



**Written Submission**

**for the**

**Royal Society for the Protection of Birds**

**Submitted for Deadline 15**  
**1<sup>st</sup> September 2020**

**Planning Act 2008 (as amended)**

**In the matter of:**

**Application by Norfolk Boreas Limited for an**  
**Order Granting Development Consent for the**  
**Norfolk Boreas Offshore Wind Farm**

**Planning Inspectorate Ref: EN010087**  
**Registration Identification Ref: 20022916**

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## 1. Summary

- 1.1 The UK is of outstanding international importance for its breeding seabirds, including northern gannet for which the UK supports over 50% of the world population and around 10% of the world population of black-legged kittiwake. As with all Annex I and regularly occurring migratory species, the UK has particular responsibility under the Birds Directive<sup>1</sup> to secure the conservation of these important seabird populations. This importance has been acknowledged in the Examining Authority's report on Norfolk Vanguard.
- 1.2 The Conservation Objectives and Supplementary Advice for the Flamborough and Filey Coast SPA and the Alde-Ore Estuary SPA provide the primary guidance regarding action needed to ensure the populations of qualifying features and seabird assemblages remain in favourable condition. These have been based on the best available advice and evidence and provide the basis for considering how projects may impact on Protected Areas. We detail this in section 3 and specifically Table 3.
- 1.3 We set out our expectations with respect to the legal process against which Norfolk Boreas must be assessed in section 4. A key starting point in addressing the Regulations 64 and 68, Habitats Regulations, derogation tests is agreeing the nature and magnitude of the predicted and potential adverse effects on the impacted Natura 2000 site(s) and its/their features. It is of critical importance that this be done to a common, agreed standard to ensure the tests are addressed in a robust, fair and proportionate way in decisions by the competent authority relating to this and any future offshore wind farm schemes. Importantly, there needs to be a transparent link between these two aspects to ensure the compensatory measures are targeted at the requirements of the SPA feature(s) adversely affected.
- 1.4 In section 5, we clarify the RSPB's position at the end of the Norfolk Vanguard examination, including the extension. For gannet, guillemot and razorbill, we considered that adverse effects on integrity existed in-combination with Hornsea Three. For kittiwake, we considered that adverse effects on integrity existed irrespective of whether the impacts of Hornsea Three were included. Consequently, we could also not rule out an adverse effect on the seabird assemblage. The RSPB also concluded adverse effects on integrity existed in respect of the lesser black-backed gull population of the Alde-Ore Estuary SPA when the Norfolk Vanguard scheme was considered in-combination with other plans or projects. This was a significant shift in position – moving from a position where we were unable to exclude the risk of adverse effects on integrity

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<sup>1</sup> Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version) (the Birds Directive).

to one where we were confident that effects existed, and reflects a continuing development of our understanding of the impacts of offshore wind farms in the southern North Sea on the seabirds of the Flamborough and Filey Coast SPA (as well as other protected sites).

1.5 The RSPB's current position on potential impacts from the Norfolk Boreas project are summarised in Section 6. We conclude that adverse effects on site integrity on the **Flamborough and Filey Coast SPA** exist, with reference to the following SPA features:

- **Kittiwake:** in-combination effects due to collision risk (adverse effect on site integrity exists irrespective of whether Hornsea Three and Four figures are included)
- **Gannet:** in-combination effects due to collision risk and exacerbated by operational displacement (adverse effect on site integrity exists irrespective of whether Hornsea Three and Four figures are included)
- **Guillemot:** in-combination effects due to operational displacement (adverse effect on site integrity exists when mortality Hornsea Three and Four figures are included)
- **Razorbill:** in-combination due to operational displacement (adverse effect on site integrity exists when mortality Hornsea Three and Four figures are included)
- **Seabird assemblage:** in-combination (not possible to rule out adverse effect on site integrity due to collision risk and operational displacement. This is based on combined impacts of: kittiwake, gannet, guillemot and razorbill).

1.6 We also conclude that adverse effects on site integrity on the **Alde-Ore Estuary SPA** exist, with reference to the following SPA feature:

- **Lesser black-backed gull:** in-combination effects due to collision risk.

1.7 In addition, the RSPB considers the following cumulative EIA impacts on the **North Sea populations** are significant:

- **Kittiwake and great black-backed gull:** collision risk;
- **Red-throated diver, guillemot and razorbill:** operational displacement;
- **Gannet:** collision risk and operational displacement.

1.8 Whilst the RSPB is aware of the Secretary of State's conclusion on Norfolk Vanguard in which he considered that the scheme would not have an adverse effect on the integrity the RSPB respectfully disagrees. We consider the Secretary of State has misunderstood the practical reality of the nature of these accumulating in-combination impacts on the affected seabird SPA populations, how they compromise the ability to restore or maintain the integrity of their respective SPAs and thereby meet the relevant site conservation objectives. Our position is in

broad agreement with Natural England's submission at Deadline 14<sup>2</sup> and its response to Q5.8.4.1 in particular. We draw particular attention to the following:

"...each additional impact beyond an already detrimental level, be it in terms of reduced colony growth rates or population abundance, will take the population further away from its desired state and the attainment of the required favourable condition more difficult e.g. by making the population more prone to stochastic events (such as winters with low survival rates or breeding seasons with poor food availability), or impairing the effectiveness of conservation measures."<sup>3</sup>

1.9 In section 7, we set out the justification for our current position, with a particular focus on impacts on kittiwake from the from the Flamborough and Filey Coast SPA and lesser black-backed gulls from the Alde-Ore Estuary SPA which have suffered significant declines from their favourable levels: c.40-50% and c.87% respectively. The in-combination impacts of Norfolk Boreas will cause each population to deteriorate further from its current unfavourable level, contrary to its conservation objectives.

1.10 As all are aware, the Application can only be granted consent if the Secretary of State is convinced that it will not have an adverse effect on the integrity of European Sites and their qualifying features, having applied the precautionary principle and taken account of the conservation objectives for those sites and their features. *Waddenzee* confirmed that where reasonable scientific doubt remains as to the absence of adverse effects on the integrity of the site, approval should be refused<sup>4</sup>, subject to the consideration of alternative solutions, imperative reasons of overriding public interest and the provision of compensatory measures, as set out in regulations 64 and 68 of the Conservation of Habitats and Species Regulations 2017. We consider the Applicant's approach to its derogation case in section 8.

1.11 In light of the Secretary of State's guidance to applicants contained in his Norfolk Vanguard decision letter, and his clear statement that there is no guarantee he will request post-examination information in the future, the decision not to provide additional information on compensatory measures is at the Applicant's own risk. It means the Examining Authority has no detailed evidence in front of it as to:

- Whether the compensation measures will be sufficient, if the Secretary of State were to conclude an adverse effect on integrity of an SPA feature could not be ruled out; and

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<sup>2</sup> Natural England's response to Examining Authority's Fifth round of Written Questions (REP14-064)

<sup>3</sup> See page 26 of REP14-064

<sup>4</sup> CJEU Case-127/02; [2004] ECR-7405 at [56]-[57]

- That those compensation measures had been secured.

1.12 For the reasons given in section 7, it is the RSPB's view that an adverse effect on integrity on both the Flamborough and Filey Coast SPA and Alde-Ore Estuary SPA cannot be ruled out. In deciding not to submit a detailed derogation case that demonstrates that sufficient compensation measures with a reasonable guarantee of success have been secured, the Applicant leaves the Secretary of State in the position of having to refuse consent should he conclude that an adverse effect on integrity on one or both of those SPAs cannot be ruled out.

## 2. Introduction

2.1 In the Rule 17 letter questions (in lieu of an oral hearing on offshore ornithology matters), the RSPB was asked to provide its position following publication of the Secretary of State's decision letters for the Norfolk Vanguard and Hornsea Three offshore wind farm projects on 1<sup>st</sup> July 2020. The RSPB is grateful for the opportunity to make submissions in response to the Secretary of State's decision letters and confirmed that we would provide more detailed comments once we had completed our review of the implications of the decision letters.

2.2 This document sets out the RSPB's views on those matters and considers:

- The nature conservation importance of the seabirds affected by the Norfolk Boreas offshore wind farm scheme:
  - The features of the Flamborough and Filey Coast SPA and their conservation objectives;
  - The features of the Alde-Ore Estuary SPA and their conservation objectives;
- Legal requirements;
- The RSPB's position at the end of the Norfolk Vanguard extended consultation;
- The RSPB's current position on the Norfolk Boreas scheme;
- The RSPB's conclusions on Norfolk Boreas and the affected SPA features of the Flamborough and Filey Coast SPA and the Alde-Ore Estuary SPA;
- The RSPB's position regarding the Norfolk Boreas derogation case.

2.3 While we appreciate that some of the information in this submission may have been included in earlier submissions, for ease of reference we have included all relevant background information here to provide context to our comments and observations.



### 3. The nature conservation importance of the seabirds affected by the Norfolk Boreas offshore wind farm scheme

#### Context

3.1 The UK is of outstanding international importance for its breeding seabirds, including northern gannet for which the UK supports over 50% of the world population and around 10% of the world population of black-legged kittiwake (Table 1). As with all Annex I and regularly occurring migratory species, the UK has particular responsibility under the Birds Directive<sup>5</sup> to secure the conservation of these important seabird populations. This importance has been acknowledged in the Examining Authority’s report on Norfolk Vanguard.

**Table 1: Proportion of the world population of seabird species relevant to the Norfolk Boreas project that the UK supports.**

Species	% World population	Status
Northern gannet <sup>6</sup>	c.56	Most increasing, but a few colonies have declined
Black-legged kittiwake <sup>7</sup>	8	Declining
Common guillemot <sup>8</sup>	c.13	Some colonies increasing but many declining
Razorbill <sup>9</sup>	c.22	A few colonies increasing but many declining
Lesser black-backed gull ( <i>graellsii</i> ) <sup>10</sup>	c.38 [c.63% of <i>graellsii</i> sub-species]	Most declining, including many large coastal colonies

#### The Flamborough and Filey Coast SPA

##### Qualifying features

3.2 The Flamborough Head and Bempton Cliffs SPA was designated under Article 4(2) of the Birds Directive as an SPA in 1993 due to the presence of 83,370 pairs<sup>11</sup> of black-legged kittiwake (*Rissa tridactyla*), representing 4% of the Eastern Atlantic breeding population. In 2001, the UK SPA Review<sup>12</sup> found that it also qualified under Article 4(2) as a site regularly supporting at least

<sup>5</sup> Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version) (the Birds Directive).

<sup>6</sup> <https://jncc.gov.uk/our-work/northern-gannet-morus-bassanus/>

<sup>7</sup> <https://jncc.gov.uk/our-work/black-legged-kittiwake-rissa-tridactyla/>

<sup>8</sup> <https://jncc.gov.uk/our-work/guillemot-uria-aalge/>

<sup>9</sup> <https://jncc.gov.uk/our-work/razorbill-alca-torda/>

<sup>10</sup> <https://jncc.gov.uk/our-work/lesser-black-backed-gull-larus-fuscus/>: based on biogeographic population for

<sup>11</sup> The Applicant has previously disputed this figure; however we note that Natural England and JNCC have carefully reviewed the evidence and concluded that the figure is accurate and is an appropriate target for restoration to favourable conservation status – see Natural England’s submissions REP4-040 & REP7-045.

<sup>12</sup> Stroud, DA, Chambers, D, Cook, S, Buxton, N, Fraser, B, Clement, P, Lewis, P, McLean, I, Baker, H & Whitehead, S (eds). 2001. The UK SPA network: its scope and content. JNCC, Peterborough.

20,000 seabirds, as at the time of designation the site regularly supported 305,784 individual seabirds including: Atlantic puffin (*Fratercula arctica*), razorbill (*Alca torda*), guillemot (*Uria aalge*), European herring gull (*Larus argentatus*), gannet (*Morus bassanus*), and kittiwake. Kittiwake and the seabird assemblage are therefore the qualifying features of this SPA.

3.3 In January 2014, Natural England held a consultation on proposals to change the SPA. The proposals comprised changes to the designated site boundary including extending it to cover part of the Filey Coast (hence the change in its name) and changes to the numbers of qualifying species. This new site was formally designated in August 2018<sup>13</sup>, incorporating the Flamborough Head and Bempton Cliffs SPA.

3.4 At the same time, Natural England also conducted a review of the seabird populations using contemporary data (Natural England Departmental Brief 2014<sup>14</sup>). A summary of Natural England's review of the ornithological interest of the SPA is as follows with the key features set out in more detail in Table 2 below:

"The application of the JNCC SPA selection guidelines to current data for this site confirm that it qualifies by regularly supporting internationally important numbers of breeding black-legged kittiwakes, northern gannet, common guillemot and razorbill and an assemblage of European importance of over 20,000 breeding seabirds. Black-legged kittiwake, northern gannet, common guillemot and razorbill are all main components of the assemblage and present in internationally important numbers. However, northern fulmar is also present in sufficient numbers to warrant being listed as main component species of the assemblage, since numbers exceed 2,000 individuals (10% of the minimum qualifying assemblage of 20,000 individuals). In addition, Atlantic puffin, herring gull, European shag (*Phalacrocorax aristotelis*) and great cormorant (*Phalacrocorax carbo*) are also part of the breeding seabird assemblage."

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<sup>13</sup> [Flamborough and Filey Coast SPA citation, updated August 2018](#)

<sup>14</sup> Natural England (2014) Proposed extension to Flamborough Head and Bempton Cliffs Special Protection Area and renaming as Flamborough and Filey Coast potential Special Protection Area. Departmental Brief. Natural England.

**Table 2: Summary of Ornithological Interest of the SPAs**

Feature	Count (period)	% of subspecies or population (pairs)	Interest Type
<b>Flamborough Head and Bempton Cliffs SPA</b>			
Black-legged kittiwake <i>Rissa tridactyla</i>	83,700 pairs (1987)	4% Western Europe	Migratory
<b>Flamborough and Filey Coast SPA</b>			
Black legged kittiwake <i>Rissa tridactyla</i>	44,520 pairs 89,041 breeding adults (2008-2011)	2% North Atlantic	Migratory
Northern gannet <i>Morus bassanus</i>	8,469 pairs 16,938 breeding adults (2008-2012)	2.6% North Atlantic	Migratory
Common guillemot <i>Uria aalge</i>	41,607 pairs 83,214 breeding adults (2008-2011)	15.6% ( <i>Uria aalge albionis</i> )	Migratory
Razorbill <i>Alca torda</i>	10,570 pairs 21,140 breeding adults (2008-2011)	2.3% ( <i>Alca torda islandica</i> )	Migratory
	<b>Count period</b>	<b>Average number of individuals</b>	
<b>Seabird assemblage</b>	<b>2008-2012</b>	<b>215,750</b>	

3.5 Natural England has set out conservation advice for the Flamborough and Filey Coast SPA, including Conservation Objectives<sup>15</sup> and Supplementary Advice on Conservation Objectives<sup>16</sup>. Below, we summarise the key aspects of that conservation advice.

### Conservation Objectives

3.6 The Conservation Objectives for the Flamborough and Filey Coast SPA are as follows:

*“...to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;*

- *The extent and distribution of the habitats of the qualifying features*
- *The structure and function of the habitats of the qualifying features*
- *The supporting processes on which the habitats of the qualifying features rely*
- *The population of each of the qualifying features*

<sup>15</sup> [Natural England Conservation Advice for Marine Protected Areas: Flamborough and Filey Coast SPA \(dated 13 March 2020\)](#). Accessed 24 August 2020.

<sup>16</sup> [Natural England: Flamborough and Filey Coast SPA: Supplementary Advice on Conservation Objectives \(updated 13 March 2020\)](#). Accessed 24 August 2020.

- *The distribution of the qualifying features within the site.”*
- 3.7 Since this site was originally designated as an SPA in 1993, the national populations of both kittiwake and some assemblage species have suffered substantial declines. For example, the UK breeding kittiwake population has reduced by 70% since 1986 (State of the UK’s Birds, 2017<sup>17</sup>). Within the SPA there has been an approximate 40-50% reduction in the kittiwake population from the original 83,700 breeding pairs (designation population, 1987) to an average of 44,520 breeding pairs between 2008 and 2011. A single year full colony count in 2017 indicated 51,535 pairs across the SPA.<sup>18</sup>
- 3.8 The current SPA citation does not reflect this substantial decline in the population of breeding kittiwake or other seabird species included under the assemblage feature (see below for more detail on the recent kittiwake population trends including productivity).

*Supplementary Advice on Conservation Objectives (dated 13 March 2020)*

- 3.9 Natural England’s Supplementary Advice on the Conservation Objectives for the Flamborough and Filey Coast SPA<sup>19</sup> identifies, for each SPA feature, key attributes and targets. Attributes<sup>20</sup> are the ecological characteristics or requirements of the classified features within the SPA and deemed to best describe the site’s ecological integrity. If safeguarded this will enable achievement of the Conservation Objectives and favourable conservation status for all the designation features, including the assemblage.
- 3.10 Table 3 below sets out, for each qualifying feature, the targets in respect of the following attributes:
- Breeding population: abundance;
  - Connectivity with supporting habitats;
  - Disturbance caused by human activity;
  - Extent and distribution of supporting habitat for the breeding season; and
  - Food availability.

