



## **ECOLOGICAL, HYDROGEOLOGICAL, CHEMICAL AND PHYSICAL ANALYSIS AND DESIGN OF AN EXPERIMENTAL SYSTEM FOR COSA RIVER RESTORATION.**

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Since streams and rivers are among the most endangered ecosystems worldwide, there are urgent demands for comprehensive methodological approaches to evaluate the actual state of these ecosystems and to monitor their rate of changes. Physical, chemical and bacteriological measurements commonly form the basis of monitoring, because they provide complete spectrum of information for proper water management. However, in running waters, where changes in hydrology are rapid and difficult to estimate, they cannot reflect the integration of numerous environment factors and long-term sustainability of river ecosystems for their instantaneous nature. Biomonitoring has been proven to be necessary supplementary to those traditional monitoring techniques. Aquatic organisms, such as diatoms, macrophyte and benthic macroinvertebrates, can serve as bioindicators to integrate their total environment and their responses to complex sets of environmental conditions. They offer the possibility to obtain an ecological overview of the current status of streams or rivers.

Cosa river originates from Mount Vermicano at around 1750 m above sea level, extends for a length of nearly 35 km, affecting the province of Frosinone and flowing into the river Sacco at an altitude of 124 m above sea level. Because of the strong urbanization and industrialization along its course Cosa river is exposed to intense human pressure that causes a significant pollution. The ecosystem of the riverbed and riparian zones has been seriously compromised.

In accordance with the principles established by Legislative Decree n. 152 Plan of Water Protection of the Lazio Region aims to maintain the integrity of water resources compatible with the uses of the same resource for the quality of life and the maintenance of socio-economic activities of the local populations.

This PhD project will concern different aspect of river quality status evaluation, using both traditional measurement and biomonitoring. Moreover, with the whole data of water quality an experimental system for Cosa river restoration will be set up through phytodepuration.