

EGU22-8884

<https://doi.org/10.5194/egusphere-egu22-8884>

EGU General Assembly 2022

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## Effects of the Nature-Based Solutions on the ecosystem services; an evaluation of the Piave River catchment (Italy) in a 2050 scenario

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Sustainable river management should consider potential impacts on ecosystem services in decision-making with respect to mitigating future climate impacts. In this respect, there is a clear need to better understand how nature-based solutions (NBS) can benefit specific ecosystem services, in particular within the complex spatial and temporal dynamics that characterize most river catchments. To capture these changes, ecosystem models require spatially explicit data that are often difficult to obtain for model development and validation. Citizen science allows for the participation of trained citizen volunteers in research or regulatory activities, resulting in increased data collection and increased participation of the general public in resource management.

In the present study, we examined the temporal and spatial drivers in nutrient and sediment delivery, carbon storage and sequestration and water yield in a major Italian river catchment and under different NBS scenarios. Information on climate, land use, soil and river conditions, as well as future climate scenarios, were used to explore future (2050) benefits of NBS on local and catchment scales, followed the national and European directives related to water quality (Directive 2000/60/EC) and habitat (Directive 92/43/EEC). We estimate the benefits of individual and combined NBS approaches related to river restoration and catchment reforestation.