

**Summary of oral case from Issue Specific Hearing 15 & 16 September
2015
For
The Royal Society for the Protection of Birds**

Submitted for Deadline 3

24 September 2015

Planning Act 2008 (as amended)

In the matter of:

Application by SMartWind for an Order granting Development Consent for the

Hornsea Offshore Wind Farm – Project Two

**Planning Inspectorate Ref: EN010053
Registration Identification Ref: 10031166**



Summary of the RSPB's oral case from the Issue Specific Hearings on 15-16 September 2015

Summary of the RSPB Position on Intertidal Issues

1. The RSPB does not consider it possible to conclude that Project 2 will avoid adverse effects on the integrity of the Humber Estuary SPA through disturbance of SPA birds during the construction of Project 2 both alone and in combination with Project 1. This is principally as a result of the significantly extended intertidal construction period for Project 2 (5 years) as opposed to the originally mooted 4 years for **both** Project 1 and Project 2 during the examination of Project 1.
2. We consider the key to limiting disturbance impacts on SPA birds is the application of an appropriate tidal height related working restriction. Based on the information supplied with the application and our knowledge of bird usage of the site we consider that the necessary restriction is:

The undertaker must not construct or install those licensable activities comprised in Work Nos. 4A and 5A within one kilometre seaward of the seawall during the period of time commencing two hours before a high tide greater than 6.5 metres (Chart Datum) and ending two hours after a high tide greater than 6.5 metres (Chart Datum) between 1 April and 30 September (inclusive).

3. In addition, based on the construction methods information provided in the Environmental Statement and Habitats Regulations Assessment, we believe that there is scope to further reduce impacts through a reduction in the length of the working window (currently April to September (RSPB Response to Deadline 2, Appendix 1, paras 9-12).

Agenda Items

3. CL: Construction Onshore and Inter-tidal

3.2. As Dong now owns both Hornsea Projects 1 and 2:

- a) *scope for both onshore cable routes of Hornsea Project 1 and Hornsea Project 2 to be installed at the same time to minimise local disruption;*
- b) *update on sequencing of the construction of Hornsea Projects 1 and 2 projects (eg: simultaneously); and*
- c) *possible review of scope of compensation compounds*

The RSPB is keen to see smooth operation between Projects 1 and 2 that limits the disturbance effects on the Humber Estuary Special Protection Area (SPA).

We are keen to see investigation into whether joint ownership provides greater opportunities to reduce impacts through sharing resources and cooperative working (e.g. Project 1 laying the ducting for Project 2).

3.4. ***Inter-tidal zone issues, including, but not limited to: scope for reducing period of impacts (in years and/or in months per year); burial depth; timing of ducting installation; relationship to Hornsea Project 1; protection via Environmental Management Plan (EMP) and Code of Construction Practice (CoCP); scheduled inspections outside the ornithological overwintering period.***

Scope for reducing period of impacts (in years and/or in months per year)

- 3.4.1. The RSPB does not consider it possible to conclude that Project 2 will avoid adverse effects on the integrity of the Humber Estuary SPA through disturbance of SPA birds during the construction of Project 2 both alone and in combination with Project 1.
- 3.4.2. It is our view that the mitigation measures currently proposed by the Applicant are insufficient.
- 3.4.3. We consider the key to limiting disturbance impacts on SPA birds is the application of an appropriate tidal height related working restriction. Based on the information supplied with the application and our knowledge of bird usage of the site we consider that the necessary replacement wording for Draft Regulation 20(4) of Schedules I and K (the Transmission Assets DMLs) is:

The undertaker must not construct or install those licensable activities comprised in Work Nos. 4A and 5A within one kilometre seaward of the seawall during the period of time commencing two hours before a high tide greater than 6.5 metres (Chart Datum) and ending two hours after a high tide greater than 6.5 metres (Chart Datum) between 1 April and 30 September (inclusive).

