



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 655594.

## **Co-location of renewable energy installations with MPAs**

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The European Marine Energy Centre and Wave Hub are Marine Renewable Energy Installations MREI in the UK. Concerns exist that MREIs will negatively impact marine fauna and habitats through a multitude of factors e.g. collision, electromagnetic fields, noise and physical disturbance from cables and moorings. While the effects of MREI may represent short term, local scale, disturbance to marine ecosystems, we anticipate positive impacts over wide spatial (many 10s of km<sup>2</sup>) and longer temporal scales (years) as MREIs will displace fishing activity and introduce structure, which may act as artificial reefs.

Clean Energy From Ocean Waves (CEFOW) is an EU Horizon 2020 project, which will test a new Wave Energy Converter, known as the Wello Penguin, and allow us to assess the interaction of the Penguin on the benthos. Using a towed, flying video array, this study firstly assessed the species assemblages present at these sites in the context of the ecological processes and functions that they provide. Secondly, an experiment comparing species assemblages on the cable rock armouring at the Wave Hub site (two, four and five years after deployment) with control areas was done to assess recovery of the benthos associated with the cable route. As coastal marine space is limited, we discuss the potential merits and issues of co-locating MREI with Marine Protected Areas. It is hoped that this work will aid future development of management approaches to minimise negative impacts, promote biodiversity while ensuring the delivery of energy from renewable sources in the marine environment.

Keywords: Ecological effects; Wave Energy Convertors; fishing displacement; HD video survey, MPA