



This Project is funded
by the European Union

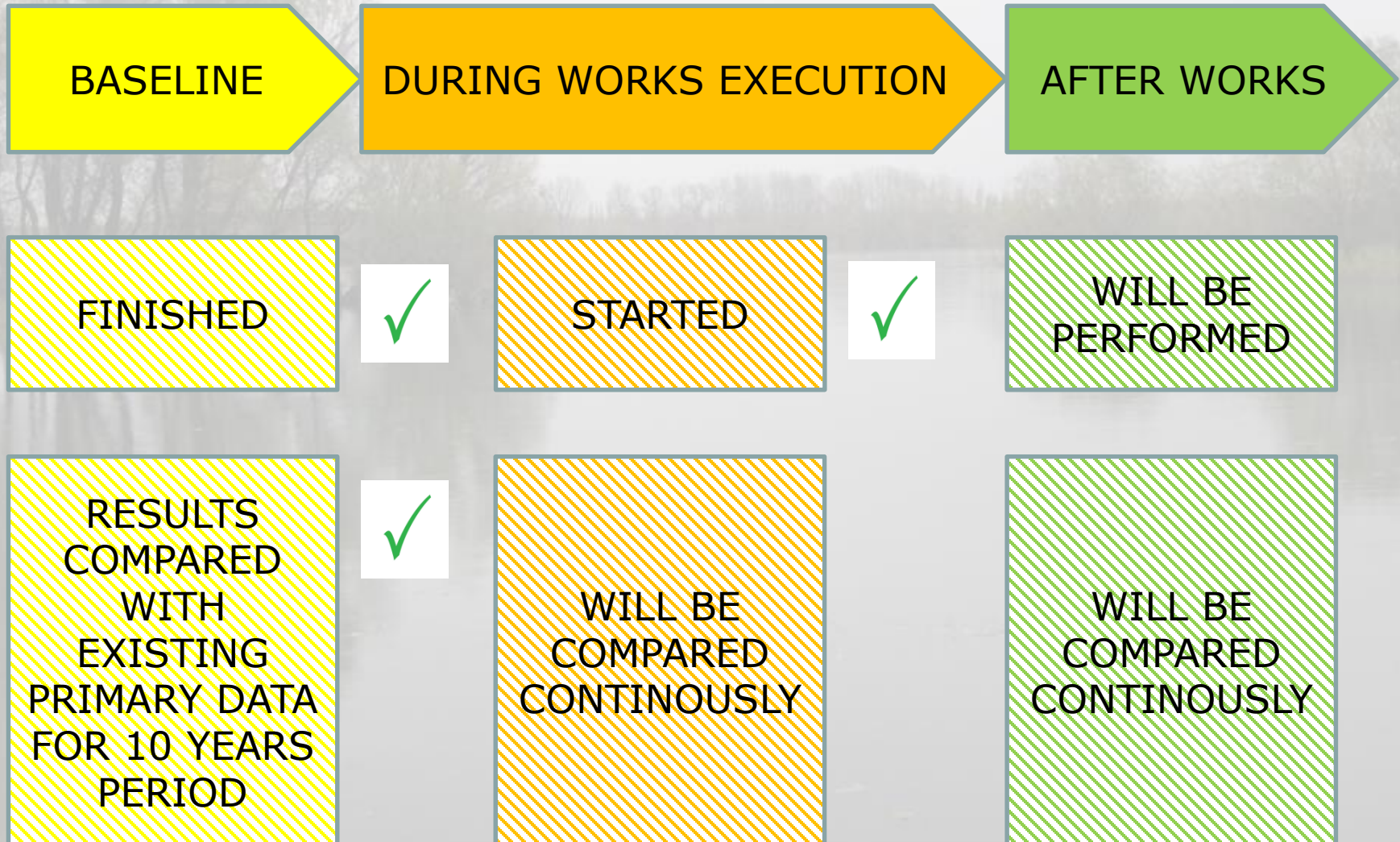
Supervision and Environmental Monitoring of River Training and Dredging Works on Critical Sectors on the Danube River

