on the comment that confidence in status assessment is not being requested in the relevant WFD reporting sheets, it was decided to report on the confidence in **status presentation** for the **whole national part** of an ICPDR GW-body.

Regarding the level of confidence of groundwater status presentation at ICPDR level the following procedure is foreseen. It considers that national parts of ICPDR GW-bodies might consist of either one national GW-body (or a group of GW-bodies) or aggregated GW-bodies (national GW-bodies or groups of GW-bodies). Confidence is indicating the (in)homogeneity of the status within an aggregated GW-body.

<p>High confidence</p> <ol style="list-style-type: none"> 1.) Status assessment is based on WFD compliant monitoring data. 2.) If the national part of an ICPDR GW-body (the aggregated GW-body) is formed by more than one GW-body or groups of GW-bodies, all have the same status. 	
<p>Medium confidence</p> <ul style="list-style-type: none"> - If the national part of an ICPDR GW-body is formed by more than one GW-body or groups of GW-bodies, the status assessment is based on WFD compliant monitoring data and not all have the same status. 	
<p>Low confidence</p> <ul style="list-style-type: none"> - Status assessment is based on risk assessment data. 	

 Poor status
  Good status
  Risk

[Status of discussion: 7th Meeting of the GW TG in October 2008]

4.2. Procedures for data provision and data exchange

In order to fulfil the requirements for the preparation of the DRBM Plan 2009 and to collect harmonized data, a series of templates was developed and discussed within the GW TG.⁹

In addition to the templates prepared by the GW TG, the GIS Expert Group also elaborated GIS templates for data collection which were provided for download at <http://www.danubegis.org> under “Template Tools”. The templates relevant for collecting data and information on GW-body characterisation, pressures, impacts, status and exemptions are called ‘GWBody’ and ‘GWBodyAggr’ and are attached to this guidance in the Annex. The detailed content of the templates is explained in the related code list. The templates need to be submitted to DANUBIS by the national GIS experts in close cooperation with the groundwater experts (GW TG members) who are mainly responsible for the groundwater related content. The collection of data via the GIS templates allows for automatic display of the data in the maps of the DanubeGIS and for the preparation of the maps used in the ICPDR reports.

4.2.1. Methodology applied for status assessment

The information on the methodology applied for the assessment of the status of the transboundary GW-bodies was collected via Table 5 (in the Annex). The collected information is presented in the DRBM Plan 2009 as Annex 9.

⁹ 6th [Meeting of the Groundwater Task Group, April, 10/11 2008 in Vienna](#)

4.2.2. Status of groundwater bodies and impacts

The information on the chemical and quantitative status of the transboundary GW-bodies and the impacts was collected via Table 6 (in the Annex). The collected information is presented in the DRBM Plan 2009 as Annex 11.

4.2.3. Significant Pressures and Measures

The information on the significant pressures and the measures established in the transboundary GW-bodies was collected via Table 7 and Table 8 (in the Annex). The collected information is presented in the DRBM Plan 2009 as Annex 11.

4.3. Data gaps – Differences – Need for harmonisation

As data collection for the first WFD reporting cycle (ICPDR Roof Report under Article 5 and Article 8 and the DRBM Plan 2009) happened the first time and such data on groundwater has never been collected in the Danube River Basin before, differences in the progress of WFD implementation in the Danube countries have become obvious. Danube countries used a broad spectrum of different approaches for the delineation of GW-bodies, their characterisation, for the assessment of the risk of failure to reach good status, for the establishment of threshold values and for the status assessment. An analysis would be helpful to check for differences in the national approaches in order to further harmonise the different methods.

Data gaps and inconsistencies have become apparent in the underlying data resulting in uncertainties in the interpretation of the data. In addition, some countries have identified the need to expand the current monitoring networks to include monitoring stations along the national borders, where transboundary GW-bodies are located. In some cases, countries have assessed the need to adapt their current monitoring programmes to collect better information on water quality and quantity.

This entails the need for intensive bi- and multilateral co-operation to achieve a harmonisation of data sets for transboundary GW-bodies. In addition, the interactions of groundwater with surface water or directly dependent ecosystems would need further attention.

At the moment no harmonised system for coding of the different layers of GW-bodies is available. The aspect of different groundwater horizons needs further discussion and clarification.

On the homepage of the ICPDR the detailed results of the data collection for the preparation of the WFD Reports are accessible under the following address: http://www.icpdr.org/icpdr-pages/river_basin_management.htm.

5. TNMN Groundwater

The development of the “Transnational Monitoring Network” (TNMN) of the ICPDR within the last 15 years was exclusively focussing on surface waters. Hence, the network as well as the monitoring and reporting procedures are already well established for surface waters.

The transnational groundwater management activities in the Danube River Basin District started in February 2002 and were triggered by the WFD. Finally 11 transboundary GW-bodies (Table 1) were identified as being of basin-wide importance. Monitoring of these selected GW-bodies is now decided to be an integral part of the TNMN.

For groundwater monitoring under the TNMN a six-year reporting cycle is foreseen, which is in line with the reporting requirements under the WFD. The TNMN has to meet the requirements of the WFD and the ICPDR. Monitoring networks should be at high standards.

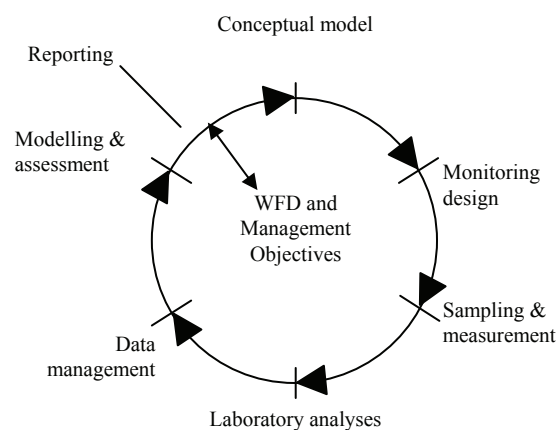
Regarding the WFD, reporting on the monitoring network is foreseen according to Article 8 and the results of monitoring are essential components within the RBMP. The monitoring programme includes both quantitative and chemical (quality) monitoring and shall provide the necessary information to assess groundwater status, to identify trends in pollutant concentrations, to support GW-body characterisation and the validation of the risk assessment, to assess whether drinking water protected area objectives are achieved and to support the establishment and assessment of programmes of measures and the effective targeting of economic resources. According to the WFD, monitoring programmes meeting these requirements must have been operational by 22 December 2006 at the latest.

Monitoring follows a cyclic procedure and each step in this process needs proper attention and the consideration of integrated and verifiable quality assurance and quality control in order to produce reliable and comparable monitoring data.¹⁰

Monitoring results reported to ICPDR will be the basis for the preparation of the TNMN Yearbook and furthermore the basis for the development of a joint Programme of Measures within the DRBMP.

Since the joint groundwater activities within the TNMN are in an initial implementation phase, further efforts for the harmonisation of monitoring are still needed. Main emphasis is to be put on:

- Development of conceptual models of GW-bodies.
- Achievement of harmonised monitoring networks.
- Establishing of criteria for the selection of parameters



¹⁰ [Guidance Document No. 15: Groundwater Monitoring. \(2007\).](#)

5.1. Monitoring strategies and network design

To design the monitoring network different criteria have been applied by the countries to select appropriate sites. Important criteria are aquifer type and characteristics (porous, karst and fissured, confined and unconfined groundwater) and the depth of the GW-body since deep GW-bodies are more difficult and costly accessible than shallow GW-bodies. For deep GW-bodies the flexibility in the design of the monitoring network is very limited. The flow direction was also taken into consideration by some countries as well as the existence of associated drinking water protected areas or ecosystems (aquatic and/or terrestrial).

The current monitoring network designs are mainly based on already existing national monitoring programmes which were in some cases still under adaptation to the requirements of Article 8 WFD. The Monitoring report according to Article 8 WFD represents the state of information of August 2006. There was still ongoing development and harmonisation of the monitoring programmes until the compilation of the RBM Plan 2009.

5.2. Transboundary aspects

With respect to groundwater the WFD requests information on the chemical and quantitative status of groundwater. Specific provisions concern those bodies of groundwater, which cross the boundary between two or more Member States (see also chapter 9). For the ICPDR this concerns the identified 11 transboundary GW-bodies of basin-wide importance.

With the view of establishing a basin wide coherent monitoring approach, bilateral agreements should be reached on monitoring strategies (i.e. sampling procedures, network design etc.) and principles, which require coordination of conceptual model development, the exchange of data and QA and QC aspects (in line with the requirements of Article 13(2) WFD).

According to Annex V 2.4 WFD the provisions for surveillance monitoring require sufficient monitoring sites to be selected for bodies which cross a Member State boundary and transboundary GW-bodies to be monitored for those parameters, which are relevant for the protection of all uses, supported by the groundwater flow.

