



## INTERMEDIATE ENVIRONMENTAL MONITORING REPORT AFTER WORKS n° 2

### ČORTANOVCI – SUMMARY OF RESULTS

#### Introduction

The main objective of this environmental report after works is to address the base values of the main parameters identified during the elaborations of the EMRbW. These values were established during the Inception Phase, and will serve as the base for evaluation of effects of river training and works to the environment.

According to the ToR, the first report will be submitted 6 months after the beginning of the DNP, covering effects of river training works. And second report must be submitted by the S&EM Services Contractor 12 months after the beginning of the DNP, covering effects of both river training and dredging works), identifying all changes in environmental parameters compared to the base values identified in the Environmental Monitoring Report Before Works, also arguing the reasons for these changes, as well as their long-term impact to the integrity of the affected areas.

Works begun at Čortanovci on April 23<sup>th</sup> 2019 and officially ended 30<sup>th</sup> January 2020. So that, after twelve months this report has the purpose of analyze the environment status during the Defect Notification Period. The Environmental Monitoring Report after works n° 2 covers the following fields:

- Hydromorphology
- Sediment and water quality
- Waste
- Biology
  - Phytoplankton
  - Macrozoobenthos
  - Vegetation (*Limosella aquatica*)
  - Birds (*Charadrius dubius* and *Riparia riparia*)
  - Fish (*Acipenser ruthenus*)
- Development of vegetation and riparian areas
- Protected Areas and Ecological Networks

The table below shows the works to be carried out in the critical sector Čortanovci and their exact location according to the Final Design:

N°	Name of critical sector	Type of works	Chainage from	to	Executed
	Čortanovci	Sill 22.1	1237+700		yes
		Sill 22.2	1237+150		yes
		Sill 22.3a	1236+150		yes
		Sill 22.3b	1236+000		yes
		Dredging	1240+300	1239+350	no



The report shows the status of environment once completed six months since the finalization of works, according to ToR statements.

### Description of work site

Construction works have been performed on two locations Sill 22.2 and sill 22.1.

Construction works were started at the downstream location (sill 22-2), and just after approximately three weeks (May 15<sup>th</sup> they were started at the upstream location, sill 22.1).

Floating barge with construction material was used as a temporary storage for solid material like steel armature (reinforcement bar) and new rolls of geotextile are into the foil Floating office.



Figure 1 Čortanovci critical sector

### Status of the works after 12 months (January 2020 – January 2021)

As works ended last December 2019 (DNP officially begun January 2020), there is not any activity associate to the project in this sector.

### Project context

River stretch Čortanovci is located downstream from gauging station Novi Sad.



### Hydromorphology

Downstream of Vojvodina capital – Novi Sad between km1241+600 and km1235 has been situated stretch Čortanovci. It is characterized by a typical hourglass shape, with approximately 350m width at the narrowest section. River bed are tapering from the width of 600 m to 350 m in contraction and spreading on 840 m downstream. Such morphological characteristics are favorable for bed load deposition downstream of contraction where water current slowing down and provides conditions for sedimentation. Water flow is divided into two currents, where one of the branches is dominant and attracts more water flow.

Experience from previous analysis addressing us on two most dynamic locations on the Čortanovci stretch. First one is the area along the right riverbank where was massive depression envisaged initially for the deposition of dredged material. The second one is on the peak of the most downstream river island, which has started to grow and to suppress the navigation fairway towards the left riverbank.

### Water quality monitoring

Detailed Monitoring plan for both water and sediment quality was created in accordance with monitoring plan from the Inception Report but also in accordance with currently valid dynamic plan and prediction that working period are going to be longer than it was planned.

**During the works execution phase**, regular monitoring campaign was carried out on the section Čortanovci, in mid-August (16/07/2019) and at the beginning of November (01/11/2019) (Table 3). During this campaigns, samplings were performed at the position located about 100 m downstream from the works. Sampling and further analyses were performed by accredited laboratory Anahem from Belgrade.

In the meantime, 6 water samples in three campaigns were taken for additional screening analyses. Samples were taken downstream of the construction sites on 13/05/2019 (just downstream second sill) and upstream and downstream of the construction sites, as well as between them, on 16/07/2019 (one upstream the first sill, one downstream the second one, and one between sills), and also on 29/08/2019 (one downstream from the first sill and one downstream the second one).

**After works execution was finished, in phase of monitoring state on the location after that**, and until now, it has been performed two regular sampling and analyses campaigns of the Danube River water on Čortanovci location, in accordance with the Intention Monitoring Plan, as well as



the ToR. Water sampling at the location Čortanovci 2 have been performed on 09<sup>th</sup> July 2020 and 26<sup>th</sup> January 2021, downstream from the second sill.

