

OFFSHORE WIND FARM NOISE IMPACTS THE ZOOPLANKTON FOOD WEB: A MESOCOSM STUDY

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Offshore Wind Farms (OWF) are often considered a good alternative to carbon fuel approaches to produce energy, due to their low CO₂ emission. However, OWF are also a source of pollution when it comes to the soundscape (Duarte et al., 2021). When operating, OWFs produce low frequency elevated sound levels that impact the surrounding ecosystems and therefore the marine life. While studies have shown that noise from the construction of OWF noise affects fishes and marine mammals, we still lack understanding on how operational noise affects marine food webs and, especially, lower trophic levels including zooplankton.

To improve our knowledge on how zooplankton can be affected by OWF noise, an in situ mesocosm experiment was conducted in July–August 2024, in Hopavågen, a coastal lagoon in central Norway. For this purpose, an underwater speaker was deployed in the lagoon to broadcast a recording from an OWF for 19 days. Three mesocosms were placed 5 m away from the speaker and were exposed to sound levels ranging between 95 and 100 dB re: 1 µPa over 100-2000 Hz, meanwhile three other mesocosms were deployed farther in the lagoon to be isolated from the noise treatment and served as control with an ambient sound level of 70-80 dB. During the experiment, water temperature, salinity, light and chlorophyll-a fluorescence, were monitored continuously using autonomous sensors, immersed at 1 m deep in each mesocosms. The microzooplankton and mesozooplankton communities were identified and abundance estimated based on seawater samples collected every second day, and microzooplankton and copepod feeding rates were estimated using the two-point dilution technique.

Abiotic conditions were identical between the control and the noise treatment. However, the zooplankton abundances and feeding rates indicated an impact of the OWF noise treatment on the plankton community and functioning. This further indicates that noise emanating from OWF can affect low trophic levels such as zooplankton, potentially yielding cascading effects on the marine food web.

Duarte C, et al. (2021). The soundscape of the Anthropocene Ocean. *Science*, 371(6529), eaba4658