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# A general methodological framework to quantify the supply of marine ecosystem services in the context of offshore renewable energy development

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## ABSTRACT

**Offshore wind industry** is actually booming and considering the integration of these new activities in marine spatial planning becomes an urgent priority. Tools and methods must be developed to consider the impacts of offshore wind farm (OWF) on the ecosystems and the human activities and support decision-making. To that aim, the ecosystem service (ES) mapping approach is particularly powerful, as it allows to study ecosystem dynamics and to link them to the spatialization and the development of human activities.

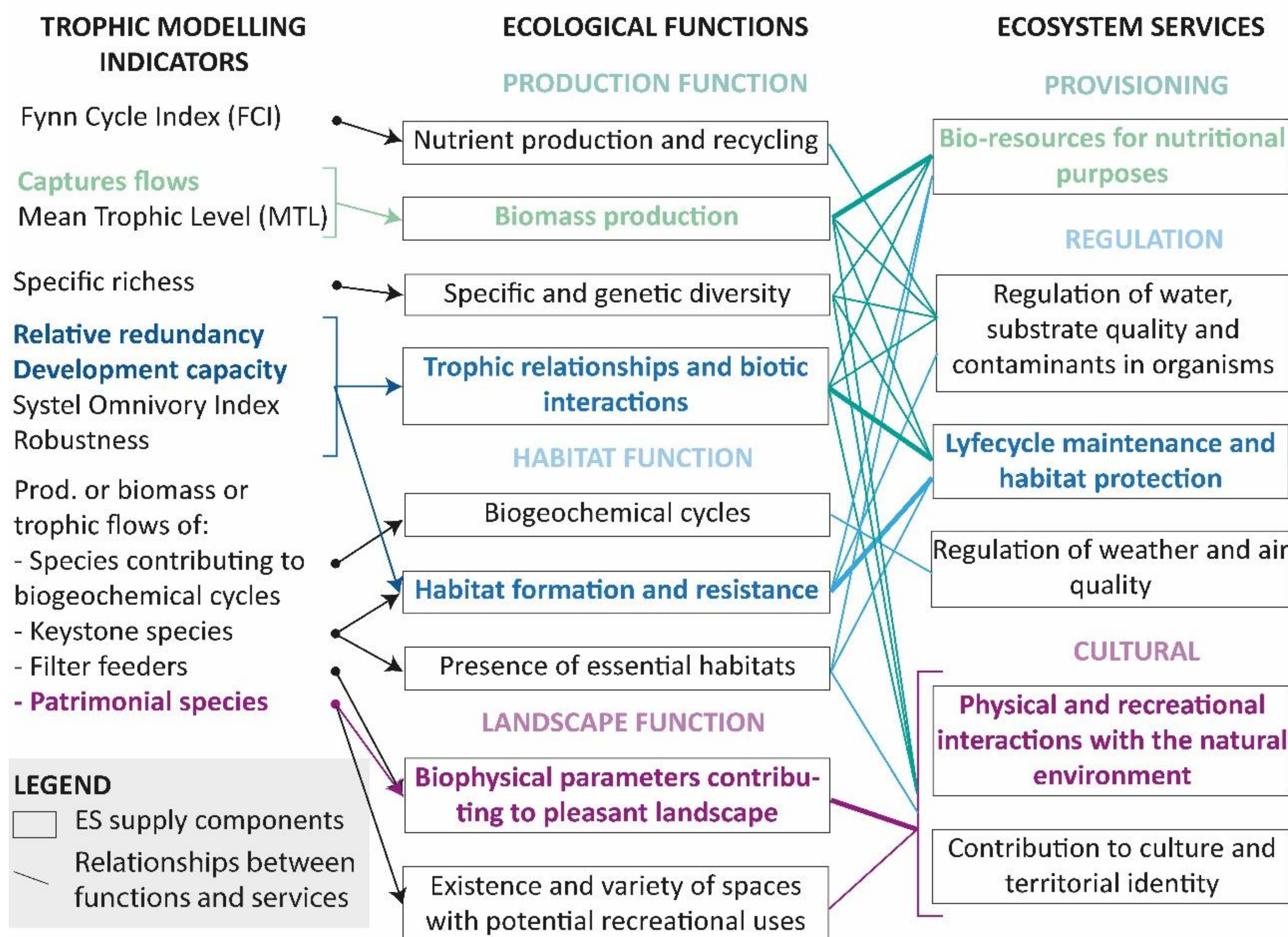
However, this methodology faces challenges in mobilizing marine ecological and socio-economic data to map services, and to integrate the full dynamic, multi-scale range of ecological processes to characterize ES provision. For this purpose, coupling ecosystem models, which seek to model trophic relationships in a holistic way, with the ES concept is highly promising. Trophic modeling has already been developed from different studies related to OWF and could be used to improve our understanding of the OWF impacts on ES supply.

