QUESTIONNAIRE FOR EXISTING SAMPLING, LABORATORY AND EVALUATION METHODS

0.0. State your institution and country.
NARIC, Hungary
0.1. State institution(s) from which you got data to fill this questionnaire.
OVF (General Directorate of Water Management), and own experience

I.LEGISLATIVE FRAMEWORK

I.1Enumeration of national or European legislation (laws, governmental orders, emergency ordinances) that regulates the concentrations of dangerous substances posing a risk to the health of the population or aquatic life, in soils, surface waters, drinking water, river sediments, marine sediments, sewage, therapeutic sludge, air and biota.
[PLEASE, SUPPORT YOUR ANSWERS WITH REFERENCES (NATIONAL LEGISLATIVE DOCUMENTS AND/OR WEB LINKS)]

No	Title (in national language)	Title (in English)	Link	Country
1	10/2010. (VIII. 18.) VM rendelet a felszíni víz vízszennyezettségi határértékeiről és azok alkalmazásának szabályairól	Environmental quality standards and other thresholds for Surface waters and the usage of these limit values	https://net.jogtar.hu/getpdf?docid=a1000010.vm&targetdate=&printTitle=10/2010.+%28VIII.+18.%29+VM+rendelet	HU

1. 1995. évi LIII. törvény a környezet védelmének általános szabályairól
2. 1995. évi LVII. törvény a vízgazdálkodásról (ill. a 2001. évi LXXI. törvény az előbbi módosításáról)
3. 1996. évi LIII. törvény a természet védelméről
4. 2004. évi LXXVI. törvény a környezet védelmének általános szabályairól szóló 1995. évi LIII. törvény, valamint a természet védelméről szóló 1996. évi LIII. törvény módosításáról
5. 155/2002. (VII. 9.) Korm. rendelet a környezetvédelmi és vízügyi miniszter feladat- és hatásköréről
6. Az Európai Parlament és a Tanács 2000. október 23-i 2000/60/EK irányelve a vízvédelmi politika terén a közösségi fellépés kereteinek meghatározásáról
7. 74/2000. (V. 31.) Korm. rendelet a Duna védelmére és fenntartható használatára irányuló együttműködésről szóló, 1994. június 29-én, Szófiában létrehozott Egyezmény kihirdetéséről

8. 1959. évi 32. törvényerejű rendelet a Magyar Népköztársaság és az Osztrák Köztársaság között a határvidék vízgazdálkodási kérdéseinek szabályozása tárgyában Bécsben, az 1956. évi április hó 9. napján aláírt egyezmény kihirdetéséről
9. 1985/17. Nemzetközi Szerződés az Országos Környezet és Természetvédelmi Hivatal elnökétől SZERZŐDÉS a Magyar Népköztársaság és az Osztrák Köztársaság között a környezetvédelem területén való együttműködésről
10. 55/1978. (XII. 10.) MT rendelet a Magyar Népköztársaság Kormánya és a Csehszlovák Szocialista Köztársaság Kormánya között a határvizek vízgazdálkodási kérdéseinek szabályozásáról Budapesten, 1976. évi május hó 31-én aláírt Egyezmény kihirdetéséről
11. 2093/1999. (V. 5.) Korm. határozat a Magyar Köztársaság Kormánya és a Szlovák Köztársaság Kormánya között a környezetvédelem és természetvédelem terén való együttműködésről szóló, Pozsonyban, 1999. február 12-én aláírt Egyezmény jóváhagyásáról
    1999/17. Nemzetközi Szerződés a környezetvédelmi minisztertől
12. 117/1999. (VIII. 6.) Korm. rendelet a Magyar Köztársaság Kormánya és Ukrajna Kormánya között Budapesten, 1997. november 11-én aláírt, a határvizekkel kapcsolatos vízgazdálkodási kérdésekről szóló Egyezmény kihirdetéséről

Plus, the main (related) EU directives, what we adapted:

- 2000/60/EC
- 2008/105/EC and 2013/39/EU
- and 2009/90/EC

I.2List of dangerous (hazardous) substances (metals, non-metals, PAHs, PCBs, other parameters) concentration levels, their significance (*definition of terms used for thresholds*) in waters, solids or biota, in accordance with the national legislative framework.

