



Sealscarers as a mitigation technique for harbour porpoises during offshore wind farm construction: an outdated approach?

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INTRODUCTION: To avoid harbour porpoise injury caused by pile driving noise during offshore wind farm construction, it is mandatory in German waters to deploy a sealscarer for harbour porpoise deterrence beforehand.

We conducted studies testing the deterrence effects of a Lofitech sealscarer on harbour porpoises and compared it to zones of injury and deterrence of pile driving, raising the question of whether sealscarer deployment still meets the mitigation demands during future offshore wind farm projects.

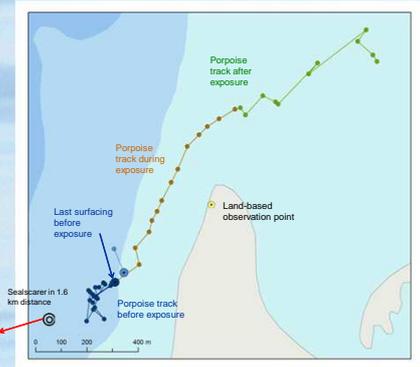


Fig.1: Porpoise avoidance reaction during sealscarer exposure in the Baltic Sea.

METHODS AND RESULTS: Two studies testing porpoise deterrence radii of a Lofitech sealscarer:

Visual tracking study in Danish Baltic Sea: complete avoidance down to 132 dB SEL (800 m distance) and mostly avoidance down to 119 dB (2.4 km) (Fig.1).

Passive acoustic monitoring (PODs) and aerial surveys in deeper North Sea waters: no complete avoidance, acoustic detection rates reduced down to sealscarer sound levels of 113 dB (7.5 km distance) (Fig.2). Decreased visual sighting rates (Fig.3).

Differences between the two studies are in part due to greater sound attenuation in coastal shallow waters than deeper North Sea waters.

DISCUSSION: Recent study at the German Offshore windfarm BW2: Use of a Big Bubble Curtain around the pile driving site reduced noise levels considerably and led to 165 dB at about 600 m (potential zone of porpoise injury) and 140 dB at about 6.5 km distance (zone of porpoise disturbance) instead of 3 km and 20 km without sound mitigation (Fig.4).

With effective sound mitigation applied, deterrence effects of sealscarer reaches beyond needed distances and even exceeds deterrence radii of pile driving itself.

Given that sealscarer are also deployed some time before pile driving, this leads to unnecessary disturbance, which could be avoided if developing a better suited mitigation technique (operating at higher frequencies, where porpoise hearing is more sensitive and which are prone to greater attenuation with distance).

Such devices have already been developed (by Seamarco and Genuswave) but reactions on free-ranging porpoises have not yet been tested.

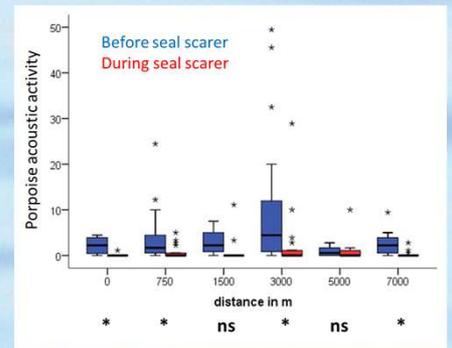


Fig.2: Porpoise acoustic detections before and during sealscarer exposure in the North Sea.

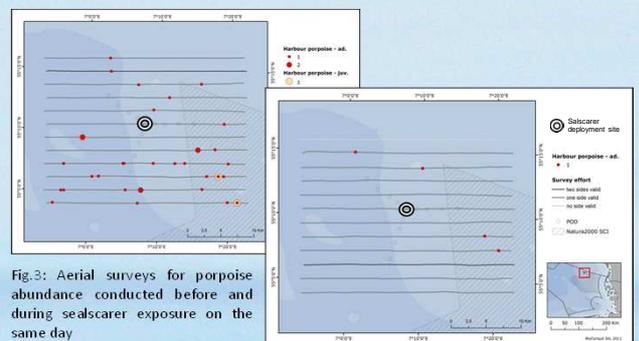
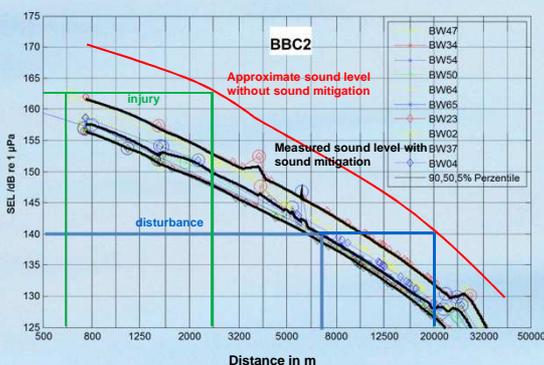


Fig.3: Aerial surveys for porpoise abundance conducted before and during sealscarer exposure on the same day

Fig.4: Sound measurements during construction of several foundations at the windfarm BW2 in the German North Sea with and without a Big Bubble Curtain as sound mitigation. Source: Itap GmbH Oldenburg.

Conclusion: Recent developments in sound mitigation techniques during offshore pile driving may call for a better suited porpoise deterrence device to be deployed during offshore windfarm construction in order to avoid porpoise injury. This is because the deterrence effect of sealscarer (which are still being used) reaches beyond what is needed and may lead to even further reaching disturbance than pile driving itself when sound mitigation is applied.