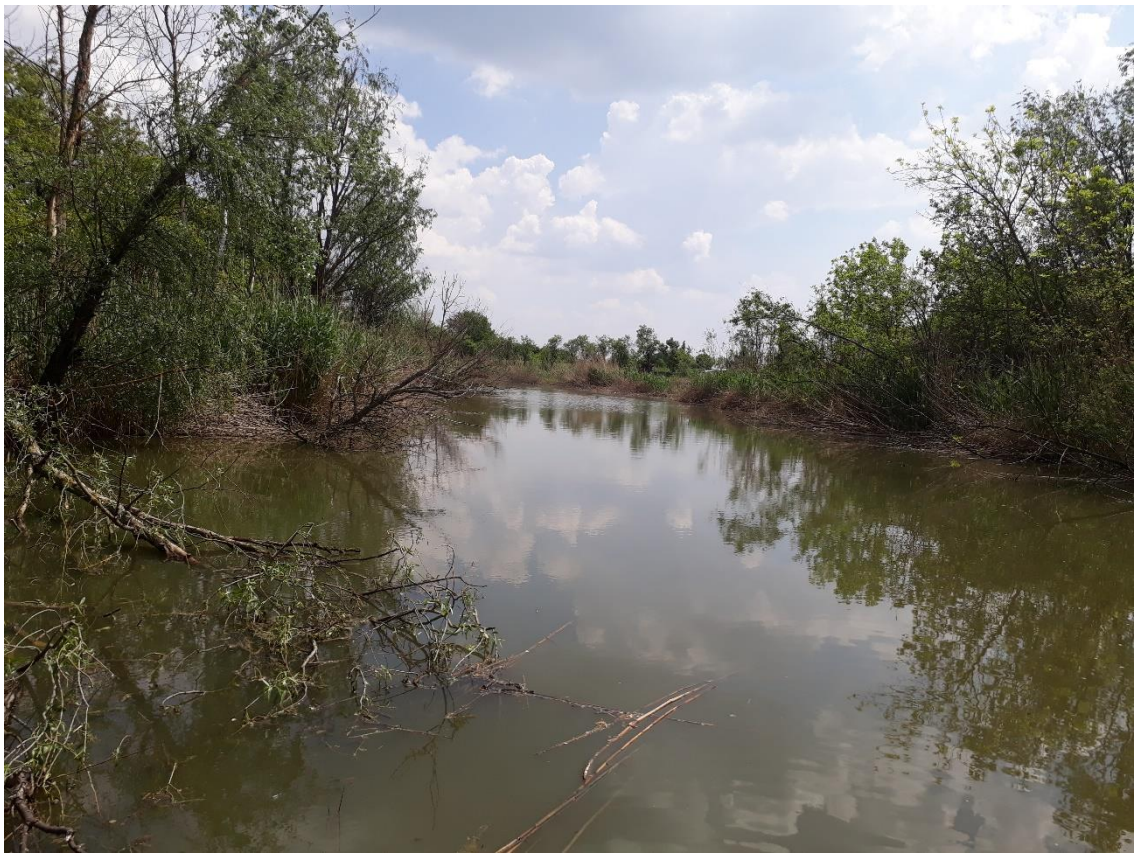
Monitoring of the Kurca main channel 2019-2020. Summary



Before and after the dredging, water quality, sludge quality and biological analyses were performed in the areas covered by the rehabilitation on the following dates:
May 2, 2019
May 13, 2019
March 2, 2020
March 11, 2020

From a **hydro-chemical perspective**, at the time before the dredging, the water body could be described with a good ecological potential. At the time of sampling after the dredging, primarily the salt content showed significant deterioration due to the low water level, the admitted thermal water, and the lack of flushing. Dredging was still taking place at the time of the second sampling, therefore the value of

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ammoniacal nitrogen, and thus the value of total nitrogen was increased in the freshly disturbed section. With the completion of the dredging, the concentration values of these parameters will presumably settle. At the time of the May 2019 sampling, we measured high TPH values along the longitudinal profile. TPH values at the March 2020 sampling were below the lower measuring limit of the applied measurement method. Among the specific pollutants, the level of arsenic exceeded the environmental limits, both before and after the dredging.

With regard to the sediment, the limit value for the geological medium was exceeded by the content of nickel at several points, compared to before the dredging. With respect to arsenic, concentrations above limit values were measured at most of the sampling points at the time before the dredging. After the dredging, these values fell below the limit value. The dredging removed significant amounts of nitrogen and phosphorus.

