THE PLANNING ACT 2008

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

Sheringham Shoal Extension and Dudgeon Extension Offshore Wind Farms

Appendix B2 to the Natural England Deadline 7 Submission

Natural England's Offshore Ornithology Position (Revision 1)

For:

The construction and operation of the Sheringham Shoal Extension and Dudgeon Extension Offshore Wind Farms located approximately 16km and 27km respectively from the Norfolk Coast in the Southern North Sea.

Planning Inspectorate Reference: EN010109

10th July 2023

Appendix B2 - Natural England's Offshore Ornithology Position Revision 1

1. Introduction

This document provides an overview of Natural England's final positions on the potential for Adverse Effects on Integrity (AEoI); Habitats Regulations Assessments (HRA) on key seabird species at Deadline 7. In addition, at Deadline 7, we provide Natural England's final position on the potential for significant adverse impacts (Environmental Impact Assessment (EIA)) When compiling this document, we have mainly used the following submissions from the Applicant:

Document	Reference
Environmental Statement (ES) Chapter 11 – Offshore Ornithology	APP-097
Environmental Statement Appendix 11.1 – Offshore Ornithology Technical Report	APP-195
Report to Inform Appropriate Assessment (RIAA)	APP-059
Collision Risk Modelling (CRM) Updates (EIA Context) Technical Note (Revision B) herein 'CRM Updates Note'	REP3-089
Apportioning and Habitats Regulations Assessment Updates Technical Note (Revision C) (Tracked)	REP5-044
Review of 2022 Highly Pathogenic Avian Influenza (HPAI) outbreak on relevant UK seabird colonies herein 'HPAI report'	REP4-042
Gannet and Auk Cumulative Displacement Updates Technical Note	REP5-063

2. Outstanding Issues and Implications for the Assessment

Natural England has identified some outstanding issues that could influence the values within the impact assessment. Where these issues are not considered likely to influence the outcome of our position and/or only require a minor re-calculation, Natural England have addressed the discrepancies and provided our position. Where there are issues that await more substantial updates from the Applicant, Natural England have not provided a position.

These outstanding issues and our approach to them within this document is summarised in Table 1 below.

Table 1. Outstanding issues and implications for the assessment at Deadline 7.

Species/SPA/Assessment	Issue	Natural England Action	Result
Gannet FFC SPA, in-combination assessment	Hornsea 4 (H4) gannet displacement mortality rate should be presented as a range of 1-10% (Applicant presents all windfarms at 1% mortality rate)	Natural England has provided a calculation to adjust the in-combination total.	Position provided.
Gannet, Kittiwake FFC SPA in combination assessment	CRM in-combination totals in HRA Updates Note [REP2-036] have not been updated in line with the latest CRM Updates Note [REP3-089].	Natural England has considered the discrepancies in the in-combination collision totals and concluded it would make no difference to the conclusion and, at best, a minor difference to the quantification of impact.	Position provided. Applicant is advised to update HRA Updates Note [REP2-036] before close of Examination.
Kittiwake FFC SPA in-combination assessment	Consented projects that are subject to compensation have had collision mortality reduced to zero	Natural England has re-calculated in-combination impacts to include these projects, alongside totals where zeroes are used.	Position provided.
Guillemot and Razorbill, FFC SPA in-combination assessment	The impact estimates for Hornsea 4 need to be updated for guillemot and razorbill to reflect NEs approach to calculation of impact (both standard and bespoke). This was requested at Deadline 3, and a revised HRA update note has been submitted at Deadline 5.	Deadline 5 update provided	Position provided.
FFC SPA Seabird assemblage	The impact estimates for Hornsea 4 need to be updated for guillemot and razorbill to reflect NEs approach to calculation of impact (both standard and bespoke). This	Deadline 5 update provided	Position provided.

Species/SPA/Assessment	Issue	Natural England Action	Result
	was requested at Deadline 3, and a revised HRA update note has been submitted at Deadline 5		
RTD GW SPA	Further information on proposed mitigation measures will be submitted by the applicant at Deadline 7.	Await Deadline 7 update	Position provided at Deadline 3 [REP3-143] - awaiting Deadline 7 update and will provide final position at Deadline 8.
RTD OTE SPA	Further information on proposed mitigation measures will be submitted by the applicant at Deadline 7.	Await Deadline 7 update	Natural England will provide a final position at Deadline 8.

3. Approach to Interpretation of Predicted Impacts and Application of Population Viability Analysis (PVA)

Natural England advise that where there is a change of greater than 1% in the baseline mortality threshold of a relevant reference population, further investigation of the potential impacts should be carried out. This generally requires the use of PVA to assess how the predicted impacts of the development may influence the population relative to an unimpacted scenario. Cook & Robinson (2016) recommend using both the counterfactual of population growth rate (CGR) and the counterfactual of population size (CPS) metrics. Similarly, a further review by Jital et al. (2017), commissioned by Marine Scotland Science, also reinforce the utility of both metrics. Natural England therefore recommends that assessments should focus on the CGR and CPS metrics to quantify the relative changes in a population in response to anthropogenic impacts, as these are the two metrics that have been shown to be the least sensitive metrics to mis-specification of the population trend and demographic rates used in the PVA model.

Natural England advises that a range of site, and project specific factors need to be considered when making integrity judgements. Population metrics need to be considered with reference to the site trend, population status and SPA conservation objectives for HRA. As it is not known what the growth rate of a specific feature of a colony will be over the next 35 years (lifespan of the project), this uncertainty should be considered when judging the significance of predicted impacts against the conservation objectives for the feature.

In interpreting the metrics from a PVA, the CPG and CPS metrics at the end of the impact (e.g., after 35 years) should be considered against a realistic assessment of the current and potential future population trend. Where a specific feature of a designated site has a conservation objective to restore the population size to a given level, as is the case for kittiwakes at FFC SPA and Sandwich tern at NNC SPA, reductions in population growth rates and population size because of additional anthropogenic impacts are likely to be counter to such conservation objectives. Whereas, if a specific feature has a conservation objective to maintain the population size at or above a given level, as is the case for gannet, guillemot and razorbill at the FFC SPA, then consideration will need to be given to a range of plausible growth rates for the colony and whether the PVA metrics suggest that the population will be maintained at or be able to grow above the current population size over the lifetime of the predicted additional impact.

4. Avian Influenza Epidemic

We must highlight that the long-term impacts of the ongoing avian influenza epidemic on the seabird SPA populations are presently unknown. This means there is considerable uncertainty regarding the likely population sizes and growth rates in the future. The future population size will have

implications for the numbers of birds present in the SEP and DEP project sites and the likely levels of impact arising from SEP and DEP, and also the robustness of the population and therefore its resilience to impacts.

Natural England has provided interim advice on our approach to HPAI [RR-063 and REP4-049] and the Applicant has submitted a review of the data we have from 2022 to contextualize the situation for the populations of relevance to this assessment [REP4-042]. We will refer to this when providing our advice.

Nevertheless, it is challenging to provide advice on PVA outputs projecting population trends 35 years into the future in the absence of an understanding of the long-term impacts of this event (or how long HPAI will continue to impact seabirds). This does inevitably reduce the level of confidence in our integrity judgements.

5. Other Foreseeable Plans and Projects not included in the Assessment

Natural England notes that a number of North Sea OWF projects have submitted EIA scoping reports to PINS, namely Rampion 2, Five Estuaries, North Falls, Outer Dowsing, Dogger Bank South (2 projects) and Dogger Bank D. The Rampion 2 PEIR was consulted on in 2022. The Five Estuaries, North Falls, Outer Dowsing and Dogger Bank South PEIRs have been consulted on recently. In Scottish waters, a Section 36 application for Berwick Bank OWF has been submitted to Marine Scotland.

