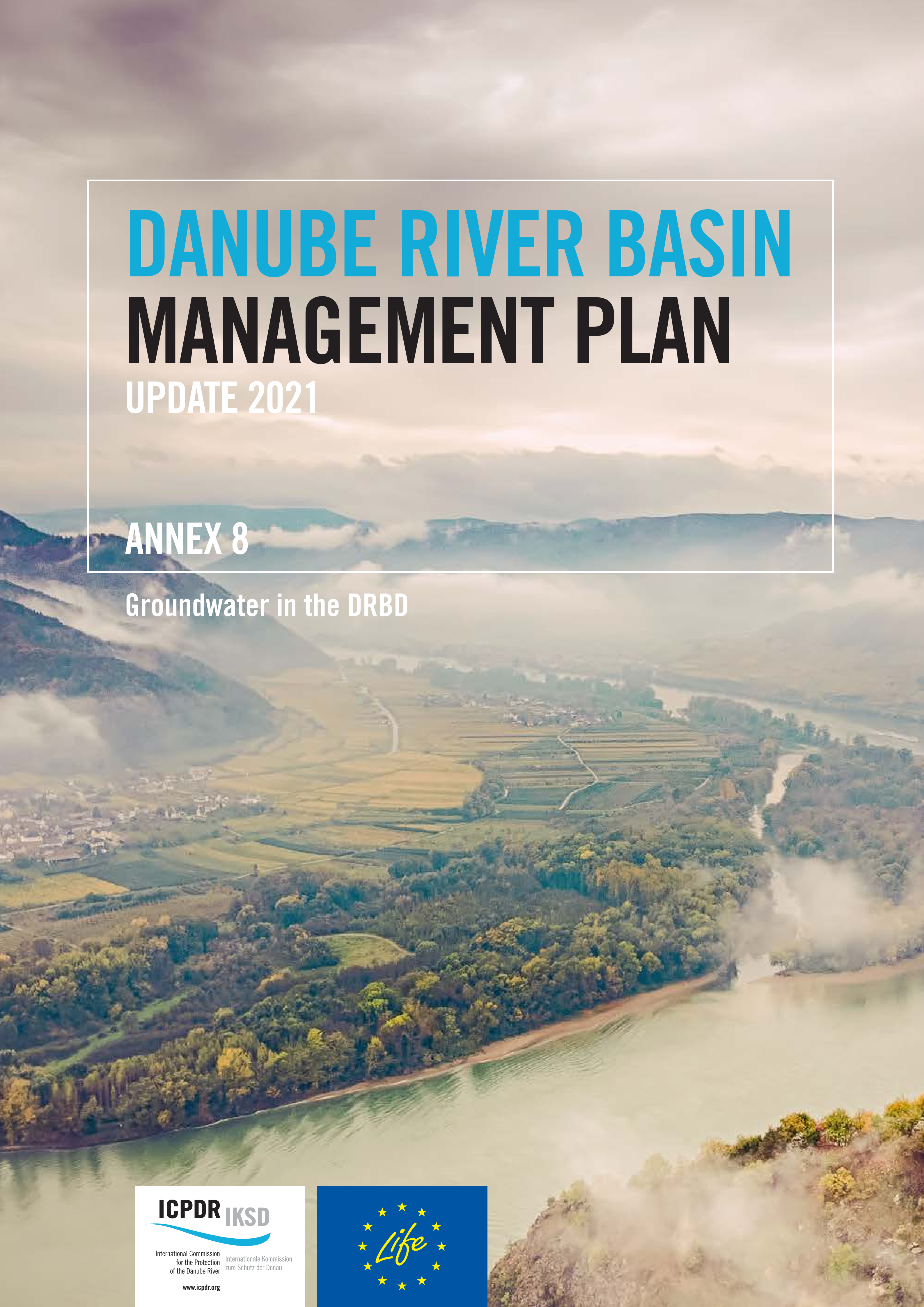

DANUBE RIVER BASIN MANAGEMENT PLAN

UPDATE 2021

ANNEX 8

Groundwater in the DRBD

ICPDR IKSD
International Commission for the Protection of the Danube River
Internationale Kommission zum Schutz der Donau
www.icpdr.org

Table 1: Nominated transboundary GWBs of Danube basin wide importance

GWB	Nat. part	Area [km²]	Aquifer characteristics		Main use	Overlying strata [m]	Criteria for importance
			Aquifer Type	Confined			
1	AT-1	1,650	K	Yes	SPA, CAL	100-1000	Intensive use
	DE-1	4,250					
2	BG-2	13,034	F, K	Yes	DRW, AGR, IND	0-600	> 4000 km²
	RO-2	11,340					
3	MD-3	9,662	P	Yes	DRW, AGR, IND	0-150	> 4000 km², GW use, GW resource
	RO-3	12,646					
4	BG-4	3,308	K, F-K	No	DRW, AGR, IND	0-10	> 4000 km²
	RO-4	2,187		Yes			
5	HU-5	4,989	P	No	DRW, IRR, IND	2-30	> 4000 km², GW resource, DRW protection
	RO-5	2,227					
6	HU-6	1,034	P	No	DRW, AGR, IRR	5-30	GW resource, DRW protection
	RO-6	1,459					
7	HU-7	7,098	P	No	DRW, AGR, IND, IRR	0-125	> 4000 km², GW use, GW resource, DRW protection
	RO-7	11,355		Yes			
	RS-7	10,506		No			
8	HU-8	1,152	P	No	DRW, IRR, AGR, IND	2-5	GW resource, DRW protection, dependent ecosystems
	SK-8	2,186					
9	HU-9	750	P	No	DRW,IRR	2-10	GW resource, DRW protection, dependent ecosystems
	SK-9	1,470		Yes			
10	HU-10	493	K	No	DRW, OTH	0-500	GW resources, DRW protection, dependent ecosystem
	SK-10	598	K, F				
11	HU-11	3,337	K	Yes	DRW, SPA, CAL	0-2500	Thermal water resource
	SK-11	563	F, K				
12	HU-12	146	P	No	DRW, AGR	0-10	DRW protection, dependent ecosystems, GW resource
	SK-12	198					

Table 2: Nominated transboundary GWBs of Danube basin wide importance

Transboundary GWB	Nat. part	National GWB Codes	Area [km²]	Area [km²]	Aquifer characteri-sation		Main use	Overlying strata	Criteria for importance
					Aquifer Type	Confined			
1: Deep Thermal	AT-1	ATGK100158	5,900	1,650	K	Yes	SPA, CAL	100–1000	Intensive use
	DE-1	DEGK1110		4,250					
2: Upper Jurassic – Lower Cretaceous	BG-2	BG1G0000J3K051	24,374	13,034	F, K	Yes	DRW, AGR, IND	0–600	>4000 km²
	RO-2	RODL06		11,340					
3: Middle Sarmatian - Pontian	MD-3	MDPR01	22,308	9,662	P	Yes	DRW, AGR, IND	0–150	>4000 km², GW use, GW resource
	RO-3	ROPR05		12,646					
4: Sarmatian	BG-4	BG1G000000N049	5,495	3,308	K, F-K	No / Yes	DRW, AGR, IND	0–10	>4000 km²
	RO-4	RODL04		2,187					
5: Mures / Maros	HU-5	HU_AIQ605 HU_AIQ604 HU_AIQ594 HU_AIQ593	7,216	4,989	P	No	DRW, IRR, IND	2-30	>4000 km², GW resource, DRW protection
	RO-5*	ROMU20 ROMU22		2,227 1,774					
6: Somes / Szamos	HU-6	HU_AIQ649 HU_AIQ648 HU_AIQ600 HU_AIQ601	2,493	1,034	P	No	DRW,AGR, IRR	5–30	GW resource, DRW protection
	RO-6*	ROSO01 ROSO13		1,459 1,392					
7: Upper Pannonian-Lower Pleistocene / Vojvodina / Duna-Tisza köze déli r.	HU-7	HU_AIQ528 HU_AIQ523 HU_AIQ532 HU_AIQ487 HU_AIQ590 HU_AIQ529 HU_AIQ522 HU_AIQ533 HU_AIQ486 HU_AIQ591	28,959	7,098	P	No / Yes / No	DRW, AGR, IND, IRR	0–125	> 4000 km², GW use, GW resource, DRW protection
	RO-7	ROBA18		11,355					
	RS-7	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		10,506					
8: Podunajska Basin, Zitny Ostrov /	HU-8	HU_AIQ654 HU_AIQ572 HU_AIQ653 HU_AIQ573	3,338	1,152	P	No	DRW, IRR, AGR, IND	2–5	GW resource, DRW protection,

Transboundary GWB	Nat. part	National GWB Codes	Area [km²]	Area [km²]	Aquifer characteri-sation: Aquifer Type	Aquifer characteri-sation: Confined	Main use	Overlying strata	Criteria for importance
Szigetköz, Hanság-Rábca	SK-8	SK1000300P SK1000200P		2,186					dependent ecosystems
9: Bodrog	HU-9	HU_AIQ495 HU_AIQ496	2,220	750	P	No / Yes	DRW,IRR	2–10	GW resource, DRW protection, dependent ecosystems
	SK-9	SK1001500P		1,470					
10: Slovensky kras / Aggtelek-hgs.	HU-10	HU_AIQ485	1,091	493	K	No	DRW, OTH	0–500	GW resource, DRW protection, dependent ecosystems
	SK-10	SK200480KF		598	K, F				
11: Komarnanska Kryha / Dunántúli-khgs. északi r.	HU-11	HU_AIQ558 HU_AIQ552 HU_AIQ564 HU_AIQ660	3,900	3,337	K	Yes	DRW, SPA, CAL	0–2,500	Thermal water resource
	SK-11	SK300010FK SK300020FK		563	F, K				
12: Ipel / Ipoly	HU-12	HU_AIQ583	344	146	P	No	DRW, AGR	0–10	DRW protection, dependent ecosystems, GW resources
	SK-12	SK1000800P		198					

*...GWBs overlying

Explanation to Table 1 and 2

Transboundary GWB	ICPDR GWB code which is a unique identifier and the name
Nat. part	Code of national shares of ICPDR GWB
National GWB Codes	National codes of the individual GWBs forming the national part of a transboundary GWB of basin wide importance.
Area	Whole area of the transboundary GWB covering all countries concerned / Area of national shares in km²
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	Indicates a range of thickness (minimum and maximum in metres)
Criteria for importance	If size < 4 000 km² criteria for importance of the GW body have to be named, they have to be bilaterally agreed upon.

Table 3: Number of monitoring stations and density per GWB

Transboundary GWB	Nat. part	Area [km²]	CHEMICAL			Associated to		QUANTITY			Associated to	
			Sites	km²/ site	Sites bilaterally agreed for data exchange	Drinking water protected areas	Eco-systems	Sites	km²/ site	Sites bilaterally agreed for data exchange	Drinking water protected areas	Eco-systems
1 Deep Thermal	AT-1	1,650	4	413	-[2]	-	-	3	550	-[2]	-	-
	DE-1	4,250	4	1,063	-[2]	-	-	4	1,063	-[2]	-	-
	Σ	**5,900**	**8**	**738**				**7**	**843**			
2 Upper Jurassic – Lower Cretaceous	BG-2	13,034	9	1,448	2	yes	-	10	1,303	2	yes	-
	RO-2	11,340	26	436	4		-	1	11,340	4	0	-
	Σ	**24,374**	**35**	**696**				**11**	**2,216**			
3 Sarmatian – Pontian	MD-3	9,662	6	1,610				7	1,380			
	RO-3	12,646	19	666	0	-	-	17	744	0	0	-
	Σ	**22,308**	**25**	**892**				**24**	**930**			
4 Sarmatian	BG-4	3,308	7	473	2	yes	-	5	662	2	yes	-
	RO-4	2,187	18	122	4		-	18	122	4	0	-
	Σ	**5,495**	**25**	**220**				**23**	**239**			
5 Mures/Maros	HU-5	4,989	125	40	6	94	5	110	45	5	20	8
		2,227	20	111				16	139			
	RO-5*	1,774	3	591	5	0	-	3	591	5	0	-
	Σ	**7,216**	**148**	**48**				**129**	**56**			
6 Somes/Szamos	HU-6	1,034	25	41	5	12	4	18	57	1	2	2
		1,459	33	44				115	13			
	RO-6*	1,392	6	232	2	0		7	199	2		
	Σ	**2,493**	**64**	**39**				**141**	**18**			
7 Upper Pannonian – Lower Pleisto-cene / Vojvodina / Duna-Tisza köze deli r.	HU-7	7,098	159	45	0	105	14	151	47	0	22	15
	RO-7	11,355	44	258		0	-	24	473		0	-
	RS-7	10,506	11	955	0	yes	**	93	113	0	**	**
	Σ	**28,959**	**214**	**135**				**268**	**108**			
8 Podunajska Basin, Zitny Ostrov / Szigetköz, Hanság-Rábca	HU-8	1,152	59	20	0	24	18	108	11	24	31	22
	SK-8	2,186	133	16	0	**	**	274	8	136	**	**
	Σ	**3,338**	**192**	**17**				**382**	**9**			
9 Bodrog	HU-9	750	12	62	0	6	0	16	47	12	0	2
	SK-9	1,470	93	16	0	**	**	92	16	8	**	**
	Σ	**2,220**	**105**	**21**				**108**	**21**			
10 Slovensky kras /Aggtelek-hsg.	HU-10	493	13	38	0	10	6	16	31	9	6	6
	SK-10	598	7	85	0	**	**	22	27	3	**	**
	Σ	**1,091**	**20**	**55**				**38**	**29**			
11 Komarnanska Kryha / Dunántúli-khgs. Északi r.	HU-11	3,337	23	167	0	20	1	48	70	10	5	0
	SK-11	563	4	141	0	**	**	3	188	-	**	**
	Σ	**3,900**	**27**	**144**				**51**	**76**			
12 Ipel / Ipoly	HU-12	146	6	29	0	6	3	7	21	1	0	2
	SK-12	198	26	8	0	**	**	19	10	7	**	
	Σ	**344**	**32**	**11**				**26**	**13**			

*...GWBs overlying; ** no information; [2] unrestricted data exchange on demand; + will be updated

Explanation to Table 3

Transboundary GWB	ICPDR GWB code which is a unique identifier and the name
Nat. part	Code of national shares of ICPDR GWB
Area	Area of the whole transboundary ICPDR GWB covering all countries concerned and of the national shares of the ICPDR GWB in km².
CHEMICAL / QUANTITY	
Sites	Number of monitoring sites – Reference year (AT/DE 2018/19, BG 2016/19, RO 2017/19, SK 2018)
km²/site	Area in km² represented by each site – Reference year (AT/DE 2018/19, BG 2016/19, RO 2017/19, SK 2018)
Number of sites bilaterally agreed for data exchange	Number of monitoring sites for which transboundary data exchange is bilaterally agreed.
Associated to	
Drinking water protected areas	Number of monitoring sites associated to drinking water protected areas
Ecosystems	Number of monitoring sites associated to ecosystems

Table 4: Parameters and frequency for the surveillance monitoring program

	AT/DE	BG	RS	HU	MD	RO	SK
Transboundary GWB	1	2, 4	7	5 – 12	3	2 – 7	8 – 12
CHEMICAL (with estimation of frequency)							
Oxygen	1/a	>1/a	1/a	1/6; <1/a		1/a***	>1/a
pH-value	1/a	>1/a	1/a	>1/a*		1/a	>1/a
Electrical conductivity	1/a (cont. DE)	>1/a	1/a	>1/a*		1/a	>1/a
Nitrate	1/a	>1/a	1/a	>1/a*		1/a	>1/a
Ammonium	1/a	>1/a	1/a	>1/a*		1/a	>1/a
Temperature	cont.	>1/a	1/a	>1/a*		1/a	>1/a
Further parameters, e.g. major ions	x**	x	1/a	x		x	x
operational		x		x		x	x
QUANTITY (with estimation of frequency)							
GW levels/well head pressure	x	x	x	x		x	x
spring flows		x		x		x	x
Flow characteristics							x
Extraction (not obligatory)	x						
Reinjection (not obligatory)	x						

Remarks:

Transboundary GWB:	Code of transboundary GWB of Danube basin wide importance
>1/a:	More than 1 per year
x:	Parameter is measured
*…	In the starting year
**…	A yearly program and a five year monitoring program were established. Further parameters in DE are chloride, sulphate and total hardness
***…	Monitoring frequency is according to surveillance monitoring program. The frequency is >1/year (2/y) in case of operational monitoring program

Table 5: Groundwater QUALITY: Risk and Status Information of the ICPDR GW-bodies over a period of 2013 to 2027

GWB	Nat. part	Danube RBM Plan 2015							Danube RBM Plan 2021						
		Chemical Status 2015	Status Pressure Types 2015	Significant upward trend (parameter)	Trend reversal (parameter)	Risk 2013→2021	Risk Pressure Types →2021	Exemptions from 2021	Chemical Status 2021	Status Pressure Types 2021	Significant upward trend (parameter)	Trend reversal (parameter)	Risk 2019→2027	Risk Pressure Types →2027	Exemptions (Year of achievement)
GWB-1	AT-1	Good	-	-	-	-	-	-	Good	-	-	-	-	-	-
	DE-1														
GWB-2	BG-2	Good	-	-	-	-	-	-	Good	-	-	-	-	-	-
	RO-2											Cl			
GWB-3	MD-3	Good	-	-	-	Risk	PS, DS, WA	-	Good	-	-	-	-	-	-
	RO-3					-	-								
GWB-4	BG-4	Good	-	-	-	-	-	-	Good	-	-	-	-	-	-
	RO-4								Poor	DS			Risk	DS	2027
GWB-5	HU-5	Poor	DS	SO_4	-	Risk	DS	2027	Poor	DS	NO_3, NH4, EC, SO_4		Risk	DS	2027+
	RO-5			NH_4							-	Cr, Pb			2027
GWB-6	HU-6	Good	-	-	-	-	-	-	Good	-	-	-	-	-	-
	RO-6														
GWB-7	HU-7	Poor	DS	NO_3	-	Risk	DS	2027	Poor	DS	-	-	Risk	DS	2027+
	RO-7	Good	-	-	-	-	-	-	Good	-	-	PO_4, Cl	-	-	-
	RS-7	Good*	-			-	-	-	Good	-	-	-	-	-	-
GWB-8	HU-8	Good	-	-	-	-	-	-	Good	-	-		-	-	-
	SK-8	Good		NH_4, NO_3, Cl, As, SO_4			PS, DS	-			PO_4	NH_4***, Cl***, SO_4, TOC	Risk	PS, DS	-
GWB-9	HU-9	Good	-	-	-	-	-	-	Good		NH_4	-	Risk	DS	
	SK-9								Poor	DS, PS	PO_4	NH_4			2027+
GWB-10	HU-10	Good	-	-	-	-	-	-	Good	-	-	-	Risk	PS	-
	SK-10														
GWB-11	HU-11	Good	-	-	-	-	-	-	Good	-	-	-	-	-	-
	SK-11	Unknown		Unknown*											
GWB-12	HU-12	Good	DS	NO_3	-	Risk	-	-	Good	-	-	-	-	-	-
	SK-12	Poor	DS	SO_4					Poor	DS	-	-	Risk	DS	2027+

'-' means 'No'; * The status information is of low confidence as it is based on risk assessment; ** Not yet discussed; *** The trend was partially reversed, it means for some sites identified with significant upward trends in the 2nd RBMP.
TOC - total organic carbon

Explanation: see next page

Table 6: Groundwater QUANTITY: Risk and Status Information of the ICPDR GW-bodies over a period of 2013 to 2027

GWB	Nat. part	Danube RBM Plan 2015					Danube RBM Plan 2021				
		Quantitative Status 2015	Status Pressure Types 2015	Risk 2013→2021	Risk Pressure Types →2021	Exemptions from 2021	Quantitative Status 2021	Status Pressure Types 2021	Risk 2019→2027	Risk Pressure Types →2027	Exemptions (Year of achievement)
GWB-1	AT-1 DE-1	Good	-	-	-	-	Good	-	-	-	-
GWB-2	BG-2 RO-2	Good	-	-	-	-	Good	-	-	-	-
GWB-3	MD-3 RO-3	Good	-	-	-	-	Good	-	-	-	-
GWB-4	BG-4 RO-4	Good	-	-	-	-	Good	-	-	-	-
GWB-5	HU-5	Poor	WA	Risk	WA	2027	Poor	WA	Risk	WA	2027+
	RO-5	Good	-	-	-	-	Good	-	-	-	-
GWB-6	HU-6 RO-6	Good	-	-	-	-	Good	-	-	-	-
GWB-7	HU-7	Poor	WA	Risk	WA	2027	Poor	WA	Risk	WA	2027+
	RO-7	Good	-	-	-	-	Good	-	-	-	-
	RS-7	Poor*	WA	Risk	WA	**	Poor	WA	Risk	WA	***
GWB-8	HU-8	Poor	WA	Risk	WA	2027	Good	-	-	-	-
	SK-8	Good	-	-	-	-					
GWB-9	HU-9	Good	-	-	-	-	Poor	OP	Risk	OP	2027+
	SK-9						Good	-	-	-	-
GWB-10	HU-10	Good	-	-	-	-	Good	-	-	-	-
	SK-10								Risk	WA	
GWB-11	HU-11	Good	-	-	-	-	Good	-	-	-	-
	SK-11	Unknown									
GWB-12	HU-12 SK-12	Good	-	-	-	-	Good	-	-	-	-

- … no / not applicable; * … Status information is of low confidence as it is based on risk assessment; ** … not yet discussed; ***… information will be provided, when the Plan is officially adopted.

Explanation to Table 5 and Table 6

GWB	ICPDR GWB code which is a unique identifier.	
Nat. part	Code of national shares of ICPDR GWBs	
Danube RBM Plan 2015	**Danube RBM Plan 2021**	
[Chemical/Quantitative] Status 2015	**Status 2021**	**Good / Poor / Unknown**
Status Pressure Types 2015	**Status Pressure Types 2021**	Indicates the significant pressures causing poor status in 2015. **AR =** artificial recharge**, DS** = diffuse sources**, PS** = point sources**, OP** = other significant pressures**, WA** = water abstractions
Significant upward trend (parameter)	**Significant upward trend (parameter)**	Indicates for which parameter a significant sustained upward trend has been identified.
Trend reversal (parameter)	**Trend reversal (parameter)**	Indicates for which parameter a trend reversal could have been achieved.
Risk 2013→2021	**Risk 2019→2027**	**Risk** / - (which means 'no risk')
Risk Pressure Types →2021	**Risk Pressure Types →2027**	Indicates the significant pressures causing risk of failing to achieve good status in 2021. **AR =** artificial recharge**, DS** = diffuse sources**, PS** = point sources**, OP** = other significant pressures**, WA** = water abstractions
Exemptions from 2021	**Exemptions (Year of achievement)**	Indicates the year by when good status is expected to be achieved.

Table 7: Groundwater QUALITY: Status 2021 - Reasons for failing good groundwater chemical status in 2021 for the ICPDR GW-bodies.

GWB	GWB Name	National part	Year of status assessment	Chemical Status 2021	Which parameters cause poor status	Failed general assessment of GWB as a whole	Saline or other intrusion	Failed achievement of Article 4 objectives for associated surface waters	Significant damage to GW dependent terrestrial ecosystem	Art 7 drinking water protected area affected
				good /poor	*parameter*	*Yes / - / Unknown (parameter)*	*Yes / - / Unknown (parameter)*	*Yes / - / Unknown (parameter)*	*Yes / - / Unknown (parameter)*	*Yes / - / Unknown (parameter)*
GWB-1	Deep GWB – Thermal Water	AT-1	2020	Good	-	-	-	-	-	-
		DE-1								
GWB-2	Upper Jurassic – Lower Cretaceous GWB	BG-2	2019	Good	-	-	-	-	-	-
		RO-2	2017							
GWB-3	Middle Sarmatian - Pontian GWB	MD-3	2018	Good	-	-	-	-	-	-
		RO-3	2017							
GWB-4	Sarmatian GWB	BG-4	2019	Good	-	-	-	-	-	-
		RO-4	2017	Poor	NO_3	Yes				
GWB-5	Mures / Maros	HU-5	2020	Poor	NO_3, SO_4, NH_4, Cl,	-	-	-	-	Yes (NO_3, SO_4, NH_4, Cl)
		RO-5	2017		NO_3	Yes				-
GWB-6	Somes / Szamos	HU-6	2020	Good	-	-	-	-	-	-
		RO-6	2017							
GWB-7	Upper Pannonian – Lower Pleistocene / Vojvodina / Duna-Tisza köze deli r.	HU-7	2020	Poor	NO_3	Yes (NO_3)	-	-	-	-
		RO-7	2017	Good	-	-				
		RS-7	2019	Good	-	-				
GWB-8	Podunajska Basin, Zitny Ostrov / Szigetköz, Hanság-Rábca	HU-8	2020	Good	-	-	-	-	-	-
		SK-8	2013-2018							
GWB-9	Bodrog	HU-9	2020	Good	-		-	-	-	-
		SK-9	2013-2018	Poor	NH_4, PO_4	Yes				
GWB-10	Slovensky kras / Aggtelek-hgs.	HU-10	2020	Good	-	-	-	-	-	-
		SK-10	2013-2018							
GWB-11	Komarnanska Kryha / Dunántúli-khgs. északi r.	HU-11	2020	Good	-	-	-	-	-	-
		SK-11	2013-2018							
GWB-12	Ipel / Ipoly	HU-12	2020	Good	-	-	-	-	-	-
		SK-12	2013-2018	Poor	NO_3, SO_4, PO_4	Yes				

'-' means 'No'; * The status information is of low confidence as it is based on risk assessment;

Table 8: Groundwater QUALITY: Risk 2027 - Reasons for risk of failing good groundwater chemical status in 2027 for the ICPDR GW-bodies.

GWB	GWB Name	National part	Year of risk assessment	‚at risk‘ 2021	Which parameters cause risk	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
				Risk / -	*parameter*	*Yes / - / Unknown (parameter)*	*Yes / - / Unknown (parameter)*	*Yes / - / Unknown (parameter)*	*Yes / - / Unknown (parameter)*	*Yes / - / Unknown (parameter)*
GWB-1	Deep GWB – Thermal Water	AT-1	2020	-	-	-	-	-	-	-
		DE-1								
GWB-2	Upper Jurassic – Lower Cretaceous GWB	BG-2	2019	-	-	-	-	-	-	-
		RO-2	2017							
GWB-3	Middle Sarmatian - Pontian GWB	MD-3	2017	-	-	-	-	-	-	-
		RO-3								
GWB-4	Sarmatian GWB	BG-4	2019	-	-	-	-	-	-	-
		RO-4	2017	Risk	NO_3	Yes				
GWB-5	Mures / Maros	HU-5	2018	Risk	NH4, glyphosate*, Cl, SO_4	Yes (NH_4)	-	-	-	Yes (NO_3, Cl, SO_4)
		RO-5	2017		NO_3	Yes				-
GWB-6	Somes / Szamos	HU-6	2018	-	-	-	-	-	-	-
		RO-6	2017							
GWB-7	Upper Pannonian – Lower Pleistocene / Vojvodina / Duna-Tisza köze deli r.	HU-7	2018	Risk	Glyphosate*, EC, NH_4, NO_3	Yes (NH_4, NO_3)	-	-	-	NO_3, EC
		RO-7	2017	-	-	-				-
		RS-7	2019	-	-	-				
GWB-8	Podunajska Basin, Zitny Ostrov / Szigetköz, Hanság-Rábca	HU-8	2018	-	-	-	-	-	-	-
		SK-8	2020	Risk	NH_4					Yes
GWB-9	Bodrog	HU-9	2018	Risk	NH_4	-	-	-	-	Yes (NH_4)
		SK-9	2020		NH_4, PO_4	Yes				-
GWB-10	Slovensky kras / Aggtelek-hgs.	HU-10	2018	Risk	TCE	-	-	-	-	TCE
		SK-10	-							
GWB-11	Komarnanska Kryha / Dunántúli-khgs. északi r.	HU-11	2018	-	.	-	-	-	-	-
		SK-11	2020							
GWB-12	Ipel / Ipoly	HU-12	2018	-	-	-	-	-	-	-
		SK-12	2020	Risk	NO_3, PO_4, SO_4	Yes				

‘-‘ means ‘No’; * based on single data after risk assessment period

Table 9: Groundwater QUANTITY: Status 2021 - Reasons for failing good groundwater quantitative status in 2021 for the ICPDR GW-bodies.

GWB	GWB Name	National part	Year of status assessment	Quantitative status 2021	Exceedance of available GW resource	Failed achievement of Article 4 objectives for associated surface waters	Significant damage to GW dependent terrestrial ecosystem	Uses affected (drinking water use, irrigation etc.)	Intrusions detected or likely to happen due to alterations of flow directions resulting from level changes
				good / poor	*Yes / - / Unknown*	*Yes / - / Unknown*	*Yes / - / Unknown*	*Yes / - / Unknown If yes, which?*	*Yes / - / Unknown*
GWB-1	Deep GWB – Thermal Water	AT-1 DE-1	2020	Good	-	-	-	-	-
GWB-2	Upper Jurassic – Lower Cretaceous GWB	BG-2 RO-2	2019 2017	Good	-	-	-	-	-
GWB-3	Middle Sarmatian - Pontian GWB	MD-3 RO-3	2017	Good	-	-	-	-	-
GWB-4	Sarmatian GWB	BG-4 RO-4	2019 2017	Good	-	-	-	-	-
GWB-5	Mures / Maros	HU-5 RO-5	2020 2017	Poor Good	-	-	Yes -	-	-
GWB-6	Somes / Szamos	HU-6 RO-6	2020 2017	Good	-	-	-	-	-
GWB-7	Upper Pannonian – Lower Pleistocene / Vojvodina / Duna-Tisza köze deli r.	HU-7 RO-7 RS-7	2020 2017 2019	Poor Good Poor	Yes - Yes	- - Unknown	Yes - Unknown	- - Yes	- - Unknown
GWB-8	Podunajska Basin, Zitny Ostrov / Szigetköz, Hanság-Rábca	HU-8 SK-8	2020 2013-2017	Good	-	-	-	-	-
GWB-9	Bodrog	HU-9 SK-9	2020 2013-2017	Poor Good	Yes -	-	-	-	Unknown -
GWB-10	Slovensky kras / Aggtelek-hgs.	HU-10 SK-10	2020 2013-2017	Good	-	-	-	-	-
GWB-11	Komarnanska Kryha / Dunántúli-khgs. északi r.	HU-11 SK-11	2020 2015-2017	Good	-	-	-	-	-
GWB-12	Ipel / Ipoly	HU-12 SK-12	2020 2013-2017	Good	-	-	-	-	-

Table 10: Groundwater QUANTITY: Risk 2027 - Reasons for risk of failing good groundwater quantitative status in 2027 for the ICPDR GW-bodies.

