

Re: Application by Norfolk Vanguard Limited for an Order Granting Development Consent
for the Norfolk Vanguard Offshore Wind Farm

RSPB Response Submitted for Deadline 1: 16th January 2019

Response to the Examining Authority's First Written Questions

Question to:		Question:
3.	Ecology offshore - ornithology	
3.1	NE and RSPB	Can you confirm that you are content that the baseline environment for ornithology along the offshore cable corridor has been sufficiently well informed and has been characterised correctly?
	We have not commented on this matter and therefore defer to Natural England's view on this point.	
3.3	Applicant, NE and RSPB	<p>Can an update be provided on the progress that has been made since NE's RR [RR-106] and RSPB's RR [RR-197] in resolving the outstanding areas of disagreement regarding the following offshore ornithology matters for Norfolk Vanguard alone and in-combination, and in particular in regard to the following matters:</p> <p>(a) The use of potential biological removal (PBR) versus population viability analysis (PVA) modelling;</p> <p>(b) The mean peak seasonal abundances for red-throated diver that have been used in the operational displacement assessments and matrices in Tables 13.27 to 13.29 of ES Chapter 13 [APP-337];</p>

		<p>(c) The displacement and mortality rate levels that have been used for red-throated diver;</p> <p>(d) The use of the Applicant's own stochastic collision modelling (CRM) rather than that advocated by the RSPB and NE (ie the Marine Scotland Science Model, MacGregor <i>et al</i> 2018);</p> <p>(e) As requested by NE, please can the Applicant please provide the CRM input data that it has used in its own stochastic CRM, including the R code;</p> <p>(f) The use of median bird densities within the CRM, and the overall derivation of bird densities used in the CRM;</p> <p>(g) The Nocturnal Activity Factor that has been used in the CRM;</p> <p>(h) Can the Applicant explain its reasoning for using displacement assessments for Norfolk Vanguard East using birds in flight and birds on the water, but only birds on the water for Norfolk Vanguard West, and clarify whether any corrections if made would be likely to alter the conclusions reached;</p> <p>(i) The differences between the deterministic model and the Applicant's model in terms of collision mortality;</p> <p>(j) The apportioning of mortality to SPAs;</p> <p>(k) Having regard to the evidence from Cleasby <i>et al</i> (2015) that the RSPB has cited, the appropriateness of the gannet avoidance rate in regard to the breeding season;</p> <p>(l) The kittiwake tracking data, including the availability of the RSPB data;</p> <p>(m) The effectiveness of predator management at the Alde-Ore Estuary SPA as a mitigation measure in regard to lesser black-backed gull.</p>
	<p>Significant areas of concern remain regarding the assessments of displacement and collision risk. We have not seen any revisions of these assessments to allay these concerns and so would welcome further dialogue with the Applicant to enable the appropriate information to be provided.</p>	

a)	<p>PVA vs PBR</p> <p>We agree with Natural England’s position (as stated in their Relevant Representations, doc. RR-106), that PVA models should be used in preference to PBR for the assessment of the effects of collision mortality on SPA populations. PBR was designed to manage whaling quotas by detecting unsustainable mortality in a population leading to risk of its extinction and therefore indicates the maximum acceptable mortality in this context. PVA enables comparison of the change in population size with and without a windfarm project after several years, thereby presenting an indication of the magnitude of change attributable to the proposal and is therefore more suitable for assessing the effects of a project on an SPA. We also agree that, where population modelling is required, new PVA models for the Norfolk Vanguard project should be developed to allow robust assessment of this project’s impact levels using project-specific input data.</p>
b)	<p>Mean peak seasonal abundances for red-throated diver</p> <p>We note Natural England’s comments in their Relevant Representations (RR-106) that the mean peak seasonal abundances for red-throated diver in Norfolk Vanguard West are based on birds on the water only. We agree that this requires revision to incorporate birds in flight as well as those on the water, as has been used for Norfolk Vanguard East.</p>
c)	<p>Displacement and mortality rates for red-throated diver</p> <p>We agree with Natural England’s stated position in their Relevant Representations (doc. RR-106), that displacement of up to 100% and mortality of up to 10% should be considered within the assessment of displacement impacts on red-throated diver.</p>
d)	<p>The Applicant’s stochastic CRM</p> <p>As explained in our Relevant Representations (RR-197) and our Written Representations, we still have serious concerns regarding the adequacy of the Applicant’s own unverified stochastic CRM. We recommend that, if a stochastic CRM is to be presented, that the modelling should be rerun using the tested and verified Marine Scotland (McGregor <i>et al.</i> 2018) model.</p>
e)	<p>Applicant requested to provide CRM input data and R code</p> <p>This question is directed at the Applicant but we confirm that we would welcome provision of this information.</p>

