THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES

2010

Natural England's additional guidance on the assessment of guillemot and razorbill displacement impacts for the Hornsea Project Four Offshore Wind Farm

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

20th June 2022

Overview

This document provides further guidance to the Applicant on the assessment of potential displacement impacts on common guillemot (*Uria aalge*, guillemot hereafter) and razorbill (*Alca torda*) that may arise from the construction, operation, and maintenance phase of the proposed offshore wind farm. We feel this is necessary due to our lack of agreement with the approach currently adopted by the Applicant for guillemot in EIA and HRA and for razorbill for HRA in the DCO application. These concerns are highlighted in the Natural England Risk and Issues Log (points B28, B33, B50, B51, B67, B73 and B77). We aim to provide clarity on Natural England's preferred approach so that this can be included in further submissions anticipated at Deadline 5 of the Examination and to ensure the results inform the range of impacts considered in Population Viability Analyses. This advice is specifically tailored to the Hornsea Project Four and should not be applied to other projects.

Background

Natural England welcome the mitigation applied by the Applicant to reduce the developable area to exclude the areas of higher concentrations of birds including guillemot and razorbill. However, it is evident that large numbers of guillemot and razorbill, species with a similar ecology and that may be sensitive to displacement effects, still occur in the revised project area and a 2 km buffer during August and September; this suggests the array area is important for these species at this time of year. During this period, following breeding, birds dispersing from the colony will be in moult (flightless), many of the males may have attendant chicks that they are caring for, and individuals will be dependent on productive foraging areas to improve their condition prior to the winter (Ellis & Gabrielsen 2002, St John Glew et al. 2018, Dunn et al. 2019, Dunn et al 2020, Christie 2020, Merkel et al. 2021, Buckingham et al. 2022). Given the proximity of the array area to Flamborough and Filey Coast Special Protection Area (FFC SPA), and the likelihood of significant numbers of guillemot and razorbill being present at this time of year, the potential impact of this project on these species needs careful consideration.

Natural England advise that the standard approach to displacement assessments for guillemot does not adequately address the occurrence of these peaks in August and September due to the seasonal definitions adopted, which are generally drawn from Furness (2015). Furness (2015) suggests a distinct "post-breeding migration" season for razorbill of August-October, but despite defining a similar season for guillemot as August to October, the report does not advocate separating this from the wider non-breeding season due to a lack of information on post-breeding movements. However, Furness (2015) does note that post-breeding aggregations of guillemot may occur and refers specifically to the FFC SPA area in this respect: "*in autumn shortly after dispersal from colonies there may be aggregations of SPA birds close to Flamborough Head & Bempton SPA*" and expresses concern that guillemot may be vulnerable to marine renewables development during this period (Furness 2015).

The use of the current Furness (2015) seasonal definitions means that any impacts on guillemot occurring in August and September would be attributed to the wider non-breeding season. They would therefore be subject to a very small apportioning rate derived at the Biologically Defined Minimum Population Scale (BDMPS) for FFC SPA. For razorbill, impacts in the "post-breeding migration season", as defined in Furness (2015), are also apportioned based on assumed mixing with other colonies at the wider BDMPS, resulting in a low apportioning rate to FFC SPA.

Connectivity in the chick rearing/ moult period

Studies have suggested guillemot and their chicks may disperse rapidly away from colonies and potentially mix with birds from other colonies at the end of the breeding season (e.g.

Camphuysen et al. 2002, Harris et al. 2015, Christie 2020, Dunn et al. 2020). Camphuysen (2002) and Christie (2020) also provide some suggestion that adults with attendant chicks may aggregate in specific locations during the post-breeding moult. Such areas could effectively act as important nursery areas (Camphuysen et al. 2002). However, most of these studies are based on a small sample size of birds from a limited number of colonies using methods, with inherent limitations relating to the inaccuracy of geolocator tags (in the order of ±200 km without refinement) or dependence on re-sighting data (Christie 2020). Following the chick rearing/moult period, some adult guillemot and razorbill may also return to their colonies, implying a proportion of adults remain local throughout the non-breeding season (Harris & Wanless 1990, Dunn et al. 2020).