- 3.4.4. We consider this is consistent with our position taken during the Project 1 Examination and the consideration of the potential impacts of that Project both alone and in combination with Project 2:
- During the Project 1 Examination, Project 2 was predicted to involve 2 years of construction activities (giving a potential for 4 years in combination with Project 1). The Project 2 application alone now involves up to 5 years of construction activities in closer proximity to key SPA bird roosting areas than for Project 1. The overall construction period for Projects 1 and 2 may now be up to 7 years.
 - The duration of construction components for Project 2 (e.g. duct pulling, cable-laying) have increased from the predictions made during the Project 1 examination so intensifying the works in a given year; again, involving works in closer proximity to key SPA bird roosting areas than for Project 1.
 - There is greater uncertainty over the emergence location in the intertidal of the duct/cable boring techniques used to pass under the seawall (estimates for Project 2 range from 100 to 2500 metres from the sea wall).
- 3.4.5. We made an error in our written representations by referencing tide heights to Ordnance Datum rather than Chart Datum. We have issued a correction note to the Applicant, which is appended to this summary. During the Issue Specific Hearing on 15 September the Applicant stated the view that the Project 1 tidal restriction referred to a 7.7m Chart Datum level. The RSPB considers that this is incorrect, as the wording of the condition uses “as measured at Grimsby” as the tide height reference point. A physical measurement at Grimsby will include the 1.2m dock sill and therefore a 7.7m tide measured at Grimsby is a 6.5m Chart Datum tide.

Analysis of ABP’s tide tables provides the following information:

	Total high tides	Total hours	6.5m CD tides	% of tides	Hours restricted	% of hours	7.7m CD tides	% of tides	Hours restricted	% of hours
April	58	720	31	53%	124	17%	0	0%	0	0%
May	60	744	31	52%	124	17%	0	0%	0	0%
June	58	720	33	57%	132	18%	0	0%	0	0%
July	60	744	35	58%	140	19%	0	0%	0	0%
August	60	744	36	60%	144	19%	1	2%	4	0.5%
September	58	720	35	60%	140	19%	4	7%	16	2%
Total	354	4392	201	57%	804	18%	5	1.4%	20	0.5%

Notes: The hours restricted figure is obtained by multiplying the total number of tides by 4 hours (2 hours either side of the high tide).

From this information it is clear that the RSPB would not have agreed to such a limited restriction, particularly as it was responsible for promoting it.

3.4.6. We note that the Applicant and Natural England are discussing an approach that would only restrict working on some high tides above 6.5m Chart Datum (covering April, May, August and September), rather than all high tides. The RSPB is sceptical of such an approach because:

- the flat nature of the intertidal is likely to make working physically impossible on most of the high tides in question (due to the tide submerging the working area) and
- we are unclear as to how the Applicant and Natural England will make an ecologically sound determination of the number of tides over 6.5m CD that can be worked upon, and then how they will select these (i.e. which tides will be more or less important for roosting birds?).

In discussion with the Applicant we have asked for the issue of tide coverage of the intertidal zone to be investigated.

3.4.7. In addition, as detailed in Appendix 1 of our response to Deadline 2, based on the construction methods information provided in the Environmental Statement and Habitats Regulations Assessment, we believe that there is scope to further reduce impacts via reducing the time spent working on the intertidal. Our Appendix 1 for Deadline 2 proposes a way of doing this by reducing the working window to 3 months (June to August inclusive). The Applicant has committed to providing us with further information to better explain their desire to maintain a 6 month working window.

3.4.8. The RSPB considers it necessary to delete from the DCO the provision in DML A2 and B2 (reg 20(3)) which would allow intertidal work outside the April – September window (D2, Appendix 1, para 14), as such an approach has not been assessed in the ES or HRA. The RSPB has reviewed the ES and HRA and the following paragraphs appear to confirm that working outside the April to September window has not been fully considered in either document, for example:

- HRA, para 5.9.52 states: “The seasonal restriction on works schedules at the landfall (April to September inclusive) when numbers of estuarine birds are lower, will also reduce the potential for adverse effects on waterbird species.”
- HRA, para 5.9.128 states: “In relation to impacts on birds using the intertidal and coastal areas in the vicinity of the export cable landfall, simultaneous work on Project One and Project Two would result in an increased spatial extent and frequency of disturbance between April and September. This is outside the winter

period when the highest numbers of estuarine birds are present, but overlaps with the spring and autumn passage periods during which some VORs are present in large numbers. Nevertheless, disturbance to the intertidal area would be intermittent rather than continuous, with periods of no or minimal disturbance between periods of construction activity.”

- ES, Intertidal Ornithology, Table 4.15: “Works at the export cable landfall will be undertaken outside of the winter period when the largest numbers of birds are present in the Humber Estuary. Works would be completed between April and September inclusive. **Justification:** To minimise impacts of likely disturbance to wintering and migratory birds utilising the adjacent SPA habitats.”
- Similar information is set out in the Project Description (ES Chapter 3) at paragraphs 3.3.11 and 3.5.32 to 3.5.35.