f)	<p>Bird densities within the CRM</p> <p>We remain concerned that the values for bird densities within the deterministic CRM (Band, 2012) are based on median values, resulting in lower mortality predictions than if the correct mean values are used. We also note that, while mean monthly bird densities appear to be presented in Annex 1 of Appendix 13.1 Offshore Ornithology Technical Appendix (doc. 6.2.13.1), that para. 6 of that document states that the means presented are actually means of the median values and therefore their use in CRM would again result in lower predicted collisions than if true mean values were used.</p>
g)	<p>Nocturnal Activity Factor</p> <p>Our concerns around the revised Nocturnal Activity Factors presented by the Applicant remain (explained in full in our Written Representations). In particular, the figures presented for gannet do not align with those recommended in the recently published review (Furness <i>et al.</i> 2018) and those for kittiwake are based on unpublished work. We agree with Natural England's position (doc. RR-106) that the revised values should not be applied to the cumulative/in-combination assessment. It is unlikely that survey timings for other windfarms will be known, and therefore peaks in foraging activity at first and last light may not be represented in the survey data and the use of the revised Nocturnal Activity Factors could therefore result in underestimates of collision risk.</p>
h)	<p>Displacement assessments for Norfolk Vanguard East and West</p> <p>This question is directed at the Applicant, but we would welcome sight of a revised assessment.</p>
i)	<p>Differences between the deterministic model and the Applicant's model</p> <p>We consider that there will be differences in predicted collision mortality arising from the following approaches:</p> <ul style="list-style-type: none"> • The Applicant's calculation of the deterministic outputs based on median monthly bird densities • The deterministic outputs based on the correct mean monthly bird densities • The Applicant's stochastic CRM • The Marine Scotland (McGregor <i>et al.</i> 2018) stochastic CRM <p>In our view, the Applicant's calculations of collision mortality using both deterministic and stochastic modelling are likely to underestimate collision mortality when compared to the standard versions of these respective models. We have attempted to recalculate collision risk using the correct versions of the deterministic and stochastic models. Whilst some CRM input data are missing</p>

	<p>from the information provided by the Applicant meaning there are some caveats to our calculations (see our Written Representations for full details), these recalculations do give an indication that the Applicant's approaches significantly underestimate mortality.</p>
j)	<p>The apportioning of mortality to SPAs</p> <p>We still do not agree with the apportioning of 16.5% of kittiwake mortality to the Flamborough and Filey Coast SPA or the apportioning of 25% of lesser black-backed gull mortality to the Alde-Ore Estuary SPA. We consider that the kittiwake apportionment is likely to underestimate mortality as it does not take account of recent tracking data which shows that parts of the Norfolk Vanguard site are within important foraging areas for kittiwakes from this colony. We also consider that the figure presented for lesser black-backed gull is unlikely to be suitably precautionary, as it is based on an assumption that urban birds will forage in the offshore marine environment to the same extent as coastal birds is not substantiated. We discuss suitable alternative apportioning rates in our answers in the 'Habitats Regulations Assessment' section of this document.</p>
k)	<p>Breeding season gannet avoidance rate</p> <p>We maintain our position that, whilst we agree with the use of a 98.9% avoidance rate for non-breeding gannets, in the breeding season, a 98% avoidance rate is appropriate. Cleasby <i>et al.</i>, (2015), while not discussing avoidance rates, demonstrated that foraging birds are at more risk of collision than commuting birds. In order to provision chicks, gannets will need to forage more during the breeding season and will also be constrained by central place foraging. Such behavioural differences are likely to result in changes in avoidance behaviour (Cook <i>et al.</i>, 2018), and since the figures used for the calculation of avoidance rates advocated by the SNCBs are largely derived from the non-breeding season for gannet (Cook <i>et al.</i>, 2014 and Cook <i>et al.</i>, 2018) we recommend a more precautionary avoidance rate for the breeding season.</p>
l)	<p>Kittiwake tracking data</p> <p>The kittiwake tracking data from Flamborough and Filey Coast SPA were supplied to the Applicant's consultants in November 2017. Historical tracking data from the FAME/STAR tracking was also provided to the consultants in February 2017. The more recent data request required RSPB to obtain permission from partners in the project, whereas the FAME/STAR data is publicly available upon submission of a data request.</p>

