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INSTRUMENTS FOR INTEGRATED WATER RESOURCES MANAGEMENT: WATER QUALITY MODELING FOR SUSTAINABLE WASTEWATER MANAGEMENT

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Abstract

This study presents the development and use of a hydraulic-coupled water quality model for the simulation of Biochemical Oxygen Demand (BOD) concentrations in the Bahlui River, a small river located in northeastern Romania. This river experiences the typical pollution problems for many Romanian water bodies: heavy pollution from both diffuse and point sources, low connectivity to wastewater systems in rural areas and moderate removal of pollutants in municipal wastewater treatment plants. The model was used to generate an image of the BOD regime of the Bahlui River, and to simulate two wastewater infrastructure development scenarios: the first one considered the improvement of the municipal wastewater treatment facilities, and the second scenario considered that all the point sources along the river discharge BOD-containing wastewaters within appropriate limits. Simulation results for the two scenarios indicated that upgrading the wastewater treatment infrastructure does not necessarily lead to major improvements in river quality, and subsequently, other wastewater management options have to be considered to achieve the Water Framework Directive objectives. The study shows how even with limited data a useful model can be developed to assess the contribution of different sources and evaluate strategies for water quality improvement. The application of models is rather new in Romanian water resources management but can help stakeholders to get more insight on the system behavior and find integrated and effective solutions.

Key words: Bahlui River, BOD, Romania, wastewater treatment, water quality modeling

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