From the phytoplankton analysis results it can be concluded that the Kurca main canal is characterized by significant planktonic eutrophication too, in addition to the benthic eutrophication. Besides the high plant nutrient content (total P: 0.26 – 0.58 mg/l, orthophosphate-P: 0.06 – 0.35 mg/l, total N: 2 – 11 mg/l), the most important factor shaping the composition and amount of phytoplankton, the higher specific electric conductivity (848–1692 µS/cm) allows the appearance of halophilic species such as the *Entomoneis paludosa*, and favors the mass appearance of *Cyclotella meneghiniana*. The high nitrogen content provides ideal living conditions for green algae, while the high suspended solids content (41–275 mg/l) and the reduced amount of light caused by the vegetation were most favorable for cryptomonads and euglenoids.

Comparing conditions before and after the dredging, the significant decrease of phytoplankton diversity is noticeable. This is partly attributable to seasonality, as there was a species-rich spring community in May, while there was a species-poor winter community of psychrophile species at the beginning of March. The result of the March 2020 sampling reflects the response of phytoplankton to the condition established after the dredging. The sediment mixed by the dredging, and the release of plant nutrients accumulated in it favored the appearance of fast-reproducing, small cell, cold- and shade-tolerant cryptomonads in large masses. It should be noted that this state will only be able to last for a short time due to the limiting factors of

the environment, after its collapse, the formation of a community with a significantly smaller number of individuals is probable.

The evolution of the Kurca phytoplankton community depends, to a large extent, on how much plant nutrients will be removed from the system during the dredging, and the amount of removed aquatic plants too. It could happen that the dredging will further aggravate planktonic eutrophication, if the nutrients, used so far by aquatic plants until their removal, are utilized by planktonic organisms. However, the effect of dredging on phytoplankton could only be known after a sampling performed in late spring and/or at the end of summer in 2020.

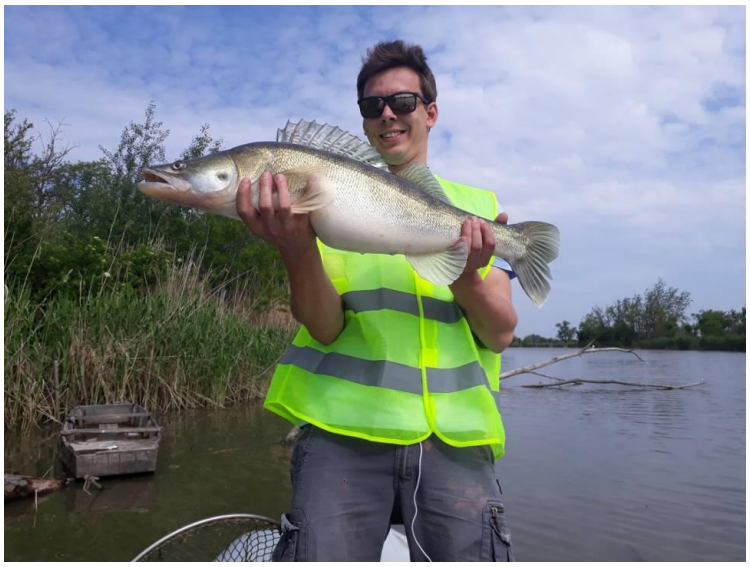
Based on the fishery survey it can be concluded that the dredging performed on the Kurca canal did not cause significant change in the fish population compared to the survey in 2019.
There was no fish extinction, nor any hazard event affecting fishes. As the dredging only covered the edge of one bank, the spawning substrate required for the reproduction of phytophile fishes is available along the entire length of the river. It is an unfortunate fact, however, that out of the 15 detected species 5 belonged to invasive non-native species (bighead carp, grass carp, prussian carp, brown bullhead, pumpkinseed). A further problem is that the biomass of these undesirable 5 species in the Kurca may be many times higher than that of all other indigenous fish species. From a fishing-fish management perspective, some sort of solution should be sought to remove them, but at least reduce their biomass.

