



NORFOLK BOREAS OFFSHORE WIND FARM

Planning Inspectorate Reference: EN010087

Deadline 9

29th April 2020

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**Natural England's comments on Norfolk Boreas In Principle Habitats  
Regulations Derogation, Provision of Evidence Appendix 1 Flamborough and  
Filey Coast SPA In Principle Compensation**

Our Ref NE.NB.D9.10.FFC

## **1. Summary of Natural England's advice**

- 1.1. Natural England welcomes the in principle compensation measures presented by Norfolk Boreas for kittiwakes at the Flamborough and Filey Coast (FFC) SPA. We believe that these proposals are in principle heading in the right direction in relation to addressing the ecological impacts. Although, we note that the compensation measure mostly likely to increase the FFC SPA productivity i.e. fisheries management measures has not been taken forward by Norfolk Boreas in the proposed approach to delivery and draft conditions to secure the compensation; with the Applicant in favour of providing nesting ledge provision for kittiwakes. Please be advised that we still have significant concerns in relation to the evidence base for this proposal, which requires much greater analysis, and implementation/legal issues to fully understand and address before this can be considered an appropriate compensatory measure to address collision mortality impacts.
- 1.2. Natural England does not consider it appropriate to restrict the potential compensation for kittiwakes at the FFC SPA to just the option of provision of artificial nesting sites at this time. Therefore, we would recommend that alternative draft conditions are produced which allow for a range of compensatory measures (e.g. to also include fisheries management). This would allow the Secretary of State (SoS) to consider the appropriateness of a range of potential compensatory measures.

## **2. Scale of Impact**

- 2.1. As noted in our EV9-003 and Deadline 9 responses to the updated Collision Risk Modelling (CRM) for Norfolk Boreas alone submitted by the Applicant in REP5-059 and REP7-029/30, Natural England welcomes the mitigation measures committed to by Norfolk Boreas through reduced numbers of turbines and increased draught heights.
- 2.2. Based on the collision predictions presented in REP5-059 and REP7-029/030 the revised collision predictions are now 14 kittiwakes from the Flamborough and Filey Coast (FFC) SPA (range of collisions to account for uncertainty in input parameters: 4-28), based on the new worst case scenario (WCS) of 14.7MW turbines with a draught height of 30m above mean high water springs (MHWS), using Natural England's preferred breeding season apportionment rate.
- 2.3. Using the updated WCS figures for both Norfolk Vanguard and Norfolk Boreas (as submitted by the Applicant in REP8-025/026), the in-combination collision totals when Natural England's preferred breeding season apportionment rates are applied for Norfolk Vanguard and Boreas for kittiwakes at the FFC SPA are 363 per annum if Hornsea Projects 3 and 4 are excluded from the total, and 699 per annum if Hornsea 3 and 4 are included.
- 2.4. The mitigation provided by Norfolk Boreas must either avoid or reduce as far as possible the impacts associated with the development. That mitigation should mean the development will not, alone, have an adverse effect on the integrity (AEoI) of the SPA. Any residual effects of the development which alone are not adverse must be considered in combination with the residual impacts of other plans and projects.

