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POSTER ABSTRACT

Avoidance behaviour at offshore wind farms: a new joint industry approach

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Introduction

Current models of collision risk to birds from offshore wind turbines are heavily dependent on estimates of avoidance rates. Validation data for these models, in the form of measurements of avoidance rates and direct observations of collisions at sea, are rare. The gathering of validation data is key to improving our understanding of the impacts of offshore wind energy developments and better informing the decision-making process. The offshore wind industry, Marine Scotland, Department of Energy and Climate Change, and The Crown Estate are now working jointly to address this UK-wide strategic issue.

Offshore Renewables Joint Industry Programme

The Offshore Renewables Joint Industry Programme (ORJIP) is being established to manage a range of strategic offshore research projects designed to improve our understanding of key consent risks to planned offshore wind farm developments. The work being proposed within the programme represents significant research challenges of a biological, ecological and engineering nature. Funding from industry and government bodies is needed to deliver the work.

One of the priority projects is the planned collaborative monitoring study of bird avoidance behaviour at operational wind farms. The other three priority projects focus on the effects of marine renewables developments on mammals and include: investigating the population consequences of those effects, developing mitigation technologies for pile driving and developing improvements to standard noise mitigation measures prior to pile driving.

ORJIP Joint Industry Project number 1

Potentially one of the most significant environmental impacts from offshore wind farms is the risk of birds colliding with the turbine blades. There is considerable uncertainty over the scale of any impact from collision mortality on birds due to the relatively few detailed monitoring studies so far undertaken. However, the results from those that have been undertaken indicate a very high level of avoidance behaviour. The results from these studies are used in wind farm applications to demonstrate that there will not be any significant adverse effects arising from the proposed development.

To date, the level of evidence to support the applications has been proportionate to the likely scale of impact and most applications have been approved based on the evidence available and precautionary avoidance rates of either 95% or, more recently, 98%. However, uncertainties over the scale of potential impact have caused significant delays in the consenting process. As the number of offshore developments increases, and consequently as does the scale of predicted cumulative

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impacts, there is an ever increasing risk that the numbers of birds predicted to collide, based on the current level of knowledge, will not result in future projects gaining consent under either the Environmental Impact Assessment (EIA) or the Habitats Regulations.

It is widely recognized that to minimize the future risk of offshore wind farm developments not being consented, further robust evidence on avoidance behaviour is required. To achieve this, a large-scale project is required that will provide the level of evidence needed to ensure that future applications and EIAs are based on sound evidence-based conclusions.