The surveillance monitoring programme is also useful for characterising GW-bodies, validating the risk assessment, defining natural background and assessing trend developments within the GW-body. This will enable future changes in conditions to be assessed, reference data to be acquired and typologies to be investigated.

According to Annex V 2.2 WFD the quantitative monitoring network shall be designed so as to provide a reliable assessment of the quantitative status of all GW-bodies or groups of bodies of basin-wide importance including an assessment of the available groundwater resource. For GW-bodies within which groundwater flows across a Member State boundary, it has to be assured that sufficient monitoring points and sufficient frequency of measurement are provided to estimate the direction and rate of groundwater flow across the Member State boundary.

5.3. Selection of parameter sets

5.3.1. Chemical monitoring

The following core set of determinants was agreed by the GW TG¹¹ to be monitored within TNMN groundwater:

Mandatory by the WFD

- dissolved oxygen,
- pH-value,
- electrical conductivity,
- nitrate,
- ammonium,

Recommended:

- temperature and
- a set of major (trace) ions.

In special cases other parameters might be needed for monitoring, depending on the particular characteristics of the groundwater body (e.g. deep thermal artesian groundwater bodies).

Parameters such as temperature and a set of major and trace ions are not formally requested by the WFD but may be helpful to validate the Article 5 risk assessment and the conceptual models. Selective determinants (e.g. heavy metals and relevant basic radio nuclides) would be needed for assessing natural background concentrations.

For the selection of parameters, the provisions of the Groundwater Directive (GWD, Directive 2006/118/EC, Annexes I and II) have to be considered. Helpful information can also be found in the CIS Monitoring Guidance¹² which was elaborated within EU WG C 'Groundwater'.

Additional indicators of anthropogenic contaminants typical of land use activities in the area and with a potential to impact groundwater might also be required on an infrequent basis for validating the WFD risk assessments and to check for any new identified pressure turn up to be relevant.

In addition it is recommended to monitor the water level at all chemical monitoring points in order to describe (and interpret) the 'physical status of the site' and to help interpreting (seasonal) variations or trends in chemical composition of groundwater.

In addition to the core parameters, selective determinants will need to be monitored at specific locations, or across GW-bodies, where the risk assessments indicate a risk of failing to achieve WFD objectives. Transboundary water bodies shall also be monitored for those parameters, which are relevant for the protection of all of the uses supported by the groundwater flow (see chapter 9).

The selection of parameters depends on the results of the risk assessment, the characterisation of a GW-body, considering existing water quality data and local expert knowledge. The chemical monitoring sites must be reviewed on a regular basis to ensure that they provide representative information and data on groundwater quality and fully support the risk assessment process.

Generalised land use/cover categories can be used as a basis for the initial selection of parameters. An in-depth analysis of land use/cover and the nature and approximate amounts of chemicals being used should be made in cooperation with competent local bodies in order to identify potential pollutants.

¹¹ 3rd Meeting of the ICPDR Groundwater Task Group on September, 25–26 2006 in Vienna.

¹² [Guidance Document No. 15: Groundwater Monitoring. \(2007\).](#)

5.3.2. Quantity monitoring

The WFD requires only GW-levels but it was recommended by the GW TG to monitor the following parameters for the purposes of quantitative assessment of groundwater:

- Groundwater levels in boreholes or wells (only this parameter is mentioned in WFD, the other parameters are recommended as supportive);
- Spring flows;
- Flow characteristics and/or stage levels of surface water courses during drought periods (i.e. when the flow component directly related to rainfall can be neglected and discharge is sustained substantially by groundwater);
- Stage levels in significant groundwater dependent wetlands and lakes.
- Optional: water abstraction

5.4. Monitoring frequency

5.4.1. Chemical monitoring

The selection of appropriate monitoring frequency should generally be based on the conceptual model and, in particular, the characteristics of the aquifer and its susceptibility to pollution pressures. Sampling for operational monitoring must be continued until the GW-body is determined with adequate confidence, to be no longer at poor status or at risk of being at poor status and there is adequate data to demonstrate a reversal of trends.

Sampling frequency and sample timing at each monitoring location should furthermore consider:

- Requirements for trend assessment;
- Whether the location is up-gradient, directly below, or down-gradient of the pressure. Locations directly below a pressure may require more frequent monitoring;
- The level of confidence in the Article 5 risk assessments, and changes in the assessments over time;
- Short-term fluctuations in pollutant concentrations, e.g. seasonal effects. Where seasonal and other short-term effects are likely to be encountered, it is essential that sampling frequencies and timings are adjusted (increased) accordingly and that sampling takes place at the same time(s) each year, or under the same conditions, to enable comparable data for trend assessment, accurate characterisation and status assessment; and
- Land use management patterns, e.g. the period of pesticides or fertilizer application. This is especially important for rapid flow systems like karstic aquifers and/or shallow GW-bodies.

5.4.2. Quantity monitoring

The amount and frequency of monitoring should be determined by the data needed to determine risk and status, and where necessary to support the design and assessment of the programme of measures.

Frequency of monitoring predominantly depends of the characteristics of the water body and the monitoring site respectively. Sites with significant annual variability should be monitored more frequently than sites with only minor variability. In general monthly monitoring will be sufficient for quantity monitoring where variability is low but daily monitoring would be preferred (particularly when measuring flows). The frequency should be revised as knowledge of the aquifer response and behaviour improves and in relation to the significance of any changes in pressures on the GW-body. This will ensure that a cost-effective programme is maintained.

5.5. Data aggregation

The provision of data is not foreseen under the WFD reporting, but for the purpose of reporting to the ICPDR for the TNMN Yearbook the GW TG agreed¹³ to provide the following aggregated data for each aggregated GWB (whole national part of ICPDR GW-body – see definition in chapter 2.1).

Remark: All aggregated data are based on the arithmetic mean values per monitoring point per year. The following statistical key-values are proposed:

- Minimum
- Mean
- Maximum
- Standard deviation
- 10, 25, 50, 75, 90 Percentile

Table 2 provides details on the aggregation procedures for the relevant parameters.

5.6. Procedures for data provision and data exchange

The procedure for the development of the DRBMP and the reporting is outlined by an ICPDR Strategic Paper.¹⁴ All data reported to ICPDR will be integrated in the ICPDR databases. The major tool for this purpose is the Danube GIS. The interoperability with the European Information System on Water (WISE) is foreseen through the work of the GIS EG of the ICPDR.

5.6.1. For the purpose of the WFD

For the preparation of the ICPDR Roof Report on Monitoring according to Article 8 WFD as well as for the preparation of the DRBM Plan 2009 the following templates were distributed for collecting and updating appropriate data and information on monitoring networks in the transboundary GW-bodies of basin-wide importance. Table 9 (in the Annex) covers a description of the chemical (surveillance and operational) and quantitative monitoring network for each GW-body. The detailed description of the country specific approaches of the monitoring network design for each GW-body can be found in the Roof Report 2007 on Monitoring according to Article 8, Annex 1.¹⁵

A template in the Annex (Table 10) collects relevant information and data on each monitoring point. This template was prepared in accordance with the GIS-template ‘GWStn’ which was elaborated by the GIS Expert Group and is available for download at <http://www.danubegis.org> under “Template Tools”. The GIS template ‘GWStn’ needs to be submitted to the DANUBIS by the national GIS experts in close cooperation with the groundwater experts (GW TG members) who are mainly responsible for the groundwater related content. The GIS template ‘GWStn’ is attached in a separate Excel document, together with the GIS templates ‘GWBody’ and ‘GWBodyAggr’. The detailed content of the template is explained in the related code list.

¹³ 3rd Meeting of the ICPDR Groundwater Task Group on September, 25–26 2006 in Vienna

¹⁴ [Development of the Danube River Basin District Management Plan Strategy for coordination in a large international river basin](#)

¹⁵ [Monitoring Roof Report 2007](#)

5.6.2. For the purpose of the TNMN Yearbook

The agreed six-year reporting cycle which is foreseen under the TNMN, is in line with the reporting requirements under the WFD. This will allow for making any relevant statement on significant changes of groundwater status for the GW-bodies of basin-wide importance. A possibility of annual reporting of groundwater status was considered (as part of future TNMN Yearbooks) but it was pointed out that the slow character of changes in groundwater quality in response to the emerging pressures makes the added value of annual reporting questionable. Moreover, an informative note on the regular reporting on the groundwater status within the DRBMP will be included in each TNMN Yearbook to provide public with a complete overview of the ICPDR monitoring activities.¹⁶ The note will be amended by explanation on which GW-bodies are of basin-wide importance. In case that any significant changes in status of monitored GW-bodies will occur, the GW TG will consider publishing this in the TNMN Yearbook.