GWB	GWB Name	National part	Year of risk assessment	'at risk' 2027	Exceedance of available GW resource	Failed achievement of Article 4 objectives for associated surface waters	Significant damage to GW dependent terrestrial ecosystem	Uses affected (drinking water use, irrigation etc.)	Intrusions detected or likely to happen due to alterations of flow directions resulting from level changes
				Risk / -	*Yes / - / Unknown*	*Yes / - / Unknown*	*Yes / - / Unknown*	*Yes / - / Unknown If yes, which?*	*Yes / - / Unknown*
GWB-1	Deep GWB – Thermal Water	AT-1	2020	-	-	-	-	-	-
		DE-1							
GWB-2	Upper Jurassic – Lower Cretaceous GWB	BG-2	2019	-	-	-	-	-	-
		RO-2	2017						
GWB-3	Middle Sarmatian - Pontian GWB	MD-3	2018	-	-	-	-	-	-
		RO-3	2017						
GWB-4	Sarmatian GWB	BG-4	2019	-	-	-	-	-	-
		RO-4	2017						
GWB-5	Mures / Maros	HU-5	2020	Risk	-	-	Yes	-	-
		RO-5	2017	-			-		
GWB-6	Somes / Szamos	HU-6	2020	-	-	-	-	-	-
		RO-6	2017						
GWB-7	Upper Pannonian – Lower Pleistocene / Vojvodina / Duna-Tisza köze deli r.	HU-7	2020	Risk	Yes	-	Yes	-	-
		RO-7	2017	-	-	-	-	-	-
		RS-7	2019	Risk	Yes	Unknown	Unknown	Yes, DW	Unknown
GWB-8	Podunajska Basin, Zitny Ostrov / Szigetköz, Hanság-Rábca	HU-8	2020	-	-	-	-	-	-
		SK-8	2017						
GWB-9	Bodrog	HU-9	2020	Risk	Yes	-	-	-	-
		SK-9	2017	-	-				
GWB-10	Slovensky kras / Aggtelek-hgs.	HU-10	2020		-	-	-	-	-
		SK-10	2017	Risk		Yes			
GWB-11	Komarnanska Kryha / Dunántúli-khgs. északi r.	HU-11	2020	-	-	-	-	-	-
		SK-11	2017						
GWB-12	Ipel / Ipoly	HU-12	2020	-	-	-	-	-	-
		SK-12	2017						

- means 'No';

Table 11: Summary table: Groundwater threshold values

		GWB-1	GWB-2		GWB-3	GWB-4		GWB-5		GWB-6		GWB-7		GWB-8		GWB-9		GWB-10		GWB-11	GWB-12	
Parameter	**unit**		**BG-2**	**RO-2**	**RO-3**	**BG-4**	**RO-4**	**RO-5**	**HU-5**	**HU-6**	**RO-6**	**HU-7**	**RO-7**	**HU-8**	**SK-8**	**HU-9**	**SK-9**	**HU-10**	**SK-10**	**HU-11 SK-11****	**HU-12**	**SK-12**
Ammonium	mg/l		0.4487	0.5	6.4	0.38	0.7	0.5–1.9	2–5	2–5	0.5–1.3	2–5	6.4	1–2	0.26	2–5	0.30	0 .5	0.27	0.5–no TV	2	0.90
AOX	µg/l								20	20		20		20		20		20		20–no TV	20	
Arsenic	µg/l		7.6	10	10	7.7	10	40		-	10				6		6		5.5			6
Benzene	µg/l			10	10		10	10			10		10		0.8		0.8		0.8			0.8
Cadmium	µg/l		3.8	5	5	3.9	5	5	5	5	5	5	5	5	3.0	5	3.0	5	2.7	5–no TV	5	2.9
Chloride	mg/l		189	250	250	188.75	250	250	250-500	250	250	250	250	250	135.8-137.3	250	147.4	250	131.8	250–no TV	250	135.7
Chromium	µg/l		38.875		50	38.25		50			50		50		26		27		25			26
COD Mn	mg O2/l		3.975			3.8625																
Conductivity	µS/cm		1640.625			1713.6			2500-4000	2500		2500-4000		2500		2500		2500		2500–no TV	2500	
Copper	µg/l		152.7		100	150.1		100			100		100		1001-1002		1004		1001			1003
Cyanides	mg/l		0.04			0.04																
Iron total	mg/l		0.1607			0.15									0.125-0.135		0.150		0.105			0.150
Lead	µg/l		8.1	10	10	7.6	10	10–20	10	10	30–70	10	10	10	6.5-7.0	10	9.0	10	5.5	10–no TV	10	7.0
Manganese	mg/l		0.038			0.038									0.030		0.030		0.027			0.100
Mercury	µg/l		0.8	1	1	0.8	1		1	1	1	1	1	1	0.7-0.8	1	0.7	1	0.6	1–no TV	1	0.6
Nickel	µg/l		15.05		20	15.5	20	20			20		20									
Nitrates**	mg/l		38.5			39.87												25		25–50–no TV		
Nitrites	mg/l		0.3801	0.5	0.5	0.375	0.5	0.5			0.5		0.5		0.26		0.26		0.26			0.26
Phenols	µg/l							2			2		4									
Phosphates	mg/l		0.3805	0.5	1.4	0.3798	0.5	0.5–0.6			0.5		1		0.22		0.22		0.24			0.24
Orthophosphate	mg/l								2–5	0.5–2		1–5		1		1–2		0.25		0.25-no TV	2	
Sodium	mg/l		156.75			158.25									104.5-105.8		111.0		52.3			119.8
Sulphates	mg/l		192	250	250	189	250	250	250–500	250	250	250–500	250	250	148.9–157.6	250	167.4	250	167.6	250–no TV	500	140.8
Tetrachloroethylen	µg/l		7.5*	10	10	7.5*	10	10	10	10	10	10	10	10	7.5*	10	7.5*	10	7.5*	10	10	7.5*
Trichlorethylene	µg/l		*	10	10	*	10	10	10	10	10	10	10	10	7.5*	10	7.5*	10	7.5*	10	10	7.5*
Zinc	mg/l		0.777		5	0.7537	5	5			5		5									
Pesticides total**			0.375			0.375																

*...7.5 for Tetrachloroethylen + Trichlorethylene; ** the quality standards for nitrates (50 mg/l) and for pesticides (0.1 for individual pesticides and relevant metabolites and 0.5 for total pesticides) are not mentioned in the table. **…The criterion for evaluating the chemical status of geothermal GWB is the stability of the chemical composition

Methodologies of status and trend assessment of the ICPDR GW-bodies

GWB-1: Deep Groundwater Body – Thermal Water

GWB-1	National share	**AT-1** **DE-1**	Status 2021 for each national GWB?	
			Chemical (substance)	Quantity
List of individual GW-bodies forming the whole national share (national code incl. country code)	AT	ATGK100158	Good	Good
	DE	DEGK1110	Good	Good

Description/Characterisation of the ICPDR GW-body	*The thermal groundwater of the Malm karst (Upper Jurassic) in the Lower Bavarian and Upper Austrian Molasse Basin is of transboundary importance. It is used for spa purposes and to gain geothermal energy. The geothermal used water is totally re-injected in the same aquifer.* *The transboundary GW-body covers a total area of 5,900 km²; the length is 155 km and the width is up to 55 km. The aquifer is Malm (karstic limestone); the top of the Malm reaches a depth of more than 1,000 m below sea level in the Bavarian part and 2,000 m in the Upper Austrian part. The groundwater recharge is mainly composed of subterranean inflow of the adjacent Bohemian Massif and infiltration of precipitation in the northern part of the GWB area. The total groundwater recharge was determined to 820 l/s. The GW-body is selected as of basin-wide importance because of its intensive use. An expert group takes care for the permanent bilateral exchange of information and a sustainable transboundary use.*
Description of **status** assessment methodology.	***Chemical Status*** *The chemical status of the deep GWB will be described on the basis of measurement and analysis data according to a procedure agreed between the two states. The decisive parameters for the evaluation of the qualitative status of near-surface GWBs (such as nitrate and pesticides) are not relevant for deep GWBs.* *As expected, the parameters measured in the GWB extending over 5900 km² differ (in some cases considerably) from site to site. This is due to regionally different geo-hydraulic conditions. Therefore the description of the qualitative status cannot be made in the same way as that for near-surface GWBs (on the basis of aggregated data), but made on the basis of measurement and analysis data available at every individual measuring site. Contrary to near-surface GWBs, it should be considered that, due to the utilization of the waters (balneological and thermal uses), good status is not only not achieved if the concentration of certain contents rises above a certain level, but also if it falls below it.* *The available data is presently not sufficient to identify precisely enough the scope of fluctuations relevant for individual parameters at the individual measuring sites.* *Good chemical status is considered to be reached if the threshold value (TV) of the decisive parameters neither exceed nor fall below the scope of fluctuations determined for every measuring site. It is planned to examine the current selected scope of fluctuations on the basis of many years of monitoring, (at least over a period of 10 years) and to adapt them, where required.* *In any case, the GWB is considered to be in a good chemical status if at least 75% of the measuring sites meet good status.* *The following parameters are used as a basis for the determination of the qualitative status of the deep GWB: temperature, electrical conductivity, total hardness, sulphate and chloride.* ***Quantitative Status*** *No Changes since 2009* *There is no interaction between deep groundwater and surface waters and/or terrestrial ecosystems.* *The quantitative status of the deep GWB can be described by means of:* - *the identification of trends over a period of many years monitoring of the level of hydraulic pressure at groundwater measuring sites and wells;* - *a balancing calculation: a comparison between the thermal water supply and thermal water abstractions.* *Apart from Bad Füssing (records since 1948), no long-term monitoring of pressure potentials that would be significant for a trend analysis is available.* *As early as in 1998, detailed thermal water balancing was carried out for the deep GWB. In the course of this balancing an exploitation of the available thermal water resources by thermal water abstractions of about 25% was recorded, which corresponds to a good quantitative status (at least 30% of the quantity available).* *In the meantime, the extent of utilisation has been considerably reduced due to successfully implemented management measures (among other things the obligation to reinject the used thermal water exclusively).*

	Good quantitative status could be even further improved on the basis of the level of hydraulic pressure in the thermal waters of Bad Füssing which has risen again since then. *With a view to the regionally uneven distribution of the available quantity, water abstraction points and abstracted water quantities, a sub-division of the balance area into sub-areas can be made. For these areas the decisive balance parameters can be determined separately*
Groundwater threshold value relationships	*No changes since 2015*
Verbal description of the **trend** assessment methodology	*No changes since 2015*
Verbal description of the **trend reversal** assessment methodology	*No changes since 2015*
Threshold values per GWB	

	Pollutant / Indicator	*TV (or range) [unit]*	*NBL (or range) [unit]*	*Level of TV establishment (national, RBD, GWB)*	*Related to risk in this GWB [yes/-]*

GWB-2: Upper Jurassic – Lower Cretaceous GWB

GWB-2	National share	**BG-2, RO-2**	Status 2021 for each national GWB?	
			Chemical (substance)	Quantity
List of individual GW-bodies forming the whole national share (national code incl. country code)	BG-2	BG1G0000J3K051	Good	Good
	RO-2	RODL06	Good	Good

Description/Characterisation of the ICPDR GW-body	***Bulgaria:*** *The starting point for identifying the geographical boundaries of the GWB BG1G0000J3K051 (Upper Jurassic-Lower Cretaceous) is the geological boundaries. After that additional sub-division on the basis of groundwater flow lines and piezometric heads.The lithological composition of GWB is: limestones, dolomitic limestones and dolomites. Overlying strata consists of marls, clays, sands, limestones, pebbles and loess. The age of the above mentioned deposits is Hauterivian, Sarmatian, Pliocene and Quaternary. With the exception of small cropped out areas the GWB is very well protected. There is no significant impact on the GWB. The main use of groundwater is for drinking water, agriculture and industry supply.* ***Romania:*** *Criteria for delineation is development of Upper Jurassic-Lower Cretaceous permeable deposits and water content in these deposits. The lithological composition is limestones, dolomitic limestones and dolomites. Overlying strata consists of marls, clays, sands, limestones, pebbles and loess. The age of the above mentioned deposits is Hauterivian, Sarmatian, Pliocene and Quaternary.* *Groundwater body RODL06- Valachian Platform has great extension and partially covers Valah platform. It is a transboundary water body of great potential, the depth aquifer having partially a free level (in the sector adjacent to the Danube) and is quartered in calcareous formations, sometime fissured and karstic, with regional extension in the whole South Dobrogea. These deposits are characterized by a hydraulic communication through an aquitard.* *From the geological point of view, this aquifer complex has a complex structure, being divided by a system of major older than the Sarmatian fault with orientations approximately NNE-SSW and WNW-ESE.* *Excluding small cropped out areas the GWB is very well protected. The main use is for drinking water supply, agriculture and industry supply. In Romania the GWB has an interaction with Lake Siutghiol situated near the Black Sea.* *The criterion for selection as 'important' is for both GWBs the size which exceeds 4,000 km²*
Description of **status** assessment methodology.	<u>Chemical Status</u> ***Bulgaria:*** *Assessment of the chemical status of groundwater has been done by carrying out the following tests and steps:* *GQA-Test: General assessment of the chemical status of GWB.* *<u>Step 1:</u> Calculation of arithmetic means per monitoring point (MP) for each indicator for the period 2017-2020. Values below LoQ are replaced by ½ LoQ.* *<u>Step 2:</u> Comparison of arithmetic means with the lowest QS or TVs (EQS, intrusion of salt or polluted waters, drinking water standard or other).* *<u>Step 3:</u> Assessment of the chemical status in the area of the MP:* - *If for all indicators, the status is "good", then the GWB in the area of the MP is "good";* - *If for one or more indicators, the status is "poor", then the GWB in the area of the MP is "poor". In this case, a careful analysis was carried out of the primary hydrochemical data. If the data are doubtful or insufficiently reliable, the indicator (indicators) are rejected from the final assessment and a respective justification for this is presented.* *<u>Step 4:</u> If in the areas of all MP the status is good, the GWB is determined 'good' and no other tests are needed.* *<u>Step 5:</u> The confidence of the assessment is determined by the following criteria:* - *Density of the monitoring points in GWB: low (1 MP on area > 200 km²); medium (1 MP on area 50–200 km²), high (1 MP on area <50 km²);* - *Data have to meet the following requirements: All analytical methods are validated in accordance with standard BDS EN ISO / IEC-17025 or other equivalent internationally*

recognized standard. Accredited laboratories shall ensure minimum criteria for all applie analytical methods. Minimum length of the time series.

Step 6: The extent of exceedance was calculated. If the status is determined as "poor" for one or more indicators in one or more MP, then an assessment of the affected area was performed.

- *Based on the conceptual model, it is determined whether the MP (points) is (are) located in the recharge zone or in the transit zone or in the drainage zone of GWB.*
- *The areas of GWB in which the average annual concentrations of pollutants exceed QS or TV have been delineated. Each area of GWB affected by pollution includes the area located between the MP where QS or TV have been exceeded. Further, a 1 km buffer zone was delineated around this zone or around the contaminated MP.*

Step 7: If the polluted area is more than 20% of the total area of the GWB, the confidence assessment was made according step 5.

Step 8: The places of the exceedances are connected with the groundwater receptors. Depending on the identified locations and GW receptors, relevant tests have been applied: saline or other intrusion, surface water bodies with deteriorated status, GW directly dependent terrestrial ecosystems, drinking and household water supply located at polluted area.

Step 9: Local conceptual models have been developed for each exceedance point considering the possibility for the pollutant to move through the GWB, identification of pressures, additional trend assessment.

A GWB is in good chemical status when the extent of exceedance is less than 20% and the remaining tests show that: the quality of groundwater used for drinking and domestic water supply has not deteriorated, the GW status-related to surface waters and terrestrial ecosystems (directly dependent of GW) has not deteriorated and there is no intrusion of salt or polluted waters; no significant and sustainable upward trends in concentrations of pollutants and pollution indicators have been identified.

***Romania:** The methodology for the chemical status assessment followed the requirements of the Groundwater Directive (2006/118/EC) as well as the recommendations of the CIS Guidance Document no. 18 – Guidance on Groundwater status and trend assessment.*

The first step was to check any exceedances of the quality standards and TVs which were established taken into consideration the NBL values. If no exceedances of the quality standards and TVs have been recorded, the groundwater body has been considered as being in good chemical status. If exceedances of TVs were recorded the following relevant tests were carried out:

- *General assessment of the chemical status: Data aggregation was performed and it was checked whether the total area of exceedance was greater than 20% of the total area of the GWB. The test showed a good status for the water body if no exceeding occurs.*
- *Saline or other intrusion: not relevant.*
- *Significant diminution of associated surface water chemistry and ecology due to transfer of pollutants from the GWB: The location of the exceedance of the relevant TVs was not found in areas where pollutants might be transferred to surface waters. A comparison of the pollutant load transferred from the GWB to the surface water body with the total load in the surface water body did not exceed 50%. The test showed a good status for the water body.*
- *Significant damage to GWDTEs due to transfer of pollutants from the GWB: No GWDTE was found to be damaged. The test showed a good status for the water body;*
- *Meets the requirements of WFD Article 7(3) – Drinking Water Protected Areas: there is no evidence of increased treatment due to changes in water quality. The test showed a good status for the water body.*

To assess the chemical status of the groundwater bodies, the following steps are considered:

- *for each monitoring point the annual average concentrations for each indicators was calculated; for the metals the concentration of the dissolved form was considered;*
- *For each monitoring point the annual average concentration of the each parameters was compared with the thresholds values (determined for each GWB) or standards value (nitrates and pesticides).*

	• *The GWB is of good chemical status when no EQS or TV is exceeded in any monitoring point.* • *The GWB is of poor chemical status when EQS or TV are exceeded at monitoring points representing more than 20% of the GWB surface.* Quantitative Status ***Bulgaria:*** *The assessment considered data from national and self-monitoring of groundwater abstraction facilities according to the issued permits. The main criteria for assessing good quantitative status are the exploitable (available) groundwater resources of GWB and the groundwater level. To verify compliance with the requirements of the WFD, various tests were performed. The assessment was based on data from 2017–2020 and trends were assessed, with data from 2007–2020. The following tests were performed:* - *Water balance test: the assessment of the GW level downward trend is an indication that, the available GW resources were exceeded and the GWB is in poor status.* - *Surface water test and terrestrial ecosystem test: both not applicable in BG-2 as surface water bodies and terrestrial ecosystems are not associated/connected.* - *Saline intrusion test: not relevant* ***Romania:*** *The criterion for risk assessment of the quantity status is based on trend assessment evolution of the groundwater levels. The quantitative status has been assessed taking into account the CIS Guidance no.18. The following criteria have been used:* • *water balance* • *the connection with surface waters* • *the influence on the terrestrial ecosystems which depend directly on the GWB* • *the effects of saline or other intrusions* *The quantitative status analysis has been done for the GWB level by comparing the average of the hydrostatic level from 2017 (reference year) with the multiannual average during the whole observation period*
Groundwater threshold value relationships	Receptors considered: ***Romania:*** *Drinking Water standards* ***Bulgaria:*** *Drinking Water standards* Consideration of NBL and EQS (environmental quality standards, drinking water standards) in the TV establishment: ***Romania:*** *The methodology for TV establishment in Romania has been developed according to CIS Guidance No. 18. NBL are the key elements in the process of TV setting. As described above, during the TV establishment, the NBL have been compared with the drinking water standards. The maximum allowable concentrations (MAC) provided by the Law no.458/2002 as amended, were chosen as TV where NBL are smaller than MAC. Where NBL are higher than MAC, a small addition of 0.2 NBL was used, in order to avoid misclassification of the respective GWB (TV = NBL + 0.2 NBL = 1.2 NBL).* *The updated list of TVs established for each GWB was published in the new Order of the Minster no. 621/2014 approving TV for GWBs from Romania.* ***Bulgaria:*** *The methodology for TV determination in Bulgaria has been developed according to CIS Guidance No. 18. TVs are determined by comparing NBLs with criterial values (CVs). CVs is the concentration of a pollutant (without taking into account the NBLs), which, if exceeded, could lead to a distortion of the criteria for good status. CVs should take into account the risk assessment and receptors of groundwater.* *The NBL were established for each GWB as a result of the project report 'Assessment of the natural hydrochemical background of the substances composition of groundwater in Bulgaria" (GEOFUND V-402), 1998' NBLs are available for Ca, Mg, SO4, Cl, HC03, Total hardness, Cu, Pb, Zn, As, Fe, F, Al, Mn, Cr, Co, V, J, Ag, Ni, Na, K.* *The NBLs were determined for each hydrogeological classes (5 classes) in the 90th percentile and 50th percentile (median) of the statistical sample.* *Criterial values (CVs) have been drinking water standards according to the Bulgarian Regulation N-9.* *When NBL > CV, the TV is equal to NBL.* *When CV > NBL, the TV = NBL + Ktv* (CV-NBL).* ***0 < Ktv < 1***

	Ktv is usually between 0.5 and 0.75, as recommended and providing reasonable assurance. Ktv <0.5 has a large certainty and is used for GWBs, which have important economic significance and are the sole source of drinking water supply of settlements. This value should be used for such GWB to which they are attached particularly valuable wetlands presence of dependent PA terrestrial ecosystems. The higher value (0.75) is used in all other cases or GWBs already classified bodies at risk.
Verbal description of the **trend** assessment methodology	***Bulgaria:*** *The trend analysis is based on recognized statistical methods such as regression method and a time series of data from 2012 to 2019 (using annual values, semi-annual or quarterly values).* *Based on regression analysis is assessed whether there is a break in the trend i.e. after sustained upward trend follows sustained downward trend or the opposite case the sustained downward trend is followed by sustained upward trend.* • *Initially , the entire curve of the experimental data is approximated by a polynomial curve of degree 2 (quadratic regression curve).* • *If there is detected a maximum in the polynomial curve it means that a change of the direction of the trend is available - from ascending to descending.* • *If there is detected a minimum in the polynomial curve it means that a change of the direction of the trend is available - from descending to ascending.* • *Then, (in case of available maximum) the entire curve is divided into two branches: 1st branch – till the date of the maximum and the second branch - after the peak.* • *In case with available minimum: 1st branch – till the date of the minimum and the second branch - after the minimum.* • *Data from the first and second branch are considered separately and are approximated by linear trends (straight lines) . The date at which it crossed the two approximating straight lines corresponds to the date at which it changes the direction of the linear trend - from ascending to descending or from descending to ascending* *By extrapolation of the second (falling) trend can be predicted date at which the starting concentration (75% GWQS in our case 60% TV) will be reached* ***Romania:*** *In order to assess the trend in pollutant concentrations, the results of the chemical analysis from the monitoring points have been used. Minimum period of analysis was at least 17 years (2000–2017).* *The methodology for identifying significant upper trends consists in adjustment and aggregation of the data from each monitoring points on groundwater bodies. The trend analysis was done using the Gwstat program.* *The steps used for trend assessment were:* • *Identifying the monitoring points and the associated results of chemical analysis, assessment of data series, for each year of reference period (2000–2017)* • *Establishment of baseline concentration for each parameter as the average concentration registered during the year 2000* • *Calculation of annual average for the available data in each monitoring point* • *Significant upward trends were identified by Gwstat software, based on Anova Test*
Verbal description of the **trend reversal** assessment methodology	***Bulgaria:*** *The starting point for trend reversal should be placed where the concentration of the pollutant reaches 75% of the groundwater quality standard or 75% of the threshold value of the relevant pollutant. Selected starting points should be possible to reverse trends in the most effective way before pollutant concentrations can cause irreversible changes in groundwater quality. When we have GWB who responds too slowly to changes, there may be a need for an early starting point and vice versa - for responsive GWB should be chosen starting point at a later moment.* *Initially, the entire curve of the experimental data is approximated by a polynomial curve of degree 2 (quadratic regression curve).* *If there is detected a maximum in the polynomial curve it means that a change of the direction of the trend is available - from ascending to descending.* *If there is detected a minimum in the polynomial curve it means that a change of the direction of the trend is available - from descending to ascending.*

Then, (in case of available maximum) the entire curve is divided into two branches: 1st branch – till the date of the maximum and the second branch - after the peak

In case with available minimum: 1st branch – till the date of the minimum and the second branch - after the minimum.

Data from the first and second branch are considered separately and are approximated by linear trends (straight lines). The date at which it crossed the two approximating straight lines corresponds to the date at which it changes the direction of the linear trend - from ascending to descending or from descending to ascending

By extrapolation of the second (falling) trend can be predicted date at which the starting concentration (75% GWQS in our case 60% TV) will be reached .Practically for the second RBMP we have used 60 % from the TV.

Romania: *Trend reversal assessment methodology consists also in the use of Gwstat software.*

This method assumes that the time series can be characterized by two linear trends with a slope change within the time interval (analysis period). Thus, by applying the 95% quantile of the distribution, a reversal of the trend is identified, if in the first section the slope of the trend is positive, and in the second section the slope of the trend is negative. The stages of the method of reversing the pollutant concentration tendency:

- *optimizing the choice of time sections regarding the shape of the resulting model*
- *examining the significance of the rift for the simple linear regression model based on the square of the residue sum*
- *conducting a statistical test to verify that the 2-sections model is significantly more than a simple regression model.*

Threshold values per GWB

	Pollutant / Indicator	*TV (or range) [unit]*	*NBL (or range) [unit]*	*Level of TV establishment (national, RBD, GWB)*	*Related to risk in this GWB [yes/-]*
RO	*Nitrates*	*50 mg/l*		*National*	-
RO	*Benzen*	*10 µg/l*		*National*	-
RO	*Tricloretilena*	*10 µg/l*		*National*	-
RO	*Tetracloretilena*	*10 µg/l*		*National*	-
RO	*Ammonium*	*0.5 mg/l*	*0.31mg/l*	*GWB*	-
RO	*Chlorides*	*250 mg/l*	*73,87 mg/l*	*GWB*	-
RO	*Sulphates*	*250 mg/l*	*71,44 mg/l*	*GWB*	-
RO	*Nitrites*	*0.5 mg/l*	*0.039 mg/l*	*GWB*	-
RO	*Phosphates*	*0.5 mg/l*	*0.08 mg/l*	*GWB*	-
RO	*Cadmium*	*0.005 mg/l*	*0.0001mg/l*	*GWB*	-
RO	*Mercury*	*0.001 mg/l*	*0.000042 mg/l*	*GWB*	-
RO	*Lead*	*0.01 mg/l*	*0.0011 mg/l*	*GWB*	-
RO	*Arsenic*	*0.01 mg/l*	*0.00075 mg/l*	*GWB*	-
BG	*Nitrates*	*38.5 mg/l*	*2.2 mg/l*	*GWB*	-
BG	*Pesticides sum*	*0.375 µg/l*		*GWB*	
BG	*Arsenic*	*0.0076 mg/l*	*0.0004 mg/l*	*GWB*	
BG	*Lead*	*0.0081 mg/l*	*0.0026 mg/l*	*GWB*	
BG	*Cadmium*	*0.0038 mg/l*	*0.0002 mg/l*	*GWB*	
BG	*Mercury*	*0.0008 mg/l*	*0.0002 mg/l*	*GWB*	
BG	*Ammonium*	*0.4487 mg/l*	*0.295 mg/l*	*GWB*	
BG	*Chlorides*	*189 mg/l*	*6 mg/l*	*GWB*	
BG	*Sulphates*	*192 mg/l*	*18 mg/l*	*GWB*	
BG	*Tri + Tetrachlo-roethyle*	*7.5 µg/l*		*GWB*	
BG	*Conductivity*	*1640.625 µS/cm*	*562.5 µS/cm*	*GWB*	
BG	*Manganese*	*0.038 mg/l*	*0.022 mg/l*	*GWB*	
BG	*Total Iron*	*0.1607 mg/l*	*0.043 mg/l*	*GWB*	
BG	*Nitrites*	*0.3801 mg/l*	*0.0207mg/l*	*GWB*	
BG	*Sodium*	*156.75 mg/l*	*27 mg/l*	*GWB*	

BG	*Chromium*	*38.875 mg/l*	*5.5 µg/l*	*GWB*	
BG	*Cupper*	*0.1527 mg/l*	*0.0108 mg/l*	*GWB*	
BG	*Nikel*	*15.05 µg/l*	*0.2 µg/l*	*GWB*	
BG	*Zink*	*0.777 mg/l*	*0.109 mg/l*	*GWB*	
BG	*COD - Mn*	*3.975 mgO2/l*	*0.9 mgO2/l*	*GWB*	
BG	*PO4*	*0.3805 mg/l*	*0.022 mg/l*	*GWB*	
BG	*Cyanides*	*0.04 mg/l*	*0.01 mg/l*	*GWB*	

GWB-3: Middle Sarmatian - Pontian GWB

GWB-3	National share	**MD-3** **RO-3**	Status 2021 for each national GWB?	
			Chemical (substance)	Quantity
List of individual GW-bodies forming the whole national share (national code incl. country code)		MDPR01	Good	Good
		ROPR05	Good	Good

Description/Characterisation of the ICPDR GW-body	***Romania:*** *The criteria for delineation of the GWB was the development of the Sarmatian aquifer deposits on the territories of Neamt, Bacau and Vaslui districts, situated in the Siret and Prut River Basins. Lithologically, the water-bearing deposits are constituted of sands and sandstones thin layer. Geologically, the wells have pierced the following sub-stages of the Sarmatian: Buglovian, Volhynian, Basarabian and Chersonian. The wells data have indicated that the Sarmatian deposits thickness is highly variable, going from 295 m (Iaşi) to 886 m (Bârlad). It is considered that the Sarmatian deposits unconformably overlay the Late Badenian ones, because the Early Buglovian is lacking. The upper boundary of Sarmatian, respectively the Sarmatian-Meotian boundary, is difficult to assign due to the lack of sure paleontological elements.* *Lithologically, the water-bearing deposits are constituted of thin layers with fine towards medium grain-size (sands, rarely gravels), sometimes with lens aspect, situated at depth of 30–350 meters.* *Hydrogeologically and hydrochemically, the investigation of wells data has revealed important areal differences, of quantitative and qualitative order, both horizontally and vertically. The differences of quantitative order are especially due to the Sarmatian deposits grain size.* *The overlying strata is represented by clay of about 50 meters thickness.* *The groundwater is mainly used for drinking water supply, agricultural and industrial supplies. The criterion for selection as "important" consists in its size that exceeds 4,000 km^2.* ***Republic of Moldova:*** *Criteria for delineation are: geological boundaries; groundwater flow lines; chemical and one quantitative status; GWB vulnerability; surface–groundwater interaction. The MD GWB consists of five deep aquifers.* *<u>Silurian - Cretaceous aquifer</u> (S-K2) is spread on the whole territory of the basin and it is used for centralized water supply only in the northern part of the basin. Groundwater is contained in limestone, sandstone, with interlayers of Silurian marls and argilites with total thickness varying from 50-60 m to 100-120 m. Water bearing capacity of the aquifers vary in a wide range. Dominating values of hydraulic conductivity and transmissivity are rather low (K=0.12–0,37 m/day, Km=10-50 m2/day). The chemical composition of the Silurian-Cretaceous aquifers is heterogenous. In the northern part of the basin fresh groundwaters with mineralisation <1g/l and dominating hydrocarbonate-sulphate-calcium-magnesium ions are detected. Going to the south chemical composition of the aquifer the characteristics is changing to hydrocarbonate-sulphate-sodium and hydrocarbonate sodium type and the amount of total dissolved solids increases to 2-10 mg/l.* *<u>Baden-Sarmatian</u> aquifer (N1b-s) is the most productive and most important for centralized water supply. Water-bearing layers are represented by limestone with interlayers of fine grained sand, sometimes clays, marls and gypsum. Thickness of the aquifer reaches 50 m, in some places up to 90 m, with average thickness of about 25 m. In the northern part of the basin water bearing*

	sediments outcrop to the pre-Quaternary surface and these areas coincide with the recharge zones of the aquifer. Groundwater is discharging into the valley of Prut's tributaries. Southwards Baden-Sarmatian aquifer occurs deeper and near the village Gotesti it was detected by drilling at the depth of 572 m.Hydraulic properties of the aquifer are rather poor. Hydraulic conductivity reaches 1–12 m/day, with mean values of 5 m/day, transmissivity is also low – only 5–20 m²/day. Capacity of wells varies in a range of 0.09–8l/s. *When water bearing rocks are composed of limestones they contain fresh or slightly mineralised hydrocarbonate-calcium-sodium water with mineralization below 1 g/l. Such areas, however, are rather scarce and groundwaters with mineralization above 1 g/l are prevailing in the basin.* *Upper Sarmatian Meotic aquifer system (N1s3-m), which can be included in this GWB is only partially exploited for groundwater abstraction in the southern part of the river basin. Sarmat-Meotis deposits in the area are represented by fine-grained sands and clay with the lenses of quartz sand with total thickness of the aquifer 60–70 m. This sand is water-bearing and contains good quality water. The thickness of water bearing layers is 4–5 m. Yields of exploitation wells vary between 3 and 7 m³/h. Waters from the aquifer system are supplying the needs of several enterprises. Near the Prut river valley yields of the wells increase to 10 m³/h with the drawdown of up to 30 m. This aquifer contains hydrocarbonate-sodium waters with total mineralization of 1–1.5 g/l. In some areas chemical composition changes to sulphate-hydrocarbonate-sodium and mineralization increases to 2 g/l. Hydraulic parameters of the aquifer are rather poor: hydraulic conductivity varies between 0.8–5 m/day with mean values of 2.3 m/day and transmissivity changes in a range of 10–25 m²/day, mean being 5 m²/day.* *Groundwater monitoring results over three wells for the period from 2005 to 2009 indicate a decrease in the level of groundwater. The rate of decrease is 0.5–1.4 meter per year. This can be attributed to an increase in the water abstraction from the operating wells located in the vicinity.* *Middle Sarmatian (Congeriev) aquifer (N1s2)is used for a centralised water supply in the southern part of Republic of Moldova. Groundwater is contained in fine-grained sands with interlayers of clays, sandstones and limestones. Thickness of water bearing sediments varies from 5–15 m to 40–50 m with mean values of 20–30 m. Hydraulic properties of water bearing sands are quite poor. Hydraulic conductivity changes from 0.6 to 1.9 m/day average being 1.3 m/day. Transmissivity values are also very low and do not exceed 20–50 m²/day. Depth to groundwater aquifer depends on the landscape and varies from 1.5 to 100 m. Yields of wells vary from 5 to 75 l/s. When hydrocarbonate-sulphate-chloride anions dominate in groundwater its mineralisation is below 1.5 g/l. When chloride–hydrocarbonate and sodium ions prevail total mineralization increases up to 2 g/l. Monitoring of the aquifer indicates a slight decrease in groundwater level with the rate of 0.4–0.65 m/a.* *Pontian aquifer (N2p) is spread in the southern part of Republic of Moldova. Water bearing sediments are composed of sandy clays with interlayers of sand and shell limestone with the total thickness of 70–80 m.Prevailing hydraulic properties of water bearing sands are rather poor. Hydraulic conductivity changes from 3.5–3.7 with mean values of 3 m/day. Transmissivity coefficient varies between 18–45 m²/day in some places (e.g. Giurgiulesti village) increasing to 250–260 m²/day. Depth to groundwater aquifer depends on the landscape and varies from 2 to 125 m. Yields of wells vary from 1.1–2.3 l/s, increasing southwards to 3.7–7.6 l/s. Near the village of Taraklia few springs are discharging into Prut river valley with the capacity of 8–9 l/sec. Aquifer contains fresh groundwater with mineralisation <1 g/l (figure 2.6) and prevailing ions of hydrocarbonate -sulphate-chloride-sodium, sometimes sulphate –hydrocarbonate-sodium.* *Groundwater from this aquifer is used for drinking and agricultural water supply.*
Description of **status** assessment methodology.	Chemical Status ***Republic of Moldova:*** *The methodology for the chemical status assessment followed the requirements of the Groundwater Directive (2006/118/EC) as well as the recommendations of the CIS Guidance Document no. 18 – Guidance on Groundwater status and trend assessment.* ***Romania:*** *The methodology for the chemical status assessment followed the requirements of the Groundwater Directive (2006/118/EC) as well as the recommendations of the CIS Guidance Document no. 18 – Guidance on Groundwater status and trend assessment.* *The first step was to check any exceedances of the quality standards and TVs which were established taken into consideration the NBL values. If no exceedances of the quality standards and TVs have been recorded, the groundwater body has been considered as being in good*

	chemical status. If exceedances of TVs were recorded the following relevant tests were carried out: • *General assessment of the chemical status: Data aggregation was performed and it was checked whether the total area of exceedance was greater than 20% of the total area of the GWB. The test showed a good status for the water body if no exceeding occurs.* • *Saline or other intrusion: not relevant.* • *Significant diminution of associated surface water chemistry and ecology due to transfer of pollutants from the GWB: The location of the exceedance of the relevant TVs was not found in areas where pollutants might be transferred to surface waters. A comparison of the pollutant load transferred from the GWB to the surface water body with the total load in the surface water body did not exceed 50%. The test showed a good status for the water body.* • *Significant damage to GWDTEs due to transfer of pollutants from the GWB: No GWDTE was found to be damaged. The test showed a good status for the water body;* • *Meets the requirements of WFD Article 7(3) – Drinking Water Protected Areas: there is no evidence of increased treatment due to changes in water quality. The test showed a good status for the water body* *To assess the chemical status of the groundwater bodies, the following steps are considered:* • *for each monitoring point the annual average concentrations for each indicator was calculated; for the metals the concentration of the dissolved form was considered;* • *For each monitoring point the annual average concentration of the each parameters was compared with the thresholds values (determined for each GWB) or standards value (nitrates and pesticides).* • *The GWB is of good chemical status when no EQS or TV is exceeded in any monitoring point.* • *The GWB is of poor chemical status when EQS or TV are exceeded at monitoring points representing more than 20% of the GWB surface.* Quantitative Status: ***Republic of Moldova:*** *The criterion for risk assessment of the quantity status is based on trend assessment evolution of the groundwater levels. The quantitative status has been assessed taking into account the CIS Guidance № 18* ***Romania:*** *The criterion for risk assessment of the quantity status is based on trend assessment evolution of the groundwater levels. The quantitative status has been assessed taking into account the CIS Guidance № 18. The following criteria have been used:* • *water balance* • *the connection with surface waters* • *the influence on the terrestrial ecosystems which depend directly on the GWB* • *the effects of saline or other intrusions* *The quantitative status analysis has been done for the GWB level by comparing the average of the hydrostatic level from 2017 (reference year) with the multiannual average levels during the whole period.*
Groundwater threshold value relationships	Receptors considered: ***Romania:*** *Drinking Water standards* ***Republic of Moldova:*** Consideration of NBL and EQS (environmental quality standards, drinking water standards) in the TV establishment: ***Romania:*** *The methodology for TV establishment in Romania has been developed according to CIS Guidance No. 18. NBL are the key elements in the process of TV setting. As described previously, during the TV establishment, the NBL have been compared with the drinking water standards. The maximum allowable concentrations (MAC) provided by the Law no.458/2002 as amended, were chosen as TV where natural background levels (NBL) are smaller than MAC.*

