INTERMEDIATE ENVIRONMENTAL MONITORING REPORT DURING WORKS no.2

PRELIV – SUMMARY OF RESULTS

Introduction

The main objective of this environmental report during 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, one Monitoring report must be prepared 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), 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 have begun in Preliv on November 7th 2019 and they have not been finished by the end of May 2020, so this report is necessary in order to identify the current status of environment after six months.

The Environmental Monitoring Report nº 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 Preliv and their exact location according to the Final Design:

Nº	Name of critical sector	Type of works	Chainage from	to
	Preliv	Chevron nº 1	1200+600	

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

Description of work site

Preliv is the only critical sector where works execution is in progress in this moment. Construction works are being performed on one location Chevron nº 1. According to Engineer's proposal, chevron nº2 will not be executed due to the changes occurred in the riverbed since the project were designed.

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

Status of the works after 6 months

The construction Works in the sector 24 (Preliv) are not completed. The table below shows the current status of each planned activity per structure.

Sector 24	**Chevron nº 1**
Geotextile	Completed
Base layer (phase I)	Completed
Base layer (phase II)	Completed
Profiling the base layer	Completed
Construction of the body	On going
Profiling of body	On going

Project context

Gauging station Zemun is referent station for stretch Preliv.

Stretch has right river band shape with radius which gradually becomes smaller. The most upstream part of the stretch is narrow (about 500m) with talweg depth about 6.5m. Cross-section is U shaped and provides optimal transportation capacity in terms of discharges and bed load transportation.

Left riverbank is protected with longitudinal dike from km 1206+350 to km 1202+400 (source: Detail Design). According to the available satellite images, space between training construction and riverbank is mostly filled in with sand and covered with vegetation

Main navigational problems are occurred in river band where water current is divided into two branches with similar capacity for transportation of water, sediment and bed load. Curvature radius of outer riverbank is about 2200m and consequence of such small radius and sharp curve is intensive helicoid flow. Nature of helicoid flow is to undermine the outer riverbank and to deposits excavated material on the opposite side. Most likely, the sand deposit was emerged into

the middle of the river is consequence of the above depicted complex currents. Historically, navigation was carried out in both branches, depending on upstream flowing conditions.

Left riverbank, which is exposed to the erosion, is also protected (source: Detail design), but much details about this construction was not available.

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.

Regular water quality monitoring is performed every third month (four times per year), while additional monitoring is performed more frequently. During additional monitoring campaigns parameters like temperature, TSS and mineral oil are being determined. Extra monitoring of these parameters is not predicted within the Inception Report for the locations where the construction is performed, only where dredging and sediment disposal is performed. However, the SEM team concluded that additional monitoring could be useful for screening the situation during works execution.

Until now, two regular monitoring campaign were carried out on the section Preliv, at the beginning of February 2020 (03/02/2020) and middle of May 2020 (14/05/2020). During this campaign, 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, one additional water screening analyses was performed, at the same time when regular analises was carried out. Lfor short analises, water sample was taken upstream from the construction site.

Sediment monitoring

Until now one sampling campaign was carried out in Preliv, in the same time as water samples were taken at the beginning of February and in middle of May 2020, at the position downstream from the works execution is performed.

Additional sampling and testing of sediment quality during the construction works is not proposed with the Inception Reports, only for the dredging and sediment disposal activities.

Review of water and sediment quality results

Results obtained **during the second regular sampling campaign** carried out on 14/05/2020 show that quality of water sample was not quite different than quality of the samples analysed in previous performed campaign.

The results of the physico-chemical analyzes show that the quality of the River Danube at location Preliv (Belegiš) - **downstream of the work site** predominantly corresponds to the quality of water I class, except for dissolved oxygen and BPK5, that correspond to quality water of the II class, total nitrogen that corresponds to the class III and ammonium ion which value corresponds to the class IV of water quality.

