

ASSESSING HARBOUR PORPOISE OCCURRENCE AND THE REEF EFFECT OF OPERATIONAL WINDFARMS



PrePARED Output Summary No. 3

Background

UK waters provide an enormous potential to meet climate change targets through the development of large-scale offshore windfarms. However, efforts to realise this potential must be balanced against the need to minimise impacts on protected wildlife populations. Assessments of these trade-offs remain constrained by limited information on whether offshore wind developments will have beneficial or detrimental effects on wildlife populations.

One protected wildlife species is the harbour porpoise. Porpoises are abundant and widely distributed across North Sea sites being considered for offshore wind developments. Little is known about the extent to which porpoises use operational windfarms or if they are attracted to structures, the so-called “reef effect”. Developer-funded monitoring of porpoises is being conducted through the Moray Firth Marine Mammal Monitoring Programme. These data underpin ongoing work within the OWEC funded PrePARED project which investigates predator and prey distribution around offshore windfarms to address critical knowledge gaps hindering sustainable offshore wind development.



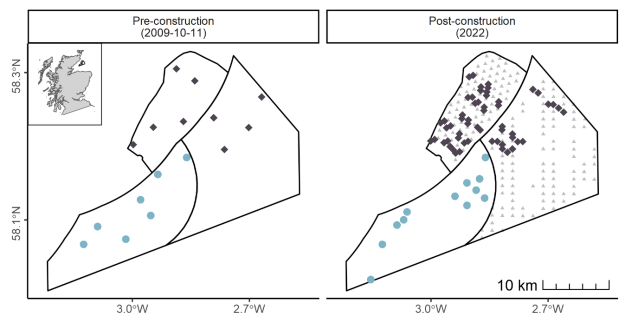
Harbour porpoises in the Moray Firth

Study Aims

1. Assess broad-scale changes in the occurrence of porpoises in relation to the operational windfarms in the Moray Firth comparing pre- and post-construction data.
2. Assess fine-scale reef effects around turbine foundations comparing pair of CPODs within the operational windfarms.

Data Collection

Echolocation click detectors were used to assess porpoise occurrence. A total of 103 CPODs were deployed throughout August 2009, 2010, 2011 (pre-construction) and 2022 (post-construction) across the operational windfarms at Beatrice and Moray East, and within reference sites in the Moray West development area where no structures are yet present. In 2022, devices were moored as pairs with one device located < 60 m from turbine foundations (**structure CPOD**) and the second device within the corridors between turbines (**midpoint CPOD**).



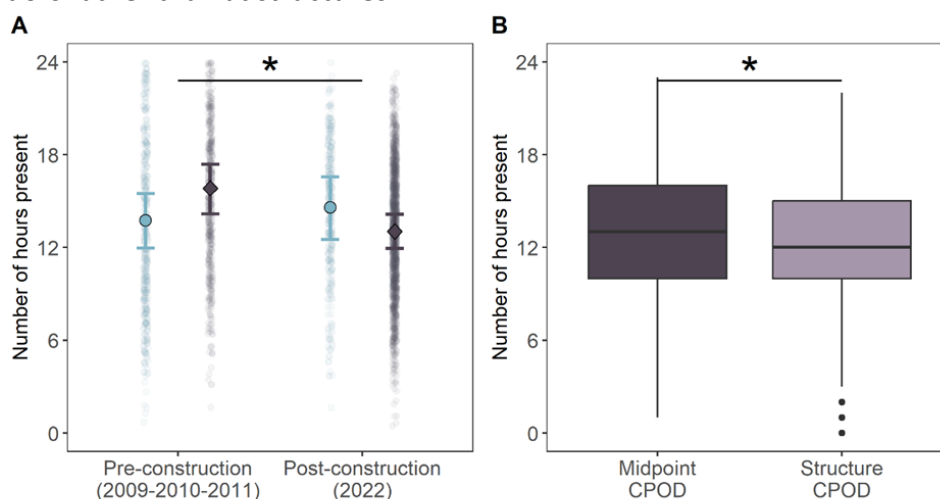
Black lines: Beatrice, Moray East (operational) and Moray West (reference) OWFs boundaries. Grey triangles: turbines. CPOD deployments: operational OWFs (black diamonds), reference site (blue diamond).

Results

Analyses of the data from the CPODs confirmed that porpoises were detected regularly, for between 6 to 18 hours a day, throughout operational wind farm sites in August 2022.

Comparison with pre-construction baseline suggested that, on average, porpoise occurrence was slightly lower (~17%) in operational windfarms, but this was largely driven by a high occurrence within Beatrice in two of three pre-construction years.

Comparison of pairs of CPODs found no evidence of reef effects, with slightly higher porpoise occurrence within the corridors rather than at structures.



Number of hours in which harbour porpoise were present A) at the reference site (blue circles) or operational windfarms Beatrice and Moray East (black diamonds) during pre-construction (2009-2010-2011) and post-construction (2022), and B) at the **midpoint** (corridors between turbines) and **structure** CPODs (within 60 m from turbines) in 2022. Statistical significance: * significant, $P < 0.05$; NS not significant, $P > 0.05$.

Conclusions

Porpoises were not displaced from the operational windfarms. While there was a slight decrease in occurrence within operational windfarms, this difference was small relative to inter-annual variation observed within the baseline data.

The lack of a reef effect was unexpected based on work at older structures. As part of the PrePARED project, further investigation linking fish distribution and porpoise activity, while accounting for vessel traffic, will help better understand whether changes in habitat quality affect predator prey relationships. Additional data collected in 2023 will be used to investigate whether the reef effect can be detected one year later.

CPOD (Cetacean Porpoise Detector)



CPOD Echolocation detectors being recovered to monitor variation in occurrence and foraging activity of harbour porpoises

For detailed findings see: Iorio-Merlo, V., Fernandez-Betelu, O., Benhemma-Le Gall, A., Graham, I. M., Thompson, P.M. (2023). Task 4.2. Work Package 4 – Changes in the occurrence of harbour porpoises following the construction of Moray Firth offshore windfarms. PrePARED Report, No. 002. March 2024.