



Hornsea Project Four

Applicant's response to Natural England's additional guidance on apportioning of seabirds to FFC SPA for Hornsea Project Four

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Glossary

Term	Definition
Bio-season	Bird behaviour and abundance is recognised to differ across a calendar year, with particular months recognised as being part of different seasons. The biologically defined minimum population scales (BDMPS) bio-seasons used in this report are based on those in Furness (2015), hereafter referred to as bio-seasons.
Confidence intervals	Range of values that with a specified certainty contains the true mean of the population that a sample was taken from. For example, 95% confidence intervals states a range of values with a 95% certainty those values contain the population mean.
Displacement	The potential for birds and other animals to avoid an area due to the presence of the wind turbines or from vessel activity.

Acronyms

Term	Definition
BDMPS	Biologically Defined Minimum Population Scale
BEIS	Business, Energy and Industrial Strategy
EIA	Environmental Impact Assessment
ETG	Expert Topic Group
EP	Evidence Plan
FFC	Flamborough and Filey Coast
HRA	Habitats Regulations Assessment
OWF	Offshore Wind Farm
SNCBs	Statutory Nature Conservation Bodies
SNH	Scottish Natural Heritage
SoS	Secretary of State
SPA	Special Protection Area

1 Introduction

1.1.1.1 Natural England submitted two documents at deadline 5 ([Additional guidance on the assessment of guillemot and razorbill displacement impacts for the Hornsea Project Four Offshore Wind Farm \(REP5-115\)](#) and [Additional guidance on the apportioning of northern gannet and black-legged kittiwake to Flamborough and Filey Coast \(FFC\) Special Protection Area \(SPA\) for the Hornsea Project Four Offshore Wind Farm \(REP5-116\)](#)) outlining their preferred approach to apportionment and assessment of the gannet, kittiwake, guillemot and razorbill qualifying features of the Flamborough and Filey Coast Special Protection Area (FFC SPA). These documents were shared with the Applicant prior to submission at deadline 5 and Natural England's preferred approach was subsequently assessed and presented in [G5.25 Ornithology Environmental Impact Assessment \(EIA\) and Habitats Regulations Assessment \(HRA\) Annex \(REP5-078\)](#) submitted at Deadline 5. Although the Applicant agreed to present Natural England's preferred approach to assessment of these qualifying features, the Applicant wholly disagrees with Natural England's recommendations specifically tailored to the Hornsea Project Four only, with the rationale for such disagreement is detailed in this report.

2 Additional guidance on the assessment of guillemot and razorbill displacement impacts for the Hornsea Project Four Offshore Wind Farm (REP5-115)

2.1 Background

2.1.1.1 As detailed in Natural England's latest additional guidance on the assessment of auks ([REP5-115](#)), this change in advice is to not adopt the standard approach to displacement following the Joint Statutory Nature Conservation Bodies (SNCBs) interim displacement advice (updated, 2022) on seasonality. The joint SNCBs advice is to assess on the seasonal definitions defined by Furness (2015), whilst Natural England's latest advice is that in their opinion additional advice is required and is to be applied for Hornsea Project Four only. The rationale for this updated and project-specific advice is put forward as a means to include an additional post-breeding migration bio-season for guillemot. However, as presented in this response from the Applicant, this is counter to all other English offshore wind farm (OWF) assessments accounting for such a post-breeding migration bio-season despite similar peak numbers being apparent across the wider post-breeding season in historic and recently consented OWF projects in the North Sea.

2.1.1.2 Natural England make reference to the following quote from Furness (2015) to provide justification for their latest additional guidance:

2.1.1.3 *"in autumn shortly after dispersal from colonies there may be aggregations of SPA birds close to Flamborough Head & Bempton SPA".*

2.1.1.4 However, in relation to this same statement Furness (2015) specifies that these aggregations take place in a number of locations and also specifies that they are "very short-lived in the transition between breeding and non-breeding distributions". Furness (2015) also states that these aggregations occur "during the brief post-breeding dispersal stage in late July", which is contrary to the Natural England's latest additional guidance that suggests these

aggregations occur over a much longer period of two months and incorrectly specifies them to being in August to September.

- 2.1.1.5 Furthermore, these aggregations occur close to the FFC SPA, whilst the Hornsea Four array area is approximately 70km offshore from the FFC SPA. Therefore, the Hornsea Four array area is significantly outside of the key foraging habitat close by to the colony as identified from the modelling undertaken by Cleasby et al. (2018) and Wakefield et al. (2017) as presented in Figures 5.6 and 5.7 of [A2.5 Environmental Statement Volume A2 Chapter 5 Offshore and Intertidal Ornithology \(APP-017\)](#). Following this, it can be concluded that Hornsea Four is significantly outside of the aggregation hotspot Furness (2015) is referring to in his research.

