

A SOUND STRATEGY: STUDYING MINKE WHALE RESPONSES TO ACOUSTIC DETERRENT DEVICES (ADDs)

Could the outcomes of a recently published research study on minke whales and their responses to Acoustic Deterrent Devices (ADDs) in Iceland help to improve processes in gaining consent for offshore wind farm development projects?



In late summer 2016, the aptly named research vessel 'Song of the Whale' undertook a journey in Faxaflói Bay, in south-west Iceland. The bay is a common feeding ground for minke whales during the summer season and was therefore an ideal area to conduct research on this species.

The aim of this study was to assess the effectiveness of Acoustic Deterrent Devices (ADDs) to displace minke whales, to explore the sensitivity of this low frequency species to noise signals from ADDs.

In a little over a month, the researchers on board carefully observed 246 minke whales, tracked 46 of them and deployed ADDs within 500m of them in ten separate controlled trials. The study provided evidence that the tracked whales clearly reacted to signals at the upper limit of their hearing sensitivity, avoiding a 15 kHz ADD. In every deployment of the ADDs, the whales responded strongly and moved away from the source of the noise.

This study was conducted by the Marine Conservation Research team, in collaboration with RPS. Its outcomes have been published online in [the Inter-Research Science Publisher Journal, as part of a Marine Ecology Progress Series](#). This project was undertaken through the Offshore Renewables Joint Industry Partnership (ORJIP) managed through [the Carbon Trust](#) and funded by developers.

The learnings from this study could help mitigate some of the existing challenges faced within offshore wind permitting, particularly around consent for exploration and asset development.

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LISTENING FOR THE PROBLEM

Anthropogenic noise, or ‘underwater noise linked to human activity’, has increased globally, alongside the ever-increasing amount of human activity in our seas and oceans. At the same time, our understanding of how this noise activity is perceived by marine mammals has grown exponentially, through important research and development projects.

There is a growing body of evidence to suggest that anthropogenic noise may cause certain behavioural changes in marine life, including interrupted feeding and foraging patterns, auditory stress leading to temporary or permanent hearing damage, and in some extreme cases, even threat to life. Despite that evidence, we still do not have a complete understanding of the hearing ability of cetaceans, or one as extensive as we would like. The most detailed and insightful body of research in this area concerns studies conducted mostly on small-toothed whales.

For larger creatures, there are considerable challenges to studying them in controlled conditions, over an appropriate amount of time, so our understanding of their reaction to anthropogenic noise has thus far been based on conjecture.

A STUDY OF WHALES USING ACOUSTIC DETERRENT DEVICES

ADDs or acoustic ‘pingers’ (active sonar) were initially developed to reduce interactions between cetaceans, including dolphins and porpoises, and fishing equipment – keeping them away from fishing nets and preventing what’s known as bycatch, or accidental trapping, in fishing gear. They have been in widespread use against seals, to protect fish farms; however, their effectiveness in solving that problem has been somewhat debatable.

They have since been widely used to reduce potential injury or harm during construction activities such as pile-driving for an offshore wind farm. Several studies have been conducted on the effectiveness of ADDs on certain marine mammals, such as various dolphin species, humpback whales and harbour porpoises, and their outcomes. The effects of ADDs on baleen whales or minke whales, however, have been largely unquantified until the outcomes of this study as their swimming patterns make tagging them with tracked attachments more difficult.



THE IMPACT ON OFFSHORE PERMITTING PROCESSES

A combination of **Passive Acoustic Monitoring (PAM)** and **Marine Mammal Observers (MMOs)** on the decks of marine vessels currently forms a key part of the methodology used to reduce injury in marine environments in the UK.

The moment a marine mammal is spotted anywhere near a pile-driving site, work is brought to a halt until they are safely out of the way before piling commences, an approach that can get even trickier with poor visibility and unfavourable weather conditions.

The level of subsea noise generation, in and of itself, is a critical consideration within the consent process for **offshore wind** farm development and permitting. Added to that, unplanned construction delays can have an impact to developers or asset explorers, both financially and operationally.

A conclusive study like this one, that can cite evidence that minke whales not only move away at once in the opposite direction and out of danger, but consistently keep swimming away from an ADD, can definitively help developers and asset explorers in developing their mitigation plans.



WE'VE BARELY SCRATCHED THE SURFACE

This research outcome, coupled with more fine-tuned technological advancements with ADDs, can scale up our understanding of sensitivities of marine mammals even further. Indeed, further research into minke whale behaviour as well as other cetaceans would be welcomed.

There was some initial evidence in this study that some whale behaviour (horizontal speed and extended dives) was caused by the presence of the ADD signal alone, and not necessarily the magnitude. This could mean that limited deployment with appropriate oversight could be the way forward, to ensure the line is not crossed between deterrence and harassment. This would also be in line with consent criteria developed by regulatory authorities for offshore exploration.

Related Read: [US offshore wind permitting: the SAP, the COP and the regulatory process in between](#)

As RPS is at the forefront of these research initiatives, we are in a uniquely advantageous position of being able to understand the need to be robust in addressing environmental concerns such as displacement or disruption to the routine of marine mammals. We constantly navigate these complex waters on behalf of developers, explorers and permitting managers – if we can help answer your questions, please get in touch.

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