However we note that the Applicant has also offered to review the assessments undertaken. We look forward to receiving that information.

Timing of ducting installation;

3.4.9. We look forward to receiving further information from the Applicant clarifying the timing, duration and phasing of the duct installation works and will comment on that new information for Deadline 4.

Protection via Environmental Management Plan (EMP) and Code of Construction Practice (CoCP);

- 3.4.10. The RSPB considers that the role of the Ecological Clerk of Works (ECoW) should be expanded to permit temporary suspension of works if there is a risk of significant disturbance to wading birds at high tide (RSPB Response to Deadline 2, question EL10, para 2). The EMP already gives the ECoW “an ecological watching brief” (PINS ref 12.5, para 5.3.8) and this sits appropriately within this remit (RSPB Response to Deadline 2, question CL10, para 2). The Applicant provided references to paragraphs 4.2.130 to 4.2.134 as illustration that this is already covered by the CoCP. These paragraphs make no specific reference to such a remit for the ECoW and therefore the RSPB requests clarification as to whether the Applicant has produced an updated version of the CoCP.
- 3.4.11. There is no reference to ecological monitoring in the CoCP requirements (para 8, Sch A, Draft DCO (v4)) – the RSPB’s view is that this should be included in the DCO.
- 3.4.12. The pre- and post-construction survey requirements in the CoCP and EMP make no reference to bird surveys – the RSPB’s view is that these should be explicitly added (D2, CL10, para 6)

8. EOO: Ecology Offshore-Ornithology

8.2 Brief introductory updates from the Applicant, NE and RSPB, including position reached by Applicant and NE on the Offshore Ornithology Road Map.

Summary of the RSPB position

The RSPB has concerns with the impacts on the pSPA with respect to five of its designation species, gannet kittiwake guillemot razorbill and puffin, and concerns with the manner in which the assessment of these impacts has been carried out. In particular these concerns are:

- Collision risk modelling; the use of the extended model, avoidance rates and uncertainty;
- Displacement; the displacement rate and consequent mortality; and
- Population modelling; the use of density dependence. There was an outstanding issue with apportioning into age classes, but this has now been resolved.

8.3 Concise statement from Applicant on extent of agreement between parties on baseline data issues.

- 8.3.1 The RSPB welcomes much of the manner in which much of the assessment has been undertaken. In particular the presentation of a range of values for both collision risk and displacement. For collision risk, the presentation of a range of model options and avoidance rates, albeit an incomplete range for the latter, and a full range of displacement rates and potential consequent mortality of displacement effects allows for a better characterisation of uncertainty inherent in these measures. The information presented in Appendices N, O, P, Q and R for deadline IIA for each species allows a meaningful comparison of the assessment of potential harm to the pSPA for the five key designation species with comparative results obtained by the means preferred by the Applicant and those by Natural England. The RSPB is broadly in alignment with the position of Natural England.
- 8.3.2 The Applicant has also provided confidence intervals for collision risk modelling for gannet and kittiwake to account, separately, for variability in flight height and density in the collision estimates.
- 8.3.3 However, as detailed below, the RSPB disagree with the Applicant on a number of methodological issues for both collision risk and displacement.
- 8.3.4 The RSPB also welcomes the fact that the Applicant has conducted PVA modelling of 5 species, presented as Appendix M to the Deadline IIA response, and that these include the RSPB preferred metric, the counterfactual of population size after 25 years (CPS). The RSPB does have an issue though with the data comparability between the PVA and the predicted mortality through collision and displacement.

8.4 Extent of agreement between parties on methodological issues, including aspects of (a) Collision Risk Modelling (CRM), (b) calculation of Displacement Rates, (c) Population Viability Analysis (PVA) and Potential Biological Removal (PBR), and (d) tiering/relevant projects for cumulative and in-combination effects assessment.

(a) Collision Risk Modelling

- 8.4.1 The Band Collision Risk Model is a simple, mechanistic model that predicts the number of birds that would collide with a turbine over a period of time. While its basic version is in common use, it has not been fully validated and so its use requires an empirical acknowledgement of uncertainty.
- 8.4.2 It is the RSPB's view that the Applicant's CRM assessment is incorrect for three reasons:
- An incorrect Band Model Option has been preferred for assessment;
 - There is an inappropriate use of an elevated correction factor; and
 - An incomplete account is given for uncertainty and variability.