2.1.2 Connectivity in the chick / moult period

- 2.1.2.1 As correctly identified by Natural England, studies suggest that adult male guillemots accompanying their chicks disperse rapidly away from colonies, mixing with birds from other colonies at the end of the breeding season (Camphuysen 2002, Harris et al. 2015, Christie 2020, Dunn et al. 2020). However, these studies suggest that the dispersal period occurs in mid to late July (Camphuysen 2002, Harris et al. 2015, Dunn et al. 2020) not August and September as suggested by Natural England. The evidence for post dispersal of adult male and chick movement primarily occurring in July is further evidenced from Hornsea Four's site specific survey data, as presented in Table 34 of [G5.9 Revised Ornithology Baseline \(REP5-087\)](#). These data suggest that the key month when adults attend fledglings was in July in both survey years, with no records of fledglings in the August 2016 survey and a significant reduction (4 times less) in August 2017 comparatively to July 2017. There were also no records of fledglings in September for both survey years. This site-specific evidence suggests that adult males and fledglings from the FFC SPA disperse rapidly through the FFC SPA during July, not August and September, with birds from northerly colonies likely to contribute more to those moving through to wintering grounds from July onwards.
- 2.1.2.2 Natural England make reference to the Camphuysen (2002) study in relation to areas of sea which might act as important nursery areas. The study found only one instance of a nursery site with the approximate location being nearly 200km east of the Humber coast and roughly 100km away from Hornsea Four. Interestingly, Camphuysen (2002) notes that adult males attending fledglings tended to avoid key foraging areas where feeding frenzies occur, instead occupying areas away from near-colony feeding grounds.
- 2.1.2.3 The most recent study on auk dispersal comes from Buckingham et al. (2022), as referenced by Natural England, which reviewed core dispersal ranges of auks from 11 UK colonies to the North of the FFC SPA. When interpreting the results of the Buckingham et al. (2022) study there are several elements which need to be carefully considered;
- The core distributions are based on a small sample size compared to the overall size of each colony, which means the core distribution of whole colony is likely to differ comparatively to the birds sampled;
 - The study did not differentiate between breeding adult males and females, which exhibit differing behaviour within the time period being assessed;

- The study does show that within the months of August to September the auks core distribution is significantly widespread (over several hundred kilometers away from the colony of origin) with significant overlap and therefore mixing of birds from differing colonies; and
- Based on this study it is therefore highly likely that birds from colonies to the North of the FFC SPA could migrate through the Hornsea Four array area during this time period to reach their wintering grounds.

2.1.2.4 Natural England conclude by agreeing with the Applicant's position that there is highly likely to be auks from colonies other than the FFC SPA during what Natural England classify as the 'chick rearing / moult' period. However, as is suggested above, the interaction between Hornsea Four and auks from the FFC SPA occurs primarily during the month of July and not August and September, by which time there is more likely to be a mix of late dispersing FFC SPA adults and immatures with others from more northerly SPAs.

2.1.3 The Applicant's approach

2.1.4 Weighted seasonal mean peak abundance estimates

2.1.4.1 As noted by Natural England, the Applicant's preferred approach to the calculation of a realistic peak seasonal abundance for the entire seven months in the non-breeding season was to use a weighted approach. Natural England is correct in that the Applicant's justification for this approach is due to the large peaks of birds moving through on migration, which as stated above by Furness (2015) as being a very short-lived behaviour, which is not reflective of the sites usage over the majority of the seven month non-breeding season. The use of the weighting approach accounts for the large peaks over a short time frame at the beginning of the non-breeding season and also the significantly lower abundance for the majority and remainder of the non-breeding season, thus providing a realistic peak abundance for the entire seven-month period.