As Tier 4 and Tier 5 projects, these projects should be considered as part of in-combination assessments where this would be meaningful. On the basis of our review of the EIA scoping reports and PEIRs so far, Natural England concludes that the only project for which sufficient data was available to carry out a quantitative assessment of impacts at the time of the SEP and DEP DCO submission was Rampion 2. Even then, limited confidence can be placed on the impact assessment values as they have not been subject to detailed consultation.

Regarding the PEIRs of the other projects listed, based on the material reviewed so far we have been unable to draw any conclusions regarding the likely level of impact. Natural England therefore advises the Applicant has considered all appropriate set of plans and projects, as data for the aforementioned projects will not be available until after the end of Examination. However, if this information become available prior to determination for SEP and DEP we may need to seek the incorporation of such data into any consultation request received from the Secretary of State (SoS).

One exception to this is that of Berwick Bank OWF. The Section 36 submission for Berwick Bank, while later than the SEP and DEP DCO submission, is now available and any relevant impacts

presented within the Berwick Bank application should now be incorporated into the in-combination assessment and submitted into the examination before close. However, Natural England consider that based on recent submissions from Hornsea Project 4 (which now include Berwick Bank) this additional data from Berwick Bank will not affect the integrity judgments we have provided.

Natural England highlights that the lack of data regarding Tier 4 and Tier 5 projects does inevitably introduce additional uncertainty into the in-combination assessments, and requires a precautionary approach to the appraisal of those impacts that are quantifiable.

6. Summary of Natural England's Position Based on our Advised Approach to the Assessments

The following table represents Natural England's current position on the potential for AEoI (Table 2) for the projects alone (SEP, DEP), together (SEP and DEP) and in-combination with other plans and projects at Deadline 7. These tables should be considered in relation to the information provided above and in the detailed comments and conclusions on project alone and in-combination impacts for HRA below.

Table 2. Summary of HRA conclusions for assessments of SEP and DEP alone, together and in-combination with other plans and projects.

HRA Species and Site	**SEP**	**DEP**	**SEP and DEP together**	**SEP and DEP** in- **combination with other consented OWF projects** (and Hornsea 4 (H4), and Rampion 2)
Gannet, Flamborough & Filey Coast SPA: collision + displacement	No AEoI	No AEoI	No AEoI	No AEoI
Kittiwake, Flamborough & Filey Coast SPA: collision	No AEoI	No AEoI	No AEoI	Unable to rule out AEoI
Guillemot, Flamborough & Filey Coast SPA: displacement	No AEoI	No AEoI	No AEoI	Unable to rule out AEoI
Razorbill, Flamborough & Filey Coast SPA: displacement	No AEoI	No AEoI	No AEoI	Unable to rule out AEoI
Breeding seabird assemblage, Flamborough & Filey Coast SPA	No AEoI	No AEoI	No AEoI	Unable to rule out AEoI
Sandwich Tern, North Norfolk Coast SPA Collision	No AEoI	No AEoI	No AEoI	Unable to rule out AEoI
Red-throated diver, Greater Wash SPA: displacement (array displacement, cable installation, construction and O&M vessel movements)	No AEoI	No AEoI	No AEoI	Unable to rule out AEoI.

HRA Species and Site	**SEP**	**DEP**	**SEP and DEP together**	**SEP and DEP** in- **combination with other consented OWF projects** (and Hornsea 4 (H4), and Rampion 2)
Little Gull, Greater Wash SPA: Collision	No AEoI	No AEoI	No AEoI	No AEoI
Sandwich Tern Greater Wash SPA: Collision	No AEoI	No AEoI	No AEoI	Unable to rule out AEoI
Red-throated diver, Outer Thames Estuary SPA: displacement (construction and O&M vessel movements)	No AEoI	No AEoI	No AEoI	Position to be provided at Deadline 8, following review of material to be submitted at Deadline 7.

7. Detailed Comments and Conclusions on Projects Alone, Together and In-combination Impacts for HRA

This paper (Appendix B1) is a technical document submitted into the SEP and DEP Examination to provide scientific justification for Natural England's advice provided on the significance of the potential for project alone and in-combination impacts in relation to Habitats Regulation Assessment (HRA). Our advice is based on best available evidence at the time of writing and is subject to change in the future should further evidence be presented.

8. Methods

We refer the reader to the *'Outstanding Issues and Implications'* in Section 2 within the Advice Summary. This summarises the outstanding issues that Natural England have identified with the Applicant's assessment, and how they have been addressed or affected the assessment that follows.

Natural England's approach to displacement is that we provide values as a range of displacement and mortality rates bounded by the upper and lower ranges for each species, the rates are defined in the species sections below.

For collision risk modelling impacts, we consider the range presented by the Applicant for the project alone based on the Natural England Approach and use the central value from that range for the in-combination assessments. We acknowledge that the Applicant has provided updated collision estimates in the CRM update note [REP3-090] and the HRA update note [REP2-036] in response to updated collision risk guidance provided by Natural England [RR-063], and we have used these in our assessment.

The impact apportioning rates we have used are described in the HRA update note [REP2-036].

Where Natural England agrees with the Applicant on the methodology, presentation of impacts and conclusions reached by the Applicant we have not presented detailed information and instead refer to the relevant submission.

9. Potential for Adverse Effects on Integrity of Designated Seabird Features of Alde Ore Special Protection Area

Lesser black backed gull - alone and in-combination with other plans and projects

Natural England agrees with the conclusion presented by the Applicant in the HRA update note [REP2-036] that mortality due to collision at SEP, DEP, and SEP and DEP would not adversely affect the integrity of the Alde-Ore Estuary SPA. There would be no measurable contribution from SEP and DEP to in-combination effects.

Implications of HPAI

As noted in the submitted HPAI report [REP4-042], no mortality from HPAI has been recorded in data provided by Natural England within the Alde-Ore Estuary SPA population for 2022. There is therefore no current indication of an increased sensitivity of this colony to impacts, though any conclusion can only be drawn with low confidence.

10. Potential for Adverse Effects on Integrity of Designated Seabird Features of Flamborough and Filey Coast Special Protection Area

Gannet – alone and in-combination with other plans and projects

Displacement

For Natural England's approach to displacement, we provide values as a range of displacement and mortality rates bounded by the upper and lower ranges for each species.

For gannet, in this instance it is agreed that this range is defined as 60 - 80% displacement and 1% mortality, as presented by the Applicant, noting that in the case of Hornsea 4 it was considered appropriate to employ a larger range of mortality from 1-10% as Hornsea 4 is situated at close proximity to FFC SPA, while in other recent cases (Boreas, Vanguard EA1N and EA2) Natural England have accepted a mortality rate of 1% as these projects, while still in foraging range, are at some distance from the colony.

Natural England considers that Hornsea 4 should be assessed for a range of mortality from 1-10%, which means that a correction needs to be applied to the figures presented by the Applicant in the HRA update. Natural England has presented this in the table 3 below.

Collision

Natural England note that the Applicant revised the collision risk modelling parameters in accordance with our advice. This advice has resulted in the Applicant providing revised collision risk totals for SEP, DEP and previous projects (as per Appendix 2 in the CRM note [REP3-089]).

