

**SCOTTISHPOWER
RENEWABLES**

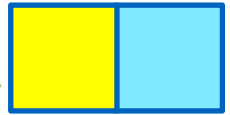
East Anglia ONE North and East Anglia TWO Offshore Windfarms

Cumulative Auk Displacement and Seabird Assemblage Assessment of FFC SPA and Gannet PVA

Applicants: East Anglia ONE North Limited and East Anglia TWO Limited
Document Reference: ExA.AS-3.D2.V1
SPR Reference: EA1N_EA2-DWF-ENV-REP-IBR-001125

Date: 17th November 2020
Revision: Version 01
Author: MacArthur Green / Royal HaskoningDHV

Applicable to East Anglia ONE North and East Anglia TWO



Revision Summary

Rev	Date	Prepared by	Checked by	Approved by
001	17/11/2020	Paolo Pizzolla	Lesley Jamieson / Ian MacKay	Rich Morris

Description of Revisions

Rev	Page	Section	Description
001	n/a	n/a	Final for issue



Table of Contents

1	Introduction	1
2	Cumulative Auk Displacement Updates	2
3	Flamborough and Filey Coast SPA Seabird Assemblage Assessment	12
3.1	Project Alone	12
3.2	In-Combination	12
4	Gannet Population Viability Analysis (PVA)	14
5	References	16



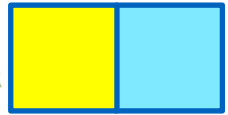
Glossary of Acronyms

APP	Application Document
AS	Additional Submission
AEol	Adverse Effect on Integrity
ExA	Examining Authority
FFC	Flamborough and Filey Coast
HRA	Habitats Regulations Assessment
NE	Natural England
SPA	Special Protection Area
RR	Relevant Representation
RSPB	Royal Society for the Protection of Birds



Glossary of Terminology

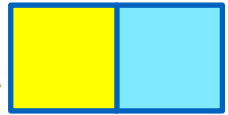
Applicants	East Anglia TWO Limited / East Anglia ONE North Limited
East Anglia ONE North project	The proposed project consisting of up to 67 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia TWO project	The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia ONE North windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
East Anglia TWO windfarm site	The offshore area within which wind turbines and offshore platforms will be located.



1 Introduction

1. This note provides:
 - An updated cumulative and in-combination displacement tables for guillemot and razorbill (Auks) to address comments from Natural England (NE) regarding the projects included within the cumulative and in-combination assessments (see **section 2**).
 - An assessment of the potential effects on the seabird assemblage feature of the Flamborough and Filey Coast (FFC) Special Protection Area (SPA) is provided in **section 3**. This is provided in response to the Royal Society for the Protection of Birds (RSPB) requests during the Statement of Common Ground Process (AS-054); and
 - A project-alone population viability analysis (PVA) for gannet in **section 4**. This is provided in response to the Royal Society for the Protection of Birds (RSPB) requests during the Statement of Common Ground Process.

2. This document is applicable to both the East Anglia ONE North and East Anglia TWO applications, and therefore is endorsed with the yellow and blue icon used to identify materially identical documentation in accordance with the Examining Authority's (ExA) procedural decisions on document management of 23rd December 2019. Whilst for completeness of the record this document has been submitted to both Examinations, if it is read for one project submission there is no need to read it again.



2 Cumulative Auk Displacement Updates

3. Point 26 of the NE Relevant Representation (RR) (RR-059) and Written Representation (REP1-171) highlighted that the following offshore windfarm sites were excluded from the cumulative and in-combination displacement assessments for guillemot and/or razorbill:
 - Beatrice Demonstrator;
 - Gunfleet Sands;
 - Kentish Flats;
 - Kentish Flats Extension;
 - Methil;
 - Rampion; and
 - Scroby Sands
4. As noted in the Applicants comments on the NE RR (AS-036), there are no data for the Beatrice Demonstrator project and Scroby Sands for either species. For Kentish Flats and Kentish Flats Extension there are no data for razorbill. However, displacement estimates are available for Rampion, Methil and Gunfleet Sands (both species) and for guillemot for Kentish Flats and Kentish Flats Extension.
5. Where estimates are available, these have been included in updated cumulative tables below for guillemot (**Table 1**) and razorbill (**Table 2**). Where no data are available, the windfarm has been added to the table for completeness, but without any estimate. The estimates used are the positions agreed with NE from the Norfolk Boreas Deadline 2 submission (Norfolk Boreas, 2019) but with Thanet Extension removed following its refusal of consent.
6. Overall, the updates presented do not alter the conclusions of negligible significance for the EIA and no adverse effects on integrity (AEoI) for the HRA within the assessments submitted (**Chapter 12 Offshore Ornithology** (APP-060) and the **Information to Support Appropriate Assessment Report** (APP-043)).