2.1.4.2 Natural England's key disagreement with this approach is stated as their opinion being that auks are likely to be particularly vulnerable to displacement during the 'chick rearing / moult' period. However, Natural England do not provide any evidence to support this statement. The Applicant presented a full review of auk displacement and mortality ([G1.47 Auk Displacement and Mortality Evidence Review \(REP1-069\)](#)) supported by historical and more recent evidence from post-consent monitoring datasets and reporting from OWFS, including from the Belgian North Sea (Degraer et al. 2021). This study accepted that previously predicted high levels of displacement from OWFs could be due to in part to the analysis method used to derive displacement levels inadequate at account for high levels of zero-inflated data and also high levels of vessel traffic not the actual OWF itself. This means that an area of sea whereby vessel movement would be heavily restricted to an occasional maintenance vessel comparatively to the area of sea surrounding Hornsea Four during this time period is unlikely to lead to any meaningful negative impact as suggested by Natural England. In fact, it cannot be ruled out that an OWF array area during this time

period might result in attraction, due to limited disturbance comparatively, as has been previously recorded ([REP1-069](#)).

- 2.1.4.3 Natural England questioned why the Applicant did not assess distinct ecological / bio-seasons within the wider non-breeding period. The reason for this was to align with the Joint SNCBs (update, 2022) Interim displacement advice on seasonality and also align with previously agreed methods for all other recently consented OWFs. Furthermore, during Expert Topic Group (ETG)#9 discussions Natural England stressed that there would be limited value in trying to break the non-breeding bio-season down into further discrete seasons and there would be lots of complications inherent in that process. Their advice was to continue to assess against the non-breeding season defined by Furness (2015), as assessed following the Applicant's approach to apportionment and assessment. This latest advice significantly deviates from previous consultation on the matter of FFC SPA auk apportionment during the Evidence Plan (EP) process.

2.1.5 Approach to apportioning outside of the breeding season

- 2.1.5.1 The Applicant welcomes Natural England's acknowledgement that the assessments for Hornsea Four cater for their request to consider a bespoke approach to account for a higher proportion of individuals being apportioned to the FFC SPA during the non-breeding season. The request came from Natural England late during the Application phase and as stated by Natural England there was insufficient time for the method to be discussed in full (agreement [OFF-ORN-6.12](#) – as set out in Evidence Plan Logs which are appendices to the Hornsea Four Evidence Plan ([B1.1.1: Evidence Plan \(APP-130\)](#))). However, for guillemot it appears that Natural England have misunderstood the non-breeding apportionment approach adopted by the Applicant, which is described in [B2.2 Report to Inform Appropriate Assessment Part 11: Appendix H: Offshore Ornithology Flamborough and Filey Coast \(FFC\) Special Protection Area \(SPA\) Population Viability Analysis \(APP-177\)](#). As requested by Natural England, for the months of August and September, the Applicant has used an assumption based on expert judgement inferred from the above cited studies on guillemot dispersal, that a precautionary 75% of all breeding adults expected to occur in those months are from the FFC SPA, despite the information above suggesting that guillemots from the FFC SPA are likely to disperse through the Hornsea Four array area primarily during July. The Applicant also accounted for the presence of immature and juvenile guillemots and adults taking a sabbatical from breeding within these two months (August and September). This resulted in an overall apportionment of 35% of all guillemots being breeding adults from the FFC SPA during the two months (August and September), which is a significantly higher proportion than the typical 4.41% used by all other impact assessments for guillemot displacement in other consented OWFs in the North Sea (SPR, 2021; Norfolk Boreas Limited, 2019). For the remaining five non-breeding season months (October to February), where the guillemots found within the array area will almost certainly contain a mix from different SPAs as well as non-breeding birds, the Applicant used the standard apportionment value of 4.41%. This resulted in an overall apportionment value for the entire seven-month non-breeding season of 13.12%, which is nearly three times greater than the standard apportionment approach

used by all other consented OWFs for the non-breeding season (SPR, 2021; Norfolk Boreas Limited, 2019).

- 2.1.5.2 Natural England queried why the Applicant did not assess the two months (August and September) as a separate season, the reason for this is as stated above, this goes against the Joint SNCBs (updated, 2022) interim displacement advice on seasonality and Natural England's own advice provided throughout the pre-application consultation process for Hornsea Four and recorded at ETG#9 to the Applicant on seasonality.
- 2.1.5.3 In relation to razorbill, as noted by Natural England the Applicant followed the standard apportionment method as used for all other UK OWFs in North Sea (SPR, 2021; Norfolk Boreas Limited, 2019) when apportioning impacts in the non-breeding season. As detailed in Table 5 of [G5.7 Indirect Effects of Forage Fish and Ornithology \(REP5-085\)](#), the vast majority of OWFs in Southern North Sea show the same pattern of distributional change during the months of July to October, which shows razorbills pulsing through different OWF sites on migration to wintering grounds. For all these other OWFs, Natural England did not request a higher apportionment value be used within these months despite the FFC SPA also being the closest colony to all other more southerly OWFs. The Applicant therefore concluded that there was insufficient justification to deviate from the standard non-breeding apportionment rates for razorbill. Furthermore, Natural England's justification for a higher apportionment being advocated is due to concerns over razorbills being particularly vulnerable to OWFs during the post-breeding dispersal months. As with guillemot, Natural England have not provided any evidence to substantiate this claim, which is contrary to latest evidence from post-consent monitoring reports ([REP1-069](#); Degraer et al. 2021) providing evidence that areas of sea with reduced vessel traffic might in fact lead to increasing numbers of razorbills.