Collision impacts are provided for gannet including a macro- avoidance rate of 70% (a central value between 60% and 80%), pending the outcomes of a Natural England commissioned project. We consider it is appropriate to assess the combined impacts including the indicative 70% macro-avoidance correction, though we note that this level of macro-avoidance is expected to be refined following the publication of a Natural England commissioned project report.

For the in-combination assessment, we agree with the values presented by the Applicant in the latest CRM update and HRA update, noting that while there are slight changes to the cumulative CRM tables presented in CRM update [REP3-089] that have not yet carried over to the HRA update, Natural England do not consider these discrepancies will materially affect the conclusion.

HPAI

As noted in the HPAI report [REP4-042], there were 259 dead gannets (adults and young) recorded at the Flamborough and Filey Coast (FFC) SPA in 2022, but this is considered likely to be an underestimate, due to the limitations of under-reporting of mortality and assigning mortality to a particular colony (in the case of birds found dead in non-colony areas of the coast). Furthermore, in terms of population impacts, gannet productivity at sample plots at FFC was reduced significantly in 2022, from an average of c. 0.8 chicks/pair in previous years to less than 0.36 chicks/pair in 2022.

This indicates that the colony may be increasingly sensitive to other impacts, although as stated in the HPAI report [REP4-042] a reduction in the wider gannet population would be expected to result in a proportionate reduction in any collision/displacement effects at SEP and DEP.

Predicted Impacts and Integrity Judgement

Projects alone and together (SEP, DEP and SEP and DEP)

In all cases the combined displacement and collision impacts result in increases to baseline mortality of substantially less than 1% and no further assessment is required.

Natural England can advise that there is no adverse effect on integrity (AEoI) of the gannet feature of the FFC SPA for SEP alone, DEP alone and SEP & DEP together.

SEP and DEP in-combination with other plans and projects

In combination, the predicted combined displacement and collision impacts based on the Natural England advice vary due to the range in displacement and mortality rates assessed. All scenarios result in the range of predicted impacts for FFC SPA gannet exceeding a 1% increase in the baseline mortality (based on the latest SPA count). Thus, further consideration of the potential population level impacts for FFC SPA is required.

FFC SPA has a conservation objective for gannet to maintain the size of the breeding population at a level which is above 8,469 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.

As presented in our Hornsea 4 closing statement [REP7-104]:

'We note that the gannet population of FFC SPA increased (compound growth rate) at 9.9% per annum (between 2003/4 and 2015, JNCC Seabird Monitoring Programme 'SMP' data). Using FFC SPA data for 2000-2017 the growth rate was 10.2% per annum.

However, it is not known what the growth rate of the colony will be over the next 35 years and the FFC SPA colony is a relatively 'young' colony (90 years or so). To define possible population trajectories, Natural England reviewed growth rates for the 22 gannet colonies across Britain, Channel Islands and Ireland with repeated census data (see H4 for full review), and found that the average annual growth rate calculated over a period of >90 years across the 8 gannet colonies with records exceeding 90 years is 1.8%.

Given the analysis of trends in gannet colony growth rates amongst a suite of long-established colonies, it is highly likely that its annual growth rate averaged over the whole period since founding will drop from its current average of approximately 11% over the first 80 years. The highest annual colony growth rate calculated over a period of >100 years is 4.5% at Grassholm. The Flamborough colony is unlikely to achieve a higher annual growth rate than this.

The analysis suggests that in the long term it is likely the growth rate at FFC SPA will decrease from approx. 10%, potentially to something in the order of 1.8-4.5%. However, even when taking into account the uncertain population implications of HPAI, it seems unlikely that the population growth rate for gannets at FFC SPA would decrease from approx. 10% per annum to under 1% in the next 35 years. This conclusion can only be drawn with reduced confidence until there is a greater understanding of HPAI impacts.

The range of increase to baseline mortality 5.6-9.6% (based on combined displacement and collision risk of 122.5 - 208.5) is below the level presented at H4. This reduction in the in-combination impact is due in part to alterations to the CRM parameters (AR) and partly to differing approaches to applying mortality rates to in-combination displacement (in the case of H4 10% was applied to all projects, while in this case it has only been applied to H4). No AEOSI was concluded at H4 with the focus for the assessment being on the 80% and 2% mortality impact (equating to 225 birds) as stated: At this impact level, the colony would be predicted to be maintained at its current size or increase, for a growth rate scenario of ≥1% per annum'

Table 3. Predicted combined collision and displacement impacts on the gannet FFC SPA population for the range of revised mortality impacts (presented in the HRA update note [REP2-036]) predicted for projects alone, together and in- combination combined collision and displacement impacts. Counterfactuals of growth rate and Counterfactuals for final population size have been presented by the Applicant within HRA update note [REP2-036].

Gannet: Flamborough and Filey Coast SPA scale						
Assessment description	**Displacement 60-80% and 1%. (70% and 1%)**	**Collision, 99.2 % AR and MA of 70%**	**Total (collision plus displacement at 70% and 1%)**	**% Baseline mortality using 2017 census data***	**Counterfactual of Growth Rate (CGR) after 35 years**	**Counterfactual of Final Population Size (CPS) after 35 years**
DEP alone	2 to 3 (2.37	0.3	2.3 - 3.3 (2.67)	0.11 - 0.15(0.12)	**n/a**	**n/a**
SEP alone	0 to 0.26 (0.23)	0.04	0.04 - 0.3 (0.27)	0-0.01 (0.01)	n/a	n/a
SEP and DEP	2 - 3.26 (2.6)	0.34	2.34 - 3.6(2.94)	0.1 - 0.17 (0.14)	n/a	n/a
Rampion 2	0.04 to 0.05 (0.05)	0.06	0.10 - 0.11 (0.11)		n/a	n/a
Consented projects incl H4 and SEP and DEP and Rampion 2	55-73 (64)**	67.48	122.5-140.5 (131.5)	5.6 - 6.5 (6.1)	0.993 - 0.994 (0.994)	0.801 - 0.775 (0.787)
Consented projects plus H4 at 10% mortality and 80% displacement	55 - 141***	67.48	122.5 - 208.5	5.6 - 9.6%	0.993 – approx. 0.991***	0.801 – approx. 0.7 ***

* 26,784 adults

** the in-combination mortality is derived from the HRA update revision B, which is prior to the update of the CRM note to take account of windfarms where the AR was unknown, the total apportioned difference in numbers is 651.3 vs 650.62 (67.48 apportioned to FFC SPA) so NE do not consider this will alter the conclusion.

*** Gannet is assessed in H4 at 60-80% displacement and 1-10% mortality hence H4 is a special case. The total number of birds at H4 subject to displacement is 946, so the range of impact is 6 - 76, and this increases the number of birds possibly subject to displacement mortality by 68. The CGR and CPS for this is approximated from the closest scenario presented in the RIAA (196.5 birds).

On this basis Natural England can advise that there is no adverse effect on integrity (AEoI) of the gannet feature of the FFC SPA for SEP, DEP and SEP&DEP in-combination with currently consented projects.

Kittiwake – Alone and In-combination with Other Plans and Projects

Background

The Applicant has provided updated collision risk estimates for SEP and DEP and other plans and projects into an in-combination assessment.

Natural England notes that the Applicant has updated both the alone and in combination CRM parameters (as provided by Natural England in our interim advice note) which due to an increase in the Avoidance Rate from 98.9% to 99.2% has resulted in a reduction of total collisions (both for the projects alone, together and in combination). This is presented in the updated HRA updates note [REP2-036] and CRM updates notes [REP3-089].

