Lost and fragmentation of open spaces within metropolitan areas in the Mediterranean Region: landscape indices and metrics as tools for the evaluation of resilient planning scenario

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Abstract

The thesis highlights the relevance of the landscape ecology analysis as a tool for planning the resilience of the metropolitan areas in relation to the processes of loss and fragmentation that are impacting on the open spaces. The research is focused on the Mediterranean region where an ever-growing alteration and fragmentation of the natural and semi-natural environments, as consequence of rapid urban and infrastructural expansions, is observable at multiple scales. For this reason, the thesis supports two main hypotheses: namely that planners should led more effective plans of resilience to the abovementioned processes monitoring the evolution of the metropolitan landscapes through several metrics and indices provided by the discipline of the landscape ecology; nevertheless, these analytical tools should be part of more integrated analysis with the aim of sustaining or restore the landscape services, on which all the species depend.

The work starts with a bibliographic recognition of the historical trajectories that have generated the metropolitan and the post-metropolitan forms. In order to debate the ways to resolve the socio-ecological critical points emerging from the model of unlimited growth that have guided their evolution, several alternative models (such as socio-metabolic models and bioregional approaches) are taken into account. An original explorative analysis of the recent dynamics of lost and fragmentation interesting the metropolitan areas in the Mediterranean eco-region is presented. The implementation part considers the CLC land use data in a multi-temporal perspective (1990-2012) for the elaboration of a set of metrics and indices referred to a representative number (97) of metropolitan areas. This set has been employed for several objectives: to evaluate the urban and infrastructural expansion's features; to identify examples of landscape fragmentation impacting on the ecological connectivity; to illustrate the recent loss of landscape functions (habitat function); and, finally, to develop a proposal of a GIS-based method allowing the identification of critical areas needing priority -and multi-disciplinary- intervention with the aim of supporting and restoring the landscape ecological functionality.