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<sup>17</sup> [Hayhow D.B., Ausden M.A., Bradbury R.B., Burnell D., Copeland A.I., Crick H.Q.P., Eaton M.A., Frost T., Grice P.V., Hall C., Harris S.J., Morecroft M.D., Noble D.G., Pearce-Higgins J.W., Watts O., Williams J.M. \(2017\) State of the UK’s Birds 2017. The RSPB, BTO, WWT, DAERA, JNCC, NE and NRW, Sandy, Bedfordshire.](#)

<sup>18</sup> [Natural England: Flamborough and Filey Coast SPA: Supplementary Advice on Conservation Objectives \(updated 13 March 2020\).](#) Accessed 24 August 2020.

<sup>19</sup> [Natural England: Flamborough and Filey Coast SPA: Supplementary Advice on Conservation Objectives \(updated 13 March 2020\).](#) Accessed 24 August 2020.

<sup>20</sup> [Natural England: Flamborough and Filey Coast SPA: Supplementary Advice on Conservation Objectives \(updated 13 March 2020\).](#) Accessed 24 August 2020.

3.11 The RSPB considers these attributes and targets are particularly relevant to consideration of the Norfolk Boreas scheme as they respectively relate to:

- the population levels at which the features should be maintained or restored to;
- the need to:
  - maintain or restore safe passage of birds moving between their nesting and feeding areas;
  - reduce/avoid disturbance to foraging, feeding, moulting and/or loafing birds;
  - maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle; and
  - maintain or restore the distribution, abundance and availability of key food and prey items.

**Table 3: Flamborough and Filey Coast SPA: supplementary advice on conservation objectives – breeding population (abundance) and connectivity with supporting habitats.**

SPA feature	Attribute	Target	Season	Site specific comments
Kittiwake (breeding)	Breeding population: abundance	Restore the size of the breeding population at a level which is above 83,700 breeding pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	Breeding (summer season)	Current population figures indicate major decline since designation population count (1987).  Ongoing trend of low breeding productivity.
	Connectivity with supporting habitats	Restore safe passage of birds moving between nesting and feeding areas	Year-round	NE has advised regulators that predicted in-combination collision mortality from consented or proposed offshore wind farms could adversely affect the integrity of the SPA.
	Disturbance caused by human activity	Restrict the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed	Breeding (summer season)	This species may be vulnerable to impacts of habitat loss, displacement and collision from offshore activities.
	Supporting habitat: extent and distribution of supporting habitat for the breeding season	Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding) at existing level.	Year round – to ensure the habitat remains suitable for when the feature is present	Colony reliant on chalk and limestone ledges, water column out to 2km for feeding and loafing, and the offshore environment for feeding.

SPA feature	Attribute	Target	Season	Site specific comments
	Supporting habitat: food availability	Restore the distribution, abundance and availability of key food and prey items (e.g. sandeel, sprat, cod, squid, shrimps) at preferred sizes.	Year-round	Kittiwake feed mainly on small shoaling fish near the sea surface. Evidence for the wider North Sea indicates that availability of sandeels is likely to be a factor in kittiwake decline. Recent evidence suggests that the decline in sandeel in the area around Flamborough may be attributable to fishing activity. Sea surface temperature rise (related to climate change) may be an additional factor in reduction in sandeel availability.
Gannet (breeding)	Breeding population: abundance	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.	Breeding (summer season)	Latest colony count (2017) showed increase to 13,392 Apparently Occupied Nests (AON).
	Connectivity with supporting habitats	Maintain safe passage of birds moving between nesting and feeding areas.	Year-round	Evidence that gannet may be vulnerable to collision with offshore turbines. They are also sensitive to displacement effects.
	Disturbance caused by human activity	Restrict the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed	Breeding (summer season)	This species may be vulnerable to impacts of habitat loss, displacement and collision from offshore activities.
	Supporting habitat: extent and distribution of supporting habitat for the breeding season	Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding) at: current extent.	Year round – to ensure the habitat remains suitable for when the feature is present	Colony reliant on 5km of high cliffs at Bempton, water column out to 2km for feeding and loafing, and the offshore environment for feeding.
	Supporting habitat: food availability	Maintain the distribution, abundance and availability of key food and prey items (e.g. Herring, mackerel, sprat, sandeel) at preferred sizes.	Year-round	

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<b>SPA feature</b>	<b>Attribute</b>	<b>Target</b>	<b>Season</b>	<b>Site specific comments</b>
Guillemot (breeding)	Breeding population: abundance	Maintain the size of the breeding population at a level which is above 41,607 breeding pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	Breeding (summer season)	[No post-designation colony count noted.]
	Connectivity with supporting habitats	Maintain safe passage of birds moving between nesting and feeding areas.	Year-round	Cumulative effect of habitat loss and displacement due to offshore developments may result in reduced breeding productivity and/or lower adult fitness and survival.
	Disturbance caused by human activity	Restrict the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed	Breeding (summer season)	This species may be vulnerable to impacts of habitat loss, displacement and collision from offshore activities.
	Supporting habitat: extent and distribution of supporting habitat for the breeding season	Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding).	Year round – to ensure the habitat remains suitable for when the feature is present	Colony reliant on chalk and limestone ledges, water column out to 2km for feeding and loafing, and the offshore environment for feeding.
	Supporting habitat: food availability	Maintain the distribution, abundance and availability of key food and prey items (e.g. sandeel, herring, sprat) at preferred sizes.	Year-round	Recent studies at Flamborough Head indicate that clupeid species (most likely sprats) form 91.5% of guillemot chick diet. They have also been recorded to forage for sandeels and gadoid species.
Razorbill (breeding)	Breeding population: abundance	Maintain the size of the breeding population at a level which is above 10,570 breeding pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	Breeding (summer season)	The 2017 colony count indicated approximately 20,253 pairs across the site.
	Connectivity with supporting habitats	Maintain safe passage of birds moving between nesting and feeding areas.	Year-round	Cumulative effect of habitat loss and displacement due to offshore developments may result in reduced breeding productivity and/or lower adult fitness and survival.

SPA feature	Attribute	Target	Season	Site specific comments
	Disturbance caused by human activity	Restrict the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed	Breeding (summer season)	This species may be vulnerable to impacts of habitat loss, displacement and collision from offshore activities.
	Supporting habitat: extent and distribution of supporting habitat for the breeding season	Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding).	Year round – to ensure the habitat remains suitable for when the feature is present	Colony reliant on chalk and limestone ledges, water column out to 2km for feeding and loafing, and the offshore environment for feeding.
	Supporting habitat: food availability	Maintain the distribution, abundance and availability of key food and prey items (e.g. sandeel, sprat, krill) at preferred sizes.	Year-round	Recent studies at Flamborough Head indicate that almost 90% of razorbill chick diet was sandeels, with a smaller proportion of clupeid species (most likely sprats).
Seabird assemblage (breeding)	Assemblage of species: abundance	Maintain the overall abundance of the assemblage at a level which is above 216,730 individuals whilst avoiding deterioration from its current level as indicated by the latest peak mean count or equivalent.	Breeding (summer season)	[No post-designation colony count noted.]
	Disturbance caused by human activity	Restrict the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed	Breeding (summer season)	Offshore: some species may be vulnerable to impacts of habitat loss, displacement and collision from offshore activities.
	Supporting habitat: extent and distribution of supporting habitat for the breeding season	Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding) current extent - (water column; vegetated sea cliffs of the Atlantic and Baltic coast; intertidal rock).	Year round – to ensure the habitat remains suitable for when the feature is present	

3.12 The RSPB considers these attributes and targets are directly relevant to the consideration of whether the SPA's conservation objective to maintain or restore site integrity can be met and



the SPA achieve favourable conservation status for all its features including the seabird assemblage.

### Kittiwakes

3.13 With particular reference to the SPA kittiwake population, we note that Natural England's Supplementary Advice refers to Aitken *et al.*, 2017<sup>21</sup> where recent census data has shown that kittiwake productivity has declined rapidly at the SPA: more recent data shows productivity has remained low (see Figure 1 below). As a long-lived species, such lowering in productivity will take some time before it becomes apparent in population numbers. However, if this trend continues it will have severe long-term impacts on the population growth.

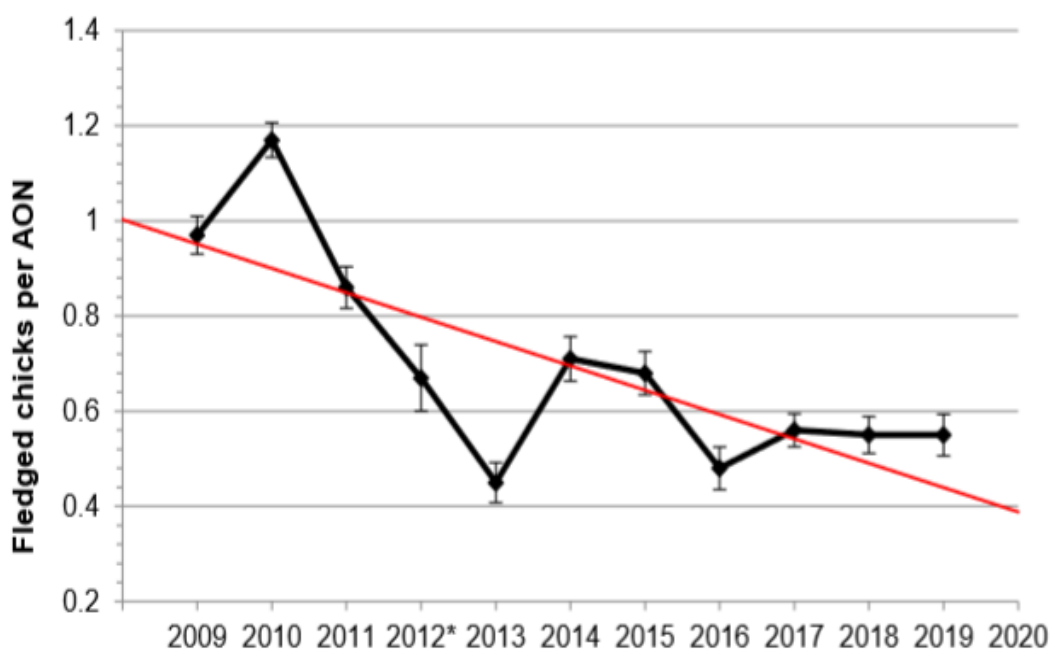


Figure 1: Reproduction of Fig.3 from Lloyd *et al.* (2019).<sup>22</sup> Flamborough/Bempton black-legged Kittiwake productivity 2009-2019, mean of plot results plus/minus SE.

3.14 The JNCC (2018a)<sup>23</sup> discusses the rapid decline in the UK kittiwake population observed since the early 1990s and links this to declining productivity and adult survival, with declines in sandeel prey and the effects of climate change on sea surface temperatures noted as likely contributory

<sup>21</sup> Aitken, D., Babcock, M., Barratt, A., Clarkson, C. and Prettyman, S. (2017). Flamborough and Filey Coast pSPA Seabird Monitoring Programme: RSPB.

<sup>22</sup> Lloyd, I., Aitken, D., Wildi, J. and O'Hara, D. (2019) Flamborough and Filey Coast SPA Seabird Monitoring Programme 2019 Report. RSPB and Natural England. Pp 44.

<sup>23</sup> [JNCC \(2018a\) Latest population trends: black-legged kittiwake.](#)

factors. Frederiksen *et al.* (2004)<sup>24</sup> also demonstrated the vulnerability of kittiwake populations to human activities through a study based on the Isle of May. Their population modelling showed that this population was unlikely to increase should the local sandeel fishery remain active and would be likely to decline further if sea surface temperature also increased, due to effects on both productivity and adult survival.

- 3.15 Given this context of continued declines in the UK kittiwake population since the early 1990s and the effect of anthropogenic impacts on adult survival and productivity, the RSPB considers that offshore windfarm mortality could add significantly to the multiple stressors affecting this population and reduce the likelihood of population recovery. We return to this in section 7 below, demonstrating that Norfolk Boreas, in-combination with other offshore wind farms, will exacerbate the cumulative impacts on the Flamborough and Filey Coast SPA kittiwake population and make it more difficult to meet its conservation objective to restore the population to favourable status.

## The Alde-Ore Estuary SPA

### *Qualifying features*

- 3.16 The main feature of the Alde-Ore Estuary SPA affected by the Application is the breeding lesser black-backed gull population, the majority of which currently breed at Havergate Island (which is a RSPB reserve) and, to a much-reduced extent, Lantern Marshes on Orfordness (a National Trust reserve).
- 3.17 The Alde-Ore Estuary SPA was classified in 1996<sup>25</sup> for, among other things, supporting 12% of the British population and 8% of the biogeographic population of breeding lesser black-backed gulls of the *graellsii* race. Natural England established a peak-mean population of 14,070 pairs based on the period 1994-1997. Following classification, the lesser black-backed gull population experienced a rapid increase in the late 1990s, peaking in 2000. This is reflected in the population of 21,700 pairs described in the Alde-Ore Estuary SPA site account in the UK SPA Review (Stroud *et al.* 2001). Since this time, the population has experienced a severe decline, such that in 2019 there were only 1,717 breeding pairs recorded in the Alde-Ore Estuary SPA. Further details of the population figures are set out in Table 4 and Figure 2 below.

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<sup>24</sup> Frederiksen, M., Harris, M.P., Daunt, F., Rothery, P. and Wanless, S. 2004. The role of industrial fisheries and oceanographic change in the decline of North Sea black-legged kittiwakes. *Journal of Applied Ecology* 41: 1129-1139.

<sup>25</sup> [Alde-Ore SPA citation dated January 1996](#)

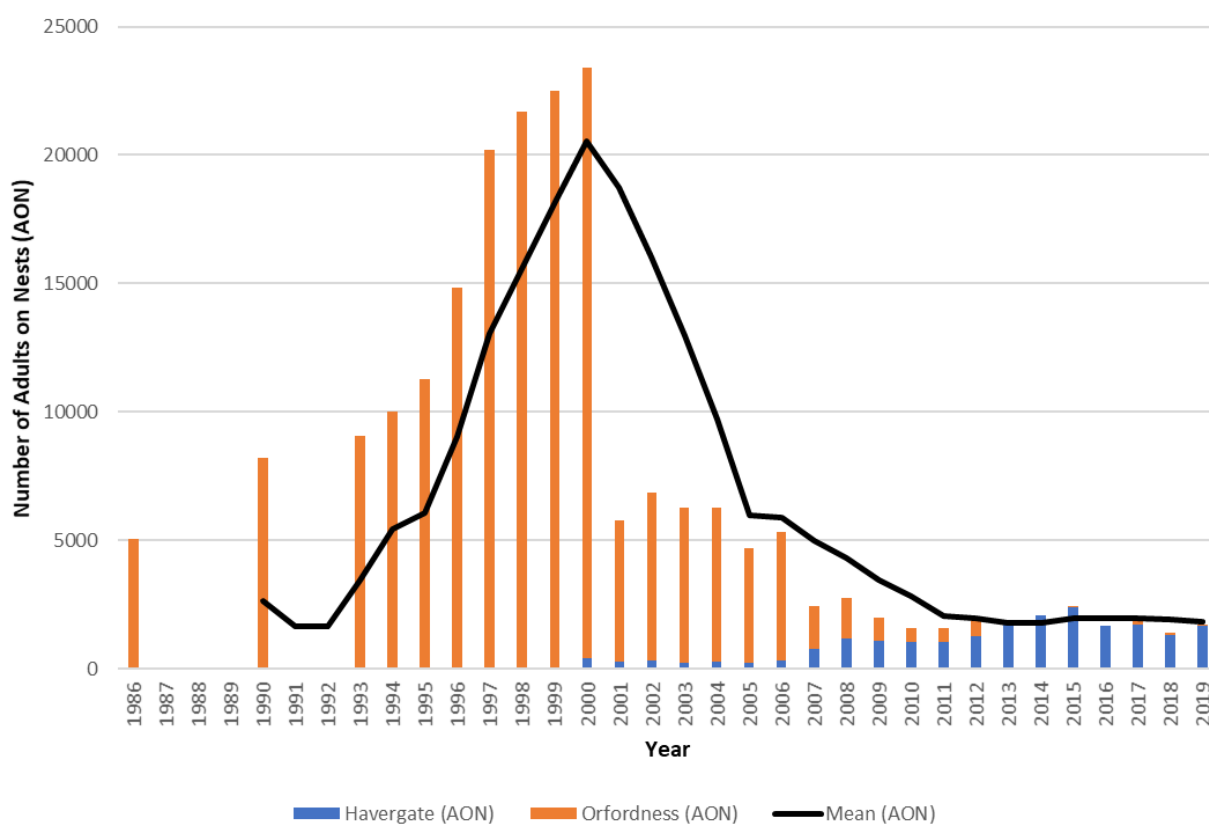
3.18 The Alde-Ore Estuary is the only SPA for lesser black-backed gull on the east coast of England, the others being located in north-west and south-west England. As such it plays an important role, both in terms of population and range, with respect to the UK conservation of this species. Even at its now much reduced size the most recent population estimate (1,717 pairs) represents 1.53% of the UK population of 112,000 Apparently Occupied Nests (AON).<sup>26</sup>