- 2.5. The revised predicted WCS collision predictions based on Natural England's preferred breeding season apportionment of 14 (range: 4-28) equates to less than 1% of baseline mortality of the FFC SPA kittiwake colony. On that basis, Natural England agrees that AEOL can be ruled out for kittiwake at the FFC SPA from Norfolk Boreas alone and therefore, there is no need for compensation due to Norfolk Boreas alone. However, we consider that there is an AEOL of these features due to in-combination collision mortality and that includes a contribution from Norfolk Boreas of 14 of 363 birds per annum if Hornsea 3 and 4 are excluded and 14 of 699 per annum if Hornsea 3 and 4 are included. Natural England notes that we have already advised at Hornsea 2 and East Anglia 3 examinations onwards that it was not possible to rule out an AEOL on the FFC SPA from operational and consented projects due to the level of annual in-combination collision mortality predicted for kittiwake. In Natural England's recent representations to the Secretary of State's consultations regarding the Hornsea 3 and Norfolk Vanguard, Natural England highlighted that the in-combination total of collision mortality across consented plans/projects had already exceeded levels which were considered to be of an adverse effect on integrity to kittiwake at FFC SPA, and that any additional mortality arising from these proposals would therefore be considered adverse. This would include additional mortality from Norfolk Boreas.
- 2.6. Whilst Norfolk Boreas's contribution to the in-combination totals for kittiwake at the FFC SPA has been significantly reduced by the mitigation, Natural England's position remains that Norfolk Boreas still makes a contribution to the total (based on the figures for the revised WCS in REP5-059 and REP7-029/030): of 14 (range: 4-28) kittiwakes from the FFC SPA for Natural England's preferred breeding season apportionment rates. It should be noted that the Norfolk Boreas alone figure of 14 is an estimation which is underpinned by a number of assumptions, several of which have considerable uncertainty associated with them. Accordingly, Natural England takes a range-based approach to considering impacts. We note Natural England's advice during the Thanet Extension examination was that whilst this project made a small contribution to the in-combination collision mortality, it could not be concluded that there would be no AEOL on the site by the project, when considered in-combination.
- 2.7. Norfolk Boreas notes that the reduced project alone kittiwake collision predictions are lower than those for several consented offshore wind farms (Hornsea One, Dogger Bank Creyke Beck A and B, Dogger Bank Teesside A and B and Triton Knoll). We note that these are already consented and therefore represent an already increased level of anthropogenic mortality that the Norfolk Boreas project adds to. The relative contribution of Norfolk Boreas compared to these consented projects is therefore not relevant. The assessment for Norfolk Boreas therefore needs to be in the context of this existing consented impact.
- 2.8. Norfolk Boreas note in paragraph 37 that the impacts from Norfolk Boreas alone are more than offset by the reductions in in-combination totals currently locked up in the available headroom, created by the difference between assessed, consented and as built schemes. Natural England has in REP6-049 and REP7-048 provided detailed comments raising several issues regarding the approach to headroom taken by Norfolk Boreas in REP4-014 and REP6-021. We also note that that if Norfolk Boreas

successfully identify headroom this does not necessarily mean that headroom is the project's to utilise, as there are multiple projects not yet consented.

- 2.9. Natural England therefore welcomes the 'in-principle' compensation measures proposed by Norfolk Boreas for kittiwakes at the FFC SPA.

### 3. Flamborough and Filey Coast (FFC) SPA

- 3.1. With regard to the 1987 count of 83,370 pairs of kittiwake at the site, we note our comments regarding this in REP4-037 and REP7-045.

### 4. Prey Enhancement

#### I. Closure of sandeel fishing to benefit kittiwakes at the FFC SPA

- 4.1. We agree that in principle, the enhancement of sandeel populations through the reduction or removal of fishing of the sandeel stocks on which FFC kittiwakes rely, is likely to be beneficial to that kittiwake population, and therefore is a compensatory measure worth exploring. Such a measure is likely to be of benefit to adult bird health/survival as well as productivity and this should be factored in when considering the merits of this approach.
- 4.2. However, much greater consideration is required of the evidence around the certainty that the sandeel stock will recover and by how much as fishing mortality is reduced (potentially to zero), or whether this is likely to be constrained by other environmental drivers (e.g. increases in abundance of sandeel predators, climate change, changes in sandeel prey abundance). Additionally, greater detail is required of the quantitative nature of the relationship between kittiwake productivity (and adult survival) and sandeel stock, to determine by how much fishing mortality needs to be reduced (again possibly to zero) in order to lead to the desired increase in kittiwake productivity.