2.1.6 Adult ratios

- 2.1.6.1 The Applicant agrees with Natural England that where possible the use of site-specific age classification data should be used to calculate the proportional split between adult and immature birds. However, for guillemot and razorbill, differentiation in plumage between adult and immatures only occurs for a limited time period post-fledging and therefore site-specific data cannot be relied upon to derive age ratios. The Applicant therefore used the stable age ratios as the best available evidence to derive the age ratio of guillemot and razorbills within Hornsea Four, which aligns with Natural England's recommendation to use demographic data in the absence of site-specific data.
- 2.1.6.2 Natural England raise concerns that the stable age ratios used do not consider the following from Furness (2015):
- 2.1.6.3 *"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."*
- 2.1.6.4 As stated above, the Hornsea Four array area is located nearly 70km offshore from the FFC SPA, which based on modelling by Cleasby et al. (2018) and Wakefield et al. (2017) is significantly outside of the FFC SPA key foraging area for both auk species. Furthermore, the

current mean max foraging ranges for both species as derived from Woodward et al. (2019) are significantly influenced by the outlier foraging distances from the Fair Isle. When calculating the mean max foraging distance excluding the Fair Isle (which is currently advised by other SNCBs and the author due to being erroneous data) this results in a mean max foraging range of 55.5km for guillemot and 73.8km. These revised foraging ranges suggest that Hornsea Four is actually significantly outside of the plausible foraging range for guillemot and at the limit of the plausible foraging range for razorbill from FFC SPA. This would, therefore, support the Applicant's case that a high proportion of auks found within Hornsea Four during the breeding season are likely to be non-breeding birds (sabbaticals and immatures).

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

2.1.8 Guillemot

2.1.8.1 Natural England's preferred approach for apportionment of predicted impacts to the guillemot qualifying feature of the FFC SPA is as follows:

2.1.8.2 **"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."

2.1.8.3 The Applicant agrees with Natural England on the component months used to define the breeding season and also the assumption that all predicted impacts on breeding adult guillemots in the breeding season should be apportioned to the FFC SPA, for a precautionary assessment. The Applicant does not agree with Natural England's assumption that all birds recorded within the months of March to July are breeding adults though, nor does this align with Natural England's own assessment guidance (REP5-115). As stated above, considering Hornsea Four's location being outside of the FFC SPA colony's foraging range and also being significantly offshore (nearly 70km offshore), there is a high likelihood that a significant proportion of guillemots within the Hornsea Four array area are non-breeding adults and immature birds. Furthermore, Natural England have failed to account for the significant proportion of juveniles (roughly 50% of all birds aged in June and July) recorded in the site-specific data within their preferred approach to apportionment in the breeding season.

2.1.8.4 It can therefore be concluded that Natural England's preferred approach to apportionment during the breeding season significantly overestimates the predicted impact apportioned to the FFC SPA from Hornsea Four and does not account for their own advice provided to the Applicant to make use of site-specific data where applicable. The Applicant considers that during the breeding season for the reasons stated above, account needs to be taken for the number of non-breeding guillemots within Hornsea Four, which Natural England have failed to include within their approach.

2.1.8.5 **"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."