Alert threshold = concentrations of pollutants in air, water, soil or in emissions/discharges, which, when reached, warn the competent authorities on a potential impact on environment and trigger an additional monitoring and/or reduction of pollutant concentrations in emissions/discharges.
Intervention threshold = concentrations of pollutants in air, water, soil or in emissions/discharges, which, when reached, determine the competent authorities to order risk assessment studies and reduction of pollutant emissions from emissions/discharges.

Each country, please deliver the definition of specific terms in the respective law.

Hungary use the WFD "thresholds", these called Environmental Quality Standards (EQSs) for the Priority Subtances + Priority Hazardous Substances (PSs/PHSs) (see WFD Annex X. for the list) in the water.

Table 1 Metal trace elements in soils

Trace Element	Levels in soils (mg/kg)					
metals	A) normal values*		B) alert threshold		C) intervention threshold	
Values based on use category	A1	A2	Sensitive B1	Less sensitive B2	Sensitive C1	Less sensitive C2
Mercur (Hg)	See attachment 6_2009. (IV. 14.) KvVM-EüM-FVM együttes rendelet					
As						
Cd						
Cr						
Cu						
Ni						
Pb						
Zn						

*Refering to Normal values, for example, in Romania, there is a single set of **normal** values for all types of soils (probably an average value).Taking into account that some other countries could have more sets of normal values (depending on soil type, region etc.), more columns can be added in the table by the respective country.

Table 2 Metal trace elements in river water

Trace Element	Levels in river water (µg/l)					
metals	A) normal values		B) alert threshold		C) intervention threshold	
Values based on use category	A1	A2	Sensitive B1	Less sensitive B2	Sensitive C1	Less sensitive C2
Mercur (Hg)	We use EQSs for waters. See 2013/39/EU. we use these limit values.					
As						
Cd						
Cr						
Cu						
Ni						
Pb						
Zn						

Table 3 Metal trace elements in drinking water

Trace Element	Levels in drinking water (µg/l)		
metals	A)normal values	B)alert threshold	C)intervention threshold

Values based on use category	A1	A2	Sensitive B1	Less sensitive B2	Sensitive C1	Less sensitive C2
Mercur (Hg)	See the attaechment: 201_2001. (X. 25.) Korm. rendelet					
As						
Cd						
Cr						
Cu						
Ni						
Pb						
Zn						

Table 4 Non-metal trace elements in soils

Trace Element	Levels in soils (mg/kg)					
Non-metals	A)normal values		B)alert threshold		C)intervention threshold	
Values based on use category	A1	A2	Sensitive B1	Less sensitive B2	Sensitive C1	Less sensitive C2
F	See attachment 6_2009. (IV. 14.) KvVM-EüM-FVM együttes rendelet					
Cl						
S						
Br						
I						

Table 5 Non-metal trace elements in river water

Trace Element	Levels in river water (µg/l)					
Non-metals	A)normal values		B)alert threshold		C)intervention threshold	
Values based on use category	A1	A2	Sensitive B1	Less sensitive B2	Sensitive C1	Less sensitive C2
F	We have no EQSs for these substances.					
Cl						
S						
Br						
I						

Table 6 Non-metal trace elements in drinking water

Trace Element	Levels in drinking water (µg/l)					
Non-metals	A)normal values		B)alert threshold		C)intervention threshold	
Values based on use category	A1	A2	Sensitive B1	Less sensitive B2	Sensitive C1	Less sensitive C2
F	See the attachment: 201_2001. (X. 25.) Korm. rendelet					
Cl						
S						
Br						
I						

Please complete the list of HSs according to national documents with:
-Table of Polycyclic Aromatic Hydrocarbons –PAHs,
-Table of Polychlorinated Biphenyls-PCBs,
-Table of microbiological parameters, as well as other parameters that are provided in national legislations

I.3Quality objectives for hazardous substances (please complete the tables of HSs according to national documents)
We use EQSs for waters. See 2013/39/EU. we use these limit values.
AA: annual average.
MAC: maximum allowable concentration.
Unit: [µg/l]
We have no EQSs for sediment.