Incorrect Model Version

- 8.4.3 The RSPB welcomes the presentation of all four options of the Band model, however in this instance believe that only the outputs from Option 2 of the basic Band model can be relied upon. This is because:
- a. The use of the extended model contradicts precedent and guidance. The decision for Hornsea Project One did not consider the use of the extended Band model appropriate and relied on the basic Band model outputs within the Appropriate Assessment for both gannets and kittiwakes. Subsequently an important conclusion of the BTO Avoidance Rate Review was that the data that exist for

kittiwake and gannet were inadequate to calculate an avoidance rate for use with the extended Band model for these species. This meant that the BTO recommended that only a no-avoidance collision estimate should be presented when using the extended model for gannet and kittiwake, until better data were available. In response to this review, the SNCBs issued guidance in which they were clear that: “*it is not appropriate to use the Extended Band Model in predicting collision figures (for gannet and kittiwake) at the current time*” (Page 4, para 3.2)

- b. The version of the extended model preferred by the Applicant requires data at a higher resolution than is possible to obtain from boat based visual estimation. Flight height estimation to the nearest five metre intervals, as undertaken by the Applicant, is likely to provide a large degree of error, as it can be considered extremely unlikely that observers in a moving vessel, are able to make such estimation with any degree of accuracy. Such an approach differs from the usual survey method, whereby flight height is allocated to broad bands, often defined by fixed structures such as mast height as reference points, as well as the upper and lower swept heights of the proposed turbine blades. This method of apportioning into broad bands is specifically designed to minimize error, as a surveyor is more likely to allocate a flight height to a broad band rather than a narrow one. It is incorrect to assume that there will be the same level of error regardless of the width of height band. The Applicant’s derivation of flight height distributions required for use in extended model differs significantly from that used to derive conventional flight height distribution curves. This manipulation of data that are likely to be inaccurate in the first place and their subsequent use in a mathematically sophisticated model (the extended Band model) is likely to compound the fundamental error in height estimation from boats, whereas the methods used by Johnston *et al.* are designed to minimise such error. Johnston *et al.* used well established and robust statistical means to determine the flight height distributions and associated confidence intervals from a large sample of height estimates in such a way as to reduce the uncertainty associated with height estimation. The results have been accepted and published in one of the world’s leading ecological journals.
- c. For a number of species, the proportion of flights estimated to be at PCH (potential collision height) at Hornsea Project Two, is substantially lower than those in Johnston *et al.*, (2014). For kittiwake, lesser and great black-backed gulls in particular this proportion was lower than the lowest 95% confidence intervals for the generic data and for kittiwake this was lower than that of any other offshore development. These figures for flight height of kittiwake at Hornsea Project Two are also considerably lower than those obtained from elsewhere by different means of estimating flight height. This disparity leads to concern that assessment based on site-specific data presented by Hornsea Project Two may lead to underestimation of the risk of collision, notably for kittiwake. The magnitude of this observed difference merits critical examination. Such a critical examination has not been presented for Hornsea Project Two; rather there is the statement that standard methods were used by experienced surveyors. There are three possible explanations:
 - i. While we would not question the experience of the surveyors, the method used to determine flight height for Hornsea Project Two was the *estimation* of height to the nearest 5 metres (HRA, Annex 5.5.1, para 2.1.7 pg 4: *the estimated height of flying birds was recorded to the nearest 5m*”). This is contrary to standard practice which is that birds are apportioned to height bands, often with reference to fixed structures. This methodological

difference is the most likely explanation for the discrepancy in flight heights. Research by the Marine renewable Ornithology Group (comprising NE, SNH, NRW, NIEA, JNCC, RSPB and MSS) is ongoing into the accuracy of height estimation by boat based surveyors, but initial results suggest that estimation into 5m bands underestimates height to a greater degree than into broader bands.

- ii. The method used to calculate PCH is unusual and it is unclear why a novel method for the calculation of PCH was used, one that it is inconsistent with methods used elsewhere in the assessment. Furthermore it is entirely unnecessary.
- iii. That there is something ecologically unusual about the Hornsea Project Two site. However the Applicant has been unable to account for the reasons why this might be the case.