- 2.1.8.6 The Applicant wholly disagrees with the creation of an additional seasonal assessment, as it goes against both Joint SNCBs (updated, 2022) interim displacement advice on seasonality and Natural England's own advice provided at ETG#9 to the Applicant on seasonality. Furthermore, Natural England's justification for such a deviation from their own advice does not align with the evidence provided in their guidance on assessment (REP5-115). As evidenced above, the chick rearing / moult period occurs primarily in July with rapid dispersal of birds in a short period of time as evidenced from the cited studies above and also Hornsea Four's site-specific survey data. By August and September significant mixing and overlap of colony distribution occurs as evidenced in Buckingham et al. (2022), which goes against Natural England's assumption that 90% of all adult birds are likely to be from the FFC SPA. This is further evidenced when considering the results presented in Table 3 of G5.7 Indirect Effects of Forage Fish and Ornithology (REP5-085), where it is very clear that the total abundance recorded within the zonal lease areas for Southern North Sea OWF projects over the months of July to October far exceeds the FFC SPA population (the closest colony to all lease areas) and, therefore must include a significant proportion of guillemots from other colonies.
- 2.1.8.7 As detailed above, Natural England's rationale for deviating from their own guidance and creating an additional impact phase was due to concerns over the vulnerability of guillemots during the months of August to September. However, as detailed above Natural England have not provided any evidence to support this claim, whilst latest evidence from post-consent monitoring (REP1-069; Degraer et al. 2021) suggests that areas of sea with reduced vessel traffic might in fact lead to increasing numbers of guillemots.
- 2.1.8.8 It can therefore be concluded that Natural England's latest additional approach to include a further impact assessment bio-season significantly overestimates the predicted impact apportioned to the FFC SPA from Hornsea Four and does not account for their own advice provided to the Applicant or others. The Applicant considers that Joint SNCBs (updated, 2022) interim advice on displacement should instead be followed, and assessments be made against a single non-breeding bio-season (August to February), as applied to inform predicted impacts for all other North Sea OWFs.
- 2.1.8.9 **"Non-breeding (October to February): 4.41% - this is based upon the standard BDMPS approach (Furness 2015)."**
- 2.1.8.10 The Applicant agrees with the apportionment rate calculated of 4.41% being the standard non-breeding season apportionment value as used for all other consented OWFs. As detailed above, the Applicant does not agree with splitting the non-breeding season up into two separate seasons for assessment purposes as suggested by Natural England, which goes against the Joint SNCBs (updated, 2022) interim displacement advice on seasonality and Natural England's own advice provided at ETG#9 to the Applicant on seasonality. The Applicant considers that the SNCBs (updated, 2022) interim advice on displacement should

instead be followed, and assessments be made against a single non-breeding bio-season (August to February), as applied to inform predicted impacts for all other North Sea OWFs.

2.1.9 Razorbill

2.1.10 Natural England's preferred approach for apportionment of predicted impacts to the razorbill qualifying feature of the FFC SPA is as follows:

2.1.10.1 **"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"

2.1.10.2 The Applicant agrees with Natural England on the component months used to define the breeding season and also the assumption that all predicted impacts on breeding adult razorbills in the breeding season should be apportioned to the FFC SPA. The Applicant does not agree with Natural England's assumption that all birds recorded within the months of March to July are breeding adults, nor does this align with their own assessment guidance (REP5-115). As stated above considering Hornsea Four's location being at the limit of the likely colony foraging range and also being significantly offshore (nearly 70km offshore), there is a high likelihood that a significant proportion of razorbills within the Hornsea Four array area are non-breeding adults and immature birds. Furthermore, Natural England have failed to account for the significant proportion of juveniles (roughly 50% of all birds aged in June and July) recorded in the site-specific data within their latest additional approach to apportionment in the breeding season.

2.1.10.3 It can therefore be concluded that Natural England's preferred approach to apportionment during the breeding season significantly overestimates the predicted impact apportioned to the FFC SPA from Hornsea Four and does not account for their own advice provided to the Applicant. As evidenced above, the chick rearing / moult period occurs primarily in July with rapid dispersal of birds in a short period of time as evidenced from the cited studies above and also Hornsea Four's site-specific survey data. By August and September significant mixing and overlap of colony distribution occurs as evidenced in Buckingham et al. (2022), which goes against Natural England's assumption that 90% of all adult birds are likely to be from the FFC SPA. This is further evidenced when considering the results presented in Table 5 of G5.7 Indirect Effects of Forage Fish and Ornithology (REP5-085), it is very clear that the total abundance recorded within the zonal lease areas for Southern North Sea OWF projects over the months of July to October far exceeds the FFC SPA population (the closest colony to all lease areas) and therefore must include a significant proportion of razorbills from other colonies. The Applicant considers that during the breeding season, for the reasons stated above, account needs to be taken for the number of non-breeding razorbills within Hornsea Four which Natural England have failed to include within their approach.

2.1.10.4 **"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."

