

## Evaluation of water quality in an urban park for environmental sensitization: A large scale simulation model

S. Karavoltzos, A. Sakellari, M. Antonopoulou, M. Dassenakis, M. Scoullos\*

National and Kapodistrian University of Athens, Department of Chemistry, Section III, Laboratory of Environmental Chemistry, Panepistimiopolis, 157 71, Athens, Greece  
Tel. +30 210 7274274; Fax +30 210 7274945; email: skarav@chem.uoa.gr

Received 25 February 2009; Accepted 9 July 2009

---

### ABSTRACT

Urban parks are important components of the urban environment since they are critical to improving livelihoods and the environment in densely populated cities, offering also shelter to several wildlife species and opportunities for outdoor educational activities. The park of Environmental Information and Sensitization “Antonis Tritsis” is the largest park of the Athens metropolitan area (~1.15 km<sup>2</sup>) including an artificial system of six large reservoirs referred as lakes of total surface of approximately 6 hectares (5–6% of its total surface) constituting the largest surface of fresh water within the city structure. The aforementioned system is a “controlled” one since it is fed by two distinctly different, monitored water sources, namely the pumped local water and the occasional runoff from rains. The bottom of the “lakes” is covered by geomembrane allowing the system to be considered as a very large scale simulation experiment. The results obtained provide insight into the biochemical functioning of the water system which constitutes a useful tool as a model. Two seasonal samplings were carried out, the first during the dry summer period when water supply for the lakes is provided exclusively from a local drilling and the second in autumn of 2007 directly after an intense rainfall. The physicochemical parameters measured were temperature, conductivity, suspended particulate matter, dissolved oxygen and pH and those directly related to eutrophication were ammonium, nitrites, nitrates, phosphates, chlorophyll a and dissolved organic carbon. The microbial charge was also assessed through analyses of *Enterococci*, *Coliforms* and *Escherichia coli*. From the results obtained it became clear that water deriving from the drilling has high concentrations of nitrates and the microbiological parameters studied. Runoff, which washes out the nearby urban area, introduces significant quantities of nutrients, mostly phosphates, to the lake system. In the wetland in the northern part of the park, where lake side vegetation is abundant, concentrations of both nitrates and phosphates are significantly reduced. Measurements of dissolved organic carbon and chlorophyll a indicate increased algal presence in the central lakes, linked to a certain extent to aesthetic deterioration.

*Keywords:* Water quality; Lakes; Urban; Park; Athens

---

\* Corresponding author.

Presented at the AQUA 2008 International Conference on Water Science and Technology-Integrated Water Resources Management, 16–19 October 2008, Athens Greece.