(1)	(2)	(3)	(4)	(6)	(8)
No	Name of substance	CAS number (1)	AA-EQS (2) Inland surface waters (3)	MAC-EQS (4) Inland surface waters (3)	EQSBiota (12)
(1)	Alachlor	15972-60-8	0,3	0,7	
(2)	Anthracene	120-12-7	0,1	0,1	
(3)	Atrazine	1912-24-9	0,6	2,0	
(4)	Benzene	71-43-2	10	50	
(5)	Brominated dipheny- lethers (5)	32534-81-9		0,14	0,0085
(6)	Cadmium and itscompounds (depending on water hardness classes) (6)	7440-43-9	≤ 0,08(Class 1)0,08 (Class 2)0,09 (Class 3)0,15 (Class 4)0,25 (Class 5)	≤ 0,45(Class 1)0,45 (Class 2)0,6 (Class 3)0,9 (Class 4)1,5 (Class 5)	
(6a)	Carbon- tetrachlo- ride (7)	56-23-5	12	not applicable	
(7)	C10-13Chloroal- kanes (8)	85535-84-8	0,4	1,4	
(8)	Chlorfen- vinphos	470-90-6	0,1	0,3	

(1)	(2)	(3)	(4)	(6)	(8)
No	Name of substance	CAS number (1)	AA-EQS (2) Inland surface waters (3)	MAC-EQS (4) Inland surface waters (3)	EQSBiota (12)
(9)	Chlorpyrifos (Chlor-pyrifos- ethyl)	2921-88-2	0,03	0,1	
(9a)	Cyclodiene pesticides: Aldrin (7)Dieldrin (7)Endrin (7)Isodrin (7)	309-00-260-57-172-20-8465-73-6	Σ = 0,01	not applicable	
(9b)	DDTtotal (7), (9)	Not applicable	0,025	not applicable	
	para-para- DDT (7)	50-29-3	0,01	not applicable	
(10)	1,2-Dich-loroethane	107-06-2	10	not applicable	
(11)	Dichlorome- thane	75-09-2	20	not applicable	
(12)	Di(2-ethylhexyl)-phthalate (DEHP)	117-81-7	1,3	not applicable	
(13)	Diuron	330-54-1	0,2	1,8	
(14)	Endosulfan	115-29-7	0,005	0,01	
(15)	Fluoran- thene	206-44-0	0,0063	0,12	30
(16)	Hexachloro-benzene	118-74-1		0,05	10
(17)	Hexachloro-butadiene	87-68-3		0,6	55
(18)	Hexachloro-cyclohexane	608-73-1	0,02	0,04	
(19)	Isoproturon	34123-59-6	0,3	1,0	
(20)	Lead and its compounds	7439-92-1	1,2 (13)	14	
(21)	Mercury and its compounds	7439-97-6		0,07	20
(22)	Naphthalene	91-20-3	2	130	
(23)	Nickel and its compounds	7440-02-0	4 (13)	34	
(24)	Nonylp- henols(4-Nonylp- henol)	84852-15-3	0,3	2,0	
(25)	Octylp- henols ((4-(1,1',3,3'-tetramethyl- butyl)-phenol))	140-66-9	0,1	not applicable	
(26)	Pentachloro-benzene	608-93-5	0,007	not applicable	
(27)	Pentachloro-phenol	87-86-5	0,4	1	
(28)	Poly- aromatic hydro- carbons (PAH) (11)	Not applicable	not applicable	not applicable	
	Benzo(a)py- rene	50-32-8	1,7 × 10–4	0,27	5
	Benzo(b)flu- or-anthene	205-99-2	see footnote 11	0,017	see footnote 11
	Benzo(k)flu- or-anthene	207-08-9	see footnote 11	0,017	see footnote 11
	Benzo(g,h,i-)-perylene	191-24-2	see footnote 11	8,2 × 10–3	see footnote 11
	Indeno(1,2,- 3-cd)-pyrene	193-39-5	see footnote 11	not applicable	see footnote 11
(29)	Simazine	122-34-9	1	4	
(29a)	Tetrachloro-ethylene (7)	127-18-4	10	not applicable	
(29b)	Trichloro- ethylene (7)	79-01-6	10	not applicable	

