

Offshore wind power and wave energy devices create artificial reefs

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Offshore wind power and wave energy foundations can increase local abundances of fish and crabs. The reef-like constructions also favour for example blue mussels and barnacles. What's more, it is possible to increase or decrease the abundance of various species by altering the structural design of foundation. This was shown by Dan Wilhelmsson of the Department of Zoology, Stockholm University, in a recently published dissertation.

"Hard surfaces are often hard currency in the ocean, and these foundations can function as artificial reefs. Rock boulders are often placed around the structures to prevent erosion (scouring) around these, and this strengthens the reef function," says Dan Wilhelmsson.

A major expansion of offshore wind power is underway along European coasts, and the interest is growing in countries such as the US, China, Japan, and India. Moreover, <u>wave power</u> technologies are being developed very rapidly. Many thousand wind and wave <u>power plants</u> grouped in large arrays that each cover several square kilometers can be expected. How marine life will react to this is not clear, but several research projects investigating the impacts of noise, shadows, electromagnetic fields, and changes in hydrology etc. are underway.

Dan Wilhelmsson studied how offshore wind turbines constitute habitats for fish, crabs, lobsters, fouling animals, and plants. He shows that wind turbines, even without scour protection, function as artificial reefs for bottom dwelling fish. The seabed in the vicinity of wind turbines had



higher densities of fish compared to further away from the turbines and in reference areas. This was despite that the natural bottoms were rich in boulders and algae. Blue mussels dominated on the wind turbines that appeared to offer good growth conditions.

Wave power foundations, too, constituting massive concrete blocks, proved to attract fish and large crabs. Blue mussels fall down from the surface buoys and become food for animals on the foundations and on the adjacent <u>seabed</u>. Lobsters also settle under the foundations. In a largescale experiment, holes were drilled in the foundations, and this dramatically increased numbers of crabs. The position of the holes also proved to be of importance for the crabs.

However, aggregations of certain species may have a negative impact on other species. The number of predatory animals on artificial reefs can sometimes become so large that the organisms they prey on, such as seapens, starfish, and crustaceans, are decimated in the surroundings, and certain species can disappear entirely.

"With wind and <u>wave energy</u> farms, it should be possible to create large areas with biologically productive reef structures, which would moreover be protected from bottom trawling. By carefully designing the foundations it would be possible to favour and protect important species or, conversely, to reduce the reef effects in order minimize the impact on an area," says Dan Wilhelmsson.

Provided by Expertsvar

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