Natural England agrees with the revised figures, noting that the HRA update has yet to be revised to reflect the slight changes made to the cumulative collision risk figures presented in CRM note (this only affects a limited number of consented projects, where the avoidance rate cannot be corrected). The difference in total birds for kittiwake (not apportioned to FFC SPA) is 3009.5 birds in the corrected CRM note compared with 3007.6 in the HRA note (with 292.7 apportioned to FFC SPA). Natural England does not consider this would make a difference to the conclusions drawn from the in-combination total.

We further note that the revision of the HRA note results in an updated in-combination total lower than that presented at Hornsea 4 (SADEP in combo total is 292, Hornsea 4 in combo total is 393). While Natural England agrees with the approach to correcting the avoidance rates, which has resulted in the reduction of collisions, Natural England note that SADEP have excluded projects that are currently subject to compensation (Hornsea 3, Norfolk Boreas, Norfolk Vanguard, East Anglia 1N, East Anglia 2). However, Natural England considers that DESNZ may require the inclusion of the impacts of these projects in regards assessment of whether the qualifying feature is subject to an adverse effect. Due to this, Natural England have amended the in-combination totals to include the collisions attributed to these projects based on figures presented in Table 10 of the Hornsea 4, Applicant's Response to RFI dated 16 December (https://infrastructure.planninginspectorate.gov.uk/wpcontent/ipc/uploads/projects/EN010098/EN010098002234G9.2%20Applicants%20Response%20to%20RFI%20dated%2016%20December.pdf).

This results in an additional 101.1 birds, and the in-combination total increases to 394. It should be noted that the 101.1 birds have not been corrected for the revised Avoidance Rate for kittiwake, and so is a precautionary total, albeit reflecting the compensatory requirements set by the SoS's HRA.

HPAI

A small number of mortalities were recorded at FFC SPA due to HPAI in 2022 (7 birds in total), though this may well under-estimate the likely impacts. Much higher numbers were recorded at other east coast colonies, most notably at Farne Islands SPA where 823 deaths due to HPAI, predominantly adult birds, were recorded (around 7-9% of the adult population). The current long-term implications for the FFC SPA population are unknown.

Predicted Impacts & integrity Judgement

Projects alone and together (SEP, DEP and SEP&DEP)

In all cases the collision impacts result in increases to baseline mortality of substantially less than 1% and no further assessment is required.

Natural England can advise that there is no adverse effect on integrity (AEoI) of the kittiwake feature of the FFC SPA for SEP alone, DEP alone and SEP and DEP together.

SEP and DEP in-combination with other plans and projects

The predicted collision impact arising from SEP & DEP in-combination with other consented projects has been presented by the Applicant as 292 birds (causing an increase to baseline mortality of 1.94%) and when recalculated to include the impact of projects subject to compensation this increases to 394 (2.6% of baseline mortality). In either event both the CGR and CPS indicate that the population could decline from current levels.

While the current HPAI outbreak adds further uncertainty to the long-term population status for kittiwakes at FFC SPA, Natural England's advice regarding in-combination collision impacts to FFC SPA kittiwakes remains the same as that set out in our end of examination response during the HP4 Examination (REP7-104). Namely that, as this feature has a restore conservation objective requiring the population to be returned to previous levels, and because there are indications that the predicted level of mortality would mean the population could decline from current levels should it currently be stable, **it is not possible to rule out AEoI of the kittiwake feature of the FFC SPA for collision impacts from in-combination with other plans and projects.**

We note that the SoS has drawn similar conclusions for all OWF projects from Hornsea Three onwards and that the Applicant has also concluded AEOI cannot be ruled out in combination with other plans and projects.

Table 4. Predicted impacts on the kittiwake FFC SPA population for the range of revised mortality impacts presented in the Applicant's HRA update note [REP2-036] and RIAA [APP-059] of projects alone, together and in-combination collision impacts. Counterfactuals of growth rate and Counterfactuals for final population size have been presented as by the Applicant within the HRA update note [REP2-036].

Kittiwake: Flamborough and Filey Coast SPA SPA					
Assessment description	**Additional mortality**	**% Baseline mortality using 2017 census data***	**Closest Applicant assessed impact scenario**	**Counterfactual of Growth Rate (CGR) after 35 years**	**Counterfactual of Final Population Size (CPS) after 35 years**
SEP	0.55 (0-2.67)	0 (0-0.02)	na	na	na
DEP	5.8 (0.91-14.34)	0.04 (0.01-0.1)	na	na	na
SEP and DEP	6.36 (0.91-17.01)	0.04 (0.01-0.11)	na	na	na
Rampion 2	0.4	0	na	na	na
Consented projects + SEP + DEP +Rampion 2(projects with compensation set to zero)	292	1.94	292	0.997	0.871
Above plus H3, Boreas, Vanguard, EA1N and EA2 (102.1 extra birds)	394	2.6	323 - 479	0.996 - 0.995	0.859 - 0.798

*103,070

Guillemot – Alone and In-combination with Other Plans and Projects

Background

For Natural England's approach to displacement, we provide values as a range of displacement and mortality rates bounded by the upper and lower ranges for each species.

For guillemot, in this instance it is agreed that this range is defined as 30 - 70% displacement and 1 - 10% mortality (as presented by the Applicant in the HRA updates note REP5-044 and RIAA [APP-059]).

In the case of Hornsea Project 4 there are a range of estimates presented, which differ in the approach to apportioning and seasonal definitions. Natural England advised that the Natural England 'bespoke' approach and Natural England 'standard' approach should be presented within the in-combination figures for SEP and DEP, and the Applicant has updated the HRA and apportioning update note accordingly. It should be noted that given Natural England have advised the bespoke approach is the most appropriate treatment of data for the Hornsea 4 project, in-combination figures calculated using the 'bespoke' figures for Hornsea 4 will inform our in-combination position.

In response to a recent SoS Request for Further Information (RFI) regarding Hornsea 4, Natural England have provided advice on a number of alternative array scenarios recently submitted by Hornsea 4, a number of which result in a reduced estimated displacement impact to guillemot and razorbill. However, at this stage it is unclear whether any of these scenarios will be adopted. If the SoS consents an alternative scenario, this may have implications for the in-combination totals (and Natural England's position). We consider that this matter may be best addressed following the Examination.

PVA outputs

We note the applicant, in the latest revision of the HRA Update note [REP5-044] has reduced the number of simulations from 5000 to 1000 (paras 1, 47 and 73 HRA Update note [REP5-044]) , and this appears to have resulted in counterfactuals that reflect a reduced impact to the population (in terms of population growth rate and final population size). Natural England consider it more appropriate to refer to the original PVA outputs presented in the RIAA [REP2-050], which were run with 5000 simulations (thus being more representative of the true stochasticity within the parameters). This has entailed referring to the closest impact presented within the RIAA [REP2-050] (Table 9-112) to inform Table 5 and resulting position

HPAI

No guillemot mortalities were recorded at FFC SPA due to HPAI in 2022, however the worst affected colony in England was the Farne Islands SPA where 3542 deaths due to HPAI, (predominantly chicks, were recorded. The current long-term implications for the FFC SPA population are unknown.

Predicted Impacts an Integrity Judgement

Projects alone and together (SEP, DEP and SEP&DEP)

In all cases (SEP, DEP and SEP and DEP together), while the predicted displacement impacts vary due to the range in displacement and mortality rates assessed, in all cases the range of predicted impacts do not exceed an increase in baseline mortality of 1% and therefore we can conclude that:

Natural England advise no AEoI on the guillemot feature of the FFC SPA for SEP, DEP and SEP & DEP together.