- 2.1.10.5 The Applicant agrees with the component months defined which aligns with the post-breeding migration bio-season as defined in Furness (2015). The Applicant does not agree with Natural England's assumption that 90% of all adult birds record during this time period are from the FFC SPA, which deviates completely from the 3.38% advised for all other UK North Sea OWFs. As detailed above the assumption of 90% also goes against their own advice provided to the Applicant.
- 2.1.10.6 It can therefore be concluded that Natural England's preferred approach to significantly increase the apportionment rate in the non-breeding season from the standard 3.38%, advised for all other UK North Sea OWFs, to 66% significantly overestimates the predicted impact apportioned to the FFC SPA from Hornsea Four. The Applicant considers that apportionment should follow the standard approach to apportionment during the post-breeding migration bio-season, as followed for all other North Sea OWFs.
- 2.1.10.7 **"Non-breeding winter (November to December): 3.38%** - this is based upon the standard BDMPS approach (Furness 2015)"
- 2.1.10.8 The Applicant agrees with the component months, however the Applicant believes that the apportionment rate of 3.38% specified by Natural England might be an error, as the standard apportionment rate for this bio-season is 2.74% for the non-breeding winter (defined as the migration-free winter in Furness, 2015) as used for all other consented OWFs
- 2.1.10.9 **"Pre-breeding (January to March): 2.74%** - this is based upon the standard BDMPS approach (Furness 2015)"
- 2.1.10.10 The Applicant agrees with the component months, however the Applicant believes that the apportionment rate of 2.74% specified by Natural England is an error, as the standard apportionment rate for this bio-season is 3.38% for pre-breeding (defined as the return migration in Furness, 2015) as used for all other consented OWFs.

2.2 Generic advice

- 2.2.1.1 Natural England conclude by recommending that displacement assessments should consider a displacement rate range of 30-70% and a mortality rate range of 1-10%, which are the rates based on the Joint SNCBs (updated, 2022) interim displacement advice advocated for use when there is an absence of empirical data. As identified and critically appraised by the Applicant in [G1.47 Auk Displacement and Mortality Evidence Review \(REP1-069\)](#), there is a wealth of empirical evidence (21 different post-consent monitoring studies) which can be used to significantly refine Natural England's generic displacement and mortality range to provide a realistic worst-case scenario that continues to offer precaution.
- 2.2.1.2 Natural England also suggested that it would be good practice to estimate impacts based on the lower and upper confidence limits to capture variability or uncertainty. The Applicant completely disagrees with this statement, as the purpose of confidence limits is to provide a reference and understanding on how confident you can be around your abundance estimate only. If assessments were to be undertaken on confidence limits equal weighting

would be required on the results from both the upper and lower confidence limits, which would ultimately lead the assessment to be focused on the mean abundance estimate, rendering the notion of assessment on confidence limits meaningless.

- 2.2.1.3 In relation to the treatment of construction impacts, the Applicant welcomes Natural England's clarification and has assessed accordingly as presented in [G5.25 Ornithology Environmental Impact Assessment \(EIA\) and Habitats Regulations Assessment \(HRA\) Annex \(REP5-078\)](#).
- 2.2.1.4 Natural England, despite providing reference to the occurrence of sabbatical breeding birds occurring (Harris & Wanless 1995), suggest their existence should be ignored and any consideration excluded unless supported by site-specific empirical evidence. It is known that detection of sabbatical birds in site-specific survey is not possible, regardless of the survey method undertaken. This is because the plumage of breeding adults and non-breeding adults on sabbatical is indistinguishable, hence why the Applicant considered the use of advocated sabbatical rates from Scottish SNCBs who considered this for impact assessments of OWFs at similar distances from seabird colonies to Hornsea Four. The exclusion of sabbatical birds almost certainly overestimates the predicted impacts apportioned to the FFC SPA, especially considering the 35-year operational timeframe of Hornsea Four.

2.3 Implications for compensation

- 2.3.1.1 Natural England have provided advice on seasonal definitions to derive seasonal mean peak abundance estimates for EIA and HRA for guillemot in their deadline 5 submission (Additional guidance on the assessment of guillemot and razorbill displacement impacts for the Hornsea Project Four Offshore Wind Farm ([REP5-115](#))). This has resulted in the introduction of an additional bio-season of "chick rearing/moult" in August and September with a 60% apportioning rate to the Flamborough and Filey Coast SPA based on productivity information from that SPA.
- 2.3.1.2 The Applicant wholly disagrees with the creation of an additional seasonal assessment as detailed in their response to this additional guidance ([REP5-115](#)), as it goes against the Joint SNCBs (updated, 2022) interim displacement advice on seasonality, Natural England's own advice provided at ETG#9 to the Applicant on seasonality for Hornsea Four and advice and assessment methods applied at all other consented and planned offshore wind farms (OWFs) in the North Sea that all consider and assess the months of August and September within two or four different bio-seasons for guillemot and razorbill as defined by Furness (2015). The latter point is very important to recognise, as the majority of proposed and / or consented OWFs in the North Sea record peak number of auks at some stage during the post-breeding dispersal period between July and October, as evidenced in the report [G5.7 Indirect Effects of Forage Fish and Ornithology \(REP5-085\)](#). As all other projects compiled their seasonal assessments following SNCBs guidance and are broadly in line with the Furness (2015) bio-seasons then should additional consideration be provided for a new season outside of the non-breeding bio-season to account for potential impacts during the post-breeding dispersal period in addition to the breeding and wider non-breeding bio-seasons then the cumulative and in-combination effect levels would be significantly