(1)	(2)	(3)	(4)	(6)	(8)
No	Name of substance	CAS number (1)	AA-EQS (2) Inland surface waters (3)	MAC-EQS (4) Inland surface waters (3)	EQSBiota (12)
(30)	Tributyltin compounds (Tributyltin- cation)	36643-28-4	0,0002	0,0015	
(31)	Trichloro- benzenes	12002-48-1	0,4	not applicable	
(32)	Trichloro- methane	67-66-3	2,5	not applicable	
(33)	Trifluralin	1582-09-8	0,03	not applicable	
(34)	Dicofol	115-32-2	1,3 × 10–3	not appli- cable (10)	33
(35)	Perfluoro- octane sulfonic acid and its derivatives (PFOS)	1763-23-1	6,5 × 10–4	36	9,1
(36)	Quinoxyfen	124495-18-7	0,15	2,7	
(37)	Dioxins and dioxin-like compounds	See footnote 10 in Annex X toDirective 2000/60/EC		not applicable	Sum of PCDD+PC-DF+PCB- DL0,0065 µg.kg–1 TEQ (14)
(38)	Aclonifen	74070-46-5	0,12	0,12	
(39)	Bifenox	42576-02-3	0,012	0,04	
(40)	Cybutryne	28159-98-0	0,0025	0,016	
(41)	Cyper- methrin	52315-07-8	8 × 10–5	6 × 10–4	
(42)	Dichlorvos	62-73-7	6 × 10–4	7 × 10–4	
(43)	Hexabromo-cyclodo- decane (HBCDD)	See footnote 12 in Annex X toDirective 2000/60/EC	0,0016	0,5	167
(44)	Heptachlor and heptachlor epoxide	76-44-8/1024-57-3	2 × 10–7	3 × 10–4	6,7 × 10–3
(45)	Terbutryn	886-50-0	0,065	0,34	

(1) CAS: Chemical Abstracts Service.

(2) This parameter is the EQS expressed as an annual average value (AA-EQS). Unless otherwise specified, it applies to the total concentration of all isomers.

(3) Inland surface waters encompass rivers and lakes and related artificial or heavily modified water bodies.

(4) This parameter is the EQS expressed as a maximum allowable concentration (MAC-EQS). Where the MAC-EQS are marked as 'not applicable', the AA-EQS values are considered protective against short-term pollution peaks in continuous discharges since they are significantly lower than the values derived on the basis of acute toxicity.

(5) For the group of priority substances covered by brominated diphenylethers (No 5), the EQS refers to the sum of the concentrations of congener numbers 28, 47, 99, 100, 153 and 154.

(6) For Cadmium and its compounds (No 6) the EQS values vary depending on the hardness of the water as specified in five class categories (Class 1: < 40 mg $CaCO_3$/l, Class 2: 40 to < 50 mg $CaCO_3$/l, Class 3: 50 to < 100 mg $CaCO_3$/l, Class 4: 100 to < 200 mg $CaCO_3$/l and Class 5: ≥ 200 mg $CaCO_3$/l).

(7) This substance is not a priority substance but one of the other pollutants for which the EQS are identical to those laid down in the legislation that applied prior to 13 January 2009.

(8) No indicative parameter is provided for this group of substances. The indicative parameter(s) must be defined through the analytical method.

(9) DDT total comprises the sum of the isomers 1,1,1-trichloro-2,2 bis (p-chlorophenyl) ethane (CAS number 50-29-3; EU number 200- 024-3); 1,1,1-trichloro-2 (o-chlorophenyl)-2-(p-chlorophenyl) ethane (CAS number 789-02-6; EU Number 212-332-5); 1,1-dichloro- 2,2 bis (p-chlorophenyl) ethylene (CAS number 72-55-9; EU Number 200-784-6); and 1,1-dichloro-2,2 bis (p-chlorophenyl) ethane (CAS number 72-54-8; EU Number 200-783-0).

(10) There is insufficient information available to set a MAC-EQS for these substances.