Table 1 Guillemot Cumulative and In-Combination Displacement Risk (added windfarms in bold)

Windfarm	Breeding season		Nonbreeding season		Annual	
	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
Beatrice Demonstrator	No estimate available					
Gunfleet Sands	0	0	363	16	363	16
Kentish Flats	0	0	3	0.1	3	0.1
Kentish Flats Extension	0	0	4	0.2	4	
Greater Gabbard	345	0	548	24.1	893	24.1
Lincs & LID	582	0	814	35.8	1396	35.8
London Array	192	0	377	16.6	569	16.6
Scroby Sands	No estimate available					
Sheringham Shoal	390	0	715	31.5	1105	31.5
Teesside	267	267	901	39.6	1168	306.6
Thanet	18	0	124	5.5	142	5.5
Humber Gateway	99	99	138	6.1	237	105.1
Westermost Rough	347	347	486	21.4	833	368.4
Hywind	249	0	2136	94	2385	94
Kincardine	632	0	0	0	632	0



Windfarm	Breeding season		Nonbreeding season		Annual	
	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
Beatrice	13610	0	2755	121.2	16365	121.2
Dudgeon	334	0	542	23.8	876	23.8
Galloper	305	0	593	26.1	898	26.1
Race Bank	361	0	708	31.2	1069	31.2
Rampion	10887	0	15536	683.6	26423	683.6
Hornsea Project One	9836	4554.1	8097	356.3	17933	4910.4
Blyth Demonstration Project	1220	0	1321	58.1	2541	58.1
Dogger Bank Creyke Beck A	5407	1892.5	6142	270.2	11549	2162.7
Dogger Bank Creyke Beck B	9479	3317.7	10621	467.3	20100	3785
East Anglia ONE	274	0	640	28.2	914	28.2
European Offshore Wind Deployment Centre	547	0	225	9.9	772	9.9
Firth of Forth Alpha	13606	0	4688	206.3	18294	206.3
Firth of Forth Bravo	11118	0	4112	180.9	15230	180.9
Inch Cape	4371	0	3177	139.8	7548	139.8
Methil	25	0	0	0	25	0



Windfarm	Breeding season		Nonbreeding season		Annual	
	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
Moray Firth (EDA)	9820	0	547	24.1	10367	24.1
Near na Gaoithe	1755	0	3761	165.5	5516	165.5
Dogger Bank Teesside A	3283	1149.1	2268	99.8	5551	1248.9
Dogger Bank Teesside B	5211	1823.9	3701	162.8	8912	1986.7
Triton Knoll	425	425	746	32.8	1171	457.8
Hornsea Project Two	7735	3581.3	13164	579.2	20899	4160.5
East Anglia THREE	1744	0	2859	125.8	4603	125.8
Hornsea Project Three	13374	0	19174	843.7	32548	843.7
Norfolk Vanguard	4320	0	4776	210.2	9096	210.2
Moray West	24426	0	38174	1679.7	62600	1679.7
Norfolk Boreas	7767	0	13777	606.2	21544	606.2
East Anglia TWO	2077	0	1675	73.7	3752	73.7
East Anglia ONE North	4183	0	1888	83.1	6071	83.1
Hornsea 4 (PEIR)	15245	15245	69555	3060.4	84800	18305.4
Total (all projects)	185878	32701.6	241831	10640.8	427697	43342.2



Windfarm	Breeding season		Nonbreeding season		Annual	
	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
Total (minus Hornsea Project Three)	172492	32701.6	222657	9797.1	395149	42498.5
Total (minus Hornsea Project Four)	170621	17456.6	172276	7580.4	342897	25036.8
Total (minus Hornsea Project Three and Hornsea Project Four)	157247	17456.6	153102	6736.7	310349	24193.1



