Interreg
Danube Transnational Programme
SIMONA

TABLE OF SAMPLING SITES PROVIDING DETAILS SOUTH DANUBE TEST AREA

Deliverable 3.2.1

Programme co-funded by the European Union funds (ERDF, IPA, ENI)

PROJECT TITLE
Sediment-quality Information, Monitoring and Assessment System to support transnational cooperation for joint Danube Basin water management

ACRONYM
SIMONA

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For further information on the project, partnership and the Danube Transnational Programme:
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CONTENTS

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1. INTRODUCTION

SIMONA project`s WP3 has activity 3.2. "Planning sampling points for 3 test areas and for DRB baseline network", scheduled to be completed in the third period of the project, respectively fifth perod for the DRB baseline network.

The 3 test areas represent different hydrological conditions and environmental pressures in the Danube River Basin. In each of the test areas ten sampling sites will be selected, for sampling bottom sediments by the PP teams or accredited sub-contractor in accordance with the newly designed **SIMONA transnationally harmonized sediment sampling protocol (THSSP)** developed within WP4. At sites where possible suspended and active floodplain sediments will also be sampled, following the same protocol. The collected samples would be adequately stored, transported and delivered to the reference laboratory of SIMONA project. At the reference laboratory analyses of HSs (heavy metals and their compounds, and organic susbtances in accordance with the list of WFD) will be carried out in accordance with the standards established in the **SIMONA transnationally harmonized sediment laboratory protocol** developed also within WP4 of the project.

For the selection of the 10 representative sampling points for each SIMONA test area, the criteria settled in the following documents and standards were applied:

- ISO 5667 - 12:2017
- Iao 5667 - 17:2008
- Guidance Document No. 25
- TNMN monitoring sites criteria
- SMONA transnationally harmonized sediment sampling protocol

The criteria were discussed and completed during the SIMONA Workshop in Sofia (Bulgaria) in October 2019, where priorities have been assigned to each one.

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2. CHARACTERISATION OF THE SOUTH DANUBE TEST AREA

The South Danube test area comprises the part of the Lower Danube River from the border between Serbia, Romania and Bulgaria to Silistra (Calarasi), including a number of large and small tributaries. The area is characterized with present and past mining activity and industrial and agricultural activities which contributes to the overall sediment pollution.

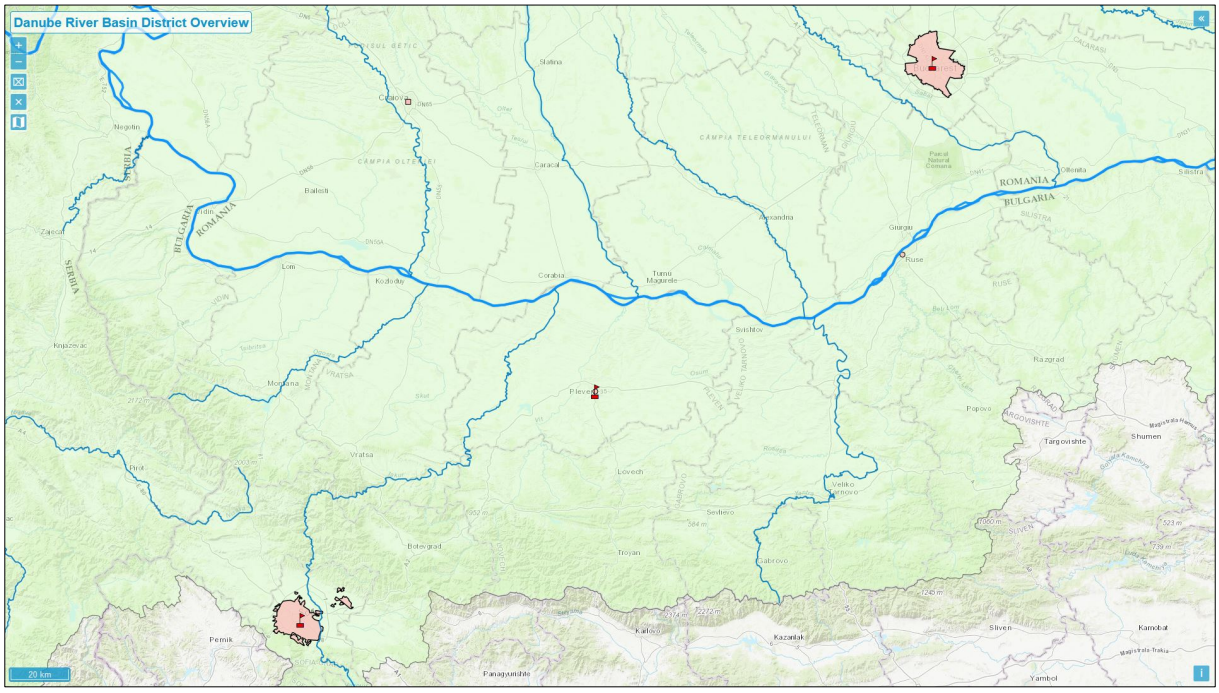

Fig 1 Location of South Danube test area

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3. DESCRIPTION OF THE SAMPLING SITES

Sampling sites in the South Danube test area were selected upon the following major criteria:

- Trans-national character;
- Covering river of different size (small, medium, and large), including the Danube River;
- Existing sediment/water monitoring sites;
- Different geology;
- Diverse pollution sources;
- Good infrastructure.