**Table 4: Number of pairs of lesser black-backed gulls breeding at the Alde-Ore Estuary SPA between 1986 and 2019. The RSPB Havergate Island data comes from the RSPB’s Annual Reserves Monitoring data set. The Orfordness data comes from the JNCC Seabird Monitoring Programme.**

Year	Havergate (AON)	Orfordness (AON)	Total (AON)	Running 5-year mean (AON)
1986	0	5043	5043	
1987	1		1	
1988	0		0	
1989	0		0	
1990	0	8223	8223	2653
1991	0		0	1645
1992	4		4	1645
1993	7	9043	9050	3455
1994	27	9981	10008	5457
1995	35	11221	11256	6064
1996	3	14814	14817	9027
1997	2	20216	20218	13070
1998	4	21700	21704	15601
1999	14	22500	22514	18102
2000	400	23000	23400	20531
2001	290	5500	5790	18725
2002	338	6500	6838	16049
2003	249	6000	6249	12958
2004	264	6000	6264	9708
2005	208	4500	4708	5970
2006	325	5000	5325	5877
2007	768	1678	2446	4998
2008	1185	1584	2769	4302
2009	1074	900	1974	3444
2010	1053	550	1603	2823
2011	1030	550	1580	2074
2012	1267	640	1907	1967
2013	1747		1747	1762

<sup>26</sup> [JNCC \(2018b\) Latest population trends: lesser black-backed gull.](#)

Year	Havergate (AON)	Orfordness (AON)	Total (AON)	Running 5-year mean (AON)
2014	2070		2070	1781
2015	2399	60	2459	1953
2016	1668		1668	1970
2017	1714	239	1953	1979
2018	1327	87	1414	1913
2019	1665	52	1717	1842



**Figure 2: Change in breeding lesser black-backed gulls (pairs) on the Alde-Ore Estuary SPA, including running five-year mean.**

3.19 The RSPB summarised its understanding of the reasons for the decline in breeding lesser black-backed gulls at paragraphs 26-28 of its submission (dated 22 April 2020) to the Secretary of State in respect of the Hornsea Three and Norfolk Vanguard schemes:<sup>27</sup>

<sup>27</sup> See [RSPB \(2020\) Written Submission for The Royal Society for the Protection of Birds. Response to the Secretary of State’s Consultations, 22 April 2020. Hornsea Project Three Offshore Wind Farm and Norfolk Vanguard Offshore Wind Farm](#) (also included at Annex 1 of RSPB Deadline 10 submission (REP10-067))

- “26. A study of gull productivity on the Alde-Ore Estuary by the RSPB in 2010 and 2011 identified the most likely factors contributing to poor productivity within the Alde-Ore Estuary SPA by comparing productivity at Orfordness and Havergate. This study has been referenced in the RSPB’s submissions to various offshore wind farm examinations including Galloper and East Anglia One.<sup>28</sup> It is now available as an RSPB report.<sup>29</sup> The factors identified were:
- Fox predation;
  - Flooding; and
  - Habitat quality – dense vegetation.
27. The RSPB agrees with Natural England’s view summarised by the Examining Authority for the Galloper Wind Farm application that “*it is not clear what actually caused the LBBG breeding population to collapse in the first place, and there is a lack of hard data on the effectiveness of site management measures*” (see para (xii) of the Examining Authority’s Report on the Implications for European Sites, submitted to the NID Examination of the GWF application in November 2012). It is for this reason that at the time of the Galloper and East Anglia One examinations, the RSPB set out that further experimental research was essential to assess which management measure(s) would be most effective in increasing breeding productivity of breeding LBBGs at the Alde-Ore Estuary SPA to restore the colony to favourable status.<sup>30</sup> This remains the case.
28. The need to address these site management issues is now set out in Natural England’s Site Improvement Plan for the Alde-Ore Estuary Natura 2000 Sites.<sup>31</sup>...”

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<sup>28</sup> See RSPB Response to Written Representations and Statements of Common Ground at Deadline 2 for the East Anglia One offshore wind farm examination, dated 23 August 2013. Para 4.30.

<sup>29</sup> Davis, S., Sharps, E., Brown, A., Lock, L., Wilson, L.J. and Bolton, M. 2018. *Breeding success of sympatric Herring Gulls *Larus argentatus* and Lesser Black-backed Gulls *Larus fuscus* breeding at two adjacent colonies with contrasting population trends*. RSPB Research Report 62. RSPB Centre for Conservation Science, RSPB, The Lodge, Sandy, Bedfordshire, SG19 2DL

<sup>30</sup> See for example: RSPB responses to the Examiners’ Second Written Questions for the Galloper Offshore Wind Farm examination, dated 24 September 2012, Question 20.36.

<sup>31</sup> Natural England (2014) *Site Improvement Plan Alde-Ore Estuaries*.

3.20 Natural England has set out conservation advice for the Alde-Ore Estuary SPA, including Conservation Objectives<sup>32</sup> and Supplementary Advice on Conservation Objectives<sup>33</sup>. Below, we summarise the key aspects of that conservation advice in respect of lesser black-backed gull.

#### *Conservation objectives*

3.21 Natural England has determined that the target population of the SPA is 14,074 pairs of lesser black-backed gulls if the SPA is to meet its conservation objectives.

3.22 The Conservation Objectives for the Alde-Ore Estuary SPA are as follows:

*“Ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;*

- *The extent and distribution of the habitats of the qualifying features*
- *The structure and function of the habitats of the qualifying features*
- *The supporting processes on which the habitats of the qualifying features rely*
- *The populations of each of the qualifying features*
- *The distribution of the qualifying features within the site.”*

#### *Supplementary Advice on Conservation Objectives (dated 13 September 2019)*

3.23 Natural England’s Supplementary Advice on the Conservation Objectives for the Alde-Ore Estuary SPA identifies, for each SPA feature, key attributes and targets. Attributes<sup>34</sup> are the ecological characteristics or requirements of the classified features within the SPA and deemed to best describe the site’s ecological integrity. If safeguarded this will enable achievement of the Conservation Objectives and favourable conservation status for all the designation features, including the assemblage.

3.24 Table 5 below sets out, for the lesser black-backed gull qualifying feature, the targets in respect of the following attributes:

- Breeding population: abundance;
- Connectivity with supporting habitats;
- Disturbance caused by human activity;

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<sup>32</sup> [Natural England Conservation Advice for Marine Protected Areas: Alde-Ore Estuary SPA](#) (variously dated). Accessed 24 August 2020.

<sup>33</sup> [Natural England: Alde-Ore Estuary SPA: Supplementary Advice on Conservation Objectives \(updated 13 September 2019\)](#). Accessed 24 August 2020.

<sup>34</sup> [Natural England: Alde-Ore Estuary SPA: Supplementary Advice on Conservation Objectives \(updated 13 September 2019\)](#). Accessed 24 August 2020.

- Predation – all habitats;
- Supporting habitat: conservation measures;
- Extent and distribution of supporting habitat for the breeding season; and
- Food availability.

3.25 The RSPB considers these attributes and targets are particularly relevant to the consideration of the Norfolk Boreas scheme as they respectively relate to:

- the population levels at which the features should be maintained or restored to;
- the need to maintain or restore safe passage of birds moving between their nesting and feeding areas; and
- the need to
  - reduce/avoid disturbance to foraging, feeding, moulting and/or loafing birds;
  - maintain the extent, distribution and availability of suitable breeding habitat (either within or outside the site boundary) which supports the feature for all necessary stages of its breeding cycle (including feeding); and
  - maintain or restore the distribution, abundance and availability of key food and prey items.

**Table 5: Alde-Ore Estuary SPA: supplementary advice on conservation objectives.**

<b>SPA feature</b>	<b>Attribute</b>	<b>Target</b>	<b>Season</b>	<b>Site specific comments</b>
Lesser black-backed gull (breeding)	Breeding population: abundance	Restore the size of the breeding population to a level which is above 14,074 [pairs] whilst avoiding deterioration from its current level indicated by the latest mean peak count or equivalent	Breeding (summer) season	After peak of 23,400 pairs in 2000, numbers reduced significantly below the target, the 5-year peak mean (2011-2015) was 1,940 breeding pairs.  Survey/monitoring evidence shows the feature to be negatively impacted.
	Connectivity with supporting habitats	Maintain safe passage of birds moving between nesting and feeding areas	Year-round	Results from study of tagged individuals during 2010 and 2011 breeding seasons show that 10% of journeys made from Orfordness were offshore.
	Disturbance caused by human activity	Reduce the frequency, duration and/or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or	Breeding (summer) season	Disturbance to birds at the site can be caused by people accessing the site by boats or through walking overland. Trampling can affect

SPA feature	Attribute	Target	Season	Site specific comments
		loafing birds so that they are not significantly disturbed		<p>vegetated shingle habitats. Aircraft can cause disturbance when flown low over the site.</p> <p>An investigation into public access/disturbance at the site will help inform a plan to reduce disturbance (NE, 2014).</p>
	Predation – all habitats	Reduce predation and disturbance caused by native and non-native predators	Breeding (summer) season	Issues associated with fox predation/ disturbance are being assessed and will inform a predator control management plan (NE, 2014)
	Supporting habitat: conservation measures	Maintain the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised	Year round – to ensure the habitat remains suitable for when the feature is present	<p>Considerable part of site sympathetically managed by Suffolk Wildlife Trust, National Trust, RSPB and Natural England.</p> <p>Threats posed by sea level rise and coastal squeeze being addressed through the Environment Agency Local Environment Action Plan and estuary Management Plan.</p> <p>Issues associated with fox predation/ disturbance are being assessed and will inform a predator control management plan (NE, 2014)</p>
	Supporting habitat: extent and distribution of supporting habitat for the breeding season	Maintain the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding). Please see site specific supporting notes for extent details.	Year round – to ensure the habitat remains suitable for when the feature is present	<p>Target may apply to supporting habitat outside the site boundary.</p> <p>Birds will not nest on habitat regularly flooding by the tide but will be found on intertidal habitats above mean high water mark. Habitat include intertidal mixed sediments, intertidal mud and intertidal sand and muddy sand.</p>



SPA feature	Attribute	Target	Season	Site specific comments
				A range of supporting habitats are used by the species at this site, including: coastal lagoons, freshwater and coastal grazing marsh.
	Supporting habitat: food availability	Maintain the distribution, abundance and availability of key food and prey items (eg. voles, small seabirds, waders, sandeel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish) at preferred sizes.	Year-round	

3.26 The above information highlights the substantial decline (almost 90%) in the SPA’s lesser black-backed gull population and the scale of the challenge needed to restore this SPA feature to a favourable conservation status. Any additional mortality and disturbance to foraging birds from the Alde-Ore Estuary SPA could have serious implications for the maintenance of the SPA population and hinder efforts to restore it to a favourable conservation status through appropriate site management. The RSPB considers that this is directly relevant to the consideration of whether the SPA’s conservation objective to restore site integrity can be met and the SPA achieve favourable conservation status. We return to this in section 7 below, demonstrating that Norfolk Boreas, in-combination with other offshore wind farms, will exacerbate the cumulative impacts on the Alde-Ore Estuary SPA lesser black-backed gull population and make it more difficult to meet its conservation objective to restore the population to favourable status.

## 4. Legal requirements

- 4.1 SACs and SPAs are “European sites” in inshore waters (up to 12 nautical miles from the baselines) under provisions within the Conservation of Habitats and Species Regulations 2017 (Habitats Regulations); and in offshore waters (i.e. from 12-200 nautical miles) are “European Offshore Marine sites” under provisions within the Conservation of Offshore Marine Habitats and Species Regulations 2017 (Offshore Regulations).
- 4.2 The Habitats and Offshore Regulations set out the sequence of steps to be taken by the competent authority (here the Secretary of State for Business, Energy and Industrial Strategy (BEIS)) when considering authorisation for a project that may have an impact on a European site and its features before deciding to authorise that project. These are as follows:
- i) Step 1: consider whether the project is directly connected with or necessary to the management of the SPA and its species (regulation 63 (1)). If not –
  - ii) Step 2: consider, on a precautionary basis, whether the project is likely to have a significant effect on the SPA and its features, either alone or in-combination with other plans or projects (the Likely Significance Test) (regulation 63 (1)).
  - iii) Step 3: make an appropriate assessment of the implications for the SPA and its features in view of its conservation objectives. There is no requirement or ability at this stage to consider extraneous (non-conservation e.g. economics, renewable targets, public safety etc) matters in the appropriate assessment (regulation 63 (1)).
  - iv) Step 4: consider whether it can be ascertained that the project will not, alone or in-combination with other plans or projects, adversely affect the integrity of the SPA and its features, having regard to the manner in which it is proposed to be carried out, and any conditions or restrictions subject to which that authorisation might be given (the Integrity Test) (regulation 63 (6)).
  - v) Step 5: In light of the conclusions of the assessment, the competent authority shall agree to the project only after having ascertained that it will not adversely affect the integrity of the SPA, alone or in-combination with other plans or projects (regulation 63 (5)).
  - vi) Step 6: only if the competent authority is satisfied that, there being no alternative solutions and the plan or project must be carried out for imperative reasons of overriding public interest (which, subject to (regulation 64(2)), may be of a social or economic nature), they may agree to the plan or project notwithstanding a negative assessment of the implications for the European site (regulation 64 (1)).
  - vii) Step 7: in the event of the no alternative solutions and imperative reasons of overriding public interest tests being satisfied, the Secretary of State must secure that any necessary

compensatory measures are taken to ensure that the overall coherence of the Natura 2000 network is protected (regulation 68).

- 4.3 It is important to add that in addition to the requirements set out above, in relation to both inshore area and the offshore marine area, any competent authority must exercise its functions so as to secure compliance with the requirements of the Habitats Directive and the Birds Directive; and in particular to take such steps as it considers appropriate to secure the preservation, maintenance and re-establishment of a sufficient diversity and area of habitat for wild birds<sup>35</sup>, having regard to the requirements of Article 2 of the Birds Directive.<sup>36</sup> And for offshore SPAs and SACs regulation 26 of the Offshore Regulations requires competent authorities to exercise their functions (as far as possible) to secure steps to avoid the disturbance of species and the deterioration of habitats or habitats of species within those sites.
- 4.4 It is clear that the Norfolk Boreas scheme is not directly connected with or necessary for the management of the SPA.

#### Appropriate assessment and site conservation objectives

- 4.5 As set out in steps 3 to 5, the Secretary of State must make an appropriate assessment of the implications for the SPA and its features in view of its conservation objectives. In light of the conclusions of the assessment, the Secretary of State shall agree to the project only after having ascertained that it will not adversely affect the integrity of the SPA, alone or in-combination with other plans or projects i.e. where no reasonable scientific doubt remains as to the absence of adverse effects. Therefore, it is critical the competent authority carefully evaluates the predicted impacts against the SPA conservation objectives and Natural England's associated supplementary advice. We return to this issue in section 7 below.

#### Relationship between adverse effect on integrity and the derogation tests

- 4.6 A key starting point in addressing the Regulations 64 and 68, Habitats Regulations, derogation tests is agreeing the nature and magnitude of the predicted and potential adverse effects on the impacted Natura 2000 site(s) and its/their features. This is critical to the three derogation tests as follows:

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<sup>35</sup> As required by Article 3, Birds Directive.

<sup>36</sup> See regulation 9(1) and 10(1)(2)(3) and (8) of the Habitats Regulations and regulation 6 of the Offshore Regulations. Article 2 Birds Directive imposes a requirement on Member States to maintain all wild bird populations at a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements, or if necessary, to restore the population of these species to that level (Article 2).

- **Alternative solutions:** enables an assessment of whether an alternative solution is more or less damaging than the plan or project under consideration;
  - **Imperative reasons of overriding public interest:** enables the need to protect the Natura 2000 site to be weighed against the claimed need (including public interest(s)) of the project; and
  - **Compensatory measures:** enables clear objectives and related targets to be defined to identify and design compensatory measures that will protect the overall coherence of the Natura 2000 network.
- 4.7 Ensuring this is done to a common, agreed standard will be important to ensure the tests are addressed in a robust, fair and proportionate way in decisions by the competent authority relating to this and any future offshore wind farm schemes. Ideally this would:
- agree such a standard for assessing all potential adverse impacts (e.g. annual mortality of breeding adult birds from collision);
  - develop a consistent approach to translate those potential impacts into suitable objectives for any compensatory measure(s) deemed necessary to protect the overall coherence of the Natura 2000 network for each affected feature. This must ensure success is measured in terms of whether the compensation measure results in actual benefits to the affected feature e.g. increased number of breeding pairs, or improved breeding productivity above a defined level.
- 4.8 There needs to be a transparent link between these two aspects to ensure the compensatory measures are targeted at the requirements of the SPA feature(s) adversely affected.

