CHARACTERIZATION OF THE IMPACT CAUSED BY THE DISCHARGES OF A WASTEWATER TREATMENT PLANT INTO A FLUVIAL LEISURE AREA - A PORTUGUESE EXAMPLE

PEDRO ALMEIDA[1], NORBERTO CARVALHO[1], NUNO OLIVEIRA[1], ANA SILVA[1], MARGARIDA ANTUNES[2], ANA FERREIRA[1], TERESA ALBUQUERQUE[1]*

[1]*ESTCB, Castelo Branco, 6000-747, Portugal*
[2]*ESACB, Castelo Branco, 6000, Portugal*
teresal@ipcb.pt

The Ocreza River is a Portuguese river that has it source in the Gardunha chain, inner center of Portugal, at 1160 m altitude and stretches for 80 km until it drains into the Tagus River. It has several creeks and tributaries along which there are several river beaches and lakes that are used for recreational activities. The impact of several wastewaters treatment plants discharges on water quality must be monitored and controlled, because of its crucial role on local communities' health.
This paper focuses on the Póvoa wastewaters treatment plant which discharges into the Ramalhoso River, a tributary of the river Ocreza. Twelve water samples were collected between the wastewaters treatment plant discharge and the Ocreza river confluence, and were georeferenced. The first point is located upstream to the discharge point, the second one in the discharge point and all the other samples are located downstream of secondary inflows at approximately equal distances. Sampling campaigns were conducted during three different hydrological periods in 2010: rainy winter (January), intermediate conditions (March) and dry season (June). For all campaigns and sampled points a field flow measurement was done. The following chemical parameters were also analyzed: (BOD) biochemical oxygen demand, (DO) dissolved oxygen concentration, dry residue, Ptotal, Ntotal; pH, temperature and microbiological parameters. The dissolved oxygen concentration (DO), biochemical oxygen demand (BOD) and the microbiological parameters were used as indicators for the presence of organic matter in the body of water, and as parameters for evaluating the environmental pollution.
A coupled hydrodynamic and water dispersion model was used to simulate the pollution in the Ocreza River due to sewage effluent. The QUAL2kv2 software was used to construct a water quality model. The simulation results are consistent with field observations and demonstrate that the model has been correctly calibrated. The model is suitable for evaluating the environmental impact of sewage effluent on Ocreza River from the wastewaters treatment plant inflows, allowing feasibility studies of different treatment schemes and the development of specific monitoring activities.

Keywords: wastewater plant discharges, water quality model, numerical simulation