Reporting to the ICPDR for TNMN purposes is foreseen in the following way and summarised in Table 2:¹⁶

- Groundwater quantity
 - o Status/risk information and in case of poor status or risk, the particular reason.
- Groundwater quality
 - o Status/risk/trend information and in case of poor status or risk, the particular reason;
 - o Aggregated quality data on the level of GW-bodies for selected parameters e.g.:
 - Electrical conductivity, ammonium, nitrate;
 - Parameters characterising the GW-body; and
 - Parameters causing risk/poor status

It is planned to start this data collection for the first time in 2010 in order to provide a respective analysis in the Yearbook 2009 as this year corresponds with the reference year for the groundwater data used in the DRBMP. This overview would also include the information on the quantitative and chemical status of the respective GWBs.

Draft templates for the collection of the above mentioned data were presented and discussed at the 11th GW TG meeting in Budapest (21–22 Oct 2010) The templates and their explanations are attached in the Annex (see Table 12 to Table 14). The templates are based on the procedure laid down in Table 2 and amended according to the specifications laid down in the EU CIS guidance document No 18 (Groundwater status and trend assessment). They are used to collect information on the GW quantity status, information on the chemical status of GW-bodies and GW chemical data.

For the chemical data collection it was agreed to collect aggregated statistical assessments for national parts of ICPDR GW-bodies from the reference year 2009. The statistical data are based on annual (for the reference year) arithmetic mean values for each monitoring point. The procedure is:

1. to calculate the annual arithmetic mean value for each monitoring point in the GW-body for the reference year; and
2. to calculate the statistical results for each (whole) national part of an ICPDR GW-body, based on the mean values per site. "

¹⁶ 3rd Meeting of the ICPDR Groundwater Task Group on September, 25–26 2006 in Vienna

Table 2: Aggregation procedures

Groundwater Quality Data	Groundwater Quality Status	Groundwater Quantity Status
EUCD_BODY	EUCD_BODY	EUCD_BODY
Reporting period from - to reference Year	reference year "at risk"	reference year "at risk"
Parameter	yes / possibly / no good / poor / (unknown - decision until 2009)	yes / possibly / no good / poor / (unknown - decision until 2009)
Threshold value - TV	Status	Status
Number of sites	if at risk or in poor status for which parameter(s)	if at risk or in poor status exceedance of available GW resource failed achievement of Article 4 objectives for associated surface waters
Number of sites > TV aggregated data per GW-body	for Parameter	Y/N / unknown
Minimum (of all sites - mean per site)	increasing trends exceeding 75% TV	Y/N / unknown
Mean (based on mean per site)	failed achievement of Article 4 objectives for associated surface waters significant damage to GW dependent terrestrial ecosystem	Y/N / unknown
standard deviation	intrusions detected	Y/N / unknown
Maximum	Art 7 drinking water protected area affected	Y/N / unknown
10 Percentile		
25 Percentile		
50 Percentile		
75 Percentile		
90 Percentile		

[Source/Status: 3rd Meeting of the GW TG September 2006, Vienna]

6. GW in drinking water production in the DRB

At the 8th GW TG meeting in Zagreb it was agreed to collect information on the share of groundwater for drinking water production in the DRB. The main objective of this activity is to compare and highlight the importance of groundwater in the DRB by the example of drinking water production.

This issue was further discussed at the 10th meeting in Regensburg and it was decided as follows:

- In a first step, the overview will be prepared for the Danube countries participating in the GW TG and in a second step, all ICPDR Contracting Parties will be asked to provide the data in order to complete the overview for the whole DRB.
- Data on total drinking water abstraction from fresh surface water and fresh groundwater is collected at the national level and at the level of the DRB - main emphasis is on the DRB level. Furthermore, also data on percentage/amount of population served by drinking water from groundwater or surface water should be collected, as far as available.
- It was agreed that the OECD data should be used as a basis for providing the information on the national level and the best available data estimates will be used for the DRB level. Within the discussion in the GW TG it was decided that – in contradiction to the OECD questionnaire - bank filtered water is considered as groundwater water, which better reflects the current practice of accounting in the Danube member countries.

A template (Table 11 in the Annex) was developed to enable the harmonised collection and the exchange of data.

7. GW contribution to TNMN Yearbook

GW TG decided to prepare and provide annual contributions to the TNMN Yearbook in order to regularly highlight the importance respectively even the existence of groundwater in the Danube River Basin and to provide public with a complete overview of the ICPDR monitoring activities. The contributions consist of both thematic highlights which need to be selected by the GW TG and the presentation of the status of groundwater by aggregated data which are reported to the ICPDR every six years according to the provisions laid down in chapter 5.5 and 5.6. However, in case that any significant changes in status of monitored GW-bodies will occur, the GW TG will consider publishing this in the TNMN Yearbook. Similarly, the results of targeted studies on groundwater quantity and quality will be published therein.

8. Need for bilateral information exchange

As river basin management according to the WFD is focusing on river basins, transboundary aspects are of immense importance. Bi- and multilateral cooperation and harmonization is needed since the adoption of the WFD, starting from the delineation of international river basins and river basin districts, the delineation and characterisation of transboundary GW-bodies, monitoring, the establishment of threshold values and continuing for the development and implementation of programmes of measures. This chapter provides the relevant legal findings of the WFD and the GWD concerning transboundary issues and as a consequence bilateral information exchange.

8.1. Coordination within RBDs (WFD)

WFD, Preamble

(35) Within a river basin where use of water may have transboundary effects, the requirements for the achievement of the environmental objectives established under this Directive, and in particular in all programmes of measures, should be coordinated for the whole of the river basin district. For river basins extending beyond the boundaries of the Community, Member States should endeavour to ensure the appropriate coordination with the relevant non-member States. This Directive is to contribute to the implementation of Community obligations under international conventions on water protection and management, notably the United Nations Convention on the protection and use of transboundary water courses and international lakes, approved by Council Decision 95/308/EC and any succeeding agreements on its application.

WFD, Article 3 - Coordination of administrative arrangements within river basin districts

Article 3 of the WFD clearly expresses the need of coordination between Member States sharing a river basin district and even with non-Member States coordination should be endeavoured to be established.

4. Member States shall ensure that the requirements of this Directive for the achievement of the environmental objectives established under Article 4, and in particular all programmes of measures are coordinated for the whole of the river basin district. For international river basin districts the Member States concerned shall together ensure this coordination and may, for this purpose, use existing structures stemming from international agreements. At the request of the Member States involved, the Commission shall act to facilitate the establishment of the programmes of measures.

5. Where a river basin district extends beyond the territory of the Community, the Member State or Member States concerned shall endeavour to establish appropriate coordination with the relevant non-Member States, with the aim of achieving the objectives of this Directive throughout the river basin district. Member States shall ensure the application of the rules of this Directive within their territory.

8.2. Characterisation (WFD)

Annex II, 2.3. - Review of the impact of human activity on groundwaters

For those bodies of groundwater which cross the boundary between two or more Member States or are identified following the initial characterisation undertaken in accordance with paragraph 2.1 as being at risk of failing to meet the objectives set for each body under Article 4, the following information shall, where relevant, be collected and maintained for each groundwater body: [...]

8.3. Groundwater Monitoring (WFD, GWD)

GWD, Preamble

(16) In order to ensure consistent protection of groundwater, Member States sharing bodies of groundwater should coordinate their activities in respect of monitoring, [...].

WFD, Annex V, 2.2. - Monitoring of groundwater quantitative status

2.2.2 Density of monitoring sites

[...] - for groundwater bodies within which groundwater flows across a MS boundary, ensure sufficient monitoring points are provided to estimate the direction and rate of groundwater flow across the Member State boundary.

2.2.3. Monitoring frequency

[...] - for groundwater bodies within which groundwater flows across a MS boundary, ensure sufficient frequency of measurement to estimate the direction and rate of groundwater flow across the Member State boundary.

WFD, Annex V, 2.4. - Monitoring of groundwater chemical status

2.4.2 Surveillance monitoring

[...] Sufficient monitoring sites shall be selected for

- bodies which cross a MS boundary*

[...] Transboundary water bodies shall also be monitored for those parameters which are relevant for the protection of all of the uses supported by the groundwater flow.

8.4. Groundwater threshold values (GWD) and chemical status assessment

Common principles for establishing groundwater threshold values (TVs) and harmonization and coordination at setting such values within transboundary GW-bodies are the basis for comparable and harmonised assessment of groundwater chemical status and trend development.

GWD, Preamble

(16) In order to ensure consistent protection of groundwater, Member States sharing bodies of groundwater should coordinate their activities in respect of monitoring, the setting of threshold values, and the identification of relevant hazardous substances.