(11) For the group of priority substances of polyaromatic hydrocarbons (PAH) (No 28), the biota EQS and corresponding AA-EQS in water refer to the concentration of benzo(a)pyrene, on the toxicity of which they are based. Benzo(a)pyrene can be considered as a marker for the other PAHs, hence only benzo(a)pyrene needs to be monitored for comparison with the biota EQS or the corresponding AA-EQS in water.

(12) Unless otherwise indicated, the biota EQS relate to fish. An alternative biota taxon, or another matrix, may be monitored instead, as long as the EQS applied provides an equivalent level of protection. For substances numbered 15 (Fluoranthene) and 28 (PAHs), the biota EQS refers to crustaceans and molluscs. For the purpose of assessing chemical status, monitoring of Fluoranthene and PAHs in fish is not appropriate. For substance number 37 (Dioxins and dioxin-like compounds), the biota EQS relates to fish, crustaceans and molluscs, in line with section 5.3 of the Annex to Commission Regulation (EU) No 1259/2011 of 2 December 2011 amending Regulation (EC) No 1881/2006 as regards maximum levels for dioxins, dioxin-like PCBs and non-dioxin-like PCBs in foodstuffs (OJ L 320, 3.12.2011, p. 18).

(13) These EQS refer to bioavailable concentrations of the substances.

(14) PCDD: polychlorinated dibenzo-p-dioxins; PCDF: polychlorinated dibenzofurans; PCB-DL: dioxin-like polychlorinated biphenyls; TEQ: toxic equivalents according to the World Health Organisation 2005 Toxic Equivalence Factors.

I.4Listing of analytical standards (national analytics and international e.g. USEPA, ASTM, etc.) recommended in documents for chemical, physical, microbiological analyzes of samples

Element	National analytical standards	International analytical standards	"in-house" developed methods"
Mercury in drinking water	See attachments: Laboratories folder		
Mercury (Hg) in solids samples (sediments)			
Etc.			

*ASTM=American Society for Testing and Materials

I.5. List of chronic or acute toxicity tests and determination of bioaccumulation or persistence in biota according to the specificity of the dangerous substance in the trophic chain (Ex: Microtox test - The potential ecological impacts of anaerobic degradation of vegetable oil on freshwater sediments; Hyalella Azteca etc).
No WFD compatible, routine test for this. We use the results of scientific publications (e.g. from toxnet).

I.6List of national, and international guides of techniques on the design of sampling, transport, storage, samples preparation (sieving, fraction extraction, separation, etc.) recommended in documents

Nr		sediment	soil	water
1	Sampling lakes	ISO 5667-12:1995, MSZ 21470-1:1998, MSZ EN 14899:2006		MSZ ISO 5667-4:1995 https://www.iso.org/standard/55450.html
2	Sampling rivers			ISO 5667-6:2014 https://www.iso.org/standard/55451.html

3	Transport, storage		MSZ EN ISO 5667-3:2013 https://www.iso.org/standard/72370.html

I.7 Specify the recommended remedy measures associated with the contents of the hazardous substances (alert threshold, intervention threshold)
If it exceeds the EQS, denser monitoring is prescribed at the sampling site and the source of contamination is searched for, which could cause the EQS to be exceeded.

II PRACTICES, EXPERIENCES

II.1. Significant national, European, finalized or ongoing projects related to geochemistry of waters, soils, sediments in the Danube basin

No.	Project title (national language, if available)	Project Title (EN)	Year	Country	Project coordinators, Partners

I have no information about geochemistry projects.

II.2. Significant scientific papers, books, related to geochemistry of waters, soils, sediments in the Danube basin

No.	Paper title (national language,if available)	Title (EN)	Year	Country	Authors

I have no information about geochemistry publications.

II.3Existent waterbodies and sampling sites (Ramsar, Natura2000 etc.) and current quality monitoring stations of the Danube River

Danube River Quality Monitoring Stations

KTJ	Name	Sampling location	EOV_X	EOV_Y
101178209	Duna	Budapest, upsteam	227275	647456

101178195	Duna	Budapest, downstream	249640	652137
101845862	Duna	Göd	259782	655720
101178184	Duna	Szob, Ipoly downstream	274405	635980
101178151	Duna	Medvei bridge, - 1806,2 river km	273142	545431
101178162	Duna	Rajka gaging station, - 1848,4 fkm	297123	515675
101178210	Duna	Solt	162925	641290
101178232	Duna	Hercegszántó	62700	631897
101178807	Duna	Szob	274084	635863
101180545	Duna	Komárom, Vág upstream, - 1766,8 fkm	267891	580519

See attachment: HU_sites.xls These are the main sites (surveillance monitoring network).