In terms of the microbiological classification of the quality of this sample, it can be concluded that the Danube waters at the site of Preliv (Beška) belong to the class I, except for the total coliform of fecal origin that corresponds to the class II and aerobic heterotrophs to the class IV of the water quality.

No one analysed priority and priority hazardous substances were detected within the taken sample.

DURING WORK EXECUTION

Quality of parameters temperature, suspended matters and mineral oils of additionally taken sample corresponds to the class I of water quality:

PRELIV

SAMPLING POINTS	RESULTS OF WATER QUALITY IN DIFFERENT CAMPAIGNS					
	03/02/2020			14/05/2020		
	temperature (°C) / suspended metters (mg/l) / mineral oils (mg/l)					
Sampling point 1 (upstream)	7.5	6	<0.1	19.5	10	<0.1
Sampling point 2 (downstream)	7.5	12	<0.1	19.5	12	<0.1

LEGEND: I CLASS | II CLASS | III CLASS | IV CLASS | V CLASS

Results of the sediment quality obtained during regular monitoring campaigns performed on 14/05/2020 show that all parameters values are below target values and most of them are not even detected.

Waste

During this period regular inspections have been carried out with the purpose of detecting uncontrolled discharges of waste or pollution incidents. The monitoring has been done by visual inspection of vessels and water analysis.

Conclusions show that all the established preventive measures are been followed by WKSC, so during this period there has been no incident related to discharges or waste

Phytoplankton

This is typical phytoplankton community structure for this season. Community structure was uniform along depth gradient and among localities.

Macrozoobenthos

Mussels population from sediment downstream of chevron was represented by one individual of Quagga mussel (Dreissena rostriformis bugensis).

Mussels population from riverbank includes four genera and five species. Most dominant is genus Dreissena, with hundreds of individuals polymorpha and rostriformis bugensis on sandbar downstream of work zone. Several individuals of Swollen river mussel (Unio tumidus) has been recorded in sediment and in shallow water closer to the right bank. Freshawater Asiatic clam

(Sinanodonta woodiana) has 10-15 individuals in the shallow water. Asian clam (Corbicula fluminea) was present with few dozen individuals on the riverbank and in the shallow water.

Sector	*Unio* sp.	*Other species*
Sector 24 Preliv	*Unio tumidus*	*Sinanodonta woodiana* *Corbicula fluminea* *Dreissena polymorpha* *Dreiseena rostriformis bugensis*

Birds

Bird populations is very diverse in qualitative sense. Barn swallow (Hirundo rustica) dominates in number. This species has fast flight close to water, with around 20 individuals. For the first time, one individual of Pied avocet (Recurvirostra avosetta) has been recorded on this sector, in the shallow water on the edge of sandbar. One individual of Eurasian jay (Garrulus glandarius) was in settlement. Two individuals of Whiskered tern (Chlidonias hybrida) were in flight close to water. Black-headed gull (Larus ridibundus) was present on the sandbar. European herring gull (Larus argentatus) is common, with up to ten individuals. Several Swifts (Apus sp.) was in flight, but it is not sure what species is it because it is difficult to distinguish pallid from common swift. One Little egret (Egretta garzetta) was recorded over the water.

Near the loess escarpment, around 10-20 individuals of European bee-eater (Merops apiaster) were in flight close to its holes and in them. Mallard (Anas platyrhynchos), both male and female, was registered by several individuals. House sparrow (Passer domesticus) is common near the human settlements. Two Grey herons (Ardea cinerea) were near the riverbank, one Carrion crow (Corvus corone), as well as several individuals of Common raven (Corvus corax). One individual of Eurasian magpie (Pica pica) was recorded. Several individuals of Great cormorant (Phalacrocorax carbo) were on tree trunk near the edge of sandbar. Eurasian collared dove (Streptopelia decaocto) and Great tit (Parus major) were identified by sound.

