

**Applying an ecosystem and risk-based approach towards an integrated assessment of benthic habitat communities at a regional seas scale**

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The Marine Strategy Framework Directive (MSFD) aims to implement an integrated ecosystem-based approach to manage of the marine environment, by setting descriptors which summarise its functions within European Union waters. These descriptors are made up of numerous indicators which help quantify the state of the marine environment. Unfortunately this process has led to overlaps between indicators, double counting and poor coherence. In addition, there are many unknowns about the marine environment including the extent and condition of benthic habitats and the effect of cumulative pressures and impacts on benthic habitats. Such knowledge gaps can make it difficult to set baselines required for monitoring and assessment processes.

We propose an integrated cyclical approach to assess the state of the seabed and benthic communities with the use of best available evidence at a sub-regional scale but applicable to all MSFD regions. This method integrates indicators relating biodiversity, seafloor integrity and potentially commercial fish and food web descriptors in a cyclical process. Through this integrated cyclical process, multi-metric indices are used to assess changes in the condition of the seabed and its communities at a site scale to provide quantitative feedback to set thresholds, seafloor disturbance levels and habitat sensitivity assessments at a sub-regional scale. This method integrates biodiversity and seafloor integrity related indicators, and provides a mechanism to strengthen and improve confidence in indicator assessment, where prior information is missing. This integrated cyclical approach to assess the state of the seabed is an innovative method, based on monitoring and assessment methods.

**Keywords:** Ecosystem-based fisheries management, MSFD, Indicators, integrated assessment.

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