STAKEHOLDERS' FORUM – 21st September 2018

**Republic of Serbia
Ministry of Construction,
Transport and Infrastructure**



3 PHASES OF WATER AND SEDIMENT MONITORING



BASELINE

General parameters	Oxygen Regime	Nutrients	Salinity	Metals	Microbiological parameters	Priority and priority hazardous substances
I class	II class	changeable I/II/III class	I class	I class	changeable II/III/IV class	Lead (II/III) Cadmium (III) Mercury (V)

■ I class
 ■ II class
 ■ III class
 ■ IV class
 ■ V class

- SEDIMENT QUALITY: concentrations of pollutants in all analysed sediment sample are at the level of the natural background and all of them can be displaced without any special protection measures
- ❑ GENERAL CONCLUTION RELATED TO PRIMARY AND SECONDARY DATA
 - there were no major deviations from the primary data(SEPA; RHMZ; ICPDR)
 - some parameters of water and sediment quality were changed, not important

DURING WORKS EXECUTION

❑ WATER QUALITY MONITORING

- Will be performed following the same rules established during the baseline monitoring
- **Same parameters, same analytical approach, same locations**
- **REGULAR SYSTEMATIC SAMPLING AND ANALYSES – every 3 months from the start of the construction works at each critical sector till the end of works** (at critical sectors on which dredging activities are performed) **and until the start of the Defects Notification Period** (for critical sectors on which river training structures have been constructed)
- Water quality will be monitor **on three depths on the same profile** during dredging works
- Additionally, **more specific local monitoring will be performed**
 - **temperature, TSS and mineral oil at least one per week in a distance of 200 m downstream the dredging and disposal activity**, but only during the execution of construction works
- Official data about water quality on **SEPA's stations** will be followed and compared
 - **In situation that additional investigation on those locations be needed**, SEM will perform it in accordance with defined requirements

DURING WORKS EXECUTION

□ SEDIMENT QUALITY MONITORING

- Will be performed following the same rules established during the baseline monitoring
 - **Same parameters, same analytical approach, same locations**
- It is accepted that sediment quality be monitor by taking 2-3 samples equally distributed per dredging area or 10000 m³ of dredged material plus 3 samples equally distributed in the dredging deposit area, **2 times per year** i.e. during the dredging works
- **Additional sediment monitoring**
- During the construction period monitoring of changes in sediment structure and organic content can be relevant in case of dredging; excavation or other activities that may result in high concentration of suspended material are performed
- **Program will be determined based on the situation on the field**
 - Such program will be to focused primarily on the **grain size distribution (granulometric analysis) and the total organic content** of the surface sediment, **eventually a content of mineral oils in sediments, as well as oil in suspended material**

Methodology of sampling and analysis performing



Sampling and analysing will be performed in accordance with Serbian law regulation and carried out by authorized laboratory.

On site:

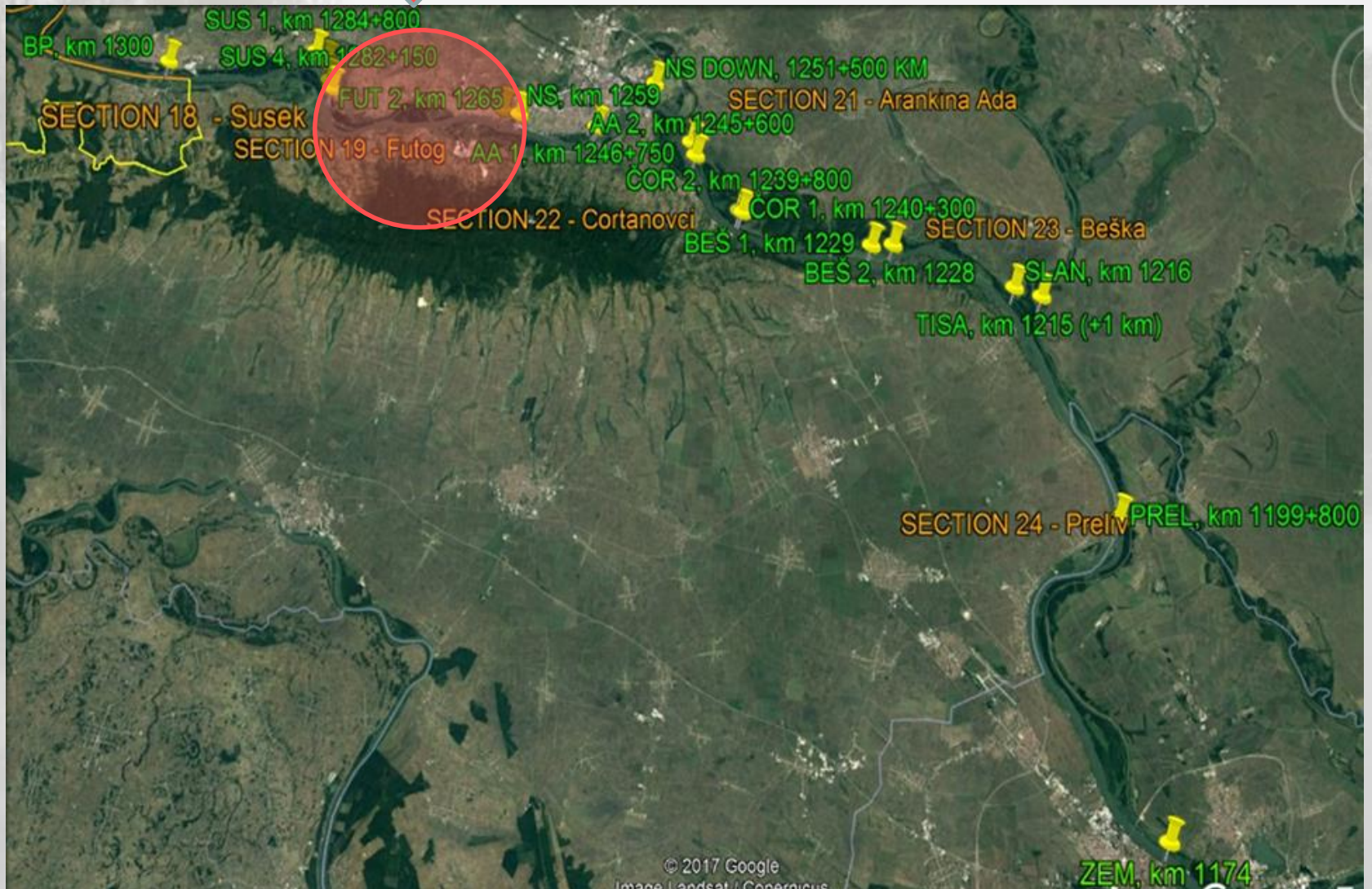
- temperature,
- turbidity,
- pH value,
- conductivity,
- dissolved oxygen

Off site: all other parameters

Ship and some equipment used for water and sediment sampling (November 2017)

WATER AND SEDIMENT QUALITY MONITORING

FUTOG - Detached groyne and chevrone / dredging

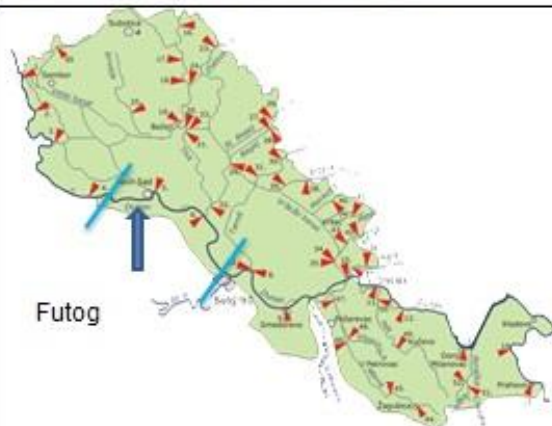


FUTOG - Detached groyne and chevrone / dredging

BASELINE

SECTION 19 (FUTOG)