### Sediment monitoring

After works execution was finished, in phase of monitoring state on the location, after that and until now, it has been performed two regular a sediment sampling and analyses campaigns on Čortanovci location, in accordance with the Intention Monitoring Plan, as well as the ToR. Sampling at the location Čortanovci 2 has been performed on 09<sup>th</sup> July 2020 and 26<sup>th</sup> January 2021, downstream from the second sill.

### Review of water and sediment quality results

Results obtained within the **second sampling campaign** carried out on 26th January 2021, show that quality of water sample predominantly corresponds to the quality of water I class, except for the parameters dissolved oxygen, total nitrogen, nitrates and BOD, that correspond to quality water of the II class.

In terms of the microbiological classification of the quality of this sample, it can be concluded that the Danube waters at the site of Čortanovci belong to the class I for total coliform and aerobic heterotrophs, while for total coliform bacteria of fecal origin and intestinal enterococci it corresponds to class II.



Overview of the first regular monitoring campaign results obtained after works executed – Čortanovci, 26/01/2021

Results of the sediment quality obtained during this monitoring campaign show that all parameters values are below target values and most of them are not even detected.

### Waste

During this period there has been no activity on the sector, therefore it has not been necessary to control whether there were discharges into the river from the boats.

### Phytoplankton

This is typical phytoplankton community structure for this season, characterized by low primary production. Community structure was uniform along depth gradient and among localities

### Macrozoobenthos

Mussels were represented by two genera and two species. Water level was very high, and mussels were present (visible) only in the part of the riverbank between the sills. That part of riverbank is covered by several hundreds of individuals. There were present *Corbicula* and *Dreissena* species, approximately in equal ratio. In the river bottom sediment upstream of upper sills were no mussels. In the river bottom sediment in the zone of lower sills one individual of *Corbicula fluminea* was found.

Sector	<i>Unio</i> sp.	Other species
Sector 22	--	<i>Corbicula fluminea</i>



Čortanovci		<i>Dreissena polymorpha</i>
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### Birds

Two individuals of White-tailed eagle (*Haliaeetus albicilla*) were standing on the tree on the island. Mallard (*Anas platyrhynchos*) was present with several individuals on the water and in the flight.

Not any individual of migratory birds *Charadrius dubius* and *Riparia riparia* have been found.

Sector	<i>Charadrius dubius</i>	<i>Riparia riparia</i>	Other species
Sector 22 - Čortanovci	--	--	<i>Haliaeetus albicilla</i> <i>Anas platyrhynchos</i>

### Fishes

In net which stayed over the night three species (*Chondrostoma nasus*, *Ballerus sapa* and *Aspius aspius*) from three genera, with total ten individuals, have been found. In two standing nets between sill 2 and lower sills no one individual has been found. In pulling the nets no one individual has been found. In electrofishing no one individual has been found. No one individual of Sterlet (*Acipenser ruthenus*) has been found

Sector	<i>Acipenser ruthenus</i>	Other species
Sector 22 – Čortanovci	--	<i>Chondrostoma nasus</i> (3 individuals) <i>Ballerus sapa</i> (1) <i>Aspius aspius</i> (6)

### Macrovegetation

Some perennial herbaceous plants are present, such as *Arctium lappa* which has stem, and *Hedera helix*. Roots of some species are in zone of water, due to high water level. Forest plants are in good health status, except some individuals with partially damaged trunks due to activity of European beaver (*Castor fiber*).

Sector	Species: <i>Limosella aquatica</i>	Other species
Sector 22 Čortanovci	--	<i>Populus euroamericana</i> <i>Populus alba</i> <i>Salix alba</i> <i>Quercus sp.</i> <i>Tilia sp.</i> <i>Morus rubra</i> <i>Fraxinus americana</i> <i>Ulmus sp.</i> <i>Acer negundo</i> <i>Acer campestre</i> <i>Amorpha fruticosa</i> <i>Corylus avellana</i> <i>Hedera helix</i>



		<i>Crataegus monogyna</i> <i>Arctium lappa</i>
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### Plants

Not any individual of species *Limosella aquatica* and *Lindernia palustris* have been found.

Sector	Species: <i>Limosella aquatica</i> Species: <i>Lindernia palustris</i>
Sector 22 Čortanovci	No results

### Development of vegetation

Vegetation is in phase of hibernation. Some tree branches are damaged due to strong wind and snow in previous period. Herbaceous plants are represented by species from families *Salicaceae*, *Fagaceae*, *Malvaceae*, *Moraceae*, *Oleaceae*, *Ulmaceae*, *Sapindaceae*, *Fabaceae*, *Betulaceae*, *Araliaceae*, *Rosaceae* and *Asteraceae*.

