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TITLE: Synthesis of Knowledge on Marine Biodiversity in European Seas: From Census to Sustainable Management

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ABSTRACT:

The recently completed European Census of Marine Life, conducted within the framework of the global Census of Marine Life programme (2000-2010), markedly enhanced our understanding of marine biodiversity in European Seas, its importance within ecological systems, and the implications for human use. Here we undertake a synthesis of present knowledge of biodiversity in European Seas and identify remaining challenges that prevent sustainable management of marine biodiversity in one of the most exploited continents of the globe. Our analysis demonstrates that changes in faunal standing stock with depth depends on the size of the fauna, with macrofaunal abundance only declining with increasing water depth below 1000 m, whilst there was no obvious decrease in meiofauna with increasing depth. Species richness was highly variable for both deep water macro- and meio- fauna along latitudinal and longitudinal gradients. Nematode biodiversity decreased from the Atlantic into the Mediterranean whilst latitudinal related biodiversity patterns were similar for both faunal groups investigated, suggesting that the same environmental drivers were influencing the fauna. While climate change and habitat degradation are the most frequently implicated stressors affecting biodiversity throughout European Seas, quantitative understanding, both at individual and cumulative/synergistic level, of their influences are often lacking. Full identification and quantification of species, in even a single marine habitat, remains a distant goal, as we lack integrated data-sets to quantify these. While the importance of safeguarding marine biodiversity is recognised by policy makers, the lack of advanced understanding of species diversity and of a full survey of any single habitat raises huge challenges in quantifying change, and facilitating/prioritising habitat/ecosystem protection. Our study highlights a pressing requirement for more complete biodiversity surveys to be undertaken within contrasting habitats, together with investigations in biodiversity-ecosystem functioning links and identification of separate and synergistic/cumulative human-induced impacts on biodiversity.

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