

QUESTIONNAIRE FOR EXISTING SAMPLING, LABORATORY AND EVALUATION METHODS

0.0. State your institution and country.

**Technical University of Cluj-Napoca - ROMANIA
Geological Institute of Romania**

0.1. State institution(s) from which you got data to fill this questionnaire.

National Administration Romanian Waters

I. LEGISLATIVE FRAMEWORK

I.1 Enumeration 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	ORDIN nr.184/1997 pentru aprobarea Procedurii de realizare a bilanturilor de mediu	ORDER no.184 / 1997 for approval of the Environment Balance Sheet Procedure	http://www.mmediu.ro/app/webroot/uploads/files/OM-184-1997-bilant-de-mediu-si-OM-756-1997-evaluarea-poluarii-mediului.pdf	RO
2	ORDIN nr.756/1997 pentru aprobarea Reglementării privind evaluarea poluării mediului	ORDER no. 756/1997 for the approval of the Regulation on the assessment of environmental pollution	https://biosol.ro/wp-content/uploads/linkuri/ord-756-din-03-11-1997-pentru-aprobarea-Reglementarii-privind-evaluarea-poluarii-mediului.pdf	RO
3	Ordin nr. 161 din 16/02/2006 pentru aprobarea Normativului privind clasificarea calitatii apelor de suprafata in	Order no. 161 of 16/02/2006 for the approval of the Normative on the Classification	http://www.rowater.ro/dacrisuri/Documente%20Repository/Legislatie/gospodarirea%20apelor/ORD.%20161_16.02.2006.pdf	RO

	vederea stabilirii starii ecologice a corpurilor de apa	of Surface Water Quality to establish the ecological status of the water bodies		
	Legea nr. 311 din 28/06/2004 privind calitatea apei potabile	Law no. 311 of 28/06/2004 on the quality of drinking water	http://legislatie.just.ro/Public/DetaliiDocument/53106 or http://legislatie.just.ro/Public/FormaPrintabila/00000G290A50GQCZXGG1FNY252MXXQQS	RO

I.2 List 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.

In the meaning of the Order 756/03-11-1997, the definitions of the following terms will be used: <https://biosol.ro/wp-content/uploads/linkuri/ord-756-din-03-11-1997-pentru-aprobarea-Reglementarii-privind-evaluarea-poluarii-mediului.pdf>

- Ambient air - air to which people, plants, animals and goods are exposed in open spaces outside the perimeter.
 - Competent authority - environmental, water, health authority or other authority empowered by law to carry out control of the regulations in force regarding the protection of air, water, soil and aquatic or terrestrial ecosystems.
 - Emission of pollutants / emissions - discharge into the atmosphere of pollutants from stationary or mobile sources.
- Waste / evacuation - discharge directly or indirectly into aquatic receptors of wastewater containing pollutants or residues that alter the initial physical, chemical and bacteriological characteristics of the water used, as well as rainwater leaking from contaminated land.
- Risk assessment - analysis of the probability and severity of the main components of an environmental impact.
- Sensitive and less sensitive use - types of land use, which involve a certain quality of soils, characterized by a maximum accepted level of pollutants.

- Environmental impact - a considerable negative change in the physical, chemical and structural characteristics of the natural elements and natural factors; diminishing biological diversity; the considerable negative change in the productivity of natural and anthropogenic ecosystems; the deterioration of the ecological balance, the considerable reduction of the quality of life or the deterioration of the anthropic structures, caused mainly by the pollution of water, air and soil; overexploitation of natural resources, management, use or territorial planning ORDER no. 756 of 3 November 1997 3 inappropriate; such an impact can be identified at present or may be likely to occur in the future, considered unacceptable by the competent authorities.
- Remediation targets - concentrations of pollutants determined by the competent authority for soil pollution reduction and which will represent the maximum concentrations of soil pollutants after depollution operations. These values will be below alert or intervention levels of contaminants, depending on the results and recommendations of the risk assessment study.
- Significant potential pollution - concentrations of pollutants in the environment that exceed the alert thresholds provided in the environmental pollution assessment regulations. These values define the level of pollution at which competent authorities consider a site to have an impact on the environment and establish the need for further studies and measures to reduce pollutant concentrations in emissions / discharges.
- Significant pollution - concentrations of pollutants in the environment that exceed the intervention thresholds provided in the environmental pollution assessment regulations.
- Alert threshold - concentrations of pollutants in air, water, soil or emissions / evacuation to warn competent authorities of a potential impact on the environment and trigger additional monitoring and / or reduction of pollutant emissions / discharges.
- Intervention threshold - concentrations of pollutants in air, water, soil, or emissions / discharges where competent authorities will arrange for the conduct of risk assessment studies and the reduction of pollutant concentrations in emissions / discharges.
- Reference sample - Material sample produced by a specialized institute that can be used to identify the accuracy and accuracy of soil chemical analysis techniques.
- Water preceptors - inland, coastal or coastal surface waters as well as underground waters where wastewater is discharged, excluding areas of direct or mixing of these discharges.

Table 1 Metal trace elements in soils

Trace Element	Levels in soils(mg/kg)					
	A) Normal values*		B) alert threshold		C) intervention threshold	
metals						
Values based on use category	A1	A2	Sensitive B1	Less sensitive B2	Sensitive C1	Less sensitive C2

Mercury (Hg)	0.1		1	4	2	10
As	5		15	25	25	50
Cd	1		3	5	5	10
Cr	30		100	300	300	600
Cr ⁺⁶	1		4	10	10	20
Cu	20		100	250	200	500
Ni	20		75	200	150	500
Pb	20		50	250	100	1000
Zn	100		300	700	600	1500
Sb	5		12.5	20	20	40
Ag	2		10	20	20	40
Ba	200		400	1000	625	2000
Be	1		2	7.5	5	15
B	1		2	5	3	10
Co	15		30	100	50	250
Mn	900		1500	2000	2500	4000
Mo	2		5	15	10	40
Se	1		3	10	5	20
Sn	20		35	100	50	300
Tl	0.1		0.5	2	2	5
V	50		100	200	200	400

*Referring 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)					
	A) normal values		B) alert threshold		C) intervention threshold	
metals						
Values based on use category	A1	A2	Sensitive B1	Less sensitive B2	Sensitive C1	Less sensitive C2
Mercury (Hg)	0.1					
As	10					
Cd	0.5					
Cr	25					
Cu	20					
Ni	10					
Pb	5					
Zn	100					

Table 3 Metal trace elements in drinking water

Trace Element	Levels in drinking water($\mu\text{g/l}$)					
	A) normal values		B) alert threshold		C) intervention threshold	
metals						
Values based on use category	A1	A2	Sensitive B1	Less sensitive B2	Sensitive C1	Less sensitive C2
Mercury (Hg)	<1					
As	<10					
Cd	<5					
Cr	<50					
Cu	<100					
Ni	<20					
Pb	<10					
Zn	<5000					

Table 4 Non-metal trace elements in soils

Trace Element	Levels in soils (mg/kg)					
	A) normal values		B) alert threshold		C) intervention threshold	
Non-metals						
Values based on use category	A1	A2	Sensitive B1	Less sensitive B2	Sensitive C1	Less sensitive C2
F			150	500	300	1000
Cl						
S			400	5000	1000	20000
Br			50	100	100	300
I						
Cyanide (free)	<1		5	10	10	20
Cyanide (complex)	<5		100	200	250	500
Sulphides			200	400	1000	2000
Sulphates			2000	5000	10000	50000
Sulphocyanates	<0.1		10	20	20	40

Table 5 Non-metal trace elements in river water

Trace Element	Levels in river water (µg/l)					
	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						
Cl						
S						
Br						
I						

Table 6 Non-metal trace elements in drinking water

Trace Element	Levels in drinking water (µg/l)					
	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	1200					
Cl	500					
S						
Br						
I						

Please complete the list of HSs according to national documents with:

-Table of Polycyclic Aromatic Hydrocarbons –PAHs,

Trace Element	Levels in soils(mg/kg)					
	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
ΣDDT	<0.15		0.5	1.5	1	4
DDT	<0.05		0.25	0.75	0.5	2
DDE	<0.05		0.25	0.75	0.5	2
DDD	<0.05		0.25	0.75	0.5	2
HCH	<0.005		0.25	0.75	0.5	2
α -HCH	<0.002		0.1	0.3	0.2	0.8
β -HCH	<0.001		0.05	0.15	0.1	0.4
γ -HCH	<0.001		0.02	0.05	0.05	0.2
δ -HCH	<0.001		0.05	0.15	0.1	0,4
Total organochlorine pesticides	<0.2		1	2	2	5
Total triazine	<0.1		1	2	2	5

-Table of Polychlorinated Biphenyls-PCBs,

Trace Element	Levels in soils(mg/kg)					
	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
Total chlorobenzenes	<0,1		5	10	10	30
Total chlorophenols	<0,02		2.5	5	5	10
Polychlorinated biphenyls						
PCB 28	<0.0001		0.002	0.01	0,01	0.05
PCB 52	<0.0001		0.002	0.01	0.01	0.05
PCB 101	<0.0004		0.01	0.04	0.04	0.20
PCB 118	<0.0004		0.01	0.04	0.04	0.20
PCB 138	<0.0004		0.01	0.04	0.04	0.20
Total polychlorinated biphenyls	<0.01		0.25	1	1	5
Total Policlordibenzodione (PCDD),	<0.0001		0.0001	0.0001	0.001	0.001
Total polychlorodibenzofurans (PCDF):	<0.0001		0.0001	0.0001	0.001	0.001

-Table of microbiological parameters, as well as other parameters that are provided in national legislations

I.3 Quality objectives for hazardous substances (please complete the tables of HSs according to national documents)

Dangerous substance (HS)	Water quality objective (µg/l)	Quality target for sediment (mg/kg)	Quality objective for biocenosis (mg/kg)
Cd	5	10	-mollusks (as far as possible <i>Mytilus edulis</i>) and fish.
Hg	0.1	-	0.3 mollusks and fish

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

Nr. Crt		HAZARDOUS SUBSTANCES	National analytical standards	International analytical standards	Method
	General guidelines	solids samples (solis, sediments)		ISO 22892:2006 Soil quality -- Guidelines for the identification of target compounds by gas chromatography and mass spectrometry https://www.iso.org/standard/35198.html	gas chromatography and mass spectrometry
	Pesticides and polychlorinated biphenyls	solids samples (solis, sediments)		ISO 10382:2002 Soil quality -- Determination of organochlorine pesticides and polychlorinated biphenyls -- Gas-chromatographic method with electron capture detection https://www.iso.org/standard/32422.html	Gas-chromatographic method with electron capture detection
	Cd, Cr, Co, Cu, Pb, Mn, Ni, Hg, As, Sn, Se,	solids samples (solis, sediments)		ISO 11047:1998 Soil quality -- Determination of cadmium, chromium, cobalt, copper, lead, manganese, nickel and zinc -- Flame and electrothermal atomic absorption spectrometric methods https://www.iso.org/standard/24010.html ISO 15192:2010 Soil quality -- Determination of chromium(VI) in solid material by	Flame and electrothermal atomic absorption spectrometric methods alkaline digestion and ion chromatography with

			<p>alkaline digestion and ion chromatography with spectrophotometric detection https://www.iso.org/standard/50389.html</p> <p>ISO/TR 18105:2014 Soil quality -- Detection of water soluble chromium(VI) using a ready-to-use test-kit method https://www.iso.org/standard/61450.html</p> <p>ISO/TS 16727:2013 Soil quality -- Determination of mercury -- Cold vapour atomic fluorescence spectrometry (CVAFS) https://www.iso.org/standard/57561.html</p> <p>ISO 16772:2004 Soil quality -- Determination of mercury in aqua regia soil extracts with cold-vapour atomic spectrometry or cold-vapour atomic fluorescence spectrometry https://www.iso.org/standard/32401.html</p> <p>ISO 20280:2007 Soil quality -- Determination of arsenic, antimony and selenium in aqua regia soil extracts with electrothermal or hydride-generation atomic absorption spectrometry https://www.iso.org/standard/44538.html</p> <p>ISO/DIS 21226 Soil quality -- Guideline for the screening of soil polluted with toxic elements using soil magnetometry https://www.iso.org/standard/70136.html</p> <p>ISO 23161:2018 Soil quality -- Determination of selected organotin compounds -- Gas-chromatographic method https://www.iso.org/standard/73990.html</p>	<p>spectrophotometric detection</p> <p>test-kit method</p> <p>Cold vapour atomic fluorescence spectrometry (CVAFS)</p> <p>aqua regia soil extracts with cold-vapour atomic spectrometry or cold-vapour atomic fluorescence spectrometry</p> <p>aqua regia soil extracts with electrothermal or hydride-generation atomic absorption spectrometry</p> <p>soil magnetometry</p> <p>Gas-chromatographic method</p>
	Cyanide	solids samples (solis, sediments)	<p>ISO 11262:2011 Soil quality -- Determination of total cyanide https://www.iso.org/standard/53737.html</p> <p>ISO 17380:2013 Soil quality -- Determination of total cyanide and easily liberatable cyanide -- Continuous-flow analysis method https://www.iso.org/standard/55886.html</p> <p>ISO/TR 19588:2017 Background information and guidance on environmental cyanide analysis https://www.iso.org/standard/65215.html</p>	<p>Continuous-flow analysis method</p>
	Herbicides	solids samples	ISO 11264:2005	

		(solis, sediments)		Soil quality -- Determination of herbicides -- Method using HPLC with UV-detection https://www.iso.org/standard/41478.html	HPLC with UV-detection
	Elements (trace, general)	solids samples (solis, sediments)		<p>ISO 11466:1995 Soil quality -- Extraction of trace elements soluble in aqua regia https://www.iso.org/standard/19418.html</p> <p>ISO 12914:2012 Soil quality -- Microwave-assisted extraction of the aqua regia soluble fraction for the determination of elements https://www.iso.org/standard/52171.html</p> <p>ISO 13196:2013 Soil quality -- Screening soils for selected elements by energy-dispersive X-ray fluorescence spectrometry using a handheld or portable instrument https://www.iso.org/standard/53490.html</p> <p>ISO 14869-1:2001 Soil quality -- Dissolution for the determination of total element content -- Part 1: Dissolution with hydrofluoric and perchloric acids https://www.iso.org/standard/28454.html</p> <p>ISO 14869-2:2002 Soil quality -- Dissolution for the determination of total element content -- Part 2: Dissolution by alkaline fusion https://www.iso.org/standard/28453.html</p> <p>ISO 14869-3:2017 Soil quality -- Dissolution for the determination of total element content -- Part 3: Dissolution with hydrofluoric, hydrochloric and nitric acids using pressurised microwave technique https://www.iso.org/standard/60536.html</p> <p>ISO 14870:2001 Soil quality -- Extraction of trace elements by buffered DTPA solution https://www.iso.org/standard/25232.html</p> <p>ISO/TS 16965:2013 Soil quality -- Determination of trace elements using inductively coupled plasma mass spectrometry (ICP-MS) https://www.iso.org/standard/58056.html</p> <p>ISO 17586:2016 Soil quality -- Extraction of trace elements using dilute nitric acid https://www.iso.org/standard/60060.html</p> <p>ISO 18227:2014</p>	<p>Extraction in aqua regia</p> <p>Microwave-assisted extraction of the aqua regia</p> <p>energy-dispersive X-ray fluorescence spectrometry</p> <p>Dissolution with hydrofluoric and perchloric acids</p> <p>Dissolution by alkaline fusion</p> <p>Dissolution with hydrofluoric, hydrochloric and nitric acids using pressurised microwave</p> <p>buffered DTPA solution</p> <p>(ICP-MS)</p> <p>dilute nitric acid</p> <p>X-ray fluorescence</p> <p>ammonium nitrate solution</p>

			<p>Soil quality -- Determination of elemental composition by X-ray fluorescence https://www.iso.org/standard/61816.html</p> <p>ISO 19730:2008 Soil quality -- Extraction of trace elements from soil using ammonium nitrate solution https://www.iso.org/standard/41019.html</p> <p>ISO 22036:2008 Soil quality -- Determination of trace elements in extracts of soil by inductively coupled plasma - atomic emission spectrometry (ICP - AES) https://www.iso.org/standard/40653.html</p>	ICP - AES
Aromatic hydrocarbons (Polycyclic, halogenated)	solids samples (solis, sediments)		<p>ISO 13859:2014 Soil quality -- Determination of polycyclic aromatic hydrocarbons (PAH) by gas chromatography (GC) and high performance liquid chromatography (HPLC) https://www.iso.org/standard/54337.html</p> <p>ISO 18287:2006 Soil quality -- Determination of polycyclic aromatic hydrocarbons (PAH) -- Gas chromatographic method with mass spectrometric detection (GC-MS) https://www.iso.org/standard/33387.html</p> <p>ISO 22155:2016 Soil quality -- Gas chromatographic determination of volatile aromatic and halogenated hydrocarbons and selected ethers -- Static headspace method https://www.iso.org/standard/65184.html</p>	<p>gas chromatography (GC) and high performance liquid chromatography (HPLC)</p> <p>Gas chromatographic method with mass spectrometric detection (GC-MS)</p> <p>Gas chromatographic determination</p>
Polychlorinated biphenyls	solids samples (solis, sediments)		<p>ISO 13876:2013 Soil quality -- Determination of polychlorinated biphenyls (PCB) by gas chromatography with mass selective detection (GC-MS) and gas chromatography with electron-capture detection (GC-ECD) https://www.iso.org/standard/54338.html</p>	<p>gas chromatography with mass selective detection (GC-MS) and gas chromatography with electron-capture detection (GC-ECD)</p>
Linear alkylbenzene sulfonate	solids samples (solis, sediments)		<p>ISO/TS 13896:2012 Soil quality -- Determination of linear alkylbenzene sulfonate (LAS) -- Method by HPLC with fluorescence detection (LC-FLD) and mass selective detection (LC-MSD) https://www.iso.org/standard/54339.html</p>	<p>HPLC with fluorescence detection (LC-FLD) and mass selective detection (LC-MSD)</p>
Nonylphenols (NP) and nonylphenol-mono- and diethoxylates	solids samples (solis, sediments)		<p>ISO/TS 13907:2012 Soil quality -- Determination of nonylphenols (NP) and nonylphenol-mono- and diethoxylates -- Method by gas</p>	<p>gas chromatography with mass selective detection (GC-MS)</p>

				chromatography with mass selective detection (GC-MS) https://www.iso.org/standard/54341.html	
	Selected phthalates	solids samples (solis, sediments)		ISO 13913:2014 Soil quality -- Determination of selected phthalates using capillary gas chromatography with mass spectrometric detection (GC/MS) https://www.iso.org/standard/54342.html	capillary gas chromatography with mass spectrometric detection (GC/MS)
	Dioxins and furans and dioxin-like polychlorinated biphenyls	solids samples (solis, sediments)		ISO 13914:2013 Soil quality -- Determination of dioxins and furans and dioxin-like polychlorinated biphenyls by gas chromatography with high-resolution mass selective detection (GC/HRMS) https://www.iso.org/standard/54343.html	gas chromatography with high-resolution mass selective detection (GC/HRMS)
	Selected chlorophenols, phenols and chlorophenols	solids samples (solis, sediments)		ISO 14154:2005 Soil quality -- Determination of some selected chlorophenols -- Gas-chromatographic method with electron-capture detection https://www.iso.org/standard/36132.html ISO/TS 17182:2014 Soil quality -- Determination of some selected phenols and chlorophenols -- Gas chromatographic method with mass spectrometric detection https://www.iso.org/standard/59260.html	Gas-chromatographic method with electron-capture detection Gas chromatographic method with mass spectrometric detection
	Volatile aromatic hydrocarbons, naphthalene and volatile halogenated hydrocarbons	solids samples (solis, sediments)		ISO 15009:2016 Soil quality -- Gas chromatographic determination of the content of volatile aromatic hydrocarbons, naphthalene and volatile halogenated hydrocarbons -- Purge-and-trap method with thermal desorption https://www.iso.org/standard/65179.html	Purge-and-trap method with thermal desorption
	Aliphatic and aromatic hydrocarbons	solids samples (solis, sediments)		ISO 16558-1:2015 Soil quality -- Risk-based petroleum hydrocarbons -- Part 1: Determination of aliphatic and aromatic fractions of volatile petroleum hydrocarbons using gas chromatography (static headspace method) https://www.iso.org/standard/57106.html Now under development ISO 16558-1:2015/DAmD 1 https://www.iso.org/standard/75097.html ISO/TS 16558-2:2015 Soil quality -- Risk-based petroleum hydrocarbons -- Part 2: Determination of aliphatic and aromatic fractions of semi-volatile petroleum hydrocarbons using gas chromatography with flame ionization detection (GC/FID) https://www.iso.org/standard/59263.html	gas chromatography (static headspace method) gas chromatography with flame ionization detection (GC/FID)