Most recently, Buckingham et al. (2022), investigated non-breeding movements of guillemot and razorbill from 11 UK colonies in the northern UK (not FFC SPA) using refined geolocator tag data. Their results suggested Scottish colony core distributions (50% kernel density contours), during the main period of post-breeding moult (mid-August to mid-September), did not overlap with the Hornsea Project Four area. This infers those birds from the more northerly SPAs are unlikely to heavily utilise the Hornsea Project Four area at this specific time of year and instead appeared to favour areas largely to the north and east of the colonies. Nevertheless, the research did suggest some birds may reach the Hornsea Project Four area during August and September with implications for apportioning. Unfortunately, no data are currently available for guillemot or razorbill breeding or fledged at FFC SPA due to the difficulty of safely tagging birds at this colony.

Thus, whilst there is clearly potential for some contribution of birds from other SPAs to the Hornsea Project Four area during chick rearing/ moult, it is likely the vast majority will come from the nearby FFC SPA. If this is not factored into the assessment, the potential impacts on birds that are likely to have come from the SPA may be significantly underestimated.

The Applicant's approach

Weighted seasonal mean peak abundance estimates

Natural England note that the Applicant introduced a new method for estimating seasonal mean peak abundance estimates for guillemot within their DCO Application submission. This had not been used in the previous draft submitted to Natural England within the evidence plan process and we had not requested or approved this change to the assessment methodology.

Within the DCO Application, the Applicant adopted a "weighted" approach to the calculation of seasonal mean peak abundance estimates. These values are used in the assessment of displacement for both EIA and HRA. The approach splits the single non-breeding season into post-breeding (August to September), migration-free winter (October to November) and return migration (December to February) periods. The methods are detailed in the Displacement Analysis Annex (Section 1.4.4) submitted within the Application[1].

This approach was employed to reduce the influence of the large peaks that occurred during the post-breeding (August and September) period. The Applicant suggests these peaks are short-lived and inflate the seasonal mean peak estimate for the non-breeding season leading to over-precaution in assessing potential displacement.

Natural England do not agree with this approach. It fails to adequately capture impacts on birds during the chick rearing/moult period when there are large aggregations of present in the

[1] Volume A5, Annex 5.2: Offshore Ornithology Displacement Analysis, PINS Document Reference: A5.5.2

project area and individuals are likely to be particularly vulnerable to displacement. The Applicant has acknowledged there are likely to be distinct ecological/bio-seasons within the wider non-breeding period, but instead of assessing these separately, as for other species such as razorbill, they have chosen to weight the estimates. This results in a significant under-representation of potential impacts at a critical time of year for the auk life-cycle.

Approach to apportioning impacts outside of the breeding season

Natural England acknowledge that, based upon our requests during the Examination, the Applicant has attempted to provide a bespoke approach to apportioning to take into account the large peaks in abundance of guillemot that occur in August and September within the project area. However, we did not have the opportunity to agree the approach with the Applicant prior to the submission. Natural England strongly disagree with the adopted methods for guillemot and razorbill[2].

For guillemot, the Applicant has again adopted a weighted approach, this time to the apportioning of impacts to FFC SPA during the non-breeding season for HRA. This approach is detailed in the Offshore Ornithology FFC SPA Population Viability Analysis Appendix submitted within the Application[3]. The method effectively reduces the impacts assigned to FFC SPA by placing less weight on the months with large peaks in the abundance of guillemot (August and September), when a higher proportion of bird in the Hornsea Project Four area are likely to be from FFC SPA. For the HRA, the Applicant has split the non-breeding season into only two periods, rather than three as for the seasonal mean peaks. The Applicant describes August and September as the 'post dispersal' period and October to February as the remaining non-breeding season. Natural England advise that there is no need for weighting if August and September, clearly a well-defined ecological period for guillemot in the Hornsea Project Four area, are simply assessed as a separate season in a similar fashion to Razorbill.