#### a. Spatial scale

- 4.3. Due to the uncertainty of success and the uncertainty associated with the predicted level of impact, Natural England would suggest that the aim should not just be looking for an extra 28 chicks fledged to offset the 14 predicted additional mortalities (noting that the range of predictions is 4-28 kittiwake collisions), but that a multiplier should be applied (e.g. x2, x4) to reflect the uncertainty of success. We note that the examples of x2 or x4 are typical multipliers used in existing habitat related cases where there is uncertainty regarding the success of compensatory measures delivering required habitats. However, as this is an entirely new method of compensation, with significantly greater uncertainty around effectiveness, it therefore shouldn't necessarily be constrained by established multipliers. The appropriate figure should be derived from the best available evidence and deliver sufficient confidence for the competent authority to be sure that the adverse effects will be compensated for.
- 4.4. Greater scrutiny of the analysis by Carroll et al. (2017) and any other relevant studies is required in order to demonstrate the validity of the argument that halving fishing mortality (i.e. from 0.6, as given in paragraph 56, to 0.3), would see kittiwake productivity increase by 0.2 chicks per nest.
- 4.5. To ensure that compensatory measures are fully effective, if this option were progressed the number of kittiwake chicks that are being foregone currently at the FFC SPA would need to be calculated, rather than relying on a statement that there are "*large numbers of kittiwake chicks dying at the FFC SPA*". It would also need to

be demonstrated by how much the sandeel stock would need to increase in order to offset that, and by how much fishing effort would need to be reduced to deliver that increase in stock size. All these issues need to be carefully worked through, with a range of measures of variation included, in order to gauge the scale of the measure needed to deliver the desired benefit and to decide upon an appropriate multiplier, to ensure that, given the scale of uncertainty, impacts will be compensated for.

- 4.6. Natural England recognises that this sort of proposal has the potential to provide compensation for a positive outcome for the population for an order of magnitude greater than the risk from the Norfolk Boreas project in isolation. We agree that it is likely to be difficult to precisely deliver the exact amount of compensation required for Norfolk Boreas, and that it would also be very difficult to measure the effect of the very small change to productivity required to compensate for loss of the predicted number of kittiwakes predicted due to this development. But again consideration could be given to this option providing wider more strategic industry compensation. Please see point 4.8 below.
- 4.7. When deciding on a proposed location, consideration should also be given to the proposed extension projects and Round 4 offshore windfarm zones as the development of projects in those areas may limit the ongoing deliverables of any compensation measure. Whilst it is recognised that the onus will be on future projects to fully assess the impacts and address any hindrance to existing compensation measures, if possible we advise that potential spatial overlapping issues are avoided at project consenting.

***b. Timescale***

- 4.8. Natural England agrees that the recovery of sandeel stocks may be constrained by other environmental drivers (e.g. increases in abundance of sandeel predators, climate change, changes in sandeel prey abundance) and we therefore agree that any compensation (in terms of improved stock biomass) on these grounds should aim to exceed the minimum suggested by the statistical relationship between sandeel total stock biomass and kittiwake productivity.
- 4.9. Natural England considers this option has significant potential to deliver compensatory measures for multiple offshore windfarms (including Norfolk Boreas), noting that there are currently five offshore windfarm projects currently in examination, another likely to be submitted in 2020, and a series of seabed leases for extensions to existing North Sea windfarms. However, a more detailed analysis of the predicted scale of benefits would help strengthen the case for implementing this measure, and to demonstrate the scale of sandeel fishing reduction that would be required.

***c. Feasibility***

- 4.10. Natural England notes that if measures directly benefiting kittiwake at the FFC SPA are considered necessary (noting that compensation should be first aimed at the feature and site affected), then fisheries management would seem to be the only plausible option. We note that fishery closure for conservation of seabirds has been done in Scotland, so whilst not for offshore wind farm impacts in that case, the approach is not without precedent.

- 4.11. We recognise that this approach is not in Norfolk Boreas's gift to deliver alone, but it would likely require facilitation by the UK Government/the regulating authority. However, the benefits of this approach could be supportive of the wider offshore windfarm industry and help facilitate future progress towards 'net zero'.

