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UPDATE ON THE CONSERVATION STATUS OF THE ITALIAN MARINE HABITATS AND SPECIES LISTED IN THE EU HABITATS DIRECTIVE (92/43/EEC)

AGGIORNAMENTO SULLO STATO DI CONSERVAZIONE DEGLI HABITAT E DELLE SPECIE MARINE ITALIANE INSERITE NELLA DIRETTIVA HABITAT (92/43/CEE)

Abstract - Under the Habitats Directive (92/43/EEC), a cornerstone of European nature conservation, EU Member States are required to submit a national report every six years, contributing to a comprehensive European assessment of habitats and species of community interest. This study details the work undertaken in Italy to compile the fifth national report on marine habitats and species for the 2019-2024 period. Led by the Italian Institute for Environmental Protection and Research (ISPRA), in collaboration with 30 experts from the Italian Society of Marine Biology (SIBM), this work updates the conservation status of 8 habitats and 19 species using standardised reporting formats adopted across Europe. By comparing current findings with those from the previous reporting cycle, we identified short-term changes in the conservation status of marine biodiversity, as well as persistent methodological limitations, thereby highlighting critical elements for improving the accuracy and effectiveness of future assessments.

Keywords: endangered species, biodiversity conservation, expert knowledge, European policy

Introduction – Conservation practices are pivotal for maintaining or restoring biodiversity functionality, ensuring its associated services, and preventing further ecosystem degradation (Lotze, 2021). Their importance has been increasingly underlined by several policies adopted at global level. In Europe, one of the most important policies to ensure biodiversity conservation is the Habitats Directive (HD; Council Directive 92/43/CEE), which includes 230 habitat types and over a 1000 species of conservation concern, for which a “favourable conservation status” must be ensured (Art. 2). To evaluate the effectiveness of the HD and the impact of conservation measures, each Member State is required to produce a national report every six years, assessing the conservation status (CS) of its habitats and species (Art. 17). These national reports are later assembled by the European Environmental Agency (EEA), to produce a comprehensive overview of the European biodiversity status (European Environment Agency, 2020). In Italy, the first three national reports were submitted in 2001, 2007 and 2013, and revealed substantial knowledge gaps, particularly regarding marine habitats and species (La Mesa *et al.*, 2021). The quality of the assessment improved starting from 2018, when the reporting process began to be coordinated by the Institute for the Environmental Protection and Research (ISPRA), in collaboration with regional authorities and scientists operating in the national context (La Mesa *et al.*, 2021). In July 2025, Italy submitted the fifth national report to the EEA, covering the period 2019-2024. The main objectives of this study are to:

- i) present the key findings on the CS assessments for the marine habitats and selected species included in the report;

- ii) compare the current CS of marine biodiversity with that reported in the previous evaluation, which covered the period 2013-2018.

Materials and methods - The CS of 8 marine habitats (Tab. 1) and 19 marine species regularly present in Italian waters (2 algae, 6 invertebrates, 10 mammals, 1 reptile) was assessed using the standardised reporting format required across all the Member States. The format includes several sections, e.g., range, pressures and threats, conservation measures, future prospects. To compile certain sections, distribution data for marine habitats and species were collected using an online GIS platform. These data were plotted into grid maps with cells of 10 km × 10 km, using the maps from the fourth national report as baselines. For the remaining parameters, data were retrieved from monitoring programs, scientific literature, and expert knowledge provided by 30 researchers from the Italian Society of Marine Biology (SIBM). The overall CS was classified into four categories: favourable (FV), inadequate (U1), bad (U2), or unknown (XX). For the habitats, the overall CS was derived from the evaluation expressed for the parameters range, area, structures and functions, and future prospects, whereas for the species it was based on the assessment of range, population, habitat for the species, and future prospects. The overall CS assessments were then compared with those from the previous reporting cycle (2013-2018), and the observed short-term trends were classified as stable, unknown, decreasing, increasing, or reflecting increased knowledge. Findings were finally used to identify strengths and limitations of the evaluation process.

Tab. 1 - Marine habitats listed in the Habitats Directive and occurring in Italian waters.
Habitat marini elencati nella Direttiva Habitat e presenti nei mari italiani.

Code	Habitat name
1110	Sandbanks which are slightly covered by sea water all the time
1120	Posidonia beds (<i>Posidonia oceanica</i>)
1130	Estuaries
1140	Mudflats and sandflats not covered by seawater at low tide
1160	Large shallow inlets and bays
1170	Reefs
1180	Submarine structures made by leaking gases
8330	Submerged or partially submerged sea caves

