

Towards answering the “so what” question in marine renewables environmental impact assessment.

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Marine renewable energy (MRE) projects are increasingly occupying the European North-Atlantic coasts and this is clearly observed in the North Sea. Given the expected impacts on the marine environment, each individual project is accompanied by a legally mandatory, environmental monitoring programme. These programmes are focused on the resultant effects on ecosystem component structure (e.g. species composition, numbers and densities) of single industrial projects. To date, there is a tendency to further narrow down to only a selection of ecosystem components (e.g. marine mammals and birds). While a wide knowledge-based understanding of structural impacts on (a selection of) ecosystem components exists, this evidence is largely lacking when undertaking impact assessments at the ecosystem functioning level (e.g. trophic interactions, dispersal and nutrient cycling). This critical knowledge gap compromises a scientifically-underpinned answer to the “so what” question of environmental impacts, i.e. whether the observed impacts are considered to be good or bad, or acceptable or unacceptable. The importance of ecosystem functioning is further acknowledged in the descriptors 4 and 6 of the Marine Strategy Framework Directive (EU MSFD) and is at the heart of a sustainable use and management of our marine resources. There hence is a fundamental need to focus on ecosystem functioning at the spatial scales at which marine ecosystems function when assessing MRE impacts. Here, we make a plea for an increased investment in a large (spatial) scale impact assessment of MRE projects focused on ecosystem functioning.

This presentation will cover a selection of examples from North Sea MRE monitoring programmes, where the current knowledge has limited conclusions on the “so what” question. We will demonstrate how an ecosystem functioning-focused approach at an appropriate spatial scale could advance our current understanding, whilst assessing these issues. These examples will cover biogeochemical cycling, food webs and connectivity in a cumulative MRE impact assessment context. This presentation will highlight both the available knowledge base and further elaborate on the knowledge gaps. We will offer guidance on how these knowledge gaps could be further investigated, based on examples taken from the recently started projects FaCE-It, Functional biodiversity in a changing sedimentary environment: implications for biogeochemistry and food webs in a managerial setting (financed by the Belgian Science Policy) and UNDINE, Understanding the influence of man-made structures on the ecosystem functions of the North Sea (financed by INSITE). This presentation will set the scene and offer further thinking on the current issues associated to MRE monitoring, particularly beyond the level of ecological structure and individual industrial projects. The overall message will aid advancing and strengthening a collaborative MRE monitoring, helping scientists, managers and regulators to answer the much needed “so what” question to support environmental assessments.

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