For razorbill, there has been no consideration of the higher connectivity between FFC SPA and the Hornsea Project Four area during the "post-breeding migration season", when there are also large numbers of razorbill present. The Applicant has instead applied the BDMPS apportioning approach which assumes birds from different colonies are well mixed across the wider BDMPS region (i.e. North Sea and Channel). Given the behaviour and sensitivity of the species at this time, NE consider the current approach is likely to significantly underrepresent the impacts for HRA[4].

Adult ratios

Natural England also note that the Applicant has made use of generic ratios of adults to immature birds that have been estimated from Appendix A in Furness (2015) in their apportioning calculations. Natural England do not support the application of these ratios for apportioning of birds as adults from specific projects, particularly at sites near to large breeding colonies where breeding adults are likely to be dominant. This is because the ratio is based on a modelled population, with manipulated demographic rates to achieve zero population change over time. This is unlikely to be realistic and population growth, or decline, could

[2] Appendix B to the Relevant Representations of Natural England - Offshore Ornithology and detailed comments: 16, 50, 79 and 89

[3] Report to Inform Appropriate Assessment Part 11: Appendix H: Offshore ornithology FFC SPA Population Viability Analysis, PINS Document Reference: B2.2.

[4] Appendix B to the Relevant Representations of Natural England - Offshore Ornithology, detailed comments: 79 and 98

results in different age structures. Further, the generic model ratios do not consider spatial and temporal variations. Furness (2015) notes that:

"*the at sea distribution of seabirds differs between age classes, with youngest birds tending to spend their time in the winter quarters even during summer, breeding adults tending to stay closest to their breeding area, and immature birds probably at sea in areas that have good food supplies but are away from large colonies."*

Thus, where possible, Natural England instead advises the use of good quality site-specific ageing data to define the proportions of adults present within an area at a specific time of year. However, where sufficient data has not been collected, we suggest other evidence (e.g. other survey data from relevant areas or demographic data from connected colonies) can be used to provide an indication of the potential age structure of birds within the project area at relevant times of the year.

Natural England's preferred approach to the assessment of impacts on guillemot and razorbill

Natural England provide their preferred approach to the assessment of displacement impacts from Hornsea Project Four on guillemot and razorbill below. We consider this approach is likely to best capture the potential impacts on both species in both EIA and HRA contexts. Natural England will review this advice if and when additional relevant evidence is submitted into the Examination.

For illustrative purposes, a comparison between the Natural England advice and the Applicant's approach, based on the abundance values submitted in the original Application, is provided in Table 1. However, please note that this comparison is based on data that will be superseded in the final assessment and the results should only be treated as indicative of the potential differences between methods.

Guillemot

Natural England advise the use of the following seasons to derive seasonal mean peak abundance estimates for EIA and HRA for guillemot. These should then be subject to the accompanying overall apportioning rates for Flamborough & Filey Coast Special Protection Area (FFC SPA) for HRA:

- **Breeding season (March to July): 100%** - this assumes 100% of all birds are adults from FFC SPA and represents the worst-case scenario against which the Applicant's approach (56%), based on adult apportioning from Furness (2015) and applying a sabbatical rate, can be considered.
- **Chick rearing/moult (August and September): 60%** - this is based on productivity information from FFC SPA in 2016 (0.64 chicks per pair) and 2017 (0.68 chicks per pair excluding a plot that was disturbed) during the baseline survey period. This suggests that, on average, there would be 0.33 chicks per breeding adult, which is equivalent to 67% adults at the end of the breeding season (Aitken et al. 2016, Babcock et al. 2017). Taking into consideration the likely connectivity between FFC SPA and the Hornsea Project Four area at this time and allowing for some degree of dilution by adults from other colonies to North, we suggest that it is suitably precautionary to assume that around 90% of the adults come from FFC SPA. Notwithstanding any new evidence, this would equate to approximately 60% of all guillemots in the Hornsea Project Four area being adults linked to the FFC SPA.
- **Non-breeding (October to February): 4.41%** - this is based upon the standard BDMPS approach (Furness 2015).