increased. The Applicant is concerned that Natural England do not appear to have considered that the phenomenon of auks dispersing across wide areas of the North Sea (including across multiple OWF array areas) is commonplace during this period of their life cycle and the implications of their latest additional advice not only for Hornsea Four, but also at a strategic level as well as any ramifications for the wider OWF Industry. Should peak months for auks, particularly guillemots, recorded during the post-breeding dispersal period (ranging from July and October) at Hornsea Four and all other OWFs within the North Sea have to be separated out for assessment of potential impacts in addition to the wider non-breeding bio-season, then this would vastly increase the current cumulative and in-combination values artificially.

- 2.3.1.3 For context, the application of the latest advice from Natural England would increase the compensation required from the Applicant's position of **175 breeding pairs of guillemot** to compensate for an impact of 39.5 breeding adults from FFC SPA (applying a 50% displacement and 1% mortality) (as set out in **B2.7.6 Compensation measures for Flamborough and Filey Coast (FFC) Special Protection Area (SPA) Overview (REP5-022)** submitted at Deadline 5), or the Applicant's interpretation of Natural England's position of 689 breeding pairs of guillemot to compensate for an impact of 155.9 breeding adults (applying a 70% displacement and 2% mortality) to **1,999 breeding pairs of guillemot** to compensate for an impact of 452.3 breeding adults from FFC SPA (applying a 70% displacement and 2% mortality). From the review of available compensation locations for auk species undertaken by Orsted for Hornsea Four this would require the Applicant to return to its long list of compensation locations to seek to deliver the required number of breeding pairs, given it is highly unlikely sufficient nesting space is available in England and/or the Channel Islands at these compensation values. Of concern for the offshore wind industry, should the same advice also be applied more widely to values attributed to consented and planned OWFs then the cumulative and in-combination values would present considerable difficulties to the Industry accounting for the more precautionary displacement and mortality rates applied by Natural England for auk species. The potential quantum of compensation that would be required is so significant that there are concerns that beyond Hornsea Four there may not be sufficient compensation readily available within the UK to consent more than one or two more OWFs in the entire North Sea (Scottish and English waters). NE's Deadline 5 advice, in addition to being overly precautionary, against Joint SNCB advice and without precedent, would therefore inhibit OWF development in the North Sea. This is contrary to Government policy to enable the rapid development of offshore wind as set out by the British Energy Security Strategy (BESS, 2022) which recognises the even greater need for rapid development of OWFs committing to 'cut the process time by over half' and 'helping to speed up delivery timelines'. The Applicant recognises how vital it is that assessment methodologies are evidentially sound, and that any required compensation is not only successful for Hornsea Four, but for the Industry and that the progress of Hornsea Four will be watched closely.
- 2.3.1.4 In summary, the additional advice Natural England provided for use on Hornsea Four for the creation of an additional seasonal assessment is not evidently sound, as demonstrated above, has no precedent and as it has not been required for any other planned or consented OWF project and goes against the Joint SNCBs (updated, 2022) interim displacement advice the Applicant does not consider it fit for purpose. Natural England's new additional advice

also does not reflect the pressing and urgent need to deliver 50GW of offshore wind energy by 2030, as set out in the British Energy Security Strategy.