II.4.Data and metadata availability (including information on ambient or natural concentrations of HSs for establishing intervention measures)
The list of past or current economic polluters referring to the direct effect on the quality of sediment in the Danube (the HSs whose possible concentrations are likely to be exceeded), information on the HSs biological effects, evidence of impact of anthropogenic activities.

Ambient or natural concentrations of HSs: we have calculations, but we do not understand the environmental procedures very well. But now we have projects for this, we are waiting for the results.

Economic polluters: we know the legal emission sources, they need to be reported regularly. We have lack of information about the contamination of overland flow and about the illegal sources.

II.5. Problems of current monitoring procedures in DRB

III.INVENTORY OF SAMPLING METHODOLOGIES

III.1. Water

III.1.1. Sampling design strategy. How do you choose sampling locations,number of sites, sampling position within the national Danube sector, distance from confluence points, distance from point industry/agriculture polluters, distance from big cities, sampling depth, distance from the water course/bodies banks? How do you decide about temporal frequency of collecting samples?

See CIS guidance No. 7 and 19. We design inline with that.

III.1.2. Which parameters of water **quality/quantity** are measured ***in situ***?

pH (MSZ 1484-22:2009, illetve MSZ EN ISO 10523:2012 szabvány szerint), a fajlagos elektromos vezetőképesség (MSZ EN ISO 27888:1998 szabvány szerint) és a hőmérséklet (MSZ 448-2:1967 (visszavont szabvány) 1. fejezet szerint) helyszíni mérését.

III.1.3. Which **instruments** are used for ***in situ*** measurements (include manufacturer and type)?

We have 7 official water laboratories and they have different equipment.

III.1.4. Please, describe **methodology** for ***in situ*** measurements.
See the standards in III.1.2.

III.1.5. Which **tools** are used for collecting samples for **laboratory** measurements (include manufacturer and type)?
We have 7 official water laboratories and they have different equipment.

III.1.6 Sample preservation (samples chemical preservation according to their type and used analysis method).
MSZ EN ISO 5667-3:2013

III.1.7 Please, describe a **methodology** for collecting samples
Lakes: MSZ ISO 5667-4:1995, Streams: ISO 5667-6:2014

III.2 Sediment
We have no official, accredited sediment monitoring yet.
III.2.1. Which type(s) of sediment do you sample/measure **bottom**, **suspended**, **floodplain**?
III.2.2. Sampling design strategy. How do you choose sampling locations?
How do you decide about temporal frequency of collecting samples?
III.2.3. Which parameters of sediment **quality**/**quantity** are measured ***in situ***?
III.2.4. Which appropriate sampling devices (e.g. GRAIFER, CAROTIER etc.) and instruments are used for ***in situ*** measurements (include manufacturer and type)?
III.2.5. Please, describe **methodology** for ***in situ*** measurements.
III.2.6. Which **tools** are used for collecting samples for **laboratory** measurements (include manufacturer and type)?
III.2.7. Please, describe a **methodology** for collecting samples for **laboratory** measurements.
III.2.8. Please, describe a **transport** methodology for samples intended for laboratory measurements.
III.2.9. Do you **archive** samples? If yes, please describe how.

III.3 . **Biota**
III.3.1. Which type(s) of **biota** do you sample/measure: **flora**, **fauna** (name species)?
fish (mainly: chub)
III.3.2. Sampling design strategy. How do you choose sampling locations? How do you decide about temporal frequency of collecting samples?

We are investigating monitoring program now, to find the best sampling sites for long-term biota monitoring.

III.3.3. Which parameters of biota **quality**/**quantity** are measured ***in situ***?