	Isopropanol-extractable organic compounds	solids samples (solis, sediments)		ISO 17183:2016 Soil quality -- Screening soils for isopropanol -extractable organic compounds by determining emulsification index by light attenuation https://www.iso.org/standard/65917.html	determining emulsification index by light attenuation
	Perchlorate	solids samples (solis, sediments)		ISO 20295:2018 Soil quality -- Determination of perchlorate in soil using ion chromatography https://www.iso.org/standard/67560.html	ion chromatography
	Radioactivity	solids samples (solis, sediments)		ISO 18589-1:2005 Measurement of radioactivity in the environment -- Soil -- Part 1: General guidelines and definitions https://www.iso.org/standard/35655.html Now under development ISO/DIS 18589-1 Measurement of radioactivity in the environment -- Soil -- Part 1: General guidelines and definitions https://www.iso.org/standard/71210.html ISO 18589-3:2015 Measurement of radioactivity in the environment -- Soil -- Part 3: Test method of gamma-emitting radionuclides using gamma-ray spectrometry https://www.iso.org/standard/60059.html ISO 18589-4:2009 Measurement of radioactivity in the environment -- Soil -- Part 4: Measurement of plutonium isotopes (plutonium 238 and plutonium 239 + 240) by alpha spectrometry https://www.iso.org/standard/40876.html Now under development ISO/DIS 18589-4 Measurement of radioactivity in the environment -- Soil -- Part 4: Plutonium 238 and plutonium 239 + 240 -- Test method using alpha spectrometry https://www.iso.org/standard/69086.html ISO 18589-5:2009 Measurement of radioactivity in the environment -- Soil -- Part 5: Measurement of strontium 90 https://www.iso.org/standard/40877.html Now under development ISO/DIS 18589-5 Measurement of radioactivity in the environment -- Soil -- Part 5: Strontium 90 -- Test method using proportional counting or liquid scintillation counting https://www.iso.org/standard/69074.html	gamma-ray spectrometry alpha spectrometry alpha spectrometry proportional counting or liquid scintillation counting alpha and beta spectrometry gas-flow proportional counting

			<p>ISO 18589-6:2009 Measurement of radioactivity in the environment -- Soil -- Part 6: Measurement of gross alpha and gross beta activities https://www.iso.org/standard/40878.html</p> <p>Now under development ISO/DIS 18589-6 Measurement of radioactivity in the environment -- Soil -- Part 6: Gross alpha and gross beta activities -- Test method using gas-flow proportional counting https://www.iso.org/standard/69069.html</p> <p>ISO 18589-7:2013 Measurement of radioactivity in the environment -- Soil -- Part 7: In situ measurement of gamma-emitting radionuclides https://www.iso.org/standard/55362.html</p>	gamma-ray spectrometry
	Phenol	Water	<p>ISO 6439:1990 Water quality -- Determination of phenol index -- 4-Aminoantipyrine spectrometric methods after distillation https://www.iso.org/standard/12795.html</p> <p>ISO 8165-1:1992 Water quality -- Determination of selected monovalent phenols -- Part 1: Gas-chromatographic method after enrichment by extraction https://www.iso.org/standard/15249.html</p> <p>ISO 8165-2:1999 Water quality -- Determination of selected monovalent phenols -- Part 2: Method by derivatization and gas chromatography https://www.iso.org/standard/15250.html</p> <p>ISO 14402:1999 Water quality -- Determination of phenol index by flow analysis (FIA and CFA) https://www.iso.org/standard/23708.html</p> <p>ISO 17495:2001 Water quality -- Determination of selected nitrophenols -- Method by solid-phase extraction and gas chromatography with mass spectrometric detection https://www.iso.org/standard/30700.html</p> <p>ISO 18857-1:2005 Water quality -- Determination of selected alkylphenols -- Part 1: Method for non-filtered samples using liquid-liquid extraction and gas chromatography with mass selective detection https://www.iso.org/standard/33681.html</p>	spectrometric methods after distillation

			<p>ISO 18857-2:2009 Water quality -- Determination of selected alkylphenols -- Part 2: Gas chromatographic-mass spectrometric determination of alkylphenols, their ethoxylates and bisphenol A in non-filtered samples following solid-phase extraction and derivatization https://www.iso.org/standard/34673.html</p> <p>ISO 24293:2009 Water quality -- Determination of individual isomers of nonylphenol -- Method using solid phase extraction (SPE) and gas chromatography/mass spectrometry (GC/MS) https://www.iso.org/standard/42156.html</p>	
	Organochlorine insecticides, polychlorinated biphenyls and chlorobenzenes	Water	<p>ISO 6468:1996 Water quality -- Determination of certain organochlorine insecticides, polychlorinated biphenyls and chlorobenzenes -- Gas chromatographic method after liquid-liquid extraction https://www.iso.org/standard/12826.html</p>	Gas chromatographic method after liquid-liquid extraction
	Cyanide	Water	<p>ISO 6703-1:1984 Water quality -- Determination of cyanide -- Part 1: Determination of total cyanide https://www.iso.org/standard/13141.html</p> <p>ISO 6703-2:1984 Water quality -- Determination of cyanide -- Part 2: Determination of easily liberatable cyanide https://www.iso.org/standard/13142.html</p> <p>ISO 6703-3:1984 Water quality -- Determination of cyanide -- Part 3: Determination of cyanogen chloride https://www.iso.org/standard/13143.html</p> <p>ISO 14403-1:2012 Water quality -- Determination of total cyanide and free cyanide using flow analysis (FIA and CFA) -- Part 1: Method using flow injection analysis (FIA) https://www.iso.org/standard/51083.html</p> <p>ISO 14403-2:2012 Water quality -- Determination of total cyanide and free cyanide using flow analysis (FIA and CFA) -- Part 2: Method using continuous flow analysis (CFA) https://www.iso.org/standard/52208.html</p> <p>ISO 17690:2015 Water quality -- Determination of available free cyanide (pH 6) using flow injection analysis (FIA), gas-diffusion and amperometric detection</p>	<p>flow analysis (FIA and CFA)</p> <p>flow analysis (FIA and CFA)</p> <p>flow injection analysis (FIA), gas-diffusion and amperometric detection</p> <p>ligand exchange, flow injection analysis (FIA), gas-diffusion and amperometric detection</p>

			<p>https://www.iso.org/standard/60268.html</p> <p>ISO 20950-1:2018 Water quality -- Determination of available weak and dissociable (WAD) cyanide -- Part 1: Method using ligand exchange, flow injection analysis (FIA), gas-diffusion and amperometric detection https://www.iso.org/standard/69533.html</p> <p>ISO/CD 22066 [Under development] Water Quality -- Determination of available total cyanide -- Method using segmented flow injection, in-line ultraviolet Digestion Analysis by gas Diffusion and amperometric detection https://www.iso.org/standard/72488.html</p>	segmented flow injection, in-line ultraviolet Digestion Analysis by gas Diffusion and amperometric detection
	Surfactants	Water	<p>ISO 7875-1:1996 Water quality -- Determination of surfactants -- Part 1: Determination of anionic surfactants by measurement of the methylene blue index (MBAS) https://www.iso.org/standard/24784.html</p> <p>Revisions / Corrigenda ISO 7875-1:1996/Cor 1:2003 https://www.iso.org/standard/38714.html</p> <p>ISO 7875-2:1984 Water quality -- Determination of surfactants -- Part 2: Determination of non-ionic surfactants using Dragendorff reagent https://www.iso.org/standard/14809.html</p>	<p>measurement of the methylene blue index (MBAS)</p> <p>Dragendorff reagent</p>
	Polycyclic aromatic hydrocarbons	Water	<p>ISO 7981-1:2005 Water quality -- Determination of polycyclic aromatic hydrocarbons (PAH) -- Part 1: Determination of six PAH by high-performance thin-layer chromatography with fluorescence detection after liquid-liquid extraction https://www.iso.org/standard/33883.html</p> <p>ISO 7981-2:2005 Water quality -- Determination of polycyclic aromatic hydrocarbons (PAH) -- Part 2: Determination of six PAH by high-performance liquid chromatography with fluorescence detection after liquid-liquid extraction https://www.iso.org/standard/33884.html</p> <p>ISO 17993:2002 Water quality -- Determination of 15 polycyclic aromatic hydrocarbons (PAH) in water by HPLC with fluorescence detection after liquid-liquid extraction https://www.iso.org/standard/31666.html</p> <p>ISO 28540:2011</p>	<p>high-performance thin-layer chromatography with fluorescence</p> <p>high-performance liquid chromatography with fluorescence</p> <p>HPLC with fluorescence detection after liquid-liquid extraction</p> <p>gas chromatography with mass spectrometric detection (GC-MS)</p>

				Water quality -- Determination of 16 polycyclic aromatic hydrocarbons (PAH) in water -- Method using gas chromatography with mass spectrometric detection (GC-MS) https://www.iso.org/standard/44752.html	
	Hydrocarbon oil			ISO 10301:1997 Water quality -- Determination of highly volatile halogenated hydrocarbons -- Gas-chromatographic methods https://www.iso.org/standard/18345.html ISO 9377-2:2000 Water quality -- Determination of hydrocarbon oil index -- Part 2: Method using solvent extraction and gas chromatography https://www.iso.org/standard/27604.html ISO 10301:1997 Water quality -- Determination of highly volatile halogenated hydrocarbons -- Gas-chromatographic methods https://www.iso.org/standard/18345.html	Gas-chromatographic solvent extraction and gas chromatography Gas-chromatographic methods
	Organically bound halogens			ISO 9562:2004 Water quality -- Determination of adsorbable organically bound halogens (AOX) https://www.iso.org/standard/36918.html	
	Plant treatment agents, pesticides, herbicides			ISO 11369:1997 Water quality -- Determination of selected plant treatment agents -- Method using high performance liquid chromatography with UV detection after solid-liquid extraction https://www.iso.org/standard/19314.html ISO/TS 11370:2000 Water quality -- Determination of selected organic plant-treatment agents -- Automated multiple development (AMD) technique https://www.iso.org/standard/19315.html ISO 15089:2000 Water quality -- Guidelines for selective immunoassays for the determination of plant treatment and pesticide agents https://www.iso.org/standard/25938.html ISO 15913:2000 Water quality -- Determination of selected phenoxyalkanoic herbicides, including bentazones and hydroxybenzotrioles by gas chromatography and mass spectrometry after solid phase extraction and derivatization	high performance liquid chromatography with UV detection after solid-liquid extraction Automated multiple development (AMD) technique gas chromatography and mass spectrometry after solid phase extraction and derivatization solid-phase microextraction (SPME) followed by gas chromatography-

			<p>https://www.iso.org/standard/29523.html</p> <p>ISO 27108:2010 Water quality -- Determination of selected plant treatment agents and biocide products -- Method using solid-phase microextraction (SPME) followed by gas chromatography-mass spectrometry (GC-MS)</p> <p>https://www.iso.org/standard/44000.html</p>	mass spectrometry (GC-MS)
	Benzene and some derivatives		<p>ISO 11423-1:1997 Water quality -- Determination of benzene and some derivatives -- Part 1: Head-space gas chromatographic method</p> <p>https://www.iso.org/standard/19362.html</p> <p>ISO 11423-2:1997 Water quality -- Determination of benzene and some derivatives -- Part 2: Method using extraction and gas chromatography</p> <p>https://www.iso.org/standard/19363.html</p> <p>ISO 15680:2003 Water quality -- Gas-chromatographic determination of a number of monocyclic aromatic hydrocarbons, naphthalene and several chlorinated compounds using purge-and-trap and thermal desorption</p> <p>https://www.iso.org/standard/27983.html</p>	<p>Head-space gas chromatographic method</p> <p>extraction and gas chromatography</p> <p>purge-and-trap and thermal desorption</p>
	Polychlorinated alkanes, naphthenes		<p>ISO 12010:2012 Water quality -- Determination of short-chain polychlorinated alkanes (SCCPs) in water -- Method using gas chromatography-mass spectrometry (GC-MS) and negative-ion chemical ionization (NCI)</p> <p>https://www.iso.org/standard/51124.html</p> <p>Under development</p> <p>ISO/FDIS 12010 Water quality -- Determination of short-chain polychlorinated alkanes (SCCP) in water -- Method using gas chromatography-mass spectrometry (GC-MS) and negative-ion chemical ionization (NCI)</p> <p>https://www.iso.org/standard/72127.html</p> <p>ISO/TS 16780:2015 Water quality -- Determination of polychlorinated naphthalenes (PCN) -- Method using gas chromatography (GC) and mass spectrometry (MS)</p> <p>https://www.iso.org/standard/68420.html</p>	<p>gas chromatography-mass spectrometry (GC-MS) and negative-ion chemical ionization (NCI)</p> <p>gas chromatography-mass spectrometry (GC-MS) and negative-ion chemical ionization (NCI)</p> <p>gas chromatography (GC) and mass spectrometry (MS)</p>
	Cd, Co, Ni, Cu, Zn, Pb, Cr, Hg, Se,	Water	<p>ISO 5961:1994 Water quality -- Determination of cadmium by atomic absorption spectrometry</p>	atomic absorption spectrometry