Sampling sites in the South Danube test region were selected in agreement with Project Partners from the South Danube Catchment area countries – Serbia, Romania, and Bulgaria (Fig. 1). As a result the following sites were selected:

- 1 sampling point at the Borska Reka trubitary (SRB);
- 1 sampling point at the Timok River in its transboundary part (BG/SRB);
- 1 sampling points at the Ogosta River (BG);
- 2 points in the Iskar River basin (BG) – one above the confluence with the Danube and one at its trubitary Malak Iskar River;
- 1 sampling point at the lower Jiu River (RO);
- 1 sampling point at the Lower Olt River (RO);
- And 3 transnational sampling points/transects (RO/BG) on the Danube River: one near Pristol (Romania), one near Svishtov (Bulgaria) and one near Oltenita (Romania).

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Table 1 Selected sediment sampling stations in South Danube test area

Nr.	Code	Name of the river	Name of the site	WGS Long	WGS Lat	Owner of water monitoringdata	Owner of sediment monitoring data	Responsible for sampling	Existent archive water, sediment monitoring data	Comment
1.	RGOTINA_42906	**Borska Reka**	Rgotina	44.002971	22.278857	EPA	EPA	UB/ GI-BAS	yes	
2.	BG1WO00014MS140	**Timok**	Timok at Bregovo	44.5406	22.62722	DRBD Pleven	DRBD Pleven	UB/ GI-BAS	yes	
3.	BG1OG00001MS010	**Ogosta**	Ogosta before Danube at Oriahovo	43.740833	23.87695	DRBD Pleven	DRBD Pleven	GI-BAS	yes	
4.	BG1IS00119MS020	**Iskar**	Iskar before Danube at Orehovitsa	43.58773	24.3587	DRBD Pleven	DRBD Pleven	GI-BAS	yes	
5.	BG1IS00021MS050	**Malak Iskar**	Malak Iskar near Roman	43.1391	23.925	DRBD Pleven	DRBD Pleven	GI-BAS	yes	
6.	BG1DU07973MS070	**Danube**	Danube at Svishtov	43.62333	25.34542	DRBD Pleven	DRBD Pleven	GI-BAS/ IGR	yes	
7.	RORW14-1_B3 3 sections RO14130_1 RO14130_2 RO14130_3	**Danube**	Danube at Pristol	44.2132	22.682069	ANAR	ANAR	IGR/ GI-BAS	yes	ANAR monitoring station
8.	RORW7-1_B148 Section RO7400	**Jiu**	Zaval, downstream of bridge	43.841761	23.844953	ANAR/ Jiu RBA	ANAR/Jiu RBA	IGR	yes	ANAR/Jiu RBA monitoring station
9.	RORW8-1_B12 Section RO87600	**Olt**	Islaz, upstream Danube confluence	43.717558	24.792675	ANAR/ Olt RBA	ANAR/Olt RBA	IGR	yes	ANAR/Olt RBA monitoring station
10.	RORW14-1_B3 Section RO14270_1	**Danube**	Olterniţa (upstream confluence Argeş)	44.054251	26.605097	ANAR	ANAR	IGR/ GI-BAS	yes	ANAR monitoring station

The points have been approved by the Bulgarian Water Authorities (DBRD Pleven), Romanian Water Authority – ANAR (Administraţia Naţională Apele Române, ASP in SIMONA project) and the Environmental Protection Agency (Ministry of Environmental Protection of the Republic of Serbia). The characteristics of the selected sample points are shown in Table 1 and their overall spatial distribution in Fig 2 and 3.