## 5. The RSPB’s position at the end of the Norfolk Vanguard extended consultation (April 2020)

### Overview of the RSPB’s position at the end of the Norfolk Vanguard extended consultation (April 2020)

5.1 Table 6 below summarises the RSPB’s position on impacts on features at the Flamborough and Filey Coast SPA and Alde-Ore Estuary SPA at the end of the Norfolk Vanguard extended consultation (April 2020).

**Table 6: The RSPB’s position on adverse effects on site integrity of the Flamborough and Filey Coast SPA and Alde-Ore Estuary SPA**

Feature	SPA	Alone	In-combination with other plans or projects
Kittiwake	FFC	Conclude that there will not be an adverse effect on site integrity	Adverse effect on site integrity exists (irrespective of whether Hornsea Project Three figures are included)
Gannet	FFC	Conclude that there will not be an adverse effect on site integrity	Adverse effect on site integrity exists (when mortality from Hornsea Three is included)
Guillemot	FFC	Conclude that there will not be an adverse effect on site integrity	Adverse effect on site integrity exists (when mortality from Hornsea Three is included)
Razorbill	FFC	Conclude that there will not be an adverse effect on site integrity	Adverse effect on site integrity exists (when mortality from Hornsea Three is included)
Seabird assemblage	FFC	Conclude that there will not be an adverse effect on site integrity	Not possible to rule out adverse effect on site integrity due to collision risk and displacement (based on combined impacts of kittiwake, gannet, guillemot and razorbill).
Lesser black-backed gull	Alde-Ore Estuary	Conclude that there will not be an adverse effect on site integrity	Adverse effect on site integrity exists.

5.2 In addition, the RSPB considered the following cumulative EIA impacts were significant:

- Collision: kittiwake and great black-backed gull
- Displacement: red-throated diver, guillemot, razorbill and puffin.

- 5.3 The RSPB's focus during the Expert Topic Group process for the Norfolk Vanguard application, and during the examination, was upon the individual SPA features. However, the breeding<sup>37</sup> seabird assemblage (including but not restricted to migratory birds) as a combination of these features and other species is equally important and we are unable to exclude the risk of an adverse effect on that assemblage feature as well.
- 5.4 There were a number of important areas of disagreement with the Applicant over assessment methodology during the Norfolk Vanguard examination, but the majority of these were resolved. The key outstanding issues were the level of precaution that was being applied to calculate the number of birds that could be impacted by the proposed scheme and, ultimately, the interpretation of the evidence. The RSPB explained in detail why we considered that the position adopted by ourselves and Natural England was not overly precautionary (as set out in the RSPB's updated "Note on Precaution", included here as Annex 1).
- 5.5 The RSPB accepted the methods applied to understand the potential impacts of Norfolk Vanguard on the seabird populations identified in Table 6 and the model outputs that were provided. We therefore had confidence in the information provided by the Applicant enabling the RSPB to reach more definite conclusions on the possible adverse effects on integrity i.e. adverse effects existed for certain SPA features. Our final position on both the Filey to Flamborough Coast SPA and Alde-Ore Estuary SPA are set out below.

#### The RSPB's position on adverse effects on the integrity of the Flamborough and Filey Coast SPA

- 5.6 At the end of the Norfolk Vanguard extended consultation the RSPB considered that adverse effects on integrity existed for the kittiwake, gannet, guillemot and razorbill populations of the Flamborough and Filey Coast SPA.
- 5.7 For gannet, guillemot and razorbill this was in-combination with Hornsea Three, for kittiwake the conclusion was reached irrespective of whether the impacts of Hornsea Three were included. This was a significant shift in position – moving from a position where we were unable to exclude the risk of adverse effects on integrity to one where we were confident that effects existed, and reflects a continuing development of our understanding of the impacts of offshore wind farms in the southern North Sea on the seabirds of the Flamborough and Filey Coast SPA (as well as other protected sites).

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<sup>37</sup> The breeding population includes juveniles and non-breeding adults. Natural England's [Conservation Advice for the Flamborough and Filey Coast SPA](#) further notes that: "The species of the seabird assemblage are distributed throughout the SPA and components of the assemblage are present year-round."

5.8 We also considered that as a consequence of these impacts it was not possible to rule out adverse effects on the integrity of the breeding seabird assemblage of the Flamborough and Filey Coast SPA when considered in-combination with other offshore wind farms. This is due to kittiwake, guillemot, razorbill and gannet being a features of the seabird assemblage, as well as a features in their own right for which an adverse effect on site integrity could not be ruled out.

#### [The RSPB's position on adverse effects on the integrity of the Alde-Ore Estuary SPA](#)

5.9 At the end of the Norfolk Vanguard extended consultation the RSPB considered that adverse effects on integrity existed for the lesser black-backed gull population of the Alde-Ore Estuary SPA. We concluded that the project would not result in adverse effects on the integrity of the lesser black-backed gull population of the Alde-Ore Estuary SPA feature alone. However, the RSPB concluded adverse effects on integrity existed in respect of the lesser black-backed gull population of the SPA when the Norfolk Vanguard scheme was considered in-combination with other plans or projects.

## 6. The RSPB's current position on the Norfolk Boreas examination

6.1 Below is a summary of the RSPB's position on impacts at this end stage of the Norfolk Boreas Examination.

6.2 We conclude that adverse effects on site integrity on the **Flamborough and Filey Coast SPA** exist, with reference to the following SPA features:

- **Kittiwake:** in-combination effects due to collision risk (adverse effect on site integrity exists irrespective of whether Hornsea Three and Four figures are included);
- **Gannet:** in-combination effects due to collision risk and exacerbated by operational displacement (adverse effect on site integrity exists irrespective of whether Hornsea Three and Four figures are included);
- **Guillemot:** in-combination effects due to operational displacement (adverse effect on site integrity exists when mortality Hornsea Three and Four figures are included);
- **Razorbill:** in-combination due to operational displacement (adverse effect on site integrity exists when mortality Hornsea Three and Four figures are included);
- **Seabird assemblage:** in-combination (not possible to rule out adverse effect on site integrity due to collision risk and operational displacement. This is based on combined impacts of: kittiwake, gannet, guillemot and razorbill).

6.3 We also conclude that adverse effects on site integrity on the **Alde-Ore Estuary SPA** exist, with reference to the following SPA feature:

- **Lesser black-backed gull:** in-combination effects due to collision risk.

6.4 In addition, the RSPB considers the following cumulative EIA impacts on the **North Sea populations** are significant:

- **Kittiwake and great black-backed gull:** collision risk;
- **Red-throated diver, guillemot, and razorbill:** operational displacement;
- **Gannet:** collision risk and operational displacement

6.5 The RSPB has previously not mentioned gannet in our concerns relating to EIA impacts. However, having reviewed Natural England's comments in detail we agree with their evidence and support their view that a significant EIA impact due to collision risk and displacement cannot be ruled out. This position is also made given the increasing level of impacts from offshore wind farms on



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this species and the need to ensure that colonies are not affected in the future as a result of “death by a thousand cuts”, as stated in Natural England’s Deadline 13 response (REP13-038).

## 7. The RSPB's conclusions on Norfolk Boreas and the affected SPA features of the Flamborough and Filey Coast SPA and the Alde-Ore Estuary SPA

7.1 This section sets out the RSPB's conclusions on the impacts of Norfolk Boreas in respect of affected SPA features. We have taken in to account the Secretary of State's determinations on Hornsea Three and Norfolk Vanguard, as well as the available information for East Anglia One North, East Anglia Two and Hornsea Four.

7.2 The RSPB is aware of the Secretary of State's conclusion on Norfolk Vanguard in which he considered that the scheme would not have an adverse effect on the integrity of either the Flamborough and Filey Coast SPA or the Alde-Ore Estuary SPA as:

"...the potential loss of a relatively very small number of birds through collision impacts does not contribute in a significant way to the total number of birds predicted to be impacted in-combination..."<sup>38</sup>

7.3 The RSPB respectfully disagrees and considers the Secretary of State has misunderstood the practical reality of the nature of these accumulating in-combination impacts on the affected seabird SPA populations, how they compromise the ability to restore or maintain the integrity of their respective SPAs and thereby meet the relevant site conservation objectives.

7.4 The RSPB has reviewed Natural England's submission at Deadline 14<sup>39</sup> and its response to Q5.8.4.1 in particular. The RSPB is in broad agreement with Natural England's response. In the context of the analysis set out below, we draw particular attention to the following:

"...each additional impact beyond an already detrimental level, be it in terms of reduced colony growth rates or population abundance, will take the population further away from its desired state and the attainment of the required favourable condition more difficult e.g. by making the population more prone to stochastic events (such as winters with low survival rates or breeding seasons with poor food availability), or impairing the effectiveness of conservation measures."<sup>40</sup>

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<sup>38</sup> Paragraph 5.7 of: Secretary of State for Business, Energy and Industrial Strategy (2020). Decision letter dated 1 July 2020 to Norfolk Vanguard Limited regarding application for the Norfolk Vanguard Offshore Wind Farm Order.

<sup>39</sup> Natural England (2020) Deadline 14: Natural England's response to Examining Authority's Fifth round of Written Questions (REP14-064)

<sup>40</sup> See page 26 of REP14-064

7.5 Using kittiwakes and lesser black-backed gulls as illustrative examples, below we seek to show why an adverse effect on the integrity of both the Flamborough and Filey Coast SPA and the Alde-Ore Estuary SPA from the Norfolk Boreas scheme cannot be ruled out. This is because the predicted additional contributions to in-combination impacts de facto comprise a deliberate, cumulative reduction of the populations of those SPA seabirds and represent a further loss of site integrity by moving further away from the ability to achieve the site conservation objectives of these SPA features.

7.6 In the context of Norfolk Boreas (and other offshore wind farms), this is because it will undermine the ability to:

- Restore the size of the SPA breeding populations to a favourable level by causing deterioration from their current unfavourable levels;
- Restore/maintain safe passage of birds moving between their nesting and feeding areas;
- Reduce/avoid disturbance to foraging, feeding, moulting and/or loafing birds;
- Restrict/reduce the frequency, duration and/or intensity of disturbance to roosting, nesting, foraging, feeding, moulting and/or loafing birds so they are not significantly disturbed;
- Maintain the extent, distribution and availability of suitable breeding habitat (either within or outside the site boundary) which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding); and
- Restore/maintain or restore the distribution, abundance and availability of key food and prey items.

7.7 The same logic can be applied to other impacted SPA features and we provide summary conclusions with respect to gannets, guillemots and razorbills from the Flamborough and Filey Coast SPA.

### [Flamborough and Filey Coast SPA](#)

#### [Conservation Objectives and Supplementary Advice](#)

7.8 As set out and discussed in Section 2 above, the Conservation Objectives and Supplementary Advice are central to the consideration of potential adverse effects on the SPA and its features, and also for the consideration of any compensation required (as defined in Section 4 above).

7.9 Among other things, the Conservation Objectives for SPAs require the maintenance or restoration of the population for each qualifying feature and the supporting processes on which the habitats of the qualifying features rely. The Supplementary Advice then sets out the key

attributes and targets for each qualifying feature. The predicted impacts of the Norfolk Boreas scheme on each SPA feature needs to be carefully considered against each of these.

7.10 Below, we consider the effects of the project on the following SPA features and summarise our view in Table 7:

- Kittiwake
- Gannet
- Guillemot
- Razorbill
- Seabird assemblage.

#### *Kittiwake*

7.11 The RSPB considers that the key concern relates to kittiwake as one of the qualifying features of the SPA. It is also important to separately consider the SPA assemblage and kittiwake's contribution to that SPA feature.

#### *Site conservation objectives and supplementary advice*

7.12 The RSPB accepts the Applicant's view that there will be no adverse effects on the integrity of the Flamborough and Filey Coast SPA **alone**. However, the RSPB concludes that the data demonstrate that an adverse effect on integrity in-combination with other projects exists, irrespective of whether mortality from the Hornsea Three or Hornsea Four projects are included. With this in mind it is worth noting our comments on kittiwake in relation to the Hornsea Three offshore wind farm, namely:

"The kittiwake population of the Flamborough and Filey Coast SPA is one of only two kittiwake populations in the North Sea that is relatively stable, the other being on the Suffolk Coast (Lowestoft harbour and Sizewell Rigs CWS). All others are declining precipitously. And the enhanced monitoring of the Flamborough and Filey Coast SPA is demonstrating that productivity has declined and is consequently a concern for the long-term viability of the population."<sup>41</sup>

7.13 Notwithstanding its relative recent stability, the SPA population has declined by around 40-50% from its original SPA level of 83,700 pairs such that it is in unfavourable conservation status. Recent declines in breeding productivity (see Figure 1 above) underline this unfavourable status. It is for this reason that Natural England has set its conservation objectives (see Table 3 above)

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<sup>41</sup> RSPB/Ørsted Statement of Common Ground (March 2019), page 25.

and associated targets for kittiwake with a focus on restoration. We draw particular attention to the following targets as relevant to the impacts of offshore wind farms (emphasis added):

- **Restoration to above its original designation population of 83,700 pairs** and avoid deterioration from its current unfavourable level;
- **Restore safe passage** for birds moving between nesting and feeding areas;
- **Maintain** the extent, distribution, and **availability of suitable breeding habitat** which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, **feeding**); and
- **Restore** the distribution, abundance and **availability of key food and prey items**.

7.14 The Norfolk Boreas offshore wind farm scheme will act to undermine each of these and add further to existing in-combination impacts on the SPA's kittiwake population predicted to arise from preceding schemes.

7.15 The substantial decline in the kittiwake population has also acted to reduce the overall seabird assemblage population from its historic level of 305,784 individual seabirds (as per JNCC UK SPA Review 2001) to 216,730 individuals at the designation of the Flamborough and Filey Coast SPA.

*Kittiwake in-combination impacts and adverse effect on site integrity*

7.16 Using the Applicant's own figures on in-combination collision risk impacts on kittiwakes apportioned to the Flamborough and Filey Coast SPA from Norfolk Boreas and other offshore wind farms, we set out below how the additional impacts from Norfolk Boreas will act to make the conservation status of the kittiwake feature more unfavourable. This will move us further away from the ability to achieve the restore conservation objectives of the kittiwake feature of the Flamborough and Filey Coast SPA and comprises an adverse effect on site integrity.

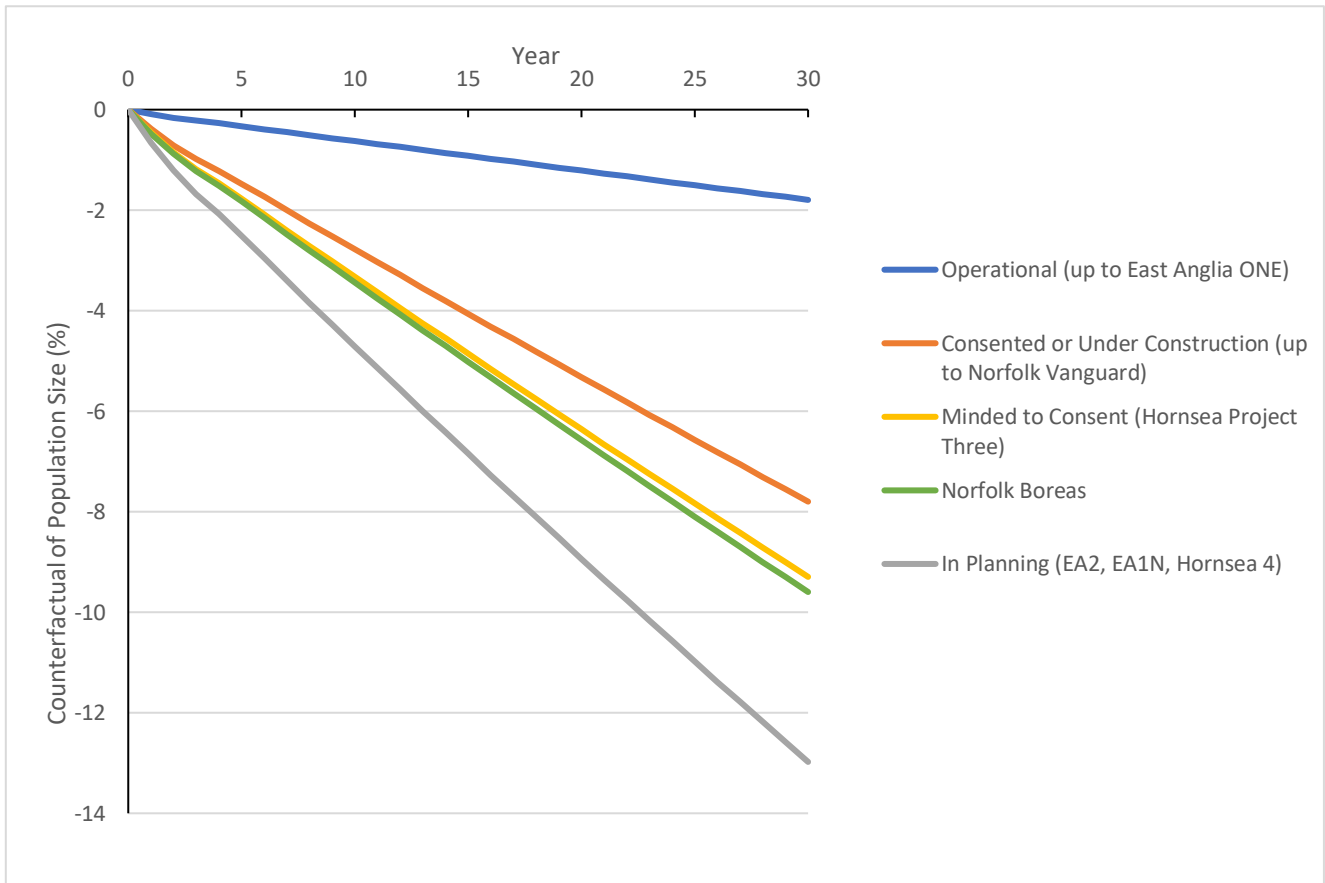
7.17 In order to illustrate the point that every additional wind farm exacerbates the cumulative impact on the population and makes it more difficult for this conservation objective to be met, we ran Population Viability Analyses (PVAs) for the Flamborough and Filey Coast SPA kittiwake population, for a range of scenarios incorporating cumulative collision mortality for offshore wind farms. All models were density-independent, deterministic models. These models were designed to mimic those submitted by the Applicant, with collision mortality figures taken from the Norfolk Boreas Assessment<sup>42</sup>. Similarly, the demographic data used in these models mirrored

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<sup>42</sup> Norfolk Boreas Offshore Wind Farm. Offshore Ornithology Assessment Update Cumulative and In-combination Collision Risk Modelling (Clean), April 2020, Version 2 (REP8-025). Table 2.2 for Kittiwake and Table 2.3 for Lesser Black-backed Gull.