	Sn, Sb, As, etc			<p>https://www.iso.org/standard/12157.html</p> <p>ISO 8288:1986 Water quality -- Determination of cobalt, nickel, copper, zinc, cadmium and lead -- Flame atomic absorption spectrometric methods https://www.iso.org/standard/15408.html</p> <p>ISO 9174:1998 Water quality -- Determination of chromium -- Atomic absorption spectrometric methods https://www.iso.org/standard/28636.html</p> <p>ISO 11083:1994 Water quality -- Determination of chromium(VI) -- Spectrometric method using 1,5-diphenylcarbazide https://www.iso.org/standard/19070.html</p> <p>ISO 11885:2007 Water quality -- Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) https://www.iso.org/standard/36250.html</p> <p>ISO 12846:2012 Water quality -- Determination of mercury -- Method using atomic absorption spectrometry (AAS) with and without enrichment https://www.iso.org/standard/51964.html</p> <p>ISO 15586:2003 Water quality -- Determination of trace elements using atomic absorption spectrometry with graphite furnace https://www.iso.org/standard/38111.html</p> <p>ISO 15587-1:2002 Water quality -- Digestion for the determination of selected elements in water -- Part 1: Aqua regia digestion https://www.iso.org/standard/31354.html</p> <p>ISO 15587-2:2002 Water quality -- Digestion for the determination of selected elements in water -- Part 2: Nitric acid digestion https://www.iso.org/standard/31355.html</p> <p>ISO 17294-1:2004 Water quality -- Application of inductively coupled plasma mass spectrometry (ICP-MS) -- Part 1: General guidelines https://www.iso.org/standard/32957.html</p> <p>ISO 17294-2:2016</p>	<p>Flame atomic absorption spectrometry</p> <p>atomic absorption spectrometry</p> <p>Spectrometric method</p> <p>(ICP-OES)</p> <p>using atomic absorption spectrometry (AAS) with and without enrichment</p> <p>atomic absorption spectrometry with graphite furnace</p> <p>Aqua regia digestion</p> <p>Nitric acid digestion</p> <p>ICP-MS</p> <p>ICP-MS</p> <p>Gas chromatographic</p> <p>hydride generation atomic fluorescence spectrometry (HG-AFS)</p> <p>hydride generation atomic fluorescence spectrometry (HG-AFS)</p>
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			<p>Water quality -- Application of inductively coupled plasma mass spectrometry (ICP-MS) -- Part 2: Determination of selected elements including uranium isotopes https://www.iso.org/standard/62962.html</p> <p>ISO 17353:2004 Water quality -- Determination of selected organotin compounds -- Gas chromatographic method https://www.iso.org/standard/31362.html</p> <p>ISO 17378-1:2014 Water quality -- Determination of arsenic and antimony -- Part 1: Method using hydride generation atomic fluorescence spectrometry (HG-AFS) https://www.iso.org/standard/55219.html</p> <p>ISO 17378-2:2014 Water quality -- Determination of arsenic and antimony -- Part 2: Method using hydride generation atomic absorption spectrometry (HG-AAS) https://www.iso.org/standard/55220.html</p> <p>ISO/TS 17379-1:2013 Water quality -- Determination of selenium -- Part 1: Method using hydride generation atomic fluorescence spectrometry (HG-AFS) https://www.iso.org/standard/55222.html</p> <p>ISO/TS 17379-2:2013 Water quality -- Determination of selenium -- Part 2: Method using hydride generation atomic absorption spectrometry (HG-AAS) https://www.iso.org/standard/55221.html</p> <p>ISO 17852:2006 Water quality -- Determination of mercury -- Method using atomic fluorescence spectrometry https://www.iso.org/standard/38502.html</p> <p>ISO 18412:2005 Water quality -- Determination of chromium(VI) -- Photometric method for weakly contaminated water https://www.iso.org/standard/36916.html</p> <p>ISO/TS 19620:2018 Water quality -- Determination of arsenic(III) and arsenic(V) species -- Method using high performance liquid chromatography (HPLC) with detection by inductively coupled plasma mass spectrometry (ICP-MS) or hydride generation atomic fluorescence spectrometry (HG-AFS)</p>	<p>hydride generation atomic fluorescence spectrometry (HG-AFS)</p> <p>hydride generation atomic absorption spectrometry (HG-AAS)</p> <p>atomic fluorescence spectrometry</p> <p>Photometric method</p> <p>high performance liquid chromatography (HPLC) with detection by inductively coupled plasma mass spectrometry (ICP-MS) or hydride generation atomic fluorescence spectrometry (HG-AFS)</p> <p>gas chromatography-mass spectrometry (GC-MS) after phenylation and solvent extraction</p> <p>flow analysis (FIA and CFA) and spectrometric detection</p>
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	dioxin-like polychlorinated biphenyls, polychlorinated dioxins, furans		<p>ISO 17858:2007 Water quality -- Determination of dioxin-like polychlorinated biphenyls -- Method using gas chromatography/mass spectrometry https://www.iso.org/standard/38503.html</p> <p>ISO 18073:2004 Water quality -- Determination of tetra- to octa-chlorinated dioxins and furans -- Method using isotope dilution HRGC/HRMS https://www.iso.org/standard/31687.html</p> <p>ISO/CD 23256 [Under development] Water Quality -- Rapid detection of dioxin-like polychlorinated dibenzop-Dioxins, dibenzofurans and biphenyls -- Method using a flow immunosensor https://www.iso.org/standard/75092.html</p>	<p>gas chromatography/mass spectrometry</p> <p>isotope dilution HRGC/HRMS</p> <p>a flow immunosensor</p>
	polychlorinated alkanes	Sediments	<p>ISO 18635:2016 Water quality -- Determination of short-chain polychlorinated alkanes (SCCPs) in sediment, sewage sludge and suspended (particulate) matter -- Method using gas chromatography-mass spectrometry (GC-MS) and electron capture negative ionization (ECNI) https://www.iso.org/standard/63093.html</p>	<p>gas chromatography-mass spectrometry (GC-MS) and electron capture negative ionization (ECNI)</p>
	Phthalates		<p>ISO 18856:2004 Water quality -- Determination of selected phthalates using gas chromatography/mass spectrometry https://www.iso.org/standard/33680.html</p>	<p>gas chromatography/mass spectrometry</p>
	polyfluorinated alkyl		<p>ISO/DIS 21675 [Under development] Water quality -- Determination of polyfluorinated alkyl substances (PFAS) in water -- Method using solid phase extraction and liquid chromatography-tandem mass spectrometry (LC-MS/MS) https://www.iso.org/standard/71338.html</p>	<p>phase extraction and liquid chromatography-tandem mass spectrometry (LC-MS/MS)</p>

	active pharmaceutical ingredients, transformation products and other organic substances			<p>ISO 21676:2018 Water quality -- Determination of the dissolved fraction of selected active pharmaceutical ingredients, transformation products and other organic substances in water and treated waste water -- Method using high performance liquid chromatography and mass spectrometric detection (HPLC-MS/MS or -HRMS) after direct injection https://www.iso.org/standard/71340.html</p>	
	polybrominated diphenyl ethers	Sediment		<p>ISO 22032:2006 Water quality -- Determination of selected polybrominated diphenyl ethers in sediment and sewage sludge -- Method using extraction and gas chromatography/mass spectrometry https://www.iso.org/standard/36069.html</p>	
	Radioactivity			<p>ISO 9696:2017 Water quality -- Gross alpha activity - - Test method using thick source https://www.iso.org/standard/66766.html</p> <p>ISO 9697:2018 Water quality -- Gross beta activity -- Test method using thick source https://www.iso.org/standard/72374.html</p> <p>ISO 9698:2010 Water quality -- Determination of tritium activity concentration -- Liquid scintillation counting method https://www.iso.org/standard/51944.html</p> <p>ISO 10703:2007 Water quality -- Determination of the activity concentration of radionuclides -- Method by high resolution gamma-ray spectrometry https://www.iso.org/standard/42756.html</p> <p>ISO/FDIS 9698 Now under development Water quality -- Tritium -- Test method using liquid scintillation counting https://www.iso.org/standard/69649.html</p> <p>ISO 10704:2009 Water quality -- Measurement of gross alpha and gross beta activity in non-saline water -- Thin source deposit method https://www.iso.org/standard/46063.html will be replaced by ISO/FDIS 10704 Water quality -- Gross alpha and gross beta activity -- Test method using thin source deposit https://www.iso.org/standard/70597.html</p>	

			<p>ISO 11704:2018 Water quality -- Gross alpha and gross beta activity -- Test method using liquid scintillation counting https://www.iso.org/standard/71996.html</p> <p>ISO 13160:2012 Water quality -- Strontium 90 and strontium 89 -- Test methods using liquid scintillation counting or proportional counting https://www.iso.org/standard/53332.html</p> <p>ISO 13161:2011 Water quality -- Measurement of polonium 210 activity concentration in water by alpha spectrometry https://www.iso.org/standard/53402.html Will be replaced by ISO/DIS 13161 Water quality -- Polonium 210 -- Test method using alpha spectrometry https://www.iso.org/standard/74776.html</p> <p>ISO 13163:2013 Water quality -- Lead-210 -- Test method using liquid scintillation counting https://www.iso.org/standard/56463.html</p> <p>ISO 13164-1:2013 Water quality -- Radon-222 -- Part 1: General principles https://www.iso.org/standard/53405.html</p> <p>ISO 13164-2:2013 Water quality -- Radon-222 -- Part 2: Test method using gamma-ray spectrometry https://www.iso.org/standard/56108.html</p> <p>ISO 13164-3:2013 Water quality -- Radon-222 -- Part 3: Test method using emanometry https://www.iso.org/standard/56109.html</p> <p>ISO 13164-4:2015 Water quality -- Radon-222 -- Part 4: Test method using two-phase liquid scintillation counting https://www.iso.org/standard/62424.html</p> <p>ISO 13165-1:2013 Water quality -- Radium-226 -- Part 1: Test method using liquid scintillation counting https://www.iso.org/standard/56464.html</p> <p>ISO 13165-2:2014 Water quality -- Radium-226 -- Part 2: Test method using emanometry https://www.iso.org/standard/53406.html</p> <p>ISO 13165-3:2016</p>	
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			<p>Water quality -- Radium-226 -- Part 3: Test method using coprecipitation and gamma-spectrometry https://www.iso.org/standard/60146.html</p> <p>ISO 13166:2014 Water quality -- Uranium isotopes -- Test method using alpha-spectrometry https://www.iso.org/standard/59209.html</p> <p>ISO 13169:2018 Water quality -- Uranium -- Test method using alpha liquid scintillation counting https://www.iso.org/standard/68769.html</p> <p>ISO 13167:2015 Water quality -- Plutonium, americium, curium and neptunium -- Test method using alpha spectrometry https://www.iso.org/standard/53408.html</p> <p>ISO 20899:2018 Water quality -- Plutonium and neptunium -- Test method using ICP-MS https://www.iso.org/standard/69404.html</p> <p>ISO 13168:2015 Water quality -- Simultaneous determination of tritium and carbon 14 activities -- Test method using liquid scintillation counting https://www.iso.org/standard/53409.html</p> <p>ISO/CD 22017 [Under development] Water quality - Guidance for rapid radioactivity measurements in nuclear or radiological emergency https://www.iso.org/standard/72373.html</p> <p>ISO/DIS 22125-1 [Under development] Water quality -- Technetium-99 -- Part 1: Test method using liquid scintillation counting https://www.iso.org/standard/72631.html</p> <p>ISO/DIS 22125-2 [Under development] Water quality -- Technetium-99 -- Part 2: Test method using inductively coupled plasma mass spectrometry (ICP-MS) https://www.iso.org/standard/72647.html</p> <p>ISO/CD 22515 [Under development] Water quality -- Iron-55 -- Test method using liquid scintillation counting https://www.iso.org/standard/73375.html</p>	
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				ISO/DIS 22908 [Under development] Water quality - Radium 226 and radium 228 - Test method using liquid scintillation counting https://www.iso.org/standard/74120.html	
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*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).

OM no. 245/2005

(OJ No. 565 / 01.07.2005) for the approval of the Risk Assessment Methodology of List I and II List of Hazardous Substances / Priority Substances in the Aquatic Environment by Mathematical Modeling and the Methodology for Assessment of the Impact of List I and II and priority / priority hazardous substances on the aquatic environment through ecotoxicological tests - green algae, daphnia, fish

The ecotoxicological properties of municipal waste and the resulting leachate are required in the Romanian legislation (although no methods are described) in "Framework regulation of the sanitation service of the localities from 09.03.2015 - CHAPTER II Ensuring the sanitation service and operating conditions - SECTION 10a Administration of landfills and / or municipal waste disposal facilities, article 97, paragraph 3, letter f: ecotoxicological properties of waste and the resulting leachate" (<https://lege5.ro/Gratuit/gyydgnjsgy/sectiunea-a-10-a-administrarea-depozitelor-de-deseuri-si-sau-a-inst-regulament-capitolul-ii-asigurarea-serviciului-de-salubritate-si-conditii-de-functionare?dp=g43demjuhe4ds> - in Romanian).

I.6 List 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.	Design		INTERNATIONAL: ISO 18400-100:2017 Soil quality -- Sampling -- Part 100: Guidance on the selection of sampling standards https://www.iso.org/standard/67788.html ISO 18400-101:2017 Soil quality -- Sampling -- Part 101: Framework for the preparation and application of a sampling plan https://www.iso.org/standard/62842.html	SR EN ISO 5667-1:2007, Calitatea apei. Prelevare. Partea 1: Ghid general pentru stabilirea programelor și a tehnicilor de prelevare https://magazin.asro.ro/standarde/ics-ierarhic/2/13.060.45/104568064 INTERNATIONAL: ISO 5667-1:2006 Water quality -- Sampling -- Part 1: Guidance on the design of sampling programmes and sampling techniques https://www.iso.org/standard/36693.html

		<p>ISO 18400-102:2017 Soil quality -- Sampling -- Part 102: Selection and application of sampling techniques https://www.iso.org/standard/62843.html</p> <p>ISO 18400-103:2017 Soil quality -- Sampling -- Part 103: Safety https://www.iso.org/standard/62363.html</p> <p>ISO 18400-104:2018 Soil quality -- Sampling -- Part 104: Strategies https://www.iso.org/standard/65223.html</p> <p>ISO 18400-202:2018 Soil quality -- Sampling -- Part 202: Preliminary investigations https://www.iso.org/standard/65225.html</p> <p>ISO 18400-203:2018 Soil quality -- Sampling -- Part 203: Investigation of potentially contaminated sites https://www.iso.org/standard/65226.html</p> <p>ISO 25177:2008 Soil quality -- Field soil description https://www.iso.org/standard/42783.html Now under development ISO/DIS 25177 Soil quality -- Field soil description https://www.iso.org/standard/70772.html</p> <p>ISO 12404:2011 Soil quality -- Guidance on the selection and application of screening methods https://www.iso.org/standard/51407.html Will be replaced by ISO/NP 12404 Soil quality -- Guidance on the selection and application of screening methods https://www.iso.org/standard/75242.html</p> <p>ISO 17616:2008 Soil quality -- Guidance on the choice and evaluation of bioassays for ecotoxicological characterization of soils and soil materials https://www.iso.org/standard/38417.html Will be replaced by ISO/DIS 17616 Soil quality -- Guidance on the choice and evaluation of bioassays for ecotoxicological characterization of soils and soil materials https://www.iso.org/standard/73592.html</p> <p>ISO 19258:2018 Soil quality -- Guidance on the determination of background values https://www.iso.org/standard/67982.html</p> <p>ISO 18400-205:2018 Soil quality -- Sampling -- Part 205: Guidance on the procedure for investigation of natural, near-natural and cultivated sites https://www.iso.org/standard/67787.html</p> <p>ISO 16133:2018 Soil quality -- Guidance on the establishment and maintenance of monitoring programmes https://www.iso.org/standard/68254.html</p> <p>ISO 17402:2008 Soil quality -- Requirements and guidance for the selection and application of methods</p>	<p>Now under development ISO/CD 5667-1 Water quality -- Sampling -- Part 1: Guidance on the design of sampling programmes and sampling techniques https://www.iso.org/standard/72369.html</p> <p>ISO 17381:2003 Water quality -- Selection and application of ready-to-use test kit methods in water analysis https://www.iso.org/standard/30626.html</p>
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			for the assessment of bioavailability of contaminants in soil and soil materials https://www.iso.org/standard/38349.html	
2.	Sampling, Preparation, pretreatment, screening	<p>SR ISO 5667-12:2001, Calitatea apei. Prelevare. Partea 12: Ghid general pentru prelevarea sedimentelor de fund</p> <p>INTERNATIONAL:</p> <p>ISO 5667-12:2017 Water quality — Sampling — Part 12: Guidance on sampling of bottom sediments from rivers, lakes and estuarine areas https://www.iso.org/standard/59903.html</p> <p>ISO 5667-17:2008 Water quality -- Sampling - Part 17: Guidance on sampling of bulk suspended solids https://www.iso.org/standard/42891.html</p> <p>ISO/TS 3716:2006 Hydrometry -- Functional requirements and characteristics of suspended-sediment samplers https://www.iso.org/standard/3716.html</p>	<p>INTERNATIONAL:</p> <p>ISO 18400-201:2017 Soil quality -- Sampling -- Part 201: Physical pretreatment in the field https://www.iso.org/standard/62366.html</p> <p>ISO 11277:2009 Soil quality -- Determination of particle size distribution in mineral soil material -- Method by sieving and sedimentation https://www.iso.org/standard/54151.html will be replaced by ISO/DIS 11277</p> <p>Soil quality -- Determination of particle size distribution in mineral soil material -- Method by sieving and sedimentation https://www.iso.org/standard/69496.html</p> <p>ISO 11464:2006 Soil quality -- Pretreatment of samples for physico-chemical analysis https://www.iso.org/standard/37718.html</p> <p>ISO 14507:2003 Soil quality -- Pretreatment of samples for determination of organic contaminants https://www.iso.org/standard/32421.html</p> <p>ISO 16720:2005 Soil quality -- Pretreatment of samples by freeze-drying for subsequent analysis https://www.iso.org/standard/30427.html</p> <p>ISO 18400-206:2018 Soil quality -- Sampling -- Part 206: Collection, handling and storage of soil under aerobic conditions for the assessment of microbiological processes, biomass and diversity in the laboratory https://www.iso.org/standard/68249.html</p> <p>ISO 23909:2008 Soil quality -- Preparation of laboratory samples from large samples</p> <p>ISO 18589-2:2015 Measurement of radioactivity in the environment -- Soil -- Part 2: Guidance for the selection of the sampling strategy, sampling and pre-treatment of samples https://www.iso.org/standard/63916.html</p>	<p>SR ISO 5667-4:2000, Calitatea apei. Prelevare. Partea 4: Ghid de prelevare a apelor din lacuri naturale și artificiale</p> <p>SR EN ISO 5667-6:2017, Calitatea apei. Prelevare. Partea 6: Ghid pentru prelevările efectuate în râuri și alte cursuri de apă (engleză)</p> <p>SR EN ISO 5667-23:2011, Calitatea apei. Prelevare. Partea 23: Ghid privind prelevarea pasivă în apele de suprafață</p> <p>INTERNATIONAL:</p> <p>INTERNATIONAL:</p> <p>ISO 5667-4:2016 Water quality -- Sampling -- Part 4: Guidance on sampling from lakes, natural and man-made https://www.iso.org/standard/55450.html</p> <p>ISO 5667-6:2014 Water quality -- Sampling -- Part 6: Guidance on sampling of rivers and streams https://www.iso.org/standard/55451.html</p> <p>ISO 5667-23:2011 Water quality -- Sampling -- Part 23: Guidance on passive sampling in surface waters https://www.iso.org/standard/50679.html</p> <p>ISO 19458:2006 Water quality -- Sampling for microbiological analysis https://www.iso.org/standard/33845.html</p>