	Where background levels are higher than MAC, a small addition of 0.2 NBL was used, in order to avoid misclassification of the respective GWB (TV = NBL + 0.2 NBL = 1.2 NBL). *The updated list of TVs established for each GWB was published in the new Order of the Minster no. 621/2014 approving TV for groundwater bodies from Romania.*
Verbal description of the **trend** assessment methodology	***Republic of Moldova:*** *In order to assess the trend in pollutant concentrations, the results of the chemical analysis from the monitoring points have been used. Minimum period of analysis was at least 22 years (1996-2018).* ***Romania:*** *In order to assess the trend in pollutant concentrations, the results of the chemical analysis from the monitoring points have been used. Minimum period of analysis was at least 17 years (2000-2017).* *The methodology for identifying significant upper trends consists in adjustment and aggregation of the data from each monitoring points on groundwater bodies. The trend analysis was done using the Gwstat program.* *The steps used for trend assessment were:* • *Identifying the monitoring points and the associated results of chemical analysis, assessment of data series, for each year of reference period (2000–2017)* • *Establishment of baseline concentration for each parameter as the average concentration registered during the year 2000* • *Calculation of annual average for the available data in each monitoring point* • *Significant upward trends were identified by Gwstat software, based on Anova Test*
Verbal description of the **trend reversal** assessment methodology	***Romania:*** *Trend reversal assessment methodology consists also in the use of Gwstat software. This method assumes that the time series can be characterized by two linear trends with a slope change within the time interval (analysis period). Thus, by applying the 95% quantile of the distribution, a reversal of the trend is identified, if in the first section the slope of the trend is positive, and in the second section the slope of the trend is negative. The stages of the method of reversing the pollutant concentration tendency:* • *optimizing the choice of time sections regarding the shape of the resulting model;* • *examining the significance of the rift for the simple linear regression model based on the square of the residue sum;* • *conducting a statistical test to verify that the 2-sections model is significantly more than a simple regression model.*

Threshold values per GWB

	Pollutant / Indicator	*TV (or range) [unit]*	*NBL (or range) [unit]*	*Level of TV establishment (national, RBD, GWB)*	*Related to risk in this GWB [yes/-]*
RO	*Nitrates*	*50 mg/l*		*National*	*-*
RO	*Benzen*	*10 µg/l*		*National*	*-*
RO	*Tricloretilena*	*10 µg/l*		*National*	*-*
RO	*Tetracloretilena*	*10 µg/l*		*National*	*-*
RO	*Ammonium*	*6.4 mg/l*	*5,34 mg/l*	*GWB*	*-*
RO	*Chlorides*	*250 mg/l*	*78,87 mg/l*	*GWB*	*-*
RO	*Sulphates*	*250 mg/l*	*192 mg/l*	*GWB*	*-*
RO	*Nitrites*	*0,5 mg/l*	*0.34 mg/l*	*GWB*	*-*
RO	*Phosphates*	*1,4 mg/l*	*1,13 mg/l*	*GWB*	*-*
RO	*Chromium*	*0,05 mg/l*	*0.0003033 mg/l*	*GWB*	*-*
RO	*Nickel*	*0,02 mg/l*	*0.00053 mg/l*	*GWB*	*-*
RO	*Copper*	*0,1 mg/l*	*0.00307 mg/l*	*GWB*	*-*
RO	*Zinc*	*5 mg/l*	*0.02425 mg/l*	*GWB*	*-*
RO	*Cadmium*	*0,005 mg/l*	*0.0000455 mg/l*	*GWB*	*-*
RO	*Mercury*	*0,001 mg/l*	*0.000003385 mg/l*	*GWB*	*-*
RO	*Lead*	*0,01 mg/l*	*0.0001825 mg/l*	*GWB*	*-*
RO	*Arsenic*	*0,01 mg/l*	*0.003175 mg/l*	*GWB*	*-*

GWB-4: Sarmatian GWB

GWB-4	National share	**BG-4** **RO-4**	Status 2021 for each national GWB?	
			Chemical (substance)	Quantity
List of individual GW-bodies forming the whole national share (national code incl. country code)	BG-4	BG1G000000N049	Good	Good
	RO-4	RODL04	Poor (nitrates)	Good

Description/Characterisation of the ICPDR GW-body	*The starting point for identifying the boundaries of the GWB BG1G000000N049 Sarmatian is the geological boundaries. The lithological composition of water-bearing deposits is as follows:* - *in Bulgaria: limestones, sands;* *Overlying strata consists of loess and loesses clays and clays. The age of the above mentioned deposits is Quaternary. The GWB is vulnerable with cropped out regions of limestones and sandstones or covered with loess. GWB main use is for drinking water supply, agriculture and industry supply.* ***Romania:*** *Criteria for delineation are the development of Sarmatian permeable deposits and water resources in these deposits. The lithological composition of water-bearing deposits is oollitic limestones and organogenic limestone.* *Overlying strata consists of loess and clays. The GWB is well protected in the clay covered areas, but is vulnerable to pollution in pre-dominantly loess and sands covered areas. This explains nitrate contamination in some areas.* *GWB main use is for drinking water supply, and also agricultural and industrial purposes.* *The main pressures are agriculture activities, waste landfills and less industrial plants.* *The criterion for selection as "important" is the size, which exceeds 4000 km².*
Description of **status** assessment methodology.	Chemical Status ***Bulgaria:*** *Assessment of the chemical status of groundwater has been done by carrying out the following tests and steps:* *GQA-Test: General assessment of the chemical status of GWB.* *Step 1: Calculation of arithmetic means per monitoring point (MP) for each indicator for the period 2017-2020. Values below LoQ are replaced by ½ LoQ.* *Step 2: Comparison of arithmetic means with the lowest QS or TVs (EQS, intrusion of salt or polluted waters, drinking water standard or other).* *Step 3: Assessment of the chemical status in the area of the MP:* - *If for all indicators, the status is "good", then the GWB in the area of the MP is "good";* - *If for one or more indicators, the status is "poor", then the GWB in the area of the MP is "poor". In this case, a careful analysis was carried out of the primary hydrochemical data. If the data are doubtful or insufficiently reliable, the indicator (indicators) are rejected from the final assessment and a respective justification for this is presented.* *Step 4: If in the areas of all MP the status is good, the GWB is determined 'good' and no other tests are needed.* *Step 5: The confidence of the assessment is determined by the following criteria:* - *Density of the monitoring points in GWB: low (1 MP on area > 200 km²); medium (1 MP on area 50–200 km²), high (1 MP on area <50 km²);* - *Data have to meet the following requirements: All analytical methods are validated in accordance with standard BDS EN ISO / IEC-17025 or other equivalent internationally recognized standard. Accredited laboratories shall ensure minimum criteria for all applie analytical methods. Minimum length of the time series.* *Step 6: The extent of exceedance was calculated. If the status is determined as "poor" for one or more indicators in one or more MP, then an assessment of the affected area was performed.* - *Based on the conceptual model, it is determined whether the MP (points) is (are) located in the recharge zone or in the transit zone or in the drainage zone of GWB.*

	- *The areas of GWB in which the average annual concentrations of pollutants exceed QS or TV have been delineated. Each area of GWB affected by pollution includes the area located between the MP where QS or TV have been exceeded. Further, a 1 km buffer zone was delineated around this zone or around the contaminated MP.* *Step 7: If the polluted area is more than 20% of the total area of the GWB, the confidence assessment was made according step 5.* *Step 8: The places of the exceedances are connected with the groundwater receptors. Depending on the identified locations and GW receptors, relevant tests have been applied: saline or other intrusion, surface water bodies with deteriorated status, GW directly dependent terrestrial ecosystems, drinking and household water supply located at polluted area.* *Step 9: Local conceptual models have been developed for each exceedance point considering the possibility for the pollutant to move through the GWB, identification of pressures, additional trend assessment.* *A GWB is in good chemical status when the extent of exceedance is less than 20% and the remaining tests show that: the quality of groundwater used for drinking and domestic water supply has not deteriorated, the GW status-related to surface waters and terrestrial ecosystems (directly dependent of GW) has not deteriorated and there is no intrusion of salt or polluted waters; no significant and sustainable upward trends in concentrations of pollutants and pollution indicators have been identified.* ***Romania:** The methodology for the chemical status assessment followed the requirements of the Groundwater Directive (2006/118/EC) as well as the recommendations of the CIS Guidance Document no. 18 – Guidance on Groundwater status and trend assessment.* *The first step is to check any exceedances of the quality standards and TVs which were established taken into consideration the NBL values. If no exceedances of the quality standards and TVs are recorded, the groundwater body is considered as being in good chemical status. If exceedances of TVs or quality standards are recorded the following relevant tests are carried out:* • *General assessment of the chemical status: Data aggregation is performed and it is checked whether the total area of exceedance is greater than 20% of the total area of the GWB. In case there are no exceedances, the test indicate a good status for the water body.* • *Saline or other intrusion: not relevant.* • *Significant diminution of associated surface water chemistry and ecology due to transfer of pollutants from the GWB: the location of the exceedance of the relevant TVs was not found in areas where pollutants might be transferred to surface waters; a comparison of the pollutant load transferred from the GWB to the surface water body with the total load in the surface water body did not exceed 50%. The test show a good status for the water body if these criteria are achieved.* • *Significant damage to GWDTEs due to transfer of pollutants from the GWB: No GWDTE was found to be damaged. The test show a good status for the water body if this criteria is achieved;* • *Meets the requirements of WFD Article 7(3) – Drinking Water Protected Areas: there is no evidence of increased treatment due to changes in water quality.* *To assess the chemical status of the groundwater bodies, the following steps are considered.* • *for each monitoring point the annual average concentrations for each indicator was calculated; for the metals the concentration of the dissolved form was considered;* • *For each monitoring point the annual average concentration of the each parameters was compared with the thresholds values (determined for each GWB) or standards value (nitrates and pesticides).* • *The GWB is of good chemical status when no EQS or TV is exceeded in any monitoring point.* • *The GWB is of poor chemical status when EQS or TV are exceeded at monitoring points representing more than 20% of the GWB surface.* *The chemical status of the GWB RODL06 is poor, considering the results of applying the methodology for chemical status assessment*

	Quantitative Status ***Bulgaria:*** *The assessment considered data from national and self-monitoring of groundwater abstraction facilities according to the issued permits. The main criteria for assessing good quantitative status are the exploitable (available) groundwater resources of GWB and the groundwater level. To verify compliance with the requirements of the WFD, various tests were performed. The assessment was based on data from 2017–2020 and trends were assessed, with data from 2007–2020. The following tests were performed:* - *Water balance test: the assessment of the GW level downward trend is an indication that, the available GW resources were exceeded and the GWB is in poor status.* - *Surface water test and terrestrial ecosystem test: both not applicable in BG-2 as surface water bodies and terrestrial ecosystems are not associated/connected.* - *Saline intrusion test: not relevant* ***Romania:*** *The criterion for risk assessment of the quantity status is based on trend assessment evolution of the groundwater levels. The quantitative status has been assessed taking into account the CIS Guidance no.18. The following criteria have been used:* • *water balance* • *the connection with surface waters* • *the influence on the terrestrial ecosystems which depend directly on the GWB* • *the effects of saline or other intrusions* *The quantitative status analysis has been done for the GWB level by comparing the average of the hydrostatic level from 2017 (reference year) with the multiannual average levels during the whole observation period.*
Groundwater threshold value relationships	Receptors considered: ***Romania:*** *Drinking Water standards* ***Bulgaria:*** *Drinking Water standards* Consideration of NBL and EQS (environmental quality standards, drinking water standards) in the TV establishment: ***Romania:*** *The methodology for TV establishment in Romania has been developed according to CIS Guidance No. 18. NBL are the key elements in the process of TV setting. As described above, during the TV establishment, the NBL have been compared with the drinking water standards. The maximum allowable concentrations (MAC) provided by the Law no.458/2002 as amended, were chosen as TV where NBL are smaller than MAC. Where NBL are higher than MAC, a small addition of 0.2 NBL was used, in order to avoid misclassification of the respective GWB (TV = NBL + 0.2 NBL = 1.2 NBL).* *The updated list of TVs established for each GWB was published in the new Order of the Minster no. 621/2014 approving TV for GWBs from Romania.* ***Bulgaria:*** *The methodology for TV determination in Bulgaria has been developed according to CIS Guidance No. 18. TVs are determined by comparing NBLs with criterial values (CVs). CVs is the concentration of a pollutant (without taking into account the NBLs), which, if exceeded, could lead to a distortion of the criteria for good status. CVs should take into account the risk assessment and receptors of groundwater.* *The NBL were established for each GWB as a result of the project report 'Assessment of the natural hydrochemical background of the substances composition of groundwater in Bulgaria" (GEOFUND V-402), 1998' NBLs are available for Ca, Mg, SO4, Cl, HC03, Total hardness, Cu, Pb, Zn, As, Fe, F, Al, Mn, Cr, Co, V, J, Ag, Ni, Na, K.* *The NBLs were determined for each hydrogeological classes (5 classes) in the 90th percentile and 50th percentile (median) of the statistical sample.* *Criterial values (CVs) have been drinking water standards according to the Bulgarian Regulation N-9.* *When NBL > CV, the TV is equal to NBL.* *When CV > NBL, the TV = NBL + Ktv* (CV-NBL).* ***0 < Ktv < 1*** *Ktv is usually between 0.5 and 0.75, as recommended and providing reasonable assurance.* *Ktv <0.5 has a large certainty and is used for GWBs, which have important economic significance and are the sole source of drinking water supply of settlements. This value should be used for such GWB to which they are attached particularly valuable wetlands presence of*

	dependent PA terrestrial ecosystems. The higher value (0.75) is used in all other cases or GWBs already classified bodies at risk.
Verbal description of the **trend** assessment methodology	***Bulgaria:*** *The trend analysis is based on recognized statistical methods such as regression method and a time series of data from 2012 to 2019 (using annual values, semi-annual or quarterly values).* *Based on regression analysis is assessed whether there is a break in the trend i.e. after sustained upward trend follows sustained downward trend or the opposite case the sustained downward trend is followed by sustained upward trend.* • *Initially, the entire curve of the experimental data is approximated by a polynomial curve of degree 2 (quadratic regression curve).* • *If there is detected a maximum in the polynomial curve it means that a change of the direction of the trend is available - from ascending to descending.* • *If there is detected a minimum in the polynomial curve it means that a change of the direction of the trend is available - from descending to ascending.* • *Then, (in case of available maximum) the entire curve is divided into two branches : 1st branch – till the date of the maximum and the second branch - after the peak.* • *In case with available minimum: 1st branch – till the date of the minimum and the second branch - after the minimum.* • *Data from the first and second branch are considered separately and are approximated by linear trends (straight lines). The date at which it crossed the two approximating straight lines corresponds to the date at which it changes the direction of the linear trend - from ascending to descending or from descending to ascending* *By extrapolation of the second (falling) trend can be predicted date at which the starting concentration (75% GWQS in our case 60% TV) will be reached* ***Romania:*** *In order to assess the trend in pollutant concentrations, the results of the chemical analysis from the monitoring points have been used. Minimum period of analysis was at least 17 years (2000–2017).* *The methodology for identifying significant upper trends consists in adjustment and aggregation of the data from each monitoring points on groundwater bodies. The trend analysis was done using the Gwstat program.* *The steps used for trend assessment were:* • *Identifying the monitoring points and the associated results of chemical analysis, assessment of data series, for each year of reference period (2000–2017)* • *Establishment of baseline concentration for each parameter as the average concentration registered during the year 2000* • *Calculation of annual average for the available data in each monitoring point* • *Significant upward trends were identified by Gwstat software, based on Anova Test*
Verbal description of the **trend reversal** assessment methodology	***Bulgaria:*** *The starting point for trend reversal should be placed where the concentration of the pollutant reaches 75% of the groundwater quality standard or 75% of the threshold value of the relevant pollutant. Selected starting points should be possible to reverse trends in the most effective way before pollutant concentrations can cause irreversible changes in groundwater quality. When we have GWB who responds too slowly to changes, there may be a need for an early starting point and vice versa - for responsive GWB should be chosen starting point at a later moment.* *Initially, the entire curve of the experimental data is approximated by a polynomial curve of degree 2 (quadratic regression curve).* • *If there is detected a maximum in the polynomial curve it means that a change of the direction of the trend is available - from ascending to descending.* • *If there is detected a minimum in the polynomial curve it means that a change of the direction of the trend is available - from descending to ascending.* • *Then, (in case of available maximum) the entire curve is divided into two branches: 1st branch – till the date of the maximum and the second branch - after the peak* *In case with available minimum: 1st branch – till the date of the minimum and the second branch - after the minimum.*

	Data from the first and second branch are considered separately and are approximated by linear trends (straight lines). The date at which it crossed the two approximating straight lines corresponds to the date at which it changes the direction of the linear trend - from ascending to descending or from descending to ascending *By extrapolation of the second (falling) trend can be predicted date at which the starting concentration (75% GWQS in our case 60% TV) will be reached .Practically for the second RBMP we have used 60 % from the TV.* ***Romania:*** *Trend reversal assessment methodology consists also in the use of Gwstat software. This method assumes that the time series can be characterized by two linear trends with a slope change within the time interval (analysis period). Thus, by applying the 95% quantile of the distribution, a reversal of the trend is identified, if in the first section the slope of the trend is positive, and in the second section the slope of the trend is negative. The stages of the method of reversing the pollutant concentration tendency:* • *optimizing the choice of time sections regarding the shape of the resulting model;* • *examining the significance of the rift for the simple linear regression model based on the square of the residue sum;* • *conducting a statistical test to verify that the 2-sections model is significantly more than a simple regression model.*

Threshold values per GWB

	Pollutant / Indicator	*TV (or range) [unit]*	*NBL (or range) [unit]*	*Level of TV establishment (national, RBD, GWB)*	*Related to risk in this GWB [yes/-]*
RO	*Nitrates*	*50 mg/l*		*National*	*Yes*
RO	*Benzen*	*10 µg/l*		*National*	*-*
RO	*Tricloretilena*	*10 µg/l*		*National*	*-*
RO	*Tetracloretilena*	*10 µg/l*		*National*	*-*
RO	*Ammonium*	*0.7 mg/l*	*0.504 mg/l*	*GWB*	*-*
RO	*Chlorides*	*250 mg/l*	*189 mg/l*	*GWB*	*-*
RO	*Sulphates*	*250 mg/l*	*120.5 mg/l*	*GWB*	*-*
RO	*Nitrites*	*0,5 mg/l*	*0.069 mg/l*	*GWB*	*-*
RO	*Phosphates*	*0,5 mg/l*	*0.21 mg/l*	*GWB*	*-*
RO	*Nickel*	*0,02 mg/l*	*0.035 mg/l*	*GWB*	*-*
RO	*Zinc*	*5 mg/l*	*0.355 mg/l*	*GWB*	*-*
RO	*Cadmium*	*0.005 mg/l*	*0.000202 mg/l*	*GWB*	*-*
RO	*Mercury*	*0.001 mg/l*	*0.00012 mg/l*	*GWB*	*-*
RO	*Lead*	*0.01mg/l*	*0.001 mg/l*	*GWB*	*-*
RO	*Arsenic*	*0.01 mg/l*	*0.0013 mg/l*	*GWB*	*-*
BG	*Nitrates*	*39.87 mg/l*	*9.49mg/l*	*GWB*	*-*
BG	*Pesticides sum*	*0.375 µg/l*		*GWB*	*-*
BG	*Arsenic*	*0.0077 mg/l*	*0.0007mg/l*	*GWB*	*-*
BG	*Lead*	*0.0076 mg/l*	*0.0005 mg/l*	*GWB*	*-*
BG	*Cadmium*	*0.0039 mg/l*	*0.0005 mg/l*	*GWB*	*-*
BG	*Mercury*	*0.0008 mg/l*	*0.0002 mg/l*	*GWB*	*-*
BG	*Ammonium*	*0.3758 mg/l*	*0.0031mg/l*	*GWB*	*-*
BG	*Chlorides*	*188.75 mg/l*	*5 mg/l*	*GWB*	*-*
BG	*Sulphates*	*189 mg/l*	*6 mg/l*	*GWB*	*-*
BG	*Tri+Tetraclo-retilena*	*7.5 µg/l*		*GWB*	
BG	*Conductivity*	*1713.6 µS/cm*	*854.5 µS/cm*	*GWB*	*-*
BG	*Manganese*	*0.0379 mg/l*	*0.016 mg/l*	*GWB*	*-*
BG	*Total Iron*	*0.1513 mg/l*	*0.005 mg/l*	*GWB*	*-*
BG	*Nitrites*	*0.375 mg/l*	*0.0001 mg/l*	*GWB*	*-*
BG	*Sodium*	*158.25 mg/l*	*33 mg/l*	*GWB*	*-*
BG	*Chromium*	*38.25 mg/l*	*3 µg/l*	*GWB*	*-*
BG	*Cupper*	*0.1501 mg/l*	*0.003 mg/l*	*GWB*	*-*

BG	*Nikel*	*15.5 µg/l*	*2 µg/l*	*GWB*	-
BG	*Zink*	*0.7537 mg/l*	*0.015 mg/l*	*GWB*	
BG	*COD - Mn*	*3.8625 mgO2/l*	*0.45 mgO2/l*	*GWB*	-
BG	*PO4*	*0.3798 mg/l*	*0.0195 mg/l*	*GWB*	-
BG	*Cyanides*	*0.04 mg/l*	*0.01 mg/l*	*GWB*	-

GWB-5: Mures / Maros

GWB-5	National share	**HU-5** **RO-5**	Status 2021 for each national GWB?	
			Chemical (substance)	Quantity
List of individual GW-bodies forming the whole national share (national code incl. country code)	HU	HU_AIQ605	Poor (NH4, NO_3, SO_4, Cl)	Good
	HU	HU_AIQ604	Good	Good
	HU	HU_AIQ594	Poor (NH_4, NO_3, SO_4)	Poor
	HU	HU_AIQ593	Good	Good
	RO	ROMU20	Poor (nitrates)	Good
	RO	ROMU22	Good	Good

Description/Characterisation of the ICPDR GW-body	*The alluvial deposit of the Maros/Mures River lies along both sides of the southern Hungarian – Romanian border, to the north of the actual river bed of the Maros/Mures. In particular, it is an important water resource for drinking water purposes for both countries and water abstraction in one country influences the water availability in the other.* *The basin of the SE part of the Great Hungarian Plain is filled up with more than 2000 m thick deposits of different ages, which are progressively thinning in Romania. The alluvial fan of the Maros/Mures River forms the Pleistocene part of the strata. The aquifer is divided into several GWBs in both countries. Despite the differences in the delineation method of the two countries, it was possible to select the relevant water bodies from the transboundary point of view. Of the four water bodies containing cold water in Hungary (HU), two contain Quaternary strata from the surface to a depth of 30 m, namely the shallow GWBs (HU_AIQ605, HU_AIQ594). Underneath them are two porous GWBs (GWB HU_AIQ604, HU_AIQ593), which, besides Quaternary strata, include some parts of the Upper- Pannonian deposits as well (to a depth of 400–500 m corresponding to the surface separating cold and thermal waters).* *Two Quaternary water bodies have been selected in Romania.* *On the* ***Romanian*** *side, two water bodies are included in the transboundary evaluation because in the Romanian method there is a separating horizon at the limit of the Upper (GWB ROMU20) and Lower Pleistocene (GWB ROMU22) age of the strata. Both water bodies can be lithologically characterised by pebbles, sands and clayey inter-layers, but the upper part is significantly coarser with better permeability. Virtually following the same separation line on the Hungarian side, the lower 100 m of the 250–300 m thick Pleistocene strata is silty-sand, sandy-silt, sand and clay, and the upper part is mainly sand with gravel, so that permeability improves towards the surface (the hydraulic conductivity of the aquifers ranges between 5–30 m/day). The covering layer is mainly sandy silt and clay of 3-13 m thickness.* *On the Romanian side, the upper water body is unconfined and the lower is confined.* *In* ***Hungary*** *both confined and unconfined conditions occur in the southern water bodies (HU_AIQ604, HU_AIQ605) and mainly confined conditions are characteristic for the water bodies of the upward flow system (HU_AIQ593, HU_AIQ594). The groundwater table is 2–4 m below the surface in Hungary. Recharge in sandy areas has only local importance (15 Mm3/year). At present, because of the considerable amount of water abstracted from the deep layers, there is a permanent recharge from shallow groundwater to the deep groundwater system (app. 15 Mm³/year) and large areas with sandy-silty covered layers also contribute to the recharge of the abstracted amount in Hungary. Another important element of the global recharge of the Hungarian part is the lateral flow across the border, estimated at 15–20 Mm³/d*

	(uncertain value based on limited available knowledge). The direction of the groundwater flow is from the recharge area to the discharge areas (main river valleys and zones with groundwater level close to the surface) i.e. from SE to N and NW
Description of **status** assessment methodology.	Chemical status ***Romania:*** *The methodology for the chemical status assessment followed the requirements of the Groundwater Directive (2006/118/EC) as well as the recommendations of the CIS Guidance Document no. 18 – Guidance on Groundwater status and trend assessment.* *The first step is to check any exceedances of the quality standards and TVs which were established taken into consideration the NBL values. If no exceedances of the quality standards and TVs are recorded, the groundwater body is considered as being in good chemical status. If exceedances of TVs or quality standards are recorded the following relevant tests are carried out:* • *General assessment of the chemical status: Data aggregation is performed and it is checked whether the total area of exceedance is greater than 20% of the total area of the GWB. In case there are no exceedances, the test indicate a good status for the water body.* • *Saline or other intrusion: not relevant.* • *Significant diminution of associated surface water chemistry and ecology due to transfer of pollutants from the GWB: the location of the exceedance of the relevant TVs was not found in areas where pollutants might be transferred to surface waters; a comparison of the pollutant load transferred from the GWB to the surface water body with the total load in the surface water body did not exceed 50%. The test show a good status for the water body if these criteria are achieved.* • *Significant damage to GWDTEs due to transfer of pollutants from the GWB: No GWDTE was found to be damaged. The test show a good status for the water body if this criteria is achieved;* • *Meets the requirements of WFD Article 7(3) – Drinking Water Protected Areas: there is no evidence of increased treatment due to changes in water quality.* *To assess the chemical status of the groundwater bodies, the following steps are considered:* • *For each monitoring point the annual average concentrations for each indicator was calculated; for the metals the concentration of the dissolved form was considered;* • *For each monitoring point the annual average concentration of the each parameters was compared with the thresholds values (determined for each GWB) or standards value (nitrates and pesticides).* • *The GWB is of good chemical status when no EQS or TV is exceeded in any monitoring point.* • *The GWB is of poor chemical status when EQS or TV are exceeded at monitoring points representing more than 20% of the GWB surface.* *The chemical status of the GWB ROMU20 is poor, considering the results of applying the methodology for chemical status assessment.* ***Hungary:*** *Assessment of the chemical status of GWBs was conducted: Analysing of the chemical data of individual monitoring points within each of the GWBs; Identifying of the pressures - sources of pollution; The NBLs were calculated and used to determine TVs. TVs have been determined according to CIS Guidance No. 18. Contamination limits have been determined for all indicators listed in Annex II Part B of Directive 2006/118/EC and indicators of the report under Art. 5 of Directive 2006/118/EC.* *The following parameters were investigated:* *a) NBL was determined for the following components: nitrate, ammonium, specific conductivity, sulphate, chloride, arsenic, cadmium, lead, mercury, orthosphosphate* *b) For each monitoring point the median concentration of each parameters of the studied period was compared to the TVs (determined for each GWB) or standards values (in the case of nitrates, metals and pesticides).* *c) Different tests were conducted to assess GWB status: Diffuse pollution test (nitrate, ammonium, orthosphosphate), Drinking water supply tests for numerous elements or components in both drinking water wells and monitoring wells and trend analysis based on the data of the surveillance monitoring system. Studied components of these*

	tests are: nitrate, ammonium, chloride, sulphate, specific conductivity, mercury, lead, cadmium, pesticides and organics, furthermore in the trend analysis pH and dissolved oxygen. *d) Based on these tests, GWB was evaluated.* Quantitative Status ***Romania**: The criterion for risk assessment of the quantity status is based on trend assessment evolution of the groundwater levels. The quantitative status has been assessed taking into account CIS Guidance No.18. The following criteria have been used:* • *water balance* • *the connection with surface waters* • *the influence on the terrestrial ecosystems which depend directly on the GWB* • *the effects of saline or other intrusions* *The quantitative status analysis has been done for the GWB level by comparing the average of the hydrostatic level from 2017 (reference year) with the multiannual average levels during the whole observation period.* ***Hungary:** To determine the overall quantitative status for a GWB, a series of tests should be applied that considers the impacts of anthropogenically induced long-term alterations in groundwater level and/or flow. Each test will assess whether the GWB is meeting the relevant environmental objectives. The quantitative status has been assessed taking into account CIS Guidance No.18. The following criteria have been used:* • *GW alteration (Drawdown) test* • *Water Balance test* • *Surface Water Flow test* • *Groundwater Dependent Terrestrial Ecosystems (GWDTE)* • *Saline or other Intrusion test*
Groundwater threshold value relationships	Receptors considered ***Romania:** Drinking Water standards* ***Hungary:** Drinking water* Consideration of NBL and EQS (environmental quality standards, drinking water standards) in the TV establishment: ***Romania:** The methodology for TV establishment in Romania has been developed according to CIS Guidance No. 18. NBL are the key elements in the process of TV setting.* *As described previously, during the TV establishment, the NBL have been compared with the drinking water standards. The maximum allowable concentrations (MAC) provided by the Law no.458/2002 as amended, were chosen as TV where NBL are smaller than MAC. Where background levels are higher than MAC, a small addition of 0.2 NBL was used, in order to avoid misclassification of the respective GWB (TV = NBL + 0.2 NBL = 1.2 NBL).* *The updated list of TVs established for each GWB was published in the new Order of the Minster no. 621/2014 approving TV for groundwater bodies from Romania.* ***Hungary:*** *EQS for herbicides and total pesticides, tri-, tetrachloroethylenes based on 201/2001. (X.25.) Gov. decree and the 6/2009. (IV.14.) KvVM-EüM-FVM common ministerial decree in correspondence to I. Annex of the 2006/118/EC directive.* *In Hungary, more than 95% of drinking water ensured from subsurface waters, so for all other components the DWS is applicable.* *For those GWBs where the NBL was higher than the DWS due to natural hydro-geological reasons, the TVs for ammonium, SO4 and EC were defined by taking into account these higher values, as described in Guidance Document No. 18.*
Verbal description of the **trend**	***Romania:** In order to assess the trend in pollutant concentrations, the results of the chemical analysis from the monitoring points have been used. Minimum period of analysis was at least 17 years (2000-2017).*

assessment methodology	*The methodology for identifying significant upper trends consists in adjustment and aggregation of the data from each monitoring points on groundwater bodies. The trend analysis was done using the Gwstat program. The steps used for trend assessment were:* • *Identifying the monitoring points and the associated results of chemical analysis, assessment of data series, for each year of reference period (2000–2017)* • *Establishment of baseline concentration for each parameter as the average concentration registered during the year 2000* • *Calculation of annual average for the available data in each monitoring point* • *Significant upward trends were identified by Gwstat software, based on Anova Test* ***Hungary****: To assess the trend of pollutant concentrations, chemical data of the surveillance monitoring systems were used for the period of 2000 to 2012. The trend analysis was done using Matlab program package of Man-Kendall method with fitted Sen slope. The steps used for trend assessment were:* • *During the assessment trend of all components for all monitoring objects were created using yearly average data and excluding time series with less than 4 data points.* • *The trend of groundwater body level aggregates of yearly annual data were assessed as well.* • *Significant upward or downward trends were identified on 95 and 90% significance level using Man-Kendall method with Sen's slope.*
Verbal description of the **trend reversal** assessment methodology	***Romania:*** *Trend reversal assessment methodology consists also in the use of Gwstat software. This method assumes that the time series can be characterized by two linear trends with a slope change within the time interval (analysis period). Thus, by applying the 95% quantile of the distribution, a reversal of the trend is identified, if in the first section the slope of the trend is positive, and in the second section the slope of the trend is negative. The stages of the method of reversing the pollutant concentration tendency:* • *optimizing the choice of time sections regarding the shape of the resulting model;* • *examining the significance of the rift for the simple linear regression model based on the square of the residue sum;* • *conducting a statistical test to verify that the 2-sections model is significantly more than a simple regression model..* ***Hungary:*** *To assess the trend reversal of pollutant concentrations, two consecutive time periods were compared and evaluated*