m)	Predator management as mitigation at the Alde-Ore Estuary SPA As explained in our Written Representations, we do not agree that predator management can be accepted as mitigation for impacts on lesser black-backed gull of the Alde-Ore Estuary SPA. Predator control is already in place in the main areas supporting lesser black-backed gulls, and it is not clear that further efforts in this regard would raise productivity significantly. We also question whether these measures within an SPA could lawfully be adopted as mitigation.	
3.6	RSPB	Can you clarify what information you consider is required to rule out cumulative operational displacement to North Sea populations of red-throated diver.
	A revised assessment for Norfolk Vanguard alone based on mean bird densities based on birds in flight and on the water, as advised by Natural England is required, and the outputs incorporated into a revised cumulative assessment. The assessment should then consider cumulative mortality based on displacement rates of up to 100% and mortality rates of up to 10% and, given that it would be expected that this would result in an increase of 2% or more on baseline mortality, PVA may then be required to assess the effect on the population. In order to rule out cumulative effects, density independent PVA outputs in the form of counterfactuals of population size must be presented to be considered alongside contextual information such as population status and importance, other potential sources of mortality and the extent of uncertainty in assessment.	
3.12	RSPB	Please set out what information you consider is required to enable cumulative operational displacement to North Sea populations of auks (guillemot, razorbill and puffins) to be ruled out?
	The cumulative assessment should be based on displacement rates of up to 100% and mortality rates of up to 10%. Given that it is likely that this would result in an increase of 2% or more on baseline mortality, PVA may then be required to assess the effect on the population. In order to rule out cumulative effects, density independent PVA outputs in the form of counterfactuals of population size must be presented to be considered alongside contextual information such as population status and importance, other potential sources of mortality and the extent of uncertainty in assessment.	
3.15	RSPB	Can you please explain what information is required to rule out cumulative collision mortality to North Sea populations of kittiwake and great black-backed gull?
	Kittiwake Given the level of collision mortality predicted, we do not consider that it will be possible to rule out cumulative collision risk mortality for North Sea populations of kittiwake. Using the density independent PVA model produced for East Anglia THREE, a decline of 10.3-10.9% in this population is predicted over 25 years, based on mortality of 4000 per year. We also consider that the Applicant's	