		<p>tandard/42863.html</p> <p>ISO 4364:1997 Measurement of liquid flow in open channels - - Bed material sampling https://www.iso.org/standard/10242.html</p> <p>ISO 4364:1997 /Cor 1:2000 https://www.iso.org/standard/34340.html</p> <p>ISO 9195:1992 Liquid flow measurement in open channels - - Sampling and analysis of gravel-bed material https://www.iso.org/standard/16820.html</p>		
3.	Transport, storage, preservation and handling	<p>SR EN ISO 5667-15:2010, Calitatea apei. Prelevare. Partea 15: Ghid general pentru conservarea și tratarea probelor de nămol și sediment</p> <p>INTERNATIONAL:</p> <p>ISO 5667-15:2009(en) Water quality — Sampling — Part 15: Guidance on the</p>	<p>ISO 10381-2/2001 https://www.iso.org/standard/32424.html</p> <p>INTERNATIONAL:</p> <p>ISO 18400-105:2017 Soil quality -- Sampling -- Part 105: Packaging, transport, storage and preservation of samples https://www.iso.org/standard/62364.html</p> <p>ISO 18512:2007 Soil quality -- Guidance on long and short term storage of soil samples https://www.iso.org/standard/38721.html https://www.iso.org/standard/41918.html</p>	<p>SR EN ISO 5667-3:2013, Calitatea apei. Prelevare. Partea 3: Conservarea și manipularea probelor de apă</p> <p>INTERNATIONAL:</p> <p>ISO 5667-3:2018 Water quality -- Sampling -- Part 3: Preservation and handling of water samples https://www.iso.org/standard/72370.html</p>

		preservation and handling of sludge and sediment samples https://www.iso.org/standard/42892.html		
4.	Quality control, auditing		INTERNATIONAL: ISO 18400-106:2017 Soil quality -- Sampling -- Part 106: Quality control and quality assurance https://www.iso.org/standard/62841.html	SR EN ISO 5667-14:2017, Calitatea apei. Prelevare. Partea 14: Ghid pentru asigurarea calității și controlul calității în prelevarea și tratarea apelor din mediul înconjurător (engleză) INTERNATIONAL: ISO 5667-14:2014 Water quality -- Sampling -- Part 14: Guidance on quality assurance and quality control of environmental water sampling and handling https://www.iso.org/standard/55452.html ISO 5667-24:2016 Water quality -- Sampling -- Part 24: Guidance on the auditing of water quality sampling https://www.iso.org/standard/60577.html
5.	Recording and reporting, correlating, decision making		INTERNATIONAL: ISO 18400-107:2017 Soil quality -- Sampling -- Part 107: Recording and reporting https://www.iso.org/standard/62365.html ISO 28258:2013 Soil quality -- Digital exchange of soil-related data https://www.iso.org/standard/44595.html Now under development ISO 28258:2013/DAmD 1 https://www.iso.org/standard/72743.html ISO 15903:2002 Soil quality -- Format for recording soil and site information https://www.iso.org/standard/29028.html	ISO 5667-20:2008 Water quality -- Sampling -- Part 20: Guidance on the use of sampling data for decision making -- Compliance with thresholds and classification systems https://www.iso.org/standard/40003.html ISO/TS 13530:2009 Water quality -- Guidance on analytical quality control for chemical and physicochemical water analysis https://www.iso.org/standard/52910.html ISO/TS 16489:2006 Water quality -- Guidance for establishing the equivalency of results https://www.iso.org/standard/39959.html ml Corrigenda/Amendments ISO/TS 16489:2006/Cor 1:2006 https://www.iso.org/standard/45279.html ISO/TS 20612:2007 Water quality -- Interlaboratory comparisons for proficiency testing of analytical chemistry laboratories https://www.iso.org/standard/46269.html ml

I.7 Specify the recommended remedy measures associated with the contents of the hazardous substances (alert threshold, intervention threshold)

1. Governmental Decision HG no. 1408 on the methods of investigation and evaluation of soil and subsoil pollution published in OJ no. 802/ 3.XI.2007 - Part I
2. HG no. 1403 regarding the rehabilitation of the areas where the soil, subsoil and terrestrial ecosystems have been affected, published in OJ no. 804/26.XI.2007 - Part I
3. Decision approving the Ecological and Economic Reshaping Program in the Romanian Danube Meadow sector and its financing
4. HG no. 472/2000 regarding some measures for the protection of the quality of water resources - M.Of. no. 272/15.06.2002
5. HG no. 1300/2000 regarding the ecological reconstruction of the Ialomita river and tributaries in the Ilfov county - M.Of. no. 690/22.12.200
6. Order no. 223/2006 for the approval of the Regulation on the organization and functioning of the accidental water pollution alarm system in Romania (SAPA-ROM) and of the main international accident center for accidental pollution on the Romanian Danube (CIPA-ROM)

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
2017RO16CF MP023	WATMAN - Sistem informațional pentru managementul integrat al apelor	Watman – Information system for integrated water management	2014-2020	Romania	Managing authority: Ministry of Regional Development, Public Administration and European Funds Beneficiary: National Administration "Apele Române"
2009RO161PR 002	Extinderea și reabilitarea infrastructurii de apă și apă uzată în județul Bihor	Extension and modernisation of water and wastewater infrastructure in Bihor county	2007-2013	Romania	Managing authority: Ministry of Environment and Forests Beneficiary: S.C. Compania de Apa Oradea S.A.

No.	Project title (national language, if available)	Project Title (EN)	Year	Country	Project coordinators, Partners
2009RO161PR047	Extinderea și reabilitarea infrastructurii de apă și apă uzată în județul Maramureș	Extension and modernization of water supply and waste water treatment systems in Maramureș County	2007-2013	Romania	Managing authority: Ministry of Environment and Forests Beneficiary: S.C. Vital S.A. Baia Mare
2016RO16CFMP011	Proiectul regional de dezvoltare a infrastructurii de apă și apă uzată în județul Satu Mare	Extension and modernization of water supply and waste water treatment systems in Satu Mare County - Phase II	2014-2020	Romania	Managing authority: Ministry of Regional Development, Public Administration and European Funds Beneficiary: S.C. APASERV SATU MARE S.A.
2007RO161PR008	Extinderea și reabilitarea sistemelor de apă și apă uzată în regiunea Turda-Câmpia Turzii	Extension and the rehabilitation of water and wastewater systems in Turda-Câmpia Turzii region, in Cluj County	2007-2013	Romania	Ministry for Environment and Sustainable Development
2007RO161PR009	Extinderea și reabilitarea sistemelor de apă și apă uzată în județele Cluj – Sălaj	Extension and the rehabilitation of water and wastewater systems in	2008-2015	Romania	Ministry for Environment and Sustainable Development

No.	Project title (national language, if available)	Project Title (EN)	Year	Country	Project coordinators, Partners
		Cluj – Salaj Counties area			
2009RO161PR004	Extinderea și modernizarea infrastructurii de apă și apă uzată în județul Bistrița-Năsăud	Modernising water and wastewater infrastructure in Bistrita-Nasaud County	2010-2016	Romania	Managing authority: Ministerul Mediului Beneficiary: SC AQUABIS SA
PNII-RU-TE-2012-3-0386	STUDIUL VARIABILITATII CLIMATICE PE BAZA ANALIZEI DEPOZITELOR GLACIARE SI SEDIMENTELOR LACUSTRE	CLIMATE VARIABILITY RECORD BY GLACIAL DEPOSITS AND LAKE SEDIMENTS	2012-2016	Romania	UNIVERSITATEA "STEFAN CEL MARE" SUCEAVA

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
1	Măsurători de radioactivitate în prospectarea zăcămintelor de titan și alte elemente rare din zona teritorială și acvateritorială a Deltei Dunării	Radioactivity measurements for prospecting titanium deposits and other rare elements in the Danube Delta's territorial and aquatic area	1971	RO	Brătăsanu Elisabeta Gohn Emil Isvoreanu Ion

2	Notă asupra unei anomalii radiometrice în zona acvatorială din fața grindului Sărăturile	Note on a radiometric anomaly in the aquatic area in front of the grinders	1972	RO	Brătăsanu Elisabeta Gohn Emil Isvoreanu Ion
3	Cercetări hidrochimice pe brațul Sf. Gheorghe și influența reciprocă dintre acesta și deltă	Hydrochemical research on St. George's arm and mutual influence between it and the delta	1963	RO	Brezeanu Gheorghe Arion-Prunescu Elena
4	Starea ecologică actuală a ecosistemelor acvatice ale Deltei Dunării și a celor marine din zona litoralului românesc al Mării Negre	Current ecological status of aquatic ecosystems of the Danube Delta and the Marine Seas in the Black Sea Romanian Seaside	2000	RO	Brezeanu Gheorghe Pleniceanu Vasile Cioboiu Olivia
5	Harta depozitelor litologice de suprafață și diviziunilor morfogenetice din rezervația biosferei Delta Dunării (aplicații GIS)	Map of surface lithological deposits and morphogenetic divisions in the Danube Delta biosphere reserve (GIS applications)	1997	RO	Brînzan G., Nichersu Iulian, Constantinescu A.
6	Harta depozitelor litologice de suprafață și diviziunilor morfogenetice din R.B.D.D. (aplicații GIS)	Map of surface lithological deposits and morphogenetic divisions from R.B.D.D. (GIS applications)	1997	RO	Brînzan Grigore
7	Delta Dunării - Rezervație a Biosferei - Apele subterane	Danube Delta - Biosphere Reserve - Underground waters	2008	RO	Brînzan Grigore Cioacă Eugenia Drăgoi Ioana-Jeni
8	Determinări de U, Ra, Rn, Si, Th în apele din Delta Dunării	Determinations of U, Ra, Rn, Si, Th in Danube Delta waters	1993	RO	Cherejl I. Dreve S. Boscaneanu S.
9	Influența amendamentelor de oxid de calciu, folosite în piscicultura dirijată din Delta Dunării asupra producției piscicole și asupra cadrului natural	Influence of calcium oxide modifications used in fish farming directed from the Danube Delta on fish production and on the natural environment	1977	RO	Ciocan Nicolae
10	Evaluation of heavy metal and persistent organic pollutants input from Danube waters in the Black Sea area influenced by Danube, in the context of recent climatic changes and bioaccumulation of this compounds in biota	Evaluation of heavy metal and persistent organic pollutants input from Danube waters in the Black Sea area influenced by Danube, in the context of recent climatic changes and bioaccumulation of this compounds in biota	2008	RO	Coatu Valentina Piescu Victoria Oros Andra Mihnea R.
11	Soluri formate pe loess în Delta Dunării	Soils formed on loess in the Danube Delta	1964	RO	Conea Ana Ghirițescu Nadia Neacșu Vasilica Vlad Lucia

12	Efectele poluante ale circulației navale asupra ecosistemelor rezervației biosferei Delta Dunării	The polluting effects of naval traffic on the ecosystems of the Danube Delta biosphere reserve	1992	RO	Constantin Nicolae
13	Efectele poluante ale circulației navale asupra ecosistemelor rezervației biosferei Delta Dunării	The polluting effects of naval traffic on the ecosystems of the Danube Delta biosphere reserve	1993	RO	Constantin Nicolae Iacovici Eugenia
14	The Impact of Large-Scale Atmospheric Forcing on the Dynamics of Water Turbidity in the Danube Delta Coastal Area	The Impact of Large-Scale Atmospheric Forcing on the Dynamics of Water Turbidity in the Danube Delta Coastal Area	1994	RO	Constantin Nicolae Iacovici Eugenia
15	Design a cartographic online application in order to assess the Danube Delta evolution	Design a cartographic online application in order to assess the Danube Delta evolution	2015	RO	Constantin Sorin Greuc Florina Constantinescu Ștefan
16	Sources of sediments from present deposits in Danube Delta	Sources of sediments from present deposits in the Danube Delta	2011	RO	Costea C.
17	Analize de ape minerale din R.P.R. - Localități și lacuri cu ape minerale analizate - Caraorman	Mineral Water Analysis of R.P.R. - Localities and lakes with mineral water analyzed - Caraorman	1953	RO	Crasu V. Manole V. Cociașu E.
18	Analize de ape minerale din R.P.R. - Localități și lacuri cu ape minerale analizate - Sulina	Mineral Water Analysis of R.P.R. - Localities and lakes with mineral water analyzed - Sulina	1953	RO	Crasu V. Manole V. Cociașu E.
19	Indicatori hidrochimici de calitate ai apelor Dunării pe teritoriul rezervației biosferei Delta Dunării - 1997	High quality hydrochemical indicators of Danube waters on the territory of the Danube Delta Biosphere Reserve - 1997	1998	RO	David Cristina Bogdan Laura Constantinescu A.
20	Dinamica multilaterală a elementelor biogene în ecosistemele din rezervația biosferei Delta Dunării	Multidimensional dynamics of biogenic elements in ecosystems in the Danube Delta biosphere reserve	1999	RO	David Cristina Bogdan Lelia
21	Monitorizarea reziduurilor de pesticide orfanoclorurate în ecosistemele acvatice din Rezervația biosferei Delta Dunării	Monitoring of orphanochlorurated pesticide residues in aquatic ecosystems in the Danube Delta Biosphere Reserve	1998	RO	David Cristina Bogdan Lelia
22	Dinamica formelor de azot mineral în lacurile din RBDD 1991-1995	Dynamics of mineral nitrogen forms in the lakes of RBDD 1991-1995	1996	RO	David Cristina Despina Camelia
23	Nutrienți în rezervația biosferei Delta Dunării 1991-1995	Nutrients in the Danube Delta Biosphere Reserve 1991-1995	1996	RO	David Cristina Despina Camelia
24	Indicatori de poluare - Ceatal Chilia 1991 - 1994	Pollution indicators - Ceatal Chilia 1991 -1994	1995	RO	David Cristina Gherghișan Camelia Condur Mihaela
25	Dinamica indicatorilor chimici de eutrofizare în	Dynamics of chemical indicators of eutrophication in the lakes	1995	RO	David Cristina, Gherghișan Camelia Condur Mihaela

	Iacurile din Delta Dunării 1991 - 1994	of the Danube Delta 1991 - 1994			
26	Distribuția spațială și temporal a principalelor componente abiotice și biotice în ecosistemele acvatice în RBDD	Spatial and temporal distribution of the major abiotic and biotic components in aquatic ecosystems in RBDD	1999	RO	David Cristina Hulea Orieta Dumitru Rodica Tudor Mihaela Torok Liliana Tomeș Alina
27	Water quality in Danube Delta and Razim Sinoe complex in the extremes hydrological conditions in august 2003	Water quality in Danube Delta and Razim Sinoe complex in the extremes hydrological conditions in august 2003	2006	RO	David Cristina Lefter Costică Teodorof Liliana Tudor Dana
28	Impactul poluării apelor asupra biodiversității din Delta Dunării	Impact of water pollution on biodiversity in the Danube Delta	1999	RO	David Cristina Oțel Vasile
29	Delta Dunării - Rezervație a Biosferei - Caracteristicile fizico-chimice și calitatea apelor	Danube Delta - Biosphere Reserve - Physical and chemical characteristics and water quality	2008	RO	David Cristina Torok Liliana
30	Date preliminare privind granulometria sedimentelor superficiale din Delta Dunării	Preliminary data on the surface sediment granulometry of the Danube Delta	1999	RO	Doinici Anca Păun F.
31	Studii microbiologice asupra unor soluri din Delta Dunării - rezervația biosferei	Microbiological studies on soils in the Danube Delta - Biosphere Reserve	1994	RO	Drăgan-Bularda Mihail Manolache Elena Marin Georgeta Munteanu Vasile Crișan R. Pașca Daniela Kiss Ștefan
32	Poluarea apelor din Delta Dunării și a unor medii eterogene cu uraniu	Pollution of Danube Delta waters and heterogeneous environments with uranium	2009	RO	Dreve Simina - Virginia
33	Poluarea apelor din Delta Dunării și a unor medii eterogene cu uraniu	Pollution of Danube Delta waters and heterogeneous environments with uranium	1997	RO	Dreve Simona - Virginia
34	Nutrient retention, total N and P export, and greenhouse gas emission from the Danube Delta Lakes	Nutrient retention, total N and P exports, and greenhouse gas emissions from the Danube Delta Lakes	2008	RO	Durisch-Kaiser E. Pavel A. Doberer A. Reutimann J. Bălan S. Sobek S. Rădan Silviu Wehrli B.
35	Utilizarea deuteriului la studiul apelor rezervației biosferei Delta Dunării 1. Stratificarea și originea apelor din zona sudică a complexului lagunar Razelm-Sinoe	Use of Deuterium in the Danube Delta Biosphere Reservation Waters Survey 1. Stratification and origin of water in the southern area of the Razelm-Sinoe lagoon complex	1993	RO	Feurdean V. Feurdean L.

36	Utilizarea determinărilor de concentrații ale deuteriului la studiul circulației apelor din Delta Dunării	The use of deuterium concentration determinations in the Danube Delta water circulation study	1994	RO	Furdean V. Furdean L.
37	Apele subterane și deuteriul din apele subterane limitrofe rezervației biosferei Delta Dunării	Groundwater and deuterium in groundwater near the Danube Delta biosphere reserve	1997	RO	Furdean Victor Furdean Lucia
38	Uzina de apă din Sulina	Water plant in Sulina	2010	RO	Filip Anca
39	Aspecte privind cartografierea solurilor din lunca și Delta Dunării	Soil mapping aspects of the meadow and the Danube Delta	1968	RO	Floca F. Seltzman G.
40	Soils of the Romanian Danube Delta Biosphere Reserve"	Soil of the Romanian Danube Delta Biosphere Reserve ".	1997	RO	Munteanu Ion Florea Nicolae
41	Delta Dunării - Caracterizare pedogeografică	Danube Delta – Pedo-geographic characterization	2008	RO	Florea Nicolae Ignat Petru Săvulescu Ionuț Geanana Mihai
42	Delta Lakes as nutrient sinks - A process study in the Danube Delta	Delta Lakes as nutrient sinks - A process study in the Danube Delta	1999	RO	Friederich Jana Dinkel Gh. Grieder E. Rădan Silviu Steingruber Sandra Wehrli B.
43	Danube branches Delta 2006: Heavy minerals of the bottom sediments, discharged in the Black Sea basin	Danube branches Delta 2006: Heavy minerals of the bottom sediments, discharged in the Black Sea basin	2007	RO	Fulga Constantina
44	Încărcarea cu metale grele a apelor din zona digului Sulina Sf. Gheorghe 1997	Loading of heavy metals in the Sulina St. George 1997	1997	RO	Gheorghiu G. Ulvoczki Carol Iacov Daniela
45	Heavy minerals in the sediments of Sulina and Sf. Gheorghe branches	Heavy minerals in the sediments of Sulina and Sf. Gheorghe branches	1996	RO	Fulga Constantina
46	Încărcarea cu metale grele a apelor din zona digului litoral Sulina - Sf. Gheorghe 1997	Severe heavy metal loading of waters in the Sulina seaside - Sf. Gheorghe 1997	1997	RO	Gheorghiu Gaetanu Ulvoczki Carol Iacob Daniela Lăcătușu Radu Grigoraș Constantin
47	Cercetări privind poluarea cu HCH și DDT a solurilor din incinta agricolă Pardina din R.B.D.D.	Research on HCH and DDT pollution of the soils from the agricultural premises Pardina from R.B.D.D.	1996	RO	Gheorghiu Gaetanu Ulvoczki Carol Ochea Marlina
48	Aspecte ale variabilității hemoglobinei în trei comunități umane din Delta Dunării	Aspects of the variability of hemoglobine in three human communities in the Danube Delta	1979	RO	Ghigea Silvia Istrate Maria Sevastru Pavel
49	Zonele umede .Abordare ecologica.Dunarea.	Wetlands. Ecological approach. The Danube Delta. The Western Plain of Romania	2009	RO	Gomoiu MarianTraian