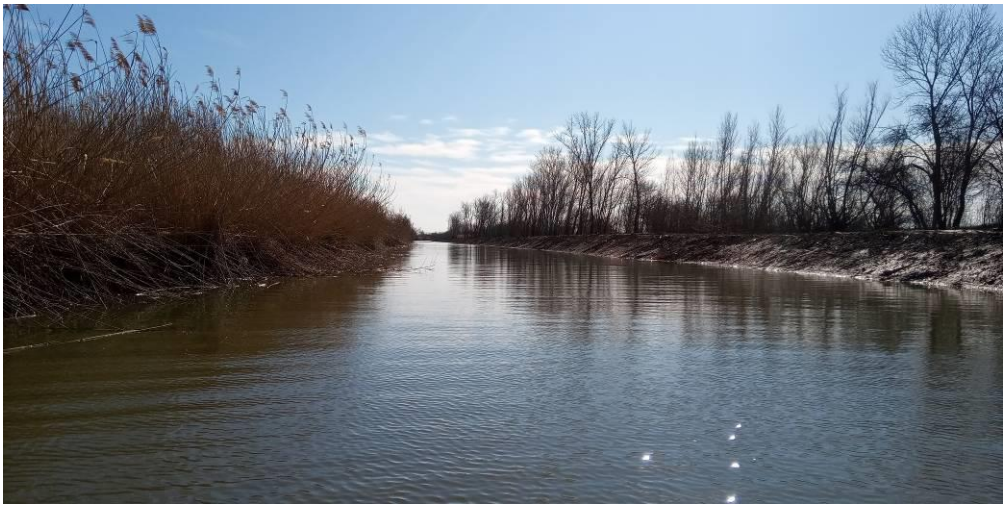
The **macrophyte survey** of the Kurca main canal was performed at four sampling points on June 9, 2019 and September 16, 2019. Out of this, one sampling point was selected on the already dredged section of the canal, two on the section designated for dredging, and one on the section above the planned dredging. Qualification according to the WFD based on macrophyte groups was performed according to the „Methodological guide for the collection and processing of macrophyte groups based on the WFD" of Lukács et al (2015). During the analyses it could be concluded that the average EQR of the already dredged canal section is of 0.56 „good" ecological potential, while the average EQR of the sections designated for dredging is of 0.51 „**average**" ecological potential.

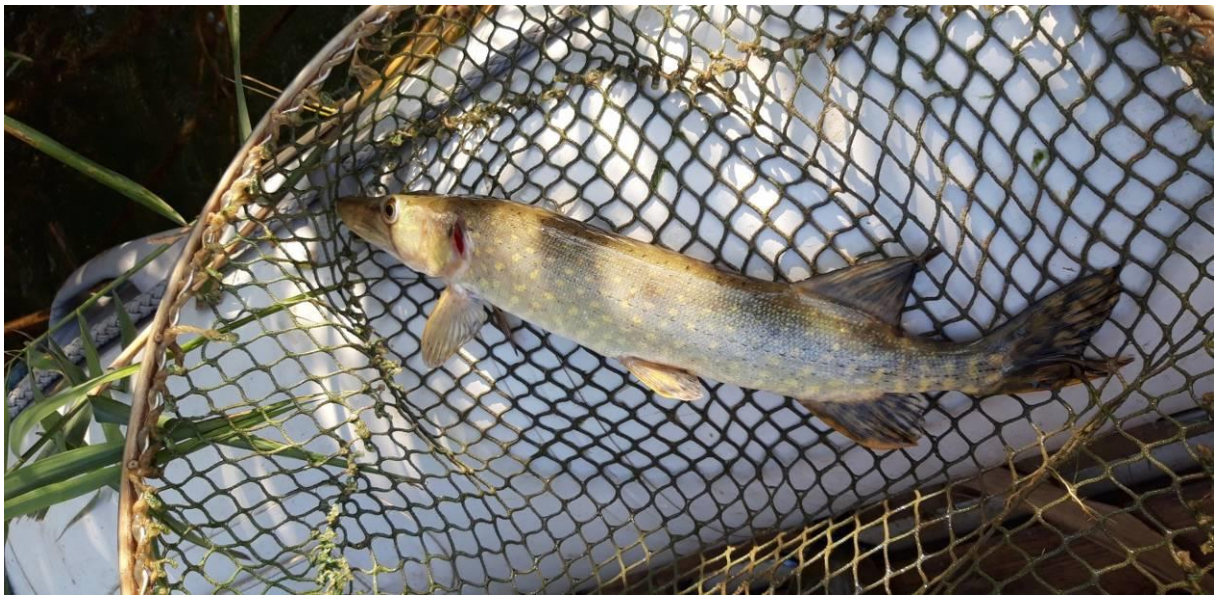
The analysis of **macroscopic aquatic invertebrates** was carried out on two occasions: on July 19, 2019, and on September 16, 2019, at the same time and sampling points as the macrophyte analyses. Based on the aggregated (summer and fall) survey results, it can be said that the aquatic macroinvertebrate fauna of the Kurca main canal showed an image common to small watercourses of the Great Plain. Dragonfly larvae (Odonata), freshwater snails (Gastropoda), and chironomid larvae (Chironomidae) were present in the largest numbers of species and individuals at the analyzed sampling locations, but water beetles (Coleoptera) were also present in significant numbers. During the analyses, a total of 670 aquatic macroinvertebrates were identified, that were classified into 26 families and 48 species or genus level taxa. Based on the aggregated number of individuals, the dominant aquatic macroinvertebrate taxa of the Kurca main canal were 44 % chironomid larvae (*Chironomidae*), 16 % freshwater snails (*Gastropoda*: *Physidae*-7%; *Viviparidae*-6%; *Planorbidae*-3%), 10 % crustaceans (*Crustacea*: *Mysidae*-4%; *Asellidae*-3%; *Corophidae*-3%), 7 % dragonflies (*Odonata*) and 4 % oligochaete worms (*Naididae*/*Tubificidae*).

