

# Sediment management in Lake Trakošćan, Croatia - an example of the social and economic aspects of sediment long-term impacts

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**Introduction:** Trakošćan Lake is an artificial lake located next to the Drašković family castle of the same name. The castle is in the north-western part of Croatia and is one of the most attractive in Croatia, it was first mentioned in written documents back in the 14th century. At the beginning of the 19th century, Count Juraj Drašković restored it into a residential castle, which in its present form represents a preserved ensemble of the romantic park and residential architecture.

Lake Trakošćan was built in the period from 1850 to 1862 as a pond and landscape addition to the castle, and fish was bred in it. The topographic catchment area of the lake is 10,7 km<sup>2</sup>, it is about 1,5 km long, and its area is about 17 hectares, with an average depth of about 2,5 meters. The lake's total volume was originally 400,000 cubic meters. [1]



Fig. 1: Lake and Trakošćan castle [1]

**Methods:** In the beginning, the lake was emptied every two to three years, silt was picked up and deposited in the fields to improve soil fertility, and after filling the lake with new water, restocking was carried out. This was the case until the end of World War II, and the silt was no longer removed from the lake. After 61 years, the lake was drained at the end of 2021, and in 2022 work began on sediment excavation to improve the lake's ecological condition due to about 200,000 cubic meters of deposited silt in the lake. The estimated depth of the lake averages around 6 meters after removing the excess sediment.

To preserve plant and animal habitats, a part of the lake that will not be touched is separated. It was estimated that there are as many as 9 tons of fish in the lake. The fish was caught and selected by an authorized fish owner, indigenous species were moved to another water pond, and allochthonous species were

disposed of as provided by the appropriate documentation, management plan and conditions of the Ministry of Agriculture, Fisheries Directorate. indicated.

The entire project is under the jurisdiction of Hrvatske vode (Croatian Waters), a public water management company in the Republic of Croatia. The project is worth about 2 million euros, which includes two contracts – a contract for works worth HRK 1,87 million euro based on an estimate of 200,000 cubic meters of sediment and a contract for a professional supervision service worth 15.600 euros. The planned completion of the project was by the end of winter 2022. [1]



Fig. 2: Drained Lake Trakošćan

**Results:** Geotechnical research and laboratory testing of sediment samples was carried out during 2019 and this results with sediment quantity estimation were published in Geotechnical study [1].

**Discussion:** Although the work was announced much earlier, there were a series of delays. First, the contractor had to make a temporary barrier (dam) on the final part of the lake, at the mouth of Čemernica stream, to ensure that 20 per cent of the area remained an untouched habitat. Also, the fish needed to be "moved" out of the lake. The downtime was due to waiting for an annex to the Management Plan contract.

**References:** [1] <https://www.jutarnji.hr/vijesti/2021>), [2] Geokon Zagreb d.d., (2019) *Geotechnical study on conducted research of the sediment thickness, sediment composition and water quality in the Lake Trakošćan*.