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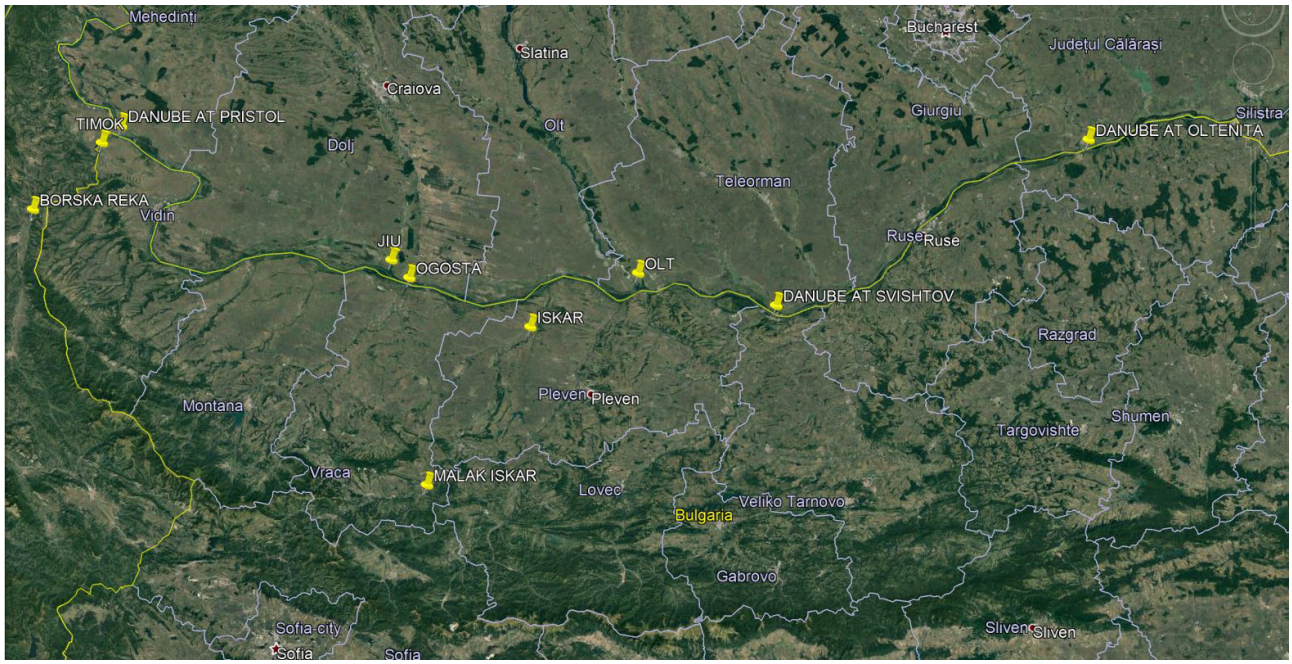

Fig. 2. Overall view of the sediment sampling points in the South Danube test area (by name in Table 1)