Table 2 Razorbill Cumulative and In-Combination Displacement Risk (added windfarms in bold)

Windfarm	Breeding season		Autumn migration		Nonbreeding season		Spring migration		Annual	
	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
Beatrice Demonstrator	No estimate available									
Gunfleet Sands	0	0	0	0	30	0.8	0	0	30	1
Kentish Flats	No estimate available									
Kentish Flats Extension	No estimate available									
Greater Gabbard	0	0	0	0	387	10.5	84	2.8	471	13
Lincs & LID	45	0	34	1.1	22	0.6	34	1.1	134	3
London Array	14	0	20	0.7	14	0.4	20	0.7	68	2
Scroby Sands	No estimate available									
Sheringham Shoal	106	0	1343	45.7	211	5.7	30	1	1690	52
Teesside	16	0	61	2.1	2	0.1	20	0.7	99	3
Thanet	3	0	0	0	14	0.4	21	0.7	37	1



Windfarm	Breeding season		Autumn migration		Nonbreeding season		Spring migration		Annual	
	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
Humber Gateway	27	0	20	0.7	13	0.4	20	0.7	80	2
Westernmost Rough	91	91	121	4.1	152	4.1	91	3.1	455	102
Hywind	30	0	719	24.4	10	0.3			759	25
Kincardine	22	0		0		0			22	0
Beatrice	873	0	833	28.3	555	15	833	28.3	3094	72
Dudgeon	256	0	346	11.8	745	20.1	346	11.8	1693	44
Galloper	44	0	43	1.5	106	2.8	394	13.4	587	18
Race Bank	28	0	42	1.4	28	0.8	42	1.4	140	4
Rampion	630	0	66	2.2	1244	33.6	3327	113.1	5267	149
Hornsea Project One	1109	534.5	4812	163.6	1518	41	1803	61.3	9242	800
Blyth Demonstration Project	121	0	91	3.1	61	1.6	91	3.1	364	8
Dogger Bank Creyke Beck A	1250	375	1576	53.6	1728	46.7	4149	141.1	8703	616



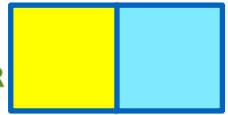
Windfarm	Breeding season		Autumn migration		Nonbreeding season		Spring migration		Annual	
	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
Dogger Bank Creyke Beck B	1538	461.4	2097	71.3	2143	57.9	5119	174	10897	765
East Anglia ONE	16	0	26	0.9	155	4.2	336	11.4	533	17
European Offshore Wind Deployment Centre	161	0	64	2.2	7	0.2	26	0.9	258	3
Firth of Forth Alpha	5876	0			1103	29.8			6979	30
Firth of Forth Bravo	3698	0			1272	34.3			4970	34
Inch Cape	1436	0	2870	97.6	651	17.6			4957	115
Methil	4	0	0	0	0	0	0	0	4	0
Moray Firth (EDA)	2423	0	1103	37.5	30	0.8	168	5.7	3724	44
Near na Gaoithe	331	0	5492	186.7	508	13.7			6331	200



Windfarm	Breeding season		Autumn migration		Nonbreeding season		Spring migration		Annual	
	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
Dogger Bank Teesside A	834	250.2	310	10.6	959	25.9	1919	65.2	4022	352
Dogger Bank Teesside B	1153	345.9	592	20.1	1426	38.5	2953	100.4	6125	505
Triton Knoll	40	0	254	8.6	855	23.1	117	4	1265	36
Hornsea Project Two	2511	1210.3	4221	143.5	720	19.4	1668	56.7	9119	1430
East Anglia THREE	1807	0	1122	38.1	1499	40.5	1524	51.8	5952	130
Hornsea Project Three	630	0	2020	68.7	5024	135.6	1754	59.6	9428	264
Norfolk Vanguard	879	0	866	29.5	839	22.7	924	31.4	3508	84
Moray West	2808	0	3544	120.5	184	5	3585	121.9	10121	247
Norfolk Boreas	630	0	263	8.9	1065	28.8	345	11.7	2303	49
East Anglia TWO	281	0	44.1	1.5	136.4	3.7	230	7.8	692	13



