

## New tool will measure impact of man-made noise on sea-mammals

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A team of scientists from the University of St Andrews has developed a new computer modelling tool for assessing the impact of noise from human disturbance, such as offshore wind development, on marine mammal populations.

The team, led by Professor John Harwood of the School of Biology, has



created the interim Population Consequences of Disturbance (PCOD) framework for assessing the consequences of human-induced noisedisturbance on <u>animal populations</u>. The study is published today in the journal *Methods in Ecology and Evolution*.

Changes in natural patterns of animal behaviour and health resulting from them being disturbed may alter the conservation status of a population if the activity affects the ability of individuals to survive, breed or grow. However, information to forecast population-level consequences of such changes is often lacking.

The project team developed an interim framework to assess impacts when evidence is sparse. Crucially, the model shows how daily effects of being disturbed, which are often straightforward to estimate, can be scaled by the duration of disturbance and to multiple sources of disturbance.

One important application for the PCOD framework is in the marine industry. Many industries use practices that involve the generation of underwater noise. These include shipping, oil and gas exploration, defence activities and port, harbour and renewable energy construction.

For example, offshore wind turbines are installed using a method called 'pile driving' – which effectively involves a large hammer driving foundation posts into the seabed – which generates short pulsed sounds every few seconds. The potential risk of injury and/or disturbance to marine mammals during these noise-producing activities has been identified as a key consenting risk for offshore wind projects in UK waters, but many other noise sources are less stringently regulated.

Possible consequences of exposure to underwater noise include: disturbance that could cause marine mammals to either move away or change behaviour, eg, stop feeding, or suffer temporary hearing damage



or permanent physical injury. The PCOD model assesses what the longer term and larger scale impacts of these consequences on individual animals are to the population as a whole.

The tool has been designed to use the kind of information that is likely to be provided by developers in Environmental Statements and Habitats Regulations Assessments, and currently covers five key priority species in the UK: bottlenose dolphins, harbour porpoises, minke whales, and harbour and grey seals. However, the approach can be applied to other marine and terrestrial species.

This version of the PCOD model is considered an 'interim' one, because it was developed to help manage uncertainty within the current knowledge of marine mammals, where there are limited data available on some of the key information needed.

The research follows on from previous work by the team on developing understanding of how noise might impact <u>marine mammal</u> health.

Lead author Dr Stephanie King, Honorary Research Fellow in the School of Biology, said: "The effects of noise on animal populations are a current global concern for policy-makers. We have developed a novel framework that can be used to broadly forecast the consequences of manmade disturbance on animal populations, which, in principal, can be applied to a range of marine and terrestrial species and different types of disturbance. Our framework represents an important first step towards more informed management decisions within a rigorous and quantitative framework."

Dr Ian Davies, Renewables and Energy Programme Manager at Marine Scotland Science, who chaired the steering committee for the project, said: "The publication of this model provides a new framework and is a significant step forward in our ability to assess acoustic risks to marine



mammals. However, it is very much an interim measure; it is expected that it will be further refined and built upon over time as more evidence becomes available. The interim PCOD model is a novel tool that will allow further insight into the potential impacts of disturbance on marine mammal populations. For now, it's important that renewable energy project developers considering using the Interim PCOD approach seek advice from the SNCBs (Statutory Nature Conservation Bodies)and/or regulators at an early stage."

**More information:** "An interim framework for assessing the population consequences of disturbance." *Methods in Ecology and Evolution*. doi: 10.1111/2041-210X.12411

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