Projects In-combination with Other Plans and Projects

The predicted displacement induced mortality arising from SEP & DEP in-combination with other consented projects (and Hornsea project 4 and Rampion) is between 112 and 2608 using the Natural England 'standard' apportioning/displacement approach and using the Natural England 'bespoke' apportioning/displacement approach, which Natural Enlgand considers to be most appropriate treatment of the data for the Hornsea 4 project the range of mortality increases to 176 - 4099. This range results in the population growth rate being reduced by between 0.2% and 2.8%), and the final population size decreasing by between 3.9 – 69.2%. Noting that both the upper CGR and CPS of 2.8% & 69.2% respectively are an underestimate, based on 3079 mortalities, the true upper range is 4099.

The full range of displacement impacts are considered, however as a reference point, and in line with previous cases (Hornsea 4 and Norfolk Boreas https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-002883-SoS%20Deadline%20-%20Natural%20England.pdf) the mortality level arising using 70% displacement for all projects, 2% mortality of all projects other than Hornsea 4 which was calculated at 5%, has been calculated. Using data from this assessment, the total mortality at those rates would be 1498 birds, and this

results in a reduction in growth rate of 1.4% (based on 1539 birds RIAA Table 9.112) and a reduction in final population size of 54.3%, meaning that the FFC SPA population is projected to reduce if it didn't maintain a growth rate of over 1.4% for the 35 years of the project.

The figures presented within the current SEP and DEP assessment accord closely with those of Hornsea 4 (the range of consented projects being 197 to 4605 - the slightly higher estimates at Hornsea 4 being due to the incorrect inclusion of Hornsea 3 impacts in the breeding season), (the 70/2, 70/5 figure was 1600) and as such the considerations and conclusion provided by Natural England for H4 apply equally in this case.

In the Hornsea 4 examination Natural England considered a range of scenarios and took into account the current and future colony growth rate, productivity and conservation objectives (please refer to https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010098/EN010098-001969-Natural%20England%20-%20Comments%20on%20any%20submissions%20received%20at%20Deadline%206.pdf ref for full details).

The H4 position concluded that considering the colony's current and likely future growth rates, and evidence of declines in productivity at the colony, Natural England cannot be confident that the FFC SPA annual growth rate will be sustained at a level over the next 35 years to prevent it from being susceptible to the displacement impacts of Hornsea Project Four alone and in-combination with other plans and projects.

While the current HPAI outbreak adds further uncertainty to the long-term population status for guillemot at FFC SPA, Natural England's advice regarding in-combination displacement impacts to FFC SPA guillemot remains unchanged as that set out in our end of examination response during the HP4 Examination (REP7-104). Namely that, because there are indications that the predicted level of mortality would mean the population could decline from current levels should the current population growth rate not be sustained and **it is therefore not possible to rule out AEoI of the guillemot feature of the FFC SPA for displacement impacts in-combination with other plans and projects.**

Table 5. Predicted impacts on the guillemot FFC SPA population for the range of revised mortality impacts presented in/estimated from the Applicant's HRA Update Note [REP2-036] predicted for project alone displacement impacts. The range of displacement impacts represents the lower (30% displacement and 1% mortality) and upper (70% displacement and 10% mortality) bounds of our advice.

Guillemot: Flamborough and Filey Coast SPA scale				
Assessment description ()	**Displacement Mortality 30-70% displacement and 1%-10% mortality rate.**	**% Baseline mortality using 2017 census data***	**Counterfactual of Growth Rate (CGR) after 35 years**	**Counterfactual of Final Population Size (CPS) after 35 years**
DEP alone	2-46	0.02 – 0.62	n/a	n/a
SEP alone	0-3	0 – 0.04	n/a	n/a
SEP and DEP	2-49	0.02 - 0.66	n/a	n/a
Rampion 2	2-40		n/a	n/a
Consented projects including H4 (NE standard approach 33-771 birds mortality) and SEP and DEP and Rampion 2	112-2608	1.51-35.12	0.999-0.976 (132 – 2639)	0.952-0.365 (132 – 2639)
Consented projects including H4 (NE bespoke approach 97 – 2262 mortality) and SEP and DEP and Rampion 2	176-4099	2.37-55.19	0.998-0.972 (176 – 3079) 4099** = 0.978	0.961-0.308 (176 – 3079) 4099** = 0.402

*121,754

** in the case of the upper range (4099) there is no original PVA output to refer to, but it is of note that the highest mortality modelled in the RIAA (3079) results in lower counterfactuals than the higher impact of 4099 in the updated PVA (which has a reduced number of simulations).

Razorbill – Alone and In-combination with Other Plans and Projects

Background

For Natural England's approach to displacement, we provide values as a range of displacement and mortality rates bounded by the upper and lower ranges for each species.

For razorbill, in this instance it is agreed that this range is defined as 30 - 70% displacement and 1 - 10% mortality (as presented by the Applicant in the HRA note [REP5-044] and RIAA [APP-059]).

In the case of Hornsea Project 4 there are a range of estimates presented, which differ in the approach to apportioning and seasonal definitions. Natura England advised that the Natural England bespoke approach and Natural England standard approach should be presented within the in-combination figures, the HRA and apportioning update note has been updated accordingly. It should be noted that Natural England have advised the bespoke approach is the most appropriate treatment of data for the Hornsea 4 project, and in-combination figures calculated using the bespoke figures for Hornsea 4 will inform our in-combination position.

At this stage Natural England are providing advice based on the size and layout of the currently consented Hornsea 4. Natural England acknowledge that Hornsea 4 has recently submitted alternative scenarios, a number of which result in a reduced estimated displacement impact to guillemot and razorbill. If the SOS consents an alternative scenario, then the in-combination impact and Natural England's position will need to be updated to reflect this.

PVA outputs

We note the applicant, in the latest revision of the HRA and Apportioning Update note [REP5-044] has reduced the number of simulations from 5000 to 1000 (paras 1, 47 and 73), and this appears to have resulted in counterfactuals that reflect a reduced impact to the population (in terms of population growth rate and final population size). Natural England consider it more appropriate to refer to the original PVA outputs presented in the RIAA, which were run with 5000 simulations (thus being more representative of the true stochasticity within the parameters). This has entailed referring to the closest impact presented within the RIAA (Table 9-122) to inform Table 6 and the resulting position.

HPAI

No razorbill mortalities were recorded at FFC SPA due to HPAI in 2022. 43 mortalities were recorded in total in England, the majority found at Lindisfarne (the nearest colony being Farne Islands SPA). The current long-term implications for the razorbill FFC SPA population are unknown.

Predicted Impacts an Integrity Judgement

Projects alone and together (SEP, DEP and SEP&DEP)

In all cases (SEP, DEP and SEP and DEP together), while the predicted displacement impacts vary due to the range in displacement and mortality rates assessed, in all cases the range of predicted impacts do not exceed an increase in baseline mortality of 1% and therefore we can conclude that:

Natural England advise no AEoI on the razorbill feature of the FFC SPA for SEP, DEP and SEP & DEP together.

Projects in-Combination with Other Plans and Projects

The predicted displacement induced mortality arising from SEP & DEP in-combination with other consented projects (and Hornsea project 4 and Rampion) is between 21 and 500 using the Natural England 'standard' apportioning/displacement approach and using the Natural England 'bespoke' apportioning/displacement approach, which Natural England consider to be more suitable for the Hornsea 4 project the range of mortality increases to 30 - 689.