### Riparian areas

Water level is very high and significantly number of woody plants has roots below the water. Also, some herbaceous plants are almost totally covered by water. Water enters in riverbank approximately 1.5-2 m in comparison to common state and cover plant habitats. Vertebrata are represented by birds (Mallard and White-tailed eagle) and invertebrate animals by two mussel species. Presence of European beaver is evident by some felled trees and damaged tree bark on the left riverbank, and by shelters in the big tree roots of Poplar species. High water level strongly influences on survival of mussel population.

Sector	Species
Sector 22 Čortanovci	<i>Fungi – Fomes fomentarius</i>

### Protected areas

The selected quarry is located inside the National Park Fruška Gora. The mentioned EIA concluded that not any impact could be expected in the National Park due to the fact that the quarry is currently active for some other uses. During this period, negative effect over the National Park of "Fruška Gora" due to the activities of this project have not been observed.

### Ecological network

One area, which is near to work zone, is mentioned in Decree on Ecological Network ("Official Gazette of RS", No. 102/2010). This is "Kovilj-Petrovaradin marsh", on left riverbank. This area is not affected by the works because all planned activities took place in the river closer to the right bank.

### Summary of results

After field surveys during November 2017, February, March and August 2018, January, May, June, July and October 2019, June 2020 and January 2021, the following target species have been found in sector Čortanovci:



Period	Macrozoobenthos ( <i>Unio</i> sp.)	Fishes ( <i>Acipenser ruthenus</i> )	Plants ( <i>Limosella aquatica</i> )	Plants <i>Lindernia palustris</i>	Birds <i>Riparia riparia</i>	Birds <i>Charadrius dubius</i>
November 2017	-	-	Two individuals	-	-	-
February 2018	-	-	-	-	-	-
March 2018	-	-	-	-	-	-
August 2018	<i>Unio pictorum</i> (several) <i>Unio tumidus</i> (several)	-	-	-	-	-
January 2019	<i>Unio tumidus</i> (1)	-	-	-	-	-
May 2019	<i>Unio tumidus</i> (1)	-	-	-	-	-
June 2019	<i>Unio tumidus</i> (1)	-	-	-	-	-
July 2019	<i>Unio tumidus</i> (10) <i>Unio pictorum</i> (5-7)	-	-	-	-	-
October 2019	<i>Unio pictorum</i> (a few dozen) <i>Unio tumidus</i> (a few dozen)	-	-	-	-	-
March 2020	--	--	--	--	--	--
June 2020	<i>Unio tumidus</i> (8-10) <i>Unio pictorum</i> (3)	-	-	-	-	-
January 2021	-	-	-	-	-	-

### Summary of main impacts in the sector during this period

In this sector was defined the construction of some river training structures and dredging works. These activities included dredging in the central part of the river between km 1240+300 and km 1239+350 and the construction of two sills and one sill with the opening, located between km 1236+000 and 1237+000. Training structures have been built in the defined location, however, technical decision after several analysis concluded that dredging works were not necessary at this moment.

Several monitoring has been executed during construction phase, which results have been compared with surveys carried out in June and July 2020 and now in January 2021 in order to compare the status of environment twelve months after works finalization.



Regarding water and sediments, after this period it is possible to conclude that there are no significant effect over these parameters. The obtained results during field surveys in January are significantly similar to the previous ones. This can be interpreted as the works have not been not affected the quality of water and sediments in the vicinity of critical sector of Čortanovci.

From the point of view of biology, the results show that the nature has not been affected by the works, which confirm the conclusion obtained in previous reports.

Bearing in mind that works were being executed from the water, the riparian vegetation existing in the river banks not suffered any impact except a little dust deposited on leaves. This impact cannot be avoided because mainly depends on wind direction. However, it is not significant and the general status of riparian habitat remains in good conditions.

None of individuals of protected species of plants had been affected during those months and wildlife seemed not to be impressed by the presence of machinery and workers. Protected species of birds have not been detected in Čortanovci in any of the field surveys.

This the second survey after twelve months without works disturbances shows how the environment in vicinity of structures remains in the same conditions as was addressed in monitoring made before works.

#### Protective and corrective measures

As works in critical sector Cortanovci finished in December 2020 (DNP officially begins 30<sup>th</sup> January 2020), there no need to apply protective or corrective measures.

#### Conclusions & Recommendations

Once complete one year after works finalization, monitoring surveys show that environment in the vicinity of new structures have not been affected. As established in Terms of Reference a final survey must be done in order to prepare the Final Environmental Report after works, once the six critical sector will be completed around August 2021. This final survey, will permit definitely conclude that this sector remain with the same nature conditions.

Works that are being executed in another sector will be assess in different report.