## **II. Purchase of sandeel fishery quota**

- 4.12. As noted above regarding the closure of sandeel fisheries, there are again considerable uncertainties with this suggestion. Therefore, Natural England questions the aim that Norfolk Boreas simply needs to deliver 28 extra fledged kittiwakes per annum and suggests that the aim should not just be looking for an extra 28 chicks fledged to offset the 14 predicted additional mortalities (noting the range of predictions is 4-28 kittiwake collisions), but that an appropriately precautionary multiplier should be applied to reflect the uncertainties.
- 4.13. We consider the piecemeal approach whereby Norfolk Boreas might buy out the quota of a single or multiple vessels would come with high levels of uncertainty. Any non-linearity in the relationships between fishing mortality and subsequent sandeel stock size or kittiwake productivity may mean that reducing fisheries effort by purchasing the quota of many boats has no beneficial effect at all for kittiwake foraging success and productivity. It may be necessary to significantly reduce sandeel quotas to produce any tangible benefits. The work by Cury et al. (2011) indicates that non-linear relationships between seabird productivity and fish stock biomass are the normal pattern, so it will be necessary to identify the nature of the present relationship and the shift required to deliver sufficient compensation.
- 4.14. Therefore we would not advise in favour of this kind of approach unless it is undertaken in a precautionary (i.e. buying out a substantial proportion of quota in order to realise tangible benefits) manner.

## **5. Predator control / mortality reduction**

- 5.1. We agree with Norfolk Boreas that it is unlikely that predator control would significantly increase breeding success of kittiwake colonies to offset the predicted collision mortalities from the FFC SPA. We also note that predator control at other colonies will not benefit kittiwakes at the FFC SPA.

## **6. Productivity Improvement – Construction of artificial nest sites**

- 6.1. Natural England agrees that in principle, the provision of additional nest sites for kittiwakes in the southern North Sea/south-east of England might have the potential to be of benefit to the regional kittiwake population, though unlike sandeel fisheries management, this measure would not directly benefit the FFC SPA population.

Furthermore, we feel that greater confidence is needed on the following relevant issues:

- I. That there would be a net benefit to the overall kittiwake population size (not just simply causing a redistribution); and
  - II. That there are sufficient food resources within likely foraging range around any new location to support the required level of productivity.
- 6.2. In order to select potential new nesting locations that are not likely to result in the kittiwakes from the new colony entering into competition with the foraging ranges



of the FFC SPA, site selection could be informed by the modelled distribution of kittiwake from the FFC SPA shown in Cleasby et al. (2018). An analysis of population trends/productivity of kittiwake colonies in East Anglia with those in south-east England and the Channel, drawing on Hamilton et al. (2016), would also help identify locations that are most likely to host productive kittiwakes over the project lifetime. In addition, proximity to existing or proposed windfarms should be considered, in order to select a location where collision mortality will not risk the success of the compensatory measure.

**a. Delivery mechanism**

- 6.3. Whilst the creation of artificial nest sites in the southern North Sea/south-east England would have the obvious benefit of increasing the number of colonies, whether that delivers a net gain to the overall size of the kittiwake population will depend upon whether the birds that recruit to new colonies would be more productive than if they had tried to recruit to some existing colony. To establish this a better understanding of the nature and strength of density-dependence and an understanding of patterns of movement/immigration/emigration between colonies is likely to be required, together with perhaps the development of an integrated meta-population model that builds in that density dependence (e.g. such as the roseate tern model, Seward et al. 2019). As noted above, certainty is required around the availability of good food supplies around any proposed additional nest site location. Encouraging birds to nest in areas where they might come into significant levels of competition with birds from the large FFC SPA colony could reduce the amount of compensation provided, at least until the fishing pressure on the sandeel stock is reduced.
- 6.4. As noted above regarding fishery closures, a precautionary multiplier should be applied to take account of the uncertainty of success and of the level of the predicted impact, and aiming for double the number of kittiwake chicks produced to that predicted to be killed by collisions does not appear to robustly take account of this.
- 6.5. The compensation aspect of creating additional nesting sites would presumably involve purchasing or leasing the structure (for its new purpose), modifying it as needed, and then maintaining it and monitoring success. Alternatively a bespoke structure may need to be installed. We raise the question for the SoS as to how to ensure that the structure would form part of the Natura 2000 network and that it is appropriately protected and managed in the future. Recognising that there would be potential negative impacts to the N2K network if removal of said structure was proposed at the time of decommissioning.