Threshold values per GWB

	Pollutant / Indicator	*TV (or range) [unit]*	*NBL (or range) [unit]*	*Level of TV establishment (national, RBD, GWB)*	*Related to risk in this GWB [yes/-]*
HU	*Nitrates*	*50 mg/l*	*0,5-12.1 mg/l*	*GWB*	*Yes*
HU	*Ammonium*	*2-5 mg/l*	*1,97-4.54 mg/l*	*GWB*	*Yes*
HU	*Conductivity*	*2500-4000 µS/cm*	*1210-2500 µS/cm*	*GWB*	*-*
HU	*Sulfate*	*250-500 mg/l*	*20-481 mg/l*	*GWB*	*Yes*
HU	*Chloride*	*250-500 mg/l*	*32,5-300 mg/l*	*GWB*	*Yes*
HU	*Ortophosphate*	*2-5 mg/l*	*0.65-1.71 mg/l*	*GWB*	
HU	*Cadmium*	*5 µg/l*	*0.16-0.83 µg/l*	*national*	*-*
HU	*Lead*	*10 µg/l*	*2.7-5 µg/l*	*national*	*-*
HU	*Mercury*	*1 µg/l*	*0.39-0.49 µg/l*	*national*	*-*
HU	*Trichlorethylene*	*10 µg/l*		*national*	*-*
HU	*Tetrachloroethylene*	*10 µg/l*		*national*	*-*
HU	*Absorbed organic halogens AOX*	*20 µg/l*		*national*	*-*
HU	*Pesticides by components*	*0,1 µg/l*		*national*	*-*
HU	*Pesticides all*	*0,5 µg/l*		*national*	*-*
RO	*Nitrates*	*50 mg/l*		*National*	*Yes*

RO	*Benzen*	*10 µg/l*		*National*	-
RO	*Tricloretilena*	*10 µg/l*		*National*	-
RO	*Tetracloretilena*	*10 µg/l*		*National*	-
RO	*Ammonium*	*0.5–1.9 mg/l*	*0.216–1.56 mg/l*	*GWB*	-
RO	*Chlorides*	*250 mg/l*	*66.755–179.57 mg/l*	*GWB*	-
RO	*Sulphates*	*250 mg/l*	*102.04–193.99 mg/l*	*GWB*	-
RO	*Nitrites*	*0,5 mg/l*	*0.046–0.2 mg/l*	*GWB*	-
RO	*Phosphates*	*0,5–0.6 mg/l*	*0.134–0.5 mg/l*	*GWB*	-
RO	*Chromium*	*0,05 mg/l*	*0.006296–0.00811mg/l*	*GWB*	-
RO	*Nickel*	*0,02 mg/l*	*0.009–0.00836 mg/l*	*GWB*	-
RO	*Copper*	*0.1 mg/l*	*0.0113–0.0117 mg/l*	*GWB*	-
RO	*Zinc*	*5 mg/l*	*0.125–0.0274 mg/l*	*GWB*	-
RO	*Cadmium*	*0.005 mg/l*	*0.0035 mg/l*	*GWB*	-
RO	*Lead*	*0.01-0.02 mg/l*	*0.0075–0.01316 mg/l*	*GWB*	-
RO	*Arsenic*	*0.04 mg/l*	*0.0289 mg/l*	*GWB*	-
RO	*Phenols*	*0.002mg/l*	*0.0015 mg/l*	*GWB*	-

GWB-6: Somes / Szamos

GWB-6	National share	**HU-6** **RO-6**	Status 2021 for each national GWB?	
			Chemical (substance)	Quantity
List of individual GW-bodies forming the whole national share (national code incl. country code)	HU	HU_AIQ649	Good	Good
	HU	HU_AIQ648	Good	Good
	HU	HU_AIQ600	Good	Good
	HU	HU_AIQ601	Good	Good
	RO	ROSO01	Good	Good
	RO	ROSO13	Good	Good

Description/Characterisation of the ICPDR GW-body	***Reasons for selection as an important transboundary GWB*** *The alluvial deposit of the Somes/Szamos River extends on both sides of the northern part of the Hungarian-Romanian border. It is also connected to the aquifer system lying in Ukraine close to the borders. The aquifer system supplies drinking water to a population of approx. 170,000 inhabitants in Romania and 50,000 inhabitants in Hungary. On the Hungarian side, due to the lowland character and upward flow system, the terrestrial ecosystems require surplus transpiration from groundwater; 7% of the area of the water body is under nature conservation. The recharge zone is in Romania and Ukraine, thus the available groundwater resource and the status of the terrestrial ecosystems on the Hungarian side depend on the lateral flow from the neighbouring countries. The Romanian and Hungarian parts of the water body complex are described below.* ***General description*** *The Somes/Szamos River has formed a 30–250 m thick alluvial deposit* *The aquifer is divided into several GWBs in both countries. Despite the differences in the delineation method of the two countries, it was possible to select the relevant water bodies from the transboundary point of view.* *Four water bodies containing cold water occur in Hungary. Two of them contain Quaternary strata from the surface to a depth of 30 m, namely the shallow GWBs (HU_AIQ649, HU_AIQ600). Underneath are the porous GWBs (HU_AIQ648, HU_AIQ601), which beside Quaternary strata include some parts of the Upper- Pannonian deposits as well, to a depth of 400–500 m corresponding to the surface separating cold and thermal waters.* *This Holocene-Pleistocene formation is divided vertically in Romania by the horizon separating the Upper- and Lower-Pleistocene strata. In Romania two water bodies are considered, overlapping each other, covering a surface of 1,440 km^2. According to the Hungarian approach of delineation, the cold part of the Upper-Pannonian and the Pleistocene and Holocene layers are vertically unified. The Hungarian part can be characterised only by an upward flow system, thus no further horizontal separation is applied. The area covered by the water body is 1,035 km2.*

	*In **Romania**, the shallow (Holocene-Upper-Pleistocene) aquifer is unconfined, consisting of sands, argillaceous sands, gravels and even boulders in the eastern part, and has a depth of 25–35 m. The silty-clayey covering layer is 5–15 m thick.* *The deeper (Lower-Pleistocene) aquifer is confined (it is separated from the Upper-Pleistocene part by a clay layer); its bottom is declining from 30 m to 130 m below the surface from East to West. The gravely and sandy strata (characteristic to westwards from Satu-Mare town) represent the main aquifer for water supply in the region.* *In **Hungary** (as part of the cold water body), the Quaternary (Pleistocene) and Holocene strata are 50 m thick at the Ukrainian border and its continuously declining bottom is around 200 m below the surface at the western boundary. Mainly confined conditions characterise the Hungarian part, with a silty clayey covering layer of 1–6 m (increasing from the NE to the SW). The Quaternary aquifer is sand or gravelly sand, and the hydraulic conductivity ranges between 10- 30 m/d. It should be noted that the Hungarian water body includes the cold water bearing part of the Upper-Pannonian formation as well, to a depth of 400–500 m (under this level, thermal water of a temperature greater than 30 ºC can be found).* *Depth of the groundwater level (mainly pressure in confined area) below the surface ranges between 2 and 5 m in Hungary. The flow direction is from the ENE to the WSW in both countries, corresponding to the recharge and main discharge zones (rivers and area with groundwater level close to the surface).* *The recharge area is in the Romanian part of the water body (and in Ukraine). In Hungary the infiltrated amount from local recharge zones supplies neighbouring discharge zones and cannot be considered as part of the available groundwater resources.*
Description of **status** assessment methodology.	Chemical status ***Romania:** The methodology for the chemical status assessment followed the requirements of the Groundwater Directive (2006/118/EC) as well as the recommendations of the CIS Guidance Document no. 18 – Guidance on Groundwater status and trend assessment.* *The first step is to check any exceedances of the quality standards and TVs which were established taken into consideration the NBL values. If no exceedances of the quality standards and TVs are recorded, the groundwater body is considered as being in good chemical status. If exceedances of TVs or quality standards are recorded the following relevant tests are carried out:* • *General assessment of the chemical status: Data aggregation is performed and it is checked whether the total area of exceedance is greater than 20% of the total area of the GWB. In case there are no exceedances, the test indicate a good status for the water body.* • *Saline or other intrusion: not relevant.* • *Significant diminution of associated surface water chemistry and ecology due to transfer of pollutants from the GWB: the location of the exceedance of the relevant TVs was not found in areas where pollutants might be transferred to surface waters; a comparison of the pollutant load transferred from the GWB to the surface water body with the total load in the surface water body did not exceed 50%. The test show a good status for the water body if these criteria are achieved.* • *Significant damage to GWDTEs due to transfer of pollutants from the GWB: No GWDTE was found to be damaged. The test show a good status for the water body if this criteria is achieved;* • *Meets the requirements of WFD Article 7(3) – Drinking Water Protected Areas: there is no evidence of increased treatment due to changes in water quality.* *To assess the chemical status of the groundwater bodies, the following steps are considered:* • *For each monitoring point the annual average concentrations for each indicator was calculated; for the metals the concentration of the dissolved form was considered;* • *For each monitoring point the annual average concentration of the each parameters was compared with the thresholds values (determined for each GWB) or standards value (nitrates and pesticides).* • *The GWB is of good chemical status when no EQS or TV is exceeded in any monitoring point.*

	• *The GWB is of poor chemical status when EQS or TV are exceeded at monitoring points representing more than 20% of the GWB surface.* ***Hungary:*** *Assessment of the chemical status of groundwater was conducted: Analysing of the chemical data of individual monitoring points within each of the GWBs; Identifying of the pressures - sources of pollution; The background levels were calculated and used to determine threshold value. Threshold values have been determined according to CIS Guidance No. 18. Contamination limits have been determined for all indicators listed in Annex II Part B of Directive 2006/118/EC and indicators of the report under Art. 5 of Directive 2006/118/EC.* *The following parameters were investigated:* *a) Natural Background Level was determined for the following components: nitrate, ammonium, specific conductivity, sulphate, chloride, arsenic, cadmium, lead, mercury, orthophosphate* *b) For each monitoring point the median concentration of each parameters of the studied period was compared to the thresholds values (determined for each GWB) or standards values (in the case of nitrates, metals and pesticides).* *c) Different tests were conducted to assess groundwater body status: Diffuse pollution test (nitrate, ammonium, orthophosphate), Drinking water supply tests for numerous elements or components in both drinking water wells and monitoring wells and trend analysis based on the data of the surveillance monitoring system. Studied components of these tests are: nitrate, ammonium, chloride, sulphate, specific conductivity, mercury, lead, cadmium, pesticides and organics, furthermore in the trend analysis pH and dissolved oxygen.* *d) Based on these tests, groundwater body was evaluated.* <u>Quantitative Status</u> ***Romania*****:** *The criterion for risk assessment of the quantity status is based on trend assessment evolution of the groundwater levels. The quantitative status has been assessed taking into account the CIS Guidance No.18. The following criteria have been used:* • *water balance* • *the connection with surface waters* • *the influence on the terrestrial ecosystems which depend directly on the GWB* • *the effects of saline or other intrusions* *The quantitative status analysis has been done for the GWB level by comparing the average of the hydrostatic level from 2017 (reference year) with the multiannual average levels during the observation period.* ***Hungary:*** *To determine the overall quantitative status for a GWB, a series of tests should be applied that considers the impacts of anthropogenically induced long-term alterations in groundwater level and/or flow. Each test will assess whether the GWB is meeting the relevant environmental objectives. The quantitative status has been assessed taking into account CIS Guidance No.18. The following criteria have been used:* • <u>*GW alteration (Drawdown) test*</u> • *Water Balance test* • *Surface Water Flow test* • *Groundwater Dependent Terrestrial Ecosystems (GWDTE)* • *Saline or other Intrusion test*
Groundwater threshold value relationships	<u>Receptors considered</u> ***Romania:*** *Drinking Water standards* ***Hungary:*** *Drinking water* <u>Consideration of NBL and EQS (environmental quality standards, drinking water standards) in the TV establishment:</u> ***Romania:*** *The methodology for TV establishment in Romania has been developed according to CIS Guidance No. 18. NBL are the key elements in the process of TV setting.*

	As described previously, during the TV establishment, the NBL have been compared with the drinking water standards. The maximum allowable concentrations (MAC) provided by the Law no.458/2002 as amended, were chosen as TV where natural background levels (NBL) are smaller than MAC. Where background levels are higher than MAC, a small addition of 0.2 NBL was used, in order to avoid misclassification of the respective GWB (TV = NBL + 0.2 NBL = 1.2 NBL). *The updated list of TVs established for each GWB was published in the new Order of the Minster no. 621/2014 approving TV for groundwater bodies from Romania.* ***Hungary:*** *EQS for herbicides and total pesticides, tri-, tetrachloroethylenes based on 201/2001. (X.25.) Gov. decree and the 6/2009. (IV.14.) KvVM-EüM-FVM common ministerial decree in correspondence to I. Annex of the 2006/118/EC directive.* *In Hungary, more than 95% of drinking water ensured from subsurface waters, so for all other components the DWS is applicable.* *For those GWBs where the NBL was higher than the DWS due to natural hydro-geological reasons, the TVs for ammonium, SO4 and EC were defined by taking into account these higher values, as described in Guidance Document No. 18.*
Verbal description of the **trend** assessment methodology	***Romania:*** *In order to assess the trend in pollutant concentrations, the results of the chemical analysis from the monitoring points have been used. Minimum period of analysis was at least 10 years (2000-2011).* *The methodology for identifying significant upper trends consists in adjustment and aggregation of the data from each monitoring points on groundwater bodies. The trend analysis was done using the Gwstat program.* *The steps used for trend assessment were:* • *Identifying the monitoring points and the associated results of chemical analysis, assessment of data series, for each year of reference period (2000–2011)* • *Establishment of baseline concentration for each parameter as the average concentration registered during the year 2000* • *Calculation of annual average for the available data in each monitoring point* • *Significant upward trends were identified by Gwstat software, based on Anova Test* ***Hungary****: To assess the trend of pollutant concentrations, chemical data of the surveillance monitoring systems were used for the period of 2000 to 2012. The trend analysis was done using Matlab program package of Man-Kendall method with fitted Sen slope. The steps used for trend assessment were:* • *During the assessment trend of all components for all monitoring objects were created using yearly average data and excluding time series with less than 4 data points.* • *The trend of groundwater body level aggregates of yearly annual data were assessed as well.* • *Significant upward or downward trends were identified on 95 and 90% significance level using Man-Kendall method with Sen's slope.*
Verbal description of the **trend reversal** assessment methodology	***Romania:*** *Trend reversal assessment methodology consists also in the use of Gwstat software. This method assumes that the time series can be characterized by two linear trends with a slope change within the time interval (analysis period). Thus, by applying the 95% quantile of the distribution, a reversal of the trend is identified, if in the first section the slope of the trend is positive, and in the second section the slope of the trend is negative. The stages of the method of reversing the pollutant concentration tendency:* • *optimizing the choice of time sections regarding the shape of the resulting model;* • *examining the significance of the rift for the simple linear regression model based on the square of the residue sum;* • *conducting a statistical test to verify that the 2-sections model is significantly more than a simple regression model.* ***Hungary:*** *To assess the trend reversal of pollutant concentrations two consecutive time period was compared and evaluated*
Threshold values per GWB	

	Pollutant / Indicator	*TV (or range) [unit]*	*NBL (or range) [unit]*	*Level of TV establishment (national, RBD, GWB)*	*Related to risk in this GWB [yes/-]*
HU	*Nitrates*	*50 mg/l*	*1-11.5 mg/l*	*GWB*	*-*
HU	*Ammonium*	*2-5 mg/l*	*1.5-3.3 mg/l*	*GWB*	*-*
HU	*Conductivity*	*2500 µS/cm*	*649-1787 µS/cm*	*GWB*	*-*
HU	*Sulfate*	*250 mg/l*	*17.8-184 mg/l*	*GWB*	*-*
HU	*Chloride*	*250 mg/l*	*21.4-138 mg/l*	*GWB*	*-*
HU	*Orthophosphate*	*0.5-2 mg/l*	*0.11-0.92 mg/l*	*GWB*	
HU	*Cadmium*	*5 µg/l*	*0.04-0.16 µg/l*	*national*	*-*
HU	*Lead*	*10 µg/l*	*0.38-4.7 µg/l*	*national*	*-*
HU	*Mercury*	*1 µg/l*	*0.005-0.27 µg/l*	*national*	*-*
HU	*Trichlorethylene*	*10 µg/l*		*national*	*-*
HU	*Tetrachloro ethylene*	*10 µg/l*		*national*	*-*
HU	*Absorbed organic halogens AOX*	*20 µg/l*		*national*	*-*
HU	*Pesticides by components*	*0,1 µg/l*		*national*	*-*
HU	*Pesticides all*	*0,5 µg/l*		*national*	*-*
RO	*Nitrates*	*50 mg/l*		*National*	*-*
RO	*Benzen*	*10 µg/l*		*National*	*-*
RO	*Tricloretilena*	*10 µg/l*		*National*	*-*
RO	*Tetracloretilena*	*10 µg/l*		*National*	*-*
RO	*Ammonium*	*0.5-1.3 mg/l*	*0.22-1.05 mg/l*	*GWB*	*-*
RO	*Chlorides*	*250 mg/l*	*19.46- 51.5 mg/l*	*GWB*	*-*
RO	*Sulphates*	*250 mg/l*	*19,01- 91.78 mg/l*	*GWB*	*-*
RO	*Nitrites*	*0.5 mg/l*	*0.08- 0.15 mg/l*	*GWB*	*-*
RO	*Phosphates*	*0.5 mg/l*	*0.16-0.41 mg/l*	*GWB*	*-*
RO	*Chromium*	*0.05 mg/l*	*0.0071-0.010 mg/l*	*GWB*	*-*
RO	*Nickel*	*0.02 mg/l*	*0.011-0.005 mg/l*	*GWB*	*-*
RO	*Copper*	*0.1 mg/l*	*0.0153-0.024 mg/l*	*GWB*	*-*
RO	*Zinc*	*5 mg/l*	*0.26-0.262 mg/l*	*GWB*	*-*
RO	*Cadmium*	*0,005 mg/l*	*0.00085-0.0023 mg/l*	*GWB*	*-*
RO	*Mercury*	*0,001 mg/l*	*0.000035-0.00002 mg/l*	*GWB*	*-*
RO	*Lead*	*0.03-0.07 mg/l*	*0.022-0.055 mg/l*	*GWB*	*-*
RO	*Arsenic*	*0.01mg/l*	*0.0021- 0.006 mg/l*	*GWB*	*-*
RO	*Phenols*	*0.002mg/l*	*0.001- 0.0013 mg/l*	*GWB*	*-*

GWB-7: Upper Pannonian – Lower Pleistocene / Vojvodina / Duna-Tisza köze deli r.

GWB-7	National share	**HU-7** **RO-7** **RS-7**	Status 2021 for each national GWB?	
			Chemical (substance)	Quantity
List of individual GW-bodies forming the whole national share (national code incl. country code)	HU	HU_AIQ528	Good	Good
	HU	HU_AIQ523	Good	Good
	HU	HU_AIQ532	Good	Good
	HU	HU_AIQ487	Good	Good
	HU	HU_AIQ590	Good	Good
	HU	HU_AIQ529	Good	Poor
	HU	HU_AIQ522	Good	Poor
	HU	HU_AIQ533	Good	Poor
	HU	HU_AIQ486	Good	Poor
	HU	HU_AIQ591	Poor (NO_3)	Good
	RO	ROBA18	Good	Good
	RS	RS_TIS_GW_I_1	Good	Poor
	RS	RS_TIS_GW_SI_1	Good	Good
	RS	RS_TIS_GW_I_2	Good	Poor
	RS	RS_TIS_GW_SI_2	Good	Good
	RS	RS_TIS_GW_I_3	Good	Poor
	RS	RS_TIS_GW_SI_3	Good	Good
	RS	RS_TIS_GW_I_4	Good	Poor
	RS	RS_TIS_GW_SI_4	Good	Good
	RS	RS_TIS_GW_I_7	Good	Poor
	RS	RS_TIS_GW_SI_7	Good	Good
	RS	RS_D_GW_I_1	Good	Poor
	RS	RS_D_GW_SI_1	Good	Good

Description/Characterisation of the ICPDR GW-body	*The GWB is mainly used for drinking water supply, agricultural and industrial supplies. The criterion for selection as "important" consists in its size that exceeds 4,000 km².* *The whole aquifer system of the Danube-Tisza region stretches from the foothills of the northern mountainous region of Hungary to the Danube in Serbia, where the river flows to the south-east. The western boundary is the Danube itself downstream of Budapest in Hungary but after crossing the Hungarian border it enlarges towards Slavonia (western part of Backa in Croatia). The eastern boundary is somewhat east from the Tisza River in Hungary and in Serbia it includes the Banat as well, whose eastern part is in Romania. The Danube, Tisza and Timis Rivers are important discharge-lines but cannot be considered as pure hydrodynamic boundaries, since there is some flow under the river in the deeper aquifer that is not discharged into the river.* *The porous aquifer system between the Danube and Tisza Rivers is the biggest geological unit of the Pannonian Basin. It lies mainly in Hungary and Serbia, with a smaller part in Croatia and Romania. Serbia and Hungary have selected it as an important transboundary GWB complex because: (i) size, (ii) importance in supplying drinking water for the population and (iii) the need to satisfy the water demand of agriculture and industry, (iv) protected areas cover a large part of the GWB complex (protection zones for vulnerable drinking water resources, nature conservation areas and nitrate-sensitive areas).* *In **Serbia**, the area of the whole Dunav aquifer system is 17,435 km² (the areas of Backa and Banat). However, the transboundary importance is related only to the GWBs adjacent to the state borders with Hungary (a total of 6 GWBs: 3 shallow (RS_TIS_GW_SI_1; RS_TIS_GW_SI_2; RS_TIS_GW_SI_3) and 3 deep (RS_TIS_GW_I_1; RS_TIS_GW_I_2; RS_TIS_GW_I_3)) and with Romania (a total of 6 GWBs: 3 shallow (RS_TIS_GW_SI_4; RS_TIS_GW_SI_7; RS_D_GW_SI_1) and 3 deep (RS_TIS_GW_I_4; RS_TIS_GW_I_7; RS_D_GW_I_1). The area of water bodies situated towards Hungary is 5,647 km2 and towards Romania 4,859 km2, with a total aggregated area of 10,506 km2 for the Vojvodina GWB.* *In **Hungary**, the aquifer system is divided into several water bodies according to major subsurface catchment areas and downward-upward flow systems. For the transboundary conciliation, only the southern part of the aquifer system is considered, which includes 10 cold water bodies. Five of them contain Quaternary strata from the surface to a depth of 23–30 m.*

	Beneath these are five porous GWBs. Besides Quaternary strata, these include part of the Upper-Pannonian deposits as well, to a depth of 400–500 m corresponding to the surface and separating cold and thermal water bodies. The Hungarian part can be characterised by both upward and downward flow systems that are the basis for the horizontal separation of the GWBs. The area covered by these water bodies is 7,098 km2. The aquifer can be considered unconfined in the shallow GWBs, despite a considerable area where the water level is in the semi-permeable covering layer, and confined in the deeper ones. *The depth of the groundwater level below the surface ranges between 3 and 5 m in Hungary, with a maximum depth of 7–12 m in the main recharge zones (HU_AIQ529, HU_AIQ591 and HU_AIQ533).* *In **Romania**, the aquifer system covers around 11,408 km2 and is adjacent to the state border with Serbia. The GWB is generally confined, its covering strata being of Quaternary age. The depth of the groundwater level below surface ranges from 3–20 m. The protection degree of the GWB is very good. The main aquifer is the Quaternary alluvial deposit of the Danube lying on the Pannonian strata. Its thickness is a few tens of meters at the northern, western and southern boundary and increases up to 700 m in the middle of the basin (in the lower Tisza-valley). At the eastern boundary, the thick Quaternary deposit is a mixture of the alluvial deposits of the Danube and the Carpathian rivers. In respect to lithology, the aquifer consists of medium and coarse sands and gravely sands with inter-layers and lenses of silty sands and silty clays. Average hydraulic conductivity ranges between 5–30 m/d. The topographically elevated ridge between the Danube and the Tisza is formed of eolian sand with relatively good recharge conditions and phreatic groundwater. In the river valleys and east of the Tisza, mainly confined conditions appear. The depth of the fluvial-swamp silty clays and swamp clays overlying strata varies from 10-20 m in the western and southern part, and up to 100–125 m in the north-eastern part of Backa and in Banat. Here, prior to intensive groundwater abstraction, an artesian type of groundwater occurred.* *The main recharge area is in Hungary, in the eolian sand ridge, and in Romania. In Hungary, the estimated value of the recharge is approx. 220 Mm3/year. In Serbia, only local recharge areas exist (areas of the Deliblat Sands and the Subotica/Horgos Sands), thus the lateral flow crossing the border from the neighbouring country - as a component of the overall recharge - is very important.* *The groundwater is mainly discharged by the rivers (and drainage canals) and by the surplus of evapotranspiration from vegetation in the areas characterised by groundwater levels close to the surface. Small lakes and marshes in locally deeper areas (i.e. in topographic depressions) must be considered as local discharge areas – they are important from the nature conservation point of view. Besides natural discharge, there is also significant groundwater tapping for various uses (drinking water, agriculture, industry, irrigation etc.). In Vojvodina, the entire public water supply relies exclusively on groundwater from aquifers formed at different depths, from 20 m to more than 200 m.* *The direction of the groundwater flow in the upper part of the aquifer-system follows the topography and recharge-discharge conditions. At the Hungarian-Serbian border, the flow direction is almost parallel to the border (flowing slightly from Hungary towards Serbia). In the deeper part, the general flow direction is NW to SE i.e. from the Danube to the Tisza in Hungary and in Backa, while in Banat the general direction of the groundwater flow is from E to W. GWB is mainly used for drinking water supply, agricultural and industrial supplies. The criterion for selection as "important" consists in its size that exceeds 4000 km².*
Description of **status** assessment methodology.	<u>Chemical status</u> ***Romania:*** *The methodology for the chemical status assessment followed the requirements of the Groundwater Directive (2006/118/EC) as well as the recommendations of the CIS Guidance Document no. 18 – Guidance on Groundwater status and trend assessment.* *The first step is to check any exceedances of the quality standards and TVs which were established taken into consideration the NBL values. If no exceedances of the quality standards and TVs are recorded, the groundwater body is considered as being in good chemical status. If exceedances of TVs or quality standards are recorded the following relevant tests are carried out:* • *General assessment of the chemical status: Data aggregation is performed and it is checked whether the total area of exceedance is greater than 20% of the total area of*

	the GWB. In case there are no exceedances, the test indicate a good status for the water body. • *Saline or other intrusion: not relevant.* • *Significant diminution of associated surface water chemistry and ecology due to transfer of pollutants from the GWB: the location of the exceedance of the relevant TVs was not found in areas where pollutants might be transferred to surface waters; a comparison of the pollutant load transferred from the GWB to the surface water body with the total load in the surface water body did not exceed 50%. The test show a good status for the water body if these criteria are achieved.* • *Significant damage to GWDTEs due to transfer of pollutants from the GWB: No GWDTE was found to be damaged. The test show a good status for the water body if this criteria is achieved;* • *Meets the requirements of WFD Article 7(3) – Drinking Water Protected Areas: there is no evidence of increased treatment due to changes in water quality.* *To assess the chemical status of the groundwater bodies, the following steps are considered:* • *For each monitoring point the annual average concentrations for each indicator was calculated; for the metals the concentration of the dissolved form was considered;* • *For each monitoring point the annual average concentration of the each parameters was compared with the thresholds values (determined for each GWB) or standards value (nitrates and pesticides).* • *The GWB is of good chemical status when no EQS or TV is exceeded in any monitoring point.* • *The GWB is of poor chemical status when EQS or TV are exceeded at monitoring points representing more than 20% of the GWB surface..* ***Hungary:*** *Assessment of the chemical status of groundwater was conducted: Analysing of the chemical data of individual monitoring points within each of the GWBs; Identifying of the pressures - sources of pollution; The background levels were calculated and used to determine threshold value. Threshold values have been determined according to CIS Guidance No. 18. Contamination limits have been determined for all indicators listed in Annex II Part B of Directive 2006/118/EC and indicators of the report under Art. 5 of Directive 2006/118/EC.* *The following parameters were investigated:* *a) Natural Background Level was determined for the following components: nitrate, ammonium, specific conductivity, sulphate, chloride, arsenic, cadmium, lead, mercury, orthophoshate* *b) For each monitoring point the median concentration of each parameters of the studied period was compared to the thresholds values (determined for each GWB) or standards values (in the case of nitrates, metals and pesticides).* *c) Different tests were conducted to assess groundwater body status: Diffuse pollution test (nitrate, ammonium, orthophoshate), Drinking water supply tests for numerous elements or components in both drinking water wells and monitoring wells and trend analysis based on the data of the surveillance monitoring system. Studied components of these tests are: nitrate, ammonium, chloride, sulphate, specific conductivity, mercury, lead, cadmium, pesticides and organics, furthermore in the trend analysis pH and dissolved oxygen.* *d) Based on these tests, groundwater body was evaluated.* ***Serbia:*** *The criteria for the chemical status assessment were: present groundwater quality, pressures and their impacts, natural protection (overlying strata),. Pressures and impacts where assessed on the basis of the census data at settlement level for the 2011 regarding demographics, sanitation and water supply practices (septic tanks, sewerage, water supply, connection rates) and agricultural census data from 2012 (livestock, Agricultural land use).* *The Census data was projected to 2016 for the purpose of STATUS assessment. Non agricultural land use pressures were evaluated on the basis of CORINE 2016 data set and CORINE CLASS specific pollution coefficients for BOD, TN. Pressures were evaluated for organic pollution and nutrients (Indicators used were BOD, TN). Pressure analysis were conducted for 160 analytical units (settlements covering the total area of ground water bodies).*

	Monitoring data for 16 groundwater monitoring stations for the 12 GWB in Serbia covering a period from 2004 to 2018 was evaluated and stations with at least 5 years of data on monitoring were selected for status and impact assessment. Parameters considered for the analysis included NO3 and pesticides. For each of the monitoring stations trend analysis were conducted on all available data (minimum for 5 years, maximum for 15 years). Trend significance was classified in terms of annual rate of increase/decrease in a manner that would lead to the exceedance of the threshold value for NO3 (50 mg/L as NO3) within 10 years in relation to the observed average NO3 concentration at any given station. Regression coefficient values were used as a measure of a level of confidence of the trend assessment so that if r2 value was above 0,7 trend assessment was to be considered as high confidence assessment, values of r2 between 0,4 and 0,7 lead to medium confidence of the trend assessment and values of r2 indicate that trend assessment is of low confidence. • *The GWB is of good chemical status when no TV is exceeded in any monitoring point and when no significant increasing trend is detected, and GW is not under significant pressure (Pressure is considered to be significant if total load on the GWB exceeds 10 kg TN-N/ha/yr)* • *The GWB is of poor chemical status when TV are exceeded at monitoring points representing more than 20% of the GW samples analysed at the particular monitoring point in the period from 2004 to 2018.* • *The GWB is declared under risk if observed trend would lead to the exceedance of the TV for NO3 within 10 if the observed trend continued at any of the monitoring stations for a given water body. The assessment of Risk is accompanied with level of confidence of the assessment.* <u>Quantitative Status</u> ***Romania**: The criterion for risk assessment of the quantity status is based on trend assessment evolution of the groundwater levels. The quantitative status has been assessed taking into account CIS Guidance No.18. The following criteria have been used:* • *water balance* • *the connection with surface waters* • *the influence on the terrestrial ecosystems which depend directly on the GWB* • *the effects of saline or other intrusions* *The quantitative status analysis has been done for the GWB level by comparing the average of the hydrostatic level from 2017 (reference year) with the multiannual average levels during the observation period.* ***Hungary:** To determine the overall quantitative status for a GWB, a series of tests should be applied that considers the impacts of anthropogenically induced long-term alterations in groundwater level and/or flow. Each test will assess whether the GWB is meeting the relevant environmental objectives. The quantitative status has been assessed taking into account CIS Guidance No.18. The following criteria have been used:* • *<u>GW alteration (Drawdown) test</u>* • *Water Balance test* • *Surface Water Flow test* • *Groundwater Dependent Terrestrial Ecosystems (GWDTE)* • *Saline or other Intrusion test* ***Serbia:** Considering the risk of not achieving good quantitative status, groundwater bodies within which there is a registered trend of groundwater level decrease as a consequence of abstraction are considered to be at risk. For this purpose, data time series of registered groundwater levels were used only for shallow GWBs, since no organized monitoring of deep aquifers exists.* *For groundwater bodies where no quantitative monitoring exists, the estimate of groundwater balance is calculated, using available data on precipitation, abstraction etc. Assessment of risk from non-achievement of the good quantitative status until 2015 was carried out based on the criteria that average GW abstraction over several years < 50% of groundwater recharge, no substance intrusion into the body caused by the change of GW streaming direction and associated surface ecosystems are not endangered by GW abstraction.*

