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An innovative method to calculate reserved flow in an highly exploited river

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In the Northern Italy, the Serio river is highly exploited by several users such as hydroelectric power plants, agricultural intakes, waste water treatment plants, drinking water supply plants and fishing activities. This causes the actual river discharge to be strongly regulated and polluted, moreover during droughts some branches are completely dry. To improve the water quality for the conservation of the aquatic environment, from January 1st 2009 the Italian government has been imposing a reserved flow, as a guarantee of the minimum discharge necessary to the river ecosystems survival. To fix the correct value of the minimum flow after the water intakes, the regional authorities sponsored many hydrologic studies in the last 10 years, without obtaining any good applicable value. So in 2007 the Lombardy government tried a new pragmatic approach, based on campaign measures. Usually the reserved flow is calculated and then monitored after the water intakes, but in the Serio case it was too difficult because of their large number and spatial distribution. Most of the involved users agreed to release four different minimum flow scenarios, in the meantime the Regional Environmental Protection Agency measured some quality EU-WFD parameters in 19 representative river sections, as the global effect of the single releases. With 3 field campaigns in different hydrological seasons, more than 180 discharge measures were carried out. The collected data gave a detailed knowledge of the basin behaviour, specially about the interaction between the river and the water table. This let the regional authorities to establish a correct achievable value of the reserved water flow for the Serio river.