	Delta Dunarii. Cîmpia de Vest a României				Ardelean Aurel Ardelean Gavri Ardelean Doru Onciu Teodora Skolka Marius Karacsonyi Karol
50	Radioactivitatea nisipurilor litorale din zona Sf. Gheorghe-Deltă în comparație cu rezultatele mineralogice și chimice	Radioactivity of littoral sands in the Sf. Gheorghe-Delta area compared to mineralogical and chemical results	1972	RO	Gohn Emil Brătășanu Elisabeta Papacostea Clarisa Năstase Maria
51	Solurile de pe grindul Stipoc din Delta Dunării	The soils on the Stipoc grunt in the Danube Delta	1960	RO	Guștiuc I. Gheorghiu E. Poenescu M
52	Solurile din Delta Dunării și evoluția lor	Soils in the Danube Delta and their evolution	1957	RO	Guștiuc L.
53	Solurile din Delta Dunării și evoluția lor	Soils in the Danube Delta and their evolution	1958	RO	Guștiuc L. Chiriță Constantin
54	Solurile de pe grindul Chilia și măsurile pedoameliorative	The soils on the Chilia and remediation measures	1960	RO	Guștiuc L. Gheorghiu E. Poenescu M
55	Solurile salinizate de pe grindurile fluvio-maritime din Delta Dunării	Salinated soils on the Danube Delta river fluvial rivers	1962	RO	Guștiuc L. Gheorghiu E. Poenescu M.
56	Assessment of ecological status of Danube Delta Lakes using indicator macrophytes species	Assessment of ecological status of Danube Delta Lakes using indicator macrophytes species	2008	RO	Hanganu I. Doroftei M. Ștefan Nicolae
57	Contribuție la studiul dinamicii carbonului organic particulat în apele dulci din Delta Dunării	Contribution to the study of organic carbon particle dynamics in Danube Delta	1985	RO	Hiel'ekueta Lohola Mbap'tema
58	Comparative research between the Danube Delta and the mouth of Sulina-arm regarding the solugle glucids in water, sediment and reed	Comparative research between the Danube Delta and the mouth of Sulina-arm regarding the solugle glucids in water, sediment and reed	1978	RO	Hurghîșiu Ileana
59	Cercetări comparative asupra caracteristicilor chimice ale macrofitelor și ale mediului din ghiolurile Puiu și Roșu și din Japșa Porcu	Comparative research on the chemical characteristics of macrophytes and the environment of Puiu and Roșu and Japșa Porcu	1981	RO	Hurghîșiu Ileana
60	Caracteristicile chimice ale unor macrofite li ale mediului din ghiolurile Matița și Mehrei (Delta Dunării)	Chemical characteristics of macrophytes and environment of the Matița and Mehrei (Danube Delta)	1983	RO	Hurghîșiu Ileana
61	Physico-chemical characteristics of water and sediments in the Danube Delta	Physico-chemical characteristics of water and sediments in the Danube Delta	1980	RO	Hurghîșiu Ileana
62	Dynamics of organic and mineral substances	Dynamics of organic and mineral substances in	1983	RO	Hurghîșiu Ileana

	in macrophytes (Danube Delta and foredelta)	macrophytes (Danube Delta and foredelta)			
63	Dinamica azotului și a fosforului din sedimentele unor lacuri din Delta Dunării	Dynamics of nitrogen and phosphorus in the sediments of lakes in the Danube Delta	1992	RO	Hurghișiu Ileana
64	Dinamica substanțelor organice și minerale în ghiolurile Matîța și Merhei (Delta Dunării)	Dynamics of organic and mineral substances in Matîța and Merhei (Danube Delta)	1985	RO	Hurghișiu Ileana Nicolescu Nicolae
65	Water quality in Danube Delta Lakes: An assessment using benthic macroinvertebrates community	Water quality in Danube Delta Lakes: An assessment using benthic macroinvertebrates community	2015	RO	Ibram Orhan
66	Nutrients and heavy metals dynamics in the Danube Delta Lakes	Nutrients and heavy metals dynamics in the Danube Delta Lakes	2001	RO	Ibram Orhan David Cristina Cojocaru Liliana
67	Considerațiuni asupra cursului inferior al Dunării și formarea Deltei	Considerations on the lower Danube course and the formation of the Delta XX-II-III Bulletin of the Romanian Geographic Society	1899	RO	Ionescu Dobrogeanu M.
68	Cause - effect analysis over the ecological and economical aggression forms that effected the ecosystem of the Danube Delta	Cause - effect analysis over the ecological and economical aggression forms that effected the ecosystem of the Danube Delta	2006	RO	Ionescu I. Chitoroiu Brîndușa Popa Grațîela
69	Influența chimismului apei și solului asupra dezvoltării unor characee din Delta Dunării	The Influence of Water and Soil Chemistry on the Development of Characters in the Danube Delta	1971	RO	Ionescu-Țeculescu Venera Godeanu Marioara
70	L'entomofaune de l'le de Letea (Delta du Danube) - Ord. Coleoptera (pars)	The entomofaune of Letea Island (Danube Delta) - Ord. Coleoptera (pars)	2001	RO	Ibram Orhan David Cristina Cojocaru Liliana
71	Distrucția materiei organice în unele ecosisteme acvatice din Delta Dunării (1994-1995)	Destruction of organic matter in some aquatic ecosystems in the Danube Delta (1994-1995)	1996	RO	Ionică Doina Sandu Cristina Simon-Gruîță Alexandra, Nicolescu Dorina
72	Decomposition of organic matter in the Danube Delta ecotonal zones	Decomposition of organic matter in the Danube Delta ecotonal zones	2005	RO	Ionică Doina Zinevici Victor Sandu Cristina Parpală Laura Mușă Renata Dobre D.
73	Distribuția metalelor grele în ecosistemele acvatice din Delta Dunării	The distribution of heavy metals in aquatic ecosystems in the Danube Delta	1997	RO	Iordache Virgil Mihăilescu Nicolae Cristofor Sergiu Postolache Carmen Vădineanu Angheluță
74	La avriabilite de la lipodemie et la cholesterolemie en fonction du sexe, de l'age et des conditions	The reliability of lipodemia and cholesterolemia according to sex, age and living conditions in a	1980	RO	Istrate Maria Bălțeanu Cezara- Ana Miu Georgeta

	de vie chez une population du Delta du Danube (Roumanie)	population of the Danube Delta (Romania)			
75	Dispozitive de prelevare pentru studiul faunei fitofile în condițiile Deltei Dunării	Sampling devices for the study of phytophilous fauna in Danube Delta conditions	1985	RO	Isvoranu V.
76	Încărcarea și poluarea cu metale grele a solurilor din incinta Pardina - R.B.D.D.	Charging and pollution of heavy soils in Pardina - R.B.D.D.	1996	RO	Lăcătușu Radu Gheorghiu Gaetanu Dumitru Mihail Ulvoczki Carol Lungu Mihaela Trandafir M. Vintilă Roxana
77	Nivelul de încărcare cu poluanți unor zone strict protejate alerezervației biosferei Delra Dunării	Pollution loading level in strictly protected areas of the Danube Delta biosphere reserve	1998	RO	Lăcătușu Radu Grigoraș C. Gheorghiu G. Plaxienco Doina Ulvoczi C. Cîrstea Stelian Lungu Mihaela Badea Laura
78	Selenium in soils of the Danube Delta North-Western Part	Selenium in soils of the Danube Delta North-Western Part	2012	RO	Lăcătușu Radu Stanciu-Burileanu Mihaela Monica Rășnoveanu Ion Lăcătușu Anc Rizea Nineta Vrînceanu A. Lazăr Rodica
79	Caracterizarea geochemică a sedimentelor din Lacul Isacova la nivelul anului 2006	Geochemical characterization of sediments in Lake Isacova in 2006	2007	RO	Lechea Violeta
80	Alcătuirea geologică a Deltei Dunării	Geological composition of the Danube Delta	1963	RO	Liteanu Emil Pricăjan Artemiu
81	Alcătuirea geologică a Deltei Dunării	Geological composition of the Danube Delta	1963	RO	Liteanu Emil Pricăjan Artemiu
82	Cercetări privind studiul principalelor elemente poluanre în ecosistemul Delta Dunării	Research on the study of the main pollutants in the Danube Delta ecosystem	2000	RO	Lungeanu Lucian
83	Studiul mișcării poluanților în bazine naturale sau artificiale cu aplicație la Lacul Razelm	Study of the movement of pollutants in natural or artificial pools with application to Lake Razelm	2003	RO	Lupan Gheorghe
84	Indici de caracterizare ai stării de troficitate a agroecosistemelor din Delta Dunării	Indicators for the characterization of the trophic status of agroecosystems in the Danube Delta	1998	RO	Marin Georgeta
85	Aspects related to evolution of some soil salts in southern part of Pardina polder	Aspects related to evolution of some soil salts in southern part of Pardina polder	2007	RO	Mierlă Marian
86	25 years of research of the Danube Delta lacustrine sediments:	25 years of research of the Danube Delta lacustrine sediments:	2006	RO	Mihăilescu Nicolae

	Samples, cores, hydro and geochemical analyses	Samples, cores, hydro and geochemical analyses			
87	Studiul geologic al lacurilor Deltei Dunării	The geological study of the lakes of the Danube Delta	1996	RO	Mihăilescu Nicolae Costea Constantin Rădan Silviu Vanghelie Iulian Răcan Corneliu Rădan Maria Pestrea S. Strechie C. Popescu I.
88	Studiul geocologic al sistemului Dunăre-Delta Dunării - litoralul Mării Negre - Marea Neagră. Stabilirea ecosistemelor caracteristice	The geocological study of the Danube-Danube Delta system - the Black Sea coast - the Black Sea. Establishing characteristic ecosystems	1996	RO	Mihăilescu Nicolae Rădan Silviu Costea Constantin Vanghelie Iulian Rădan Sorin Rădan Maria Gyongy R.
89	A fluvial sedimentation model - the Danube Delta	A fluvial sedimentation model - the Danube Delta	1984	RO	Mihăilescu Nicolae Rogojină Constantin
90	Radiometric investigation of ¹³⁷ Cs vertical profile in Danube Delta: Matița Lake core	Radiometric investigation of ¹³⁷ Cs vertical profile in Danube Delta: Matița Lake core	1996	RO	Mihăilescu Nicolae Vanghelie Iulia Dinescu Lucreția Duliu Octavian
91	Nivelurile de eutrofizare și poluare ale apei din amenajările piscicole, comparativ cu cele ale ecosistemelor acvatice naturale din Delta Dunării	Water Eutrophication and Pollution Levels in Fisheries, Compared to Natural Aquatic Ecosystems in the Danube Delta	1999	RO	Mitache V.
92	Caracterizarea profilurilor de sol - Profilul nr. 8 - C.E. Chilia - sol aluvial salinizat	Characterization of soil profiles - Profile no. 8 - C.E. Chilia - salinized alluvial soil	1994	RO	Munteanu Ioan
93	Soils of Romanian Danube Delta Biosphere	Soils of Romanian Danube Delta Biosphere	1999	RO	Munteanu Ioan
94	Delta Dunării - Rezervație a Biosferei - Solurile	Danube Delta - Biosphere Reserve - Soils	2008	RO	Munteanu Ioan
95	Ecological characteristics of soils in the Danube Delta Biosphere Reserve	Ecological characteristics of soils in the Danube Delta Biosphere Reserve	2001	RO	Munteanu Ioan
96	Soils of the Romanian Danube Delta Biosphere Reserve	Soils of the Romanian Danube Delta Biosphere Reserve	1996	RO	Munteanu Ioan
97	Baza de date a profilurilor de sol din Delta Dunării	The Danube Delta soil database	1995	RO	Munteanu Ioan Canarache Andrei Vlad Virgi Tarhoaca Ecaterina Cosma Daniela
98	Delta Dunării - Soluri	Danube Delta - Soils	1994	RO	Munteanu Ioan Curelariu Gheorghe
99	Solurile Deltei fluvio-maritime a Dunării	The soils of the fluvial-maritime Delta of the Danube	1964	RO	Munteanu Ioan Ionescu Nicolae Colios Elena

100	New data concerning fish fauna from lakes of the fluvial Danube Delta (Gorgova-Uzilina and Şontea-Furtuna lake-complexes, Romania) in 2010	New data concerning fish fauna from lakes of the fluvial Danube Delta (Gorgova-Uzilina and Şontea-Furtuna lake-complexes, Romania) in 2010	2012	RO	Năstase Aurel
101	Delta Dunării - Rezervație a Biosferei - Resursele de subsol și energetice	Danube Delta - Biosphere Reserve - Subsoil and Energy Resources	2008	RO	Nechersu Iulian
102	Bacterioplantonul Deltei maritime și avandelei	Marine and fore-delta Bacterioplankton	1989	RO	Nicolescu Ana
103	Bacterioplantonul Deltei maritime și Avandelei	Marine and fore-delta Bacterioplankton	1989	RO	Nicolescu Doina Eugenia Ana
104	Planctonul bacterian din ecosistemele lacustre ale Deltei Dunării, în perioada 1965-1987 (densitate numerică)	The bacterial plankton in the lacustrine ecosystems of the Danube Delta, between 1965 and 1987 (numerical density)	1990	RO	Nicolescu Dorina
105	Dinamica degradării aerobe a materiei organice din ecosistemele lacustre din Delta Dunării - Rxpresie a unctiionalității comunităților microbiene planctonice în condițiile anilor 1991-1992	Dynamics of Aerobic Degradation of Organic Matter from the Danube Delta Ecosystems - Presentation of the Unity of the Planktonic Microbial Communities in the Periods 1991-1992	1993	RO	Nicolescu Dorina Girip Alexandra
106	Contribuții la studiul calității apei unor ecosisteme lacustre din Delta Dunării în condițiile anului 1993	Contributions to the study of the water quality of some lacustral ecosystems in the Danube Delta under the conditions of 1993	1994	RO	Negulescu Mihaela Nazaru Mariana
107	Delta Dunării - Rezervație a Biosferei - Activitățile industriale	Danube Delta - Biosphere Reserve - Industrial Activities	2008	RO	Nichersu Iulian
108	Pollution state of sediments dredged from the Sulina distributary and their influence to the Danube Delta front area	Pollution status of sediments dredged from the Sulina distributary and their influence on the Danube Delta front area	1999	RO	OAI E Gheorghe, Secieru Dan, Szobotka Ștefan, Stănică Adrian, Soare Romeo
109	Monitoring geocologic în cadrul macrosistemului Dunăre Delta Dunării prin metode geologice, geochemice și geofizice	Geo-ecological monitoring within the Danube Delta Danube macro-system through geological, geochemical and geophysical methods	1994	RO	OAI E Gheorghe Szobotka Ștefan Secieru D. Rădan Maria Rădan Silviu Rădan Sorin
110	Environmental state of the Danube River in 1996	Environmental state of the Danube River in 1996	1997	RO	Oaie Gheorghe Szobotka Ștefan Stănică A.
111	Granulometry of sediments from the littoral zone between Sfântu Gheorghe and Gura Portiței	Granulometry of sediments from the littoral zone between Sfântu Gheorghe and Gura Portiței	2006	RO	Opreanu Gicu Oaie Gheorghe Szobotka Ștefan
112	Impact of subsidence on Murighiol-Dunavăț	Impact of subsidence on Murighiol-Dunavăț	2007	RO	Panait Valentin

	dammed and drainage area	dammed and drainage area			
113	The soil evaluation qualitative modeling in the Danube Delta Biosphere Reserve, using the open source software	The soil evaluation qualitative modeling in the Danube Delta Biosphere Reserve, using the open source software	2008	RO	Panait Valentin
114	The preventions and controls measures of the rainfall regime variation (high or low) issue, on the dammed and drained area of Danube Delta Biosphere Reserve	The preventions and controls measures of the rainfall regime variation (high or low) issue, on the dammed and drained area of Danube Delta Biosphere Reserve	2006	RO	Panait Valentin
115	The wetland soil observation status assessment using plant indicators and remote sensing techniques on Caraorman Area	The wetland soil observation status assessment using plant indicators and remote sensing techniques on Caraorman Area	2010	RO	Panait Valentin
116	Le Delta du Danube. Étude géodynamique et sédimentologique.	Danube Delta. A geodynamical and sedimentological study	1996	RO	Panin Nicolae
117	Danube Delta. Genesis, evolution, geological setting and sedimentology	Danube Delta. Genesis, evolution, geological setting and sedimentology	1997	RO	Panin Nicolae
118	Dinamica producerii, consumului și emisiei de gaze cu efect de seră din Delta Dunării.	Dynamics of production, consumption and emission of greenhouse gases in the Danube Delta.	2009	RO	Pavel Alina
119	Analyse des processus sédimentaires récents dans l'éventail profond du Danube (Mer Noire)	Analysis of recent sedimentary processes in the deep range of the Danube (Black Sea)	2002	RO	Popescu Irina
120	Heavy metals present in the Danube water suspension (Sf. Gheorghe Area) and their geochemical behaviour	Heavy metals present in the Danube water suspension (Sf. Gheorghe Area) and their geochemical behaviour	2004	RO	Popescu Rodica Ungureanu Viorel
121	Monitoring prin susceptibilitate magnetică (faza 1995) în sistemul Dunăre-Delta Dunării: Semnificații geoecologice - 2-Dunărea	Magnetic susceptibility monitoring (phase 1995) in the Danube-Danube Delta system: Geoecological Meaning - 2-Danube	1996	RO	Rădan Maria Rădan Sorin Rădan Silviu Szbobotka Ștefan Oaie Gheorghe
122	EROS-2000 Danube Programme : State of Ecosystems within the Danube Delta in 1995	EROS-2000 Danube Programme : State of Ecosystems within the Danube Delta in 1995	1997	RO	Rădan Silviu Strechie Claudia Ganciu Andrei Ruzsa Gyongyi Rădan Sorin Rădan Maria