Windfarm	Breeding season		Autumn migration		Nonbreeding season		Spring migration		Annual	
	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA	Total	FFC SPA
East Anglia ONE North	403	0	85	2.9	54	1.5	207	7	749	11
<i>Hornsea 4 (PEIR)</i>	<i>580</i>	<i>580</i>	<i>5960</i>	<i>202.6</i>	<i>685</i>	<i>18.5</i>	<i>1361</i>	<i>46.3</i>	<i>8586</i>	<i>847.4</i>
Total (all projects)	32704	3848.3	41060.1	1396	26155.4	706.6	33541.0	1140	133458.0	7091.4
Total (minus Hornsea Project Three)	32074	3848.3	39040.1	1327.3	21131	571	31787	1080.5	124030.0	6827.4
Total (minus Hornsea Project Four)	32124	3268.3	35100.1	1193.4	25470.4	688.1	32180	1093.8	124872	6244
Total (minus Hornsea Project Three and Hornsea Project Four)	31494	3268.3	33080.1	1124.7	20446.4	552.5	30426	1034.2	115444	5980



3 Flamborough and Filey Coast SPA Seabird Assemblage Assessment

3.1 Project Alone

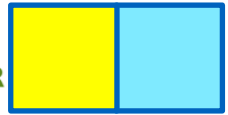
7. The seabird assemblage feature of the Flamborough and Filey Coast SPA comprises gannet, fulmar, kittiwake, guillemot, razorbill, puffin, herring gull, shag and cormorant. Four of these species have been assessed as individual named features (gannet, kittiwake, razorbill and guillemot) (**sections 4.6.1, 4.6.2, 4.6.3 and 4.6.4** of the **Information to Support Appropriate Assessment Report** (APP-043) respectively) and it has been concluded that there will be no adverse effect on the integrity (AEol) of the SPA in relation to these species due to either the East Anglia TWO or the East Anglia ONE North project alone.
8. For the remaining assemblage species it is considered that there is no pathway for effect for the following reasons:
 - Herring gull, shag and cormorant have no likelihood of connectivity due to small foraging ranges (Thaxter et al. 2012) or coastal preferences;
 - Fulmar flies at very low levels and therefore has negligible collision risk and is not considered to be at risk of displacement due to very wide ranging habitats and low densities. Fulmar are therefore not considered to be at risk of impacts at windfarms; and
 - Puffin were recorded in such low numbers that there is no risk of an impact on the population. Observations at East Anglia TWO were made in April only, with a windfarm plus 2km abundance of 13.8 individuals, which gives an apportioned Flamborough and Filey Coast SPA population of <0.1 individual (see Appendix 12.2 (APP-470; using a nonbreeding season apportioning rate of 0.41%, as advised by Natural England for the Norfolk Vanguard assessment (Norfolk Vanguard, 2019). Puffin was not recorded in the East Anglia ONE North surveys.
9. Therefore, on the basis that there are not considered to be any risks of AEol of the Flamborough and Filey Coast SPA due to impacts on the individual components of the seabird assemblage feature it can be concluded that there will be no risk of adverse effect on the integrity on the seabird assemblage feature itself.

3.2 In-Combination

10. Since it has been concluded that the Projects will not have in-combination AEol on any of the individual components of the seabird assemblage feature for which individual assessments have been undertaken (gannet, kittiwake, guillemot and



razorbill, see **sections 4.6.1, 4.6.2, 4.6.3** and **4.6.4** of the **Information to Support Appropriate Assessment Report** (APP-043)), and the additional species (herring gull, fulmar, puffin, shag and cormorant) are not considered to be at risk of adverse effects (as outlined above) it can therefore be concluded that there will not be an AEoI of the Flamborough and Filey Coast SPA due to an in-combination effect on the seabird assemblage feature.



