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Foreseen hydrological changes drive efforts to formulate water balance improvement measures as part of the management options of adaptation at Lake Balaton, Hungary

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Located in Western Hungary, Lake Balaton (LB) is one of the shallowest large lakes of the world. The catchment area including the lake is 5775 km2, only 10 times more than the lake surface area of 593 km2. This relatively small catchment area and the relatively dry climate results in high vulnerability of the lake water budget to any hydro-meteorological changes.

Due to the combined effects of planned water quality protection measures (refer to adjoining article on LB water quality) water quality was not as serious a concern over the last 15 years. However, a new and potentially more damaging threat, decreasing water level started to emerge in 2000. The natural water budget was negative half of the time, i.e. 6 years in the last 12 years. It hadn't occurred in the previous 80 years, since 1921, the year from which detailed meteorological data on the area are available.

This new phenomenon raised and continues to raise serious sustainability concerns in the Lake Balaton area requiring better understanding of climatic changes and their foreseen impacts on hydrological and ecological processes that would lead decision makers to formulate the appropriate vulnerability and adaptation policies.

Based on the common methodologies of the EULAKES project, present state of the hydrological conditions was analyzed as well as qualitative vulnerability assessment carried out to the area. Using the climate scenarios developed by the project partner Austrian Institute of Technology, calculations on water budget changes was possible. It is estimated that by the middle of the 21st century the lake will experience a drastic drop in the inflow and, accompanied by the increased evaporation, it is likely that years without outflow and serious drops in water-level would occur. The increased frequency of unfavorable water deficit will cause not only ecological, but also socio-economic conflicts in the multipurpose usage of the lake.

Therefore, a qualitative vulnerability assessment was completed with a similar methodology applied in partner lakes of the EULAKES project. Based on the assessment through a participatory process involving a broad group of stakeholders the possible management options were gathered and tested as the alternatives to improve the water balance of the lake.