123	Monitoring prin susceptibilitate magnetică (faza 1995) în sistemul Dunăre-Delta Dunării: Semnificații geocologice - 1. Delta Dunării și complexul lacustru Razelm-Sinoe	Magnetic susceptibility monitoring (phase 1995) in the Danube-Danube Delta system: Geocological meanings - 1. The Danube Delta and the Razelm-Sinoe Lake Complex	1996	RO	Rădan Sorin Rădan Maria Rădan Silviu
124	Geophysical images - sedimentologically interpreted - regarding the lakes of the Danube Delta and the Razelm - Sinoe System	Geophysical images - sedimentologically interpreted - regarding the lakes of the Danube Delta and the Razelm - Sinoe System	1985	RO	Rădan Sorin Rădan Maria Rădan Silviu
125	Caracterizarea magnetosusceptibilimetrică a sedimentelor lacustre din Delta Dunării - Monitoring 1996; Semnificații ambientale confirmate	Magnetosusceptibilimetric characterization of lake sediments in the Danube Delta - Monitoring 1996; Confirmed environmental interpretations	1996	RO	Rădan Sorin Rădan Maria Rădan Silviu Ganciu Andrei
126	A magnetic susceptibility scale for lake sediments; Inferences from the Danube Delta and the Razim - Sinoe lagoonal complex (Romania)	A magnetic susceptibility scale for lake sediments; Inferences from the Danube Delta and the Razim - Sinoe lagoonal complex (Romania)	2007	RO	Rădan Sorin Rădan Silviu
127	Integrated magnetic susceptibility and lithological studies on lacustrine recent sediments from the Danube Delta	Integrated magnetic susceptibility and lithological studies on lacustrine recent sediments from the Danube Delta	2009	RO	Rădan Sorin Rădan Silviu
128	The use of magnetic susceptibility to study (hydro)sedimentary environments and processes in Danube Delta	The use of magnetic susceptibility to study (hydro)sedimentary environments and processes in Danube Delta	2010	RO	Rădan Sorin Rădan Silviu
129	State of the sedimentary environments of the Măța - Merhei Depression (Danube Delta, Romania) as inferred from magnetic susceptibility data	State of the sedimentary environments of the Măța - Merhei Depression (Danube Delta, Romania) as inferred from magnetic susceptibility data	2004	RO	Rădan Sorin Rădan Silviu
130	The use of the magnetic susceptibility record as a proxy signature for the lithological composition of lake sediments: evidences from short cores in the Meșteru-Fortuna depression (Danube Delta)	The use of the magnetic susceptibility record as a proxy signature for the lithological composition of lake sediments: evidences from short cores in the Meșteru-Fortuna depression (Danube Delta)	2013	RO	Rădan Sorin Rădan Silviu Catianis Irina
131	Relationship between the magnetic susceptibility and	Relationship between the magnetic susceptibility and lithological	2014	RO	Rădan Sorin Rădan Silviu Catianis Irina

	lithological composition in sediment cores from Lake of Matița - Merhei Depression /Danube Delta, Romania)	composition in sediment cores from Lake of Matița - Merhei Depression /Danube Delta, Romania)			
132	An environmental magnetolithogenetic study in the lakes of the Gorgova-Uzlina depression (Danube Delta, Romania) I. insights from short sediment cores	An environmental magnetolithogenetic study in the lakes of the Gorgova-Uzlina depression (Danube Delta, Romania) I. insights from short sediment cores	2016	RO	Rădan Sorin Rădan Silviu Catianis Irina
133	An environmental magnetolithogenetic study in the lakes of the Gorgova-Uzlina depression (Danube Delta, Romania) II. insights from short sediment cores	An environmental magnetolithogenetic study in the lakes of the Gorgova-Uzlina depression (Danube Delta, Romania) II. insights from short sediment cores	2016	RO	Rădan Sorin Rădan Silviu Catianis Irina
134	Environmental magnetic signatures identified from lake sediments in the Danube Delta (Romania)	Environmental magnetic signatures identified from lake sediments in the Danube Delta (Romania)	1999	RO	Rădan Sorin Rădan Silviu Rădan Maria
135	Magnetometry and kappametry applied in the Danube Delta and the Razelm Lake; Some methodological and sedimentological aspects	Magnetometry and kappametry applied in the Danube Delta and the Razelm Lake; Some methodological and sedimentological aspects	1983	RO	Rădan Sorin Rădan Silviu Rădan Maria Mihăilescu Nicolae Angheliescu O.
136	Caracterizarea magneto-susceptibilimetrică și geochemică a ambianțelor sedimentare din ecosistemele lacustre ale Depresiunii Matița-Merhei (Delta Dunării, România). Semnificații geoecologice	Magneto-susceptibilimetric and geochemical characterization of sedimentary environments in the lacustrine ecosystems of the Matița-Merhei Depression (Danube Delta, Romania). Geoecological meanings	2005	RO	Rădan Sorin Rădan Silviu
137	Despre conținutul metalelor în apele lacurilor Roșu, Roșulet și golful Baia de Nord (Delta Dunării)	About the content of metals in the waters of Red, Rosulet and North Bay (Danube Delta)	1997	RO	Zubcov Elena Toderaș I. Vicol M.

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

Danube River Quality Monitoring Stations

http://www.rowater.ro/Legislatia%20internationala/Directiva%20Cadru%20Apa/Plan_implementare_Directiva_substante_periculoase.pdf

No.	Site	Country	Section left side of the river - L, right - R, middle - M
RO1	Bazias	RO	LMR
RO2	Pristol - Novo Selo	RO	LMR
RO3	upstream Oltenița (Arges)	RO	LMR
RO4	Chiciu - Silistra	RO	LMR
RO5	Reni bratul Chilia/Kilia	RO	LMR
RO6	Vilkova Bratul Chilia/Kilia (Periprava - Vâlcov)	RO	LMR
RO7	Sulina	RO	LMR
RO8	Sf. Gheorghe	RO	LMR
RO9	Arges – Dunare confluence	RO	M
RO10	Siret - Dunare Sendreni confluence	RO	M
RO11	Prut - Dunare Giurgiulesti confluence		M
BG01	Pristol - Novo Selo	BG	LMR
BG04	Amonte Russe	BG	MR
BG05	Silistea Chiciu	BG	LMR
UA1	Reni bratul Chilia/Kilia	UA	M
UA2	Vilkova Bratul Chilia/Kilia	UA	M

Catchment	Water body	Sampling site	Responsible lab
Upper Tisa	Tisa	Valea Viselui (granita)	S.G.A. Maramureș
	Vișeu	Poiana Borșa	S.G.A. Maramureș
	Cisla	am. Baia Borșa	S.G.A. Maramureș
	Bălășina, Cislișoara	Priza SUP Borșa	S.G.A. Maramureș
	Cisla	av. Baia Borșa	S.G.A. Maramureș
	Vișeu	Moisei	S.G.A. Maramureș

Catchment	Water body	Sampling site	Responsible lab
	Vaser	Vaser- am. cfl. Vișeu	S.G.A. Maramureș
	Bocicoel	am. sat Bocicoel	S.G.A. Maramureș
	Ruscova	Ruscova- am. cfl. Vișeu	S.G.A. Maramureș
	Valea Bilei	priza comuna Ruscova	S.G.A. Maramureș
	Vișeu	Bistra	S.G.A. Maramureș
	Iza	am. Săcel	S.G.A. Maramureș
	Boicu	am. Dragomiresti - am.capt.MHC	S.G.A. Maramureș
	Boicu	am. Dragomiresti - av.capt.MHC	S.G.A. Maramureș
	Mara	Mara - Vadu Izei	S.G.A. Maramureș
	Iza	Iza - Vadu Izei	S.G.A. Maramureș
	Sapanta	am. loc. Sapanta, am.capt. MHC	S.G.A. Maramureș
	Sapanta	am. loc. Sapanta, av.capt. MHC	S.G.A. Maramureș
	Tisa	Teceu (granita)	S.G.A. Maramureș
	Upper Tisa	Tur	amonte Negresti
Valea Rea		Valea Rea - am. Negrești, am.capt.MHC	S.G.A. Satu Mare
Valea Rea		Valea Rea - am. Negrești	S.G.A. Satu Mare
Valea Albă		am. Huta Certeze	S.G.A. Satu Mare
Valea Rea		am. ac. Călinești	S.G.A. Satu Mare
Tur		am. ac. Călinești	S.G.A. Satu Mare
Tur		av. ac. Călinești	S.G.A. Satu Mare
Paraul Someș		captare Vama	S.G.A. Satu Mare
Talna		Talna - am.cf.Racsa	S.G.A. Satu Mare
Talna		Pasunea Mare	S.G.A. Satu Mare
Turț		am. EM Turț	S.G.A. Satu Mare
Turț		am. cfl. Tur	S.G.A. Satu Mare
Turț-Hodos		am. cfl. Tur	S.G.A. Satu Mare
Egher		am. Livada	S.G.A. Satu Mare
Tur		Micula (granita)	S.G.A. Satu Mare
Valea Frasinului		capt. Primaria Tarna Mare1	S.G.A. Satu Mare
Valea Sloiului		capt. Primaria Tarna Mare2	S.G.A. Satu Mare
Tarna		av. Bocicău	S.G.A. Satu Mare
Someș	Someș Mare	am. cfl. Măria	S.G.A. Bistrița- Năsăud

Catchment	Water body	Sampling site	Responsible lab
	Cobasel	am. cfl. Somesul Mare (Cobasel), am.capt. MHC	S.G.A. Bistrița-Năsăud
	Cobasel	am. cfl. Somesul Mare (Cobasel), av.capt. MHC	S.G.A. Bistrița-Năsăud
	Paraul Băilor	am. SE. V. Vinului	S.G.A. Bistrița-Năsăud
	Paraul Băilor	am. cfl. Somes Mare (Rodna)	S.G.A. Bistrița-Năsăud
	Anieș	Anieș priza	S.G.A. Bistrița-Năsăud
	Anieș	am. cfl. Somesul Mare (Anieș), am.capt. MHC	S.G.A. Bistrița-Năsăud
	Anieș	am. cfl. Somesul Mare (Anieș), av.capt. MHC	S.G.A. Bistrița-Năsăud
	Paraul Pietrelor	am. loc. Lunca Ilvei	S.G.A. Bistrița-Năsăud
	Ilva	am. cfl. Someș Mare (Ilva)	S.G.A. Bistrița-Năsăud
	Someș Mare	Nepos	S.G.A. Bistrița-Năsăud
	Rebra	am. cfl. Someș Mare (Rebra)	S.G.A. Bistrița-Năsăud
	Paraul Repede	am. loc. Romuli	S.G.A. Bistrița-Năsăud
	Sălăuța	am. Romuli	S.G.A. Bistrița-Năsăud
	Sălăuța	h.s. Salva	S.G.A. Bistrița-Năsăud
	Paraul Voristei	am. loc. Runcu Salvei	S.G.A. Bistrița-Năsăud
	Tibles	am. loc. Zagra, am.capt. MHC	S.G.A. Bistrița-Năsăud
	Tibles	am. loc. Zagra, av.capt. MHC	S.G.A. Bistrița-Năsăud
	Someș Mare	Săsarm	S.G.A. Bistrița-Năsăud
	Șieu	am. Șieuț	S.G.A. Bistrița-Năsăud
	Bistrița	Bistrița Bârgăului abstraction	S.G.A. Bistrița-Năsăud
	Geamănu	priza Cușma	S.G.A. Bistrița-Năsăud
	Bistrița	priza Bistrița	S.G.A. Bistrița-Năsăud
	Bistrița	Sărata	S.G.A. Bistrița-Năsăud
	Dipșa	Chiraleș	S.G.A. Bistrița-Năsăud

Catchment	Water body	Sampling site	Responsible lab
	Lechinta	Lechinta - am.cfl. Dipsa	S.G.A. Bistrița-Năsăud
	Budac	am. Budacu de Jos - am.capt.MHC	S.G.A. Bistrița-Năsăud
	Budac	am. Budacu de Jos - av.capt.MHC	S.G.A. Bistrița-Năsăud
	Izvorul Cald	am. loc. Ardan	S.G.A. Bistrița-Năsăud
	Șieu	p.h. Șintereag	S.G.A. Bistrița-Năsăud
	Ilișua	Ilișua - am. cfl. Someș Mare	S.G.A. Bistrița-Năsăud
Someș	Someș Mare	am. cfl. Someș Mic	A.B.A.S.T. Cluj
	Someș Cald	am. Smida	A.B.A.S.T. Cluj
	Ac. Tarnita	priza Ac.Tarnita	A.B.A.S.T. Cluj
	Ac. Somesul Cald	priza apa bruta	A.B.A.S.T. Cluj
	Beliș	Poiana Horea	A.B.A.S.T. Cluj
	Paraul Paltinita	am.loc. Maguri Racatau	A.B.A.S.T. Cluj
	Paraul Bulbuc	Loc. Maguri	A.B.A.S.T. Cluj
	Răcățâu	am. cfl. Someș Rece	A.B.A.S.T. Cluj
	Someș Rece	Uzina Somesul Rece	A.B.A.S.T. Cluj
	Căpuș	am. cfl. Someș Mic (Căpuș)	A.B.A.S.T. Cluj
	Fenes	am. cfl. Somes Mic (Fenes)	A.B.A.S.T. Cluj
	Someș Mic	am. Cluj	A.B.A.S.T. Cluj
	Nadăș	Radaia	A.B.A.S.T. Cluj
	Popești	am. cfl. Nadăș	A.B.A.S.T. Cluj
	Nadăș	am. cfl. Someș Mic (Nadăș)	A.B.A.S.T. Cluj
	Someș Mic	punte Grigorescu	A.B.A.S.T. Cluj
	Someș Mic	pod Colectivistilor	A.B.A.S.T. Cluj
	Zăpodie	am. Pata Rat	A.B.A.S.T. Cluj
	Zăpodie	am. cfl. Someș Mic (Zăpodie)	A.B.A.S.T. Cluj
	Someș Mic	Apahida	A.B.A.S.T. Cluj
	Gădălin	am. cfl. Someș Mic (Gădălin)	A.B.A.S.T. Cluj
	Lonea	Lonea - am.cfl. Somes Mic	A.B.A.S.T. Cluj
	Fizeș	am. cfl. Someș Mic (Fizeș)	A.B.A.S.T. Cluj
	Nima	am. cfl. Somes Mic (Nima)	A.B.A.S.T. Cluj
	Someș Mic	Salatiu	A.B.A.S.T. Cluj
	Someș	am. Dej	A.B.A.S.T. Cluj
	Someș	Strambu Baiut	am. cfl. Lapus
Lăpuș		Izvorul Alb-Negru	S.G.A. Maramureș
Lapus		am.cfl. Botiz	S.G.A. Maramureș
Lăpuș		Lăpușul Românesc	S.G.A. Maramureș

Catchment	Water body	Sampling site	Responsible lab
	Suciu	am. Suciu de Sus (MHC)	S.G.A. Maramureș
	Lăpuș	Răzoare	S.G.A. Maramureș
	Dobric	Dobric - am.cfl. Lapus	S.G.A. Maramureș
	Cavnic	am. Cavnic	S.G.A. Maramureș
	Berbincioara, V.Alba, Șuitor	priza SC Vital SA Baia Mare - Agentia Cavnic	S.G.A. Maramureș
	Gutin, Bolduț	Priza Spital Psihiatrie Cavnic	S.G.A. Maramureș
	Cavnic	Copalnic	S.G.A. Maramureș
	Lăpuș	Lăpușel	S.G.A. Maramureș
	Craica	am. cfl. Lapus (Craica)	S.G.A. Maramureș
	Săsar	am. Baia Sprie	S.G.A. Maramureș
	Limpedeia	priza SC Vital SA Baia Sprie	S.G.A. Maramureș
	Săsar	av. Baia Mare	S.G.A. Maramureș
	Chiuzbaia	am. cfl. Sasar (MHC)	S.G.A. Maramureș
	Firiza	Blidari	S.G.A. Maramureș
	Ac. Firiza	priza Berdu	S.G.A. Maramureș
	Valea Neagra	am. cfl. Firiza (V.Neagra) (MHC)	S.G.A. Maramureș
	Jidovaia	am.cfl. Firiza	S.G.A. Maramureș
	Firiza	am. cfl. Săsar	S.G.A. Maramureș
	Băița	am. cfl. Lăpuș (MHC)	S.G.A. Maramureș
	Lăpuș	Lăpuș - Bușag	S.G.A. Maramureș
	Nistru	Nistru - Bușag	S.G.A. Maramureș
	Someș	Cicârlău	S.G.A. Maramureș
	Ilba	Ilba - am. cfl. Someș	S.G.A. Maramureș
Someș	Someș	Fodora	S.G.A. Sălaj
	Someș	Jibou	S.G.A. Sălaj

Catchment	Water body	Sampling site	Responsible lab
	Iapa	Iapa - am.loc. Rus	S.G.A. Sălaj
	Paraul Vacii	am.loc. Fantanele	S.G.A. Sălaj
	Briglez	am.loc Garbou	S.G.A. Sălaj
	Almaş	am. cfl. Someş (Almaş)	S.G.A. Sălaj
	Dragu	am.loc. Hida	S.G.A. Sălaj
	Agrij	am. cfl. Someş (Agrij)	S.G.A. Sălaj
	Someş	Ulmeni	S.G.A. Sălaj
	Sălaj	am. Cehu Silvaniei	S.G.A. Sălaj
	Sălaj	Sălsig	S.G.A. Sălaj
	Crasna	am. Cizer	S.G.A. Sălaj
	Crasna	Crasna	S.G.A. Sălaj
	Coliţa	am. Meseşenii de Sus	S.G.A. Sălaj
	Coliţa	Coliţa - am. ac. Vârşolţ	S.G.A. Sălaj
	Mortăuţa	Mortăuţa - am. ac. Vârşolţ	S.G.A. Sălaj
	Ac. Vârşolţ	priza Vârşolţ	S.G.A. Sălaj
	Crasna	Moiad	S.G.A. Sălaj
	Zalău	am. Zalău	S.G.A. Sălaj
	Zalău	Borla	S.G.A. Sălaj
	Crasna	Supuru de Jos	S.G.A. Sălaj
	Someş	Valea Vinului	am. Poiana Codrului
Someş		Dara (granita)	S.G.A. Satu Mare
Maria		am. cfl. Crasna (Maria)	S.G.A. Satu Mare
Crasna		Bervenii (granita)	S.G.A. Satu Mare

No.	Project title (national language, if available)	Project Title (EN)	Year	Country	Project coordinators, Partners
1		DANUBESEDIMENT Danube Sediment Management - Restoration of the Sediment Balance in the Danube River	2017-2019	Hungary	The Danube Transnational Programme (DTP) gathers one of the highest numbers of participating countries among all the Interreg programmes: 9 EU countries (Austria, Bulgaria, Croatia, Czech Republic, Germany - Baden-Württemberg and Bavaria-, Hungary, Romania, Slovakia, Slovenia) and 5 non-EU countries

					(Bosnia and Herzegovina, the Republic of Moldova, Montenegro, Serbia, Ukraine - four provinces: Chernivetska Oblast, Ivano-Frankiviska Oblast, Zakarpatska Oblast and Odessa Oblast).
2		Danube WATER integrated management” – Danube WATER” MIS ETC 166	29.06.2012 – 29.07.2015.	Romania	<p>Ministry of Environment and Climate Changes from Romania is the Lead Partner and is coordinating the activities of 12 partners, including:</p> <ul style="list-style-type: none"> – 7 (seven) project partners from Romania: PP2- National Administration “Romanian Waters”; PP3- National Institute of Hydrology and Water Management; PP4-Technical University of Civil Engineering from Bucharest (TUCEB); PP5- National Environmental Protection Agency; PP6- National Research & Development Institute for Chemistry & Petrochemistry – ICECHIM Bucharest; PP7- Romanian Authority for Nuclear Activities – Institute for Nuclear Research Pitesti; PP8- University

					Politehnica of Bucharest; – 5 (five) project partners from Bulgaria: PP9- Ministry of Environment and Water; PP10- National Institute of Meteorology and Hydrology – Bulgarian Academy of Sciences; PP11- Executive Agency for Exploration and Maintenance of the Danube River (EAEMDR); PP12- Executive Environmental Agency; PP13- The Institute for Nuclear Research and Nuclear Energy (INRNE).
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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.