GWD, Article 3 –Criteria for assessing groundwater chemical status

2. Threshold values can be established at the national level, at the level of the river basin district or the part of the international river basin district falling within the territory of a Member State, or at the level of a body or a group of bodies of groundwater.

3. MS shall ensure that, for bodies of groundwater shared by two or more MS and for bodies of groundwater within which groundwater flows across a MS's boundary, the establishment of threshold values is subject to coordination between the MS concerned, in accordance with Article 3(4) of Directive 2000/60/EC.

4. Where a body or a group of bodies of groundwater extends beyond the territory of the Community, the MS(s) concerned shall endeavour to establish threshold values in coordination with the non-MS(s) concerned, in accordance with Article 3(5) of Directive 2000/60/EC.

At the 6th Groundwater Task Group Meeting¹⁷ it was agreed that in the DRBMP for each transboundary GW-body the status will be reported for each national part separately, applying relevant national threshold values. The process of future coordination/harmonization of TVs and of the status assessment will be mentioned in the DRBMP making reference to GWD Article 3.3.

8.5. River Basin management Plans (WFD)

WFD, Article 13 – River basin management plans

2. In the case of an international river basin district falling entirely within the Community, Member States shall ensure coordination with the aim of producing a single international river basin management plan. Where such an international river basin management plan is not produced, Member States shall produce river basin management plans covering at least those parts of the international river basin district falling within their territory to achieve the objectives of this Directive.

3. In the case of an international river basin district extending beyond the boundaries of the Community, Member States shall endeavour to produce a single river basin management plan, and, where this is not possible, the plan shall at least cover the portion of the international river basin district lying within the territory of the Member State concerned.

8.6. Programme of measures (WFD)

WFD, Preamble

(33) The objective of achieving good water status should be pursued for each river basin, so that measures in respect of surface water and groundwaters belonging to the same ecological, hydrological and hydrogeological system are coordinated.

¹⁷ [Minutes of the 6th Groundwater Task Group Meeting, Vienna, 10-11 April 2008](#)

9. Link to European Legislation and the EC-activities

9.1. The Water Framework Directive

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2000L0060:20011216:EN:PDF>

9.2. The Groundwater Directive

Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration.

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:372:0019:0031:EN:PDF>

9.3. European Commission, DG Environment

The European Commission provides access to all legal provisions via EUR-Lex <http://eur-lex.europa.eu>; and offers access to monitor the decision-making process between institutions via PreLex <http://ec.europa.eu/prelex/apcnet.cfm?CL=en>

DG Environment provides a comprehensive website where all (ground)water relevant processes are described and related documents can be accessed:

- <http://water.europa.eu/>
- <http://ec.europa.eu/environment/>
- <http://ec.europa.eu/environment/water/water-framework/groundwater.html>
- [CIRCA](#)

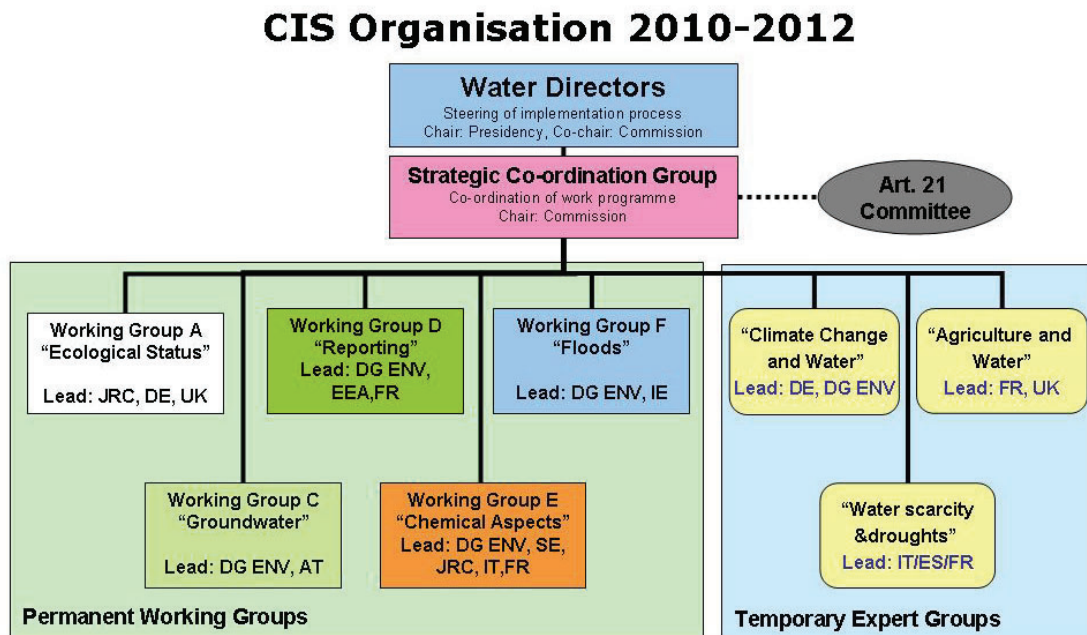
9.4. CIS Working groups

In order to address the challenges of the WFD in a co-operative and coordinated way, the MS, Norway and the Commission agreed on a Common Implementation Strategy (CIS) for the WFD. Furthermore, the Water Directors stressed the necessity to involve stakeholder, NGOs and the research community in this joint process as well as to enable the participation of Candidate Countries in order to facilitate their cohesion process. The main aim of this strategy is to ensure the coherent and harmonious implementation of the directive through the clarification of a number of methodological questions enabling a common understanding to be reached on the technical and scientific implications of the Water Framework Directive. In this framework, working groups or ad hoc expert groups carry out activities under the umbrella of a Strategic Coordination Group (SCG) composed of Member States and representatives of stakeholder organisations under the supervision of the European Commission and EU Water Directors (see Figure 3).¹⁸

Since the first phase of this joint process, a number of guidance documents were prepared and these documents were tested in Pilot River Basins across Europe. All guidance documents are available for download at the [EC website](#).

¹⁸ Groundwater Brochure: The new Groundwater Directive – Consolidating the EU regulatory framework.

Figure 3: Common Implementation Strategy (CIS) of the WFD



[Source: WFD CIS Progress and work programme for 2010–2012]

9.5. Working Group ‘Groundwater’ (WG C)

Within the framework of the CIS a technical Working Group on Groundwater (WG C) was established. Its original mission was to help the European Commission in the development phase of the Groundwater Directive proposal, which took place in 2002–2004. The aim of the group then evolved in exchange of information and experiences on groundwater issues as they related to the WFD (e.g. characterisation, risk assessment, monitoring, chemical status and trends, programmes of measures). The members of the working group share information and experiences via different means such as workshops, technical reports and guidance documents which gather participants’ experiences. The second phase of the working group (2004–2006) resulted in the publication of three technical reports (see below). Within its third period (2007–2009), focus was put on implementing the new Groundwater Directive and the groundwater elements of the WFD, in particular monitoring and the preparation of the first River Basin Management Plan.¹⁹ Four important guidance documents (No. 15 to No. 18) were published during this mandate period.

The working Group on Groundwater is now in its fourth working period (2010–2012) and aims to contribute to an exchange of information and lessons learnt during the current first phase of the implementation of the WFD and the new Groundwater Directive (GWD, 2006/118/EC) in order to aim at a well harmonized implementation of WFD and GWD in the next (2nd) RBMPs including a critical review of experiences with guidance documents in place. It aims to contribute to and support the revision of the new GWD which will be carried out by the Commission until early 2013 and it will contribute to horizontal issues (e.g. climate change), which will be dealt with on an ad-hoc basis (e.g. single workshops).

¹⁹ Groundwater Brochure: The new Groundwater Directive – Consolidating the EU regulatory framework.

9.6. Groundwater relevant publications

9.6.1. Commission reports on the implementation of the WFD and the GWD

The Commission has to assess the progress in the implementation of the WFD in certain intervals and to inform the European Parliament, the Council and the public about the results of its assessments (see Article 18 WFD). So far, [two reports are available](#).

- The first report covers the transposition of the WFD into national law, the set-up of administrative structures (Article 3 WFD) and the environmental and economic analysis of river basin districts (Article 5 WFD).
- The second report addresses the establishment of monitoring programmes for surface waters and groundwater (see Article 8 and Annex V WFD). The reports are made available at the European Commission website for [download](#).

According to Article 3.5 of the new Groundwater Directive (GWD), groundwater quality standards (called "threshold values") were established by Member States by the end of 2008. The Commission has prepared [a report and a Commission staff working document](#) on the establishment of these national standards that is a first important step of the implementation of the Directive. The documents are made available at the European Commission website for [download](#).

