

Underwater sound levels at a wave energy device testing facility in Falmouth Bay, UK

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Abstract

There is a paucity of evidence on the noise produced from *in situ* wave energy converters (WECs) during all stages of their deployment, operation and decommissioning. Research in this area is needed to inform the consenting process. The aim of this research is to gather empirical data to address this knowledge gap.

A WEC has been trialled at the Falmouth Bay Test Site (FaBTest), in Cornwall, UK since March 2012. The area supports considerable commercial shipping and recreational boating along with diverse marine fauna, including bottlenose dolphins, harbour porpoises and fish.

A passive acoustic monitoring device, recording broadband sound in the effective frequency range 10 Hz to 32 or 48 kHz, for half an hour in every hour, has been deployed at the FaBTest site since March 2012. Underwater sound monitoring covered a two week baseline period, a five day installation period, testing periods when the WEC was producing power and when the device was not producing power but was *in situ*.

The median sound level during the baseline period ranged from 60-80 dB re 1 μ Pa in the frequency range 0.01-10 kHz, then decreasing to \sim 45 dB re 1 μ Pa at 48 kHz. It is likely that the considerable shipping present at the site affects the sound levels.

Sound levels were, on average, higher during installation activity compared to periods of no installation activity in the frequency range 10-5000 Hz with a median increase of 8.2 dB re 1 μ Pa (interquartile range = 6.7 dB re 1 μ Pa).

Average sound levels were found to be louder at times when the WEC was producing power compared to times when the device was *in situ* and not producing power in the frequency range 10-1000 Hz with a prominent peak in the frequency range 57-63 Hz.

From the long term monitoring of the site it has been identified that the sound levels are highly variable, and it is difficult to determine the effect of the wave energy converter in such a variable ambient noise environment. The paper will summarise the sound level findings and estimated source levels of installation and operational sounds, which will be combined with hearing sensitivity information from the literature to estimate the effect on local species.