THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES

2010

Natural England review of G1.47 Auk Displacement and Mortality Evidence Review
Revision: 01

For:

The construction and operation of Hornsea Project Four Offshore Wind Farm, located approximately 69 km from the East Riding of Yorkshire in the Southern North Sea, covering an area of approximately 468 km^2.

Planning Inspectorate Reference EN010098

29th March 2022

Natural England response to G1.47 Auk Displacement and Mortality Evidence Review Revision: 01 [REP1-069]

Summary

Natural England welcome the Applicant's report on auk displacement and mortality rates. The re-evaluation of displacement rates and comparison with environmental variables and offshore wind farm design metrics is of particular interest. The report usefully highlights that the evidence base regarding OWF displacement is patchy and contradictory. Natural England observes that there are methodological issues with many of the studies cited, not just those reporting more significant displacement effects, not least the use of boat-based surveys, a survey methodology that is no longer considered fit for purpose.

Natural England advises that the information provided in the report does not provide justification for the use of single displacement (50%) and mortality (1%) rate values for the auks at Hornsea 4, and we advise that these values could underrepresent impacts on these species. The use of single values runs a significant risk of 'false precision', which is inappropriate given the range of responses apparently recorded and the limitations of the studies thus far carried out. Accordingly, Natural England's range-based approach seeks to encompass a range of potential displacement effects as observed in post-construction monitoring studies (30-70%) and mortality rates (1-10%) that reflect the considerable uncertainty relating to site-specific drivers for, and impacts of, displacement. We also highlight that the mortality rates are a simple way of attempting to capture a range of sub-lethal as well as lethal effects from displacement, e.g. adults entering the breeding season in poor condition.

Given the size of the Hornsea 4 project, proximity to the FFC SPA and apparent importance of the area to guillemot and razorbill during August and September, when they may be flightless with attendant chicks, Natural England consider taking a range-based approach to the assessment of potential impacts to be entirely appropriate.

Detailed comments

The provided report identifies many sources of uncertainty in both data collection and analytical methods used to evaluate impacts associated with offshore wind farms and to generate displacement estimates. This is largely a result of birds being present in small numbers and insufficient survey effort during studies. Nevertheless, the review clearly demonstrates that impacts are highly variable and are likely to be project-specific for guillemot and razorbill. Natural England would also like to note that some of the cited documents are not referenced in the bibliography and could therefore not be checked.

The report also examines drivers of variations in displacement rates, though two important potential variables have not been fully considered: seasonal effects (e.g. Peschko et al. 2020) and proximity to breeding colony (Vallejo et al. 2017). Further, it is often unclear how displacement rates have been calculated and the distance (i.e. array only, array + different sized buffers) over which displacement has been calculated is not given full consideration in the report. Displacement rates might be expected to decrease with distance the impact and therefore the size of the buffer included in an analysis is likely to be a critical factor in determining whether displacement rates are comparable between projects. For example, Vanermen et al. (2019) estimated a guillemot displacement rate of 71% based on the Bligh Bank array + 0.5 km buffer, reducing to 53% when the area up to 3 km was considered. Peschko et al. (2020) consider a 3 km buffer when deriving their displacement rates, but also note that significant displacement of guillemot was recorded up to 9 km from the wind farms.

The report draws links between displacement and wind farm layout, turbine density, marine traffic and auk density, and it is suggested that displacement rates can be refined from a range based on similar attributes. However, it remains difficult to draw comparisons between the projects described in the review and Hornsea 4. No projects are considered in the analysis that are of a similar scale (area, number of turbines and size of turbines) relative to Hornsea 4, or location relative to the largest English breeding seabird colony.

At Hornsea 4, it is unclear to what extent the distribution of guillemot and razorbill will be constrained by environmental limitations and whether this could affect the scope for avoidance behaviour that is not costly to the displaced birds. The extent of avoidance could also be strongly influenced by prey distributions, particularly during the moulting period in August and September when both guillemot and razorbill are flightless, may have attendant chicks and have greater energetic demands. In this case, displacement may be a function of how the wind farm will be perceived by birds in terms of permeability and risk, how accessible alternative, good quality, foraging habitat is and whether the levels of competition for potentially limited habitat patches are tolerable. Although the density of turbines planned for Hornsea 4 may be lower than with other OWF, the rotor diameter is around double of the turbines installed at Beatrice. The effect of this on wind farm risk perception by birds and the influence on displacement rates currently remains unknown. Natural England currently consider there to be insufficient evidence to draw conclusions about these site-specific factors and that it is inappropriate generalise displacement rates into single values.

The impacts of displacement, translated as mortality rates of displaced birds, are also likely to be site-specific and driven by seasonal trends and life-stages. As noted in the summary above, the displacement matrices are a simple attempt to capture both lethal and non-lethal effects. When considering mortality rates, the report relies on two main studies and acknowledges the clear lack of empirical data and evidence relating to the subject. This is precisely why Natural England recommend a range-based approach when considering the impacts. Both studies are based on complex modelling approaches, including assumptions and sources of uncertainty and both have limitations regarding seasonality and geographic extents.

The SeabORD tool (Searle et al 2018; Daunt et al. 2020), is currently limited to one phase of the breeding season (specifically the chick rearing period) and has only been applied to projects in Scotland. Given the lack of suitable parameterisation the results are not applicable to FFC SPA. Moreover, at Hornsea 4, Natural England is particularly concerned about the potential additional mortality resulting from displacement during August-September, when the guillemot and razorbill have moved offshore from the colony and may be most vulnerable. The SeabORD model is likely to be sensitive to underlying prey levels which require careful calibration, and also the methods for deriving the foraging distribution of birds (i.e. GPS tracking or at-sea survey data).