9.6.2. CIS Guidance Documents

All CIS guidance documents can be downloaded from [CIRCA](#). Some selected guidance papers with strong relation to groundwater are listed below:

- [Common Implementation Strategy for the Water Framework Directive \(2000/60/EC\). Guidance Document No. 2. Identification of water bodies \(2003\)](#)
- [Common Implementation Strategy for the Water Framework Directive \(2000/60/EC\). Guidance Document No. 3. Analysis of Pressures and Impacts \(2003\)](#)
- [Common Implementation Strategy for the Water Framework Directive \(2000/60/EC\). Guidance Document No. 7. Monitoring under the Water Framework Directive \(2003\)](#)
- [Common Implementation Strategy for the Water Framework Directive \(2000/60/EC\). Guidance Document No. 12. The Role of Wetlands in the WFD. \(2003\)](#)
- [Common Implementation Strategy for the Water Framework Directive \(2000/60/EC\). Guidance Document No. 15. Guidance on Groundwater Monitoring \(2007\)](#)
- [Common Implementation Strategy for the Water Framework Directive \(2000/60/EC\). Guidance Document No. 16. Groundwater in Drinking Water Protected Areas \(2007\)](#)
- [Common Implementation Strategy for the Water Framework Directive \(2000/60/EC\). Guidance Document No. 17. Preventing and Limiting Direct and Indirect Inputs \(2007\)](#)
- [Common Implementation Strategy for the Water Framework Directive \(2000/60/EC\). Guidance Document No. 18. Groundwater Status and Trend Assessment \(2009\)](#)
- [Common Implementation Strategy for the Water Framework Directive \(2000/60/EC\). Guidance No. 21. Guidance for reporting under the WFD \(2009\)](#)
- [Common Implementation Strategy for the Water Framework Directive \(2000/60/EC\). Guidance No. 22. Updated WISE GIS guidance \(Nov'2008\) \(2009\)](#)
- [Common Implementation Strategy for the Water Framework Directive \(2000/60/EC\). Guidance Document No. 24. River Basin Management in a Changing Climate \(2009\)](#)
- [Common Implementation Strategy for the Water Framework Directive \(2000/60/EC\). Guidance Document No. 26. Risk Assessment and the Use of Conceptual Models for Groundwater \(2010\)](#)

9.6.3. Technical Reports on Groundwater

Technical Reports on groundwater provide information which has been developed on the basis of the CIS Guidance Documents and contributions from the participants of the Workshops of WG C 'Groundwater'. The reports highlight the main findings for Groundwater. Additionally the reports summarize the experience and experts knowledge of the Member States regarding the implementation of the WFD. The following reports are currently available. The technical reports can be downloaded at the [EC website](#) or from [CIRCA](#)

- Technical Report No. 1 on Groundwater Trends (2001),
- Technical Report No. 2 on Groundwater Characterisation (2004),
- Technical Report No. 3 on Groundwater Monitoring (2004),
- Technical Report No. 4 on Groundwater Risk Assessment (2004);
- Technical Report No. 5 on Groundwater Management in the Mediterranean (2007);

9.7. Groundwater relevant research and technological development projects (RTD-projects)

European Commission information on RTD: http://ec.europa.eu/research/rtdinfo/index_en.html

Selected projects in alphabetic order.

AQUATERRA (www.eu-aquaterra.de): Integrated project of FP6 that aims to provide the scientific basis for an improved river basin management.

BASELINE (www.bgs.ac.uk/hydrogeology/baseline/europe/home.html): Natural Baseline Quality in European Aquifers: A Basis for Aquifer Management.

BRIDGE (www.wfd-bridge.net): Background cRiteria for the IDentification of Groundwater thrEsholds. FP6 project developing a common methodology for establishing groundwater threshold values. (2005–2006)

CCWATERS (www.ccwaters.eu): Climate Change and Impacts on Water Supply. The main objective is to ensure sustainable and safe future water supply, which is influenced by climate and land use changes. (2009–2012)

EAQC-WISE (www.eaqc-wise.net): European Analytical Quality Control in support of the Water Framework Directive via the Water Information System for Europe. An FP6 project which aims at producing a blue print of an efficient and potentially sustainable QC system for WFD implementation.

FOOTPRINT (<http://www.eu-footprint.org>): Functional Tools for Pesticide Risk Assessment and Management. An FP6 project which provides three software tools to evaluate - and reduce - the risk of pesticides impacting on water resources at different scales (national and EU scale / catchment and regional / farm scale). (since 2006)

GENESIS (www.thegenesisproject.eu): Groundwater and Dependent Ecosystems: New Scientific and Technological Basis for Assessing Climate Change and Land-use Impacts on Groundwater. (2009–2014)

NORMAN (www.norman-network.net): Network among European Reference Laboratories and Related Organisations Dealing with Emerging Environmental Pollutants. A self-sustained network of reference laboratories for monitoring emerging environmental pollutants. (since 2005)

RISKBASE (<http://www.riskbase.info>): The objective of RISKBASE is to review and synthesise the outcome of EC FP4–FP6 projects, and other major initiatives, related to integrated risk assessment-based management of the water/sediment/soil system at the river-basin scale. (2006–2009)

SWIFT (www.swift-wfd.com): Screening methods for Water data InFormaTion in support of the implementation of the WFD. It is a 6th FP project (2004–2006).

WATERCOST (<http://www.watercost.org>): The project is focusing on identifying and establishing a usable cost-effective analysis methodology based on existing knowledge, experience and expertise from different European regions. (2006–2007).

WFDvisual (www.WFDvisual.com): A comprehensive set of visualisation tools developed to support the communication on groundwater with the general public and decision makers. It includes the visualisation of a variety of pressures, groundwater aquifers, path ways and interactions with surface waters and ecosystems in 3-D. This image library (~1,200) is freely available for download.

WISE-RTD (<http://www.wise-rtd.info/>): Consolidated experiences in water management. This web portal forwards to websites with focus on information relevant for the implementation of the WFD. Information is presented from all over Europe (and even beyond), at European, national and regional level as well as for river(sub-)basins.

10. Literature

- EC (2003): Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance Document No. 2. Identification of Water Bodies.
- EC (2003): Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance Document No. 3. Analysis of Pressures and Impacts.
- EC (2007): Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance Document No. 15. Guidance on Groundwater Monitoring.
- EC (2007): Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance Document No. 16. Groundwater in Drinking Water Protected Areas.
- EC (2007): Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance Document No. 17. Preventing and Limiting Direct and Indirect Inputs.
- EC (2008): Groundwater Protection in Europe. The new Groundwater Directive – Consolidating the EU regulatory framework. Groundwater Brochure.
- EC (2009): Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance Document No. 18. Groundwater Status and Trend Assessment.
- EC (2010): Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance Document No. ???. Risk Assessment and the Use of Conceptual Models for Groundwater.
- ICPDR (2005): The Danube River Basin District. River basin characteristics, impact of human activities and economic analysis required under Article 5, Annex II and Annex III, and inventory of protected areas required under Article 6, Annex IV of the EU Water Framework Directive (2000/60/EC). Part A – Basin-wide overview, (WFD Roof Report 2004), 18 March 2005.
- ICPDR (2007): Summary Report to EU on monitoring programmes in the Danube River Basin District designed under Article 8 of the EU Water Framework Directive (2000/60/EC). Part II: Status report: Towards the development of groundwater monitoring in the Danube River Basin – Basin-wide overview, (WFD Roof Report 2007), 18 March 2007.
- ICPDR (2009): Danube River Basin Management Plan. Part A – Basin-wide overview.
- UN/ECE Task Force on Monitoring & Assessment (2000): Guidelines on Monitoring and Assessment of Transboundary Groundwaters. Work Programme 1996 – 1999. Lelystad, Netherlands.
<http://www.unece.org/env/water/publications/documents/guidelinesgroundwater.pdf>
- UN/ECE Task Force on Monitoring & Assessment (1999): Inventory of Transboundary Groundwaters. http://www.iwac-riza.org/downloads/task_force_voll.pdf
- UN/ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes *done at Helsinki on 17 March 1992*:
<http://www.unece.org/env/water/partnership/part63.htm#632>
- UN/ECE Programme Area III Monitoring and Assessment:
<http://www.unece.org/env/water/cooperation/area423.htm>

11. Annex

11.1. GIS Templates

The respective GIS templates relevant for GW issues were elaborated by the GIS Expert Group:

- GWBody
- GWBodyAggr
- GWStn

The templates are available for download at <http://www.danubegis.org> (after login) under “Template Tools” and they are attached in a separate file (Draft-Guidance-V2_2010-10-29_Annex2.xls):

The detailed content of the templates is explained in the related code lists.

The templates need(ed) to be submitted to DANUBIS by the national GIS experts in close cooperation with the groundwater experts (GW TG members) who are mainly responsible for the groundwater related content.