Results - The assessment of the Italian marine biodiversity under the HD revealed that 37.5% of habitats and 63.2% of species are currently in a favourable CS. In contrast, 37.5% of habitats and 10.5% of species show an inadequate CS. The invertebrate *Pinna nobilis* Linnaeus, 1758, which suffered widespread mortality across the Mediterranean due to pathogens, and the marine mammal *Monachus monachus* (Hermann, 1779), a species that had disappeared from most of the Mediterranean but, thanks to specific monitoring activities and the implementation of conservation measures, is now being sighted more frequently in Italy, represent the 10.5% of species assessed as being in bad condition. For the remaining cases, the CS is still unknown (Fig. 1a-b). Compared to the previous report, the CS of most habitats and species remained stable. However, two habitats and one species suffered a deterioration, while 12.5% of habitats and 26.3% of species were assessed for the first time (Fig. 1c-d). Distribution maps were compiled for all habitats (Fig. 2), showing minimal differences compared to the previous report, mainly due to an improved knowledge of the marine environment. Notably, for three habitats (codes 1110, 1130, and 1170, see Tab. 1), the area protected under the Nature 2000 network expanded over the last six years. Transport activities and pollution

were identified as the main pressures and threats, as they affect six of the eight habitats listed in the HD. Conservation measures have been undertaken for most marine habitats, aimed mainly at limiting infrastructure development and the exploitation of biological resources. Regarding the species, the distribution of the two algal species *Lithothamnium corallioides* (Crouan & Crouan) Crouan & Crouan and *Phymatholithon calcareum* (Pall.) Adey & McKibbin ex Woelkering & Irvine was mapped for the first time, although available data were fragmented at the national scale. The main pressures and threats to species were pollution and biological resources exploitation. This latter one affected invertebrates, cetaceans and algae, but its impact has been mitigated by the adoption of several conservation measures.

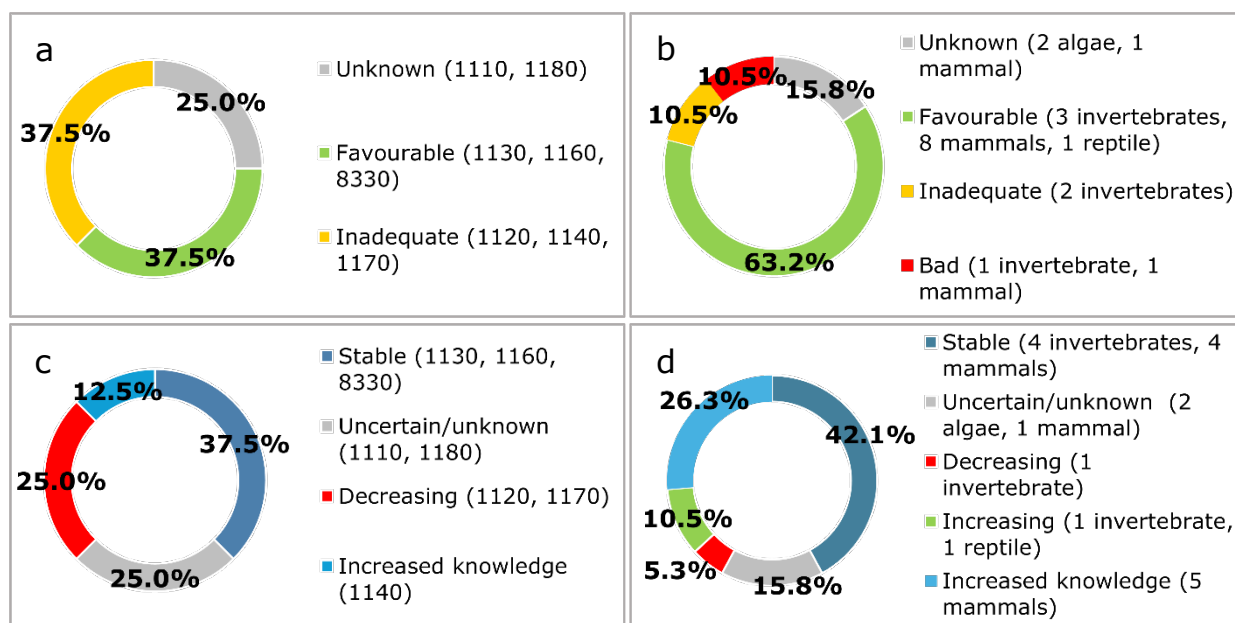


Fig. 1 - Conservation status (CS) of 8 marine habitats (a) and 19 species (b) in the fifth Italian report of the Habitats Directive. Short-term trends in CS for habitats (c) and species (d), based on a comparison between the fourth and the fifth reports. Habitat codes are given in brackets (see Tab. 1).

Stato di conservazione (SC) degli 8 habitat (a) e delle 19 specie (b) marine nel quinto report italiano della Direttiva Habitat. Cambiamento nello SC di habitat (c) e specie (d) tra il quarto e il quinto report. I codici degli habitat sono riportanti tra parentesi (si veda la Tab. 1).