8.4.4 For reasons 1 and 2 above the RSPB do not accept that it is appropriate to use the extended Band model, and for reasons 2 and 3 consider that options reliant on site-specific data should be used. This means only Option 2 is appropriate to be used for the Appropriate Assessment.

Avoidance Rates

8.4.5 Since Chamberlain *et al.*, 2006, and subsequently Band (2012), uncertainty surrounding avoidance rates has been considered to “swamp” all other sources of uncertainty. However a recent sensitivity analysis (Masden 2015) has shown that when considered as the figure actually used for the CRM procedure, (that is 1 minus AR) the sensitivity of the model outputs to variation in avoidance rate is equal to that associated with bird density, flight height and flight speed. Clearly variability and uncertainty in avoidance rate remains an important consideration, however equal consideration should also be given to other sources of uncertainty.

8.4.6 The use of Avoidance Rates in the Hornsea Project Two Habitats Regulations Assessment claims to follow those presented in the BTO Review. However, as Avoidance Rates for the extended model are used, this represents a fundamental mis-reading of the BTO AR Review Report, and also contradicts the advice of the SNCBs in response to the BTO Report.

8.4.7 In particular, the Applicant misinterprets the BTO Review for gannet and kittiwake, stating that the BTO made no recommendation for the avoidance rate for these species. The BTO made it clear that based on the current evidence it was impossible to calculate an avoidance rate for gannet and kittiwake. The Applicant has provided no new evidence to support its suggested avoidance rates and their cited reference from the Hornsea Project One application has been entirely superseded by the BTO Report.

8.4.8 For the use the basic Band model with kittiwake, the SNCB advice differs from the BTO Report for the following reason. There were no species-specific data for kittiwake available to review, so the BTO allocated them to a “small gulls” category, based on their size. The data underpinning this category were comprised almost entirely of common and black-headed gulls, in largely terrestrial and coastal habitats. However the SNCBs preferred kittiwake to be allocated to the “all gulls” category, based on behaviour (such as flight speed and marine habitats). In the light of the information of the importance of flight speed presented in the sensitivity analysis by Masden (2015), calculated subsequent to the BTO review, the RSPB agree with the SNCB position. This issue is the only significant difference between the BTO review and the SNCB response and relates only to the basic Band model and kittiwake. Crucially the BTO and SNCBs agree, as does

the RSPB, that it is impossible to derive an avoidance rate for gannet and kittiwake for use with the extended model.

Expression of uncertainty

- 8.4.9 As illustrated by the BTO Review Report, there are scant data to validate all Collision Risk Models for most seabirds, notably in a UK context and for breeding seabirds, whatever version of the Collision Risk Model is used. This means that outputs from the Collision Risk Model can provide only a relative estimate of collision risk for most bird species. The single figure output from the Collision Risk Model that is usually presented for each bird species, presents a misleading impression of accuracy when in fact the model output is an approximation that may or may not be close to the actual collision risk. The RSPB welcomes the presentation of the confidence intervals alongside flight height distribution curves by Johnston *et al.*, 2014, by the Applicant in Appendix J.
- 8.4.10 This expression of uncertainty is only part of the recommendations in the Band (2012) guidance. He also recommends consideration of the following: general variability in survey data, data unavailability out with favourable survey conditions, natural variability in bird populations, observer bias in flight height information, the simplified geometry of the Collision Risk Model, potential collision with turbine towers, variability in bird parameters (length, wingspan, flight speed), insufficient empirical data on bird displacement avoidance and attraction. Therefore the confidence intervals shown by the Applicant only account for a small amount of this uncertainty, namely that associated with variability flight height and density. There are numerous other sources of uncertainty in the assessment that should be taken account of as well.
- 8.4.11 These include the impacts of mortality on the juvenile and non-breeding adults excluded from analysis by apportionment. While we acknowledge the difficulty in assessing these effects, they should be borne in mind when considering the uncertainty around the assessment.

(b) Displacement

- 8.4.12 Displacement arises when there is a significant reduction in the density of birds within the wind farm footprint and the surrounding area (the buffer zones), which may be partial or total displacement, compared with the baseline situation. Displacement is equivalent to habitat loss and may be temporary or permanent, depending on whether or not there is habituation, i.e. adjustment to the presence of the wind farm and a resumption of use of the area. It may be triggered during construction, or during operation, depending on the direct cause.