Razorbill

For razorbill, we advise the use of the standard seasons defined by Furness (2015) to derive seasonal mean peak abundance estimates for EIA and HRA. These should then be subject to the accompanying overall apportioning rates for Flamborough & Filey Coast Special Protection Area (FFC SPA) for HRA:

- **Breeding season (April to July): 100%** - this assumes 100% of all birds are adults from FFC SPA and represents the worst-case scenario against which the Applicant's approach (56%), based on adult apportioning from Furness (2015) and applying a sabbatical rate, can be considered.
- **Chick rearing/moult (August to October): 66%** - this is based on productivity information from FFC SPA in 2016 (0.5 chicks per pair) and 2017 (0.56 chicks per pair). On average, this suggests there would be 0.265 chicks per breeding adult, which is equivalent to 73.5% adults at the end of the breeding season (Aitken et al. 2016, Babcock et al. 2017). Again, allowing for some degree of mixing in the Hornsea Project Four area, we suggest that it is suitably precautionary to assume that around 90% of the adults come from FFC SPA. Notwithstanding any new evidence, this would equate to approximately 66% of all razorbill in the Hornsea Project Four area being adults linked to the FFC SPA.
- **Non-breeding winter (November to December): 3.38%** - this is based upon the standard BDMPS approach (Furness 2015).
- **Pre-breeding (January to March): 2.74%** - this is based upon the standard BDMPS approach (Furness 2015).

Generic advice

The seasonal mean peak estimates from each defined season should be summed for EIA and the apportioned estimates to FFC SPA summed for HRA. The Natural England advised displacement (30-70%) and mortality rates (1-10%) should be applied to estimate the potential impacts for the project alone for both EIA and HRA. Total annual impacts can be used in relevant cumulative and in-combination assessments. Impact estimates should be compared against the natural baseline mortality rate for the relevant population at the appropriate scale (i.e. largest BDMPS for EIA and FFC SPA for HRA).

In all cases, Natural England consider it to be good practice to estimate impacts based on the mean abundance estimates and associated lower and upper confidence limits to capture variability or uncertainty.

For assessment of construction impacts, we advise the predicted impacts from operation and maintenance are halved to represent partial displacement.

Whilst skipped breeding may occur in some seabird populations that are subject to extreme environmental stresses, for most species, when conditions are normal or good, virtually all birds of a breeding age are likely to breed (Harris & Wanless 1995). Thus, Natural England also currently advise against the apportioning out of sabbaticals (skipped breeders) in assessments where there is no supporting site-specific empirical evidence.

Table 1. Indicative comparison between the Natural England advised approach, and the Applicant's approach (at DCO Application) to the calculation of seasonal mean peak abundance estimates and apportioning to Flamborough and Filey Coast Special Protection Area (FFC SPA) for guillemot and razorbill. Please note that the abundance estimates used in the example are based on MRSea_v1 data which we expect to be updated at Deadline 5.

Species	Type	Season definition	% from FFC	% adults	% breeders (i.e. not sabbatical)	Overall apportioning to FFC SPA	Seasonal mean peak abundance (MRSea_v1)	Overall % apportion to FFC SPA	Sum of apportioned abundance estimates
Guillemot	Natural England	Breeding (Mar-Jul)	100	100	100	100	9,080	9,080	
		Chick rearing/moult (Aug-Sept)	90	67	100	60	32,841	19,803	
		Non-breeding (Oct-Feb)	BDMPS			4.41	12,044	531	**29,414**
	Applicant	Breeding (Mar-Jul)	100	60	93	56	9,080	5,067	
		Weighted non-breeding (Aug-Feb)	*mean peak abundance and apportioning using weighted approach*			13	32,841	4,319	**9,385**
Razorbill	Natural England	Breeding (Mar-Jul)	100	100	100	100	331	331	
		Post-breeding migration (Aug-Oct)	90	73.5	100	66	3,590	2,375	
		Winter (Nov-Dec)	BDMPS			2.74	517	14	
		Return migration (Jan-Mar)	BDMPS			3.38	410	14	**2,734**
	Applicant	Breeding (Apr-Jul)	100	60	93	56	331	185	
		Post-breeding migration (Aug-Oct)	BDMPS			3.38	3,590	121	
		Winter (Nov-Dec)	BDMPS			2.74	517	14	
		Return migration (Jan-Mar)	BDMPS			3.38	410	14	**334**

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