Photos of the sampling points position



Photos from the SEM's baseline sampling location, November 2017



Futog 1
midpoint
km 1266+500

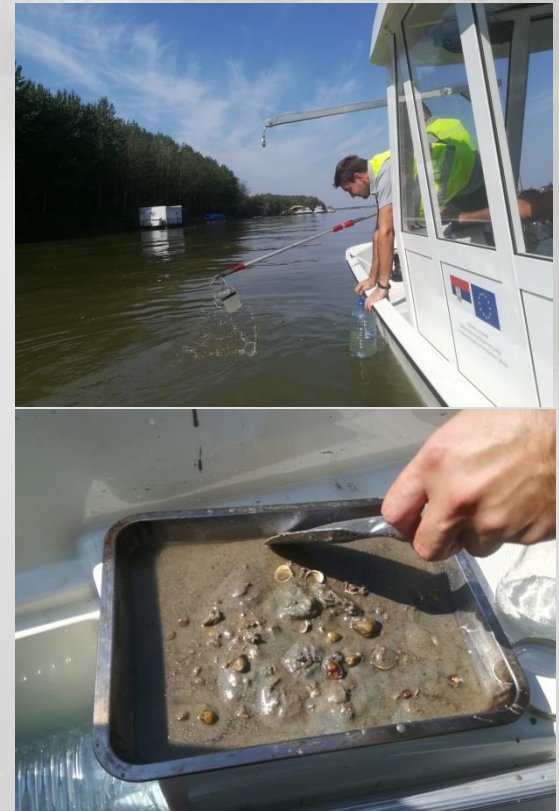


Futog 2
left coast,
midpoint,
right coast
km 1265

FUTOG - Detached groyne and chevrone / dredging

DURING WORKS EXECUTION

❑ First campaign was carried out – 07/09/2018



FUTOG - Detached groyne and chevrone / dredging

BASELINE

VALUE OF THE WATER QUALITY PARAMETERS

			VALUE OF THE WATER QUALITY PARAMETERS																											
Profile	Chainage	Code of water body or sampling points	General Parameters		Oxygen regime						Nutrients						Salinity				Metals						Microbiological parameters			
			pH value	Suspended matters	Dissolved oxygen (O2)	Percentage of saturation of water by oxygen	BOD 5	COD from K2Cr2O7	COD from KMnO4	Total Organic Carbon (TOC)	Total nitrogen (N)	Nitrates (NO3-N)	Nitrites (NO2-N)	Amonium ion (NH4-N)	Total phosphates (P)	Orthophosphates (PO4-P)	Chlorides (Cl-)	Sulphates (SO4--)	Total soluble salts	Electroconductivity	Arsenic (As)	Boron (B)	Copper (Cu)	Zinc (Zn)	Chromium (Cr)	Iron (Fe)	Manganese (Mn)	Fecal coliforms	Total coliforms	Fecal enterococci
				mg/l	mg/l	%	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µS/cm	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	cfu/100	cfu/100	cfu/100	cfu/100 ml
Futog																														
	km 1265	FUT 2 WL	I	I	I		II			II	III	II	I/II	I	I	I/II	I	I		I	I	I	I	I	II	I	III	II	II	III
		FUT 2 WM	I	I	I		II			II	III	II	I/II	I	I	I/II	I	I		I	I	I	I	I	II	I	III	II	II	III
		FUT 2 WR	I	I	I		II			I	III	II	I/II	II	I	I/II	I	I		I	I	I	I	I	II	I	III	II	II	IV

■ I class
 ■ II class
 ■ III class
 ■ IV class
 ■ V class

- **Priority and hazardous priority substances in water:** lead (III) on left side
- **Sediments:** additional FUT 1 SM + 2 samples from EIA period
- All obtained results are below target values and most of them are not even detected.
- Some PAHs compounds are detected but their concentrations are also below the limit values.

DURING WORKS EXECUTION

I CAMPAIGN 07/09/2019

FUT 2 WR	7/9/2018	I	III-V	II	II					II	II	I	I	I						I							II	I	I	III
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- **Priority and hazardous priority substances in water:** mercury (V)
- **Sediments:** All obtained results are below target values and most of them are not even detected.

WATER AND SEDIMENT QUALITY MONITORING

FUTOG - Detached groyne and chevrone / dredging



DURING WORKS EXECUTION

AFTER WORKS

BE CONTINUED

Thank you for your attention