**b. Spatial scale**

- 6.6. The information provided by Norfolk Boreas in paragraph 89 regarding the size and productivity of any new colonies required as compensation represents the broad nature of a future, more detailed analysis, which would be required to determine the sufficient level of compensation. The key aspect to demonstrate would be that the required number of individuals will reach breeding age in comparison to what would otherwise happen without the artificial structure i.e. that additional kittiwakes will be produced to compensate for the collision mortality. It would not

be sufficient to set up a new colony and attract kittiwakes to it if these birds were simply attracted from one existing colony (e.g. the FFC SPA) to the new one.

- 6.7. We agree that depending on the location of any artificial site and its proximity to wind turbines, there may be a risk that birds in the new colony are at risk of collisions themselves, thereby reducing the degree of compensation delivered for the FFC SPA. Therefore, the location of any new site needs to be carefully considered – see our comments above. This also again highlights the need to consider a multiplier to account for such issues and other uncertainties when deciding on the level of compensation required.
- 6.8. Natural England is uncertain of the merits of encouraging additional nesting close to key feeding areas on Dogger Bank (and also the large existing kittiwake colony at the FFC SPA) rather than elsewhere. Bolton et al. (2019) showed that segregation of foraging areas between colonies of seabirds is the norm. Therefore, the level of competition exerted by kittiwakes from the large FFC colony may effectively exclude foraging kittiwakes from other colonies which in theory could have overlapping foraging ranges. The distribution of foraging birds dictated by the point source foraging constraints of breeding compared to where the actual feeding resource is may indicate areas where a new colony would have access to ‘under-utilised’ foraging, thus securing sufficient productivity and minimising impacts on existing breeders. There is also the issue of introducing another hard substrate (the structure itself and any scour protection) into a soft substrate environment. These factors would need careful consideration before a final location for the artificial structure is selected.
- 6.9. When deciding on a proposed location, consideration should also be given to the proposed extension projects and Round 4 offshore windfarm zones as the development of projects in those areas may limit the ongoing deliverables of any compensation measure. Whilst it is recognised that the onus will be on future projects to fully assess the impacts and address any hindrance to existing compensation measures, if possible we advise that potential spatial overlapping issues are avoided at project consenting.

### *c. Timescale*

- 6.10. We would expect that by the time a project was consented that the compensation was agreed and shown to be deliverable on the ground. In the terrestrial world this is normally done by the windfarm agreeing terms with a landowner that only come into force if the agreement is approved and whose execution is a condition of permission. If a an artificial kittiwake nesting structure approach was to be agreed ‘in-principle’, then Norfolk Boreas would need to secure a site and prepare a detailed design so that Natural England can comment on the suitability of this before a conditional consent was discharged. The structure would need to be in place by the time construction of the windfarm started, and if offshore should include the provision of artificial nest structures. ‘Seeding’ artificial structures with nest domes from existing colonies (albeit those being lost to development) appears to have been successful in attracting kittiwakes to new locations on Tyneside (Peter Bell, former Gateshead Council ecologist, pers. comm.).