11.2. Templates MS Word and MS Excel based

The following tables were developed and discussed within the GW TG and used for the collection and exchange of information and data between the member countries and the ICPDR.

Table 3: Initial characterisation (including risk information) of the transboundary GW-bodies of basin-wide importance

NAME	MS_CD	Size: km ²	National size: km ²	Aquifer characterisation		Main use: DRW = drinking water AGR = agriculture IRR = irrigation IND = industry SPA = balneology CAL = caloric energy OTH = other	overlying strata: Range in m	criteria for importance bilaterally agreed	Risk:		bilaterally agreed with	responsibility for data delivery
				Predom. P = porous K = karst F = fissured	Confined: Yes/No				Yes = at risk No = not at risk Insuf = insufficient data/knowledge	Quality		
NAME	Name of the important transboundary GW-body.											
MS_CD	Max. 100 digits, no restrictions concerning language, central European encoding (CEE), different national names divided by slash Member State Code which is a unique identifier.											
Size: km²	ISO-Code 2-digits & max. 22 digits. National codes from all countries sharing the GW body have to be named to identify the bodies in the respective part B (National Reports).											
National size: km²	Whole area of the transboundary GW-body covering all countries concerned											
Aquifer characterisation	Each country indicates the size on the national territory Multiple selection possible											
Main use	Predominantly porous, karst, fissured and combinations are possible. Main type should be listed first. Multiple selection possible											
Overlying strata	Indicates a range of thickness min, max in metres.											
Criteria for importance	If size < 4,000 km ² criteria for importance of the GW body have to be named, they have to be bilaterally agreed upon.											
Risk	Indicates whether a GW-body is at risk of failing good status											
Bilaterally agreed with	Country which has been bilaterally agreed with has to be indicated, two digit country code after ISO 3166											
Responsibility for data delivery	Indicate two digit country code after ISO 3166 and institution which is responsible for the data delivery											

Note: *EU_CD is the unique European code for a water body at EU level. This code has to be defined on a central level for the transboundary GW-bodies. The yellow marked columns contain information which is also needed for GIS purposes.*

[Source/Status: WFD Roof Report 2004]

Ad Table 3

GIS-DATA
<p>IMPORTANT NOTICE: Please attach GIS maps (ArcView shapes) or paper maps (to be sent in digital formats such as .JPG or .TIFF).</p> <p>GIS data should be sent in the reference system of WGS84/ETRS89, or at least information about: 1. Name of Reference System, 2. Projection, 3. Ellipsoid must be added.</p>

Table 4: Further characterisation of the transboundary GW-bodies of basin-wide importance

Descriptive text on the transboundary groundwater body ½ to 1 page for one body	
Member State Code MS_CD	Member State Code which is a unique identifier. ISO-Code 2-digits & max. 22 digits. National codes from all countries sharing the GW body have to be named to identify the bodies in the respective part B (National Reports).
Descriptive text on the important transboundary GW-body	<i>Criteria for delineation, geological overview, GW use, impacts, pressures, interaction with aquatic ecosystems, criteria for selection as 'important'</i>
Description of methodology for estimating the risk of failure to achieve the good status	<i>approach and criteria for both quality and quantity</i>
GW-body identified as being at risk of failing to meet the objectives under Art. 4	
Lower objectives identified according to Art. 4 and Annex II 2.4 and 2.5	
Gaps and uncertainties in the underlying data	

[Source/Status: WFD Roof Report 2004]

Table 5: Template on methodology for status assessment of the transboundary GW-bodies

ICPDR Number and Name of the aggregated GWB
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Member State Code MS_Code	<i>Member State Code which is a unique identifier. ISO-Code 2-digits & max. 22-digits. National codes from all countries sharing the GW body have to be named to identify the bodies in the respective part B (national reports).</i>			
Descriptive text on the important transboundary groundwater body	<i>Criteria for delineation, geological overview, GW use, impacts, pressures interaction with aquatic ecosystems, criteria for selection as 'important'</i>			
Description of status assessment methodology	<p>Chemical Status: <i>Description of methodology for assessing chemical status. How were exceedances of QS or TVs taken into account?</i> < 5000 characters</p> <p>Quantitative Status: <i>Description of methodology for assessing quantitative status.</i> < 5000 characters</p>			
In case of poor chemical status				
Parameter(s) responsible for poor status				
further information on threshold values (TVs)	<p>Procedure: <i>Brief summary of the way the procedure set out in Annex II Part A of the GWD has been followed to derive TVs</i> < 5000 characters</p> <p>Relationship: <i>Brief summary of the relationship between TVs and background levels for naturally occurring substances</i> < 2000 characters</p>			
Threshold values per GWB	GWB	Pollutant / Indicator	TV (or range)* in mg/l or µg/l	Level on which the TV is established (national, RBD, GWB)
	<i>e.g. 1-AT</i>	<i>Nitrates</i>	<i>45 mg/l</i>	<i>national</i>

*) Insert the range of TVs if different TVs are applied within the national aggregated ICPDR GWB

Table 6: Template on status of the transboundary groundwater bodies and impacts

Name of the Groundwater Body	<i>Locally used name of the GW body e.g. Maros</i>	
EuropeantransboundaryGWBCode	<i>Internationally agreed code for a transboundary GW body e.g. 5 (Mures / Maros)</i>	
EuropeanAGWBCode	<i>International code for an aggregated GW body (for the whole national part of the transb. GWB) e.g. HU5</i>	
Status		
Chemical Status	<i>good, poor</i>	<i>if poor, list the Pollutants/Indicators:</i>
Quantitative Status	<i>good, poor</i>	<i>if poor, please select (multi-selection possible): exceeding available groundwater resource, damage to surface waters, damage to terrestrial ecosystem, saline or other intrusion</i>
(Risk: only in case there is no status assessment available)		
Quality	<i>Yes, No</i>	
Quantity	<i>Yes, No</i>	
Review of the impact of human activity on groundwaters		
Impact to aquatic ecosystems due to ...	<i>Quantity, Quality, both, no, unknown</i>	
Impact to terrestrial ecosystems due to ...	<i>Quantity, Quality, both, no, unknown</i>	
Impact to actual or potential legitimate uses due to ...	<i>Quantity, Quality, both, no, unknown</i>	
Impact (deterioration) on quality of waters for human consumption due to ...	<i>Quantity, Quality, both, no, unknown</i>	
Less stringent environmental objectives & exemptions (WFD Art. 4 (5))		
Exemptions will be needed for ...	<i>Quantity, Quality, both, no</i>	

Table 7: Template on significant pressures on the transboundary groundwater bodies

Name of the Groundwater Body	Locally used name of the GW-body e.g. Maros	<i>Deep Groundwater Body - Thermal Water</i>	
ATGK100158	Internationally agreed code for a transboundary GW body e.g. 5 (Mures / Maros)	<i>DEGK1110 ATGK100158</i>	
EuropeanAGWBCode	International code for an aggregated GW body (for the whole national part of the transb. GWB) e.g. HU5		
Significant Pressures and Measures Checklist for Groundwater Quality and Quantity- incl. Supplementary Measures and Additional Measures			
Please select all relevant pressures and provide information on Supplementary and Additional Measures			
Significant Pressures for Groundwater	Posing Risk/poor status for Quality	Posing Risk/poor status for Quantity	Where relevant give details of supplementary measures (Art 11(4)) put in place (Type of measure from pick list of Annex VI part B and details) and additional measures (Art 11(5)) (Type of measure from pick list and details)
	Yes/No	Yes/No	
Point sources			
Leakages from contaminated sites			
Leakages from waste disposal sites (landfill and agricultural waste disposal)			
Leakages associated with oil industry infrastructure			
Mine water discharges			
Discharges to ground such as disposal of contaminated water to soakways			
Other relevant point sources (specify)			
Diffuse Sources			
due to agricultural activities			
due to non-sewered population			
Urban land use			
Water abstractions			
Abstractions for agriculture			
Abstractions for public water supply			
Abstractions by industry			
IPPC activities			
Non-IPPC activities			
Abstractions by quarries/open cast coal sites			
Other major abstractions (specify)			If yes, specify the abstractions
Artificial recharge			
Discharges to groundwater for artificial recharge purposes			
Returns of groundwater to GWB from which it was abstracted (e.g. for sand and gravel washing)			
Mine water rebound			
Other major recharges (specify)			If yes, specify the recharges
Other significant pressures			
Saltwater intrusion			
Other intrusion (specify)			If yes, specify the intrusion