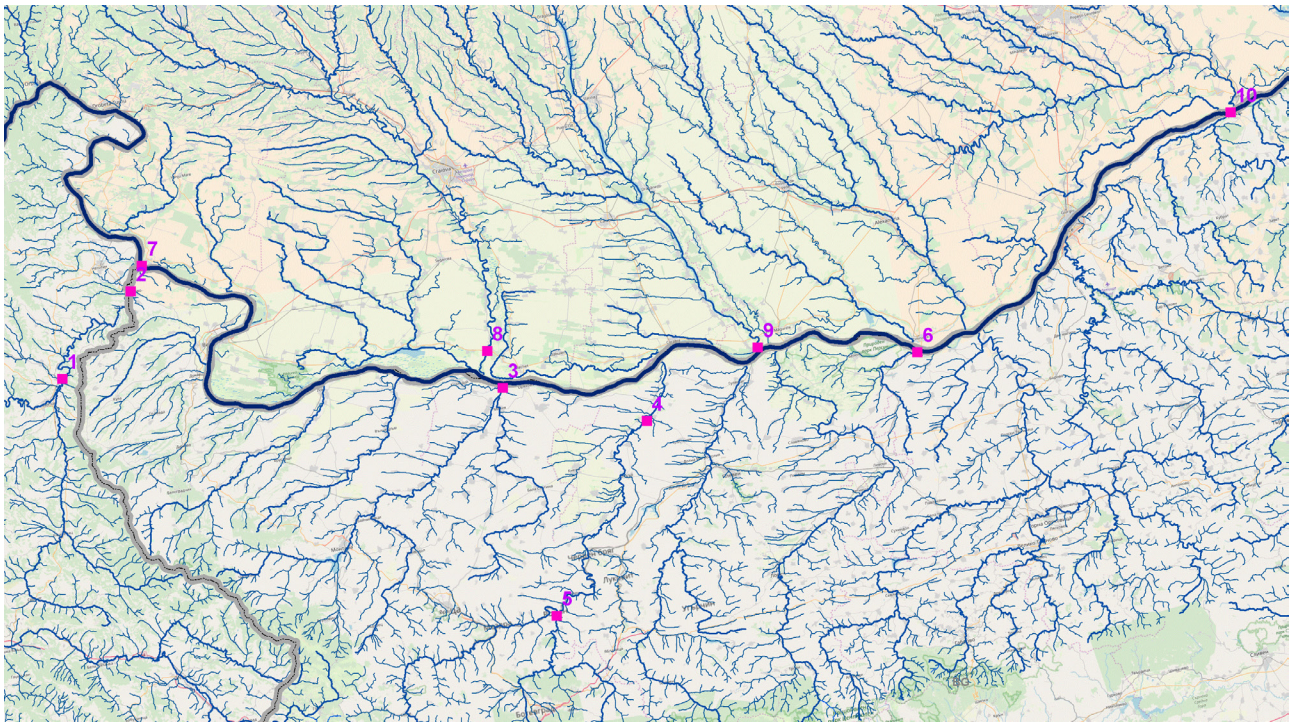

Fig. 3. Overall view of the sediment sampling points in the South Danube test area (by number of station in Table 1 – OpenStreet Maps and the Catchment Characteristion and Modelling database CCM of Joint Research Centre, European Commission)

1.Borska Reka - Rgotina

Fig. 4. Sampling point 1 – Borska Reka - Rgotina - Serbia (Google Earth)

Description and reason for selection

The sampling point is situated on the Borska Reka River, southern of Rgotina and northern from Vrazogrnac, around 3 km before the confluence with the Timok River. The Borska Reka River is the biggest tributary of the Timok River with the average annual discharge of about 3.22 m3/s (Milijašević et al., 2011). It is among the strongest polluted small rivers in Serbia, representing an out-of-water class river and does not contain traces of life. The fundamental pollution source of the entire Borska Reka basin is the Bor Mining and Metallurgic Complex, which has a more than 100 years long exploitation and industrial activity. However, so far only a few studies that address the problem of water quality and pollution in this river basin exist, and they are mainly written in Serbian (e.g., Lekovski et al., 1997)

National Administration Serbian Waters monitoring: Yes - Environmental Protection Agency (Ministry of Environmental Protection of the Republic of Serbia)
Monitoring type: operational
Monitoring programs: This station (Rgotina_42906) was covered by the Monitoring program of the status of surface and ground water performed by the Environmental Protection Agency of the Serbian Ministry of Environmental Protection. The quality of water was monitored on monthly basis in the period from 1997 to 2012 and it included physicochemical, chemical, microbiological and biological parameters. The sediment samples have been taken yearly, during dry periods.