## OBJECTIVE

Propose a methodological framework with indicators from trophic modeling, allowing to map the supply of all ecosystem services and their evolution in the context of offshore wind farm development.

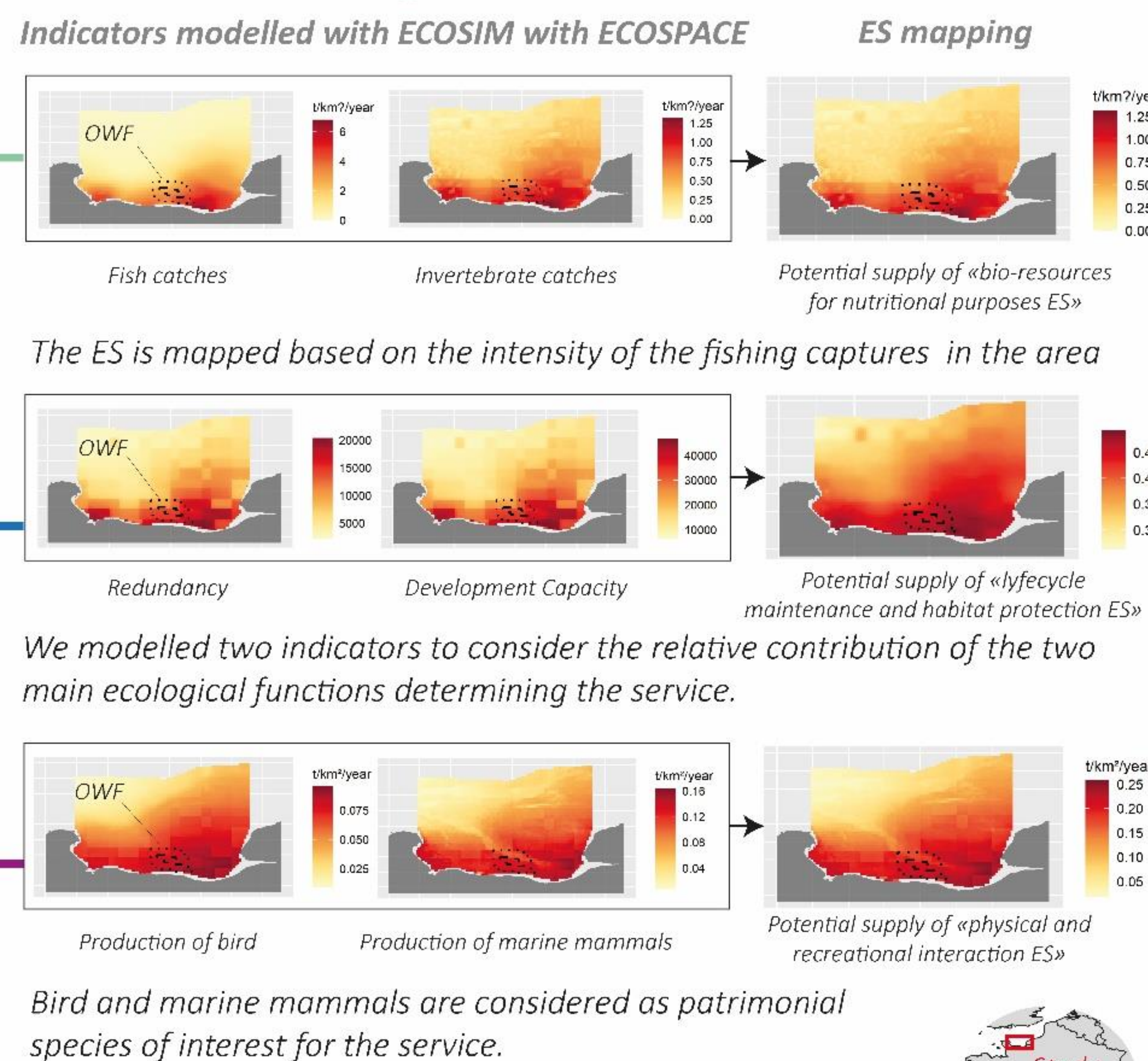


## THE METHODOLOGICAL FRAMEWORK



## EXAMPLES OF MAPPING OUTPUT

From Nogues et al. in review



## METHODOLOGY

- Based on Baulaz et al.2023 and Nogues et al. accepted.
- 6 focus groups with experts in trophic modelling

Which indicators could map which ecosystem function?

What are the + & - of trophic modelling for ES mapping in OWF context?



## DISCUSSION & CONCLUSION

This study proposes a general methodological framework to map the supply of ES in the context of OWF development. Our results show that methodological developments are still needed to obtain a complete quantification of ES and the consideration of all OWF impacts. However, trophic modeling seems a promising approach that will address important barriers of the characterization and mapping of marine ES in the context of OWF development.

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