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# The INSPIRE approach to assess the plastic removal efficiency of technology-based solutions for rivers

Mariana N. Miranda<sup>\*†1</sup>, Luca Muth<sup>2</sup>, Stephan Wagner<sup>2</sup>, George Triantaphyllidis<sup>3</sup>,  
Liesbeth De Keukelaere<sup>4</sup>, Rok Pučnik<sup>5</sup>, Annamaria Vujanović<sup>5</sup>, Daniel  
González-Fernández<sup>6</sup>, Tim Van Emmerik<sup>7</sup>, Ana Catarino<sup>1</sup>, and Gert Everaert<sup>1</sup>

<sup>1</sup>Flanders Marine Institute (VLIZ) – InnovOcean Campus, Jacobsenstraat 1, Oostende, 8400, Belgium

<sup>2</sup>Hochschule Fresenius (HS Fresenius) – Institute for Analytical Research, Limburger Str. 2, 65510  
Idstein, Germany

<sup>3</sup>MINDS Technologies Environmental Science (MINDS) – 2nd km Lavriou-Souniou Av., GR 195 00  
Lavrion, Belgium

<sup>4</sup>Vlaamse Instelling Voor Technologisch Onderzoek (VITO) – Boeretang 200, Mol, 2400, Belgium

<sup>5</sup>University of Maribor, Faculty of Chemistry and Chemical Engineering (UM) – Smetanova 17,  
Maribor, Slovenia

<sup>6</sup>Department of Biology, University Marine Research Institute INMAR, University of Cádiz (UCA) –  
Puerto Real, Spain

<sup>7</sup>Hydrology and Quantitative Water Management Group, Wageningen University Research (WUR) –  
Wageningen, Netherlands

## Abstract

Different solutions have been designed towards mitigation of the global plastic pollution problem. Consequently, both existing and innovative upstream and downstream technology-based solutions have been tested over the last decade to assess their effectiveness in removing (macro to nano) plastics from the natural or built environment. While there is consensus that plastic removal efficiency (PR%) is a measure of the amount of plastic that is successfully removed over the total amount, there are uncertainties on how it should be estimated and reported, and which protocols and test materials are suitable to perform this assessment. With this work, we start by exploring the current needs for standardization and questions that emerge when assessing technologies with different characteristics and targets. Then, we present our proposed approach to tackle them, which resulted from a collaborative effort between researchers and technology companies in the scope of the project INSPIRE (Innovative Solutions for Plastic Free European Rivers). One of our goals is to assess in the field 10 technologies (used alone or in combination) that target different plastics categories (e.g., sizes and densities) and that are designed to be installed/deployed in different locations: rivers, ports, marinas, stormwater collection systems, wastewater treatment plants, and water inlets in rivers (drinking water treatment plants and industrial facilities). From this, we aim to provide stakeholders (from industry to academia and regulatory agencies) with the necessary tools and guidelines to assess efficiencies that are comparable and unbiased but, at the same time, that result from a fair, flexible, and modular approach to cover a broad

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<sup>\*</sup>Speaker

<sup>†</sup>Corresponding author: mariana.miranda@vliz.be

group of technologies. The data collected from this type of assessment is instrumental in estimating the solutions cost-benefit and to empower policymakers and the private sector with necessary data for decision-making and creation of tailored plastic pollution mitigation strategies.

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