Sector	*Charadrius dubius*	*Riparia riparia*	*Other species*
Sector 24 Preliv	--	--	*Hirundo rustica* *Recurvirostra avosetta* *Garrulus glandarius* *Chlidonias hybrida* *Larus ridibundus* *Larrus argentatus* *Apus (pallidus?)* *Egretta garzetta* *Merops apiaster* *Anas platyrhynchos* *Passer domesticus* *Ardea cinerea* *Corvus corone* *Corvus corax* *Pica pica* *Phalacrocorax carbo* *Streptopelia decaocto*

			Parus major *Cygnus olor* *Columba livia*

Fishes

On location Preliv 2B presence of eight species from three families has been recorded. Total number of individuals is 43. In standing net on the left bank were four Sterlets, while in pulling nets were 25 individulas of Sterlet. To all individuals of Sterlet total length, standard length and mass has been measured, after which they returned to the water.

On location Preliv 1A presence of ten species from four families has been recorded. Total number of individuals is 73. Sterlet has not been recorded on this location

Sectors	***Acipenser ruthenus***	***Other species***
Sector 24 Preliv	*29 individuals -*	*Alburnus alburnus (60 individuals)* *Abramis brama (2)* *Barbus barbus (3)* *Chondrostoma nasus (2)* *Aspius aspius (2)* *Leuciscus idus (1)* *Rutilus rutilus (2)* *Esox lucius (1)* *Neogobius fluviatilis (4)* *Perca fluviatilis (1)* *Ballerus sapa (8)* *Blicca bjoerkna (1)*

Macrovegetation

Woody and herbaceous plants are fully developed by floors. Forest litter is preserved with different thickness, depending of habitat location.

Sector	***Species: Limosella aquatica***	**Other species**
Sector 24 Preliv	No results	*Populus x euroamericana* *Populus x canadensis* *Populus alba* *Salix alba* *Fraxinus sp.* *Acer rubrum* *Robinia pseudoacacia* *Morus nigra* *Morus rubra*

		Tilia sp. *Acer negundo* *Ulmus sp.* *Xanthium strumarium* *Hordeum murinum* *Erodium ciconium* *Anisantha diandra* *Oxalis sp.* *Iris sp.* *Glechoma hederacea* *Aristolochia clematitis* *Galium aparine* *Capsella bursa-pastoris* *Chelidonium majus* *Torilis nodosa* *Urtica dioica* *Artemisia vulgaris* *Onopordum acanthium* *Humulus lupulus* *Stellaria media* *Plantago sp.* *Erigeron sp.* *Marrubium vulgare* *Chenopodium album* *Phragmites sp.*

Plants

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

Sector	**Species*: Limosella aquatica*** **Species*: Lindernia palustris***
Sector 24 Preliv	No results

Development of vegetation

Herbaceous plants are represented by species from families *Asteraceae, Poaceae, Geraniaceae, Oxalidaceae, Iridaceae, Lamiaceae, Aristolochiaceae, Rubiaceae, Brassicaceae, Papaveraceae, Apiaceae, Urticaceae, Cannabaceae, Caryophyllaceae, Plantaginaceae* and *Amaranthaceae*.

Riparian areas

Vegetation and their habitats are preserved. Birds are occurred by several common genera, predominantly by Barn swallow (*Hirundo rustica*). Invertebrate animals are represented by Snails, Mussels (families *Unionidae, Cyrenidae* and *Dreissenidae*), Insects (*Vanessa atalanta, Gonepteryx rhamni, Pieris sp., Apis meliffera, Vespa sp., Lestes sponsa, Gerris lacustris, Notonecta glauca, Graphosoma italicum, Coreus marginatus, Pyrrhocoris apterus, Hippodamia*

sp. and with unidentified species from families *Nymphalidae, Syrphidae, Curculionidae and Chrysomelidae*) and one dead individual of Crustacea. Vertebrata have been represented by one dead individual of European pond turtle (*Emys orbicularis*) on the sandbar and one dead individual of European mole (*Talpa europaea*) on the road. On investigated area are no permanent or temporarily water streams. Vegetation and animals, except mussels, are not endangered in no way. Variable water level influences on riparian habitats

