Raising the Reef – Innovations in monitoring of marine growth on offshore renewable energy infrastructure allow for better informed decommissioning practices

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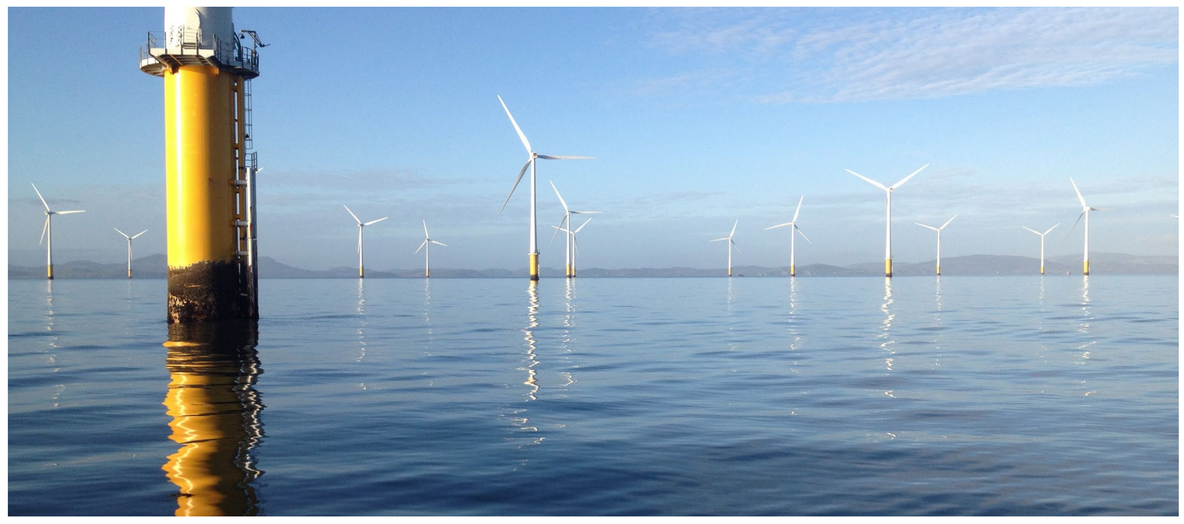
Summary

- Innovative techniques for assessing marine growth on offshore wind infrastructure improve our understanding of artificial reef effects on local ecosystems and its influence on NID development and decommissioning practices
- Studies using video surveillance and eDNA show how newly created habitats are utilised by many species
- Strong species zonation on SIME through the water column was observed - providing a variety of habitats
- Research identifying which scour protection materials are best suited to colonisation can inform future NID before construction commences on SIME, allowing for improved environmental prosperity
- eDNA showed key species were more prevalent within turbines, demonstrating how artificial reefs provide fish refuge and food and the importance of considerate decommissioning practices in conserving these effects



Results of marine growth monitoring

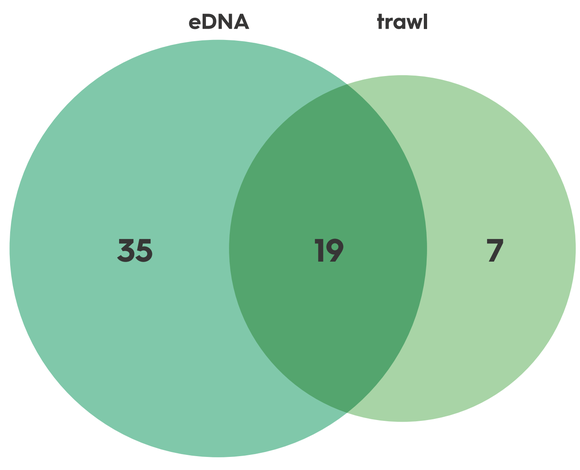
Video surveillance

- Marine growth surveys conducted on several OWF structures show a diverse epibenthic community, including Priority Marine Features, with clear zonation patterns from water mark to the seabed.
- Diverse epibenthic communities provide ecosystem services such as a food source for fish and diving seabirds, shelter and nutrient recycling.

eDNA sampling

- Developments in technology such as eDNA sampling can provide more insights into fish abundances around wind farms.
- When comparing eDNA sampling vs traditional trawls as a method of quantifying species richness, eDNA yielded wider results.
- eDNA offers a non-intrusive, scalable, affordable and efficient way of monitoring species utilisation of offshore wind structures.
- eDNA sampling allowed surveying of areas adjacent to turbines, not normally accessible by trawl surveys. The findings supports the hypothesis that the artificial habitat created by turbines may be providing shelter and food for fish, with greater fish densities within the turbines and some reef associated species present or at higher relative densities compared to stations outside of the turbine area.
- Species which occur in greater relative abundance within the turbines include bottom dwelling fish that prefer rocky, reef or sandy habitats. This highlights the microhabitat function of SIME.
- Marine Mammal species were also identified during the assessment. Identification of these species have been traditionally restricted to visual assessments.

Venn diagram showing no. of species detected by eDNA (fish assay) and trawls:



Nature inclusive design (NID)

- NID = Integrating ecological considerations into the design of SIME to benefit receptor species.
- Species colonisation on SIME can inform how best to integrate NID into construction, to maximise potential ecosystem benefits through the creation of microhabitats. One example is through the modification of scour protection on cable routes through adapted rock protection to benefit benthic species through the introduction of varied hard substrate (CEMNID, 2024).
- The proven efficacy of NID in improving biodiversity suggests that such modifications should be considered in the design of SIME.

Decommissioning practices

- Findings from marine growth monitoring and development of NID support the argument for potentially leaving structures in place where positive reef effects etc. have been observed.
- Complete removal of these structures during decommissioning may have negative effects on the environment.
- Preserving positive ecosystem effects that have accrued since construction can be beneficial to the long-term health of ecosystems long after the lifespan of SIME.
- This suggests that the possible negative environmental impacts of decommissioning should be considered at early stages, with NID and biodiversity enhancement being a feature of the planning stages of future projects involving SIME.

References

CEMNID

eDNA report

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