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2. Timok

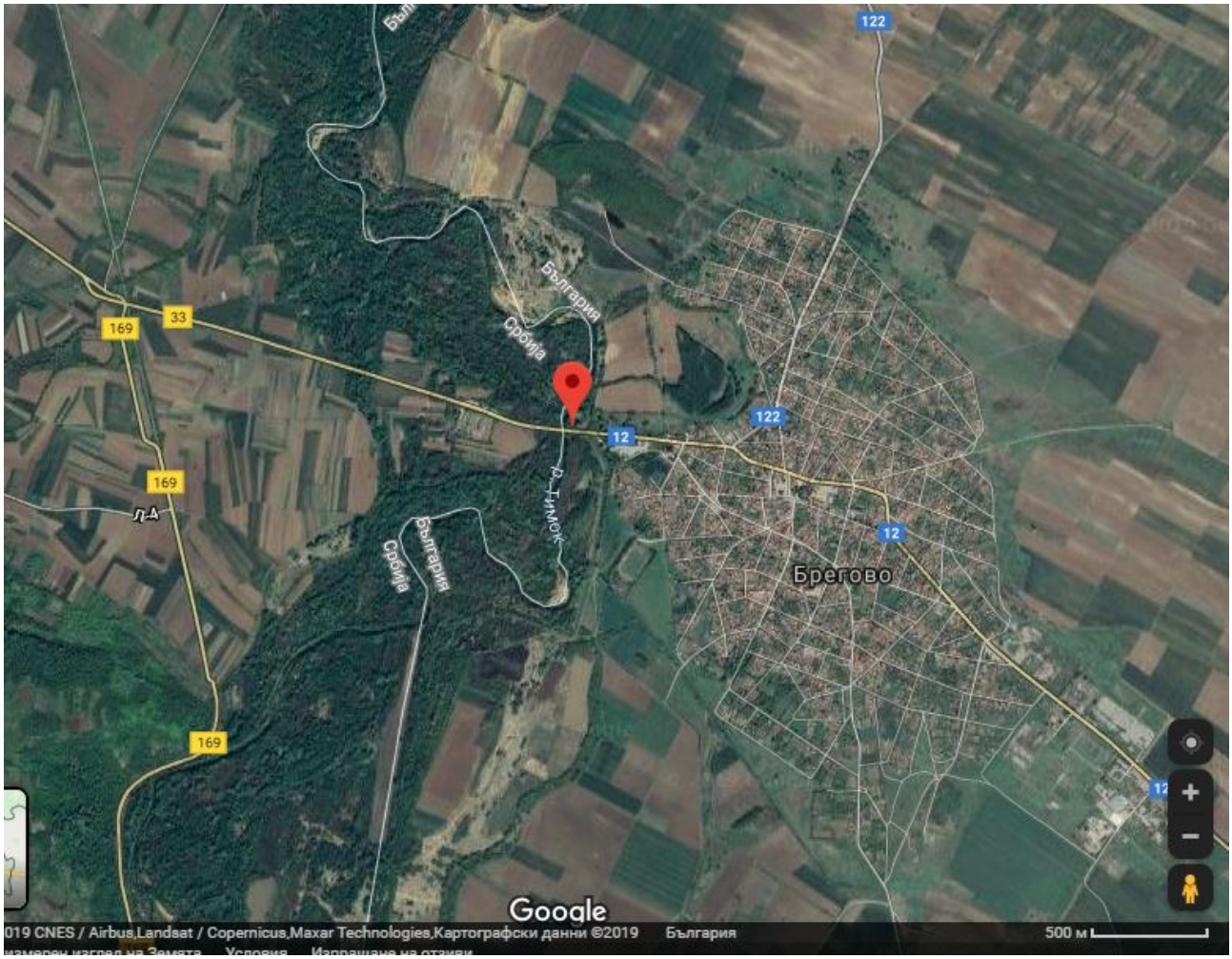

Fig. 5. Sampling point 2 - Timok – Serbia/Bulgaria (Google Maps)

Description and reason for selection

Timok at Bregovo sampling point is one of the points where bottom sediments are sampled by the Bulgarian Water Authority. It's situated on the Timok River at Bregovo, at the border between Serbia and Bulgaria. Expected pollution is derived from recent mining activity.

National Bulgarian water and sediment monitoring: Yes
Monitoring type: (O) operational monitoring program
Monitoring programs: Hazardous substances (HS) and Basic physicochemical parameters

3. Ogosta

Fig. 6. Sampling point 3 - Ogosta - Bulgaria (Google Maps)

Description and reason for selection

Ogosta sampling point is one of the points where bottom sediments are monitored by the Bulgarian Water Authority. It's situated on the Ogosta River, 1 km before the confluence with the Danube. Posible pollution from past mining activity and agricultural sources.

National Bulgarian water and sediment monitoring: Yes
Monitoring type: (S) surveillance monitoring program
Monitoring programs: Hazardous substances (HS) and Basic physicochemical parameters