Protected areas

The selected quarry is located inside the National Park Fruška Gora. The EIA concluded that any impact could be expected in the National Park due to the fact that the querry is currently active for some other uses. Some visuals inspections have been carried out during the firsts three months of activity in order to verify the accomplishment of the preventive measures defined in the EIA Report, as well as the preventive measures proposed in the EMRbW and the Environmental Plan presented by the WKSC. 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

According to Decree on Ecological Network ("Official Gazette RS" No. 102/2010), in the wider area of work zone, except Danube river in general, are no ecological important areas, ecological corridors and protective zones

Summary of results

After field surveys during November 2017, August 2018, October 2019, January and May 2020, the following target species have been found **in sector Preliv.**

Period	Macrozoobenthos *Unio* sp.	Fishes *Acipenser ruthenus*	Plants *Limosella aquatica*	Plants *Lindernia palustris*	Birds *Riparia riparia*	Birds *Charadrius dubius*
November 2017	-	-	-	-	-	-
August 2018	-	-	-	-	-	-
October 2019	*Several Unio tumidus* *3 Unio pictorum*	**23 individuals**	-	-	-	-
January 2020	*Several Unio tumidus* *Several Unio pictorum*	-	-	-	-	-
May 2020	Several *Unio tumidus*	**29 individuals**				

Summary of main impacts in the sector during this period

In this sector is defined the construction of one river training structure: **Chevron nº 1.**

During these six months activities have been focused on the construction of chevron 24.1. The monitoring activities during this period has been focused on determination of the potential effects on biological parameters and water and sediments parameter, due to the fact that the effects on the hydromorphology would be analysed once the works will have been completed.

According to the data explained in precedent sections, several monitorings have been executed during these months, the last of them after complete six months since the beginning of works in

Preliv. The obtained results have been compared with data included in Environmental Monitoring Report before Works.

Regarding water and sediments, after these six months it is possible to conclude that there are no significant effects over these parameters. The obtained results during field surveys in May are significantly similar to the previous ones. This can be interpreted as the works are not affecting the quality of water and sediments in the vicinity of critical sector of Preliv.

From the point of view of biology, the results show that the nature is not been affected by the works. Results obtained until now are line with normal status during each season, especially birds and fishes.

Bearing in mind that works are being executed from the water, the riparian vegetation existing in the riverbanks are not suffering 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 impact and the general status of riparian habitat remains in good conditions.

None of individuals of protected species of plants have been affected during these months and wildlife seems not to be impressed by the presence of machinery and workers. Protected species of birds have not been detected in Preliv during the field surveys.

Protective and corrective measures

The following mitigation measures have been carried out during these months to reduce or to avoid the described adverse impacts resulting from the proposed project activities:

- Confirm the absence of the river mussel (Unio sp.) in the vicinity of the working area.
- Perform monitoring of spills and suspended concentration during the execution of the works. If excedance of the critical concentration is observed the work intensity is to be reduced;
- Monitor the incidence of works over the vegetation surrounding the working area
- Monitor the variations, if any, of wildlife population around the working areas, focused on the main species mentioned in the EIA.

Conclusions & Recommendations

Works that are being executed currently on critical sector Preliv are following the methods and recommendations regarding environment protection included in EIA report and official decision. Additionally, WKSC is accomplishing the environmental measures included in the tender specifications and taking into consideration conclusions of Inception Report.The environmental monitoring begun at the same moment that the works and has been considered one of the most important elements of the project. Thank to this, the measures implemented by WKSC and the continuous monitoring are avoiding negative effects over the nature.

The main recommendation is to continue with the strong and continuous monitoring until the end of works in this sector. If any negative effect would appear, the environmental team should be immediately advised in order to take the most adequate corrective measures.