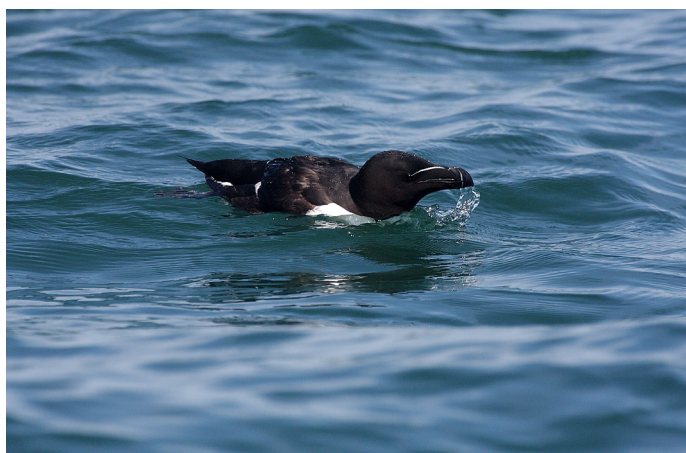


BSG TECHNICAL REVIEW

THE EGMOND AAN ZEE OFFSHORE WIND FARM:

A Short Summary of the Results of Ornithological Monitoring



Razorbill *Alca torda* – Auks were generally not recorded within the wind farm
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Gannet *Morus bassanus* – Gannets were seen to take active avoidance of the OWF
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Introduction

The Egmond aan Zee Offshore Wind Farm, which lies between 10 and 18 kilometres off the coast of the Netherlands, is a 36 turbine scheme that has been operational since 2007. The turbines have a hub height of 70 metres and a rotor diameter of 90 metres.

Baseline ornithological information was collected between 2003 and 2005 to inform the initial assessment of impacts of the scheme. Following construction, three years of ornithological monitoring has been undertaken by Bureau Waardenburg and the Institute for Marine Resources and Estuarine Studies (IMARES) to determine the effect of the wind farm on bird flight paths and altitudes and to collect data on any other detectable changes in the behaviour and abundance of migrant and resident species. Initial work on flight lines has already been formally reported¹. An overview of further monitoring work, which included additional information collected up to (and including) 2010 was presented at the Trondheim Conference². Below we set out a summary of some of the key findings of this work (particularly relating to bird flight lines), and our thoughts on what the findings might mean for the wind industry.

Background

The study aimed to establish the flight paths, altitudes and changes in flight intensity³ of

locally resident and migrant bird species, to establish seasonal and daily patterns of flight activity, and to investigate how flight behaviour was influenced by weather conditions. The authors then analysed whether there was evidence that the Egmond aan Zee Wind Farm influenced flight behaviour in individual species and species groups.

The study focussed on local seabirds (i.e. species that may remain in the locality for considerable parts of the year) such as cormorant, gulls and auks, migratory waterfowl such as divers and scoter, and non-marine migratory species including thrushes and geese.

Methods

A range of methods were employed to collect the data to inform the study:

- Visual observations were regularly conducted from a meteorological mast approximately 500m from the turbine array. The flight altitude and distance all flying birds within 3km of the mast were recorded during these watches;
- Nocturnal bird activity was also monitored from this platform, with birds identified by call, and the direction and apparent altitude of flight also recorded in good background light conditions;

- Horizontal and vertical radar (also situated on the meteorological mast) was used throughout the three years of study to continuously scan an area of up to 6km around and 1.5km above the observation platform. The data was processed and recorded using a Merlin system, which filters out 'clutter;' and,

- Data was collected by video to help validate and calibrate the radar information.

The visual observation data allowed the species identified by the radar to be confirmed.

Findings

The study found that responses of different species to the wind farm varied considerably, but there was little variability in response within a species. Visual observations indicated that the commonest species locally were cormorant, large gulls (including herring and lesser black-backed gulls), smaller gulls (kittiwake, common and black-headed gulls) and starling, with seasonal patterns of abundance noted in most species. Very few divers, scoter or auks were recorded.

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Flight intensity and altitude (predictably) varied, with birds recorded flying at altitudes ranging between just above the surface of the sea to the upper extent of the area sampled by the radar (1.5km). This high altitude passage mainly involved nocturnal migrants including waders and thrushes, and was more notable in autumn than in spring (reflecting movements of Scandinavian and Siberian thrushes, waders and geese towards wintering grounds in south-west Europe). Low altitude flights recorded during the day were most commonly made by gulls and cormorants.

During the summer and winter periods most flight activity was recorded during the day, while during migratory periods night time movements predominated. Within migratory periods the mean number of bird movements (tracks) recorded varied considerably (by hour) and was correlated to both weather conditions and time of night. Gulls were noted to fly at different altitudes when leaving and returning to roost sites at dawn and dusk.

The wind farm covers almost 50% of the area subject to monitoring, but supported around 30% of the birds recorded, suggesting a clear displacement effect. Given that some of the more commonly occurring species such as cormorants (which used the meteorological mast as a perch) and gulls took no avoidance action, this highlights the degree of avoidance by others, such as gannet. Gannets, geese and swans

showed a high level of 'deflection'⁴ when approaching the wind farm at or below rotor height. Gannets, auks, divers and seaduck also showed clear evidence of avoidance of the vicinity of the wind farm. Terns, gulls and cormorant, in contrast, were regularly recorded foraging within it.

Migratory land birds moving through the area at night (such as thrushes) and some seabirds, including terns, showed no evidence of wind farm avoidance. Waders, geese and swans flying above turbine height showed no discernible reaction to the wind farm.

Viewpoint

Ornithological assessments for UK wind farms can be very difficult to complete as relatively few robust post-construction monitoring studies are made the subject of a condition of planning permission. For those that are, the monitoring reports are often restricted in terms of public distribution to nature conservation consultees and planning authorities. This has meant, and in some cases continues to mean, that consultants have very little empirical evidence upon which to gauge likely collision, disturbance and displacement effects, and this reduces the level of certainty with which it is possible to assess impacts.

The monitoring study for Egmond aan Zee provides very useful information on the flight behaviour of many bird species that occur along the coast and in the inshore

waters around the UK in relation to a large offshore wind farm. In conjunction with other detailed studies, such as those completed at the Horns Rev Offshore Wind Farm (<http://www.hornsrev.dk/index.en.html>), it constitutes a useful resource of information that could help with offshore wind farm site-selection and other early planning and design appraisals.

As well as this study, detailed information is emerging from collision monitoring and displacement studies, pre- and post-construction monitoring of bird flight activity, and the distribution of nesting waders in relation to wind farms across Europe. This will be explored further in some of our forthcoming reviews.

References

¹Krijgsveld, K.L., Fijn, R.C., Heunks, C., van Horsen, P.W., de Fouw, J., Collier, M., Poot, M.J.M., Beuker, D & Dirksen, S. (2010). Effect studies: offshore wind farm Egmond aan Zee. Report to Nordzeewind.

²Krijgsveld, K.L., Fijn, R.C., Heunks, C & Dirksen, S. (2011). Flight paths of birds in an offshore wind farm in the Netherlands. Presentation to the Trondheim Conference, May 2011.

³Defined as number of birds per time unit per surface area.

⁴A rapid alteration in flight direction that appeared to be directly related to the wind farm.