This range results in the population growth rate being reduced by between 0.1% and 1.5%, and the final population size decreasing by between 3.4 – 45.4%. Noting that both the upper CGR and CPS of 1.5% & 45.4% respectively are an underestimate, based on 502 mortalities, the true upper range is 689.

The full range of displacement impacts are considered, however as a reference point, and in line with previous cases (Hornsea 4 and Norfolk Boreas https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-002883-SoS%20Deadline%20-%20Natural%20England.pdf) the mortality level arising using 70% displacement for all projects, 2% mortality of all projects other than Hornsea 4 which was calculated at 5%, has been calculated. Using data from this assessment, the total mortality at those rates would be 206 birds, and this results in a reduction in growth rate of 0.6% (based on 215 birds RIAA Table 9.122) and a reduction in final population size of 22.7%, meaning that the FFC SPA population is projected to reduce if it didn't maintain a growth rate of over 0.6% for the 35 years of the project.

The figures presented within the current SEP and DEP assessment accord closely with those of Hornsea 4 (the range of consented projects being 30-700 – the discrepancy being likely due to inclusion of Hornsea 3 breeding season impacts in the Hornsea 4 figures), as such the

considerations and conclusion provided by Natural England for H4 apply equally in this case. (please refer to EN010098-001969-Natural England - Comments on any submissions received at Deadline 6.pdf (planninginspectorate.gov.uk) [REP7-104]ref for full details).

The H4 position concluded that considering the colony's current and likely future growth rates, , Natural England cannot be confident that the razorbill FFC SPA annual growth rate will be sustained at a level over the next 35 years to prevent it from being susceptible to the displacement impacts of Hornsea Project Four alone and in-combination with other plans and projects.

While the current HPAI outbreak adds further uncertainty to the long-term population status for razorbill at FFC SPA, Natural England's advice regarding in-combination displacement impacts to FFC SPA razorbill remains the same as that set out in our end of examination response during the HP4 Examination (REP7-104). Namely that, because there are indications that the predicted level of mortality would mean the population could decline from current levels should the current population growth rate not be sustained and **it is therefore not possible to rule out AEoI of the razorbill feature of the FFC SPA for displacement impacts in-combination with other plans and projects.**

Table 6. Predicted impacts on the razorbill FFC SPA population for the range of revised mortality impacts presented in the HRA update note [REP2-036] predicted for project alone displacement impacts. The range of displacement impacts represents the lower (30% displacement and 1% mortality) and upper (70% displacement and 10% mortality) bounds of our advice.

Razorbill: Flamborough and Filey Coast SPA scale				
Assessment description ()	**Displacement Mortality 30-70%displacement and 1-10% mortality rate.**	**% Baseline mortality using 2017 census data***	**Counterfactual of Growth Rate (CGR) after 35 years**	**Counterfactual of Final Population Size (CPS) after 35 years**
DEP alone	**0-16**	0.02 – 0.37	**n/a**	**n/a**
SEP alone	0-5	0.01 – 0.12	n/a	n/a
SEP and DEP	1-21	0.02 – 0.49	n/a	n/a
Rampion 2	0.2 - 5	0-0.12	n/a	n/a
Consented projects incl H4 (NE standard 2-39 mortality) and SEP and DEP and Rampion 2	21 - 500	0.5-11.76	0.999-0.985 (22 – 502)	0.975 – 0.546 (22-502)
Consented projects incl H4 (NE bespoke 10-228 mortality) and SEP and DEP and Rampion 2	30-689	0.69-16.21	0.999-0.985 (29 – 502)	0.966-0.546 (29-502)

*40,506 individuals

Breeding seabird assemblage (including Puffin) – Alone and In-combination with Other Plans and Projects

Projects alone and together (SEP, DEP and SEP&DEP)

Natural England are awaiting in-combination Guillemot and Razorbill updates in the HRA Apportioning and Habitats Regulations Assessment Updates Technical Note (Revision C) note to provide a position on in-combination impacts. However, Natural England agrees with the Applicants conclusion, set out in HRA and Apportioning updates technical note (Revision B) that **the effects from SEP alone, DEP alone, and SEP and DEP together would not result in an adverse effect on the breeding seabird assemblage qualifying feature of the FFC SPA**, including that no measurable increase in FFC puffin mortality is predicted to arise from SEP, DEP or SEP & DEP.

Projects in-Combination with Other Plans and Projects

Natural England considers that the conclusion reached at Hornsea Project 4 (unable to rule out AEOSI), combined with the above in-combination positions relating to AEoI to Kittiwake, Guillemot and Razorbill resulting in further potential reductions in population size for these key components of the FFC seabird assemblage mean that **Natural England are not able to rule out a conclusion of AEoI for the seabird assemblage at FFC SPA**. However, we note that species specific compensation for the above-mentioned species, once fully agreed, will also meet the required compensation for the seabird assemblage as a whole, and no stand-alone compensation proposal is required.

11. Potential for Adverse Effects on Integrity of Designated Seabird Features of North Norfolk Coast Special Protection Area

Sandwich tern – alone and in-combination with other plans and projects

Background

Natural England note that the Applicant revised the collision risk modelling parameters in accordance with our advice, increasing the recommended avoidance rate to 99% (from 98%) and removing the macro-avoidance element. This advice has resulted in the Applicant providing revised collision risk totals for SEP, DEP and previous projects (as per Appendix 2 in the CRM note [REP3-089] and in HRA updates note [REP5-044]).

In addition to the revised CRM parameters in the case of Sandwich tern, there is a wider range of estimated collision mortality for Sandwich tern than other species sensitive to collision. This due to a larger range of collision modelling parameters presented by the Applicant. For clarity, we have listed the additional parameters below and indicated which ones we include when forming our position:

Flight Speed

The Applicant has presented outputs from models using two different flight speeds: one taken from the published literature, Fijn and Gyimesi (2018); and one taken from data collected from tracked birds at NNC SPA -and hence directly relevant to the population under consideration - but not yet published and peer reviewed Fijn and Collier (2020).

In the case of the two flight speed options, Natural England can place more confidence in the published, peer reviewed speed (Fijn and Gyimesi, 2018) but acknowledge the relevance of the data collected from the population in question (and analysed in a similar manner to Fijn and Gyimesi 2018). As such Natural England will consider the range of both outputs when forming our position, placing a stronger emphasis on outputs using the Fijn and Gyimesi (2018). Natural England note that the Fijn and Collier (2020) flight speed is lower and results in a lower predicted number of collisions (about 18% lower for model based), and as such is not a precautionary option. In the case of in-combination CRM, the Applicant has only presented the Fijn and Collier (2020) flight speed option, which as noted is the less precautionary option to refer to.

Density Estimates

In the case of Sandwich tern both model-based and design-based analysis were used to produce density data. Natural England accept that both approaches can be valid as regards the calculation of density, and again will consider a range of values, however, in this instance we will place more confidence in the outputs using model-based estimates.

Offshore wind farm parameters (consented vs as built)

In terms of in-combination impact, the Applicant has presented six scenarios to reflect the variation between consented and built wind farm parameters. OWFs are consented based on the 'Rochdale envelope' approach of establishing and consenting 'worse case' design parameters. In the case of collision, the worst case tends to be more numerous, smaller turbines. This leads to a difference when considering the 'as built' turbine parameters in a collision model as opposed to the 'consented' parameters. The scenarios use 'as built' and as 'consented' wind farm parameters to illustrate the differences in collision risk. However, as advised previously Natural England can only base our position on legally secured parameters, which in most cases are the 'consented' parameters (Scenario A). In the case of Dudgeon, we consider the as-built turbine parameters legally secured due to the specific details within the original Marine Licence. This means Natural England can also refer to scenario F which is as per Scenario A apart from the collision estimates for Dudgeon, which are calculated using 'as built' turbine parameters.

