59. A GIS-based methodology to support Green Infrastructure spatial planning for biodiversity improvement

Alessandra Marra, Michele Grimaldi, Isidoro Fasolino

1 Department of Civil Engineering, University of Salerno, via Giovanni Paolo II, 132, Fisciano, Italy *

Under the “umbrella concept” of Nature-Based Solutions (NBS), Green Infrastructures (GIs) are of particular interest to integrate the spatial benefits of NBS into spatial planning processes. The literature reveals a lack of quantitative approaches for assessing the benefits associated with Gis, in particular for the biodiversity, which can be measured through the analysis of the Ecological Connectivity (EC). The aim of this work is to propose a model with a dual purpose: (i) to identify the most relevant components of the GI network for EC; (ii) to quantitatively and spatially assess how land-cover changes affect EC at both network and patch levels. The proposed methodology, based on Geographic Information System (GIS), consists of resistance mapping, identification of the GI network, construction of the graph and calculation of global and local network metrics, and comparison of the metrics in different temporal scenarios. The knowledge base that can be produced, by applying these methodological steps, is useful for identifying particularly problematic areas in which to intervene as a priority for the improvement of biodiversity. The proposed model is applied to the Metropolitan City of Naples (Italy), a densely urbanized and infrastructural area, characterized by significant fragmentation of habitats, considering 2006 and 2018 as temporal scenarios. The results show an overall reduction in EC and make it possible to identify the most critical areas, supporting GI spatial planning for biodiversity improvement.