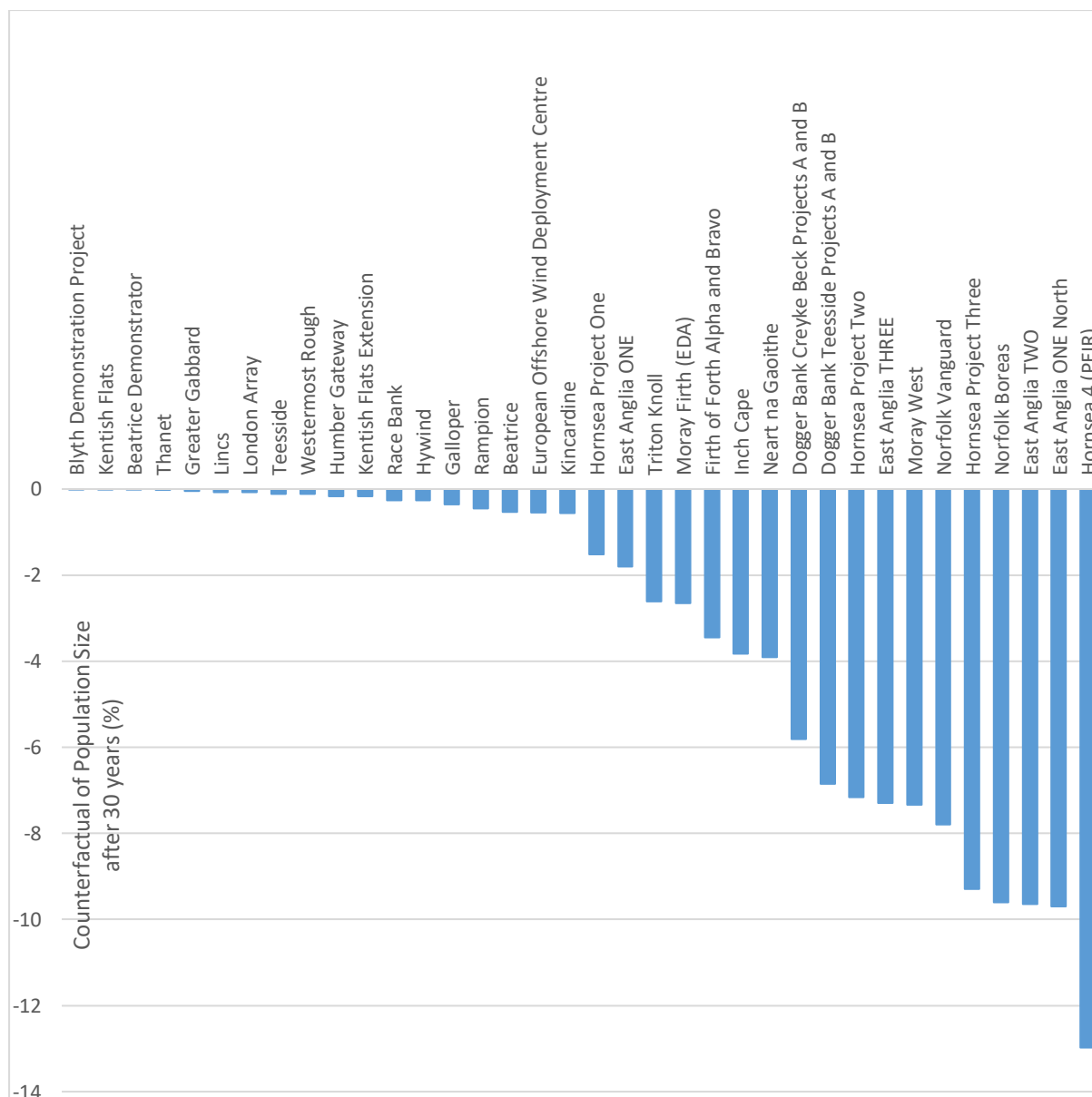
those used in the Norfolk Boreas assessment. Details of these parameters are presented in Annex 2.

7.18 Figure 3 shows the increases in counterfactual of population size, that is the percentage difference between the impacted SPA population size and the unimpacted population, over each year of the lifetime of the proposed development. Figure 4 shows the increase in the size of counterfactual of population size after thirty years as the cumulative mortality of each development is added.



**Figure 3: Outputs of a 30-year population viability analysis showing the Counterfactual of Population Size (CPS) for kittiwakes in the Flamborough and Filey Coast SPA (a) with combined collision mortality for all operational offshore wind farms (as at August 2020), (b) with combined collision mortality for all operational, under construction and consented offshore wind farms, (c) with combined collision mortality for all operational, under construction and consented offshore wind farms, plus Hornsea 3 (minded to consent)<sup>43</sup>, (d) with combined collision mortality for all of the above plus Norfolk Boreas and (e) with combined collision mortality for all UK wind farms including those currently in planning.**

<sup>43</sup> NB The figures for Hornsea Project Three collision mortality have been updated to the median of the latest Hornsea Project Three estimates (69 per annum), as used to inform the “minded to consent” decision recently, hence they differ from the larger figures (181 per annum) used in the Norfolk Boreas assessment.



**Figure 4: Outputs of a Population Viability Analysis showing the predicted % reduction in population size of the Flamborough and Filey Coast SPA kittiwake population after 30 years (the Counterfactual of Population Size, CPS) due to the combined collision mortality for all offshore wind farms where collision risk has been estimated for this SPA (including operational, under construction, consented and in planning). Each bar on the graph represents the reduction in relative population size caused by the labelled wind farm and all previous wind farms (i.e. all those to the left of it on the graph).**

7.19 These figures, based on the Applicant’s preferred parameters, show a relative **9.6%** reduction in the kittiwake population of the Flamborough and Filey Coast SPA as a result of in-combination collision impacts, in comparison with an unimpacted population, during the lifetime of the wind farms. The RSPB notes that this differs from the figure given in Natural England’s response to the Examining Authority’s Fifth round of Written Questions (Q5.8.6.2, REP14-064), where the

CPS value is 13.7%. This is because, while the RSPB agrees with the more precautionary parametrisation of the model that Natural England use, in order to illustrate the scale of the impacts we decided to use the Applicant's less precautionary approach and therefore mirrored their approach. The potential differences in approach are detailed in Annex 2.

- 7.20 Whilst the details of the PVA can be debated, the demographic parameters used actually make relatively little difference to the Counterfactual of Population Size (the percentage difference between the predicted population size without any additional mortality from wind farms, and the predicted population size with the additional mortality from wind farms). The key point is that every additional wind farm exacerbates the cumulative impact on the population and makes it increasingly more difficult for the SPA's Conservation Objectives (in terms of restoring bird populations to a target level) to be met. It is therefore not possible to conclude no adverse effect on integrity as a result of collision mortality through the project in-combination.

#### *Gannet*

- 7.21 The population abundance target for gannet set out in Natural England's Supplementary Advice on Conservation Objectives is to **maintain** the population of gannets at its designation level of 8,469 pairs, whilst **avoiding deterioration** from its current level e.g. 13,392 pairs in 2017 (see Table 3). It also sets out additional targets of **maintaining safe passage** for birds moving between nesting and feeding areas, reducing disturbance, **maintaining** the extent, distribution, and **availability of suitable breeding habitat including feeding habitat**, and **maintaining food availability**.
- 7.22 The Applicant's own calculations (REP8-025) predicts in-combination collision mortality of gannet apportioned to the Flamborough and Filey Coast SPA of **359** when Hornsea Projects Three and Four are included and **287** when omitted. Using the Applicant's own population models these would result in, respectively, **37%** and **30%** relative reductions in the gannet population of the Flamborough and Filey Coast SPA as a result of in-combination collision impacts, in comparison with the unimpacted population, during the lifetime of the wind farm. We therefore find it impossible to conclude no adverse effect on integrity as a result of collision mortality through the project in-combination.
- 7.23 In this context, it is the RSPB's view that the increase in mortality as a consequence of collision risk, in-combination with other plans and projects, undermines the achievement of the SPA's conservation objectives and the associated Supplementary Advice targets. This impact will be further exacerbated by the additional effects of displacement. Therefore, the RSPB continues to



conclude an adverse effect on site integrity exists as a result of the project in-combination with other plans or projects (irrespective of Hornsea Three and Four).

### *Guillemot*

7.24 The population abundance target for guillemot set out in Natural England's Supplementary Advice on Conservation Objectives is to **maintain** the population of guillemots at its designation level of 41,607 pairs whilst **avoiding deterioration** from its current level (see Table 3). It also sets out additional targets of **maintaining safe passage** for birds moving between nesting and feeding areas, **reducing disturbance**, **maintaining** the extent, distribution, and **availability of suitable breeding habitat including feeding habitat**, and **maintaining food availability**.

7.25 As detailed in the Applicant's Deadline 2 submission 'Offshore Ornithology Assessment Update' (REP2-035), the Applicant predicts up to a **72.56%** reduction in the guillemot population of the Flamborough and Filey Coast SPA as a result of in-combination displacement impacts, in comparison with the unimpacted population, during the lifetime of the wind farm. We therefore find it impossible to conclude no adverse effect on integrity as a result of displacement mortality through the project in combination.

7.26 In this context, it is the RSPB's view that the increase in mortality as a consequence of displacement, in-combination with other plans and projects, undermines the achievement of the SPA's conservation objectives and the associated Supplementary Advice targets. The RSPB continues to conclude an adverse effect on site integrity exists as a result of the project in-combination with other plans or projects (including Hornsea Three and Four).

### *Razorbill*

7.27 The population abundance target for razorbill set out in Natural England's Supplementary Advice on Conservation Objectives is to **maintain** the population of razorbills at its designation level of 10,570 pairs whilst **avoiding deterioration** from its current level (see Table 3). It also sets out additional targets of **maintaining safe passage** for birds moving between nesting and feeding areas, **reducing disturbance**, **maintaining** the extent, distribution, and **availability of suitable breeding habitat including feeding habitat**, and **maintaining food availability**.

7.28 As detailed in the Applicant's Deadline 2 submission 'Offshore Ornithology Assessment Update' (REP2-035), the Applicant predicts up to a **50.1%** reduction in razorbill population of the Flamborough and Filey Coast SPA as a result of in-combination displacement impacts, in comparison with the unimpacted population, during the lifetime of the wind farm. We therefore find it impossible to conclude no adverse effect on integrity as a result of displacement mortality through the project in combination.

7.29 In this context, it is the RSPB's view that the increase in mortality as a consequence of displacement, in-combination with other plans and projects, undermines the achievement of the SPA's conservation objectives and the associated Supplementary Advice targets. Therefore, the RSPB continues to conclude an adverse effect on site integrity exists as a result of the project in-combination with other plans or projects (including Hornsea Three and Four).

#### *The breeding seabird assemblage*

7.30 The seabird assemblage comprises several seabird species. Historically, kittiwake was the most numerous component of the seabird assemblage (83,700 pairs) but as noted above has declined by approximately 50%, such that it is in unfavourable conservation status.

7.31 The population abundance target for the seabird assemblage set out in Natural England's Supplementary Advice on Conservation Objectives is to **maintain** the population at its designation level of 216,730 individuals, while **avoiding deterioration** from its current level (see Table 3). It also sets out an additional target of **restricting the frequency, duration and intensity of disturbance** affecting, among other things, foraging, feeding, moulting and/or loafing birds, **with particular reference to the vulnerability of some species to collision and displacement from offshore activities**; and **maintaining** the extent, distribution, and **availability of suitable breeding habitat, including feeding habitat**.

7.32 Given the level of risk to the individual SPA features of kittiwake, gannet, guillemot and razorbill set out above, the RSPB's view is that it is not possible to exclude the risk of adverse effects on the SPA seabird assemblage feature, and therefore site integrity, as a result of the project in-combination with other plans or projects.

#### *Alde-Ore Estuary SPA*

##### *Conservation Objectives and Supplementary Advice*

7.33 As set out and discussed above the Conservation Objectives and Supplementary Advice are central to the consideration of potential adverse effects on the SPA and its features and also for the consideration of any compensation required.

7.34 Among other things, the Conservation Objectives for SPAs require the maintenance or restoration of the population for each qualifying feature and the supporting processes on which the habitats of the qualifying features rely. The Supplementary Advice then sets out the key attributes and targets for each qualifying feature of which the following are particularly relevant:

- Breeding population abundance;
- Connectivity with supporting habitats (safe passage);
- Restricting disturbance;

- Maintaining the extent, distribution, and availability of suitable breeding habitat; and
- Maintaining food availability

7.35 Below, we consider the effects of the project on the following SPA feature and summarise our view in Table 7:

- Lesser black-backed gull

### *Lesser black-backed gull*

#### *Site conservation objectives and supplementary advice*

7.36 The RSPB accepts the Applicant's view that there will be no adverse effects on the integrity of the Alde-Ore SPA **alone**. However, the RSPB concludes that the data demonstrate that an adverse effect on integrity in-combination with other projects exists.

7.37 As highlighted in Section 3 above, the Alde-Ore Estuary is the only SPA for lesser black-backed gull on the east coast of England, and as such it plays an important role, both in terms of population and range, with respect to the UK conservation of this species. However, the Alde-Ore population has experienced a severe decline over the last 20 years, falling from a peak of 21,700 pairs in 2000 to just 1,717 breeding pairs in 2019 and as a result it is considered to be in unfavourable conservation status. We estimate its current level is 1,842 pairs (five year mean 2015-2019, see Table 4) i.e. an approximate 87% decline from its favourable population of 14,074 pairs.

