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An integrated approach to manage coastal ecosystems and prevent marine pollution effects

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This work focuses an integrated approach based on Sea-Use-Map (SUM), backed by a permanent monitoring system (C-CEMS-Civitavecchia Coastal Environmental Monitoring System). This tool supports the management of the marine coastal area, contributing substantially to ecosystem benefits evaluation and to minimize pollution impacts.
Within the Blue Growth strategy, the protection of marine ecosystems is considered a priority for the sustainable growth of marine and maritime sectors.
To face this issue, the European MSP and MSFD directives (2014/89/EU; 2008/56/EC) strongly promote the adoption of an ecosystem-based approach, paying particular attention to the support of monitoring networks that use L-TER (long-term ecological research) observations and integrate multi-disciplinary data sets.
Although not largely used in Europe yet, the Environmental Sensitivity Index (ESI), developed in 1979 by NOAA (and promoted by IMO in 2010), can be considered an excellent example of ecosystem-based approach to reduce the environmental consequences of an oil spill event in a coastal area.
SUM is an ecosystem oriented cartographic tool specifically designed to support the sustainable management of the coastal areas, such as the selection of the best sites for the introduction of new uses or the identification of the coastal areas subjected to potential impacts.
It also enables a rapid evaluation of the benefits produced by marine areas as well as of their anthropogenic disturbance. SUM integrates C-CEMS dataset, geomorphological and ecological features and knowledge on the coastal and maritime space uses.
The SUM appliance allowed to obtain relevant operational results in the Civitavecchia coastal area (Latium, Italy), characterized by high variability of marine and coastal environments, historical heritage and affected by the presence of a big harbour, relevant industrial infrastructures, and touristic features.
In particular, the valuation of marine ecosystem services based on benthic biocenosis as relevant spatial unit, and the ESI calculation for Civitavecchia coastal areas, are reported.