#### *d. Monitoring*

- 6.11. Natural England notes that monitoring of the changes in breeding numbers of kittiwake at the affected SPA and any new compensation colony will be needed as part of the package of measures. There will be a need to verify efficacy of the measures, so there will need to be a monitoring package that allows for kittiwake: (a) adult survival and (b) productivity at both the FFC SPA and any new compensation colony to be understood to quantify net impact. Monitoring at any new colony should also include tagging of birds using the site in order to be able to model the foraging range of these birds and relationships with windfarm infrastructure.
- 6.12. It should be noted that such monitoring of the FFC SPA colony will be required regardless of any compensation measure that is approved for impacts to this SPA (i.e. prey enhancement through fisheries closures/buying of quotas, productivity improvement through construction of nest sites). However, we note that monitoring in itself is **not** a compensation measure.
- 6.13. Natural England has concerns regarding the use of a figure of 0.8 chicks per pair as a suitable target to include within any licence condition as a measure of success of the compensation measure. Other studies e.g. Frederikson et al. (2004) and Cook & Robinson (2010) have calculated higher productivity levels are needed to produce stable population trends, so this matter requires further consideration to produce an agreed productivity target.

#### *e. Feasibility*

- 6.14. The availability of nest ledges at the FFC SPA is not thought to be a limiting factor for the kittiwake population at the site at present. In any event kittiwakes using new nest sites provided at Flamborough would be competing with the c50,000 pairs of kittiwake already present at the colony.
- 6.15. In that context, Norfolk Boreas notes that further south of Flamborough, nest sites are limited by a lack of suitable natural cliffs, the East Anglian colonies being artificial in nature (Lowestoft Pier and Sizewell Outfall). Therefore, providing a man-made site further south would increase the ability of kittiwake to utilise waters further away from the FFC SPA colony. These birds would also be less exposed to competition for prey resources from the Flamborough foragers, though as noted above it would need to be demonstrated that these birds would not be exposed to a level of collision risk from offshore windfarms that would prevent compensation from being effective. Nevertheless, we agree with Norfolk Boreas that this is in principle a feasible option, though further analysis is required to identify a suitable location. Please see below for comments on Norfolk Boreas's proposed approach to delivery of such a measure.

### **7. Proposed approach to delivery of compensation and DCO condition**

- 7.1. Part 1 of paragraph 100 suggests that Natural England agrees with what follows. We are not in a position as yet to agree that the nest sites should be located offshore on a meteorological mast, and nor have we agreed where that structure might best be

located. We note that use of a meteorological mast-type structure is novel as an artificial nesting structure for kittiwakes. However, we note that kittiwakes are known to occupy offshore rigs and so the concept seems reasonably likely to be successful, provided that the structure is designed to provide sufficient ledges with appropriate shelter/exposure to weather conditions, and that these are not susceptible to predation from large gulls. However, greater certainty is required that an artificial nesting site is likely to deliver a net increase in the size of the kittiwake population, and not just a redistribution of existing breeders.

7.2. Norfolk Boreas state that the artificial nest sites are likely to be constructed within the existing Order limits for the project. Part 3 of paragraph 100 suggests that there is the potential to locate the artificial nest sites away from turbines whilst within the Order limits. If the artificial nest site structures are to be located within the project's Order limits then it is highly likely that any birds that nest there will be at immediately greater collision risk than those nesting at the FFC SPA, limiting (perhaps severely) the effectiveness of the compensation measures. Therefore Natural England questions whether this represents an appropriate or sustainable location for compensatory measures, and advises that before any location can be agreed, a greater amount of evidence and analysis is required regarding the merits and risks of adding nests:

- I. Within the Order limit as opposed to elsewhere within the FFC SPA kittiwake foraging range;
- II. Somewhere else completely different away from the FFC SPA.

7.3. The approach and draft conditions are limited to construction of artificial nest sites, as Norfolk Boreas consider this to be the most appropriate measure to deliver compensation prior to the construction of Norfolk Boreas. Natural England does not consider it appropriate to restrict the potential compensation to just this option at this time. Therefore, we would recommend that alternative draft conditions are produced which allow for a range of compensatory measures (e.g. to also include fisheries management options). This would allow the SoS to consider the appropriateness of a range of compensatory measures.

## 8. References

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