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Nature-Based solutions for geo-hydrological risk reduction: the Portofino Park (Italy) experience in the H2020 RECONNECT project

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The Horizon 2020 RECONNECT - Regenerating ECOsystems with Nature-Based Solutions for hydro-meteorological risk rEduCTion - Project aims to contribute to a European reference framework on NBS by demonstrating, upscaling and spreading large-scale NBSs in natural areas.

The Italian RECONNECT demonstrator is set in the Portofino Park, which represents a unique natural and cultural landscape but is severely endangered by geo-hydrological hazards.

The most frequent processes are shallow landslides and flash floods, sea-storm surges, rockfalls and mud-debris flows. Often, several different processes can occur simultaneously during an intense meteorological event, causing a location specific multi-hazard effect.

This research introduces the NBSs interventions designed within the RECONNECT Italian case study in two pilot catchments (San Fruttuoso and Paraggi basins), accessed by thousands of tourists throughout the year.

Amongst all possible interventions that can be implemented in the protected area, NBSs are considered to be most suitable due to their minimal impact and the possibilities for integration within the natural environment. The Portofino Park has already been promoting interventions aimed at reducing the impact of geo-hazards within the protected area in response to climate change. As part of the RECONNECT project, and in order to achieve sound engineering and technological solutions which can also preserve unique landscapes of natural and cultural heritage, the Park authority is realizing a set of NBSs in San Fruttuoso and Paraggi catchments. The purpose of the design is to demonstrate how NBSs can be integrated into such areas and how to reduce geo-hydrological risk for given climate change scenarios within the framework of an

ecosystem based holistic approach for risk reduction.

The main scope of NBSs in San Fruttuoso is to address following basic challenges: stabilizing of rock masses; reduction of geo-hydrologic risks in order to intercept and reduce suspended and solid transport along the streams as well as reducing erosion; forest management focused to improve biodiversity, to remove non-native species and dangerous old specimen (Pine trees), not suitable in a Mediterranean climate, in order to select the climax species (i.e. *Quercus ilex*); restoration of dry-stone walls with the aim to valorize the terraced landscape as well as stabilizing the slopes.

The reconstruction of terraces and the regeneration of natural and man-made ecosystems will also be implemented within the Paraggi basin. In addition, hydraulic-forestry arrangements on water courses will be undertaken to improve the outflow and decrease solid transport and floating debris. Furthermore, other measures such as riverbed and tributary implementations, maintenance along hiking paths, slope stabilization, and cleaning and removing dead vegetation and dirt will also be undertaken.

The project also includes hydro-meteorological monitoring activities in the selected basins and the periodic checking of NBSs performance indicators. Lastly, remote sensing surveys are used to quantitatively assess the ongoing geomorphological processes.

In relation to future projections of natural and socio-economic impacts of climate change, NBS represent a relevant mitigation and adaptation strategy for the Portofino case study, which may be upscaled to national and international level.