

**Evaluation of a Nature-Based Solution to reduce water pollution in the  
Massaciuccoli Lake within the H2020 PHUSICOS Project  
(<https://phusicos.eu/>)**

**- MUSLOC 2019 -**

**Pilar Andrés<sup>\*1</sup>, Roberto Molowny-Horas<sup>1</sup>, Enrique Doblas-Miranda<sup>1</sup>, Jordi Vayreda<sup>1</sup>, Joan Pino<sup>1,2</sup>, Gerardo Caroppi<sup>3</sup>, Francesco Pugliese<sup>3</sup>, Maurizio Giugni<sup>3</sup> and Nicola Del Seppia<sup>4</sup>**

<sup>1</sup> CREAM, Cerdanyola del Vallès 08193, Spain

<sup>2</sup> Univ. Autònoma Barcelona, Cerdanyola del Vallès 08193, Spain

<sup>3</sup> Department of Civil, Architectural and Environmental Engineering (DICEA),  
University of Naples Federico II (UNINA), 80125 Napoli, Italy

<sup>4</sup> Autorità di Bacino Distrettuale Appennino Settentrionale,  
Via Vittorio Veneto 1, 55100 Lucca, Italy

**ABSTRACT**

Nature-based solutions (NBSs) are designed to address various environmental challenges in a resource efficient and adaptable manner and to provide simultaneously economic, social and environmental benefits. H2020 Project PHUSICOS (meaning 'According to nature' in Greek) relies on a transdisciplinary consortium to develop innovative actions on five fronts: technical, service, governance, learning arena and product innovations. The main objective of Project PHUSICOS is to evaluate a set of NBS case-study sites and to demonstrate how NBSs provide robust, sustainable and cost-effective measures for reducing the risk of extreme weather events in rural mountain landscapes.

We present the evaluation carried out for one of the PHUSICOS proposals for the Demonstrator Site Serchio River Basin: “Construction of buffer strips between Fosso Boccalli and Fossa Nuova Channel in the South-Est of Massaciuccoli’s Lake” ([https://phusicos.eu/case\\_study/serchio-river-basin-italy/](https://phusicos.eu/case_study/serchio-river-basin-italy/)). The environment of the Massaciuccoli lake in the Province of Lucca, Tuscany (Italy), is part of the great natural value Park of San Rossore Massaciuccoli (SIC, SIR, ZPS, Ramsar) while embeds a considerable agricultural mosaic. This proposal intends to reduce soil loss, improve water quality and avoid eutrophication of the Massaciuccoli Lake caused by agrochemicals leached from crop areas and also by erosion. A system of slopes and channels guide stormwater runoff from the crops to the lake most of the year although also water from the lake is used for irrigation during summer drought, an increasing threat due to climate change. The Vegetative Filter Strip Modeling System [1] (VFSSMOD) software has been used to model the effect of adding buffer strips on both sides of the irrigation channels around the lake to prevent sediments and eroded materials from leaving the fields. In this contribution, the preliminary results gained on the efficiency of these NBS measures to help decreasing the eutrophication rate of the Massaciuccoli lake are illustrated.

**REFERENCES**

[1] Munoz-Carpena, R., Parsons, J. E., & Gilliam, J. W. (1999). Modeling hydrology and sediment transport in vegetative filter strips. *Journal of hydrology*, 214(1-4), 111-129.