The information on data and metadata availability is presented in the following table:

Database title	Date	Description	Link
EWN1: River quality	2013-04-09	Monitoring stations with coordinates. Data on 5 preferred SoE nutrient, hazardous substances and biology data.	https://www.eea.europa.eu/data-and-maps/data/waterbase-water-quality-1
EWN2: Lake quality	2013-05-20	Monitoring stations with coordinates. Data on 5 preferred SoE nutrient, hazardous substances and biology data.	https://www.eea.europa.eu/data-and-maps/data/waterbase-water-quality-1

EWN3: Groundwater quality	2013- 04-02	Data for 4 chemical substances in aggregated form. GIS data for GW bodies and list of GW bodies with most important attributes and pressure data.	https://www.eea.europa.eu/data-and-maps/data/waterbase-water-quality-1
WISE1: Emissions to water	2013- 04-23	Emission discharges from point sources are provided for 7 nutrients or organic matter determinants and 7 hazardous substances. They are split to urban and industrial discharges.	https://www.eea.europa.eu/data-and-maps/data/waterbase-emissions-6

The information on past or current economic polluters referring to the direct effect on the quality of sediment in the Tisa basin is presented in the following table:

Catchment	River	Economic polluter	Current activity (Y/N)	Main activity	Hazardous substances
Mures	Mures	S.C. GO S.A. Gheorgheni	Y	Water distribution and wastewater treatment	Cu, Zn, Pb
	Mures	S.C. AQUA CALIMANI Toplita	Y	capture, treatment and distribution of drinking water	Cu, Zn, Pb
	Mures	S.C. AQUASERV S.A. Reghin Branch	Y	distribution of drinking water and sewerage system	Cu, Zn, Pb
	Mures	S.C. AZOMURES S.A.	Y	fertilizer producers	Hg, Ag
	Mures	S.C. AQUASERV Tg. Mures	Y	distribution of drinking water and	Cu, Zn, Pb

Catchment	River	Economic polluter	Current activity (Y/N)	Main activity	Hazardous substances
				sewerage system	
	Mures	S.C. ZAHARUL S.A. Ludus	Y	sugar refining mill	Zn, Pb, Cu, Mn
	Mures	APA CTTA S.A. Alba Iulia Branch	Y	capture, treatment and distribution of drinking water	Cu, Zn, Pb
	Mures	CNC AFE MIN VEST S.A. Central Branch	N	mining	Cu, Zn
	Mures	S.C. ACTIVITATEA GOSCOM S.A. Orastie	Y	distribution of drinking water	Cu, Zn, Pb
	Mures	S.C. ELECTROCENTRALE S.A. Deva	Y	power plant	ash and slag
	Mures	S.C. APAPROD S.A. Deva	Y	distribution of drinking water and sewerage system	Cu, Zn, Pb
	Aries	S.C. MECHEL S.A. Campia Turzii	Y	wire industry	Cu, Mn, Fe, Zn
	Aries	CUPRUMIN S.A. Abrud	Y	extraction of non-ferrous ores, preparation of copper ores and recovery of cuprous concentrate and precious metals.	Cu, Fe, Mn, Zn

Catchment	River	Economic polluter	Current activity (Y/N)	Main activity	Hazardous substances
	Tarnava Mica	AQUASERV S.A. Company Tarnaveni Branch	Y	distribution of drinking water and sewerage system	Cu, Zn, Pb
	Tarnava Mare	AQUASERV S.A. Company Sighisoara Branch	Y	distribution of drinking water and sewerage system	Cu, Zn, Pb
	Tarnava Mare	S.C. APA TARNAVEI MARI S.A. Medias	Y	distribution of drinking water and sewerage system	Cu, Zn, Pb
	Cerna	CNCAF S.C. MINVEST S.A. Boita Hateg mine	Y	waste water collection and treatment	Cu, Zn, Pb
Somes	Somesul Mic	Apa Somes SA Company	Y	waste water collection and treatment	CCO-Cr, Cu, N _T , P _T , NH ₄ ⁺
	Bitrita	RAJA Aquabis Bistrita	Y	waste water collection and treatment	CCO-Cr, H ₂ S, NH ₄ ⁺
	Somesul Mare	SC Edilitare SA Beclean	Y	waste water collection and treatment	CBO ₅ , NH ₄ ⁺
	Valea Zalau	Apa Somes SA Company	Y	waste water collection and treatment	Cu, NH ₄ ⁺ , NO ₂ ⁻
	Crasna	Apa Somes SA Company	Y	waste water collection	NO ₂ ⁻

Catchment	River	Economic polluter	Current activity (Y/N)	Main activity	Hazardous substances
				and treatment	
	Somes	Apa Somes SA Company	Y	waste water collection and treatment	NO ₂ ⁻
	Sasar	SC Vital SA Baia Mare	Y	waste water collection and treatment	CCO-Cr
	Sasar	SC Vitaspria SA Baia Sprie	Y	waste water collection and treatment	Zn, CBO ₅ , NH ₄ ⁺
	Somes	SC Apaserv SA Satu Mare	Y	waste water collection and treatment	Zn, CBO ₅
	Crasna	SC Apaserv SA Satu Mare	Y	waste water collection and treatment	CCO-Cr
	Sasar	Baia Sprie mine with Tautii de Sus tailing pond	N	extraction of non-ferrous ores	Mn, Cu, Zn, Pb
	Cavnic	Cavnic mine	N	extraction and processing of non-ferrous ores	Ca, Mn, Zn
	Firiza	Herja mine	N	extraction and processing of non-ferrous ores	Zn, Mn, Pb
	Lapus	Bozanta tailing pond	N		Hg, Cd

Catchment	River	Economic polluter	Current activity (Y/N)	Main activity	Hazardous substances
	Somesul Mare	Rodna mine with Glod Valley tailing pond	N	mine	Fe, Zn, Mn, Cu
	Somes	SC RO-MIN SA Baia Mare	N	mine wastewater treatment	Fe, Zn, Cu, Mn, Pb, Ni
	Somes	SC Somes SA Dej	temporarily N	produces cellulose and paper	Al, Cd, CBO5, CCOCr
	Sasar	SC Cuprom SA Bucuresti, Baia Mare branch	N	nonferrous metallurgy	Pb, Cu, Ni, As
	Nistru	SC Domaso Construct SA Petrosani	Y	manages mine wastewater treatment	Hg, Cd
	Sasar	SC Romplumb SA Baia Mare	N	nonferrous metallurgy and metal production	Zn, Pb
	Crasna	SC Abo Mix SA Satu Mare	Y	pig farm	Cd, Hg
Upper Tisa	Iza	SC Acaterm SA Sighetu Marmatiei	Y	waste water collection and treatment	Ni
	Viseu	SPAC Borsa	Y	waste water collection and treatment	NH ₄ ⁺ , NO ₂ ⁻
	Viseu	SGCL Viseu de Sus	Y	waste water collection and treatment	Ni
	Viseu	Baia Borsa mine	N	extraction and processing	Zn, Cu, Mn

Catchment	River	Economic polluter	Current activity (Y/N)	Main activity	Hazardous substances
				of non-ferrous ores and cuprifers	
	Vaser	Novat tailing pond	N		As, Cr, Cu, Cd, Ni, Pb
	Tur	Turt mine	N	extraction and processing of non-ferrous ores	Zn, Cu, Mn, Pb, Cd
	Tarna Mare	S.C. Domaso Construct SA Petrosani	N	mine wastewater treatment	Ni, Cu, Mn, Fe, Pb
Crisuri	Crisul Alb	Bradmin Brad Branch	N	mine	Cd, Pb
	Crisul Negru	SC Mineral Mining SRL	N	mine	Cd, Pb, Ni
	Crisul Repede	SC Apa Somes Cluj Company, Huedin branch	Y	wastewater treatment	Ni
	Crisul Repede	SC Bega Minerale Industriale SA Suncuius branch	Y	producer of quartz sands	Cd, Pb, Ni
	Crisul Repede	SC Helios SA	Y	industrial wastewater treatment	Cd, Pb, Ni
	Crisul Repede	SC Holchim SA	Y	building materials industry	Hg, Pb
	Crisul Repede	SC Apa Oradea Company SA	Y	wastewater treatment	Cd, Pb, Ni
	Barcau	OMV Pertom SA	Y	oil industry	Cd, Hg, Ni, Pb

II.5.Problems of current monitoring procedures in DRB

III. INVENTORY OF SAMPLING METHODOLOGIES

III.1. Water

In Romania, the standard SR EN ISO 5667-6: 2017 is used.

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?

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

In Romania for Danube and the Danube Delta there are measured in situ: turbidity, temperature, pH, O₂ (mg/l)

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

Portable pH meter HACH DR Drell 2000.

III.1.4. Please, describe **methodology** for *in situ* measurements.

III.1.5. Which **tools** are used for collecting samples for **laboratory** measurements (include manufacturer and type)?

III.1.6 Sample preservation (samples chemical preservation according to their type and used analysis method).

III.1.7 Please, describe a **methodology** for collecting samples

III.2 Sediment

III.2.1. Which type(s) of sediment do you sample/measure **bottom, suspended, floodplain**?

- sediments in suspension, dragged sediments, river bed sediments

III.2.2. Sampling design strategy. How do you choose sampling locations?

How do you decide about temporal frequency of collecting samples?

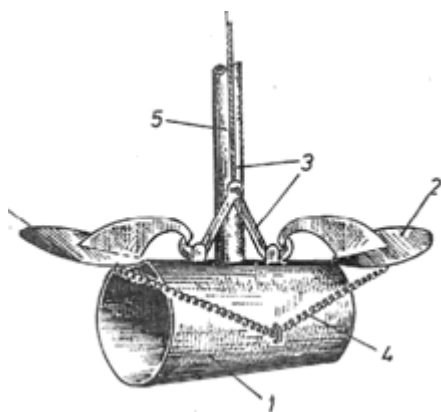
- weekly (7 days interval),

III.2.3. Which parameters of sediment **quality/quantity** are measured *in situ*?

- quantity of sediment

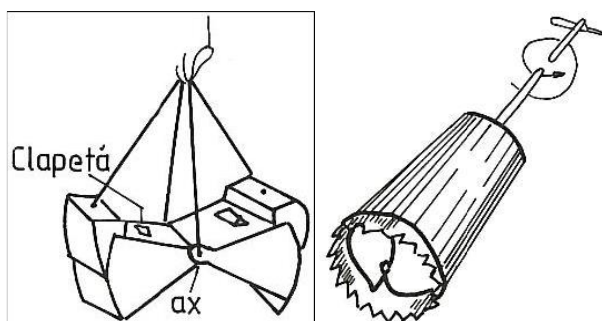
III.2.4. Which appropriate sampling devices (e.g. GRAIFER, CAROTIER etc.) and instruments are used for *in situ* measurements (include manufacturer and type)?

1. Sediments in suspension: - Rapid collector Nansen bottle (cylinders with flaps for sediments)



The cylinder (1) is inserted at the point of collection with the flaps (2) raised and reinforced by a simple arming-tripping system (3). By the trigger, the flaps close suddenly, pulled by the springs (4). The appliance is placed at the sampling point using a stem (5). Dragged sediments: frequently used devices: trap Nansen bottle (ISCH type) and sieve Nansen bottle.

2. River bed sediments: Sampling from the river bed (under water) is done with GRAIFER, CAROTIER, and from the floodplain (dry sampling) with an ordinary shovel.



For Danube and teh Danube Delta there were used the folowing devices:

- Kullenberg correr
- Reineke Boxcorrer
- Van Veen Bodengreifer
- Petersen Bodengreifer
- Dredge haul Berthold
- Dregde haul with net for coarse sediments

III.2.5. Please, describe **methodology** for *in situ* measurements.

A. Sample taking is done with Nansen bottle at a depth of 7 cm from the surface of the water. To collect samples of sediments in suspension with the Nansen bottle, insert the device into the water with the rod or cable. Due to the empennage, the device directs itself to the water flow. By building the nozzles are on the same line as the rod. The cable is used when samples are taken from a bridge, large water or from certain constructions.

When the device reached the sampling point, pulling the thin cable the water inlet nozzle closes and the water starts to enter the front chamber. After the camera has been filled (when no air bubbles appear), remove the device from the water and keep it in a horizontal position so that water does not flow from one room to another.

Emptying the water from the room is done by opening the caps from the two holes; first break the tail cap to drain the water from the back room, then the

front cap to allow the water in the first chamber to pour into a bottle. During water transfer, the device should be well shaken so as not to leave sediments inside.

All the collected water should be poured into the bottle, taking care not to leave any sediment deposited on the walls of the device. Sample casting will always be done with large funnels.

When the water is slightly cloudy, one liter is sufficient for each sample. For rivers in the hilly or lowland areas, when the water is clear, 2 - 3 liters are collected.

At mountain rivers when the water is clear the sample should contain 3 up to 10 liters when the water is very clear. Samples are taken in separate bottles or flasks for each test.

B. Collecting samples of dragged sediments

Samples are collected from at least 5 fixed points where the full flow of dragged sediments is measured. Nansen bottle Sieve (R). The points are indicated by the staff of the hydrological station. The points where samples of water should be taken will be marked (with paint) on the cable, bridge or deck bridge.

From each point, 3 samples are taken at the same collecting time. Sample collection is done by immersing the Nansen bottle on the bottom of the bed, by opening the access cover, and it collects in a certain amount of time (according to the technical instructions of the device).

After a time, T (minutes) recorded on the stopwatch, the Nansen bottle is extracted from the water and the retained sediments inside are weighed. Samples collected in the "Recording book for the flow of dragged sediments".

C. Sampling of sediment from the river bed

In general, it must be established 2-3 points of sample collection in the river bed and 1 - 2 points in the floodplain (depending on the mobility of the bed).

Samples should be collected during the year after important floods.

The number of samples must not be less than 4. It is mandatory that the samples of sediments in the river bed must be collected together with the samples of sediments in suspension.

Samples are collected from the first 10 - 15 cm from the surface of the river bed. The amount of sediment collected from each point should be approximately the same volume and particle size.

III.2.6. Which **tools** are used for collecting samples for **laboratory** measurements (include manufacturer and type)?

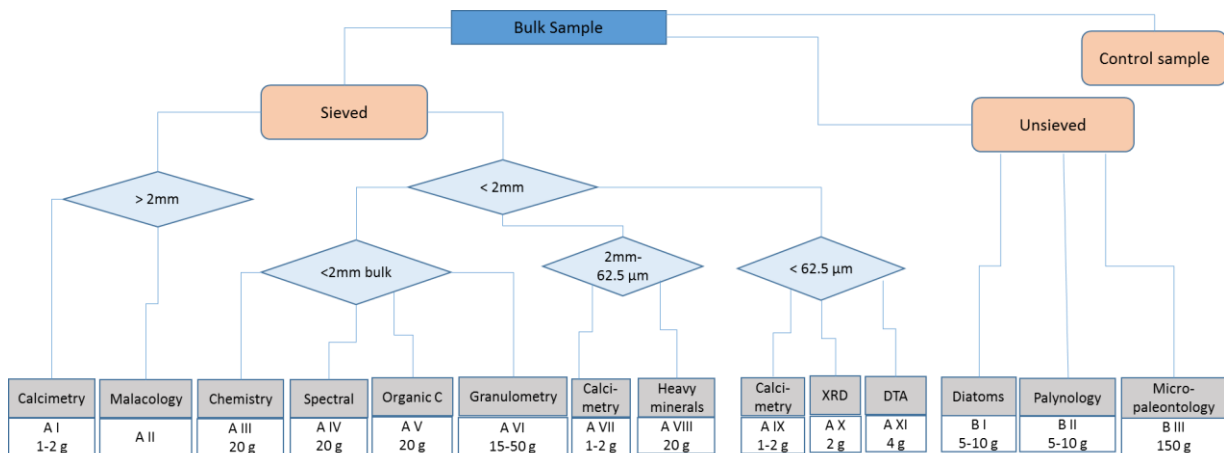
Laboratory equipment used for collecting samples are: filter paper, laboratory glassware.

Trays, plastic and cotton bags are used for solid samples.

100 cm³ sarpagan boxes with sealing cups.

III.2.7. Please, describe a **methodology** for collecting samples for **laboratory** measurements.

For the sediments in the Danube and Danube Delta, the samples were prepared for various analysys according to the scheme below.