HPAI

Sandwich terns were severely impacted by HPAI in 2022, with some of the key impacts at NNC SPA. The estimates for NNC SPA are that at least 12% of adults suffered HPAI mortality, and this is likely to be an underestimate, with impacts likely to be over 20% of adults. Furthermore, the productivity was severely reduced (due to both adult and chick mortality). At a wider population scale, the European Sandwich Tern network estimated that around 30% of the adult breeding population of Sandwich Tern in Europe was lost due to HPAI in 2022.

This indicates that the colony (and indeed the site network as a whole) may have increased sensitivity to other impacts, even taking into account that a reduction in the wider sandwich tern population would be expected to result in a proportionate reduction in any collision/displacement effects at SEP and DEP.

Predicted Impacts an Integrity Judgement

Projects alone and together (SEP, DEP and SEP&DEP)

In all cases the collision impacts result in increases to baseline mortality of substantially less than 1% and no further assessment is required.

Natural England can advise that there is no adverse effect on integrity (AEoI) of the Sandwich tern feature of NNC SPA for SEP alone, DEP alone and SEP and DEP together.

Projects in-combination with other plans and projects.

The predicted level of in-combination mortality arising from collision is in the order of 85-87.8 birds, resulting in an increase to baseline mortality of 8.8-9.1%.

It should be noted that the in-combination mortality presented may be under-estimated due to:

- These figures use the less precautionary flight speed which for projects alone resulted in approx. 18% reduction in mortality);
- As Natural England advised at deadline 3, the projects included as contributing to the in-combination mortality are limited to those within foraging range of NNC SPA. Natural England accept this approach on this occasion, as while projects further afield may contribute to impacts in the non-breeding season, they are likely to not have presented CRMs for Sandwich tern, in large part due to the being low numbers of sandwich tern at the project sites.
- The Sandwich tern feature at NNC SPA has a restore conservation objective requiring the population to return to previous levels (of 4500 pairs, 9000 adults). While the 2018 and 2019 mean population is above this target (at 9443 adults), there is considerable uncertainty regarding the current trajectory of this population, in large part due to HPAI, which has had severe impacts to Sandwich tern both on the North Norfolk Coast SPA population and to the wider biogeographic population.

The PVA outputs suggest that the in-combination mortality would result in reductions in population growth rate of over 1%, and a final population size almost 40% lower than the current one.

HPAI places the population further at risk of a negative population growth rate (i.e., causing a decline in the population), and while it is unknown what the long term implications of HPAI will be for Sandwich terns in the North Sea, it is imperative that ecologically effective compensation measures are robustly secured for SEP and DEP to ensure the coherence of the SPA network is safeguarded for this species.

It is therefore not possible to rule out AEoI of the Sandwich tern feature of NNC SPA for collision impacts in-combination with other plans and projects.

Table 7. Predicted impacts on the Sandwich tern NNC SPA population for the range of revised mortality impacts presented in HRA update note [REP2-036], reflecting the range of parameters (flight speed and model vs design based) and RIAA [APP-059] of projects alone, together and in-combination collision impacts. Counterfactuals of growth rate and Counterfactuals for final population size have been presented as by the Applicant within the HRA update note [REP2-036].

Sandwich tern: North Norfolk Coast Special Protection Area						
Assessment description	**NE collision mortality***	**Range of mean collision mortality****	**% Baseline mortality using 2017 census data*****	**Closest Applicant assessed impact scenario**	**Counterfactual of Growth Rate (CGR) after 35 years**	**Counterfactual of Final Population Size (CPS) after 35 years**
SEP	1.64 (0.92 - 3.02)	0.93-1.64	0.17 (0.1-0.31)	na	na	na
DEP	5.06 (2.84-8.52)	3.69 - 5.06	0.52 (0.29-0.88)	na	na	na
SEP and DEP	6.7 (3.76 - 11.55)	4.62 -6.7	0.70 (0.39-1.20)	na	na	na
Consented projects + SEP + DEP +Rampion 2 (SCENARIO A)	87.8		9.1	87.8	0.988	0.616
Consented projects + SEP + DEP +Rampion 2 (SCENARIO F)	85		8.8	84.8	0.989	0.626

*using Fijn & Gyimesi (2018) and model based design estimates, with upper and lower Confidence intervals (table 12-2 HRA rev B) for SEP, DEP and SEP and DEP but using Fijn&Collier (2020) for the in-combination assessments.

** reflecting the range of parameters (flight speed and model vs design based)

***using Natural England collision mortality and a population of 9,443 individuals (the mean population size 2018 and 2019)

12. Potential for Adverse Effects on Integrity of Designated Seabird Features of Greater Wash SPA

Sandwich tern alone and in-combination with other plans and projects

Natural England advises that the conclusions reached at NNC SPA also apply to GW SPA, namely that there is no adverse effect on site integrity for SEP alone, DEP alone and SEP & DEP together but that an AEOI cannot be ruled out in-combination with other plans and projects.

Little Gull alone and in-combination with other plans and projects

Natural England agrees with the conclusions presented by the Applicant in regards Little Gull, namely no adverse effect on site integrity for little gull alone (SEP/DEP) together (SEP&DEP) or in-combination with other plans and projects.

HPAI

No HPAI data exists for this species in England.

13. Environmental Impact Assessment

In the case of EIA we have provided two summary tables, indicating our final positions (Table 8) and key data used to reach these positions (Table 9). These positions are largely unchanged since Hornsea 4 (EN010098-001969-Natural England - Comments on any submissions received at Deadline 6.pdf (planninginspectorate.gov.uk) [REP7-104]) and hence no further detail is supplied. There are three species that either differ in impact but not position (Gannet and Kittiwake) or were not considered at Hornsea 4 (Sandwich tern), these are addressed in the text following Table 8.

In compiling this summary, we have referred to the following documents:

Document	Reference
Environmental Statement (ES) Chapter 11 – Offshore Ornithology	APP-097
Environmental Statement Appendix 11.1 – Offshore Ornithology Technical Report	APP-195
Collision Risk Modelling (CRM) Updates (EIA Context) Technical Note (Revision B) herein 'CRM Updates Note'	REP3-089
Review of 2022 Highly Pathogenic Avian Influenza (HPAI) outbreak on relevant UK seabird colonies herein 'HPAI report'	REP4-042
Gannet and Auk Cumulative Displacement Updates Technical Note	REP5-063

Please note, the advice provided above with regards to the HRA position for HPAI and the inclusion of 'other reasonably foreseeable plans and projects'. As per our advice, in the position below we have included Hornsea 4 and Rampion 2 but excluded Five Estuaries and North Falls PEIR figures. Note also that we advise Berwick Bank figures should be incorporated into the cumulative assessment and submitted before close.

Summary of Natural England's position based on our advised approach to the assessments

The following tables represent Natural England's position on the potential for significant adverse impacts the projects alone, together and cumulatively (EIA) other plans and projects at Deadline 7.

Table 8. Summary of EIA conclusions for assessments of SEP and DEP alone, together and cumulatively with other plans and projects. Findings based on information derived from the above listed references.