Population estimates

- 8.4.13 Concerns regarding inconsistencies in the manner that the boat survey data have been analysed to produce bird population estimates, such that these estimates are much lower than would be expected, and with incomplete surveys in December in year 1 and November and December in year 2 have largely been addressed by the Applicant, and the RSPB accept these *provided* that the assessment is carried out in such a manner as to be suitably precautionary in order to reflect the greater uncertainty associated with incomplete survey.

Displacement magnitude

- 8.4.14 In its HRA Report, the Applicant has a preferred value of 30% as the magnitude of displacement for guillemot and 40% for razorbill and puffin, although these figures are presented in a matrix, and the values preferred by Natural England are discussed. This presentation of a range of values is welcomed as the available evidence indicates

considerable variation in the observed magnitude of displacement for these species. The observed variability in the studies that do exist warrants further consideration and impact assessment for a range of magnitude of displacement. The Applicant has presented 70% displacement as “the maximum of Natural England’s advocated range of rates”, while this is a correct summary of NE’s position, based on the limited evidence 70% can be considered a *reasonable* estimate rather than a maximum; there are data for guillemot to support this figure. There is an almost total absence of any data for razorbill or puffin, so similarly this level cannot be considered a “maximum” for these species.

Displacement mortality

- 8.4.15 The selected displacement mortality values taken forward in the HRA Report for Hornsea Project Two do not exceed 10%, e.g. 10% and 1% respectively for guillemots during breeding, non-breeding seasons and 10% and 2% for razorbills during breeding, non-breeding seasons, and 2%, 1% and 1% respectively for gannet during breeding, post-breeding pre-breeding. Inadequate justification is given for which of these values have been chosen. We do not know the consequences for mortality of the effects of displacement and therefore cannot determine whether or not these values are precautionary, as indicated, or if they are underestimates. While we welcome the matrix approach to setting out the mortality values, further justification for the preferred values is needed.
- 8.4.16 The proximate effect of displacement of breeding seabirds is likely to be a reduction in breeding productivity, especially for those species, such as guillemots, that have to make frequent food deliveries to chicks. However increased energetic demands of displacement on breeding seabirds, making repeat return foraging trips during the breeding season, may also lead to increased mortality. Such mortality may not occur immediately, but may act later, during the non-breeding season, due to loss of condition during the breeding season. Furthermore, lower provisioning rates to chicks during the breeding season can lead to poor condition of these chicks, and subsequent mortality. As these complex and somewhat diffuse effects of displacement will act throughout the year, and be caused by displacement that can occur throughout the year mortality values estimated for each season should also be considered as an annual figure, by combining seasonal values in some manner. Such presentation of annual mortality is important as an input into the PVA model.

(c) Population modelling

- 8.4.17 The RSPB welcomes the fact that the Applicant has conducted PVA modelling of 5 species, presented as Appendix M to the Deadline IIA response, and that these include the RSPB preferred metric, the counterfactual of population size after 25 years.
- 8.4.18 The population modelling presented relies to some extent on density dependence. Density dependence occurs when the population growth rate or demographic rates vary causally with population size. When population density is high, increased competition for resources – food, nest sites, mates etc, tends to slow or halt population growth whilst at lower population density, competition tends to be reduced, leading to increases in population growth rates. At very low population density, individuals may be less able to find mates; this is inverse density dependence. Density independence is in where there is no link between demographic rates and population size.
- 8.4.19 Whilst the RSPB welcomes the Applicant’s PVA, it contends the only the version of this measure from the density independent model is robust because results from versions that include density dependence are sensitive to the assumptions made about its strength. The true strength of density dependence is unknown and has had to be estimated. This flaw in the use of density dependent models has previously been

acknowledged in a report to CEFAS carried out by the authors of the PVA modelling for Hornsea Projects One and Two. This stated “*the most robust approach for modelling is to avoid the temptation to include density dependence, since this is often based on the premise that ‘it must be operating therefore it should be included’ even if the mechanism is unknown*”. The Applicant’s modelling of two sets of demographic rates demonstrates that the density dependant model is more sensitive to variation in these rates than the density independent model.