Table 8: Template on measures in the transboundary groundwater bodies

Name of the Groundwater Body	Locally used name of the Gwbody e.g. Maros	<i>Deep Groundwater Body - Thermal Water</i>	
EuropeantransboundaryGWBCode	Internationally agreed code for a transboundary GW body e.g. 5 (Mures / Maros)	<i>DEGK1110 ATGK100158</i>	
EuropeanAGWBCode	International code for an aggregated GW body (for the whole national part of the transb. GWB) e.g. HU5		
Measures (Basic and other basic measures)			
Basic measures (Directive listed in Annex VI Part A)	Measures implemented to address ... (tick if yes) poor status/risk for Quality poor status/risk for Quantity		Explanatory Keywords: for non EU-Member States - add information on corresponding national legislation
Drinking Water Directive (80/778/EEC) as amended by Directive (98/83/EC)			
Urban Waste-water Treatment Directive (91/271/EEC)			
Plant Protection Products Directive (91/414/EEC)			
Nitrates Directive (91/676/EC)			
Habitats Directive (92/43/EEC)			
Integrated Pollution Prevention Control Directive (96/61/EC)			
Other basic measures as required by Article 11(3)(b-I)	Measures implemented to address ... (tick if yes) poor status/risk for Quality poor status/risk for Quantity		Explanatory Keywords: for non EU-Member States - add information on corresponding national legislation
Measures for the protection of water abstracted for drinking water (Article 7) including those to reduce the level of purification required for the production of drinking water (note: these basic measures may not apply to the whole territory)			
Controls over the abstraction of fresh surface water and groundwater and impoundment of fresh surface waters including a register or registers of water abstractions and a requirement for prior authorization of abstraction and impoundment			
Controls, including a requirement for prior authorization of artificial recharge or augmentation of GW-bodies			
Requirement for prior regulation of point source discharges liable to cause pollution			
Prohibition of direct discharge of pollutants into groundwater			
Any measures required to prevent significant losses of pollutants from technical installations and to prevent and/or reduce the impact of accidental pollution incidents			
Need for Supplementary/Additional Measures WFD Article 11(4) and 11(5)			
Will the basic measures identified above be sufficient to address the significant pressures			Yes/No

Table 9: Template monitoring networks

Please use for **each relevant transboundary GW-body** or a group of GW-bodies belonging to one transboundary GW-body **a separate document**.

EUCD_BODY	Unique code(s) of GW-Body(ies) (=MS_CD of Art.5 Annex 12 report) within one transboundary GW-body	
NAME	GW-body(ies) name	
Country	country name	

CHEMICAL MONITORING	
Criteria for chemical monitoring network design (e.g. referring to characterisation and pressures) & site selection (max. 2000 characters)	
Criteria for selection of parameters (max. 2000 characters). Please attach a list of parameters expected to be monitored (surveillance / operational) as a separate attachment if too long.	
Sampling and analysis methodologies (max. 2000 characters)	
Criteria for chemical monitoring frequency (max. 2000 characters)	
Measures taken for QA/QC (laboratories, data control, data flow, standards, ...) (max. 2000 characters)	
Justifying why chemical monitoring programme/s are delayed (max. 2000 characters)	
Need of further development of the chemical monitoring programme (max. 2000 characters)	

QUANTITY MONITORING	
Criteria for quantity monitoring network design (e.g. referring to characterisation and pressures) & site selection (max. 2000 characters)	
Criteria for selection of parameters (max. 2000 characters)	
Sampling and analysis methodologies (max. 2000 characters)	
Criteria for quantity monitoring frequency (max. 2000 characters)	
Measures taken for QA/QC laboratories, data control, data flow, standards, ...) (max. 2000 characters)	
Justifying why quantity monitoring programme/s are delayed (max. 2000 characters)	
Need of further development of the quantity monitoring programme (max. 2000 characters)	

GROUNDWATER MONITORING SITES	
Monitoring start date (max. 2000 characters)	
Number of sites (quantity) (max. 2000 characters)	
Number of sites (chemical) (max. 2000 characters)	
Number of sites associated to drinking water protected areas (Art.7) (max. 2000 characters)	
Additional monitoring requirements in relation to drinking water protected areas (max. 2000 characters)	
Number of sites associated to aquatic and/or terrestrial ecosystems (max. 2000 characters)	

[Source/Status: WFD Roof Report 2007]

Table 10: Template for the description of sampling stations

template description							
attribute name	field name	field type*		description of the attribute	obligation*	values and codelists	example values
EuropeanGWStCode	EUCD_GWST	string	24	International code for the GW station	m	ISO3166_CD Domain & [MSCD_GWst]	ATPG4000622
MSGWStCode	MSCD_GWST	string	22	National code for the GW station	m		PG4000622
Name	NAME	string	100	Locally used name of the GW Station	o		Hinter Heinrichs Hühnerhaus
EuropeanWaterBodyCode	EUCD_BODY	string	24	Unique code of parent GW Body	m		ATGK100158
Quantity	QUANTUM	string	1	Monitoring station of the groundwater level monitoring network for the quantitative status	m	Y=Yes, N=No	Y
Operational	OPERAT	string	1	Station Type (operational monitoring)	m	Y=Yes, N=No	N
Surveillance	SURVEIL	string	1	Station Type (surveillance monitoring)	m	Y=Yes, N=No	Y
ScreenRangeFrom	SCREENFROM	double	6,1	Screened range of depth from "m" below the surface of well	m		13,5
ScreenRangeTo	SCREENTO	double	6,1	Screened range of depth to "m" below the surface of well	m		18,5
ScreenDepth	SCREENDEPTH	string	1	What is the screen depth of the well within the vertical extension of the GW Body: U=upper, M=middle, L=lower, X=mixed. Field is empty for springs.	m	U, M, L, X, " "	L
WellOrSpring	WELL_O_SPR	string	6	Is the site a well or spring	m	well, spring	well
UseOfSite - Monitoring	MONITOR	String	3	Monitoring site is only used for monitoring	m	Y=Yes, N=No, U=unknown	N
UseOfSite - Drinkwater	DRINKWATER	String	3	Is the monitoring site part of the drinking water supply?	m	Y=Yes, N=No, U=unknown	Y
UseOfSite - Industry	INDU_SUPPL	String	3	Is the monitoring site part of the industrial water supply?	m	Y=Yes, N=No, U=unknown	N
UseOfSite - Irrigation	IRRIGATION	String	3	Is the monitoring site part of the irrigation water supply?	m	Y=Yes, N=No, U=unknown	N
UseOfSite - Other	OTHE_SUPPL	String	3	Is the monitoring site part of any other usage?	m	Y=Yes, N=No, U=unknown	U
Longitude	LONGITUDE	double	8,5	Longitude (decimal degree) in ETRS89 that represents EUCD_GWST	o		16,39586
Latitude	LATITUDE	double	8,5	Latitude (decimal degree) in ETRS89 that represents EUCD_GWST	o		48,20154
Part of Monitoring Network	PART_O_NET	string	100	Is the site part of other international monitoring networks (e.g. EIONET-water)?	m		EIONET, Nitrate-D
InsertedWhen	INS_WHEN	date		Moment of insertion in the database	m		01.11.2006
InsertedBy	INS_BY	string	15	Acronym of operator	m		scheidleder
MetadataID	META_ID	string	24	Link to Metadata	m	"GWST_" & ISO3166_CD Domain & RBDCCode Domain	GWStn_AT1000
All sampling stations of all relevant national parts of transboundary GW-bodies (See Art 5) can be included in one list.							

[Source/Status: WFD Roof Report 2007]

Table 11: Template for the collection of data on the share of groundwater in the drinking water production.

Country:	Annual drinking water abstraction by source (Mio. m ³) Population served with drinking water by source (Mio. inhabitants)					
	Country Level			DRB Level		
	Mio m ³ abstracted	Mio inhabitants supplied	reference year of data/estimation	Mio m ³ abstracted	Mio inhabitants supplied	reference year of data/estimation
Austria						
Total drinking water abstraction from fresh surface water (Public water supply + Private households)						
Total drinking water abstraction from fresh groundwater (Public water supply + Private households)						
Total drinking water abstraction from surface and groundwater (Public water supply + Private households)						

Definitions and tables are based on the OECD / Eurostat Questionnaire on Inland Waters 2008

Definitions were amended according to the recent TG GW Meeting in Regensburg (river bank infiltration)

FRESH SURFACE WATER

Water which flows over, or rests on the surface of a land mass, natural watercourses such as rivers, streams, brooks, lakes, etc., as well as artificial watercourses such as irrigation, industrial and navigation canals, drainage systems and artificial reservoirs. Sea-water, and transitional waters, such as brackish swamps, lagoons and estuarine areas are not considered fresh surface water and so are included under NON FRESHWATER SOURCES.