7.38 Natural England's Supplementary Advice on the Conservation Objectives for the Alde-Ore Estuary SPA is therefore designed to restore this qualifying feature and avoid any further deterioration from current populations levels. We draw particular attention to the following targets for the SPA as relevant to the impacts of offshore wind farms (emphasis added):

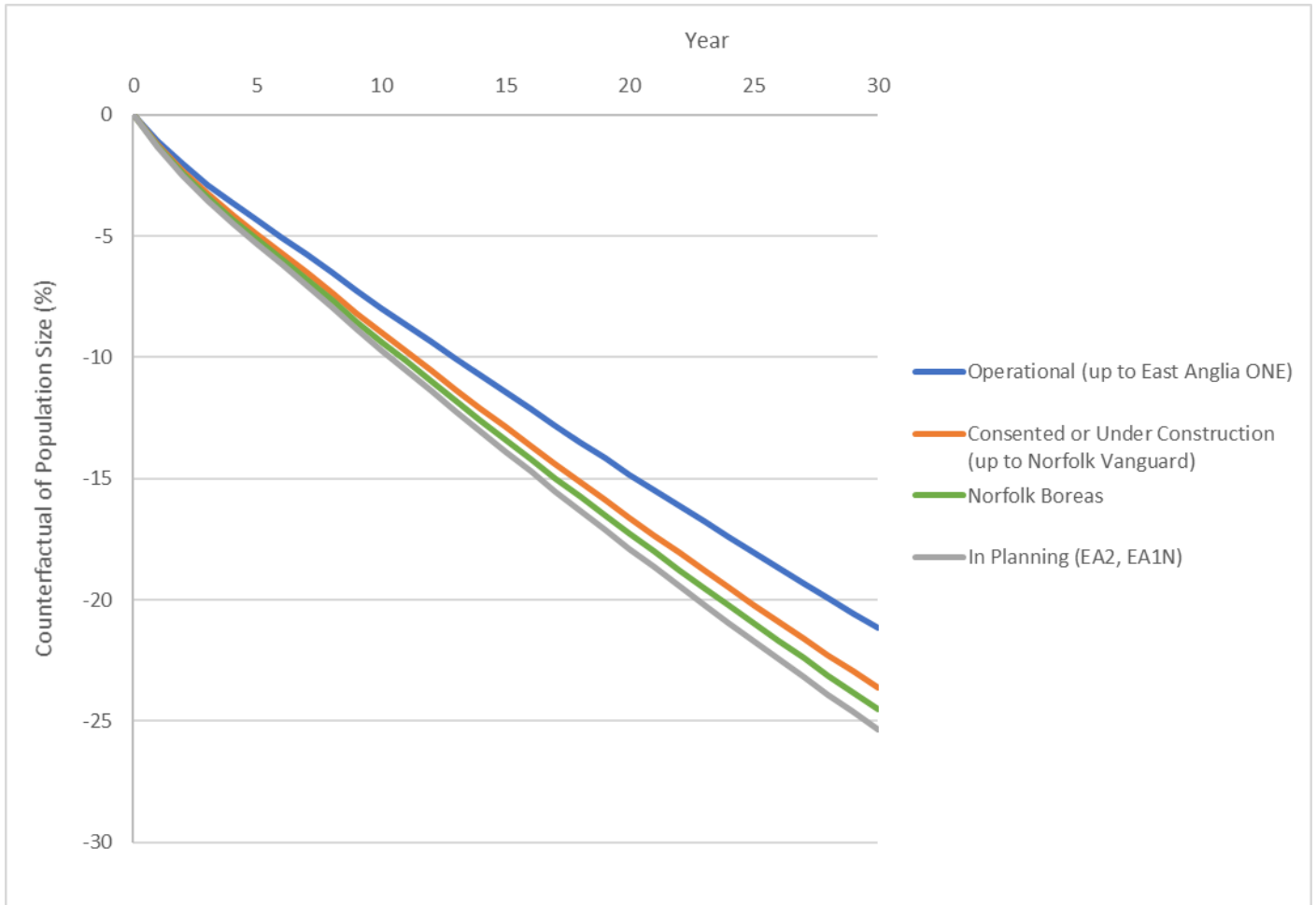
- **Restoration to above its original designation population of 14,074 pairs** whilst avoiding deterioration from its current unfavourable level;
- **Maintain safe passage** for birds moving between nesting and feeding areas;
- **Maintain** the extent, distribution, and **availability of suitable habitat (within or outside the site boundary)** which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, **feeding**); and
- **Maintain** the distribution, abundance and **availability of key food and prey items**.

7.39 The Norfolk Boreas offshore wind farm project will act to undermine each of these and add further to existing in-combination impacts on the SPA's lesser black-backed gull population predicted to arise from preceding schemes.

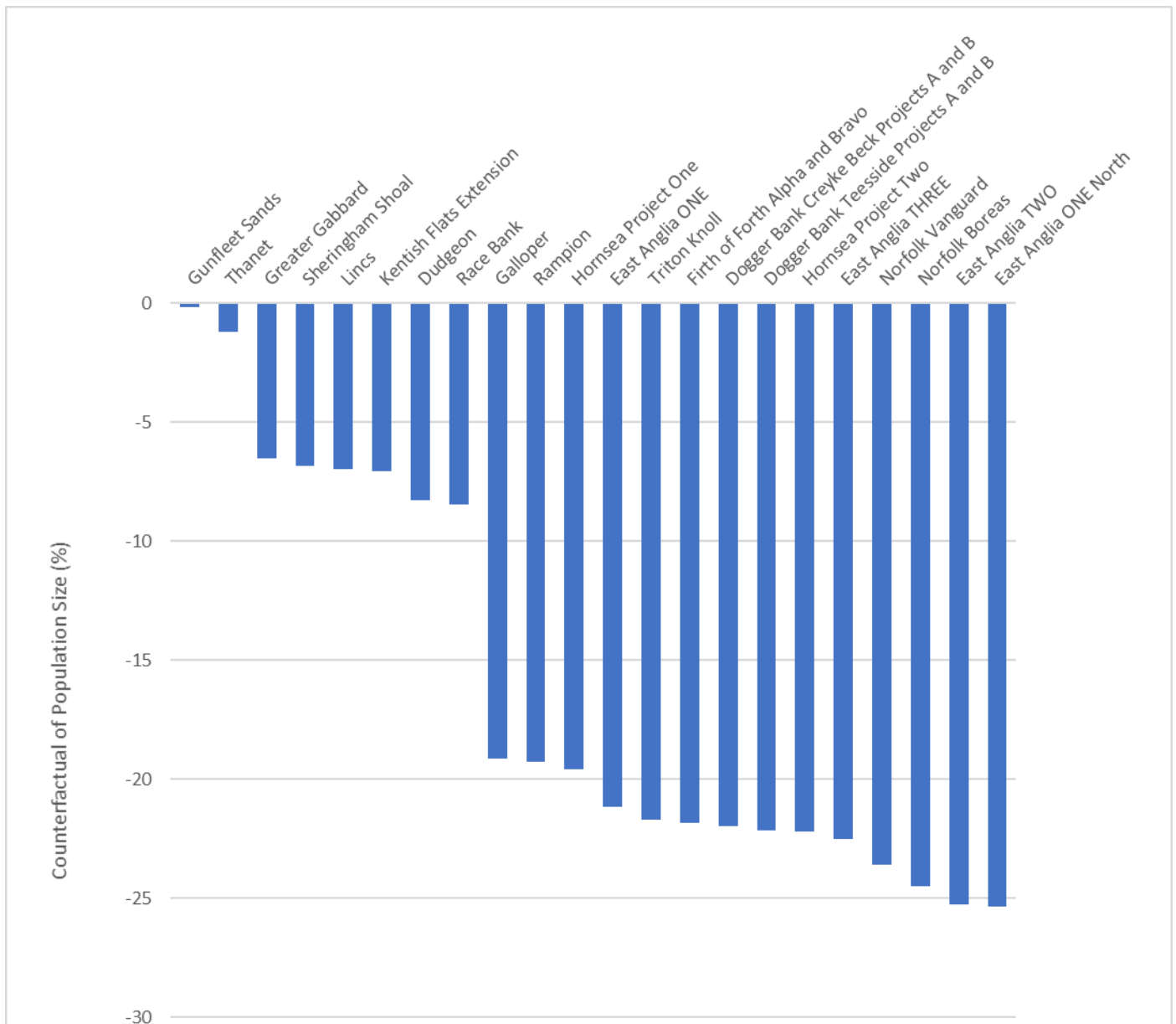
- 7.40 Using the Applicant's own figures on in-combination collision risk impacts on lesser black-backed gull apportioned to the Alde-Ore Estuary SPA from Norfolk Boreas and other offshore wind farms, we set out below how the additional impacts from Norfolk Boreas will act to make the conservation status of the lesser black-backed gull feature more unfavourable. This will move us further away from the ability to achieve the conservation objectives of the lesser black-backed gull feature of the Alde-Ore Estuary SPA and comprises an adverse effect on site integrity.
- 7.41 In order to illustrate the point that every additional wind farm exacerbates the cumulative impact on the population and makes it more difficult for this conservation objective to be met, we ran PVAs for the Alde-Ore Estuary SPA lesser black-backed gull population, for a range of scenarios incorporating cumulative collision mortality for offshore wind farms. All models were density-independent, deterministic models. These models were designed to mimic those submitted by the Applicant, with collision mortality figures taken from the Norfolk Boreas Assessment<sup>44</sup>. Similarly, the demographic data used in these models mirrored those used in the Norfolk Boreas assessment. Details of these parameters are presented in Annex 2.
- 7.42 Figure 5 shows the increases in counterfactual of population size, that is the percentage difference between the impacted SPA population size and the unimpacted population, over each year of the lifetime of the proposed development. Figure 6 shows the increase in the size of counterfactual of population size after thirty years as the cumulative mortality of each development is added.

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<sup>44</sup> Norfolk Boreas Offshore Wind Farm. Offshore Ornithology Assessment Update Cumulative and In-combination Collision Risk Modelling (Clean) April 2020, Version 2 (REP8-025). Table 2.2 for Kittiwake and Table 2.3 for Lesser Black-backed Gull



**Figure 5. Outputs of a 30-year population viability analysis showing the Counterfactual of Population Size (CPS) for lesser black-backed Gulls at the Alde-Ore Estuary SPA (a) with combined collision mortality for all operational offshore wind farms (as at August 2020), (b) with combined collision mortality for all operational, under construction and consented offshore wind farms, (c) with combined collision mortality for all of the above plus Norfolk Boreas and (d) with combined collision mortality for all UK wind farms including those currently in planning.**



**Figure 6. Outputs of a Population Viability Analysis showing the predicted % reduction in population size of the Alde-Ore Estuary SPA Lesser Black-backed Gull population after 30 years (the Counterfactual of Population Size, CPS) due to the combined collision mortality for all offshore wind farms where collision risk has been estimated for this SPA (including operational, under construction, consented and in planning). Each bar on the graph represents the reduction in population size caused by the labelled wind farm and all previous wind farms (i.e. all those to the left of it on the graph).**

7.43 These figures, based on the Applicant’s own calculations, show a relative **24.5%** reduction in the lesser black-backed gull population of the Alde-Ore Estuary SPA as a result of in-combination collision impacts, in comparison with the unimpacted population, during the lifetime of the wind farms. This demonstrates the addition of mortality arising from Norfolk Boreas to the in-combination impacts on the lesser black-backed gull feature of the Alde-Ore Estuary SPA causes a further deterioration from its current unfavourable population level and makes it increasingly

difficult to achieve the restore conservation objective and associated supplementary advice targets for the species at this site. It is therefore not possible to conclude no adverse effect on integrity as a result of collision mortality through the project in-combination.

**Overall conclusions with regards AEOI on the Flamborough and Filey Coast SPA and Alde-Ore Estuary SPA**

*The RSPB's view on affected features*

7.44 The RSPB's overall conclusions with regards all potential adverse effect on integrity of the Norfolk Boreas scheme on the Flamborough and Filey Coast SPA and Alde-Ore Estuary SPA are summarised in Section 6 above in Table 7 below. The RSPB considers that due to in-combination impacts with other plans or projects adverse effects on integrity exist for kittiwake, gannet, guillemot and razorbill from the Flamborough and Filey Coast SPA and lesser black-backed gull from the Alde-Ore Estuary SPA; and that adverse effects on the integrity cannot be ruled out on the seabird assemblage of the Flamborough and Filey Coast SPA. The RSPB considers there to be sufficient certainty in the data presented by the Applicant to support this conclusion.

**Table 7: The RSPB's current position on Norfolk Boreas impacts on the Flamborough and Filey Coast SPA and Alde-Ore Estuary SPA**

<b>Feature</b>	<b>SPA</b>	<b>Alone</b>	<b>In-combination with other plans or projects</b>
Kittiwake	FFC	Conclude that there will not be an adverse effect on site integrity	Adverse effect on site integrity exists (irrespective of whether Hornsea Project Three figures are included) due to collision risk
Gannet	FFC	Conclude that there will not be an adverse effect on site integrity	Adverse effect on site integrity exists (irrespective of whether Hornsea Project Three figures are included) due to collision risk and exacerbated by displacement.
Guillemot	FFC	Conclude that there will not be an adverse effect on site integrity	Adverse effect on site integrity exists (when mortality from Hornsea Three and Four are included) due to displacement.
Razorbill	FFC	Conclude that there will not be an adverse effect on site integrity	Adverse effect on site integrity exists (when mortality from Hornsea Three and Four are included) due to displacement.
Assemblage	FFC	Conclude that there will not be an adverse effect on site integrity	Not possible to rule out adverse effect on site integrity (irrespective of whether Hornsea Project Three figures are included) due to collision risk and displacement (based on combined impacts of: kittiwake, gannet, guillemot and razorbill).
Lesser black-backed gull	Alde-Ore Estuary	Conclude that there will not be an adverse effect on site integrity	Adverse effect on site integrity exists due to collision risk.

## Conclusion

7.45 The RSPB's analysis supports its conclusions that the in-combination impacts of Norfolk Boreas exacerbate the cumulative impact on the populations of each SPA feature and makes it more difficult for the conservation objectives of the Flamborough and Filey Coast SPA and Alde-Ore Estuary SPA to be met. Therefore, the integrity of each SPA will be undermined for the reasons set out in Section 6 and Table 7.

7.46 This is particularly obvious with respect to kittiwakes from the Flamborough and Filey Coast SPA and lesser black-backed gulls from the Alde-Ore Estuary SPA which have suffered significant declines from their favourable levels: c.40-50% and c.87% respectively. The in-combination impacts of Norfolk Boreas will cause each population to deteriorate further from its current unfavourable level, contrary to its conservation objectives.

7.47 This further supports Natural England's position that:

"...each additional impact beyond an already detrimental level, be it in terms of reduced colony growth rates or population abundance, will take the population further away from its desired state and the attainment of the required favourable condition more difficult e.g. by making the population more prone to stochastic events (such as winters with low survival rates or breeding seasons with poor food availability), or impairing the effectiveness of conservation measures.

In other words, these impacts would be contrary to the high-level conservation objectives of the site."<sup>45</sup>

7.48 As all are aware, the Application can only be granted consent if the Secretary of State is convinced that it will not have an adverse effect on the integrity of European Sites and their qualifying features, having applied the precautionary principle and taken account of the conservation objectives for those sites and their features. *Waddenzee* confirmed that where reasonable scientific doubt remains as to the absence of adverse effects on the integrity of the site, approval should be refused<sup>46</sup>, subject to the consideration of alternative solutions, imperative reasons of overriding public interest and the provision of compensatory measures, as set out in regulations 64 and 68 of the Conservation of Habitats and Species Regulations 2017. We consider the Applicant's approach to its derogation case in section 8.

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<sup>45</sup> See page 26 of Natural England's response to Examining Authority's Fifth round of Written Questions (REP14-064)

<sup>46</sup> CJEU Case-127/02; [2004] ECR-7405 at [56]-[57]



## 8. The RSPB's position regarding the Norfolk Boreas derogation case

8.1 The RSPB notes that in both his decision letter on Norfolk Vanguard and his "minded to consent" letter on Hornsea Three, the Secretary of State signalled that full consideration should be given to derogation issues during the course of an NSIP examination. At paragraphs 5.2 and 5.3 of the Norfolk Vanguard decision letter<sup>47</sup> he stated (emphasis added):

**"5.2... he wishes to make it clear that, in order to maintain the efficient functioning of the development consenting system, he may not always request post-examination representations on such matters. Indeed, it should be assumed that he will not do so, and he may, therefore, make decisions on such evidence as is in front of him following his receipt of the ExA's report. It is, therefore, important that potential Adverse Effects on the Integrity of designated sites are identified during the pre-application period and full consideration is given to the need for derogation of the Habitat Regulations during the Examination. He expects Applicants and statutory nature conservation bodies ("SNCBs") to engage constructively during the pre-application period and provide all necessary evidence on these matters, including possible compensatory measures, for consideration during the Examination.**

5.3 This does not mean that it is necessary for Applicants to agree with SNCBs if SNCBs consider that there would be significant adverse impacts on designated sites. The final decision on such matters remains for the Secretary of State (though the Secretary of State reserves the right not to request further evidence from Applicants following the Examination). Applicants should be assured that where they disagree with SNCBs and maintain a position that there are no significant adverse impacts, but provide evidence of possible compensatory measures for consideration at the examination on a "without prejudice" basis, both the ExA in the examination and the Secretary of State in the decision period will give full and proper to consideration to the question of whether or not there are significant adverse impacts. It will not be assumed that the provision of information regarding possible compensatory measures signifies agreement as to the existence of significant adverse impacts. **The ExA will be required to provide an opinion on the sufficiency of the proposed compensation even if it considers that compensation is not required** (in case the Secretary of State disagrees

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<sup>47</sup> Secretary of State for Business, Energy and Industrial Strategy (2020). Decision letter dated 1 July 2020 to Norfolk Vanguard Limited regarding application for the Norfolk Vanguard Offshore Wind Farm Order.

with that conclusion), but such measures would only be required if the Secretary of State were to find that there would be significant adverse impacts (and that the proposed compensatory measures are appropriate).”

8.2 The RSPB notes that in respect of the Hornsea Three scheme, the Secretary of State stated in his “minded to consent” letter<sup>48</sup> that (emphasis added):

“3.6... [he did not] consider that [the] necessary compensatory measures for that impact have been secured...”

3.7 The Secretary of State is therefore minded to grant consent subject to the Applicant providing sufficient evidence that the said compensatory measures have been secured.