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4. Iskar

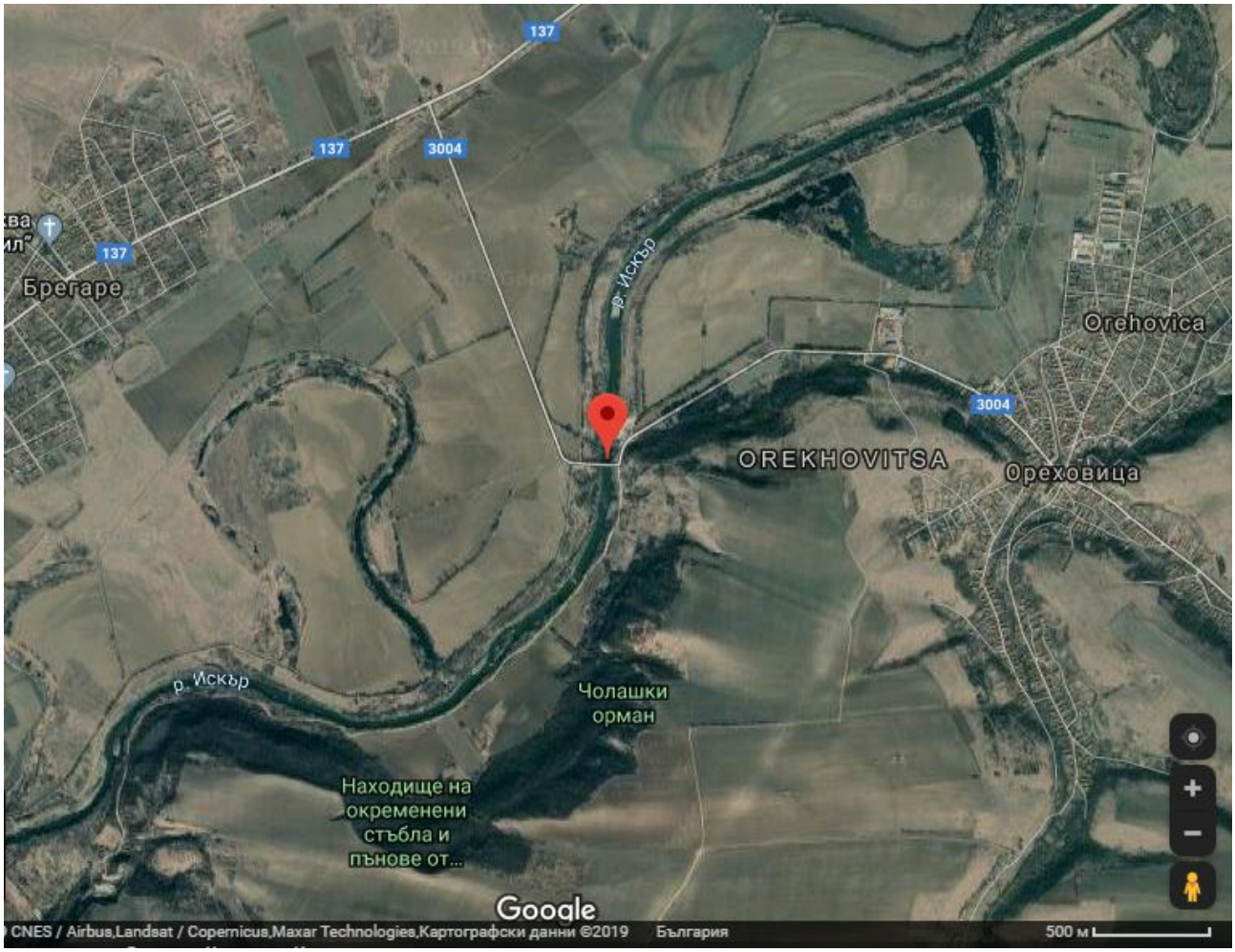

Fig. 7. Sampling point 4 - Iskar - Bulgaria (Google Maps)

Description and reason for selection

Iskar sampling point is one of the points where bottom sediments are monitored by the Bulgarian Water Authority and is also part of the Trans National Monitoring Network (TNMN). It's situated on the Iskar River, 18 km before the confluence with the Danube. Possible pollution from industrial and agricultural activity.

National Bulgarian water and sediment monitoring: Yes
Monitoring type: (S, TNMN) surveillance monitoring program
Monitoring programs: Hazardous substances (HS) and Basic physicochemical parameters

