

## **Restoration of Wadi Zaimer using a Pilot Instream Phytoremediation System for the Reduction of Industrial Pollution Loads from Nablus West, Palestine**

Odai Attili<sup>1</sup>, Rashed Al-Sa`ed<sup>2</sup>

<sup>1</sup> Faculty of Graduate Studies, Birzeit University (BZU), Birzeit, Palestine  
M: +972 592421060; E: [odai-attili@hotmail.com](mailto:odai-attili@hotmail.com)

<sup>2</sup> Institute of Environmental and Water Studies (IEWS), Birzeit University (BZU), Birzeit, Palestine  
M: +970599999820; E: [rsaed@birzeit.edu](mailto:rsaed@birzeit.edu)

### **ABSTRACT**

This study aims at the design and evaluation of phytoremediation, a nature-based solution, using constructed wetlands to revitalize Wadi Zaimer from industrial pollution loads discharged from Nablus West. The urban sewage works for Nablus West is not capable of treating heavy industrial pollution loads, and the industrial firms of various types lack onsite treatment systems to get permits for legal connection to public sewerage network. Recent studies revealed that the annual discharges of industrial wastewater into Wadi Zomer pose severe public health and quality degradation in groundwater resources. Lack of science-based data pertinent to the role of bioremediation using local vegetation on the removal of organic and inorganic pollutants in Wadi Zomer warrants deep insight understanding. A pilot phytoremediation system using constructed wetlands cultivated by local vegetation (Typhae and Cattail), a 400 m long instream low impact development strip, along the course of Wadi Zomer will be established and monitored. Analysis of physical, chemical and biological parameters including organic, inorganic (heavy metals) pollutants and biological (microbial counts and enzymatic activities) provides evidence on self-purification capacity and efficacy of phytoremediation processes. What role bioremediation may play in the uptake of selective heavy metals is part of the research questions this study raises. The results provide decision makers in the field of water and environment road map regarding integration of natural based treatment technologies for the pollution reduction and environmental protection. Low-impact developments along Wadi Zomer ensure pollution loads reduction, where compliance with national and regional water quality limits help Palestinian government avoid annual Israel environmental levy and promote recreation activities along Wadi Zaimer course.

**Keywords:** Aquatic restoration; bioremediation; constructed wetlands; industrial wastewater; Wadi Zaimer