Sample preparation scheme for various analyses of the Danube and Danube Delta sediments

Detailed laboratory procedures described by RO-TUCN are as follows:

The filter paper and the envelope have the stamp of the laboratory weighing, a serial number and its weight in grams. In the bulletin it is recorded the sample volume, the number of the filter written on it and on the envelope from the hydrological station laboratory. Filtration is done using tripods. In order not to confuse the bottles and filters, it is recommended that the envelope is placed next to the filter funnel and the bottles to be filtered are placed in front of the stand.

After emptying the bottle, rinses with clean water until the walls are cleared of sediments. The water used for rinsing will be poured into the filter and will not be counted with the amount (volume) of filtered water.

When the amount of sediments is too high, then the sample will be poured into two or maximum three filters. The filters of this same sample are placed in the same envelope.

When the entire amount of collected water was filtered, take the bottles of the stand and allow the filters to dry thoroughly, covering them with the envelopes. To avoid dust or rubbish on the filters, place a piece of cardboard or newspaper over the funnels. Once the filters have dried, they will not be left in the funnel because sediments can shatter.

The filters are packed and are each inserted into the envelope on which the data has been filled in; close the envelopes and fill in the bulletins.

Bulletins with the data from the sediment measurements must be completed in the following columns:

- current number;
- the day;
- the hour;
- Myrtle level;
- no. points;
- the abscissa of the point from which the sample was taken (distance in meters of the horizontal at the landmark);
- the depth of from which it was collected;
- filter number

- sample volume.

In "observations" it is written with which device the samples were taken.

For each month a separate bulletin is added for "simple" samples (single samples). In the case of complete or "simplified" measurements, one bulletin for each measurement shall be completed.

All samples taken from a point in a profile are mixed together in a global average granulometry sample.

Sampling is done as follows:

- the collected sample (with the probe or shovel) is poured in a tray;
- drain the water from the tray and spread the sample on a piece of cloth to drain all the water;
- mix the sample very well, then lay in a layer of the same thickness;
- one part (one quarter, one half, etc.) is taken from the global sample depending on the size of the sample and the granules.
- the weight of the global sample depends on the maximum diameter of the deposited sediments, namely:
 - when the maximum alumina diameter is greater than 7 cm (boulders), the weight of the aggregate sample should be about 10 kg;
 - if the maximum sediment diameter is between 3 and 7 cm (gravel), the weight of the aggregate sample will be 3-5 kg;
 - if the maximum diameter of gravel is between 1 and 3 cm, the weight of the bulk sample will be about 1 kg;
 - for a maximum diameter of less than 1 cm, the average sample will be several hundred grams.

The average sample is placed in a strong cloth bag.

The following data shall be filled in on a sheet of paper: the river, hydrometric station, the collecting date, the weight and the diameter of each boulder larger than 8 - 10 cm that was part of the average sample but no longer inserted into the bag.

III.2.8. Please, describe a **transport** methodology for samples intended for laboratory measurements.

Samples of sediments in suspension are sent to the laboratory with each filter. The filters are packed and are each inserted into the envelope on which the data has been filled in; the envelopes are closed, and the bulletins are filled.

Solid samples are transported in hard cloth bags with the data from sediment measurement.

III.2.9. Do you **archive** samples? If yes, please describe how.

Every month a separate bulletin is added for each sample and measurement. Envelopes and filters are kept in a clean, moisture-free room.

References: Mary-Jeanne ADLER, Ion PAȘOI, Macc PETREA, Laurențiu PETRESCU, ÎNDRUMAR PENTRU ACTIVITATEA STAȚIILOR HIDROMETRICE PE RÂURI, ISBN 978-973-0-13558-9, Vol. I

III.3 Biota

III.3.1. Which type(s) of biota do you sample/measure: flora, fauna (name species)?

Most samples of aquatic organisms include: plankton, bacteria, periphyton, protozoa, algae, fungi, macrophytes, macro invertebrates, bivalves and fish.

Aquatic macrophages.

A series of algae, bryophytes, amphibian or hydrophilic have strong accentuation of the concentration of both mineral elements (heavy metals) and organic xenobiotic compounds in the tissues.

Aquatic muscles with potential for bioaccumulation are among others: Fontinalis, Amblystegium, Rhychoyostegium, Plathyhypnidium, Cindidotus.

A number of studies have established that Fontinalis squamosa and Fontinalis antipyretics have a high capacity of bioaccumulation of Zn and other toxic metals. It was found that the last species also accumulates PCBs or other xenobiotic organic compounds, or rare metals (very low concentrations) like Ag, Bi, Sn.

Algae. Red alga Lemanea sp. is one of the few macrophytes that can live in the immediate vicinity of water from a tailings pond at a Pb exploitation. It can develop in waters with high concentrations of toxic metals and can be found in waters containing 1.16 mg / l Zn.

Phanerogams. Typha latifolia has proven to be an effective Zn bio accumulator, accumulating in the roots up to 1400 mg Zn / kg when the plants have grown on sediment containing 10 mg Zn / kg of sediment.

Mollusks and other aquatic invertebrates. Lamelibranhi mollusks are excellent bioindicators for contamination of both continental and marine waters. They have considerable bioaccumulation capacities and are additionally sedentary, which is very useful in detecting and locating the source of contamination more precisely.

In freshwaters, large bivalves such as Unio, Anodonta (river clam), Dreissenia are of particular interest because of their relatively high frequency. To these are added some small bivalves of the sweet medium such as spheroids: Sphaerium, Pisidium.

Fish. Fish species at the top of the organic pyramid, with a rapier or superior kidnapper regime, are likely to have concentration factors greater than 10 times the water content of certain mineral or organic contaminants.

The fish have been widely used as bioindicators for the pollution of aquatic ecosystems with heavy metals or with other toxic elements. Thus, the study of copper bioaccumulation in rainbow trout (*Salmo gairdneri*) demonstrated a very good correlation between the concentration of Cu in the body of the fish and the water content. The *Esox lucius* has proved to be an excellent bioindicator for monitoring the pollution of mercury-containing ecosystems. In this case, a very good correlation between the body content of Hg in the pike and the Hg content in the sediments was established. Its

bioconcentration capacity also depends on the pH of the water, being higher in acid waters.

III.3.2. Sampling design strategy. How do you choose sampling locations? How do you decide about temporal frequency of collecting samples?

There is no sampling design strategy described in the Romanian legislation. The sampling methods are described in the APHA, ISO, OECD guides and documents.

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

Choice of sampling device should be thought of in terms of qualitative, semi-quantitative, and quantitative sampling.

In a qualitative sampling design, the aim of the research is to determine which species, genera, or families are present, in order to obtain general information with which to estimate the relative abundance or percentage of taxa (e.g., number of Oligochaeta/total number of benthic macroinvertebrates) or functional feeding groups present (e.g., percentage of collectors/total invertebrates collected or, the percentage of burrowers/total number of invertebrates, for both taxonomic and biogeographic studies. In this type of sampling, large samples should be collected to account for any rare species present in relatively low numbers. Qualitative sampling provides comparable values, when samples are collected within the same habitat and when the sampling device is the same for all samples. A qualitative sampling regime might be turned into a semi-quantitative sampling method if sampling effort (distance or time) is taken into account during the sampling procedure. Uniform sampling efforts should be considered when planning this type of sampling (taking into account the same distance or time for collecting each sample).

In quantitative sampling, the size of the sampling unit is known. Because of this, in studies involving a quantitative sampling design, it is possible to determine the density (number of individuals/area or volume), biomass (usually a dry weight/area or volume), diversity, richness or other metrics, within the same habitat or among different habitats allowing for comparative studies. Quantitative sampling requires strict considerations on sampling site location, sampling frequency, and number of sample units (sample size) to be collected during each time interval. The number and size of samples depend on the variability and distribution of organisms in the area and the level of accuracy and precision needed for the research. However, in most cases replicated quantitative sampling provides the strongest, most interpretable data.

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

Aquatic organisms' group	Sampling method	References
Plankton	Planktonic Wire, Bottle, Trap	APHA, ISO, OECD

Bacteria	Different types of probes	APHA
Periphyton	Natural and artificial substrates	APHA, ISO, OECD
Protozoa	Different types of cylinders	APHA, ISO, OECD
Algae	Different types of bottles, fillets	APHA
Fungi	Different types of bottles and grabs	APHA
Macrophytes	Different methods	APHA
Benthic invertebrates and algae	Grabs, cores	APHA, ISO, OECD
Macro-invertebrates	Grabs, cores, dredges, nets	APHA
Bivalve	Dredges, nets, manual	APHA
Fish	Dredges, nets, electric	APHA, ISO, OECD

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

For capturing small, bottom-dwelling (benthic) invertebrates, various kinds of sediment samplers are used. Some of these are coring devices; others are dredges or grabs. Both can be operated from a boat to collect samples of the bottom material and bring them to the surface for further analysis.

Fish can be captured for research purposes in a variety of ways, including nets (gill nets, seine nets, trap nets), minnow traps, and by angling (rod and reel). Used properly, these techniques generally prevent the fish from being killed. Some methods, like trap netting and seine netting may catch other animals as well, such as turtles, newts, crayfish, insect larvae, and small crustaceans.

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

For diatoms harvesting can be done directly with the teaspoon or syringe. For zooplankton a Schindler-Patalas trap is of common use.

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

Sampling of macrophytes and submerged macroalgae

The entire plant is taken and put in a plastic bag to be transferred to the laboratory. To displace the attached diatoms, the plants are vigorously shaken in distilled water in a large glass. The macrophytes are then removed from the beaker, and let to decant while removing the supernatant from the drain.

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Fish can be captured for research purposes in a variety of ways, including nets (gill nets, seine nets, trap nets), minnow traps, and by angling (rod and reel). Used properly, these techniques generally prevent the fish from

being killed. Some methods, like trap netting and seine netting may catch other animals as well, such as turtles, newts, crayfish, insect larvae, and small crustaceans.

Preparation of blades for microscope

Samples should be fixed in the field in 4% formalin solution. In the laboratory, after repeated washing of the material in distilled water to remove the formaldehyde, proceed to the preparation of the fixed preparations.

The biological material (suspended in distilled water) is burned on the lamellae for 12-24 hours, after which it is permanently fixed the rosin lamellas. Then examine the microscope preparations to identify the species

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

All samples being shipped for biological analysis should be properly packaged and labeled before transport offsite or within the site. The primary concern is the possibility of spills, leaks, or breakage of the sample containers.

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

Usually, biological samples are not being archived.

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

IV. INVENTORY OF LABORATORY METHODOLOGIES

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

a) water

b) sediment: drying in Sanyo MOV112 oven, sieving in Retsch RM100, Retsch ZM200 grinding mill and Retsch RM100 milling machine

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.

Spectrometric system ICP-AES BAIRD 2070 (CETAC U500AT nebulizer, CETAC HGX-200 hydride generator according to ISO 11885 (75 7466) Determination of Ag, Al, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Pb, Si, Sn, Sr, Ti, V, Zn in water and aqueous extracts (ICP-OES)

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.).

Microwave-Milestone MLMEGA1200-for acid microwave digestion according ISO standards

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.

AAS Spectrophotometer Zenit-700 (GFAAS; FAAS, HG AAS) produced by AnalytikJena, Germany.

HG ANALYZER Hydra IIA,Teledyne LeemanLabs

ISO 11047/1998 - Soil quality -- Determination of cadmium, chromium, cobalt, copper, lead, manganese, nickel and zinc -- Flame and electro thermal atomic absorption spectrometric methods

EPA Method 245.7 – Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry

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.

Minipal 4-PANALITYCAL (energy dispersion) according to ISO 12677 Determination of SiO₂, Al₂O₃, Fe₂O₃, CaO, MgO, TiO₂, MnO, K₂O, Na₂O, P₂O₅ in geological material, soils, sediments, sludge by XRF.

ISO 17225 (1-7) Determination of As, Ag, Ba, Bi, Br, Cd, Ce, Cl, Cr, Cs, Cu, Ga, La, Mo, Nb, Ni, Pb, Rb, Sb, Se, Sn, Sr, Te, Th, U, V, W, Y, Zn, Zr in geological material, soils, sediments, sludge by XRF.

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.

Sample preparation follows a standardized method involving crushing, grinding, sieving (disk mill) (grain size <60 µm) and preparation of pressed pellets (5 g of a powder is homogenized and mixed well with 1 g of binder – wax, and then pressed with 20 tons to a 40 mm pellet); or for powder analysis (4 g of a powder is poured into a sample cup with an inner diameter of 32 mm. The bottom of a sample cup is covered with a 4 µm polypropylene film. Identical preparation procedure for CRMs.

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.

The Technical University of Cluj-Napoca uses Shimadzu 6000 X-ray diffractometers (within the Research Center for Materials Physics and Environmental Physics) and INEL Equinox 3000 X-ray diffractometer (MAGNETIC MATERIALS AND NANOMATERIALS RESEARCH GROUP) and

microscope JEOL JSM 5600 LV (Faculty of Material Engineering and Environment).

The Geological Institute of Romania (IGR) uses Scanning electron microscope (SEM) ZEISS MERLIN GEMINI2.

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

The XRD analysis can determine the mineralogical composition of crystallized sediments that can retain heavy metals.

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

Sediment samples are dried in the oven at 105°C, ground to less than 1 µm, and the resulting powder is analyzed by XRD.

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.

1. ALS Romania Loc. Gura Rosia, Comuna Rosia Montana, Alba Iulia 517619, www.alsglobal.com/geochemistry
2. SCIENT Analytcs SRL, cu sediul în loc. Tancabesti, str. Petre Ispirescu nr. 1 C, județul Ilfov,, <https://www.scient.ro/>

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 international projects which had developed the Protocols.

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

V .INVENTORY OF EVALUATION METHODS

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.).

If you refer to sediments then they must be established through this project

V.2. Are **threshold values fixed or variable** and do they depend on the sample form, drainage basin lithology, time of the year, etc.?

It may depend on lithology if there are very large differences in the substrate

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?

There are quality categories for soils and water.

The status of a body of surface water (river, lake, canal, river sector, canal sector, transitional waters, and part of coastal waters) is established by assessing its ecological status and its chemical status.

"Ecological status" is an expression of the quality of the structure and functioning of aquatic ecosystems associated with surface water, classified in accordance with Annex V of WFD (60/2000/EC).

The assessment of the ecological status of surface water bodies classifies surface water bodies in five quality classes, namely: very good, good, moderate, poor and bad with the appropriate colour code (blue, green, yellow, orange and red). The assessment of the ecological status of bodies of surface water is achieved through the integration of quality elements (biological, physicochemical, nutrients and specific pollutants).

The quality biological elements used to assess the ecological status of natural water bodies are phytoplankton, phytobenthos, macro-invertebrates and fish (for rivers).

For natural lakes, quality biological parameters include phytoplankton, phytobenthos and macro-invertebrates, and for transitional and coastal waters phytoplankton and phytobenthos.

For each of the mentioned biological elements and water typology, evaluation indices have been established, with values characteristic of the five quality classes and guide values for the non-synthetic pollutants (As, Zn, Cr) and synthetic (Xylene, PCBs, toluene, acenaphthen, phenol, detergents and total cyanides). The methodology for assessing the ecological status of natural water bodies in the "rivers" category for general physico-chemical elements (support for biological elements) complies with the requirements of Directive 90/2009/EC transposed into national legislation in Romania by HG 1038/2010.

In the assessment of specific pollutants there are used the annual average of the concentration values for each non-synthetic indicator (concentration of the dissolved fraction in the water column, taking also in consideration the natural background) and synthetic indicator (organic substances). The ratios refer to the total concentration in the water column.

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:

Stuart L Simpson, Graeme E Batley, Anthony A Chariton, Jenny L Stauber, Catherine K King, John C Chapman, Ross V Hyne, Sharyn A Gale, Anthony C Roach, William A Maher ***Handbook for Sediment Quality Assessment***, CSIRO, 2005

Williamn, R.B., Mills, G.N. (2009) sediment Quality Guidelines for the Regional Discharges Project. Prepared by Diffuse Sources Ltd. For Auckland Regional Council. Auckland Regional Council Technical Report 2009/050

Watch Your Danube Joint Danube Survey Fact Sheet 1 ICPDR IKSD. JDS3 Scientific Scope

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.

Limnology (2002) 3:65–75 © The Japanese Society of Limnology 2002

G. Allen Burton, Jr. Sediment quality criteria in use around the world. Received: December 26, 2000 / Accepted: December 28, 2001

Canadian Sediment Quality Guidelines for the Protection of Aquatic Life. Protocol for the Derivation of Canadian Sediment Quality Guidelines for the Protection of Aquatic Life. Canadian Council of Ministers of the Environment 1995. CCME EPC-98E.

Canadian Sediment Quality Guidelines for the Protection of Aquatic Life. Summary Tables. Canadian Council of Ministers of the Environment. Updated 1999, Winnipeg.

Environment Canada and Ministère du Développement durable, de l'Environnement et des Parcs du Québec. 2007. Criteria for the Assessment of Sediment Quality in Quebec and Application Frameworks: Prevention, Dredging and Remediation. 39 pages.

Review of Sediment Quality Data for the Similkameen River Department of Ecology. Publications Distributions Office. Address: PO Box 47600, Olympia WA 98504-7600 E-mail: ecypub@ecy.wa.gov

Sediment Quality Gibraltar Doc No: 048 Issue: 1 Rev: 0 Date: 30 July 2007
Maritime\PROJECTS\Coastal\DCSBGA\3.Disciplines\Environmental\ES Submission July 2007\Final ES

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Mihăilescu N., Jipa D., Rădan S., Giușcă R., Vanghelie I., 1972, Studiul sedimentologic informativ al aluviunilor Dunării și lacului Schitu; Report IGR archive.

Mihăilescu N., et. al., 1991, Studiul complex, geologic și geofizic pentru cercetările aluviunilor Dunării, sector Ostrovul Mare - Drobeta Turnu Severin; Report IGR archive.

Mihăilescu N., 1996, Studiul geocologic al lacurilor din Delta Dunării; Report IGR archive.

Vogt J., Soilee P., de Jager A., Rimavaciute E., Mehl W., Foisneau S., Bodia K., Dusart J., Paracchini M.L., Hastrup P., Bamps C., 2007 – A pan-European River and Catchment Database, EUR 22920 EN – Joint Research Centre – Institute for Environment and Sustainability, 120 pp., EUR – Scientific and Technical Research Series – ISSN 1018 -5593, ISBN 978-92-79-06941-3, DOI 10.2788/25907.