4 Gannet Population Viability Analysis (PVA)

11. In their Relevant Representation (RR-067), the RSPB considered there to be the potential for adverse effects on the integrity of the Flamborough and Filey Coast (FFC) SPA and its features as a result of predicted collision mortality from the East Anglia TWO project alone and the East Anglia ONE North project alone on the gannet population and that this should be assessed using Population Viability Analysis (PVA). It should be noted that the *in-combination* effects on this population were assessed by the Applicants using PVA and provided in APP-043, and the Applicants concluded there would be no adverse effects on the SPA integrity (AEoI) as a consequence of the in-combination total mortality from summed collisions and displacement. Nevertheless, outputs from the PVA for the Project alone impacts have been provided here.
12. The impacts modelled are set out in **Table 1**, comprising mortality estimated for the SPA population due to collisions and displacement. The summed impact across both projects was 23.2, split fairly evenly across East Anglia ONE North (10.6) and East Anglia TWO (12.6).

Table 1 Gannet collision and displacement mortality apportioned to Flamborough and Filey Coast SPA. Displacement at 60% or 80% combined with 1% mortality, collisions updated following draught height increase.

Project	FFC SPA collisions	FFC SPA displacement (60% with 1%)	FFC SPA displacement (80% with 1%)	Total collisions and displacement (maximum)
East Anglia ONE North	10.4	0.14	0.18	10.58
East Anglia TWO	12.2	0.34	0.45	12.65
Summed for Projects	12.6	0.48	0.63	23.23

13. A PVA for this population, conducted in accordance with Natural England advice, was presented for the Hornsea Project Three windfarm (MacArthur Green 2018) and the results of this were presented for the Projects' assessments (APP-043) in relation to in-combination effects. Below, consideration is given to the PVA results appropriate to the mortality due to the Projects alone. It should be noted that the PVA was conducted for additional adult mortality levels at increments of 25 individuals from 0 to 500, therefore the lowest of these (25) is the nearest modelled mortality and the PVA outputs for this mortality are presented in **Table 2**.



Table 2 Gannet Flamborough and Filey Coast SPA population modelling results (see MacArthur Green 2018 for details).

Model	Adult mortality (individuals)	Counterfactual metric (after 25 years)		Source table (MacArthur Green 2018)
		Growth rate	Population size	
Rate set 1, density independent	25	0.999	0.973	Table A2 1.1 & 1.3
Rate set 1, density dependent	25	0.999	0.981	Table A2 2.1 & 2.3
Rate set 2, density independent	25	0.999	0.973	Table A2 3.1 & 3.3
Rate set 2, density dependent	25	0.999	0.981	Table A2 4.1 & 4.3

14. The maximum reduction in the population growth rate, at a mortality of 25 adults (representing the maximum impact across both windfarms), using either the more precautionary density independent model or the more realistic density dependent model was 0.1% (=1-0.999).
15. On the basis of the observed rate at which this population has grown over the last 25 years, which has been at least 10% per year (Lloyd et al. 2019), a maximum reduction of 0.1% to this rate represents a negligible risk for the population and would be undetectable against background variations. Therefore, on the basis of the very small reduction in the predicted population growth rate, there is no risk of an AEoI for the FFC SPA gannet population as a result of combined collisions and displacement at either the East Anglia ONE North or East Anglia TWO windfarms alone, nor for the summed total across both windfarms.

5 References

Norfolk Boreas Limited, (2019). Deadline 2 Submission – Offshore Ornithology Assessment Update [REP2-036]. Available at:
<https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010087/EN010087-001420-Offshore%20Ornithology%20Assessment%20Update.pdf>

Lloyd, I., Aitken, D., Wildi, J., O'Hara, D. (2019) Flamborough and Filey Coast SPA Seabird Monitoring Programme 2019 Report. RSPB report

MacArthur Green, (2018). Hornsea Project Three Offshore Windfarm: Appendix 9 to Deadline 1 submission – Population Viability Analysis. Available at:
https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010080/EN010080-001142-DI_HOW03_Appendix%209.pdf

Norfolk Vanguard Limited, (2019). Ref: EN010079 280590 Norfolk Vanguard Natural England's Comments by species on Vanguard Deadline 6 (REP6-021) and Deadline 6.5 (AS-043) information <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010079/EN010079-002878-DL7%20-%20Natural%20England%20-%20Deadline%20Submission.pdf>

Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W. and Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying Marine Protected Areas. *Biological Conservation*, 156, 53-61.