5. Malak Iskar

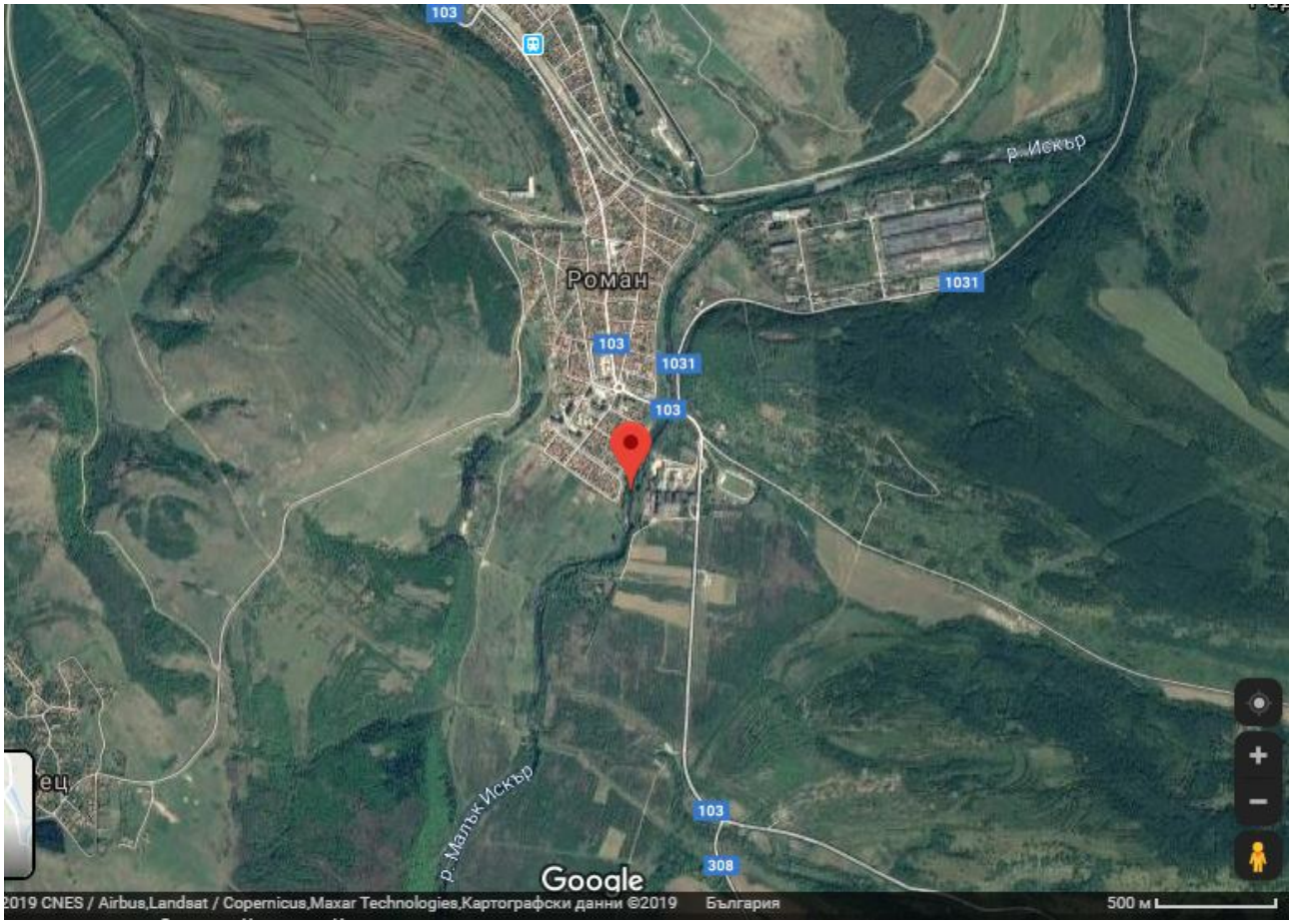

Fig. 8. Sampling point 5 - Malak Iskar - Bulgaria (Google Maps)

Description and reason for selection

Malak Iskar sampling point is one of the points where bottom sediments are monitored by the Bulgarian Water Authority. It's situated on the Malak Iskar River at the town of Roman, before the confluence with the Iskar River. Posible pollution from recent mining activity.

National Bulgarian water and sediment monitoring: Yes
Monitoring type: (S) surveillance monitoring program
Monitoring programs: Hazardous substances (HS) and Basic physicochemical parameters

6. Danube - Svishtov

Fig. 9. Sampling point 6 - Danube – Svishtov – Bulgaria/Romania (Google Maps)

Description and reason for selection

Danube at Svishtov sampling point is one of the points where water quality is monitored by the Bulgarian Water Authority and is also part of the Trans National Monitoring Network (TNMN). It is situated on the Danube River at the town of Svishtov. Posible pollution from industrial and agricultural activity.

National Bulgarian water monitoring: Yes
Monitoring type: (S, TNMN) surveillance monitoring program
Monitoring programs: Hazardous substances (HS) and Basic physicochemical parameters

7. Danube - Pristol

Fig. 10 Sampling point 7 Danube – Pristol – Romania/Bulgaria (Google Earth)

Description and reason for selection

Danube at Pristol sampling point is one of the points that samples water quality by the National Administration Romanian Waters, on the left bank, middle and right bank of the Danube River, downstream of the confluence of Timok River. It is situated in the vicinity of Pristol locality, near the borders of Serbia, Romania and Bulgaria.

Metal content in bottom sediments and in solvit are available in the archive of IGR (Mihăilescu at al., 1992), together with data on particles size distribution.

The station was approved by the National Administration Romanian Waters as an intermediate station between the Drobeta Turnu Severin Romanian station, where suspended sediment have been monitoring and Novo Selo Bulgarian station for suspended sediment monitoring.

National Administration Romanian Waters monitoring: Yes, with 28 monitoring sections
Monitoring type: operational
Monitoring program: According to order 101/2006 there are 5 groups: “oxygene regime”, “nutrients”, “general ions, salinity”, “metals“ and “organic and anorganic micro-poluants” to which HSs and biota are added.

8. Jiu

Fig. 11 Sampling point 8 Jiu –Zăval, Romania (Google Earth)

Description and reason for selection

Jiu is one of the points that samples water quality and suspended sediment by the the National Administration Romanian Waters It's situated on the Jiu River upstream of the confluence with the Danube River, immeadiately downstream of the bridge that links Zăval locality with the regional road. Posible pollution could be caused by coal activity in the Petroșani Depression, industry in Craiova (the city and Petrom SA DOLJVHIM Craiova) and agricultural activity in the Romanian Plain.

Data of metal content in solvit are available in the archive of IGR (Mihăilescu at al., 1992), together with data on particles size distribution.

Being already a station of suspended sediment monitoring in Romania, the results can be checked with the national laboratories.

National Administration Romanian Waters monitoring: Yes, with 53 monitoring sections.
Monitoring type: operational (water and suspended sediment, phytoplancton, phytobenthos and bentic macro-nonvertebrates).
Monitoring program: According to order 101/2006 there are 5 groups: "oxygene regime", "nutrients", "general ions, salinity", "metals" and "organic and anorganic micro-poluants" to which HSs and biota are added.