3.8 **The Secretary of State requests the Applicant provides further information confirming that sufficient compensatory measures have been secured as soon as possible...”**

8.3 The RSPB notes that the Applicant for Norfolk Boreas has, to date, declined to provide any further information on its derogation case, in particular any compensatory measures, beyond the “in principle” case it submitted at Deadline 7. The RSPB notes that no further evidence has been provided by the Applicant that the proposed compensatory measures set out in its “in principle” case are both sufficient and have been secured. The RSPB’s conclusions on the Applicant’s “in principle” compensatory measures proposals therefore remain as set out in our Deadline 10 submission (REP10-067):

**“Compensatory measures**

**Section 6** sets out the RSPB’s detailed comments on how compensation measures need to be considered and our views on the measures proposed by Hornsea Three and Norfolk Vanguard. For the detailed reasons set out in section 6, the RSPB considers that neither Hornsea Three or Norfolk Vanguard have put forward compensation measures that can be considered to have a reasonable guarantee of success as required by both Defra and European Commission guidance. In summary, the RSPB’s conclusions are:

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<sup>48</sup> Secretary of State for Business, Energy and Industrial Strategy (2020). “Minded to consent” letter dated 1 July 2020 to Orsted Hornsea Project Three (UK) Limited regarding application for the Hornsea Project Three Offshore Wind Farm Order.

*Flamborough and Filey Coast SPA: breeding kittiwake (and the seabird assemblage feature)*

The RSPB welcomes the work carried out by both Hornsea Three and Norfolk Vanguard to identify potential compensation measures to address the predicted in-combination adverse effects on breeding kittiwakes from the FFC SPA. For reasons each has set out, devising a compensation measure for breeding kittiwakes with a “reasonable guarantee of success” is highly problematic.

At this point in time, it is the RSPB’s conclusion that neither Hornsea Three or Norfolk Vanguard have established that their preferred option meets the necessary standards and evidence base to be considered a compensation measure that has a “reasonable guarantee of success”. Each has its difficulties which, in summary, are...:

- **Norfolk Vanguard:** there is little or no evidence to demonstrate that creation of a de nouveau artificial nesting structure will successfully attract and sustain a population of breeding kittiwakes. In addition, the RSPB is concerned that the proposal to locate the structure in the southern North Sea within its offshore Order limits exposes any birds that do colonise the structure to two known negative pressures: poor food availability and collision risk, thereby undermining the measure from the outset. Any proposal to over-compensate to address these issues should only be considered on the basis of a fuller understanding of the implications of each pressure on the likely outcome, including appropriate population modelling.

*Alde-Ore Estuary SPA: breeding lesser black-backed gulls*

As with kittiwakes, the RSPB welcomes the work carried out by Norfolk Vanguard to identify potential compensation measures to address the predicted in-combination adverse effects on breeding LBBGs from the Alde-Ore Estuary SPA. In principle, we support the proposal to carry out a structured review to identify potential compensation measures that would have a “reasonable guarantee of success”.

However, at this point in time, it is the RSPB’s conclusion that Norfolk Vanguard has not established that its preferred option meets the necessary standards and evidence base to be considered a compensation measure that has a “reasonable guarantee of success”. In summary, Norfolk Vanguard’s preferred option to create a predator fenced area within the Alde-Ore Estuary:

- would not be additional to measures already necessary to restore the LBBG population of the SPA to favourable status;

- There is scientific uncertainty as to the effectiveness of the measures. Further research is required to test the efficacy of the most likely measures;
- It would be necessary to show how any compensatory measures within the SPA are genuinely additional to site management.

*Overall conclusions on compensation measures*

Based on the RSPB's detailed comments, the RSPB's overall conclusions are that neither Hornsea Three nor Norfolk Vanguard have presented compensation measures that:

- Have a reasonable guarantee of success based on the best scientific knowledge;
- Would be secured (legally, financially and technically) in advance of consent being granted;
- Would ensure the overall coherence of the Natura 2000 network was protected.

The RSPB considers that any formal proposal for compensation measures must be secured prior to DCO consent being granted.”

8.4 Therefore, in light of the Secretary of State's guidance to applicants contained in his Norfolk Vanguard decision letter, and his clear statement that there is no guarantee he will request post-examination information in the future, the decision not to provide additional information is at the Applicant's own risk. It means the Examining Authority has no detailed evidence in front of it as to:

- Whether the compensation measures will be sufficient, if the Secretary of State were to conclude an adverse effect on integrity of an SPA feature could not be ruled out; and
- That those compensation measures had been secured.

8.5 For the reasons given in section 7 above, it is the RSPB's view that an adverse effect on integrity on both the Flamborough and Filey Coast SPA and Alde-Ore Estuary SPA cannot be ruled out. In deciding not to submit a detailed derogation case that demonstrates that sufficient compensation measures with a reasonable guarantee of success have been secured, the Applicant leaves the Secretary of State in the position of having to refuse consent should he conclude that an adverse effect on integrity on one or both of those SPAs cannot be ruled out.

## 9. Annex 1: RSPB note on precaution (updated 1st September 2020)

9.1 The Applicant has constantly argued that they consider that the Natural England and RSPB recommended approach to assessment of offshore wind farm developments is overly precautionary. Many of the arguments presented to support that position are unjustified and in this note the RSPB will demonstrate why the approach taken is not overly precautionary. The RSPB considers its approach and that of Natural England is a measured and reasonable response to the considerable uncertainty inherent in the assessment procedure. While the RSPB welcomes the Offshore Ornithology Assessment Update, there is nothing presented within it that would cause a change in our position with regard to adverse effects, as laid out in previous written submissions

### The precautionary principle

9.2 The precautionary principle exists for situations where scientific data does not exist or is incomplete and therefore it is not possible to complete a full evaluation of the possible risks a plan, project or activity may cause to the environment, including possible danger to humans, animal or plant health, or to the environment in general. The European Commission's Precautionary Principle guidance<sup>49</sup> states that it should apply when a phenomenon, product or process may have a dangerous effect, identified by a scientific and objective evaluation, if this evaluation does not allow the risk to be determined with sufficient certainty. As such the degree of precaution applied to an evaluation, or assessment, can be seen to be directly proportional to the extent of scientific uncertainty inherent in that assessment. As the guidance goes on to recommend, "The implementation of an approach based on the precautionary principle should start with a scientific evaluation, as complete as possible, and where possible, identifying at each stage the degree of scientific uncertainty."

### Uncertainty

9.3 As there can be "almost as many definitions of uncertainty as there are treatments of the subject"<sup>50</sup>, following Masden *et al.* (2015)<sup>51</sup>, the RSPB defines it as a lack of knowledge, or incomplete information about a particular subject. Masden *et al.*, identified a hierarchy of uncertainty in offshore wind farm assessment. This included not only the uncertainty arising from scientific knowledge, as argued by the Applicant, but uncertainty arising more strategically

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<sup>49</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52000DC0001&from=EN>

<sup>50</sup> Argote, L. (1982). Input Uncertainty and Organizational Coordination in Hospital Emergency Units. *Administrative Science Quarterly*, 27(3), 420-434. doi:10.2307/2392320

<sup>51</sup> Masden, E. A., McCluskie, A., Owen, E., & Langston, R. H. (2015). Renewable energy developments in an uncertain world: the case of offshore wind and birds in the UK. *Marine Policy*, 51, 169-172.

from the process of assessment itself, such as uncertainty within language and decision-making. Included within this process, uncertainty can be considered as anything that increases the difficulty in reaching firm and robust conclusions, such as revisions in modelling approaches, late submissions, overly complicated language and unsupported arguments put forward as evidence. As such, the approach taken by the Applicant to date, and as evidenced below, is one of increasing uncertainty rather than reducing it. As the degree of precaution is proportional to the degree of uncertainty, such an approach increases the need for precaution in the assessment.

## Collision Risk Assessment

### *Consented and built out capacity*

- 9.4 The Applicant refers to projects in the in-combination assessment that have been built out to a lower capacity than that consented as a source of precaution within the assessments. As discussed in our earlier written submissions, this is an acceptable point for windfarms where the Development Consent Order (DCO) has been amended and therefore there is legal certainty regarding the reduction. However, where windfarms still have their original DCOs and therefore the ability to construct more wind turbines, it is not appropriate to do anything less than consider the full extent of those DCOs when considering in-combination/cumulative effects.
- 9.5 The Applicant cites an unpublished report commissioned by the Crown Estate (Appendix 2 of The Applicant's comments on Written Representations and Additional Submissions; REP3-007). This report, which was not designed for use in assessment, was flawed for several reasons and took an approach counter to the principles of sustainable development. Rather than seeking to achieve maximum capacity for least environmental effect, the report implied that the calculated 'headroom' for each species is simply expendable. Furthermore, no new knowledge and understanding was accommodated within the report, for example, there was no clarity on the accuracy of the underlying baseline data sets, uncertainties within the modelling and expression of confidence intervals for the outputs of those models. In the absence of this context, the report cannot be relied upon to be used to inform assessment.

### Nocturnal activity

- 9.6 We do not agree with the changes in nocturnal activity rates proposed. While for gannet, we welcome the latest published evidence review (Furness et al. 2018<sup>52</sup>), for the other species there is no such peer reviewed evidence. There are several issues with this.
- 9.7 Mortalities are potentially underestimated because in doing so there is no account for the potential interaction between survey timing and diurnal behavioural patterns. Peaks in foraging activity at first and last light (see for example, Fig. 3 in Furness et al. 2018) will not be accounted for in the assessment if these did not coincide with surveys (the timings of which are currently unknown, but likely to be in the middle of the day), and the survey may have been carried out at a time of much lower activity. Thereby the application of the revised nocturnal activity rates either recommended by Furness et al. (2018) or the rates suggested by the Applicant could result in underestimates of collision risk. We request that details of the timings of survey are presented.
- 9.8 It is not clear how the revised rates, other than those for gannet, account for the distinction between the definition of daylight as used in the Band model and with the official concept of 'twilight' and 'night'. This is an issue, as the Band (2012) model considers the nocturnal period as between sunset to sunrise and so treats flight activity that occurs at twilight as being within the nocturnal flight period. This period is of importance as evidence from tagging shows that a number of seabirds actively forage at twilight.
- 9.9 The Applicant's proposed reductions in collisions from nocturnal activity do not take into account spatial or temporal variability in nocturnal activity. This variation in seabird behaviour has been shown by a number of studies (e.g. Dias *et al.*, 2012<sup>53</sup>, Paredes *et al.*, 2014<sup>54</sup>, Kokubun *et al.*, 2015<sup>55</sup>, Dias *et al.*, 2016<sup>56</sup>). This variation can be related to underlying habitat and prey choice and stages of the lunar cycle, potentially due to different light levels that affect the ability

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<sup>52</sup> Furness, R. W., Garthe, S., Trinder, M., Matthiopoulos, J., Wanless, S., & Jeglinski, J. (2018). Nocturnal flight activity of northern gannets *Morus bassanus* and implications for modelling collision risk at offshore wind farms. *Environmental Impact Assessment Review*, 73, 1-6.

<sup>53</sup> Dias, M. P., Granadeiro, J. P., & Catry, P. (2012). Working the day or the night shift? Foraging schedules of Cory's shearwaters vary according to marine habitat. *Marine Ecology Progress Series*, 467, 245-252.

<sup>54</sup> Paredes, R., Orben, R. A., Suryan, R. M., Irons, D. B., Roby, D. D., Harding, A. M., ... & Heppell, S. (2014). Foraging responses of black-legged kittiwakes to prolonged food-shortages around colonies on the Bering Sea shelf. *PLoS one*, 9(3), e92520.

<sup>55</sup> Kokubun, N., Yamamoto, T., Kikuchi, D. M., Kitaysky, A., & Takahashi, A. (2015). Nocturnal foraging by red-legged kittiwakes, a surface feeding seabird that relies on deep water prey during reproduction. *PLoS one*, 10, e0138850.

<sup>56</sup> Dias, M. P., Romero, J., Granadeiro, J. P., Catry, T., Pollet, I. L., & Catry, P. (2016). Distribution and at-sea activity of a nocturnal seabird, the Bulwer's petrel *Bulweria bulwerii*, during the incubation period. *Deep Sea Research Part I: Oceanographic Research Papers*, 113, 49-56.

to effectively forage. As such, cloud cover could also cause variability in nocturnal activity. Furthermore, there is likely to be significant individual and colony scale variability not included in the Applicant's limited reviews. Such variability highlights the importance of presenting a range of nocturnal activity factors, in order to capture the uncertainty inherent in the estimate and ensure a proportionately precautionary assessment. The Applicant's preferred approach of presenting a single value, derived from a limited sample of studies and non-peer reviewed in all cases except gannet, does not sufficiently account for variability and therefore is not suitably precautionary. This may lead to a serious underestimation of uncertainty.

#### *Over emphasis on 95% confidence intervals*

9.10 Following Masden *et al.* (2015) Natural England requested that an indication of uncertainty is given around estimates of abundance – a request that the RSPB strongly supports. This means that although there may be insufficient scientific knowledge for an estimate to be made with full confidence, as uncertainty is inherent in all scientific research, presenting an indication of the extent of this uncertainty provides a measure of confidence that greatly assists any decision making. This point is made by Millner-Gullard & Shea (2017<sup>57</sup>) as follows: “In order to manage uncertainty it must first be acknowledged and identified”.

9.11 However, the Applicant argues that the 95% confidence intervals requested by Natural England to give the indication of uncertainty, are an “over emphasis”. This misinterprets the advice given by Natural England, which is that the means are used in the overall assessment, but confidence intervals also need to be presented to allow consideration of the variability (and therefore the uncertainty) in the underlying annual population estimates. This ensures confidence in any conclusions can be expressed, but does not affect the actual conclusions, which should of course be based on the means (or other measure of central tendency). This is an entirely appropriate method and not in any way over precautionary. Not to express this uncertainty, as the Applicant seems to advocate, would not be consistent with European Commission Guidance on the Precautionary Principle. By not identifying and highlighting uncertainty, the need for precaution could therefore increase.

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<sup>57</sup> Milner-Gulland, E. J., & Shea, K. (2017). Embracing uncertainty in applied ecology. *The Journal of applied ecology*, 54(6), 2063.



### *Kittiwake flight speeds*

- 9.12 The Applicant highlights the difference in flight speed of kittiwake that is typically used in assessment and which was recorded during the study carried out by Skov *et al.* (2018)<sup>58</sup>. The RSPB welcomes the use of parameters with an evidence base in collision risk assessment, however, there are several reasons why the flight speeds presented in Skov *et al.* should not be used in isolation, which we outline below.
- 9.13 The speed given is from a single study, the ORJIP Bird Collision Avoidance study, that was carried out at a single wind farm offshore from Kent and distant from kittiwake breeding colonies. As such, the behaviours recorded will largely have not been from breeding birds. Indeed, Bowgen and Cook (2018)<sup>59</sup> in their analysis of Skov *et al.* caution that the flight speeds “come from a single site during the non-breeding season. Given the influence of site-specific data on the estimated collision rates, such data may not be directly transferable to other sites or, to the breeding season.”
- 9.14 There is considerable variability in the flight speeds of seabirds, and this can be related to, for example, behavioural state, prey type and abundance, and the presence of fishing vessels (Votier *et al.*, 2010<sup>60</sup>), (the latter is of interest in this context, as aspects of the Skov *et al.* study were compromised by the presence of fishing vessels (Bowgen & Cook, 2018)), and can vary between years and between colonies (Petex *et al.*, 2012<sup>61</sup>). There are also different measures of flight speed presented in Skov *et al.*, true flight speed and straight-line speed, and there remains no consensus as to which is the most appropriate to use with the Band model.
- 9.15 Given the extent of this potential variability, it is not precautionary to base assessment on a speed parameter derived from a single site where not all behavioural states will have been recorded. This may be compromised by the presence of vessels and may not have the environmental conditions relative to the site being assessed. In this case it is best to have site specific parameters, or, in the absence of these, a range of values.

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<sup>58</sup> Skov, H., Heinänen, S., Norman, T., Ward, R.M., Méndez-Roldán, S. & Ellis, I. 2018. ORJIP Bird Collision and Avoidance Study. Final report – April 2018. The Carbon Trust. 247 pp

<sup>59</sup> Bowgen, K. & Cook, A. 2018. Bird Collision Avoidance: Empirical evidence and impact assessments. JNCC Report No. 614, JNCC, Peterborough, ISSN 0963-8091.

<sup>60</sup> Votier, S. C., Bearhop, S., Witt, M. J., Inger, R., Thompson, D., & Newton, J. (2010). Individual responses of seabirds to commercial fisheries revealed using GPS tracking, stable isotopes and vessel monitoring systems. *Journal of Applied Ecology*, 47(2), 487-497.

<sup>61</sup> Pettex, E., Lorentsen, S. H., Grémillet, D., Gimenez, O., Barrett, R. T., Pons, J. B., ... & Bonadonna, F. (2012). Multi-scale foraging variability in Northern gannet (*Morus bassanus*) fuels potential foraging plasticity. *Marine biology*, 159(12), 2743-2756.