Further, the report draws upon examples of possible additional mortality from displacement estimated by Daunt et al. (2020) using SeabORD, based on similar distances, from the considered SPAs to the theoretical wind farms, as Hornsea 4 to FFC SPA. Nevertheless, the results from Daunt et al. (2020) suggested, whilst variable between the SPAs considered, the mortality rates of displaced guillemot could exceed 10% based on the upper 95% confidence intervals. Moreover, Daunt et al. (2020) highlight that the SeabORD results generally suggest greater mortality rates than the arbitrary 1% value. This indicates that the applicant's proposal for a single mortality value of 1% is not in fact supported by one of the modelling studies used in its defence. Thus, whilst the SeabORD tool and model-based approach to assessing displacement is promising, Natural England consider that further development (currently ongoing) and parameterisation for FFC SPA across all seasons is required to provide confidence in the use of the tool for English projects.

A study by Van Kooten et al. (2019) is also presented as potential evidence for low mortality rates associated with displacement. This research looks to estimate the general population level impacts of different offshore wind farm scenarios rather than estimating mortality rates. The results are used to infer the potential impacts on population growth rates under 'realistic' (50% displacement and modelled survival) and 'precautionary' (100% displacement and 10% mortality) conditions. The study also has several limitations regarding data availability and levels of uncertainty associated with outputs, and therefore the conclusions should be treated with caution. We also highlight that the study does not specifically provide any evidence towards the actual levels of mortality that could be associated with displacement from a specific project and the resultant effects on a particular SPA.

The report also cites the results of the Peshcko et al. (2020) study, and lack of obvious correlations between estimated displacement and the Heligoland guillemot colony success as an example of a lack of significant impacts resulting from displacement. However, the lack of a detectable impact does not provide evidence of no impact, and other factors may have resulted in improvements in demographic rates that may have offset impacts. For example, natural changes in prey distributions may have allowed birds to access new, better quality, foraging habitat during the breeding season. We do not consider the conclusions drawn to be valid in the absence of an understanding of the value of the areas from which the auks were displaced. Moreover, it may be very difficult to disentangle displacement related mortality impacts from other processes such as migration and both key references cited are clear that it is likely to be difficult to infer displacement effects from colony population trends. In this context, we highlight that guillemot population trends in England are generally positive and therefore it is by no means exceptional that the Heligoland colony experienced growth in the study period.

These studies do not consider the potential impacts of displacement on auks during the time that higher densities of guillemot and razorbill were observed at Hornsea 4. During August and September, male guillemots accompany dependent young offshore from the colony, and both males and females undergo a moult, during which time all individuals are flightless. In relation to Hornsea 4, displacement effects are likely to be at the greatest during this particularly vulnerable time for both juveniles and adults. Thus, they may be expected to be most sensitive to impacts at this stage and, as the report states, the impacts relating to the displacement of these birds will be dependent on changes to prey or habitat accessibility and levels of competition for both. Impacts are likely to correlate with the scale and quality of the habitat lost. Whilst 'at cliff' productivity will not be directly affected during August and September, chick/juvenile and adult survival rates may be.

Although the Applicant has highlighted several times that the array area and buffer are not the 'most important' areas for auks during the August and September, this does not detract from the fact that they remain important. This is evidenced by the large densities of guillemot and razorbill found within the array and 2 km buffer at this time of year (a time that the vast majority of the individuals present are likely to be from FFC SPA). That adjacent areas are potentially of higher quality, and have been identified as supporting greater numbers of birds, suggests they may already be at carrying capacity, and displaced birds may find it difficult to compete for available resources in such areas. This also assumes the most important areas remain static and do not show any interannual variation, for example due to changes in the location of the Flamborough Front. The Applicant argues that the areas which may receive displaced auks are unlikely to be at carrying capacity. This is more likely to be the case at times of year when lower numbers of auks are present in the area, but seems rather less likely during August and September. Thus, Natural England consider that the application of a range of mortality rates (1-10%) for guillemot and razorbill is more fully justified and consistent with the precautionary approach in this scenario.

References

Searle, K.R.A., Butler, A, Mobbs, D.C., Trinder, M., Waggitt, J., Evans. P. and Daunt. F. (2019). Scottish Waters East Region Regional Sectoral Marine Plan Strategic Ornithology Study: final report. CEH report to Marine Scotland/SEANSE, CEH Ref: NEC07184.

Peschko, V., Mendel, B., Müller, S., Markones, N., Mercker, M. and Garthe, S. (2020). Effects of offshore windfarms on seabird abundance: Strong effects in spring and in the breeding season. Marine Environmental Research 162: 105157.

Searle, K. R., Mobbs, D.C., Butler, A., Furness, R.W., Trinder, M.N. and Daunt, F. (2018). Finding out the fate of displaced birds (FCR/2015/19). Finding out the fate of displaced birds (FCR/2015/19). Scottish Marine and Freshwater Science Vol 9 No 08. https://www2.gov.scot/Topics/marine/marineenergy/mre/current/SeabORD

Vallejo, G.C., Grellier, K., Nelson, E.J., McGregor, R.M., Canning, S.J., Caryl, F.M. and McLean, N. (2017). Responses of two marine top predators to an offshore wind farm. Ecology and Evolution 7, 8698-8708.

Vanermen, N. and Stienen, E.W.M. (2019). Seabirds: displacement. pp. 174–205. In: M.R. Perrow. [ed.]. Wildlife and Wind Farms, Conflicts and Solutions. Volume 3. Offshore: Potential effects. Pelagic Publishing, Exeter, UK.

van Kooten, T., Soudijn, F., Tulp, I., Chen, C., Benden, D., & Leopold, M. (2019). The consequences of seabird habitat loss from offshore wind turbines, version 2: Displacement and population level effects in 5 selected species (No. C063/19). Wageningen Marine Research.