Data on species (abundance) established in the field are recorded in field records. The sampling method is recorded during sampling (inwading / boat sampling) and which habitat type has been sampled (small, medium, large, very large river basin, Danube), other sampling conditions (eg. what kind of modification was required due to field conditions in the sampling procedure). We give the value of some abiotic variables characteristic of the sampling phase which are the following: average water depth at the sampling stage, average water depth at the sampling site, average flow rate, substrate composition, full coverage of the bottom cover and its composition in %, composition of coastal vegetation and structure of the river bank.

III.3.4. Which **instruments** are used for ***in situ*** measurements (include manufacturer and type)?

No measurements.

III.3.5. Please, describe **methodology** for ***in situ*** measurements.

No measurements.

III.3.6. Which **tools** are used for collecting samples for **laboratory** measurements (include manufacturer and type)?

plastic sampling bags

III.3.7. Please, describe a **methodology** for collecting samples for **laboratory** measurements.

In general, in watercourses (small and medium watercourses), the survey is carried out with a portable electric fishing machine, while in large and very large river basins and in the river Danube, with a high-performance aggregator and boat.

III.3.8. Please, describe a **transport** methodology for samples intended for laboratory measurements.

The fish species are stored in separate storage pockets in a refrigerator, possibly frozen, at the sampling points.

III.3.9. Do you **archive** samples? If yes, please describe how.

fYes, by deep freezing.

[PLEASE, SUPPORT YOUR ANSWERS WITH REFERENCES (NATIONAL LEGISLATIVE DOCUMENTS AND/OR WEB LINKS)]

We have it only in Hungarian.

IV.INVENTORY OF LABORATORY METHODOLOGIES

See attachment: Laboratories folder and Lab_standards.doc

IV.1. How do you **mechanically prepare samples** for measurement (drying, sieving, grinding, homogenization, etc.)?

a) water
b) sediment
c) biota?

IV.2 Chemicals.

Granulometric analysis (information on the correlation of particle sizes and the absorption of toxic metals or metal compounds in sediments).

Analytical methods (including sample preparation: e.g. acid digestion, etc.) for the hazardous substance analyzed in agreement with the matrix in which it is being analyzed (water, sediment, sludge).
Type of analytical equipments.
Description of internal procedures

IV.2.1. Organic matter. What is the **procedure** for **organic matter** content determination in water and sediment?

IV.2.2. ICP-MS, ICP-AES systems
IV.2.2.1. Which system of analysis do you use (ICP-MS, ICP-AES, etc.)? Please, include manufacturer and type.
IV.2.2.2. Which **elements (HSs)** do you measure by this system? Please, state **detection limits** for measured elements (HSs).
IV.2.2.3. Please, describe **sample preparation and procedure** for these measurements (microwave acid digestion, another disintegration procedure, gas velocity, temperature of atomization, mirrors position, nebulizer type, excitation power, wavelengths etc.).
IV.2.2.4. How do you calculate **accuracy and precision** (references)?

IV.2.3. AAS systems
IV.2.3.1. Please, state manufacturer and type of AAS(F-AAS,GF-AAS) instrument you use.
IV.2.3.2. Which **elements (HSs)** do you measure by AAS? Please, state **detection limits** for measured elements (HSs).
IV.2.3.3. Please, describe **sample preparation and procedure** for AAS measurements (dissolution, radiation source, source temperature, wavelengths, etc.).
IV.2.3.4. How do you calculate **accuracy and precision** (references)?

IV.2.4. XRF
IV.2.4.1. Please, state manufacturer and type of XRF(EDXRF,WDXRF) instrument you use.
IV.2.4.2. Which **elements and/or compounds** (HSs) do you measure by **XRF**? Please, state **detection limits** for measured elements and/or compounds (HSs).
IV.2.4.3. Please, describe **preparation of the sample and procedure** for XRF measurements.
IV.2.4.4. How do you calculate **accuracy and precision** (references)?

IV.2.5 DC-arc –AES
IV.2.5.1. Please, state manufacturer and type of instrument you use (type of detectors etc.).
IV.2.5.2. Which **elements and/or compounds** (HSs) do you measure by **DC-arc-AES**? Please, state **detection limits** for measured elements and/or compounds (HSs).
IV.2.5.3. Please, describe **preparation of the sample and procedure** for DC-arc-AES measurements.
IV.2.5.4. How do you calculate **accuracy and precision** (references)?