3 Additional guidance on the apportioning of northern gannet and black-legged kittiwake to Flamborough and Filey Coast (FFC) Special Protection Area (SPA) for the Hornsea Project Four Offshore Wind Farm (REP5-116)

3.1 Background and Natural England's preferred approach to the apportioning of northern gannet and black-legged kittiwakes impacts to the FFC SPA

- 3.1.1.1 In relation to appointment of gannet and kittiwake Natural England's primary disagreement relates to the breeding adult and immature proportions used during breeding season apportionment. Natural England's latest additional approach is to use Hornsea Four's site-specific survey data.
- 3.1.1.2 In relation to kittiwake, it is only first winter juvenile birds that are readily distinguishable from other age categories due to the distinct 'W pattern' across the wings and black tail-band (Svensson et al. 2009). This pattern, however, is lost by the time a kittiwake reaches its second winter moult, whereby the bird is indistinguishable from an adult bird. As presented in Coulson (2011), the modal age of kittiwakes first breeding is four years old, although the age of first breeding has been documented as late as 10 years old. This clearly shows that by simply applying the assumption that all adult plumage birds are breeding adults it is highly likely to overestimate the proportion of breeding adult birds using the Hornsea Four array area that from the FFC SPA.
- 3.1.1.3 In relation to gannet, with juvenile (first calendar year birds) plumage being primarily grey-brown in colour with a lack of a distinct yellow head (Svensson et al. 2009) this makes them distinctly different to adult birds. For second calendar year birds, the grey-brown plumage on the head, underparts, uppertail-coverts and usually some of the lesser wing uppertail-coverts becomes white (Svensson et al. 2009), makes this age category readily distinguishable from adult birds. For third calendar year birds most tail-feathers and secondaries are usually black intermixed with white feathers, whilst the remaining body and head largely resemble the plumage of an adult bird, although these birds are still readily identifiable from adult birds. For fourth calendar year birds only the central tail-feathers and the odd scattered secondaries remain black, the rest of the bird's plumage resembles that of an adult bird, depending on the quality of the aerial digital video data and behaviour of the bird recorded (e.g. banking birds) might be difficult to observe and therefore this age category may be less regularly distinguished from adult birds. From fourth calendar year onwards the plumage of gannets remains indistinguishable, with the average age of first breeding at five years old. As noted in Aitken et al. (2017), a significant proportion (1,169 individuals, which equates to over 4% of the entire colony) of non-breeding birds (typically 4th and 5th calendar birds) form 'clubs' at the colony which undoubtedly are just as likely to interact with Hornsea Four as much as breeding adult birds. Therefore, the assumption that all adult plumage birds are breeding adults is highly likely to overestimate the proportion of breeding adult birds using the Hornsea Four array area from the FFC SPA.
- 3.1.1.4 Due to the fact that site-specific survey data cannot be reliably used to inform absolute adult to immature ratios, due to differentiation between some immature and adult phase

plumage not being possible, the Applicant therefore relied on demographic data as advised by Natural England ([REP5-116](#)) to calculate a suitable adult / immature age ratios.

- 3.1.1.5 The Applicant also does not agree with Natural England's assumption for kittiwake that 100% of all adult type birds recorded within Hornsea Four are from the FFC SPA. As presented within [B2.2 Report to Inform Appropriate Assessment Part 11: Appendix H: Offshore Ornithology Flamborough and Filey Coast \(FFC\) Special Protection Area \(SPA\) Population Viability Analysis \(APP-177\)](#), there are an additional 26 kittiwake colonies within mean max foraging range of Hornsea Four. Although Hornsea Four is the largest colony within mean max foraging range of Hornsea Four, it is highly likely that birds from these other colonies forage within the Hornsea Four array area. This is accounted for in the Applicant's approach to apportionment, which follows the Scottish Natural Heritage (SNH) breeding season apportionment methodology (SNH, 2018).
- 3.1.1.6 For gannet, the Applicant took the same approach as Natural England and apportioned 100% of breeding adults to the FFC SPA, due to acknowledgment of gannet colonies typically exhibiting 'space partitioning' with adjacent colonies which minimises overlap of breeding season foraging areas (Wakefield et al. 2013). However, it should be noted that this is likely to be highly precautionary due to the fact that there is evidence to suggest that gannets from Bass Rock regularly forage as far as the Hornsea Zone during the breeding season (Lane et al. 2020).
- 3.1.1.7 It should also be noted that the Applicant does not agree with the component months which make up the breeding season advocated by Natural England for gannet. As detailed in Section 2.5.4 of [G4.7 Ornithological Assessment Sensitivity Report \(REP5-065\)](#), Natural England's preferred wider breeding season does not align with the behaviour exhibited within the site-specific survey data and also goes against the seasonality agreed by the Secretary of State (SofS) HRA (BEIS, 2020) for Hornsea Three.
- 3.1.1.8 Outside of the breeding season the Applicant agrees with Natural England's apportionment rates for gannet and kittiwake, but not the months which make up the component seasons.

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