

The Ecosystem Approach for the design of compensation and mitigation measures on coastal marine environment: the case study of Civitavecchia harbour

Marco Marcelli, Sergio Scanu, Viviana Piermattei, Simone Bonamano, Emanuele Mancini, and Alice Madonia
University of Tuscia, DEB, Department of ecological and biological sciences, Civitavecchia, Italy (marcomarcell@unitus.it)

The coastal marine domain is characterized by physical and ecological conditions that favour and determine a spatial overlap between the different uses of natural resources. In this context, the coastal area of Civitavecchia houses important biodiversity hotspots as well as multiple human activities, being affected by potential conflicts. In particular, the works of expansion scheduled for the Port of Civitavecchia, one of the largest in Europe in terms of cruise and ferry traffic, could impact on two Sites of Community Importance (IT6000005 and IT6000006), for the presence of priority habitats (Posidonia oceanica meadows and reefs of rocky substrates and biogenic concretions) and species (Pinna nobilis and Corallium rubrum) according to Habitat Directive 92/43/EEC. Considering that the Natural Capital analysis is indeed a valid emerging management tool for marine conflicts resolution (Maritime Spatial Planning Directive 2014/89 / EU - MSP), this study aims to propose a methodology to quantify the compensation and mitigation measures, evaluating the ecosystem services of priority habitats and species impacted by harbour expansion activities.

To evaluate the ecosystem services the benthic biocoenoses, analyzed in the study area over the past 35 years, were chosen as reference spatial unit. We present the results of the economic evaluation of the benefits produced by Posidonia oceanica meadows (Habitat 1120), and Reef (Habitat 1170). For Posidonia oceanica meadows we computed benefits in relation to carbon sequestration, erosion control, bioremediation, food production, recreational potential and O₂ supply, for Reefs using the method proposed by De Groot et al. 2012. The results of the economic assessment of ecosystem services for Habitat 1120 are in agreement with literature data. The results for the services related to the Habitat 1120 are significantly lower because of the influence of the ongoing impacts of human activity.

This study allowed to define a specific relation between the impact in terms of loss of economic value of the Natural Capital and compensation measures capable of mitigate the conflicts of use.