8.4.20 For interpretation of the model counterfactual outputs under the Habitat Regulations Assessment, the PVA results must be considered with supplementary contextual information. Most importantly they must be considered in the context of the current population trend, not only of the SPA/pSPA, but also the national and, if appropriate, biogeographical population trend. Further contextual information required includes the drivers of current population trends, reliability of the survey results they are derived from and also the confidence in the level of mortality predicted as an impact of the development, and the level of uncertainty associated with that mortality. At the time of the hearing, the RSPB were unable to fully accept the results of the PVA, due to an issue with apportioning mortality to different age classes that needed clarification.

(d) Tiering/relevant projects for cumulative and in-combination effects assessment.

8.4.21 The RSPB welcomes the further information provided by the Applicant and will be providing any further comments for Deadline IV

8.5 Update on assessment of collision and displacement impacts, as appropriate, of Hornsea Project 2 alone, and in combination, for all relevant species, for the Flamborough Head and Filey (FFC) Coast pSPA. In particular, what are the views of NE and the RSPB on the updated assessments submitted by the Applicant for Deadline 2a, for the following species: (a) gannet; (b) kittiwake; (c) guillemot; (d) razorbill, and (e) puffin?

The RSPB reserves its position on potential impacts until all the contextual information around these populations described above is fully considered and compared against the CPS value for both project alone and in combination assessments.

8.7 Extent of agreement between NE and the Applicant on the likely significant effects of the project alone, and cumulatively, for relevant EIA species populations in the North Sea.

8.7.1 Potential Biological Removal (PBR) is relied upon in the Environmental Impact Assessment. PBR is a method for detecting overharvesting of exploited animal populations and unsustainable mortality of other kinds. Typically, it identifies levels of additional death in a population which, if exceeded would be almost certain to cause it to decline to extinction. As such, and unlike PVA, it does not estimate the changes in population size that result from additional mortality, a key requirement in impact assessment. Furthermore, PBR relies upon the operation of density dependence (see below) and in doing so makes unsupported assumptions about the form of this density dependence upon which accurate information is not known. Finally, it requires the use of a recovery factor f which is set based on opinion rather than being determined by empirical evidence.

8.7.2 Given these deficiencies, it is important to acknowledge that the PBR method has not been validated for birds or mammals. Because the PBR calculation involves a (unsubstantiated) choice of recovery factor, a feedback loop was incorporated into the original method whereby the recovery factor could be modified in light of monitoring and modification of harvesting rates. Such monitoring and modification of mortality from

offshore wind farm developments is impossible.

8.9 Mitigation measures, monitoring for the full life cycle of the project, and the adequacy of DCO requirements and DML conditions.

The RSPB strongly argue the need for their involvement in the drafting of requirements for monitoring, and in any subsequent steering group set up, due to their considerable expertise and experience in this area. In addition, the draft requirements must detail monitoring at clearly identified stages of the timetable, throughout the lifetime of the project. A strategic approach should be taken, with monitoring at Hornsea 2 combined with Hornsea 1, and also link with other monitoring programmes.

9. EL: Ecology Onshore and Inter-tidal

Most of the RSPB's points on intertidal impacts were considered under Agenda Item 3 – Construction Onshore and Inter-tidal, as set out above. The majority of our comments are set out there.

9.2. Update on positions of interested parties on currency of data (onshore and inter-tidal).

The RSPB does not object to use of the Applicant's bird survey data but we highlight the difficulty for any survey programme to coincide with and so record the important pulses of SPA bird migration and that the age of the survey data supports a precautionary approach to its interpretation.

9.3. Extent of agreement between NE and the Applicant on any adverse integrity effects for relevant (a) ornithological species and (b) habitats for the Humber Estuary SPA, Ramsar and SAC sites, for the project alone, and in combination with other projects.

As per paragraph 3.4.1 above, the RSPB does not consider it possible to conclude no adverse effects on the integrity of the Humber Estuary SPA. Species of concern in this regard are bar-tailed godwit, dunlin, grey plover, knot, oystercatcher, ringed plover and sanderling.

Further Information to be provided by the Applicant

The following information (identified at relevant points above) is to be provided by the Applicant and the RSPB will consider it and endeavour to get any comments back by Deadline 4.

- Information on the extent of the intertidal zone that will not be under water two hours either side of on a 6.5m tide measured against Chart Datum.
- More detailed information on intertidal works, including further information on the timing, duration and phasing of the duct installation works, to provide a better understanding of the Applicant's desire to maintain a 6 month working window.
- A review of the ES and HRA to establish whether the potential impact of intertidal works between October and March was formally assessed.