FRESH GROUND WATER

Fresh water which is being held in, and can usually be recovered from, or via, an underground formation. All permanent and temporary deposits of water, both artificially charged and naturally, in the subsoil, of sufficient quality for at least seasonal use. This category includes phreatic water-bearing strata, as well as deep strata under pressure or not, contained in porous or fracture soils. For purposes of this questionnaire, ground water includes springs, both concentrated and diffused, which may be subaqueous. **For purposes of this ICPDR TG GW questionnaire (based on agreement in Regensburg), bank filtration (induced infiltration of river water through bankside gravel strata (by pumping from wells sunk into the gravel strata to create a hydraulic gradient) with the intention of improving the water quality) is included under fresh groundwater.**

MIO INHABITANTS SUPPLIED

Approximate number of inhabitants (in Mio) supplied with drinking water by the different sources - by fresh surface water, fresh groundwater and total.

Ad Table 12

Name of column / row	Description
CODE of ICPDR GW-body	Prefilled
NAME of ICPDR GW-body	Prefilled
CODE of national part of ICPDR GW-body	Prefilled
reference year	Reference year to which the assessment refers to
"at risk"	Is the national part of the ICPDR GW-body at quantitative risk? (yes / possibly / no)
Status	Quantitative status of the national part of the ICPDR GW-body (good / poor / (unknown - decision until YYYY))
if at risk or in poor status:	
Exceedance of available GW resource	Available groundwater resource is exceeded by the long term annual average rate of abstraction (Y / N / unknown)
Failed achievement of Article 4 objectives for associated surface waters	Significant diminution of surface water chemistry and/or ecology resulting from anthropogenic water level alteration or change in flow conditions that would lead to failure of relevant Article 4 objectives for any associated surface water bodies (Y / N / unknown)
Significant damage to GW dependent terrestrial ecosystem	Significant damage to groundwater dependent terrestrial ecosystems resulting from an anthropogenic water level alteration (Y / N / unknown)
Uses affected	(Y / N / unknown) - Please report which uses are affected (e.g. AGR, IRR, DRW, ...)
Intrusions detected or likely to happen due to alterations of flow directions resulting from level changes	Saline or other intrusions resulting from anthropogenically induced sustained changes in flow direction (Y / N / unknown)

Ad Table 13

Name of column / row	Description
CODE of ICPDR GW-body	Prefilled
NAME of ICPDR GW-body	Prefilled
CODE of national part of ICPDR GW-body	Prefilled
reference year	Reference year to which the assessment refers to
"at risk"	Is the national part of the ICPDR GW-body at chemical risk? (yes / possibly / no)
Status	Chemical Status of the national part of the ICPDR GW-body (good / poor / (unknown - decision until YYYY))
if at risk or in poor status:	
for which parameters	List parameters which are responsible for risk or poor status
Failed general assessment of GWB as a whole	(Y / N / unknown) - Please give the respective parameter
Saline or other intrusions	(Y / N / unknown) - Please give the respective parameter
Failed achievement of Article 4 objectives for associated surface waters	Significant diminution of surface water chemistry and ecology due to transfer of pollutants from the GWB (Y / N / unknown) - Please give the respective parameter
Significant damage to GW dependent terrestrial ecosystem	Significant damage to GW DTE due to transfer of pollutants from the GWB (Y / N / unknown) - Please give the respective parameter
Art 7 drinking water protected area affected	Deterioration in quality of waters for human consumption (GWD Article 4(2)(c) (iii) and Annex III 4) and not meeting the requirements of WFD Article 7(3) - Drinking Water Protected Areas (Y / N / unknown) - Please give the respective parameter
Increasing trends exceeding 75% TV	(Y / N / unknown) - Please give the respective parameter

Table 12 : Template for collecting Groundwater Quantity Status

CODE of ICPDR GW-body	NAME of ICPDR GW-body	CODE of national part of ICPDR GW-body	Reference year	"at risk" yes/ possibly/ no	Status good / poor / (unknown - decision until YYYY)	if at risk or in poor status:	Exceedance of available GW resource	Failed achievement of Article 4 objectives for associated surface waters	Significant damage to GW dependent terrestrial ecosystem	Uses affected	Intrusions detected or likely to happen due to alterations of flow directions resulting from level changes
GWB-1	Deep Groundwater Body – Thermal Water	DE-1 AT-1					Yes / No / Unknown	Yes / No / Unknown	Yes / No / Unknown	Yes / No / Unknown If yes, which?	Yes / No / Unknown
GWB-2	Upper Jurassic – Lower Cretaceous GWB	BG-2 RO-2									
GWB-3	Middle Sarmatian - Pontian GWB	RO-3 MD-3									
GWB-4	Sarmatian GWB	RO-4									
GWB-5	Mures / Maros	BG-4 RO-5 HU-5									
GWB-6	Somes / Szamos	RO-6 HU-6									
GWB-7	Upper Pannonian – Lower Pleistocene / Vojvodina / Duna- Tisza köze deli r.	RO-7 RS-7 HU-7									
GWB-8	Podunajska Basín, Zitny Ostrov / Szigetköz, Hanság-Rábca	SK-8 HU-8 SK-9									
GWB-9	Bodrog	HU-9									
GWB-10	Slovensky kras / Aggtelek-hgs.	SK-10 HU-10									
GWB-11	Komármanska Vysoka Kryha / Dunántúli-khgs. északi r.	SK-11 HU-11									

Table 13 : Template for collecting Groundwater Chemical Status

CODE of ICPDR GW-body	NAME of ICPDR GW-body	CODE of national ICPDR GW-body	Reference year	"at risk"	Status	if at risk or in poor status:	for which parameters	Failed general assessment of GWB as a whole	Saline or other intrusions	Failed achievement of Article 4 objectives for associated surface waters	Significant damage to GW dependent terrestrial ecosystem	Art 7 drinking water protected area affected	Increasing trends exceeding 75% TV
				yes / possibly / no	good / poor		parameter	Yes / No / Unknown (parameter)	Yes / No / Unknown (parameter)	Yes / No / Unknown (parameter)	Yes / No / Unknown (parameter)	Yes / No / Unknown (parameter)	Yes / No / Unknown (parameter)
GWB-1	Deep Groundwater Body – Thermal Water	DE-1											
GWB-2	Upper Jurassic – Lower Cretaceous GWB	AT-1 BG-2 RO-2											
GWB-3	Middle Sarmatian - Pontian GWB	RO-3 MD-3											
GWB-4	Sarmatian GWB	RO-4 BG-4											
GWB-5	Mures / Maros	RO-5 HU-5											
GWB-6	Somes / Szamos	RO-6 HU-6											
GWB-7	Upper Pannonian – Lower Pleistocene / Vojvodina / Duna-Tisza köze deli r.	RO-7 RS-7 HU-7											
GWB-8	Podunajska Basin, Zitny Ostrov / Szigetköz, Hanság-Rábca	SK-8 HU-8											
GWB-9	Bodrog	SK-9 HU-9											
GWB-10	Slovensky kras / Aggtelek-hgs.	SK-10 HU-10											
GWB-11	Komarmanska Vysoka Kryha / Dunántúli-khgs. északi r.	SK-11 HU-11											

Table 14 : Template for collecting Groundwater Chemical Data

CODE of national part of ICPDR GW-body	reference year	Parameter & unit	Number of sites	Minimum	Arithmetic mean value	Standard deviation	Maximum	10 Percentile	25 Percentile	50 Percentile	75 Percentile	90 Percentile
e.g. HU-5	2009 is preferred	e.g. nitrates (mg/l)										
Example XY-1	2009	nitrates (mg/l)	70	0.8	57.5	32.9	133.8	18.3	36.1	53.6	76.8	104.2

Name of column / row	Description
CODE of national part of ICPDR GW-body reference year	The reference year of monitoring data should be 2009
	Provide the name of the parameter (in English) together with the unit e.g.: nitrates (mg/l) Please provide data for the following parameters
	- Nitrates (mg/l) - Ammonium (mg/l) - Electrical Conductivity (µS/cm) - Parameters causing risk or poor status - Parameters necessary for characterising the GW-body
Parameter & unit	Number of groundwater monitoring points in the GW-body
Number of sites	Basis of the assessment are the annual arithmetic mean values per sampling site
Minimum	Basis of the assessment are the annual arithmetic mean values per sampling site
Arithmetic mean	Basis of the assessment are the annual arithmetic mean values per sampling site
Standard deviation	Basis of the assessment are the annual arithmetic mean values per sampling site
Maximum	Basis of the assessment are the annual arithmetic mean values per sampling site
10 Percentile	Basis of the assessment are the annual arithmetic mean values per sampling site
25 Percentile	Basis of the assessment are the annual arithmetic mean values per sampling site
50 Percentile	Basis of the assessment are the annual arithmetic mean values per sampling site
75 Percentile	Basis of the assessment are the annual arithmetic mean values per sampling site
90 Percentile	Basis of the assessment are the annual arithmetic mean values per sampling site