### *Avoidance rates*

- 9.16 The Applicant cites Bowgen and Cook (2018) as evidence of higher Avoidance Rates than those currently used. The work this report is drawn from has acknowledged limitations that prevent conclusions being drawn from it. These include the fact that fishing vessels were present on the periphery of the wind farm during the study, thereby biasing the results, and that due to the wind farm being of some distance from breeding colonies, that gannets and kittiwakes seen were non-breeders, or were recorded out with the breeding season. It is also of note that the Bowgen and Cook (2018) report's calculated avoidance rate for kittiwake is actually lower than that previously recommended by the BTO (the report's authors) indicating that avoidance rates can go up as well as down and so are not always the most precautionary.
- 9.17 The Avoidance Rate is cited by the Applicant from Bowgen and Cook as an "Empirical" Avoidance Rate, that is one derived from behavioural observation. This is not correct. An Empirical Avoidance Rate differs from those Avoidance Rates conventionally used in the Band model which are correction factors used to account not only for avoidance behaviour, but also model and parameter uncertainty, error and variability. As such, Empirical Avoidance Rates are not directly comparable with conventional Avoidance Rates and Bowgen & Cook (2018) were careful to make the distinction between the two.
- 9.18 In their comments on Written Representations and Additional Submissions (REP3-007), the Applicant highlights the difference in preferred or recommended breeding season avoidance rate for gannet between the RSPB and Natural England and the other Statutory Nature Conservation Bodies. Whilst the RSPB accepts the Statutory Nature Conservation Bodies' recommended amendment<sup>62</sup> to the gannet avoidance rate (AR) from 98% to 98.9% for non-breeding birds, we do not agree that this figure should be applied to the breeding season due to the lack of available evidence relating to breeding birds. During the breeding season there are significant time and energy constraints imposed on foraging birds by the requirement to return to the nest to incubate eggs or brood and provide food for chicks. As such, the response of foraging and commuting birds to the presence of a windfarm is likely to be different during the breeding season. Consequently, the avoidance rate, which incorporates such reactive behaviour, is also likely to be different.

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<sup>62</sup> Joint Nature Conservation Committee (JNCC), Natural England (NE), Natural Resource Wales (NRW), Northern Ireland Environment Agency (NIEA), Scottish Natural Heritage (SNH) (2014). Joint Response from the Statutory Nature Conservation Bodies to the Marine Scotland Science Avoidance Rate Review

9.19 As acknowledged in the BTO Review the Statutory Nature Conservation Body advice is drawn from<sup>63,64</sup>, the majority of the evidence used to assess avoidance behaviour of gannet is from non-breeding birds (the BTO review makes this clear, saying: “it should be noted that this figure is based on data that are most representative of the non-breeding season”). Breeding birds, under the constraints outlined above, will behave differently and potentially be subject to greater impacts from developments<sup>65</sup>. As such, we recommend a more precautionary AR of 98% for the breeding season to account for this uncertainty regarding breeding bird behaviour around windfarms.

9.20 This difference between the RSPB and Natural England is the only difference in our positions on Collision Risk Assessment. There is agreement that due to the uncertainty and variability in model parameters, such as gannet breeding season Avoidance Rate, that a range of values be used. Natural England have confirmed this position in their response to Q8.10.3 of the Examining Authority’s Written Questions (REP2-080).

### Displacement Assessment

9.21 There have been few robust studies of seabird displacement, the results differ, and we do not know the consequences for mortality or population trajectories. Because of the consequent uncertainty, it is appropriate to consider a range of putative displacement and mortality rates.

### Extent of Displacement

9.22 Citing their own review (MacArthur Green 2019<sup>66</sup>), the Applicant claims that their preferred displacement rates are precautionary, for guillemot and razorbill claiming few studies show greater than 50% displacement. Unfortunately, the review did not include Vanerman *et al.*, (2019<sup>67</sup>) which reports on 6 years of post-construction study at Thornton Bank wind farm. This study reports displacement rates of 60 and 63% for guillemot and 75-80% for razorbill. In this

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<sup>63</sup> Cook, A.S.C.P., Humphreys, E.M., Masden, E.A. & Burton, N.H.K. (2014) The Avoidance Rates of Collision between Birds and Offshore Turbines. Scottish Marine and Freshwater Science Volume 5 Number

<sup>64</sup> Report Published by Marine Scotland Science 16 Cook, A. S., Humphreys, E. M., Bennet, F., Masden, E. A., & Burton, N. H. (2018). Quantifying avian avoidance of offshore wind turbines: current evidence and key knowledge gaps. *Marine environmental research*, 140, 278-288.

<sup>65</sup> Masden, E. A., Haydon, D. T., Fox, A. D., & Furness, R. W. (2010). Barriers to movement: modelling energetic costs of avoiding marine wind farms amongst breeding seabirds. *Marine Pollution Bulletin*, 60(7), 1085-1091.

<sup>66</sup> MacArthur Green (2019c) Norfolk Vanguard Offshore Wind Farm. The Applicant Responses to First Written Questions Appendix 3.3 - Operational Auk and Gannet Displacement: update and clarification.

<sup>67</sup> Vanermen, N., Courtens, W., Van De Walle, M., Verstraete, H., & Stienen, E. (2019) Seabird monitoring at the Thornton Bank Offshore wind farm. In *Environmental Impacts of Offshore Windfarms in the Belgian Part of the North Sea*. Degraer, Brabant, Rumes and Vigin (eds) Roya Belgian Institute of Natural Sciences.

context, the higher values in the range recommended by Natural England should be viewed as realistic, rather than over-precautionary.

- 9.23 The Applicant argues that displacement rates are based on evidence from studies carried out at older wind farms and that these had smaller, more closely spaced turbines. However, the argument is then made, without evidence, that displacement will be reduced with modern turbine design, where the turbines are spaced further apart and are considerably larger. Notwithstanding the lack of evidence for this assertion, it intuitively seems very unlikely that larger turbines will cause less displacement. It would be far more likely that greater displacement would arise. Again, the use of these speculative and counter-intuitive arguments has the effect of increasing the uncertainty within the assessment process.

#### *Mortality arising from Displacement*

- 9.24 Despite acknowledging that mortality rates arising from displacement are less well known, in support of their preferred lower mortality percentage, the Applicant cites a review carried out previously by their consultants (MacArthur Green, 2019). In this review it is claimed that as some seabirds attain higher weights during the non-breeding season, that they have little difficulty finding food at this time. However, the review does not include other conflicting evidence that some seabirds may have an “energetic bottleneck” in the winter (Fort *et al.*, 2009<sup>68</sup>). The higher weight in some non-breeding seabird reported by the Applicant is also likely to be because birds are not subject to the stresses and constraints of breeding. As such the non-breeding period can be seen as a recovery and preparatory period and it is wrong to suggest that higher weights during this period mean that the birds can be subjected to greater disturbance without consequence. Such consequences could apply by reducing condition prior to breeding and thereby decreasing breeding success.

- 9.25 The Applicant also suggests that as current estimates of red-throated diver mortality include that occurring as a consequence of shipping activity, that additional mortality arising from displacement from wind farms is likely to be small. This ignores the recent evidence from Mendel *et al.* (2019)<sup>69</sup> that the extent of displacement caused by the presence of wind farms is far greater than that arising from shipping traffic. The Applicant’s argument appears to be that because the

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<sup>68</sup> Fort, J., Porter, W. P., & Grémillet, D. (2009). Thermodynamic modelling predicts energetic bottleneck for seabirds wintering in the northwest Atlantic. *Journal of Experimental Biology*, 212(15), 2483-2490.

<sup>69</sup> Mendel, B., Schwemmer, P., Peschko, V., Müller, S., Schwemmer, H., Mercker, M., & Garthe, S. (2019). Operational offshore wind farms and associated ship traffic cause profound changes in distribution patterns of Loons (*Gavia spp.*). *Journal of environmental management*, 231, 429-438.

birds are already disturbed by shipping traffic that further disturbance will not matter. However, it is not known whether red-throated divers in the southern North Sea are close to a tipping point in terms of disturbance and whether any more could significantly exacerbate the mortality and lead to catastrophic impacts. The use of mortality figures that are lower than the current recommendations therefore risks under-estimating the significance of the impact on this and other species.

### *Density Dependence*

- 9.26 We do not accept the arguments for the use of PVA outputs incorporating compensatory density dependence, although acknowledge that both density dependent and independent formulations are presented. The reasons for this are outlined in Green *et al.* (2016)<sup>70</sup> and the reviews by Cook and Robinson (2015)<sup>71</sup> and Horswill and Robinson (2015)<sup>72</sup>. It is not that density dependence does not exist, but rather that we do not have the means to accurately quantify the strength and form of it in a biologically meaningful way in order to incorporate it into PVA.
- 9.27 Whilst we accept that density dependence is likely to exist in seabird populations, precise species and colony specific knowledge of its size and shape are needed to correctly parameterise the population models. This is important to acknowledge because density dependence is not always compensatory, but can also be depensatory, slowing the rate of population growth at lower population densities. In other words, a population decline arising from an offshore wind farm could have larger consequences on the population than are predicted by the compensatory density dependent or even density independent models.
- 9.28 Horswill and Robinson (2015) identified depensation occurring in three gull species (blacklegged kittiwake, black-headed gull and herring gull). As such, it would be very wrong to simply assume that density independent outputs are highly precautionary, rather that density independent outputs are the most sensible to use for assessment. The Applicant claims depensatory density dependence will only occur on small populations. Given the length of time the wind farm will be operational, and the potential decline in populations, particularly kittiwake, there is no way of knowing if in the future these populations could be subject to depensatory density dependence.

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<sup>70</sup> Green, R. E., Langston, R. H. W., McCluskie, A., Sutherland, R. and Wilson, J. D. (2016), Lack of sound science in assessing wind farm impacts on seabirds. *J Appl Ecol.* doi:10.1111/1365-2664.12731

<sup>71</sup> Cook, A.S.C.P. and Robinson, R.A. (2015) The scientific validity of criticisms made by the RSPB of metrics used to assess population level impacts of offshore windfarms on seabirds. BTO Research Report No. 665. <https://www.bto.org/sites/default/files/publications/rr665.pdf>

<sup>72</sup> Horswill, C. & Robinson R. A. (2015). Review of seabird demographic rates and density dependence. JNCC Report No. 552. Joint Nature Conservation Committee, Peterborough.

- 9.29 The Applicant's preference for density dependent modelling is counter to all advice, including the Applicant's own consultants who made clear in a report to Defra, "the most robust approach is to avoid the temptation to include density dependence, since it is often based on the premise that 'it must be operating therefore it must be included', even if the mechanism is unknown" (Furness *et al.*, 2013<sup>73</sup>). The argument against the use of density dependent population models is not that density dependence does not exist in seabird populations, rather that it should only be incorporated when its strength and form are known for a specific species and colony (Cook and Robinson, 2015). The Applicant's approach of modelling density dependence almost entirely based on a single meta-analysis (Cury *et al.*, 2011<sup>74</sup>), is against this advice. Indeed, Cook and Robinson (2015) also point out that "focussing on a single study, even one as comprehensive as Cury *et al.* (2011), therefore risks potentially over-looking important responses."
- 9.30 While the Applicant argues that NE and RSPB advocate an overly precautionary approach to population modelling, they do not always use the most precautionary approach. For example, the productivity of kittiwakes at the Flamborough and Filey Coast SPA has fallen in recent years, with more recent monitoring showing the rate in the most recent 5 years ranges between 0.55-0.7 chicks per pair (Lloyd *et al.*, 2019<sup>75</sup>). Running the models with this parameter updated would produce a slightly more severe predicted impact. Furthermore, a non-breeding rate (i.e. the proportion of adults that do not attempt to breed each year) is not included for kittiwake, but there is good evidence that some adults will not attempt to breed each year and that this varies between increasing and declining colonies (rates recommended by and reported in Horswill & Robinson 2015). Running the models with this parameter included (even the lower rate for an increasing colony, which would be appropriate for Flamborough and Filey Coast) would produce a slightly more severe predicted impact.

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<sup>73</sup> Furness, R. W., MacArthur, D., Trinder, M., & MacArthur, K. (2013). Evidence review to support the identification of potential conservation measures for selected species of seabirds. *Report to Defra*.

<sup>74</sup> Cury, P.M., Boyd, I.L., Bonhommeau, S., Anker-Nilssen, T., Crawford, R.J., Furness, R.W., Mills, J.A., Murphy, E.J., Österblom, H., Paleczny, M. and Piatt, J.F., 2011. Global seabird response to forage fish depletion—one-third for the birds. *Science*, 334(6063), pp.1703-1706.

<sup>75</sup> Lloyd, I., Aitken, D., Wildi, J. & O'Hara, D. (2019) Flamborough and Filey Coast SPA Seabird Monitoring Programme. 2019 Report. RSPB.

## 10. Annex 2: Details of Population Viability Analysis

10.1 Population Viability Analyses (PVAs) were run by the RSPB for the Flamborough and Filey Coast SPA kittiwake population, and the Alde-Ore Estuary lesser black-backed gull population, for a range of scenarios incorporating cumulative collision mortality for offshore wind farms. All models were density-independent, deterministic models.

10.2 Collision mortality figures were taken from the Norfolk Boreas Assessment<sup>76</sup>, using the annual figures for the relevant SPA.

10.3 Demographic data used in these models mirrored those used in the Norfolk Boreas assessment. For kittiwake, there were two alternative demographic data sets, as explained in MacArthur Green (2015)<sup>77</sup>, the first, “set 1”, obtained from an independent review of published studies conducted by MacArthur Green (2015) and the second, “set 2”, using more widely accepted data from Horswill & Robinson (2015)<sup>78</sup>, plus productivity data (fledged young per pair) taken as the 6-year average between 2009-2014 from productivity monitoring in the Flamborough and Filey Coast SPA. For the purposes of these models we used “set 1”. For lesser black-backed gulls the figures are the same as those used in MacArthur Green (2019)<sup>79</sup>.

Species/set	SPA Population size (individuals)	Survival					Fledged young per pair	Age at first breeding
		0-1	1-2	2-3	3-4	Adult		
Kittiwake Set 1	89040	0.79	0.85	0.87	-	0.882	0.672	4
Kittiwake Set 2	89040	0.79	0.854	0.854	-	0.854	0.847	4
Lesser black- backed gull	4000	0.82	0.885	0.885	0.885	0.885	0.351*	5

\*accounts for a non-breeding rate of 0.34 (i.e. a proportion of adults do not attempt to breed each year)

<sup>76</sup> Norfolk Boreas Offshore Wind Farm. Offshore Ornithology Assessment Update Cumulative and In-combination Collision Risk Modelling (Clean), April 2020, Revision 2 (REP8-025). Table 2.2 for Kittiwake and Table 2.3 for Lesser Black-backed Gull.

<sup>77</sup> [MacArthur Green \(2015\) Seabird PBA report, Hornsea Offshore Windfarm Project Two, Appendix M for the Response Submitted for Deadline IIA, Application Reference: EN010053.](#)

<sup>78</sup> [Horswill, C. & Robinson, R.A. \(2015\) Review of Seabird Demographic Rates and Density Dependence, JNCC Report No. 552, JNCC, Peterborough, ISSN 0963-8091.](#)

<sup>79</sup> [MacArthur Green \(2019\) Lesser Black-backed Gull Alde Ore Estuary Population Viability Analysis, Deadline 6, Norfolk Vanguard Offshore Windfarm, Application Reference: EN010079.](#)

10.4 Whilst we have used the same parameters as the assessment for consistency, it should be noted that there are a number of areas where more up-to-date data are available:

- The population size for kittiwake at the Flamborough and Filey Coast SPA is the number of individuals estimated at the time the site was reclassified (2008-2011, 44,520 pairs = 89,040 individuals). However, a more recent full colony count in 2017 showed that the kittiwake population has subsequently increased, and is now 51,535 pairs (103,070 individuals). Running the models with this parameter updated would produce a less severe predicted impact.
- The productivity of kittiwakes at the Flamborough and Filey Coast SPA has fallen in recent years, with more recent monitoring showing the rate in the most recent 5 years ranges between 0.55-0.7 chicks per pair (Lloyd et al. 2019<sup>80</sup>). Running the models with this parameter updated would produce a slightly more severe predicted impact.
- A non-breeding rate (i.e. the proportion of adults that do not attempt to breed each year) is not included for kittiwake, but there is good evidence that some adults will not attempt to breed each year and that this varies between increasing and declining colonies (rates reported in Horswill & Robinson 2015<sup>3</sup>). Running the models with this parameter included (even the lower rate for an increasing colony, which would be appropriate for Flamborough and Filey Coast) would produce a slightly more severe predicted impact.

10.5 However, whilst the details of the PVA could be debated, the demographic parameters used actually make relatively little difference to the Counterfactual of Population Size (the percentage difference between the predicted population size without any additional mortality from wind farms, and the predicted population size with the additional mortality from wind farms). The key point is that every additional wind farm exacerbates the cumulative impact on the population and makes it more difficult for the SPA's Conservation Objectives (in terms of restoring bird populations to a target level) to be met.

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<sup>80</sup> Lloyd, I., Aitken, D., Wildi, J. & O'Hara, D. (2019) Flamborough and Filey Coast SPA Seabird Monitoring Programme. 2019 Report. RSPB.