IV.2.6. Radionuclides

IV.2.6.1. **Which instrumental method(s)** you use to detect radionuclides in water, sediment and/or biota? Please, state manufacturer and type of radionuclide detection instrument you use.

IV.2.6.2. **Which radionuclides** do you measure? Please, state **detection limits** for measured radionuclides.

IV.2.6.3. How do you calculate **accuracy and precision** (references)?

IV.2.7. Organic compounds (HSs)

IV.2.7.1. **Which instrumental method(s)** you use to detect organic compounds (HSs) in water, sediment and/or biota?

IV.2.7.2. **Which organic compounds (HSs)** do you measure?

Please, state **detection limits** for measured organic compounds (HSs).

IV.2.7.3. How do you calculate **accuracy and precision** (references)?

IV.2.8. XRD

IV.2.8.1. Please, state manufacturer and type of XRD instrument you use.

IV.2.8.2. Do you use **XRD for sediment analysis**?

IV.2.8.3. Please, describe **preparation of the sample and procedure** for XRD measurements

IV.3 Inventory of national laboratories where dangerous substances are analyzed, specifying whether they have accreditations on the quality of analyzes (certificate issued by the national body attesting the quality of the analyzes), price and time of analyses.

See attachment: Laboratories folder.

IV.4 Description of "good practices" in laboratory and “in situ” analysis. For example, ways to convert analytical data obtained from sediment analysis to water quality assessments (taking into account the high cost of water analysis compared to the sediment).

IV.5 Description of protocols for intercomparison and intercalibration between laboratories. List of national and internationals projects which had developed the Protocols.

[PLEASE, SUPPORT YOUR ANSWERS WITH REFERENCES (NATIONAL LEGISLATIVE DOCUMENTS AND/OR WEB LINKS)]

V .INVENTORY OF EVALUATION METHODS

We have a methodological document with 250 pages, in Hungarian. So many specific problem has to be solve, grouping of parameters, bioavailability, LOQ is higher then EQS/3, data aggregation in time and space. If you want, we can make a ppt presentation for the Inventory Workshop to show our methodology. Our biggest advantage is using uncertainty calculations, and the method is robust.

V.1. How **threshold values** for HSs are set in each type of media (sediment, water, biota)? (e.g. average of the last measured values, average with the

treatment of outliers, average of the values measured in areas without anthropogenic influence, enrichment factor, conservative **elements** for normalization, etc.).
V.2. Are **threshold values fixed or variable** and do they depend on the sample form, drainage basin lithology, time of the year, etc.?
V.3. Do you use **corrections for threshold values**? (amount of **quartz**, **organic matter** etc.).
V.4 The environmental quality objectives are based on measuring the total metal concentration and / or some dangerous compounds of that metal in different valence states?
V.5 How the legislation reflects the phenomenon of "bioaccumulation"? Is the type of biota correlated with the ecosystem?
V.6. Does your national legislative find **categories of environment quality** based on deviations from threshold values?
V.7. Can these categories be **defined by quality of more than one medium?**
V.8. Please, describe **algorithm** for **defining** these **categories**? (e.g. weight coefficients).
V.9. How does your legislative framework define **difference** between **contamination** and **pollution**?
V.10. Do you **relate specific HSs** with **sources of contamination and pollution** and how?
V.11. Please, describe **actions** in case of contamination and pollution.
V.12. How do you **present results** in your **reports**, e.g. do you use complex representation for scientific community or simple representation for target groups? Does the report include methodology, full results, QA/QC, models? Are these results public or can be obtained by request?
V.13. Do you have a method for **space-time risk assessment** after determination of contamination and/or pollution?
[PLEASE, SUPPORT YOUR ANSWERS WITH REFERENCES (NATIONAL LEGISLATIVE DOCUMENTS AND/OR WEB LINKS)]

VI. SELECTED REFERENCES:

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Method Implementation Document for EN 14385. BS EN 14385:2004. Stationary source emissions – Determination of the total emission of As, Cd, Cr, Co, Cu, Mn, Ni, Pb, Sb, Tl and V. Measurement of metals including an option to measure mercury. Environment Agency, Version 4, December 2013.

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