Groundwater threshold value relationships	<u>Receptors considered:</u> ***Romania:*** *Drinking Water standards* ***Hungary:*** *Drinking water* ***Serbia:*** <u>Consideration of NBL and EQS (environmental quality standards, drinking water standards) in the TV establishment:</u> ***Romania:*** *The methodology for TV establishment in Romania has been developed according to CIS Guidance No. 18. NBL are the key elements in the process of TV setting.* *As described previously, during the TV establishment, the NBL have been compared with the drinking water standards. The maximum allowable concentrations (MAC) provided by the Law no.458/2002 as amended, were chosen as TV where natural background levels (NBL) are smaller than MAC. Where background levels are higher than MAC, a small addition of 0.2 NBL was used, in order to avoid misclassification of the respective GWB (TV = NBL + 0.2 NBL = 1.2 NBL).* *The updated list of TVs established for each GWB was published in the new Order of the Minster no. 621/2014 approving TV for groundwater bodies from Romania.* ***Hungary:*** *EQS for herbicides and total pesticides, tri-, tetrachloroethylenes based on 201/2001. (X.25.) Gov. decree and the 6/2009. (IV.14.) KvVM-EüM-FVM common ministerial decree in correspondence to I. Annex of the 2006/118/EC directive.* *In Hungary, more than 95% of drinking water ensured from subsurface waters, so for all other components the DWS is applicable.* *For those GWBs where the NBL was higher than the DWS due to natural hydro-geological reasons, the TVs for ammonium, SO4 and EC were defined by taking into account these higher values, as described in Guidance Document No. 18.* ***Serbia:***
Verbal description of the **trend** assessment methodology	***Romania:*** *In order to assess the trend in pollutant concentrations, the results of the chemical analysis from the monitoring points have been used. Minimum period of analysis was at least 17 years (2000-2017).* *The methodology for identifying significant upper trends consists in adjustment and aggregation of the data from each monitoring points on groundwater bodies. The trend analysis was done using the Gwstat program. The steps used for trend assessment were:* • *Identifying the monitoring points and the associated results of chemical analysis, assessment of data series, for each year of reference period (2000–2017)* • *Establishment of baseline concentration for each parameter as the average concentration registered during the year 2000* • *Calculation of annual average for the available data in each monitoring point* • *Significant upward trends were identified by Gwstat software, based on Anova Test* ***Hungary****: To assess the trend of pollutant concentrations, chemical data of the surveillance monitoring systems were used for the period of 2000 to 2012. The trend analysis was done using Matlab program package of Man-Kendall method with fitted Sen slope. The steps used for trend assessment were:* • *During the assessment trend of all components for all monitoring objects were created using yearly average data and excluding time series with less than 4 data points.* • *The trend of groundwater body level aggregates of yearly annual data were assessed as well.* *Significant upward or downward trends were identified on 95 and 90% significance level using Man-Kendall method with Sen's slope.* ***Serbia:*** *No methodology for trend assessment has been developed.*
Verbal description of the **trend reversal** assessment methodology	***Romania:****. Trend reversal assessment methodology consists also in the use of Gwstat software. This method assumes that the time series can be characterized by two linear trends with a slope change within the time interval (analysis period). Thus, by applying the 95% quantile of the distribution, a reversal of the trend is identified, if in the first section the slope of the trend is positive, and in the second section the slope of the trend is negative. The stages of the method of reversing the pollutant concentration tendency:*

- *optimizing the choice of time sections regarding the shape of the resulting model;*
- *examining the significance of the rift for the simple linear regression model based on the square of the residue sum;*
- *conducting a statistical test to verify that the 2-sections model is significantly more than a simple regression model.*

Hungary: *To assess the trend reversal of pollutant concentrations two consecutive time periods were compared and evaluated*

Serbia: *No methodology for trend reversal assessment has been developed*

Threshold values per GWB

	Pollutant / Indicator	*TV (or range) [unit]*	*NBL (or range) [unit]*	*Level of TV establishment (national, RBD, GWB)*	*Related to risk in this GWB [yes/-]*
HU	*Nitrates*	*50 mg/l*	*0.5-9.6 mg/l*	*GWB*	*Yes*
HU	*Ammonium*	*2-5 mg/l*	*1.3-4.54 mg/l*	*GWB*	-
HU	*Conductivity*	*2500-4000 µS/cm*	*565-2004 µS/cm*	*GWB*	-
HU	*Sulfate*	*250-500 mg/l*	*5.6-373 mg/l*	*GWB*	-
HU	*Chloride*	*250 mg/l*	*8-183 mg/l*	*GWB*	-
HU	*Orthophosphate*	*1-5 mg/l*	*0.16-1.71 mg/l*	*GWB*	
HU	*Cadmium*	*5 µg/l*	*0.01-0.52µg/l*	*national*	-
HU	*Lead*	*10 µg/l*	*1-6 µg/l*	*national*	-
HU	*Mercury*	*1 µg/l*	*0.06-0.52 µg/l*	*national*	-
HU	*Trichlorethylene*	*10 µg/l*		*national*	-
HU	*Tetrachloro ethylene*	*10 µg/l*		*national*	-
HU	*Absorbed organic halogens AOX*	*20 µg/l*		*national*	-
HU	*Pesticides by components*	*0,1 µg/l*		*national*	-
HU	*Pesticides all*	*0.5 µg/l*		*national*	-
RO	*Nitrates*	*50 mg/l*		*National*	-
RO	*Benzen*	*10 µg/l*		*National*	-
RO	*Tricloretilena*	*10 µg/l*		*National*	-
RO	*Tetracloretilena*	*10 µg/l*		*National*	-
RO	*Ammonium*	*6.4 mg/l*	*5.33 mg/l*	*GWB*	-
RO	*Chlorides*	*250 mg/l*	*51.66 mg/l*	*GWB*	-
RO	*Sulphates*	*250 mg/l*	*69.47 mg/l*	*GWB*	-
RO	*Nitrites*	*0.5 mg/l*	*0.137 mg/l*	*GWB*	-
RO	*Phosphates*	*1 mg/l*	*0.774 mg/l*	*GWB*	-
RO	*Chromium*	*0.05 mg/l*	*0.00505 mg/l*	*GWB*	-
RO	*Nickel*	*0.02 mg/l*	*0.009573 mg/l*	*GWB*	-
RO	*Copper*	*0,1 mg/l*	*0.017913 mg/l*	*GWB*	-
RO	*Zinc*	*5 mg/l*	*0.350642 mg/l*	*GWB*	-
RO	*Cadmium*	*0.005 mg/l*	*0.000333 mg/l*	*GWB*	-
RO	*Mercury*	*0.001 mg/l*	*0.0004 mg/l*	*GWB*	-
RO	*Lead*	*0.01-mg/l*	*0.00744 mg/l*	*GWB*	-
RO	*Phenols*	*0.004 mg/l*	*0.003 mg/l*	*GWB*	-

GWB-8: Podunajska Basin, Zitny Ostrov / Szigetköz, Hanság-Rábca

GWB-8	National share	**HU-8** **SK-8**	Status 2021 for each national GWB?	
			Chemical (substance)	Quantity
List of individual GW-bodies forming the whole national share (national code incl. country code)	HU	HU_AIQ654	Good	Good
	HU	HU_AIQ572	Good	Good
	HU	HU_AIQ653	Good	Good
	HU	HU_AIQ573	Good	Good
	SK	SK1000300P	Good	Good
	SK	SK1000200P	Good	Good

Description/Characterisation of the ICPDR GW-body	***Slovakia:*** *The delineation consists of the following steps:* 1. *The aquifers are vertically divided in three floors: Quaternary sediments, Pre-quaternary strata containing cold waters, thermal aquifers (temperature > 25°C or it is considered as thermal by classification).* 2. *The pre-quaternary strata are further divided horizontally by geological types of the aquifer: volcanic rocks, other fissured rocks, karstic rocks, porous sediments.* 3. *Further separation is due to the borders of the surface catchment areas considered as river basin management units.* ***Hungary:*** *The delineation of groundwater bodies in Hungary has been carried out by:* 1. *Separation of the main geological features: porous aquifers in the basins, karstic aquifers, mixed formations of the mountainous regions, other than karstic aquifers.* 2. *Thermal water bodies are separated according to the temperature greater than 30 °C. In the case of porous aquifers it is done vertically, while in karstic aquifers horizontally. There are no thermal aquifers in the mountainous regions other than karstic.* 3. *Further division is related to the subsurface catchment areas and vertical flow system (in the case of porous aquifers) and to the structural and hydrological units (in the case of karstic aquifers and mountainous regions).* *For transboundary water bodies the more detailed further characterisation is carried out (n.b. because of the numerous transboundary water bodies and the expected further 20–30 % due to the risk of failing good status, Hungary decided to apply the methodology of further characterisation for all water bodies).* ***Reasons for selecting as important transboundary GWB*** *The large alluvial deposit of the River Danube downstream Bratislava lies in three countries: Slovakia (Podunajská lowland and its part: Žitný ostrov), Hungary (Northern part of Kisalföld including the Szigetköz) and in Austria. The aquifer system has been considered by Slovakia and Hungary as an important transboundary aquifer because of (i) its size, (ii) the unique amount of available groundwater resource and the important actual use for drinking water and other purposes as well (iii) the groundwater dependent terrestrial ecosystem of the floodplain, (iv) majority of the area is protected (protection zones of drinking water abstraction sites, nitrate sensitive areas, nature conservation areas), (v) the existence of the Gabcikovo Hydropower System.* ***General description*** *The Danube has been playing the decisive role in the formation of the aquifer system. The main aquifer is made up of 15–500 m thick Quaternary alluvia: hydraulically connected mixture of sands, gravels, intercalated with numerous clay and silt lenses. The average hydraulic conductivity is in the range of 100–500 m/day providing extremely high transmissivity, especially in the centre of the basin. Here, the bottom of the underlying Pannonian deposits is at a depth of 3,500 m.* *The aquifer is divided into several groundwater bodies in both countries. Despite the differences in the delineation method of the two countries, it was possible to select the relevant water bodies from transboundary point of view: two water bodies containing cold water in Hungary, which beside the Quaternary strata include some part of the Upper-Pannonian deposits as well, to the depth of 400–500 m corresponding to the surface separating cold and thermal waters (1,152 km2) and two Quaternary water bodies in Slovakia (2,186 km2) have been selected, i.e. 3,338 km2 in total (see the summary table above).*

	The aquifer can be considered as unconfined, despite the considerable area where the water level is in the semi-permeable covering layer. *Due to the high transmissivity of the aquifer, the groundwater regime and groundwater quality mainly depend on the surface water. The flow system and the type of covering layer provide surplus recharge condition in the majority of the area, but the main source of groundwater recharge is the Danube. Before the construction of the hydropower system (1992), the riverbed had been the infiltration surface, and the Danube's line had been the hydraulic boundary between the countries as well (in upper parts of Danube stream between Devín and Hrušov, approximately since 1970's, river bed started to drain groundwater). In the actual situation, the artificial recharge system is the main source for the vicinity of the Danube, but a remaining part of the aquifers in the Hungarian territory is recharged by the Čunovo reservoir. Where the reservoir is in the neighbourhood of the main channel (between Rajka and Dunakiliti) considerable transboundary groundwater flow appears under the Danube. The Danube's river bed downstream the reservoir – due to the derived flow and the consequently decreased average water level - drains the neighbouring groundwater, causing considerable drop of groundwater level in the imminent vicinity of the river bed. Both the quantity and the quality of the recharge from the reservoir highly depend on the continuously increasing deposit in the reservoir and the developing physico-chemical processes. Deposits in the reservoir are extracted. Signs of long-term changes of quantity and quality of recharge caused by continuously increasing deposit in the reservoir were not observed in the Slovak part of the aquifer yet.* *The depth of the groundwater table varies between 2 and 5 m. The wetting conditions of the covering layer has substantially changed along the Danube and in the lower Szigetköz, where prior to the derivation of the Danube the groundwater has fluctuated in the covering layer and the existing artificial recharge system does not compensate sufficiently the former influence of the Danube. On the Slovak territory, annual artificial flooding of the river system in the high water periods seems to efficiently supply groundwater as well as the soil moisture resources.*
Description of **status** assessment methodology.	Chemical Status ***Slovakia:*** *The methodology for assessing chemical status followed the requirements of the Groundwater Directive (2006/118/EC) as well as the recommendations of the CIS Guidance Document no. 18 - Guidance on groundwater status and trend assessment. The assessment of the chemical status of GWB in the conditions of the Slovakia consisted of the following tests:* *1. General quality assessment (GQA) test - years 2016-2017.* *2. Drinking water protected areas (DWPA) test - period 2008-2017.* *3. Test of significant diminution of associated surface water chemistry and ecology due to transfer of pollutant from the GWB - named as Surface water test - period 2013-2018.* *In the GQA test and the Surface water test, the procedure was based on a comparison of the arithmetic means of the concentration of the individual component with quality standards (QS) or thresholds values (TV) for each monitoring point. If no exceedances of the QS/TV were recorded in all monitoring points, the whole GWB was evaluated in good chemical status. If exceedances of QS/TVs were recorded than the methodologies were as follows:* *In the GQA test, the data aggregation to whole GWB was performed. If the calculated total area of exceedance of the QS/TV was less than 20% of the total area of the GWB, the GWB was evaluated in good status. If the exceedance more than 20% of the total area of the GWB was recorded and based on expert judgment, the GWB was evaluated in poor chemical status.* *In the Surface water test, each GWB (with the relevant groundwater monitoring point) associated with the surface water body was assessed individually, taking into account the hydrological criterion, the hydrogeological criterion, the groundwater and surface water concentration profile, dilution (if data available) and that the estimated load of pollutant from groundwater transferred to associated surface water could be more than 50%, the GWB was evaluated in poor chemical status.* *In the DWPA test, the procedure was based on trend analysis (Mann-Kendal, linear regression, 10 years) of biological, chemical and radiological parameters of groundwater intended for human consumption before any level of treatment. If there was not a statistically significant and sustained upward trend in any drinking water abstraction points, the GWB was evaluated in good chemical status. If there was any significant and sustained upward trend in any parameter in any of drinking water abstraction point in the GWB, the methodology was as follows: the data aggregation to whole GWB was performed (kriging from 2 years mean). If the calculated*

	total area of exceedance of the QS/TV was less than 20% of the total area of the GWB, the GWB was evaluated in good status. If the exceedance more than 20% of the total area of the GWB was recorded and based on expert judgment, the GWB was evaluated in poor chemical status. ***Hungary:*** *Assessment of the chemical status of groundwater was conducted: Analysing of the chemical data of individual monitoring points within each of the GWBs; Identifying of the pressures - sources of pollution; The background levels were calculated and used to determine threshold value. Threshold values have been determined according to CIS Guidance No. 18. Contamination limits have been determined for all indicators listed in Annex II Part B of Directive 2006/118/EC and indicators of the report under Art. 5 of Directive 2006/118/EC.* *The following parameters were investigated:* *a) Natural Background Level was determined for the following components: nitrate, ammonium, specific conductivity, sulphate, chloride, arsenic, cadmium, lead, mercury, orthophosphate* *b) For each monitoring point the median concentration of each parameters of the studied period was compared to the thresholds values (determined for each GWB) or standards values (in the case of nitrates, metals and pesticides).* *c) Different tests were conducted to assess groundwater body status: Diffuse pollution test (nitrate, ammonium, orthophosphate), Drinking water supply tests for numerous elements or components in both drinking water wells and monitoring wells and trend analysis based on the data of the surveillance monitoring system. Studied components of these tests are: nitrate, ammonium, chloride, sulphate, specific conductivity, mercury, lead, cadmium, pesticides and organics, furthermore in the trend analysis pH and dissolved oxygen.* *d) Based on these tests, groundwater body was evaluated.* Quantitative Status ***Hungary:*** *To determine the overall quantitative status for a GWB, a series of tests should be applied that considers the impacts of anthropogenically induced long-term alterations in groundwater level and/or flow. Each test will assess whether the GWB is meeting the relevant environmental objectives. The quantitative status has been assessed taking into account CIS Guidance No.18. The following criteria have been used:* • *GW alteration (Drawdown) test* • *Water Balance test* • *Surface Water Flow test* • *Groundwater Dependent Terrestrial Ecosystems (GWDTE)* • *Saline or other Intrusion test* ***Slovakia:*** *Assessment of groundwater quantitative status consists of 4 tests:* *1. balance assessment of groundwater bodies for the period 2013-2017 and evaluation of the long-term trend of development of balance levels of groundwater bodies for the period 2004-2018* *2. evaluation of the existence of significant declining trends in the groundwater level and spring yield in groundwater bodies for the period 2007-2016 processed by aggregation of point results of groundwater quantity monitoring in the facilities of the state hydrological network of the SHMI* *3. assessment of the impact of groundwater quantity on the status of terrestrial ecosystems dependent on groundwater* *4. assessment of the impact of groundwater quantity on surface water.*
Groundwater threshold value relationships	Receptors considered ***Slovakia:*** *Drinking water, Surface water* ***Hungary:*** *Drinking water* Consideration of NBL and EQS (environmental quality standards, drinking water standards, surface water standards) in the TV establishment:

	Slovakia: *The natural background level (NBL) was determined and used to derive the threshold value (TV). The TV were determined for all indicators listed in Part B of Annex II to Directive 2006/118/EC and in Directive 2014/80/EU. The TV for the inorganic substances were derived according to the formula: TV = (NBL + DWS)/2. The TV for organic compounds were derived using the formula: TV = 0.75 * DWS. These TV were used for GQA and DWPA tests.* *An updated list of the TV established for each GWB was published in the amended Regulation of the Government of the Slovakia no. 282/2010 Coll.* *For the Surface water test, the TV were derived as follows: TV = CV = AF * EQS (surface water standard)/DF, where AF (Attenuation factor) and DF (Dilution factor) are equal to 1 (the worst case).* *For that GWB where the NBL was higher than the TV due to natural hydro-geological reasons, the TV was set up as TV = NBL.* ***Hungary:*** *EQS for herbicides and total pesticides, tri-, tetrachloroethylenes based on 201/2001. (X.25.) Gov. decree and the 6/2009. (IV.14.) KvVM-EüM-FVM common ministerial decree in correspondence to I. Annex of the 2006/118/EC directive.* *In Hungary, more than 95% of drinking water ensured from subsurface waters, so for all other components the DWS is applicable.* *For those GWBs where the NBL was higher than the DWS due to natural hydro-geological reasons, the TVs for ammonium, SO4 and EC were defined by taking into account these higher values, as described in Guidance Document No. 18.*
Verbal description of the **trend** assessment methodology	***Slovakia:*** *Trend is assessed separately for groundwater quality and quantity at which for trends in quantity the procedure applies for all GW quantity monitoring sites. The assessment follows a stepwise procedure. Consisting of the evaluation of the data sets and the monitoring points (no gaps in time series are allowed and data from 2007–2016 were used), consisting of the performance of the non-parametric Mann-Kendall trend test (95% confidence level) and comprising the regression analysis. GWBs with decreasing trends but with no evidence of abstraction are excluded from assessment in the 3rd RBMP. For assessing trends in concentrations of pollutants in groundwater the evaluation period was 2007–2016. The results of surveillance and operational monitoring were applied for the assessment. Monitoring frequency depends on the GWB type. In the analysis the values <LOQ are replaced by LOQmax/2. Trend assessment is only performed if the number of values <LOQ is less than 50%. Non-parametric Mann-Kendall test with 5% significance level was applied for trend evaluation. For time series showing a normal distribution, the statistical significance of the trend was also tested by the parametric method (ANOVA) with 5% significance level. Than for all times series with statistically significant upwards trends, the statistically significant upward trend was evaluated and identified if the median of the values measured over the last 2 years was higher than 0.75 * QS/TV or the calculated predicted value of the linear trend up to 2026 (regression model calculated by the least squares method or Sen's nonparametric procedure) was higher than QS/TV. The significant sustained upward trends of pollutant concentrations were identified at the level of monitoring points and at the GWB level.* *The starting point for trend reversal was placed where the concentration of the pollutant reaches 75% of the QS/TV of the relevant pollutant.* ***Hungary****: To assess the trend of pollutant concentrations, chemical data of the surveillance monitoring systems were used for the period of 2000 to 2012. The trend analysis was done using Matlab program package of Man-Kendall method with fitted Sen slope. The steps used for trend assessment were:* • *During the assessment trend of all components for all monitoring objects were created using yearly average data and excluding time series with less than 4 data points.* • *The trend of groundwater body level aggregates of yearly annual data were assessed as well.* *Significant upward or downward trends were identified on 95% significance level using Man-Kendall method with Sen's slope.*
Verbal description of the **trend**	***Slovakia:*** *Trend reversal assessment methodology consists in the use of GWstat software. Time series were included in the assessment, on the basis of which significant sustained upward trends at the level of monitoring sites in the previous RBMP were classified. The time series*

reversal assessment methodology	*entering the evaluation were supplemented by data monitored in previous years so that the evaluation period was 14 years. The evaluation was performed by dynamically dividing the time series into two sections with different lengths and then evaluating the statistical significance of the trends separately for each allocated section. A reversal of the trend was indicated if the following conditions were met at the same time: the statistical significance of the trends evaluated within individual sections is higher than the statistical significance of the trend evaluated on the basis of all data forming the evaluated time series, the section representing the results of monitoring in the older period shows a statistically significant upward trend, which is followed by a statistically significant decreasing trend evaluated on the basis of the results of monitoring in the newer period* ***Hungary: To assess the trend reversal of pollutant concentrations two consecutive time period was compared and evaluated***

Threshold values per GWB

	Pollutant / Indicator	*TV (or range) [unit]*	*NBL (or range) [unit]*	*Level of TV establishment (national, RBD, GWB)*	*Related to risk in this GWB [yes/-]*
HU	*Nitrates*	*50 mg/l*	*2.9-12 mg/l*	*GWB*	-
HU	*Ammonium*	*1-2 mg/l*	*0.4-0.86 mg/l*	*GWB*	-
HU	*Conductivity*	*2500 µS/cm*	*657-1030 µS/cm*	*GWB*	-
HU	*Sulfate*	*250 mg/l*	*88.8-220 mg/l*	*GWB*	-
HU	*Chloride*	*250 mg/l*	*30-49.7 mg/l*	*GWB*	-
HU	*Orthophosphate*	*1 mg/l*	*0.24-0.44 mg/l*	*GWB*	
HU	*Cadmium*	*5 µg/l*	*0.17-1.1 µg/l*	*national*	-
HU	*Lead*	*10 µg/l*	*1.9-3.1 µg/l*	*national*	-
HU	*Mercury*	*1 µg/l*	*0.07-0.2 µg/l*	*national*	-
HU	*Trichlorethylene*	*10 µg/l*		*national*	-
HU	*Tetrachloro ethylene*	*10 µg/l*		*national*	-
HU	*AOX*	*20 µg/l*		*national*	-
HU	*Pesticides by components*	*0,1 µg/l*		*national*	-
HU	*Pesticides all*	*0,5 µg/l*		*national*	-
SK1000300P	*Ammonium*	*0.26 mg/l*	*0.02 mg/l*	*GWB*	*Yes*
	Arsenic	*6 µg/l*	*2 µg/l*	*GWB*	-
	Benzene	*0.8 µg/l*	-	*national*	-
	Cadmium	*3.0 µg/l*	*1 µg/l*	*GWB*	-
	Chloride	*137.3 mg/l*	*24.6 mg/l*	*GWB*	-
	Chromium	*26 µg/l*	*2 µg/l*	*GWB*	-
	Copper	*1002 µg/l*	*4 µg/l*	*GWB*	-
	Iron total	*0.135 mg/l*	*0.07 mg/l*	*GWB*	-
	Lead	*7.0 µg/l*	*4 µg/l*	*GWB*	-
	Manganese	*0.030 mg/l*	*0.01 mg/l*	*GWB*	-
	Mercury	*0.8 µg/l*	*0.5 µg/l*	*GWB*	-
	Nitrates	*50 mg/l*	*6.6 mg/l*	*GWB*	-
	Nitrites	*0.26 mg/l*	*0.01 mg/l*	*GWB*	-
	Phosphates	*0.22 mg/l*	*0.04 mg/l*	*GWB*	-
	Sodium	*104.5 mg/l*	*8.9 mg/l*	*GWB*	-
	Sulphates	*157.6 mg/l*	*65.2 mg/l*	*GWB*	-
	Tetrachloroethylen	*7.5* µg/l*	-	*national*	-
	Trichlorethylene	*7.5* µg/l*	-	*national*	-
SK1000200P	*Ammonium*	*0.26 mg/l*	*0.01 mg/l*	*GWB*	-
	Arsenic	*6 µg/l*	*2 µg/l*	*GWB*	-
	Benzene	*0.8 µg/l*	-	*national*	-
	Cadmium	*3.0 µg/l*	*1 µg/l*	*GWB*	-
	Chloride	*135.8 mg/l*	*21.5 mg/l*	*GWB*	-
	Chromium	*26 µg/l*	*1 µg/l*	*GWB*	-
	Copper	*1001 µg/l*	*2 µg/l*	*GWB*	-

	Iron total	*0.125 mg/l*	*0.05 mg/l*	*GWB*	-
	Lead	*6.5 µg/l*	*3 µg/l*	*GWB*	-
	Manganese	*0.030 mg/l*	*0.01 mg/l*	*GWB*	-
	Mercury	*0.7 µg/l*	*0.4 µg/l*	*GWB*	-
	Nitrates	*50 mg/l*	*14.2 mg/l*	*GWB*	-
	Nitrites	*0.26 mg/l*	*0.01 mg/l*	*GWB*	-
	Phosphates	*0.22 mg/l*	*0.04 mg/l*	*GWB*	-
	Sodium	*105.8 mg/l*	*11.5 mg/l*	*GWB*	-
	Sulphates	*148.9 mg/l*	*47.8 mg/l*	*GWB*	-
	Tetrachloroethylen	*7.5* µg/l*	-	*national*	-
	Trichlorethylene	*7.5* µg/l*	-	*national*	-

* 7.5 for Tetrachloroethylene + Trichlorethylene

GWB-9: Bodrog

GWB-9	National share	**HU-9** **SK-9**	Status 2021 for each national GWB?	
			Chemical (substance)	Quantity
List of individual GW-bodies forming the whole national share (national code incl. country code)	HU	HU_AIQ495	Good	Good
	HU	HU_AIQ496	Good	Poor
	SK	SK1001500P	Poor (NH_4, PO_4)	Good

Description/Characterisation of the ICPDR GW-body	***Delineation:*** *see GWB-8* *At the common eastern border of Slovakia and Hungary, the alluvial aquifer system corresponding to the Bodrog River catchment area in Slovakia and the Tisza-valley between Záhony and Tokaj (confluence with the Bodrog River) has been selected as important due to (i) its significance in meeting the water demand of the region, (ii) contamination threat of the groundwater in the vicinity of state border between Slovakia and Hungary. Some part of the water aquifer system is in Ukraine.* ***General description*** *The aquifer is the alluvial deposit of the Bodrog River and its tributaries. The Tisza divides the lowland area in Hungary into Bodrogköz (northern part) and Rétköz (Southern part). Holocene silty-clayey layers cover the surface with peaty areas. The Quaternary aquifer is around 60 m thick in the Slovakian side and its thickness gradually increases in Hungary towards the South (50-200 m). The fluvial sediments (from sandy gravels in the North to sands is the South with intercalated silt and clay lenses) can be characterized by 5 – 30 m/d hydraulic conductivity.* *In the Slovakian part only the Quaternary aquifer system is part of the transboundary water body-complex while in Hungary the Upper part of the Pannonian formation is also attached (depth is app. 500 m, corresponding to water temperature less than 30°C).* *The main recharge area is in the Slovakian territory. The rain waters infiltrate at the marginal mountains and penetrate into permeable deep aquifers. In the upstream part of the catchment area surface waters also contribute to the recharge. In the Slovakian side the water bodies are mainly unconfined or in some places partly confined. In Hungary both water bodies are in discharge position and the main aquifers can be considered as confined. Here the groundwater level lies close to (between 2 and 4 m below) the surface. Where it is around 2 m below the surface, the groundwater can considerably contribute to the transpiration need of the vegetation, which are adapted to that condition, and consequently they are very sensitive to the status of the groundwater. The surplus of evapotranspiration and the artificial drainage system (canals) collect the upward groundwater flow. From South, the sandy hills of Nyírség contribute to the discharged groundwater as well, but the boundary of the waters of different origin is not exactly known (that is why both discharge areas in Hungary have been attached to the transboundary aquifer). The general direction of the groundwater flow is N-S (NE-SW) to the North of the Tisza River and SE-NW in the Rétköz and uncertain below the Tisza.* *The regional hydro-geochemical picture follows the flow system. Close to the river bed sections recharging groundwater, the water quality is almost the same as in surface streams. Generally low TDS, Ca-Mg-HCO3 type waters occur in the recharge areas, Na-HCO3 waters dominate in the middle and western part of Rétköz, and mixture of these two types in the western part of Bodrogköz region. At the centre of the Bodrogköz, elevated Cl-content indicates strong upward migration from the deeper zones.* *The major water quality problem of natural origin in the Bodrogköz Quaternary aquifer complex is the high iron and manganese content (reducing conditions). In the Rétköz elevated (10–30 µ/l) arsenic-content occurs.* *The estimated amount of available groundwater resources is almost 50 Mm3/year in the Slovakian part, out of that 10–15 Mm3/year should be maintained as lateral flow towards the Hungarian part. It is to be mentioned, that the southern part of the Hungarian discharge area receives water from the southern recharge areas as well, but no local recharge can be considered available for abstraction in the Bodrogköz and Rétköz.* ***Major pressures and impacts***

	The groundwater is mainly used for drinking water supply, but partially for industrial and agricultural purposes (inc. irrigation) as well. The use ratio is quite low in Slovakia: only 10 %. The development is limited by occurrence of technologically inappropriate substances in water (Mn, Fe) and sometimes also by groundwater pollution from surface waters, industry, agriculture and transport infrastructure (Strážske, Hencovce, Michalovce, Čierna nad Tisou). *In Hungary the available groundwater resources of the two water bodies are quite different. In the northern part, which is in close relation to the Slovakian part, the water demand of the groundwater dependent aquatic and terrestrial ecosystems can be estimated at 5–8 Mm3/d, thus the available groundwater resources is in the range of 5–7 Mm3/year. The abstracted amount of groundwater is 3 Mm3/year, so the ratio is around 50 %, but the majority is concentrated to Ronyva/Roňava river valley. In the southern part, the lateral flow from the recharge zone of Nyírség (app. 30 Mm3/year) provides sufficient water for the minimum water demand of ecosystems (8-12 Mm3/year) and for 8 Mm3/year of abstraction.* *In Hungary 10 significant point sources of pollution have been registered. The shallow groundwater has usually high nitrate under the settlements, because of the inappropriate handling of manure and the totally or partially missing sewer systems. The agriculture contributes to the pollution as well, through use of chemicals. The estimated amunt of surplus Nitrogen is 15 kgN/ha/year originated from the use of 88 kgN/ha/year fertilizer and 13 kgN/year manure.* *The groundwater quality in Slovakia is monitored in 17 sampling sites, groundwater samples are taken from the first aquifer 2 times per year). The Hungarian water quality monitoring is concentrating in the surrounding of waterworks. The quality of the Ronyva/Roňava aquifer close to the waterworks of Sátoraljaújhely shows increasing tendency of Nitrate pollution: the average concentration is around 30 mg/l, and in one production well the Nitrate-concentration exceeds the limit value of 50 mg/l. Information on pollution in arable lands is practically missing in this region.* *The high vulnerability of groundwater and the expected future development in water demand requires high level of protection in the Slovakian part of the region mainly oriented to measures focused on industrial pollution sources. In Hungary the protection zones of the waterworks (5 %) need special attention.*
Description of **status** assessment methodology.	<u>Chemical Status</u> ***Slovakia:*** *The methodology for assessing chemical status followed the requirements of the Groundwater Directive (2006/118/EC) as well as the recommendations of the CIS Guidance Document no. 18 - Guidance on groundwater status and trend assessment. The assessment of the chemical status of GWB in the conditions of the Slovakia consisted of the following tests:* 1. *General quality assessment (GQA) test - years 2016-2017.* 2. *Drinking water protected areas (DWPA) test - period 2008-2017.* 3. *Test of significant diminution of associated surface water chemistry and ecology due to transfer of pollutant from the GWB - named as Surface water test - period 2013-2018.* *In the GQA test and the Surface water test, the procedure was based on a comparison of the arithmetic means of the concentration of the individual component with quality standards (QS) or thresholds values (TV) for each monitoring point. If no exceedances of the QS/TV were recorded in all monitoring points, the whole GWB was evaluated in good chemical status. If exceedances of QS/TVs were recorded than the methodologies were as follows:* *In the GQA test, data aggregation to whole GWB was performed. If the calculated total area of exceedance of the QS/TV was less than 20% of the total area of the GWB, the GWB was evaluated in good status. If the exceedance more than 20% of the total area of the GWB was recorded and based on expert judgment, the GWB was evaluated in poor chemical status.* *In the Surface water test, each GWB (with the relevant groundwater monitoring point) associated with the surface water body was assessed individually, taking into account the hydrological criterion, the hydrogeological criterion, the groundwater and surface water concentration profile, dilution (if data available) and that the estimated load of pollutant from groundwater transferred to associated surface water could be more than 50%, the GWB was evaluated in poor chemical status.* *In the DWPA test, the procedure was based on trend analysis (Mann-Kendal, linear regression, 10 years) of biological, chemical and radiological parameters of groundwater intended for human consumption before any level of treatment. If there was not a statistically significant and*

	sustained upward trend in any drinking water abstraction points, the GWB was evaluated in good chemical status. If there was any significant and sustained upward trend in any parameter in any of drinking water abstraction point in the GWB, the methodology was as follows: the data aggregation to whole GWB was performed (kriging from 2 years mean). If the calculated total area of exceedance of the QS/TV was less than 20% of the total area of the GWB, the GWB was evaluated in good status. If the exceedance more than 20% of the total area of the GWB was recorded and based on expert judgment, the GWB was evaluated in poor chemical status ***Hungary:*** *Assessment of the chemical status of groundwater was conducted: Analysing of the chemical data of individual monitoring points within each of the GWBs; Identifying of the pressures - sources of pollution; The background levels were calculated and used to determine threshold value. Threshold values have been determined according to CIS Guidance No. 18. Contamination limits have been determined for all indicators listed in Annex II Part B of Directive 2006/118/EC and indicators of the report under Art. 5 of Directive 2006/118/EC.* *The following parameters were investigated:* *a) Natural Background Level was determined for the following components: nitrate, ammonium, specific conductivity, sulphate, chloride, arsenic, cadmium, lead, mercury, orthophosphate* *b) For each monitoring point the median concentration of each parameters of the studied period was compared to the thresholds values (determined for each GWB) or standards values (in the case of nitrates, metals and pesticides).* *c) Different tests were conducted to assess groundwater body status: Diffuse pollution test (nitrate, ammonium, orthophosphate), Drinking water supply tests for numerous elements or components in both drinking water wells and monitoring wells and trend analysis based on the data of the surveillance monitoring system. Studied components of these tests are: nitrate, ammonium, chloride, sulphate, specific conductivity, mercury, lead, cadmium, pesticides and organics, furthermore in the trend analysis pH and dissolved oxygen.* *d) Based on these tests, groundwater body was evaluated.* Quantitative Status ***Hungary:*** *To determine the overall quantitative status for a GWB, a series of tests should be applied that considers the impacts of anthropogenically induced long-term alterations in groundwater level and/or flow. Each test will assess whether the GWB is meeting the relevant environmental objectives. The quantitative status has been assessed taking into account CIS Guidance No.18. The following criteria have been used:* • *GW alteration (Drawdown) test* • *Water Balance test* • *Surface Water Flow test* • *Groundwater Dependent Terrestrial Ecosystems (GWDTE)* • *Saline or other Intrusion test* ***Slovakia:*** *Assessment of groundwater quantitative status consists of 4 tests:* *1. balance assessment of groundwater bodies for the period 2013-2017 and evaluation of the long-term trend of development of balance levels of groundwater bodies for the period 2004-2018* *2. evaluation of the existence of significant declining trends in the groundwater level and spring yield in groundwater bodies for the period 2007-2016 processed by aggregation of point results of groundwater quantity monitoring in the facilities of the state hydrological network of the SHMI* *3. assessment of the impact of groundwater quantity on the status of terrestrial ecosystems dependent on groundwater* *4. assessment of the impact of groundwater quantity on surface water*
Groundwater threshold value relationships	Receptors considered ***Slovakia:*** *Drinking water, Surface water* ***Hungary:*** *Drinking water*

