Ecological assessment of Mediterranean reservoirs: Alqueva reservoir as a case study (Alentejo, Southern Portugal)

Morais Manuela, Maria Helena Novais, Susana Nunes, Joana Rosado, Alexandra Penha, Amely Zavattieri, Miguel Potes, Rui Salgado
Instituto Ciências da Terra (ICT), University of Évora, Rua Romão Ramalho nº. 59, 7000-671 Évora

Lakes and reservoirs, due to their vulnerability, have been considered as sentinels of environmental changes, such as anthropogenic effects and global warming. Water exploitation from reservoirs requires specific chemical and biological quality of the water, but often brings up the questions of eventual problems regarding trophic level increase that could influence the water quality.
To understand the functioning of large and deep reservoirs during the summer period in the Mediterranean Region, Alqueva reservoir was studied from June until September 2014. To do so, vertical profiles of temperature, dissolved oxygen, pH, oxidation-reduction potential and electrical conductivity were monthly taken; simultaneously, water samples were collected for physical-chemical analyses and an integrated sample, representative of the euphotic zone, was collected for phytoplankton identification and quantification.
Thermal stratification was observed during the summer period, with thermocline between 7.5-10 m. Low values of Total Phosphorus and Total Nitrogen were detected during the whole campaign, higher in bottom samples, thus reflecting the low contribution of external loads to the system and confirming the mesotrophic status of the reservoir. Phytoplankton assemblages were dominated by cyanobacteria throughout the experiment, whilst chlorophyta were the taxa richest group; a sucession of phytoplankton species was observed, mainly cyanobacteria, thus representing a temporal dynamics, typical of reservoirs not under severe anthropogenic pressure.
The ecological status of Alqueva reservoir differs from the majority of the reservoirs in the South of Portugal, therefore, a comparison with a small eutrophic reservoir located in the same watershed is also carried out.
Given the trophic status of the reservoir, management strategies should be implemented in order to prevent the impairment of the ecological status and consequently the water quality.