Conclusions - By updating the assessment of marine biodiversity listed under the HD at the national level, this work contributes to fulfil the objectives set by the HD. Compared to the previous evaluation, the quality of the collected information has improved, due to increased data availability and resolution. This progress was facilitated by the cooperation between regional and national institutions and scientists, but also by the expansion of dedicated monitoring campaigns (La Mesa *et al.*, 2025) and species-specific studies covering most of the Italian sea (*e.g.*, Toma *et al.*, 2022; Ferranti *et al.*, 2023). Nevertheless, the contribution of expert judgment, primarily provided by members of the SIBM, remained essential for completing this evaluation, as standardized monitoring protocols were still applied inconsistently across Italian marine waters. Indeed, disparities in data availability among habitats and species, as well as regional inconsistencies, were observed. Overall, this evaluation highlights critical elements for improvement, guiding future assessments toward greater accuracy, consistency, and effectiveness in monitoring the CS of marine biodiversity.

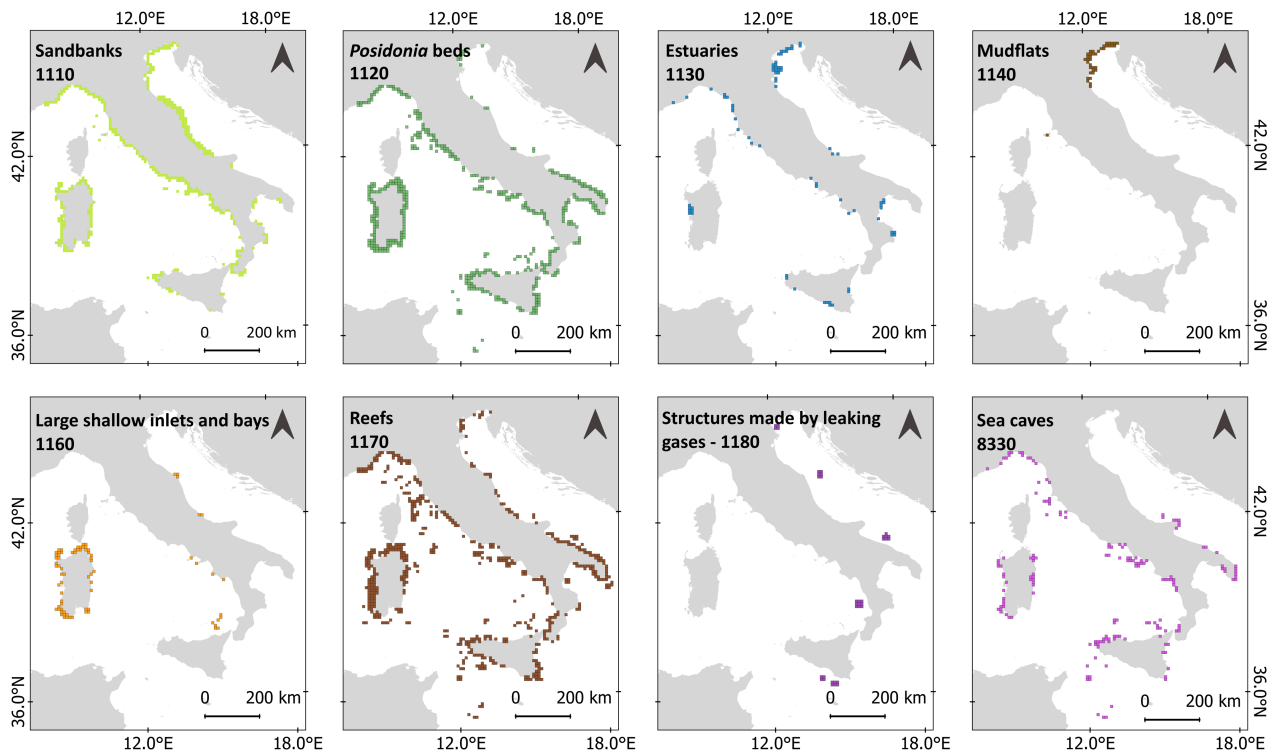


Fig. 2 - Distribution maps of the marine habitats included in the Habitats Directive. Each map includes the name of the habitat and the relative reference code.

Mappe di distribuzione degli habitat marini inclusi nella Direttiva Habitat. Ogni mappa contiene il nome dell'habitat e il relativo codice di riferimento.

We would like to express our gratitude to all the scientists from SIBM that contributed to this work: Giandomenico Ardizzone, Andrea Belluscio, Carlo Nike Bianchi, Giovanni Chimienti, Barbara Calcinai, Alberto Castelli, Carlo Cerrano, Martina Coppari, Cristina Gioia Di Camillo, Annalisa Falace, Maria Paola Ferranti, Guido Gnone, Daniele Grech, Gabriella La Manna, Joachim Langenec, Antonella Logiurato, Antonino Mancuso, Antonio Mazzola, Michele Mistri, Carla Morri, Maria Antonietta Nitopi, Alice Oprandi, Daniela Silvia Pace, Antonietta Rosso, Giovanni Russo, Adriano Sfriso, Rita Tarantini, Antonio Terlizzi. We are also grateful to ISPRA for funding the project.

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