9. Olt

Fig. 12 Sampling point 9 Islaz-Olt, upstream of the confluence with the Danube - Romania (Google Earth)

Description and reason for selection

Olt is one of the points that samples water quality by the National Administration Romanian Waters. It is situated on the Olt River upstream of the confluence with the Danube River, near Islaz locality. Pollution sources in this river are due to chemical activity (Oltchim – Ramnicu Valcea, U.S. Govora, Viromet – Victoria), zootehny (Suin Let, C.s. Europig S.A. Poiana Marului) and farms associations (Miercurea Ciuc, Brasov, Sibiu, Ramnicu Valcea, Slatina)

Data of metal content in solvit are available in the archive of IGR (Mihăilescu at al., 1992), together with data on particles size distribution.

National Administration Romanian Waters monitoring: Yes, with 137 monitoring sections.
Monitoring type: operational
Monitoring program: According to order 101/2006 there are 5 groups: “oxygene regime”, “nutrients”, “general ions, salinity”, “metals“ and “organic and anorganic micro-poluants” to which HSs and biota are added.

10. Danube – upstream Oltenita

Fig. 13 Sampling point 10 Danube – Oltenita – Romania/Bulgaria (Google Maps)

Description and reason for selection

The National Administration Romanian Waters has a monitoring station at Oltenița named "upstream Oltenița", upstream of the confluence of Argeș River. There is another station downstream of Argeș confluence (measuring in reality on three points: left bank of the Danube, middle and right bank). Measurements of water quality in these stations started very long time ago (Banu, 1967). The purpose of selecting this station is to compare and complete the data collected by the National Administration Romanian Waters (ANAR) with new analysis in sediments in order to find out how much pollution comes from Bucharest, the capital and biggest city in Romania, to which pollution from agriculture is expected.

Metal content in bottom sediments and in solvit are available in the archive of IGR (Mihăilescu at al., 1992), together with data on particles size distribution and some organic substances.

National Administration Romanian Waters monitoring: Yes, with 28 monitoring sections
Monitoring type: suveillance
Monitoring program: According to order 101/2006 there are 5 groups: "oxygene regime", "nutrients", "general ions, salinity", "metals" and "organic and anorganic micro-poluants" to which HSs and biota are added.

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LIST OF PRIORITY SUBSTANCES AND DANUBE RIVER BASIN SPECIFIC POLLUTANTS

APPENDIX 2 OF THE SIMONA SEDIMENT QUALITY SAMPLING PROTOCOL

List of priority substances (PS) in the field of water policy (Part A, Annex I; Directive 2013/39/EU)

	Number in PS directive	WISE-SoE code (CAS/EEA) number[1]	Name of priority substance
1	2	CAS_120-12-7	Anthracene
2	5	EEA_32-04-2	Brominated diphenylethers (congener numbers 28, 47, 99, 100, 153 and 154)
3	6	CAS_7440-43-9	Cadmium and its compounds
4	7	CAS_85535-84-8	C10-13-chloroalkanes
5	12	CAS_117-81-7	Di(2-ethylhexyl)phthalate (DEHP)
6	15	CAS_206-44-0	Fluoranthene
7	16	CAS_118-74-1	Hexachlorobenzene
8	17	CAS_87-68-3	Hexachlorobutadiene
9	18	CAS_608-73-1	Hexachlorocyclohexane
10	20	CAS_7439-92-1	Lead and its compounds
11	21	CAS_7439-97-6	Mercury and compounds
12	23	CAS_7440-02-0	Nickel and its compounds
13	26	CAS_608-93-5	Pentachlorobenzene
14	28	EEA_33-56-7	Total PAHs (Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Indeno(1,2,3-cd)pyrene)
15	30	CAS_36643-28-4	Tributyltin-cation
16	34	CAS_115-32-2	Dicofol
17	35	CAS_1763-23-1	Perfluorooctane sulfonic acid and its derivatives (PFOS)
18	36	CAS_124495-18-7	Quinoxyfen
19	37	EEA_33-58-9	Dioxins and dioxin-like compounds (7 PCDDs + 10 PCDFs + 12 PCB-DLs)
20	43	EEA_33-57-8	Hexabromocyclododecane (HBCDD)
21	44	EEA_33-50-1	Heptachlor and heptachlor epoxide

List of River Basin Specific Pollutants for the Danube River Basin (ICPDR, 2003)

	CAS number[1]	Name of Substance
22	CAS_7440-38-2	Arsenic and its compounds
23	CAS_7440-50-8	Copper and its compounds
24	CAS_7440-66-6	Zinc and its compounds
25	CAS_7440-47-3	Chromium and its compounds

[1] WISE-SoE: European Environment Information and Observation Network reporting systems; CAS: Chemical Abstracts Service; EEA: European Environment Agency registration number (if CAS is not acceptable)

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