	<p>assessment of impacts for Norfolk Vanguard alone underestimates the project's contribution to cumulative collision risk, and that the revisions to the CRM discussed above would result in a higher contribution.</p> <p>Great black-backed gull</p> <p>Given the level of collision mortality predicted, we do not consider that it will be possible to rule out cumulative collision risk mortality for North Sea populations of great black-backed gull. Using the density independent PVA model produced for East Anglia THREE, a decline of 21.3-21.5% in this population is predicted over 25 years, based on mortality of 900 per year. We also consider that the Applicant's assessment of impacts for Norfolk Vanguard alone underestimates the project's contribution to cumulative collision risk, and that the revisions to the CRM discussed above would result in a higher contribution.</p>	
3.18	Applicant or RSPB or NE	Please provide the following papers that have been referred to in either the ES, NE's RR [RR-106] or RSPB's RR [RR-197]: Cleasby <i>et al</i> (2015), Furness (2015), Furness <i>et al</i> (2013), Furness <i>et al</i> (2018), Garthe <i>et al</i> (2004), Green <i>et al</i> (2016), MacGregor <i>et al</i> (2018), O'Brien <i>et al</i> (2017), Wade <i>et al</i> (2016).
	We understand that the Applicant has provided copies of these papers.	
20.	Content of the draft DCO (dDCO)	
20.117	NE and RSPB	In the relevant DML Conditions in Schedules 10 and 11 of the made DCO for East Anglia THREE and Requirement 2(2), there was a specified minimum draught height of 22m above MHWS, but there was also the stipulation of a maximum number of wind turbine generators (WTGs) with a draught height of less than 24m from MHWS. Are you satisfied that this has not been included in the dDCO for Norfolk Vanguard?
	<p>This condition was for the purpose of minimising collision risk by raising the height of the turbines, as this reduces the number of birds flying at Potential Collision Height and hence reduces likely collision mortality. We would welcome a similar approach for Norfolk Vanguard, but given the inadequacies of the CRM presented so far, we are not able to calculate reductions in predicted collisions for any given increases in turbine heights. Therefore whilst this would be likely to be beneficial, we are unable at this stage to say with any confidence what effect raising the height of the turbines would have for individual species or impact significance.</p>	

23.	Habitats Regulations Assessment	
23.34	NE and RSPB	In terms of the seasonal apportioning of impacts for the Alde-Ore Estuary SPA and Ramsar site, what figure do you consider should be applied to lesser black-backed gulls?
	<p>We consider that the apportioning of 25% of collision risk at Norfolk Vanguard to the Alde-Ore Estuary SPA is not sufficiently supported by evidence in two key areas: the estimation of the non-SPA lesser black-backed gull population and its likely growth rate, and the assumption that urban and inland gulls are likely to forage at sea to the same level as rural coastal birds.</p> <p>Whilst we acknowledge the difficulties arising from the lack of recent census data for urban gull colonies, the approach taken by the Applicant to estimate the urban gull population in Norfolk and Suffolk is speculative and lacking in precaution. A key source of information, the Seabird 2000 census, is missing from the cited colony counts and no evidence is provided for the rate chosen to account for colony growth since the last counts. The Seabird 2000 census carried out in 1999 – 2002 (Mitchell <i>et al.</i>, 2004) recorded 1149 apparently occupied nests (AON) in Suffolk roof-nesting colonies, 1605 AON in Norfolk coastal colonies, and 1456 in Suffolk Coastal colonies (excluding the SPA colony at Orfordness). This gives a total of 4210 AON outside the SPA, or 8420 adult birds. We acknowledge that these data do not include roof-nesting birds in Norfolk, and that the counts of roof-nesting birds are thought to be underestimated. More recent work by Coulson and Coulson (2015) suggests that results from the vantage point surveys of roof-nesting birds carried out for Seabird 2000 should be multiplied by 1.33 to correct for under-detection of nests. This would raise the number of adult birds in Norfolk and Suffolk to 9178 when the roof-nesting numbers for Suffolk are corrected in this way. Given that Norfolk is likely to be similar to Suffolk in terms of urban habitats available, it may be appropriate to double the numbers of urban birds in Suffolk to account for the missing Norfolk data. This would give a total non-SPA population of 12,234 adult birds, or 21,093 birds of all ages (assuming adults comprise 58% of the population, Furness, 2015), of which 10,539 are from urban colonies in Norfolk and Suffolk.</p> <p>JNCC (2018) discuss the growth rate of lesser black-backed gull colonies since the Seabird 2000 census, and conclude that there is insufficient evidence to allow a trend to be identified. Colonies display differing trends, due to differences in factors affecting their growth rate. Many large coastal colonies have undergone significant declines, including that of the Alde-Ore Estuary SPA at Orfordness, whilst some urban colonies, particularly in the south-east and north-west are known to have increased significantly. Given that JNCC (2018) cannot specify trend figures, and that the non-SPA population for Norfolk and Suffolk includes both urban colonies (likely to have increased) and rural coastal colonies (may have decreased), we therefore do not consider it safe to propose an overall level of population change for the non-SPA population since the Seabird 2000 census.</p> <p>There is also no discussion of the differences in foraging behaviour between urban and inland colonies and rural, coastal colonies. Whilst the evidence available is limited, some studies of lesser black-backed gull diet are available. Coulson and Coulson (2008) found no offshore marine component (i.e. fish or fish offal) in the diet of the lesser black-backed gull colony in Dumfries, in an analysis of regurgitated pellets. Food sources were predominantly agricultural (55% of pellets), from landfill sites (23%) or intertidal habitats (12%). Similarly, at an inland colony in the Netherlands (c.30km from the North Sea), Gyimesi <i>et al.</i> (2016) found no marine remains in an analysis of pellets and boluses, and found only 2 of 710 trips recorded by GPS tags visited the North Sea. Conversely, at two rural island</p>	