	Consideration of NBL and EQS (environmental quality standards, drinking water standards, surface water standards) in the TV establishment: ***Slovakia:*** *The natural background level (NBL) was determined and used to derive the threshold value (TV). The TV were determined for all indicators listed in Part B of Annex II to Directive 2006/118/EC and in Directive 2014/80/EU. The TV for the inorganic substances were derived according to the formula: TV = (NBL + DWS)/2. The TV for organic compounds were derived using the formula: TV = 0.75 * DWS. These TV were used for GQA and DWPA tests.* *An updated list of the TV established for each GWB was published in the amended Regulation of the Government of the Slovakia no. 282/2010 Coll.* *For the Surface water test, the TV were derived as follows: TV = CV = AF * EQS (surface water standard)/DF, where AF (Attenuation factor) and DF (Dilution factor) are equal to 1 (the worst case).* *For that GWB where the NBL was higher than the TV due to natural hydro-geological reasons, the TV was set up as TV = NBL.* ***Hungary:*** *EQS for herbicides and total pesticides, tri-, tetrachloroethylenes based on 201/2001. (X.25.) Gov. decree and the 6/2009. (IV.14.) KvVM-EüM-FVM common ministerial decree in correspondence to I. Annex of the 2006/118/EC directive.* *In Hungary, more than 95% of drinking water ensured from subsurface waters, so for all other components the DWS is applicable.* *For those GWBs where the NBL was higher than the DWS due to natural hydro-geological reasons, the TVs for ammonium, SO4 and EC were defined by taking into account these higher values, as described in Guidance Document No. 18.*
Verbal description of the **trend** assessment methodology	***Slovakia:*** *Trend is assessed separately for groundwater quality and quantity at which for trends in quantity the procedure applies for all GW quantity monitoring sites. The assessment follows a stepwise procedure. Consisting of the evaluation of the data sets and the monitoring points (no gaps in time series are allowed and data from 2007–2016 were used), consisting of the performance of the non-parametric Mann-Kendall trend test (95% confidence level) and comprising the regression analysis. GWBs with decreasing trends but with no evidence of abstraction are excluded from assessment in the 3rd RBMP. For assessing trends in concentrations of pollutants in groundwater the evaluation period was 2007–2016. The results of surveillance and operational monitoring were applied for the assessment. Monitoring frequency depends on the GWB type. In the analysis the values <LOQ are replaced by LOQmax/2. Trend assessment is only performed if the number of values <LOQ is less than 50%. Non-parametric Mann-Kendall test with 5% significance level was applied for trend evaluation. For time series showing a normal distribution, the statistical significance of the trend was also tested by the parametric method (ANOVA) with 5% significance level. Than for all times series with statistically significant upwards trends, the statistically significant upward trend was evaluated and identified if the median of the values measured over the last 2 years was higher than 0.75 * QS/TV or the calculated predicted value of the linear trend up to 2026 (regression model calculated by the least squares method or Sen's nonparametric procedure) was higher than QS/TV. The significant sustained upward trends of pollutant concentrations were identified at the level of monitoring points and at the GWB level.* *The starting point for trend reversal was placed where the concentration of the pollutant reaches 75% of the QS/TV of the relevant pollutant.* ***Hungary****: To assess the trend of pollutant concentrations, chemical data of the surveillance monitoring systems were used for the period of 2000 to 2012. The trend analysis was done using Matlab program package of Mann-Kendall method with fitted Sen slope. The steps used for trend assessment were:* • *During the assessment trend of all components for all monitoring objects were created using yearly average data and excluding time series with less than 4 data points.* • *The trend of groundwater body level aggregates of yearly annual data were assessed as well.* *Significant upward or downward trends were identified on 95% significance level using Mann-Kendall method with Sen's slope.*

Verbal description of the **trend reversal** assessment methodology	***Slovakia:*** *Trend reversal assessment methodology consists in the use of GWstat software. Time series were included in the assessment, on the basis of which significant sustained upward trends at the level of monitoring sites in the previous RBMP were classified. The time series entering the evaluation were supplemented by data monitored in previous years so that the evaluation period was 14 years. The evaluation was performed by dynamically dividing the time series into two sections with different lengths and then evaluating the statistical significance of the trends separately for each allocated section. A reversal of the trend was indicated if the following conditions were met at the same time: the statistical significance of the trends evaluated within individual sections is higher than the statistical significance of the trend evaluated on the basis of all data forming the evaluated time series, the section representing the results of monitoring in the older period shows a statistically significant upward trend, which is followed by a statistically significant decreasing trend evaluated on the basis of the results of monitoring in the newer period* ***Hungary:***

Threshold values per GWB

	Pollutant / Indicator	*TV (or range) [unit]*	*NBL (or range) [unit]*	*Level of TV establishment (national, RBD, GWB)*	*Related to risk in this GWB [yes/-]*
HU	*Nitrates*	*50 mg/l*	*1.2-12.8 mg/l*	*GWB*	*-*
HU	*Ammonium*	*2-5 mg/l*	*1.79-3.6 mg/l*	*GWB*	*Yes*
HU	*Conductivity*	*2500 µS/cm*	*1370-1483 µS/cm*	*GWB*	*-*
HU	*Sulfate*	*250 mg/l*	*42.2-191 mg/l*	*GWB*	*-*
HU	*Chloride*	*250 mg/l*	*135-214 mg/l*	*GWB*	*-*
HU	*Orthophosphate*	*1-2 mg/l*	*0.3-1.45 mg/l*	*GWB*	
HU	*Cadmium*	*5 µg/l*	*0.03-1 µg/l*	*national*	*-*
HU	*Lead*	*10 µg/l*	*3.5-4.36µg/l*	*national*	*-*
HU	*Mercury*	*1 µg/l*	*0.1-0.19 µg/l*	*national*	*-*
HU	*Trichlorethylene*	*10 µg/l*		*national*	*-*
HU	*Tetrachloro ethylene*	*10 µg/l*		*national*	*-*
HU	*Absorbed organic halogens AOX*	*20 µg/l*		*national*	*-*
HU	*Pesticides by components*	*0.1 µg/l*		*national*	*-*
HU	*Pesticides all*	*0.5 µg/l*		*national*	*-*
SK	*Ammonium*	*0.30 mg/l*	*0.09 mg/l*	*GWB*	*Yes*
SK	*Arsenic*	*6 µg/l*	*2 µg/l*	*GWB*	*-*
SK	*Benzene*	*0.8 µg/l*	*-*	*national*	*-*
SK	*Cadmium*	*3.0 µg/l*	*1 µg/l*	*GWB*	*-*
SK	*Chloride*	*147.4 mg/l*	*44.7 mg/l*	*GWB*	*-*
SK	*Chromium*	*27 µg/l*	*4 µg/l*	*GWB*	*-*
SK	*Copper*	*1004 µg/l*	*8 µg/l*	*GWB*	*-*
SK	*Iron total*	*0.150 mg/l*	*0.1 mg/l*	*GWB*	*-*
SK	*Lead*	*9.0 µg/l*	*8 µg/l*	*GWB*	*-*
SK	*Manganese*	*0.030 mg/l*	*0.01 mg/l*	*GWB*	*-*
SK	*Mercury*	*0.7 µg/l*	*0.4 µg/l*	*GWB*	*-*
SK	*Nitrates*	*50 mg/l*	*9.7 mg/l*	*GWB*	*-*
SK	*Nitrites*	*0.26 mg/l*	*0.01 mg/l*	*GWB*	*-*
SK	*Phosphates*	*0.22 mg/l*	*0.02 mg/l*	*GWB*	*Yes*
SK	*Sodium*	*111.0 mg/l*	*22 mg/l*	*GWB*	*-*
SK	*Sulphates*	*167.4 mg/l*	*84.7 mg/l*	*GWB*	*-*
SK	*Tetrachloroethylen*	*7.5* µg/l*	*-*	*national*	*-*
SK	*Trichlorethylene*	*7.5* µg/l*	*-*	*national*	*-*

* 7.5 for Tetrachloroethylene + Trichlorethylene

GWB-10: Slovensky kras / Aggtelek-hgs.

<table>
<tr><td rowspan="2">GWB-10</td><td rowspan="2">National share</td><td rowspan="2">HU-10
SK-10</td><td colspan="2">Status 2021 for each national GWB?</td></tr>
<tr><td>Chemical (substance)</td><td>Quantity</td></tr>
<tr><td rowspan="3">List of individual GW-bodies forming the whole national share (national code incl. country code)</td><td>HU</td><td>HU_AIQ485</td><td>Good</td><td>Good</td></tr>
<tr><td>SK</td><td>SK200480KF</td><td>Good</td><td>Good</td></tr>
<tr><td colspan="4"></td></tr>
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<table>
<tr><td>Description/Characterisation of the ICPDR GW-body</td><td>
Delineation: see GWB-8
The Aggtelek Mountain and the Slovensky kras form a large common karstic aquifer system in the Eastern part of the counrtries. It is selected for presenting in the Danube-basin report as important transboundary water body: (i) National Park covers the majority of its surface, where the role of the groundwater is presented by springs and stalactite caves, (ii) significant drinking water resource in Slovakia, regionally important in Hungary (iii) vulnerable area requiring protection.
General description
The GWB is in a Mesozoic complex with morphologically visible karstic plateau and canyon-like valleys of water courses, separating different units. Hydrogeological units are very different according to the character of permeability, character of groundwater circulation, type of groundwater regime, and also in the resulting yield of groundwater springs. From hydro-geological point of view, the most important tectonic unit in the area is the Silicicum unit, mainly its Middle Triassic and Upper Triassic part. The most important aquifer here is the Middle and Upper Triassic limestone and dolomites with karst-fissure type of permeability. Similarly important hydrogeological units in the Hungarian side are Alsóhegy, Nagyoldal, Hasagistya and Galyaság, which contain the Aggtelek-Domica cave system. Tertiary basins act as a regional impermeable barrier for the groundwater accumulated in Triassic limestone.
Groundwater circulation in these rocks is controlled by extreme heterogeneity of carbonate rocks, following the tectonic development. These tectonically pre-destinated drainage structures show the major influence on the directions of groundwater flow. Majority of groundwater is drained towards big karstic springs. Areas between such tectonic faults are less karstified and also less permeable. If not drained by cave systems or permeable tectonic faults, groundwater usually feeds the Quaternary coverage. Specific hydraulic feature of the karstified carbonate complex with preferred drainage structures is that no continuous groundwater table ca be defined within the rock mass. Groundwater in many cases only fills up karstic openings – conduits, sometimes enlarged into the cave systems, while segments between the preferred groundwater routes are unsaturated. On the other hand, groundwater level changes in these zones are sharp and show quick response to the meteorological situation. Typical amplitude of groundwater level change is from 5 to 15 m. In such levels above the erosion base perennial springs occur after an intensive rainfall events or sudden snowmelts. Hidden outflow to the deeper structures within and outside of the area the territory (generally of westward direction under the Tertiary sediments of the Rimavská kotlina Basin) is considered to be quite important from the water management point of view. Groundwater abstraction for various purposes is concentrated at the natural outflows of springs – relatively small portion is abstracted by pumping from boreholes and wells.
Major pressures and impacts
The estimated amount of available resources in Slovenský kras is 40.4 Mm3/year, the actual use is 21 % of available resources, mainly for drinking water purposes.
In the Hungarian side only the amount of karstic water is utilized, which flows out naturally from karstic springs in Jósvafő, Szögliget, Komjáti, Égerszög and Aggtelek. There are enough data about karst spring discharge. Observed discharge data are available for a period of nearly 30 years. Because of the National Park no important karstic water abstraction will be planned on the area.
National Parks cover the majority of the area. In addition, in Hungary the total area of the GWB is considered as Nitrate-sensitive. .
</td></tr>
<tr><td>Description of status</td><td><u>Chemical Status:</u></td></tr>
</table>

assessment methodology.	***Slovakia:*** *The methodology for assessing chemical status followed the requirements of the Groundwater Directive (2006/118/EC) as well as the recommendations of the CIS Guidance Document no. 18 - Guidance on groundwater status and trend assessment. The assessment of the chemical status of GWB in the conditions of the Slovakia consisted of the following tests:* *1. General quality assessment (GQA) test - years 2016-2017.* *2. Drinking water protected areas (DWPA) test - period 2008-2017.* *3. Test of significant diminution of associated surface water chemistry and ecology due to transfer of pollutant from the GWB - named as Surface water test - period 2013-2018.* *In the GQA test and the Surface water test, the procedure was based on a comparison of the arithmetic means of the concentration of the individual component with quality standards (QS) or thresholds values (TV) for each monitoring point. If no exceedances of the QS/TV were recorded in all monitoring points, the whole GWB was evaluated in good chemical status. If exceedances of QS/TVs were recorded than the methodologies were as follows:* *In the GQA test, data aggregation to whole GWB was performed. If the calculated total area of exceedance of the QS/TV was less than 20% of the total area of the GWB, the GWB was evaluated in good status. If the exceedance more than 20% of the total area of the GWB was recorded and based on expert judgment, the GWB was evaluated in poor chemical status.* *In the Surface water test, each GWB (with the relevant groundwater monitoring point) associated with the surface water body was assessed individually, taking into account the hydrological criterion, the hydrogeological criterion, the groundwater and surface water concentration profile, dilution (if data available) and that the estimated load of pollutant from groundwater transferred to associated surface water could be more than 50%, the GWB was evaluated in poor chemical status.* *In the DWPA test, the procedure was based on trend analysis (Mann-Kendal, linear regression, 10 years) of biological, chemical and radiological parameters of groundwater intended for human consumption before any level of treatment. If there was not a statistically significant and sustained upward trend in any drinking water abstraction points, the GWB was evaluated in good chemical status. If there was any significant and sustained upward trend in any parameter in any of drinking water abstraction point in the GWB, the methodology was as follows: the data aggregation to whole GWB was performed (kriging from 2 years mean). If the calculated total area of exceedance of the QS/TV was less than 20% of the total area of the GWB, the GWB was evaluated in good status. If the exceedance more than 20% of the total area of the GWB was recorded and based on expert judgment, the GWB was evaluated in poor chemical status.* ***Hungary:*** *Assessment of the chemical status of groundwater was conducted: Analysing of the chemical data of individual monitoring points within each of the GWBs; Identifying of the pressures - sources of pollution; The background levels were calculated and used to determine threshold value. Threshold values have been determined according to CIS Guidance No. 18. Contamination limits have been determined for all indicators listed in Annex II Part B of Directive 2006/118/EC and indicators of the report under Art. 5 of Directive 2006/118/EC.* *The following parameters were investigated:* *a) Natural Background Level was determined for the following components: nitrate, ammonium, specific conductivity, sulphate, chloride, arsenic, cadmium, lead, mercury, orthophosphate* *b) For each monitoring point the median concentration of each parameters of the studied period was compared to the thresholds values (determined for each GWB) or standards values (in the case of nitrates, metals and pesticides).* *c) Different tests were conducted to assess groundwater body status: Diffuse pollution test (nitrate, ammonium, orthophosphate), Drinking water supply tests for numerous elements or components in both drinking water wells and monitoring wells and trend analysis based on the data of the surveillance monitoring system. Studied components of these tests are: nitrate, ammonium, chloride, sulphate, specific conductivity, mercury, lead, cadmium, pesticides and organics, furthermore in the trend analysis pH and dissolved oxygen.* *d) Based on these tests, groundwater body was evaluated.* Quantitative Status:

	Hungary: *To determine the overall quantitative status for a GWB, a series of tests should be applied that considers the impacts of anthropogenically induced long-term alterations in groundwater level and/or flow. Each test will assess whether the GWB is meeting the relevant environmental objectives. The quantitative status has been assessed taking into account CIS Guidance No.18. The following criteria have been used:* • *GW alteration (Drawdown) test* • *Water Balance test* • *Surface Water Flow test* • *Groundwater Dependent Terrestrial Ecosystems (GWDTE)* • *Saline or other Intrusion test* ***Slovakia:*** *Assessment of groundwater quantitative status consists of 4 tests:* *1. balance assessment of groundwater bodies for the period 2013-2017 and evaluation of the long-term trend of development of balance levels of groundwater bodies for the period 2004-2018* *2. evaluation of the existence of significant declining trends in the groundwater level and spring yield in groundwater bodies for the period 2007-2016 processed by aggregation of point results of groundwater quantity monitoring in the facilities of the state hydrological network of the SHMI* *3. assessment of the impact of groundwater quantity on the status of terrestrial ecosystems dependent on groundwater* *4. assessment of the impact of groundwater quantity on surface water*
Groundwater threshold value relationships	Receptors considered ***Slovakia:*** *Drinking water, Surface water* ***Hungary:*** *Drinking water* Consideration of NBL and EQS (environmental quality standards, drinking water standards, surface water standards) in the TV establishment: ***Slovakia:*** *The natural background level (NBL) was determined and used to derive the threshold value (TV). The TV were determined for all indicators listed in Part B of Annex II to Directive 2006/118/EC and in Directive 2014/80/EU. The TV for the inorganic substances were derived according to the formula: TV = (NBL + DWS)/2. The TV for organic compounds were derived using the formula: TV = 0.75 * DWS. These TV were used for GQA and DWPA tests.* *An updated list of the TV established for each GWB was published in the amended Regulation of the Government of the Slovakia no. 282/2010 Coll.* *For the Surface water test, the TV were derived as follows: TV = CV = AF * EQS (surface water standard)/DF, where AF (Attenuation factor) and DF (Dilution factor) are equal to 1 (the worst case).* *For that GWB where the NBL was higher than the TV due to natural hydro-geological reasons, the TV was set up as TV = NBL.* ***Hungary:*** *EQS for herbicides and total pesticides, tri-, tetrachloroethylenes based on 201/2001. (X.25.) Gov. decree and the 6/2009. (IV.14.) KvVM-EüM-FVM common ministerial decree in correspondence to I. Annex of the 2006/118/EC directive.* *In Hungary, more than 95% of drinking water ensured from subsurface waters, so the DWS is applicable. Exempt those cases, when the karstic and shallow GWBs are in direct relation to aquatic ecosystems (GWAAE), so here the EQS nitrate is applicable (25 mg/l) instead of 50 mg/l of DWS.* *For other components the DWS is applicable.* *For those GWBs where the NBL was higher than the DWS due to natural hydro-geological reasons, the TVs for ammonium, SO4 and EC were defined by taking into account these higher values, as described in Guidance Document No. 18.*
Verbal description of the **trend**	***Slovakia:*** *Trend is assessed separately for groundwater quality and quantity at which for trends in quantity the procedure applies for all GW quantity monitoring sites. The assessment follows a stepwise procedure. Consisting of the evaluation of the data sets and the monitoring points (no gaps in time series are allowed and data from 2007–2016 were used), consisting of*

<table>
<tr><td>assessment methodology</td><td>the performance of the non-parametric Mann-Kendall trend test (95% confidence level) and comprising the regression analysis. GWBs with decreasing trends but with no evidence of abstraction are excluded from assessment in the 3rd RBMP. For assessing trends in concentrations of pollutants in groundwater the evaluation period was 2007–2016. The results of surveillance and operational monitoring were applied for the assessment. Monitoring frequency depends on the GWB type. In the analysis the values <LOQ are replaced by LOQmax/2. Trend assessment is only performed if the number of values <LOQ is less than 50%. Non-parametric Mann-Kendall test with 5% significance level was applied for trend evaluation. For time series showing a normal distribution, the statistical significance of the trend was also tested by the parametric method (ANOVA) with 5% significance level. Than for all times series with statistically significant upwards trends, the statistically significant upward trend was evaluated and identified if the median of the values measured over the last 2 years was higher than 0.75 * QS/TV or the calculated predicted value of the linear trend up to 2026 (regression model calculated by the least squares method or Sen's nonparametric procedure) was higher than QS/TV. The significant sustained upward trends of pollutant concentrations were identified at the level of monitoring points and at the GWB level.
The starting point for trend reversal was placed where the concentration of the pollutant reaches 75% of the QS/TV of the relevant pollutant.

Hungary: To assess the trend of pollutant concentrations, chemical data of the surveillance monitoring systems were used for the period of 2000 to 2012. The trend analysis was done using Matlab program package of Man-Kendall method with fitted Sen slope. The steps used for trend assessment were:
• During the assessment trend of all components for all monitoring objects were created using yearly average data and excluding time series with less than 4 datapoints.
• The trend of groundwater body level aggregates of yearly annual data were assessed as well.
Significant upward or downward trends were identified on 95 and 90% significance level using Man-Kendall method with Sen’s slope.</td></tr>
<tr><td>Verbal description of the trend reversal assessment methodology</td><td>Slovakia: Trend reversal assessment methodology consists in the use of GWstat software. Time series were included in the assessment, on the basis of which significant sustained upward trends at the level of monitoring sites in the previous RBMP were classified. The time series entering the evaluation were supplemented by data monitored in previous years so that the evaluation period was 14 years. The evaluation was performed by dynamically dividing the time series into two sections with different lengths and then evaluating the statistical significance of the trends separately for each allocated section. A reversal of the trend was indicated if the following conditions were met at the same time: the statistical significance of the trends evaluated within individual sections is higher than the statistical significance of the trend evaluated on the basis of all data forming the evaluated time series, the section representing the results of monitoring in the older period shows a statistically significant upward trend, which is followed by a statistically significant decreasing trend evaluated on the basis of the results of monitoring in the newer period
Hungary:</td></tr>
</table>

Threshold values per GWB

	Pollutant / Indicator	*TV (or range) [unit]*	*NBL (or range) [unit]*	*Level of TV establishment (national, RBD, GWB)*	*Related to risk in this GWB [yes/-]*
HU	*Nitrates*	*25 mg/l*	*8.6 mg/l*	*GWB*	-
HU	*Ammonium*	*0.5 mg/l*	*0.26 mg/l*	*GWB*	-
HU	*Conductivity*	*2500 µS/cm*	*732 µS/cm*	*GWB*	-
HU	*Sulfate*	*250 mg/l*	*123 mg/l*	*GWB*	-
HU	*Chloride*	*250 mg/l*	*88 mg/l*	*GWB*	-
HU	*Orthophophate*	*0.25 mg/l*	*0.1 mg/l*	*GWB*	
HU	*Cadmium*	*5 µg/l*	*0.02 µg/l*	*national*	-
HU	*Lead*	*10 µg/l*	*0.7 µg/l*	*national*	-
HU	*Mercury*	*1 µg/l*	*0.49 µg/l*	*national*	-
HU	*Trichlorethylene*	*10 µg/l*		*national*	-

HU	*Tetrachloro ethylene*	*10 µg/l*		*national*	-
HU	*Absorbed organic halogens AOX*	*20 µg/l*		*national*	-
HU	*Pesticides by components*	*0.1 µg/l*		*national*	-
HU	*Pesticides all*	*0.5 µg/l*		*national*	-
SK	*Ammonium*	*0.27 mg/l*	*0.03 mg/l*	*GWB*	-
SK	*Arsenic*	*5.5 µg/l*	*1 µg/l*	*GWB*	-
SK	*Benzene*	*0.8 µg/l*	-	*national*	-
SK	*Cadmium*	*2.7 µg/l*	*0.4 µg/l*	*GWB*	-
SK	*Chloride*	*131.8 mg/l*	*13.5 mg/l*	*GWB*	-
SK	*Chromium*	*25 µg/l*	*0.4 µg/l*	*GWB*	-
SK	*Copper*	*1001 µg/l*	*1 µg/l*	*GWB*	-
SK	*Iron total*	*0.105 mg/l*	*0.01 mg/l*	*GWB*	-
SK	*Lead*	*5.5 µg/l*	*1 µg/l*	*GWB*	-
SK	*Manganese*	*0.027 mg/l*	*0.003 mg/l*	*GWB*	-
SK	*Mercury*	*0.6 µg/l*	*0.1 µg/l*	*GWB*	-
SK	*Nitrates*	*50 mg/l*	*16.7 mg/l*	*GWB*	-
SK	*Nitrites*	*0.26 mg/l*	*0.01 mg/l*	*GWB*	-
SK	*Phosphates*	*0.24 mg/l*	*0.07 mg/l*	*GWB*	-
SK	*Sodium*	*52.3 mg/l*	*4.6 mg/l*	*GWB*	-
SK	*Sulphates*	*167.6 mg/l*	*85.1 mg/l*	*GWB*	-
SK	*Tetrachloroethylen*	*7.5* µg/l*	-	*national*	-
SK	*Trichlorethylene*	*7.5* µg/l*	-	*national*	-

* 7.5 for Tetrachloroethylene + Trichlorethylene

GWB-11: Komarnanska Kryha / Dunántúli-khgs. északi r.

GWB-11	National share	**HU-11** **SK-11**	Status 2021 for each national GWB?	
			Chemical (substance)	Quantity
List of individual GW-bodies forming the whole national share (national code incl. country code)	HU	HU_AIQ558	Good	Good
	HU	HU_AIQ552	Good	Good
	HU	HU_AIQ564	Good	Good
	HU	HU_AIQ660	Good	Good
	SK	SK300010FK	Good	Good
	SK	SK300020FK	Good	Good

Description/Characterisation of the ICPDR GW-body	***Delineation****: see GWB-8* ***Reasons for selecting as important transboundary GWB*** *The Middle and Upper-Triassic karstic dolomite and limestone formation of the northern part of the Transdanubian Mountain (Hungary) and the Komarnanská Kryha (Slovakia) belong to one of the largest karstic aquifer systems in Central Europe. It provides good quality drinking water for the population of the region in Hungary; it contributes to the characteristic landscape by supplying springs and the deeper part of the aquifer system is very important thermal water resources in both countries.* ***General description*** *The karstic formation of the northern part of the Transdanubian Mountains is composed mainly of Upper-Triassic dolomite and limestone. The considerable matrix porosity of the dolomite is due to the dense fissure-system, while in the limestone large fractures are characteristic along the faults. The elevated open karstic zones are separated by sunken basins, where the thickness of the covering layer is several hundred meters. Above the thermal part it exceeds 500 m of thickness (in some places it reaches even 2,500 m) consisting of different types of sediments: sand, clay, marl, sandstone, Eocene karstic formation with brown coal.*

	The Slovakian part (the Komarno block) extends between Komarno and Sturovo. It is fringed by the Danube River in the South and by the E-W Hurbanovo fault in the North. The southern limit along the Danube is tectonic as well and therefore the Komarno block is a sunken tract of the northern slope of the Gerecse and Pilis Mountains. The Komarno block consists largely of Triassic dolomites and limestones up to 1,000 m in thickness. The surface of the pre-Tertiary substratum plunges towards the north from a depth of approximately 100 m near the River Danube to as much as 3,000 m near the Hurbanovo fault. *The karstic aquifer is divided into six water bodies. In Hungary, where the recharge area appears, two water bodies bearing cold waters have been delineated according to the flow system. The thermal water bodies (in Hungary waters with temperature more than 30 ºC is considered as thermal, while in Slovakia the limit is 25ºC: HU_kt..1.2, HU_kt.1.4, SK_300010FK and SK_300020FK are in close hydraulic connection with the cold ones. To be noted, that the missing continuation of the cold water bodies in the Slovakian part is mainly due to the different consideration of the limit of temperature. Taking into account hydro-geothermal aspects, the deep Slovakian karstic aquifer is divided into the Komarno high block (SK 300010FK) and the Komarno marginal block (SK300020FK).* *The Danube River is the regional erosion base of the water bodies. The water level fluctuation is in strong relation with the water level changes in the river. The water bodies are hydraulically connected. It is valid at the border of the countries as well, i.e. under the Danube and the Ipoly/Ipel Rivers, making the abstractions of water in both countries highly interrelated.* *The recharge area is in the Hungarian side and the total recharge is estimated at 60 Mm^3/y. Without abstraction this amount of water is discharged by the springs and by the upward flow towards the covering layer, and some part is infiltrating to the deeper, thermal part.* *The temperature of the water abstracted (captured) from the Hungarian thermal water bodies does not exceed 60 ºC. Heat-flow densities suggest that the Komarno high block can be characterised by a fairly low (thermal spring at Sturovo and Patince are 39 and 26 ºC warm) and the marginal block by a medium geothermal activity (40–68 ºC). Heat flow given in mW/m^2 is 50- 60 in Komárno high block and 60–70 mW/m^2 in Komárno marginal block, both considered as low values.* *Coefficient of transmissivity in the high block varies from 13 to 100 m^2/d, while in the marginal block between 4 to 20 m^2/d. Prognostic recoverable amount of thermal water in the high block is estimated at 12,000 m^3/d water of 20 to 40°C warm. In the marginal block the abstracted thermal water should be re-injected after use.* ***Major pressures and impacts*** *In Hungary the actual abstractions are apr. 30 M m^3/y from the cold part and 2 M m^3/y from the thermal part. In Slovakia the thermal water abstraction is 0.6 M m^3/y mainly in area Komárno-Patince-Štúrovo. The cold karstic water is used for drinking water, the thermal water for balneology (in Hungary and in Slovakia) and for energy production (in Slovakia). Disposal of used geothermal water is solved in Slovakia by discharge into surface water (River Danube and Váh) after dilution with groundwater on acceptable qualitative parameters.* *Due to the mining activities in the 20th century, the actual water levels - especially in the cold water bodies in the Hungarian side - are significantly lower than the long-term natural averages and as a consequence all cold and lukewarm karstic springs dried out. In the Slovak side the regime of geothermal water (decreasing discharges of wells) was also affected by the extensive pumping of karstic water from coal mines in Tatabánya and Dorog (Hungary). After the mining was stopped (in 1993), the water levels have been showing increasing trend and the gradual reappearance of the springs is forecasted in the coming 5–15 years.* *The abandoned cuts and fields of mine submerged by the rising karstic water represent a potential pollution source. Water quality monitoring has been installed, but data are not sufficient for estimating future impacts.* *In extremely vulnerable open karstic area a few settlements should be considered as potential source of pollution. Relatively a high number of significant pollution exists in the area (40). The majority is lying above the not vulnerable covered part. The average amount of Nitrogen fertilizer is 86 kgN/ha/year, the use of manure is insignificant (3 kgN/ha/year). The surplus Nitrogen from agriculture is 17 kgN/ha/year, but in the majority of the area the thick covering layers provide natural protection. (Localities in real danger should be assessed at smaller scale, focusing on open karstic zones).*

