

>> SYNTHESIZE MOUNTAINS OF KNOWLEDGE <<

## Submitted Abstract

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## Abstract

The impact of human activities on, most notably, biodiversity and the carbon and nitrogen cycles are pushing humanity out of a safe operating space, undermining the resilience of many socio-ecological mountain systems worldwide. The adoption and implementation of Nature-based Solutions (NbS) such as Green Infrastructure (GI), however, has the potential not only to foster the sustainable management of our resources, but also to enhance the delivery of benefits, or ecosystem services (ES), to society. Ecosystems and natural features can indeed provide several environmental, socio-economic, and biodiversity benefits which can help address the societal challenges of today. In this context, the concept of multifunctional GI networks fosters strategic planning at landscape level and the sustainable management of individual GI elements. By proposing a practical approach for mapping GI networks in several pilot regions across the Alpine Space cooperation area, we aim to highlight how the concept of GI can enable practitioners and researchers to enhance multifunctionality, develop tailored management strategies, and harness synergies between ES and policy goals. To this end, we spatially explicitly map several ES, assess ecosystem multifunctionality, and combine these findings with an ecological connectivity analysis to identify potential GI networks. Our analyses provide high-resolution and targeted information showcasing key multifunctional features in urban, agricultural, forested, and open areas, highlighting critical corridors for regional and transboundary ecological connectivity. In agricultural landscapes, green linear elements and woody features support connectivity and important regulating services, such as pollination. The present mapping approach can support decision-makers and practitioners in conserving, restoring and sustainably managing our natural resources effectively and efficiently. The inclusion of not only provisioning, but also regulating and cultural ecosystem services provided by different landscape features allows to maximise the synergies but also to navigate the conflicts occurring between different ES, sectoral policies, and stakeholders' interests. In this context, the consideration of both ecosystem service-based multifunctionality and ecological connectivity can support decision-makers in meeting the EU policy goals outlined in both the Farm to Fork and Biodiversity strategy for 2030.