The Kurca main canal is of M6 typological classification: flatland calcareous, average watercourse with medium-fine riverbed. Based on the Multimetric Macrozoobenthon Index (HMMI_sl), the qualification of the KURCA-01 sampling location was of “excellent”, while the qualification of the KURCA-02 – KURCA-04 sampling locations were of “good” ecological potential.

Gallery







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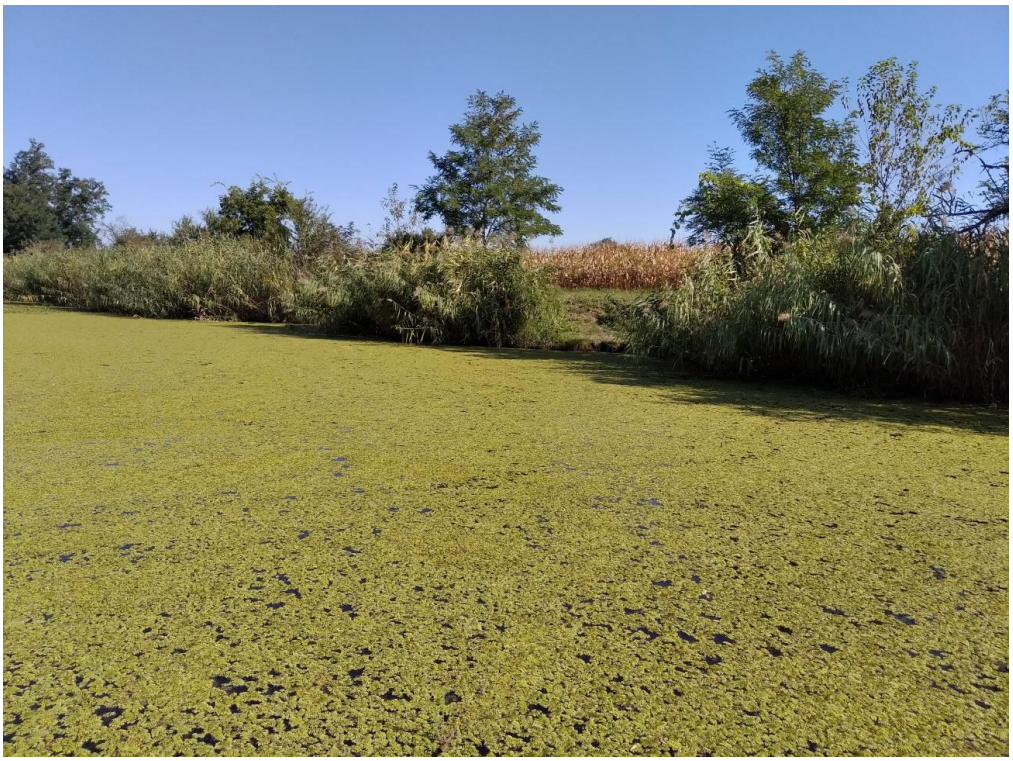

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