Description of **status** assessment methodology.	Chemical Status ***Hungary:*** *Assessment of the chemical status of groundwater was conducted: Analysing of the chemical data of individual monitoring points within each of the GWBs; Identifying of the pressures - sources of pollution; The background levels were calculated and used to determine threshold value. Threshold values have been determined according to CIS Guidance No. 18. Contamination limits have been determined for all indicators listed in Annex II Part B of Directive 2006/118/EC and indicators of the report under Art. 5 of Directive 2006/118/EC.* *The following parameters were investigated:* *a) Natural Background Level was determined for the following components: nitrate, ammonium, specific conductivity, sulphate, chloride, arsenic, cadmium, lead, mercury, orthophosphate* *b) For each monitoring point the median concentration of each parameters of the studied period was compared to the thresholds values (determined for each GWB) or standards values (in the case of nitrates, metals and pesticides).* *c) Different tests were conducted to assess groundwater body status: Diffuse pollution test (nitrate, ammonium, orthophosphate), Drinking water supply tests for numerous elements or components in both drinking water wells and monitoring wells and trend analysis based on the data of the surveillance monitoring system. Studied components of these tests are: nitrate, ammonium, chloride, sulphate, specific conductivity, mercury, lead, cadmium, pesticides and organics, furthermore in the trend analysis pH and dissolved oxygen.* *d) Based on these tests, groundwater body was evaluated.* ***Slovakia:*** *An important factor in assessing the chemical status of geothermal waters, especially in terms of their use, is the stability of their chemical composition. The stability of the chemical composition for individual sources will be evaluated in those indicators that characterize the chemical type of water (Mineralization, Ca, Mg, Na, Cl,* HCO_3*,* SO_4*). Another method is the evaluation of the development trend of the mentioned indicators in individual sources of the geothermal unit. The interquartile range (IQR) method was chosen to evaluate the chemical stability of geothermal water.* *Good chemical status is if :* • *the main indicators of the chemical type of water are between the lower and upper dispersion limits,* • *the trend of development of components of the chemical type of water reaches the same course and individual deviations can be described from the source regime.* Quantitative Status ***Hungary:*** *To determine the overall quantitative status for a GWB, a series of tests should be applied that considers the impacts of anthropogenically induced long-term alterations in groundwater level and/or flow. Each test will assess whether the GWB is meeting the relevant environmental objectives. The quantitative status has been assessed taking into account CIS Guidance No.18. The following criteria have been used:* • *GW alteration (Drawdown) test* • *Water Balance test* • *Surface Water Flow test* • *Groundwater Dependent Terrestrial Ecosystems (GWDTE)* • *Saline or other Intrusion test* ***Slovakia:*** *The assessment of the quantitative status of geothermal groundwater bodies consists of the balance assessment of individual bodies and the identification of sources for which a critical or emergency balance state occurred during the use of groundwater during the monitored period (2015-2017). For comparison, the state of balance in the period between the geothermal bodies, each will use the value of balance taking into account the state transformed usable amounts expressed in % (BST).* *Good quantitative status is, if:* • *the balance value of the BsT geothermal unit for the observed period may not exceed the value of 80%,*

	• *the trend of development of BsT values <70% is not marked, for BsT> 70% we mark the trend with signs,* • *in case of occurrence of sources with critical or emergency balance state Bs ≤ 1,18 - definition of causes.*
Groundwater threshold value relationships	<u>Receptors considered</u> ***Hungary:*** *Drinking water standards* ***Slovakia:*** <u>Consideration of NBL and EQS (environmental quality standards, drinking water standards) in the TV establishment:</u> ***<u>Hungary:</u>*** *EQS for herbicides and total pesticides, tri-, tetrachloroethylenes based on 201/2001. (X.25.) Gov. decree and the 6/2009. (IV.14.) KvVM-EüM-FVM common ministerial decree in correspondence to I. Annex of the 2006/118/EC directive.* *In Hungary, more than 95% of drinking water ensured from subsurface waters, so the DWS is applicable. Exempt those cases, when the karstic and shallow GWBs are in direct relation to aquatic ecosystems (GWAAE), so here the EQS nitrate is applicable (25 mg/l) instead of 50 mg/l of DWS.* *For other components the DWS is applicable.* *For those GWBs where the NBL was higher than the DWS due to natural hydro-geological reasons, the TVs for ammonium, SO4 and EC were defined by taking into account these higher values, as described in Guidance Document No. 18.* ***<u>Slovakia:</u>*** *The criterion for evaluating the chemical status of geothermal GWB is the stability of the chemical composition as was described above.*
Verbal description of the **trend** assessment methodology	***Hungary****: To assess the trend of pollutant concentrations, chemical data of the surveillance monitoring systems were used for the period of 2000 to 2012. The trend analysis was done using Matlab program package of Mann-Kendall method with fitted Sen slope. The steps used for trend assessment were:* • *During the assessment trend of all components for all monitoring objects were created using yearly average data and excluding time series with less than 4 data points.* • *The trend of groundwater body level aggregates of yearly annual data were assessed as well.* *Significant upward or downward trends were identified on 95% significance level using Mann-Kendall method with Sen's slope.*
Verbal description of the **trend reversal** assessment methodology	***Hungary:*** ***Slovakia****:*

Threshold values per GWB

	Pollutant / Indicator	*TV (or range) [unit]*	*NBL (or range) [unit]*	*Level of TV establishment (national, RBD, GWB)*	*Related to risk in this GWB [yes/-]*
HU	*Nitrates*	*50-no TV mg/l*	*<1-9.8 mg/l*	*GWB*	*-*
HU	*Ammonium*	*0.5-no TV mg/l*	*0.26-16.7 mg/l*	*GWB*	*-*
HU	*Conductivity*	*2500-no TV µS/cm*	*996-5097 µS/cm*	*GWB*	*-*
HU	*Sulfate*	*250-no TV mg/l*	*124-266 mg/l*	*GWB*	*-*
HU	*Chloride*	*250-no TV mg/l*	*35-627 mg/l*	*GWB*	*-*
HU	*Orthophosphate*	*0.25-no TV mg/l*	*0.1 mg/l*	*GWB*	
HU	*Cadmium*	*5-no TV µg/l*	*0.08-0.2 µg/l*	*national*	*-*
HU	*Lead*	*10-no TV µg/l*	*2-3.42 µg/l*	*national*	*-*
HU	*Mercury*	*1-no TV µg/l*	*0.21-0.5 µg/l*	*national*	*-*

HU	*Trichlorethylene*	*10-no TV µg/l*		*national*	-
HU	*Tetrachloro ethylene*	*10-no TV µg/l*		*national*	-
HU	*Absorbed organic halogens AOX*	*20-no TV µg/l*		*national*	-
HU	*Pesticides by components*	*0.1-no TV µg/l*		*national*	-
HU	*Pesticides all*	*0.5-no TV µg/l*		*national*	-

*: no TV for karst thermal GWB

GWB-12: Ipel /Ipoly

GWB-12	National share	**HU-12** **SK-12**	Status 2021 for each national GWB?	
			Chemical (substance)	Quantity
List of individual GW-bodies forming the whole national share (national code incl. country code)	HU	HUAIQ583	Good	Good
	SK	SK1000800P	Poor (NO_3, SO_4, PO_4)	Good

Description/Characterisation of the ICPDR GW-body	***Delineation:*** *The Ipoly-valley is situated in the border of Slovakia and Hungary, east of Danube River. Its area is 145,8 km^2, the elevation varies between 290 m asl to 128 m asl. The middle Ipoly-valley has an east to west direction, while the lower Ipoly-valley is a north to south one. Left side of the river belongs to Hungary. The middle-Ipoly valley formed by several young refilling trenches, on the south is separated by a defined morphological barrier showing terrace-like river valley. Several river terraces forms the lower-Ipoly-valley between the Börzsöny and Helemba hills. Morphologically, it is a diverse pediment surface from the level of the river up to 200 m asl.* ***Reasons for selecting as important transboundary GWB:*** *The surrounding area of this aquifer suffers from lack of water, while these groundwater bodies are important local drinking water resources in Slovakia and Hungary. Therefore, collaboration between SK and HU to delineate the HU and SK GWBs as common transboundary GWB is a key to maintain safe water supply in sufficient quantities. The alluvial deposits of the Ipeľ/ Ipoly River extend on both sides of the Hungarian-Slovakian border. The aquifer supplies drinking water to a population of approx. 170,000 inhabitants in Slovakia and 50,000 inhabitants in Hungary. On the Hungarian side, due to the lowland character and upward flow system, the terrestrial ecosystems (NATURA 2000 site) require surplus transpiration from groundwater; 7% of the area of the water body is under nature conservation. The recharge zone is in Slovakia and Hungary thus the available groundwater resource and the status of the terrestrial ecosystems depend on the lateral flow from the neighbouring countries. Both sides of the GWBs have issues with groundwater quality problems The Ipeľ/ Ipoly River had formed a 0-10 meters thick alluvial deposit, along the stretch of approximately 80km of the river, which forms a natural boundary between Slovakia and Hungary. More importantly, hydraulic connection between the SK100080OP – HUAIQ583 groundwater bodies is anticipated (http://www.all-in.sk/enwat/ipel.html).* ***General description:*** *The middle and the lower part of the Ipoly-valley significantly differ in geology. In the area of upper-Ipoly-valley, the maximum 10 meters thick soil covers the alluvial sand, sandy gravel sediments. Below the maximum few tenth meters thick Holocene-Pleistocene sequence, several hundred meters thick Oligocene schlier, sandstone, clay sequence (Szécsényi schlier, Pétervásárai sandstone, Kiscelli clay and Hárshegy sandstone) covers the schist and gneiss basement. In the area of lower-Ipoly-valley below the few meters thick alluvial sand and gravel sediment few hundred meters thick Miocene marl, limestone sequence (Lajta limestone, Szilágy clayly marl) covers the magmatic tuffs (Nagyvölgyi Dacite tuffs) sediments.* *The lower boundary of the groundwater body is formed by the thick low permeability schlier and sandstone formations, respectively thick clayly marl aquitard (Szilágyi clayly marl). In the*

	river terraces the Pleistocene fluvio- eolian sand and loess is a good water bearing strata, however the main aquifer is the few meters thick (4 m in average) Holocene fluvial sand and gravel along the river. The recharge of the upper part of the river is in Slovakia, while the middle and lower part of it is recharged both side of the river. *The area of interest is delimited by the extent of the youngest alluvium of the river Ipoly/Ipeľ and partially also of some of its tributaries. The alluvium lies on the impermeable clayey sediments of the Neogene filling of the Juhoslovenská and Podunajská panva basins in the Slovakian side. In the groundwater body there are mainly alluvial and terrestrial gravel, sandy gravel, sand, stratigraphic classification of Pleistocene - Holocene as collector rocks. In hydrogeological collectors of the formation, the inter-grain permeability prevails. The average range of the thickness of the guardrails is <10 m, the value of the filtration coefficient here is in the range of 1.10-4 to 1.10-3 m.s-1. The general direction of groundwater flow in the alluvial floodplain of the quaternary formation SK1000800P is more or less parallel to the course of the main flow. Intergranular groundwater body of Quaternary sediments of the Ipeľ river is in the Hron watershed area. The evaluated area (agricultural land including arable land, grassland, pastures and permanent crops plantations) shares 86.69 % of total groundwater body area, rest of groundwater body area land cover is represented by forests, semi-natural land, surface water tables and artificial surfaces. Within the groundwater body area, evaluated area creates large and compact patterns which regularly cover whole area. In general, groundwater body shows lowered potential of soil regarding possible negative influence of surface contamination to groundwater.* *The main aquifer is the alluvial sediments of the river Ipoly/Ipeľ and the connecting terraces. Their thickness is about 4-10 m, or more. The gravels and sands are covered with 1.5-4 m of clayey flood sediments. The changing thickness sometimes causes the occurrence of the confined groundwater. The gravels and sands have high transmissivity. The width of the river flood plain is about 1-2 km, but at some places it is of only tens of meters. Groundwater recharge occurs by infiltration of precipitations and infiltration of surface water at high water levels. The changing (decreasing) surface water level of the river has negative impact of the water supply possibilities Strong variability of groundwater chemical composition and quality is characteristic for the Ipeľ region. Ca-Mg-HCO3 dominates in groundwater as the result of dissolution of carbonates and hydrolytical decomposition of silicate minerals. Groundwater qualitative properties in the region reflect either the natural character of the area or the addition of compounds due to anthropogenic activities.* ***Major pressures and impacts*** *Anthropogenic contamination of groundwater is mostly originated by agricultural activities and production of waste waters. It is mainly contamination of the uppermost groundwater horizons that occurs in the area. Deteriorated groundwater quality is mainly characterized by high contents of nitrates, chlorides, ammonia ions, phosphates or specific organic parameters (PAH, COD) and occasionally pesticides. Locally high pesticide concentrations (> 0.5 mg/l) are found in both surface water and in groundwater along the Ipoly/Ipeľ valley. Pesticides in unsaturated soils can be released by erosion, which can be increased by climate change. Nitrates have also a substantial impact on the shallow parts (0-20 m) of the groundwater systems. In general, detected pesticide concentrations suggest that water quality can be considered to be at risk until further investigations will be made and the additional measures as defined by WFD, will be taken. Furthermore, besides the anthropogenic pressures the locally important drinking water resource has high natural sulphate content and electric conductivity. The whole GWB is highly sensitive to climatic changes*
Description of **status** assessment methodology.	<u>Chemical Status:</u> ***Hungary:*** *Assessment of the chemical status of groundwater was conducted: Analysing of the chemical data of individual monitoring points within each of the GWBs; Identifying of the pressures - sources of pollution; The background levels were calculated and used to determine threshold value. Threshold values have been determined according to CIS Guidance No. 18. Contamination limits have been determined for all indicators listed in Annex II Part B of Directive 2006/118/EC and indicators of the report under Art. 5 of Directive 2006/118/EC.* *The following parameters were investigated:* *a) Natural Background Level was determined for the following components: nitrate, ammonium, specific conductivity, sulphate, chloride, arsenic, cadmium, lead, mercury, orthophosphate*

b) *For each monitoring point the median concentration of each parameters of the studied period was compared to the thresholds values (determined for each GWB) or standards values (in the case of nitrates, metals and pesticides).*

c) *Different tests were conducted to assess groundwater body status: Diffuse pollution test (nitrate, ammonium, orthophosphate), Drinking water supply tests for numerous elements or components in both drinking water wells and monitoring wells and trend analysis based on the data of the surveillance monitoring system. Studied components of these tests are: nitrate, ammonium, chloride, sulphate, specific conductivity, mercury, lead, cadmium, pesticides and organics, furthermore in the trend analysis pH and dissolved oxygen.*

d) *Based on these tests, groundwater body was evaluated.*

Slovakia: *The methodology for assessing chemical status followed the requirements of the Groundwater Directive (2006/118/EC) as well as the recommendations of the CIS Guidance Document no. 18 - Guidance on groundwater status and trend assessment. The assessment of the chemical status of GWB in the conditions of the Slovakia consisted of the following tests:*

1. *General quality assessment (GQA) test - years 2016-2017.*
2. *Drinking water protected areas (DWPA) test - period 2008-2017.*
3. *Test of significant diminution of associated surface water chemistry and ecology due to transfer of pollutant from the GWB - named as Surface water test - period 2013-2018.*

In the GQA test and the Surface water test, the procedure was based on a comparison of the arithmetic means of the concentration of the individual component with quality standards (QS) or thresholds values (TV) for each monitoring point. If no exceedances of the QS/TV were recorded in all monitoring points, the whole GWB was evaluated in good chemical status. If exceedances of QS/TVs were recorded than the methodologies were as follows:

In the GQA test, data aggregation to whole GWB was performed. If the calculated total area of exceedance of the QS/TV was less than 20% of the total area of the GWB, the GWB was evaluated in good status. If the exceedance more than 20% of the total area of the GWB was recorded and based on expert judgment, the GWB was evaluated in poor chemical status.

In the Surface water test, each GWB (with the relevant groundwater monitoring point) associated with the surface water body was assessed individually, taking into account the hydrological criterion, the hydrogeological criterion, the groundwater and surface water concentration profile, dilution (if data available) and that the estimated load of pollutant from groundwater transferred to associated surface water could be more than 50%, the GWB was evaluated in poor chemical status.

In the DWPA test, the procedure was based on trend analysis (Mann-Kendal, linear regression, 10 years) of biological, chemical and radiological parameters of groundwater intended for human consumption before any level of treatment. If there was not a statistically significant and sustained upward trend in any drinking water abstraction points, the GWB was evaluated in good chemical status. If there was any significant and sustained upward trend in any parameter in any of drinking water abstraction point in the GWB, the methodology was as follows: the data aggregation to whole GWB was performed (kriging from 2 years mean). If the calculated total area of exceedance of the QS/TV was less than 20% of the total area of the GWB, the GWB was evaluated in good status. If the exceedance more than 20% of the total area of the GWB was recorded and based on expert judgment, the GWB was evaluated in poor chemical status

<u>Quantitative Status:</u>

Hungary: *To determine the overall quantitative status for a GWB, a series of tests should be applied that considers the impacts of anthropogenically induced long-term alterations in groundwater level and/or flow. Each test will assess whether the GWB is meeting the relevant environmental objectives. The quantitative status has been assessed taking into account CIS Guidance No.18. The following criteria have been used:*

- *<u>GW alteration (Drawdown) test</u>*
- *Water Balance test*
- *Surface Water Flow test*
- *Groundwater Dependent Terrestrial Ecosystems (GWDTE)*
- *Saline or other Intrusion test*

	Slovakia: *Assessment of groundwater quantitative status consists of 4 tests:* 1. *balance assessment of groundwater bodies for the period 2013-2017 and evaluation of the long-term trend of development of balance levels of groundwater bodies for the period 2004-2018* 2. *evaluation of the existence of significant declining trends in the groundwater level and spring yield in groundwater bodies for the period 2007-2016 processed by aggregation of point results of groundwater quantity monitoring in the facilities of the state hydrological network of the SHMI* 3. *assessment of the impact of groundwater quantity on the status of terrestrial ecosystems dependent on groundwater* 4. *assessment of the impact of groundwater quantity on surface water*
Groundwater threshold value relationships	Receptors considered ***Slovakia:*** *Drinking water, Surface water* ***Hungary:*** *Drinking water* Consideration of NBL and EQS (environmental quality standards, drinking water standards, surface water standards) in the TV establishment: ***Slovakia:*** *The natural background level (NBL) was determined and used to derive the threshold value (TV). The TV were determined for all indicators listed in Part B of Annex II to Directive 2006/118/EC and in Directive 2014/80/EU. The TV for the inorganic substances were derived according to the formula: TV = (NBL + DWS)/2. The TV for organic compounds were derived using the formula: TV = 0.75 * DWS. These TV were used for GQA and DWPA tests.* *An updated list of the TV established for each GWB was published in the amended Regulation of the Government of the Slovakia no. 282/2010 Coll.* *For the Surface water test, the TV were derived as follows: TV = CV = AF * EQS (surface water standard)/DF, where AF (Attenuation factor) and DF (Dilution factor) are equal to 1 (the worst case).* *For that GWB where the NBL was higher than the TV due to natural hydro-geological reasons, the TV was set up as TV = NBL.* ***Hungary:*** *EQS for herbicides and total pesticides, tri-, tetrachloroethylenes based on 201/2001. (X.25.) Gov. decree and the 6/2009. (IV.14.) KvVM-EüM-FVM common ministerial decree in correspondence to I. Annex of the 2006/118/EC directive.* *In Hungary, more than 95% of drinking water ensured from subsurface waters, so for all other components the DWS is applicable.* *For those GWBs where the NBL was higher than the DWS due to natural hydro-geological reasons, the TVs for ammonium, SO4 and EC were defined by taking into account these higher values, as described in Guidance Document No. 18.*
Verbal description of the **trend** assessment methodology	***Slovakia:*** *Trend is assessed separately for groundwater quality and quantity at which for trends in quantity the procedure applies for all GW quantity monitoring sites. The assessment follows a stepwise procedure. Consisting of the evaluation of the data sets and the monitoring points (no gaps in time series are allowed and data from 2007–2016 were used), consisting of the performance of the non-parametric Mann-Kendall trend test (95% confidence level) and comprising the regression analysis. GWBs with decreasing trends but with no evidence of abstraction are excluded from assessment in the 3rd RBMP. For assessing trends in concentrations of pollutants in groundwater the evaluation period was 2007–2016. The results of surveillance and operational monitoring were applied for the assessment. Monitoring frequency depends on the GWB type. In the analysis the values <LOQ are replaced by LOQmax/2. Trend assessment is only performed if the number of values <LOQ is less than 50%. Non-parametric Mann-Kendall test with 5% significance level was applied for trend evaluation. For time series showing a normal distribution, the statistical significance of the trend was also tested by the parametric method (ANOVA) with 5% significance level. Than for all times series with statistically significant upwards trends, the statistically significant upward trend was evaluated and identified if the median of the values measured over the last 2 years was higher than 0.75 * QS/TV or the calculated predicted value of the linear trend up to 2026 (regression model calculated by the least squares method or Sen's nonparametric procedure)*

	was higher than QS/TV. The significant sustained upward trends of pollutant concentrations were identified at the level of monitoring points and at the GWB level. *The starting point for trend reversal was placed where the concentration of the pollutant reaches 75% of the QS/TV of the relevant pollutant.* ***Hungary**: To assess the trend of pollutant concentrations, chemical data of the surveillance monitoring systems were used for the period of 2000 to 2012. The trend analysis was done using Matlab program package of Mann-Kendall method with fitted Sen slope. The steps used for trend assessment were:* • *During the assessment trend of all components for all monitoring objects were created using yearly average data and excluding time series with less than 4 data points.* • *The trend of groundwater body level aggregates of yearly annual data were assessed as well.* *Significant upward or downward trends were identified on 95% significance level using Mann-Kendall method with Sen's slope.*
Verbal description of the **trend reversal** assessment methodology	***Slovakia:** Trend reversal assessment methodology consists in the use of GWstat software. Time series were included in the assessment, on the basis of which significant sustained upward trends at the level of monitoring sites in the previous RBMP were classified. The time series entering the evaluation were supplemented by data monitored in previous years so that the evaluation period was 14 years. The evaluation was performed by dynamically dividing the time series into two sections with different lengths and then evaluating the statistical significance of the trends separately for each allocated section. A reversal of the trend was indicated if the following conditions were met at the same time: the statistical significance of the trends evaluated within individual sections is higher than the statistical significance of the trend evaluated on the basis of all data forming the evaluated time series, the section representing the results of monitoring in the older period shows a statistically significant upward trend, which is followed by a statistically significant decreasing trend evaluated on the basis of the results of monitoring in the newer period.* ***Hungary:** To assess the trend reversal of pollutant concentrations two consecutive time period was compared and evaluated*

Threshold values per GWB

	Pollutant / Indicator	*TV (or range) [unit]*	*NBL (or range) [unit]*	*Level of TV establishment (national, RBD, GWB)*	*Related to risk in this GWB [yes/-]*
HU	*Nitrates*	*50-no TV mg/l*	*9.5 mg/l*	*GWB*	*-*
HU	*Ammonium*	*2.0-no TV mg/l*	*1.1 mg/l*	*GWB*	*-*
HU	*Conductivity*	*2,500-no TV µS/cm*	*1,570 µS/cm*	*GWB*	*-*
HU	*Sulphate*	*500-no TV mg/l*	*284 mg/l*	*GWB*	*-*
HU	*Chloride*	*250-no TV mg/l*	*119 mg/l*	*GWB*	*-*
HU	*Orthophosphate*	*2.0 mg/l*	*0,91 mg/l*	*GWB*	
HU	*Cadmium*	*5-no TV µg/l*	*0.07 µg/l*	*national*	*-*
HU	*Lead*	*10-no TV µg/l*	*0.293 µg/l*	*national*	*-*
HU	*Mercury*	*1-no TV µg/l*	*0.005 µg/l*	*national*	*-*
HU	*Trichlorethylene*	*10-no TV µg/l*		*national*	*-*
HU	*Tetrachloro ethylene*	*10-no TV µg/l*		*national*	*-*
HU	*Absorbed organic halogens AOX*	*20-no TV µg/l*		*national*	*-*
HU	*Pesticides by components*	*0.1-no TV µg/l*		*national*	*-*
HU	*Pesticides all*	*0.5-no TV µg/l*		*national*	*-*
SK	*Ammonium*	*0.9 mg/l*	*0.9 mg/l*	*GWB*	*-*
SK	*Arsenic*	*6 µg/l*	*2 µg/l*	*GWB*	*-*
SK	*Benzene*	*0.8 µg/l*	*-*	*national*	*-*
SK	*Cadmium*	*2.9 µg/l*	*0.7 µg/l*	*GWB*	*-*
SK	*Chloride*	*135.7 mg/l*	*21.3 mg/l*	*GWB*	*-*

SK	*Chromium*	*26 µg/l*	*2 µg/l*	*GWB*	*-*
SK	*Copper*	*1003 µg/l*	*6 µg/l*	*GWB*	*-*
SK	*Iron total*	*0.150 mg/l*	*0.1 mg/l*	*GWB*	*-*
SK	*Lead*	*7.0 µg/l*	*5 µg/l*	*GWB*	*-*
SK	*Manganese*	*0.100 mg/l*	*0.1 mg/l*	*GWB*	*-*
SK	*Mercury*	*0.6 µg/l*	*0.1 µg/l*	*GWB*	*-*
SK	*Nitrates*	*50 mg/l*	*1.5 mg/l*	*GWB*	*Yes*
SK	*Nitrites*	*0.26 mg/l*	*0.02 mg/l*	*GWB*	*-*
SK	*Phosphates*	*0.24 mg/l*	*0.08 mg/l*	*GWB*	*Yes*
SK	*Sodium*	*119.8 mg/l*	*39.6 mg/l*	*GWB*	*-*
SK	*Sulphates*	*140.8 mg/l*	*31.6 mg/l*	*GWB*	*Yes*
SK	*Tetrachloroethylen*	*7.5* µg/l*	*-*	*national*	*-*
SK	*Trichlorethylene*	*7.5* µg/l*	*-*	*national*	*-*

* 7.5 for Tetrachloroethylene + Trichlorethylene

Significant pressures on the ICPDR GW-bodies

Code of ICPDR GW-body		*GWB-1*
National share of ICPDR GW-body (nationally aggregated part)		*AT-1, DE-1*

Significant Pressures for Groundwater	**Status pressure types 2021**				**Risk pressure types 2019→2027**			
	Chemical Yes/-		**Quantity** Yes/-		**Chemical** Yes/-		**Quantity** Yes/-	
	AT	DE	AT	DE	AT	DE	AT	DE
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 soak ways								
Other relevant point sources (specify below)								
Diffuse Sources	-				-			
due to agricultural activities								
due to non-sewered population								
Urban land use								
Other significant diffuse pressures (specify below)								
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 below)								
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 below)				
Other significant pressures	-	-	-	-
Saltwater intrusion				
Other intrusion (specify below)				

Description of other significant pressures than those selected above.	

Code of ICPDR GW-body		*GWB-2*
National share of ICPDR GW-body (nationally aggregated part)		*BG-2, RO-2*

Significant Pressures for Groundwater	**Status pressure types 2021**				**Risk pressure types 2019→2027**			
	Chemical Yes/-		**Quantity** Yes/-		**Chemical** Yes/-		**Quantity** Yes/-	
	BG	RO	BG	RO	BG	RO	BG	RO
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 soak ways								
Other relevant point sources (specify below)								
Diffuse Sources	-				-			
due to agricultural activities								
due to non-sewered population								
Urban land use								
Other significant diffuse pressures (specify below)								
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 below)								
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 below)								
Other significant pressures	-		-		-		-	
Saltwater intrusion								
Other intrusion (specify below)								

Description of other significant pressures than those selected above.	

Code of ICPDR GW-body		*GWB-3*
National share of ICPDR GW-body (nationally aggregated part)		*MD-3, RO-3*

Significant Pressures for Groundwater	**Status pressure types 2021**				**Risk pressure types 2019→2027**			
	Chemical Yes/-		**Quantity** Yes/-		**Chemical** Yes/-		**Quantity** Yes/-	
	MD	RO	MD	RO	MD	RO	MD	RO
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 soak ways								
Other relevant point sources (specify below)								
Diffuse Sources	-				-			
due to agricultural activities								
due to non-sewered population								
Urban land use								
Other significant diffuse pressures (specify below)								
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 below)								
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 below)								
Other significant pressures	-		-		-		-	
Saltwater intrusion								
Other intrusion (specify below)								

Description of other significant pressures than those selected above.	

Code of ICPDR GW-body		*GWB-4*
National share of ICPDR GW-body (nationally aggregated part)		*BG-4, RO-4*

	Status pressure types 2021				**Risk pressure types 2019→2027**			
Significant Pressures for Groundwater	**Chemical** Yes/-		**Quantity** Yes/-		**Chemical** Yes/-		**Quantity** Yes/-	
	BG	RO poor	BG	RO	BG	RO risk	BG	RO
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 soak ways								
Other relevant point sources (specify below)								
Diffuse Sources	-	**Yes**			-	**Yes**		
due to agricultural activities		x				x		
due to non-sewered population		x				x		
Urban land use								
Other significant diffuse pressures (specify below)								
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 below)								
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 below)								
Other significant pressures	-		-		-		-	
Saltwater intrusion								
Other intrusion (specify below)								

Description of other significant pressures than those selected above.	

Code of ICPDR GW-body					*GWB-5*			
National share of ICPDR GW-body (nationally aggregated part)					*HU-5, RO-5*			
Significant Pressures for Groundwater	**Status pressure types 2021**				**Risk pressure types 2019→2027**			
	Chemical Yes/-		**Quantity** Yes/-		**Chemical** Yes/-		**Quantity** Yes/-	
	HU poor	RO poor	HU poor	RO	HU risk	RO risk	HU risk	RO
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 soak ways								
Other relevant point sources (specify below)								
Diffuse Sources	**Yes**	**Yes**			**Yes**	**Yes**		
due to agricultural activities	x	x			x	x		
due to non-sewered population	x	x			x	x		
Urban land use	x				x			
Other significant diffuse pressures (specify below)								
Water abstractions			**Yes**	**-**			**Yes**	**-**
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 below)								
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 below)								
Other significant pressures		**-**		**-**		**-**		**-**
Saltwater intrusion								
Other intrusion (specify below)								

Description of other significant pressures than those selected above.	HU: indirect water abstraction: inland excess water drainage

Code of ICPDR GW-body		*GWB-6*
National share of ICPDR GW-body (nationally aggregated part)		*HU-6, RO-6*

Significant Pressures for Groundwater	**Status pressure types 2021**				**Risk pressure types 2019→2027**			
	Chemical Yes/-		**Quantity** Yes/-		**Chemical** Yes/-		**Quantity** Yes/-	
	HU	RO	HU	RO	HU	RO	HU	RO
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 soak ways								
Other relevant point sources (specify below)								
Diffuse Sources	-				-			
due to agricultural activities								
due to non-sewered population								
Urban land use								
Other significant diffuse pressures (specify below)								
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 below)								
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 below)								
Other significant pressures	-		-		-		-	
Saltwater intrusion								
Other intrusion (specify below)								

Description of other significant pressures than those selected above.	

Code of ICPDR GW-body		*GWB-7*
National share of ICPDR GW-body (nationally aggregated part)		*HU-7, RO-7, RS-7*

Significant Pressures for Groundwater	**Status pressure types 2021** **Chemical** Yes/-			**Quantity** Yes/-			**Risk pressure types 2019→2027** **Chemical** Yes/-			**Quantity** Yes/-		
	HU poor	RO	RS	HU poor	RO	RS poor	HU risk	RO	RS	HU risk	RO	RS risk
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 soak ways												
Other relevant point sources (specify below)												
Diffuse Sources	**Yes**	-	-				**Yes**	-	-			
due to agricultural activities	x						x					
due to non-sewered population	x						x					
Urban land use	x						x					
Other significant diffuse pressures (specify below)												
Water abstractions				**Yes**	-	**Yes**				**Yes**	-	**Yes**
Abstractions for agriculture				x		x				x		x
Abstractions for public water supply				x		x				x		x
Abstractions by industry						x						x
IPPC activities												
Non-IPPC activities												
Abstractions by quarries/open cast coal sites												
Other major abstractions (specify below)												
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 below)												
Other significant pressures		-			-			-			-	
Saltwater intrusion												
Other intrusion (specify below)												

Description of other significant pressures than those selected above.	