HRA Species & Site	SEP and DEP alone	SEP and DEP together	SEP and DEP cumulatively with consented OWF projects, and Hornsea 4 and Rampion
Gannet	No significant adverse impact	No significant adverse impact	Unable to rule out significant adverse impact
Kittiwake: collision	No significant adverse impact	No significant adverse impact	Unable to rule out significant adverse impact
Guillemot: displacement	No significant adverse impact	No significant adverse impact	Unable to rule out significant adverse impact
Razorbill: displacement	No significant adverse impact	No significant adverse impact	Unable to rule out significant adverse impact
Puffin: displacement*	No significant adverse impact	No significant adverse impact	No significant adverse impact
Great black-backed gull: collision	No significant adverse impact	No significant adverse impact	Unable to rule out significant adverse impact
Lesser black-backed gull: collision	No significant adverse impact	No significant adverse impact	No significant adverse impact
Herring gull: collision	No significant adverse impact	No significant adverse impact	No significant adverse impact
Sandwich Tern	No significant adverse impact	No significant adverse impact	No significant adverse impact
RTD	On hold until D7 submission	On hold until D7 submission	On hold until D7 submission

*Puffin data (cumulatively) was not presented with SEP and DEP, however NE are content that the EIA position remains as at Hornsea 4

Table 9. Summary of predicted operational impacts Biologically Defined Minimum Population Scales and percentage of baseline mortality rates Impacts are provided for the Natural England approach to collision, displacement and combined assessments for relevant species. Cumulative estimates are based on the Applicant's numbers presented in documents listed above. Impacts that would result in an increase in baseline mortality of >1% are highlighted in shaded cells.

Species	Assessment	Predicted impacts					%Increase baseline mortality BDMPS**			
		DEP Project alone	SEP Project alone	SEP & DEP together	Cumulative (incl H4 and Rampion only)****	Largest BDMPS popn. ind. (Furness 2015)	DEP Project alone	SEP Project alone	SEP & DEP together	Cumulative (incl H4 and Rampion only)
Gannet	Displacement - 60-80% & 1% mortality rate(o70% and 1%)	5 to 7	0.17 - 0.22	5.17 - 7.22	295 -393 (344)		**n/a**			
	Collision	0.9	0.16	1.06	651					
	Combined	5.9-7.9	0.33-0.38	6.2-8.3	946-1044 (995)	456,298	0	0	0	**1.1-1.2 (1.14)**
Kittiwake	Collision	11	1.5	12	3,010	839,456	0.01	0	0.01	**2.3**
Guillemot	Displacement (NE standard - 30-70% displacement and 1-10% mortality	56-1311	7-153	63-1463	1266-29537	2,045,078			0.022 - 0.51	**0.44 - 10**
Razorbill	Displacement (NE standard - 30-70% displacement and 1-10% mortality	17-408	6-133	23-541	418-9758	591,874			0.22 - 0.53	**0.41-9.5**
Great black-backed gull	Collision	1.6	4.4	6	1357	91,399	0.01	0.03	0.04	**8**

Species	Assessment	Predicted impacts					%Increase baseline mortality BDMPS**			
		DEP Project alone	SEP Project alone	SEP & DEP together	Cumulative (incl H4 and Rampion only)****	Largest BDMPS popn. ind. (Furness 2015)	DEP Project alone	SEP Project alone	SEP & DEP together	Cumulative (incl H4 and Rampion only)
Lesser black-backed gull	Collision	1.6	0.64	2.2	640	209,007	0.01	0	0.01	**2.4**
Sandwich tern*	Collision	5.4	1.7	7	98	38,051	0.06	0.02	0.08	0.26

*model based, Fijn& Gyimesi 2018 flight speed and scenario F

** as per mortalities presented in Table A1 Chapter 11

*** North Sea flyway population

**** North Falls and Five Estuaries PEIR figures are excluded from all for consistency (they are present in the Gannet and Auk cumulative displacement updates note, but not CRM update).

Gannet

The cumulative total for gannet presented here is reduced from that presented at the end of examination for Hornsea 4 (EN010098-001969-Natural England - Comments on any submissions received at Deadline 6.pdf (planninginspectorate.gov.uk) [REP7-104]) .

In terms of collisions, a macro-avoidance rate of 70% was applied by Natural England at Hornsea 4 and at SEP and DEP to all plans and projects in-combination. However, at SEP and DEP in addition to the macro-avoidance rate, the within wind farm avoidance rate used in collision risk modelling was updated (from 98.9% to 99.2%) for all plans and projects resulting in a further decrease in total collisions. (see CRM update note).

At Hornsea 4 the full range of displacement impact is presented - 60-80% displacement and 1-10% mortality, while at SEP and DEP the range is limited to 60-80% displacement and 1% mortality.

This has resulted in the in-combination total reducing from 1,178-4,737 (an increase in BDMPS baseline mortality of 1.38-5.55%) at Hornsea 4 to 946-1044 in the current assessment (an increase in BDMPS baseline mortality of 1.1-1.2%).

At Hornsea 4 the assessment used an illustrative example of total mortality arising from collisions plus displacement calculated at 70% displacement and 1% mortality. At Hornsea 4 this total was 1225, reflecting a 1.44% increase in baseline morality of the BDMPS population, while at SEP and DEP the figure is reduced to 995 (1.12% increase in baseline mortality). This reduction in impact (from Hornsea 4 to SEP and DEP) is much less pronounced, than the reduction in the full range.

We further advise that for some Scottish projects, applying 70% macro-avoidance may notbe the approach advised by Nature Scot, and Scottish impacts should include Berwick Bank OWF we therefore recognise the total is likely to underestimate the cumulative impact from Scottish projects.

Gannet is Amber listed (BOCC) and classified as ‘Least concern’ (IUCN). However while the UK gannet population is currently increasing (growth rates of 2-3% per annum) there is considerable uncertainty in regards the future population trajectory of gannet in face of the HPAI. This is particularly the case at an EIA scale, as the population includes numerous Scottish colonies (that have also been severely impacted by HPAI).

Natural England advise that although the predicted impact has decreased, in the face of uncertainty around the true level of impact and the future population trajectory we are **unable to rule out significant adverse impact.**

Kittiwake

The cumulative total for kittiwake is reduced from that at Hornsea 4 (3979 at Hornsea 4, resulting in an increase in baseline BDMPS mortality of 3.04%) to a current total of 3010 and in increase in baseline mortality of 2.3%. This reduction is due to the change in within windfarm avoidance rate from 98.9% to 99.2%, resulting in a correction to previous in-combination totals (see CRM update note)

However, kittiwake is Red listed (BOCC) and classified as critically endangered (GB) and vulnerable (Globally), and almost all sites designated for breeding kittiwake in Great Britain have unfavourable conservation status. As such while the predicated impact has decreased, it is still at a level to conclude we are **unable to rule out significant adverse impact**

Sandwich tern

An EIA position has not been provided in recent cases, including Hornsea 4. The current assessment presents a cumulative collision impact of 98 birds, resulting in an increase in baseline mortality at BDMPS scale of 0.26%. This is as underestimate of the true scale, as the cumulative totals only includes those from the wider Greater Wash area. However, at this stage, accepting that there is a detailed HRA process underway for Sandwich tern breeding within the Greater Wash area including a full compensation package, it is acceptable to conclude **no significant adverse impact**. We further note that applicant concludes moderate adverse impact at a more localised scale (that of the Greater Wash) and agree with this conclusion at this scale, however, consider this is better dealt with in the HRA process.

References:

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