	<p>colonies in the south-eastern North Sea, Kubetzki and Garthe (2003) found that 80% of lesser black-backed gull pellets contained prey from coastal waters. Given this difference, we do not consider it safe to assume that birds from urban colonies will forage at sea to the same extent as those birds from rural coastal colonies, including the Alde-Ore Estuary SPA. There is an argument therefore, to exclude urban populations when considering apportioning to the SPA.</p> <p>Using the Applicant's calculation of 6,700 birds of all ages associated with the SPA, the apportioning to the Alde-Ore SPA would therefore be between 24.1% if urban birds are included ($6700/21093 + 6700$) and 38.8% when urban birds are excluded ($6700/10555 + 6700$). Given the discussion above, the lower figure (which is close to the Applicant's proposed 25%) is clearly unrealistic, and a figure likely to be at least 35% would be more appropriate.</p> <p>However, the RSPB further advocate the use of the theoretical approach as laid out in SNH guidance (SNH 2018). This theoretical approach is based on foraging range and three colony-specific weighting factors: colony size, distance of colony from site and the areal extent of the open sea within the foraging range of the relevant species.</p>	
23.37	RSPB	What value do you suggest should be apportioned to kittiwake breeding season apportioning in relation to the Flamborough and Filey Coast SPA?
	<p>The RSPB advocate the use of the theoretical approach as laid out in SNH guidance (SNH 2018) amended, as per the guidance, to take into account recent tracking data from Flamborough and Filey Coast SPA. This theoretical approach is based on foraging range and three colony-specific weighting factors: colony size, distance of colony from site and the areal extent of the open sea within the foraging range of the relevant species.</p> <p>Tracking of kittiwake from the Flamborough and Filey Coast SPA has been carried out from 2010 to 2015 and 2017-2018. The tags used between 2010 and 2015 were GPS tags that required recapturing of the birds and typically were only able to collect data for a period of a few days, around the time of late incubation and early hatching when the birds are likely to remain closest to the nest. The tags used in 2017-2018 were very lightweight tags that allowed for remote downloading of data so there was no need to recapture the birds. A different attachment method was also used which meant that the tags remained on for longer, between 20 and 29 days. This means that kittiwakes were tracked for a longer part of the breeding season including when adults were provisioning large chicks (that can be left for longer than small chicks). The tracking data for 2017 are presented in Wischniewski <i>et al.</i> (2018) and has been made available to the Applicant. The foraging ranges recorded during 2017 were greater than those previous recorded, with a maximum foraging range of</p>	

	<p>324km¹, and this is most likely to be a function of the longer tracking period. The tracking in 2017 also showed a high degree of overlap with Norfolk Vanguard. Data from 2018 is currently being analysed.</p> <p>As such we recommend that the applicant, in discussion with NE and RSPB, revise and recalculate the apportioning value for kittiwake using the amended SNH method which takes into account these recent tracking data. This value is likely to be higher than the current arbitrary suggested value.</p> <p>Marine Scotland have been developing a tool that uses the information from Wakefield <i>et al.</i>, (2017) to apportion birds to colonies. This is currently under internal review at Marine Scotland and is likely to be available soon. Once available it is likely to provide the best method for apportioning, for some species, including kittiwake.</p>
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¹ A further maximum foraging range of 346km was recorded from a tag retrieved subsequent to the cited report.