Code of ICPDR GW-body		*GWB-8*
National share of ICPDR GW-body (nationally aggregated part)		*HU-8, SK-8*

Significant Pressures for Groundwater	**Status pressure types 2021**				**Risk pressure types 2019→2027**			
	Chemical Yes/-		**Quantity** Yes/-		**Chemical** Yes/-		**Quantity** Yes/-	
	HU	SK	HU	SK	HU	SK risk	HU	SK
Point sources	-				-	**Yes**		
Leakages from contaminated sites						x		
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 soak ways								
Other relevant point sources (specify below)						x		
Diffuse Sources	-					**Yes**		
due to agricultural activities						x		
due to non-sewered population						x		
Urban land use								
Other significant diffuse pressures (specify below)								
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 below)								
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 below)								
Other significant pressures	-		-		-		-	
Saltwater intrusion								
Other intrusion (specify below)								

Description of other significant pressures than those selected above.	SK: discharges from wastewater treatment plant (indirect pressure)

Code of ICPDR GW-body		*GWB-9*
National share of ICPDR GW-body (nationally aggregated part)		*HU-9, SK-9*

Significant Pressures for Groundwater	**Status pressure types 2021** **Chemical** Yes/-		**Quantity** Yes/-		**Risk pressure types 2019→2027** **Chemical** Yes/-		**Quantity** Yes/-	
	HU	SK poor	HU poor	SK	HU risk	SK risk	HU risk	SK
Point sources	**-**	**Yes**			**-**			
Leakages from contaminated sites		x						
Leakages from waste disposal sites (landfill and agricultural waste disposal)		x						
Leakages associated with oil industry infrastructure								
Mine water discharges								
Discharges to ground such as disposal of contaminated water to soak ways								
Other relevant point sources (specify below)		x						
Diffuse Sources	**-**	**Yes**			**Yes**	**Yes**		
due to agricultural activities					x	x		
due to non-sewered population		x			x			
Urban land use								
Other significant diffuse pressures (specify below)								
Water abstractions			Yes	**-**			**Yes**	**-**
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 below)								
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 below)								
Other significant pressures	**-**		**-**		**-**		**-**	
Saltwater intrusion								
Other intrusion (specify below)								

Description of other significant pressures than those selected above.	SK: discharges from wastewater treatment plant (indirect pressure) HU: indirect water abstraction: inland excess water drainage

Code of ICPDR GW-body		*GWB-10*
National share of ICPDR GW-body (nationally aggregated part)		*HU-10, SK-10*

Significant Pressures for Groundwater	**Status pressure types 2021** **Chemical** Yes/-		**Status pressure types 2021** **Quantity** Yes/-		**Risk pressure types 2019→2027** **Chemical** Yes/-		**Risk pressure types 2019→2027** **Quantity** Yes/-	
	HU	SK	HU	SK	HU risk	SK	HU	SK risk
Point sources	-				**Yes**	-		
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 soak ways								
Other relevant point sources (specify below)					x			
Diffuse Sources	-				-	-		
due to agricultural activities								
due to non-sewered population								
Urban land use								
Other significant diffuse pressures (specify below)								
Water abstractions			-					**Yes**
Abstractions for agriculture								x
Abstractions for public water supply								x
Abstractions by industry								x
IPPC activities								
Non-IPPC activities								
Abstractions by quarries/open cast coal sites								
Other major abstractions (specify below)								
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 below)								
Other significant pressures	-		-		-		-	
Saltwater intrusion								
Other intrusion (specify below)								

Description of other significant pressures than those selected above.	HU: unknown pollution source, monitoring required

Code of ICPDR GW-body		*GWB-11*
National share of ICPDR GW-body (nationally aggregated part)		*HU-11, SK-11*

Significant Pressures for Groundwater	**Status pressure types 2021**				**Risk pressure types 2019→2027**			
	Chemical Yes/-		**Quantity** Yes/-		**Chemical** Yes/-		**Quantity** Yes/-	
	HU	SK	HU	SK	HU	SK	HU	SK
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 soak ways								
Other relevant point sources (specify below)								
Diffuse Sources	-				-			
due to agricultural activities								
due to non-sewered population								
Urban land use								
Other significant diffuse pressures (specify below)								
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 below)								
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 below)								
Other significant pressures	-		-		-		-	
Saltwater intrusion								
Other intrusion (specify below)								

Description of other significant pressures than those selected above.	

Code of ICPDR GW-body		*GWB-12*
National share of ICPDR GW-body (nationally aggregated part)		*HU-12, SK-12*

Significant Pressures for Groundwater	Status pressure types 2021 Chemical Yes/-		Status pressure types 2021 Quantity Yes/-		Risk pressure types 2019→2027 Chemical Yes/-		Risk pressure types 2019→2027 Quantity Yes/-	
	HU	SK poor	HU	SK	HU	SK risk	HU	SK
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 soak ways								
Other relevant point sources (specify below)								
Diffuse Sources		**Yes**				**Yes**		
due to agricultural activities		x				x		
due to non-sewered population		x						
Urban land use								
Other significant diffuse pressures (specify below)		x						
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 below)								
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 below)								
Other significant pressures	-		-		-		-	
Saltwater intrusion								
Other intrusion (specify below)								

Description of other significant pressures than those selected above.	SK: other anthropogenic pressure - unknown

Groundwater measures

The overview table indicates the status of implementation of all key measures in the following way:

MC **Measure** implementation **Completed** by end of 2020

Implementation of measure is estimated to be ***completed by the end of 2020***

MO **Measure** implementation **On-going** after the end of 2020

(Involving administrative acts, diffuse pollution, advisory services, research etc.)

PO **Construction Planning On-going** after the end of 2020

Planning *of construction measure is* ***on-going***.

(Involving construction or building works)

CO **Construction On-going** after the end of 2020

Construction *of measure is* ***on-going***.

(Involving construction or building works)

MP **Measure** implementation **Not Started** by the end of 2020

Implementation of measure is planned

MN **Measure** implementation **Not Started** by the end of 2020

The detailed tables provide more details on particular measures in each relevant GWB:

- description of the measure,
- responsible authority,
- quantitative information by appropriate indicators (number of measures/projects and costs).

GWBs at poor status in 2021 or at risk in 2027 and the implemented measures

DRBD-GWB		GWB-4	GWB-5			GWB-7			GWB-8	GWB-9		GWB-10		GWB-12
National part		**RO-4**	**RO-5**	**HU-5**		**HU-7**		**RS-7**	**SK-8**	**HU-9**	**SK-9**	**HU-10**	**SK-10**	**SK-12**
Poor status (Chem or Quant)		**Chem**	**Chem**	**Chem**	**Quant**	**Chem**	**Quant**	**Quant**	**-**	**Quant**	**Chem**		**-**	**Chem**
Risk (Chem or Quant)		**Chem**	**Chem**	**Chem**	**Quant**	**Chem**	**Quant**	**Quant**	**Chem**	**Chem Quant**	**Chem**	**Chem**	**Quant**	**Chem**
Basic Measures (BM) – Article 11(3)(a)														
BM-01	BathingWater													
BM-02	Birds													
BM-03	DrinkingWater	MO	MO						MO					
BM-04	Seveso													
BM-05	EnvironmentalImpact													
BM-06	SewageSludge													
BM-07	UrbanWasteWater	CO	CO	MO		MO			CO	MO	CO			
BM-08	PlantProtectionProducts			MO		MO			MO		MN			MO
BM-09	Nitrates	MO	MO	MO		MO			MO	MO	MN			MO
BM-10	Habitats													
BM-11	IPPC													
Other Basic Measures (OBM) – Article 11(3)(b-l)														
OBM-20	CostRecoveryWaterServices													
OBM-21	EfficientWaterUse													
OBM-22	ProtectionWaterAbstractions			MP		MP						MN		
OBM-23	ControlsWaterAbstraction				MP		MP			MP			MN	
OBM-24	RechargeAugmentationGroundwater													
OBM-25	PointSourceDischarge													
OBM-26	PollutantsDiffuse			MP		MP								
OBM-27	AdverseImpact													
OBM-28	PollutantDirectGroundwater													
OBM-29	SurfacePrioritySubstances													
OBM-30	AccidentalPollution													
Supplementary Measures (SM) – Article 11(4)&(5)		MO	MO	MP	MP	MP	MP		MO	MP	MN	MN		MO

MC…Measure implementation completed by end of 2020, **MO**…Measure implementation on-going after the end of 2020, **PO**…Construction planning on-going after the end of 2020, **CO**…Construction on-going after the end of 2020, **MN**…Measure implementation not started by end 2020, **MP**…Measure implementation not started by end 2020, implementation of measure is planned

Detailed description of measures

[**BM** = basic measures**, OBM** = other basic measures**, SM** = supplementary measures].

GWB-4: Sarmatian

GWB Code	Size [km²]	Pressures		Status/Risk		Measures		Exemptions
		Chemical	Quantity	Chemical	Quantity	Chemical	Quantity	
GWB-4 BG-RO	5,412	DS	-	Poor, Risk (RO)	Good	BM, SM	-	2027

MC - Measure implementation completed by the end of 2020

MO - Measure implementation on-going after the end of 2020

RO – Chemical:

BM-03 Ensuring the protection areas for the drinking groundwater abstraction (MO)

- **description of the measure:** establishment of safeguard zones and buffer zones ensuring the protected area according to the water legislation in force (Water Law 107/1996 modified and completed, GD 930/2005 and Order 1278/2011); banning measures for some activities and restricted use of land, in order to prevent the water contamination risk/
- **responsible authority:** water authorities, local authorities;
- **quantitative information:** according with the Water Law 107/1996 as amended and GD 930/2005, for all drinking groundwater abstractions are establishing the safeguard zones and buffer zones, in order to prevent the water resources contamination.

BM-09 Applying the Action Programs (whole territory approach) in accordance to the Nitrates Directive (MO)

In Romania, following the discussions with the EC, whole territory approach is applied according with Decision 221983/GC/12.06.2013 of the Inter-ministerial Commission for the implementation of the Action Programs for the protection of waters against pollution caused by nitrates from agricultural sources.

- **description of the measure –** programme of measures applied for the agriculture diffuse sources in order to reduce the effects of the agriculture activities
- **responsible authority:** county agriculture authorities, local authorities and farmers
- **quantitative information by appropriate indicators:** This measure is applied in whole Dobrogea-Litoral Water Basin Administration territory.

SM - Research study for evaluation of the type and quantity of pollutants in soil and groundwater and the transfer/degradation mechanisms (MO)

- **description of the measure**: development of modelling tools for the evaluation of spatial and temporal pollutants migration – the support tool for finalising the evaluation methodology of the groundwater status and of the pollutant trends.
- **responsible authority**: Ministry of Environment, Waters and Forests, National Administration ”Romanian Waters”, National Institute for Hydrology and Water Management.
- **quantitative information by appropriate indicators**: research study

PO - Construction measure planning on-going after the end of 2020

CO - Construction of measure on-going after the end of 2020

RO – Chemical:

BM – 07 Construction of collecting system (CO)

- **description of the measure** – execution of the new sewage networks
- **responsible authority:** local authority

- **quantitative information** construction of collecting systems and improvement of the waste water treatment plant performance

MN - Measure implementation not started by the end of 2020

GWB-5: Mures/Maros

GWB Code	Size [km²]	Pressures		Status/Risk		Measures		Exemptions
		Chemical	Quantity	Chemical	Quantity	Chemical	Quantity	
GWB-5 HU-RO	7,216	DS	WA	Poor, Risk (RO, HU)	Poor, Risk (HU)	BM, OBM, SM	OBM, SM	2027+ (HU) 2027 (RO)

MC - Measure implementation completed by the end of 2020

MO - Measure implementation on-going after the end of 2020

<u>RO – Chemical:</u>

BM-03 Ensuring the protection areas for the drinking groundwater abstraction (MO)

- **description of the measure:** establishment of safeguard zones and buffer zones ensuring the protected area according to the water legislation in force (Water Law 107/1996 modified and completed, GD 930/2005 and Order 1278/2011); banning measures for some activities and restricted use of land, in order to prevent the water contamination risk/
- **responsible authority:** water authorities, local authorities;
- **quantitative information:** according with the Water Law 107/1996 as amended and GD 930/2005, for all drinking groundwater abstractions are establishing the safeguard zones and buffer zones, in order to prevent the water resources contamination.

BM-09 Applying the Action Programs (whole territory approach) in accordance to the Nitrates Directive (MO)

In Romania, following the discussions with the EC, whole territory approach is applied according with Decision 221983/GC/12.06.2013 of the Inter-ministerial Commission for the implementation of the Action Programs for the protection of waters against pollution caused by nitrates from agricultural sources.

- **description of the measure –** programme of measures applied for the agriculture diffuse sources in order to reduce the effects of the agriculture activities
- **responsible authority:** county agriculture authorities, local authorities and farmers
- **quantitative information by appropriate indicators:** This measure is applied in whole Dobrogea-Littoral Water Basin Administration territory.

SM - Research study for evaluation of the type and quantity of pollutants in soil and groundwater and the transfer/degradation mechanisms (MO)

- **description of the measure**: development of modelling tools for the evaluation of spatial and temporal pollutants migration – the support tool for finalising the evaluation methodology of the groundwater status and of the pollutant trends.
- **responsible authority**: Ministry of Environment, Waters and Forests, National Administration ”Romanian Waters”, National Institute for Hydrology and Water Management.
- **quantitative information by appropriate indicators**: research study

<u>HU – Chemical:</u>

BM-07

- **description of the measure:** BM07
- **responsible authority:** local governments
- **quantitative information by appropriate indicators (number of measures/projects and costs):**

HU transposed the Urban Waste Water Directive by Gov. decree 25/2002. (II. 27.) on the National Wastewater Collection and Treatment program. The implementation of UWWD is ongoing. In the South Great Plain Region the rate of the settlements connected to the sewage system was 71,9 % in 2019.

BM-08

- **description of the measure:** BM08
- **responsible authority:** plant protection authority
- **quantitative information by appropriate indicators (number of measures/projects and costs):**

  Implementation of EU the plant protection action program required by Sustainable Use of Pesticides Directive in the territory of the whole country with special regard to sensitive areas like drinking water protection zones, buffer strips of surface waters, etc. with additional voluntary measures planned under CAP 2021-27.

BM-09

- **description of the measure:** BM09
- **responsible authority:** authorities for soil protection and for water protection
- **quantitative information by appropriate indicators (number of measures/projects and costs):**

  HU transposed the ND by the Gov. Decree No. 27/2006. (II.7.) on the protection of waters against pollution caused by nitrates of agricultural sources. Designation of nitrate vulnerable zones was revised in 2013 (NVZ; ~69% of Hungary) . The Code of Good Agricultural Practice (GAP) is obligatory on NVZ's. Outside the NVZ's, the agri environmental measures assist the implementation of GAP on a voluntary basis.

<u>RO – Quantity:</u>

OBM-23

- **description of the measure** - In Romania, the measures (basic and other basic measures) are taken for all groundwater bodies (even if they are in good status), to prevent deterioration of groundwater bodies status but also taking into consideration the precautionary principle.
- **responsible authority:** water authorities, local authorities
- **quantitative information by appropriate indicators:** according with the Water Law 107/1996, Annex 3 (C) as amended, the groundwater abstraction shall be authorized and controlled, and the water abstraction register is regularly update.

<u>HU – Quantity:</u>

SM: measure for the inland excess water retention

OBM-23: development of water information system concerning the electronic-authorisation; New regulation on water management elaborated to take action against the installation and use of illegal agricultural water wells.

PO - Construction measure planning on-going after the end of 2020

CO - Construction of measure on-going after the end of 2020

<u>RO – Chemical:</u>

BM–07 Construction of collecting system (CO)

- **description of the measure** – execution of the new sewage networks
- **responsible authority:** local authority
- **quantitative information** construction of collecting systems and improvement of the waste water treatment plant performance
-

MN - Measure implementation not started by the end of 2020

<u>HU – Chemical:</u>

OBM-22

- **description of the measure:** OBM22 – protection of water abstractions
- **responsible authority:** authorities for water protection and water management

- **quantitative information by appropriate indicators (number of measures/projects and costs):**
  The protection of drinking water abstraction sites is regulated by 123/1997. (VII. 18.) Gov. Decree, acc. to which protection zones of sensitive abstraction sites have to be revised every 10 years. Revision includes i. a. the review of potential pollution sources and activities in the protection zones and their impacts on water quality and taking restrictive measures or additional monitoring if necessary. In addition to the implementation of the risk-based approach in the protection zones of drinking water abstraction acc. to the new Drinking Water Directive, other basic measures to support water protective agricultural practices, e. g. forestation, special practices for areas prone to erosion, excess water or droughts, will be introduced and subsidised by CAP 2021-27.

OBM-26

- **description of the measure:** OBM26 – poll. diffuse
- **responsible authority:** authorities for soil protection and for water protection
- **quantitative information by appropriate indicators (number of measures/projects and costs):**
  New compulsory and voluntary measures to reduce erosion and prevent nutrient (esp. phosphorus) inputs into waters in CAP 2021-27 are under elaboration.

SM - Supplementary Measures

- **description of the measure:** SM – education
- **responsible authority:** Ministry of Agriculture, farmers' advisors
- **quantitative information by appropriate indicators (number of measures/projects and costs):**
  Expand farmers' advisory system and introduce consultation for farmers on water protecting agricultural practices in the fields of sustainable nutrient and pesticide management, water saving cultivation practices, irrigation, natural water retention, erosion to assist to a successful application and use of CAP subsidies, both compulsory and voluntary.

- **description of the measure:** SM – research, development – kiegészítő intézkedés
- **responsible authority:** Ministry of Interior, Ministry of Agriculture
- **quantitative information by appropriate indicators (number of measures/projects and costs):**
  The request "Strengthening water monitoring in Hungary" (21HU07) for support under the first round of the Technical Support Instrument (TSI 2021) has been preliminarily accepted for funding by DG Reform. The project aims at ensuring high-quality monitoring and processing of water related information, integration of monitoring activity of the aquatic environment (soil, ecosystem, water, air) between sectors and organizations and closing the gap between research to practical application. (Planned budget: 650 000€, expected end: 2022)

GWB-7: Upper Pannonian – Lower Pleistocene / Vojvodina / Duna-Tisza köze deli r.

GWB Code	Size [km²]	Pressures		Status/Risk		Measures		Exemptions
		Chemical	Quantity	Chemical	Quantity	Chemical	Quantity	
GWB-7 HU-RO-RS	28,959	DS	WA	Poor, Risk (HU)	Poor, Risk (HU, RS*)	BM, OBM, SM	OBM, SM	2027+ (HU) YYYY (RS*)

MC - Measure implementation completed by the end of 2020

HU - Quantity

SM: measures from the CAP in order to protect the groundwater resources (CAP planning is ongoing)

OBM-23: development of water information system concerning the electronic-authorisation; New regulation on water management elaborated to take action against the installation and use of illegal agricultural water wells.

MO - Measure implementation on-going after the end of 2020

HU – Chemistry

BM-07

- **description of the measure:** BM07
- **responsible authority:** local governments
- **quantitative information by appropriate indicators (number of measures/projects and costs):**
  HU transposed the Urban Waste Water Directive by Gov. decree 25/2002. (II. 27.) on the National Wastewater Collection and Treatment program. The implementation of UWWD is ongoing. In the South Great Plain Region the rate of the settlements connected to the sewage system was 71,9 % in 2019.

BM-08

- **description of the measure:** BM08
- **responsible authority:** plant protection authority
- **quantitative information by appropriate indicators (number of measures/projects and costs):**
  Implementation of EU the plant protection action program required by Sustainable Use of Pesticides Directive in the territory of the whole country with special regard to sensitive areas like drinking water protection zones, buffer strips of surface waters, etc. with additional voluntary measures planned under CAP 2021-27.

BM-09

- **description of the measure:** BM09
- **responsible authority:** authorities for soil protection and for water protection
- **quantitative information by appropriate indicators (number of measures/projects and costs):**
  HU transposed the ND by the Gov. Decree No. 27/2006. (II.7.) on the protection of waters against pollution caused by nitrates of agricultural sources. Designation of nitrate vulnerable zones was revised in 2013 (NVZ; ~69% of Hungary) . The Code of Good Agricultural Practice (GAP) is obligatory on NVZ's. Outside the NVZ's, the agri environmental measures assist the implementation of GAP on a voluntary basis.

PO - Construction measure planning on-going after the end of 2020

CO - Construction of measure on-going after the end of 2020

MN - Measure implementation not started by the end of 2020

HU – Chemistry

OBM-22

- **description of the measure:** OBM22 – protection of water abstractions
- **responsible authority:** authorities for water protection and water management
- **quantitative information by appropriate indicators (number of measures/projects and costs):**
  The protection of drinking water abstraction sites is regulated by 123/1997. (VII. 18.) Gov. Decree, acc. to which protection zones of sensitive abstraction sites have to be revised every 10 years. Revision includes i. a. the review of potential pollution sources and activities in the protection zones and their impacts on water quality and taking restrictive measures or additional monitoring if necessary. In addition to the implementation of the risk-based approach in the protection zones of drinking water abstraction acc. to the new Drinking Water Directive, other basic measures to support water protective agricultural practices, e. g. forestation, special practices for areas prone to erosion, excess water or droughts, will be introduced and subsidised by CAP 2021-27.

OBM-26

- **description of the measure:** OBM26 – poll. diffuse
- **responsible authority:** authorities for soil protection and for water protection
- **quantitative information by appropriate indicators (number of measures/projects and costs):**
  New compulsory and voluntary measures to reduce erosion and prevent nutrient (esp. phosphorus) inputs into waters in CAP 2021-27 are under elaboration.

SM - Supplementary Measures

- **description of the measure:** SM – education
- **responsible authority:** Ministry of Agriculture, farmers' advisors
- **quantitative information by appropriate indicators (number of measures/projects and costs):**
  Expand farmers' advisory system and introduce consultation for farmers on water protecting agricultural practices in the fields of sustainable nutrient and pesticide management, water saving cultivation practices, irrigation, natural water retention, erosion to assist to a successful application and use of CAP subsidies, both compulsory and voluntary.

- **description of the measure:** SM – research, development
- **responsible authority:** Ministry of Interior, Ministry of Agriculture
- **quantitative information by appropriate indicators (number of measures/projects and costs):**
  The request "Strengthening water monitoring in Hungary" (21HU07) for support under the first round of the Technical Support Instrument (TSI 2021) has been preliminarily accepted for funding by DG Reform. The project aims at ensuring high-quality monitoring and processing of water related information, integration of monitoring activity of the aquatic environment (soil, ecosystem, water, air) between sectors and organizations and closing the gap between research to practical application. (Planned budget: 650 000€, expected end: 2022)

Note

** The National Plan for the Republic of Serbia is still in progress (available as draft), therefore, the year for exemptions as well as information on measures for the national part of GWB 7 which is in quantitative risk cannot be provided before the deadline of data collection of this overview. The information will be provided, when the Plan is officially adopted.*

GWB-8: Podunajska Basin, Zitny Ostrov / Szigetköz, Hanság-Rábca

GWB Code	Size [km^2]	Pressures		Status/Risk		Measures		Exemptions
		Chemical	Quantity	Chemical	Quantity	Chemical	Quantity	
GWB-8 HU-SK	3,338	PS, DS		Risk (SK)	Good	BM, SM		

MC - Measure implementation completed by the end of 2020

MO - Measure implementation on-going after the end of 2020

<u>SK – Chemical</u>

BM-03 Drinking water protected areas (DWPA)

- **description of the measure:** Reconsider the safeguard zone and restrictions in the DWPA, if they are sufficient to protect the quality of drinking water sources.
- **responsible authority:** Slovak Environmental Inspection, Ministry of Agriculture and Rural Development of the Slovak Republic
- **quantitative information by appropriate indicators:** DWPA Žitný ostrov (area 1200 km^2)

BM-08 Plant protection products

- **description of the measure:** Continue to meet the requirements arising from the implementation of European Parliament and Council Directive 2009/128/EC concerning the reduction of pesticides pollution from agriculture and implementation of this Directive into national Law and National action programme to achieve sustainable use of pesticides. Continue to apply measure concerning the placing of plant protection products on the market according to Regulation No. 1107/2009 of the EU Parliament and of the Council.
- **responsible authority:** Central Control and Testing Institute in Agriculture, Ministry of Agriculture and Rural Development of the Slovak Republic

- **quantitative information by appropriate indicators:**

BM-09 Nitrates Directive

- **description of the measure:** Continuing in application of requirements of the Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources (Nitrates Directive). The Nitrates Directive requires the fulfilment of the task of the Action Programme, which is established in the SR by Act no. 136/2000 Coll. on fertilizers.
- **responsible authority:** Ministry of Agriculture and Rural Development of the Slovak Republic, Central Control and Testing Institute in Agriculture
- **quantitative information by appropriate indicators:** This measure is applied in groundwater body's vulnerable areas (1694 km^2) according to Government Regulation no. 174/2017 Coll. (will be revised in 2021/2022).

SM - Supplementary Measures

- Remediation of contaminated sites - continuing in remediation and monitoring of environmental burdens at priority sites listed in the Informational System of Environmental Burdens according to the State Remediation Programme of Environmental Burdens (2022–2027).
- Continuing in application of measures according to Rural Development Programme for SR (2014–2020) extended to 2022, when the new Common Agricultural Policy (CAP) enters into force. The measures include the advisory services for agriculture, support for organic farming, managed agricultural and forestry activities in NATURA 2000 areas, etc.
- Research, improvement of knowledge base reducing uncertainty - support of research project, support of purpose monitoring to increase information about groundwater contamination and sources of contamination.
- Strengthening control activities (personnel ad financial) including increasing the number of controls.
- Education and training in the field of water protection for the professional and public (including school).

PO - Construction measure planning on-going after the end of 2020

CO - Construction of measure on-going after the end of 2020

SK – Chemical

BM-07 Measures to reduce pollution from urban areas

- **description of the measure:** Construction or upgrades of sewerage systems and wastewater treatment plants according to Plan of Public Sewerage System Development for years 2021 - 2027. Measures for sewerage systems (collecting systems for urban waste water) to comply article 3 of Council Directive 91/271/EEC and measures for urban waste water treatment to comply with article 4 and article 5 of Council Directive 91/271/EEC in ground water bodies.
- **responsible authority:** Ministry of Environment of the Slovak Republic
- **quantitative information by appropriate indicators:** measures for agglomerations >2000 PE: sewerage systems in 5 agglomerations and 3 WWTP need to be (re)constructed or upgraded; measures in DWPA Žitný ostrov for agglomerations <2000 PE: 41 agglomerations sewerage systems and 5 agglomerations sewerage systems and WWTP.

MN - Measure implementation not started by the end of 2020

GWB-9: Bodrog

GWB Code	Size [km²]	Pressures		Status/Risk		Measures		Exemptions
		Chemical	Quantity	Chemical	Quantity	Chemical	Quantity	
GWB-9 HU-SK	2,220	DS		Poor (SK), Risk (HU, SK)	Poor, Risk (HU)	BM, SM	SM, OBM	2027+

MC - Measure implementation completed by the end of 2020

MO - Measure implementation on-going after the end of 2020

HU – Chemical

BM-07

- **description of the measure:** BM07
- **responsible authority:** local governments
- **quantitative information by appropriate indicators (number of measures/projects and costs):**

HU transposed the Urban Waste Water Directive by Gov. decree 25/2002. (II. 27.) on the National Wastewater Collection and Treatment program. The implementation of UWWD is ongoing.

BM-09

- **description of the measure:** BM09
- **responsible authority:** authorities for soil protection and for water protection
- **quantitative information by appropriate indicators (number of measures/projects and costs):**

HU transposed the ND by the Gov. Decree No. 27/2006. (II.7.) on the protection of waters against pollution caused by nitrates of agricultural sources. Designation of nitrate vulnerable zones was revised in 2013 (NVZ; ~69% of Hungary) . The Code of Good Agricultural Practice (GAP) is obligatory on NVZ's. Outside the NVZ's, the agri environmental measures assist the implementation of GAP on a voluntary basis.

HU – Quantity:

SM: measure for the inland excess water retention

OBM-23: development of water information system concerning the electronic-authorisation; New regulation on water management elaborated to take action against the installation and use of illegal agricultural water wells.

PO - Construction measure planning on-going after the end of 2020

CO - Construction of measure on-going after the end of 2020

SK – Chemical

BM-07 Measures to reduce pollution from urban areas

- **description of the measure:** Construction or upgrades of sewerage systems and wastewater treatment plants according to Plan of Public Sewerage System Development for years 2021–2027. Measures for sewerage systems (collecting systems for urban waste water) to comply article 3 of Council Directive 91/271/EEC and measures for urban waste water treatment to comply with article 4 and article 5 of Council Directive 91/271/EEC in ground water bodies.
- **responsible authority:** Ministry of Environment of the Slovak Republic
- **quantitative information by appropriate indicators:** sewerage networks in 2 agglomerations (>2000 PE) and 1 WWTP need to be (re)constructed or upgraded

MN - Measure implementation not started by the end of 2020

SK – Chemical

BM-08 Plant protection products

- **description of the measure:** Continue to meet the requirements arising from the implementation of European Parliament and Council Directive 2009/128/EC concerning the reduction of pesticides pollution from agriculture and implementation of this Directive into national Law and National action programme to achieve sustainable use of pesticides. Continue to apply measure concerning the placing of plant protection products on the market according to Regulation No. 1107/2009 of the EU Parliament and of the Council.

- **responsible authority:** Central Control and Testing Institute in Agriculture, Ministry of Agriculture and Rural Development of the Slovak Republic
- **quantitative information by appropriate indicators:**

BM-09 Nitrates Directive

- **description of the measure:** Continuing in application of requirements of the Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources (Nitrates Directive). The Nitrates Directive requires the fulfilment of the task of the Action Programme, which is established in the SR by Act no. 136/2000 Coll. on fertilizers.
- **responsible authority:** Ministry of Agriculture and Rural Development of the Slovak Republic, Central Control and Testing Institute in Agriculture
- **quantitative information by appropriate indicators:** This measure is applied in groundwater body's vulnerable areas (1293 km^2) according to Government Regulation no. 174/2017Coll. (will be revised in 2021/2022).

SM - Supplementary Measures

- Remediation of contaminated sites - continuing in remediation and monitoring of environmental burdens at priority sites listed in the Informational System of Environmental Burdens according to the State Remediation Programme of Environmental Burdens (2022 - 2027).
- Continuing in application of measures according to Rural Development Programme for SR (2014 -2020) extended to 2022, when the new Common Agricultural Policy (CAP) enters into force. The measures include the advisory services for agriculture, support for organic farming, managed agricultural and forestry activities in NATURA 2000 areas, etc.
- Research, improvement of knowledge base reducing uncertainty - support of research project, support of purpose monitoring to increase information about groundwater contamination and sources of contamination.
- Strengthening control activities (personnel ad financial) including increasing the number of controls.
- Education and training in the field of water protection for the professional and public (including school).

GWB-10: Slovensky kras /Aggtelek-hsg

GWB Code	Size [km²]	Pressures		Status/Risk		Measures		Exemptions
		Chemical	Quantity	Chemical	Quantity	Chemical	Quantity	
GWB-10 HU-SK	1,091	PS	WA	Risk (HU)	Risk (SK)	OBM, SM	OBM	-

MC - Measure implementation completed by the end of 2020

MO - Measure implementation on-going after the end of 2020

PO - Construction measure planning on-going after the end of 2020

CO - Construction of measure on-going after the end of 2020

MN – Measure implementation not started by the end of 2020

HU - Chemical

OBM-22

- **description of the measure:** OBM22 – protection of water abstractions
- **responsible authority:** authorities for water protection and water management
- **quantitative information by appropriate indicators (number of measures/projects and costs):**

The protection of drinking water abstraction sites is regulated by 123/1997. (VII. 18.) Gov. Decree, acc. to which protection zones of sensitive abstraction sites have to be revised every 10 years. Revision includes i. a. the review of potential pollution sources and activities in the protection zones and their impacts on water quality and taking restrictive measures or additional monitoring if necessary. In addition to the implementation of the risk-based approach in the protection zones of drinking water abstraction acc. to the new Drinking Water Directive, other basic measures to support water protective agricultural practices, e. g. forestation, special practices for areas prone to erosion, excess water or droughts, will be introduced and subsidised by CAP 2021-27.

SM

- **description of the measure:** SM – research, development
- **responsible authority:** Ministry of Interior, Ministry of Agriculture
- **quantitative information by appropriate indicators (number of measures/projects and costs):**

The request "Strengthening water monitoring in Hungary" (21HU07) for support under the first round of the Technical Support Instrument (TSI 2021) has been preliminarily accepted for funding by DG Reform. The project aims at ensuring high-quality monitoring and processing of water related information, integration of monitoring activity of the aquatic environment (soil, ecosystem, water, air) between sectors and organizations and closing the gap between research to practical application. (Planned budget: 650 000€, expected end: 2022)

SK – Quantity

OBM-3 Controls of WaterAbstractions

- **description of the measure:** Controls and periodically reviewed abstractions of groundwater in accordance with the national Act no. 364/2004 Coll. on waters.
- **responsible authority:** State water management institutions - Ministry of Environment of the Slovak Republic, Slovak Environmental Inspection, and local authorities
- **quantitative information by appropriate indicators:** water law permits

GWB-12: Ipel / Ipoly

GWB Code	Size [km^2]	Pressures		Status/Risk		Measures		Exemptions
		Chemical	Quantity	Chemical	Quantity	Chemical	Quantity	
GWB-12 HU-SK	344	DS	WA	Poor, Risk (SK)	Good	BM, SM		2027+

MC - Measure implementation completed by the end of 2020

MO - Measure implementation on-going after the end of 2020

SK – Chemical

BM-08 Plant protection products

- **description of the measure:** Continue to meet the requirements arising from the implementation of European Parliament and Council Directive 2009/128/EC concerning the reduction of pesticides pollution from agriculture and implementation of this Directive into national Law and National action programme to achieve sustainable use of pesticides. Continue to apply measure concerning the placing of plant protection products on the market according to Regulation No. 1107/2009 of the EU Parliament and of the Council.
- **responsible authority:** Central Control and Testing Institute in Agriculture, Ministry of Agriculture and Rural Development of the Slovak Republic
- **quantitative information by appropriate indicators:**

BM-09 Nitrates Directive

- **description of the measure:** Continuing in application of requirements of the Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources (Nitrates Directive). The Nitrates Directive requires the fulfilment of the task of the Action Programme, which is established in the SR by Act no. 136/2000 Coll. on fertilizers.
- **responsible authority:** Ministry of Agriculture and Rural Development of the Slovak Republic, Central Control and Testing Institute in Agriculture
- **quantitative information by appropriate indicators:** This measure is applied in groundwater body's vulnerable areas (173 km^2) according to Government Regulation no. 174/2017 Coll. (will be revised in 2021/2022).

SM - Supplementary Measures

- Continuing in application of measures according to Rural Development Programme for SR (2014–2020) extended to 2022, when the new Common Agricultural Policy (CAP) enters into force. The measures include the advisory services for agriculture, support for organic farming, managed agricultural and forestry activities in NATURA 2000 areas, etc.
- Research, improvement of knowledge base reducing uncertainty - support of research project, support of purpose monitoring to increase information about groundwater contamination and sources of contamination.
- Strengthening control activities (personnel ad financial) including increasing the number of controls.
- Education and training in the field of water protection for the professional and public (including school).

PO - Construction measure planning on-going after the end of 2020

CO - Construction of measure on-going after the end of 2020

MN - Measure not having started by the end of 2020