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Valuing environmental assets for flood exposure assessment

Enrica Caporali, **Gabriele Bertoli**, and Chiara Arrighi
Department of Civil and Environmental Engineering, University of Florence, Firenze, Italy (enrica.caporali@unifi.it)

Environmental assets are critical to human well-being, ecosystem vitality and the equilibrium of natural processes. Despite their recognized importance in providing numerous ecosystem services, their value remains essentially intangible and difficult to monetize. For this reason, environmental assets are rarely included in flood exposure and impact assessments, despite being required by Directive 60/2006/EC. A common thinking is that floods are a natural phenomenon and as such they should not be detrimental for environmental assets. However, the literature identifies impacts on fish fauna, habitats, tree survival and plant reproduction. This work has the objectives of (i) identifying which environmental assets are to be included in the exposure analysis, (ii) analysing the environmental value based on objective parameters and based on the social value recognized by a group of users to whom an online test is administered. The developed methodology is based on three levels with increasing of detail (from regional/national to local analysis). In the first level, exposed environmental areas are evaluated based on the level of regulatory constraint. In the second, environmental areas are assigned their main ecosystem services, and in the third, the ecosystem service subcategory is further detailed. The level 1 and 2 methods are applied to the entire Tuscany Region (Italy) for low hydraulic hazard areas mapped by the Hydrographic District of the Northern Apennine, the level 3 methodology is applied to the Val d'Orcia and Val di Chiana catchments. The results particularly highlight at the regional level the exposure of wetlands of recognized international value, lakes and all water resources that provide numerous ecosystem services for supply and regulation, and UNESCO-recognized cultural landscapes.