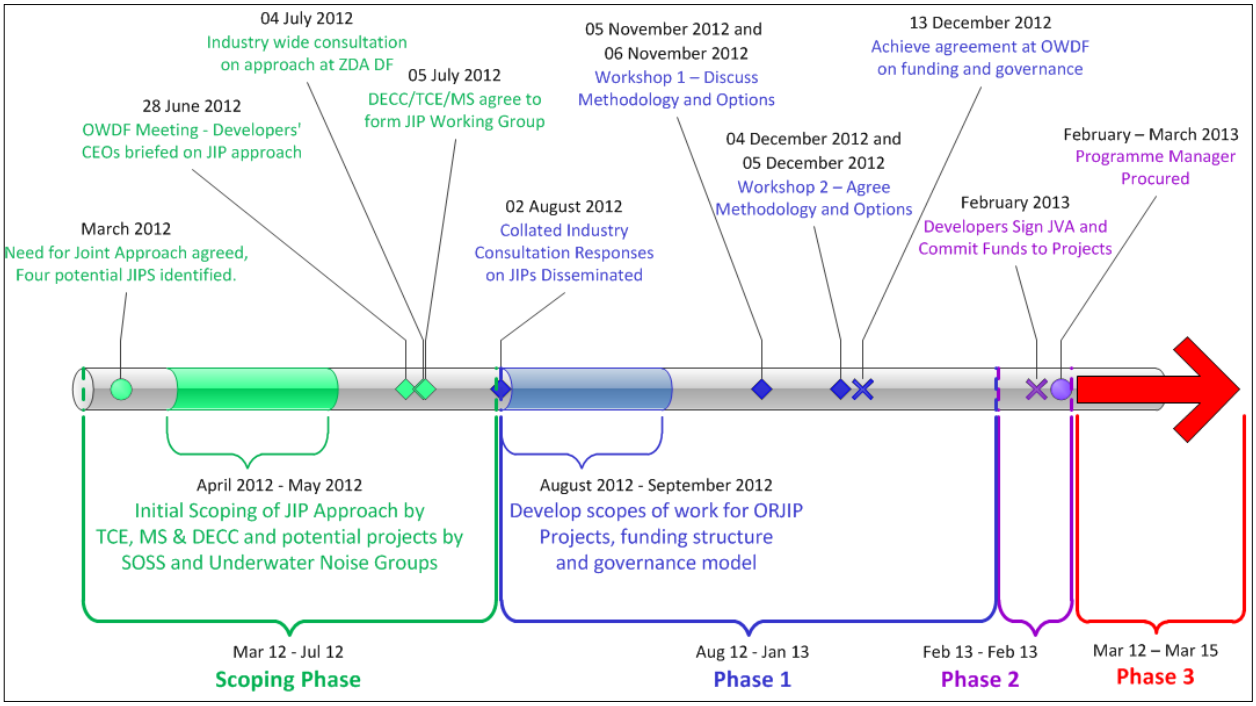

Figure 1. An indicative timeline for the Offshore Renewables Joint Industry Programme (ORJIP).

Previous avoidance behaviour studies

Several studies of bird behaviour have been undertaken that provide limited empirical evidence to inform collision risk models, using a range of methods. At Blyth in northeast England, shore-based watches were undertaken (Rothery *et al.*, 2009). Observations at Zeebrugge have recorded significant effects on a breeding tern colony due to collisions (Everaert & Stienen, 2007). Studies at Danish and Dutch offshore windfarms have combined radar techniques with species identification by field observers (Petersen *et al.*, 2006; Krijgsveld *et al.*, 2011).

Outline of the project

The proposed study aims to measure avoidance behaviours at operational offshore wind farms that are representative of conditions at the current proposed offshore wind farms in the UK. It is likely to use a variety of technologies to measure behaviours at a range of spatial scales (e.g. evasive movement relative to blades, movement between turbines, and movement

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around wind farms or turbine arrays). The study will seek to improve our understanding of behaviours at a species level, with a focus on species that are considered potentially sensitive to collision risk, such as gulls (Furness & Wade, 2012).

The aims of the project are to:

- Identify a number of offshore wind farms in the UK or overseas suitable for undertaking a monitoring programme whereby the collation of data obtained will be suitable for use to inform consenting of current and future projects.
- Select a range of suitable equipment that can be deployed to measure either or both micro- and macro-avoidance behaviour and, if appropriate, collision impacts.
- Measure the level of bird avoidance and collision at one or more offshore wind farms and provide robust evidence on the rates of avoidance and collision for a number of key species identified as being most at risk from collision with offshore wind turbines.

The objective of the project is to obtain data on avoidance behaviour and collision impacts at operating offshore wind farms using proven, practical and cost-effective monitoring systems that can be used to inform the estimation of potential impacts of other offshore wind farms. This aims to reduce the uncertainty over the prediction of the impact of new offshore wind projects on key bird species, and the degree of precaution necessary in assessments in the light of that reduction in uncertainty.

The results from the monitoring undertaken during the project will provide robust, substantive evidence on the levels of avoidance behaviour and collision impacts for a range of seabirds and, if appropriate, non-seabird species that currently pose significant uncertainty for developers, advisors and regulators during collision risk modelling for consent applications.

Following discussions with company representatives and stakeholders, a number of key species of concern were identified:

- Kittiwake *Rissa tridactyla*
- Great black-backed Gull *Larus marinus*
- Lesser black-backed Gull *Larus fuscus*
- Gannet *Morus bassanus*
- Herring Gull *Larus argentatus*
- Little Gull *Hydrocoloeus minutus*

Whilst not considered as important as the gulls above, the presence of other species potentially at risk (Great Skua *Stercorarius skua*, Sandwich Tern *Sterna sandvicensis*, swans, geese) would be an advantage.

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